

Initial Environmental Examination

March 2019

Cambodia: National Solar Park Project

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Annexure 1 to Initial Environmental Examination (IEE)

March 2019

ENVIRONMENTAL MANAGEMENT PLAN

Cambodia: National Solar Park Project

Prepared by Electricité du Cambodge, Government of Cambodia for the Asian Development Bank

A. Introduction

1. This project Environmental Management Plan (EMP) identifies the potential project environmental impacts and defines mitigation measures and monitoring requirements for the design and pre-construction, construction and operation stages of the project. It also defines the institutional arrangements, roles and responsibilities of institutions involved and cost estimates for implementation of the EMP. The EMP will ensure environmental protection activities during all stages of the project implementation in order to prevent, reduce or mitigate adverse environmental impacts and risks. The EMP draws on the findings of the project initial environmental examination (IEE) report and discussions and agreements with Electricité du Cambodge (EDC) and the Asian Development Bank (ADB).

2. This EMP is based on inputs from the Feasibility Study team for the project as of June – July 2018. Detailed engineering designs are yet to be finalized and may require subsequent revisions to this EMP. The EDC will provide the detailed designs to ADB for review to determine if the EMP requires revision. The draft and final EMP will be disclosed on the ADB public website (www.adb.org) and included in the project administration manual (PAM). The final EMP will be included as a separate annexure in all bidding, tender and contract documents. The contractors¹ will be informed of their obligations to implement the EMP and to include EMP implementation costs in their bids for project works.

B. Mitigation and Monitoring Plan

3. This EMP covers the project area of influence and consists of three components: (i) project readiness checks for effective environmental management during design and pre-construction stage and environmental mitigation measures during construction and operation stage; (ii) environmental monitoring measures during all stages of project implementation; and (iii) the last section of this EMP contains the safeguards tender requirements for Independent Power Producers (IPPs) i.e. a list of environmental contract clauses for inclusion into all bidding documents and works contracts in the project for environmental management. These are arranged as Part 1 Tables 1 through 4 of this EMP.

C. Institutional Arrangements and Implementation Responsibilities

4. **Executing Agency.** The EDC will be the executing agency (EA) responsible for overall supervision and monitoring of project implementation and compliance with loan / grant assurances and the EMP. EDC shall ensure that the design, construction, operation and maintenance of the project components to be financed under output 1 are carried out in accordance with ADB SPS 2009, the applicable laws and regulations of the Government of Cambodia, IEE and EMP.

5. **Project Management Office.** The EA has established the project management office (PMO) and this will be the Implementing Agency (IA). The IA is assigned responsibility on behalf of the EA, for the day-to-day management of the project. The PMO will have the responsibility to supervise and oversee compliance with (i) loan and grant covenants, (ii) environmental safeguards requirements, (iii) coordinate the project GRM, (iv) coordinate with line ministries to ensure smooth implementation of the project, (v) engage the project implementation consultant

¹ Contractors imply - solar park and transmission interconnection infrastructure Engineering Procurement, Construction contractor and solar PV plant key subcontractor(s) - EPC contractor.

(PIC) services, (vi) supervise the procurement process and (v) report to the ADB. The PMO will appoint at least one environmental focal person on staff.

6. **Project Implementation Consultant Services.** PIC services will be engaged to assist EDC / PMO with the implementation of the project, EMP and oversight of the EPC contractor for the solar park infrastructure during construction and operation. At the end of PIC services contract, PMO / SEPRO will be responsible for ensuring compliance with safeguards.

7. The PIC will: (a) update, as necessary, the Initial Environmental Examination (IEE), Environmental Management Plan (EMP), and Land Acquisition and Resettlement Plan (LARP), and, after obtaining ADB's approval, oversee their implementation; and (b) supervise the design, supply, installation, and commissioning of the solar park infrastructure works by the EPC contractor. For the upgrade works, PIC will collaborate with the CTL².

8. The PIC will be responsible for building EDC's capacity in financial management, contract administration, social and environmental monitoring and reporting.

9. The PIC will recruit and manage a local registered firm, who will work with EDC to prepare and submit an Initial Environmental Impact Assessment (IEIA) or full EIA for the solar park infrastructure to the Ministry of Environment (MOE) for clearance and approval, as required, prior to any civil works contract awards.

10. International and national environmental and social safeguards specialists will support PMO for a total of twenty-two (22) months over a 30-month period.

Positions	Number	Person–Months
International		
Environmental Specialist	1	3
Resettlement / Social Development Specialist	1	3
Sub-total		6
National		
Environmental Specialist	1	8
Resettlement / Social Development Specialist	1	8
Sub-total		16
Total		22

11. **Contractors.** All contractors or third-party consultants will be responsible for implementing the mitigation measures during construction and operation under the supervision of the PIC and PMO. To ensure that the contractors comply with the EMP provisions, the PMO will ensure that the safeguards requirements are included in all bids, contracts and tender documents including the provision to apply penalties in case non-compliances to safeguards are encountered repeatedly. All Contractors will be required to prepare a site-specific Construction Environmental Management Plan (CEMP) and Standard Operating Procedures (SOPs) for operation stage, appoint an Environment, Health and Safety Officer ("C-EHS" officer) and submit monthly progress reports on the implementation of the CEMP/EMP. Contractors will also be the key local entry point for the Grievance Redress Mechanism (GRM) viz. appointment of a Contractor GRM focal

² The existing GS6 is operated and managed by the CTL since 2013 in accordance with a 25-year agreement with EDC on Build Own and Operate ("BOO") contract.

person (“C-GRM” officer) within its staff and will be required to regularly co-ordinate with affected persons (APs), village chiefs and commune councils to provide up to date information on project activities and address any issues that arise during project implementation.

12. **Social and Environmental Public Relations Office.** The Social and Environmental Public Relations Office (SEPRO) of EDC in coordination with PMO and PIC will be responsible for overall supervision and coordination during project implementation. In particular SEPRO will ensure consistency of safeguards documents with government policy, legal and administrative framework across all jurisdictions – national, state and local level as well as assist with project GRM and meaningful consultations.

D. Reporting and Monitoring

13. The PMO will be responsible for environmental reporting. The PIC will provide the environment input based on site visits, compliance checks and environmental monitoring and prepare the project Quarterly Progress Reports (QPR) for submission to the PMO till the project completion report is issued. The PMO will verify and use the information from the project QPR and prepare an Environmental Monitoring report for submission to ADB semi-annually during construction and annually during operation phase. The environmental monitoring reports will be publicly disclosed on the ADB website. Reporting to ADB will continue until project completion report (PCR) is prepared, one year after physical completion of the project.

14. The PIC will be responsible for environmental monitoring. Three types of project monitoring will be conducted under the EMP.

- **Project readiness monitoring.** To be conducted by the PIC and PMO (see Project Readiness Checklist)
- **Environmental monitoring.** To be conducted across all stages of project implementation as described in the Environmental Monitoring Plan (EMOP) and assessing compliance with applicable Cambodia environmental quality standards (This is provided in Part 2 of this EMP)
- **Compliance monitoring.** To be conducted by the PIC to verify EMP and EMOP compliance during project implementation

15. ADB will oversee project compliance on the basis of the annual environmental monitoring reports provided by PMO and site visits (generally one to two times per year).

16. In addition, PIC will coordinate and interact with the PMO and SEPRO on compliance to ADB safeguards requirements and with relevant government agencies and local authorities on permits and clearances, national regulatory requirements, update and finalize the draft IEE as needed. The PIC will be responsible for assisting the PMO/ SEPRO and contractors in handling complaints and/or grievances filed through the GRM, if any. The PIC will also assist the PMO in conducting random checks / audits of contractor’s EHS performance.

17. The contractor(s) will submit monthly progress reports to PIC on CEMP/EMP implementation, which will inform the project QPR and semi-annual safeguard monitoring reports.

Project Readiness Checklist

Indicator ³	Criteria	Assessment
IEE and EMP update	• EMP was updated after technical detail design and approved by ADB	Yes No
Compliance with loan / grant covenants	• The borrower complies with loan covenants related to project design and environmental management planning	Yes No
Implementation Set up	• PIC services hired, including International and National Environmental and Social Safeguards Specialists	Yes No
Training and Capacity Building	• Training and capacity building conducted for PMO, SEPRO and contractors	Yes No
Public involvement effectiveness	• Meaningful consultation completed	Yes No
	• GRM established with entry points	Yes No
	• Staff environment focal point appointed by PMO	Yes No
	• Environment focal point appointed by Contractor	Yes No
	• GRM focal point appointed by Contractor	Yes No
LARP	• Land acquisition completed and compensation paid	Yes No
CEMP / SOP	• CEMP / SOP prepared with site specific maps with receptor information	Yes No
Climate risks measures	• Climate risks integrated into final detailed engineering design	Yes No
Environmental Baseline survey	• Monitoring conducted, findings and recommendations shared	Yes No
Seasonal Bird / Bat Survey	• Surveys conducted	Yes No
Bidding documents and contracts with environmental safeguards	• Bidding documents and contracts incorporating the environmental activities and safeguards listed as loan assurances	Yes No
UXO clearance	• Certification of clearance obtained	Yes No
Permits and Clearances	• Permits and Clearances obtained	Yes No
EMP financial support	• The required funds have been set aside for EMP implementation	Yes No

E. Training and Capacity Building

18. The capacity of PMO, SEPRO and contractors' staff responsible for EMP implementation, GRM and supervision will be strengthened. All parties involved in implementing and supervising the EMP must have an understanding of the goals, methods, and practices of project

³ LARP = Land Acquisition and Resettlement Plan; CEMP = Construction Environmental Management Plan; SOP = Standard Operating Procedures; UXO = Unexploded Ordinances; GRM = Grievance Redress Mechanism.

environmental management. The project will address the lack of capacity and expertise in environmental and social management through project output 2 consisting of the following steps:

- The capacities of PMO, SEPRO and contractors to coordinate environmental management will be strengthened through a set of measures:
 - a. Appointment of at least one environment focal person within the PMO staff (PMO EHS officer) to be in charge of EMP coordination, implementation and site inspections including project GRM
 - b. Appointment of at least one environment, health and safety officer (“C-EHS”) within the contractor staff to be in charge of EMP coordination, implementation, site inspections and information disclosure and consultations
 - c. Appointment of at least one GRM focal person (“C-GRM”) within the contractor staff to be in charge of project GRM coordination, handling complaints, dispute resolution, site visits and information disclosure and consultations
- PMO, SEPRO and contractors will receive training in EMP implementation, supervision, monitoring and reporting, project GRM, conducting meaningful consultations and relevant environmental rules and regulation. Training will be facilitated by the PIC. In addition, orientation and briefing of project staff, all contractors / sub-contractors, hired workers will be conducted prior to mobilization on site during construction and operation stages.

Training and Capacity Building Plan

Training	Attendees	Content	Schedule	Period (day)	No of persons	Cost (USD /person/day)
EMP and EMOP implementation	PMO SEPRO Contractors	ADB SPS (2009) Cambodia's relevant environment, health and safety laws, regulations and policies ⁴ WBG EHS Guidelines ⁵ environmental monitoring and reporting Requirements for information disclosure, public consultation, community awareness program LARP	Once prior to start of civil works	2	20	100

⁴ For details refer to project IEE Section 2 – Policy, Legal and Administrative Framework

⁵ WBG EHS Guidelines

Training	Attendees	Content	Schedule	Period (day)	No of persons	Cost (USD /person/day)
Project GRM		Roles and responsibilities Procedures	Once prior to start of civil works	1	20	100
Orientation and Briefing on Safeguards	Project Staff, Workers, Contractors / Sub-contractors / Facility Operators		Once prior to mobilization on site during construction and once before start of operation	4	40	100
Total Estimated Cost						22,000
PMO = project management office; Contractors = solar park and transmission interconnection infrastructure Engineering Procurement, Construction contractor and Solar PV Plant key subcontractor(s) - EPC contractor; LARP = Land Acquisition and Resettlement Plan; WBG EHS = World Bank Group Environmental, Health and Safety						

F. Information Disclosure, Consultation and Participation

19. **Consultation during design and pre-construction.** Section 7 of the IEE describes the public consultation and participation activities carried out during project preparation.

20. **Future Consultations.** A detailed Consultation Plan will be prepared with the affected persons (APs) in the project area with schedule, location, invited participants, information to be disseminated and methods of consultation. PIC will assist PMO in preparing the Consultation Plan. An overview activity outline for a Consultation Plan is enclosed. Consultations with the APs will include information of the project environmental impacts (positive and negative), safeguards measures including community health and safety, training in emergency response (ERPs), project implementation schedule and process, results from environmental baseline surveys, land acquisition and compensation process, APs right to complain and the GRM. Consultations with the APs will provide a two-way information-sharing channel, ensuring that the concerns, questions and ideas of the APs will be discussed and responded to in an appropriate and gender inclusive way. The PIC and contractors will record all information dissemination and consultation activities and the results from consultations with the APs. The PIC will also record how concerns raised and recommendations made are addressed in the updated IEE and EMP. Consultations will be supported and supervised by PMO and SEPRO. Consultations with APs, concerned stakeholders especially the affected communities and households will continue throughout project implementation and will be open and gender inclusive

21. The updated IEE and EMP will be disclosed on ADB website (www.adb.org) as required by the ABD SPS 2009 and Public Communication Policy 2011. An updated project information booklet (PIB) / frequently asked questions (FAQ) leaflet in Khmer will be made available for the affected communities in public consultation meetings, project construction field offices and at commune councils. This will include the contact information including EDC website address, PMO/PIC and SEPRO and contractors address and telephone number for local entry points e.g. C-EHS and G-GRM, village chiefs, communes councils.

Activity Outline for Consultation Plan

Project Implementation Schedule	Activity	Stakeholders
Detail design phase: Detailed Walkover Survey	Public information meetings Informal meetings for information updates on project schedule and activities through village leaders and commune councils Update of public information booklet/leaflet Community Awareness Program one month prior to civil works	Affected Persons Affected Households Villages, Village leaders, Commune councils
Civil works construction	Informal meetings for information updates on project schedule and activities through village leaders and commune councils Public information meetings as needed Community Awareness Program once during civil works PIB / FAQ made available at consultations, project field offices and commune councils	
Operation and Maintenance	PIB / FAQ distributed to communities Informal meetings for information updates and concerns	

G. Project GRM

22. A project specific GRM will be established as part of this EMP to receive and manage any public concerns or issues that may arise due to the project. The GRM comprises: (i) a set of clear procedures developed by the PMO to receive, record and address any concerns which are raised; (ii) specific contact details for individuals at the PMO / SEPRO and contractors.

23. **Composition.** The PMO will set up a Grievance Redress Committee (GRC) as soon as the project commences. GRC will function from construction to operation stage. As practiced, the GRC will include the relevant local commune or village chiefs and where needed, a local Non-governmental organization (NGO) may assist the APs in filing complaints. The designated commune officials shall exercise all efforts to settle complaints and issues at the commune level through appropriate community consultations.

