Cambodia Solid Waste and Plastic Management Improvement Project

Preliminary Environmental and Social Impact Assessment (P-ESIA) for the Solid Waste and Plastic Infrastructure Options in Siem Reap

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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AHP	Analytical Hierarchy Process
APSARA	Authority of the Protection of the Site and Management of Region of Angkor
BOD	Biological Oxygen Demand
C/N	Carbon-Nitrogen
CEST	CEST, Incorporated
CIP	Commune Investment Plan
COD	Chemical Oxygen Demand
COMPED	Cambodian Education and Waste Management Organization
CSWPMIP	Cambodia Solid Waste and Plastic Management Improvement Project
DAC	Disability Action Council
DGH	Directorate General for Health
DO	Dissolved Oxygen
DOE	Department of Environment
DP	Development Partners
E&S	Environment and Social
EC	Electrical Conductivity
EC	European Commission
ECA	Environmentally Critical Areas
EDC	Electricite du Cambodge
EEE	Electrical and Electronic Equipment
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESA	Environmental and Social Assessment
ESC	Environmental Solutions & Consulting
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
EU	European Union
FEIA	Full Environmental Impact Assessment
FGD	Focus Group Discussion
FPIC	Free, Prior and Informed Consent
GAEA	Global Action for Environmental Awareness

GBV	Gender Based Violence
GCL	Geosynthetic Clay Liner
GDR	General Departments of Resettlements
GFHSS	Global Fund Health Systems Strengthening
GHG	Greenhouse Gas
GIIP	Good International Industry Practice
GM	Grievance Mechanism
GN	Guarding Notes
HC	Health Centers
HDPE	High-Density Polyethylene
HH	Household
IBA	Important Bird Areas
IBAT	Integrated Biodiversity Assessment Tool
ICF	International Classification of Functioning, Disability, and Health
IEIA	Initial Environmental Impact Assessment
IFC	International Finance Corporation
IP	Indigenous People
IPCC	Intergovernmental Panel on Climate Change
IPP	Indigenous People Plan
IR	Involuntary Resettlement
IRC	Inter-Ministerial Resettlement Committee
IUCN	International Union for Conservation of Nature
JICA	Japan International Cooperation Agency
KBA	Key Biodiversity Areas
KCC	Key Consultants Cambodia, Ltd.
KII	Key Informant Interview
KPI	Key Performance Indicator
LAR	Land Acquisition and Involuntary Resettlement
LARAP	Land Acquisition and Resettlement Action Plan
LEAP	Livelihood Enhancement and Association of the Poor
LFG	Landfill Gas
LMP	Labor Management Practice
LRF	Livelihood Restoration Framework
LRP	Livelihood Restoration Plan
M&E	Monitoring and Evaluation
MAFF	Ministry of Agriculture, Forestry and Fisheries
MEF	Ministry of Economy and Finance
MFI	Microfinance Institutions
MLMUPC	Ministry of Land Management, Urban Planning and Construction
MOE	Ministry of Environment

MOI	Ministry of Interior
MOP	Ministry of Planning
MoSALVY	Ministry of Labour, Vocational Training, and Youth Rehabilitation
MOSVY	Ministry of Social Affairs, Veterans and Youth Rehabilitation
MOWRAM	Ministry of Water Resources and Meteorology
MPWT	Ministry of Public Works and Transports
MRFs	Materials Recovery Facility
MSL	Mean Sea Level
MSW	Municipal Solid Waste
NCSD	National Council for Sustainable Development
NESAP	National Environment Strategy and Action Plan
NGO	Non-Governmental Organization
NIS	National Institute of Statistics
NR 6	National Road 6
NSPS	National Social Protection Strategy
OHS	Occupational Health and Safety
PAD	Project Appraisal Document
PCO	Project Coordination Office
PDOE	Provincial Department of Environment
P-ESIA	Preliminary Environmental and Social Impact Assessment
PET	Polyethylene Terephthalate
PHC	Private Health Clinics
PIU	Project Implementation Units
PKNP	Phnom Kulen National Park
PPAH	Possible Project-affected Households
PPAP	Possible Project-affected Persons
PPE	Personal Protective Equipment
PPP	Purchasing Power Parity
RDNLM	Realistic Digital Noise Level Meter
RPF	Resettlement Policy Framework
RGC	Royal Government of Cambodia
RH	Referral Hospitals
ROWs	Right-of-way
SEA/SH	Sexual Exploitation Abuse and Sexual Harrassment
SEP	Stakeholder Engagement Plan
SES	Socioeconomic Survey
SLF	Sanitary Landfill Facility
SMS	Short Text Message
SOP	Standard Operating Procedures
SRWSA	Siem Reap Water Supply Authority

SWM	Solid Waste Management
TBD	To Be Determined
TDS	Total Dissolved Solid
TN	Total Nitrogen
TP	Total Phosphorous
TPH	Total Petroleum Hydrocarbons
TSA	Tonle Sap Authority
TSBA	Tonle Sap Basin Authority
TSBR	Tonle Sap Biosphere Reserve
TSP	Total Suspended Particulate
TSS	Total Suspended Solids
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
US EPA	United States Environmental Protection Agency
WB	World Bank
WBG	World Bank Group
WHO	World Health Organization
WMF	Waste Management Facilities
WWTP	Wastewater Treatment Plan

UNITS OF MEASUREMENT

%	percent
°C	Celsius
USD $	US Dollar
KHR	Cambodian Riel
cm	centimeter
cu. cm	cubic centimeter
cu.m.	cubic meters
dB(A)	a-weighted decibel
ha	hectares
kg	kilograms
km	kilometer
kw	kilowatt
m	meters
MCM	million cubic meters
mm	millimeter
sq.km.	square kilometers
sq.m.	square meters
tons	metric tons

DEFINITION OF TERMS

Cell – refers to a single, waste-holding unit within the larger landfill property. These cells are generally shaped as basins during excavation, with berms running along the sides to contain leachate and other liquids.

Closure – The period after a landfill has reached its permitted capacity but before it has received certification of closure from a state regulatory agency. During the closure period, certain activities must be performed to comply with environmental and other regulations (e.g., capping, landscaping, etc.).

Composting – refers to the controlled decomposition of organic matter by micro-organisms, mainly bacteria and fungi, into a humus-like product.

Disposal – defined as any waste management operation serving or carrying out the final treatment and disposal of waste. It covers the following main operations such as final treatment, including incineration without energy recovery (on land; at sea), biological, physical, chemical treatment resulting in products or residues that are discarded, i.e. going to final disposal, including deposit into or onto land (e.g. landfill), including specially engineered landfill, deep injection, surface impoundment and release into water bodies.

Disposal site – refers to a site where solid waste is finally discharged and deposited.

Dump site – means a land utilized by local body for disposal of solid waste without following the principles of sanitary land filling.

Generation – refers to the act or process of producing solid waste.

Junkshop – refers to a recycling center that purchases or otherwise accepts recyclable materials from the public for the purpose of recycling such materials.

Material Recovery Facility (MRF) – a facility where recyclable municipal solid waste is processed and separated using manual and/or mechanical methods. The recovered materials may include paper, glass, plastics and metals, which are baled, temporary stored and eventually sold to recycling or manufacturing firms. The remaining residual wastes are then disposed of into a sanitary landfill. MRFs can process either source-separated recyclables or mixed wastes in which case the biodegradable components can be processed through in another facility into compost.

Municipal Waste (MW) – includes household waste and similar waste. The definition also includes bulky waste (e.g., white goods, old furniture, mattresses); and yard waste, leaves, grass clippings, households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). Waste from selected city services, i.e.,

waste from park and garden maintenance, waste from street cleaning services (street sweepings, and the content of litter containers, market cleansing waste).[1]

Leachate – refers to the liquid produced when waste undergoes decomposition, and when water percolates through solid waste undergoing decomposition. It is contaminated liquid that contains dissolved and suspended materials.

Municipal Solid Waste (MSW) – refers to waste generated by residences, institutions, commercial and business establishments which include paper, food items, yard waste, tin cans, bottles, plastics but not industrial and hazardous waste.

Open dump – refers to a disposal area wherein the solid wastes are indiscriminately thrown or disposed of without due planning and consideration for environmental and health standards.

Polyethylene terephthalate (PET) – a plastic material commonly used to make bottles for food, beverages, pharmaceutical and other liquid products. The standard plastic code for PET is #1.

Recycling – refers to the treating of used or waste materials through a process of making them suitable for beneficial use and for other purposes. It includes any process by which solid waste materials are transformed into new products in such a manner that the original product may lose its identity, and which may be used as raw materials to produce other goods or services.

Recyclable Material – refers to any waste material retrieved from the waste stream and free from contamination that can still be converted into suitable beneficial use or for other purposes, including but not limited to newspaper, ferrous scrap metal, non-ferrous scrap metal, used oil, corrugated cardboard, aluminum glass, office paper, tin can and other materials.

Sanitary Landfill – refers to a waste disposal site designed, constructed, operated and maintained in a manner that exerts engineering control over significant potential environment impacts arising from the development and operation of the facility.

Solid Waste Management (SWM) – refers to the discipline associated with the control of generation, storage, collection, transfer and transport, processing and disposal of solid wastes in a manner that is in accord with the best principles of public health, economics, engineering, conservation, aesthetics, and other environmental considerations, and that is also responsive to public attitudes.

Sorting – means separating various components and categories of recyclables such as paper, plastic, cardboard, metal, glass, etc., from mixed waste as may be appropriate to facilitate recycling.

[1] Municipal waste is a complex and blurred term. In general, it includes household waste and waste originating from other sources. The degree of precision and accuracy in definition is not yet satisfactory in most regions. This makes any comparison between countries fragile. Comparisons, having in mind different practices, can at best indicate differences.

Transfer Station – means a facility created to receive solid waste from collection areas and transport in bulk in covered vehicles or containers to waste processing and/or disposal facilities.

Treatment – means the physical, thermal, chemical or biological processes, that change the characteristics of the waste in order to reduce its volume or hazardous nature, facilitate its handling or enhance recovery.

Waste Generator – means and includes every person or group of persons, every residential premises and non-residential establishments which generate solid waste.

Waste Picker – means a person or groups of persons informally engaged in collection and recovery of reusable and recyclable solid waste from the source of waste generation the streets, bins, material recovery facilities, processing and waste disposal facilities for sale to recyclers directly or through intermediaries to earn their livelihood.

សេចក្តីសង្ខេប

<u>គោលបំណង និងវិសាលភាពនៃការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមនៅខេត្តសៀមរាប</u>

ការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម (P-ESIA) នេះមានគោលបំណងដូចខាងក្រោម៖ (i) ដើម្បីផ្តល់ព័ត៌មានជាបឋមស្តីអំពីស្ថានភាពបរិស្ថាន និងសង្គមដើម្បីជួនជាដំណឹង និងសម្រួលដល់ដំណើរការជ្រើសរើសទីតាំងទីលានទុកដាក់សំរាម ក៏ដូចជាជម្រើស "មិនធ្វើអ្វីទាំងអស់" (ii) ដើម្បីផ្តល់នូវទិដ្ឋភាពទូទៅនៃហេតុប៉ះពាល់ដែលអាចកើតមានជាទូទៅជាមួយនឹងវិធានការកាត់បន្ថយនិងហានិភ័យផ្នែកបរិស្ថាននិងសង្គមសម្រាប់ការជ្រើសរើសយកទីតាំង ការសាងសង់ និងប្រតិបត្តិការនៃការវិនិយោគ លើហេដ្ឋារចនាសម្ព័ន្ធសំរាមសំណល់រឹងដែលរួមមាន ទីលានទុកដាក់សំរាម ស្ថានីយ៍ផ្ទេរ ទីកន្លែងទាញយកវត្ថុធាតុមកប្រើប្រាស់ឡើងវិញ កន្លែងធ្វើជីកំប៉ុស នឹងដំណើរការបិទកន្លែងចាក់សំរាមចាស់ ដែលជាកត្តាពាក់ព័ន្ធជាមួយកិច្ចដំណើរការនៃទីលានទុកដាក់សំរាម និង (iii) ដើម្បីផ្តល់ជូនព័ត៌មានដល់ភាគីពាក់ព័ន្ធដែលរស់នៅក្នុងតំបន់គោលដៅអំពីសកម្មភាព និងជម្រើសនានាដែលអាចកើតឡើងពាក់ព័ន្ធជាមួយគម្រោង។

របាយការណ៍ ESIA បឋមនេះ រួមជាមួយនិងរបាយការណ៍ក្របខ័ណ្ឌគ្រប់គ្រងបរិស្ថាន និងសង្គមផ្សេងទៀតរាប់បញ្ចូល ផែនការចូលរួមរបស់អ្នកពាក់ព័ន្ធ ដែលដើរតួនាទីក្នុងការផ្សព្វផ្សាយព័ត៌មានដល់រដ្ឋាភិបាល ក៏ដូចជាទៅកាន់អ្នកពាក់ព័ន្ធ ជាច្រើនផ្សេងទៀតនៅក្នុងខេត្តសៀមរាប។ វាក៏ដើរតួនាទីជាធាតុចូលយ៉ាងសំខាន់ក្នុងការសម្រួលដល់ការប្រឹក្សាសាធារណៈ និងការចូលរួមរបស់អ្នកពាក់ព័ន្ធ អំពីព័ត៌មានគម្រោងទូទៅ ក៏ដូចជាដំណើរការជ្រើសរើសទីតាំងទីលានទុកដាក់សំរាម។ ឯកសារទាំងអស់នេះ ត្រូវបានផ្សព្វផ្សាយ ជាសាធារណៈនៅលើគេហទំព័រ។

របាយការណ៍ ESIAបឋមនេះ មិនមែនជាការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន និងសង្គមជាក់លាក់ពេញលេញសម្រាប់ជម្រើសទីតាំងទីលានទុកដាក់ក់សំរាមមួយ ឬច្រើននោះទេ។ នៅពេលដែលជម្រើសនៃទីតាំងទីលានចុងក្រោយត្រូវបានជ្រើសរើសនិងយល់ព្រមសម្រាប់សាងសង់ទីលានទុកដាក់សំរាម និងហេដ្ឋារចនាសម្ព័ន្ធសំណល់រឹង ការរចនាលម្អិតត្រូវបានកំណត់ធ្វើឡើងជាមួយនឹងតម្រូវការទីតាំងដីជាក់លាក់ និង ប្លង់ និងរបាយការណ៍ ESIA សម្រាប់ទីតាំងជាក់ស្តែង ផែនការការគ្រប់គ្រងបរិស្ថាន និងសង្គម (ESMP) ជាមួយនឹងផែនការតាំងទីលំនៅថ្មី និងអាចមានផែនការសម្រាប់ជនជាតិដើមភាគតិច (IPP) ដែលនឹងត្រូវបានរៀបចំស្របតាមក្របខណ្ឌគ្រប់គ្រងបរិស្ថាន និងសង្គម (ESMF), របាយការណ៍ ក្របខណ្ឌបរិស្ថាន និងសង្គម (ESF) និងការរកឃើញផ្សេងៗចេញពីរបាយការណ៍ ESIA បឋមនេះ។

របាយការណ៍ ESIA ជាបឋមនេះត្រូវបានធ្វើឡើងសម្រាប់ជម្រើសបីផ្សេងៗគ្នាដើម្បីពិចារណាទៅលើភាពសមស្រប នៃទីតាំងទីលានទុកដាក់សំរាមនិងដំណើរការជ្រើសរើសទីតាំងសម្រាប់ខេត្តសៀមរាប ជម្រើសទាំងនោះរួមមាន៖

- **ជម្រើសទី 0 "មិនធ្វើអ្វីសោះ"** បន្តចាក់សំរាមនៅកន្លែងចាក់សំរាមចាស់ស្ថិតនៅភូមិអន្លង់ពីរ ឃុំត្រពាំងធំ ស្រុកប្រាសាទបាគង។

- **ជម្រើសទី ១** ធ្វើការស្តារ និងពង្រីកបន្ថែមទៅលើកន្លែងចាក់សំរាមចាស់ដែលស្ថិតនៅក្នុងភូមិអន្លង់ពីរ ឃុំត្រពាំងធំ ស្រុកប្រាសាទបាគង។
- **ជម្រើសទី ២** បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានទុកដាក់សំរាមថ្មីក្នុងភូមិសាស្ត្រ ភូមិត្រពាំងទឹម ឃុំកណ្តៀក ស្រុកប្រាសាទបាគង។

ទិដ្ឋភាពទូទៅ និងប្រវត្តិគម្រោង

រដ្ឋាភិបាលកម្ពុជាបានដាក់ចេញយុទ្ធសាស្ត្រជាច្រើន ដោយផ្តោតលើការពង្រឹងការគ្រប់គ្រង សំណល់រឹងនៅកម្ពុជា។ ទោះបីជាមានដែនការ និងយុទ្ធសាស្ត្រក្នុងការកែលម្អការគ្រប់គ្រង សំណល់រឹង និងផ្លាស្ទិកក៏ដោយ ក៏ការប្រមូលនិងការទុកដាក់/ចោលសំរាមឱ្យបានត្រឹមត្រូវ នៅតែជាបញ្ហាប្រឈមនៅក្នុងប្រទេស។ ការគ្រប់គ្រងសំណល់មិនទាន់បានគ្រប់គ្រាន់ មានប្រភពចេញពីការធ្វើឯកជនភាវូបនីយកម្មលើសេវាកម្មប្រមូលកសំណល់នៅពេលដែលពុំទាន់មានតម្រូវការ លក្ខខណ្ឌចាំបាច់ក្នុងបទប្បញ្ញត្តិផ្សេងៗ ការត្រួតពិនិត្យ និងការដាក់ឱ្យអនុវត្តនានា ដើម្បីធ្វើឱ្យឯកជនភាវូបនីយកម្មបែបនេះទទួលបានជោគជ័យ។ គុណភាពទាប និងកង្វះខាតហេដ្ឋារចនាសម្ព័ន្ធគ្រប់គ្រងសំរាម សំណល់រឹងនៅកម្ពុជាក៏ជាបញ្ហាសំខាន់ផងដែរ។ អវត្តមាននៃ (**ក**) ទីលានទុកដាក់សំរាមអនាម័យ ឬទីលានមានការត្រួតពិនិត្យសមរម្យ នៅតាមទីក្រុងទាំងអស់; (**ខ**) ហេដ្ឋារចនាសម្ព័ន្ធពាក់ព័ន្ធទីលានទុកដាក់សំរាមដែលរួមមានជញ្ជីងថ្លឹង ប្រព័ន្ធប្រមូលឧស្ម័នមេតាន និងទឹកសំណល់ទីលាន(ទឹករងៃ) ការផ្តល់សម្ភារៈគ្របដណ្តប់ និងឧបករណ៍ធុនធ្ងន់/សម្ភារៈដឹកជញ្ជូន; (**គ**) ស្ថានីយ៍ផ្ទេរសំរាមនៅតាមទីក្រុងនានា; និង (**ឃ**) គ្រឿងបរិក្ខារកែឆ្នៃ/សំអាតសំរាម ដើម្បីបង្កើនសកម្មភាពកែច្នៃឡើងវិញ និងកាត់បន្ថយបរិមាណសំណល់យកទៅចាក់ចោលនៅទីលានចាំបាច់ត្រូវដោះស្រាយជាបន្ទាន់។ ការគ្រប់គ្រងសំរាមសំណល់រឹងដោយមិនបានត្រឹមត្រូវ បានជះហេតុប៉ះពាល់លើបរិស្ថាន និងសេដ្ឋកិច្ចជាច្រើន ហើយត្រូវបានរដ្ឋាភិបាលមើលឃើញកាន់តែខ្លាំងឡើងថាជាឧបសគ្គដ៏ចម្បងសម្រាប់ការអភិវឌ្ឍសេដ្ឋកិច្ច-សង្គម និងវិស័យទេសចរណ៍របស់កម្ពុជា។

គម្រោងនេះមានគោលបំណងកែលម្អការគ្រប់គ្រងសំណល់រឹង និងផ្លាស្ទិកនៅកម្ពុជា។ គម្រោងនេះ មានគោលបំណងធ្វើឲ្យទីក្រុងដែលបានជ្រើសរើសនៅទូទាំងប្រទេសកម្ពុជាអាច៖ (i) បង្ហាញពីការ កែលម្អចំពោះការគ្រប់គ្រងសំរាម សំណល់រឹងដែលអាចអនុវត្ត និងអាចពង្រីកបានសំរាប់ទីក្រុងផ្សេងទៀតក្នុងប្រទេស (ii) គាំទ្រដល់គោលនយោបាយ និងច្បាប់ ក្នុងការគ្រប់គ្រងសំរាម សំណល់រឹង និង (iii) គាំទ្រដល់ការអភិវឌ្ឍន៍សមត្ថភាពលើ ការគ្រប់គ្រងសំរាមសំណល់រឹងទាំងថ្នាក់ជាតិនិងថ្នាក់ក្រុង។ គម្រោង នេះនឹងរួមបញ្ចូលការគាំទ្រសម្រាប់ការកែលម្អចំពោះការប្រមូលសំរាម ការដឹកជញ្ជូន និងប្រើប្រាស់ឡើងវិញ ប្រព្រឹត្តិកម្ម ការកែច្នៃ ការទុកដាក់ និងការទទួលបានថ្លៃដើមមកវិញតាមរយៈការកែសំរួលក្នុងការប្រមូលថ្លៃចោលសម្រាម។ គម្រោងក៏នឹងផ្តល់ការគាំទ្រដល់ការកែលម្អនូវការត្រួតពិនិត្យ និងការដាក់អោយអនុវត្តចំពោះក្រុមហ៊ុនឯកជន ក្នុងវិស័យគ្រប់គ្រងសំណល់រឹង ព័ត៌មានដែលអាចរកបាននិងមានទំនុកចិត្ត ការចូលរួមរបស់ប្រជាពលរដ្ឋ និងព័ត៌មានសាធារណៈ។ គម្រោងនេះក៏នឹងផ្តល់ការគាំទ្រលើគោលនយោបាយពាក់ព័ន្ធនិងផ្លាស្ទិក ក៏ដូចជាការកែលម្អនូវការគ្រប់គ្រងសំណល់ផ្លាស្ទិក ដើម្បីកាត់បន្ថយបរិមាណសំណល់ដែលត្រូវប្រមូល ឬកប់ចោលនៅទីលាន

ចាក់សំរាម បង្កើនការប្រើប្រាស់ឡើងវិញនិងការកែច្នៃ និងរួមចំណែកកាត់បន្ថយវត្តមានប្លាស្ទិកនៅតាមផ្លូវទឹក និងសមុទ្រ។

នៅកម្រិតមូលដ្ឋាន គម្រោងនឹងផ្តល់ការគាំទ្រដល់ការអនុវត្តអនុក្រឹត្យលេខ១១៣ របស់កម្ពុជាដូចដែលបានចែងក្នុងមាត្រា៩ ដែលបានបញ្ជាក់ថា "រដ្ឋបាលរាជធានីស្រុកមានតួនាទីក្នុងការគ្រប់គ្រង សំរាមសំណល់រឹងតាមទីប្រជុំជន ដែលស្ថិតនៅក្នុងដែនសមត្ថកិច្ចរបស់ខ្លួន"។ គម្រោងនេះនឹងផ្តោត ការយកចិត្តទុកដាក់ក្នុងការគាំទ្រដល់ការកែលម្អសេវាប្រមូលសំរាម ការប្រមូលថ្លៃចោលសំរាម និងការស្រង់ថ្លៃដើមមកវិញ ក៏ដូចជាការបង្កើនការយល់ដឹងជាសាធារណៈ និងការចូលរួមពីសំណាក់ ប្រជាពលរដ្ឋតាមរយៈជំនួយបច្ចេកទេស មុននឹងធ្វើការវិនិយោគលើហេដ្ឋារចនាសម្ព័ន្ធនានា។ ការកសាងសមត្ថភាពនិងជំនួយបច្ចេកទេសនឹងផ្តោតការយកចិត្តទុកដាក់លើការកែលម្អនូវប្រតិបត្តិការរបស់វិស័យឯកជន តាមរយៈការផ្តល់សេវាប្រឹក្សាយោបល់ក្នុងការប្រតិបត្តិ។ ការអនុវត្តបែបនេះ វាមានលក្ខណៈល្អសមស្របទៅនឹងការអនុវត្តជាអន្តរជាតិ នៃសេវាកម្មគ្រប់គ្រងសំណល់រឹងដោយរដ្ឋាភិបាលក្នុងស្រុក ដើម្បីធានាថាប្រជាពលរដ្ឋអាចផ្តល់យោបល់កែលម្អដោយផ្ទាល់ទៅលើសេវាកម្មដែលផ្តល់ឱ្យពួកគេ។

គម្រោងនេះមានសមាសភាគសំខាន់ៗចំនួនបី និងសមាសភាគមួយចាំបាច់ដែលនឹងត្រូវអនុវត្តក្នុងរយៈពេលប្រាំមួយឆ្នាំខាងមុខ ដែលមានឈ្មោះដូចខាងក្រោម៖

សមាសភាគ**ទី១៖** ការអភិវឌ្ឍន៍ និងការពង្រឹងច្បាប់ បទបញ្ញត្តិ គោលនយោបាយជាតិ និង ក្របខ័ណ្ឌស្ថាប័នសំរាប់គ្រប់គ្រងសំណល់រឹង និងប្លាស្ទិក

សមាសភាគ**ទី២៖** ការគ្រប់គ្រងសំណល់រឹង និងប្លាស្ទិករួមបញ្ចូលគ្នា ការរៀបចំផែនការ ការត្រួតពិនិត្យ និងការកសាងសមត្ថភាព សម្រាប់ទីក្រុងដែលត្រូវបានជ្រើសរើសក្នុងការចូលរួមក្នុងគម្រោង

សមាសភាគ**ទី៣៖** ហេដ្ឋារចនាសម្ព័ន្ធគ្រប់គ្រងសំណល់រឹង និងប្លាស្ទិក

សមាសភាគ**ទី៤ ៖** ការឆ្លើយតបពេលមានអាសន្នបន្ទាន់។

<u>សមាសភាគទី១៖ ការអភិវឌ្ឍ និងការពង្រឹងច្បាប់ បទបញ្ញត្តិ គោលនយោបាយជាតិ និងក្រប ខ័ណ្ឌស្ថាប័នគ្រប់គ្រងសំណល់រឹង និងប្លាស្ទិក</u>

អនុវត្តកម្មវិធីសកម្មភាពនានាក្នុងគោលបំណងអភិវឌ្ឍ និងពង្រឹងច្បាប់បទបញ្ញាត្តិគោលនយោបាយ និងក្របខ័ណ្ឌស្ថាប័នដែលទាក់ទងទៅនឹងការគ្រប់គ្រងសំណល់រឹងនិងសំណល់ប្លាស្ទិករួមមាន៖ (**ក**) ការអភិវឌ្ឍន៍ និងការពង្រឹងច្បាប់ បទប្បញ្ញត្តិ អនុក្រឹត្យ គោលនយោបាយ និងគោលការណ៍ណែនាំផ្សេងៗដែលទាក់ទងជាមួយនឹងការគ្រប់គ្រងសំណល់រឹងដែលរួមមាន (i) ការចាត់ថ្នាក់កាកសំណល់ ការធ្វើផែនការ ការរៀបចំរបាយការណ៍ ការត្រួតពិនិត្យ ការដាក់អោយអនុវត្តការប្រមូលកាកសំណល់តាមជនបទនិងតាមសហគមន៍ និងការគ្រប់គ្រងទិន្នន័យ និង (ii) ការគណនាថ្លៃប្រមូលកាកសំណល់និងប្រព័ន្ធគណនេយ្យ និងហិរញ្ញវត្ថុនៃកាកសំណល់ (**ខ**) ការអភិវឌ្ឍន៍ និងការពង្រឹងច្បាប់នានាដែលពាក់ព័ន្ធបទប្បញ្ញត្តិ អនុក្រឹត្យ គោលនយោបាយ និងគោលការណ៍ណែនាំដែលពាក់ព័ន្ធទៅនឹងការគ្រប់គ្រងប្លាស្ទិកដើម្បីបង្កើនការកាត់បន្ថយ ការ

ប្រើប្រាស់ឡើងវិញ និងការកែច្នៃប្លាស្ទិក; (**គ**) ការកសាងសមត្ថភាពស្ថាប័នពាក់ព័ន្ធរួមមាន ក្រសួងបរិស្ថាន (MOE) ក្រសួងមហាផ្ទៃ(MOI) និងក្រសួងសាធារណការនិងដឹកជញ្ជូន(MPWT)។

<u>សមាសភាគទី២៖ ការគ្រប់គ្រងសំណល់រឹង និងប្លាស្ទិករួមបញ្ចូលគ្នា ការរៀបចំផែនការ ការត្រួតពិនិត្យ និងការកសាងសមត្ថភាពសម្រាប់ក្រុងដែលត្រូវបានជ្រើសរើសចូលរួមក្នុងគម្រោង</u>

អនុវត្តកម្មវិធីសកម្មភាពនានាដែលរួមចំណែកកសាងសមត្ថភាពរបស់ក្រុង ដែលត្រូវបានជ្រើសរើសចូលរួមក្នុងគម្រោងគ្រប់គ្រងសំណល់រឹង និងប្លាស្ទិកដោយរួមបញ្ចូលការគាំទ្រលើ៖ (**ក**) ការរៀបចំផែនការគ្រប់គ្រងសំណល់រឹងនិងប្លាស្ទិក សេវាប្រឹក្សាប្រតិបត្តិ និងការរចនាសូចនាករលើការអនុវត្តសម្រាប់កិច្ចសន្យាគ្រប់គ្រងកាកសំណល់; (**ខ**) ការអភិវឌ្ឍន៍ប្រព័ន្ធព័ត៌មានលើកាកសំណល់ ហិរញ្ញវត្ថុ និងភូមិសាស្ត្រសម្រាប់ការប្រមូលថ្លៃសេវា (កាកសំណល់) ដើម្បីបង្កើនការប្រមូលថ្លៃដើមឡើងវិញ; និង (**គ**) ការគ្រប់គ្រងដំណើរប្រតិបត្តិការ ការផ្សព្វផ្សាយជាសាធារណៈ ការយល់ដឹង ការអប់រំនិងសកម្មភាពចូលរួមនានារបស់ប្រជាពលរដ្ឋ។

សមាសភាគ**ទី២** គឺសម្រាប់ក្រុង/ស្រុកណាដែលឆ្លើយតបតាមលក្ខខណ្ឌវិនិច្ឆ័យក្នុងការទទួលបានសិទ្ធិដើម្បី៖ (**ក**) កែទម្រង់វិស័យគ្រប់គ្រងសំណល់រឹង(SWM) ស្របតាមអនុក្រឹត្យលេខ១១៣ របស់កម្ពុជាស្តីពី ការគ្រប់គ្រង សំណល់រឹងតាមទីប្រជុំជន ដែលក្រុងទាំងនោះជាអ្នកទទួលខុសត្រូវលើការគ្រប់គ្រងសំណល់រឹង; (**ខ**) កែទម្រង់ប្រតិបត្តិការសំណល់រឹង ជាពិសេសពិនិត្យឡើងវិញនូវកិច្ចសន្យាជាមួយក្រុមហ៊ុនប្រមូលសំរាមឯកជនដើម្បីរួមបញ្ចូលសូចនាករ លើការអនុវត្តសំខាន់ៗ ផែនការប្រតិបត្តិការ និងតម្រូវការឱ្យមានដាក់ជូនរបាយការណ៍ទៅក្នុងកិច្ចសន្យា រួមជាមួយនឹង ការបង្កើតខ្នង់ចំណាយលើសេវាកម្មទាំងនេះនៅក្នុងកិច្ចសន្យា; (**គ**) ព្រមព្រៀងដោយផ្តល់សិទ្ធិដល់រដ្ឋបាលក្រុងក្នុងការត្រួតពិនិត្យក្រុមហ៊ុនប្រមូលសំណល់រឹងឯកជន ហើយរដ្ឋាភិបាលជាអ្នកទទួលខុសត្រូវលើការប្រមូលថ្លៃសេវាប្រមូលកាកសំណល់តាមគ្រួសារ និងអាជីវកម្មដែលចំណូលទាំងនោះនឹងត្រូវប្រើប្រាស់ដើម្បីបង់ទៅឱ្យក្រុមហ៊ុនឯកជន សម្រាប់ការប្រមូលការដឹកជញ្ជូនប្រព្រឹត្តិកម្ម និងប្រព័ន្ធទុកដាក់កាកសំណល់; (**ឃ**) បង្កើតផែនការ (ដែលអាចអនុវត្តទៅបាន) ស្តារការស្រង់ថ្លៃដើមឡើងវិញសម្រាប់សេវាកម្មសំណល់រឹង។

<u>សមាសភាគទី៣៖ ហេដ្ឋារចនាសម្ព័ន្ធគ្រប់គ្រងសំណល់រឹង និងប្លាស្ទិក</u>

អនុវត្តកម្មវិធីសកម្មភាពសម្រាប់ក្រុងទាំងឡាយនៅក្នុងគម្រោង និងស្រុកដែលត្រូវបានជ្រើសរើសរួមបញ្ចូល៖ (**ក**) ការរៀបចំ និងការសាងសង់ហេដ្ឋារចនាសម្ព័ន្ធគ្រប់គ្រងសំណល់រឹង និង ប្លាស្ទិក សម្រាប់ការប្រមូលអោយបានត្រឹមត្រូវ ការផ្ទេរ ប្រព្រឹត្តកម្ម/កែច្នៃឡើងវិញ និងការទុកដាក់សំណល់រឹងនិងប្លាស្ទិកដោយរួមមានទីលាន ទុកដាក់សំរាម ស្ថានីយ៍ផ្ទេរ និងទីកន្លែងសម្រាប់ប្រព្រឹត្តកម្មកាកសំណល់នៅពាក់កណ្តាលទី ដូចជាកន្លែងញែកកាកសំណល់ជាប្រភេទផ្សេងៗពីគ្នា និងកន្លែងធ្វើជីកំប៉ុស រួមទាំងផ្លូវចូលទៅកាន់ទីតាំងឱ្យមានភាពងាយស្រួល ក៏ដូចជាដំណោះស្រាយបញ្ហាចម្លងរោគនៅកន្លែងចាក់សំរាមចាស់; (**ខ**) ការផលិតឯកសារណែនាំដែលពាក់ព័ន្ធនានាដូចជាបទប្បញ្ញត្តិទាក់ទងនឹងទីលានទុកក់សំរាម ស្តង់ដារក្នុងការរចនានិងប្រតិបត្តិការលើទីលានទុកដាក់សំរាម រួមជាមួយនឹងគំរូកិច្ចសន្យានិងសៀវភៅណែនាំសម្រាប់ការគ្រប់គ្រងនិងប្រតិបត្តិការទីលានទុកដាក់សំរាម។

លក្ខណៈវិនិច្ឆ័យដើម្បីទទួលបានសិទ្ធិចូលរួមនៅក្នុងសមាសភាគទី៣ ផ្អែកលើ៖ (i) តម្រូវការលើខ្នង់ចំណាយសមស្របចំពោះហេដ្ឋារចនាសម្ព័ន្ធប្រព្រឹត្តិកម្ម និងកន្លែងទុកដាក់សំណល់រឹង ដែលអាចទទួលយកបរិមាណសំណល់ដែលប្រមូលបានពីប្រជាជនច្រើនជាង ១០០.០០០(ដប់ម៉ឺន)នាក់; (ii) មានឆន្ទៈចូលរួមក្នុងការស្រង់ថ្លៃដើមឡើងវិញ ដែលយ៉ាងហោចណាស់ថ្លៃសម្រាប់ចំណាយប្រតិបត្តិការនៃការចោលសំរាម និងការគ្រប់គ្រងកន្លែងចាក់សំរាមស្របតាមកិច្ចសន្យាដែលរួមបញ្ចូលក្នុងសូចនាករលើការអនុវត្ត; (iii) ត្រូវមានទីតាំងធំគ្រប់គ្រាន់សម្រាប់ធ្វើជាទីលានទុកដាក់សំរាម និងហេដ្ឋារចនាសម្ព័ន្ធប្រព័ន្ធប្រព្រឹត្តកម្មផ្សេងទៀត ស្របតាមក្របខណ្ឌបរិស្ថាន និងសង្គមរបស់ធនាគាពិភពលោក (WB ESF)។

ការវិនិយោគលើទីលានទុកដាក់សំរាមអនាម័យ គឺផ្អែកលើកន្លែងចាក់សំរាមបែបទំនើប ដោយរួមទាំងហេដ្ឋារចនាសម្ព័ន្ធផ្សេងៗដូចជា៖ (i) ទីតាំងរណ្តៅសំរាមនិងទីតាំងអាចពង្រីកបន្ថែមបាន ដែលមានសមត្ថភាពគ្រប់គ្រាន់សម្រាប់ទុកដាក់សំរាមពី ១០ឆ្នាំ ទៅ ២០ឆ្នាំ (ii) ប្រព័ន្ធការពារជម្រាបផ្នែកបាត; (iii) បណ្តាញផ្លូវខាងក្នុងតំបន់ទីលានទុកដាក់សំរាម (iv) ប្រព័ន្ធប្រមូលទឹកស្អុយ ប្រព័ន្ធបញ្ចេញបញ្ចូល និងប្រព័ន្ធប្រព្រឹត្តកម្ម (v) ប្រព័ន្ធប្រមូលឧស្ម័នទីលាន (vi) ច្រកចេញចូលនិងអគាររដ្ឋបាល (vii) ស្ពានជញ្ជីងថ្លឹងទំងន់ (viii) យានដ្ឋាន និងរោងជាង។

ទីកន្លែងទាញយកវត្ថុធាតុមកប្រើប្រាស់ឡើងវិញ ស្ថានីយ៍ផ្ទេរ និងទីតាំងផលិតជីកំប៉ុស្តក៏ត្រូវបានគ្រោងឡើងក្នុងគោលបំណងដូចខាងក្រោម៖

ក. ការទាញយក និងការប្រើប្រាស់ឡើងវិញនូវវត្ថុធាតុដែលអាចកែច្នៃឡើងវិញបាន

ខ. ការបង្កើត និងការបន្តជីវភាពរស់នៅដោយពឹងផ្អែកលើសំណល់

គ. ការកាត់បន្ថយបរិមាណនៃសំណល់ដែល ត្រូវបោះចោលក្នុងទីលាន

ឃ. ការកាត់បន្ថយលើការបង្កើតឧស្ម័នផ្ទះកញ្ចក់ (GHG)។

វត្ថុធាតុដែលអាចកែច្នៃឡើងវិញបានត្រូវបានញែកចេញនៅស្ថានីយ៍ផ្ទេរសំរាម ឬដឹកជញ្ជូនចេញទៅក្រុមហ៊ុនទទួលទិញ ដែលប្រការនេះនឹងធ្វើឱ្យសំរាមនៅទីលាននៅសល់តែសំណល់ដែលមិនអាចកែច្នៃបាន។ អ្នករើសសំរាមនឹងត្រូវរៀបចំឱ្យនៅទីកន្លែងញែកសំរាម ដើម្បីអនុញ្ញាតឱ្យពួកគាត់នៅតែអាចបន្តរកវត្ថុធាតុដែលអាចកែច្នៃបាននៅទីកន្លែងញែកសំរាមប្រកបដោយសុវត្ថិភាព(MRF) ហើយនឹងធ្វើឱ្យអ្នករើសសំរាមទាំងនោះមានសុវត្ថិភាពជាងមុន ហើយអាចការពារពួកគាត់ពីហានិភ័យសុខភាពផ្សេងៗបាន។

ទីតាំងផលិតជីកំប៉ុសក៏នឹងជួយកាត់បន្ថយបរិមាណសំរាម ការសាយភាយឧស្ម័ន ផ្ទះកញ្ចក់និងបង្កើតប្រភពចំណូលចេញពីសំណល់ និងការផលិតជីកំប៉ុសដែលអាចប្រើប្រាស់សម្រាប់សួនសាធារណៈ សួនច្បារ និងគម្របទីលាន ហើយអាស្រ័យលើគុណភាពរបស់ជីកំប៉ុសផ្ទាល់គេក៏អាចប្រើប្រាស់ក្នុងវិស័យកសិកម្មផងដែរ។

<u>សមាសភាគទី៤ ៖ ការឆ្លើយតបពេលមានអាសន្នបន្ទាន់</u>

សមាសភាគដែលមិនត្រូវការចំណាយនេះ ត្រូវបានរចនាឡើងដើម្បីផ្តល់ការឆ្លើយតបភ្លាមៗចំពោះវិបត្តិផ្សេង ៗ ឬភាពអាសន្ននានាតាមតម្រូវការជាក់ស្តែង។

<u>ក្របខណ្ឌច្បាប់ និងស្ថាប័ន</u>

គោលនយោបាយជាតិ ច្បាប់ និងបទប្បញ្ញត្តិនៅកម្ពុជា៖ ការរៀបចំការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន និងសង្គមជាបឋមនេះ (P-ESIA) បានប្រកាន់ខ្ជាប់នូវគោលនយោបាយជាតិ ច្បាប់ និង បទប្បញ្ញត្តិ របស់រាជរដ្ឋាភិបាលកម្ពុជា ដែលមានដូចជា៖ (i) អនុក្រឹត្យលេខ ៧២ ស្តីពីកិច្ច ដំណើរការ វាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន (១៩៩៩); (ii) ប្រកាសលេខ ២១ ប្រកាសស្តីពី ចំណាត់ថ្នាក់នៃការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថានសម្រាប់គម្រោងអភិវឌ្ឍន៍ (ឆ្នាំ២០២០); (iii) ប្រកាស លេខ៣៧៦ ស្តីពីគោលការណ៍ណែនាំទូទៅសម្រាប់ការរៀបចំការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន ដំបូង និងពេញលេញ (២០០៩) សៀវភៅណែនាំស្តីពីការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន ក្នុងព្រះរាជាណាចក្រកម្ពុជា (២០២១) ច្បាប់ការងារ (១៩៩៧) ដែលរួមបញ្ចូលបទប្បញ្ញត្តិសម្រាប់ សុវត្ថិភាពសុខភាពការងារ និងតម្រូវការអាយុអាចធ្វើការប្រកាសលេខ ០០២ ស្តីពីប្រភេទនៃមុខរបរ និងការងារស្រាលដែលបានអនុញ្ញាតសម្រាប់កុមារដែលមានអាយុពី១២ឆ្នាំ ទៅ១៥ឆ្នាំ (២០០៨) ប្រកាសលេខ ១០៦ ស្តីពីការហាមឃាត់ កុមារធ្វើការនៅកន្លែងការងារប្រកបដោយគ្រោះថ្នាក់ (២០០៤) ច្បាប់ស្តីពីការទប់ស្កាត់ការជួញដូរមនុស្ស និងអំពើធ្វើអាជីវកម្មផ្លូវភេទ (២០០៨) ច្បាប់ និងបទប្បញ្ញត្តិពាក់ព័ន្ធនានាក្នុងការគ្រប់គ្រងសំណល់រឹង (SWM) ការគ្រប់គ្រង និងការការពារបរិស្ថាន ការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន ពលកម្ម លក្ខខណ្ឌការងារ សុខភាពការងារនិងសុវត្ថិភាព (OHS) ការធ្វើលទ្ធកម្មដីធ្លី និងការតាំងទីលំនៅថ្មី (LAR) ការចូលរួមពីភាគី ពាក់ព័ន្ធនិងការពិគ្រោះ យោបល់ជាធារណៈ ក្រុមងាយរងគ្រោះ និងបេតិកភ័ណ្ឌវប្បធម៌។

ស្តង់ដារច្បាប់អន្តរជាតិ សន្ធិសញ្ញា និងកិច្ចព្រមព្រៀង៖ ESIA បឋមនេះ ត្រូវបានរៀបចំឡើង ស្របតាមក្របខ័ណ្ឌបរិស្ថាន និងសង្គម (២០១៨) និងគោលការណ៍ណែនាំស្តីពីបរិស្ថាន សុខភាព និងសុវត្ថិភាពសម្រាប់ការងារគ្រប់គ្រងសំណល់ (២០០៧) របស់ក្រុមធនាគារពិភពលោក។

<u>ជម្រើសទីតាំងហេដ្ឋារចនាសម្ព័ន្ធ របស់អនុគម្រោង</u>

ទិដ្ឋភាពទូទៅនៃកន្លែងចាក់សំរាមចាស់

កន្លែងចាក់សំរាមចាស់ដែលមានស្រាប់មានទីតាំងស្ថិតក្នុងភូមិអន្លង់ពីរ ឃុំត្រពាំងធំ ស្រុកប្រាសាទ បាគង ខេត្តសៀមរាប នៅលើទីតាំងរណ្តៅដីលើផ្ទៃដីប្រមាណ ៨ ហិកតា។ ទីតាំងខាងលើជាកម្មសិទ្ធ និងដំណើរការដោយស្ថាប័នឯកជនហើយពុំទាន់មានសូចនាករគ្រប់គ្រងការអនុវត្ត និងគ្រប់គ្រងទីលានទុកដាក់សំរាមណាមួយត្រូវបានធ្វើឡើងនៅឡើយទេ។ កន្លែងចាក់សំរាមចាស់នេះ មានព្រំប្រទល់ខាងកើតនិងខាងត្បូងជាវាលស្រែ ខាងជើងនិងខាងលិចជាប់នឹងភូមិអន្លង់ពីរ។

រូបភាពទី១: កន្លែងចាក់សំរាមចាស់ស្ថិតនៅក្នុងភូមិអន្លង់ពីរ ឃុំត្រពាំងធំ (រយៈទទឹង ១៣°១៨′២២″N និង រយៈបណ្តោយ ១០៤°២′២″E)

ចម្ងាយពីរណ្តៅចាក់សំរាម និងស្រះប្រមូលទឹកស្អុយមានចម្ងាយមិនឆ្ងាយពីគ្នា ហើយជាពិសេសនៅតែមខាងជើងឆៀងខាងលិច ដែលមានលំនៅដ្ឋានប្រជាពលរដ្ឋភូមិអន្លង់ពីរនៅជាប់ដោយផ្ទាល់ទៅនឹងស្រះទឹកស្អុយ។ គេសង្កេតឃើញមានអ្នករើសអេតចាយប្រមាណ ២៧៣នាក់ ដែលកំពុងធ្វើការរើសអេតចាយនៅលើទីតាំងនេះ ដែលភាគច្រើនជាប្រជាពលរដ្ឋរស់នៅក្នុងភូមិអន្លង់ពីរ និងភូមិនៅជុំវិញដូចជាភូមិភ្នំដី សួង រកាកំបុត និងល្វា ហើយក៏មានសំណង់តូចៗមួយចំនួននៅលើទីលានទុកដាក់សំរាមផ្ទាល់។

ទីតាំងចាក់សំរាមនេះ បានដំណើរការអស់រយៈពេលជាង១០ឆ្នាំមកហើយ ដោយមានបរិមាណសំណល់ប្រមាណជា ១.០០០.០០០ ម៉ែត្រគូប។ ទីតាំងនេះ មិនមានរណ្តៅដែលត្រូវបានរចនាត្រឹមត្រូវនោះឡើយ ដោយកាកសំណល់គ្រាន់តែត្រូវបានចាក់នៅក្នុងរណ្តៅដីមានស្រាប់ ដោយមិនមានស្រទាប់ការពារផ្សេងៗ និងមិនមានប្រព័ន្ធប្រមូលឬប្រព័ន្ធប្រព្រឹត្តិកម្មទឹកស្អុយទេ។ ការគ្រប់គ្រងបរិស្ថាន ទាំងនៅក្នុងតំបន់ចាក់សំរាមឬនៅក្រៅព្រំដែនទីតាំងហាក់ដូចជានៅមានកម្រិតទាបខ្លាំងណាស់។ សំរាមប្រហែល២៥០ ទៅ ៣០០តោនក្នុងមួយថ្ងៃ ត្រូវបានចាក់ចោលនៅកន្លែងចាក់សំរាមចាស់ជាមួយនឹងអត្រានៃការប្រមូល ដែលបានរាយការណ៍ប្រហែល ៧៦% នៃបរិមាណសរុប។ ផ្ទៃដីទីលានទុកដាក់សំរាមមានទំហំប្រមាណជា៨ហិកតា ដោយមានផ្លូវចូលក្រាលគ្រួសក្រហមប្រវែងប្រមាណជា ៥០០ ម៉ែត្រ ចេញពីផ្លូវជាតិលេខ៦។ ទីលានទុកដាក់សំរាមនេះត្រូវបានគ្រប់គ្រង និងដំណើរការដោយក្រុមហ៊ុនឯកជន (អ្នកប្រមូលសំរាម) ប៉ុន្តែត្រូវបានគ្រប់គ្រងត្រួតពិនិត្យ និងផ្តល់ឱ្យនូវបច្ចេកទេសពាក់ព័ន្ធផ្សេងទៀតដោយរដ្ឋបាលក្រុងសៀមរាបជាមួយនិង មន្ទីរបរិស្ថាន (DOE) ខេត្តសៀមរាប។

<u>ការវាយតម្លៃភាពសាកសមរបស់ទីតាំង</u>

វិធានការកាត់បន្ថយហានិភ័យបរិស្ថាន និងសង្គម គឺត្រូវបានអនុវត្តដើម្បីឱ្យដំណើរការវាយតម្លៃភាពសាកសមនៃទីតាំងដែលអាចធ្វើទៅបាន។ ប្រការនេះនឹងអាចធានាថារាល់គុណប្រយោជន៍និងគុណវិបត្តិនៃទីតាំងដែល

អាចជ្រើសរើសត្រូវបានពិចារណាលម្អិតជាមុន ហើយការប្រឹក្សាពិគ្រោះ យោបល់ត្រូវបានធ្វើឡើងមុនពេលធ្វើការសម្រេចជ្រើសរើសទីតាំងសម្រាប់ដំណាក់កាលសាងសង់នៃអនុគម្រោង។ ទីតាំងនីមួយៗត្រូវបានផ្ទៀងផ្ទាត់ដើម្បីបំពេញលក្ខណៈវិនិច្ឆ័យពី ក្រសួងបរិស្ថាន (MOE) និងគោលការណ៍ណែនាំស្តីពីបរិស្ថាន សុខភាព និងសុវត្ថិភាពរបស់ធនាគារពិភពលោក (EHS) សម្រាប់ការងារគ្រប់គ្រងកាកសំណល់។

ដំណើរការពិនិត្យជ្រើសរើសទីតាំងចែកចេញជា ២ដំណាក់កាល៖ (i) ការរៀបចំគំរូនិងការគូសផែនទីតំបន់ប៉ះពាល់ និង (ii) ការចុះដើរពិនិត្យទីតាំងជាក់ស្តែងជាបន្តបន្ទាប់ដើម្បីប្រមូលព័ត៌មានថ្មីៗ។ ការធ្វើគំរូ ការធ្វើផែនទីតំបន់ប៉ះពាល់ និងការចុះពិនិត្យទីតាំង ត្រូវបានធ្វើឡើងស្របតាមគោលការណ៍ណែនាំស្តីពីការជ្រើសរើសកន្លែងចាក់សំរាម (ឆ្នាំ២០១៦) របស់កម្ពុជា និងគោលការណ៍វិនិច្ឆ័យទីលានទុកដាក់សំរាមរបស់ធនាគារពិភពលោក។

គំរូក្នុងការសម្រេចចិត្តដោយលក្ខណៈពហុវិនិច្ឆ័យចំនួន២៤ ត្រូវបានរួមបញ្ចូល ហើយត្រូវបានបែង ចែកជា ៥ ប្រភេទ៖

១. ការដឹកជញ្ជូន (រួមទាំងចម្ងាយពីតំបន់សេវា និងលក្ខណៈផ្លូវចូល)
២.លក្ខខណ្ឌទីតាំងជាក់ស្តែងសម្រាប់ការអភិវឌ្ឍន៍ទីលានទុកដាក់សំរាម(ភូមិសាស្ត្រ/ជលសាស្ត្រ/ ធារាសាស្ត្រ)
៣. ស្ថានភាពប្រើប្រាស់ដីនាពេលបច្ចុប្បន្ន កម្មសិទ្ធិ និងតំបន់អភិវឌ្ឍន៍
៤. ហេតុប៉ះពាល់លើសង្គម សុវត្ថិភាព និងលទ្ធភាពក្នុងការទទួលយក
៥. បរិស្ថាន និងបេតិកភណ្ឌវប្បធម៌

លក្ខណៈវិនិច្ឆ័យត្រូវបានជ្រើសរើសតាមរយៈដំណើរការដូចខាងក្រោម:

- **ការដាក់ពិន្ទុតាមចំណាត់ថ្នាក់៖** ការដាក់ពិន្ទុជម្រើសជំនួស/ជម្រើសដែលអាចមានសម្រាប់លក្ខណៈវិនិច្ឆ័យនីមួយៗ។ ពិន្ទុដែលបានកំណត់ទៅជម្រើសនីមួយៗគឺជាផលបូកនៃចំណាត់ថ្នាក់របស់វាសម្រាប់លក្ខណៈវិនិច្ឆ័យដែលបានអនុវត្ត។ ពិន្ទុចំណាត់ថ្នាក់ត្រូវបានសម្រួលឱ្យមានមាត្រដ្ឋានដូចគ្នា។
- **ការថ្លឹងថ្លែងនៃលក្ខណៈវិនិច្ឆ័យ៖** ការពិចារណាត្រូវបានធ្វើឡើងលើកត្តាដែលថាលក្ខណៈវិនិច្ឆ័យនីមួយៗមានសារៈសំខាន់ផ្សេងគ្នា។ ដូច្នេះ កត្តានីមួយៗត្រូវបានថ្លឹងថ្លែងដោយផ្អែកលើសារៈសំខាន់របស់វា។

លទ្ធផលជាគំរូរួមមាន ផែនទីកំណត់ទីតាំងទីក្រុងនីមួយៗនិងតំបន់ជុំវិញរបស់វា ជាមួយនឹងកូដពណ៌ដែលសំគាល់ភាពសាកសម ជាបួនប្រភេទ៖ ហាមឃាត់ សាកសមតិចតួច សាកសម សាកសមបំផុត។

ជម្រើស**ទី"0"** ត្រូវបានចាត់ទុកថាជាជម្រើស "មិនធ្វើអ្វីសោះ"។ ដំណើរការពិនិត្យទីតាំងសម្រាប់ខេត្តសៀមរាប បានបង្ហាញថាមានជម្រើសទីតាំងសមស្របចំនួនពីរ សម្រាប់ទីលានទុកដាក់សំរាម។ ជម្រើស**ទី"0"** ជាមួយនិងដំណើរការពិនិត្យទីតាំងនិងក៏លក្ខណៈវិនិច្ឆ័យផ្សេងៗ ក៏ជាផ្នែកនៃដំណើរការពិគ្រោះយោបល់និងធ្វើបច្ចុប្បន្នភាពដោយផ្អែកលើការពិគ្រោះយោបល់។

ជម្រើសទីលានទុកដាក់សំរាមដែលកំពុងត្រូវបានពិចារណាក្រោមការសិក្សារ ESIA បឋមនេះរួមមាន៖ ជម្រើសទី ១ "ការស្តារឡើងវិញ និងពង្រីកទីលានចាក់សំរាមដែលមានស្រាប់នៅក្នុងភូមិអន្លង់ពីរ" និងជម្រើសទី២ "ការបិទទីលានចាក់សំរាមក្នុងភូមិអន្លង់ពីរ និងការសាងសង់ទីលានទុកដាក់សំរាមថ្មីនៅក្នុងភូមិត្រពាំងទឹម"។ លទ្ធផលចេញពីការវិភាគលើជម្រើសទាំងអស់ រួមទាំងជម្រើសទី0 "មិនធ្វើអ្វីទាំងអស់" ត្រូវបានបង្ហាញខាងក្រោម៖

<u>ជម្រើសទី0 - មិនធ្វើអ្វីសោះ</u>

ទីតាំងចាក់សំរាមសព្វថ្ងៃនៅភូមិអន្លង់ពីរ ដែលនាបច្ចុប្បន្នកំពុងដំណើរការគឺជាកន្លែងចាក់សំរាមបើកចំហ។ នៅក្រោមសេណារីយ៉ូ "មិនធ្វើអ្វីទាំងអស់" កន្លែងចាក់សំរាមក្នុងភូមិអន្លង់ពីរនេះ នឹងបន្តបង្កហានិភ័យដល់សង្គម សុខភាពកម្មករ សហគមន៍ និងបរិស្ថានជុំវិញ។ កន្លែងចាក់សំរាមនេះ មានចម្ងាយប្រហែល ២០០-៣០០ម៉ែត្រ ពីលំនៅដ្ឋានដែលនៅជិតបំផុត ហើយបើគិតពីស្រះទឹកសម្អុយសព្វថ្ងៃគឺកាន់តែជិតទៅទៀត។ ទីតាំងចាក់សំរាមបច្ចុប្បន្ននេះ ព័ទ្ធជុំវិញដោយវាលស្រែ និងលំនៅដ្ឋានប្រជាពលរដ្ឋ។

ឧស្ម័នផ្ទះកញ្ចក់ (មេតាន) នឹងបន្តបញ្ចេញដោយគ្មានការត្រួតពិនិត្យ ហើយទឹកសម្អុយទីលានដែលមិនបានគ្រប់គ្រងត្រឹមត្រូវនឹងបន្តហូរចូលទៅទឹកក្នុងដី និងលើផ្ទៃទឹក ក្លិនស្អុយ សំរាមប៉ើងតាមខ្យល់ និងភ្នាក់ងារចម្លងជំងឺ (កណ្តុរ រុយជាដើម) ដែលកត្តាទាំងនេះនឹងបន្តបង្កហេតុប៉ះពាល់ដល់កម្មករ អ្នករើសអេតចាយ និងសហគមន៍ជុំវិញដោយបង្កជាហានិភ័យសុខភាពដល់សហគមន៍ សង្គម និងសុខភាពសាធារណៈ។ គេសង្កេតឃើញមានអ្នករើសសំរាមប្រមាណជា ២៧៣នាក់ នៅទីតាំងចាក់សំរាមបច្ចុប្បន្នដែលក្នុងនោះមាន ១០០នាក់ជាបុរស និង១៧៣នាក់ ជានារី។ ក្នុងចំណោមនេះ គេក៏សង្កេតឃើញមានក្មេងៗជាអ្នករើសសំរាមផងដែរ ដែលប្រមាណជា ៤៥នាក់មានគ្រួសារត្រឹមត្រូវ ហើយ១៥នាក់ទៀតជាក្មេងកំព្រា។

តារាងទី១ សេចក្តីសង្ខេបពីការព្រួយបារម្ភលើបរិស្ថាន សង្គម និងសុខភាពសាធារណៈនៅកន្លែងចាក់សំរាមចាស់ដែលនឹងបន្តកើតមានក្រោមសេណារីយ៉ូ "មិនធ្វើអ្វីទាំងអស់"

បរិស្ថាន	• ទីតាំងដែលមានស្រាប់មិនអនុលោមតាមស្តង់ដារជាតិនិង/ឬស្តង់ដារហេដ្ឋារចនាសម្ព័ន្ធអប្បរមាទីលានទុកដាក់សំរាមអនាម័យអន្តរជាតិនិង ស្តង់ដារ ប្រតិបត្តិការ • ទីតាំងនេះមិនមានការរចនារណ្តៅសំរាមត្រឹមត្រូវ ប្រព័ន្ធប្រមូលទឹកសម្អុយ ប្រព័ន្ធលូទឹកភ្លៀងនិងប្រព្រឹត្តកម្មទឹកសម្អុយ ដែលបង្កហេតុប៉ះពាល់បរិស្ថានដល់គុណភាពទឹកលើផ្ទៃដីនិងទឹកក្រោមដីតាមរយៈការបង្ហូរទឹកសម្អុយ ដែលមិនមានការគ្រប់គ្រងនិងមិនបានប្រព្រឹត្តកម្មត្រឹមត្រូវ • កង្វះគម្របបណ្តោះអាសន្ន និងគ្មានការបិទគម្របពេលរណ្តៅពេញ បង្កឱ្យប៉ះពាល់ដល់គុណភាពខ្យល់និងបរិស្ថានជុំវិញតាមរយៈក្លិន ការបញ្ចេញឧស្ម័នផ្ទះកញ្ចក់ រុយ និងសំរាមប៉ើងតាមខ្យល់ • អគ្គីភ័យកើតឡើងជាទូទៅតាមរយៈកង្វះការគ្រប់គ្រងកន្លែងចាក់សំរាមឱ្យបានត្រឹមត្រូវ ដែលប្រការនេះធ្វើឱ្យប៉ះពាល់ដល់គុណភាពខ្យល់បន្ថែមទៀត។ ក្លិន ធូលី និងផ្សែងគឺជាបញ្ហា ធ្ងន់ធ្ងរដែលពុំទាន់គ្រប់គ្រងបានត្រឹមត្រូវ

	• សំណល់ផ្លាស្ទិកមានប្រហែលជា 10% នៃកាកសំណល់សរុបហើយអាចបង្កជាហេតុប៉ះពាល់តាមរយៈការរាំងខ្ទប់លំហូរទឹកសម្អុយ អាចបង្កការបំពុលខ្យល់ចេញពីការដុតសំណល់ផ្លាស្ទិកប៉ះពាល់ដល់ប្រព័ន្ធអេកូឡូស៊ី។ ការកែច្នៃឡើងវិញឃើញមានតែលើប្លាស្ទិក ដបប្លាស្ទិក និងកំប៉ុងអាលុយមីញ៉ូមប៉ុណ្ណោះ។ ការកែច្នៃសំណល់រឹងទីក្រុងគឺស្ទើរតែគ្មានសោះ • ការចោលកាកសំណល់គ្រោះថ្នាក់ដោយមិនមានការគ្រប់គ្រង បើទោះជាការគ្រប់គ្រងសំណល់ទាំងនោះត្រូវបានបញ្ចូលដោយច្បាប់និងបទប្បញ្ញត្តិក៏ដោយ ប៉ុន្តែការអនុវត្តមិនត្រូវបានធ្វើឡើងនោះទេ។ កាកសំណល់វេជ្ជសាស្ត្រត្រូវបានតម្រូវឱ្យបោះចោលដាច់ដោយឡែក។ ប្រការទាំងនេះបង្កហេតុប៉ះពាល់ដល់កន្លែងចាក់សំរាមបូករួមទាំងគុណភាពទឹក និងផ្តល់ជាហានិភ័យដល់សុខភាពសាធារណៈ ជាពិសេសទៅដល់អ្នកភូមិដែលជាធម្មតាពឹងផ្អែកលើទឹកក្រោមដីឬទឹកលើដីសម្រាប់ការប្រាស្រ័យប្រចាំថ្ងៃ រួមនឹងការបំពុលទឹកដែលប៉ះពាល់ដល់សុខភាព និងសុវត្ថិភាពសហគមន៍ • សំឡេងរំខាននិងការបំពុលចេញពីកន្លែងផ្ទេរសំរាមដែលគ្រប់គ្រងមិនបានល្អ (TPS) ក្នុងក្រុងសៀមរាបដែលជាដើមហេតុបង្កជាបញ្ហាបរិស្ថានជាច្រើននៅកន្លែងចាក់សំរាម និងតាមរយៈការដឹកជញ្ជូនសំរាមតាមឡានដែលពុំមានគម្របត្រឹមត្រូវ។
សង្គម	• មិនមានការត្រួតពិនិត្យលើអ្នករើសសំរាម (ក្រៅផ្លូវការ) ដែលធ្វើការនៅកន្លែងចាក់សំរាម ហើយក៏មិនមានបទប្បញ្ញត្តិដាក់ចេញដែលធានាសុខភាព និងសុវត្ថិភាពរបស់ពួកគេនោះទេ។ អ្នករើសសំរាមភាគច្រើនជាស្ត្រី និងកុមារ ហើយអ្នករើសសំរាមមួយចំនួនរស់នៅកន្លែងចាក់សំរាម ឬក្បែរកន្លែងចាក់សំរាម ហើយទទួលបានប្រាក់ចំណូលចម្បងរបស់ពួកគេចេញពីការរើសសំរាម • សហគមន៍ដែលរស់នៅក្បែរកន្លែងចាក់សំរាម និងតាមបណ្តោយផ្លូវដឹកជញ្ជូនកាកសំណល់ត្រូវបានរងហេតុប៉ះពាល់ជាប្រចាំដោយការបំពុលពីទីតាំង SWM និងប្រតិបត្តិការប្រចាំថ្ងៃនៅទីតាំងទីលានដែលរួមបញ្ចូលការបំពុលបរិយាកាសពីការដុតសំរាម និងផ្សែងរថយន្ត ការបំពុលពីសំឡេងឡានដឹកសំរាម និងការបំពុលប្រភពទឹក • កង្វះខាតការគ្រប់គ្រងក្នុងការចេញចូល ទៅកាន់តំបន់គ្រោះថ្នាក់ដែលអាចបង្កហានិភ័យដល់សុខភាពនិងសុវត្ថិភាពរបស់អ្នករើសសំរាម និងសមាជិកដទៃទៀតនៃសហគមន៍ជុំវិញនោះ • សហគមន៍មានការយល់ដឹងតិចតួចអំពីតួនាទីនិងទំនួលខុសត្រូវរបស់ពួកគេក្នុងការចូលរួមធ្វើឱ្យការគ្រប់គ្រងសំណល់រឹងបានល្អ ការបែងចែកសំណល់ ការកាត់បន្ថយកាកសំណល់និងការកែច្នៃឡើងវិញ (3R)។ ការដុតសំរាម ការបោះចោលក្នុងទីសាធារណៈ និងតាមផ្លូវទឹក គឺជាទម្លាប់ទូទៅ។ យុទ្ធនាការផ្សព្វផ្សាយការយល់ដឹងជាសាធារណៈនៅមានកម្រិត។

សុខភាព-សុវត្ថិភាពសាធារណៈនិងសហគមន៍ និង OHS	• ដំណើរការមិនល្អនៅទីលានទុកដាក់សំរាមក៏ដូចជាការទុកដាក់កាកសំណល់មិនល្អ បណ្តាលឱ្យមានស្ថានភាពគ្រោះថ្នាក់នៅតាមរណ្តៅសំរាម ដែលក្នុងករណីខ្លះគំនរសំរាមមិនមានភាពស្ថិត ស្ថេរដែលងាយនឹងដួលរលំហើយបង្កហានិភ័យដល់កម្មករអ្នករើសសំរាមនិងសហគមន៍ជុំវិញ • កង្វះការបណ្តុះបណ្តាលការយល់ដឹងនិងការផ្តល់ឱ្យនូវឧបករណ៍សុវត្ថិភាព (PPE) បង្កហានិភ័យដល់កម្មករប្រមូលសំរាម និងអ្នករើសសំរាម • ការចោលសំរាមគ្រោះថ្នាក់ខុសច្បាប់ ជាពិសេសសំណល់មន្ទីរពេទ្យនៅកន្លែងចាក់សំរាមធ្វើឱ្យមានហានិភ័យដល់សុខភាព និងសុវត្ថិភាពរបស់កម្មករ និងអ្នករើសសំរាម • ស្ថានីយ៍ផ្ទេរ និងមធ្យោបាយដឹកជញ្ជូនដែលដំណើរការមិនល្អអាចបង្កហានិភ័យដល់សុខភាព និងសុវត្ថិភាពរបស់កម្មករ និងអ្នករើសសំរាម។