24. **Responsibilities.** The GRC is expected to: (i) resolve issues on land acquisition (if any), compensation to temporary damages to crops, orchards, trees and other use of land such as temporary / permanent areas for transmission towers / ROW; (ii) resolve issues on dust, noise, vibration, construction related nuisances to APs, households or public; (iii) convene once a month to review complaints lodged (if any); (iv) record the grievances and resolve the issues within the stipulated time from the date the grievance was filed; and (v) report to the complainant(s)/APs the status of grievance resolution and the decisions made or action taken. All contractors including contractor appointed GRM focal person ("C-GRM") and work staff will be briefed by the PIC on GRM.

25. **Area of Jurisdiction.** GRC will be established at provincial level with a process starting from commune councils across the project area of influence where the project components will be implemented.

26. **Procedures.** The key contacts for the GRC will be posted at construction sites, construction camps and public notice boards in affected communes in Khmer language. There are multiple entry points to the GRM, including face-to-face meetings, written complaints, contractor information, anonymous drop-boxes for written comments, and/or e-mail. All concerns received will be treated confidentially and professionally. The identity of individuals will not be circulated among project agencies or staff and will only be shared with senior staff and then only when there is clear justification. The GRM will consist of the following steps of conflict resolution:

Step 1

27. Any complaints by an AP / complainant can be presented to the Contractor, commune council via village or commune chief, either verbally in person or in writing.⁶ The Contractor, village or commune chief will be obliged to provide immediate written receipt of the complaint and take it forward in a written format and share with PMO.⁷ The contractor will resolve the issue within one week through negotiation.

Step 2

28. If or when the AP / complainant is not satisfied with the action or decision of the contractor, the AP / complainant will take the issue to PMO / SEPRO via the commune council. In all cases, the grievances will be recorded in writing and then forwarded to the PMO/SEPRO. SEPRO will have 15 days to resolve the complaint through negotiation. If the issue is not handled within 15 days, or if the complainant is not satisfied with the result, he/she can bring the issue to the District office.

Step 3

29. The District office has 15 days to negotiate the complaint and bring it into a resolution. If the complaint cannot be resolved in a way that is satisfactory to all parties, the District office will bring the issue to the provincial GRC.

Step 4

30. The Provincial GRC will meet the AP/ complainant and try to resolve the issue. Within 30 days of the submission of the complaint to the GRC, it has to take a decision and inform in written both the AP/ complainant and PMO / SEPRO of the decision.

Step 5

31. If the AP / complainant gets no response from the Provincial GRC or is not satisfied with the result, he/she can bring the case to the Provincial Court. The Court will make a written decision

⁶ If APs do not have sufficient writing skills or are unable to express their grievances verbally, it is a common practice that they are allowed to seek assistance from any recognized local NGO or other family members, village heads or community chiefs to have their complaints or grievances written for them. APs will be allowed to have access to the Detail measurement survey or contract document to ensure that all the details have been recorded accurately enabling all parties to be treated fairly. Throughout the grievance redress process, the responsible committee will ensure that the concerned APs are provided with copies of complaints and decisions or resolutions reached.

⁷ Each contractor will designate a contractor GRM focal person (C-GRM)

and submit copies to the EA and IA. If any party is still unsatisfied with the Provincial Court judgment, he/she can bring the case to a higher-level court.

Step 6

32. If efforts to resolve disputes using the grievance procedures remain unresolved or unsatisfactory, APs have the right to directly discuss their concerns or problems with the ADB's Environment, Natural Resources and Agriculture Division, Southeast Asia Department through the ADB Cambodia Resident Mission (CARM). If APs are still not satisfied with the responses of CARM, they can directly contact the ADB Office of the Special Project Facilitator. The Office of the Special Project Facilitator procedure can proceed based on the accountability mechanism⁸ in parallel with the project implementation.

33. **Recordkeeping and Reporting.** PMO will keep a record of all the grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were affected and final outcome. Documentation of the grievances filed and resolved will be summarized and reported in quarterly project progress reports and semi-annual safeguard reports.

34. **Disclosure of Information.** Under the direction of the PMO, the PIC will inform APs / complainants on grievance redress procedure, who to contact and when, where and how to file a grievance, time likely to be taken for redressal of minor and major grievances, etc. Grievances received and responses provided will be documented and provided to APs during the process. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the project construction field offices and commune councils and provisional office (if required).

35. **Review of the Process.** The PMO will periodically review the implementation of the GRM and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

H. Mechanisms for Feedback and Adjustment

36. The EMP is a living document. The need to update and adjust the EMP will be reviewed during final project detailed engineering design or when there are design changes, changes in construction methods and program, unfavorable environmental monitoring results or inappropriate monitoring locations and ineffective or inadequate mitigation measures. Based on environmental monitoring and reporting systems in place, PMO (with the support of the PIC) shall assess whether further mitigation measures are required as corrective action, or improvement in environmental management practices are required. PMO will inform ADB promptly on any changes to the project and needed adjustments to the EMP. The updated EMP will be submitted to ADB for review and approval and will be disclosed on the ADB project website.

I. Environmental Contract Clauses for Inclusion into Tender Documents and Civil Works Contracts

37. This is included as Table 4 in this document.

⁸ <https://www.adb.org/site/accountability-mechanism/main>

J. Cost Estimates

38. There are three types of mitigation measures and corresponding costs:
- i. Measures that will permanently become part of the infrastructure such as landscaping, re-seeding of sites, hedge planting, maintenance of field margins, perimeter fencing with adequate ground clearance for passage of wild species/animals, road signage, permanent access roads to solar park site, detailed engineering measures for preventing soil erosion and localized flooding (storm water retention pond, strengthening of drainage canals), will be included within the main civil work contract costs and not double-counted as part of the EMP costs, estimated as \$1.17 million or 4.3% of the total base cost.⁹
 - ii. Measures such as conducting environmental baseline surveys for surface water and groundwater and seasonal surveys can be counted as part of the EMP costs. Cost estimates related to environmental and social impact mitigation are estimated as \$0.20 million or 0.74% of total project base cost (see preliminary EMP cost estimates provided).
 - iii. Measures during the construction stage (e.g. dust suppression by watering, use of hand held portable air and noise monitoring devices, EMF measuring devices, quiet / low noise machinery and equipment, PPE, etc.) as well as measures to mitigate unforeseen impacts due to construction activities will need to be included in the tender documents to ensure that all contractors budget these items in their bids. Contractors will also bear all environmental monitoring costs during the operational stage.
 - iv. Information disclosure, GRM related costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the EDC.
 - v. Human resources for EMP support are part of the Project Implementation Consultation Services (PIC) and estimated as \$1.5 m or 5.6% of total project base cost.

⁹ Source: Project Administration Manual, February 2019. The total project base cost is USD 26.90 million; subject to change.

S.NO	EMP Item	Preliminary EMP Cost Estimates (USD)		Remarks
Human resources for EMP support				
1	International environmental specialist for EMP implementation, monitoring and reporting	54,000	(3 person-months)	Assumes 6 visits, 2 weeks per visit (including travel time); 6 RT @2000/RT; 88 days per diem @ \$45 /day
2	International Consultant - Travel	16,000		
3	National environmental specialist for EMP implementation, monitoring and reporting	48,000	(8 person-months)	
4	Site Visits / Transportation Costs	3,000	Assumes 20 site visits	
	Sub-total	121,000		
	Contingencies (7.5%)	9,000		
	A. TOTAL	130,000		
EMP Operating costs (Also see Footnotes)				
5	Training			
5.1	Training and Capacity building PMO, SEPRO and Project contractors	6,000	3 days x 20 persons x 100 USD / person / day	
5.2	Orientation for Project Staff, Workers and Sub-contractors	16,000	4 days x 40 persons x 100 USD / person / day	
6	Biodiversity (seasonal) survey	35,000	Total of 7 days over 5 months	
7	Surface and groundwater water quality testing	15,000	Once prior to start of civil works	
		10,000	Once after completion of civil works	
	Subtotal	82,000		
	Contingencies (10%)	8,000		
	B. TOTAL	90,000		
	GRAND TOTAL (A+B)	210,000		

NOTES:

1. Numbers may not sum up precisely because of rounding.

2. Human resources for EMP support are part of Implementation Consultant Services (estimated \$1.5 million). Source: PAM, 2019.
3. Information Disclosure, Consultation and Participation and GRM costs will be borne by EDC.
4. Measures that will permanently become part of the infrastructure (design features for environmental impact mitigation, climate risks) will be included within the main civil work contract costs (estimated total \$1.17 million)
5. EPC contractors will bear the costs for all mitigation measures during construction, including those specified in the tender and contract documents as well as those to mitigate unforeseen impacts due to their construction activities.

PART 1
Table 1 - Environmental Responsibility

Responsible Entity	Project Stage and Environmental Responsibility				
	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
EDC	The Executing Agency (EA) for the project will be responsible for the overall supervision and monitoring of the project implementation and will be established with sufficient and qualified staff. The EA will ensure implementation is in line with safeguards documents and loan and grant covenants.				
SEPRO	The Social and Environmental Public Relations Office of EDC will be responsible for overall supervision and coordination during project implementation and ensure consistency of all safeguard documents with Government policy, legal and administrative framework across all jurisdiction and will assist with project GRM, finalization of LARP and in conducting meaningful information disclosure, consultation and participation				
PMO	The Implementing Agency (IA) for the project, established by the EA for day-to-day project management, supervision and compliance with loan and grant covenants and safeguards requirements. The IA will also be responsible for procurement of goods, works and services, submission of reports to ADB and coordination with line ministries to ensure smooth and efficient implementation of the project. The PMO will appoint an environmental focal person on staff (PMO EHS officer).				
	<ul style="list-style-type: none"> Engage with Consultants on FSR, IEE, EMP, LARP Engage with international and national environmental and social specialists as part of the PIC services Apply and obtain permits and clearances from relevant government agencies 	<ul style="list-style-type: none"> Review and approve updated IEE / EMP / LARP Confirm climate change adaptation measures have been included in the final engineering design Confirm that key design features for effective environmental management and mitigation measures have been included in final engineering detail design 	<ul style="list-style-type: none"> Appoint at least one environmental focal point on staff Review bidding documents to ensure that the IEE/EMP clauses are incorporated Manage the procurement process 	<ul style="list-style-type: none"> Supervise and manage EMP implementation to ensure effectiveness Operate and coordinate the project GRM records and reporting Prepare semi-annual environment monitoring reports and submit them to ADB Inspect implementation of mitigation measures 	<ul style="list-style-type: none"> Prepare annual environmental monitoring reports until a PCR is issued
PIC	Project Implementation Consultant Services (PIC) for project will be responsible for compliance assurance with safeguards through supervision and monitoring of EMP, site specific CEMP/SOPs and all contractors across all stages of project implementation including final testing and commissioning. PIC will also be responsible for procurement process / implementation and contract management and preparation of safeguards documents, progress reports and monitoring reports.				

Responsible Entity	Project Stage and Environmental Responsibility				
	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
	<ul style="list-style-type: none"> Conduct information disclosure, consultation and participation activities Conduct training and capacity building for PMO, SEPRO and contractors Assist PMO in obtaining permits and clearances Assist CTL in obtaining permits and clearances, as required Establish collaboration with CTL for upgrade works at GS6 Coordinate with specialist to conduct seasonal bird and bat surveys 	<ul style="list-style-type: none"> Assist in updating IEE /EMP / LARP as needed Confirm that mitigation measures have been included in final engineering detail design including climate risks adaptation measures, key design features for environmental management and findings from seasonal bird survey Assist PMO and an MOE approved firm in Cambodia in preparation and submission of IEIA to MOE 	<ul style="list-style-type: none"> Incorporate IEE/EMP clauses in tender documents, bids and contracts Approve contractor appointed environmental and GRM focal point persons within contractor staff (C-EHS and G-GRM) Assist IPP and major subcontractors in project readiness with respect to EMP implementation Engage with MOE approved local Lab and coordinate environmental baseline surveys as per the environmental monitoring plan in the approved EMP 	<ul style="list-style-type: none"> Conduct orientation / briefing of workers, contractors / sub-contractors and hired staff on safeguard requirements for civil works Assist contractors in information disclosure, consultation and participation activities Provide technical support to PMO and contractors <ul style="list-style-type: none"> Advise on mitigation measures Preparation of CEMP Compliance monitoring in line with EMP Coordinate construction supervision, installation and commissioning and quality control Assist PMO in conducting random checks / audits of contractor's EHS performance Engage with MOE approved local Lab and coordinate environmental baseline surveys as per the environmental monitoring plan in the approved EMP Assist with project GRM 	<ul style="list-style-type: none"> Conduct orientation / briefing of project staff, workers, contractors / sub-contractors, facility operators on safeguard requirements for O&M Assist contractors in information disclosure, consultation and participation activities Provide technical support to contractors in preparing and implementing SOPs Coordinate environmental monitoring according to the approved EMP until a PCR is issued Oversee O&M Prepare quarterly project progress reports until a PCR is issued

Responsible Entity	Project Stage and Environmental Responsibility				
	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
				<ul style="list-style-type: none"> • Prepare quarterly project progress reports and submit them to PMO • Review monthly progress reports on CEMP implementation by Contractors 	
Biodiversity specialist / ecologist	<ul style="list-style-type: none"> • Conduct seasonal survey as per TOR • Prepare report of findings and submit to PIC and PMO 				<ul style="list-style-type: none"> • Conduct follow-up seasonal bird and bat surveys as per recommendations in the first seasonal bird and bat surveys, if required
MOE	<ul style="list-style-type: none"> • Review and approve the project IEIA 			<ul style="list-style-type: none"> • Review environmental baseline monitoring results • Conduct inspection and monitoring as per their mandate 	
Contractors / IPPs / third party consultants ¹⁰	Prepare site specific CEMP / SOP		<ul style="list-style-type: none"> • Ensure sufficient funding and human resources for proper and timely implementation of required mitigation and monitoring measures in the EMP throughout the construction phase 	<ul style="list-style-type: none"> • Appoint at least one environmental focal point person within staff (C-EHS) • Appoint at least one GRM focal point person within staff (C-GRM) • Conduct environmental baseline survey for air quality 	<ul style="list-style-type: none"> • Conduct orientation and briefing of hired workers • Conduct information disclosure, consultation and participation activities

¹⁰ Contractors imply - solar park and transmission interconnection infrastructure Engineering Procurement, Construction contractor and Solar PV Plant key subcontractor(s) - EPC contractor.

Responsible Entity	Project Stage and Environmental Responsibility				
	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
				<p>and noise levels as per the EMP</p> <ul style="list-style-type: none"> • Report results of the monitoring data to PMO and PIC • Conduct orientation and briefing of workers • Information disclosure, consultation and participation activities • Prepare and submit monthly progress reports on CEMP implementation 	<ul style="list-style-type: none"> • Undertake environmental monitoring according to the environmental monitoring plan until a PCR is issued • Ensure proper operation of associated facilities as per design standards
CTL	In collaboration with PMO and PIC prepare site specific CEMP / SOP for upgrade works at GS6			<ul style="list-style-type: none"> • Undertake upgrade works as per EMP and corrective actions as per findings of environmental audit (included in the EMP) • Conduct information disclosure, consultation and participation activities including information on ERPs 	<ul style="list-style-type: none"> • Conduct information disclosure, consultation and participation activities • Undertake environmental monitoring according to the environmental monitoring plan until a PCR is issued • Ensure proper operation and maintenance of substation
Local based MOE certified				<ul style="list-style-type: none"> • Undertake environmental baseline survey for surface and ground water quality 	

Responsible Entity	Project Stage and Environmental Responsibility				
	Project Preparation	Engineering Detailed Design	Tendering & Pre-construction	Construction	Operation
Laboratory (lab)				according to the environmental monitoring plan in the approved EMP (local lab to be <i>contracted by PMO</i>) <ul style="list-style-type: none"> Report results of the monitoring data to PMO and PIC 	
ADB	<ul style="list-style-type: none"> Review and approve the IEE and EMP and disclose on ADB website 	<ul style="list-style-type: none"> Approve updated IEE/EMP if appropriate and disclose on ADB website 	<ul style="list-style-type: none"> Review bidding documents Confirm project's readiness 	<ul style="list-style-type: none"> Review quarterly project progress reports, annual EMRs and PCR Undertake review missions Advise on compliance issues, as required Review and disclose annual EMRs on ADB website. 	<ul style="list-style-type: none"> Review and approve EMRs and disclose on ADB website Undertake project completion review mission and prepare PCR for approval by Board and disclosure on ADB website.
ADB = Asian Development Bank; CEMP = construction environmental management plan; CLT = Cambodia Transmission Limited; EA = executing agency; C-EHS = contractor environment, health & safety officer; EMP = environmental management plan; FSR = feasibility study report; GRM = grievance redress mechanism; IA = implementing agency; IEE = initial environmental examination; IPP = Independent Power Producers; LARP = Land Acquisition and Resettlement Plan; PCR = project completion report; PIC = project implementation consultant services; PMO = project management office; O&M = operation and maintenance; SOP = Standard Operating Procedures					

Table 2 - ENVIRONMENTAL MANAGEMENT PLAN (EMP)

TABLE 2 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
Project Site Selection, Route Selection	Environment Land / Vegetation Air Water Humans	<ul style="list-style-type: none">Receptors, particularly a) households areas / structures, b) surface water sources, c) groundwater wells, d) road and railway crossings, e) global and regional flyways of migratory birds, f) protected areas, critical habitats and wetlands, if any, species of conservation value, g) physical cultural resources.¹²	<ul style="list-style-type: none">Site selected for the solar park avoids sensitive natural and human receptors such as habitats of conservation value and households / structures, PCRs¹³Route selection avoids sensitive natural receptors (habitats of conversation value, water bodies); detailed walk over survey to be conducted to inform detailed engineering design to avoid sensitive human receptors (households/ structures/ schools) and cultural and heritage sites as well as to minimize impacts on human	EDC SEPRO	ADB	EDC budget

¹¹ PIC – Project Implementation Consultant; PMO – Project Management Office of EDC; SEPRO – Social and Environmental Public Relations Office of EDC; ADB – Asian Development Bank; Contractor imply- solar park and transmission interconnection infrastructure Engineering, Procurement, Construction (EPC) contractors and Solar PV Plant contractors; C-EHS – Contractor Environmental, Health and Safety Officer; C-GRM – Contractor Grievance Redress Mechanism focal person

¹² The potential sites and selection criteria are discussed in detail in terms of suitability in the Pre-Feasibility Study (Cambodia: Pre-Feasibility Study, August 2017) and Project Inception Report, February 2018, and summarized in Section 6 of the IEE.

¹³ “Receptor”: the resource (human / natural environment / economic / social) that is potentially going to receive and have to cope with an impact; “Sensitivity”: ability to cope with an impact and/or its importance to Cambodia. It is generally accepted that human health is always a high sensitivity receptor, however in terms of environmental/natural resources, the sensitivity varies according to the receptor e.g. scrubland with no significant biodiversity is considered less sensitive than a water body which may support aquatic ecosystems, local biodiversity and/or livelihoods through fishing or tourism.

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
			health, paddy fields, orchards, and trees.			
Project Implementation Set up		<ul style="list-style-type: none">Non-compliance with ADB SPS 2009¹⁴ and the National regulatory framework	<ul style="list-style-type: none">Appointment of a Project Implementation Consultant (PIC) Services¹⁵Contracting of International and National Environmental Specialists¹⁶	PIC	PMO SEPRO / ADB	Included in the Project Costs
Training and Capacity Building		<ul style="list-style-type: none">Avoid effects of unplanned activitiesSmooth project implementationStrengthening institutional capacity and	Conduct training and capacity building for PMO, SEPRO and contractors, focus on: <ul style="list-style-type: none">ADB SPS (2009)Cambodia’s relevant environment, health and safety laws, regulations and policies¹⁷	PIC	PMO SEPRO / ADB	Included in the Project Costs

¹⁴ ADB SPS 2009 – Asian Development Bank Safeguard Policy Statement 2009

¹⁵ The project implementation consultant (PIC) will be engaged to assist EDC with the implementation of the project and, in particular, to: (a) update as necessary the Initial Environmental Examination (IEE), Environmental Management Plan (EMP), and Land Acquisition and Resettlement Plan (LARP), and, after obtaining ADB's approval, oversee their implementation; and (b) supervise the design, supply, installation, and commissioning of the solar park infrastructure works by the EPC contractor. The PIC will be responsible for building EDC's capacity in financial management, contract administration, social and environmental monitoring and reporting. The PIC will recruit and manage a local registered firm, who will work with EDC to prepare and submit an Initial Environmental Impact Assessment (IEIA) or full EIA for the solar park infrastructure to the Ministry of Environment (MOE) for clearance and approval, as required, prior to any civil works contract awards. Source: Project Administration Manual (PAM) for Cambodia National Solar Power Project for Energy Access, May 2018

¹⁶ PIC will be supported by International Specialist (3 months for 30 months) and National Specialist (8 months for 30 months); Source: Project Administration Manual (PAM) for Cambodia National Solar Power Project for Energy Access, May 2018

¹⁷ For details refer to project IEE Section 2 – Policy, Legal and Administrative Framework

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
		increasing safeguards knowledge	<ul style="list-style-type: none">• WBG EHS Guidelines¹⁸• EMP, environmental monitoring and reporting• Requirements for information disclosure, public consultation, community awareness program• Project GRM¹⁹• LARP²⁰• Training to be provided to the PMO, SEPRO and contractors.			
Land Acquisition and Compensation	Humans	<ul style="list-style-type: none">• Economic loss of affected communities due to loss of crops, trees and agricultural land	Undertake appropriate compensation as described in LARP such as compensation for loss of crops, trees, orchards or any structures	PIC	PMO SEPRO / ADB	EDC budget
Climate Risks	Environment	<ul style="list-style-type: none">• Project vulnerability to climate risks	Integrate climate change adaptation measures into detailed	PIC	PMO SEPRO / ADB	Included in the Project Costs

¹⁸ WBG EHS Guidelines – World Bank Group Environmental, Health and Safety Guidelines; Web-link: [WBG EHS Guidelines](#)

¹⁹ GRM – Grievance Redress Mechanism; For details refer to project IEE Section 8 – Grievance Redress Mechanism

²⁰ LARP – Land Acquisition and Resettlement Plan

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
	Land / Vegetation Air Water Humans		engineering design including recommendations from the ongoing Hydrological study to maximize flood resilience and minimize impacts on local drainage patterns <ul style="list-style-type: none">• Consider highest flood level and suitable slope in detailed engineering design – site preparation and civil works for the solar park, substation and placement of tower footings for the transmission line; and type of road surface and embankment height for access road construction• Design improved flood protection measures for all equipment mounted at ground level• Strengthen existing drainage canals at the solar park site• Design storm-water retention pond for controlled inflow and overflow and use for operation and maintenance (e.g. landscaping, washing of PV panels, etc.)			

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
Design Features for Environmental Impact Mitigation	Environment Land / Vegetation Air Water	<ul style="list-style-type: none">Project vulnerability due to inadequate design features for effective environmental management	Integrate measures in site design to conserve the two natural streams transecting through the solar park site in its current natural condition and establishing a buffer of at least 400 m on either side of the streams Transmission Line <ul style="list-style-type: none">Consider high design standards / a resilient high capacity overhead transmission line for extreme weather conditionsRoute selection to avoid agriculturally productive land, orchards, habitats of conservation value, sensitive areas (e.g. schools, hospitals, parks), residential areas and physical cultural resources (PCRs).ROW to consider suitable slope and soil typeAvoid the construction of transmission tower footings near irrigation canals / dykes			
	Humans					

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
			<ul style="list-style-type: none">• Avoid placement of tower footings in water bodies• Substation• Select Air Insulated Substation (AIS) to avoid fugitive emissions of Sulfur Hexafluoride (SF6), a potent greenhouse gas (GHG)• Design the substation location to minimize shading by the transmission line on the solar PV plants• Design and maintain a permanent ('bunded') impermeable surface and dykes capable of carrying 110% volume of materials for accidental spills or leakage will be constructed and maintained.			
Environmental Surveys (baseline, during and after completion of the civil works)	Environment Land / Vegetation Air Water	<ul style="list-style-type: none">• Project vulnerability due to surface and groundwater and water issues	Key baseline surveys to inform project detailed design and domestic IEIA ²¹ as follows: <ul style="list-style-type: none">▪ Surface and ground water quality monitoring once before start of civil works to establish	PIC MOE approved local laboratory	PMO SEPRO	Included in the Project Costs

²¹ IEIA / EIA – Initial Environmental Impact Assessment

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
	Humans		the baseline; once during civil works and once after completion of civil works. Location: water bodies within the final solar park site and An Chrey Long reservoir.			
		<ul style="list-style-type: none">Air quality issues and increase in fugitive dust	<ul style="list-style-type: none">Air quality monitoring once before the start of civil works to establish the baseline; bi-monthly during the civil works and once after completion of the civil works. Location: solar park site and sensitive receptors along the final transmission line alignment	Contractor C-EHS	PMO SEPRO PIC	Contractor Budget
		<ul style="list-style-type: none">Increase in Noise levels	<ul style="list-style-type: none">Noise level measurements once before the start of the civil works to establish the baseline; bi-monthly during the civil works (location: solar park site and at sensitive receptor sites along the final transmission line alignment), and once after completion of the civil works / upon commissioning of the substation (solar park site only)	Contractor C-EHS	PMO SEPRO PIC	Contractor Budget

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
Biodiversity Survey	Bird and bat flyways	<ul style="list-style-type: none">Species vulnerability to anticipated change in habitat	Undertake seasonal survey to assess impacts of the solar park and transmission line alignment on migratory birds and bats to inform the project detailed design; Terms of Reference (TOR) detailing the area of influence, survey methodology and person-months, resources prepared and included as Appendix III of this IEE	PIC	PMO SEPRO / ADB	Included in the Project Costs
Physical Cultural Resources	Humans	Loss of places of worship, scared sites	<ul style="list-style-type: none">PCR sites avoided (temples, animist sites)Consult with relevant stakeholders for sensitive periods for religious / spiritual activitiesEstablish and implement chance find procedures	PIC	PMO SEPRO / ADB	Included in the Project Costs
IEE and EMP updating		Non-compliance with ADB SPS 2009 and the National regulatory framework	<ul style="list-style-type: none">Update IEE and EMP based on the final project detailed engineering designSubmit revised documents to ADB/PMO for approval and disclosure on ADB's website, if updated.	PIC	PMO SEPRO / ADB	Included in the Project Costs

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
Safeguard measures in Contracts, Bids and Tenders	Environment Land / Vegetation Air Water Humans	Non-compliance with ADB SPS 2009 and the National regulatory framework	<ul style="list-style-type: none">• Include updated IEE and EMP in the contractor bidding documents and construction contracts to provide basis for the contractors to develop specific Construction EMPs (CEMPs) for construction of the solar park and transmission interconnection infrastructure including associated facilities²² and existing facility²³.• Contracts to include a provision for:<ul style="list-style-type: none">— Compensating for any temporary or permanent damage, loss or inconvenience as result of the project during the construction stage.	PIC	PMO SEPRO / ADB	EDC Budget

²² Associated Facility – Solar PV Plants; AD SPS 2009 requires that assessment encompasses *associated facilities* that are not funded as part of the project (funding may be provided separately by the borrower or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project.

²³ Existing Facility – Grid Substation 6 (GS-6); ADB SPS 2009 requires for projects involving *existing facilities* and/or business activities that already exist, the borrower will undertake an environment and/or social compliance audit, including on-site assessment to identify past or present concerns related to impacts on the environment, involuntary assessment and indigenous peoples. The objective of the audit is to determine if actions were in accordance with SPS and to identify and address outstanding compliance issues

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
			<ul style="list-style-type: none">– Appointing an Environment Health and Safety Officer and GRM focal point person(s).– Imposition of penalties in case non-compliances to safeguards are encountered repeatedly• The PPA agreements to include a tender requirement for IPPs to comply with ADB safeguards and Cambodia national regulatory requirements as enclosed in Table 4²⁴.			
GRM	Humans	<ul style="list-style-type: none">• Smooth project implementation• Illicit opinion and consensus• Offer assistance to project affected stakeholders that maybe affected by	<ul style="list-style-type: none">• Establish and operate of an efficient and functional project GRM• Resolve queries, conflicts and complaints, if any, in a timely manner.• Issue public notices via PIB / flyers to inform the public	PIC / Contractors C-GRM	PMO SEPRO	EDC Budget

²⁴ PPA – Power Purchase Agreement; IPP – Independent Power Producer; Associated facilities i.e. Solar PV Plants will be built and operated by IPPs as per the PPA between the IPPs and EDC.