<u>ជម្រើសទី ១៖ ការស្តារឡើងវិញនិងពង្រីកកន្លែងចាក់សំរាមចាស់នៅភូមិអន្លង់ពីរ ឃុំត្រពាំងធំ</u>

ក្រោមជម្រើសនេះ កន្លែងចាក់សំរាមចាស់គួរស្តារឡើងវិញ ហើយក៏ត្រូវពង្រីកបន្ថែមជាមួយនឹងការសាងសង់រណ្តៅសំរាមថ្មី និងហេដ្ឋារចនាសម្ព័ន្ធដែលពាក់ព័ន្ធផ្សេងៗនៅលើទីធ្លាដែលមានស្រាប់តាមរយៈការស្តារឡើងវិញក៏ដូចជានៅលើដីនៅជាប់ក្បែរខាង។ ជម្រើសនេះគឺធ្វើការស្តារកន្លែងចាក់សំរាមចាស់ឡើងវិញ ការកសាងប្រព័ន្ធប្រមូលទឹកសម្អុយទីលាន ប្រព័ន្ធសម្អាត/ប្រើប្រាស់ ឧស្ម័នទីលាន ការញែក ការផលិតជីកំប៉ុស្ត និងហេដ្ឋារចនាសម្ព័ន្ធផ្សេងៗទៀត ដោយកែទម្រង់និងរក្សាស្ថេរភាពគំនរសំរាមដែលមានស្រាប់ ក៏ដូចជាពង្រីកកន្លែងចាក់សំរាមឱ្យបានឆ្ងាយពីភូមិក្បែរខាង។

កន្លែងចាក់សំរាមចាស់ចាំបាច់ត្រូវការស្តារឡើងវិញ បើទោះជាវាត្រូវបិទដំណើរការ (ក្រោមជម្រើសទី២ខាងក្រោម) ឬត្រូវពង្រីកបន្ថែមសម្រាប់ប្រើប្រាស់ជាទីលានទុកដាក់សំរាមបន្តដើម្បីការពារហេតុប៉ះពាល់ដល់បរិស្ថានដែលនឹងបន្តកើតមាន។ តាមរយៈការរចនា និងវិធានការកាត់ បន្ថយ ផ្សេងៗចំពោះស្ថានភាពបំពុលបរិស្ថានបច្ចុប្បន្ន និងហានិភ័យសម្រាប់ សហគមន៍ ជុំវិញនឹងត្រូវបានធ្វើឱ្យប្រសើរឡើងយ៉ាងខ្លាំង។

ការពង្រីកបន្ថែមទៅលើទីតាំងចាក់សំរាមបច្ចុប្បន្ន ត្រូវបានវាយតម្លៃជាគោលការណ៍ថាអាចធ្វើបាន។ បច្ចុប្បន្នដីនេះត្រូវបានគេប្រើជាដីកសិកម្ម ប៉ុន្តែវាទំនងជារងហេតុប៉ះពាល់ពីការបំពុលរួចទៅហើយ។ រហូតមកដល់ពេលនេះ មិនមានសំណង់លំនៅដ្ឋាននៅលើទីតាំងដីនេះឡើយ។ តំបន់ដែលមានសក្តានុពលក្នុងការពង្រីកថ្មីគឺទៅភាគនិរតី ដែលនឹងសម្រួលទីតាំងចាក់សំរាមឱ្យនៅឆ្ងាយប្រហែល ៤០០ ទៅ ១.០០០+ ម៉ែត្រ ចេញពីតំបន់លំនៅដ្ឋាននៃភូមិអន្លង់ពីរក្បែរនោះ ដែលស្ថិតនៅភាគខាងជើងឆៀងខាងលិចនៃទីតាំងបច្ចុប្បន្ន។ ស្រះទឹកសម្អុយដែលនៅជិតលំនៅដ្ឋានប្រជាពលរដ្ឋនឹងត្រូវបានកែសម្រួល។ ការវាយតម្លៃលម្អិតចាំបាច់ត្រូវធ្វើឡើងសម្រាប់កំណត់ទំហំដីជាក់លាក់ ដែលត្រូវការនៅក្នុងការរចនាលម្អិត និងការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាននិងសង្គមជាក់លាក់ បន្ទាប់ពីកិច្ចព្រមព្រៀង និងការបញ្ចប់ដំណើរការជ្រើសរើសទីតាំងទីលានទុកដាក់សំរាម។

<u>ជម្រើសទី ២៖ ការបិទកន្លែងចាក់សំរាមចាស់នៅភូមិអន្លង់ពីរ និងការអភិវឌ្ឍន៍ទីលានទុកដាក់ សំរាមថ្មីក្នុងភូមិត្រពាំងទឹម ឃុំកណ្តៀក</u>

ទីតាំងសក្តានុពលដែលកំណត់ដោយរដ្ឋបាល ក្រុងសម្រាប់កន្លែងទុកដាក់សំរាមអនាម័យថ្មីមានទីតាំងស្ថិតក្នុងភូមិត្រពាំងទឹម ឃុំកណ្តៀក ស្រុកប្រាសាទបាគង ខេត្តសៀមរាប។ ទីតាំងនេះមានចម្ងាយប្រមាណ ១១ គីឡូម៉ែត្រ ភាគអាគ្នេយ៍នៃក្រុងសៀមរាប។

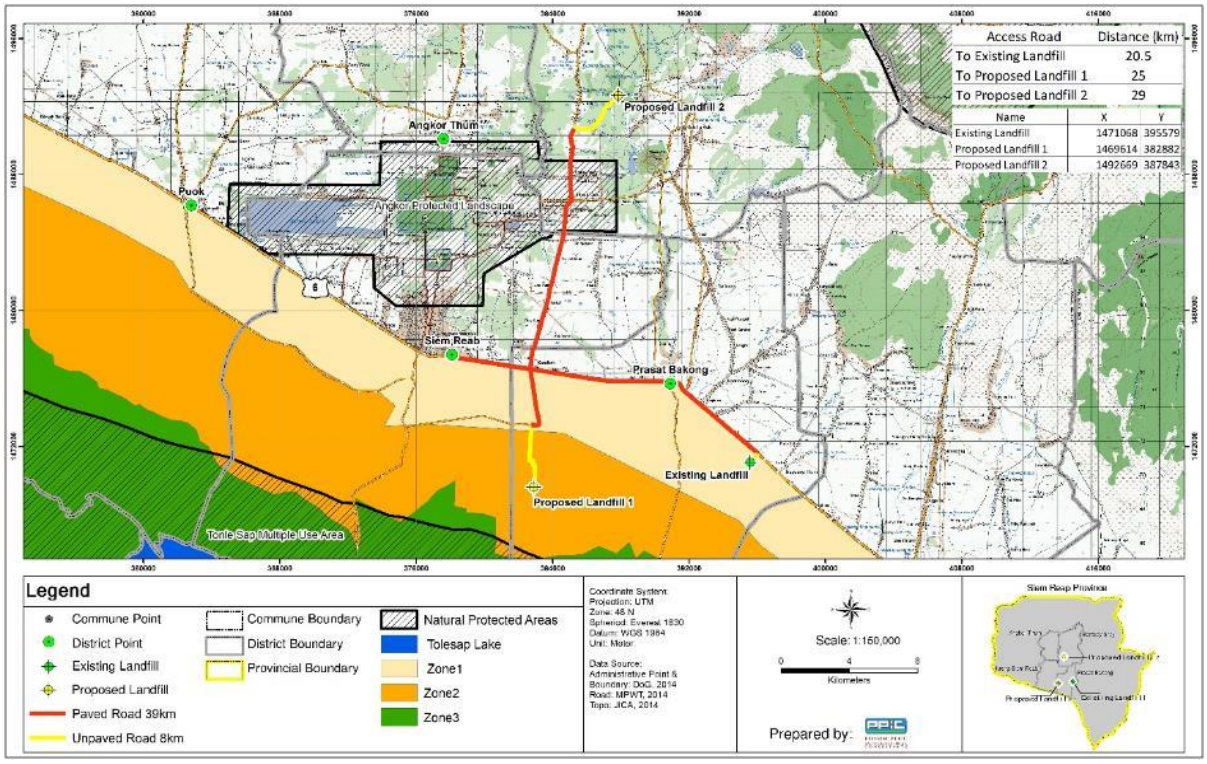
ទីតាំងនេះគឺជាទីវាលបៃតងដែលនៅជាប់នឹងទីតាំងគម្រោងអាងប្រព្រឹត្តិកម្មទឹកស្អុយ (WWTP) ដែលបានស្នើឡើង។ ទីតាំងនេះព័ទ្ធជុំវិញដោយដីកសិកម្មជាពិសេសដំណាំស្រូវ ហើយភូមិដែលនៅជិតបំផុតស្ថិតនៅចម្ងាយជាង២គីឡូម៉ែត្រភាគខាងជើង។ ទីតាំងនេះជាទីតាំងព្រៃរបោះ និងកន្លែងនេសាទសហគមន៍។ វាស្ថិតនៅក្នុងតំបន់ទំនាបដែលមានសណ្ឋានដូចនឹងទីតាំងភាគច្រើនក្នុងខេត្តសៀមរាប ហើយអាចមាននីវ៉ូទឹកក្រោមដីរាក់ដែលគេសង្ស័យថាងាយនឹងរងជំនន់ទឹកភ្លៀង និងទឹកជំនន់វស្សារ។ តាមរយៈការវិភាគស្ថានភាពភូគព្ភ-សាស្ត្រ តំបន់នេះជាតំបន់ដីខ្សាច់លាយដីឥដ្ឋ។ គេសង្កេតឃើញមានទំនប់បង្ការទឹកជំនន់ជាប់ព្រំប្រទល់ប៉ែកខាងត្បូងនៃទីតាំង ដែលត្រូវបានសាងសង់ក្នុងសម័យអាណាចក្រខ្មែរដែលត្រូវបានសង់ឡើងដើម្បីការពារទឹកជំនន់រដូវវស្សារពីបឹងទន្លេសាប។ វត្តមាននៃទំនប់នេះជួយកាត់បន្ថយហេតុប៉ះពាល់នៃទឹកជំនន់រដូវវស្សារ។ បឹងទន្លេសាបស្ថិតនៅភាគខាងត្បូងនៃទីតាំងនេះហើយក៏ជាតំបន់ការពារជីវចម្រុះរបស់អង្គការយូណេស្កូ (UNESCO)។ ទីតាំងមានសក្តានុពលនេះស្ថិតនៅក្នុងតំបន់អភិវឌ្ឍន៍កម្រិត២នៃតំបន់ការពារជីវចម្រុះខាងលើ។ នៅភាគខាងជើងទីតាំងនេះត្រូវបានកំណត់ជាតំបន់សម្រាប់ការអភិវឌ្ឍន៍លំនៅដ្ឋានតម្លៃខ្ពស់ ដែលមានការសាងសង់ចាប់ផ្តើមរួចហើយមានចំងាយប្រហែល ២ គីឡូម៉ែត្រ នៅប៉ែកខាងជើង។

ស្ថានភាពនៃទីតាំងទីលានទុកដាក់សំរាមអនាម័យជម្រើសទី២ ក្នុងភូមិត្រពាំងទឹម ឃុំកណ្តៀក

លក្ខណៈ	បរិយាយ
ទីតាំង	ក្នុងភូមិត្រពាំងទឹម ឃុំកណ្តៀក ស្រុកប្រាសាទបាគង ខេត្តសៀមរាប
កម្មសិទ្ធិ	កម្មសិទ្ធិរដ្ឋ
ទំហំ (ហិចតា)	លម្អិតតាមក្រោយ-តែអាចមានទំហំ ៥០ ហិចតាហើយអាចពង្រីកដល់ ១០០ ហិចតា
ផ្លូវចូល	ផ្លូវគ្រួសក្រហមជាមួយគម្រោងអាងប្រព្រឹត្តកម្មទឹកកខ្វក់
អគ្គីសនី	ជិតស្ថានីយ៍អគ្គីសនី
ប្រភពទឹក	ជិតបឹងទន្លេសាប
បរិយាយទីតាំង	នៅទីទំនាបជាប់បឹងទន្លេសាប ស្ថិតក្នុងតំបន់ការពារ ហើយនៅជុំវិញជាសហគមន៍នេសាទ

រូបភាពទី២ បង្ហាញថាទីតាំងចាក់សំរាមបច្ចុប្បន្នស្ថិតនៅជាយខាងក្រៅនៃតំបន់ទ្រនាប់ទី១ ក្នុងកម្រិតកំណត់ជាតំបន់ការពារជីវចម្រុះជុំវិញបឹងទន្លេសាប ដែលអនុញ្ញាតឱ្យមានការតាំងលំនៅ និងការអភិវឌ្ឍប្រកបដោយចីរភាព។

ទីតាំងមានសក្តានុពលសម្រាប់ធ្វើជាជម្រើសកន្លែងទីលានទុកដាក់សំរាមទី២ មានទីតាំងនៅកណ្តាលតំបន់ទី២ ដែលត្រូវបានកំណត់ជាតំបន់ការពារដែលតម្រូវឱ្យការប្រើប្រាស់ដីមានកម្រិត ដោយមិនរាប់បញ្ចូលការអភិវឌ្ឍន៍កន្លែងទុកដាក់សំរាម។ នៅក្រោមជម្រើសនេះ កន្លែងទុកដាក់សំរាមនឹងត្រូវបានច្របាច់បញ្ចូលគ្នារវាងតំបន់ពង្រីកទីក្រុង និងតំបន់ការពារជីវចម្រុះរបស់អង្គការយូណេស្កូ។



រូបភាពទី៣ ចំងាយនៃជម្រើសទីតាំងសម្រាប់ធ្វើជាទីលានទុកដាក់សំរាមពីតំបន់ការពារជីវចម្រុះបឹងទន្លេសាប

ការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម

ការវាយតម្លៃហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម សម្រាប់ទីតាំងសក្តានុពលនៃក្រុងសៀមរាប ដែលរាប់បញ្ចូលធាតុសំខាន់ៗដូចខាងក្រោម៖

បរិស្ថាន

- ស្តង់ដារបរិស្ថាន
- ភូមិសាស្ត្រ និងសណ្ឋានដី
- ការប្រើប្រាស់ដី
- អាកាសធាតុ
- ជលសាស្ត្រ

សង្គម

- ប្រជាសាស្ត្រ
- ក្រុមងាយរងគ្រោះ និងភាពក្រីក្រ
- ជីវភាព និងការងារ
- របរដែលពាក់ព័ន្ធនិងសំរាម
- ជនពិការ

- គុណភាពទឹក
- គុណភាពខ្យល់
- តំបន់ការពារ និងជីវចម្រុះ
- ព្រៃឈើ
- ពពួកសត្វរស់នៅលើគោក និងក្នុងទឹក
- គុណភាពបរិស្ថាន សំឡេង
- គំហើញ/សោភ័ណភាព
- ជនជាតិដើម/ជនជាតិភាគតិច
- សេវាកម្ម និងមធ្យោបាយសាធារណៈ
- ការអប់រំ
- ទេសចរណ៍
- សុខភាព
- បេតិកភណ្ឌវប្បធម៌

ការវាយតម្លៃជាមូលដ្ឋានលើធាតុសំខាន់ៗនៃបរិស្ថាន និងសង្គមទាំងអស់នេះត្រូវបានបង្ហាញនៅក្នុងជំពូក ៥.១ និងជំពូក៥.២។

បន្ថែមពីនេះទៅទៀត ការស្ទង់មតិសេដ្ឋកិច្ចសង្គមរួមទាំងការប្រមូលទិន្នន័យបឋមត្រូវបានអនុវត្តដោយផ្តោតលើកន្លែងចាក់សំរាមចាស់ និងធាតុសំខាន់មួយចំនួននៅលើទីតាំងមានសក្តានុពលនៅភូមិត្រពាំងទឹម។

ក្មេងនៅកន្លែងចាក់សំរាម

អ្នករើសសំរាមដែលរស់នៅលើតាំងចាក់សំរាម

ការដឹកជញ្ជូនវត្ថុធាតុកែឆ្នៃចេញពីកន្លែងចាក់សំរាម

សកម្មភាពរើសសំរាមពេលយប់

រូបភាពទី៤ រូបភាពបានពីការចុះអង្កេតទីវាលជាក់ស្តែង (២៧ កុម្ភៈ-១ មិនា ២០២១)

- ផ្អែកលើការធ្វើបច្ចុប្បន្នភាពចុងក្រោយដែលប្រមូលបានពីឃុំត្រពាំងធំបានបញ្ជាក់ថា ក្នុងខែមីនា ឆ្នាំ ២០២១ មានអ្នករើសសំរាមសរុបចំនួន ២៧៣ នាក់ ត្រូវបានរកឃើញនៅក្នុងកន្លែងចាក់សំរាមចាស់នៅភូមិអន្លង់ពីរ។ អ្នករើសអេតចាយភាគច្រើនរស់នៅក្នុងភូមិភ្នំដី (៥២.៨%) និងភូមិអន្លង់ពីរ (៤៧.៤%)។ ក្នុងចំណោមអ្នករើសអេតចាយចំនួន ២៧៣ នាក់ ដែលបានកំណត់អត្តសញ្ញាណ ប្រហែល ២ភាគ៣ (៦៤.១%)ជាស្ត្រី។ ភាពខុសគ្នាខ្លាំងនៃអាយុនិងភេទក្នុងចំណោមអ្នករើសអេតចាយគឺនៅចន្លោះអាយុពី២១ទៅ៣០ឆ្នាំ ដែលក្នុងនោះភាគច្រើនជាស្ត្រី។ប្រហែលមួយភាគបួននៃអ្នករើសអេតចាយស្ថិតក្នុងក្រុមដែលមានអាយុវ័យក្មេងដែលក្នុងនោះ ១១.៧% ជាកុមារ (អាយុក្រោម ១៥ឆ្នាំ) និង ១៣.៩% ជាយុវជន (អាយុចន្លោះពី ១៥ ទៅ ២០ឆ្នាំ)។ ក្នុងចំណោមអ្នកទាំងនេះមានចំនួនក្មេងស្រីភាគច្រើនជាពិសេសអ្នកមានអាយុក្រោម១៤ឆ្នាំ។ ដូចគ្នាដែរក្នុងចំណោមមនុស្សពេញវ័យដែលមានអាយុចន្លោះពី ២០ ទៅ ៦០ឆ្នាំមានចំនួនស្ត្រីច្រើនជាងបុរសជិតពីរដង។ ក្នុងចំណោមកុមារទាំង ១៥នាក់ នៃចំនួនសរុប ៥៨នាក់ ជាកុមារកំព្រាដែលក្នុងនោះមាន ៨នាក់ជាក្មេងប្រុស។ កុមារកំព្រាទាំងនេះភាគច្រើនរស់នៅក្នុងភូមិភ្នំដីហើយពួកគេភាគច្រើនជាអ្នកទទួលបានប័ណ្ណក្រីក្រ។ បើទោះបីជាទិន្នន័យដែលបានប្រមូល និងបង្ហាញជាទិន្នន័យមុនការសិក្សារលទ្ធភាពក៏ដោយវាបានបង្ហាញទំនោរភាពងាយរងគ្រោះ និងឱកាសសំខាន់ៗមួយចំនួនរួចទៅហើយដែលរួមមាន៖
- បុគ្គលភាគច្រើនដែលត្រូវបានសម្ភាសន៍គឺជាអ្នកមានលំនៅដ្ឋាននៅក្នុងភូមិជុំវិញ ដែលមិនមែនជាអ្នករស់នៅក្នុងបរិវេណនៃទីតាំងកន្លែងចាក់សំរាមផ្ទាល់ឡើយ។ ករណីនេះនឹងត្រូវបានបញ្ជាក់បន្ថែមទៀតក្នុងដំណាក់កាលសិក្សារលទ្ធភាព និង ESIA បន្ទាប់ពីមានការកំណត់ទីតាំងច្បាស់លាស់។ ទោះបីយ៉ាងណាក៏ដោយ វាបានបង្ហាញថា ការផ្លាស់ទីលំនៅ ដែលទាក់ទងនឹងការបិទ ឬពង្រីកកន្លែងចាក់ សំរាម នឹងអាចមានចំនួនតិចតួចបំផុត។
- អ្នករើសអេតចាយដែលត្រូវបានសម្ភាសន៍ជាទូទៅបាននិយាយថា ពួកគេបានធ្វើការនៅលើកន្លែងចាក់សំរាមចាស់នេះអស់រយៈពេល ១០ឆ្នាំ ឬច្រើនជាងនេះមកហើយ។ ដូច្នេះហើយ សហគមន៍ជុំវិញទំនងជាមានការពឹងផ្អែកខ្លាំងលើកន្លែងចាក់សំរាម ហើយមានការយល់ដឹងច្បាស់លាស់ចំពោះតំបន់នោះ។ ចំពោះវិសាលភាពនៃស្ថានភាពសេដ្ឋកិច្ចផ្អែកលើសំរាម និងអាជីវកម្មនានានៅជុំវិញទីតាំងចាក់សំរាម(រួមទាំងម្ចាស់ឃ្លាំងអេតចាយ ឈ្មួញកណ្តាល អ្នកដឹកជញ្ជូននិង អាជីវកម្មដែលពាក់ព័ន្ធផ្សេងៗទៀត) គឺចាំបាច់ត្រូវសិក្សារបន្ថែមឱ្យកាន់តែច្បាស់ ហើយបើទោះបីជាជម្រើសណាមួយត្រូវបានជ្រើសរើស ដែលតម្រូវឱ្យមានការបិទកន្លែងចាក់សំរាមចាស់ត្រូវរាប់បញ្ចូលទាំងហេតុប៉ះពាល់ដល់ជីវភាពរស់នៅ ក៏ដូចជាហេតុប៉ះពាល់ពីការផ្លាស់ទីលំនៅ ក្នុងសហគមន៍ទាំងមូល។តាមរយៈការពិគ្រោះយោបល់ជាបឋមក្នុងអំឡុងពេលចុះវាយតម្លៃភាពសាកសមនៃទីតាំង បានបង្ហាញពីមតិភាគច្រើនបាន គាំទ្រការបន្តដំណើរការទីលាន ចាក់សំរាមចាស់បន្តទៅទៀត តែព័ត៌មានបន្ថែមដែលផ្តល់ដោយអាជ្ញាធរមូលដ្ឋាន និងភាគីពាក់ព័ន្ធបានបង្ហាញថាប្រជាពលរដ្ឋមូលដ្ឋានបានស្នើរសុំឱ្យបិទកន្លែងចាក់សំរាមចាស់ដែល ករណីនេះវាផ្ទុយទៅនឹងលទ្ធផលនៃការស្ទាបស្ទង់មតិសង្គមដែលបានធ្វើឡើង។

- របាយការណ៍ប្រាក់ចំណូលជាធម្មតាមានចន្លោះពី៥០ដុល្លារ ទៅ ៧៥ដុល្លារ ក្នុងមួយខែដែលបង្ហាញថាប្រជាពលរដ្ឋជាច្រើនរស់ក្រោមបន្ទាត់នៃភាពក្រីក្រអន្តរជាតិ (១.៩០ដុល្លារ PPP) និងទាបជាងប្រាក់ចំណូលជាតិមធ្យមសរុបរបស់កម្ពុជា (ប្រហែល១២៧ដុល្លារ/ខែ)។ គេត្រូវការការសិក្សារវាយតម្លៃបន្ថែមទៀតដើម្បីយល់ដឹងចំណុចនេះឱ្យបានច្បាស់លាស់ លើតំរូវការជាមូលដ្ឋានសំរាប់គ្រួសារនីមួយៗបន្ថែមពីលើកត្តារាំងស្ទះមួយចំនួនទៀត (ជាលក្ខណៈស្ថាប័នវប្បធម៌ ឬ អ្វីផ្សេងៗទៀត)ដែលនឹងត្រូវប្រើប្រាស់ជាជំនួយបន្ថែមក្នុងការពន្យល់ ពីការទទួលបានការគាំទ្របណ្តាញសុវត្ថិភាពសង្គមមានកម្រិតទាបពីរាជរដ្ឋាភិបាលកម្ពុជា។
- អ្នករើសអេតចាយចំនួន៤៩នាក់ក្នុងចំណោម៧៥នាក់ ដែលត្រូវបានសម្ភាសន៍បានបញ្ជាក់ថាពួកគេមានប្រភពចំណូលផ្សេងទៀតតែទោះជាយ៉ាងណាក៏ដោយ៤៨នាក់ ក្នុងចំនួនទាំងនោះបញ្ជាក់ថាប្រភពចំណូលចម្បងរបស់ពួកគេគឺបានមកពីការរើសអេតចាយ។ នេះបង្ហាញថាយុទ្ធសាស្ត្រចិញ្ចឹមជីវិតជាច្រើនត្រូវបានបន្ត។ ទោះជាយ៉ាងណាក៏ដោយសម្រាប់បុគ្គលមួយចំនួន ប្រភពចំណូលបន្ថែមមានតិចតួច ហើយនៅតែមានកម្រិតខ្ពស់នៃការពឹងផ្អែកទៅលើ ការរើសអេតចាយជាប្រភពចំណូលចម្បង។ កត្តានេះមានមានឥទ្ធិពលដល់ការកំណត់អត្តសញ្ញាណ ការវាយតម្លៃ និងកាត់បន្ថយហេតុប៉ះពាល់សេដ្ឋកិច្ចនៃការផ្លាស់ទីលំនៅ ដែលទាក់ទងនឹងគម្រោងរចនាណាមួយដែលពាក់ព័ន្ធជាមួយនឹងការផ្លាស់ប្តូរចរន្តចេញចូលរបស់សំណល់ នៅកន្លែងចាក់សំរាមចាស់។
- ស្ទើរតែពាក់កណ្តាលនៃអ្នកចូលរួមសម្ភាសបានបញ្ជាក់ថា ពួកគេបានខ្ចីប្រាក់ក្នុងរយៈពេល១២ខែចុងក្រោយដោយមានការប្រាក់ប្រចាំខែចាប់ពី ១០ដុល្លារ ដល់ ២៦០ដុល្លារ/ខែ។ ជាមួយនឹងអវត្តមានស្ទើរតែទាំងស្រុងនៃភ្ញៀវទេសចរមកពីខេត្តសៀមរាប បរិមាណសំរាមបានធ្លាក់ចុះក៏ដូចជាឱកាសការងារ និងសកម្មភាពនានាក្នុងការរកប្រាក់ចំណូលក្នុងវិស័យទេសចរណ៍ និងសេវាកម្មក៏បានធ្លាក់ចុះផងដែរ។ កត្តាទាំងនេះអាចបណ្តាលឱ្យមានភាពតានតឹងបន្ថែមលើគ្រួសារដែលមានជីវភាពខ្សត់ខ្សោយនិងគ្រួសារក្រីក្រ។ ចំណុចនេះ និងត្រូវពិនិត្យវាយតម្លៃ និងបញ្ចូលបន្ថែមនៅក្នុងដំណាក់កាលសិក្សារពីលទ្ធភាព និងការ សិក្សារ ESIA។
- ទិន្នន័យមូលដ្ឋានដែលទាក់ទងនឹងសុខភាពសហគមន៍ មិនបានបង្ហាញពីនិន្នាការច្បាស់លាស់ណាមួយក្រៅពី "ការឈឺក្បាល" ញឹកញាប់នោះទេ។ យោងទៅលើលក្ខខណ្ឌការងាររបស់អ្នករើសអេតចាយការកើតមានបញ្ហាសុខភាពជារឿយៗដូចអ្វីដែលរំពឹងទុក។ ការរៀបចំទីលានទុកដាក់សំរាមមិនបានត្រឹមត្រូវទៀតនោះ បានធ្វើឱ្យបញ្ហាទាំងនេះកាន់តែធ្ងន់ធ្ងរបន្ថែមទៀតដោយសារប្រព័ន្ធទឹកក្រោមដីទំនងជាត្រូវបានបំពុល។ សហគមន៍មូលដ្ឋានបានរាយការណ៍ពីករណីកើតមានការបំពុលនៅក្នុងអណ្តូងទឹក ដែលបញ្ហានេះចាំ បាច់ត្រូវយល់បន្ថែមឱ្យបានច្បាស់អំពី (i) ប្រភេទ និងវិសាលភាពនៃការបំពុល; (ii) ទំនាក់ទំនងការបំពុលជាមួយកន្លែងចាក់សំរាមចាស់។

ព័ត៌មានបន្ថែមពាក់ព័ន្ធនិងការអង្កេតវាយតម្លៃសេដ្ឋកិច្ច-សង្គម មានបញ្ជាក់នៅក្នុងជំពូក ៥.៣ នៃរបាយការ ESIA បឋមសម្រាប់ខេត្តសៀមរាប។

<u>ការអង្កេតបឋមលើហានិភ័យបរិស្ថាននិងសង្គមលើហេតុប៉ះពាល់និងវិធានការកាត់បន្ថយ</u>

នៅក្នុងបរិបទនៃក្របខណ្ឌគ្រប់គ្រងបរិស្ថាន និងសង្គម (ESMF) ហានិភ័យដែលទាក់ទងនឹង ជម្រើសសាងសង់ហេដ្ឋារចនាសម្ព័ន្ធសំណល់រឹង និងប្លាស្ទិកនៅក្នុងក្រុងសៀមរាបត្រូវបានកំណត់។ ការវាយតម្លៃរាល់ហានិភ័យជាបឋមនេះបង្កើតឡើងដោយផ្អែកលើហានិភ័យនីមួយៗ ជាមួយនិងព័ត៌មានដែលបង្ហាញនៅក្នុងការកំណត់បរិស្ថាននិងសង្គមខាងលើសម្រាប់កន្លែងចាក់សំរាមចាស់និងទីតាំង ដែលអាចត្រូវបានជ្រើសរើសសម្រាប់ការអភិវឌ្ឍន៍ជាកន្លែងទុកដាក់សំរាមថ្មី។ ជាគោលការណ៍ក្នុងការរចនាការវាយតម្លៃសំខាន់ៗ គឺត្រូវបានធ្វើឡើងដើម្បីកំណត់ថាតើគួរជ្រើសរើសយកការពង្រីកកន្លែងចាក់សំរាមចាស់ ឬការអភិវឌ្ឍន៍កន្លែងទុកដាក់សំរាមអនាម័យថ្មីគឺអាស្រ័យទៅតាមទស្សនៈ បរិស្ថាន និងសង្គមតែប៉ុណ្ណោះ។ សេចក្តីសង្ខេបជាបឋមនៃកំណត់ហានិភ័យបរិស្ថាន និងសង្គមហេតុប៉ះពាល់និងវិធានការកាត់បន្ថយត្រូវបានផ្តល់ជូនក្នុង**តារាងទី២** និង**តារាងទី៣**ខាងក្រោម។ ការវាយតម្លៃពេញលេញ ត្រូវបានផ្តល់ជូននៅក្នុងជំពូកទី៦ នៃរបាយការណ៍ ESIA បឋមសម្រាប់ខេត្តសៀមរាប។

ការកំណត់ជាបឋមនៃហេតុប៉ះពាល់បរិស្ថាន និងវិធានការកាត់បន្ថយក្នុងដំណាក់កាលសាងសង់រួមមានដូចខាងក្រោម៖ការកំណត់ជាបឋមនៃហេតុប៉ះពាល់បរិស្ថាន និងវិធានការកាត់បន្ថយក្នុងដំណាក់កាលមុនសាងសង់ និងដំណាក់កាលសាងសង់សម្រាប់ជម្រើសទីតាំងសក្តានុពលទាំងពីរ ក៏ដូចជាវិធានការកាត់បន្ថយ ត្រូវបានសង្ខេបក្នុង**តារាងទី២**។

តារាងទី២ តារាងសង្ខេប នៃហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលមុនសាងសង់ និងដំណាក់កាលសាងសង់សម្រាប់ជម្រើសទីលានទាំងពីរ

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
គុណភាពខ្យល់	អវិជ្ជមាន	ការហុយធូលីដែលបង្កើតឡើងដោយសារតែសកម្មភាពសាងសង់នានាក្នុងការស្តារឡើងវិញនៃកន្លែងចាក់សំរាមដែលមានស្រាប់	មធ្យម	អវិជ្ជមាន	ការហុយធូលីដែលបង្កើតឡើងដោយសារតែសកម្មភាពសាងសង់នានាក្នុងការបិទកន្លែងចាក់សំរាមដែលមានស្រាប់ និងការសាងសង់ទីលានទុកដាក់សំរាមថ្មី	មធ្យម	• ដាក់ដំណើរការត្រួតពិនិត្យគុណភាពខ្យល់ក្នុងតំបន់លំនៅដ្ឋានក្នុងដំណាក់កាលសាងសង់ • កំណត់ម៉ោងសកម្មភាពក្នុងការសាងសង់ (ពេលថ្ងៃ) • ធ្វើការបង្ហាប់លើផ្ទៃសាងសង់ឱ្យបានល្អ • កាត់បន្ថយសកម្មភាពទាំងឡាយណាដែល បំភាយធូលី និងភាកល្អិត • បាញ់ទឹកជាប្រចាំលើតំបន់ដែលត្រូវជីកកកាយ កន្លែងដាក់តវ៉ាន់ និងកំណាត់ផ្លូវដែលមិនទាន់បានក្រាលកៅស៊ូ • រៀបចំកន្លែងលាងកង់យានយន្តនៅចំណុច ច្រកចូលផ្លូវសាធារណៈ ឬច្រកចេញចូល ការដ្ឋានសាងសង់ទីលាន • អនុវត្តការត្រួតពិនិត្យល្បឿនបើកបរនៅការដ្ឋាន • កំណត់បន្ទុកស្របតាមសមត្ថភាពផ្ទុក របស់យានយន្តដឹកជញ្ជូនដើម្បីជៀសវាងការលេចធ្លាយ • គ្របពំនូកដីដោយគម្របដែលអាចការពារសំណឹក • គរជាគំនរបានត្រឹមត្រូវជៀសវាងខ្យល់បក់ប៉ើងធូលី

[2] វិធានការកាត់បន្ថយជាក់លាក់នឹងត្រូវបានកំណត់នៅដំណាក់កាលនៃការរចនាលម្អិត និង ESIA នៃជម្រើសទីតាំងជាក់លាក់ដែលបានជ្រើសរើស

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
							• អនុវត្តតាមវិធានការសំណង់ឱ្យបានត្រឹមត្រូវ។
សំឡេង	អវិជ្ជមាន	សំឡេងត្រូវបានបង្កើតឡើងដោយសារតែការប្រើប្រាស់គ្រឿងចក្រ ក្នុងការស្តារឡើងវិញនៃកន្លែងចាក់សំរាមដែលមានស្រាប់	មធ្យម	អវិជ្ជមាន	សំឡេងត្រូវបានបង្កើតឡើងដោយសារតែការប្រើប្រាស់គ្រឿងចក្រ ក្នុងការបិទកន្លែងចាក់សំរាមដែលមានស្រាប់ និងការសាងសង់ទីលានទុកដាក់សំរាមថ្មី	មធ្យម	• គេរំពឹងថាសកម្មភាពសំណង់នឹងមិនដំណើរ ការដល់ពេលល្ងាចខ្លាំងនោះទេ។ ដូច្នេះ ផលប៉ះពាល់សំលេងរំខានទៅបរិយាកាស ជុំវិញនឹងមានកម្រិតតិចតួចប៉ុណ្ណោះ • ធ្វើឱ្យប្រសើរឡើងនូវការប្រើប្រាស់ម៉ាស៊ីន និងឧបករ-ណ៍ទាំងឡាយណាដែលបង្កជាសំឡេងរំខាន • ក្នុងករណីទទួលបានពាក្យបណ្តឹងពីតំបន់ជិតខាងទាក់ទងនឹងសំឡេងរំខាន ពេលប្រតិបត្តិការបាំងការពារសំឡេងគួរត្រូវប្រើ • សកម្មភាពការងារសំណង់ទាំងអស់គួរតែ បញ្ឈប់នៅពេលយប់។
ក្លិន	អវិជ្ជមានពេលដំបូងហើយបន្ទាប់មកវិជ្ជមាន	ផលប៉ះពាល់ពីក្លិននឹងកើតមានឡើង ដែលបង្កភាពរំខានដល់សហគមន៍ជិតខាង អំឡុងពេលអនុវត្តការងារស្តារឡើងវិញនូវកន្លែងចាក់សំរាមចាស់ ប៉ុន្តែនឹងត្រូវកាត់បន្ថយនៅកំរិតអប្បរមាបន្ទាប់ពីការងារត្រូវបានបញ្ចប់។	ខ្លាំង	អវិជ្ជមានពេលដំបូងហើយបន្ទាប់មកវិជ្ជមាន	ផលប៉ះពាល់ពីក្លិននឹងកើតមានឡើង ដែលបង្កភាពរំខានដល់សហគមន៍ជិតខាង អំឡុងពេលអនុវត្តការងារបិទកន្លែងចាក់សំរាមចាស់ ប៉ុន្តែនឹងត្រូវកាត់បន្ថយយ៉ាងខ្លាំងបន្ទាប់ពីការងារបញ្ចប់។	ខ្លាំង	• ការអនុវត្តការគ្របកាកសំណល់នៅកន្លែងចាក់សំរាមដែលមានស្រាប់សម្រាប់ជម្រើសទាំងពីរ • ការដំឡើងប្រព័ន្ធប្រព្រឹត្តកម្មឧស្ម័ននៅទីលានទុកដាក់សំរាម • ប្រព័ន្ធប្រព្រឹត្តកម្មទឹកសម្អុយទីលាន • ការប្រើប្រាស់ថ្នាំបំបាត់ក្លិន និង/ឬបាញ់ថ្នាំការពារ ក្នុងករណីបញ្ហាក្លិនកើតមានជាប្រចាំ

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
					ផលប៉ះពាល់ពីក្លិននឹងកើតមានឡើងតាមរយៈការប្រើប្រាស់គ្រឿងម៉ាស៊ីនសម្រាប់សាងសង់(ការបញ្ចេញផ្សែង) ប៉ុន្តែវាមានកម្រិតតិចតួច		
ទ្រង់ទ្រាយសណ្ដាននៃដី	អវិជ្ជមានពេលដំបូងហើយបន្ទាប់មកវិជ្ជមាន	ទម្រង់ដីនឹងត្រូវខូចខាតកំឡុងពេលធ្វើការជីកកកាយ ក្នុងការស្ដារឡើងវិញនូវកន្លែងចាក់សំរាមចាស់ ប៉ុន្តែគុណភាពដីជារួមនឹងប្រសើរឡើង បន្ទាប់ពីការងារសាងសង់ត្រូវបានបញ្ចប់	មធ្យម	អវិជ្ជមានពេលដំបូងហើយបន្ទាប់មកវិជ្ជមាន	ទម្រង់ដីនឹងត្រូវខូចខាតកំឡុងពេលធ្វើការជីកកកាយ ក្នុងការបិទកន្លែងចាក់សំរាមចាស់ ប៉ុន្តែគុណភាពដីជារួមនឹងប្រសើរឡើង បន្ទាប់ពីការងារសាងសង់ត្រូវបានបញ្ចប់។ ទម្រង់ដីនឹងត្រូវខូចខាតកំឡុងពេលសាងសង់/ការជីកកកាយសម្រាប់ការសាងសង់ទីលានទុកដាក់សំរាមថ្មី។	មធ្យម	• ប្រើប្រាស់ដីដែលជីកចេញ សម្រាប់ប្រតិបត្តិការក្នុងទីលានចាក់សំរាម៖ ការប្រើប្រាស់ជាគម្របប្រចាំថ្ងៃ និងការប្រើប្រាស់ក្នុងការបង្កើតទំនប់រណ្ដៅដី សម្រាប់ផ្ទុកសំរាម។ • ប្រើដីដែលជីកចេញ សម្រាប់គ្របរណ្ដៅសំរាមចាស់។ (និងប្រើសម្រាប់ស្រទាប់គម្របចុងក្រោយ) • ដីដែលបានជីកកកាយនៅតំបន់រណ្ដៅផ្នាល់នៃកន្លែងចាក់សំរាមចាស់ ត្រូវតែយកសំណាកទៅវិភាគដើម្បីវាយតម្លៃពីកម្រិតបំពុលនៃដី រួមនិងលទ្ធភាពដើម្បីប្រើប្រាស់ក្នុងការសាងសង់កន្លែងចាក់សំរាម។
សំណឹកដី	អវិជ្ជមានពេលដំបូងហើយបន្ទាប់មកវិជ្ជមាន	ការងារជីកកាយដីអាចបង្កឱ្យមានសំណឹកដីកើតឡើង។ ទោះជាយ៉ាងណាក៏ដោយផលប៉ះពាល់វិជ្ជមាននឹងកើតមាន	មធ្យម	អវិជ្ជមានពេលដំបូងហើយបន្ទាប់មកវិជ្ជមាន	ការងារជីកដីអាចបង្កឱ្យមានសំណឹកដីកើតឡើង។ ទោះជាយ៉ាងណាក៏ដោយ ផលប៉ះពាល់វិជ្ជមានជារួមនឹងកើត	មធ្យម	• ការដំឡើងកម្រាលការពារសំណឹកលើគំនរដី ករណីការបង្ហាប់មិនជោគជ័យ។ • ការពារគំនរដីពីការជន់លិច និងការហូរចេញដោយដាក់ធុង ឬវត្ថុធាតុផ្សេងទៀតនៅជុំវិញ។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
		ក្រោយពេលបញ្ចប់ការងារ ដោយសារតែវិធានការទប់ដីនឹងត្រូវធ្វើឡើងកំឡុងពេលជួសជុលទីតាំងចាក់សំរាមចាស់។			មានក្រោយពេលបញ្ចប់ការងារបិទកន្លែងចាក់សំរាមចាស់ ដោយសារវិធានការទប់ដីនឹងត្រូវធ្វើឡើង។ ការសាងសង់កន្លែងចាក់សំរាមថ្មីអាចបង្កឱ្យមានហានិភ័យសំណឹកដី រហូតដល់ការបញ្ចប់ការសាងសង់។		• ការពារផ្ទៃដីដែលងាយសឹកបំផុត។ • ការពារបណ្តាញលូទឹកភ្លៀង
ការបាត់បង់ដីស្រទាប់ខាងលើ	វិជ្ជមាន	ដីស្រទាប់លើនៅកន្លែងចាក់សំរាមចាស់នឹងត្រូវប៉ះពាល់ខ្លាំង ហើយគុណភាពដីស្រទាប់ដីខាងលើក៏មានកម្រិតទាប (វានឹងត្រូវសិក្សាឡើងវិញក្នុងពេលសិក្សា ESIA លម្អិតក្រោយពេលទីតាំងជាក់លាក់ត្រូវបានជ្រើសរើស)។ ទោះបីជាយ៉ាងណាក៏ដោយការបាត់បង់ដីស្រទាប់លើអាចកើតមានឡើងក្នុងអំឡុងពេលសាងសង់ទាក់ទង	មធ្យម	អវិជ្ជមាន	ការបាត់បង់ដីស្រទាប់លើនឹងកើតឡើងដោយសារតែការសាងសង់នៅលើទីតាំងទីលានចាក់សំរាមថ្មី។ ការបិទកន្លែងចាក់សំរាមចាស់ គឺមិនទំនងជាបង្កឱ្យបាត់បង់ដីស្រទាប់លើទេ ព្រោះទីតាំងនេះត្រូវបានចាក់សំរាមពាសពេញរួចទៅហើយ។	ខ្សោយ	• ការរៀបចំគំនរដីស្រទាប់លើ • ដាក់ទីតាំងពំនូកដីដោយការពារមិនឱ្យមានការបង្ហាប់ ឬកខ្វក់ពីការចេញចូលពីយានយន្តដឹកជញ្ជូន • ដាក់ពំនូកដីលើដាច់ពីពំនូកដីស្រទាប់ក្រោម • ដាក់ពំនូកដីនៅកន្លែងដែលមិនអាចជន់លិច • ដាក់ពំនូកដីតាមស្ថានភាពជាក់ស្តែង ហើយឆ្ងាយពីផ្លូវទឹក

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
		នឹងការបោះជំរុំកម្មករ រោងដាក់សម្ភារៈ និងហេដ្ឋារចនាសម្ព័ន្ធពាក់ព័ន្ធផ្សេងទៀត។					
គុណភាពទឹក	អវិជ្ជមានពេលដំបូង ហើយបន្ទាប់មកវិជ្ជមាន	សកម្មភាពសាងសង់នានាអាចបណ្តាលឱ្យកខ្វក់ប្រភពទឹកលើដី និងក្រោមដី។ បើទោះយ៉ាងណាក៏ដោយ ហេតុប៉ះពាល់ជារួមមានភាពវិជ្ជមាន ដោយសារការស្តារឡើងវិញនូវកន្លែងចាក់សំរាមចាស់ បញ្ឈប់ការជ្រាបចេញនៃទឹកសម្អុយទីលាន ទឹកកខ្វក់ដែលមិនឆ្លងកាត់ប្រព័ន្ធប្រព្រឹត្តកម្ម។	ខ្ពស់	អវិជ្ជមាន ហើយបន្ទាប់មកវិជ្ជមានសម្រាប់ទីតាំងកន្លែងចាក់សំរាមចាស់ ក៏ប៉ុន្តែមានហានិភ័យខ្ពស់សម្រាប់ទីតាំងទីលានថ្មី	សកម្មភាពសាងសង់នានាអាចបង្កឱ្យមានការបំពុលទឹកលើដី និងទឹកក្រោមដី។ ហេតុប៉ះពាល់ជារួមនឹងមានភាពវិជ្ជមាននៅកន្លែងចាក់សំរាមចាស់ ដោយសារការស្តារឡើងវិញនូវទីតាំងចាស់នឹងបញ្ឈប់ការបំពុលពីទឹកសម្អុយទីលាន ទឹកកខ្វក់ដែលមិនឆ្លងកាត់ប្រព័ន្ធប្រព្រឹត្តកម្ម។ ទីតាំងចាក់សំរាមថ្មីនឹងមានប្រព័ន្ធប្រព្រឹត្តិកម្មទឹកស្អុយទីលាន និងទឹកកខ្វក់ ប៉ុន្តែដោយសារតំបន់នេះនៅក្បែរទំនាបបឹងទន្លេសាប/ទឹកជំនន់	ខ្ពស់	• កាត់បន្ថយហេតុប៉ះពាល់ដី។ • គ្រប់គ្រងលំហូរល្បាប់ និងកម្ទេចកម្ទីហូរចាក់ទៅកាន់តំបន់ដីដែលបានប្រើប្រាស់។ • គ្រប់គ្រងប្រព័ន្ធលូទឹកនៅក្នុងតំបន់ដីប្រើប្រាស់ • រៀបចំឱ្យមានគម្របដីត្រឹមត្រូវ។ • រៀបចំឱ្យមាននីតិវិធី និងពិធីការត្រឹមត្រូវដើម្បីធានាឱ្យសំណង់មានគុណភាពល្អ កំឡុងពេលចាក់បង្ហាប់ដីបាសាល ដីគ្រួសក្រហម ព្រមទាំងបណ្តាសម្ភារវិស្វកម្មផ្នែកខាងលើ។ • រៀបចំឱ្យមានប្រព័ន្ធប្រព្រឹត្តកម្មទឹកសម្អុយទីលាន។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
					តាមរដូវ ហេតុនេះវាអាចបង្កជាហានិភ័យកើតឡើង		
ការគ្រប់គ្រងសំណល់មិនបានត្រឹមត្រូវ	អវិជ្ជមាន	សំណល់ចេញពីប្រភពផ្សេងៗក្នុងអំឡុងពេលសាងសង់ អាចមិនត្រូវបានញែកតាមប្រភេទត្រឹមត្រូវ ដើម្បីទុកដាក់ ដឹកជញ្ជូន និងបោះចោល ដែលបង្កឱ្យមានការបំពុលខ្យល់ ដី និងទឹក។	មធ្យម	អវិជ្ជមាន	សំណល់ចេញពីប្រភពផ្សេងៗក្នុងអំឡុងពេលសាងសង់ អាចមិនត្រូវបានញែកតាមប្រភេទត្រឹមត្រូវ ដើម្បីទុកដាក់ ដឹកជញ្ជូន និងបោះចោល ដែលបង្កឱ្យមានការបំពុលខ្យល់ ដី និងទឹក។	មធ្យម	• សហការជាមួយអាជ្ញាធរមូលដ្ឋានក្នុងការរៀបចំកន្លែងទុកដាក់សំរាមឱ្យបានត្រឹមត្រូវ។ អនុញ្ញាតឱ្យសហគមន៍មូលដ្ឋានប្រើប្រាស់ថ្មដែលនៅសេសសល់ពីការប្រើប្រាស់។ • កាកសំណល់ទាំងអស់ពីការដ្ឋាននឹងត្រូវទុកដាក់ស្របតាមច្បាប់បរិស្ថានក្នុងតំបន់ និងនៅកន្លែងដែលអនុម័តដោយអាជ្ញាធរមូលដ្ឋាន។ • សំណល់គ្រោះថ្នាក់ (កម្ទេចកខ្វក់ ប្រេង ថ្នាំលាបជាដើម) នឹងត្រូវបោះចោលស្របតាមការព្រមព្រៀងជាមួយអាជ្ញាធរមូលដ្ឋាន និងមន្ត្រីបរិស្ថាន។ • បុគ្គលិកដែលកាកសំណល់ទូទៅនិងសំណល់គ្រោះថ្នាក់ នឹងត្រូវទទួលការបណ្តុះបណ្តាល ក្នុងការគ្រប់គ្រង សំអាត និងការទុកដាក់សំរាម ។
ភាពរំខានលើទេសភាព /គំហើញ និងសោភ័ណភាព	វិជ្ជមាន	ការស្តារឡើងវិញនូវកន្លែងចាក់សំរាមចាស់ ត្រូវបានគេរំពឹងថានឹងបណ្តាលឱ្យមានហេតុប៉ះពាល់វិជ្ជមានទៅលើទេសភាព	មធ្យម	អវិជ្ជមានពេលដំបូង ហើយក្រោយមកវិជ្ជមានសម្រាប់កន្លែងចាក់សំរាម	ការស្តារឡើងវិញនូវកន្លែងចាក់សំរាមចាស់ ត្រូវបានគេរំពឹងថានឹងបណ្តាលឱ្យមានហេតុប៉ះពាល់វិជ្ជមានទៅលើ	មធ្យម/ខ្ពស់	• ជ្រើសរើសទីតាំងសាងសង់ឱ្យបានហ្មត់ចត់។ • កម្រិតតំបន់សាងសង់ត្រឹមតែក្នុងតំបន់ដែលបានរចនាលម្អិតដូចដែលបានគ្រោងទុក។ • ទីតាំងសាងសង់ត្រូវជ្រើសរើសនៅក្រៅតំបន់ជម្រកការពារ និងប្រព័ន្ធអេកូឡូស៊ីសំខាន់ៗ។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
		ដែលបច្ចុប្បន្នកំពុងត្រូវបានរំខាន។		ចាស់ និងមិនមានហេតុប៉ះពាល់សម្រាប់ទីតាំងទីលានថ្មី	ទេសភាពដែលបច្ចុប្បន្នកំពុងត្រូវបានរំខាន។ ការសាងសង់ទីលានទុកដាក់សំរាមថ្មីនឹងធ្វើឱ្យប៉ះពាល់ដល់ទេសភាព តែយើងអាចកាត់បន្ថយហេតុប៉ះពាល់នោះតាមភាពជាក់ស្តែង		• ការត្រួតពិនិត្យតាមដានវត្តមានទីជម្រកសំខាន់ៗ និងការបំពុល។ • ចាត់វិធានការការពារទឹកជំនន់ ក្នុងករណីចាំបាច់។
ភាពរំខានដល់ប្រព័ន្ធជីវចម្រុះ/រុក្ខជាតិ និងសត្វ	អវិជ្ជមានពេលដំបូង ហើយបន្ទាប់មកវិជ្ជមាន	ការស្តារឡើងវិញនូវកន្លែងចាក់សំរាមចាស់ អាចបណ្តាលឱ្យមានការប៉ះពាល់ជាបណ្តោះអាសន្នដល់រុក្ខជាតិ និងសត្វនៅក្នុងតំបន់ ដោយសារតែសកម្មភាពការងារសំណង់ផ្សេងៗ។ ហេតុប៉ះពាល់ជារួមនឹងផ្តល់ផលវិជ្ជមានដោយសារតែចំណុចអវិជ្ជមាននាពេលបច្ចុប្បន្ននិងត្រូវបានដោះស្រាយក្នុងដំណើរការស្តារឡើងវិញ។	មធ្យម	អវិជ្ជមាន	ទោះបីជាហេតុប៉ះពាល់នៃការបិទទីតាំងដែលមានស្រាប់នឹងមានភាពវិជ្ជមានក៏ដោយ ក៏ការសាងសង់ទីលានទុកដាក់សំរាមថ្មីនៅលើទីវាល នឹងបង្កការប៉ះពាល់ និងរំខានដល់រុក្ខជាតិ សត្វ និងជម្រកធម្មជាតិនៅក្នុងតំបន់នោះ។	ខ្ពស់	• ជ្រើសរើសទីតាំងសាងសង់ឱ្យបានហ្មត់ចត់។ • កម្រិតតំបន់សាងសង់ត្រឹមតែក្នុងតំបន់ដែលបានរចនាលម្អិតដែលបានគ្រោងទុក។ • ប្រព័ន្ធប្រមូល និងសម្អាតទឹកសម្រាប់ទីលាន។ • ការដំឡើងស្រទាប់ការពារជម្រាប។ • ទីតាំងសាងសង់ត្រូវជ្រើសរើសនៅក្រៅតំបន់ជម្រកការពារ និងប្រព័ន្ធអេកូឡូស៊ីសំខាន់ៗ។ • ការត្រួតពិនិត្យតាមដានវត្តមានសត្វ និងការបំពុល។ • ចាត់វិធានការការពារទឹកជំនន់។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
បេតិកភណ្ឌវប្បធម៌	បច្ចុប្បន្នពុំទាន់ត្រូវបានកំណត់នៅឡើយ ក៏ប៉ុន្តែវានឹងត្រូវកំណត់នៅអំឡុងពេលសិក្សា ESIA លម្អិតនៅទីតាំងដែលបានជ្រើសរើសចុងក្រោយ	ពុំមានហេតុប៉ះពាល់ណាមួយត្រូវបានកំណត់នៅឡើយទៅតំបន់បេតិកភណ្ឌវប្បធម៌ ហើយការវិភាគលើចំណុចនេះនឹងត្រូវប្រមាណថាត្រូវធ្វើបន្ថែមនៅដំណាក់កាលសិក្សា ESIA លម្អិតនៅទីតាំងដែលបានជ្រើសរើសចុងក្រោយ។	ផ្តល់ព័ត៌មានលម្អិតនៅពេលក្រោយ	បច្ចុប្បន្នពុំទាន់ត្រូវបានកំណត់នៅឡើយ ក៏ប៉ុន្តែវានឹងត្រូវកំណត់នៅអំឡុងពេលសិក្សារ ESIA លម្អិតនៅទីតាំងដែលបានជ្រើសរើសចុងក្រោយ	ពុំមានហេតុប៉ះពាល់ណាមួយត្រូវបានកំណត់នៅឡើយនៅតំបន់បេតិកភណ្ឌវប្បធម៌ ហើយការវិភាគលើចំណុចនេះនឹងត្រូវប្រមាណថាត្រូវធ្វើបន្ថែមនៅដំណាក់កាលសិក្សាESIA លម្អិតនៅទីតាំងដែលបានជ្រើសរើសចុងក្រោយ។	ផ្តល់ព័ត៌មានលម្អិតនៅពេលក្រោយ	•
ហេតុប៉ះពាល់ដល់ការតាំងទីលំនៅថ្មី បម្លាស់ទីសេដ្ឋកិច្ច និងជីវភាពរស់នៅរបស់ប្រជាពលរដ្ឋ	អវិជ្ជមាន វិជ្ជមាន	ការធ្វើលទ្ធកម្ម ផ្ទះ ឬដី ហេតុប៉ះពាល់លើអ្នករើសសំរាមទូទៅនឹងមានភាពវិជ្ជមានដោយសារអ្នករើសសំរាមនឹង	មធ្យម ខ្ពស់	មិនមាន អវិជ្ជមានសម្រាប់ទីតាំងទាំងអស់ ហើយវិជ្ជមាន	ពុំចាំបាច់មានការធ្វើលទ្ធកម្ម ផ្ទះ ឬដីនោះទេដោយសារទីតាំងថ្មីជាដីសាធារណៈ ហេតុប៉ះពាល់ចំពោះអ្នករើសសំរាមនឹងមានភាពអវិជ្ជមានក្នុងជម្រើសនេះ ដោយសារ	ទាប	• ហេតុប៉ះពាល់លើអ្នករើសសំរាម ជាទូទៅមានភាពវិជ្ជមាន ដោយសារអ្នករើសសំរាមនឹងបន្តទទួលបានធនធានពីសំរាម ក្រោមលក្ខខណ្ឌការងារ សុខភាព និងសុវត្ថិភាពប្រសើរជាងមុន ។ • ធ្វើការពិគ្រោះយោបល់ឱ្យបានច្បាស់លាស់ ជាមួយសហគមន៍ជិតខាង អ្នករើសសំរាម និងអ្នកដែលអាច

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
		បន្តរបរទទួលទានរបស់ពួកគេក្រោមលក្ខខណ្ឌការងារ សុខភាព និងសុវត្ថិភាពដែលប្រសើរជាងមុន។		សម្រាប់សុខភាព និងសុវត្ថិភាព	កន្លែងចាក់សំរាមចាស់នឹងត្រូវបិទ ហើយប្រាក់ឧបត្ថម្ភសម្រាប់ការធ្វើដំណើរទៅកន្លែងញែកសំរាម ទំនងជាត្រូវបានរួមបញ្ចូលនៅក្នុងផែនការស្តារជីវភាពរស់នៅរួមជាមួយនឹងជំនួយការស្តារជីវភាពរស់នៅ និងការគាំទ្រជីវភាពផ្សេងទៀត។		រងហេតុប៉ះពាល់នៅទីតាំងដែលអាចត្រូវបានជ្រើសរើស • ដាក់ចេញផែនការតាំងទីលំនៅថ្មីដែលរួមបញ្ចូលវិធានការស្តារជីវភាពផ្សេងៗ និងការត្រួតពិនិត្យតាមដានការអនុវត្តជាក់ស្តែង • ជ្រើសរើសទីតាំងដែលផ្តល់អាទិភាពដែលអនុញ្ញាតឱ្យអ្នករើសសំរាមអាចបន្តការងាររបស់គេដោយត្រូវធ្វើដំណើរចំងាយជិត។ • ក្នុងករណីគេពុំអាចបន្តរើសសំរាមបាន ត្រូវធ្វើការពិចារណាផ្តល់ជំនួយស្តារជីវភាពរស់នៅ • ផ្តល់ការស្តារជីវភាពរស់នៅ និងជំនួយផ្សេងទៀតសម្រាប់ក្មេងរើសសំរាមស្របតាមក្របខណ្ឌគោលនយោបាយនៃការតាំងទីលំនៅថ្មី។ • ធានាឱ្យមានការផ្សព្វផ្សាយឱកាសការងារឱ្យបានទូលំទូលាយនៅក្នុងសហគមន៍ជុំវិញ និងធ្វើការពិចារណាសម្រាប់ក្រុមងាយរងគ្រោះ តាមរយៈសកម្មភាពគាំទ្រជីវភាពបន្ថែមទៀត។
	មិនប៉ះពាល់សម្រាប់ជីវភាពរស់នៅ /វិជ្ជមានសម្រាប់សុខភាព និងសុវត្ថិភាព	អ្នករើសសំរាមជាកុមារជាពិសេសអាយុក្រោម១៨ឆ្នាំ មិនត្រូវបានអនុញ្ញាតឱ្យបន្តសកម្មភាពរើសសំរាម ហើយត្រូវការមានផែនការស្តារជីវភាពរស់នៅ និងផែនការជំនួយជីវភាពបន្ថែមទៀត។ ការដែលពួកគេបញ្ឈប់ការចូលរួមរើសសំរាមនឹងផ្តល់ផលប៉ះពាល់វិជ្ជមានជា	ខ្ពស់	សម្រាប់ជីវភាពរស់នៅ /វិជ្ជមានសម្រាប់សុខភាព និងសុវត្ថិភាព	អ្នករើសសំរាមជាកុមារជាពិសេសអាយុក្រោម១៨ឆ្នាំ មិនត្រូវបានអនុញ្ញាតឱ្យបន្តសកម្មភាពរើសសំរាម ហើយត្រូវការមានផែនការស្តារជីវភាពរស់នៅ និងផែនការជំនួយជីវភាពបន្ថែមទៀត។	ខ្ពស់	

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
		ខ្លាំងដល់សុខភាព និងសុវត្ថិភាពរបស់ពួកគេផ្ទាល់។					
ឱកាសការងារបណ្តោះអាសន្ន	វិជ្ជមាន	ការងារស្តារនិងការពង្រីកកន្លែងចាក់សំរាម ជាមួយនិងការសាងសង់ហេដ្ឋារចនាសម្ព័ន្ធផ្សេងទៀត អាចផ្តល់ឱកាសការងារដល់ប្រជាពលរដ្ឋនៅក្នុងភូមិក្បែរខាង។ អ្នកទាំងនេះភាគច្រើនបានចូលរួមក្នុងវិស័យកែច្នៃសំរាមក្នុងស្រុករួចទៅហើយ។	ខ្ពស់	វិជ្ជមាន	តំបន់លំនៅដ្ឋាននៅទីតាំងទីលានទុកដាក់សំរាមថ្មីហាក់បីដូចជាពុំផ្តល់ឱកាសការងារច្រើនដល់ប្រជាពលរដ្ឋក្នុងស្រុក ប៉ុន្តែអ្នករស់នៅក្នុងក្រុងសៀមរាបនឹងទទួលបានផលប្រយោជន៍ពីការសាងសង់ទីលាន។ ប្រជាពលរដ្ឋក្នុងភូមិនៅកន្លែងចាក់សំរាមចាស់នឹងទទួលបានការងារទាក់ទងនឹងការបិទកន្លែងចាក់សំរាម។	មធ្យម	• ដើម្បីបង្កើនអត្ថប្រយោជន៍ការងារសម្រាប់ប្រជាជនក្នុងតំបន់ ការខិតខំប្រឹងប្រែងត្រូវបានធ្វើឡើងដើម្បីធានាថាឱកាសដែលបង្កើតបាន ត្រូវបានផ្សព្វផ្សាយដល់ប្រជាជនក្នុងតំបន់ ដែលរួមបញ្ចូលការចែករំលែកព័ត៌មានប្រកបដោយតម្លាភាព អំពីឱកាសការងារដែលនឹងត្រូវបង្កើតឡើង រួមនិងការជំរុញលើកទឹកចិត្តដល់ក្រុមហ៊ុនក្នុងស្រុកដែលជាផ្នែកមួយនៃឧបសម្ព័ន្ធសម្រាប់ការដេញថ្លៃក្នុងការសាងសង់។
សុខភាព និងសុវត្ថិភាពសហគមន៍	អវិជ្ជមាន	ការងារស្តារនិងការពង្រីកកន្លែងចាក់សំរាម ជាមួយនិងការសាងសង់ហេដ្ឋារចនាសម្ព័ន្ធផ្សេងទៀត អាចជះឥទ្ធិពលអវិជ្ជមានដល់សុខភាព និងសុវត្ថិភាពសហគមន៍ដែលនៅជិតទីតាំងចាក់សំរាម ដែលរួមបញ្ចូលហេតុ	មធ្យម	អវិជ្ជមាន	ការងារស្តារដើម្បីបិទកន្លែងចាក់សំរាមចាស់ ហើយនិងការងារសាងសង់ទីលានទុកដាក់សំរាមថ្មី ក៏ដូចជាការសាងសង់ហេដ្ឋារចនាសម្ព័ន្ធផ្សេងទៀតអាចជះឥទ្ធិពលអវិជ្ជមានដល់សុខភាព និង	មធ្យម	• ត្រួតពិនិត្យការងារសំណង់ ដោយគោរពតាមកាតព្វកិច្ច និងក្រមសីលធម៌បានច្បាស់លាស់។ • ផ្តល់ព័ត៌មានទៀងទាត់អំពីវឌ្ឍនភាព និងការគោរពតាមបរិស្ថាន និងសង្គមដល់សហគមន៍មូលដ្ឋាន។ • បង្កើតប្រព័ន្ធដោះស្រាយបណ្តឹងសារទុក្ខ។ • ត្រួតពិនិត្យលើនីតិវិធីគ្រប់គ្រងការងារ។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋម ក្នុងដំណាក់មុនសាងសង់ និងដំណាក់កាលសាងសង់							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[2]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	•
		ប៉ះពាល់នៃលំហូរចូលនៃកម្មករ និងហានិភ័យផ្សេងៗពី SEA/SH។ ហានិភ័យផ្សេងៗត្រូវបានចាត់ទុកថាមានផលអវិជ្ជមានកម្រិតមធ្យម សម្រាប់ជម្រើសទីតាំងទាំងពីរ ដោយសារតែទីតាំងផ្ទាល់ និងកម្លាំងការងារមានកម្រិតមធ្យម និងស្ថិតនៅទីតាំងផ្សេងគ្នា។			សុវត្ថិភាពរបស់សហគមន៍ក្បែរខាង បូករួមជាមួយនិងហេតុប៉ះពាល់នៃលំហូរចូលកម្មករ ក៏ដូចជាហានិភ័យពី SEA/SH ។ ហានិភ័យផ្សេងៗត្រូវបានចាត់ទុកថាផ្តល់ផលអវិជ្ជមានកម្រិតមធ្យមសម្រាប់ជម្រើសទាំងពីរ ដោយសារតែទីតាំងផ្ទាល់ និងកម្លាំងការងារមានកម្រិតមធ្យម និងស្ថិតនៅទីតាំងផ្សេងគ្នា។		• ផ្តល់ព័ត៌មានអំពីម៉ោងសាងសង់ជាមួយប្រជាជនមូលដ្ឋាន។ • ត្រួតពិនិត្យលើការអនុវត្តស្របតាមបទប្បញ្ញត្តិ OH&S និងក្រមសីលធម៌ SEA/SH។ • ផ្តល់សវនាការសាធារណៈ ការពិគ្រោះយោបល់ និងការចូលរួមពីអ្នកពាក់ព័ន្ធផ្សេងៗ។ • ដាក់កំហិតលើការចេញចូលទីតាំងការដ្ឋាន។

ការកំណត់ជាបឋមនៃហេតុប៉ះពាល់បរិស្ថាន និងវិធានការកាត់បន្ថយក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការសម្រាប់ជម្រើសទីតាំងសក្តានុពលទាំងពីរ ក៏ដូចជាវិធានការកាត់បន្ថយ ត្រូវបានសង្ខេបក្នុង**តារាងទី៣**។

តារាងទី៣ តារាងសង្ខេបនៃហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការសម្រាប់ជម្រើសទីលានទាំងពីរ

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការ							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[3]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	
ទឹកសម្អុយទីលាន	វិជ្ជមាន	បច្ចុប្បន្ននេះ ការបញ្ចេញទឹកសម្អុយទីលានទៅទឹកលើដីនិងក្រោមដីដោយមិនបានគ្រប់គ្រងនៅឡើយ។ ការស្តារកន្លែងចាក់សំរាមចាស់កាត់បន្ថយការបំពុលយ៉ាងខ្លាំង។ ការស្តារទីលានជៈផលប៉ះពាល់ជាវិជ្ជមានលើកន្លែងចាក់សំរាមចាស់។	ខ្ពស់	អវិជ្ជមានសម្រាប់ទីតាំងទីលានថ្មី ហើយវិជ្ជមានសម្រាប់កន្លែងចាក់សំរាមចាស់	ទីតាំងទីវាលថ្មី ស្ថិតនៅក្នុងតំបន់ការពារនៃបឹងទន្លេសាប។ ទោះបីជាមានវិធានការកាត់បន្ថយក៏ដោយ ហានិភ័យខ្ពស់ពីការបំពុលនឹងនៅតែអាចកើតមានជាពិសេសដោយសារទឹកជំនន់ និងនីវ៉ូទឹកក្រោមដីរាក់ដែលបណ្តាលឱ្យមានហេតុប៉ះពាល់ខ្លាំងក្នុងករណីប្រតិបត្តិការផ្សេងៗ បរាជ័យ ដែលអាចផ្តល់ផលវិបាកធ្ងន់ធ្ងរលើប្រព័ន្ធអេកូឡូស៊ីរបស់បឹងទន្លេសាប។	ខ្ពស់	• សាងសង់ស្រទាប់ទ្រនាប់ និងប្រព័ន្ធប្រមូលទឹកសម្អុយទីលាន។ • ការទុកដាក់កាកសំណល់ និងការគ្រប់គ្រងប្រចាំថ្ងៃ។ • ការកាត់បន្ថយទឹកសម្អុយទីលាន។ • អាងប្រព្រឹត្តិកម្មទឹកសម្អុយទីលាន។ • ធានាឱ្យមានការផ្គត់ផ្គង់ទឹកដែលមានសុវត្ថិភាពសម្រាប់សហគមន៍មូលដ្ឋាន។ • ការត្រួតពិនិត្យគុណភាពទឹក (ទឹកក្រោមដី)។

[3] វិធានការកាត់បន្ថយជាក់លាក់នឹងត្រូវបានកំណត់នៅដំណាក់កាលនៃការរចនាលម្អិត និង ESIA នៃជម្រើសទីតាំងជាក់លាក់ដែលបានជ្រើសរើស

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការ							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[3]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	
					ហេតុប៉ះពាល់វិជ្ជមានកើតមានសម្រាប់កន្លែងចាក់សំរាមចាស់ដោយសារតែការបិទដំណើរការទីលាន។		
ឧស្ម័នទីលាន	វិជ្ជមាន	កាត់បន្ថយបានកម្រិតខ្ពស់ដោយសារមានប្រព័ន្ធប្រមូល និងសំអាតឧស្ម័នទីលាន ក៏ដូចជាការសាងសង់រោងកំប៉ុស	ខ្ពស់	វិជ្ជមាន	ការបិទកន្លែងចាក់សំរាមចាស់ និងការបង្កើតទីលានថ្មីដែលរួមមានការសាងសង់ប្រព័ន្ធប្រមូល និងសម្អាតឧស្ម័នទីលាន ក៏ដូចជារោងជីកំប៉ុស និងចូលរួមកាត់បន្ថយការបំពុលបានច្រើនប្រៀបធៀបជាមួយស្ថានភាពនាពេលបច្ចុប្បន្ន។	ខ្ពស់	• ប្រព័ន្ធប្រមូល និងសម្អាតឧស្ម័នទីលាន (ដោយការដុត)។ • រោងជីកំប៉ុសជួយកាត់បន្ថយបរិមាណសមាសធាតុសរីរាង្គដែលត្រូវយកទៅចោលនៅទីលាន។
ប្រព័ន្ធអេកូឡូស៊ី ទឹក ជីវចម្រុះ	វិជ្ជមាន	ទីតាំងចាក់សំរាមបច្ចុប្បន្នជាទីតាំងពុំមានការការពារឬវិធានការណាឡើយដើម្បីការពារពីការបំពុល។ មានការបំពុលដីស្រែជុំវិញកើតឡើងដោយអាចរាលដាលបន្ត។ ការស្តារនិងដាក់ចេញវិធានការកាត់បន្ថយ	ខ្ពស់	អវិជ្ជមាន	ទីតាំងទីវាលដែលអាចត្រូវបានជ្រើសរើសស្ថិតក្នុងតំបន់ទ្រនាប់នៃតំបន់ការពារជីវចម្រុះបឹងទន្លេសាប (UNESCO និងព្រះរាជ្យក្រឹត)។ តំបន់ទ្រនាប់នេះអនុញ្ញាតឱ្យមានការអភិវឌ្ឍ	ខ្ពស់	• ធ្វើការសិក្សារទីតាំងឱ្យបានច្បាស់លាស់ដើម្បីជ្រើសបានទៅតាំងនៅក្រៅតំបន់រសើប។ • មានគម្របរណ្តៅសំរាមប្រចាំថ្ងៃ។ • ប្រប្រព័ន្ធប្រមូល និងប្រព្រឹត្តកម្មទឹកសម្អុយទីលាន • ការដាក់ស្រទាប់ការពារជម្រាប។ • ជ្រើសរើសទីតាំងក្រៅតំបន់ដែលមានសារៈសំខាន់សម្រាប់ទីជម្រក និងប្រព័ន្ធអេកូឡូស៊ី។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការ							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[3]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	
		នានា(រួមបញ្ចូលទាំងគម្របប្រចាំថ្ងៃ ប្រព័ន្ធប្រមូលទឹកសម្អុយទីលាន ការដាក់ស្រទាប់ការពារជម្រាប ។ល។) និងផ្តល់ផលវិជ្ជមានដល់បរិស្ថាន និងប្រភពទឹកជុំវិញ។			មានកម្រិត ផ្តោតលើការអប់រំការអភិវឌ្ឍប្រកបដោយចីរភាព តែមិនរួមបញ្ចូលទីលានចាក់សំរាមទេ។ បើទោះបីជាមានវិធានការកាត់បន្ថយក៏ដោយក៏ហានិភ័យពីការបំពុលនៅតែកើតមាន (ទឹកជំនន់ នីរ៉ូទឹកក្រោមដីរាក់ បរាជ័យក្នុងប្រតិបត្តិការផ្សេងៗ) នឹងជះផលលំបាកធ្ងន់ធ្ងរដល់ប្រព័ន្ធអេកូឡូស៊ី និងជីវចម្រុះបឹងទន្លេសាប។ តែវាមានផលវិជ្ជមានដល់កន្លែងចាក់សំរាមចាស់ដោយវាត្រូវបានបិទដំណើរការ។		• ធ្វើការតាមដានពិនិត្យវត្តមានរបស់ពពួកភាវរស់ និងការបំពុល។ • ចាត់វិធានការការពារគ្រោះទឹកជំនន់។ • មិនទទួលយកការចោលសំណល់គ្រោះថ្នាក់។
ក្លិន	វិជ្ជមាន	បញ្ហាក្លិនត្រូវបានកាត់បន្ថយ បើប្រៀបធៀបទៅនឹងស្ថានភាពបច្ចុប្បន្ន ជាពិសេសសម្រាប់សហគមន៍នៅក្បែរនោះ ដោយសារតែការកែលម្អហេដ្ឋា	ខ្ពស់	-	ទីតាំងបច្ចុប្បន្នជាទីវាលបៃតងប៉ុន្តែតំបន់ទាំងមូលត្រូវបានកណាត់ក្នុងគម្រោងផ្លូវក្រវ៉ាត់ក្រុង ដែលមានសក្តានុពលក្នុងការអភិវឌ្ឍន៍ពាណិជ្ជកម្ម	មធ្យម	• ការគ្រប់រណ្តៅសំរាមប្រចាំថ្ងៃ។ • ការដាក់ប្រព័ន្ធប្រមូល និងសម្អាតឧស្ម័នទីលាន។ • ការញ៉ែកសំរាម និងសង់រោងកំប៉ុស។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការ							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[3]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	
		រចនាសម្ព័ន្ធ និងវិធានការកាត់បន្ថយនានា រួមទាំងអនុវត្តការគ្រប់គ្រងសំរាមប្រចាំថ្ងៃ ប្រព័ន្ធប្រមូលឧស្ម័ន ការញែកវត្ថុធាតុដើមប្រើឡើងវិញចេញពីសំរាម និងដីកំប៉ុស			និងលំនៅដ្ឋានចម្រុះ ដែលងាយរងហេតុប៉ះពាល់ដោយក្លិនស្អុយពីសំរាម។ តែវាមានផលវិជ្ជមានដល់កន្លែងចាក់សំរាមចាស់ដោយវាត្រូវបានបិទដំណើរការ។		
សំណល់គ្រោះថ្នាក់	វិជ្ជមាន	កាត់បន្ថយហានិភ័យពីការលាយឡំសំណល់គ្រោះថ្នាក់ជាមួយសំណល់ទូទៅតាមរយៈការពង្រឹងប្រតិបត្តិការប្រមូលសំរាម និងច្បាប់ពាក់ព័ន្ធ។	មធ្យម	វិជ្ជមាន	កាត់បន្ថយហានិភ័យពីការលាយឡំសំណល់គ្រោះថ្នាក់ជាមួយសំណល់ទូទៅតាមរយៈការពង្រឹងប្រតិបត្តិការប្រមូលសំរាម និងច្បាប់ពាក់ព័ន្ធ។	មធ្យម	• ពង្រឹងបទប្បញ្ញត្តសម្រាប់ប្រតិបត្តិការចាក់សំរាមដើម្បីផ្តល់បញ្ជីប្រភេទសំណល់ដែលអាចប្រមូលបាន និងមិនអាចប្រមូលបាន។ កាកសំណល់ដែលមិនអាចប្រមូលបានចាំបាច់ត្រូវហាមឃាត់យ៉ាងតឹងរឹង។ • ពង្រឹងការយល់ដឹង និងបណ្តុះបណ្តាលដើម្បីបញ្ចៀសការដាក់កាកសំណល់លាយគ្នា។ • កម្មករទាំងអស់នឹងត្រូវបានផ្តល់ឧបករណ៍ការពារ ការបណ្តុះបណ្តាលក្នុងការគ្រប់គ្រងកាកសំណល់ ស្ថិតក្រោមការត្រួតពិនិត្យតឹងរឹង។ • រៀបចំផែនការឆ្លើយតបបន្ទាន់ពេលមានអាសន្ន។
ហេតុប៉ះពាល់ជាក់ស្តែង និងសោភ័ណភាព	វិជ្ជមាន	ការស្តារ និងវិធានការកាត់បន្ថយហេតុប៉ះពាល់នានាដែលបានដាក់ចេញ (រួមបញ្ចូលការគ្របរណ្តៅសំរាមប្រចាំថ្ងៃ) និង	មធ្យម	អវិជ្ជមាន	ទីតាំងទីវាលដែលអាចត្រូវបានជ្រើសរើសស្ថិតនៅក្នុងតំបន់ទ្រនាប់នៃតំបន់ការពារជីវចម្រុះបឹងទន្លេសាប។ ទោះបី	មធ្យម	• ការគ្រប់រណ្តៅសំរាមប្រចាំថ្ងៃ។ • ដាំដើមឈើបាំងខ្យល់។ • ធ្វើរបងព័ទ្ធជុំវិញ។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការ							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[3]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	
		នាំឱ្យមានភាពប្រសើរឡើងលើលើសោភ័ណភាព ជាពិសេសទៅលើសហគមន៍ក្បែរខាង។			ពេលបច្ចុប្បន្នដីនេះភាគច្រើនជាដីទំនេរ ភាគខាងជើងប្រហែលជា ២គ.ម ជាតំបន់អភិវឌ្ឍលំនៅដ្ឋាន ហើយតាមរយៈផែនការអភិវឌ្ឍក្រុង តំបន់នេះជាទីតាំងអភិវឌ្ឍពាណិជ្ជកម្ម និងលំនៅដ្ឋានចម្រុះ។		
សុខភាពនិងសុវត្ថិភាពសហគមន៍ និងសុខភាពនិងសុវត្ថិភាពការងារ	វិជ្ជមាន	ការស្តារ និងការពង្រីកកន្លែងចាក់សំរាមបច្ចុប្បន្នទៅជាទីលានទុកដាក់សំរាមអនាម័យ អាចកាត់បន្ថយបានយ៉ាងច្រើននូវហានិភ័យសុខភាព និងសុវត្ថិភាពសហគមន៍ និងកម្មករជិតខាង ដោយសារការអនុវត្តបានប្រសើរឡើងស្របតាម OHS។ លំហូរចូលនៃកម្មករ; កំណើនចរាចរណ៍; បង្កហេតុប៉ះពាល់ដល់ធនធានក្នុងស្រុកបច្ចុប្បន្ន; SEA/SH	ខ្ពស់	វិជ្ជមានសម្រាប់ទីតាំងចាស់ ហើយអវិជ្ជមានសម្រាប់ទីតាំងថ្មី	ការបិទទីតាំងបច្ចុប្បន្នស្របតាមបច្ចេកទេស នឹងផ្តល់ប្រយោជន៍ដល់សុខភាព និងសុវត្ថិភាពដល់សហគមន៍ជុំវិញ ដូចមានបញ្ជាក់ក្នុងជម្រើសទី១។ នៅទីតាំងទី២ពុំមានការផ្លាស់ទីលំនៅចាំបាច់ត្រូវធ្វើឡើងឡើយ ក៏ប៉ុន្តែនឹងមានផែនការអភិវឌ្ឍធំៗដូចជាតំបន់អភិវឌ្ឍពាណិជ្ជកម្ម និងលំនៅដ្ឋានចម្រុះស្របតាមផែនការអភិវឌ្ឍក្រុង។	ខ្ពស់	• អនុវត្តតាមលំនាំទីលានចាក់សំរាមបែបទំនើប និងការដាក់បញ្ចូលសូចនាករការអនុវត្តសម្រាប់ការគ្រប់គ្រង និងការអនុវត្តនៅកន្លែងចាក់សំរាមទៅក្នុងកិច្ចសន្យា ឧទាហរណ៍ដូចជា ការបង្ហាប់កាកសំណល់ និងការគ្របរណ្តៅដីប្រចាំថ្ងៃ ដែលនឹងជួយកាត់បន្ថយវត្តមានរបស់សត្វជាភ្នាក់ងារចម្លងរោគនានា។ • ការប្រមូលឧស្ម័ន និងការធ្វើជីកំប៉ុស ដើម្បីដកចេញមួយភាគធំនៃសមាសធាតុសរីរាង្គចេញពីសំរាម។ • ការប្រមូល និងប្រព្រឹត្តកម្មទឹកសម្អុយទីលាន • ដំឡើងស្រទាប់ការពារជម្រាប និងធ្វើការគ្របរណ្តៅកាកសំណល់ប្រចាំថ្ងៃ និងគម្របកាកសំណល់ចុងក្រោយពេលរណ្តៅពេញ

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការ							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[3]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	
					លំហូរចូលនៃកម្មករ; កំណើនចរាចរណ៍; បង្កហេតុប៉ះពាល់ដល់ធនធានក្នុងស្រុកបច្ចុប្បន្ន; SEA/SH		• ធ្វើរបងហ៊ុមព័ទ្ធទីតាំង និងតម្រូវឱ្យចុះឈ្មោះពេលចេញចូល • ជ្រើសរើសកម្មករចេញពីអ្នករើសសំរាមទៅធ្វើការនៅកន្លែងញែកសំរាម និងរោងជីកំប៉ុស ដោយផ្តល់ PPE វគ្គបណ្តុះបណ្តាល និងការប្រកាន់ខ្ជាប់តាមកិច្ចប្រតិបត្តិ OHS។ • ការផ្តល់ឱ្យ PPEsបានគ្រប់គ្រាន់ និងវគ្គបណ្តុះបណ្តាលបានសមស្រប។ • ការពិនិត្យសុខភាពបានទៀងទាត់។ • ធានាឱ្យមានការផ្គត់ផ្គង់ទឹកស្អាតដល់សហគមន៍ជុំវិញ។ • បង្កើតឱ្យមានក្បាលផ្កាឈូកសម្រាប់ងូតទឹក អាងបោកគក់ បង្គន់អនាម័យ បន្ទប់ផ្លាស់សំលៀកបំពាក់។ល។ នៅបរិវេណទីលានទុកដាក់សំរាម (តាមហេដ្ឋារចនាសម្ព័ន្ធដែលចាំបាច់នានា)។
ឱកាសការងារ	វិជ្ជមាន	បើនិយាយពីការបង្កើត ឱកាសការងារក្រៅពី ឱកាសសម្រាប់អ្នករើស សំរាមគេសង្កេតឃើញមិនសូវមានភាពខុសគ្នាច្រើនទេរវាងជម្រើសទាំងពីរនេះដែលជាទូទៅគឺមានភាព វិជ្ជមានខ្ពស់	ខ្ពស់	វិជ្ជមាន	បើនិយាយពីការបង្កើតឱកាសការងារក្រៅពីឱកាសសម្រាប់អ្នករើសសំរាម គេសង្កេតឃើញមិនសូវមានភាពខុសគ្នាច្រើនទេរវាងជម្រើសទាំងពីរនេះ ដែលជាទូទៅគឺមានភាព	ខ្ពស់	• ធានាឱ្យបាននូវការផ្សព្វផ្សាយឱកាសការងារទៅដល់សហគមន៍ជុំវិញ ដែលផ្តល់អាទិភាពដល់ប្រជាពលរដ្ឋក្រីក្រ និងក្រុមងាយរងគ្រោះ។ • ការចែករំលែកព័ត៌មានប្រកបដោយតម្លាភាពអំពីឱកាសការងារដល់តំបន់ជុំវិញ។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការ							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[3]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	
		ដោយសារការ កែលម្អការប្រតិបត្តិការ ប្រមូលសំរាម បង្កើន សោភ័ណភាព ការគ្រប់គ្រងបានប្រសើរជាងមុន និងដើម្បីបម្រើប្រតិបត្តិការទីលានទុកដាក់សំរាម នឹង បង្កើតតម្រូវការការងារ បន្ថែមដែលត្រូវការកម្លាំង ពលកម្មពីគ្រប់មជ្ឈដ្ឋាន និងកម្រិតគុណសម្បត្តិ នានា ដោយរួមទាំងអ្នក ដែលមានជំនាញខ្សោយ ទាប និងមធ្យម។			វិជ្ជមានខ្ពស់ ដោយសារការកែលម្អការប្រតិបត្តិការប្រមូលសំរាម បង្កើនសោភ័ណភាព ការគ្រប់គ្រងបានប្រសើរជាងមុន និងដើម្បីបម្រើប្រតិបត្តិការទីលានចាក់សំរាមនឹង បង្កើតតម្រូវការការងារបន្ថែមដែលត្រូវការកម្លាំងពលកម្មពីគ្រប់ មជ្ឈដ្ឋាន និងកម្រិតគុណសម្បត្តិនានា ដោយរួមទាំងអ្នកដែលមានជំនាញខ្សោយ ទាប និងមធ្យម។		• ព្យាយាមប្រើប្រាស់វត្ថុធាតុដើមក្នុងស្រុកឱ្យបានច្រើនតាមតែអាចធ្វើទៅបាន។
ការជះដឋទ្ធិពលលើតម្លៃអចលនទ្រព្យ	វិជ្ជមាន	ការស្តារនិងការពង្រីក ទីតាំងចាក់សំរាមបច្ចុប្បន្ន៖ ហេតុប៉ះពាល់ទាក់ទងនឹង តម្លៃដីត្រូវបានចាត់ទុកថា វិជ្ជមាន កម្រិតខ្ពស់។	ខ្ពស់	វិជ្ជមានសម្រាប់កន្លែងចាក់សំរាមចាស់ និងអវិជ្ជមានសម្រាប់ទីតាំងថ្មី	ការបិទកន្លែងចាក់សំរាមចាស់ និងសាងសង់ ទីលានថ្មី៖ឥទ្ធិពលទាក់ទងនឹង តម្លៃដីត្រូវចាត់ទុកថាអវិជ្ជមានដោយប៉ះពាល់កម្រិតមធ្យមក្រោមជម្រើសទី2នេះ តែតម្លៃដីជុំវិញកន្លែងចាក់សំរាមចាស់ត្រូវបាន រំពឹងថានឹងមានការកើន	ខ្ពស់	• ដំណើរការជ្រើសរើសនិងកំណត់ទីតាំងទីលានទុកដាក់សំរាមដែលសមស្រប ។ • ចាត់វិធានការកាត់បន្ថយហេតុប៉ះពាល់ដល់បរិស្ថាន និងសង្គម ក្នុងអំឡុងពេលសាងសង់ និងដំណើរការទីលានដែលអាចជួយកាត់បន្ថយទំហំប៉ះពាល់ដល់តម្លៃអចលនទ្រព្យនៃសហគមន៍និងតំបន់ជុំវិញ។

ហេតុប៉ះពាល់បរិស្ថាន និងសង្គមបឋមក្នុងដំណាក់កាលដាក់ឱ្យដំណើរការ							
ហេតុប៉ះពាល់	ជម្រើសទី១៖ កែលម្អ និងពង្រីកកន្លែងចាក់សំរាមចាស់			ជម្រើសទី២៖ បិទកន្លែងចាក់សំរាមចាស់ និងបង្កើតទីលានអនាម័យថ្មី			វិធានការកាត់បន្ថយបឋម[3]
	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	ប្រភេទប៉ះពាល់	បរិយាយ	កម្រិតប៉ះពាល់	
					ឡើងដែលស្ថិតក្រោមជម្រើសទី1។ ទាក់ទងនឹងតម្លៃដីនៅកន្លែងចាក់សំរាមជម្រើសទី2ទីតាំងស្ថិតនៅក្នុងតំបន់ ទ្រនាន់ (តំបន់ទី 2) នៃតំបន់ការពារីជីវមណ្ឌលបឹងទន្លេ សាប។ទន្ទឹមគ្នានេះដែរយោងតាមផែនការអភិវឌ្ឍន៍ក្រុងគេរំពឹងថានឹងមានការអភិវឌ្ឍន៍ពាណិជ្ជកម្ម និងលំនៅដ្ឋានធំៗនៅក្នុងតំបន់។ ចំណុចនេះ គេរំពឹងថាហេតុប៉ះពាល់មានលក្ខណៈអវិជ្ជមាន។		• ធ្វើរបងជុំវិញតំបន់ទីលាន និងតំបន់ទ្រនាប់ដើម្បីកាត់បន្ថយការប៉ះពាល់ដែលអាចមើលឃើញ (របាំងដើមឈើ)។

លទ្ធផលបឋមលើការវិភាគភាពសមស្របនៃទីតាំង ហានិភ័យ និងហេតុប៉ះពាល់

កន្លែងចាក់សំរាមចាស់ គឺជាកន្លែងដែលជាប់ពាក់ព័ន្ធហើយស្ថិតនៅក្រោម WB ESF ហើយត្រូវតែធ្វើការស្តារឡើងវិញជាចាំបាច់ទោះបីក្នុងករណីទីលាននេះត្រូវបានបិទ ឬពង្រីកបន្ថែម ដើម្បីការពារហេតុប៉ះពាល់អវិជ្ជមានលើបរិស្ថានបន្តកើតឡើងបន្ថែមទៀត។ បញ្ហាបរិស្ថាន និងសុខភាពសាធារណៈដែលកើតមាននាពេលបច្ចុប្បន្ននឹងត្រូវដោះស្រាយតាមរយៈគម្រោង ដែលរួមបញ្ចូលវិធានការកាត់បន្ថយផ្សេងៗដូចជា ប្រព្រឹត្តកម្មទឹកសម្អុយទីលាន ការប្រមូល និងសម្អាតឧស្ម័ន វិធានការការពារក្លិនស្អុយ ការគ្រប់គ្រងការសាយភាយមេរោគ ធានាឱ្យមានការផ្គត់ផ្គង់ទឹកស្អាតសម្រាប់សហគមន៍ និងអ្នកដទៃផ្សេងទៀត។

បើយោងតាមហានិភ័យ និងផលប៉ះពាល់សង្គមវិញ ការស្តារកន្លែងចាក់សំរាមចាស់ (ជម្រើសទី១) នឹងអនុញ្ញាតឱ្យអ្នករើសសំរាម លើកលែងតែកុមារ បន្តមានលទ្ធភាពធ្វើការនៅទីតាំងដដែល ប៉ុន្តែក្រោមលក្ខខណ្ឌការងារ សុខភាព និងសុវត្ថិភាពប្រសើរឡើងជាងមុន។ អ្នករស់នៅក្នុងសហគមន៍អាចទទួលបានប្រាក់ចំណូលបន្ថែមតាមរយៈការងារដែលត្រូវបានបង្កើតនៅកន្លែងទុកដាក់សំរាម កន្លែងញ៉ែកសំរាម និងរោងផលិតជីកំប៉ុស។ ជម្រើសកន្លែងចាក់សំរាមទី១មានភាពសមស្របជាង បើគិតលើហេតុប៉ះពាល់ដល់អ្នករើសសំរាម និងជីវភាពរស់នៅរបស់ពួកគេ។

ជម្រើសកន្លែងចាក់សំរាមទី២ មានគុណសម្បត្តិដោយសារជាទីតាំងរួមជាមួយគម្រោងសាងសង់ WWTP ថ្មីដែលបានស្នើឡើង ហើយមានផ្ទៃដីធំទូលាយ (ច្រើនជាង៥០ហិចតា) ទីតាំងនេះបង្កហានិភ័យខ្ពស់ដល់បរិស្ថាន ដោយសារទីតាំងខាងលើស្ថិតនៅលើគែមនៃតំបន់ដែលរងគ្រោះដោយទឹកជំនន់ និងនៅក្នុងតំបន់ហាមឃាត់ការអភិវឌ្ឍរបស់អង្គការ UNESCO ជាប់ទាក់ទងជាមួយនិងតំបន់បម្រុងជីវចម្រុះបឹងទន្លេសាប។ នេះគឺហេតុផលដែលនាំឱ្យភាពសមស្របនៃទីតាំងនេះមានកម្រិតទាប។

ជម្រើសកន្លែងចាក់សំរាមទី២ ក៏បង្កអាចជាហេតុប៉ះពាល់ដល់ជីវភាពរស់នៅរបស់អ្នករើសសំរាម និងកម្មករនៅកន្លែងចាក់សំរាមចាស់ផងដែរ ដោយសារកន្លែងចាក់សំរាមចាស់នេះនឹងត្រូវបិទ ដែលបណ្តាលឱ្យមានបម្លាស់ទីសេដ្ឋកិច្ច និងហេតុប៉ះពាល់ដល់ជីវភាពរស់នៅរបស់អ្នករើសសំរាមផ្ទាល់។ ការបិទកន្លែងចាក់សំរាមចាស់ទាំងស្រុង នៅពេលទីលានចាក់សំរាមត្រូវបានជំនួសនៅទីតាំងផ្សេង នឹងបាត់អត្ថប្រយោជន៍សម្រាប់ប្រជាពលរដ្ឋក្នុងភូមិនៅជិតកន្លែងចាក់សំរាមចាស់ ដែលមិនទទួលបានប្រាក់ចំណូលពីការរើសសំរាម។ ប៉ុន្តែហេតុប៉ះពាល់ទាំងនេះអាចកាត់បន្ថយបានតាមរយៈ ការរចនាប្លង់ ការប្រតិបត្តិការ និងការគ្រប់គ្រងទីលានទុកដាក់សំរាមថ្មីបានត្រឹមត្រូវតាមបច្ចេកទេស។

EXECUTIVE SUMMARY

Objective and Scope of the Preliminary ESIA for Siem Reap

This Preliminary Environmental and Social Impact Assessment (P-ESIA) has the following objectives: (i) to provide preliminary environmental and social information to inform and facilitate the selection process for landfill site options, as well as a "do nothing" option; and (ii) to provide an overview of the generic potential impacts and mitigation measures and environmental and social risks for the siting, construction and operation of the solid waste infrastructure investments: landfill, transfer station, material recovery facility and composting facility and closing of the existing dumpsite as an associated facility to the landfill; (iii) to inform stakeholders in the target areas about potential project activities and options

The preliminary ESIA, together with the other Environmental and Social Framework documents, including the Stakeholder Engagement Plan, serve to inform the government as well a broader range of stakeholders in the Siem Reap province. It also serves as a key input to facilitate public consultations and stakeholder engagement on the general project and into the landfill site selection process. These documents have been posted for public access on WEBSITE.

The preliminary ESIA is not a full site-specific ESIA for one or more landfill site options. Once a final site option has been selected and agreed for the landfill and waste infrastructure and detailed designs are defined with specific land requirements and lay-out, a site-specific ESIA, Environmental and Social Management Plan (ESMP) with Resettlement Plan and possibly an Indigenous People's Plan (IPP) will be prepared in line with the Environmental and Social Management Framework (ESMF), the ESF and the findings of this Preliminary ESIA.

This Preliminary ESIA was conducted for the three options as considered in the landfill site suitability and selection process for Siem Reap, namely:

- Option 0, 'Do nothing' scenario: continuation with existing dumpsite at Anlong Pir Village, Trapeang Thom Commune, Prasat Bakong District
- Option 1: Rehabilitation and extension of the existing dumpsite Anlong Pir Village, Trapeang Thom Commune, Prasat Bakong District
- Option 2: Closure of the Anlong Pir existing dumpsite and development of new landfill in Trapeang Tim Village, Kandaek Commune, Prasat Bakong District

Project Overview and Background

Several Government strategies have focused on better management of solid waste in Cambodia. Despite the plans and strategies to improve solid waste and plastic management, proper waste collection and treatment/disposal remain a challenge in the country. Insufficient waste management originates to a large extent from the full privatization of waste services in the absence of the required enabling conditions in terms of regulations, monitoring and enforcement needed to make such privatization successful. Poor quality and lack of solid waste management infrastructure in Cambodia is also a significant problem. The absence of (a) proper sanitary or controlled landfills in all cities; (b) landfill supporting infrastructure,

including weighbridge, proper methane and leachate collection systems, provision of cover material, and sufficient heavy equipment/transport; (c) transfer stations in many cities; and (d) recycling/treatment process facilities to increase recycling and reduce the amount of waste going to landfills need to be addressed urgently. Inadequate solid waste management is associated with a variety of environmental and economic impacts and is increasingly seen by the Government as a critical bottleneck for Cambodia's economic and social development and tourism assets.

The Project aims to improve solid waste and plastic management in Cambodia. The Project aims to create selected cities throughout Cambodia that can: (i) demonstrate improved solid waste management performance adaptable and scalable to other cities in the country, (ii) support solid waste management policy and legislation, and (iii) support capacity development at both the national and the municipal levels. The project will include support for improvements in waste collection, transport, and recovery, treatment, recycling, disposal and cost recovery by improvement of waste fee collection. It will aid with the improved monitoring and enforcement of private waste management companies, information availability and reliability, and citizen engagement and public information. The project will also support plastic policies and improved plastics management to reduce the amount of waste that needs to be collected or landfilled, increase recovery and recycling, and contribute to reduced plastic leakage to the waterways and ocean.

At the local level, it will support the implementation of Cambodia's Sub-decree 113 as specified in Article 9 – "it is the cities and district administration that have the role to manage urban garbage and solid waste within their jurisdiction." The Project will focus on supporting the improvement of solid waste collection services, the improvement of waste fee collection and cost recovery, as well as increasing public awareness and citizen engagement through technical assistance prior to undertaking the infrastructure investments. The capacity building and technical assistance will focus on the improvement of the performance of the private sector through the provision of transaction advisory services. This is consistent with the good international practice of solid waste being a service managed by the local government to ensure citizens can provide direct feedback for the services.

The Project consists of three main components and an emergency component that will be implemented over a six-year period, namely:

Component 1: Development and Strengthening of National Legislative, Regulatory, Policy, and Institutional Frameworks for Solid Waste and Plastic Management
Component 2: Integrated Solid Waste and Plastic Management, Planning, Monitoring and Capacity Building for the Participating Municipalities
Component 3: Solid Waste and Plastic Management Infrastructure
Component 4: Contingent Emergency Response

<u>Component 1: Development and Strengthening of National Legislative, Regulatory, Policy, and Institutional Frameworks for Solid Waste and Plastic Management</u>

Carry out a program of activities aimed at developing and strengthening the legislative, regulatory, policy, and institutional frameworks related to solid waste and plastic

management, including: (a) development and strengthening of laws, regulations, sub-decrees, policies, and guidelines related to solid waste management with respect to, among others (i) waste classification, planning, reporting, monitoring, enforcement, rural and community waste collection, and database management, and (ii) cost calculation of waste fees, and waste accounting and financial systems; (b) development and strengthening of relevant laws, regulations, sub-decrees, policies, and guidelines related to plastic management to increase reduction, reuse and recycling of plastics; and (c) capacity building of relevant institutions, including the Ministry of Environment (MOE), the Ministry of Interior (MOI), and the Ministry of Public Works and Transportation (MPWT).

Component 2: Integrated Solid Waste and Plastic Management, Planning, Monitoring and Capacity Building for the Participating Municipalities

Carry out a program of activities aimed at building the capacity of the Participating Municipalities for solid waste and plastic management, including through support with: (a) waste and plastic management planning, transaction advisory services, and designing of performance indicators for waste management contracts; (b) development of waste information, financial, and geospatial systems for (waste) fee collection to increase cost recovery; and (c) operational management, and public outreach, awareness, education and citizen engagement activities.

Component 2 is for municipalities/districts that meet the agreed eligibility criteria to (a) reform the SWM sector in line with Cambodia's Sub-decree 113 on Management of Urban Garbage and Solid Waste, where municipalities take responsibility for solid waste management; (b) reform solid waste operations, specifically revise contracts with private sector waste collector companies to include key performance indicators, operational plans, and reporting requirements in the contracts together with establishment of relevant payments for these services in the contracts; (c) agree that the municipality monitors the private solid waste sector and that government takes responsibility for the waste fee collection for households and businesses that will be used to pay the private waste companies for the waste collection, transport, treatment, and disposal systems and (c) develop an (operational) cost recovery plan for solid waste services.

Component 3: Solid Waste and Plastic Management Infrastructure

Carry out a program of activities for the Participating Municipalities and select districts, including: (a) preparation and construction of solid waste and plastic management infrastructure for proper collection, transfer, treatment/recycling, and disposal of solid wastes and plastics, including landfills, transfer stations, and intermediate waste treatment facilities such as material recovery facilities and composting facilities, including potential access roads as well as remediation of contamination of existing dumpsites and (b) development of relevant guidance documents, such as landfill related regulations, landfill design and operation standards, and contract templates and manuals for landfill management and operation.

Eligibility criteria for participation for Component 3 are based on: (i) the requirement of cost-effective solid waste treatment and disposal infrastructure for which more than 100,000 population equivalent waste generators are needed, (ii) willingness for cost recovery for at least operational costs of the landfill disposal and landfill management contracts with

performance indicators and payments for operation and management of waste disposal; and (ii) land available for solid waste landfills and other treatment infrastructure, in line with WB ESF requirements.

The sanitary landfill investments are based on modern landfill including all applicable infrastructure, such as (i) Landfill cells and extension area with sufficient capacity for a 10-year to 20-year lifespan, given potential expansion; (ii) bottom sealing system; (iii) internal road network; (iv) leachate capture and recirculation and treatment system; (v) landfill gas capture system; (vi) entrance and general administration; (vii) weighbridge; and (viii) garage and workshop.

Material Recovery Facility, Transfer Stations and Composting Plants are also planned for the following purposes:

a. Recovery and reuse of recyclable materials
b. Generation and continuation of waste-based livelihoods
c. Reduction in volume of waste being disposed of in landfills
d. Reduction in greenhouse gas (GHG) generation

Recyclables are sorted at a transfer station, where these may be transferred to off-takers so that disposal sites will only receive non-recoverable waste. Waste-pickers will be integrated in the material recovery facility to continue to have access to the recyclables through construction of a safe materials recovery facility (MRF) that will provide waste-pickers safer working conditions and will prevent them from potential health risks.

Composting plants will also serve to help in reducing waste volume and GHG emissions and create waste-based livelihoods and the production of compost for parks, gardens, and cover for landfills and, depending on the quality, potentially agriculture.

Component 4: Contingent Emergency Response

This zero-dollar component is designed to provide immediate response to an Eligible Crisis or Emergency, as needed.

Legal and Institutional Framework

National Policies, Laws, and Regulations in Cambodia. The preparation of the Preliminary Environmental and Social Impact Assessment (P-ESIA) adheres to the national policies, laws and regulations of the Royal Government of Cambodia, namely: (i) Sub-Decree 72 on Environmental Impact Assessment Process (1999); (ii) Prakas 21 on the Classification of Environmental Impact Assessment for Development Projects (2020); (iii) Prakas 376 on General Guidelines for Preparing initial Environmental Impact Assessment and Full Environmental Impact Assessment Report (2009); Guidebook on Environmental Impact Assessment in the Kingdom of Cambodia (2012); Labor Law (1997) includes occupational health safety provisions and age requirements; Prakas No. 002 on Category of Occupation and Light Work Permitted for Children (2008); Prakas No. 106 on the Prohibition of Hazardous Child Labour (2004); Law on Suppression of Human Trafficking and Sexual Exploitation (2008) The pertinent laws and regulations in Solid Waste Management (SWM), Environmental Management and Protection, Environmental Impact Assessments, Labor,

Working Conditions, and Occupational Health and Safety (OHS), Land Acquisition and Resettlement (LAR), Stakeholder Engagement and Public Consultation, Vulnerable Groups, and Cultural Heritage.

International Standards, Treaties and Agreements. This Preliminary ESIA has been prepared aligned with the Environment and Social Framework (2018) and the Environment, Health and Safety Guidelines for Waste Management Facilities (2007) of the World Bank Group.

Sub-Project Infrastructure Site Options

Overview of existing open dumpsite

The existing dumpsite is situated in Anlong Pir Village, Trapeang Thom Commune, Prasat Bakong District, Siem Reap Province, and occupies a series of worked out quarries across an area of approximately 8 hectares. It is privately owned and operated without key performance indicators for the operation and management of the landfill. The dumpsite itself is bordered to the east and south primarily by agricultural fields, with the north and west bordered by Anlong Pir Village.

Existing Dumpsite in Anlong Pir Village, Trapeang Thom Commune (13°18′22″N latitude and 104°2′2″E longitude)

Separation distances between active areas of the dumpsite and leachate ponds are minimal, particularly in the north-western edges where dwellings within Anlong Pir are directly adjacent to the leachate ponds. There are approximately 273 waste-pickers working on the dumpsite, most of which are assumed to live within Anlong Pir and the surrounding villages of Phnom Dei, Suong, Rokakambot and Lovea given the relatively small number of structures on the dumpsite itself.

This existing open dumpsite has been operating for more than 10 years, with the approximate volume of waste at the dumpsite in the order of ~1,000,000 cu.m. There are no engineered cells, with waste simply being placed in former borrow pits without any containment layer

liner and no leachate collection or treatment systems. Environmental controls either within the site or outside the boundaries are very limited.

Around 250 to 300 tons of waste per day are disposed in the existing dumpsite. The land area of the dumpsite measures at approximately 8 hectares, with a 500-m laterite access road from National Road 6 (NR 6). The dumpsite is owned, managed and operated by two private companies (GAEA and CINTRI) but controlled and monitored on technical aspects by the municipal government of Siem Reap and Department of Environment (DOE) of Siem Reap.

Landfill Site suitability assessment

The key mitigation of potential environmental and social risks is to carry out a thorough site suitability assessment process. This will ensure that every advantage and disadvantage of the sites are considered prior, and consultations held prior to the selection of a site for a construction stage of the sub-project. Each site is verified to fill the criteria from the Ministry of Environment (MOE) and the World Bank Environmental, Health, and Safety (EHS) Guidelines for the Waste Management Facilities.

The site screening process is based on a two-stage approach: (i) preparation of a modelling and negative mapping process and (ii) a series of site visits to ground-truth data and gather new information from walk-over surveys. The modelling, negative mapping and site investigations were guided by the Cambodian Guidelines on Selection of Landfill Sites (2016) and the World Bank Landfill Siting Criteria.

A multi-criteria decision-making model was developed with twenty-four screening criteria which are broadly divided into five categories:

1. Transport (including distance from service area and access road conditions)
2. Physical site conditions for landfill development (Geotechnical/hydrological/ hydrogeological)
3. Current land use, ownership and development zoning
4. Social impacts, safety and acceptability
5. Environmental and cultural heritage

The criteria were run through the following process:

- ***Scoring by ranking***: scoring the identified alternatives/options available for each criterion. The score assigned to each option is the sum of its rankings for each of the applied criteria. Ranking score is normalized to same scale.
- ***Criteria weighting***: consideration is given to the fact that each of the criterion can differ in importance; thus, each is assigned a weighting factor based on its importance.

The output of the model includes a visual map of each city and surrounding area with colour-coded Suitability Banding in four categories: **Restricted**, **Less Suitable**, **Suitable**, **Most Suitable**[4].

[4] The terminology used is restricted instead of unsuitable, as with more expensive engineering measures, many sites can be made suitable if originally less suitable and if acceptable to government and communities.

Option 0 is considered the 'Do Nothing' Scenario. The site screening process for Siem Reap showed two potentially suitable site options for the location of the landfill. Option 0 and the site screening process and criteria are also part of the consultation process and updated based on the consultations.

The landfill site options being considered under this preliminary ESIA include Option 1 - "The rehabilitation and extension of the existing dumpsite in the Anlong Pir Village" and Option 2 - "The closure of the Anlong Pir open dumpsite, and construction of a new landfill in Trapeang Tim village". The resulting identified options, including an Option Zero 'do nothing', are presented below.

Option 0: Do nothing scenario.

The existing dump site at Aulung Pir Village is currently operating as an open dump. Under a 'Do Nothing' scenario, the Aulung Pir Village dump site will continue to pose a significant environmental, social and public health risk to workers, the surrounding community and the environment. The existing dumpsite is around 200-300 meters away from the closest residential structures, the current existing open leachate pond is even closer. The dumpsite is surrounded by rice fields and residential areas.

Methane gas will continue to be emitted uncontrolled; uncontrolled leachate discharge into ground and surface water will continue; odor, wind-blown waste and disease vectors (rats, flies, etc.) will continue to affect workers, waste pickers and the surrounding community with all related environmental, social, and public community health risks. There are about 273 waste-pickers at the existing dumpsite, of which about 100 are male and 175 are female. Additionally, at the dumpsite are an estimated 45 children with families and 15 orphaned children.

Summary of Environmental, Social and Public Health Concerns at the existing dumpsite which will continue as part of the Option 0 "do nothing" scenario

Environmental	• The existing dumpsite does not comply with national and/or international minimum sanitary landfill infrastructure and operating standards; • The dumpsite is lacking lined engineered cells, leachate collection, drainage, and leachate treatment has resulted in environmental impacts to surface and ground water quality and soil through uncontrolled, untreated leachate discharge; • Lack of intermediate cover and capping and closing of full cells impacts air quality and surrounding environment through odor, GHG discharge, and flies and windblown waste; • Fires are common through lack of proper landfill management; this again impacts air quality, generating odor, dust, and smoke which are not managed and represent a serious concern; • Plastics are about 10% of the total waste, with impacts of plastic pollution to obstructing wastewater run-off, causing air pollution in case of burning and impacts to ecosystems. Recycling activities are only evidenced for plastics, plastic bottles and aluminum cans. Municipal waste recycling is almost nonexistent. • Unregulated dumping of hazardous waste, it has been regulated by laws and regulations, but practices have not been enforced. Medical waste is required to be disposed of separately. These have an impact on the dumpsites both in terms of water quality and provides a public health risk; villagers typically rely on underground, or surface water and water pollution affects community health and safety; and • Noise and pollution result from poorly managed transfer stations in Siem Reap, which share many of the environmental problems cited at the landfill, and from transportation of waste on open trucks.

Social	• There is no monitoring of informal waste-pickers working at the dumpsite. There are no regulations that ensure their health and safety. Many of these waste-pickers are women and children. Some of the waste-pickers live on or near the waste dumps and derive their main income from waste picking. • Communities living near the dumpsite and along waste transport routes are routinely impacted by pollution from the SWM sites and its operations. These impacts include air pollution from burning of waste and vehicle exhaust; noise pollution from trucks; and pollution of water sources. • There is lack of controlled access to dangerous areas at the dumpsite, which may pose risks to the health and safety of waste-pickers and other members of the surrounding communities. • Communities have limited awareness of their role and responsibility in good solid waste management, waste segregation, waste reduction, and recycling (3R). Burning of waste and dumping in open spaces and water courses are common practices. Public awareness campaigns are limited.
Public and Community Health and Safety and OHS	• Poor operation of the dumpsite and poor waste placement result in dangerous conditions in the dumpsite where unstable waste masses are prone to collapse, posing risks to sanitation workers, waste-pickers, and surrounding communities. • Lack of training, awareness, and provision of safety equipment (PPE) put both sanitation staff and waste-pickers at risk. • Illegal dumping of hazardous waste, in particular hospital waste, on the dumpsite put the health and safety of workers and waste-pickers at risk. • Poorly operated transfer stations and transport equipment pose risks to health and safety of sanitation workers and waste-pickers.

Landfill Site Option 1: Rehabilitation and Extension of Existing Dumpsite in Anlong Pir Village, Trapeang Thom Commune.

Under this option, the current dumpsite would be rehabilitated and expanded with the construction of new cells and related landfill infrastructure on land of existing site gained through rehabilitation as well as on adjacent land. This option means to rehabilitate existing waste dumpsite, introduce leachate collection system; construct leachate treatment, landfill gas treatment/utilization, sorting, composting and other infrastructure by reshaping and stabilizing the existing waste mass and extend the landfill area away from the villages.

The existing dumpsite will need to be rehabilitated regardless of whether it is closed (under Option 2, below) or extended for landfill use to prevent further environmental impact. Through various design and mitigation measures the current situation, environmental pollution and risks for surrounding communities would be strongly improved.

Extension of the current site has been assessed as in principle feasible. This land is currently used as agricultural land but likely impacted already from pollution. No residential structures are identified until now. New potential extension areas to the South-East would also put the site further away, to around 400-1000+ meters, from the residential areas of the nearby Anlong Pir village to the North-West of the current site. The open leachate pond close to residential structure would be remediated. Detailed assessments will be needed for specific land area required in a detailed design and site specific Environmental and Social Impact Assessment following agreement and completion of landfill site selection process.

Landfill Site Option 2 – Closure of Anlong Pir Dumpsite and development of new landfill in Trapeang Tim Village, Kandaek Commune.

The potential location identified by the municipal government for a new greenfield sanitary landfill site is in Trapeang Tim Village, Kandaek Commune, within the Prasat Bakong district of Siem Reap Province. The site is situated approximately 11 kilometers to the south, south-east of Siem Reap City center.

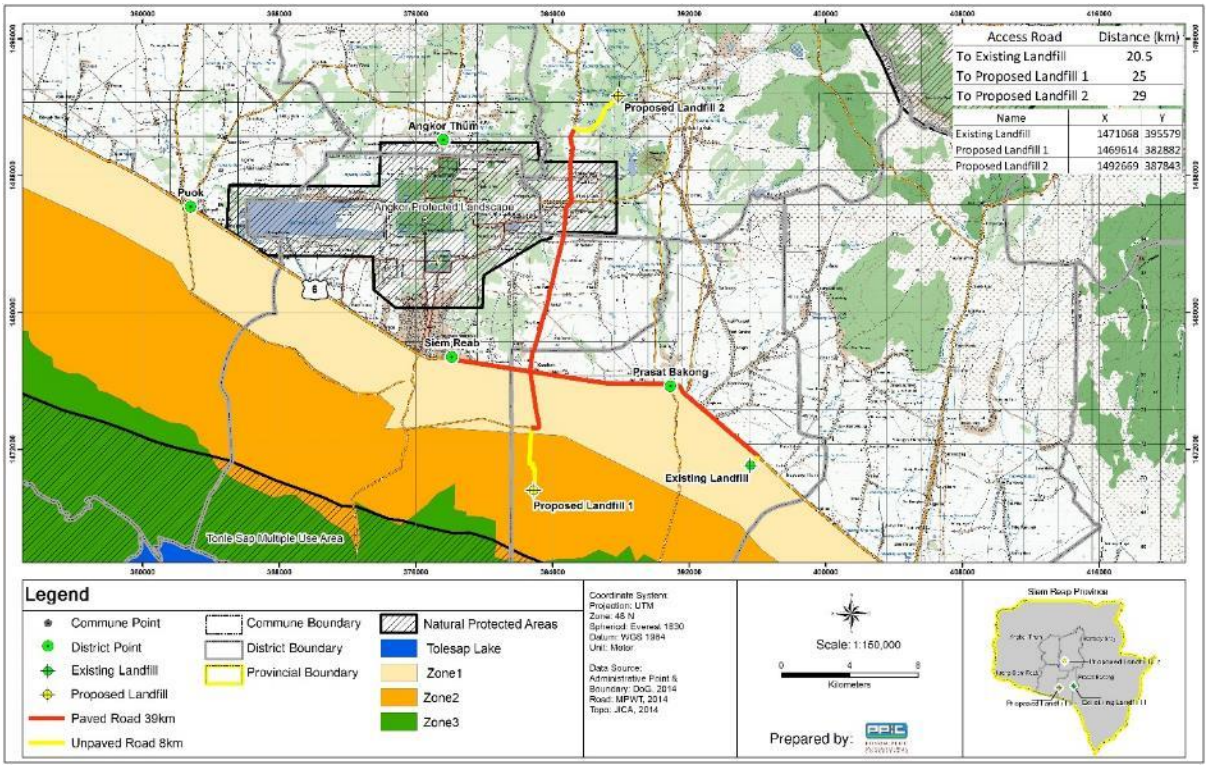
The site is a greenfield site which is adjacent to the proposed wastewater treatment plant (WWTP). It is surrounded by agricultural land, specifically rice, with the nearest village situated more than 2 kilometers away to the north. The site is occupied by scrubland and informal community fishing ponds. It is within a low-lying area and, consistent with most locations in Siem Reap, is characterized by a suspected high groundwater table which may be prone to both localized and wide-spread flooding. The geology appears to be primarily sandy silty clays. There is a flood mitigation bund immediately bordering the south of the site which was constructed during historical Khmer Kingdom periods and designed to prevent the seasonal flooding from the Tonle Sap Lake. The presence of this structure mitigates impacts of seasonal flooding. Tonle Sap is situated to the south of the site and is a UNESCO biodiversity reserve. The potential site location is situated within restricted development Zone 2 of the biodiversity reserve. To the north, the land is zoned for high value residential development, with construction already commencing approximately 2 kilometers to the north.

Profile of the Sanitary Landfill Site Option 2 in Trapeang Tim Village, Kandaek Commune

Characteristics	Description
Location	Trapeang Tim Village, Kon Dek Commune, Prasat Bakong District, Siem Reap Province
Land Property	State-owned
Size (ha)	TBD-but can be 50ha and extend up to 100ha
Access	Located in the same property of the proposed wastewater treatment plant-laterite road
Electricity	Close to power station
Water Use	Close to Tonle sap
Description of Vicinity	Located in a lowland area adjacent to the Tonle Sap Lake, a protected area, and surrounded by a fishing community

The map below shows that the existing dumpsite and also the location of landfill Site Option 1 falls on the outer edge of the zone 1 of the Tonle Sap Biodiversity Reserve which allows for settlement and sustainable land-use development.

The potential site under Landfill Site Option 2 is located in the middle of Zone 2 which is set aside as a protection buffer zone with restricted land use excluding landfill development. Under this option, the landfill site would be squeezed between the city expansion zone and the Tonle Sap UNESCO and Tonle Sap biodiversity reserve.



Preliminary Environmental and Social Assessment

A preliminary environmental and social assessment was carried out for landfill siting options in Siem Reap, including the following elements:

Environmental

- Environmental Standards
- Geography and Topography
- Land use
- Climate
- Hydrology
- Water quality
- Air quality
- Protected and biodiversity areas
- Forest
- Terrestrial and aquatic animals
- Acoustic environmental quality
- Visual impacts/aesthetics

Social

- Demography
- Vulnerable Groups and Poverty
- Livelihood and employment
- Waste based livelihoods
- Persons with disabilities
- Indigenous people/ethnic minorities
- Public services and utilities
- Education
- Tourism
- Health
- Cultural heritage

The findings of the analysis are provided in Chapter 5.1 and Chapter 5.2.

In addition, a socio-economic survey including primary data collection was carried out with a focus on the existing dumpsite and specific elements on potential site at Trapeang Tim village.

A child at the dumpsite.

Waste-picker at the dumpsite.

Transporting recyclable materials from the dumpsite.

Waste-picking activity at night-time shift.

Photos from the Field Observation (27 Feb – 1 Mar 2021)

Based on the latest inventory collected by the Trapeang Thom Commune received in March 2021, there were about 273 waste-pickers identified in the existing dumpsite in Anlong Pir. Majority of the waste-pickers reside in the villages of Phnom Dey (52.7%) and Anlong Pir (37.4%). Among the approximately 273 identified waste-pickers, about two-thirds (64.3%) are female. The largest disparity in the age and sex distribution among the waste-pickers are between the ages of 18 to 30, wherein there were more females identified. About a quarter of the waste-pickers are on the younger spectrum of the age groups, wherein 11.7% are children aged 14 years old and below (0-14) and 9.9% are children below 18 (15 to 17) years old. Among them, there are more younger females, especially those aged 14 years old and below. Similarly, among adults aged 18 to 60 years old, there are almost twice as much females as there are males. Among the children, 15 out of the total of 59 are orphans where 8 are girls are boys. These orphans mostly live in Phnom Dey Village and many of them are Poor ID holders. While the data gathered and presented was pre-feasibility level, there are already some key trends, vulnerabilities and opportunities arising, including:

- Most individuals interviewed appear to live in houses within the surrounding villages, rather than within the boundaries of the landfill site itself. This would need to be further confirmed during the detail design and site-specific ESIA phase after a landfill site has

been selected, however it implies that direct physical displacement associated with either closure or expansion of the landfill would be minimal.

- Interviewed waste pickers reported as having been working on the site for 10 years or more. The surrounding community therefore is likely to have a strong reliance on the dumpsite and there is a strong sense of attachment to the area. The full extent of waste-based livelihoods economy in and around the site (including junk traders, middlemen, transport providers and peripheral supporting businesses) needs to be better understood, however, any options to close the dumpsite will need to account not only for livelihood impacts, but for social dislocation throughout the community. Initial consultation during the visits for the site suitability assessment indicated a strong preference to remain working on the landfill site. Incidental information provided by local authorities and counterparts indicated that some local residents had been advocating for the dumpsite to be closed.
- Income was reported as typically being between 50 USD and 75 USD per month, which will place many individuals below the international poverty line (1.90 USD PPP) and well below the gross average national income of Cambodia (approximately 127 USD/month) if the waste-picking income is the only source of income. Further assessment is required to understand this on a per household basis, in addition to any barriers (institutional, cultural or otherwise) that may explain the low uptake of social safety net support from the Royal Government of Cambodia.
- 49 out of 75 interviewed waste pickers noted that they have other sources of income, however 48 also noted that their primary source of income was from waste picking. This indicates a variety of livelihood strategies are pursued. However, for some individuals the additional income sources are minimal and there remains a high-level of reliance on waste picking as the primary income source. This has implications for identification, assessment and mitigating economic displacement impacts associated with any concept design that involves changing the waste flows through the existing site.
- Almost half of the respondents noted that they have borrowed money within the last 12 months, with monthly interest payments ranging from 10 USD to 260 USD/month. With the almost complete absence of tourists from Siem Reap Province, waste volumes have dropped, as have opportunities for work and income generating activities in the tourism and service sectors. These factors may be placing additional strain on already near poor and poor families. This needs to be furthered assessed and accounted for within the feasibility and site-specific ESIA phase as part of the first year of Project implementation.
- The basic data presented in relation to community health does not present any clear data trends, other than a prevalence of “headaches”. Given the conditions that waste-pickers typically work in, underlying health issues are typically expected. The unlined nature of the landfill itself has the potential to further exacerbate these issues given the strong likelihood that it has polluted the groundwater system. The local community has

reported pollution within the groundwater wells, which needs to be fully understood in terms of (i) the type and extent of pollution, (ii) the relation to the existing dumpsite.

More detailed information from the socio-economic assessments is provided in Chapter 5.3

Preliminary Environmental and Social Risks, Impacts and Mitigation Measures

In the context of the Environmental and Social Management Framework (ESMF), potential risks associated with for the solid waste and plastic infrastructure options in Siem Reap were identified. This preliminary risk assessment builds upon these risks and the information presented within the above environmental and social setting for both the existing dumpsite and the potential location for a new landfill development. From a concept design perspective, an important assessment is to determine if remediation/rehabilitation and extension of the existing dumpsite, or development of a new sanitary landfill on a greenfield site, is preferable from an environmental and social perspective only. A summary of preliminary identified environment and social risks, impacts, and mitigation measures is provided below. The full assessment is provided in Chapter 6.

The preliminary environmental and social impacts prior and during construction phase against both potential landfill site options, and preliminary mitigation measures are summarized below.

Impact	Option 1 – Rehabilitation and extension of existing dumpsite			Option 2 – Closure of existing dumpsite and new greenfield landfill at Trapeang Tim Village, Kandaek Commune			Preliminary generic mitigation Measures. Specific mitigation measures will be determined at the stage of detail design and the accompanying site-specific ESIA
	Positive/ Negative Impact	Description	Significance	Positive/ Negative Impact	Description	Significance	
Air quality	Negative	Dust generated due to the construction activities for the rehabilitation of the existing site	Moderate	Negative	Dust generated due to the construction activities for the closure of the existing site and construction of a new landfill	Moderate	• Monitoring of air quality in residential areas during construction phase to be put in place • Limit construction hours (day times) • Stabilize the exposed surfaces • Minimize activities that suspend dust particles • Apply water to the areas to be excavated, loading and unloading areas and unpaved roads • Develop a wheel wash at the entrance to public roads or exit of the landfill construction site • Implement speed controls on-site • Maintain enough loading capacity of lorries and barges to avoid spillage • Cover soil stockpiles with erosion control blankets • Use hoarding to avoid wind-blown dust • Apply good construction practices
Noise	Negative	Noise will be generated due to the use of construction machinery for the rehabilitation of the existing site	Moderate	Negative	Noise will be generated due to the use of construction machinery for the closure of the existing site and construction of a new landfill	Moderate	• Construction activities will not be operational during the late hours; therefore, the impact on evening averages of ambient noise will be little. • Optimize the use of machines and noisy equipment

							• In case of receiving complaints from neighboring areas regarding noisy operations acoustic barriers can be placed • Construction works should be stopped at night-time
Odor	First Negative, then Positive	Odor impact will occur, causing nuisance to neighboring communities during the implementation of the construction work for the rehabilitation of the existing site but will be significantly minimized after the works are completed	Moderate	First Negative, then Positve	Odor impact will occur, causing nuisance to neighboring communities during the implementation of the construction work for the closure of the existing site but will be significantly minimized after the works are completed. Odor will be generated due to the use of the construction machinery (fugitive emissions) for the construction of a new landfill, but this significance is low.	Moderate	• Application of cover for the waste at existing dumpsite for both options. • Installation of landfill gas treatment system • Leachate treatment system • Use of odor counter actant and/or masking sprays in case odor is a chronic problem.
Soil integrity	First Negative, then Positive	Soil will be damaged during the excavation works for the rehabilitation of the existing site, but the overall soil quality will be improved after the works are completed.	Moderate	First Negative, then Positive	Soil will be damaged during the excavation works for the rehabilitation of the existing site, but the overall soil quality will be improved after the works are completed. Soil integrity will be considerably damaged during the construction/excavation works for the construction of a new landfill.	Moderate	• Use excavated soil in the landfill operations: usage as daily cover of waste, and usage in establishing side embankments for containing the waste ▪ Use excavated soil for coverage for closing of adjacent old cells (re-cultivation layers of the final cover) • Soil excavated in the direct vicinity of the existing dump site has to be sampled to assess the extent of contamination and accompanying suitability for landfill construction.
Soil erosion	First Negative, then Positive	The excavation works can trigger soil erosion. However, upon completion of the works, the overall impact will	Moderate	First Negative, then Positive	The excavation works can trigger soil erosion. However, upon completion of the works for the closure of the existing	Moderate	• Installing erosion matting over the stockpiles if further surface compaction and/or seeding fails

		be positive, as soil stabilization measures will be taken during the rehabilitation of the existing site			site, the overall impact will be positive, as soil stabilization measures will be taken. The works for the construction of a new landfill can trigger soil erosion the risk of which will exist until the completion of the construction		• Protect the stockpiles from flooding and run-off by placing berms or equivalent around the outside where necessary • Protection of most susceptible soil surfaces • Protection of drainage channels
Topsoil losses	Positive	The existing site is significantly disturbed, and the quality of topsoil is not assessed to be high (to be reconfirmed during the detailed and site-specific ESIA).Topsoil losses may occur, however, during the construction works mobilization in relation with setting camps, materials plants and other related infrastructure	Moderate	Negative	The loss of the topsoil will occur due to the construction works on a greenfield site. The works on the closure of the existing site do not envisage to cause significant topsoil loss, as the site is disturbed by uncontrolled dumping of wastes	High	• Storage of topsoil in stockpiles • Storage locations that prevent the stockpiles being compacted by vehicle movements or contaminated • Segregation from subsoil stockpiles • No storage where there is a potential for flooding • No storage close to streams, subject to local topography.
Water quality	First Negative, then Positive	The construction works can cause contamination of surface and underground water resources; however, the overall impact will be positive as the rehabilitation of the existing site will stop leakages of untreated effluents and waste waters	High	Negative, then positive for existing dumpsite and high risk for new landfill site	The construction works can cause contamination of surface and underground water resources. At the existing dumpsite, the overall impact will be positive as the rehabilitation of the existing site will stop leakages of untreated effluents and waste waters. The new landfill will have systems for leachate treatment and treatment of effluents, but due to the close proximity to Tonle Sap/seasonal flooding, this poses a risk	High	• Minimize land disturbance • Manage run-off and sediment exiting to disturbed areas • Manage drainage within the disturbed areas • Manage ground cover • Good construction quality assurance procedures and protocol during installation of the basal, lateral and top containment engineering systems • Leachate treatment

Improper management of wastes	Negative	Wastes of various origin to be generated during the construction works might be improperly sorted out, stored, transported and disposed, causing pollution of air, soil and water.	Moderate	Negative	Wastes of various origins to be generated during the construction works might be improperly sorted out, stored, transported, and disposed, causing pollution of air, soil, and water.	Moderate	• Provide disposal facilities with local authorities. Allow local communities to utilize any excess rock, which may be left following reuse • All waste from the construction site will be disposed of in accordance with local environmental regulations and at sites approved by the local authorities • Hazardous wastes (contaminated rags; oil residue, paints etc.) will be disposed of as agreed with local executive and environmental authorities • The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in waste handling, waste treatment and waste storage
Landscape disturbance/Visual and aesthetic impacts	Positive	The rehabilitation of the existing site is expected to cause a positive impact on landscape which is currently disturbed.	Moderate	First Negative, then Positive for existing dumpsite and neutral for new landfill	The closure of the existing site is expected to cause positive impact on the landscape which is currently disturbed. The construction of a new landfill will cause damages to the landscape which can be mitigated visually.	Moderate/ High	▪ Adequate site selection through thorough site assessment process ▪ Limit the construction area according to the planned detailed engineering design ▪ Location outside of zoning of vital habitats and ecosystems ▪ monitoring of species presence and pollution • flood protection measures, if needed.
Disturbance to biodiversity/ flora and fauna	First Negative, then Positive	The rehabilitation of the existing site might cause temporary disturbance to flora and fauna due to the implementation of construction works. The net impacts are expected to be positive as the current negative impacts of the	Moderate	Negative	While the impact of the closure of the existing site will be positive, the construction of a new landfill on a greenfield site will cause damage and disturbance to flora, fauna and natural habitats in that area	High	• Adequate site selection through thorough site assessment process • Limit the construction area according to the planned detailed engineering design • leachate collection and treatment system • installation of lining systems

		existing site will be addressed through rehabilitation.					• zoning outside of vital habitats and ecosystems • monitoring of species presence and pollution • flood protection measures
Cultural heritage	Currently not identified, TBD by the detailed site-specific ESIA	No impacts on the known Cultural Heritage sites and objects are envisaged from the rehabilitation of the existing site. To be further defined by detailed site-specific ESIA	TBD	Currently not identified, TBD by the detailed site-specific ESIA	No impacts on the known Cultural Heritage sites and objects are envisaged from the closure of the existing site and construction of a new landfill. To be further defined by detailed site-specific ESIA	TBD	
Resettlement, economic displacement and livelihoods impacts	Negative Positive Neutral for livelihoods /positive for health and safety	Acquisition of residential houses or land General waste pickers' impact will be positive as waste pickers will continue to have access to the waste resources under improved Occupational, Health and Safety conditions. Children waste pickers specifically under 14, cannot be permitted to participate in waste recycling activities and will require livelihood restoration support and further livelihood support options. The discontinuing of their work at the dumpsite will have significant positive health and safety impacts.	Moderate High High	Neutral Negative for the different locations, positive for health and safety Neutral for livelihoods /positive for health and safety	Acquisition of residential houses or land not needed as land for option 2 is public land Impact to waste pickers will be negative for this option as the current dumpsite would be closed and transportation allowances to the material recovery facility will likely be included in a livelihood restoration plan together with possible other livelihood restoration assistance and livelihood support options Children waste pickers specifically under 14, cannot be permitted to participate in waste recycling activities and will require livelihood restoration support and further livelihood support options	Low High High	• General impact on waste pickers impact will be positive as waste pickers will continue to have access to the waste resources under improved Occupational, Health and Safety conditions. • Meaningful consultations with neighboring communities, waste pickers and other potential affected people a potential site • Development of Resettlement Plan including Livelihood Restoration Measures and monitoring of implementation • Priorities site options that increase continued access to waste resources at shorter distances for waste pickers • In case of lost access to waste resources provision of Livelihood restoration assistance • Livelihood restoration and support options for children waste pickers as per the Resettlement Policy Framework

							• Ensure awareness of job opportunities within surrounding communities and consideration for vulnerable groups through further livelihood support activities
Temporary job opportunities	Positive	Rehabilitation and extension works at the dumpsite and construction of other waste facilities can provide job opportunities for residents of nearby villages. Many of these residents are already engaged in the local recycling sector.	High	Positive	Residential areas at new landfill site option further away to benefit from local job opportunities, however residents of wider Siem Reap city will still benefit. Residents from villages at existing dumpsite will have access to jobs related to closure of the landfill	Moderate	• To maximize the job benefits for the local population, efforts to be made to ensure that these opportunities are known to the local population, which could consist of transparent information sharing about upcoming job opportunities and exploring of opportunities to encourage local firms as part of consortia for construction tenders.
Community Health and Safety	Negative	Rehabilitation and extension works at the dumpsite and construction of other waste facilities can have negative impacts on neighboring communities' health and safety including impacts of influx of workers and accompanying risks to SEA/SH. The risks are considered negative with moderate significance for both options as the site locations and works are of medium size and in limited different locations.	Moderate	Negative	Rehabilitation works to close the existing dumpsite and works at the new landfill location and construction of other waste facilities can have negative impact to neighboring communities' health and safety including impacts of influx of workers and accompanying risks to SEA/SH. The risks are considered negative with moderate significance for both options as the site locations and works are of medium size and in limited different locations	Moderate	• Supervision of the construction works and clear obligations and code of conduct for firms. • Regular information on progress and Environmental and Social compliance for local communities • Establishing a clear grievance redress system • Monitor labor management procedures • Communicate information about the hours of construction with the local population • Supervise application of OH&S regulations and code of conduct on SEA/SH • Public hearings, meaningful consultations and stakeholder engagement • Restriction from access to the construction site

Risks from contemporaneous construction and operation.	Negative, then positive	Risks that arise from construction and operation activities overlapping in time and space (e.g. construction and operation traffic, new civil works at landfill under full operation, etc.)	High	Neutral	Risk that arise from construction and operation activities overlapping in time and space (e.g. construction and operation traffic, new civil works at landfill under full operation, etc.).	Moderate	• Phased construction planning in detailed design to minimize the risks and impacts • Very careful site management and accompanying supervision

The identified environmental and social impacts during operation phase are assessed against both potential landfill site options and summarized below.