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
		<ul style="list-style-type: none">• Economic loss• Increase in traffic, noise, vibration and dust levels,• Interference to existing utilities such as existing irrigation canals, water pumps, groundwater wells, damaged roads, electricity outages	within the project area of influence of the GRM procedures and contact information			
Information Disclosure, Participation and Consultation	Humans	<ul style="list-style-type: none">• Limited outreach and consultation	Conduct activities throughout project implementation on topics including but not limited to: <ul style="list-style-type: none">• Project design• Project implementation schedule• Key construction activities (in particular those that result in disturbance or nuisance• Potential community health and safety issues and safety training for communities residing close to the transmission line• GRM,	PIC Contractors C-EHS	PMO SEPRO	EDC Budget

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ¹¹		Source of Funds
				Implemented by	Supervised by	
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Effective Environmental Management						
			<ul style="list-style-type: none">• Status of compensation as per LARP• A Project Brief / Frequently Asked Questions (FAQ) in local language to be prepared and made publically available in project field offices, to Village Chiefs and Commune offices.			
UXO Removal	Humans / Health and Safety <ul style="list-style-type: none">• Workers• Community	<ul style="list-style-type: none">• Safety risk to workers	<ul style="list-style-type: none">• Screening and clearance of solar park and final transmission line alignment• Obtain UXO clearance certificate from Cambodia Mine Action Center	PIC Cambodia Mine Action Center	PMO SEPRO	EDC budget
Permits and Clearances		<ul style="list-style-type: none">• Potential delays in project implementation	<ul style="list-style-type: none">• Obtain permits and clearances from relevant authority	PIC	PMO SEPRO	EDC budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
CONSTRUCTION STAGE						
ACTIVITIES PRIOR TO MOBILIZATION ON SITE						
Orientation for Contractors / Sub-contractors, Workers and Hired Staff		<ul style="list-style-type: none">Awareness of Contractors on the environmental safeguards requirements and their responsibilityEnhance understanding of Contractor(s) of their responsibility in CEMP/EMP implementation	PIC to conduct briefing and orientation of Contractor(s) on: <ul style="list-style-type: none">EMP, GRM, Information disclosure and meaningful consultation, Environmental monitoring and reporting requirements.ADB and Cambodia labor standardsDeveloping and implementing the site-specific CEMPs and SOPs²⁶and monitoring environmental compliance to the EMP/CEMP²⁷.Developing and maintaining appropriate site specific maps²⁸Create awareness of sexually-transmitted diseases	PIC	PMO SEPRO	Included in the Project Costs

²⁵ Contractors imply - solar park and transmission interconnection infrastructure Engineering, Procurement, Construction contractor and Solar PV Plant contractor(s), each will have a designated EHS officer

²⁶ CEMP – Construction Environmental Management Plan; SOP – Standard Operating Procedure

²⁷ The PIC will develop checklists for use in monitoring environmental compliance.

²⁸ Map will show each work site location including at minimum: Access routes, storage areas for waste, storage area for chemicals such as fuels, re-fuelling locations for vehicles, stockpile storage areas (on & off site), first aid kit and equipment used in emergency response, location of worker camps (if required)

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			(HIV/AIDs), child labor, bonded labor or forced labor – Record and maintain briefing and orientation events log with duration and list of attendees.			
		<ul style="list-style-type: none"> Awareness of hired workers / project staff on the environmental safeguards requirements and their responsibility Enhance understanding of workers / hired staff of their responsibility in CEMP/EMP implementation 	<ul style="list-style-type: none"> Contractors to conduct briefing of workers on CEMP/EMP implementation including use of PPE²⁹ and training in ERP³⁰ Briefing on Environmental, health and safety and hygiene at work sites as well as socially transmitted disease such as HIV/AIDS to prevent potential incidences Record and maintain briefing and orientation events log with duration and list of attendees 	Contractors C-EHS C-GRM	PIC PMO SEPRO	Contractor Budget
Hiring of Project Staff and Workers		<ul style="list-style-type: none"> Avoid conflict due to workers migration Lack of local support to the Project Dispute over transparency of hiring 	<ul style="list-style-type: none"> Contractor(s) required to use local labor for manual work and eligible local workforce for clerical and office jobs Increase local employment opportunities 	Contractors C-EHS C-GRM	PMO SEPRO	Contractor Budget

²⁹ PPE – Personal Protective Equipment - gloves, foot and eye protection, protective hearing devices (earplugs, muffs) hard hats

³⁰ ERP – Emergency Response Plan

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
Presence of Workers at Construction Sites		<ul style="list-style-type: none"> • Increase in demand for services such as food, temporary housing, etc. — Create opportunities for small-scale business to provide services such as — Food, temporary housing 	None required	-	-	-
Prepare and Develop site-specific CEMP / SOP ³¹	<ul style="list-style-type: none"> • Environment — Land and Vegetation — Air — Water 	<ul style="list-style-type: none"> • Avoid effects of EPC Contractor(s) unplanned activities • Smooth work implementation 	<ul style="list-style-type: none"> • Spoils Disposal Plan • Hazardous Materials Control Plan • Noise and Dust Control Plan • Drainage and Storm-water Management Plan • Materials Management Plan • Waste Management Plan • Site Rehabilitation and Clean Up Plan 	Contractors, C-EHS	PMO SEPRO	Contractors Budget

³¹ SOP – Standard Operating Procedure(s)

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
	<ul style="list-style-type: none"> Humans 		<ul style="list-style-type: none"> Community Health and Safety Plan Occupational Health and Safety (OHS) Plan ERP Traffic and Road Management Plan SOP for Chance Find Procedures for PCRs³² 			
Information Disclosure, Participation and Consultation	Humans	Lack of outreach and consultation	<ul style="list-style-type: none"> Inform and consult with local residents (community awareness program) and authorities one month prior to commencement of civil works 	Contractors, C-EHS C-GRM	PIC PMO SEPRO	Contractor Budget
SOLAR PARK, COMMON FACILITIES, ACCESS ROADS AND ASSOCIATED FACILITIES ³³						
Site Preparation and civil works	Environment <ul style="list-style-type: none"> Land / Vegetation 	<ul style="list-style-type: none"> Loss of habitat Loss of crops and trees Use of pesticides and herbicides 	<ul style="list-style-type: none"> Clear demarcation of work sites, no encroachment outside the demarcated zone. Access to adjacent properties and agricultural land will be maintained, as necessary. 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

³² PCR – Physical Cultural Resources

³³ Associated facilities i.e. solar PV power plants will be built and operated by IPPs as per the Power Purchase Agreement (PPA) between the IPPs and EDC; Details of Safeguards Tender Requirements for IPPs are enclosed as Table 4.

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> Construction camp to be set up at least 400 m from any water source at site Vegetation clearances will be strictly restricted to the works site and access roads, hedges and field margins will be retained Use of herbicides / pesticides will be prohibited for vegetation clearing to prevent soil contamination After completion of site preparation and civil works, implement Site Rehabilitation and Clean up Plan to restore works site to pre-construction conditions including landscaping along the fenced perimeter, maintain hedges and field margins to reduce visual and dust impact, re-seeding most or all of the site with native plant species to stabilize the soil and restore habitat. 			
		Increase in erosion, spoils	<ul style="list-style-type: none"> Restore loose soil from foundations through ramming, if required 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> Implement engineering and biological measures to prevent surface erosion such as provision of silt traps or sowing soil-binding grass, as needed. Implement Spoils Disposal plan, (Disposal of spoils on farm land or within 400 m of any water source will be prohibited) Excess spoil will be backfilled onsite 			
		Localized flooding	<ul style="list-style-type: none"> Schedule construction work during dry season Flood risks mitigated by climate change risks integrated into detailed engineering design. Implement Drainage and Storm-water Management plan 			
	<ul style="list-style-type: none"> Air Noise, Vibration and Dust 	Increase in vehicular emissions due to movement of heavy equipment and construction vehicles Impact on sensitive receptors	<ul style="list-style-type: none"> Compliance with Sub-decree ANRK.BK No. 42 on Air Pollution Control and Noise Disturbance, MOE, 2000. 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
		Increase in noise, vibration and dust due to land leveling and grading works	<ul style="list-style-type: none"> Construction activities utilizing heavy machinery work will be restricted between 8 AM – 6 PM. Apply dust suppression methods (water spraying) before movement of vehicles on site / open and exposed areas and access roads Use of chemical dust suppressants prohibited Provide barricade to temporarily enclose open areas Conduct air quality and noise monitoring (see Environmental Surveys) Air quality and noise level monitoring to be undertaken using handheld portable air and noise monitoring devices at select locations for Occupational Health and Safety Purposes Implement: Noise and Dust Control Plan Traffic and Road Management Plan 			

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> Record and maintain log of monitoring / incidences of non-compliance and rectification. Construction vehicles and machinery will be maintained to a high standard to minimize emissions and noise. Construction vehicles transporting materials that generate dust will be covered with tarps Drivers will be required to observe low speed wherever necessary and no blowing of horns. Advance warning to communities will be provided with respect to the timing of noisy activities. 			
	<ul style="list-style-type: none"> Water 	<ul style="list-style-type: none"> Generation of wastewater /sewage from construction workers Localized flooding Increase in turbidity in surface water near construction sites Excess water usage 	<ul style="list-style-type: none"> Compliance with Sub-decree No. 27 ANRK.BK on Water Pollution Control, MOE, 1999. Provide temporary sanitary facilities (e.g. pit latrines) to workers and safe drinking water Conduct surface and ground water quality monitoring (see Environmental surveys) Provision of adequate short- 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<p>term drainage / storm drains / ditches will be made to prevent contaminated construction run-off entering water bodies / stream / canals, as necessary.</p> <ul style="list-style-type: none"> • No washing or repair of equipment / machinery will take within 400 m of any water source. • Groundwater abstraction will be avoided • Implement Drainage and Storm-water Management Plan 			
	<ul style="list-style-type: none"> • Waste 	Improper waste disposal	<ul style="list-style-type: none"> • Compliance with Sub-decree No. 36 ANRK.BK on Solid Waste Management, MOE, 1999 • Waste burning will be prohibited • Establish a covered onsite sorting and recycling area away from existing drainage canals or water sources • Licensed companies will be hired to collect, transport, and dispose of wastes at licensed dump facilities. 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> • Transport of recyclable to EDC depots, dedicated storage yards for resale or auction to authorized dealers • Biodegradable waste such as clear vegetation may be provided to local communities for use • Provide multiple waste containers • No final waste disposal on site • Good housekeeping • Implement the following CEMP Sub-plans that will apply the waste hierarchy to ensure efficient use and management of resources with priority to prevent waste at source as much as possible, reduce impact to human receptors and prevent contamination to land, surface and ground water sources. <ul style="list-style-type: none"> ○ Materials Management Plan ○ Waste Management Plan ○ Map with clearly identified waste disposal sites with corresponding distance and number of 			

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<p>trips made will be maintained (this will help avoid disposal of construction debris on farm land or within 400 m of any water source)</p> <ul style="list-style-type: none"> Contractor(s) will be responsible for proper removal and disposal of any significant residual materials and wastes that remain on site after completion of civil works 			
	<ul style="list-style-type: none"> Hazardous and Polluting Materials 	Inappropriate transportation, storage, use, disposal and spills	<ul style="list-style-type: none"> Compliance with Sub-decree No.36 ANRK.BK on Solid Waste Management, Chapter 3 – Hazardous Waste Management, MOE, 1999; and Declaration of Standard Level on Pollutants or Hazardous Substance permitted for disposal, MOE, 2015 Controlled area set up for handling hazardous materials <ul style="list-style-type: none"> Storage of hazardous material to be within secured areas on impermeable surfaces and dykes capable of carrying 110% volume of materials such as 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<p>accidental spillage / leakage</p> <ul style="list-style-type: none"> – Secured areas to be sited away from direct sunlight and 400 m from existing drainage /irrigation canals and /or any water source • Delivery and acceptance of all hazardous materials / equipment will be accompanied by MSDS ³⁴and/or be certified that it is PCB free³⁵. • Licensed vendors/ companies to collect transport and dispose used / unused hazardous materials / wastes • Vehicle / equipment maintenance and refueling to be done offsite or within designated service area on impermeable surfaces and away from water sources • Record of equipment and corresponding PCB free certificates will be maintained 			

³⁴ MSDS - Material Safety Data Sheet

³⁵ PCB - Polychlorinated Biphenyl

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> Records of MSDS will be maintained Record of incidents, spills / accidents / near-miss / fatalities will be maintained Implement CEMP: Hazardous Materials Control Plan including spill control and clean up 			
	Humans	Impact on Air Impact on public health	<ul style="list-style-type: none"> Asphalt making process for access roads will be located at least 500 m downwind from the nearest dwellings The following records will be maintained: <ul style="list-style-type: none"> Record of equipment and corresponding PCB free certificates List of licensed vendors/ companies that collect, transport and dispose used / unused hazardous materials / wastes Record of incidents, spills / accidents / near-miss / fatalities 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget
		Lack of consultation and outreach (communities / APs)	<ul style="list-style-type: none"> Inform and consult with local residents (community 	PIC Contractors	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			awareness program) and authorities during civil works <ul style="list-style-type: none"> • Distribute Project Brief / Frequently Asked Questions (FAQ) in local language and make it publically available in project construction field offices and commune councils • Record of consultations will be maintained in accordance with Stakeholder Analysis and Communication Plan • Record of incidents /accidents / near-miss/ fatalities associated with the project will be maintained • Records of issues raised will be maintained in accordance with GRM 	C-EHS		
		<ul style="list-style-type: none"> • Increase in traffic and road congestion • Interference with road crossings 	<ul style="list-style-type: none"> • Implement Traffic and Road Management Plan • Follow planned transportation routes and delivery schedule • Any traffic detours to have danger and clearly visible warning signs as well as flag persons • Compliance with local speed limits vehicle load carrying 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			capacity and other road regulations <ul style="list-style-type: none"> Any damage to roads to be borne by Contractor(s) Record of incidents / accidents/ near-miss/fatalities / road damage will be maintained 			
		Disturbances to local communities	Adhere to strict schedule for completion of civil works and avoid prolonged construction and disturbance.	Contractors, C-EHS	PIC PMO SEPRO	Contractor Budget
		Occupational health and safety risks to workers	<ul style="list-style-type: none"> Implement Occupational Health and Safety Plan; ERP Compliance with Cambodia Occupational Safety and Health laws and regulations, Department of Safety and Health, MoLVT, 2011³⁶ Provide sanitary facilities and wash areas, safe drinking water and garbage bins Provide regular health assessments (health and fitness once every two months) 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

³⁶ MoLVT- Ministry of Labor and Vocational Training

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> Periodic training will be provided to workers in all aspects of the ERP and OHS Coordinate with nearest hospital for arrangements in case of accidents Set up first aid treatment within construction site Assess safety risks and safety protocols (such as for electrical works, working at heights, etc.), and implement Workers will be equipped with PPE Provide communication devices to designated site officers / engineers Records of health assessments / incidents / accidents/near-miss/fatalities will be maintained 			
		Community health and safety risks to people residing in the project area of influence	<ul style="list-style-type: none"> Implement Community Health and Safety Plan Implement Traffic and Road Management Plan Provide perimeter fencing (fencing will be constructed with adequate ground clearance for passing of wild 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			animals / other species), sufficient lights, clear warning signs and danger signals <ul style="list-style-type: none"> Assign security personnel to prevent accidents, trespassing and pilferage Record of incidents /accidents /near-miss/ fatalities associated with the project will be maintained Records of issues raised will be maintained in accordance with GRMs 			
	Physical Cultural Resources (PCR)	Chance Finds of PCRs	Follow Chance Find Procedure as follows: <ul style="list-style-type: none"> Construction activities will be immediately suspended if any PCRs are encountered Destroying, damaging, defacing, or concealing PCRs will be strictly prohibited The provincial or main office of the Ministry of Culture and Fine Arts will be promptly informed and consulted Construction activities will resume only after thorough investigation and with the permission of the Ministry 	PIC Contractors C-EHS	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
OPERATION STAGE						
SOLAR PARK, COMMON FACILITIES, ACCESS ROADS, ASSOCIATED FACILITIES						
Orientation for Workers, Contractors / Sub-contractors, Facility Operators		<ul style="list-style-type: none">Awareness of workers on the environmental safeguards requirements and their responsibilityEnhance understanding of Facility Operator of their responsibility for EMP implementation	PIC to conduct briefing and orientation on: <ul style="list-style-type: none">EMP, GRM, Information disclosure and meaningful consultationEnvironmental monitoring, recording keeping and reporting requirements in line with Environmental Performance indicators and EMP³⁷.Searching for and assessing, monitoring and recording keeping of carcass searches (birds / bats)SOPs for key environmental component likely to be affectedOccupational Health and SafetyCommunity Health and Safety	PIC ³⁸	PMO SEPRO	Included in project cost

³⁷ The PIC will develop checklists for use in monitoring environmental compliance.