Impact	**Option 1 – Rehabilitation and extension of existing site**			**Option 2 – Closure of existing site and new greenfield site at Trapeang Tim Village, Kandaek Commune**			**Preliminary generic mitigation Measures. Specific mitigation measures will be determined at the stage of detail design and the accompanying site-specific ESIA**
	Positive/ Negative Impact	**Description**	**Significance**	**Positive/ Negative Impact**	**Description**	**Significance**	
Landfill leachate	Positive	Currently uncontrolled leakage of leachate into surface and ground water. Strongly reduced pollution due to rehabilitation and improvement of existing site. Positive impacts on current dumpsite location due to rehabilitation.	High	Negative for new site and positive for closure of existing dumpsite	Greenfield site within buffer zone of Tonle Sap Biosphere Reserve. Despite mitigation measures, high risks of pollution will remain specifically due to the flooding in the area and groundwater table that causes a bigger impact in case of failures in operations) with severe consequences on Tonle Sap ecosystem. Positive impacts on current dumpsite location due to closure.	High	• Lining and Leachate Collection System • Waste placement and daily cover • Leachate Reduction • Leachate Treatment Plant • Ensure access to safe water supply for local communities • (Ground)water quality monitoring
Landfill gas	Positive	Significantly reduced emissions due to gas collection and treatment system as well as composting facilities	High	Positive	Closure of current landfill and development of new landfill with gas collection and treatment system and composting facilities will lead to significantly reduced emissions compared to current status.	High	• Landfill Gas Collection and Treatment (flaring) • Composting facilities to reduce organic fraction of waste going to landfill
Ecosystems, water, biodiversity	Positive	The current site is developed and operated as open dumpsite, without any measures in place to prevent pollution. Degraded agricultural land available at site with high potential for expansion. No protected	High	Negative	The Greenfield landfill site Option is within buffer zone of Tonle Sap Biosphere Reserve (UNESCO and Cambodian Royal Degree). Buffer zone allows limited developments for education and sustainable	High	• Thorough site assessment process to prevent sites to be located in sensitive areas • Daily waste coverage • Leachate collection and treatment system • Installation of lining systems

		zones. Rehabilitation of the existing site and mitigation measures (incl. daily waste coverage; leachate collection system; lining; etc.) will thus positively affect the surrounding environment and water sources			development, but that does not include landfill development. Despite mitigation measures, high risks of pollution will remain (flooding; high groundwater table; failures in operations) with severe consequences on Tonle Sap ecosystem and biodiversity. Positive impacts on current dumpsite location due to closure		• Location outside zoning of vital habitats and ecosystems • Monitoring of species presence and pollution • Flood protection measures • Not accepting hazardous waste
Odor	Positive	Significantly reduced odor compared to current status particularly for nearby communities due to infrastructure improvements and mitigation measures incl. daily waste cover, gas collection system, and material recovery and composting facilities	High	-	Current greenfield site but entire area up to the planned ring road is planned for mixed commercial and residential development which may be impacted by odour. Positive impacts on current dumpsite location due to closure.	Moderate	• Daily waste cover • Installation of gas collection and treatment system • Material recovery and composting facility
Hazardous waste	Positive	Reduced risk for disposal of hazardous waste mixed with municipal waste due to improved operations and regulations.	Moderate	Positive	Reduced risk for disposal of hazardous waste mixed with municipal waste due to improved operations and regulations.	Moderate	• Municipal regulations for landfill operation to provide a list of acceptable and nonacceptable waste. Non-acceptable waste needs to be strictly forbidden from admission • Awareness and training to avoid a mixing of waste • All workers to be provided with protection equipment, training in waste handling, and strict supervision. • Prepare emergency response plan
Visual impacts and aesthetics	Positive	Rehabilitation of the current site and mitigation measures (incl. daily waste coverage) will lead to improvements in current aesthetics, particularly affecting nearby communities	Moderate	Negative	Greenfield site within Zone of the Tonle Sap Biosphere Reserve. While the land is currently largely unused, approximately 2km to the North residential development is ongoing, and city development	Moderate	• Daily waste coverage • Windbreak trees • Fencing of site and buffer zone

					plans show that the entire area zoned for mixed commercial and residential development		
Community Health and Safety and Occupational Health and Safety	Positive	Rehabilitation and extension of current dumpsite into a sanitary landfill will greatly reduce pollution related health and safety risks for neighboring communities and workers due to improved OHS practices. Influx of workers; increased traffic; strain the current resources of the host municipalities; SEA/SH	High	Positive for the closing and negative for new site	Adequate closure of current dumpsite will bring health and safety benefits to communities at the current dumpsite, as in Option 1. Currently no settlements exist at the site Option 2, but city development plans foresee major residential and commercial developments in the entire area. Influx of workers; increased traffic; strain the current resources of the host municipalities; SEA/SH	High	• The application of modern landfill operations and inclusion of performance indicators for landfill management and operation performance in contracts, for instance waste compaction and daily soil coverage, will limit the potential for the development of resident populations of vermin and pests • Landfill gas collection and composting to remove larger part of the organic fraction • Leachate collection and treatment • Lining system and daily waste cover and in case of closure final waste cover • Fencing of site, registration procedures • Integration of waste pickers into the waste material recovery and composting facilities through provision of PPE, training and adherence to OHS procedures • Provision of appropriate PPEs and training • Health checks • Provision of safe water supply to surrounding communities • Showers, washing basins, clean toilets, changing rooms, etc. at facilities
Job opportunities	Positive	In terms of the creation of job opportunities outside of the waste pickers impacts and opportunities, they do not differ much between the two options and are in general positive with high	High	Positive	In terms of the creation of job opportunities outside of the waste pickers impacts and opportunities, they do not differ much between the two options and are in general positive with high significance as enhanced	High	• Ensure awareness of job opportunities within surrounding communities and consideration for poor and vulnerable groups. • Transparent information sharing about the created job opportunities particularly in local areas

		significance as enhanced waste collection and cleanliness and improved landfill management and operation will require additional job opportunities for various backgrounds and qualifications including for poor people with low and medium skills			waste collection and cleanliness and improved landfill management and operation will require additional job opportunities for various backgrounds and qualifications including for poor people with low and medium skills		• Local sourcing of supplies and materials whenever possible
Impacts on property value	Positive	Rehabilitation and extension of current site: impacts with regards to land value are considered positive with high significance	High	Positive for existing dumpsite closure and Negative for new location	Closure of current site and new greenfield site: impacts with regards to land value are considered negative with moderate significance under this Option 2, the land surrounding the existing dumpsite is expected have positive impact with increase in value, as under Option 1. Regarding land value under the landfill site option 2, the site is placed at Buffer Zone (Zone 2) of the Tonle Sap Biosphere Reserve. At the same time, city development plans foresee major commercial and residential developments in the area. Here impact is foreseen to be negative	High	• Suitable landfill siting and selection process. • Proper mitigation of environmental and social impacts of construction and operation thereby minimizing impacts to neighboring communities and accompanying property values. • Fencing and buffer zones with measures against visual impacts (tree screens)

Preliminary outcome of site suitability analysis and risks and impacts

The existing dumpsite will need to be closed or integrated in the new sanitary landfills to prevent further adverse environmental impacts and because without closing the existing dumpsite, a new landfill with gate fee will not receive any waste for disposal if an open dump is still around for free. If the closing of the current dumpsite is financed by GOC, it would still be considered as an associated facility to the Project and required adherence to the WB ESF[5].

From the social risks and impacts perspective, rehabilitation of the current existing dumpsite (Option 1) would allow waste-pickers, except children, to continue having access to recyclables at the same location and be able to work under improved occupational health and safety working conditions. Community inhabitants may gain additional income through jobs created at the landfill, material recovery, and composting facility. Landfill Site Option 1 is substantially more suitable with regard to impacts to waste-pickers and their livelihoods.

Landfill Site Option 2 has advantages from being co-located with the proposed new WWTP and for having an extensive area (+50 ha) available, the site poses high environmental risks as the location is situated on the edge of a flood zone and within the UNESCO development restriction zone of the of Tonle Sap Biosphere Reserve. This is a key justification for lower suitability.

Landfill Site Option 2 also has more potential livelihood impacts on waste pickers and workers at the existing site as the current dumpsite would be closed in this option causing economic displacement and livelihood impacts for the waste-pickers. The full closure of the existing dumpsite when the landfill is placed at a different location would be beneficial for the neighboring villages close to the existing dumpsite that do not obtain income through waste picking, but these impacts can be substantially mitigated through proper design and landfill operations and management.

[5] Financing for the clean-up costs and rehabilitation for the closure of the existing dumpsites is included in the Project financing. At some point in time during the WB project will the day to day operation of the dumpsite become subject to ESF requirements and this will be explicitly established in the detailed design and accompanying site specific Environmental and Social Impact Assessment

1 INTRODUCTION

1.1 PROJECT OVERVIEW AND BACKGROUND

The Royal Government of Cambodia (RGC) is working with the World Bank to prepare the Cambodia Solid Waste and Plastic Management Improvement Project (the Project) with the objective of improving solid waste and plastic management in selected cities in Cambodia.

The continued growth of cities in the country will require higher levels of infrastructure and municipal service levels for solid waste management, which are currently facing underinvestment together with weak institutional capacity in policy, planning, implementation, and enforcement. There is a risk that the lack of municipal waste services can hamper growth and have an impact on Cambodia's tourism assets that are an important engine for growth.

The Project aims to create selected cities throughout Cambodia that can: (i) demonstrate improved solid waste management performance adaptable and scalable to other cities in the country, (ii) support solid waste management policy and legislation, and (iii) support capacity development at both the national and the municipal levels. The project will include support for improvements in waste collection, transport, and recovery, treatment, recycling, disposal and cost recovery by improvement of waste fee collection. It will also support improved monitoring and enforcement of private waste management companies, information availability and reliability, and citizen engagement and public information. The project will also support plastic policies and improved plastics management to reduce the amount of waste that needs to be collected or landfilled, increase recovery and recycling, and contribute to reduced plastic leakage to the waterways and ocean.

At the local level, the project will support the implementation of Cambodia's Sub-decree 113 that specifies "it is the cities and district administration that have the role to manage urban garbage and solid waste within their jurisdiction" (Sub-decree 113, Article 9). The Project will focus on supporting the improvement of solid waste collection services, the improvement of waste fee collection and cost recovery, as well as increasing public awareness and citizen engagement through technical assistance prior to undertaking the infrastructure investments. The capacity building and technical assistance will focus on the improvement of the performance of private and public sector companies through the provision of transaction advisory services. This is consistent with good international practice of solid waste being a service managed by the local government to ensure citizens can provide direct feedback for the services.

The Project consists of three main components and an emergency component that will be implemented over a six-year period, namely:

Component 1: Development and Strengthening of National Legislative, Regulatory, Policy, and Institutional Frameworks for Solid Waste and Plastic Management
Component 2: Integrated Solid Waste and Plastic Management, Planning, Monitoring and Capacity Building for the Participating Municipalities
Component 3: Solid Waste and Plastic Management Infrastructure
Component 4: Contingent Emergency Response

Component 1: Development and Strengthening of National Legislative, Regulatory, Policy, and Institutional Frameworks for Solid Waste and Plastic Management

Carry out a program of activities aimed at developing and strengthening the legislative, regulatory, policy, and institutional frameworks related to solid waste and plastic management, including: (a) development and strengthening of laws, regulations, sub-decrees, policies, and guidelines related to solid waste management with respect to, among others (i) waste classification, planning, reporting, monitoring, enforcement, rural and community waste collection, and database management, and (ii) cost calculation of waste fees, and waste accounting and financial systems; (b) development and strengthening of relevant laws, regulations, sub-decrees, policies, and guidelines related to plastic management to increase reduction, reuse and recycling of plastics; and (c) capacity building of relevant institutions, including the Ministry of Environment (MOE), the Ministry of Interior (MOI), and the Ministry of Public Works and Transportation (MPWT).

Component 2: Integrated Solid Waste and Plastic Management, Planning, Monitoring and Capacity Building for the Participating Municipalities

Carry out a program of activities aimed at building the capacity of the Participating Municipalities for solid waste and plastic management, including through support with: (a) waste and plastic management planning, transaction advisory services, and designing of performance indicators for waste management contracts; (b) development of waste information, financial, and geospatial systems for (waste) fee collection to increase cost recovery; and (c) operational management, and public outreach, awareness, education and citizen engagement activities.

Component 3: Solid Waste and Plastic Management Infrastructure

Carry out a program of activities for the Participating Municipalities and select districts, including: (a) preparation and construction of solid waste and plastic management infrastructure for proper collection, transfer, treatment/recycling, and disposal of solid wastes and plastics, including landfills, transfer stations, and intermediate waste treatment facilities such as material recovery facilities and composting facilities, including potential access roads as well as remediation of contamination of existing dumpsites and (b) development of relevant guidance documents, such as landfill related regulations, landfill design and operation standards, and contract templates and manuals for landfill management and operation.

Component 4: Contingent Emergency Response

This zero-dollar component is designed to provide immediate response to an Eligible Crisis or Emergency, as needed.

1.2 OBJECTIVES OF THE PRELIMINARY ESIA FOR THE SOLID WASTE AND PLASTIC INFRASTRUCTURE OPTIONS

This Preliminary Environmental and Social Impact Assessment (P-ESIA) has the following objectives: (i) to provide preliminary environmental and social information to inform and facilitate the selection process for landfill site options, as well as a "do nothing" option; and

(ii) to provide an overview of the generic potential impacts and mitigation measures and environmental and social risks for the siting, construction and operation of the solid waste infrastructure investments: landfill, transfer station, material recovery facility and composting facility and closing of the existing dumpsite as an associated facility to the landfill.

The preliminary ESIA, together with the other Environmental and Social Framework documents, including the Stakeholder Engagement Plan, serve to inform the government as well a broader range of stakeholders in the Siem Reap province. It also serves as a key input to facilitate public consultations and stakeholder engagement on the general project and into the landfill site selection process. These documents have been posted for public access on WEBSITE.

The preliminary ESIA is not a full site-specific ESIA for one or more landfill site options. Once a final site option has been selected and agreed for the landfill and waste infrastructure and detailed designs are defined with specific land requirements and lay-out, a site-specific ESIA, Environmental and Social Management Plan (ESMP) with Resettlement Plan and possibly an Indigenous People's Plan (IPP) will be prepared in line with the Environmental and Social Management Framework (ESMF), the ESF and the findings of this Preliminary ESIA.

1.3 SCOPE AND METHODOLOGY

The Preliminary ESIA has been conducted for the two (2) site locations options as proposed by the Siem Reap provincial authority and considered in the landfill site suitability and selection process for Siem Reap, namely: at the current location of the open dumpsite in Anlong Pir Village, and at a greenfield site in Trapeang Tim Village.

The Preliminary ESIA is focused on these two (2) suitable landfill site options in Siem Reap (**Table 1.3-1**) that were compared as inputs to the landfill site selection process.

Table 1.3-1: Scope of the Preliminary ESIA for Siem Reap

Landfill Site Options	Location	Proposal
Option 1	Anlong Pir Village, Trapeang Thom Commune, Prasat Bakong District	Rehabilitation and extension of the existing dumpsite into an engineered sanitary landfill, with environmental and soclal management measures.
Option 2	Trapeang Tim Village, Kandaek Commune, Prasat Bakong District	Closure of the Anlong Pir existing dumpsite, and construction of an engineered sanitary landfill near the site of the proposed ADB-financed WWTP in Trapeang Tim Village

1.3.1 Collection of environmental information and samples for air, noise and water quality

The following components of the physical environment have been part of the assessment, primarily through secondary data:

- Critical Environmental and Social Assets, including Cultural Heritage Assets

- Air Quality
- Noise Quality
- Groundwater Conditions and Quality
- Surface Water Conditions and Quality
- Geology, Geomorphology, and Hazards
- Soil and Pedology
- Hydrology
- Meteorology and Climatology
- Climate Change Impacts, specifically flood risk and other natural hazards
- Land Use and Classification

Using the Integrated Biodiversity Assessment Tool (IBAT), the proximity of the locations of Key Biodiversity Areas (KBA) and National Protected Areas within a 50-kilometer radius of the landfill site were analyzed. The output of the software is an IBAT Proximity Report where the number of different kinds of species (including vulnerable species) can also be approximated.

For the following environmental components, preliminary site investigations were conducted to collect samples from the existing dumpsite for site option 1 and site option 2:

Ground Water and Surface Water Quality

Grab sampling method was conducted by the team to assess surface and ground water quality. These samples were taken on 1 April 2021 in an accredited laboratory by the MOE. The detection limits were determined based on Cambodia's standard for drinking water and the effluent standard.

Table 1.3-2: Location of Groundwater Sampling

Sample Code	Water Sources	Location Description	Coordinates	
Option 1 – Existing Dumpsite rehabilitation and extension			**X**	**Y**
DS_GW1	Upstream	Anlong Pir Village, Trapeang Thom Commune, Prasat Bakong District, Siem Reap Province	395981	1471479
Option 2 –Alternative landfill site option near WWTP			**X**	**Y**
PS_GW1	Downstream	Trapeang Tim Village, Kandaek Commune, Prasat Bakong District, Siem Reap Province.	382787	1469497


DSW_GW1 (Option 1)


PS_GW2 (Option 2)

Figure 1.3-1: Photos of the Groundwater Sampling Stations (March 2021) – Option 1 and 2

Table 1.3-3: Location of Surface Water Sampling Stations

Sample Code	Water Sources	Location Description	Coordinates	
Option 1 – Existing Dumpsite rehabilitation and extension			**X**	**Y**
DS_SW1	Downstream	Anlong Pir Village, Trapeang Thom Commune, Prasat Bakong District, Siem Reap Province	395836	1471459
DS_SW2	Upstream		395342	1471413
Option 2 – Alternative landfill site option near WWTP			**X**	**Y**
PS_SW1	Upstream	Trapeang Tim Village, Kandaek Commune, Prasat Bakong District, Siem Reap Province	383436	1470550
PS_SW2	Downstream		381808	1469577

Note: DS_SW = Dumpsite_Surface water, PS_SW = alternative landfill site option 2_Surface water


DSW_SW1


DS_SW2

Figure 1.3-2: Photos of the Surface Water Sampling Stations (March 2021) – Option 1

PS_SW1

PS_SW2

Figure 1.3-3: Photos of the Surface Water Sampling Stations (March 2021) – Option 2

Air Quality

Degradation of air quality and increase in ambient noise level are the key impacts to be considered in conducting the preliminary survey. The air quality measure of TSP, PM_{10}, $PM_{2.5}$, SO_x, NO_x, CO, O_3, and Pb were taken on 1 April 2021. The locations were placed in areas where high receptors are present.

Existing Dumpsite and site option 1 for rehabilitation and extension (Anlong Pir Village)

Site option 2 for Landfill (Trapeang Tim Village)

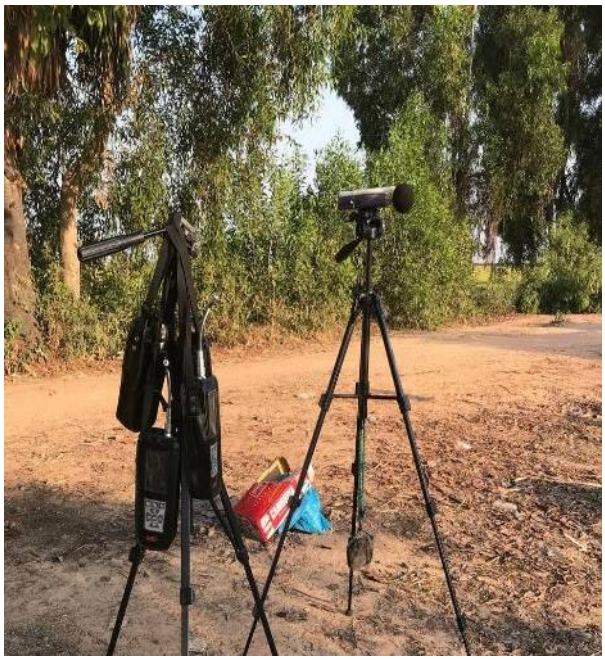
Figure 1.3-4: Photos of the Air Quality Sampling Stations (April 2021)

Noise

Noise levels were measured using a Realistic Digital Noise Level Meter. Measurements were done by recording the lowest and highest noise levels at each four-compass direction and were taken on 1 April 2021. The logarithmic average of these noise levels gives the equivalent noise level.

Existing Dumpsite
(Anlong Pir Village)

Near the house, adjacent to the existing dumpsite



Landfill Site option 2
(Trapeang Tim Village)

Near the house, adjacent to the landfill site option 2

Figure 1.3-5: Photos of the Noise Sampling Stations (April 2021)

The most stringent limit based on national and international standards is being applied. Protocols of the Environmental, Health and Safety (EHS) Guidelines of the World Bank (2007) also considered and reflected in the preliminary Environmental Management Plan (EMP) mitigation measures, where appropriate.

1.3.2 Social Secondary Data and Information

Desk review of data and information from various secondary sources has been conducted at the onset. All available plans and technical reports related to the socioeconomic profile and SWM in the project areas were collected, reviewed, and analyzed as to their significance to the project. Significant plans and documents from the national level (i.e., SWM guidelines, social and environmental laws and legislation), province level (i.e., SWM plans, land use development plans), commune/village-level (i.e., socioeconomic profile, census data) will be requested from the respective authorities and official sources of these data. A desk review of the following publicly available sources has been utilized:

- List of waste-pickers in the Anlong Pir Dumpsite as of March 2021, Trapeang Thom Commune
- 2019 Final General Population Census, Cambodia National Institute of Statistics
- 2014 Inter-censal Economic Survey, Cambodia National Institute of Statistics, and JICA
- 2010 Cambodia Demographic and Health Survey, Cambodia National Institute of Statistics, Directorate General for Health, and ICF Macro
- 2008 Population Census, Cambodia National Institute of Statistics
- IDPoor Database, Ministry of Planning

1.3.3 Social Primary Data Gathering

Primary data and information gathering were conducted through an inventory of possible project-affected persons (PPAP), socioeconomic and perception survey (SES) interviews, key informant interviews (KII), focus group discussions (FGD) and meaningful consultations. In line with the preparation studies, these were anchored on the following objectives: (i) conducting socioeconomic profiling of a sample of the PPAPs in the area of the existing dumpsite for option 1 to rehabilitate and extend the current dumpsite into a sanitary landfill and site option 2 for a sanitary landfill near the WWTP; (ii) determining the potential socioeconomic and environmental impacts of sanitary landfill and waste treatment infrastructure; (iii) identifying the perception and level of awareness of the PPAPs and the impacted communities of the project; and, (iv) informing the development of the Preliminary ESIA, the landfill site suitability process and the formulation of the ESMF and SEP.

Field Observation

Field observation trips were conducted in the district of Prasat Bakong, specifically in the two (2) landfill site options being considered in the preparation studies, namely: (Option 1) at the current location of the existing dumpsite in Anlong Pir Village, Trapeang Thom Commune, and (Option 2) at a greenfield site in Trapeang Tim Village, Kandaek Commune.

The conduct of field observations aims to facilitate better understanding and context of the conditions on the ground; collection of available information and documents, and

observation of communities, key sensitive receptors, local public infrastructure and facilities, housing condition, cultural heritage, existing land use, urbanization trend, road access improvement, fishing areas/activities, rice/crops cultivations, water resource management, and sensitive critical habitats in the area/Tonle Sap great lake, etc.

Key observations from the field observation were as follows: (a) the existing dumpsite is surrounded by two (2) villages – Anlong Pir and Phnom Dey; (b) most of the villagers are rice farmers, construction workers, and waste-pickers; (c) most of the waste-pickers are women and children, while the husbands work as construction workers; (d) waste-pickers work independently with two shifts – day time and night time; and, (e) over 90% of the waste-pickers have loans from micro-finance for building houses, building walls (or fence), buying pigs and bicycles (or motorcycles), etc.

A child at the dumpsite.

Waste-picker who chose to live at the dumpsite.

Transporting recyclable materials from the dumpsite.

Waste-picking activity at night time shift.

Figure 1.3-6: Photos from the Field Observation (27 Feb – 1 Mar 2021)

1.3.3.1 Estimate of the Possible Project-Affected Persons

The estimate of PPAPs and possible project-affected households (PPAHs), based on a list of waste-pickers in the Anlong Pir Dumpsite from Trapeang Thom Commune helps identify and categorize specific PPAPs/PPAHs and the types of affected assets, such as land and structures, and economic displacement including waste recycling businesses of waste-pickers or other

enterprises potentially affected by the possible sub-project. The estimate shall serve as guide in identifying the target respondents for the other data gathering activities.

The PPAPs identified under the P-ESIA are as follows:

1. ***Waste-pickers*** are those persons who salvage reusable or recyclable materials thrown away by others to sell or for personal purposes. Normally, waste-pickers can be categorized into: (a) persons who work at a dumpsite collecting recyclable materials; (b) persons who work as a pushcart buyer and picker along the street; and, (c) persons who work as waste collector with truck. Waste-pickers can be composed of both men and women as well as children.
2. ***Waste collectors*** are (a) persons employed by a public/private enterprise or (b) private persons who collect and dispose of municipal solid waste and recyclables from residential, commercial, industrial or other collection sites for further processing and waste disposal (through middlemen or to larger junk shops).
3. ***Waste-related Businesses*** are commercial establishments engaged in at least one phase of the solid waste supply chain after waste generation. This includes, but not limited to, recycling centers, junk shops, dismantling shops, among others.
4. ***Households*** are residents living within the vicinity of the existing dumpsite, and residents living in the vicinity of the alternative sanitary landfill site option 2[6].

Information on the number of waste-pickers, including the vulnerable groups among them, were requested from the six (6) village chiefs where the waste-pickers are from[7]. These data complement the initial estimate. Given the nature of the study, the respondents have been assured of the confidentiality of the information that will be shared and will only be used in the documentation and reference for the study. Following the completion of a site suitability process and selection of a potential site, a full census of project affected people will be undertaken with the site-specific Environment and Social Impact Assessment.

1.3.3.2 Socioeconomic and Perception Survey

A questionnaire was administered by the social survey team covering the location of the two (2) landfill site options. Samples of both households and businesses were taken from Anlong Pir Village and Trapeang Tim Village.

Stratified random sampling was used to ensure that sampling would be able to cover the different types of households, including vulnerable/disadvantaged groups (i.e., waste-pickers including women and children, farmers, fisherfolk), as well as businesses, both formal and informal and may be directly or indirectly engaged in waste-related businesses. The methodology for this can be found in **Annex F**.

Sampling was based on the result of the inventory of PPAP/PPAH per identified project impact area, as well as on official data on households in the target area.

Based on the initial field observation conducted by the study team on 25 January 2021, an approximate total of 273 waste-pickers have been identified in the existing dumpsite from the villages of Anlong Pir, Phnom Dey, Suong, Rokakambot, Banteay Russey, and Lovea. Most of

[6] In line with the Cambodian Guidelines on Selection of Landfill Sites and World Bank Landfill Siting Criteria.
[7] Waste pickers were preliminary identified from the villages of Anlong Pir, Phnom Dey, Suong, Rokakambot, Banteay Russey, and Lo Vea

the waste-pickers come from Phnom Dey, with 144. With a margin of error of 10% at 95% confidence level, a total sample of 72 waste-pickers has been included in the SES.

1.3.3.3 Focus Group Discussion

The FGDs were conducted with nine groups of stakeholders from 18-19 April 2021 to gather information from identified groups or sectors in the primary impact area/s. The participants of the FGDs were asked to share their perception of the possible project and perceived impacts on their livelihood and income. Their knowledge and attitude towards the possible project, beliefs and related practices, including their suggestions on how to address their issues and concerns were noted in the FGDs.

A purposive stratified sampling has been utilized in the conduct of the FGDs. The waste-pickers, other actors of the solid waste value chain, and vulnerable groups in the impact area identified in the inventory were grouped into the following strata. The results are reported differently in categories of (i) children below 14 years, (ii) children between 14 years and 18 years; and (iii) adults above 18 years, but below are the categories how the FGDs were conducted:

- Waste-pickers
    - Children: 14 years and below (0-14); boys and girls
    - Children below 18: 15-20 years old; male and female
    - Women: Above 20 years old
    - Men: Above 20 years old
    - Vulnerable Groups: Elderly, Persons-with-Disability
- Other actors of the solid waste value chain
    - Workers of nearby waste-related businesses
    - Owners of nearby waste-related businesses
- Vulnerable groups
    - Farmers and fisherfolk in the nearby communities
    - Women's groups in the surrounding communities

From these groups, those who have expressed willingness to participate in the FGD and agreeable to the set schedule of the focus group discussion were selected as participants. Each FGD had five (5) to eight (8) participants. With the defined stratum above, a total of eight (8) sessions of focus group discussions have been conducted for the study.

1.3.3.4 Key Informant Interviews

The KIIs were conducted on 17 April 2021 with commune chiefs of Trapeang Thom and Kandaek and village chiefs of the six previously mentioned villages to gather information from key project informants, or those with first-hand knowledge of the project and/or the project area. The methodology for this can be found in **Annex E3**.

The objectives of the KII are to determine the current situation on the dumpsite; identify the plans on or related to SWM at the village and commune levels (and possibly district and provincial levels as well); identify the plans or current programs for groups that depend on the dumpsite for their livelihood; and hear views/opinions of local leaders on the possible project.

The target participants of the KIIs were the village and commune leaders, and operators of the dumpsite who have in-depth knowledge of the field conditions. The interviews were semi-structured covering the topics on SWM activities and implementation, existing challenges, and awareness and perception on the possible sub-project.

1.3.4 Data Triangulation and Integration

The assessment made use of both quantitative and qualitative data. Data gathered on the ground were validated with secondary data, and vice versa. The use of mixed methods strengthened the soundness and validity of the assessment and analyses of the study. As illustrated in **Figure 1.3-7**, harmonization and complementarity of data has been integrated into the process of data gathering and analysis.

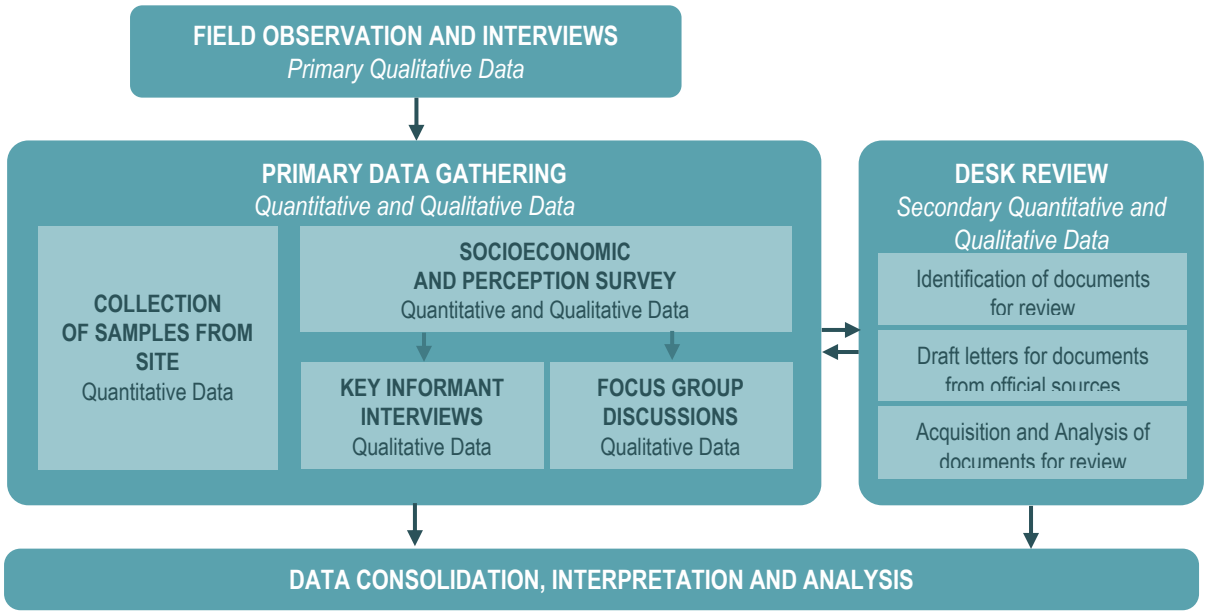


Figure 1.3-7: Data Triangulation Methodology

The information gathered from the inventory helped finetune the design and conduct of the interviews and focus group discussions.

Table 1.3-4 summarizes the primary data gathering activities and the respective type of data gathered, target respondents, and pertinent information to be gathered for each method. On the other hand, the procedure of the primary data gathering activities are illustrated in **Figure 1.3-8**.

Table 1.3-4: Primary Data Collection Method Matrix on socio economic survey, key informant groups and focused group discussions[8]

Method	Type	Target Respondents / Participants	Information Gathered
Estimate of Possible Project-	Primary and secondary quantitative data	• Waste-pickers • Workers of waste-related businesses	• Demographic data • Working arrangements and conditions • Type and value of waste gathered

[8] Details on the methodology including stratified sampling and number of respondents as well as summary results are included in Annex E1, E2, E3 and F1 and F2.

Method	Type	Target Respondents / Participants	Information Gathered
Affected Persons		• Owners of waste-related businesses • Households residing near the existing dumpsite in Anlong Pi • Households residing near the site option 2 in Trapeang Tim	• Activities related to waste-picking and other waste-related activities • Membership in organizations • Vulnerabilities[9]
Socio-Economic and Perception Survey	Primary quantitative and qualitative data	PAPs / PAHs in: <u>Existing dumpsite in Anlong Pir and surrounding areas:</u> • Waste-pickers, • 5 waste collectors and haulers, • 5 junk shop owners, • 5 people involved in animal husbandry, • 5 informal sellers and kiosk owners near the dumpsite, and • 5 other individuals / businesses whose incomes depend on the dumpsite • 20 household residents of the villages in the vicinity <u>Landfill site option 2 in Trapeang Tim Village:</u> • 20 household residents of the neighboring villages of site option 2	• Demographic data (i.e., land area, population, HH population and size, population density/growth gender, age profile, literacy rate, profile of educational attainment, etc.) • Sources of income • Living conditions • Assets • Expenditure • Future Plans after closure of dumpsite • Potential impacts during SLF construction and operation

Key Informant Interviews	Primary qualitative data	• Commune leaders
		• Village chiefs of:
		  ○ Villages surrounding the existing dumpsite
		  ○ Villages surrounding the landfill site option 2
		• Government officials at district/regency level
			• Current livelihood situation
			• Process of waste collection
			• Existing situation of the SWM (including practices) in the area
			• Existing plan/s on SWM in the area
			• Programs for the sectors that depend on the existing dumpsite for their livelihood (i.e., waste-pickers, haulers, junkshop owners)

Focused Group Discussion	Primary qualitative data	• Waste-pickers • Farmers and fisherfolk near the landfill site option 2 in Trapeang Tim • Women's group/s from the immediate surrounding community	• Existing organization and system of the waste-picking and recyclables market • Perceived impacts of the possible sub-project (i.e., closure and rehabilitation of the dumpsite and construction of a new landfill in a new location) • Proposed livelihood interventions of the government

[9] Information related to vulnerabilities of the PPAPs was gathered through the survey conducted on the field should this data be unavailable from the village chiefs.

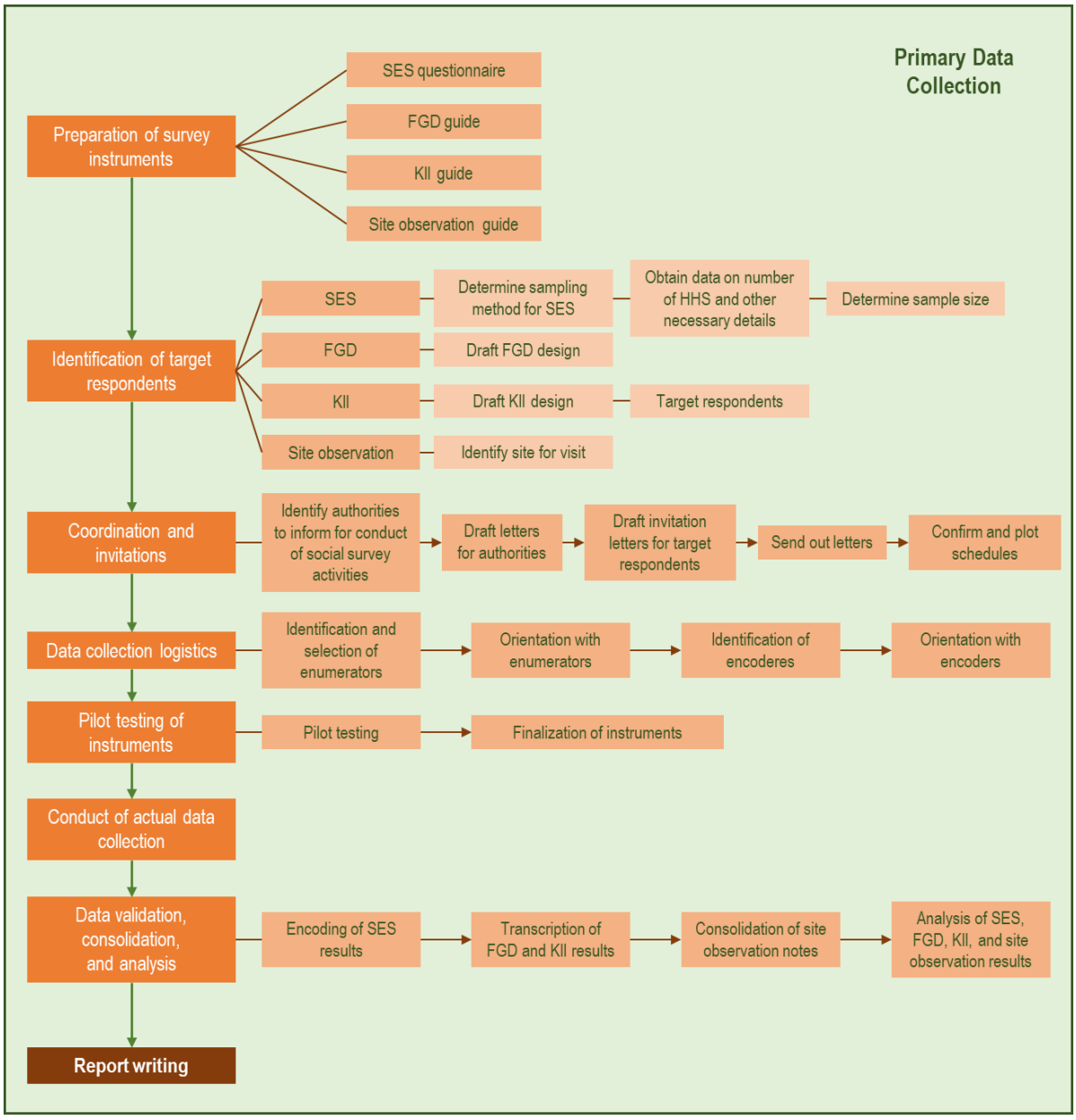


Figure 1.3-8: Flow of Primary Data Collection on socio economic surveys, key informant interviews and focused group discussions

For the conduct of the preliminary ESIA at the possible landfill site options, the Study Team worked closely with ESC, the contracted engineering consultant of the project and the provincial and municipal government of Siem Reap. Coordination has been conducted with provincial and municipal government, Ministry of Interior, Ministry of Environment and Ministry of Public Works and Transport through virtual meetings wherein knowledge-exchange sessions have taken place.

2 LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 NATIONAL POLICIES, LAWS, AND REGULATIONS IN CAMBODIA

The preparation of the Preliminary Environmental and Social Impact Assessment (P-ESIA) adheres to the national policies, laws and regulations of the Royal Government of Cambodia, namely: (i) Law on Environmental Protection and Natural Resource Management (1996); (ii) Sub-decree 182; (iii) Sub-decree 113 on Management of Urban Garbage and Solid Wastes relegating solid waste management under the responsibility of the municipality (2015); (iv) Sub-decree 80 on Solid Waste Management in Provinces and Cities (2003); (v) Sub-decree 36 on Solid Waste Management (1999); (vi) Inter-ministerial Prakas 195 of MOE, MOI and MEF on solid waste management fees (2018); (vii) Technical guideline on municipal solid waste management (2016); (viii) Prakas 387 on standard consumption for toxic substances or hazards permitted disposal (2015) (ix) Sub-Decree 72 on Environmental Impact Assessment Process (1999); (x) Prakas 21 on the Classification of Environmental Impact Assessment for Development Projects (2020); (xi) Prakas 376 on General Guidelines for Preparing initial Environmental Impact Assessment and Full Environmental Impact Assessment Report (2009); and, Guidebook on Environmental Impact Assessment in the Kingdom of Cambodia (2012). These policies are summarized in **Table 2.1-1**.

The pertinent laws and regulations in Solid Waste Management (SWM), Environmental Management and Protection, Environmental Impact Assessments, Labor, Working Conditions, and Occupational Health and Safety (OHS), Land Acquisition and Resettlement (LAR), Stakeholder Engagement and Public Consultation, Vulnerable Groups, and Cultural Heritage. Their respective summaries and applicability to the project are further detailed **Annex C**.

Table 2.1-1: Related Policies and Environmental Standards of the Royal Government of Cambodia

Policy	Summary
Law on Environmental Protection and Natural Resource Management (1996)	The law serves as the legal basis for the development and updating of environmental plans at the national and regional levels every five (5) years. The law also includes the formulation of sub-decrees on Air Pollution Monitoring and Noise Disturbance, Water Pollution Control, and Environmental Impact Assessment Process. The law emphasizes the protection of environmental and natural resources and provides due consideration to environmental impact assessment, natural resource management, sustainability and conservation, public participation and suppression of any acts that may contribute harm to the environment.
Sub-decree 182	The sub-decree consolidates the responsibility and accountability on the operation and management of city assets and services to the Municipal administration under the Public Works, Transport, Sanitation, Environment, and Public Order Office, as stated in Article 24.
Sub-decree 113 on Management of Urban Garbage and Solid Wastes relegating solid waste management under the	The sub-decree regulates solid waste, garbage, and hazardous waste management. The Sub-decree was set with proper technical manners and safe ways to ensure the protection of human health and to conserve biodiversity. The Sub-decree on Solid Waste Management is comprised of six (6) chapters: (i) General Provision; (ii) Household Waste Management; (iii) Hazardous Waste Management; (iv) Monitoring and Inspection of Hazardous Waste Management; (v) Penalty; and (vi) Final Provision

<table>
<tr><th>Policy</th><th>Summary</th></tr>
<tr><td>responsibility of the municipality (2015)</td><td>The sub-decree aims to enhance the management of garbage and solid waste of downtowns with effective, transparency and accountability, referring to ensure aesthetics, public health, and environmental protection.</td></tr>
<tr><td>Sub-decree 80 on Solid Waste Management in Provinces and Cities (2003)</td><td>The joint sub-decree of the MOI and MOE aims to improve the responsibility of authorities and institutions involved in solid waste management for environmental and efficient implementation of solid waste management in provinces and cities.</td></tr>
<tr><td>Sub-decree 36 on Solid Waste Management (1999)</td><td>The sub-decree establishes technical and safety regulations of all activities in solid waste management related to health, safety and biodiversity conservation. The sub-decree also relegates the collection, transport, storage, recycling, minimizing and dumping of waste to the respective governments of provinces and cities.</td></tr>
<tr><td>Inter-ministerial Prakas 195 of MOE, MOI and MEF on solid waste management fees (2018)</td><td>The Prakas determines the maximum fees of solid waste management in municipalities as per the article of the sub-decree. The fees apply to the services of cleaning, garbage collection, transportation and landfill. There is no mention about pre-sorting, recycling or compost. The MA has the possibility to request a fee higher than the one of the decrees. This request shall be approved by the MEF and the MOE.

Through this Inter-ministerial Prakas, the national administration focuses more on the affordability of the population. The income generated by the service is personal income of the MA. The MA may utilize additional sources to support the service. In particular, transfer budget (or subventions) is authorized.</td></tr>
<tr><td>Technical guideline on municipal solid waste management (2016)</td><td>The guidelines include the technical directions and detailed instructions related to the operations, maintenance, and closing of landfills, including composing methods, management and treatment of medical and chemical waste, as well as information on environmental education. These guidelines were developed through the support of the EU, MOE, and Cambodian Education and Waste Management Organization (COMPED)</td></tr>
<tr><td>Sub-decree 72 on Environmental Impact Assessment Process (1999)</td><td>The Sub-decree serves as the legal basis of the creation of EIA guidelines that must be complied with prior to the approval and financing of projects. The law provides the detailed guidelines for implementation of the EIA Process. Its Annex requires the conduct of IEIA or EIA on the following activities under the Project: (i) waste processing, burning activities, all sizes; (ii) wastewater treatment plants, all sizes; (iii) drainage systems, >5,000 ha.</td></tr>
<tr><td>Prakas 21 on the Classification of Environmental Impact Assessment for Development Projects (2020)</td><td>The Prakas amended the listing of impact classifications of development projects from the 1999 Sub-decree and identified the documentary requirements depending on the scale of risk and impacts, namely:
• Minor Environmental and Social Impacts: Environmental protection agreement / contract, and Environmental Management Plan
• Moderate Environmental and Social Impacts: Initial environmental and social impact assessment
• Serious Environmental and Social Impacts: Full environmental and social assessment
The risk classification for development projects that may be relevant to the landfill infrastructure and associated facilities are summarized as follows:
<table>
<tr><th>Type of Infrastructure</th><th>Size / Area</th><th>Risk Classification</th></tr>
<tr><td>Dumpsites</td><td>All sizes</td><td>IEIA / Medium Environmental and Social Impacts</td></tr>
<tr><td>Industrial waste dumping sites</td><td>All sizes</td><td>Full EIA / Serious Environmental and Social Impacts</td></tr>
<tr><td>Solid waste recycling and incinerating factories</td><td>All sizes</td><td>IEIA / Medium Environmental and Social Impacts</td></tr>
<tr><td>Business in collecting, stocking and processing all types of used car tires</td><td>All sizes</td><td>Environmental protection contract, and EMP / Minor Environmental and Social Impacts</td></tr>
</table></td></tr>
</table>

Policy	Summary		
	Construction of all kinds of buildings (i.e., offices, multipurpose buildings, commercial buildings, condominiums, building blocks, flats and villas, supermarkets and other buildings)	3,000 – 15,000 sq.m.	Environmental protection contract, and EMP / Minor Environmental and Social Impacts
		15,000 – 45,000 sq.m.	IEIA / Medium Environmental and Social Impacts
		> 45,000 sq.m.	Full EIA / Serious Environmental and Social Impacts
Prakas 376 on General Guideline for Preparing Initial Environmental Impact Assessment and Full Environmental Impact Assessment Report (2009)	The Prakas aims to provide general guidelines on the development of initial Environmental Impact Assessments (IEIA) and full Environmental Impact Assessment (EIA).The declaration specifies the basic contents of IEIA/EIA Reports, which should include: (a) introduction; (b) legal framework; (c) project description; (d) description of the existing environment; (e) public participation; (f) assessment of, and mitigation measures for, significant environmental impacts; (g) environmental management plan; (h) cost-benefit analysis; and (i) conclusion and recommendations.		
Guidebook on Environmental Impact Assessment in the Kingdom of Cambodia (2012)	The Guidebook lays out the procedures, and institutional arrangements of the process, along with the principles and process of initial and full EIAs from proposal, screening, scoping, assessment, mitigation measures, report preparation, review and decision, monitoring, and public participation.		

Labor and working conditions are governed through the following key laws and regulations:

Labor Law (1997)

This law governs relations between employers and workers resulting from employment contracts to be performed within Cambodia. The key relevant sections are provided below,

- Minimum Wage: A guaranteed minimum wage that ensures a decent standard of living is protected by the Code. The minimum wage is set by the Ministry of Labor in consultation with the National Council on Minimum Wage and Labor Advisory Committee through a Prakas. Minimum wage is determined considering the needs and cost of living of the workers and their families, and economic factors (Chap. VI, Section 1).
- Child Labor: The minimum allowable age for wage employment is set at 15 to 18 years for hazardous work. Children between 12 to 15 years old can be hired to do light work as long as the nature of work fulfils the following: (1) work is not hazardous to their health or mental and physical development., (2) work will not affect their regular school attendance, their participation in guidance programs or vocational training approved by a competent authority. For child laborers from 15 to 17 years old cannot perform night work, Employers found to be employing children less than eighteen years of age under conditions contrary to the provisions of the Code are liable to a fine of thirty-one to sixty days of the base daily wage (Chap. VI, Section 8).
- Health and Safety of Worker: The key provisions relate to the quality of the premises; cleaning and hygiene; lodging of personnel, if applicable (such as workers camp); ventilation and sanitation; individual protective instruments and work clothes; lighting and noise levels in the workplace. Article 230 of the Labor Law states that workplaces must guarantee the safety of workers. However, the only specific occupational health and safety Prakas relates to the garment industry and brick manufacturing (Chap. VIII).

- Work-Related Accidents: All occupational illness, as defined by law, shall be considered a work-related accident. The law sets out how accidents should be managed in terms of compensation (Chap. IX).

Prakas No. 106 on the Prohibition of Hazardous Child Labor (2004)

The Ministry of Labour, Vocational Training and Youth Rehabilitation (MoSALVY) released a prakas in 2004 prohibiting the employment of children below 18 years old on jobs involving hazardous works involving construction and demolition (with exception to designated safe areas with permit from labor inspector), exposure to hazardous chemicals and substances, exposure to fumes, dust gas and other ambient substances, heavy machinery and equipment.

Land Acquisition and House Demolition

Land Law (2001), The rights to land and property in Cambodia are governed by the 2001 Land Law, as grounded on the constitution of Cambodia. The law defines the scope of ownership of immovable properties, such as land, trees and fixed structures.

Prakas No. 6 on Measures to Crack Down on Land Grabbing and Encroachment (2007). The Prakas defines the right-of-way (ROW) dimensions roads and railways, which amends Sub-decree No. 197 ROW dimensions. The latter policy provides that compensation for structures and assets located in ROWs will not be subject to any compensation.

Expropriation Law (2010). The law defines the principles, mechanisms, and procedures of expropriation, and defining fair and just compensation for any construction, rehabilitation, and public physical infrastructure expansion project for the public and national interests and development of Cambodia.

Land Acquisition and Involuntary Resettlement (2018). The Standard Operating Procedures (SOP) for Land Acquisition and Involuntary Resettlement (LAR) was promulgated in 2018, which reflects RGC's laws and regulations relating to the acquisition of land and the involuntary resettlement of affected persons (AP) and the safeguard and standards/policies and procedures of Development Partners (DPs) as applied to public infrastructure investment projects.

The document provides that in the context of involuntary resettlement, indigenous peoples and communities are classified among the vulnerable groups who are likely to be more adversely affected by the impacts of involuntary resettlement. This is because IPs often have traditional land rights but do not have formal titles. Thus, particular attention and assistance is required for these communities. Among its resettlement planning considerations include the primacy of avoiding customary lands, and should be included in siting considerations The document also sets out some information and parameters to be included in an Indigenous Peoples Plan. The SOP notes that the IPP is a separate document from the Resettlement Plans, but its compensation packages should be reflected in the detailed resettlement plan. (Paragraph 48, 54, 56-57, 95-97).

The SOP also provides that displaced persons who lose their source of livelihood permanently, are normally provided with a livelihood restoration/support program to assist displaced persons in re-establishing their livelihood. The program includes two components: (i) skills training; and (ii) financial support as a cash grant to assist in re-establishment of the

livelihood. The Livelihood Restoration/Support Program will offer three categories of program namely (i) Land-Based Livelihood Restoration; (ii) Employment-Based Livelihood Restoration; and (iii) Enterprise or Business-Based Livelihood Restoration. Displaced persons will be entitled to participate in any one of the three programs.

Where appropriate, the SOP includes references to international good practices in resettlement planning, implementation, monitoring and reporting. The SOP has been promulgated under Sub Decree No. 22 ANK/BK on 22 February 2018 and applies to all externally financed projects in the Kingdom of Cambodia. The General Department of Resettlement (GDR) of the MEF is responsible for providing guidance and clarification to users of the SOP.

Law on Suppression of Human Trafficking and Sexual Exploitation (2008). All forms of human trafficking and sexual exploitation, including forced labor or services, slavery or practices similar to slavery, debt bondage, involuntary servitude, and child labor, for profit-making is declared unlawful under this law. In the explanatory note on the law by the Ministry of Justice, forced labor is defined as all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily (IJM, 2016).

National Policy for the Development of Indigenous Peoples (2009). The policy serves as an umbrella framework for government policies related to indigenous peoples and communities, particularly in culture, education, health, environment, land, agriculture, water resources, infrastructure, justice, tourism, industry and mines and energy. The defines the parameters of the registration of indigenous communities as legal entities to enable them to formally own their communal land and assets, and allow them to participate in economic development. The policy details strategy across these sectors, including the use of local languages in public consultation, primary education, and the media, and the conduct of impact assessments for all infrastructure projects.

2.2 INTERNATIONAL STANDARDS, TREATIES, AND AGREEMENTS

Likewise, this Preliminary ESIA has been designed and aligned with the following World Bank (WB) framework and guidelines, namely: (i) the Environment and Social Framework (2018); and, the Environment, Health and Safety Guidelines for Waste Management Facilities (2007) of the World Bank Group as discussed in this section.

2.2.1 World Bank Environmental and Social Framework (2018)

The Environmental and Social Standards (ESS) defined under the World Bank Environmental and Social Framework (WB ESF) establish the requirements to be adhered to by potential World Bank-financed projects to ensure that the principles of environmental and social sustainability, stakeholder engagement, nondiscrimination, and transparency and accountability in governance are adhered to. These policies are listed in **Table 2.2-1** (World Bank, 2017).

Table 2.2-1: World Bank Environmental and Social Standards

ESS	Summary and Work Required	Relevant	Commentary
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	The conduct of an assessment of the environmental and social risks and impacts is required for projects (and associated facilities) proposed for World Bank financing. The assessment shall identify, review and evaluate the risks and impacts of the projects vis-à-vis its potential contributions. The results from the assessment will be inform the design of project, including the identification of mitigation measures, through applying a mitigation hierarchy of (1) anticipating and avoiding risks and impacts, (2) minimizing or reducing risks when avoidance is not possible, (3) identifying measures to mitigate impacts from risk minimization or reduction, such as livelihood restoration, and (4) compensating and offsetting in the event that significant residual impacts remain.	Relevant	The Project includes technical assistance activities and civil construction activities. The environmental benefits of the project are seen to be significant. By improving the collection and recycling of solid waste and plastic waste, a large volume of plastic wastes will be reduced. However, the implementation of this project will cause significant environmental and social risks and impacts in many aspects. The project will implement an approach that combines support for policy development, regulatory improvements, and monitoring at the national level with support for selected provinces and municipalities This will aid the implementation of solid waste management policy and legislation as well as capacity development at both the national and the local levels. It will improve the various levels of solid waste and plastic management in Cambodia, from waste collection, transport, and recovery, treatment, recycling, and disposal, along with improvements in operational cost recovery by improving waste fee collection. It will also improve the monitoring and enforcement of private waste management companies, information availability and reliability, and citizen engagement and public information. The implementation of policies on plastic and improved plastics management will contribute towards the reduction of the amount of waste that needs to be collected or landfilled. It will increase recovery and recycling and contribute to reduced plastic leakage to the waterways and ocean. The subprojects on solid and plastic waste infrastructure in selected cities include construction of landfills to improve performance of the waste disposal. The potential negative environmental impacts identified include dust, noise, effluent, soil erosion, traffic interference, ordinary garbage, etc., as well as community health & safety, occupational health & safety, and the impact of pier construction on aquatic organisms. The potential negative social impacts identified are: Potential conflict among communities regarding the location of landfill sites, Possible resistance among waste-pickers; Physical and economic displacement from land acquisition and/or imposition of restrictions on land use/access to waste resources and potentially further marginalization of vulnerable groups. The influx of workers and other individuals seeking to benefit from the potential economic gains from the project may strain the current resources of the host

ESS	Summary and Work Required	Relevant	Commentary
			municipalities. The influx of individuals may also cause competition over basic facilities and services as well as Sexual Exploitation Abuse and Sexual Harassment (SEA/SH) as a result of labor influx. There can also be a risk for Indigenous Peoples with influx of workers. The main E&S impacts of the project come from the facilities' operation. Such as: Odor, sewage of working waste transfer stations; Temporary storage and transportation of household hazardous substance; Fire and explosion risk of biogas tank in kitchen waste treatment plant; Hazardous substance production, storage and transportation of the recyclable waste processing centers; Pollutant leakage and remediation of contaminated land and groundwater bodies caused by closure operation of the old landfills. These could have a serious impact on the environment, community health & safety and occupational health & safety if not properly mitigated. Improper management of negative environmental impacts from the project's construction and operation phases may pose risks to the health and safety of workers and community members. In case a greenfield site would be selected for a landfill development, the closure of the existing dumpsite would be an associated facility to the project as closure would be needed to ensure that the new landfill site would be used. Environmental and social impact assessments of these associated facilities will be required as part of the overall site-specific ESIA in accordance with the standards in the World Bank's ESF. The Borrower will address the risks and impacts of associated facilities in a manner proportionate to its control or influence over the associated facilities. To the extent that the Borrower cannot control or influence the associated facilities to meet the requirements of the ESSs, the environmental and social impact assessment will also identify the risks and impacts the associated facilities may present to the project. In view of the fact that the project includes a large number of technical assistance and infrastructure construction subprojects, the specific details of which have not yet been determined, therefore the Environmental and Social Management Framework (ESMF) is prepared to formulate the principles, procedures and measures for the environmental and social impact assessment of specific subproject during the implementation period. The Environmental and Social

ESS	Summary and Work Required	Relevant	Commentary
			Commitment Plan (ESCP) is developed to ensure that the project will be compliant with ESMF measures and actions during the project implementation. The Stakeholder Engagement Plan (SEP) is also prepared which will require the borrower to continuously carry out stakeholder participation and information disclosure activities at the early stage as well as the whole life cycle of the project.
ESS2: Labor and Working Conditions	The development of labor management procedures for all types of workers to be employed or engaged by the project will be required to ensure that labor standards are upheld, such as minimum benefits, termination agreements, principle of nondiscrimination and equal opportunity, minimum age of workers, occupational health and safety, grievance mechanism, and other labor management regulations set out by national law.	Relevant	During the implementation period, the project will involve direct workers, contracted workers, primary supplier workers and workers of host communities. Therefore, the requirements on working conditions, workers' rights, appeal mechanism, occupational health and safety in this standard will be applicable to the project. There are occupational health and safety risks and impacts that mainly come from the construction and operation stages of the project. These include: traffic safety, mechanical injury and falling during construction period;; disease and falling during transfer station operation; mechanical injuries, as well as risk related to the storage and transportation during operation of material recovery facilities; leakage of pollutants caused by the rehabilitation/restoration of old landfills, as well as the risks and impacts on the operators' health and safety. The ESMF document includes labor management procedure to guide the development of corresponding management procedures and labor appeal mechanism in the preparation of specific subprojects.
ESS3: Resource Efficiency and Pollution Prevention and Management	The policy sets out the requirements related to the sustainable use of resources (i.e., energy, raw materials, water) and the prevention of short and long-term pollution (i.e., air, water, noise) and waste (i.e., hazardous, nonhazardous, and chemical) due to the project.	Relevant	The project will involve the material recovery facilities for recyclables and composting and the disposal of waste which will require water consumption and energy consumption. It is recommended to adhere to the principle of cleaner production during the processing sections. As for facility construction subprojects, their construction and operation will produce leachate, waste gas, solid waste and noise. The closure of old dumpsites/landfills often involves the remediation of contaminated land and other problems left over from the past. As per ESMF, the project shall put forward requirements on pollution management and resource conservation of its technical assistance activities and civil construction activities' environmental and social impact according to the World Bank's ESF, World Bank group's Environmental, Health and Safety (EHS) Guidelines and relevant Good International Industry Practice (GIIP). The relevant mitigation and management measures are described in the 'General management

ESS	Summary and Work Required	Relevant	Commentary
			regulations' of this framework, and the corresponding documents of Environmental and social assessment report and Environmental and social management plan' of future subprojects.
ESS4: Community Health and Safety	The risks and impacts to health, safety and security of the communities that may be affected by the project must be minimized. The potential risks and impacts across the project cycle must be evaluated. Furthermore, the circumstances of the vulnerable groups must not be further exacerbated due to the impacts of the project. The project must adhere to the national standards related to building standards, traffic and road safety, ecosystem protection, health and safety and emergency preparedness, along with Environmental, Health, and Safety Guidelines (EHS) Guidelines and Good International Industry Practice (GIIP).	Relevant	Implementation of this project may impact the health and safety of the surrounding communities. During the construction stage, increased emission and vehicular movement; use, and possible influx of migrants and workers may impact on the health and safety of the surrounding communities. An environmental and social impact assessment will be done specific to specific subprojects once a landfill site has been selected, where community health and safety impacts will be discussed in detail. Corresponding management measures will be included in the management plan. A Stakeholder Engagement Plan (SEP) has been prepared for this project, which prescribes the continuous conduct of consultations that ensure the participation of stakeholders from surrounding communities.
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	The risks and impacts related to the permanent or temporary physical and economic displacement of project-affected persons with or without formal, recognizable usage rights due to land acquisition and changes in land use brought about by the project shall be assessed and evaluated. The safeguard upholds the avoidance of involuntary resettlement, and for instances wherein it cannot be avoided, measures to minimize and mitigate the adverse impacts to the displaced shall be established. Feasible resettlement options shall be offered to the physically displaced wherein the resettlement areas allow living conditions that are at least equivalent or consistent with established standards. These that are economically displaced shall be compensated according to the assets and other replacement costs that will allow them to restore and reestablish their livelihoods and income-earning capacity.	Relevant	The ESS5 aims to avoid or minimize involuntary resettlement, to avoid forced evictions, and to mitigate the unavoidable and adverse social and economic impacts of land acquisition or land use restrictions. This Standard applies to waste-pickers in case their access to recyclables becomes restricted (covered under the livelihood restoration framework). This Standard is not applicable to the technical assistance subprojects, since these will not involve civil works activities and will not require/entail land acquisition and demolition. Subprojects involving civil works may require land acquisition and involuntary resettlement and economic displacement; hence, this standard is applicable. Prior to the implementation of the subproject once a landfill site has been selected, resettlement and livelihood restoration plan shall be prepared according to the RPF and LRF outline requirements in ESMF, and following the guidelines set by the 2018 SOP on Land Acquisition and Involuntary Resettlement by MEF and WB ESS5, and will be submitted to the World Bank for approval. For those activities involving the upgrading of existing sites, Environmental and Social Due Diligence shall be conducted to assess the legal compliance status and the possible remaining problems.

ESS	Summary and Work Required	Relevant	Commentary
			In case of restriction of access to recyclable to waste-pickers for participating municipalities under the sub-projects, livelihood restoration plans will be prepared following the Livelihood Restoration Framework (LRF).
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	The policy requires the identification and assessment of threats and potential impacts to biodiversity, and natural, critical, modified and habitats that may directly or indirectly be affected by the project. Preliminary conditions have to be gathered to assess the extent of the risk and impacts identified. Once significant risks are found, a Biodiversity Management Plan will have to be developed and implemented.	Relevant	The ESMF provides the exclusion clauses of subprojects for facility construction activities All activities with possible significant impacts on natural habitats and biodiversity will not be included. The impact of project activities on biodiversity will be analyzed in detail in the process of environmental and social impact assessment of specific activities (site specific ESIAs and ESMPs). Corresponding mitigation measures will be formulated.
ESS7: Indigenous Peoples / Sub-Saharan African Historically Underserved Traditional Local Communities	An assessment of the nature and degree of the expected direct and indirect economic, social, cultural and cultural heritage, and environmental impacts of the project to indigenous peoples, including potential encroachment, transformation and degradation of their land and resources. Measures to avoid and mitigate short to long term impacts should be identified and developed in consultation with the affected indigenous peoples. Special action is required where Bank investments affect IP whose social and economic status restricts their capacity to assert their interests and rights in land and other productive resources.	Not Relevant	No presence of Indigenous Peoples in the area of influence in Siem Reap as confirmed by local authorities.
ESS8: Cultural Heritage	The risks and impacts to tangible and intangible cultural heritage, including legally protected cultural heritage areas, archaeological sites and material, built heritage, movable cultural heritage, natural features with cultural significance, are required to be identified and assessed. This includes possible changes in the physical environment, such as excavations, demolitions, movement of earth; proximity to protected area and their respective buffer zones; and proximity to recognized cultural heritage site. Avoidance of any adverse impact to cultural heritage should be upheld whenever possible. A Cultural Heritage Management Plan	Relevant	Cultural heritage of cultural significance may be existing in the local communities and cultural heritage protected by law in the project area. The project involves civil engineering activities, which have potential impact risk on local cultural heritage.

ESS	Summary and Work Required	Relevant	Commentary
	shall be developed upon identification of risks and impacts is not possible.		
ESS9: Financial intermediaries	Financial Intermediaries receiving financial support from the World Bank should monitor and management environmental and social risks of their portfolio, subprojects and financial products (i.e., project finance, corporate finance, medium and small enterprise finance, micro finance, housing finance, leasing, and trade finance).	Currently not relevant	This standard is not applicable to this project as it does not include any involvement of financial intermediaries.
ESS10: Stakeholder Engagement and Information Disclosure	Engagement of stakeholders should be implemented across the project cycle. Consultations must be conducted to ensure that timely, relevant, and understandable information are provided to project-affected parties and other interested parties. The process involves the conduct of stakeholder identification and analysis; planning of engagement; disclosure of information; stakeholder consultation; addressing and responding to grievances; and reporting to stakeholders. Upon identification of individuals and groups identified, a Stakeholder Engagement Plan must be developed that will provide for the conduct of stakeholder engagement across the project cycle. The SEP will set out how communication with stakeholders will be handled, and how potential obstacles to participation may be addressed. Consideration of vulnerabilities of the stakeholders must be taken into consideration in the engagement of these parties. Mitigation measures must be appropriate and aligned with the respective needs and concerns of the stakeholders.	Relevant	There are many key stakeholders in the project that depend on the sites of influence. Thus, a stakeholder engagement and information disclosure would be necessary. ESS10 requires the engagement of affected and interested stakeholders at the early stage of the project and should be implemented across the project cycle. Consultations will be conducted to ensure that timely, relevant, understandable information are provided to project-affected parties and other parties involved. The process should include stakeholder identification and analysis; planning of engagement; disclosure of information; stakeholder consultation; addressing and responding to grievances; and reporting to stakeholders. A Stakeholder Engagement Plan has been drafted that stipulates the plans for stakeholder engagement across the implementation timeline. The SEP will set out how communication with stakeholders will be handled, and how potential obstacles to participation may be addressed. Consideration of vulnerabilities of the stakeholders must be taken into consideration in the engagement of these parties. Mitigation measures must be appropriate and aligned with the respective needs and concerns of the stakeholders and Grievance Mechanism available.

2.2.2 World Bank Group Environment, Health, and Safety Guidelines for Waste Management Facilities (2007)

2.2.2.1 General Guidelines

The General Environmental, Health and Safety (EHS) includes provisions on Environment, Occupational Health and Safety, Community Health and Safety, and Construction and Decommissioning for large industrial projects (World Bank Group, 2007). There are also other guidance documents for specific industries and sectors.

2.2.2.2 Waste Management Facilities

The EHS guidelines of the World Bank Group applies to municipal solid and industrial waste management facilities that include the following processes:

- Waste collection and transport;
- Waste receipt,
- Unloading, processing and storage;
- Landfill disposal;
- Physio-chemical and biological treatment; and,
- Incineration Projects (WBG, 2007).

Guidelines related to labor management, community health and environmental management in waste management facilities are summarized in **Table 2.2-2**.

Table 2.2-2: EHS Guidelines Related to Labor Management, Community Health and Environmental Management in Waste Management Facilities

Component	Description
Labor Management Occupational Safety	Occupational Safety Procedures for the landfill operation must include provisions related to: • Accidents and injuries, including those involving trucks and moving equipment, unstable disposal site surfaces, and fires and explosions, • Chemical exposure, including exposure to chemical burns, and • Exposure to pathogens and vectors that can be health hazards. For informal living near waste management facilities, they often have poor living conditions with only minimal water and sanitary facilities. They are also especially at risk to exposure to hazardous and toxic waste and fumes. As much as possible, the economic displacement of these must be avoided, especially without provision of any alternatives. Facilities managing municipal solid waste must work together with government entities to allow the collection and sorting of solid waste, if possible, initiatives to help them form formal entities, such as cooperatives or micro-enterprises, can be done to formally contract them into the process of the facility. Once such work is formalized, the workers must be officially registered, provided with protective equipment, provided with washing and sanitation facilities, and receive regular health examinations and vaccinations under a health surveillance program. The design of the facility must also consider easier access of the to recyclables and reduce their contact to wastes that pose hazards. (p. 23-26)
Community Health and Safety	**Long-term Operation, Decommissioning or Closure**: Specific procedures on closure must emphasize preservation of long-term integrity and security of the site. The closure and post-closure plan must include mitigating impacts to human health and environment after the closure. All plans must be aligned with the defined post-closure use. **Landfill Siting**

Component	Description
	In the identification of landfill sites, the nearest residential developments must be over 250 meters from the site option. **Community Health and Safety** The following impacts likely to occur during the operation and decommissioning phases must be looked into: • *Waste scavenging*: should not be allowed under any circumstances in hazardous and non-hazardous industrial waste management facilities. Only facilities handling municipal solid waste may consider incorporating the employment of waste-pickers into the operations of the facility. • *Physical, chemical, and biological hazards*: access to facilities, especially for areas that hold toxic waste, must be restricted and implement security procedures. • *Litter*: garbage outside the facility must be managed to avoid the exposure of the adjacent community to hazardous substances and potentially spread disease. • *Noise*: measures to management noise should be taken to void causing nuisance to the adjacent areas., • *Dust and odors*: Buffer areas must be included in the design, especially between processing areas and potential receptors, especially residences, hospitals and schools. Processing areas must be located in areas at the downwind from these areas to manage and control exposure of community to dust and odors. (Section 1.1.1, p.10-11, 14; Section 1.3 p.26)
Environmental Protection and Management	**On emission and noise management** Additional guidelines on emission management specific for Waste Management Facilities include: • Inclusion of landfill gas collection system and its use if practical, • Use of gas blowers, and • Installation and regular sampling of boreholes. **Additional guidelines on noise management specific for Waste Management Facilities** include the following: • Construction of a buffer zone, • Road quality maintenance • Use of equipment with low-noise emission levels, • Use of sound-insulating materials, acoustic screens and silencing equipment, • Enclose inherently noisy equipment in a fixed structure, and • Inclusion of noise considerations in the design process. **EHS Guidelines for Waste Management Facilities on Landfill Siting** The guidelines provide that the proximity of groundwater and recharge area, surface water. Private or public drinking, irrigation, or livestock water supply, and perennial stream must be considered in landfill siting. Also, the exposure of the site option to hydrometeorological and seismic hazards, must be considered in the site selection. (Section 1.1.1, p.10-11, 14)

Source: World Bank Group (2007)

2.3 GAP ANALYSIS AND RECOMMENDED MEASURES

The World Bank's Environmental and Social Framework and applicable Environmental Standards and the related legislation of the Royal Government of Cambodia (RGC) at the national and local scale were reviewed and analyzed to identify gaps and measures to bridge them, as detailed in **Table 2.3-1**.

Table 2.3-1: Gap Analysis of Existing World Bank and Cambodia Policies

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
General	Paragraph 11: Associated Facilities" means facilities or activities that are not funded as part of the project and, in the judgment of the Bank, are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist.		In line with the WB ESF, the closure and remediation or rehabilitation existing dumpsites are associated facilities to the development of new landfill sites since the objective of development, operation and use of new sanitary landfills cannot be achieved without closure of the existing dumpsites. The new sanitary landfills will have a gate fee for the disposal of waste for the proper investments, operation and maintenance of the new sanitary landfill and without closure of the existing dumpsites (for which no gate fee is applied), waste will not be transported and disposed at the new landfill making the new landfill project unviable. As an alternative to closure, rehabilitation and extension of the existing dumpsite into a sanitary landfill is possible.	MWPT
Environmental and Social Impact Assessment	**ESS1**: The conduct of an assessment of the environmental and social risks and impacts (i.e., direct, indirect, cumulative) is required for proposed World Bank-financed and associated facilities across its project phases (i.e., preconstruction, construction, operation, decommissioning, closure, and reinstatement/restoration phases, whichever are relevant). Borrowers are required to undertake the following: (1) Environment and Social Assessment, identification and evaluation of potential environmental and social risks and impacts;	**Law on Environmental Protection and Natural Resource Management (1996)** includes the formulation of sub-decrees for environmental management, including policies related to the Environmental Impact Assessment Process. **Sub-decree 72 on Environmental Impact Assessment Process (1999)** serves as the legal basis that established the guidelines for the I/EIA for projects in waste processing, burning activities, wastewater treatment plants, and drainage systems greater than 5,000 ha. **Prakas 376 on General Guideline for Preparing Initial Environmental Impact Assessment and Full Environmental Impact Assessment Report (2009)** sets the guidelines and scope of I/EIAs.	WB ESS and RGC policies on EIA are aligned in terms of assessing environmental impacts of projects as a whole, focusing on the natural environment as well as on the socio-economic aspects. However, they do not fully align on social impacts and risk, specifically on requirements for ESS5 (see section below) and the focus on vulnerable groups is not as strongly provided in the RGC policies as in the WB ESS. Apart from the inclusion of public participation in the RGC's EIA process, there is no prescription on its strategic conduct, including the conduct of mapping and the preparation of a stakeholder engagement plan. The site specific ESIAs and ESMPs that will be developed for the sub-projects will specifically include focus on vulnerable groups and will include	MPWT

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	(2) Stakeholder Engagement, preparation of stakeholder engagement plans (SEP), information disclosure, and meaningful consultation as provided by ESS-10; (3) Environmental and Social Commitment Plan (ESCP), timebound planning of actions and measures for identified potential risks and impacts; and (4) Monitoring and Reporting, performance tracking and evaluation of actions identified in the ESCP. For projects that include existing facilities for rehabilitation, a review and audit must be conducted to identify corrective actions to align the existing facility with the requirements of the ESS and must be indicated in the ESCP. All high-risk projects and sub-projects must be in accordance to ESS, while Substantial-risk to low-risk projects must be in accordance to national laws and the ESS deemed relevant by WB. A CBA or other analyses will be required for instances wherein selected option in site, design or technology poses higher environmental and social risks compared to other options. The necessary capacity and trainings related to the implementation and monitoring of the ESCP must be included as part of its measures.	**Prakas on Delegation of Power to Municipal/Provincial Department of Environment to Decide on Project Development (2005)** delegates the review of I/EIAs of private individuals or companies, joint ventures, public companies and government agencies to the municipal or provincial department of environment. **2.3.1.1 Prakas 21 on the Classification of Environmental Impact Assessment for Development Projects (2020)** The Prakas provides an amended listing of the impact classification of projects to identify whether they will be required to submit an environmental protection agreement / contract (projects with small E&S impact), initial environmental and social impact assessment (projects with medium E&S impact), or full environmental and social assessment (projects with serious E&S impact).	specific stakeholder engagement plans, information will be disclosed, meaningful consultations held. and sub-project GRM established.	

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	This application of this ESS is contingent to ensuring the compliance to ESS10, and the other ESS as necessary within the context of the project. (ESS-1 Par 1011, 15, 23, 28-30; ESS-1 Guidance Notes GN 15.1-GN17.2)			
Labor Conditions and Occupational Safety	**ESS1**: Environmental and social assessment must include relevant risks and impacts including implications to health, safety and wellbeing of workers of the facility (ESS-1 Par 28)	**Labor Law (1997)** includes occupational health safety provisions not provided for sanitary landfills and other waste management facilities. The law also establishes the responsibility of employers in the workplace, including: provision of protective equipment, ensuring safe and clean work environment and safety of the workers, and bearing responsibility in work-related accidents, including compensation. (Labor Law 1997, Chapter VIII and IX) The minimum allowable age for *wage employment* is set at 15 years old, and 18 years old for hazardous work. For child laborers from 15-17 years old working wage employment are now allowed to perform night work, Children between 12-15 years old can be hired to do light work as long as the nature of work fulfills the following: (1) Work is not hazardous to their health or mental and physical development., (2) Work will not affect their regular school attendance, their participation in guidance programs or vocational training approved by a competent authority. The definition of light work is provided in a separate prakas. The law is applicable to all employment contracts within the territory of the Kingdom of Cambodia,	Both the WB ESS and RGC laws prohibit the employment of children under the age of 18 in hazardous work. However, national laws only cover children employed in the formal sector. Most child labor, especially the ones with poor labor conditions, occur in the informal sector, where waste-picking is a part of. To address this gap, the ESMF recommends a minimum working age of 18 years old. Specific guidelines will also be developed to require contractors to comply with this requirement, as well as monitor their compliance. For the sub-projects involving waste-pickers, resettlement plans and livelihood restoration plans will be prepared, adopted and implemented with meaningful consultation with affected persons in accordance with ESS5 and consistent with the requirements of the Resettlement Policy Framework (RPF), the Livelihood Restoration Framework and in agreement with the General Department of Resettlement (GDR) under the Ministry of Economy and Finance (MEF). This will include both physical displacement and economic displacement and include livelihood restoration and improvement programs for affected persons. Specific attention will be paid to women and children waste-pickers to develop suitable	MOE, MOI, MPWT, GDR, under MEF Contractors, construction supervisors

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
		regardless of where the contract was made and what the nationality and residences of the contracted parties are. This law applies to every enterprise or establishment across all industries and sectors	measures in line with ESF on the basis of site specific studies for each of the applicable sub-projects.	
		Prakas No. 002 on Category of Occupation and Light Work Permitted for Children (2008) Light work for child laborers aged 12 to 15 years old, pertaining to those that does not affect the health as well as mental and physical development of the employed children and does not affect their regular school attendance, involvement in orientation programs, or vocational trainings required by the competent authorities, includes • Working at some shopping malls such as selling booth, vegetables and fruit selling stall, or news stand and stall of other similar goods; • Receiving, packing, selecting and classifying goods as well as assembling light things, including opening or taking goods out of the package; • Lifting, carrying and holding light things. The prakas provides a full listing of the types of light work for children aged 12-15 years old and is detailed in **Section 3.2.2**. Those who employ children from 12-15 years old for light work shall allow their parents or guardian to understand the terms and conditions of employment, including the children's working time, school attending time, vulnerability to work-related accidents and diseases, adopted measures on hygiene and work safety.		

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
		Work hours for these children shall not exceed four (4) hours for school days, and seven (7) hours for school-free days. They are also prohibited from working between 8:00pm to 6:00am. They are entitled to two (2) consecutive days off per week.		
	ESS2: Labor management procedures for all types of workers to be employed or engaged by the project must include minimum benefits, termination agreements, principle of nondiscrimination and equal opportunity, minimum age of workers, occupational health and safety, and grievance mechanism to establish labor standards in the workplace. ESS 2 para 19, and footnote 13, notes that a child under the age of 18 may be employed or engaged in connection with the project if there is no hazardous work, an appropriate risk assessment is conducted prior to the work commencing, and the recipient conducts regular monitoring of health, working conditions, hours of work.	**Prakas No. 106 on the Prohibition of Hazardous Child Labour (2004)** prohibits the employment of children below 18 years old on jobs involving hazardous works involving construction and demolition (with exception to designated safe areas with permit from labor inspector), exposure to hazardous chemicals and substances, exposure to fumes, dust gas and other ambient substances, heavy machinery and equipment Employers considering to employ children of 16 years of age to do hazardous work are required to secure a permit from the Ministry and must adhere to the following: • No work between 10:00pm to 5:00am • Children undergo training • Consultation with Labor Advisory Committee • Annual health checkups with Department of Labor Health to certify that they are in the proper health condition to engage in hazardous work		
	EHS Guidelines for Waste Management Facilities on Occupational Health and Safety: Occupational Safety Procedures for the landfill operation must include provisions related to: (1) accidents and injuries, including those involving trucks	**Law on Suppression of Human Trafficking and Sexual Exploitation (2008)** declares forms of human trafficking and sexual exploitation, including forced labor or services, slavery or practices similar to slavery, debt bondage, involuntary servitude, and child labor, for profit-		

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	and moving equipment, unstable disposal site surfaces, and fires and explosions (2) chemical exposure, including exposure to chemical burns (3) exposure to pathogens and vectors that can be health hazards. For informal living near waste management facilities, they often have poor living conditions with only minimal water and sanitary facilities. They are also especially at risk to exposure to hazardous and toxic waste and fumes. As much as possible, the economic displacement of these must be avoided, especially without provision of any alternatives. Facilities managing municipal solid waste must work together with government entities to allow the collection and sorting of solid waste, if possible, initiatives to help them form formal entities, such as cooperatives or micro-enterprises, can be done to formally contract them into the process of the facility. Once such work is formalized, the workers must be officially registered, provided with protective equipment, provided with washing and sanitation facilities, and receive regular health examinations and vaccinations under a health surveillance program. The design of the facility must also consider easier access of the recyclables and reduce their contact to wastes that pose hazards. (p. 23-26)	making as unlawful. In the explanatory note on the law by the Ministry of Justice, forced labor is defined as all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.		

<table>
<tr><th>Item</th><th>Applicable WB Standards</th><th>Relevant RGC Policy</th><th>Policy Gaps Identified and Actions Suggested</th><th>Responsible Party</th></tr>
<tr><td rowspan="2">Pollution</td><td>ESS3: Policies related to requirements and standards related to the sustainable use of resources in the various stages of the project must be laid out. Additionally, measures for prevention and mitigation short and long-term pollution (i.e., air, water, noise) and waste (i.e., hazardous, nonhazardous, and chemical) must also be provided.</td><td>Law on Environmental Protection and Natural Resource Management (1996) mandates the formulation of sub-decrees on Air Pollution Monitoring and Noise Disturbance, Water Pollution Control, and Environmental Impact Assessment Process.</td><td rowspan="2">Resource efficiency and pollution prevention and management measures shall be developed under the ESMP to be prepared, submitted and implemented.</td><td rowspan="2">MWPT, MOI, MOE</td></tr>
<tr><td>General EHS Guidelines: International Standards on Air Quality and Noise Level were included in the guidelines:
<u>Ambient Air Quality</u>: WHO Ambient Air Quality Standards set in 2005 were adopted.
<u>Noise Level</u>: WHO Guidelines on Community Noise set in 1999 were adopted.
(p.4, 53)</td><td>Sub-decree 42 on Air Pollution Monitoring and Noise Disturbance (2000) establishes the standard on ambient air quality and maximum allowable noise level as follows:
<u>Noise: Vehicles</u>
<table>
<tr><th>Type of Vehicles</th><th>Max Limit (dB (A))</th></tr>
<tr><td><125cm3</td><td>85</td></tr>
<tr><td>≥125cm3</td><td>90</td></tr>
<tr><td><12 seats</td><td>80</td></tr>
<tr><td>≥12 seats</td><td>85</td></tr>
<tr><td><3.5 tons</td><td>85</td></tr>
<tr><td>≥3.5 tons</td><td>88</td></tr>
<tr><td>≥150kw</td><td>89</td></tr>
<tr><td>Others not included above</td><td>91</td></tr>
</table>
<u>Noise: Residential Areas and Public Places</u>
<table>
<tr><th>Location</th><th>6am-6pm</th><th>6pm-10pm</th><th>10pm-6am</th></tr>
<tr><td>Non-residential: Hospital, school, kindergarten</td><td>45</td><td>40</td><td>35</td></tr>
<tr><td>Residential: Hotel, house,</td><td>60</td><td>50</td><td>45</td></tr>
<tr><td>Commercial and services,</td><td>70</td><td>65</td><td>50</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Item</th><th>Applicable WB Standards</th><th>Relevant RGC Policy</th><th>Policy Gaps Identified and Actions Suggested</th><th>Responsible Party</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Industry mixing with residential</td><td>75</td><td>70</td><td>50</td></tr>
</table>
Noise: Standard at Work Place and Industries
<table>
<tr><th>Noise Level (dB (A))</th><th>Max duration (hour)</th><th>Note</th></tr>
<tr><td>75</td><td>32</td><td rowspan="9">Earplug is needed for those who work at 80 dB (A)</td></tr>
<tr><td>80</td><td>16</td></tr>
<tr><td>85</td><td>8</td></tr>
<tr><td>90</td><td>4</td></tr>
<tr><td>95</td><td>2</td></tr>
<tr><td>100</td><td>1</td></tr>
<tr><td>105</td><td>0.5</td></tr>
<tr><td>110</td><td>0.25</td></tr>
<tr><td>115</td><td>0.125</td></tr>
</table>
Air Quality
<table>
<tr><th></th><th>1h (mg/m^3)</th><th>8hrs (mg/m^3)</th><th>24hrs (mg/m^3)</th><th>1 yr (mg/m^3)</th></tr>
<tr><td>CO</td><td>40</td><td>20</td><td></td><td></td></tr>
<tr><td>NO_2</td><td>0.3</td><td></td><td>0.1</td><td></td></tr>
<tr><td>SO_2</td><td>0.5</td><td></td><td>0.3</td><td>0.1</td></tr>
<tr><td>O_3</td><td>0.2</td><td></td><td></td><td></td></tr>
<tr><td>Pb</td><td></td><td></td><td>0.005</td><td></td></tr>
<tr><td>TSP</td><td></td><td></td><td>0.33</td><td>0.1</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td></td><td>EHS Guidelines for Waste Management Facilities on emission and noise management: Additional guidelines on emission management specific for Waste Management Facilities include: (1) inclusion of landfill gas collection system and its use if practical, (2) use of gas blowers, and (3) installation and regular sampling of boreholes.

Additional guidelines on noise management specific for Waste Management Facilities include: (1)</td><td>Technical guideline on municipal solid waste management (2016) includes the detailed guidelines and instructions related to the operations, maintenance, and closing of landfills, including composing methods, management and treatment of medical and chemical waste</td><td></td><td></td></tr>
</table>

<table>
<tr><th>Item</th><th>Applicable WB Standards</th><th>Relevant RGC Policy</th><th>Policy Gaps Identified and Actions Suggested</th><th>Responsible Party</th></tr>
<tr><td></td><td>construction of a buffer zone, (2) road quality maintenance (3) use of equipment with low-noise emission levels, (4) use of sound-insulating materials, acoustic screens and silencing equipment, (5) enclose inherently noisy equipment in a fixed structure, and (6) inclusion of noise considerations in the design process.

EHS Guidelines for Waste Management Facilities on Landfill Siting: Proximity of groundwater and recharge area, surface water. Private or public drinking, irrigation, or livestock water supply, and perennial stream must be considered
Exposure of the site option to hydrometeorological and seismic hazards, must be considered in the site selection. (Section 1.1.1, p.10-11, 14)</td><td></td><td></td><td></td></tr>
<tr><td>Community Health and Safety</td><td>ESS1: Environmental social assessment must include relevant risks and impacts in in the health, safety and well-being of project affected communities, along with the community safety provisions of the EHS Guidelines.
(ESS-1 Par 28)</td><td>Sub-decree 42 on Air Pollution Monitoring and Noise Disturbance (2000) establishes the standard on ambient air quality and maximum allowable noise level as follows:

<u>Noise: Vehicles</u>
<table><tr><th>Type of Vehicles</th><th>Max Limit (dB (A))</th></tr><tr><td><125cm3</td><td>85</td></tr><tr><td>≥125cm3</td><td>90</td></tr><tr><td><12 seats</td><td>80</td></tr><tr><td>≥12 seats</td><td>85</td></tr><tr><td><3.5 tons</td><td>85</td></tr><tr><td>≥3.5 tons</td><td>88</td></tr><tr><td>≥150kw</td><td>89</td></tr><tr><td>Others not included above</td><td>91</td></tr></table></td><td>Prepare, adopt, and implement measures and action to assess and manage specific risks and impacts to the community arising from Project activities including remediation of dumpsites or rehabilitation of dumpsites into landfills, construction of waste transfer and/or treatment facilities, as described in the ESMPs for the sub-projects to be prepared in accordance with the ESMF, in a manner acceptable to the Association. Including additional community health and safety aspects like road safety, labor influx and SEA/SH.</td><td>MPWT, MOE, Siem Reap Government, Contractors</td></tr>
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<tr><td></td><td></td><td>Noise: Residential Areas and Public Places
<table><tr><th>Location</th><th>6am-6pm</th><th>6pm-10pm</th><th>10pm-6am</th></tr><tr><td>Residential: Hotel, house,</td><td>60</td><td>50</td><td>45</td></tr><tr><td>Industry mixing with residential</td><td>75</td><td>70</td><td>50</td></tr></table></td><td></td><td></td></tr>
<tr><td></td><td>ESS4: The risks and impacts to the health, safety, and security of the identified project-affected persons and community must be identified and minimized. All potential risks across all phases of the projects must be identified and evaluated while taking into consideration the circumstances of disadvantaged and vulnerable groups.</td><td>Labor law of the Kingdom of Cambodia (1997) includes Chapter VIII, Health and Safety of Workers, articles 228 to 247</td><td></td><td></td></tr>
<tr><td></td><td>EHS Guidelines for Waste Management Facilities:
Long-term Operation, Decommissioning or Closure: Specific procedures on closure must emphasize preservation of long-term integrity and security of the site. The closure and post-closure plan must include mitigating impacts to human health and environment after the closure. All plans must be aligned with the defined post-closure use.
Landfill Siting: In the identification of landfill sites, the nearest residential developments must be over 250 meters from the site option.
Community Health and Safety: The following impacts likely to occur during the</td><td>Sub-Decree on Solid Waste Management (1999) The purpose of this sub-decree is to regulate the solid waste management with proper technical manner and safe way in order to ensure the protection of human health and the conservation of bio-diversity (Article 1). This sub-decree applies to all activities related to disposal, storage, collection, transport, recycling, dumping of garbage and hazardous waste (Article 2). The collection, transport, storage, recycling, minimizing and dumping of waste in the provinces and cities are the responsibility of the authorities of provinces and city (Article 4)</td><td></td><td></td></tr>
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Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	operation and decommissioning phases must be looked into: (1) *Waste scavenging*: should not be allowed under any circumstances in hazardous and non-hazardous industrial waste management facilities. Only facilities handling municipal solid waste may consider incorporating the employment of. (2) *Physical, chemical, and biological hazards*: access to facilities, especially for areas that hold toxic waste, must be restricted and implement security procedures. (3) *Litter*: garbage outside the facility must be managed to avoid the exposure of the adjacent community to hazardous substances and potentially spread disease. (4) *Noise*: measures to management noise should be taken to void causing nuisance to the adjacent areas., (5) *Dust and odors*: Buffer areas must be included in the design, especially between processing areas and potential receptors, especially residences, hospitals and schools. Processing areas must be located in areas at the downwind from these areas to manage and control exposure of community to dust and odors. (Section 1.1.1, p.10-11, 14; Section 1.3 p.26)			

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
Land Acquisition and Livelihood Restoration	Objectives of **ESS5** are: • To avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives. • To avoid forced eviction. • To mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by: (a) providing timely compensation for loss of assets at replacement cost and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. • To improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure. • To conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant. • To ensure that resettlement activities are planned and implemented with appropriate disclosure of information,	The **Constitution of Cambodia (1993)** establishes the right to land ownership, and the right of the State to eminent domain (Article 44) **Land Law (2001)** defines the scope of ownership of immovable properties, such as land, trees and fixed structures, including: • *Eminent Domain and Just Compensation*: "No person may be deprived of his ownership, unless it is in the public interest. Any ownership deprivation shall be carried out in accordance with the governing procedures provided by law and regulations, and after the payment of fair and just compensation in advance." (Article 5) • *Basis of Land Ownership*: legal possession as the sold basis of land ownership • *Disqualification from compensation in eminent domain claims:* law defines the following as not entitled to any compensation in the event of any developments or eminent domain acquisition: ○ Lands not acquired through legal possession (Article 18-19), ○ A foreigner who falsifies national identity to become an owner of land in Cambodia shall be punished as determined under Article 251 of this law. Any property bought under these circumstances will be seized as State property without compensation from the State. (Article 8), and ○ Properties past the expiration of their lease (Article 108).	The RGC's national eligibility categories are generally consistent with the WBG ESS5's requirements on eligibility criteria except for those who might belong to Category iii, defined as those who have no recognizable legal right or claim to the land or assets they occupy or use. The third category of affected persons who occupy or use land should also receive compensation following WB ESS5. Full payment of compensation at replacement costs should take place prior to taking over the land and for vulnerable persons WB EES5 objective to improve living conditions should be followed. Particular attention will be paid to gender aspects and the needs of the poor and the vulnerable.in line with WB ESS5. The SOP provision on income restoration program is adequate to re-establish sources of livelihoods for those APs due to permanent and significant loss of livelihood or income generation. This should, however, include applicability to waste pickers being affected by the Project in case of halting and/or restriction of access to the waste due to closure or restoration of the existing dumpsite as part of the Project.	IRC GDR MEF MOI, MPWT, MOE

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
	meaningful consultation, and the informed participation of those affected The WBG ESS5 defines the eligibility categories as persons: (i) Category i: who have formal legal rights to the land or assets they occupy or use; (ii) Category ii: who do not have formal legal rights to land or assets, but have a claim to land that is recognized or recognizable under national law; or (iii) Category iii: who have no recognizable legal right or claim to the land or assets they occupy or use. Compensation to the Affected Persons should be on full replacement cost basis. The land acquisition and related assets will take place only after compensation as been made available and, where applicable, displaced people have been resettled and moving allowances provided to the displaced persons in addition to compensation.	○ A title of possession to immovable property, which is the public property of the State or public legal entities, issued by the competent authorities to a private person is null and void (Article 43). ○ Any official who issues such title shall be liable under civil and criminal codes. Any authority that is aware of such illegality and fails to take action shall be considered an accomplice and is liable to the same penalties as the person who commits the offense (Article 44). **Prakas No. 6 on Measures to Crack Down on Land Grabbing and Encroachment (2007) and Sub-decree No. 197** provides that compensation for structures and assets located in ROWs will not be subject to any compensation. **Circular No. 2 on Measures against Illegal Holding of State Land (2007)** sets the definition, measures and procedures for reclamation of state-owner lands under illegal possession. The circular reiterates that those considered as illegal occupants of state land will not be entitled to any compensation as provided by the 2001 Land Law. However, for poor and landless families "may receive preferential treatment in obtaining appropriate size of land for making their livelihood based on their actual situation" (CLP, 2007). For lands where indigenous groups have asserted collective ownership, the claim of the	For the sub-projects involving waste-pickers, resettlement plans and livelihood restoration plans will be prepared, adopted and implemented with meaningful consultation with affected persons in accordance with ESS5 and consistent with the requirements of the Resettlement Policy Framework (RPF), the Livelihood Restoration Framework and in agreement with the General Department of Resettlement (GDR) under the Ministry of Economy and Finance (MEF). This will include both physical displacement and economic displacement and include livelihood restoration and improvement programs for affected persons. Specific attention will be paid to woman and children waste-pickers to develop suitable measures in line with ESF on the basis of social baseline studies for each of the applicable sub-projects. Meaningful consultations in line with ESS10 should be conducted, with particular attention to ensuring a two-way process, that allows for feedback from APs and informed on whether feedback has been incorporated in project design.	

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
		State over the land must be postponed until it is legally registered as State-owned.		
	ESS5: The risks and impacts related to the permanent or temporary physical and economic displacement of project-affected persons across various tenure arrangements shall be assessed and evaluated. The safeguard upholds the avoidance of involuntary resettlement, and for instances wherein it cannot be avoided, measures to minimize and mitigate the adverse impacts to the displaced shall be established.	**Expropriation Law (2010)** defines the principles, mechanisms, and procedures of expropriation, as well as fair and just compensation. Only the State may carry out expropriation for use in the public and national interest (Article 7 of the Expropriation Law).		
		Inter-Ministerial Resettlement Committee and the General Department of Resettlement at the Ministry of Economy and Finance. In 1997, the Inter-Ministerial Resettlement Committee (IRC) was established with the mandate to review and evaluate the impacts on resettlement and land acquisition for public physical infrastructure development projects in Cambodia. It is a collective entity that exercises the authority of the Expropriation Committee under the 2010 Expropriation Law. The IRC consists of the MEF, Ministry of Land Management, Urban Planning and Construction (MLMUPC), Ministry of Economy and Finance (MEF) and Ministry of Agriculture, Forestry and Fisheries (MAFF). It is permanently chaired and led by the MEF, and with members from different line ministries, including consists of the MEF, Ministry of Land Management, Urban Planning and Construction (MLMUPC), and Ministry of Agriculture, Forestry and Fisheries (MAFF). The IRC carries out its role and responsibilities through the IRC-WG which is established for each public investment		

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
		project by MEF. The powers of the IRC are delegated to its permanent Chairman. The General Department of Resettlement (GDR) serves as the secretariat of the IRC and the lead for land acquisition and resettlement for public investment projects. The **Sub-Decree No.115** enacted in 2016 promoted the Resettlement Department of the MEF to GDR and defines its functions and responsibilities to the IRC and in lad acquisition and resettlement		
		2018 Land Acquisition and Involuntary Resettlement reflects RGC's laws and regulations relating to the acquisition of land and the involuntary resettlement of AP and the safeguard policies and procedures of Development Partners (DPs) as applied to public infrastructure investment projects. The SOP includes references to international good practices in resettlement planning, implementation, monitoring and reporting. The SOP has been promulgated under Sub Decree No. 22 ANK/BK on 22 February 2018 and applies to all externally financed projects in the Kingdom of Cambodia. The GDR of the Ministry of Economy and Finance (MEF) is responsible for providing guidance and clarification to users of the SOP.		
		2014 Circular No. 6 of the MEF on the Resettlement Implementation Procedure also serves as a vital reference for development projects through providing the administrative management and role and responsibility of all relevant Implementing Agency and Provinces in		

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
		implementing the resettlement for development projects.		
Biodiversity and Ecology	**ESS1**: Environmental social assessment must include relevant risks and impacts including threats to natural habitats and biodiversity, ecosystem services, fisheries and forests. (ESS-1 Par 28)	**Law on Nature Protection Area (2008)** specifies the eight (8) categories of natural protected areas: natural park, wildlife sanctuary, protected landscape, multi-purpose use management area, biosphere reserve, natural heritage site, marine park, and Ramsar site.	During construction activities, there will be possible significant impacts on natural habitats and biodiversity. The environmental management plan includes the conservation and preservation of the biodiversity and ecology of the project area. The project will not finance waste management, treatment and disposal infrastructure that could provide access to critical habitats such as wildlife sanctuary and protected areas.	MPWT, MOE, Siem Reap Government, Contractors
	ESS6: The assessment must include the identification, assessment, and evaluation of direct and indirect threats and potential impacts to biodiversity, and natural, critical, modified and habitats. As deemed necessary, a Biodiversity Management Plan may be developed.	**Law on Water Resources Management (2007)** includes regulation on discharge, disposal or deposit of polluting substances that can impact water quality. Proper authorization from the Ministry of Water Resources and Meteorology must be secured prior to any activities aligned to this.		
		Law on Forest (2002) establishes framework and regulatory measures to protect and conserve forests and their biological diversity, and places forest management under the function of the Ministry of Agriculture, Forestry and Fisheries. The same law requires the conduct of environmental and social impact assessments for any activities that may have potentially significant impacts to the forest ecosystem.		
Cultural Heritage	**ESS1**: Environmental social assessment must include relevant risks and impacts including those that will cause significant adverse risks to cultural heritage. (ESS-1 Par 28)	**Royal Decree on the Establishment of Protected Cultural Zones in the Siem Reap/Angkor Region and Guidelines for their Management (1993)** established five (5) cultural zones and what structures are within them: 1. Core Zone: Monumental sites 2. Buffer Zone: Protected Archaeological Reserves	A Chance Find Procedure is included and procedures for intangible cultural heritage in the ESMF and will be included in the ESMPs for sub-projects.	MOE, MPWT, Contractor and APSARA

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
		3. Protected Cultural Landscapes 4. Sites of Archaeological, Anthropological or Historic Interest, or sites outside of the core and buffer zones 5. Socio-Economic and Cultural Development Zone		
		Royal Decree on the creation of the APSARA National Authority (1995) serves as the legal basis in the establishment of the Authority for the Protection of the Site and Management of the Region of Angkor (APSARA) that has the jurisdiction in the protection and conservation of the Angkor Heritage Sites,		
	ESS8 specifies that risks and impacts to tangible and intangible cultural heritage are required to be identified and assessed, including potential changes in the physical environment, movement of earth; proximity to protected area and their respective buffer zones; and proximity to recognized cultural heritage site. Avoidance of any adverse impact to cultural heritage should be upheld whenever possible.	**Law on Protection of Cultural Heritage (1996)** protects natural cultural heritage and property, whether movable or immovable, publicly or privately owned. against illegal destruction, modification, alteration, excavation, alienation, exportation or importation. It stipulates the following: • Definition of Cultural Property: Cultural property is defined (Chapter 1, Article 4) • Change Discoveries: in the event of discovery of any cultural property during construction, it must immediately be turned over to and local police, to the Provincial Governor, then to cultural heritage authorities (i.e., APSARA) without delays. Within 30 days that the item is verified as cultural property by the authorities, a temporary suspension of construction works and an announcement of safeguarding measures will be taken (Section 7, Article 37-39).		

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		No. 70 SSR government Decision (2004) defined the land use in the Angkor Park, wherein its Zones 1 and 2 are considered State properties.		
		The Constitution of Cambodia (1993) provides that at the highest level, the State shall preserve and promote national culture. The State shall preserve ancient temples, artefacts and redecorate historic sites (Article 69).		
Stakeholder Engagement	**ESS1**: As part of the information disclosure, the findings of the E&S assessment of high-risk and substantial risk projects shall be provided prior to appraisal.	**Guidebook on Environmental Impact Assessment in the Kingdom of Cambodia (2012)** defines public participation and highlights the stages in the project cycle wherein stakeholder engagement is essential: project scoping, mitigation measurement, report review, and project monitoring. The guidebook provides that the identification of mitigating measures on environmental impacts should also be based on the results of public consultation.	A Stakeholder Engagement Plan (SEP) that complies with the provisions of WB ESS10 has been prepared as an stand-alone document to ensure sustained stakeholder engagement and appropriate conduct of information disclosure and consultations. The Stakeholder Engagement Plan and Grievance Redress Mechanism will be updated as it is implemented throughout the project cycle.	MOE, MOI, MPWT
	ESS10: Meaningful engagement and consultation of stakeholders must be conducted across all stages of the project cycle, thus ensuring that timely, relevant, understandable information are provided to all the identified project-affected parties. Specific measures for the identified PPAPs must be identified and laid out in a Stakeholder Engagement Plan. As provided in ESS1, and the other standards under the ESMF, the provisions under this policy must be ensured and complied with.	**Prakas on Public Participation in Environmental Impact Assessment (2017)** establishes the key principles to ensure public participation in the EIA process: Principle of Access to Information; Principle of Public Participation; Principle of Access to Social Justice and Effective Remedies; and Principle of Gender Equality in Public Participation; and Principle of Promoting Indigenous People in Public Participation		

Item	Applicable WB Standards	Relevant RGC Policy	Policy Gaps Identified and Actions Suggested	Responsible Party
Vulnerable Groups	**ESS1**: Environmental social assessment must include adverse risks and impacts that may disproportionately affect certain groups, especially the disadvantaged and vulnerable. As necessary, separate consultation to identify the risks, impacts, and specific needs of these groups can be arranged. (ESS-1 Par 28-29; ESS-1 Guidance Notes GN 28.3-29.1)	**Law on the Protection and the Promotion of the Rights of Persons with Disabilities**, which states that "Persons with disabilities: refers to any persons who lack, lose, or damage any physical or mental functions, which result in a disturbance to their daily life or activities, such as physical, visual, hearing, intellectual impairments, mental disorders and any other types of disabilities toward the insurmountable end of the scale."	Focus on vulnerable groups in the ESIA process is not as strongly provided in the RGC policies as in the WB ESS. For the sub-projects involving activities that may displace vulnerable groups, a resettlement plans and livelihood restoration plan that ensure the inclusion of meaningful consultations with affected persons in accordance with ESS5 and consistent with the requirements of the Resettlement Policy Framework (RPF) and in agreement with the General Department of Resettlement (GDR) under the Ministry of Economy and Finance (MEF) will be prepared and implemented. The preparation of corresponding resettlement and livelihood restoration plans will ensure that both physical and economic displacement are considered in assessing and sufficiently addressing project impacts on vulnerable groups, specifically on women and children.	MOE, MOI, MPWT
	Directive on Addressing Risks and Impacts on Disadvantaged or Vulnerable Individuals or Groups: the bank directive defines disadvantaged or vulnerable individuals as "individuals who, by virtue of, for example, their age, gender, ethnicity, religion, physical, mental or other disability, social, civic or health status, sexual orientation, gender identity, economic disadvantages or indigenous status, and/or dependence on unique natural resources, may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a projects benefits" (World Bank, 2016)	**National Policy on Ageing 2017-2030** defines 60 years as the cut-off age for older persons.		
		Prakas on the Prohibition of Hazardous Child Labour (2004) of the Ministry of Social Affairs, Labor, Vocational Training and Youth Rehabilitation that defines minors as individuals below 18 years of age.		
		Law on the Prevention of Domestic Violence and the Protection of Victims (2005) establishes the legal mechanisms in preventing domestic violence and protecting victims and assigns "legal qualification as the judiciary police and can act as the complaining party instead of the victims" to the Ministry of Women's Affairs. The scope of the law includes domestic violence and acts affecting life, physical integrity, torture, and sexual aggression, towards husband or wife, dependents, and any persons living under a single roof and who are dependent of the households. The law sets out the intervening measures by commune authorities, municipal administrators, and courts for cases of domestic violence		

3 PROJECT DESCRIPTION OF THE POTENTIAL SOLID WASTE AND PLASTIC INFRASTRUCTURE

3.1 OVERVIEW OF THE SOLID WASTE AND PLASTIC TECHNICAL ASSISTANCE AND INFRASTRUCTURE INVESTMENTS PROJECT ACTIVITIES IN SIEM REAP

Maximizing the use of financial resources through the most impactful means while considering environmental and operational financial sustainability is essential due to the challenges faced in financing. Investment financing through Component 3 and the technical assistance package through Component 2 will both be received by the municipalities selected in this project. The World Bank has adopted this process to increase quality and sustainability of investments that may include lower costs for facilities and equipment for solid waste collection, transport, treatment, and disposal.

Component 2 is for municipalities/districts that meet the agreed eligibility criteria. It will support the participating municipalities in the following areas: waste and plastic management planning; establishment of waste information system; operational management support; support cities to identify and prepare targeted investments and to improve the performance of private solid waste collection services andincrease financial stability of SWM through sub-national administration regulations and waste fees. Public awareness and citizen engagement activities will focus on (plastic) waste reduction and will also include training to make sure the use of participatory techniques for community engagement plus measures for the re-employment and development of alternative livelihoods for waste-pickers working in some of the project locations. Local governments will be given the assistance required through transaction advisory services in order for them to define parameters in waste collection contracts, set standards for waste-related fee collections, and proper monitoring and implementation of mechanisms through the course of this project. The proposed technical assistance activities require no civil construction works.

Infrastructure activities under the project Component 3 with potential environmental and social impacts include construction of solid waste and plastic management infrastructure and equipment for proper collection, transfer, treatment/recycling, and disposal of solid wastes and plastics, including landfills, transfer stations, and intermediate waste treatment facilities such as material recovery facilities and composting facilities, including potential access roads as well as remediation of contamination of closed existing dumpsites or rehabilitation and extension of existing dumpsites into sanitary landfills with applicable environmental and social management measures.

Key activities and related risks during construction and operations are outlined in the following sub-chapters. Building on this overview, detailed assessments including mitigation measures are provided in subsequent Chapter 4.

3.1.1 Development of Landfills

The current state of the landfills being open dumpsites, with hazardous and toxic wastes disposed at these sites causing damage to the surface water and groundwater, poses several significant health risks to the nearby environment and affected communities. Due to the lack of safety standards and lack of acceptance criteria for municipal waste only at these open dumpsites, landfill fires and air pollution from the disposal and burning of hazardous chemicals and wastes are imminent. Waste treatment investment and acceptance procedures are crucial in order to avoid failure to mitigate these risks. Rehabilitation of existing dumpsites into sanitary landfills or construction of new landfills under the project financing will help in mitigating these risks as well as provide enough capacity for ten (10) years of operation and future expansion will further extend the landfill to 20 years of operation.

The direction towards constructing regional landfill sites has been in discussion between the World Bank and the Royal Government of Cambodia (RGC). This would eliminate multiple landfills and dumpsites and would create a regional facility for a larger service area where advancements to waste treatment technology and application of efficient processes and procedures are given primary focus.

Included in the investments to the landfills are the following infrastructure:

a. Landfill cells and extension area with sufficient capacity for a 10-year to 20-year lifespan, given potential expansion
b. Bottom sealing system
c. Internal road network
d. Leachate capture and recirculation/treatment system
e. Landfill gas capture system
f. Entrance and general administration
g. Weighbridge
h. Garage and workshop

3.1.2 Material Recovery Facility, Transfer Stations and Composting Plants

These facilities will serve the following purposes:

a. Recovery and reuse of recyclable materials
b. Generation and continuation of waste-based livelihoods
c. Reduction in volume of waste being disposed in landfills
d. Reduction in greenhouse gas (GHG) generation

Recyclables are sorted at a transfer station, where these may be transferred to off-takers so that disposal sites will only receive non-recoverable wastes. Waste-pickers will be integrated in the material recovery facility to continue to have access to the recyclables through the construction of a safe materials recovery facility (MRF) that will provide waste-pickers safer working conditions and will prevent them from potential health risks.

Recyclable materials that may be sorted and recovered include the following:

a. Cardboard
b. Paper
c. PET bottles
d. Plastics
e. Glass
f. Nonferrous materials
g. Rubber/leather

h. Wood
i. Aluminum can
j. Other materials

Sortation will depend on the quantity, particle size, and presence of impurities of these materials. Recovered materials will be sent to recycling facilities and the rest will be sent for final disposal at the landfill.

Composting plants will also serve to help in reducing waste volume and GHG emissions and create waste-based livelihoods and the production of compost for parks, gardens, and cover for landfills and depending on the quality potentially agriculture.

Though the project will reduce pollution and protect and improve the environment and corresponding health and safety of neighboring communities, it is possible that potential environmental and social impacts and risks may still come out with varying degrees during the specific activities of the project. Below, an overview of potential impacts is provided, which provides the basis for detailed impacts assessment and identification of mitigation measures under Chapter 4.

3.2 POTENTIAL ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS

3.2.1 Potential Environmental Risks and Impacts

Construction:

For solid waste sorting and transfer stations, at the construction stage there are risks of damages and disturbances to surface vegetation, as well, due to construction wastewater, dust, noise and solid waste. There are also safety and health risks of the construction workers, including the risk of COVID-19.

The closure and rehabilitation of the existing dumpsites as well as the construction process for new landfills and treatment facilities such as composting and material recovery facilities can cause direct environmental impacts. Anticipated adverse impacts include: (i) proliferation of flies, rodents and other disease-carrying vectors, if adequate mitigation is not identified for dumpsite closure; impacts on flora and fauna, loss of habitat, impact on cultural resources, etc., which might occur due to improper site selection and will be determined by the environmental sensitivity of selected site; (ii) air and noise pollution from earthworks and movement of materials and heavy equipment; (iii) soil and water resources pollution due to accidental spillage of oil and other lubricants from using and washing of construction equipment and discharge of domestic sewage at construction camps; (iv) destruction and disturbance of surface vegetation and/or river water bodies during the construction period; (v) accumulation of construction wastes; and, (vi) failure to ensure occupational health and safety of workers (including the public health risk of spreading infections due to COVID-19); and, (vii) the risks of material transportation and mechanical operation to the personal safety of surrounding communities.

Operation:

For the operation of additional collection of solid wastes, the environmental impacts are mostly positive as wastes currently not being collected will be collected. There are no related

construction activities. The operation of waste collection and vehicles has no difference from conventional vehicles and environmental risk rating is low.

For the operation of sorting and transfer stations, there is the risk of discharge of wastewater, noise and solid waste. There can also be safety and occupational health risks of waste workers, including high temperature, falling, safety of machine operation, and minor risk to exposure to hazardous waste, and risk of breathing harmful gases (hazardous will not be collected as part of municipal waste collection contracts and acceptance criteria will be included as part of the management and operation contracts for the landfill which will not include hazardous and medical waste)

The operation of the solid waste management facilities constructed (landfill, composting and material recovery facilities) or rehabilitated under the project may cause several environmental impacts which might be associated with: (i) generation of leachate, landfill gas, litter and dust, which might bring about the local proliferation of flies, rodents and other disease-carrying vectors; (ii) inadequate closure of dumps could lead to uncontrolled emission of waste gases, waste burning, and the exposure of deposited waste to the atmosphere and affect air quality; (iii) poor leachate control in both closed and new waste management facilities, which could adversely impact groundwater and surface water resources and pose a human health hazard (via contaminated drinking water); (iv) poorly executed waste cover, which could contribute to the spread of pests and disease-carrying vectors; (v) improper occupational health and safety systems, which might cause risks to safety and health of operators/workers and neighboring communities (vi) malfunctioning of equipment and associated OHS risks; (vii) the traffic interference of vehicles and improper roadway safety, which might cause risks to surrounding communities, and the risks caused by accidents and waste trucks through residential areas and risks of waste spillage; and (viii) inefficient use of energy and other resources, greenhouse gas emission, etc.

3.2.2 Potential Social Risks and Impacts

Potential social risks and impacts for this project include:

(i) **Pre-Construction -** Potential conflict among communities - Communities may disagree to the closing and rehabilitation of existing dumpsites or rehabiliation and extension of existing dumpites located close to them. They may also disagree with a planned construction of a new landfill, especially if it will be located close to them.

(ii) **Construction -** Possible resistance among waste-pickers – Despite its good intentions and anticipated positive impacts, some waste-pickers may consider the project as a threat to their current source of livelihood. They may think that the project will limit their activities or, worse, prevent them from continuing with their current activities. Waste-pickers are also considered non-legal workers.

(iii) **Construction and Operation** - Physical and economic displacement from land acquisition and/or imposition of restrictions on land use/access to waste resources – Physical displacement refers to loss of residential land or shelter and/or relocation, while economic displacement pertains to loss of land, assets, or access to waste resources, leading to loss of income sources or other means of livelihood.[10] The project may require the acquisition of land

[10] Definition lifted from ESS5.

or cause to impose restrictions on the use of or access to land or waste resources, causing temporary or permanent economic displacement to specific stakeholders. Closing of an existing dumpsite may also cause economic displacement due to restriction of access to waste resources at that locatoin.

(iv) **Risk of further marginalization of vulnerable groups** – Physical and economic displacement resulting from the project may further marginalize vulnerable sectors. Hiring processes/policies may not be fair and inclusive, creating bias against vulnerable groups, such as women or other adults with limited educational background. Workplace conditions may not be compliant with local laws and policies, as well as with international standards. Women, children, and the elderly, most especially, may be forced to work or continue with waste picking under unsafe work environment or arrangement,

(v) **Improper management of negative environmental impacts from the project's construction and operation phases** – Activities during the project's construction and operation phases are not expected to result to adverse impacts to the environment, but may pose risks to the health and safety of workers and neighboring community members alike.

(vi) **Competition over local utilities, services, and resources** - The influx of workers and other individuals seeking to benefit from the potential economic gains from the project may strain the current resources of the host municipalities. The influx of individuals may also cause competition over basic facilities and services as well as sexual exploitation abuse and sexual harassment (SEA/SH) because of labor influx. There can also be a risk for Indigenous Peoples with influx of local and migrant workers.

(vii) **Potential risk of weak public participation and public information disclosure** – which can lead to waste-pickers and neighboring communities insufficiently informed about the Project, the options for landfill locations being assessed and suitability of different sites and environmental and social mitigation measures of sanitary landfills.

3.3 OVERVIEW OF PROJECT INFRASTRUCTURE LOCATION OPTIONS IN SIEM REAP

3.3.1 Overview of Solid Waste Management in Siem Reap Province

Waste Generation

Solid waste management in Siem Reap is managed and operated by a private company, GAEA, under a 50-year contract with the Municipality of Siem Reap and Siem Reap Province and by CINTRI. Municipal solid waste is collected, transported and disposed at the open dumpsite in Anlong Pir Village, Trapeang Thom commune, Bakong District, Siem Reap Province.

Municipal solid waste (MSW) in Siem Reap is generated from various sources which contain some hazardous items from household waste collection, such as paints, batteries etc. In general, waste generation is increasing year by year. However, due to the COVID-19 pandemic, the amount of waste has decreased as most daily activities have been hampered. In terms of collection, Siem Reap has a lower collection rate relative to Phnom Penh. **Table 3.3-1** shows the percentage of household waste collection rate in 2020 which is roughly around 36% (MOP, 2019).

Table 3.3-1: Waste Collection in Siem Reap (2020)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Ton per Month	7,655	7,240	6,635	5,090	5,062	5,060	5,351	5,372	5,370	5,427	5,642
Ton per Day	247	250	214	170	163	169	173	173	179	175	182

Based on 2019 survey, there are 1,006,512 people living in Siem Reap. The average urban waste generation in the country is estimated at 0.61 kilograms per person per day, resulting in a waste generation of around 600 tons of waste per day that has been produced in Siem Reap in 2019.

The private company GAEA collects between 240 to 270 tons per day, recording a steady growth of 3% waste annually. Thus, waste collection is only at around 45%, with the majority of the remaining waste being illegally dumped or burned.

The domestic waste classification in Siem Reap is as follows:

- Organic Waste - 40%
- Paper/Card Board - 4%
- Plastic - 9%
- Glass - 9%
- Others - 38%

The main types of waste generator are restaurants (26%), hotels (23.1%), households (22.9%), markets (8.4%), guest houses (7.8%), small services (3.6%), handicraft producers (1.9%), food shops (1.7%), clinics (0.8%), companies (0.7%), KTV (0.7%), supermarkets (0.6%), street sweeping waste (0.5%), hospitals (0.4%), clubs (0.4%), banks and microfinance institutions (0.3%), and night markets (0.2%).

Waste Management and Disposal

There are three (3) private contractors present in Siem Reap that provide solid waste management (SWM) services: GAEA Company, VGREEN, and CINTRI.

GAEA is the private entity contracted by the local government for the collection, transport, and disposal of solid waste within Siem Reap City. Their waste collection covers households and establishments, along with street waste sweeping along main roads and commercial areas. About one third (36.2%) of Siem Reap City is within the solid waste service area of GAEA (MOP, 2019). Their agreement is a long-term service contract from 2007 to 2057. This agreement, however, does not cover the landfill operations.

On the other hand, a different service provider collects waste in the tourist areas in Siem Reap. VGREEN is responsible for collecting and transporting waste coming from the Angkor areas.

CINTRI, another private solid waste company, has been operating informally since mid-2019, providing waste management services to Dam Dek Market on the outskirts of Siem Reap City and transporting it to the allocated open dumpsite.

Siem Reap has one landfill located 30 km east of the city centre and is directly accessed by earth road, about 0.7 km from National Road No. 6 (NR6). The site is constructed and operated as an open dumpsite, without adequate measures to address environmental and social impacts. The site is reaching capacity limits but land for extension is in principle available.

3.3.2 Landfill site suitability assessment process

The key mitigation measures toward identified potential risks outlined in Chapter 4 and Chapter 5 is to carry out a thorough site suitability assessment process. This will ensure that every advantage and disadvantage of the sites are considered prior, and consultations held prior to the selection of a site for a construction stage of the project. These include factors in environmental and social aspects and potential ownership factors. Landfill management and operation is foreseen to be continued by private waste companies, based on inclusion of performance and monitoring indicators in the landfill management and operation contracts and corresponding payments. Each site is verified to fill the criteria from the Ministry of Environment (MOE) and the World Bank Environmental, Health, and Safety (EHS) Guidelines for the Waste Management Facilities.

A shortlist of two to three suitable sites developed by key government stakeholders is to undergo detailed site assessment, with one potential site selected for a detailed suitability assessment. **Table 3.3-2** shows the landfill site suitability assessment process. A conceptual landfill design and detailed cost estimates are developed for the site with the highest potential based on the selection process that is identified as the most suitable and cost-efficient in waste management. In a phased approach, recovery of costs will be achieved through the development of an operational financial cost recovery plan that details different scenarios and tariff systems. The guiding principle is to have the selected site be able to operate self-sufficiently at the least costs.

Table 3.3-2: Landfill Site Suitability Assessment Process

A. Develop General Site Selection Criteria	General categories include: • Transport Related • Natural Conditions • Land Use and ownership • Public Acceptability • Public Safety • Presence of waste-pickers in existing dumpsites • Environmental Protection
B. Prioritize Criteria	Based on desired landfill service area: • Local Landfill • Regional Landfill
C. Identify Candidate Sites	Long list based on: • Select, high-priority criteria, and • Constraint mapping
D. Evaluate & Rank Long List Sites	Short list based on: • Site inspection, and • Weighted criteria & scoring scheme
E. Prepare Concept Design & Initial Cost Estimate	Based on: • Topography • Site Development • Phasing, and • Environmental and Social Impacts and costs

F. Prepare Feasibility Study	Including: • Work program • Cash flow forecast • Preliminary environmental and social impacts/P-ESIA
G. Final Site Selection	Decision based on meaningful consultations and engagement with neighboring communities, with commitment to develop preferred site

The site screening process for each city is based on a two (2)-stage approach: (i) preparation of a modelling and negative mapping process and (ii) a series of site visits to ground-truth data and gather new information from walk-over surveys.

The modelling, negative mapping and site investigations were guided by the Cambodian Guidelines on Selection of Landfill Sites (2016) and the World Bank Landfill Siting Criteria.

A multi-criteria decision-making model was developed through the ArcGIS software with the use of an Analytical Hierarchy Process (AHP) incorporating more than 25 landfill site suitability screening criteria. The output of the model is a visual map of each city with colored suitability banding in four (4) categories: Restricted, Least Suitable, Suitable, and Most Suitable. Twenty-four (24) screening criteria were used in the model which are broadly divided into five (5) categories:

6. Transport (including distance from service area and access road conditions)
7. Physical site conditions for landfill development (Geotechnical/hydrological/ hydrogeological)
8. Current land use, ownership and development zoning
9. Social impacts, safety and acceptability
10. Environmental and cultural heritage

The full list of the 24 screening criteria is detailed in **Annex A.**

The criteria were run through the following process:

- ***Scoring by ranking***: scoring the identified alternatives/options available for each criterion. The score assigned to each option is the sum of its rankings for each of the applied criteria. Ranking score is normalized to same scale.
- ***Criteria weighting***: consideration is given to the fact that each of the criterion can differ in importance; thus, each is assigned a weighting factor based on its importance.

The output of the model includes a visual map of each city and surrounding area with color-coded Suitability Banding in four categories: **Restricted**, **Less Suitable**, **Suitable**, **Most Suitable.** The result of the negative mapping activity is detailed in **Annex B**.

The site screening process for Siem Reap showed two (2) suitable site options for the location of the landfill including the composting/material recovery facility. The options being considered include (Option 1) the rehabilitation and extension of the existing dumpsite in the Anlong Pir Village and (Option 2) the closure of the Anlong Pir open dumpsite, and construction of an engineered sanitary landfill facility (SLF) nearby the new proposed wastewater treatment plant (WWTP) located close to the Tonle Sap Lake. The site screening process and criteria are also part of the consultation process and updated based on the consultations.

The identified three options, including an Option Zero 'do nothing', are presented below.

3.3.3 Option Zero: Do Nothing

The existing dumpsite is situated in Anlong Pir Village, Trapeang Thom Commune, Prasat Bakong District, Siem Reap Province, and occupies a series of worked out quarries across an area of approximately 8 hectares. The site itself is bordered to the east and south primarily by agricultural fields, with the north and west bordered by Anlong Pir Village.

Figure 3.3-1: Existing Dumpsite in Anlong Pir Village, Trapeang Thom Commune

This waste disposal facility has been operating for more than ten (10) years, with the approximate volume of waste remaining within the facility in the order of ~1,000,000 cu.m. There are no engineered cells, with waste simply being placed in former borrow pits without any containment layer liner and no formal leachate collection or treatment systems. Environmental controls either within the site or outside the boundaries appear to be extremely limited.

Around 250 to 300 tons of waste per day are disposed in the existing dumpsite with a reported collection rate of 76%. The land area of the dumpsite measures at approximately 8 hectares, with a 500-m laterite access road from NR 6. The profile of the dumpsite is summarized in **Table 3.3-3**. It is about 18 kilometers from the Siem Reap municipal center.

The dumpsite is owned, managed and operated by private company (waste collector) but controlled, monitored and technical aspects by the municipality of Siem Reap and Provincial Department of Environment (PDOE) of Siem Reap. A separate dumpsite is owned, managed and operated by a second private company.

Table 3.3-3: Profile of the Existing Dumpsite in Anlong Pir Village, Trapeang Thom Commune

Characteristics	Description
Location	Anlong Pir Village, Trapeang Thom Commune, Prasat Bakong District, Siem Reap Province
Land Property	Private

Characteristics	Description
Size	About 8 hectares
Access	500 meters from NR 6, with laterite road, about 5-6m width and prone to floods
Electricity	Yes
Water Use	Groundwater
Waste Generation[11] (tons/day)	~330
Waste collection (tons/day)	250
Operation and management	GAEA (waste collector)
Approx. number of waste-pickers	273 persons (98 male, 175 female)
Number of children	15 children (orphaned); 43 (with families)
Description of Vicinity	The dumpsite is surrounded by rice fields, residential area and land developments. Rice fields are left without cultivation due to the issues with the dumpsite

Separation distances between active areas of the landfill and leachate ponds with the surrounding residential areas are minimal, particularly in the north-western edges, where dwellings within Anlung Village directly abut leachate ponds. There are approximately 273 waste pickers working on the site, most of whom are assumed to live within Anlong Pir Village and other surrounding villages (e.g. Phnom Dei, Suong, Rokakambot and Lovea Villages) given the relatively small number of housing structures on the landfill itself.

The existing dump site at Anlong Pir Village is currently operating as an open dump. Under a 'Do Nothing' scenario, the Anlong Pir Village dump site will continue to pose a significant environmental, social and public health risk to workers, the surrounding community and the environment. The existing dumpsite is around 200-300 meters away from the closest residential structures, the current existing open leachate pond is even closer. Greenhouse gas will continue to be emitted uncontrolled; uncontrolled leachate discharge will continue; and odour, wind-blown waste and disease vectors (rats, flies, etc.) will continue to affect workers, waste pickers and the surrounding community. The trends, options for improvement of solid waste and plastic management and accompanying risks, opportunities and mitigation measures are outlined below for the two options identified.

3.3.4 Option 1 – Rehabilitation and Extension of Existing Dumpsite near Anlong Pir Village, Trapeang Thom Commune

Under this option, the current dumpsite would be rehabilitated and expanded with the construction of new cells and related landfill infrastructure (as outlined in Chapter 3.1) on land of existing site gained through rehabilitation as well as on adjacent (agricultural) land. This option means to rehabilitate existing waste dumpsite, introduce leachate collection system; construct leachate treatment, landfill gas treatment/utilization, sorting, composting

[11] Prior to the occurrence of COVID-19, about 500 tons of waste are generated daily.

and other infrastructure by reshaping and stabilizing the existing waste mass and extend the landfill area away from the villages.

The existing dumpsite will need to be rehabilitated regardless of whether it is closed (under Option 2, below) or extended for landfill use to prevent further environmental impact. By landfill extension of the current site, cost savings would be made through shared site management systems (leachate treatment system, access control, cell extension). Through various design and mitigation measures the current situation, environmental pollution and risks for surrounding communities would be strongly improved.

Extension of the current site has been assessed as in principle feasible, most notably to the East and South of the current site. This land is currently used as agricultural land but likely impacted already from pollution of the current site and possibly to also integrate with the further dumpsite operation. No residential structures are not identified until now, but a detailed census would be required in case of acceptance of this option. New potential extension areas to the South-East would also put the site further away, to around 400-1000+ meters, from the residential areas of the nearby Anlong Pir village to the North-West of the current site. The open leachate pond close to residential structure would be remediated. Detailed assessments will be needed for specific land area required in a detailed design and site specific Environmental and Social Impact Assessment following agreement and completion of landfill site selection process. Option 2 – Closure of Anlong Pir Dumpsite and a New Landfill option in Trapeang Tim Village, Kandaek Commune

Option 2 is the closure of the existing dumpsite at Anlong Pir and development of a new greenfield site at Trapeang Tim Village, Kandaek Commune, within the Prasat Bakong district of Siem Reap Province.

The existing dumpsite will need to be closed or integrated in the new sanitary landfills to prevent further adverse environmental impacts and because without closing the existing dumpsite, a new landfill with gate fee will not receive any waste for disposal if an open dump is still around for free. If the closing of the current dumpsite is financed by GOC, it would still be considered as an associated facility to the Project and required adherence to the WB ESF[12]. The closing of the existing dumpsite by government funds is considered as an associated facility based on the WB ESF, paragraph 11:

> *"For the purpose of this Policy, the term "Associated Facilities" means facilities or activities that are not funded as part of the project and, in the judgment of the Bank, are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist."*

The site under Option 2 would be close to a proposed Wastewater Treatment Plant and near Tonle Sap Lake, approximately 11 kilometers to the south, south-east of Siem Reap City center. The site Option 2 location is a greenfield site which is adjacent to the proposed wastewater

[12] Financing for the clean-up costs and rehabilitation for the closure of the existing dumpsites is included in the Project financing. At some point in time during the WB project will the day to day operation of the dumpsite become subject to ESF requirements and this will be explicitly established in the detailed design and accompanying site specific Environmental and Social Impact Assessment

treatment plant (WWTP). It is surrounded by scrubland and agricultural land, specifically rice farming, and informal community fishing ponds[13]. and possibly a fishery conservation zone.