³⁸ PIC role in implementation activities during operation stage will be limited to its contract duration.

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> – ERPs – Record and maintain briefing and orientation events log with duration and list of attendees. 			
Facility Operation and Maintenance Solar Park Common Facilities Access Roads Associated Facilities ³⁹	Environment Land / Vegetation	Loss of habitat due to civil works	<ul style="list-style-type: none"> • Restore and maintain landscaping along the fenced perimeter of the solar park • Maintain hedges and trees at field margins • Employ manual vegetation maintenance methods such as grazing by local animals or manual trimming of grasses and plants within the solar park site and employ local labor as possible • Re-seed all or most of the site if required • Maintenance of vegetation along access roads to the solar park site • No chemicals (herbicides / pesticides) will be used. • To avoid buildups of trimmed vegetation and branches, these will be allowed for collection by local people for 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

³⁹ Associated facilities i.e. solar PV power plants will be operated by IPPs as per the Power Purchase Agreement (PPA) between the IPPs and EDC; Details of Safeguards Tender Requirements for construction and operation by IPPs are included in Table 4.

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			firewood or facility operator will contact the relevant local authorities for collection, transport and disposal.			
	Water	Excess usage, potential contamination to water sources	<ul style="list-style-type: none"> • Maintain water retention pond for use for PV cleaning • Periodic cleaning of pond to remove debris • No use of chemicals / detergents for cleaning purposes • Avoid groundwater abstraction 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget
		Discharge of wastewater	<ul style="list-style-type: none"> • Provide and maintain permanent sanitary facilities to workers and safe drinking water • Provide and maintain a septic system for wastewater collection and disposal; tank system will be located at least 400 m from any water sources, to avoid contamination. 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget
	Waste	Lack of proper handling, storage and disposal of domestic waste	<ul style="list-style-type: none"> • Compliance with Sub-decree No. 36 Solid Waste Management, MOE 1999 • Implement SOP for 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
		Lack of proper handling, storage and disposal of broken PV panels	Materials Management and Waste Management <ul style="list-style-type: none"> Utilize licensed vendors / suppliers for collection, transportation and disposal of broken PV panels 			
	Hazardous and Polluting Materials	Lack of proper handling, storage and disposal of hazardous and polluting materials	<ul style="list-style-type: none"> Compliance with Sub-decree No.36 on Solid Waste Management, Chapter 3 – Hazardous Waste Management, MOE, 1999; and Declaration of Standard Level on Pollutants or Hazardous Substance permitted for disposal, MOE, 2015 Maintain MSDS and PCB free certification; Maintain controlled area set up for hazardous materials away from drainage / irrigation canals, dykes or water sources Utilize licensed vendors / companies for collection, transportation and disposal of used/ unused hazardous materials / wastes 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> Record of incidents, spills / accidents / near-miss / fatalities will be maintained Implement SOP for Hazardous Materials Control Only trained workers employed for handling and storage of hazardous materials and waste 			
	Humans	Potential occupational health and safety risks to workers	<ul style="list-style-type: none"> Implement SOP for Occupational Health and Safety Compliance to Cambodia Occupational Safety and Health laws and regulations, MoLVT, 2011 and Compliance to relevant National electrical safety standards Provide and maintain signage as per IEEE standards⁴⁰ at dangerous places for warning of electrical hazards Provide and maintain health assessment by a competent medical practitioner for all workers 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

⁴⁰ IEEE - Institute of Electrical and Electronics Engineers

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> • Provide periodic training to all workers with access to electrical and hazardous conditions; and certified to work on site • Provide and maintain Workers appropriate PPE • Equipment and tools will be inspected before use to ensure proper and safe operation • Appropriate grounding and deactivation of live power equipment during maintenance work or if working in close proximity to the equipment; provision of lightning arrestors as appropriate • Record of health assessments / incidents/ accidents/near-miss/fatalities will be maintained 			
	Humans	Potential community health and safety risks to persons living in the wider Project area	<ul style="list-style-type: none"> • Security and inspection personnel will be deployed to avoid vandalism of equipment and pilferage of lines/cables that may cause accident and/or electrocution. 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> Conduct information disclosure, consultation and participation activities in cooperation with local authorities and in accordance with the Stakeholder Analysis and Communication Plan Communicate with communities on potential health and safety risks and mitigation measures including ERP Record of consultations will be maintained in accordance with the GRM and Stakeholder Analysis and Communication Plan Record of incidents / issued raised will be maintained in accordance with GRM 			
	Biodiversity	Risk of birds / bat collision related fatalities Impact on local biodiversity, species	<ul style="list-style-type: none"> Provide and maintain visual deterrents and flight diverters Implement SOP for searching for and assessing, monitoring and record keeping of carcass searches including taxonomic composition of bird/ bat fatalities 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> Avoidance of on-site or off-site waste disposal areas Implement plan for season specific risks (based on the results of the Seasonal survey) 			
DECOMMISSIONING AND SITE REHABILITATION STAGE						
Preparation of the Decommissioning Plan <ul style="list-style-type: none"> Plan preparation will be at a minimum of 6 months prior to plant closure 			<ul style="list-style-type: none"> Develop a decommissioning and site reclamation plan Compliance with relevant rules regulations, standards and best practices in force at that time E.g. IFC EHS Guidelines on Construction and Decommissioning (and revisions at that time) 	Facility Operator	EDC SPERO	EDC Budget
	Environment <ul style="list-style-type: none"> Land and Vegetation Water Air Waste 	Increase in surface erosion	<ul style="list-style-type: none"> Use engineering practices to control surface erosion Upon completion of decommissioning, contour any disturbed areas Replant and re-vegetate area to minimize surface erosion and any corresponding 	Facility Operator	EDC SPERO	EDC Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			localized flooding in and around site			
		Impact to water quality and water flow	<ul style="list-style-type: none"> • Compliance with Sub-decree No.27 on Water Pollution Control, issued on 6 April 1999 (and amendments in force at that time) • Include SOP for temporary water quality control measures such as siltation fences • Provide appropriate and secure storage areas for chemicals, fuels and lubricants for machinery / equipment such as on impermeable surfaces • Strengthen drainage lines • Upon completion of decommissioning, stream will be returned to natural conditions 	Facility Operator	EDC SPERO	EDC Budget
		Impact to air quality	<ul style="list-style-type: none"> • Compliance with Sub-decree No.42 on Air Pollution and Noise Control, issued on 10 July 2000 (and amendments in force at that time) • Include SOP for temporary air quality control measures such as dust suppression and water 	Facility Operator	EDC SPERO	EDC Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			application for fugitive dust control <ul style="list-style-type: none"> • Include SOP for maintenance of equipment and machinery 			
		Noise generation	<ul style="list-style-type: none"> • Compliance with Sub-decree No.42 on Air Pollution and Noise Control, issued on 10 July 2000 (and amendments in force at that time) • Identify sensitive receptors • Include SOP for noise mitigation measures such as use of noise barriers or scheduling site activities to daytime hours only, as per Sub-decree No.42 on Air Pollution and Noise Disturbance, issued 10 July 2000 (and amendments in force at that time) 	Facility Operator	EDC SPERO	EDC Budget
		Waste generation <ul style="list-style-type: none"> – Solid waste – Construction waste – Hazardous materials Lack of proper handling, storage and disposal of waste	<ul style="list-style-type: none"> • Compliance with Sub-decree No.36 on Solid Waste Management, issued on 27 April 1999 (and amendments in force at that time) • Include SOP for recycling /sale of wastes such as concrete and masonry, steel, PV panels, power cable, pipes, pumps, 	Facility Operator	EDC SPERO	EDC Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> • Include SOP for safe disposal of non recyclable / non-hazardous waste at permitted waste disposal sites /facilities • Include SOP for handling hazardous materials such as lubricating oils, hydraulic fluids, coolants, solvents, and cleaning agents • Handling and storage of hazardous materials prior to safe transport via licensed operators/ haulers will be implemented • Include SOP for safe disposal of hazardous materials at a permitted disposal sites / facilities 			
	Biodiversity		<ul style="list-style-type: none"> • Decommissioning activities will depend on the proposed subsequent use of the site and anticipated site rehabilitation, regeneration of local biodiversity 	Facility Operator	EDC SPERO	EDC Budget
	Occupational Health and Safety	Potential occupational health and safety risks to workers	<ul style="list-style-type: none"> • Implement Occupational Health and Safety Plan (OHSP) (and amendments in force at that time) 	Facility Operator	EDC SPERO	EDC Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> • Compliance with IFC EHS Guidelines for Occupational Health and Safety (2007) (and amendments in force at that time) • Compliance with Occupational Safety and Health laws and regulations in Cambodia stipulated by the Department of Safety and Health, Ministry of Labor and Vocational Training (MoLVT), 2011 and amendments in force at that time • All workers will receive a health assessment by a competent medical practitioner and be deemed sufficiently healthy to undertake their job before commencing decommissioning operation activities at the SPP • All workers with access to electrical and hazardous conditions will be appropriately trained and certified to work • All relevant National electrical safety standards will be strictly adhered to, and equipment will be properly grounded and 			

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<p>equipped with lightning arresters as appropriate</p> <ul style="list-style-type: none"> Workers will be provided with appropriate PPE PPE will be inspected, maintained and replaced as necessary, with special attention paid to climbing harnesses and safety gear. Equipment and tools will be inspected before use to ensure proper and safe operation Appropriate grounding and deactivation of live power equipment prior to commencing work Record of health assessments / incidents/ accidents/near-miss/fatalities will be maintained 			
	Community Health and Safety	Potential community health and safety risks to persons living in the wider Project area	<ul style="list-style-type: none"> Implementation of Community Health and Safety Plan (and amendments in force at that time) Compliance with IFC EHS Guidelines of Community Health and Safety (and amendments in force at that time) 	Facility Operator	EDC SPERO	EDC Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<ul style="list-style-type: none"> • Conduction information disclosure, consultation and participation activities in cooperation with local authorities • Communicate potential safety risks and mitigation measures including ERP • Record of consultations will be maintained • Record of incidents / issued raised will be maintained 			
		<ul style="list-style-type: none"> – Traffic and road management – Interference with road crossings 	<ul style="list-style-type: none"> • Implement Traffic and Road Management Plan (and amendments in force at that time) • Planned transportation routes and schedule • Any traffic detours to have danger and clearly visible warning signs as well as flag persons • Compliance with local speed limits and other road regulations • Impacts on roads (such as due to f loads in construction trucks / heavy equipment / machinery) to comply with vehicle 	Facility Operator	EDC SPERO	EDC Budget

Project Activity	Environmental Component Likely to be affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ²⁵		Source of Funds
				Implemented by	Supervised by	
			<p>capacities and local road regulations in force at that time</p> <ul style="list-style-type: none"> Any damage to roads to be borne by EPC Contractor(s) Record of incidents / accidents/ near-miss/fatalities / road damage will be maintained 			

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility		Source of Funds
				Implemented by	Supervised by	
CONSTRUCTION STAGE						
230 KV HIGH VOLTAGE OVERHEAD TRANSMISSION LINE, SUBSTATION, UPGRADE GS6, TEMPORARY ACCESS ROADS						
Site Preparation	Environment	Loss of habitat	<ul style="list-style-type: none">• Clear demarcation of work sites, no encroachment outside the demarcated zone.• Access to adjacent properties and farmland will be maintained, as necessary.• Construction camp to be set up at least 400 m from any water source at site• Vegetation clearances will be strictly restricted to substation	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget
Substation	Land and Vegetation	Loss of crops and trees				
Tower footings		Use of pesticides / herbicides				
site excavation						
Clearance of ROW						
Erection of towers						
Stringing of conductors						

<p>Temporary Access Roads Upgrade Existing Facility (GS-6)</p>			<p>work site, transmission line ROW⁴¹ and temporary access roads, if required</p> <ul style="list-style-type: none"> • Trees below 3 m will not be cut along the ROW; tree looping / pruning will be done to maintain minimum sag • Use of herbicides / pesticides will be prohibited for vegetation clearing to prevent soil contamination • Bat roosting sites will not be disturbed • Record of crops and trees loss along the transmission line alignment will be maintained in accordance with project LARP. • Any damage to areas outside the ROW as defined in project LARP will be restored to pre-construction condition and /or compensated in line with the entitlement matrix • Stockpiling of materials to be the construction camp and not along the transmission line except prior to installation • During excavation of tower foundations, slopes will be maintained at safe angles to avoid risk of collapse • After completion of site preparation and civil works, implement Site Rehabilitation 			
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⁴¹ ROW –Right of Way

			and Clean up Plan to restore works site to pre-construction conditions including landscaping along the fenced perimeter of substation, maintain hedges and field margins to reduce visual and dust impact, re-seeding most or all of the site with native plant species (soil binding grass) to stabilize the soil and restore habitat; and vegetation planting along the ROW to stabilize soil where it does not compromise the intended transmission function and restoring temporary land use (used for material storage) to pre-construction conditions.			
		Increase in erosion, spoils	<ul style="list-style-type: none"> • Implement engineering and biological measures to prevent surface erosion such as sowing soil binding grass at the substation work site and along the ROW after completion of civil works • Implement Spoils Disposal Plan • (Disposal of spoils on farmland or within 400 m of any water source will be prohibited) • Excess spoils will be backfilled onsite or spread onsite in a manner that it causes no disturbance to existing drainage 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget

			canals, dykes or local drainage pattern			
		Localized flooding	<ul style="list-style-type: none"> • Schedule construction work during dry season • Flood risks mitigated by climate change risks integrated into detailed engineering design. • Implement Drainage and Storm-water Management plan 			
	Air	<p>Increase in vehicular emissions due to movement of heavy equipment and construction vehicles Impact on sensitive receptors</p> <p>Increase in noise, dust, and vibration due to transport of vehicles, construction works and excavations</p>	<ul style="list-style-type: none"> • Compliance with Sub-decree No. 42 ANRK.BK on Air Pollution Control and Noise Disturbance, MOE, 2000. • Construction activities utilizing heavy machinery work will be restricted between 8 AM – 6 PM. • Apply dust suppression methods (water spraying) before movement of vehicles on site / open and exposed areas and access roads • Use of chemical dust suppressants prohibited • Provide barricade to temporarily enclose open areas • Conduct air quality and noise monitoring (see Environmental Surveys) • Air quality and noise monitoring may be undertaken using handheld / portable air and noise monitoring devices at select locations for Occupational and 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget

			<p>Community Health and Safety purposes.</p> <ul style="list-style-type: none"> • Implement: Noise and Dust Control Plan Traffic and Road Management Plan • Record and maintain log of monitoring / incidences of non-compliance and rectification • Construction vehicles and machinery will be maintained to a high standard to minimize emissions and noise. • Drivers will be required to observe low speed wherever necessary and no blowing of horns. • Advance warning to communities will be provided with respect to the timing of noisy activities. 			
	Water	<p>Generation of wastewater /sewage from construction workers Localized flooding Increase turbidity in surface water near construction sites</p>	<ul style="list-style-type: none"> • Compliance with National Sub-decree ANRK.BK No.27 on Water Pollution Control, MOE, 1999 • Implement Drainage and Storm-water Management Plan • Avoidance of waterways in site selection for substation and transmission tower placement • Substation - Provision of adequate short-term drainage / storm drains / ditches will be made to prevent contaminated construction run-off entering 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget

			<p>water bodies / stream / canals, if required</p> <ul style="list-style-type: none"> • Transmission line - Construct temporary detention and settling pits at each tower foundation site, as needed, to store construction wastewater. Placement will be away from surface water bodies • Provide temporary sanitary facilities (e.g. pit latrines) to workers and safe drinking water • No washing or repair of equipment / machinery will take within 400 meters of any water source. 			
	Waste	Improper waste disposal	<ul style="list-style-type: none"> • Compliance with Sub-decree No. 36 ANRK.BK on Solid Waste Management, MOE, 1999 • Waste burning will be prohibited • Transport of recyclables to EDC depots, dedicated storage yards for resale or auction to authorized dealers; for other wastes licensed companies will be hired to collect, transport, and dispose of wastes at licensed dump facilities. • Biodegradable waste such as clear vegetation may be provided to local communities for use • No final waste disposal on site • Implement the following CEMP Sub-plans that will apply the 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget

			<p>waste hierarchy to ensure efficient use and management of resources with priority to prevent waste at source as much as possible, reduce impact to human receptors and prevent contamination to land, surface and ground water sources.</p> <ul style="list-style-type: none"> • Materials Management Plan • Waste Management Plan • Map with clearly identified waste disposal sites with corresponding distance and number of trips made will be maintained (this will help avoid disposal of construction debris on farm land or within 400 m of any water source) • Contractor(s) will be responsible for proper removal and disposal of any significant residual materials and wastes that remain on site after completion of civil works 			
	Hazardous and Polluting Materials	Inappropriate transportation, storage, usage, disposal and spills	<ul style="list-style-type: none"> • Compliance with Sub-decree ANRK.BK No.36 on Solid Waste Management, Chapter 3 – Hazardous Waste Management, MOE 1999 • All equipment / materials used will be certified as PCBs free • Controlled area set up for handling hazardous materials 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget

			<ul style="list-style-type: none"> • Storage of hazardous material to be within secured areas on impermeable surfaces and dykes capable of carrying 110% volume of materials such as accidental spillage / leakage • Secured areas to be sited away from direct sunlight and 400 m from existing drainage /irrigation canals and /or any water source • Licensed vendors/ companies to collect transport and dispose used / unused hazardous materials / wastes • Vehicle / equipment maintenance and refueling to be done offsite or within designated service area on impermeable surfaces and away from water sources • Record of equipment and corresponding PCB free certificates will be maintained • Records of MSDS will be maintained • List of licensed companies that collect, transport and dispose used/ unused hazardous materials / wastes will be maintained • Record of incidents, spills / accidents / near-miss / fatalities will be maintained • Implement CEMP: 			
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			<ul style="list-style-type: none"> Hazardous Materials Control Plan 			
	Humans	Interference to existing utilities	<ul style="list-style-type: none"> Civil works to be undertaken in a phased manner such that power interruptions are no more than 12 hours in duration, and if possible scheduled during low use times in the 24 hour cycle Advance approval from the relevant authority such as the Regional Load Dispatch Center, will be obtained prior to power cuts 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget
		Lack of consultation and outreach (communities / APs)	<ul style="list-style-type: none"> Inform and consult with local residents (community awareness program) and authorities one month prior to commencement of civil works Distribute a Project Brief / Frequently Asked Questions (FAQ) in local language and make it publically available in project field offices and Commune offices Record of consultations will be maintained in accordance with Stakeholder Analysis and Communication Plan 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget
		Increase in traffic and road congestion Interference with road crossings	<ul style="list-style-type: none"> Implement Traffic and Road Management Plan Follow planned transportation routes and delivery schedule Any traffic detours to have danger and clearly visible 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget

			<p>warning signs as well as flag persons</p> <ul style="list-style-type: none"> • Compliance with local speed limits, vehicle loading bearing capacity and other road regulations • Any damage to roads to be borne by EPC Contractor(s) • When stringing and stretching conductors across road, the following practices will be followed: • Workers / Communities will be briefed in advance to plan activities • Advance approval from Ministry of Public Works and Transport will be sought • Traffic will be diverted as appropriate to ensure safety • Scaffolding will be used to support conductors and minimize traffic disruptions • Record of incidents / accidents/ near-miss/fatalities / road damage will be maintained 			
		Disturbances to local communities	Adhere to strict schedule for completion of civil works and avoid prolonged construction and disturbance.	Contractors, C-EHS	PIC PMO SEPRO	Contractor Budget
		Potential occupational health and safety risks to workers	<ul style="list-style-type: none"> • Implement Occupational Health and Safety Plan (OHSP) 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget

			<ul style="list-style-type: none"> • Compliance with Cambodia Occupational Safety and Health laws, Department of Safety and Health, MoLVT, 2011 and to relevant National electrical safety standards • Provide temporary sanitary facilities (e.g. pit latrines / portable toilets) and wash areas, safe drinking water and garbage bins • Provide regular health assessments (health and fitness once every two months) • Periodic training will be provided to workers in all aspects of the ERP and OHS • Coordinate with nearest hospital for arrangements in case of accidents • Set up first aid treatment within construction site • Electrical safety risks will be assessed and safety protocols will be developed such as for electrical works, working at heights, etc. • Workers will be equipped with PPE • All work at height will be prohibited during night time, periods off fog and strong wind on the Beaufort Wind Scale⁴² 			
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⁴²The Beaufort Wind Scale is an empirical measure with 12 wind speed classes. Winds above Class V are higher than 10.8 m/sec

			<ul style="list-style-type: none"> • All workers climbing towers will have a Safety Certificate of Class 343 or above • All towers, steel structures and equipment will be properly earthed and equipped with lightening protection • When testing electrical equipment, all unrelated works in the flagged zone – marked as danger zone- will be stopped and unrelated workers will leave the zone • Provide communication devices to designated site officers / engineers • Record of health assessments / incidents / accidents/near-miss/fatalities will be maintained 			
		Community health and safety risks to people residing within the wider Project area	<ul style="list-style-type: none"> • Implement Community Health and Safety Plan • Implement Traffic and Road Management Plan • Provide barricade around open excavated tower foundations • Provide sufficient lights, clear warning signs and danger signals 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget

⁴³ Electric Safety Classification is regulated in Circular 31/2014/TT-BCT (2014). The Circular stipulates five Safety Classifications (1 to 5), with 5 being the highest. A Class 3 Safety Certificate designates a worker capable of working in the field, and is given to workers/technicians who: 1) pass 80% of the training; 2) have knowledge of the proper use of PPE; 3) master the method to extract an electrocuted victim from the power source; 4) can provide first aid to an electrocuted victim; 5) is able to determine unsafe practices; and 6) is able to supervise electric workers working at height and near electric equipment.

			<ul style="list-style-type: none"> • Assign security personnel to prevent accidents, trespassing, and pilferage • Warning signs and cones will be installed in and around the transmission tower site and along roads, with clearly marked danger zones • Safety flags and flag persons will be used, as needed • Record of incidents /accidents / near-miss/ fatalities associated with the project will be maintained • Records of issues raised will be maintained in accordance with GRMs 			
	Physical Cultural Resources (PCR)	Chance Finds of PCRs	<ul style="list-style-type: none"> • Follow Chance Find Procedure as follows: • Construction activities will be immediately suspended if any PCRs are encountered • Destroying, damaging, defacing, or concealing PCRs will be strictly prohibited • The provincial or main office of the Ministry of Culture and Fine Arts will be promptly informed and consulted • Construction activities will resume only after thorough investigation and with the permission of the local Cultural Heritage Bureau 	PIC Contractor C-EHS	PMO SEPRO	Contractor Budget

OPERATION STAGE						
230 KV HIGH VOLTAGE OVERHEAD TRANSMISSION LINE, SUBSTATION AND UPGRADED GS6						
Orientation for Workers, Contractors, Facility Operators		Awareness of workers on the environmental safeguards requirements and their responsibility Enhance understanding of Facility Operator of their responsibility for EMP implementation	<ul style="list-style-type: none"> PIC to conduct briefing and orientation on: EMP, GRM, Information disclosure and meaningful consultation Environmental monitoring, recording keeping and reporting requirements in line with Environmental Performance indicators and EMP44. Assessing, monitoring and recording keeping of carcass searches (birds / bats) SOPs for key environmental component likely to be affected Occupational Health and Safety Community Health and Safety ERPs Record and maintain briefing and orientation events log with duration and list of attendees. 	PIC ⁴⁵	PMO SEPRO	Included in project cost
Operation and Maintenance Transmission Line ROW	Environment Land / Vegetation	Loss of habitat due to civil works	<ul style="list-style-type: none"> Maintain hedges and field margins at the substation site Restore and maintain landscaping along the ROW (under 3 m) 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

⁴⁴ The PIC will develop checklists for use in monitoring environmental compliance.

⁴⁵ Note: PIC role in implementation activities during operation stage will be limited to its contract duration.

Substation			<ul style="list-style-type: none"> • Employ manual vegetation maintenance methods such as grazing by local animals or manual trimming of grasses and plants around substation and within the ROW and employ local labor as possible • No chemicals (herbicides / pesticides) will be used • Restore and maintain land use to pre-construction conditions along the transmission line ROW. • To avoid buildups of trimmed vegetation and branches, these will be allowed for collection by local people for firewood or facility operator will contact the relevant local authorities for collection, transport and disposal. 			
	Air	Fugitive dust emissions	<ul style="list-style-type: none"> • Open and exposed areas to be sprayed with water as required at substation site, especially during the dry season 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget
	Water	Discharge of wastewater	<ul style="list-style-type: none"> • Provide and maintain permanent sanitary facilities to workers and safe drinking water at substation • Provide and maintain a septic system for wastewater collection and disposal; tank system will be located at least 400 m from any 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

			water sources, to avoid contamination.			
	Waste	Lack of proper handling, storage and disposal	<ul style="list-style-type: none"> • Compliance with Sub.decreed No. 36 Solid Waste Management, issued 27 April 1999 • Implement Materials Management Plan 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget
	Hazardous and Polluting Materials	Lack of proper handling, storage and disposal	<ul style="list-style-type: none"> • Compliance with Sub-decree No.36 on Solid Waste Management, Chapter 3 – Hazardous Waste Management, MOE, 1999; and Declaration of Standard Level on Pollutants or Hazardous Substance permitted for disposal, MOE, 2015 • Maintain MSDS and PCB free certification; • Maintain controlled area set up for hazardous materials • Utilize licensed vendors / companies for collection, transportation and disposal of used/ unused hazardous materials / wastes • Record of incidents, spills / accidents / near-miss / fatalities will be maintained • Implement SOP for Hazardous Materials Control • Only trained workers employed for handling and storage of hazardous materials and waste 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

	Humans	Potential occupational health and safety risks to workers	<ul style="list-style-type: none"> • Implement SOP for Occupational Health and Safety • Compliance to Cambodia Occupational Safety and Health laws and regulations, MoLVT, 2011 • Compliance to relevant National electrical safety standards • Provide and maintain signage as per IEEE standards⁴⁶ at dangerous places for warning of electrical hazards • Provide and maintain health assessment by a competent medical practitioner for all workers • Provide periodic training to all workers with access to electrical 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget
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⁴⁶ IEEE - Institute of Electrical and Electronics Engineers

			<p>and hazardous conditions; and certified to work on site</p> <ul style="list-style-type: none"> • Provide and maintain workers appropriate PPE • Equipment and tools will be inspected before use to ensure proper and safe operation • Appropriate grounding and deactivation of live power equipment during maintenance work or if working in close proximity to the equipment; provision of lightning arrestors as appropriate • Record of health assessments / incidents/ accidents/near-miss/fatalities will be maintained • EMF levels expected to be below the limits set by International Commission on Non-Ionizing Radiation Protection (ICNRP) which is 4.17 kV/m for electric field and 833 mG for magnetic field 			
Transmission line ROW Substation GS6	Community Health and Safety	Potential community health and safety risks to persons living in the wider Project area	<ul style="list-style-type: none"> • Security and inspection personnel will be deployed to avoid vandalism of equipment and pilferage of lines/cables that may cause accident and/or electrocution. • Conduct information disclosure, consultation and participation activities in cooperation with 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

			<p>local authorities and in accordance with the Stakeholder Analysis and Communication Plan</p> <ul style="list-style-type: none"> • Communicate with communities on potential health and safety risks and mitigation measures including ERP • Record of consultations will be maintained in accordance with the GRM and Stakeholder Analysis and Communication Plan • Record of incidents / issued raised will be maintained in accordance with GRM 			
	Biodiversity	<p>Risk of birds / bat collision related fatalities Impact on local biodiversity, species</p> <p>Tree planting</p> <p>Vegetation management</p>	<ul style="list-style-type: none"> • Provide and maintain visual deterrents and flight diverters • Use raptor safe design for TL towers to minimize electrocution risks Implement SOP for assessing, monitoring and record keeping of carcass searches including taxonomic composition of bird/ bat fatalities • Avoidance of on-site or off-site waste disposal areas • Implement plan for season specific risks (based on the results of the Seasonal survey) 	Facility Operator, Contractors PIC	PMO SEPRO	Contractor Budget

TABLE 3 - ENVIRONMENTAL MONITORING PLAN (EMOP)

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility ⁴⁷	
					Implemented by	Supervised by
DESIGN AND PRE-CONSTRUCTION STAGE						
Project Readiness Checks for Environmental Management	Site Selection	In Kampong Chhnang and Kampong Speu provinces	Site Selection completed Route Selection completed	Once	EDC SEPRO	ADB
	Sensitive Receptors, particularly a) households areas / structures, b) surface water sources, c) groundwater wells, d) road and railway crossings, e) global and regional flyways of migratory birds, f) protected areas, critical habitats and wetlands, if any, species of conservation value, g) physical cultural resources	Project area of Influence	Sensitive natural and human receptors identified and /or avoided <ul style="list-style-type: none">Ocular inspectionTransect surveyGIS Maps	Once at the time of detailed survey		
	Project implementation Set up	EDC	Appointment of a Project Implementation Consultant (PIC) Services ⁴⁸ and	Once	PMO SEPRO	EDC ADB

⁴⁷ SEPRO – Social and Environmental Public Relations Office of EDC; ADB – Asian Development Bank; PIC – Project Implementation Consultant Services; Contractors imply - solar park and transmission interconnection infrastructure Engineering, Procurement, Construction (EPC) contractor and Solar PV Plant contractor; each will have a designated EHS officer (“C-EHS”) and GRM focal person (C-GRM).

⁴⁸ The project implementation consultant (PIC) will be engaged to assist EDC with the implementation of the project and, in particular, to: (a) update as necessary the Initial Environmental Examination (IEE), Environmental Management Plan (EMP), and Land Acquisition and Resettlement Plan (LARP), and, after obtaining ADB’s approval, oversee their implementation; and (b) supervise the design, supply, installation, and commissioning of the solar park infrastructure works by the EPC contractor. The PIC will be responsible for building EDC’s capacity in financial management, contract administration, social and environmental monitoring and reporting. The PIC will recruit and manage a local registered firm who will work with EDC to prepare and submit an Initial Environmental Impact Assessment

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility ⁴⁷	
					Implemented by	Supervised by
DESIGN AND PRE-CONSTRUCTION STAGE						
			Contracting of International and National Environmental Specialists ⁴⁹			
	Training and Capacity Building for PMO, SEPRO and Contractors	To be determined	Training and Capacity Building details completed - Date, time, duration, length and attendees list	Once	PIC	PMO SEPRO ADB
	Land Acquisition and Compensation	Project area of influence	Timely and due compensation to project affected persons (APs) in line with project LARP	Completion prior to the start of civil works	PIC	PMO ADB
	Design features as mitigation	Project area of influence	Climate risks integrated into final project detailed design; AIS substation design, transmission line design, route selection and ROW, conservation of two natural streams at solar park site	Once	PIC	PMO SEPRO
	Environmental Baseline Survey	Solar Park An Long Chrey Reservoir (for surface and ground water quality analysis)	<ul style="list-style-type: none">Sampling and chemical analysis (surface and	Once prior to start of civil works	PIC Contractor C-EHS	PMO SEPRO

(IEIA) or full EIA for the solar park infrastructure to the Ministry of Environment (MOE) for clearance and approval, as required, prior to any civil works contract awards. Source: Project Administration Manual (PAM) for CAM NSPP, May 2018

⁴⁹ PIC will be supported by International Specialist (3 months for 30 months) and National Specialist (8 months for 30 months); Source: Project Administration Manual (PAM) for CAM NSPP, May 2018

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility ⁴⁷	
					Implemented by	Supervised by
DESIGN AND PRE-CONSTRUCTION STAGE						
	<ul style="list-style-type: none">• Surface and ground water quality monitoring• Air Quality• Noise	Solar Park and Transmission line ROW (for air quality monitoring and noise level measurements)	<ul style="list-style-type: none">groundwater) at solar park and reservoir• Hand held / portable devices for air quality monitoring and noise level measurements			
	Biodiversity Survey (birds / bats) Routes of migratory birds	Project area of influence	<ul style="list-style-type: none">• Seasonal survey as per TOR for birds and bat	7 days over total 5 months	PIC	PMO SEPRO
	Physical cultural resources (PCRs)	Project area of influence	<ul style="list-style-type: none">• Identification of sensitive periods conducted• Ocular inspection/ Transect survey• Establish Chance Find Procedures	Once	PIC	PMO SEPRO
	Updating IEE and EMP	-	<ul style="list-style-type: none">• Incorporate final project detailed engineering design in IEE and EMP• Approval from ADB/PMO and disclosure	Once	PIC	PMO SEPRO ADB
	Site specific checklist for environmental monitoring	-	<ul style="list-style-type: none">• Approved Checklists	Once	PIC	PMO SEPRO ADB

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility ⁴⁷	
					Implemented by	Supervised by
DESIGN AND PRE-CONSTRUCTION STAGE						
	Safeguards requirements in tenders, contracts and bidding documents	-	<ul style="list-style-type: none">Approved Safeguards tender requirements for IPPsContractor EHS officer hired (C-EHS)Contractor GRM focal person appointed (C-GRM)	Once	PIC	PMO SEPRO ADB
	Grievance Redress Mechanism (GRM)	Project area of influence	GRM / GRC set up	Once	PIC PMO	SEPRO ADB
	Information Disclosure, Participation and Consultation <ul style="list-style-type: none">Announcement to the communities of civil works scheduleDistribution of FAQs/ PIB⁵⁰	Project area of influence	Consultation log book	One month prior to start of civil works	PIC	PMO SEPRO
	UXO clearance	Project area of influence	Obtain certification of clearance	Once prior to start of civil works	PIC Cambodia Mine Action Center	PMO SEPRO

⁵⁰ FAQ – Frequency Asked Questions, PIB – Project Information Booklet

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
Prior to mobilization on site	Orientation of Project Staff, Contractors / Sub-contractor(s), Workers	Project area of influence	<ul style="list-style-type: none">• Number of participants• Duration of briefing and orientation exercise	Once	PIC	PMO SEPRO
	Orientation of hired workers	Project area of influence	<ul style="list-style-type: none">• Number of participants• Duration of briefing and orientation exercise	Once	Contractor C-EHS C-GRM	PIC
	Hiring of Project Staff and workers - Local recruitment	Project area of influence	<ul style="list-style-type: none">• Number of local workers and staff recruited	Weekly	Contractor C-EHS C-GRM	PMO SEPRO
	CEMP / SOP ⁵¹	Project area of influence	<ul style="list-style-type: none">• Approved CEMP /SOP	Once	PIC Contractor C-EHS	PMO SEPRO
SOLAR PARK, COMMON FACILITIES, ACCESS ROADS, ASSOCIATED FACILITIES						
Site preparation and civil works	Loss of habitat	Solar park Access roads / Road easements affected by delivery of equipment	<ul style="list-style-type: none">• Ocular inspection	Once before the start of site preparation and civil works, and	PIC Contractor C-EHS	PMO SEPRO

⁵¹ CEMP – Construction Environmental Management Plan; SOP – Standard Operating Procedure

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
		and construction material		once after completion of civil works		
	Erosion, spoil control measures such as silt traps, planting and/or sowing soil binding grass	Solar park Access roads / Road easements affected by delivery of equipment and construction material	<ul style="list-style-type: none">Ocular inspection	Weekly, and once after completion of spoil disposal	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
	Air Quality and fugitive dust Spraying of water to opened land areas and before movement of construction vehicles	Solar park Access roads / Road easements affected by delivery of equipment and construction material	<ul style="list-style-type: none">Handheld / portable air monitoring devicesOcular inspection/spot checks	Bi-monthly during civil works and once after completion of civil works Every day at solar park, access roads / road easements during dry season and weekly during wet season	PIC Contractor C-EHS	PMO SEPRO
	Noise and vibration level	Solar park	<ul style="list-style-type: none">Noise monitoring using hand held devicesOcular inspection and spot checks	Bi-monthly during civil works and once after completion of civil works Weekly	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
	Smoke belching construction vehicles (emissions)	Solar park	<ul style="list-style-type: none">Ocular inspection / spot checking	Weekly	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
	Guaranteed noise level of equipment / machineries	Solar park	<ul style="list-style-type: none">Machinery and equipment specificationsCompliance to Sub-decree ANRK.BK No.42 on Air Pollution and Noise disturbance issued on 10 July 2000	Once	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
	Water quality	Solar park An Long Chrey Reservoir	<ul style="list-style-type: none">Sampling and chemical analysis (surface and groundwater)	Once after completion of civil works	PIC Contractor C-EHS (Local MOE approved Lab)	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
	Waste management	Solar park Workers' camps, Sorting and Recycling area Controlled Area set up for Hazardous Material storage area	<ul style="list-style-type: none">Ocular inspection / spot checks	Weekly	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
	All equipment used is PCB free	Solar park	<ul style="list-style-type: none">Certification checks	Bi-annually	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
Site preparation and civil works	Loss of habitat	Substation Transmission line alignment Temporary access roads / road easements affected by delivery of equipment and construction material	Ocular inspection	Once before the start of site preparation and civil works, and once after completion of civil works	PIC Contractor C-EHS	PMO SEPRO
	Erosion, spoil control measures such as silt traps, planting and/or sowing soil binding grass	Substation Transmission line alignment Temporary access roads / road easements affected by delivery of equipment and construction material	Ocular inspection	Weekly, and once after completion of spoil disposal	PIC Contractor C-EHS	PMO SEPRO
	Air Quality and fugitive dust Spraying of water to opened land areas and before movement of construction vehicles	Substation Transmission line alignment Temporary access roads / road easements affected by delivery of equipment and construction material	<ul style="list-style-type: none">Hand held/ portable air monitoring devicesOcular inspection/spot checks	Bi-monthly during civil works and once after completion of civil works Every day at substation,	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
				along transmission line alignment during dry season and weekly during wet season		
	Noise and vibration level	Substation Transmission line alignment Temporary access roads / road easements affected by delivery of equipment and construction material	<ul style="list-style-type: none">Noise monitoring using hand held / portable devicesOcular inspection/ spot checks	Bi-monthly during civil works and once after completion of civil works (only upon commissioning of the substation) Weekly	PIC Contractor C-EHS	PMO SEPRO
	Smoke belching construction vehicles (emissions)	Substation Transmission line alignment Temporary access roads / road easements affected by delivery of equipment and construction material	Ocular inspection / spot checking	Weekly	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
	Guaranteed noise level of equipment / machineries	Substation Transmission line alignment Temporary access roads	<ul style="list-style-type: none">Machinery and equipment specificationsCompliance to Sub-decree ANRK.BK No.42 on Air Pollution and Noise disturbance issued on 10 July 2000	Once	PIC Contractor C-EHS	PMO SEPRO
	Quality of transformer oil	Substation	Material Safety Data Sheet (MSDSs) – compliance to IS: 1866: Code of Practice for Electrical Maintenance and Supervision of Mineral Insulating Oil in Equipment	Once	PIC Contractor C-EHS	PMPO SEPRO
	Waste management	Transmission alignment Workers' camps, Sorting and Recycling area Controlled Area set up for Hazardous Material storage area	Ocular inspection / spot checks	Weekly	PIC Contractor C-EHS	PMO SEPRO
	All equipment used is PCB free	Solar park	Certification checks	Bi-annually	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented by	Supervised by
CONSTRUCTION STAGE						
	Occupational Health and Safety (OHS) Training	Solar park	OHS training log book	Monthly during civil works	PIC Contractor C-EHS	PMO SEPRO
	Provision of sanitary facilities and wash areas, safe drinking water and garbage bins	Solar park	Ocular inspection / spot checks	Once	PIC Contractor C-EHS	PMO SEPRO
	Danger and warning signs (traffic, electricity) for safety of workers and the community	Solar park Access roads / road easements affected by delivery of equipment and construction material	Ocular inspection / spot checks	Weekly	PIC Contractor C-EHS	PMO SEPRO
	Information Disclosure, Participation and Consultation – Distribution of FAQs/ PIB – Community Awareness Program on safety issues / Training in ERPs Grievances received / resolution, if any	Communities in and around solar park	Consultation log book	Once during civil works	PIC Contractor C-EHS	PMO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented By	Supervised by
OPERATION STAGE						
SOLAR PARK, COMMON FACILITIES, ACCESS ROADS, ASSOCIATED FACILITIES						
Operation and Maintenance	Orientation of Project Staff, Contractors / Sub-contractor(s), Workers, Facility Operators	Project area of influence	<ul style="list-style-type: none">• Number of participants• Duration of briefing and orientation exercise	Once	PIC	PMO SEPRO
	Maintenance of Sanitary facilities and wash areas, safe drinking water and garbage bins	Solar Park	Ocular inspection / spot checks	Monthly	Facility Operator / Contractor / C-EHS PIC ⁵²	PMPO SEPRO
	Maintenance of water retention pond, drainage lines	Solar Park	Operation & Maintenance log sheet	Monthly	Facility Operator / Contractor / C-EHS PIC	PMPO SEPRO

⁵²PIC role in implementation activities during operation phase will be limited to its contract duration.

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented By	Supervised by
OPERATION STAGE						
	Waste management collection, transport and disposal	Solar Park	<ul style="list-style-type: none">• Operation & Maintenance log sheet• Spot checks	Monthly	Facility Operator / Contractor / C-EHS PIC	PMPO SEPRO
	Maintenance of SOP e.g. for hazardous materials and register of activities involving hazardous materials Maintenance of MSDSs	Solar Park	<ul style="list-style-type: none">• Operation & Maintenance log sheet	Monthly	Facility Operator / Contractor / C-EHS PIC	PMPO SEPRO
	Occupational health, and safety	Solar Park	<ul style="list-style-type: none">• Number of incidents/ accidents /near-miss / fatalities	Semi-annually	Facility Operator / Contractor / C-EHS PIC	PMPO SEPRO
	Community health and Safety – Community Awareness	Communities in and around the solar park	<ul style="list-style-type: none">• Consultation log book	Once at commencement of operation	Facility Operator / Contractor / C-EHS	PMPO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented By	Supervised by
OPERATION STAGE						
Operation and Maintenance	Orientation of Project Staff, Contractors / Sub-contractor(s), Workers	Project area of influence	<ul style="list-style-type: none">• Number of participants• Duration of briefing and orientation exercise	Once	PIC	PMO SEPRO
	Failure of transmission towers	Along the transmission line alignment	<ul style="list-style-type: none">• Operation & Maintenance log sheet	Monthly	Facility (power system) operator / Contractor / C-EHS PIC	PMO SEPRO
	Occupational health, and safety	Along the transmission line alignment	<ul style="list-style-type: none">• Number of incidents/ accidents /near-miss / fatalities	Semi-annually	Facility (power system) operator / Contractor / C-EHS PIC	PMO SEPRO
	Community health and Safety	Communities located along the transmission line alignment	<ul style="list-style-type: none">• Consultation• log book	Once at commencement of operation	Facility (power system)	PMPO SEPRO

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented By	Supervised by
OPERATION STAGE						
	– Community Awareness Program on safety issues / Training in ERPs Grievances received / resolution, if any				operator / Contractor / C-EHS PIC	
	EMF ⁵³	Along the transmission line alignment Substation	• Hand held EMF field meters	Annually	Facility (power system) operator / Contractor / C-EHS PIC	PMO SEPRO
	Vegetation planting, maintenance of hedges and field margins, re-seeding of sites	Along the transmission line alignment	• Ocular inspection	Quarterly	Facility (power system) operator / Contractor / C-EHS	PMO SEPRO

⁵³ EMF Electro-magnetic field

Project Activity	Parameter / Indicator	Location	Method of Measurement	Frequency	Responsibility	
					Implemented By	Supervised by
OPERATION STAGE						
					PIC	
	Bird /Bat collision /electrocution	Along the transmission alignment	Spot checks / observation <ul style="list-style-type: none">Log sheet (carcass counts with taxonomic composition)	Monthly	Facility (power system) operator / Contractor / C-EHS PIC	PMO SEPRO
	Pilferage of cables	Along the transmission alignment	Ocular inspection <ul style="list-style-type: none">Operation & Maintenance log sheet	Quarterly	Facility (power system) operator / Contractor / C-EHS PIC	PMO SEPRO

Table 4 – Safeguards Tender Requirements for Independent Power Producers (IPPs)

Project Activity	Environmental Component Likely to be Affected	Potential Impacts / Issues	Mitigation Measures and Safeguards	Responsibility ⁵⁴		Source of Funds
				Implemented by	Supervised by	
Construction / Operation	Environment Land / vegetation Air Water Waste Humans	<ul style="list-style-type: none"> Avoid effects of contractor(s) unplanned activities Smooth work implementation 	<p>The IPP and their contractors will develop and implement CEMPs /SOPs in line with IEE and EMP.⁵⁵</p> <p>The IPP and contractors shall have qualified environmental, health and safety (EHS) officer and GRM focal person within the staff</p>	IPP Contractors C-EHS	PIC PMO SEPRO	IPP
		<ul style="list-style-type: none"> Lack of training and awareness 	<p>The IPP shall ensure adequate training to their contractors on use of PPE, Health and Safety, Information Disclosure to communities, GRM, Records management, monitoring and reporting.⁵⁶</p> <p>The IPP shall ensure that their contractors receive awareness and training programs or information materials with respect to sexually transmitted diseases such as HIV/AIDS and child labor, bonded labor or forced labor.</p>	IPP Contractors C-EHS C-GRM	PIC PMO SEPRO	IPP
	Water	<ul style="list-style-type: none"> Excess usage 	Groundwater extraction shall be prohibited	IPP Contractors	PIC	IPP

⁵⁴ PIC – Project Implementation Consultant Services, PIC role in implementation activities during operation stage will be limited to its contract duration; PMO – Project Management Office within EDC; SEPRO – Social and Environmental Public Relations Office of EDC

⁵⁵ CEMP - Construction Environmental Management Plan; IEE - Initial Environmental Examination; EMP - Environmental Management Plan

⁵⁶ PPE – Personal Protection Equipment; GRM – Grievance Redress Mechanism; Monitoring will also relate to incidents in violation of or non-compliance with ADB SPS 2009 and applicable national laws and regulations.