The local authority confirmed that Kandaek Fishing Community is officially registered with the Ministry of Agriculture, Forestry and Fisheries.

It is within a low-lying area with a suspected high groundwater table and prone to both localized and wide-spread flooding. There is a flood mitigation bund immediately bordering the south of the site which was constructed during historical Khmer Kingdom periods and designed to prevent the seasonal flooding from the Tonle Sap Lake. To the north, the land is zoned for high value residential development, with construction already commencing approximately 2 kilometers to the north. Siem Reap government is planning to build a ring road along the flood bund borders to the South. There are rapid urban development projects underway with land subdivision, and city development plans show that the entire area up to the planned ring road is zoned for mixed commercial and residential development. Tonle Sap is situated to the south of the site and is a UNESCO biodiversity reserve.

Characteristics	Description
Location	Trapeang Tim Village, Kon Dek Commune, Prasat Bakong District, Siem Reap Province
Land Property	State-owned
Size (ha)	TBD-but can be 50ha and extend up to 100ha
Access	Located in the same property of the proposed wastewater treatment plant-laterite road
Electricity	Close to power station
Water Use	Close to Tonle sap
Description of Vicinity	Located in a lowland area adjacent to the Tonle Sap Lake, a protected area, and surrounded by a fishing community

Figure 3.3-2: Profile of the Sanitary Landfill Site option 2 in Trapeang Tim Village, Kandaek Commune

[13] The fishing community (Kandaek Fishing Community) has been confirmed by the local authority to be officially registered at the Ministry of agriculture, Forestry and Fisheries.

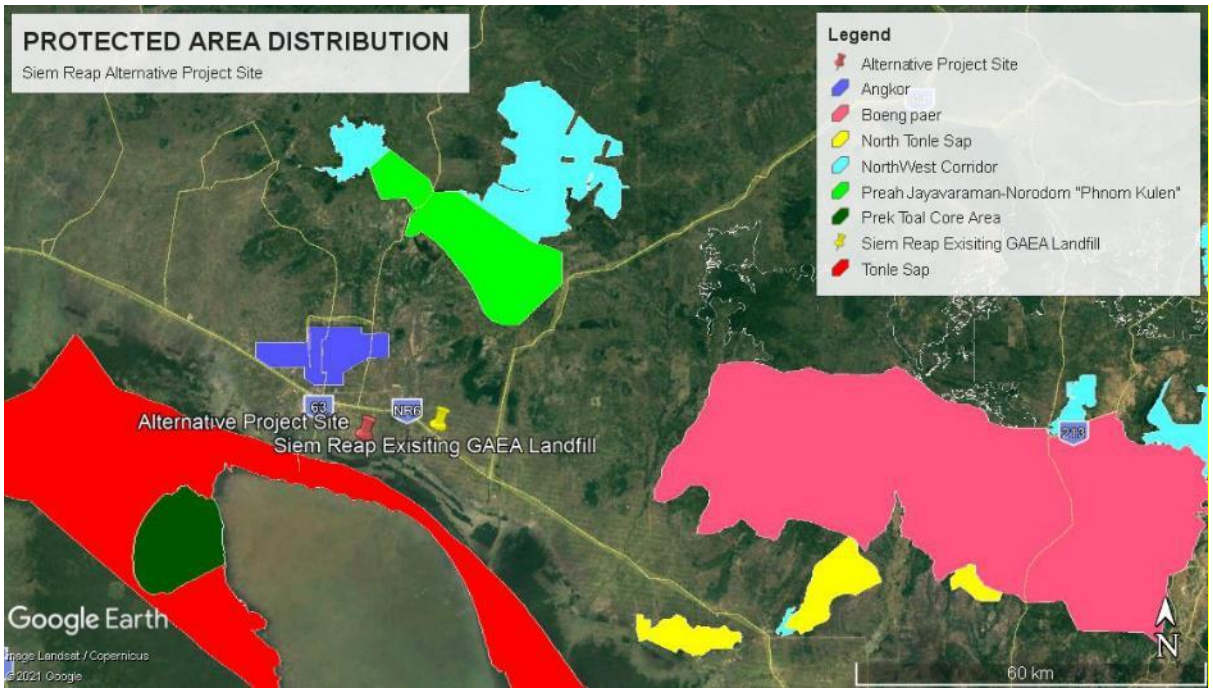


Figure 3: Landill Site option 2 (Red) Adjacent to UNESCO Biodiversity Reserve

4 PRELIMINARY ENVIRONMENTAL AND SOCIAL ASSESSMENT

4.1 PRELIMINARY ENVIRONMENTAL ASSESSMENT

4.1.1 Environmental Standards

Table 4.1-1: Key National Environmental Standards

Environmental Media	National Standard	International Standard
Ambient air quality	**Sub-decree on Control of Air Pollution and Noise Disturbance, 2000** Annex 3, Ambient Air Quality Standard	World Health Organization (WHO) Air Quality Guidelines, global update 2005
Noise	**Sub-decree on Control of Air Pollution and Noise Disturbance, 2000** Annex 4, Max. Standard of Noise Level Allowable in the Public and Residential Areas, of	WHO Guidelines for Community Noise, 1999
Groundwater quality (for drinking)	**Drinking Water Quality Standards, 2004**	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011
Groundwater (ambient)	**Ministry of Handicrafts and Industry Groundwater Quality Standards**	EU Groundwater Directive 2006/118/EC
Surface water quality	**Sub-decree on Water Pollution Control, 1999** Annex 5, Water Quality Standards for Public Waters for the Purpose of Biodiversity Conservation, and Annex 6, Water Quality Standards for Public Waters and Health	US EPA National Recommended Water Quality Criteria Mekong River Commission: Technical Guidelines for the Protection of Aquatic Life Mekong River Commission Technical Guidelines for the Protection of Human Health
Effluent quality	**Sub-decree on Water Pollution Control, 1999** Annex 7, Effluent standard (Discharged wastewater to public water areas or sewers)	International Finance Corporation-World Bank Group (IFC-WBG) EHS General Guidelines
Leachate management	No specific law, regulation, sub-decree on leachate standards in Cambodia.	IFC-WBG EHS Guidelines for Waste Management Facilities

Leachate Management/Treatment

Since there are no current national standards for leachate treatment in Cambodia, the International Finance Corporation-World Bank Group (IFC-WBG) EHS Guidelines on Waste Management Facilities shall be the basis for leachate management for the project.

Table 4.1-2 lists the recommendations on prevention, minimization, and control of leachate generation in municipal solid waste landfill sites.

Table 4.1-2: EHS Guidelines on Municipal Solid Waste Measures for Leachate Management/Treatment

Landfill Siting
• Must have stable geology • Must avoid being near particularly vulnerable/sensitive ecosystems • Must avoid being near groundwater / surface water resources
Design and Operation
• Must follow existing national requirements and international standards to minimize leachate generation

• Use of low-permeability landfill liners to prevent leachate migration and landfill gas • Use of leachate drainage and collection system • Minimize infiltration by using landfill cover (daily, intermediate, and final) • Minimize the daily exposed portion of the sanitary landfill facility where solid wastes are unloaded • Reduce infiltration of rainfall into deposited waste using perimeter drains and landfill cell compaction, slopes and daily cover materials • Prevent run-on of precipitation into the active area of the landfill by using berms or other diversions[14] • Collect and control run-off from the active area of the landfill[14]
Leachate Treatment
• Must be done onsite and/or discharge to municipal wastewater system • Treatment methods may include aerated lagoons, activated sludge, anaerobic digestion, artificial wetlands, re-circulation, membrane filtration, ozone treatment, peat beds, sand filters, and methane stripping

Groundwater and Leachate Monitoring

Based on the IFC-WBG EHS Guidelines on Waste Management Facilities, **Table 4.1-3** measures have been recommended for groundwater and leachate monitoring:

Table 4.1-3: EHS Guidelines on Municipal Solid Waste Measures for Leachate Monitoring

Groundwater Monitoring Wells
• Must be installed outside the landfill perimeter • Location and depths must be sufficient to evaluate leachate migration from the landfill into the uppermost groundwater unit • Monitoring network must include one (1) monitoring well in the upgradient groundwater flow direction from the landfill and two (2) monitoring wells in the downgradient direction • Must follow existing national requirements and international standards
Sampling

• Measure and record quantity and quality of leachate generated
  o Changes in leachate quantity/quality not attributable to weather or other factors may indicate changes in the liner, leachate collection, or landfill cover systems
• Monitoring wells must be regularly sampled and analyzed for constituents, selected based on:
  o Types, quantities, and concentrations of constituents
  o Mobility, stability, and persistence of waste constituents their reaction products in the unsaturated zone beneath the waste management area
  o Detectability of indicator parameters waste constituents, and reaction products in groundwater
  o Constituent concentrations in the groundwater background

4.1.2 Geography and Topography

Siem Reap is the second largest city which is located on the northwestern part of Cambodia (103° 51' 37.1268'' E and 13° 21' 50.5692'' N), bordered by Oddor Meanchey to the North, Preah Vihear and Kampong Thom to the East, Banteay Meanchey to the West, and Tonle Sap Lake to the south. Spanning a total area of 10,299 square kilometers, Siem Reap Province is comprised of 12 districts, 100 communes, and 875 villages. See **Figure 4.1-1** for the location map.

[14] Systems should be designed to handle the peak discharge from a 25-year storm; Run-off is typically treated with leachate from the site ((IFC-WBG, 2007)

Figure 4.1-1: Administrative Boundaries of the Siem Reap Province

Source: Food Security Atlas in GSID (2013)

The entire country is mostly characterized by low flat plains, with mountains in the north and southwestern part of the country. Its low-lying central plain is surrounded by uplands and low mountains. Forested transitional plains extend outward and rise to elevations of about 200 meters above sea level to the north

The topography of Siem Reap, particularly the southern part consists of typical plain wetland area covered with extensive flooded forests which is part of the Tonle Sap Biosphere Reserve, rice fields and other agricultural plantations. The northern part is an undulating area covered with deep green forests.

The topography within the potential landfill site options is generally flat and is around 10m to 18m above mean sea level (MSL). The water level of Tonle Sap Lake is seasonally fluctuating, and the highest level occurs during the rainy season with around 10.6 meters.

4.1.3 Geology and Soil

Cambodia has few mineral resources, and experienced tectonic activity and low-grade metamorphic rock formation throughout the Paleozoic era. The few rocks that remain are from the Cenozoic, and include bauxite through laterite weathering, in addition to phosphorite, iron, gems, limestone and other minerals.

The geological description of the Siem Reap is consist of alluvium, ancient alluvium and lateritic carapaces and sandstone alluvial deposits and other minor geology, as seen in **Figure 4.1-2**. The underlying geology of the site is not known and will need to be better understood as part of the detailed design and site specific ESIA related to either: (i) closure and rehabilitation planning, or (ii) formalisation and extension into a modern landfill. Given the presence of former borrow pits and quarries across the landscape, it is assumed that its sub-surface geology is comprised of materials other than basic alluvium.

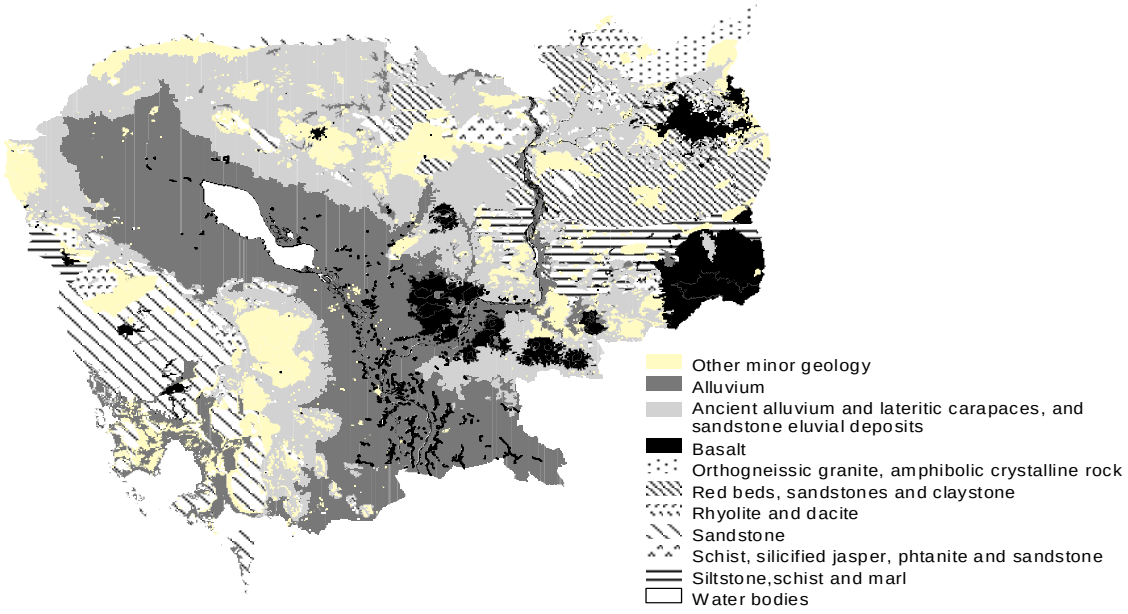


Figure 4.1-2: Geology Map of Cambodia

Source: Mekong River Commission

The soil in Cambodia is mostly clayey loam with some gravel. These soils have a lower degree of acidity. Total nitrogen and humus contents are low. Carbon-Nitrogen (C/N) ratios show a moderate value. Cation-exchange capacity is sufficient or good. The content of exchangeable calcium is normal. The percentage of calcium saturation is slightly low. The content of available calcium is low, available phosphorus and potassium values are much lower. In short, it was seen as a rule that although Cambodian soils have such favorable features as suitable soil classes, weak acidity, moderate C/N ratio and high exchange capacity, they are extremely poor in available plant nutrients.

The areas of Siem Reap is classified as Alluvial Soil from the geological point of view. Alluvial soil is found in large areas of the inland basins of Cambodia, much of which distributes widely along catchment areas of the Mekong River and around the Tonle Sap Lake, and extends far open towards the southern boundary. The soil at the existing site and potential new site

includes clay, silt and sands but detailed assessments will be required during site specific ESIA.

Based on the study conducted by the Ministry of Agriculture, Forestry, and Fisheries (MAFF) in January 2018 regarding the land degradation of Cambodia, it was found out that there are 4.45 million hectares of land under highly erodible class. The causes of soil erosion in Cambodia have been attributed mainly to deforestation, expanding agricultural lands, climate change, pest and diseases, unsustainable land management, and infrastructure development.

Based on the study, Siem Reap Province is not prone to soil erosion. In the areas for potential landfill sites and immediately adjoining areas, erosivity due to surface water flows is likely to be quite low due to the relatively flat nature of the area. However, during fallow periods in the dry season, agricultural lands may be prone to wind-blown driven soil losses.

4.1.4 Land Use, Classification and Ownership

Based on the national development master plan vision, the government designed and developed Siem Reap City as a pole for cultural, historical, and tourism world heritage. The Ministry of Land Management Urban Planning and Construction (MLMUPC) published the Land Use Master Plan 2035 for Siem Reap on 05 September 2018, which serves as a basis for the province's land management and development direction. The land use is defined as two (2) types: (a) land limited for construction; and, (b) land applicable for construction. According to the master plan, the city has a total land area of 44,147 hectares, of which 35,995 hectares are land types limited for construction, and 8,152 hectares are land types applicable for construction. The land limited for construction was established by Royal Decree No. 001 NS dated May 28, 1994, for protected cultural zones in the Siem Reap Angkor region and their management guidelines The Heritage area is under the jurisdiction of the APSARA Authority, the competent body in charge of the management, preservation, and development of Siem Reap-Angkor Sites. The land applicable for construction is the urban area, mostly residential areas are expanding. Areas along the major road are used for small retail shops and/or residential, mixed-use. Especially for the area along the NR6 towards the airport, developments of hotels and tourism facilities such as restaurants, guesthouses and massage shops etc. are ongoing.

See **Figure 4.1-3** for the Land Use Map of Siem Reap.

Land use and ownership in the existing dumpsite includes residential space, agricultural fields (paddy rice field), and commercial space. Land use is undergoing rapid change in the vicinity of Siem Reap, especially along National Road No.6 and in the direction of the Angkor temple complex.

Whereas, land use in the alternative option for sanitary landfill site includes fishing area, paddy rice field, flooded forest and water area. It is located in Tonle Sap Multiple use (Zone II).

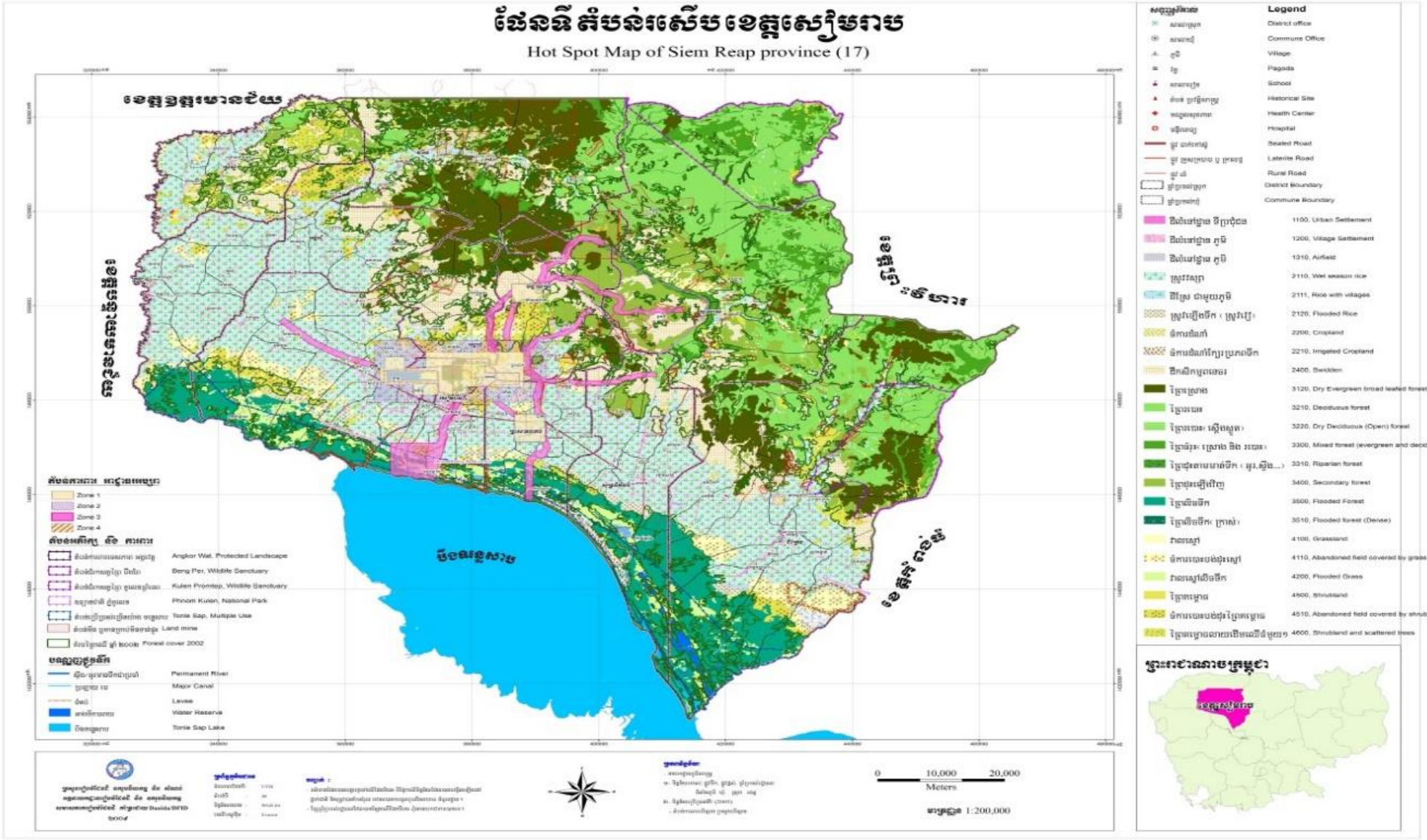


Figure 4.1-3: Land Use Map of Siem Reap Province

(Source: MLMUPC, 2018)

4.1.5 Climate

Temperature and humidity

Cambodia has a climate that is tropical, hot all year round, with a rainy season from May to mid-November (driven by the south-west monsoon) and a dry season from Mid-November to April. Based on the secondary data (i.e., World Weather Online), the province of Siem Reap recorded an average maximum temperature of 38°C, where between the month of March-April is the warmest month in year. The coldest month is December with an average minimum temperature of 20°C. The average humidity ranges from a minimum of 51% to a maximum of 86%, with July to September having the highest humidity levels.

Figure 4.1-4 shows the average temperature at the Prasat Bakong Weather Station.

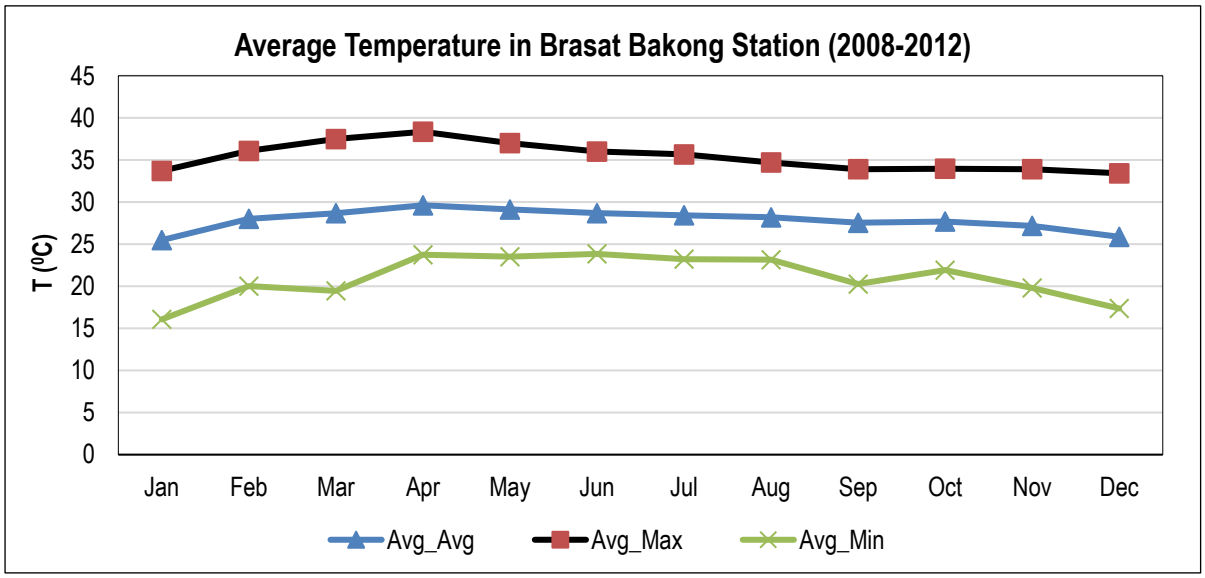


Figure 4.1-4: Monthly Average Temperature in Prasat Bakong Station, Siem Reap Province

Source: Prasat Bakong Station, the Year 2013-2020

The relative humidity is high year-round which the average maximum humidity is about 65-80%, and the average minimum humidity is about 40-60%. Maximum humidity in excess of 80%. During the dry season, daytime humidity averages 50% climbing to about 90% during the rainy season. **Figure 4.1-5** shows the average relative humidity at the Prasat Bakong weather station.

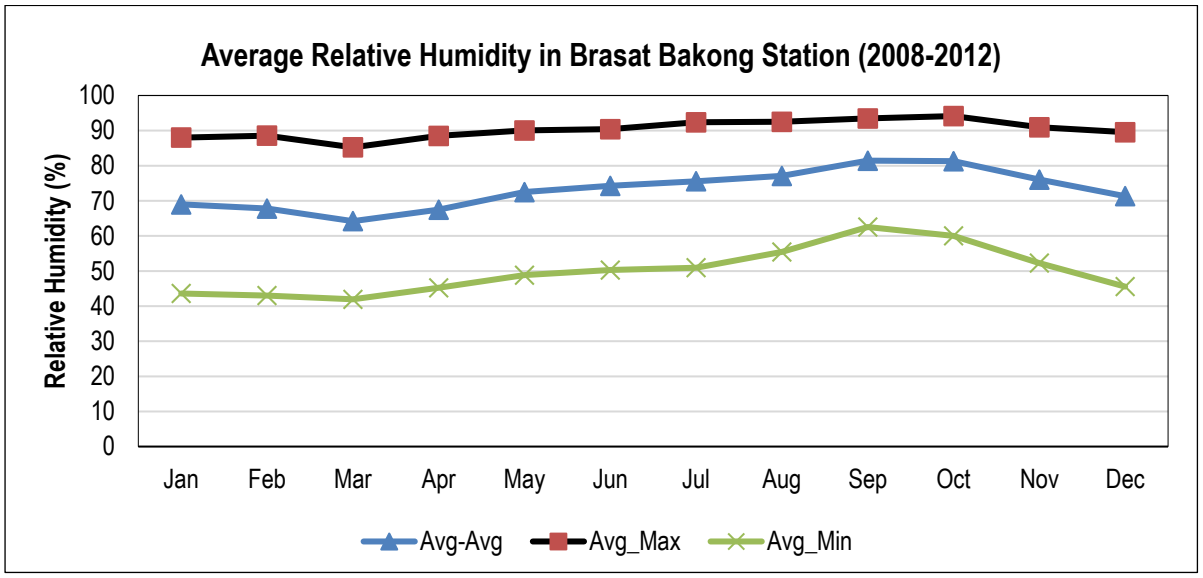


Figure 4.1-5: Monthly Average Relative Humidity in Prasat Bakong Station, Siem Reap Province

Source: Prasat Bakong Station, the Year 2013-2020

Rainfall

Within a typical year, the rainfall within inland areas of Cambodia ranges between 1,300mm and 1,800mm. The climate is slightly cooler in highland areas where remain covered by forests protected within nature reserves. These areas also receive much higher levels of rain of up to 5,000mm per year.

Siem Reap Province has distinct wet and dry seasons. The wet season will typically start in May and end in October, with the wind direction predominately from the south-west and driven by monsoons. The dry season is from November to April, with wind typically from the south-east or north-east directions. The average annual rainfall is 1,400mm, 95% of which is experienced during the wet season.

The annual average rainfall spatially distributed in the subproject area ranges from 1,000 mm to 1,800 mm during 8 years. **Figure 4.1-6** shows the annual and monthly rainfall in Prasat Bakong station, Siem Reap Province.

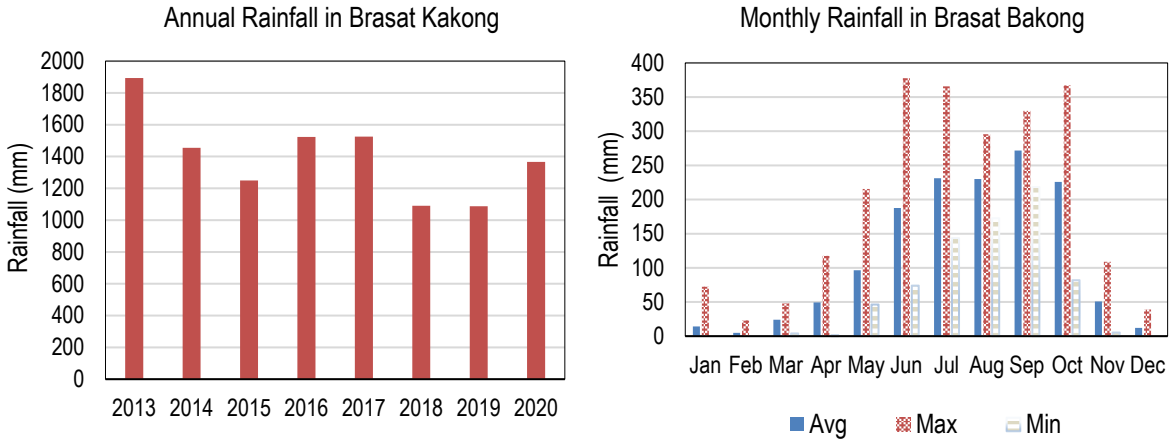


Figure 4.1-6: Annual and Monthly Average Rainfall in Prasat Bakong Station, Siem Reap Province

Source: Prasat Bakong Station, Year 2013-2020

4.1.6 Hydrology

The hydrological availability of the following three (3) surface water sources for the Siem Reap Region was investigated:

1. Siem Reap River;
2. West Baray; and
3. Lake Tonle Sap.

The Siem Reap River is the only permanent stream in the Siem Reap region. The watershed of the river is a part of Lake Tonle Sap. The river's watershed is approximately 670 sq.km. rising in the Kulen Mountains at an elevation of 487 meters, flows through alluvial fans to the Siem Reap City, and finally pours into the Lake Tonle Sap near Phnom Krom. The river's total length is about 80 kilometers with an average slope of 1/2,000 in the lower reaches of the Angkor Heritage Area. The watershed consists mainly of forests and agricultural areas, which could have been a former lake bottom. The river is used for paddy irrigation during the dry season above the Tonle Sap's inundated floodplain.

Previously the Angkor community had three (3) main reservoirs: North Baray, East Baray, and West Baray. West Baray is the only reservoir still in use; it has been fed by water from Siem Reap River and by rainfall. West Baray is around 12 kilometers Northwest of Siem Reap City. The water levels within West Baray reflect the seasonal distribution of rainfall. The average monthly water level of the Baray fluctuates over 3 meters range between the average in dry season minimum in May, which a volume of approximately 15.38 MCM. The maximum capacity is approximately 48.6 MCM in November. The water depth in the wet season can be up to 5.7 meters. Suryavarman-I constructed it in the 11th century for irrigation, drinking, bathing, and cattle feeding. It is approximately 8 kilometers long from east to west and 2 kilometers wide from north to south. The reservoir is currently used exclusively as an irrigation water source.

The Tonle Sap Lake of Cambodia is the largest freshwater body of Southeast Asia, forming an important part of the Mekong River system. Tonle Sap Lake is about 15 kilometers south of

Siem Reap City. The catchment size includes the permanent lake area of around 2,400 sq.km., being the area of the lake–floodplain system during the driest month with water level of 1.44 meters. The average maximum floodplain size is 10,800 sq.km. (excluding the permanent lake area) with a water level of 9.1 meters. The volume varies from 1.8 cubic kilometers in April to 73.9 cubic kilometers during the peak water level in October. Tonle Sap Lake represents one of the world's richest wetland ecosystems, providing a robust resource base for the economy and people's livelihood for centuries. The unique hydrological regime of the Tonle Sap and the Mekong plays a significant role in perpetuating productive biodiversity, such as fish, wildlife, and forest, and in the present land use pattern diverse cultural landscape.

The hydrological map of the existing dumpsite location and landfill site option 2 is shown in **Figure 4.1-7**.

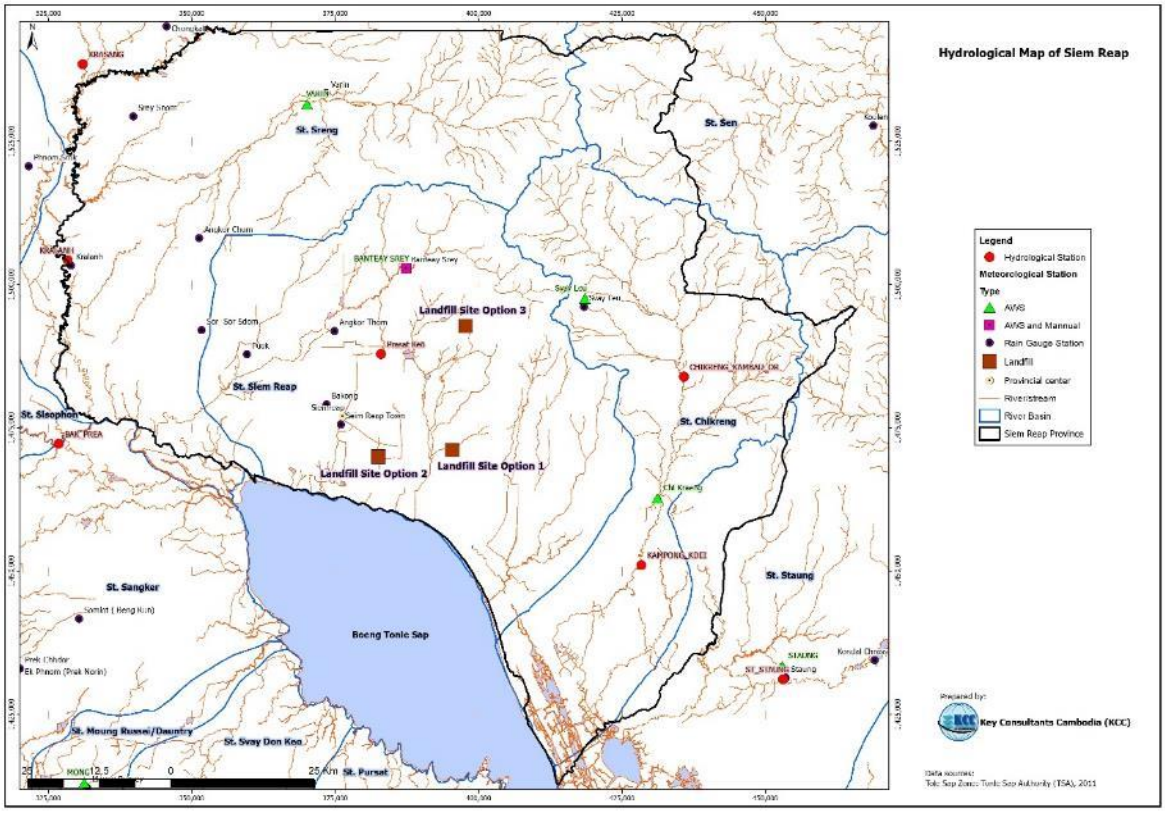


Figure 4.1-7: Hydrological Map of Siem Reap including Option 1 (rehabilitation and extension of existing site) and Option 2 (new landfill site near proposed WWTP plant)

4.1.7 Water Quality

Surface water resources

The existing dumpsite is not close to any natural rivers or surface water bodies. However, there are multiple bodies of water within the existing 8ha site previously worked out soil borrow pit that have been filled with water. In particular, there are areas where leachate is

pooling in open pits, up to 10m deep on the south-eastern edge of the site. In the area surrounding the site, there are multiple surface water bodies that appear to be largely manmade.

As shown below, these include other borrow pits/quarries that have filled with water. Natural water features in the area surrounding the site are limited. Tonle Sap is the nearest large surface water body, occupying a vast low-lying area of the alluvial and lacustrine floodplain in the lower Mekong basin.

The site is situated approximately 13km to north of the established northern shoreline of Tonle Sap and does not appear to be linked by any permanent water course or channel. The site is situated at the extremity of the Tonle Sap floodplain (see below) however overland flows during the rainy season may end within Tonle Sap. Information available to date does not indicate that there are any overflows of the leachate ponds and other surface water features on the site during periods of heavy and prolonged rainfall events during the wet season.

Figure 4.1-8: Surface water features to the north of the site

Information pertaining to water quality of the leachate ponds on the site was not able to be attained. However, due to the complete absence of surface water treatment features on the site, it is anticipated that these water features have particularly poor physical and chemical characteristics. Future evaluations for closure, rehabilitation and/or extension planning will include water quality investigations as part of a site specific ESIA.

Groundwater Resources

Within Siem Reap Province, the groundwater is generally shallow, being approximately 3-5m below the surface. The existing dumpsite site was also observed as having very shallow groundwater, as can be observed from the flooded quarry pits, and from previously presented topographic and groundwater mapping confirming this setting. Groundwater is a major source of drinking water within Cambodia, with estimates of up to 53% of Cambodian

households relying on groundwater sources during the dry season (i.e., by groundwater dug/tube wells or excavated ponds). As of 2011, there was estimated to be 270,000 tube wells with hand pumps used for drinking water. During the site visits, it was observed that the surrounding communities have a strong reliance on groundwater for most of their water supply needs.

The local community has reported their shallow wells as being polluted, with a strong link to the presence of the landfill being the likely cause. This presents a long term environmental and community health matters to better understand during future studies within the detailed design and closure and rehabilitation or rehabilitation/extension planning phases and accompanying site-specific ESIA.

Water sampling

The team was able to perform groundwater and surface water sampling during the visit before the government issued a heightened travel restriction for non-residential of Siem Reap due to the rising of number of COVID-affected persons in the city. The results of the laboratory analysis for the sampling stations for groundwater and surface water are tabulated in the two tables below.

Table 4.1-4: Result of Groundwater Sampling Analysis

No	Parameter	Unit	Option 1: Rehabilitation and extension of existing Dumpsite (Anlong Pir Village)	Option 2: Closing of existing dumpsite and Alternative Landfill (Trapeang Tim Village)	Standard(*)
1	pH (Lab)	-	**5.83**[15]	**5.47**	6.5-8.5
2	Electrical Conductivity (EC)	µs/cm	157.40	57.70	500-1500
3	Total Dissolved Solid (TDS)	mg/l	70	25.00	<800
4	Turbidity	NTU	2.00	2.00	<5.00
5	Total Hardness (as CaCO3)	mg/l	49.00	75.00	<300
6	Chloride (Cl^-)	mg/l	100.00	47.00	<250
7	Fluoride (F^{--})	mg/l	0.25	0.19	<1.5
8	Nitrate (NO3)	mg/l	6.20	4.83	<50
9	Sulphate (SO4)	mg/l	10.00	17.00	<250
10	Aluminum (Al)	mg/l	ND	0.01	<0.2
11	Arsenic (As)	mg/l	0.01	ND	<0.05
12	Cadmium (Cd)	mg/l	ND	ND	<0.003

[15] Red bolded numbers mean outside of the standard.

13	Chromium (Cr-total)	mg/l	0.26	ND	<0.05
14	Iron (Fe-total)	mg/l	0.49	5.42	<0.03
15	Manganese (Mn)	mg/l	0.04	0.18	<0.01
16	Mercury (Hg-total)	mg/l	ND	ND	<0.001
17	Thermotolerant Coliform (E-coli)	MPN/100ml	0	0	0
18	Total Coliform	MPN/100ml	0	0	0

The pH value for the two (2) sites exceeded the government standard due to the slight acidity in groundwater for the two (2) areas. All are within the standards for the other parameters and there are no bacteriological indicators to the samples taken.

Table 4.1-5: Result of Surface Water Sampling Analysis (March 2021)

No	Parameter	Unit	Option 1: Rehabilitation and extension of existing Dumpsite (Anlong Pir Village)		Option 2: Closing of existing dumpsite and alternative landfill (Trapeang Tim Village)		Standard(*)
			Downstream	Upstream	Downstream	Upstream	
1	pH (Lab)	-	7.70	6.85	6.64	6.78	6.5-8.5
2	Dissolved Oxygen (DO)	mg/l	5.80	6.40	4.80	7.80	7.5-2.0
3	Total Dissolved Solid (TDS)	mg/l	27.00	49.00	60.00	19.00	<100
4	Total Suspended Solid (TSS)	mg/l	**86.00**	**24.00**	**280.00**	18.00	1.0-15
5	Biochemical Oxygen Demand (BOD)	mg/l	4.20	8.60	6.40	5.80	<30
6	Chemical Oxygen Demand (COD)	mg/l	**17.00**	**35.00**	**20.00**	**29.00**	1.0-8.0
7	Oli and Grease	mg/l	**5.60**	**10.00**	4.80	**12.00**	<5.0
8	Detergent (MBAS)	mg/l	ND	ND	0.04	0.02	NV
9	Sulphate (SO_4)	mg/l	50.00	8.00	60.00	10.00	<300
10	Total Nitrogen (TN)	mg/l	2.00	1.00	9.00	3.00	0.1-0.6

No	Parameter	Unit	Option 1: Rehabilitation and extension of existing Dumpsite (Anlong Pir Village)		Option 2: Closing of existing dumpsite and alternative landfill (Trapeang Tim Village)		Standard(*)
			Downstream	Upstream	Downstream	Upstream	
11	Total Phosphorus (TP)	mg/l	1.30	0.62	5.13	0.08	0.005-0.05
12	Arsenic (As)	mg/l	ND	ND	ND	0.008	<0.01
13	Cadmium (Cd)	mg/l	ND	ND	ND	ND	<0.001
14	Iron (Fe-Total)	mg/l	**8.47**	**63.05**	**10.73**	1.81	<1.0
15	Lead (Pb)	mg/l	ND	ND	ND	0.006	<0.01
16	Mercury (Total)	mg/l	ND	ND	0.0002	ND	<0.00005
17	Total Coliform	MPN/100ml	210.00	92.00	**11000**	150	<1000

The surface water near the existing dumpsite in Siem Reap found to have poor values in TSS, COD, oil and grease, and iron. This is due to the contamination of the water brought by the animal manure being observed during the sampling. The other parameters are within the effluent standard set by the MOE.

For the Siem Reap River, the parameters exceeded the standards are TSS, COD, TN, Fe-total and total coliform for the upstream portion while COD, oil and grease, and TN for the downstream area. The river is polluted due to the direct discharge of various pollutants such as domestic sewage, commercial waste, agricultural run-off and untreated solid waste. Other parameters are within the effluent standard of the government.

4.1.8 Air Quality

Detailed data for air quality on the site or surrounding areas is not readily available. However, it has been recognised that there is a gradual decline in overall air quality not only due to increasing particulate matters (PM2.5 and PM10), but also acid rain causing materials that have led Siem Reap to have worse overall air quality than Phnom Penh and placing the UNESCO World Heritage site of Angkor Wat at risk of acid rain damage[16]. The air quality and odour within the site and in the immediately surrounding areas is dominated by fugitive emissions (including waste transportation trucks[17] and waste burning) from across the dumpsite, including from the informal leachate ponds.

16 https://web.archive.org/web/20160407052443/http:/www.globalpost.com/dispatch/news/regions/asia-pacific/cambodia/140630/cambodia-toxic-air-threatens-timeless-ruins

17 As part of the detailed design and site-specific ESIA, review of availability of electric garbage trucks and respective costs will be evaluated.

The results of the measurements are tabulated in the table below.

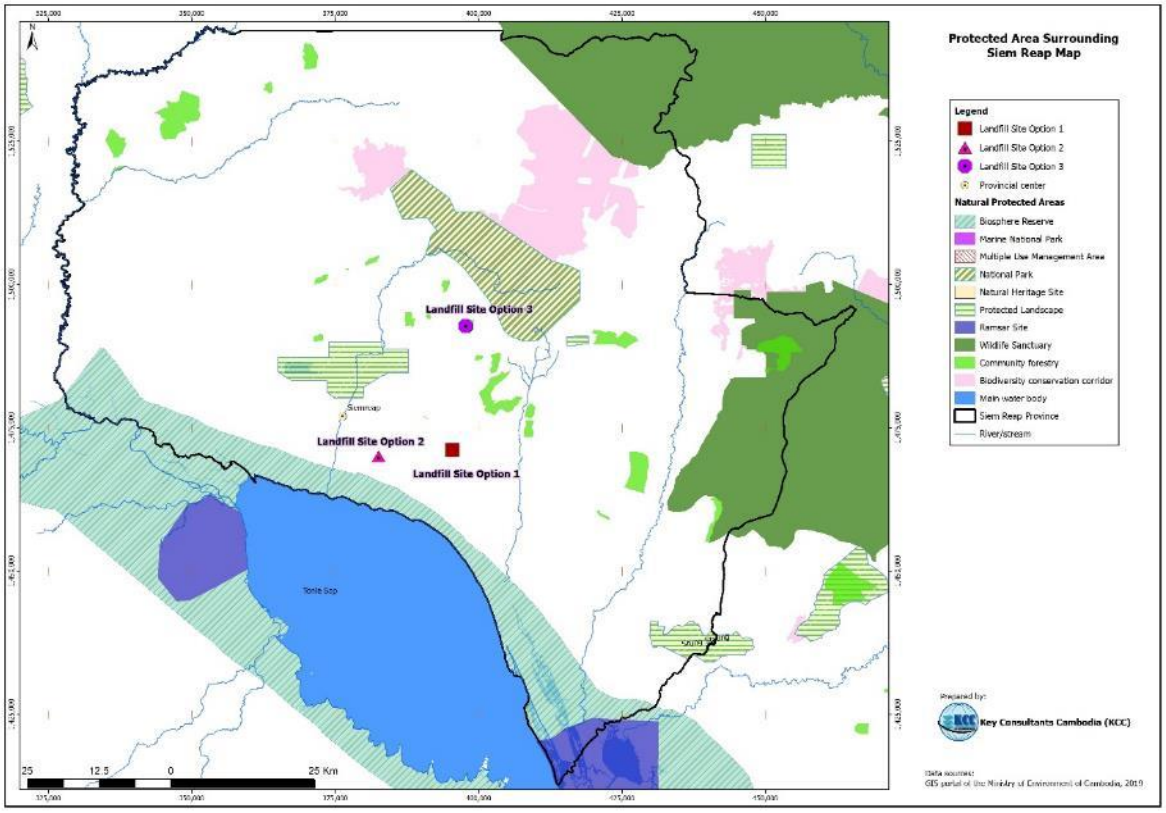
Table 4.1-6: Result of Air Quality Measurements (April 2021)

No	Parameters	Unit	Result		Standard
			Option 1: Rehabilitation and extension of existing Dumpsite (Anlong Pir Village)	Option 2: Closing of existing dumpsite and alternative landfill (Trapeang Tim Village)	
1	Carbon Monoxide (CO)	mg/m^3	1.03	0.27	<20(8 hours)
2	Nitrogen Dioxide (NO_2)	mg/m^3	0.054	0.013	<0.10 (24 hours)
3	Sulfur Dioxide (SO_2)	mg/m^3	0.065	0.012	<0.30 (24 hours)
4	Ozone (O_3)	mg/m^3	0.041	0.011	<0.2(1 hours)
5	Total Suspended Particles (TSP)	mg/m^3	0.065	0.028	<0.33(24 hours)
6	PM_{10}	mg/m^3	0.039	0.015	<0.05(24 hours)
7	$PM_{2.5}$	mg/m^3	0.020	0.008	<0.025(24 hours)
8	Lead (Pb)	mg/m^3	ND	ND	<0.005(24 hours)

Based on the results of the measurements, the measured values are all below the air quality standards of Cambodia (sub-decree No.42 on Air Pollution Control and Noise Disturbance (Jul. 2000), and Prakas No.120 on Stimulation of Term of Reference for Infrastructure and Tourism Project Development Sector (April 2018). The air quality in the area is still in good condition.

4.1.9 Protected and biodiversity areas

Siem Reap is home to significant biodiversity resources. Key Biodiversity Areas (KBA) and National Protected Areas have been analysed, within a 50km radius of the landfill site options, using the Integrated Biodiversity Assessment Tool (IBAT). The IBAT proximity report indicates that there are nine Protected Areas, and four Key Biodiversity Areas (KBA) within this 50km radius, with details for each of these shown within **Appendix H** and their locations in relation to the site shown in the below figure.



Source: IBAT Proximity Report and https://www.protectedplanet.net/

Figure 4.1-9: Protected Area Surrounding Siem Reap Landfill Location options

The existing dumpsite itself is completely modified and has a history of disturbance due to its previous use as a quarry and now as a dumpsite. The immediately adjoining areas are primarily agricultural and residential, with the only stands of vegetation being various trees in the residential areas of Anlung Village.

Referring to the IBAT Proximity Report, approximately 88 threatened species are potentially found within 50 km of the location. The number consists of 24 mammals, 24 birds, 10 reptiles, two insects, 15 freshwater biotas and 13 flora species. The threatened species that are potentially found within 50 km of the location are shown in **Appendix H**.

Phnom Kulen National Park (PKNP) is situated in Siem Reap Province, approximately 50 kilometers north of Siem Reap City and the UNESCO World Heritage Site of Angkor. Tonle Sap Biosphere of Chong Kneas provides access to the Lake and its extensive flooded forests, including Prek Toal Core Area within the Tonle Sap Biosphere Reserve (TSBR). TSBR is about 15 kilometers south of Siem Reap City. Prek Toal Core Area is the largest waterbird colony in South-East Asia. Prek Toal is located on the edge of Tonle Sap Lake. The water body is also under within the statutory framework of the World Network of Biosphere Reserves. Within the TSBR is the Ramsar site of the Boeung Chhmar and Associated River System and

Floodplain. It is covered mostly by freshwater swamp forests and is home to the rare waterbirds in the dry season.

The Law on Natural Protected Areas (2008) was enacted by the National Assembly and was promulgated by Preah Reach Kram/NS/RKM/0208/007. In this law, eight (8) areas have been categorized as protected areas, namely: (a) national park, (b) wildlife sanctuary, (c) protected landscape, (d) multiple use site, (e) Tonle Sap Biosphere Reserve, (f) ramsar site, (g) heritage site, and (h) marine park. The five (5) protected areas located in Siem Reap are categorized in Table 4.1-7 and illustrated in Figure 4.1-8.

Table 4.1-7: List of Protected Areas in Siem Reap

Kind of Protected Areas	Name of Protected Areas	Location of Protected Areas	Size (Hectare)
National Park	Preah Chey Varaman-Norodom "Phnom Kulen"	Siem Reap	37.500
Wildlife Sanctuary	Boeng Per	Kampong Thom, Preah Vihear, Siem Reap	242.500
	Kulen-Prum Tep	Preah Vihear, Siem Reap, & Oddar Meanchey	402.500
Protected Landscape	Angkor	Siem Reap	10.800
Multiple Use Site	Boeng Tonle Sap	Kampong Chhnang, Kampong Thom, Siem Reap, Battambang & Pursat	316. 250

Source: Annex of Law on Natural Protected Areas, 2008

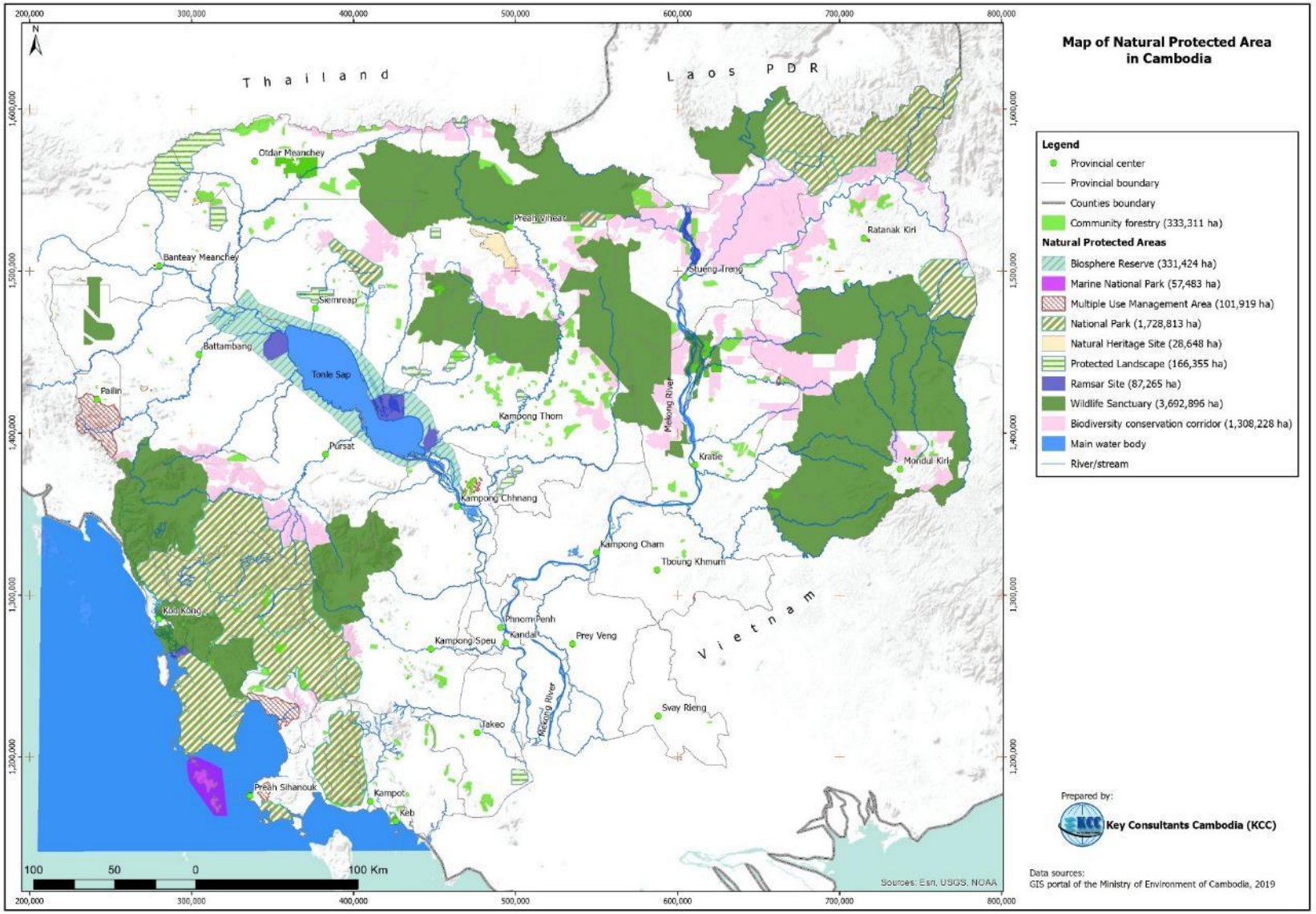


Figure 4.1-10: Map of Protected Areas in Cambodia Map of Protected Areas in Siem Reap

Data Source: MOE, 2008; Map prepared by KCC August 2021

In addition to the above UNESCO biodiversity reserve status, the Tonle Sap reserve is covered under the Cambodian Royal Decree on the Establishment and Management of Tonle Sap Biosphere Reserve (Royal Decree No. NS/RKT/0401/070) 2001. This Decree establishes the Tonle Sap Biosphere Reserve (TSBR) in accordance with the statutory framework of the World Network of Biosphere Reserves. The TSBR is divided into three Zones:

Core Area (Zone 3): Set aside for long term protection, human activity is limited to monitoring and research. Set aside to conserve biodiversity, landscape, ecosystem, including genetic resources, plant, fish and animal species, and restore the biological environment and habitat.

Buffer Zone (Zone 2): Area surrounding the core areas helping to protect the environment. It may accommodate education and training activities, and support sustainable ecological, environmental, economic, social and cultural development.

Transition Area (Zone 1): May contain a variety of agricultural activities and human settlements. Here all stakeholders have to cooperate to achieve sustainable development and conservation at local, national, and international levels.

From the map in Error! Reference source not found. it can be seen that the existing dumpsite f alls on the outer edge of the zone 1 which allows for settlement and sustainable land-use development. The potential new landfill site (Option 2) is located in the middle of zone 2 which is set aside as a protection buffer zone with restricted land use excluding the landfill development.

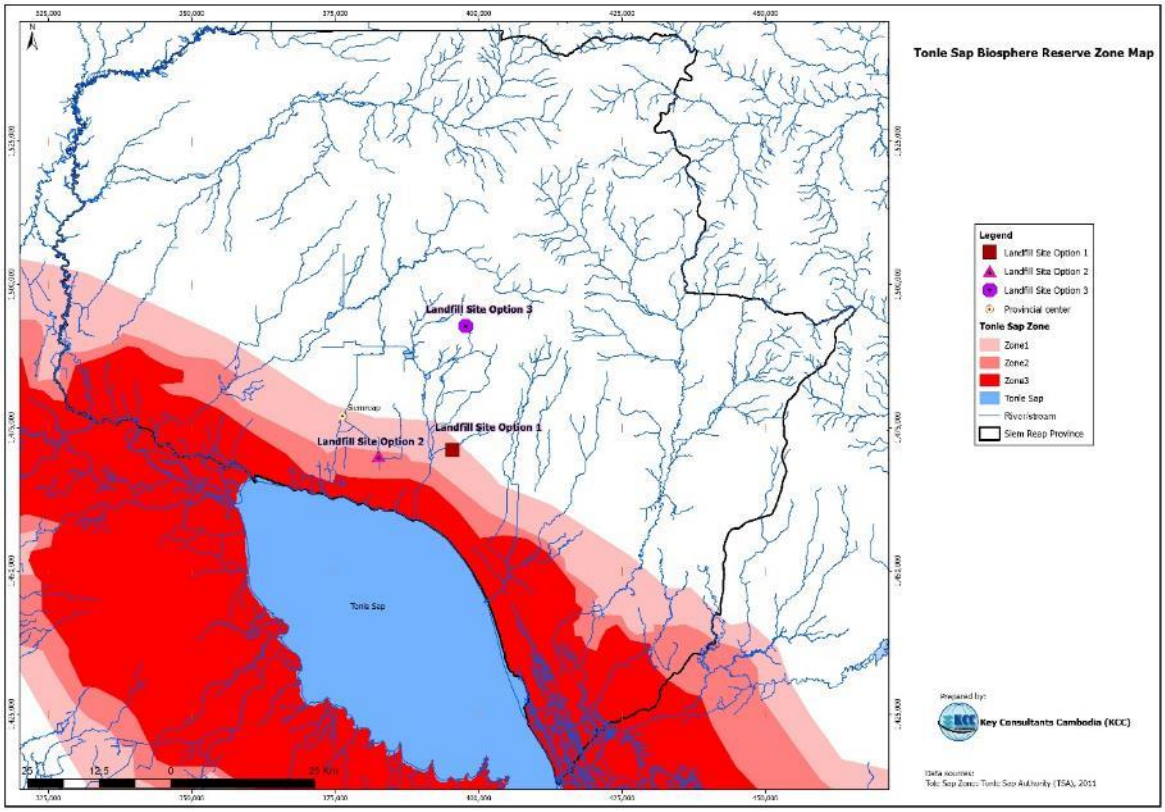


Figure X: Tonle Sap Biosphere Reserve (TSBR) Zone Map

From the map in the above Figure it can be seen that the existing dumpsite falls on the outer edge of the zone 1 which allows for settlement and sustainable land-use development. The potential new landfill site (Option 2) is located in the middle of zone 2 which is set aside as a protection buffer zone with restricted land use excluding the landfill development.

4.1.10 Forest

There is no natural forest located close to the project area; however, Siem Reap Province contains extensive flooded forests at elevations below 4 MSL adjacent to the Tonle Sap Lake.

Site option 1 is not close to the flooded area. The surrounding areas are the villages and rice fields and have never been flooded. Meanwhile, site option 2 is quite low and is sometimes flooded in the rainy season even if it is prevented by 78 dike as it is so close to the floodplain of Tonle Sap Lake.

Protection of the seasonally flooded forests surrounding the lake was the objective of land use zoning efforts in place through the establishment of the TSBR. These forests vary greatly in structure and diversity; the trees can grow to 7 to 15 meters in height on seasonally flooded alluvial soils. These forests are flooded by a maximum of 4 to 6 meters for water up to 8

months per year[18]. According to the Tonle Sap Authority (TSA), about 151 plant species had been recorded in the TSBA[19] (Tonle Sap Basin Authority). Tonle Sap floodplain's forest has a relatively floristic composition; the higher tree is about 40 species, a shrub about 38 species, climber about 33 species, aquatic about 18 species, and 22 species are weeds. Sub-decree No. 197 on boundary establishment of flooded forest site surrounding Tonle Sap Lake indicated that the forest has declined from 791,000 ha in 2002 to 688,170 ha in 2005 and 647,406 ha in 2011[20]. However, it should be noted that most of the forest is flooded scrubland, often very patchy in distribution. At the same time, the area of herbaceous seasonal swamp and farmland has increased.

Landfill Site Option 1 (Existing Dumpsite): Is next to farmland (rice fields) on the northern and western parts. The area is not flooded and the rice crop in this area is only planted once a year during the rainy season (May-October) and it gets dry in the dry season (November-April).

Landfill Site Option 2 (Proposed WWTP Site): Surrounded by farmland (rice fields) and is protected by a dike (called 78 dike) in the rainy season, but sometimes the dike itself was flooded such as in 2011 and 2015. The farmers in this area can grow 1 to 2 crops of rice per year.

The common tree species in TSBR are detailed in **Table 4.1-4**.

Table 4.1-8: The Common Plant Species in TBSA

No	Scientific Name	Khmer / Local Name
Higher Tree		
1	*Barringtonia acutangula*	Raing Toeuk/ រាំងទឹក
2	*Diospyros cambodiana*	Phtol/ផ្ទល
3	*Hydnocarpus annamensis*	Krabao/ក្របៅ
4	*Homalium brevidens*	Roteang/រទាំង
Climber Tree		
1	*Acacia thailandica*	Bay Damneub(Voir)/ រលិបាយដំណើប
2	*Breynia vitis-idaea*	Phnek Prieb(Voir)/ភ្នែកព្រាប
3	*Combretum trifoliatum*	Trors (Voir)/រល្លង់ត្រស់
4	*Connarus semidecandrus*	Lunpos Daek(Voir)/រល្លង់លំពាស់ដែក
5	*Tetracera scandens*	Doh Kun (Voir)/ដោះគន់
6	*Uncaria homomalla*	Sang Kheur(Voir)/រលិសង្ឃរ
Shrub Tree		
1	*Crateva religiosa*	Tunlea/ទន្លា
2	*Crudia crysantha*	Sdei Tuk/ស្តីទឹក
3	*Dalbergia entadoides*	Chhmal Mon/ឆ្មាលមន
4	*Elaeocarpus griffithii*	Rumdenh Phlok/រំដេញភ្លក
5	*Ficus heterophylla*	Sla/ស្លា
6	*Gmelina asiatica*	Annchanh/អញ្ចាញ
7	*Hymenocardia wallichii*	Phnom Phnaeng /ភ្នំភ្នែង

[18] http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/asia-and-the-pacific/cambodia/tonle-sap/
[19] http://www.tonlesap.gov.kh/index.php/en/sample-sites/general
[20] https://data.opendevelopmentcambodia.net/laws_record/sub-decree-no-197-on-marking-of-the-boundaries-of-flooded-forestin-6-provinces-around-tonle-sap-lak

No	Scientific Name	Khmer / Local Name
8	*Terminalia cambodiana*	Ta-our/ត្របែក
9	*Xanthophyllum glaucum*	Kansaeng/កន្ទែង

Source: (Campbell, Poole, Giesen, & Valbo-Jorgensen, 2006)

Furthermore, PKNP, which is 40 kilometers away from the site options, is considered of high conservation value on a national level. In 2003, the MOE produced an official map where the park's total area covers 37,500 hectares (MOE, 2017). It is a national park that contains cultural heritage and natural resources. The majority of the forest cover is made up of evergreen and semi-evergreen forests, combined with small patches of deciduous dipterocarp forest (Hartmann et al., 2013). In terms of vegetation, PKNP is one of the few remaining evergreen forest areas in the northern region of Cambodia. PKNP contains ten (10) out of 40 Cambodian threatened plant species on the International Union for Conservation of Nature (IUCN) Red List (MOE, 2017). According to (Sothearith et al., 2021), 195 plant species had been found in PKNP. The lychee tree species (*Litchi chinensis*) inhabits only this area and has given its name for this mountain.

4.1.11 Terrestrial and Aquatic Animals

Mammals

The mammal diversity of the TSBA is not particularly high. There are three (3) species of primate (O. Primates) that occur in the swamp forest; *Nycticebus coucang* (Slow Loris), *Macaca fascicularis* (Long-tailed Macaque), and *Semnopithicus cristatus* (Silvered Langur) (Bonhuer, 2001). All have been confirmed from the Prek Toal Core Area. Long-tailed Macaque is widely distributed around the lake, and Silvered Langur has also been recorded in the Stung Sen Core Area and in Kompong Thom province. Long-tailed Macaques are now being trapped and traded in large numbers all around the lake in response to the recent demand from "monkey farms", in both Cambodia(Campbell et al., 2006). Moreover, two species of otters (O. Carnivora) have been confirmed from the Tonle Sap Lake: *Lutra perspicillata* (Smooth Otter) and *Lutra sumatrana* (Hairy-nosed Otter)(Poole, C. M., 2003). All other species in Cambodia are under great threat from the local demand for skins for traditional medicine. The roosts of flying-foxes *Pteropus sp*. (O. Chiroptera) have been recorded throughout the year, although primarily in the wet season, from swamp forest areas in Siem Reap, Pursat, and Kompong Thom. Two species are likely found all over Cambodia: *P. vampyrus* (Large Flying-fox) and *P. lylei* (Lyle's Flying-fox)(Campbell et al., 2006).

Birds

The Tonle Sap Lake is one of the most important areas for bird conservation in the region and has long been understood to be extremely important for large waterbirds, particularly storks, pelicans, ibises, and cormorants[21]. The Prek Toal Core is a biodiversity conservation area that is 60 kilometers east-southeast of the Chong Kneas landing near Siem Reap, where it is the largest waterbird colony in South-East Asia under threat. Prek Toal now supports more than 50,000 breeding waterbirds of globally threatened species (MAFF & MOE, 2011). According to the Important Bird Areas (IBAs), the Prek Toal Core Area is home to large breeding colonies of colonial waterbirds, while the inundated grassland has its own unique suite of threatened

[21] http://www.tonlesap.gov.kh/index.php/en/sample-sites/general

breeding birds, and during the early flooded season hosts many feeding birds from the swamp forest[22]. The KBA (Key Biodiversity Areas)[23] waterbird Species of Conservation Concern Occurring in Prek Toal Core Area is shown in **Table 4.1-9**.

Table 4.1-9: Waterbird Species of Conservation Concern Occurring in Prek Toal Core Area

No	Scientific English Name	Khmer / Local Name	IUCN Status	Significance
1	*Leptoptilos dubius* Greater Adjutant	Tra Dak Thum ត្រដក់ធំ	Endangered	Second largest colony in the world (>10% of global population)
2	*Pelecanus philippensis* Spot-billed Pelican	Tong Prapheh ទុងប្រផេះ	Vulnerable	Largest colony in the world (20% of global population)
3	*Leptoptilos javanicus* Lesser Adjutant	Tradak Touch ត្រដក់តូច	Vulnerable	Largest colony in Southeast Asia (4% of global population)
4	*Micteria cineneria* Milky Stork	Ro neal sar រនាលស	Vulnerable	Only colony in mainland Southeast Asia
5	*Heliopais personata* Masked Finfoot	P Pul Teuk ពពូលទឹក	Vulnerable	Likely of global significance
6	*Anhinga melanogaster* Oriental Darter	Smaonh ស្មោញ	Near-threatened	Largest colony in Southeast Asia (>10% of global population)
7	*Threskiornis melanocephalus* Black-headed Ibis	Kngar kloun sar ក្រៃយ៉ងខ្លួនស	Near-threatened	Largest colony in Southeast Asia (4-8% of global population)
8	Micteria leucocophala Painted Stork	Roneal Por រនាលពណ៌	Near-threatened	Largest colony in Southeast Asia (20% of global population)
9	*Ephippiorhynchus asiaticus* Black-necked Stork	Angkot khmao អង្គត់ខ្មៅ	Near-threatened	Breeds in Prek Toal
10	*Ichthyophaga ichthyaetus* Grey-headed Fish-Eagle	Ak trei kbal Prapheh អកត្រីក្បាលប្រផេះ	Near-threatened	Breeding population likely of Global significance
11	*Microcarbo niger* Little Cormorant	Kaektuk Tauch ក្អែកទឹកតូច	Least Concern *(but Prek Toal population is internationally significant)*	>1% of Asian biogeographic Population
12	*Phalacrocorax fuscicollis* Indian Cormorant	Kaektuk Mothyom ក្អែកទឹកមធ្យម	Least Concern *(but Prek Toal population is internationally significant)*	>1% of Asian biogeographic Population
13	*Anastomus oscitans* Asian Openbill	Kreal kchang ចង្រៀលខ្យង	Least Concern *(but Prek Toal population is internationally significant)*	>1% of Asian biogeographic Population
14	*Ciconia episcopus* Wooly-necked Stork	Satv Ksa (Ta Trom) សត្វកស (តាត្រុំ)	Least Concern *(but Prek Toal population is regionally significant)*	Threatened as a breeding species in adjacent countries
15	*Plegadis falcinellus* Glossy Ibis	Kngar kloun rolong ក្រយ៉ងខ្លួនរលោង	Least Concern *(but Prek Toal population is regionally significant)*	Threatened as a breeding species in adjacent countries
16	*Ardea purpurea* Purple Heron	Kr Sa Thnong ក្រសាធ្នង់	Least Concern *(but Prek Toal population is regionally significant)*	Threatened as a breeding species in adjacent countries
17	*Phalacrocorax carbo* Great Cormorant	Kaektuk Thum ក្អែកទឹកធំ	Least Concern *(but Prek Toal population is regionally significant)*	Threatened as a breeding species in adjacent countries

[22] https://cambodia.wcs.org/About-Us/Latest-News/articleType/ArticleView/articleId/9169/Prek-Toal-Core-Area-Becomes-A-Ramsar-Site.aspx
[23] http://www.keybiodiversityareas.org/site/factsheet/16654

Source: (MAFF & MOE, 2011)

Amphibians and Reptiles

Surprisingly, only a relatively small number of amphibian and reptile species have been found on the Tonle Sap area[24]; however, many of the amphibians and reptile species found in the PKNP are of great importance. According to TSA, the reptiles in TSA are about 42 species[25]. There are 23 snake species (including 10 water snake species), eight (8) turtles and one (1) crocodile species, one (1) Tokay gecko (Gecko gecko), six (6) lizard species, one (1) Indo-Chinese water dragon (*Physignathus coincides*), and two (2) skink species have been found in the Tonle Sap area (MAFF & MOE, 2011).

Moreover, biodiversity in PKNP has been confirmed by IUCN listed species of global international concern indicated that 86 species (25 amphibians and 61 reptiles) are currently known to occur within PKNP (Geissler, Hartmann, Koenig, Ihlow, & Wagner, 2019). The common amphibians and reptiles are indicated in **Table 4.1-6**.

Table 4.1- 1: Globally Threatened Amphibians Species of the PKNP

No.	Scientific Name	English/Common Name	Khmer / Local Name	IUCN Status
1	*Ingerophrynus macrotis*	Large-eared toad	Kingkok Trachiek Thum គឹង្គក់ត្រចៀកធំ	Least Concern
2	*Glyphoglossur molossus*	Truncate-snouted burrowing frog	Hing Krot ហ៊ឹងគ្រោត	Near Threatened
3	*Kalophrynus interlineatus*	Striped sticky frog	Hing Chr ហ៊ឹងជ័រ	Least Concern
4	*Kaloula mediolineata*	Middle Back-stripe Bullfrog	Hing Chhnaut Khnang ហ៊ឹងឆ្នូតខ្នង	Near Threatened
5	*Microhyla berdmorei*	Berdmor narrow-mouthed frog	Hing Tauch Boet Mr ហ៊ឹងតូចបីតម៉ារ	Least Concern
6	*Micryletta inornata*	Plain narrow-mouthed frog	Hing Tauch Och Khnang ហ៊ឹងតូចអុជខ្នង	Near Threatened
7	*Limnonectes gyldenstolpei*	Capped frog	Kangkeb Katoeb កង្កែបកាតឹប	Least Concern
8	*Hylarana mortenseni*	Mortensen frog	Kangkeb Prei Mortensen កង្កែបព្រៃម៉ារថេនសេន	Near Threatened
9	*Theloderma asperum*	Pied warty tree frog	Kanhcheanhchek Ronth Chheu Pnr Sor Khmav កញ្ចាញ្ជ្រេចេករន្ធឈើពណ៌សខ្មៅ	Near Threatened
10	*Cyclemys oldhemi*	Black plastron leaf turtle	Antaek Sloek Troung khmaw អណ្តើកស្លឹកទ្រូងខ្មៅ	Endangered
11	*Malayemys subtrijuga*	Rice field terrapin	Antaek Sre អណ្តើកស្រែ	Near Threatened
12	*Indotestudo elongata*	Elongated tortoise	Antaek Prich អណ្តើកព្រិច	Critically Endangered
13	*Leiolepis rubritaeniata*	Red-banded butterfly lizard	ជៀសបួនបង្គងក្រហម	Not Evaluated
14	*Physignathus cocincinus*	Water dragon	កន្ត្រែង	Not Evaluated

[24] http://chm-ncsd.moe.gov.kh/species_database.html
[25] http://www.tonlesap.gov.kh/

No.	Scientific Name	English/Common Name	Khmer / Local Name	IUCN Status
15	*Cyrtodactylus intermedius*	Cardamoms gecko	តុកែភ្នំក្រវាញ	Not Evaluated
16	*Dixonius siamensis*	Siamese gecko	តុកែសៀម	Not Evaluated
17	*Hemiphyllodactylus yunnanensis*	Yunan gecko	តុកែចិនយូណាន	Not Evaluated
18	*Lipinia vittigera*	Red tailed stripe skink	ប្លែនឆ្នូតកន្ទុយក្រហម	Not Evaluated
19	*Scincella rupicola*	Red tailed skink	ប្លែនកន្ទុយក្រហម	Not Evaluated
20	*Sphenomorphus lineopunctulatus*	Line-spotted Forest Skink	ប្លែនព្រៃពណ៌អុជជាជួរ	Not Evaluated
21	*Tropidophorus concicinensis*	Indochinese water skink	ប្លែនទឹកឥណ្ឌូចិន	Not Evaluated
22	*Boiga siamensis*	Grey cat snake	ពស់ភ្នែកធំពណ៌ប្រផេះ	Not Evaluated
23	*Dendrelaphis subocularis*	Mountain brownzeback snake	ពស់ពណ៌ត្នោតភ្នំ	Least Concern
24	*Dryocalamus davisonii*	Davison's snake	ពស់ដេវីសុន	Least Concern
25	*Lycodon subcinctus*	White black banded wolf snake	ពស់ចចកបង្គងសខ្មៅ	Least Concern
26	*Oligodon fasciolatus*	Banded kukri snake	ពស់អង្កាច់មាសបង្គងខ្លង	Least Concern
27	*Amphiesma stolatum*	Stripe keeledback snake	ពស់ទឹកមានឆ្នូត	Not Evaluated

Source: (Geissler et al., 2019)

Aquatic Biology and Fisheries

Aquatic ecosystems in Siem Reap Province have been documented extensively by the many projects aimed at maintaining biodiversity on the Tonle Sap. Siem Reap and the lakeside landing of Chong Kneas Provide access to the lake and its extensive flooded forests including Prek Toal Core Area within the TSBR.

4.1.12 Acoustic Environmental Quality

The main tourism attractions of Siem Reap are the Angkor Heritage Area, Urban Amenity and Cultural Tourism Area, Tonle Sap Lake and Rural Areas and Distant Angkor Monument. But Siem Reap is not developed enough to attract various types of tourists who can be exposed to a touch of Angkor history and culture.

The Department of Environment in Cambodia identified three (3) major environmental issues in the area, namely: (a) water quality and sanitation issues, (b) SWM issues, and (c) air and noise pollution.

The government of Siem Reap includes in their Sector Development Plan the "Strengthening Infrastructure for Tourists and People." The infrastructure development covers five (5) sectors: transportation, water resources and water supply, SWM, drainage and sewerage, and power.

The results of the measurements are tabulated in Error! Reference source not found..

Table 4.1-10: Results of Noise Quality Measurements (April 2021)

Survey Period	Noise Level (dB[A])						Standard (Leq)
	Option 1: Rehabilitation and extension of existing Dumpsite (Anlong Pir Village)			Option 2: Closing of existing dumpsite and alternative landfill (Trapeang Tim Village)			
	LAeq	Lmax	Lmin	LAeq	Lmax	Lmin	
6:00 - 7:00	56.4	77.7	51.3	52.0	76.4	35.0	70
7:00 - 8:00	55.9	68.3	51.8	47.5	64.8	38.8	
8:00 - 9:00	56.3	65.4	50.5	49.2	72.6	38.0	
9:00 - 10:00	61.9	88.7	51.1	57.2	83.5	41.0	
10:00 - 11:00	66.3	99.2	39.1	47.9	61.9	36.2	
11:00 - 12:00	48.5	60.5	41.6	64.0	79.3	41.8	
12:00 - 13:00	50.6	63.6	42.2	56.8	72.2	37.2	
13:00 - 14:00	69.7	79.8	42.4	45.8	64.6	37.9	
14:00 - 15:00	56.0	65.9	42.8	62.1	74.6	39.8	
15:00 - 16:00	56.5	63.8	42.9	61.1	91.1	37.5	
16:00 - 17:00	60.1	71.4	44.3	50.5	68.0	37.9	
17:00 - 18:00	53.1	66.4	46.6	52.1	76.5	38.6	
18:00 - 19:00	55.1	64.6	43.6	58.3	86.0	37.4	65
19:00 - 20:00	53.5	62.0	42.3	51.7	80.4	36.7	
20:00 - 21:00	52.8	59.7	42.2	52.3	82.9	34.9	
21:00 - 22:00	52.2	59.4	41.9	44.2	58.8	32.6	
22:00 - 23:00	56.2	63.0	54.4	54.6	84.4	31.8	50
23:00 - 00:00	55.6	66.5	53.2	51.3	65.1	40.3	
00:00 - 1:00	54.9	68.0	52.5	50.7	67.7	37.5	
1:00 - 2:00	54.1	57.3	52.4	50.5	65.7	38.2	
2:00 - 3:00	52.6	63.6	49.2	41.4	58.1	32.6	
3:00 - 4:00	51.6	64.8	48.2	46.0	60.0	37.5	
4:00 - 5:00	57.6	72.1	46.7	58.9	79.4	34.7	
5:00 - 6:00	56.3	70.2	48.2	44.1	62.7	33.8	
24 hours Average	**56.0**	**68.4**	**46.7**	**52.1**	**72.4**	**37.0**	

Note: *(i) 70 dB(A) for commercial, service areas, and area of multiple businesses, daytime (6:00-18:00)*
65 dB(A) for commercial, service areas, and area of multiple businesses, in the evening (18:00-22:00)
50 dB(A) for commercial, service areas, and area of multiple businesses, at the night (22:00-6:00)

Survey Period	Noise Level (dB[A])						Standard (Leq)
	Houses Close to the Existing Dumpsite (Anlong Pir Village)			Houses Close to the alternative landfill (Trapeang Tim Village)			
	LAeq	Lmax	Lmin	LAeq	Lmax	Lmin	
15:00 - 16:00	56.20	69.70	41.30				60
16:00 - 17:00				62.40	66.20	40.10	

Note: *(i) 60 dB(A) for residential areas, hotels, administrative office, and villa/flat, daytime (6:00-18:00)*

The results of noise level measurement at Anlong Pir Open Dumpsite during daytime is between 48-69 dB(A) for the average level and about 52-55 dB(A) in the evening, 51- 57 dB(A) at the night. However, the maximum noise level is about 65-90 dB(A) in the daytime, 59-64 dB(A) in the evening, 57- 72 dB(A) at the night. The average noise level measurement in 24 hours is about 56 dB(A). It means that the preliminary measured noise level in the dumpsite area is met the Cambodian standard for mixing areas of residential, commercial, hotel, service

area, office, and multiples business area 60-70 dB(A) in the daytime (6:00-18:00), 65-50 dB(A) in the evening (18:00-22:00), and, 50-45 dB(A) at night (22:00-6:00). While the maximum noise level in one hour of the houses close to the dumpsite is 65-69 dB(A), and the average is 50-56 dB(A) only. It seems a calm place in is a residential area nearby the dumpsite.

The results of noise level measurement at Trapeang Tim Village are between 45-64 dB(A) in the daytime for the average level and about 44-58 dB(A) in the evening, 41- 58dB(A) at the night. However, the maximum noise level is about 60-80 dB(A) in the daytime, 58-80 dB(A) in the evening, 57- 84 dB(A) at the night. The average noise level measurement in 24 hours is about 52 dB(A). It means that the preliminary measured noise level in the dumpsite area is met the Cambodian standard for mixing areas of residential, commercial, hotel, service area, office, and multiples business area 60-70 dB(A) in the daytime (6:00-18:00), 65-50 dB(A) in the evening (18:00-22:00), and, 50-45 dB(A) at night (22:00-6:00). While the maximum noise level in one hour of the houses close to the dumpsite is 60-66 dB(A), and the average is 55-60 dB(A) only. It meant that the present condition of the noise level in the landfill site option 2 and nearby the residential area is good.

4.2 PRELIMINARY SOCIAL DATA

4.2.1 Demography

The population of Siem Reap Province was recorded at 1,006,512 as of 2019 (NIS, 2020) with 51.2% female and 48.8% male. Moreover, the province has an average household size of 4.48 persons/household and a total of 224,672 households.

The population density in Siem Reap Province increased from 87 persons/km^2 in 2008 to 98 persons/km^2 in 2019. The province is significantly more densely populated in comparison to Cambodia average. However, there was a declined in Siem Reap annual population growth rates between the years 2008 to 2019 of 1.1% compared to previous decade (i.e., 1998 to 2008) when the annual population growth rate was around 2.5%. The population, growth rate and population density of Siem Reap Province is shown in Table below.

Table 4.2-1: Total Population, Growth Rate and Population Density of Siem Reap Province

Province	Area (km^2)	Total Population		Annual Growth Rate (%)		Population Density	
		2008	2019	1998-2008	2008-2019	2008	2019
CAMBODIA	181,035	13,395,682	15,288,489	1.5	1.2	74	84
Siem Reap	10,299	869,443	1,006,512	2.5	1.1	87	98

Source: General Population Census of the Kingdom of Cambodia 2019

Based on the 2008 and 2019 General Population Census of Cambodia, Kandaek Commune and Trapeang Thom Commune experienced the largest increases in population from 2008 to 2019, at growth rates of 30.1% and 32.2%, respectively.

Table 4.2-2: Total Population, and Population Growth Rate of Prasat Bakong District

4.2.1.1	District/Commune	4.2.1.2 Population				4.2.1.3 Growth Rate	
		4.2.1.4	2008	4.2.1.5	2019		
4.2.1.6	**PRASAT BAKONG**	**4.2.1.7**	**61,425**	**4.2.1.8**	**72,299**	**4.2.1.9**	**17.7%**
4.2.1.10	Bakong	4.2.1.11	7,640	4.2.1.12	8,390	4.2.1.13	9.8%
4.2.1.14	Ballangk	4.2.1.15	6,259	4.2.1.16	7,050	4.2.1.17	12.6%
4.2.1.18	Kampong Phluk	4.2.1.19	2,781	4.2.1.20	3,202	4.2.1.21	15.1%
4.2.1.22	Kantreang	4.2.1.23	8,981	4.2.1.24	9,025	4.2.1.25	0.5%
4.2.1.26	**Kandaek**	**4.2.1.27**	**13,241**	**4.2.1.28**	**17,223**	**4.2.1.29**	**30.1%**
4.2.1.30	Mean Chey	4.2.1.31	5,493	4.2.1.32	6,701	4.2.1.33	22.0%
4.2.1.34	Roluos	4.2.1.35	8,904	4.2.1.36	9,965	4.2.1.37	11.9%
4.2.1.38	**Trapeang Thom**	**4.2.1.39**	**8,126**	**4.2.1.40**	**10,743**	**4.2.1.41**	**32.2%**

Source: Ministry of Planning, 2008 and 2019

The average household size in Prasat Bakong District is 4.4 as of 2019. Kandaek Commune meets this average household size with its 3,950 households, while Trapeang Thom is slightly above this with an average household size of 4.6 with its 2,325 households.

Table 4.2-3: Household Population and Average Household Size in Prasat Bakong District, 2019

District/Commune	Households	Average Household Size
PRASAT BAKONG	**16,435**	**4.4**
Bakong	1,978	4.2
Ballangk	1,657	4.3
Kampong Phluk	787	4.1
Kantreang	2,092	4.3
Kandaek	**3,950**	**4.4**
Mean Chey	1,433	4.7
Rolluos	2,213	4.5
Trapeang Thom	**2,325**	**4.6**

Source: Ministry of Planning, 2019

4.2.2 Vulnerable Groups and Poverty

Information on vulnerable groups and poverty in the section below is preliminary information obtained from a variety of sources. Once Project sites have been selected under the Project, site-specific censuses, socio-economic surveys and detailed measurement surveys will be undertaken as part of the Detailed Resettlement Plan preparation and the information on vulnerable groups, household income and poverty will be updated.

The Royal Government of Cambodia's (RGC) National Social Protection Strategy (NSPS) for the Poor and Vulnerable defines the poor and vulnerable as:

- People living below the national poverty line; and
- People who cannot cope with shocks and/or have a high level of exposure to shocks (of these, people living under or near the poverty line tend to be most vulnerable).

The NSPS affirms the intrinsic relationship between poverty and vulnerability and recognizes the tendency of poor households to have "fewer coping strategies to protect them against shocks." It groups key risks and shocks into 1) emergencies and crises; 2) human development constraints; 3) seasonal unemployment and income insecurity, and 4) health shocks. The NSPS also identifies 1) infants and children; 2) girls and women of reproductive age; and 3) households vulnerable to food insecurity and unemployment as specific groups that comprise the vulnerable in Cambodia. The fourth group is referred to as other special vulnerable groups and is composed of people living with HIV and their families; homeless people; people with disabilities; orphan children and at-risk children and youth; victims of violence, abuse and exploitation; indigenous and ethnic minorities; families of migrants; veterans; and the elderly.

The Cambodia Gender Assessment 2014[26] further identifies vulnerable groups of women and girls and classifies them into the following:

- Women and girls with disabilities;
- Elderly women;
- Widows and women-headed households;
- Lesbian and bisexual women;
- Transgender people;
- Women and girls from indigenous groups and from ethnic and religious minorities;
- Women survivors of gender-based violence (GBV) and their children;
- Women who experienced sexual violence and/or forced marriage during the khmer rouge regime;
- Women and girls with HIV;
- Women and girls living in remote areas;
- Women living in prison; and
- Women engaged in prostitution and/or working in the 'men's entertainment' sector.

The Ministry of Planning initiated IDPoor in 2005 to identify and tag households living in poverty and the most vulnerable households in order to effectively sharpen the poverty reduction efforts and socioeconomic development initiatives of the government (Ministry of Planning, n.d.). The program identified two (2) poverty classifications:

- Poor Level 1: Very poor
- Poor Level 2: Poor

According to Sub-decree 291 (2011), households are tagged under a specific level based on the endorsement of the commune/sangkat chief "following a decision by the commune/sangkat

[26] A report produced under the overall leadership and coordination of RGC's Ministry of Womens Affairs, with support and contributions from government line ministries, development partners, and civil society groups.

council, based on the results of implementation of the procedures for identification of poor households."

Almost one in five households (18.98%) in Cambodia are considered poor (Ministry of Planning, 2019).

In Siem Reap Province, 30,579 households or 12.19% of its total households are poor, most of which are under Poor Level 2. These are detailed in **Table 4.2-4**.

Table 4.2-4: Number and Percentage of Poor Households[27]

Country / Province	Total Households	Poor Level 1		Poor Level 2		Total	
		Number	% of Total HHs	Number	% of Total HHs	Number	% of Total HHs
Cambodia	3,734,573	271,661	7.27%	437,168	11.71%	708,829	18.98%
Siem Reap	250,848	10,749	4.29%	19,830	7.91%	30,579	12.19%

Source: IDPoor Database, 2019

Disaggregating this data by sex of the household head, 42.2% of the poor households in Cambodia are headed by females. The share of female-headed poor households in Siem Reap are significantly lower than the national average at 35.6%.

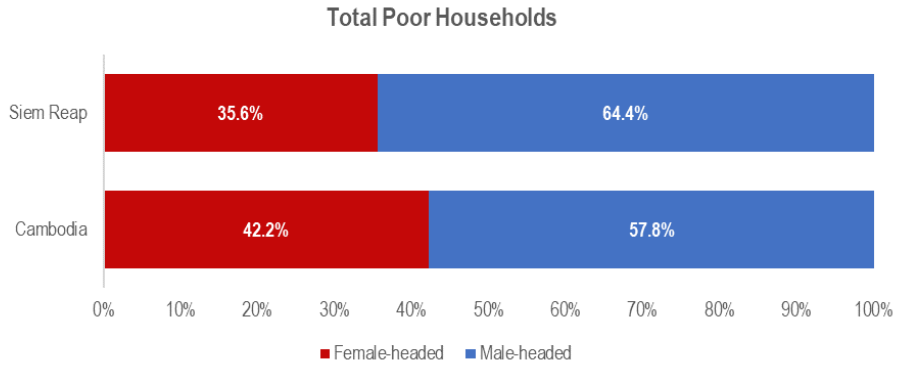


Figure 4.2-1: Total Poor Households in Cambodia by Sex of Household Head

Further analysis of data by poverty level show male-headed households holding a higher share are female-headed. Presenting the sex disaggregated data by poverty level, the data shows that the share of female-headed households among the Poor Level 1 or very poor households are higher by over 5%, in contrast to Poor Level 2 households as shown in **Figure 4.2-2**.

[27] According to the IDPoor Database, Siem Reap data was collected in 2018. National data was collected from 2017 to 2019. For indicators applying at individual level, this table shows the number of households with at least one member affected by selected indicators.

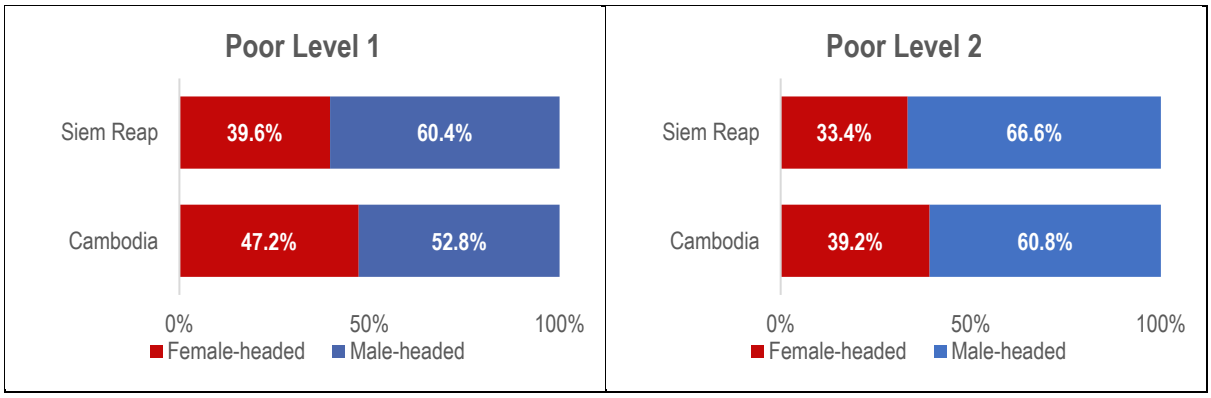


Figure 4.2-2: Poor Households by Level and Sex of Head of Household

Source: IDPoor Database, 2019

Table 4.2-5 provides a breakdown of the main economic activities and the socioeconomic characteristics of poor households in the province. from the collected data between 2010 to 2011. Housing indicator was measured through the characteristics of their housing material (i.e., roof and wall), condition of house, and floor area. Ownership was measured through possession of assets (i.e., radio, mobile phone, etc.), livestock (i.e., fish, pigs, cows, etc.), transportation (i.e., bicycle, truck, boat, etc.). Productivity was measured by identifying household members that cannot produce income, and members engaged in income generating activities, such as farming, fishing, among others. Lastly, food security was measured by measuring which households borrowed rice in the past 12 months.

In Siem Reap, about a third of the poor households (62.6%) are engaged in rice farming.

Table 4.2-5: Main Income Activities of Poor Households in Siem Reap (2010)28

Province / Country / Main Income Activity	Number of Households	Housing	Ownership			Productivity		Food Security
			Assets	Livestock	Transportation	Active Members	Income generation	
		% Max	% Max	% Max	% Max	% Max	% Max	% Max
Siem Reap								
Growing Rice	33,130	86.6	94.5	84.8	92.2	72.1	73.6	71.6
Fishing	1,730	88.2	88.6	95.6	72.4	78.0	85.5	67.5
Other	16,703	86.6	90.4	96.1	91.8	75.0	93.4	70.0
Cambodia								
Growing Rice	330,93	83.3	89.8	85,6	90.7	71.0	75.7	72.8
Fishing	14,812	85.0	85.3	95.4	79.1	77.4	88.6	68.2
Other	211,471	83.6	87.9	96.7	92.7	73.6	94.7	74.3

Source: IDPoor Atlas, 2012

Table 4.2-6 provides a breakdown of the socioeconomic characteristics of a poor household in Siem Reap in 2010.

[28] Data on the respective provinces were collected as follows: Siem Reap 2010..

Table 4.2-6: Socioeconomic Characteristics of Poor Household in Siem Reap (2010)

Poverty Category	Total Poor Household	Housing	Ownership			Productivity		Food Security
			Assets	Livestock	Transportation	Active Members	Income generation	
		% Max	% Max	% Max	% Max	% Max	% Max	% Max
Poor Level 1	24,758	94.8	97.8	96.0	97.2	82.4	92.0	84.1
Poor Level 2	28,131	79.5	88.6	82.4	86.3	65.0	70.1	59.2
Main Income Activity								
Growing Rice	33,130	86.6	94.5	84.8	92.2	72.1	73.6	71.6
Fishing	1,730	88.2	88.6	95.6	72.4	78.0	85.5	67.5
Other	16,703	86.6	90.4	96.1	91.8	75.0	93.4	70.0
District (Bakong District)								
Angkor Chum	2,991	86.5	95.8	83.3	94.3	70.7	71.8	75.4
Angkor Thum	2,016	85.4	95.4	86.7	94.0	79.4	78.2	66.1
Banteay Srei	2,920	84.3	91.3	91.5	89.7	75.6	86.9	71.1
Chi Kraeng	10,276	87.6	94.5	86.4	91.6	70.8	78.3	79.3
Kranlanh	2,892	87.9	94.3	89.0	94.6	61.5	72.2	60.5
Puok	7,131	86.8	92.1	86.5	92.4	73.2	80.8	74.2
Prasat Bakong	2,681	87.7	91.0	93.8	91.4	73.8	89.6	75.7
Krong Siem Ream	7,495	82.3	86.8	94.5	86.9	83.1	89.6	64.5
Soutr Nikom	7,110	88.0	92.6	89.7	90.4	68.8	83.7	66.7
Srei Snam	2,838	88.4	97.7	84.2	95.1	72.2	65.8	72.4
Svay Leu	1,408	90.7	96.1	91.6	94.1	71.2	69.8	61.9
Varin	3,131	88.4	97.3	88.8	91.1	76.1	78.2	68.0
TOTAL	**52,889**	**86.7**	**92.9**	**88.8**	**91.4**	**73.2**	**80.4**	**71.0**

Source: IDPoor Atlas (Ministry of Planning, Cambodia)

Apart from the tagging of poor households under the IDPoor Program, a Multidimensional Property Index has been calculated in 2010 under the Oxford Poverty and Human Development Initiative in consideration of ten (10) poverty indicators across the dimensions of health (i.e., child mortality, nutrition), education (i.e., years of schooling, school attendance), and standard of living (i.e., cooking fuel, sanitation, water, electricity, floor, asset ownership_ to measure poverty, well-being and inequality.

The Multidimensional Poverty Index of Siem Reap is 0.240 (ADB, 2014). Its poverty incidence of 51.8% is among the highest incidence across the provinces in Cambodia. The average intensity across the poor is at 46.3%, while the percentage of population vulnerable to poverty is at 24.6% and those in severe poverty is at 19.4%.

Table 4.2-7: Multidimensional Poverty Index of Siem Reap (2010)

Province	Multidimensional Poverty Index	Incidence of Poverty	Average Intensity Across the Poor	Percentage of Population Vulnerable to Poverty	Percentage of Population in Severe Poverty	Population Share
Siem Reap	0.240	51.8%	46.3%	24.6%	19.4%	6.4%

Source: Oxford Poverty and Human Development Initiative 2013 (University of Oxford)

The same report presented the poorest provinces based on the databases available in Cambodia. Siem Reap Province has identified as one of the poorest across all these databases.

Table 4.2-8: Poorest Provinces in Cambodia by Data Source (2019 – 2012)[29]

Rank	Province	CBD 2012	Province	ID Poor 2009-2011	Province	MPI 2010*
1	Preah Vihear	37	Koh Kong	44	Mondulkiri	44
2	Stung Treng	37	Kampong Chhnang	37	Rattanakiri	44
3	Rattanakiri	36	Kratie	36	Preah Vihear	39
4	Oddar Meanchey	34	Battambang	34	Stung Treng	39
5	Mondulkiri	33	Pursat	34	Kratie	29
6	Kratie	29	Preah Vihear	32	Pursat	25
7	Kampong Thom	28	Pailin	32	Kampong Thom	24
8	Siem Reap	29	Siem Reap	31	Kampong Chhnang	23
9	Pursat	28	Kampong Thom	31	Kampong Cham	20
10	Kampong Chhnang	28	Stung Treng	30	Siem Reap	19

Source: Oxford Poverty and Human Development Initiative 2013 (University of Oxford)
Note: CDB – Commune Database, MPI – Multidimensional Poverty Index

4.2.3 Livelihood and Employment

Much like majority of Cambodia, agriculture, forestry and fishing industries contributed the largest portion of employment in Siem Reap Province as of 2013 (i.e. 63.0% of the total employment). There were more females employed in these three industries, with the biggest employment ratio between female and male found in wholesale and retail trades. The total employed population by leading industry in the province are tabulated below.Error! R eference source not found. shows the total number of employed by leading industry in Siem Reap in 2013.

Table 9: Total Employed Population by Leading Industry in Siem Reap (2013)

Employment	Female	Male	Total
Siem Reap			
Employed Persons (Aged 15 and over)	239,230	243,753	482,984
% Agriculture, Forestry & Fishing	67.9	58.2	63.0
% Wholesale & Retail Trade, Others	10.9	5.0	8.0
% Manufacturing	3.7	2.5	3.1
Cambodia			

[29] For the multidimensional poverty index indicated, this was derived from severe poverty rates of the provinces.

Employment	Female	Male	Total
Employed Persons (Aged 15 and over)	4,071,609	3,987,921	8,059,530
% Agriculture, Forestry & Fishing	66.3	62.1	64.2
% Wholesale & Retail Trade, Others	12.7	7.4	10.1
% Manufacturing	10.3	5.8	8.1

Source: Cambodia Inter-censal Population Survey 2013 (Statistics Bureau of Japan)

Based on 2008 data, there are 32,120 establishments in Siem Reap Province that engage a total of 94,326 persons. Prasat Bakong District contributes to 1,851 of these establishments, which engage 4,013 persons (MOP, 2011).

Table 4.2-10: Number of Establishments and Persons Engaged in Siem Reap Province (2008)

Province/District	Number of Establishments	Number of Persons Engaged	Annual Sales (million USD $)	Annual Expenses (million USD $)
SIEM REAP	**32,120**	**94,326**	**511**	**398**
Angkor Chum	1,069	2,629	11	8
Angkor Thom	416	1,029	2	1
Banteay Srey	1,236	2,576	9	6
Chi Kreng	2,949	6,164	25	19
Kralanh	1,838	4,057	25	22
Prasat Bakong	**1,851**	**4,013**	**18**	**14**
Puok	2,792	7,392	35	29
Saut Nikum	3,289	7,011	34	27
Siem Reap	14,555	55,298	336	260
Srey Snam	808	1,825	7	5
Svay Leu	590	1,191	4	2
Varin	727	1,141	6	4

Source: Ministry of Planning, 2011

The annual sales in Siem Reap Province amount to USD $511 million and expenses to USD $398 million. Of this, Prasat Bakong District contributes USD $18 million in sales and USD $14 million in expenses.

A quarter of the labour force in the province is being employed in the tourism industry (Biz Info, n.d.) and the average of household income is estimated to be $789 per month in the overall city of Siem Reap (MPWT and CDI, 2019). Reportedly, household incomes in Siem Reap province are higher than those in other main cities around the Tonle Sap Basin due to the tourism activity from the Angkor Wat Heritage Site.

4.2.4 Waste based livelihoods

During the site visit conducted as part of the site screening and suitability assessment, it was noted that there were approximately 200 individuals engaged in waste picking at the existing landfill site. Many of these were observed to be living within Anlung Village and other villages in the proximity of the site, rather than within the landfill boundaries. To understand the centrality of waste picking and associated flow-on industries to the livelihoods of the local community, primary data was collected through a socio-economic and perception survey conducted by CEST. Prior to commencing this survey, it was determined that there were approx. 273 individuals engaging in waste picking on the site (see below table). A total of 171 individuals participated within this survey, with respondents selected utilising stratified random sampling to ensure that sampling covered various households, including vulnerable/disadvantaged groups, various livelihood types, and formal and informal sector participants. The breakdown of the sampling and respondents is shown within the below table.

Table 11: Survey Sampling

Respondent Groups	Total Pop. / HH	Sample Size
Waste pickers	273	75
GAEA Staff	260	30
Junk shops	12	11
Households within the 1-km Radius of the Anlong Pir Dumpsite in Trapeang Thom Commune	2,325	35
Households in Kandeak Commune	3,950	20
TOTAL		171

The survey instrument was designed to capture an array of data suitable to guide the pre-feasibility phase risk assessment and concept design for the existing landfill location, in addition to any amendments necessary to the ESMF required to guide the Project through the detailed design and site specific ESIA phase. This data includes (i) basic demographic data, (ii) place of residence, (iii) social safety nets, (iv) livelihood strategies, (v) overall income and income sources, and (vi) basic health indicators. It is noted that this data focuses on individual situations rather than entire household livelihood strategies and economic circumstances, and the data presented within the CEST report captured only the 75 individual respondents who reported as engaging in waste-picking for all or part of their income.

- **Profile:** A total of 75 waste pickers participated in the survey, with individuals from the villages of Phnom Dei, Anlong Pir, Suong, Rokakambot and Lovea (all within a 1km

radius of the site). The majority of the respondents were female (67%), with the proportions of age groups of 15-30 (35%), 31-50 (55%) and 51-70 (10%). The majority of the respondents was married (80%), with all respondents identified as being of Khmer ethnicity and practicing Buddhists. Only 1.3% of the respondents were identified as originally being from other provinces.

- **Residence and Safety Nets:** The interviewed waste pickers all had strong economic rationale for having their residence in proximity to the landfill. Strong family tied to the area has also been reported. While most families were identified as being poor, only 21.3% of the respondents reported as receiving any food-based safety net support from the Royal Government of Cambodia.
- **Solid-waste picking efforts and schedule:** Based on outcomes of key informant interviews (KIIs) and focus group discussions (FGDs), it was determined that 96% of respondents conduct waste picking in the morning, with 89% noting that they engage in a further shift in the afternoon, generally between 1:00pm and 5:00pm. Only six respondents noted that they work during the night-time as well, being between 7:00pm and 3:00am. The work schedule is generally restricted to weekdays, with only three respondents noting that they also work at weekend. Approximately 70% of respondents noted that they conduct waste picking every weekday. It was reported that most of the respondents engage in waste picking on the site on a long-term basis, with 65% of respondents noting that they have been working on the site for 10 years or more.
- **Income from waste-picking:** Income per person from waste picking is highly dependent upon quantity of higher value of the wastes available, unit price of waste types at the locations they sold the material, and the length of waste picking effort per week. Organic waste collected is sold on a daily basis while non-perishables are sold either weekly or monthly to local junkshops in the surrounding villages, or occasionally in junkshops in the provincial centre of Siem Reap Province where higher prices can be achieved. Monthly earnings from waste picking ranged from 15 USD to 400 USD per month, with most typical earnings range between 50 USD and 75 USD per month. As such, many of these individuals are having incomes below the international poverty lines of 1.90 USD per day adjusted for 2011 purchasing power parity (PPP), and well below the per capita gross national incomes of Cambodia, which is approximately 127 USD/month[30].
- **Income sources:** Among the 75 respondents, 49 reported that they have other sources of income from construction, fishing, hotel/restaurant/house working, livestock raising, local farm work, remittances and small-scale businesses. However, a total of 48 respondents noted that their primary source of income depends on waste picking. This indicates that at least for some individuals, the additional income sources might be

30 Poverty & Equity Data Portal (worldbank.org)

minimal and there remains a high level of reliance on waste picking as the primary livelihood type. 35 of the respondents noted that they have borrowed money within the last 12 months, with values borrowed ranging from 200 USD to 2,000 USD, and monthly interest repayments between 10 USD and 260 USD per month. It is not known how the figures were in previous years within the same location, or across other locations within Cambodia, however, the COVID-19 pandemic has caused a sharp deceleration in the tourism, manufacturing and construction sectors, which together in 2019 accounted for 70% of the country's growth and almost 40% of paid employment31. Given the proximity of the site to the city of Siem Reap and the Angkor Wat Complex, which have experienced drastic reductions in tourism levels, possible explanations for this include (i) the volumes and quality of waste generated and availability of wastes at the site for waste pickers have reduced. The figures for 2020 from the site screening and suitability report indicate that pre-pandemic monthly waste collection was in the order of 250 tonnes/day, which has reduced to between 162 and 185 tonnes/day in the second half of 2020, and (ii) the reduction in tourism within Siem Reap Province may have reduced opportunities for additional income sources for the local community. Changes in socio-economic circumstances and near-poor and the possibility of vulnerable households falling back into poverty due to the external effects of COVID-19 are consistent with the observations from the World Bank, who estimated that at least an additional 150,000 households within Cambodia (representing approximately 500,000 people) have been identified as newly poor between June 2020 and January 202132.

- **Community health:** Basic data was gathered from the 75 interviewed waste pickers pertaining to the most common illnesses and diseases experienced. 38 respondents reported as experiencing diseases, with diarrhoea and dengue fever reported, among a range of other illnesses, including "headaches" reported by 24% of the respondents who noted experiencing illnesses. This data itself is inconclusive as it needs to be compared to the general population and causality established. For example, polluted groundwater has been reported generally across the local community and there is a strong possibility that this is linked to the lack of a liner layer within the landfill.

The data collected to date does not allow for any level of evaluation in relation to gender and social inclusion aspects, particularly with regards to the role of the women in balancing household duties and waste picking, involvement of children within waste-picking, and social services.

4.2.5 Persons with Disability

31 Cambodia Overview (worldbank.org)
32 Cambodia Overview (worldbank.org)

In the 2019 Census, disability was measured in terms of physical and/or mental difficulties experienced in daily life for people aged 5 years and over. There are a total of 40,585 persons with disability in Siem Reap Province, which represents about 6% of the total population. Based on the census, there are more females with disability recorded at 56.6% of the total population of persons with disability. The province ranks 7th among the 25 provinces in Cambodia with the most persons with disability. **Table 4.2-12** presents the sex-disaggregated data among persons with disability in the province.

Table 4.2-12: Persons with Disability in Siem Reap Province by Sex (2019)

Province	Male		Female		Total		Rank
	Number	%	Number	%	Number	%	
Siem Reap	17,602	43.4%	22,983	56.6%	40,585	5.9%	7
CAMBODIA	**286,659**	**41.6%**	**402,873**	**58.4%**	**689,532**	**100.0%**	

Source: National Institute of Statistics, 2020

Data on the following types of disabilities were also collected: (a) Disability in seeing, (b) disability in hearing, (c) disability in walking or climbing stairs, (d) disability in remembering, memorizing or concentrating; (e) disability in self-care and daily tasks, (f) disability in speaking, or communication due to physical, mental and/or emotional health (NIS, 2020). For level of disability of individuals were also collected using the following scale:

- None;
- Some – "Some difficulty";
- Moderate – "A lot of difficulty"; and
- Severe – "Cannot do at all".

Table 4.2-13 shows the breakdown of persons with disability in Siem Reap by Type and Level of Disability.

Table 4.2-13: Persons with Disability in Siem Reap Province by Type and Level (2019)

Disability		Siem Reap	CAMBODIA
Type	Level		
Seeing	**Some**	24,999	**412,240**
	Moderate	3,806	**71,725**
	Severe	822	**18,288**
	Total	**29,627**	**502,253**
Hearing	**Some**	16,852	**342,233**
	Moderate	2,822	**56,729**
	Severe	740	**15,506**
	Total	**20,414**	**414,468**
Walking	**Some**	15,110	**304,985**
	Moderate	3,508	**71,593**
	Severe	799	**16,790**
	Total	**19,417**	**393,368**
Remembering	**Some**	15,581	**316,718**

Disability		Siem Reap	CAMBODIA
Type	Level		
	Moderate	2,675	**58,540**
	Severe	909	**18,687**
	Total	**19,165**	**393,945**
Self-care	**Some**	11,915	**253,393**
	Moderate	2,263	**55,715**
	Severe	778	**19,891**
	Total	**14,956**	**328,999**
Speaking	**Some**	12,579	**256,645**
	Moderate	2,296	**51,960**
	Severe	985	**18,011**
	Total	**15,860**	**326,616**

Source: National Institute of Statistics, 2020

On the other hand, **Figure 4.2-3** shows the percentage of the population persons with disability that have a severe level of disability. The figures in Siem Reap Province are within the country average, with an exception to those with severe speaking disabilities, which is 0.7% above the country average.

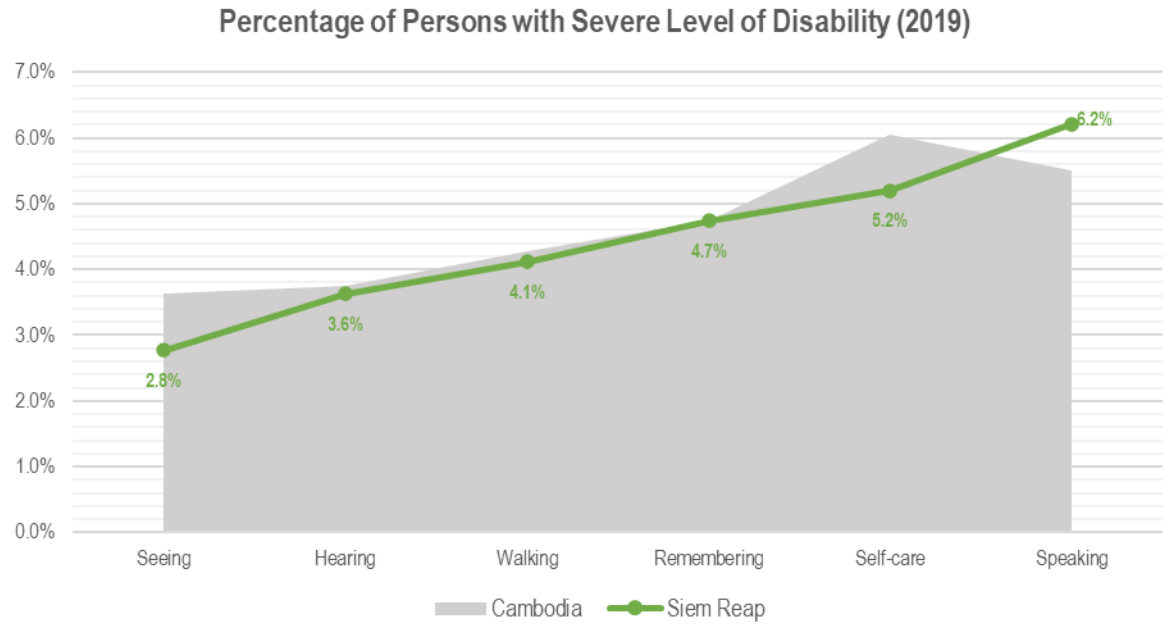


Figure 4.2-3: Percentage of Persons with Severe Level of Disability (2019)

Source: National Institute of Statistics, 2020

4.2.6 Indigenous Peoples and Ethnic Minorities

Cambodia's indigenous groups have their own language, culture and beliefs, and are often reliant on the forest and natural resources for their livelihoods, thus making them especially vulnerable. In the most recent 2019 Census of Population, majority (95.8%) of the population

are of Khmer ethnicity. On the other hand, indigenous ethnic minority groups have 448,282 population and make up 2.9% of the total population (NIS, 2020). In the 2018 draft census report of Ministry of Planning (MOP) there were 183,832 individuals identifying as to ethnic minorities across 22 groups (Ministry of Rural Development, 2020).

As illustrated in **Figure 4.2-4**, the Indigenous Peoples areas are mostly located in the northeastern provinces of Cambodia (Save Cambodia's Wildlife, 2015)

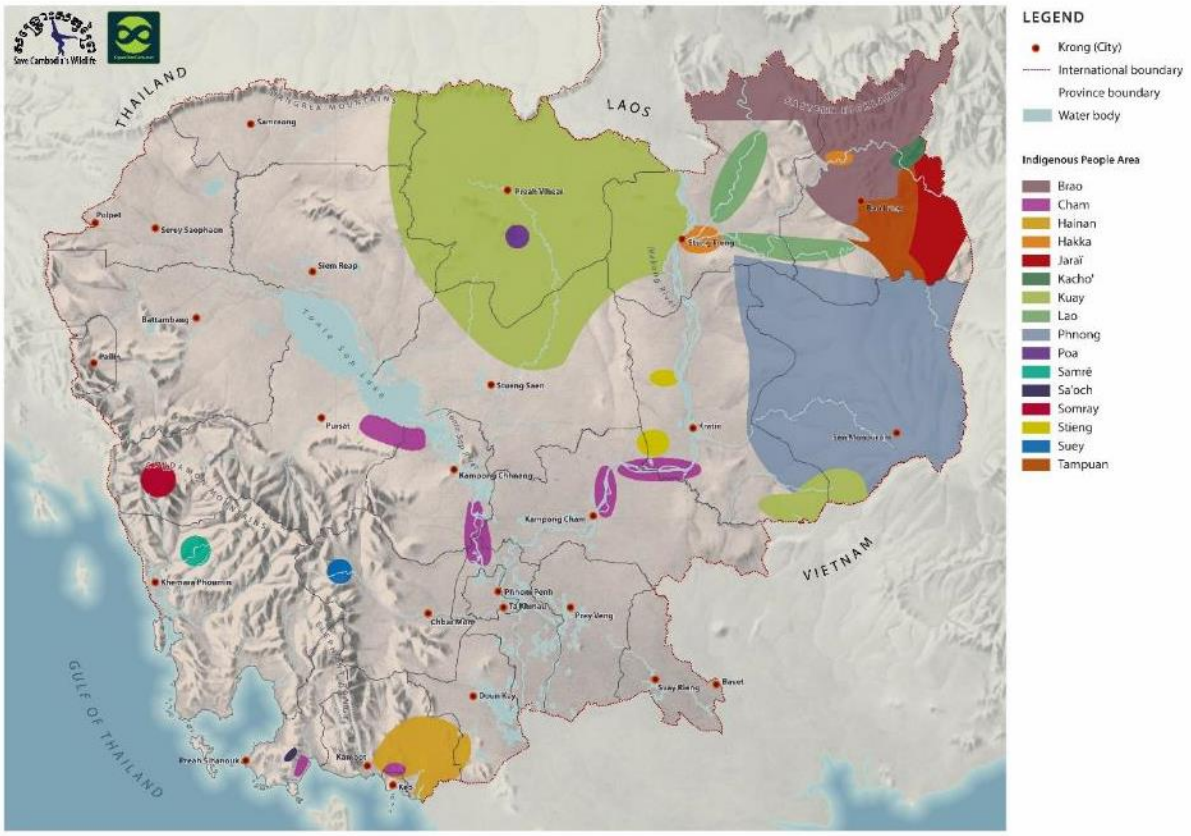


Figure 4.2-4: Indigenous People Areas in Cambodia (2013)

Source: Save Cambodia's Wildlife, 2013

In the 2013 NIS Inter-censal Survey, it was found there are over 300,000 individuals in Cambodia whose mother tongue belong to minority languages. The minority languages referred to are as follows: Chaaraay, Chaam, Kaaveat, Klueng, Kuoy, Krueng, Lon, Phnong, Proav, Tumpoon, Stieng, Ro ong, Kraol, Raandear, Thmoon, Mel, Khogn, Por, Suoy, S'ouch, Mon, Kchruk, and Kchak. Siem Reap Province is among the provinces with the smallest share of population whose mother tongue is among the minority languages, having less than a percent of the population belonging in this subset (NIS and JICA, 2013).

Table 4.2-14: Population by Mother Tongue (2013)

Mother Tongue	Cambodia	Siem Reap
Total Population	14,676,592	922,982
Minority Languages		
Number	**331,068**	**2,462**
Percent (%)	**2.3%**	**0.3%**

Source: Cambodia Inter-censal Population Survey 2013

However, the 2013 NIS and JICA survey did not include the distribution of those whose mother tongue belong to minority languages. To attempt to fill in such data gaps, the Commune Database online was consulted, albeit fairly outdated. According to their 2010, there are individuals belonging to the Kouy in Siem Reap as shown in **Table 4.2-15**. The Kuoys are the 5th indigenous group with the highest population based on the 2018 data of MRD.

Table 4.2-15: Indigenous Peoples in Siem Reap Province (2010)

Indigenous Peoples	Siem Reap	
	Persons	Families
Phnong	0	0
Kouy	**176**	**41**
Stieng	0	0
Mil	0	0
Kroal	0	0
Thmorn	0	0
Khaonh	0	0
Tompuonn	0	0
Charay	0	0
Kroeung	0	0
Kavet	0	0
Saouch	0	0
Lun	0	0
Kachak	0	0
Praov	0	0
Others	0	0
TOTAL	**176**	**41**

Source: Commune Database Online, 2010

4.2.7 Public Services and Utilities

Access to Water Supply

According to a commune database, the percentage of families with access to clean water in Siem Reap is 39.4%, representing those equipped through piped water, private pump well or private ring well which is available in all year and is accessed in or less than 150 meters from their house. As illustrated in **Figure 4.2-5**, the northern provinces in the country have less access to clean water. In the same figure, the share of families relying on communal water facilities to access clean water range is at 6.21% of the population.

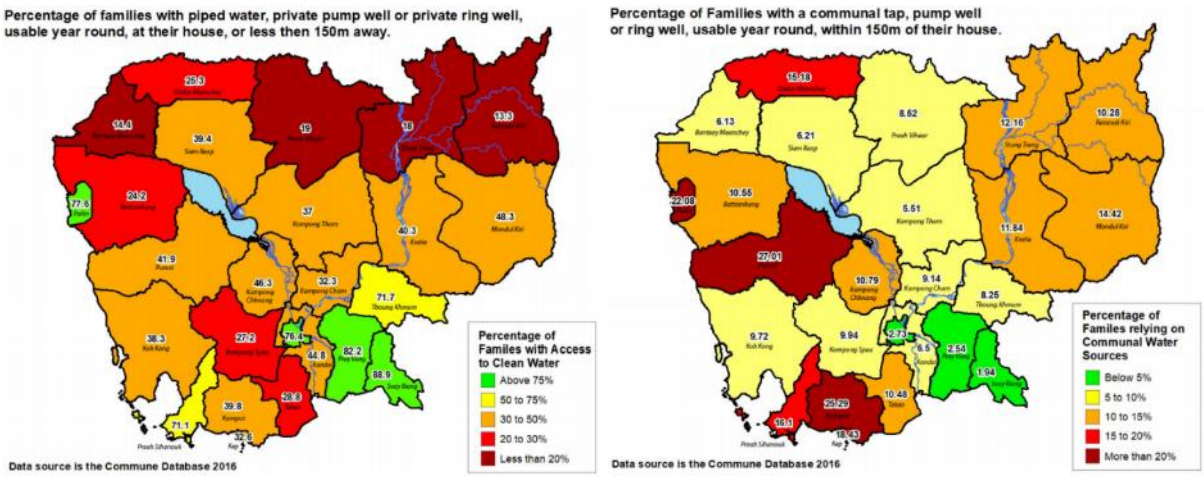


Figure 4.2-5: Families with Direct or Close Access to Clean Water (Left) and Families Reliant on Communal Water Sources (Right)

Water supply networks have been constructed by the Siem Reap Water Supply Authority (SRWSA), mainly in the city center. Many households are still using their private wells for sanitary and kitchen uses, and sometimes for drinking as well. Large areas remain unserved.

Most of the private wells are constructed with a 5-cm tube well diameter, at a depth of 15 to 30 meters, and equipped with electric and/or manual pumps. Reservoirs are made of concrete rings or plastic.

Source: Commune Database (2016) in Cambodia Atlas of Gender and Environment, The Asia Foundation (2018)

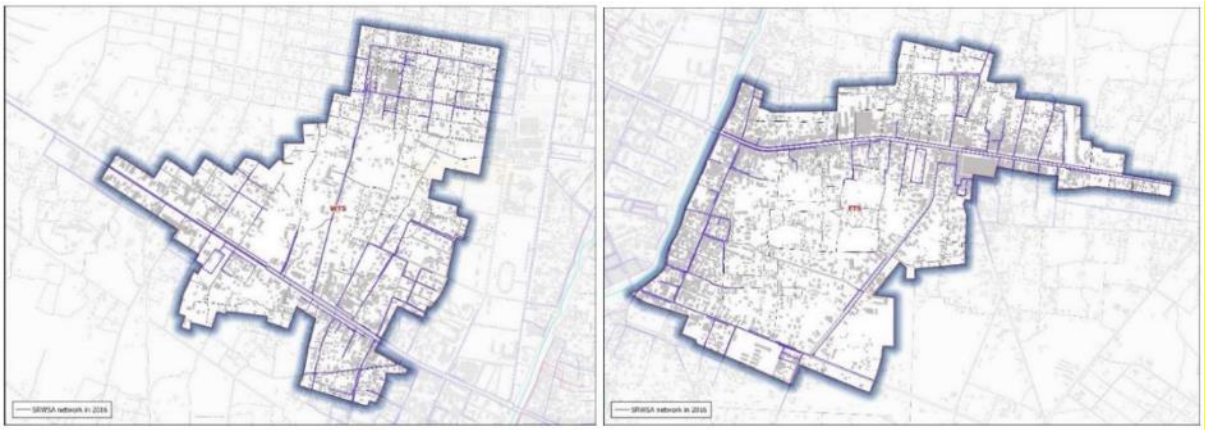


Figure 4.2-6: Water Supply Network in the WTS and ETS Areas of the Wastewater Treatment Plant (2016)

Source: Siem Reap Water Supply Authority

Access to Sanitation

Almost 100% of households in Siem Reap have access to toilet, however, as of 2015 only 46% of people in Siem Reap have improved latrine facilities. Usually, a septic tank is constructed beneath the toilet to store the wastewater and/or to seep the wastewater into the ground. Three (3) common septic tanks are in practice in Siem Reap: brick/concrete septic tank (21%), ring

tank (56%), soak away tank (19%), other (4%). Out of these septic tanks, 85% of them are unsealed base tanks. A small percentage of the septic tanks' effluent is discharged to either public sewer or open drain.

Because most of the sanitation system within the possible sub-project areas is made of household/individual septic tanks, population sewage is mainly discharged into the groundwater aquifer, just below the buildings and villas. It seems obvious that the near aquifer (<5 meters) is possibly contaminated with bacteriological pollution coming from resident. As said above, many private wells are operating for water supply in these areas.

Table 4.2-16: Water Statistics in Siem Reap (2015)

People with improved latrine	46%
Families with access to clean water	62%
People who wash their hands with soap and water after using toilets	95%

Source: The Challenges of Public Health in Pailin and Siem Reap Provinces, November 2016

Access to Electricity

Based on a 2018 study on 16 villages in Siem Reap, six (6) were found to already have electricity. Of these six (6), two (2) were urban and four (4) were rural. Six (6) urban villages and four (4) rural villages were identified as non-electrified.

Among households, a total of 119 out of the 192 sampled were non-electrified, 72 of them from urban villages and 47 from rural, while the remaining 53 were electrified, 25 coming from urban villages, and 48 from rural, as shown in **Table 4.2-17**.

Table 4.2-17: Electricity Distribution of Villages and Households in Siem Reap (2017)

Population Group	Urban		Rural		TOTAL
	Electrified	Non-Electrified	Electrified	Non-Electrified	
Villages	2	6	4	4	16
Household	25	72	48	47	192

Source: Cambodia Beyond Connections: Energy Access Diagnostic Report Based on the Multi-Tier Framework, 2018

4.2.8 Education

In terms of educational attainment, there is a significant increase in females not receiving any educational attainment in Siem Reap. The number of females in the population aged 7 and over without educational attainment dramatically increased from 42,290 in 2008 to 129,850 in 2013. The males however decreased from 94,378 to 80,787 (NIS and JICA, 2013).

Historically, people of both sexes mostly receive primary education without completion. Though more people have been able to receive secondary education and above, it is still the smallest percentage represented in the population as of 2013. This is further summarized in **Table 4.2-18**.

Table 4.2-18: Educational Attainment of the Population Aged 7 and Over by Sex in Siem Reap (2013)

Educational Attainment	2008			2013		
	Female	Male	Both Sexes	Female	Male	Both Sexes
No Educational Attainment	42,290	94,378	236,668	129,850	80,787	210,637
Primary, Not Completed	147,439	147,507	294,946	142,057	143,595	285,652
Primary, Completed	59,877	68,888	128,765	76,197	73,867	150,063
Lower Secondary	31,505	45,832	77,337	43,560	50,602	94,162
Secondary and Above	3,887	7,324	11,211	16,292	24,474	40,767
TOTAL	**384,998**	**363,929**	**748,927**	**407,956**	**373,325**	**781,281**

Source: Cambodia Inter-censal Population Survey 2013 (Statistics Bureau of Japan)

Error! Reference source not found. shows the total number of schools and total student e nrollment in Siem Reap Province in 2015. Prasat Bakong District has the 5th largest number of schools among the districts, and also has the 5th largest student enrollment in 2015 (MoEYS, 2015).

Table 4.2-19: Number of Schools and Enrollment in Siem Reap Province (2015)

Province/District	Number of Schools	Enrollment		
		Total	Boys	Girls
SIEM REAP	**1,013**	**230,936**	**115,235**	**115,701**
Angkor Chum	74	12,383	6,042	6,341
Angkor Thom	40	7,789	3,771	4,018
Banteay Srey	61	10,506	5,019	5,487
Chi Kreng	159	29,012	14,339	14,673
Kralanh	72	12,569	6,335	6,234
Prasat Bakong	**88**	**17,834**	**9,003**	**8,831**
Puok	122	28,656	14,309	14,347
Saut Nikum	120	24,321	11,868	12,453
Siemreap	120	62,061	31,847	30,214
Srey Snam	54	8,188	4,035	4,153
Svay Leu	58	8,122	3,900	4,222
Varin	45	9,495	4,767	4,728

Source: Ministry of Education, Youth and Sport, 2015

The percentage of the population attending school in Siem Reap did not experience much of a decrease in 2013 as it dropped by just 0.3% from 2008 for both males and females (NIS and JICA, 2013). This is shown in **Table 4.2-20**.

Table 4.2-20: Population Aged 6 and Over Attending School by Sex in Siem Reap (2013)

Population	2008			2013		
	Female	Male	Both Sexes	Female	Male	Both Sexes
Age 6 and Over	395,727	375,437	77,164	417,837	384,932	802,769
Attending School	102,378	112,268	214,646	107,983	113,126	221,109
% Share	25.9%	29.9%	27.8%	25.8%	29.4%	27.5%
TOTAL	**498,105**	**487,705**	**291,810**	**525,820**	**498,058**	**1,023,878**

Source: Cambodia Inter-censal Population Survey 2013 (Statistics Bureau of Japan)

Literacy rate of the population in Siem Reap aged 7 and over increased from 71.2 in 2008 to 75.3 in 2013 for both sexes. Historically, males have had a higher literacy rate than females in Siem Reap by as much as 10.2 points more as of 2013, as shown in **Table 4.2-21**.

Table 4.2-21: Literacy Rate of Population Aged 7 and Over in Siem Reap (2013)

Literacy	2008			2013		
	Female	Male	Both Sexes	Female	Male	Both Sexes
Literate	253,826	280,039	533,865	287,052	301,072	588,124
Illiterate	131,313	84,171	215,484	120,904	72,253	193,157
Not Reported	-	2	2	-	-	-
TOTAL	**385,139**	**364,212**	**749,351**	**407,956**	**373,325**	**781,281**
General Literacy Rate	65.9	76.9	71.2	70.4	80.6	75.3

Source: Cambodia Inter-censal Population Survey 2013 (Statistics Bureau of Japan)

The literacy rate, however, decreases slightly within the population aged 15 and over, as shown in **Table 4.2-22**, mostly due to the drop experienced by the female population as compared to the previous table.

Table 4.2-22: Literacy Rate of Population Aged 15 and Over in Siem Reap (2013)

Literacy	2008			2013		
	Female	Male	Both Sexes	Female	Male	Both Sexes
Literate	185,251	208,662	393,913	218,823	228,723	447,546
Illiterate	114,571	65,100	179,671	105,637	56,433	162,070
Not Reported	-	2	2	-	-	-
TOTAL	**299,822**	**273,764**	**573,586**	**324,460**	**285,156**	**609,616**
General Literacy Rate	61.8	76.2	68.7	67.4	80.2	73.4

Source: Cambodia Inter-censal Population Survey 2013 (Statistics Bureau of Japan)

4.2.9 Tourism

Tourism is one of the 4 pillars of Cambodia's economy. Cambodia received 6.20 million tourists in 2018 and 6.61 million tourists in 2019, but the number sharply dropped to 1.31 million tourists in 2020 and is expected to have an increase in 2021. Most of them are visiting Angkor Cultural Heritage Site during their stay in Cambodia; some travel especially and directly to Siem Reap, where they stay for 1-3 nights on average in hotels and accommodation. China tops the list for most travelers by nationality, with more than 1 million Chinese tourists visiting Cambodia in 2019.

In 2019, they recorded a total of 6.6 million tourist arrivals, staying at an average length of 6 days in the country, with a total international tourism receipt of USD $4.9 billion (MoT, 2020). Most international tourists visit Phnom Penh, followed by Siem Reap Angkor. On the other hand, the destination visited by local tourists is the Coastal Zone. These are presented in **Figure 4.2-7**.

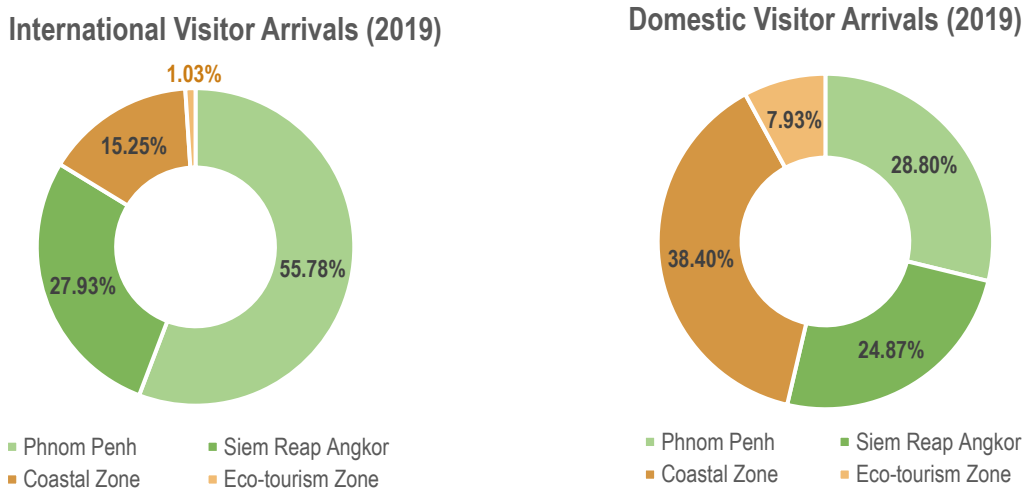


Figure 4.2-7: Domestic and International Visitor Arrivals in Cambodia by Destination (2019)

Source: Ministry of Tourism, 2020

However, the travel restrictions due to the COVID-19 pandemic significantly affected the sector. In 2020, only 1.3 million international tourist arrivals were recorded, or a decrease of 80% from the previous year (MoT, 2020) as shown in **Table 4.2-23**. In the same year, domestic tourist arrivals held 78% of the total tourist arrivals, in contrast to the previous years where share of domestic and international tourist were fairly close, as presented in **Table 4.2-24**. Among the destinations, Siem Reap showed the highest decrease in arrivals for both local and international tourists at a decrease of 65.8% and 80.8% respectively.