		<ul style="list-style-type: none"> Potential contamination to water sources 	<p>The IPP shall include in the Construction Schedule estimates of anticipated annual water usage for construction. The IPP and their contractors will review, as applicable, the availability and sources of water for usage for the construction and consult with relevant governmental stakeholders and affected communities on water availability, usage and estimated usage for future periods. Within 60 days of each Contract Year after the commercial operations date, the IPP shall provide to EDC reasonable estimates of water usage for purposes of operating and maintaining the Solar PV Plants for the applicable Contract Year.</p>	C-EHS	PMO SEPRO	
	Hazardous Materials Management	Inappropriate transportation, storage, use, disposal and spills	<p>Handling and disposal of hazardous waste and materials will be in accordance with Sub-Decree No. 36 Solid Waste Management Guidelines issued 27 April 1999, Chapter 3 – Hazardous Waste Management; MOE Declaration of Standard Level on Pollutants or Hazardous Substance permitted for disposal issued in 2015 and International Best Practices as per IFC EHS Hazardous Material Management Guidelines.</p> <p>PV Modules: In case of modules containing hazardous materials, IPP and their contractors shall develop and implement plans for environmentally safe disposal.</p>	IPP Contractors C-EHS	PIC PMO SEPRO	IPP

			<p>The purchase agreement / contractor between IPP and supplier(s) shall contain a contractual provision that obligate the supplier to take back unused / replaced modules.</p> <p>In case Energy energy Storage Batteries are used: IPP and their contractors will develop and implement plans for environmentally safe disposal.</p> <p>The purchase agreement / contractor between IPP and supplier(s) shall contain a contractual provision that obligate the supplier to take back unused / used / faulty batteries.</p> <p>All equipment installed and used will be certified as Polychlorinated Biphenyls (PCBs) free</p> <p>Use of herbicides / pesticides for vegetation clearing will be prohibited</p>			
	Health and Safety	Potential health and safety issues for workers	The IPP and their contractors shall comply with IFC EHS Guidelines on Occupational Health and Safety and Community Health and Safety requirements	IPP Contractors C-EHS	PIC PMO SEPRO	IPP
	Biodiversity	Risk of birds / bat collision related fatalities	The IPP and their contractors shall develop and implement SOP ⁵⁷ relating to searching for and assessing, monitoring and record keeping of animal	IPP Contractors C-EHS	PIC PMO SEPRO	IPP

⁵⁷ SOP – Standard Operating Procedure

		Impact on local biodiversity, species	/ bird carcass searches and maintain a log of findings; and ensure have qualified staff to conduct carcass searches.			
		Landscape and Visual Impacts	The IPP and their contractors will restore temporary use land (used for construction) to pre-construction conditions including - landscaping will be established and maintained along the perimeter fence to reduce visual and dust impacts, hedges and trees at field margins will be maintained, and the IPPs shall re-seed most or all of the site with native species of plants for soil stability and biodiversity enhancement.	IPP Contractors C-EHS	PIC PMO SEPRO	IPP
	Access to Site		The IPP will establish and maintain a secure perimeter fence at the solar PV plants to control trespassing, the fence will have adequate ground clearance that allows passage of animals / wild species in order to prevent habitat fragmentation.			

Part 2

Cambodia Environmental Quality Standards

(1) AMBIENT AIR QUALITY STANDARDS

Source: Sub-decree No. 42 ANRK.BK on Air Pollution Control and Noise Disturbance, MoE 2000.

Parameter	Averaging Period	Standard	
		Unit	Value
Nitrogen Dioxide (NO ₂)	24 hours	mg /m ³	0.1
Sulfur Dioxide (SO ₂)	24 hours	mg /m ³	0.3
Carbon Monoxide (CO)	24 hours	mg /m ³	20
PM 2.5	24 hours		-
PM 10	24 hours		-

(2) AMBIENT NOISE STANDARDS

Source: Sub-decree No. 42 ANRK.BK on Air Pollution Control and Noise Disturbance, MoE, 2000.

Areas	Time Period (24 hours)	Standard	
		Unit	Standard Value
Area is not identified	Day time (from 6:00am to 6:00pm)	Noise Level dB(A)	70.0
	Evening Time (from 6:00pm to 11:00pm)	Noise Level dB(A)	65.0
	Night time (from 11:00pm to 6:00am)	Noise Level dB(A)	50.0

(3) SURFACE WATER QUALITY STANDARD

Source: Sub-decree No. 27 ANRK.BK on Water Pollution Control, MoE, 1999; The standards of water quality are divided as follows:

Annex 2 of Sub-decree on Water Pollution Control

Effluent standard for pollution sources discharging wastewater to public water areas or sewer

No	Parameters	Unit	Allowable limits for pollutant substance discharging to	
			Protected public water area	Public water area and sewer area
1	Temperature	0C	< 45	< 45
2	pH		6 – 9	5 - 9
3	BOD ₅ (5 days at 200 C)	mg/l	< 30	< 80
4	COD	mg/l	< 50	< 100
5	Total Suspended Solids	mg/l	< 50	< 80
6	Total Dissolved Solids	mg/l	< 1000	< 2000

No	Parameters	Unit	Allowable limits for pollutant substance discharging to	
			Protected public water area	Public water area and sewer area
7	Grease and Oil	mg/l	< 5.0	< 15
8	Detergents	mg/l	< 5.0	< 15
9	Phenols	mg/l	< 0.1	< 1.2
10	Nitrate (NO ₃)	mg/l	< 10	< 20
11	Chlorine (free)	mg/l	< 1.0	< 2.0
12	Chloride (ion)	mg/l	< 500	< 700
13	Sulphate (as SO ₄)	mg/l	< 300	< 500
14	Sulphide (as Sulphur)	mg/l	< 0.2	< 1.0
15	Phosphate (PO ₄)	mg/l	< 3.0	< 6.0
16	Cyanide (CN)	mg/l	< 0.2	< 1.5
17	Barium (Ba)	mg/l	< 4.0	< 7.0
18	Arsenic (As)	mg/l	< 0.10	< 1.0
19	Tin (Sn)	mg/l	< 2.0	< 8.0
20	Iron (Fe)	mg/l	< 1.0	< 20
21	Boron (B)	mg/l	< 1.0	< 5.0
22	Manganese (Mn)	mg/l	< 1.0	< 5.0
23	Cadmium (Cd)	mg/l	< 0.1	< 0.5
24	Chromium (Cr)+3	mg/l	< 0.2	< 1.0
25	Chromium (Cr)+6	mg/l	< 0.05	< 0.5
26	Copper (Cu)	mg/l	< 0.2	< 1.0
27	Lead (Pb)	mg/l	< 0.1	< 1.0
28	Mercury (Hg)	mg/l	< 0.002	< 0.05
29	Nickel (Ni)	mg/l	< 0.2	< 1.0
30	Selenium (Se)	mg/l	< 0.05	< 0.5
31	Silver (Ag)	mg/l	< 0.1	< 0.5
32	Zinc (Zn)	mg/l	< 1.0	< 3.0
33	Molybdenum (Mo)	mg/l	< 0.1	< 1.0
34	Ammonia (NH ₃)	mg/l	< 5.0	< 7.0
35	DO	mg/l	>2.0	>1.0

No	Parameters	Unit	Allowable limits for pollutant substance discharging to	
			Protected public water area	Public water area and sewer area
36	Polychlorinated Byphenyl	mg/l	<0.003	<0.003
37	Calcium	mg/l	<150	<200
38	Magnesium	mg/l	<150	<200
39	Carbon tetrachloride	mg/l	<3	<3
40	Hexachloro benzene	mg/l	<2	<2
41	DTT	mg/l	<1.3	<1.3
42	Endrin	mg/l	<0.01	<0.01
43	Dieldrin	mg/l	<0.01	<0.01
44	Aldrin	mg/l	<0.01	<0.01
45	Isodrin	mg/l	<0.01	<0.01
46	Perchloro ethylene	mg/l	<2.5	<2.5
47	Hexachloro butadiene	mg/l	<3	<3
48	Chloroform	mg/l	<1	<1
49	1,2 Dichloro ethylene	mg/l	<2.5	<2.5
50	Trichloro ethylene	mg/l	<1	<1
51	Trichloro benzene	mg/l	<2	<2
52	Hexachloro cyclohexene	mg/l	<2	<2

Remark: The Ministry of Environment and the Ministry of Agriculture, Forestry and Fishery shall collaborate to set up the standard of pesticides which discharged from pollution sources.

Annex 4 of Sub-decree on Water Pollution Control

Water quality standard in public water areas for bio-diversity conservation

a) River

Parameter	Standard	
	Unit	Value
pH	mg/l	6.5 – 8.5
BOD5	mg/l	1 – 10
Suspended Solid	mg/l	25 – 100
Dissolved Oxygen	mg/l	2.0 - 7.5
Coliform	MPN/100ml	< 5000

b) Lakes and Reservoirs

Parameter	Standard	
	Unit	Value

pH	mg/l	6.5 – 8.5
COD	mg/l	1 – 8
Suspended Solid	mg/l	1 – 15
Dissolved Oxygen	mg/l	2.0 - 7.5
Coliform	MPN/100ml	< 1000
Total Nitrogen	mg/l	1.0 – 0.6
Total Phosphorus	mg/l	0.005 – 0.05

Annex 5 of Sub-decree on Water Pollution Control

Water Quality Standard in public water areas for public health protection

No	Parameter	Unit	Standard Value
1	Carbon tetrachloride	µg/l	< 12
2	Hexachloro-benzene	µg/l	< 0.03
3	DDT	µg/l	< 10
4	Endrin	µg/l	< 0.01
5	Dieldrin	µg/l	< 0.01
6	Aldrin	µg/l	< 0.005
7	Isodrin	µg/l	< 0.005
8	Perchloroethylene	µg/l	< 10
9	Hexachlorobutadiene	µg/l	< 0.1
10	Chloroform	µg/l	< 12
11	1,2 Trichloroethylene	µg/l	< 10
12	Trichloroethylene	µg/l	< 10
13	Trichlorobenzene	µg/l	< 0.4
14	Hexachloroethylene	µg/l	< 0.05
15	Benzene	µg/l	< 10
16	Tetrachloroethylene	µg/l	< 10
17	Cadmium	µg/l	< 1
18	Total mercury	µg/l	< 0.5
19	Organic mercury	µg/l	0
20	Lead	µg/l	< 10
21	Chromium, valent 6	µg/l	< 50
22	Arsenic	µg/l	< 10
23	Selenium	µg/l	< 10
24	Polychlorobiohenyl	µg/l	0
25	Cyanide	µg/l	< 0.005

(4) GROUNDWATER QUALITY STANDARD

Source: The Cambodian National Drinking Water Quality Standard (CNDWQS) is National Standard of the Ministry Industry and Handicraft.

No	Parameter	Standard	
		Unit	Value (CNDWQS Standard)
1	pH	-	6.5-8.5
2	Turbidity	NTU	5.0
3	Dissolved Oxygen (DO)	mg/l	NV
4	Total Suspended Solid (TSS)	mg/l	NV
5	Chloride (Cl ⁻)	mg/l	250
6	Nitrate (NO ₃)	mg/l	50
7	Phosphate (PO ₄)	mg/l	NV
8	Sulphate (SO ₄)	mg/l	250
9	(BOD) ₅	mg/l	NV
10	(COD) Mn	mg/l	NV
11	Aluminum (Al)	mg/l	0.2
12	Arsenic (As)	mg/l	0.05
13	Copper (Cu)	mg/l	1.0
14	Iron (Fe)	mg/l	0.3
15	Lead (Pb)	mg/l	0.01
16	Manganese (Mn)	mg/l	0.1
17	Mercury (Hg)	mg/l	0.001
18	Zinc (Zn)	mg/l	3.0
19	Total Coli form	MPN/100mlml	0

(5) SOIL QUALITY STANDARD

Source: Cambodia National Quality Standards for Agriculture, Ministry of Agriculture, Forest, and Fishery (MAFF).

Parameter	Standard	
	Unit	Value
pH		
Salinity	ppt	6-8
Oil & Grease	mg/kg	-
Chloride	mg/kg	-
Petroleum Hydrocarbons		
Kerosene hydrocarbons (c10-c14)	mg/kg	-
Diesel hydrocarbons (c15-c28) (mg/L)	mg/kg	-
Heavy oil hydrocarbons (c29-c36) (mg/L)	mg/kg	-
BTEX		
Ethylbenzene	mg/kg	0.018
Benzene	mg/kg	0.0068
Toluene	mg/kg	0.08
Xylene	mg/kg	2.4
Metals		
Nickel	mg/kg	50
Copper	mg/kg	63
Zinc	mg/kg	200

Arsenic	mg/kg	12
Cadmium	mg/kg	1.4
Lead	mg/kg	70
Iron	mg/kg	-
Chromium	mg/kg	64
Mercury	mg/kg	6.6