Table 4.2-23: International Arrivals, Average Length of Stay, Hotel Occupancy and Tourism Receipts (2015-2019)

Year	International Tourist Arrivals		Average Length of Stay (Days)	Hotel Occupancy (%)	International Tourism Receipts (USD $ million)
	Number	% Change			
2015	4,775,231	6.1	6.8	70.2	3,012
2016	5,011,712	5	6.3	68.9	3,212

Year	International Tourist Arrivals		Average Length of Stay (Days)	Hotel Occupancy (%)	International Tourism Receipts (USD $ million)
	Number	% Change			
2017	5,602,157	11.8	6.6	71.3	3,638
2018	6,201,077	10.7	7	72.2	4,375
2019	6,610,592	6.6	6.2	63.5	4,919
2020	1,306,143	-80.2	no data	no data	no data

Source: Ministry of Tourism, 2020

Table 4.2-24: Tourist Arrivals in Cambodia by Destination (2019-2020)

Region		2019		2020		% Change	
		Local	Int'l	Local	Int'l	Local	Int'l
Phnom Penh		2,381,301	4,404,895	1,835,414	905,254	-22.9	-79.4
Siem Reap Angkor		2,056,609	2,205,697	703,147	400,889	-65.8	-81.8
Coastal Zone		3,175,780	1,204,374	2,873,483	356,863	-9.5	-70.4
Preah Sihanouk		1,343,690	885,792	793,607	225,316	-40.9	-74.6
Eco-tourism Zone		656,029	81,588	582,423	24,887	-11.2	-69.5
TOTAL	**Number**	**8,269,719**	**7,896,554**	**5,994,467**	**1,687,893**	**-27.51**	**-78.62**
	Percentage	**51.2%**	**48.8%**	**78.0%**	**22.0%**		

Source: Ministry of Tourism, 2020

4.2.10 Health

The diseases that are considered as endemic to Cambodia are (i) tuberculosis, (ii) malaria, and (iii) dengue. Besides that, waterborne disease such as cholera, diarrhoea, typhoid, malaria, dengue fever and skin infection (MPWT and CDI, 2019) are found mainly due to the dirty water, which is contaminated by inappropriate waste disposal. Siem Reap Province is one of the provinces with the highest cumulative cases of waterborne diseases in the country (Choi, et al., 2016).

Table 4.2-25 summarizes the health situation in Siem Reap as of 2014[33]. Notable data includes the percentage of children under five (<5) who are stunted at 36% and 52% of children aged 6-59 months with any anemia. Data on children mortality show that for every 1,000 births, there are 40 infant deaths and 56 deaths under the age of five. Women aged 15-49 who experienced domestic violence comprised 23% of women between 15 to 49 years old (NIS, DGH and ICF International, 2014).

Table 4.2-25: Health Indicators for Siem Reap (2014)

Fertility		
Total fertility rate	number of children per woman	2.7
Median age at first marriage for women age (25-49)	years	20.5

[33] Latest available health data for Siem Reap

Women age 15-19 who are mothers or currently pregnant	%	15
Women age 15-49 who ever had an abortion	%	14
Family Planning (married women age 15-49)		
Using any method	%	59
Using any modern method	%	47
Unmet need for family planning	%	12
Maternal Health (women age 15-49)		
Antenatal care from skilled provider	%	96
Births delivered in a health facility	%	92
Births assisted by a skilled provider	%	93
Child Health		
Children age 12-23 months who received all basic vaccinations	%	79
Nutrition		
Children under 5 who are stunted	%	36
Children under 5 who are wasted	%	10
Children age 6-59 months with any anemia	%	52
Women age 15-49 who are obese	%	17
Women age 15-49 with any anemia	%	41
Children Mortality		
Infant mortality	deaths per 1,000 live births	40
Under-five mortality	deaths per 1,000 live births	56
HIV/AIDS (age 15-49)		
Women tested for HIV in past 12 months and received result	%	11
Men tested for HIV in past 12 months and received result	%	5
Domestic Violence (women age 15-49)		
Ever experienced physical violence since age 15	%	23
Ever experienced sexual violence	%	9

Source: Cambodia Demographic and Health Survey 2014

As of 2016, Siem Reap recorded a total of 88 health centers, five (5) referral hospitals, and 23 private health clinics to service its population. Moreover, there are 259 pharmacies. There are also 209 non-government health staff in Siem Reap (Kem & Chhan, 2016). This information is further summarized in **Table 4.2-26**.

Table 4.2-26: Health Infrastructure in Siem Reap (2016)

Health Centers (HC)	
No. of HC	88
No. of HC beds	484
HC beds/100,000 people	46.7
No. of HC staff	461

HC staff/100,000 people	44.5
Referral Hospitals (RH)	
No. of RH	5
No. of RH beds	631
RH beds/100,000 people	60.9
No. of RH staff	312
RH staff//100,000 people	30.1
Private Health Clinics (PHC)	
No. of PHC	23
PHC beds/100,000 people	100
Pharmacies	
No. of pharmacies	259
No. of pharmacies/100,000 people	59.6
NGOs	
Health NGOs staff	209
NGOs staff/100,000 people	20.2

Source: The Challenges of Public Health in Pailin and Siem Reap Provinces, November 2016

Respiratory diseases, malaria, dengue fever and diarrhea commonly occur in the northern provinces of Cambodia, including Siem Reap, most especially during rainy season. In dry season, some of these diseases still occur, particularly respiratory diseases due to dust, and diarrhea due to bad sanitation condition. Waterborne disease is mainly found due to the dirty water which is contaminated in the water body and caused from waste disposal without appropriated landfill. Waterborne diseases that can be found in the area include cholera, diarrhea, typhoid, malaria, dengue fever and skin infection (MPWT and CDI, 2019). Siem Reap, in particular, is one of the provinces with the highest cumulative cases in the country as illustrated in **Figure 4.2-8** (Choi, et al., 2016).

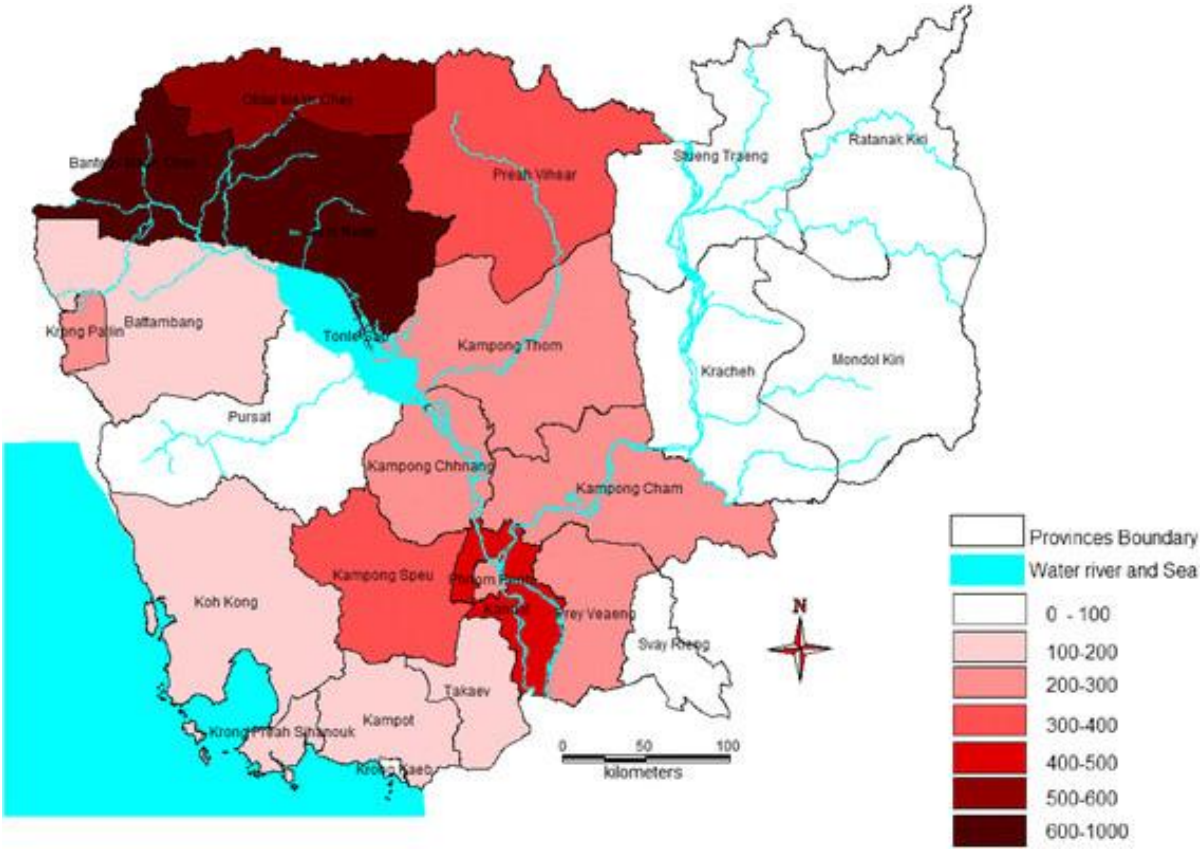


Figure 4.2-8: Cumulative Incidence of Dengue Cases per 100,000 Population in Cambodia (2012)

Source: Choi, et al (2016)

Within the area of the landfill site option 2, the most common disease occurrence, especially during rainy season, are respiratory diseases, malaria, dengue fever and diarrhea. In dry season, some diseases are still occurring such as respiratory disease due to the dust and emission from the transportation, and diarrhea due to bad sanitation condition.

Waterborne disease is mainly found due to the dirty water which is contaminated in the water body and caused from waste disposal without appropriated landfill. According to the field observation conducted for the nearby wastewater treatment plant, the waterborne diseases that can be found in the area include cholera, diarrhea, typhoid, malaria, dengue fever and skin infection.

4.2.11 Cultural Heritage

Within Siem Reap City, there are existing physical and cultural heritage sites that include the Royal Palace which is located on National Road No. 6 immediately to the west of the Siem Reap River. Nearby the possible sub-project areas, the Angkor temple complex which is of major UNESCO cultural heritage significance. Shown on the map below, the site option 1 is about 26 km from Angkor temple complex while the site option 2 is about 8.5 km from the Angkor temple complex

The Angkor Zone is one of the cultural heritage sites in Cambodia that has been inscribed in the UNESCO's World Heritage List. The site in Banteay Srei, Roluos, and the core segment of Angkor falls under Zone 1, while the surrounding areas of Angkor fall under Zone 2

(APSARA National Authority, 2011). Its components and their respective land areas are shown in **Table 4.2-27** and illustrated in **Figure 4.2-9**.

Table 4.2-27: Properties Inscribed on the World Heritage List in Cambodia

Component	Region	Zone 1 (sq.km.)	Zone 2 (sq.km.)
Angkor	Siem Reap	162	189
Roluos	Siem Reap	28	2
Banteay Srei	Siem Reap	18	2
TOTAL (sq.km.)		**208**	**193**
		401	

Source: APSARA Authority, 2011

APSARA has indicated that archaeological relics are common throughout the Siem Reap area and that there may be potential for such relics to exist at the wastewater treatment plant (WWTP) and the location for Option 2 - new sanitary landfill facility (SLF).

Given the highly disturbed nature of the site, having been historically utilised for a quarry before, and its present use as a landfill as well as agricultural use of surrounding areas, it is unlikely that any undisturbed relics of historical or archaeological significance remain at the current site and potential extension areas (Option 1). However, this would require further evaluation based on final concept design.

Based on Figure 4.1-9, the landfill site options are not within the influence area of any of the heritage zone areas. Figure 4.1-10 shows the distance from the nearest heritage sites to the two (2) site options in Siem Reap.

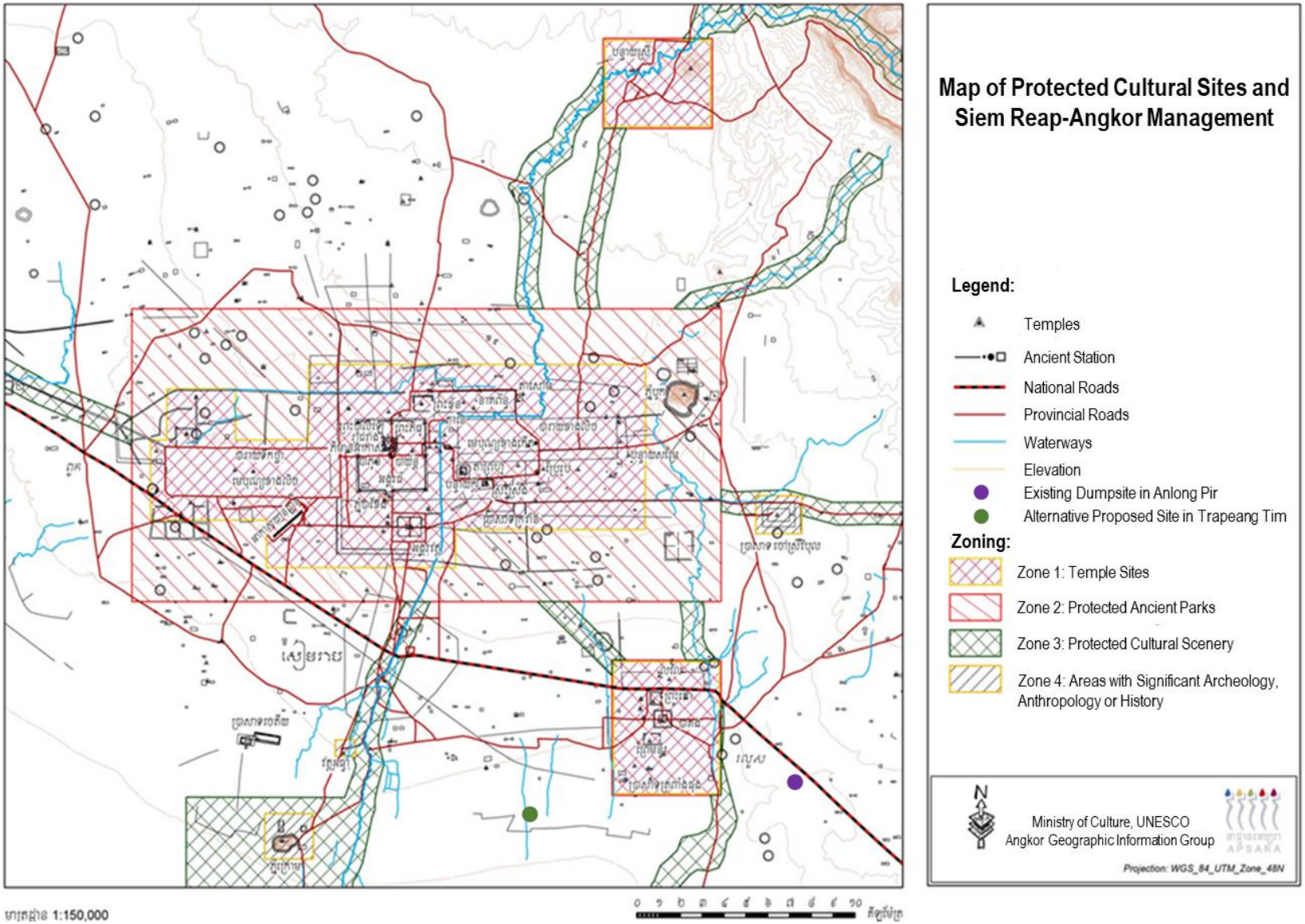


Figure 4.2-9: Map of Cultural Heritage Areas under the Protection of APSARA Authority

Source: APSARA Authority, 2021

Note: With annotations from the Study Team on the approximate locations of the two alternative sites.

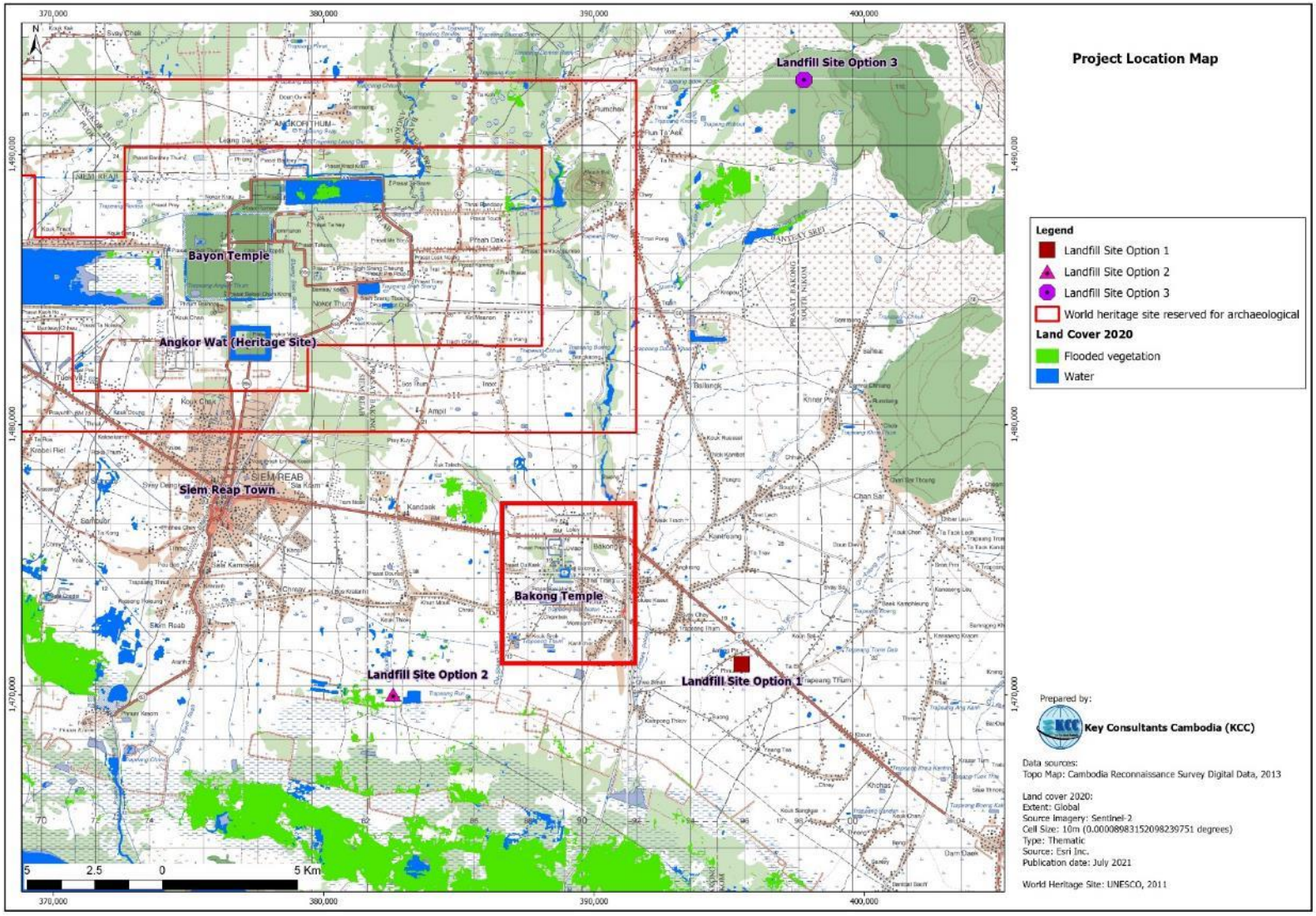


Figure 4.2-10: Map of the Siem Reap Site Options and the Cultural Heritage Sites in Siem Reap

Source: Cambodia Reconnaissance Survey Digital Data 2013; Map prepared by KCC August 2021

APSARA has indicated that archaeological relics are common throughout the Siem Reap Province that there is a possibility that these may exist in sites being assessed. For sites that are currently used for agricultural purposes, finding undisturbed relics is "considered unlikely". However, in the event that relics are found, the projects must adhere to existing cultural heritage and protection laws and procedures on how to handle such situations.

Apart from the Angkor Temples, the RGC has submitted additional sites in Siem Reap Province for consideration by UNESCO, including the following:

- Beng Malea Temple – located in the Beng Mealea village, Beng Mealea Commune, Svay Leu District, Siem Reap Province (Royal Government of Cambodia, 2020). While the temple is outside the Angkor Zone, it is being managed by the APSARA Authority.
- Phnom Kulen: Archeological Site/Ancient Site of Mahendraparvata – a 37,375 hectares proclaimed national park in Banteay Srey, Svay Leu and Varin districts, Siem Reap Province about 30 kilometers from Tonle Sap Lake. It has been under the APSARA Authority since 2008 (Royal Government of Cambodia, 2020).

4.3 SOCIO-ECONOMIC SURVEY AT EXISTING DUMPSITE

4.3.1 Inventory Results

Based on the latest inventory collected by the Trapeang Thom Commune received last March 2021, there were a total of 273 waste-pickers identified in the existing dumpsite in Anlong Pir. Only information on name, age, sex, and address were gathered by the commune.

Majority of the waste-pickers reside in the villages of Phnom Dey (52.8%) and Anlong Pir (47.4%), some 200-400 meters from the existing dumpsite. **Figure 4.3-1** shows the disaggregation of information on the residence of waste-pickers per village.

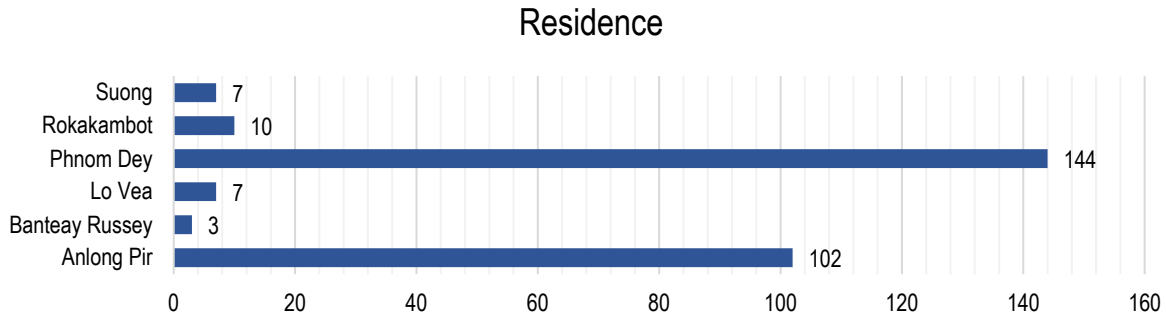


Figure 4.3-1: Distribution by Residence

Among the 273 identified waste-pickers, about two-thirds (64.3%) are female. The largest disparity in the age and sex distribution among the waste-pickers are between the ages of 18 to 30, wherein there were more females identified.

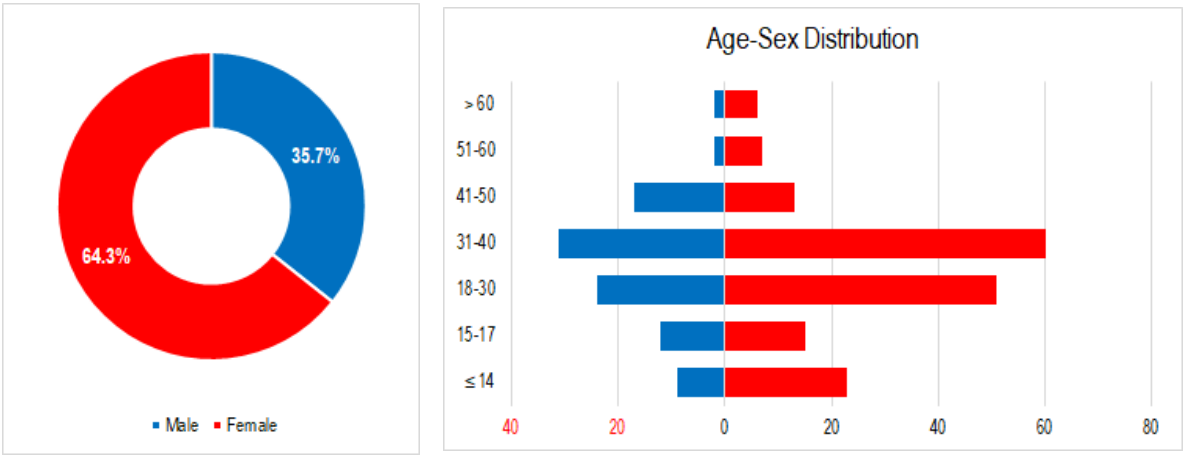


Figure 4.3-2: Waste-pickers by Sex, and Age-Sex Distribution

About a quarter of the waste-pickers are on the younger spectrum of the age groups, wherein 11.7% are children (aged 14 years and below) and 9.9% are between 15 to 17 years old. Among them, there are more younger females, especially those aged 14 years and below. Similarly, among adults between 18 to 60 years old, there are almost twice as much females as there are males. Among the children, 15 out of the total of 59 are orphans where 8 are girls are boys. These orphans mostly live in Phnom Dey Village and many of them are Poor ID holders. These are presented in **Table 4.3-1**.

Table 4.3-1: Waste-pickers by Sex and Age Group

	Number	% Share	Orphaned
Children (14 y/o and below)	32		15
Male	9	3.3%	7
Female	23	8.4%	8
Children (15-17 y/o)	27		
Male	12	4.4%	
Female	15	5.5%	
Adult (18-60 y/o)	206		
Male	74	27.1%	
Female	131	48.0%	
Elderly (>60 y/o)	8		
Male	2	0.7%	
Female	6	2.2%	
Total	**273**	**100.0%**	**15**

Disaggregating this information by their location, majority (73.9%) of the children are from Phnom Dey Village. Similarly, almost all (87.5%) of the elderly waste-pickers are from the same village. Majority (67.8%) of the children waste-pickers are also from Phnom Dey. Among the adult waste-pickers from almost all villages, with the exception of Suong, have more females than males. **Table 4.3-2** presents the data on waste-pickers by village, sex, and age.

Table 4.3-2: Waste-pickers by Village, Sex, and Age Group

Age Group / Sex	Anlong Pi		Banteay Russey		Lo Vea		Phnom Dey		Rokakambot		Suong	
Children (14 y/o and below)	**7**		**0**		**1**		**22**		**0**		**2**	
Male	4	3.9%	0	0.0%	0	0.0%	3	2.0%	0	0.0%	2	28.6%
Female	3	2.9%	0	0.0%	1	14.3%	19	13.2%	0	0.0%	0	0.0%
Children (15-17 y/o)	**5**		**0**		**2**		**18**		**2**		**0**	
Male	2	2.0%	0	0.0%	0	0.0%	8	5.6%	2	20.0%	0	0.0%
Female	3	2.9%	0	0.0%	2	28.6%	10	6.9%	0	0.0%	0	0.0%
Adult (18-60 y/o)	**89**		**3**		**4**		**97**		**8**		**5**	
Male	36	35.3%	1	33.3%	1	14.3%	30	20.8%	3	30.0%	3	42.9%
Female	52	51.0%	2	66.7%	3	42.9%	67	46.5%	5	50.0%	2	28.6%
Elderly (>60 y/o)	**1**		**0**		**0**		**7**		**0**		**0**	
Male	0	0.0%	0	0.0%	0	0.0%	2	1.4%	0	0.0%	0	0.0%
Female	1	1.0%	0	0.0%	0	0.0%	5	3.5%	0	0.0%	0	0.0%
Total	**102**	**100.0%**	**3**	**100.0%**	**7**	**100.0%**	**144**	**100.0 %**	**10**	**100.0 %**	**7**	**100.0 %**

4.3.2 Socioeconomic Survey (SES) Results

A socioeconomic survey was administered to four (4)[34] respondent groups:

1. Waste-pickers at the Anlong Pir Dumpsite;
2. Owners and workers of junk shops near the Anlong Pir Dumpsite;
3. Households within the 1-km radius of the Anlong Pir Dumpsite in Trapeang Thom Commune; and
4. Households within the 1-km radius of the site option located in in Trapeang Tim Village, Kandaek Commune.

The socioeconomic survey activities were conducted from 13 April to 18 May 2021 using the forms provided in **Annex D.2**. This section summarizes the key results and findings from the survey, while the detailed results are further elaborated in **Annex E.1**.

4.3.2.1 Waste-pickers

4.3.2.1.1 Profile of Respondents

A total of 75 waste-pickers were interviewed for the socioeconomic survey. Majority of the respondents (67%) are female, most (54%) of whom are living in the village of Phnom Dey. Adults (21 to 59 y/o) make up 86.7% of the respondents, most of whom are married (80%). Majority (55%) of the surveyed households are male-headed, while 28% are female-headed. There were children interviewed , which comprise 13% of the respondents. However, about half (47%) of the respondents had other members of the households who were also working as waste-pickers. Among these included children, most of whom belonging from male-headed households.

[34] The staff of GAEA were included among the intended respondents of the SES to gain their perspective on how the possible sub-project may affect them. However, no interviews were conducted due to the failure to get the permission due to COVID.

All of the respondents are Buddhist Khmers from within Siem Reap; one came from Poi Pet City. All respondents have resided in Siem Reap for over ten (10) years. Reasons given for their current residence include proximity to livelihood (100%), family ties (96%), and marriage (4%). Only 21.3% reported having been a recipient of ID Poor, while 78.7% said they received no government support or transfer. Almost all (90.7%) said they are not a member of any organization because of work and lack of information on organizations present in their area.

4.3.2.1.2 Waste-picking Set-up

The morning shift is the most (97.3%) popular among the interviewed waste-pickers. Only 8% took the evening shift, most of whom are adult males. Almost all (93.3%) reported working two shifts. Average hours reported for the morning shift is 4.8, 4 hours for the afternoon shift, and 11 hours for the evening shift. Males and females, on average, worked almost the same number of hours per shift.

For the morning shift, most of the respondents reported working between 7am to 12nn (58% among males and 50% among females), while in the afternoon, most reported working from 1 to 5pm (40% among males and 36% among females). Only two females reported working the evening shift: one from 7pm to 7am and the other from 5 to 8pm.

Almost all (96%) reported working during weekdays (95.8% for males and 96.1% for females), with majority (69.3%) working daily (64% among males and 72% among females). About a third (30.7%) of the respondents has been working as waste-picker for ten (10) years already and 34.7% has worked as such for more than ten (10) years. Majority of male (60%) and female (68%) respondents have been in waste-picking for ten (10) years up.

4.3.2.1.3 Income and Loans[35]

Only one respondent reported earning USD $392.55 (KHR 1,600,000) per month from waste-picking, the largest recorded amount from the survey. However, most (15, or 20%) reported earning USD $73.6 (KHR 300,000) per month. The greatest number of males (9, or 36%) reported earning between USD $101 to $200 per month, while among females, 20 (40%) said they earn between USD $51 to $100.

Majority (64%) of the respondents (62% females and 68% males) said waste-picking is their primary source of income, while the rest rely on other sources as their primary income source, namely construction work (17%) and rice farming (13%).

Majority (65%) of the respondents work multiple jobs – 70% for female respondents, 56% for male respondents. More than half (52%) of those with multiple jobs work part-time and a few (13%) works full-time. Those who have other part-time work (41.3%) are engaged in rice and livestock farming, while those who have other full-time work are in construction (8%). There is also a fulltime hotel/restaurant/house worker, a full-time livestock farmer, a fulltime rice farmer, and a small-scale business owner.

More than half (52%) of the female respondents reported having borrowed money in the past year, while majority (64%) of the males said they did not. Microfinance institutions (MFI) is a popular source of loan among respondents (57.7% among females and 77.8% among males), followed by private bank (34.6% among females and 22.2% among males). Loans were mostly

[35] Conversion rate used is USD $1.00 = KHR 4,075.94, based on rates from June 30, 2020 to May 10, 2021.

made for house renovation and improvement (42.3% among females and 55.6% among males). Four (15.4%) female respondents said they took out loans for their daily expenses. Only two respondents (one female and one male) took out loans to use as capital for their business.

Amount loaned range from USD $200 to $20,000, with monthly interest rate ranging from USD $10 to $260. Loan terms range from 12 to 84 months, with more than a third (37.1%) of the respondents opting for intermediate (13 to 36 months) term.

4.3.2.1.4 Waste Collected

The most type of waste collected is Plastic Type 1 (100%) composed of plastic bottles, followed by HDPE bottles (98.7%), tin cans (92%), beer and soda cans (Aluminum Type 1) (86.7%), and glass bottles (85.3%). The top 5 type of waste collected by material are: 1) plastic, 2) tin, 3) aluminum, 4) glass, and 5) paper. Most (84%) of the respondents sell their collected waste to waste collectors/consolidators located in the provincial center. Only 12% said they sell their collected waste to a local junk shop located within the village.

4.3.2.1.5 Health Status

About half (50.7%) of the respondents reported falling ill since they started waste-picking, with headache (47.4%) as the most reported. Other illnesses reported include diarrhea (10.5%), dengue (10.5%), flu (10.5%), hypertension (10.5%), neck lump, low blood sugar, and typhoid fever (10.5%).

4.3.2.1.6 Perceptions on Impact of possible Dumpsite Closure

Majority (61.3%) expressed concern over their possible loss of income source in case of closure of the dumpsite, while a fourth (25.3%) feared losing their job. Three (4%) female respondents are worried their debt might increase.

4.3.2.2 Owners and Workers of Nearby Junk Shops

4.3.2.2.1 Profile of Respondents

A total of 11 junkshop owners and workers were interviewed for the survey. Majority (72.7%) of the respondents are male---two (2) live in Chong Kavsou, another two (2) are from Trapeang Ses, one (1) from Choun Long, one (1) from Phnom Dei, one (1) from Angkrong, and one (1) from Damdeak. The rest of the respondents are women--- one (1) lives in Treang, another one (1) lives in Taeksin Tbuong, and one (1) lives in Tavien. All of the respondents are married, working-age adults, or those who are between 21 to 59 years old. On the other hand, older adults, or those who are 60 years old and over, comprise 27.3% of the respondents. There were no children interviewed.

All of the respondents are Buddhist Khmers, majority (63.4%) of whom are from within Siem Reap. The rest came from outside Siem Reap—one (1) from Battambang, two (2) from Kampong Thom, and one (1) from Phnom Penh. Almost all (90.1%) of the respondents have resided in Siem Reap for over ten (10) years. Their primary reason for their current residence is proximity to their source of livelihood (100%). None of the respondents are recipients of any government support or transfer programs. All respondents said they are not a member of any organization. Majority (72.7%) of the respondents own the junk shop or waste-related

business, while the rest are workers in these establishments. All of the respondents said they reside near the vicinity of the dumpsite.

4.3.2.2.2 Waste-Related Businesses Near the Anlong Pir Dumpsite

When asked to specify the type of business they are engaged in 8 out of 11 respondents said they run a junk shop, while 3 out of 11 respondents were waste collector/consolidators. The average number of employees is 3.7. Of all respondents, 6 employed both part-time and full-time workers. All full-time workers of the surveyed businesses gave their salaries on a monthly basis, while most of the part-time workers receive them on a day-to-day basis (85.7% of part-time employees). The average salary[36] of daily wage part-time employees USD $7 per day, while weekly wage part-time employees receive USD $45 per week. For full-time monthly wage employees, the average monthly salary is USD $140. Eight out of eleven responding businesses provided protective equipment to their employees, while the rest do not.

The businesses operate on an average of 10.5 hours daily – 45.45% of them operate from 7:30 AM to 5:00PM, 45.45% of them operate from 7:00 AM to 5:30 PM, and 9.10% operate from 7:00 AM to 6:00 PM. The respondents did not specify the days of the week when they operate.

The average estimated monthly income of the surveyed businesses is USD $950. Less than half of the respondents (45.5%) earn below this average estimated monthly income. About one in three of the businesses (36.4%) have been operating for over a decade, with the longest operating for 32 years. The remaining businesses are operating for about a year (9.1%), two to five years (36.4%), and six to ten years (18.2%).

All of the respondents said they collect plastics, metal, paper/cardboard, and aluminum. On the other hand, 72.7% collect glass, and 45.5% collect electronic waste. None of the surveyed businesses collected textile/fiber and wood. The volume of waste for plastic ranges from 20 to 500 kg per day. For metal, the volume ranges from 10 to 700 kg per day. For paper/cardboard, the volume ranges from 30 to 500 kg per day. For aluminum, the volume ranges from 6 to 500 kg per day. For glass, the volume ranges from 250 to 650 kg per day. Lastly, the volume for electronic waste ranges from 50 to 200 kg per day. As for the prices, the most expensive waste is electronic waste (ranging from USD $20,300 to $20,500), followed by aluminum (USD $4,200 to $6,000), plastic (USD $450 to $6,000), metal (USD $650 to $1,200), paper/cardboard (USD $4,300 to $650), and glass (USD $120 to $200).

The details on the types of waste collected by the surveyed businesses and the volume and purchase price for each type of waste are shown in **Table 4.3-3**.

Table 4.3-3: Type of Waste Collected by Volume and Purchase Price

Waste	Frequency		Volume (kg per shift/day)			Purchase Price (USD $ per kilo)		
	Number	%	Min	Average	Max	Min	Average	Max
Plastic	11	100.0%	20	264	500	450	1,475	6,000
Metal	11	100.0%	10	331	700	650	1,024	1,200
Paper/Cardboard	11	100.0%	30	211	500	300	392	650

[36] Conversion rate used is USD $1.00 = KHR 4,075.94, based on rates from June 30, 2020 to May 10, 2021.

Electronic Waste	5	45.5%	50	90	200	20,300	20,440	20,500
Glass	8	72.7%	250	475	650	120	156	200
Textile/Fiber	0	0.0%	-	-	-	-	-	-
Wood	0	0.0%	-	-	-	-	-	-
Aluminum	11	100.0%	6	252	500	4,200	5,075	6,000

Source: Survey for Junk Shop Owners and Workers (2021)

When asked to specify other income sources, most (81.8%) of the respondents said they do not have other sources of income, while the rest said they are also engaged in seasonal rice farming.

4.3.2.2.3 Loans and Borrowing Behavior

Less than half (45.5%) of the respondents reported having borrowed money in the past year, while the majority (54.5%) said they did not. Private banks are a popular source of loan among respondents (100% among females and 33.3% among males), followed by microfinance institutions (none among females, 33.3% among males). All respondents who disclosed that they loaned money for the past year have used the money as capital for their business. As of the conduct of the survey, none of the respondents have paid off the loans that they have taken out. Amount loaned range from USD $1,000 to $54,000 , with monthly interest rate ranging from USD $30 to $1,300. The estimated average amount loaned is USD $25,000. Loan terms range from 6 to 120 months, with most (80%) of the respondents opting for long-term loans, or loans to be paid off for a period of over three (3) years. Most (80.0%) of the respondents' loans required collateral, particularly land titles.

4.3.2.2.4 Perceptions on Impact of Dumpsite Closure

About half (45.5%) of the respondents said that they will not be able to buy from waste-pickers if the dumpsite is closed (Response: 'never buy waste from waste-pickers'), while 27.3% said they can buy from other sources, including house-to-house[37]. The remaining 27.3% said that they will not be affected since they buy from middlemen[38].

4.3.2.3 Anlong Pir Households

4.3.2.3.1 Profile of Respondents

A total of 35 households within the one-kilometer radius of the existing dumpsite were interviewed for the survey. More than half (54%) of the respondents are female, and the average household size recorded is 3.54. As the data gathering specified the interview of households within the one-kilometer radius of the existing dumpsite, all of the respondents are from Anlong Pir Village, Trapaeng Thom Commune. Almost all (91.4%) of the respondents are working-age adults (21 to 59 years old), most of whom are married (97.1%). There were no children and youth interviewed.

Most (97.1%) of the respondents are Buddhist Khmers from within Siem Reap Province and one came from Battambang City. Most (94.29%) have been living in Siem Reap for more than ten (10) years. Reasons given for their current residence include proximity to livelihood

[37] Response: 'Buy from home inside the village instead'
[38] Response: 'Not affected, buy from other middle man'

(100%), family ties (82.9%), and marriage (17.1%). Only one in ten households (11.4%) reported having been a recipient of ID Poor, all of which are female respondents, while the rest said they are not recipients of any government support or transfer programs.

4.3.2.3.2 Loans and Borrowing Behavior

Majority of the respondents (62.9%) have borrowed money in the past year (54.5% males, 45.5% females). About three in four (77.3%) loan borrowers acquired them from microfinance institutions. This is followed by those who borrowed from private banks (18.2%) and those who borrowed from family members (4.5%). Over half of the MFI borrowers (58.8%) got their loan from Amret.

Amount loaned range from USD $250 to $15,000, with a monthly interest rate ranging from USD $10 to $195. Loan terms range from 12 to 84 months, with more than half (59.1%) of the respondents opting for a long-term loan (over 36 months) and the remaining (40.9%) opting for an intermediate (13 to 36 months) term. All borrowers have yet to pay back the money they borrowed. All borrowers used collaterals to access the loan, most (90.9%) using land titles.

4.3.2.3.3 Information on Land and Residence

Most (94.3%) of the respondents are the sole owners of the land and structure they are currently residing in, while the rest reside in lands owned by their parents. All respondents use their current structure as their permanent residence. Majority (24, or 68.57%) use a mix of light and strong materials as housing materials for their residence, while eight (22.86%) use solely light materials, and three (8.57%) solely use strong materials. About half of the respondents (51.4%) reside in structures with an estimated floor area between 32 to 49 sq.m. This is followed by households living in residences with an estimated floor area of 50 sqm and above (40.0%), those living in residences with an estimated floor area of 17 to 30 sqm (5.7%), and those living in residences with an estimated floor area of 16 sq.m. and below (2.9%).[39]

About half (48.6%) said they have separate structures apart from their current residence. Among these households include those who have pig pens (52.9%), stores (35.3%), and storage space or warehouse (5.9%). One household did not identify which specific structure they have.

All respondents have experienced at least one natural hazard in their current residence. All respondents have experienced drought, while one in four (25.7%) households have experienced flooding. The respondents did not specify how frequent these hazards occurred.

4.3.2.3.4 Engagement in Waste-picking

Among the interviewed households, about one in four (28.6%) are engaged in waste-picking, with an estimated weekly income from waste-picking ranging from USD $12 to $74.

4.3.2.3.5 Source of Income of the Household

[39] According to the 2019-2020 NIS Socio-Economic Survey, the average floor area in Cambodia is 55.4 sq.m.. This varies for different geographic areas: 68.7 sq.m. in Phnom Penh, 57.3 sq.m. in other urban areas, and 51.5 sq.m. in rural areas (NIS and SIDA, 2020).

Majority (60.0%) of the surveyed households have multiple sources of income, while the remaining (40.0%) only have a single income source. About one in five (14.3%) respondent households have an estimated monthly household income below USD $200.[40] The income range of those that rely on a single source is between USD $98 to $196. On the other hand, those with multiple income sources have a wider disparity with estimated incomes ranging from USD $172 to $6,673. The average monthly income of those with only a single income source is USD $338, while the average monthly income for those with multiple sources is four times this amount at USD $1,377.[41]

Majority of the expenditures spent were on food items in an average annual expense of USD $1,566, followed by leisure (average of USD $275), third is education (average of USD $209), fourth is health (average of USD $134), fifth is electricity (average of USD $97), sixth is clothing (average of USD $78), seventh is telecommunications (USD $50), and vehicle-related expenses (average of USD $13).

4.3.2.3.6 Decision-making in the Household

Over half (54.28%) of the surveyed households said that both the husband and wife decide on whether to let children continue school or send them to higher education. This is followed by those who let their children decide[42] (31.4%), those who let their husband make the sole decision (11.4%), and those who let their wife make the sole decision (2.9%).

Concerning household expenses, 48.6% said that the husband gives his income to the wife and the wife manages the funds for household expenses. Those who pool their income (husband and wife) for household expenses comprise 42.9%, while 5.7% said the husband collects income from wife and other members for household expenses (2.9%).

4.3.2.3.7 Information on Health

About two in three (65.7%) respondents said they caught communicable disease/s within their households in the past year, while 57.1% of the households have members that have had non-communicable disease/s. Among the communicable diseases identified, the most predominant is having experienced flu in the past year (45.7%), followed by typhoid fever (17.1%), diarrhea (14.3%), and pneumonia (11.4%). Among non-communicable diseases, the most predominant is hypertension (28.6%), followed by diabetes (8.6%), and heart ailments (5.7%). When asked which diseases have caused death within their community, the most common responses are traffic accidents (71.4%), old age (62.9%), hypertension (45.7%), heart disease (42.9%), diabetes (27.1%), and cancer (22.9%).

When asked which health care provider they are able to regularly access, 57.1% answered referral hospitals, followed by private (25.7%), and public (14.3%) hospitals. On the other hand, all respondents expressed that doctors and healthcare workers are available daily on the respective health facilities they access. In detailing the specific services that the health facilities offer, the responses given were maternity/lying-in services (28.6%), followed by

[40] As of January 2021, the monthly minimum wage for regular workers in Cambodia is USD $192, and USD $187 for probationary workers. This minimum wage set by the Ministry of Labor and Vocational Training is only applicable to workers in the textile, garment, and footwear industries (Medina, 2021).
[41] Conversion rate used is USD $1.00 = KHR 4,075.94, based on rates from June 30, 2020 to May 10, 2021.
[42] Response: "Own decision".

vaccination (25.7%), medical consultations (20%), free medicines (17.14%), and family planning services (8.57%).

As for the nearest medical facilities to their residence, 62.9% of the respondents specified a referral hospital in Trapeang Thom as the nearest medical facility in their area. This is followed by 31.4% who identified a private medical facility in Roluos Village, and 5.7% who identified a provincial hospital in Siem Reap. Most (74.3%) of the respondents have received a vaccination program from the national or local government, while 25.7% have received a maternity program.

4.3.2.3.8 Information on Household Utilities

The most popular source of drinking water is deep well (85.7%), followed by shallow well (14.3%), and water vendors (2.9%). For household use, 85.71% source from deep wells, while the rest fetch from shallow wells (14.29%). Most (91.4%) of the respondents have not experienced any illnesses because of unclean drinking water. However, 8.6% reported to have experienced kidney stones. Additionally, about one in three (31.4%) households experience issues in their water supply due to natural hazards, such as flooding or drought, while the rest said they do not encounter such problems. Most (81.8%) of those who experience issues have specified poor water quality, followed by water supply interruption (18.2%). As for access to electricity, most (74.3%) have their own meter, while the rest share with others (25.7%). All of the surveyed households are connected to the Electricite du Cambodge (EDC). In terms of sanitation, most (88.57%) said they have their own water-sealed toilets (inside the house), while the rest did not specify the sanitation facility they use. In terms of cooking, majority (51.4%) of the respondents use gas, followed by firewood (34.3%), charcoal (11.4%), and electricity (2.9%). As for their solid waste disposal practices, 80.0% burn their waste, while only one in five (20%) households use the Anlong Pir Dumpsite.

4.3.2.3.9 Perceptions on Impact of Dumpsite Closure

All of the respondents have heard about the proposal for a sanitary landfill in the area. None of the respondents have specified where they first heard about the project. Over half (54.29%) shared potential benefits over the improvement of proper waste management facility, while 28.6% said that they do not know if there are any benefits. Among the potential benefits cited include improvements in hygiene and health (5.7%) and employment/business opportunities (2.9%). Some households (8.6%) expressed that no potential benefits or positive impacts would come out of the project.

Around one in three households (31.4%) expressed concern over the negative effect on their house and on their business (2.86%). Some (17.1%) said that their livelihood would be affected, while 11.4% expressed concern on the possible adjustments that would have to be done because of the project. The remaining (37.1%) believed that the project will not affect them and their livelihoods. All of the respondents said that the government or project proponents cannot address their concerns and mitigate the negative effects of the project.

When asked to provide recommendations, two in five (42.9%) recommended to reduce the unpleasant smell and resolve the issue of flies and vectors inside the village due to the waste. Some claimed that it has affected the health of the community, with some even leading to deaths (5.7%). About one in five (17.1%) recommended or hoped for the closure of the Anlong

Pir Dumpsite, while 2.86% cited the need to enforce strict rules to address waste disposal and smell problems. The remaining (37.1%) said they have no recommendation.

4.3.2.4 Trapeang Tim Households

4.3.2.4.1 Profile of the Respondents

A total of 20 households in the vicinity of the landfill site option 2 in Trapeang Tim Village, Kandaek Commune, were interviewed for this study.

The average household size recorded among respondents is 3.05. Most (90.0%) of the respondents are male. As the data gathering specified the interview of households in the vicinity of the landfill site option 2 in Kandaek Commune, all of the respondents are from Trapeang Tim Village. Working-age adults, or those 21 to 59 years old, make up most (80.0%) of the respondents, all of whom are married. There were no children and youth interviewed. There was elderly, which comprised 20.0% of the respondents.

All of the respondents are Buddhist Khmers. All respondents are from Siem Reap and have resided in the province for over ten years. Primary reason given for their current residence is proximity to livelihood (100.0%). Half of the respondents (50.0%) reported that they are recipients of ID Poor transfers, while the other half said they received no government support or transfer.

4.3.2.4.2 Loans and Borrowing Behavior

Two in five respondents (40.0%) reported having borrowed money in the past year, while the rest have not. Half (50.0%) of the borrowers got their loans from microfinance institution, followed by private bank (25.0%), family (12.5%), and neighbors (12.5%). Loans were mostly used for house renovation and improvement (25.0% of total, 33.3% are males), and purchase of motorbikes (25.0% of total, 50.0% are females and 16.7% are males). The remaining respondents took out loans for their daily expenses (12.5%), business capital (12.5%), and livelihood-related expense (12.5%).

Amount loaned range from USD $245 to $49,068, with a monthly interest rate ranging from USD $10 to $195. Loan terms range from 4 to 60 months, with half (50.0%) of the respondents opting for a long-term loan (over 36 months) and the remaining opting for an intermediate term (25.0%), ranging between 13 to 36 months, and short-term loan term (25.0%), ranging between one to 12 months. As of the conduct of the survey, none of the borrowers have paid off their loans. Three in four (75.0%) borrowers required collaterals, all of whom used their land titles to access the loan.

4.3.2.4.3 Information on Land and Residence

Most (95%) of the respondents are the sole owners of the land they are currently residing in, while the rest reside in lands owned by their parents. All respondents have formal land ownership. On the other hand, all respondents solely own the structure of their residence, with half (50.0%) making use of permanent residential structures and the rest having semi-permanent (45.0%) and temporary (5.0%) residential structures. Majority (65.0%) of the respondents use mixed housing materials, followed by those who use solely strong (20.0%) and solely light (15.0%) materials.

Almost half of the respondents (45.0%) said they reside in structures with an estimated floor area of 32 to 49 sq.m., followed those (30.0%) living in spaces with greater than 50 sq.m. of floor area, then 17 to 30 sq.m. (20%), lastly, less than 17 sqm (5%) in estimated floor area. Aside from their residences, majority of the respondents (65%) said they do not own a separate structure from their house while the rest do. Among these households include those who have pig pens (20.0%), and stores (20.0%),

All respondents have experienced flooding in their current residence. Two in five (40.0%) respondents experience flooding for more than a week annually. Two in five (40.0%) households experience flooding at least two (2) to three (3) days a year, while one in five (20.0%) households experience flooding between four (4) to seven (7) days a year.

4.3.2.4.4 Source of Income of the Household

Majority (75.0%) of the respondents have said that they are engaged in farming, while the remaining have said otherwise. Only 13.3% of the respondents have been farming for less than ten (10) years, while the rest have been farming for over a decade – 40.0% have farming between 11 to 20 years, 26.7% have been farming for 21 to 30 years, and 20.0% have been farming for over 30 years. In those years of farming, majority of respondents said they frequently farm during dry season only (46.7%), while the other 46.7% farm during dry and wet seasons. The remaining 6.7% farm during wet season only. When asked what farming equipment they have, most (80%) said they have water pumps, 54.3% have hand tractors, 26.7% have plows, and 20% have harrows. Some (20%) respondents engaged in farming did not specify any farming equipment they own. None of the respondents are members of any farming cooperative.

Majority (60.0%) of the respondents are also into livestock farming. In terms of years engaged in the livelihood, the responses are fairly distributed between those with 1 to 5 years, 6 to 10 years, and over 10 years in livestock farming, or 33.3% respectively. When asked what livestock they raise, more than half (58.3%) of the respondents specified cattle, followed by hog (41.7%), and poultry (16.7%). Majority (73.3%) of the respondents are not members of any livestock farming cooperative.

Only about one in ten (15.0%) households are engaged in fishing as a source of income, while the remaining have said otherwise. Majority (66.7%) of the respondents have been fishing for over five (5) years and the remaining (33.3%) from 1 to 5 years. Majority (66.7%) of the respondents claimed to fish in 78 Reservoir, followed by Tonle Sap (33.3%), and other rivers (33.3%). None of the respondents are members of any cooperative for fisherfolks.

The respondents are split between those who have single (50.0%), and multiple (50.0%) income sources. When asked to specify which income source is considered as their primary source that funds most of their day-to-day expenses, 70.0% of the respondents have specified the income of the household head, followed by the spouse of household head's salary (30.0%), then children's salary (10.0%), transfer income (10.0%), seasonal or short-term employment (10%), and lastly, from business and farming (5%). It must be noted that some respondents identified multiple sources despite being asked to specify a primary income source.

One in five (20.0%) respondent households have an estimated monthly household income below USD $200[43]. The income range of those that rely on a single source is between USD $147 to $1,178. On the other hand, those with multiple income sources have estimated total incomes ranging from USD $198 to $1,482. The average monthly income of those with only a single income source is USD $356, while the average monthly income for those with multiple sources is 1.75 times this amount at USD $628.

Majority of expenses were on food items, averaging at USD $1,916, followed by education at USD $274, and electricity at an average of USD $219, leisure at an average of USD $185, clothing at an average of USD $137, health at an average of USD $122, and lastly, telecommunications at an average of USD $84.

4.3.2.4.5 Decision-making in the Household

Majority (75.0%) of the surveyed households said that both the husband and wife decide on whether to let their children continue school or send them to higher education, followed by households whose husbands makes the sole decision (25.0%).

Concerning household expenses, 65.0% of the respondents said that the husband gives his income to the wife and the wife manages the funds for household expenses. This is followed by those who responded that the spouses pool their income for household expenses (35.0%).

4.3.2.4.6 Information on Health

All of the respondents reported having caught communicable disease/s within their households in the past year. Fifteen (75%) had flu, followed by diarrhea (6, or 30.0%), then typhoid fever (4, or 20.0%), and pneumonia (3, or 15.0%). Only one in four households (25.0%) reported having had non-communicable disease/s. All five (5) households have experienced hypertension, while one household (20.0%) experienced diabetes. When asked which diseases have caused death within their community, the most common answer is traffic accidents and old age (90.0%), followed by diabetes (55.0%), hypertension (50.0%), heart ailments (45.0%), and cancer (40.0%).

When asked which health care provider they are able to regularly access, majority (60.0%) of the respondents answered referral hospitals, followed by private facilities (40.0%). All respondents said that doctors and healthcare workers are available daily on the respective health facilities they access. Eight (40%) said that vaccination and lying-in were the most accessible health services, followed by family planning and free medicine (2, or 10%). In detailing the specific services that the health facilities offer, the responses given were maternity/lying-in services and vaccination (40.0%), followed by family planning and free medicine at 10.0%, respectively.

4.3.2.4.7 Information on Household Utilities

The most popular source of both drinking water and water for household use is deep well (85.0%), followed by shallow well (15.0%). Most (95.0%) said they have not experienced any illnesses because of unclean water. Among those who shared that a household member has

[43] As of January 2021, the monthly minimum wage for regular workers in Cambodia is USD $192, and USD $187 for probationary workers. This minimum wage set by the Ministry of Labor and Vocational Training is only applicable to workers in the textile, garment, and footwear industries (Medina, 2021).

experienced water-borne diseases, only one named the ailment and specified urine stone. Additionally, about two in five (40.0%) households experience issues in their water supply due to natural hazards, such as flooding or drought, while the rest do not encounter such problems. All of those who experience issues have interruption in water supply as the concern. As for access to electricity, most (95.0%) have their own meter for power connections, while the rest have shared connections. All of the respondents have EDC as their source of electricity. In terms of sanitation, 90.0% have their own water-sealed toilets (inside the house), while the rest (10.0%) share them with another household. In terms of cooking, majority of the respondents use gas and firewood (66.7%), followed by charcoal (33.3%). As for the solid waste disposal practices of the surveyed households, almost all (95.0%) households burn their waste, while only one respondent said that their waste is collected by the local government.

4.3.2.4.8 Perceptions on Impact of landfill site option 2

Most (90%) of the respondents said they have known about the landfill site option 2, 50% of whom heard about it from their neighbors, followed by those who heard about it in the commune meeting (40.0%). Majority (70.0%) said that no potential benefits or positive impacts would come out of the project, while 25% said that the project will lead to improvements in SWM. A small fraction (5.0%) said that they do not know if there are any benefits.

Almost all (90.0%) respondents have expressed some concern on the negative impacts. These include negative impact on their house (40.0%), community health concerns (25.0%), impacts on livelihood (20.0%), and adjustments in living conditions (5.0%). The remaining households said that they are not likely to be affected.

Only two in five households (40.0%) said that the government has the capacity to address concerns. From these households, 87.5% said that the government can only address the concerns if community health is considered, while the remaining one did not specify any reason. The remaining respondents (60.0%) who said that the government will not be able to address the concerns is because of their worry that the area for landfill site option 2 will become a dumpsite (50.0%), 25.0% said that it might end up like the existing dumpsite, 16.7% said that area might not be constructed as designed, and 8.3% expressed their concern about their health.

About one in three surveyed households (30.0%) said that they do not agree with the possible landfill project and did not provide any recommendations, while only 5% of the respondents expressed agreement with the landfill site option. Some (30.0%) also recommended the use of appropriate technology and effective management in operating the sanitary landfill. One in five respondents (20.0%) recommended avoiding any impacts it may have on paddy fields and water bodies.

4.3.3 Key Informant Interviews (KII)

4.3.3.1 Existing Dumpsite

The conduct of key informant interviews (KII) in the existing dumpsite used a blended type of meeting where offsite consultants participated via online means and participants were physically present at the venue.

The participants included the Commune and Village Chiefs of the following: Trapeang Thom, Kandaek, Trapeang Tim, Phnom Dei, Anlong Pir, Roka Kambot, La Vea, Soung.

Table 4.3-4 lists the summary responses from the conduct of KII. See **Annex E.3** for the complete report on the KII.

Table 4.3-4: Summary of KII Results

Key Questions	Response
What is the current situation on the dumpsite?	During interview with all key informants, they all have raised their concerns related to the following: dumpsite entrance pathway; waste odor during wet season; air and water pollution; and waste management capacity at dumpsite of private companies. • **Dumpsite entrance pathway:** The situation of the entrance pathway located around 600 meters from NR 6 to existing dumpsite is not good because this pathway is bumpy with many potholes and dusty condition which has caused difficulty in transporting solid waste to the dumpsite. Furthermore, the dust from the pathway has affected health of people living along. Thus, they are all requesting for the rehabilitation of this pathway by paving concrete road if the project really aims to improve the existing dumpsite. • **Waste odor during wet season:** The waste odor during wet season is described as much worse than during the dry season and the odor is diffused approximately up to 2 km radius from the dumpsite. Before, the people living in the villages around dumpsite found it difficult to live with the presence of the dumpsite but currently, it has been observed that villagers have seemingly adapted to the present situation they are in. • **Water pollution:** During wet season, the leachate from dumpsite flowed into surrounding small canals, rice fields and farmlands. People who have lands around there cannot do farming activities. Fish was also extinguished. Furthermore, the water in small canals cannot be used for animals because it has been leachate polluted. • **Air pollution:** Frequently, in the dry season, the waste was burned in the dumpsite. The smoke emitted from waste burning seriously polluted the surrounding environment and affected health of people living around the dumpsite. • **Waste management capacity at dumpsite:** The dumpsite covers approximately 17 hectares of land in which 8 hectares belong to CINTRI and 9 hectares belong to GAEA. As observed, the actual situation of waste management of both companies still remains poor, especially that the wastes are scattered around the area.
Does the commune have specific programs for waste-pickers, including programs specific to child waste-	There are no specific programs that target waste-pickers, including children waste-pickers, education, and community integration. Generally, the relevant local authorities do not allow the children who are studying to pick waste in the dumpsite because we worry how their studies might be affected. But currently, because of COVID

Key Questions	Response
pickers, education, and community integration?	19 outbreak, all schools in the province have been closed for a while. Now we see there are some children going to the dumpsite to pick waste for additional income. Even local authorities have no specific programs targeting waste-pickers, but they are enhancing the living condition of waste-pickers through cooperation with LEAP project. The Livelihood Enhancement and Association of the Poor - LEAP Project is working with the purpose to improve access of the poor and vulnerable households in communities to financial service, opportunities for generating income. More than 70% of households of waste-pickers are the targeted group of the project.
Does the village/commune have plans on or related to SWM? Is it included in the VDC plan/Commune Investment Plan? Could the study team be provided with a copy of said documents?	The dumpsite at Trapeang Thom commune is being operated by two private companies, GAEA and CINTRI within 8 hectares and 9 hectares of land, respectively, with direct technical management aspect from relevant provincial departments and provincial hall; thus, commune level has no role or responsibility in managing this dumpsite. It means that it is not within the capacity of the commune. Regarding SWM plan, the commune did not integrate into commune investment plan (CIP).
Does the village/commune have plans for groups that depend on the dumpsite for their livelihood? Is it included in the VDC plan/Commune Investment Plan?	Commune has no plan to integrate in to CIPs for group that depends on the dumpsite for their livelihood, but commune is enhancing the living condition of waste-pickers through cooperation with LEAP project and other local NGOs.
What are your views/opinions regarding the proposed project and the possible landfill site alternatives?	<u>On the Existing Dumpsite</u> The dumpsite area is located in Anlong Pir village, since it has been going on for more than ten (10) years. It cannot be acceptable due to the dumpsite condition which has not been properly implemented by private companies and does not comply with the terms of the contract between the companies and relevant provincial departments / provincial hall. Meanwhile, this is being agreed among local authority, waste-picker and private companies to operate the dumpsite by allowing waste-pickers to enter the dumpsite to collect valuable waste before being covered by soil. If not allowed to pick up, they will protest against dumping operation here, as they get part of the revenue from the dumpsite. Therefore, there is an understanding between the local people and the dumping company to make this place work until now. <u>On Landfill Site Option 2 near WWTP</u> Currently, this area is a potential eco-tourist area by connecting to the Tonle Sap Lake and otherwise this area is a flooded forest during the rainy season and is becoming an important fish conservation area.

Key Questions	Response
	Nearly 100% of people living inside this area are farmers with main occupation in farming and fishing. Generally, they are able to plant rice 3 times per year by depending on water source for irrigation from 78 dam. The 78 dam is the main water source for rice fields, animals and fishing. If the landfill site option 2 will be placed near the dam, the people would worry about losing water source for rice fields and fishing opportunity also.
Could you describe the quality of the environment in the area (in the area where the dumpsite is and its surrounding areas) before the dumpsite was established and now?	Before dumpsite establishment: **1. Anlong Pir Village** It did not affect people living in the village for environmental aspect, they could cultivate and do fishing, etc. **2. Phnom Dei Village** There was no bad impact to people living in the village for environmental issue and the health situation was normal condition. Current situation after established dumpsite: **1. Anlong Pir Village** There are a lot of exposure from the sanitation sector such as bad smell spreading around 2 to 3 km around the dumpsite, the water quality around the dumpsite is not so good due to the leakage of some leachate flowing into the stream, drilled wells, ponds. It has affected the paddy fields, reducing rice yields and has also affected drinking water; especially in the rainy season, water in the village cannot be consumed and some people usually get diarrhea and flu. **2. Phnom Dei Village** There is foul odor and some people complained on the stench, but now people are accustomed to the smell of rubbish and there are health problems for people with chickenpox.
How has the dumpsite affected its surrounding area? The community? The residents? (Positive and Negative)	**Positive Impacts:** Can create jobs and additional income for people, as well as provide convenience for people to dump garbage. Most of the villagers (~70%) choose to collect scrap metal. Some of the families go together to earn their living and can collect some organic waste for raising animals. **Negative Impacts:** During the rainy season, the quality of leachate leaking from dumpsite affects the quality of groundwater, such as unusable water from the well; some crops are damaged; and, rice yields are reduced. And, there are flies from the dumpsite coming to the villages.

4.3.4 Focus Group Discussions (FGD)

4.3.4.1 Existing Dumpsite

The conduct of focus group discussions (FGD) in the existing dumpsite used a blended type of meeting where offsite consultants participated via online means and participants were onsite at the venue.

The participants were waste-pickers, workers in waste –related business, owners of waste related business, farmers and fisherfolk and women's group. The waste-picker identified from different categories such as children with 14 years old and below, youth 15-20 years old both male and female, women with 20 years old and above and other vulnerable groups (elderly, PWDs). They are located in Anlong Pir and Phnom Dei villages, Trapeang Thom commune while the farmers, fisherfolk, and women's group were from TrapeangTim Village, Kandek Commune. The summary of FGD results is described below. See **Annex E.2** for the complete report on the FGD.

1. Waste-pickers

The participants of this FGD are waste-pickers, further classified into five (5) groups: (a) children 14 years old and below (boys and girls), (b) youth 15-20 years old (male and female), (c) women 15-20 years old, (d) men 15-20 years old, (e) vulnerable groups (elderly, PWDs).

Table 4.3-5: Summary of FGD Results: Waste-pickers

Categories and Key Questions	Responses
Length of time working as a waste-picker	The participants have been working as waste-pickers from two (2) months to 13 years, while the elderly ones have worked since the dumpsite opened in 2007.
Steps in waste-picking (from collecting waste down to their sale) and Frequency of doing these steps per week	Generally, wastes are collected after being dumped by the truck, then the collected wastes are sundried at the dumpsite or at home. After that, the waste-pickers transport collected wastes to their home. Two (2) weeks later, the dried wastes are segregated and transported to sell at junkshop located in Kantraing Commune, Bakong District, Siem Reap Province.
Location site where livelihood activities are commonly conducted (within the dumpsite)	The waste-pickers set-up a tent or an umbrella for their leisure time with their family. There are approximately 50 to 60 tents/umbrellas at the dumpsite. There are also drinks stalls for them inside dumpsite.
Where do you sell the waste that you collect?	After two (2) weeks of waste-picking, generally, they transport solid waste to sell at the following places: Angkrang market located in Angkrang Village, Kantraing Commune, Bakong District, Siem Reap Province. Except for some of them who sell to the nearby junkshop because they have no means of transportation and/or their homes are also close to that junkshop, while others have buyers who directly buy at home.
On the arrangement for waste-picking at the dumpsite	The waste-pickers are free to pick up solid waste in the dumpsite. There is no established grouping arrangement. There are no

Categories and Key Questions	Responses
	"written" rules or regulations, so to speak. But they follow and observe "first come, first pick up" norm. Scavenging solid waste is according to the ability of the individual waste-picker. The one who grabs the best location, where the waste is being dumped, picks the most. There is no form of arrangement fellow waste-pickers or waste-pickers and waste truck drivers.
On waste-pickers' borrowing money from the buyer or pay with waste collection (in kind) and form of other support and partnership	The participants said that they do not borrow money from any buyers in terms of solid waste trade. Only one of them had experienced borrowing money in advance from a junkshop without any interest as his family urgently needed some cash.

There are 11 types of waste collected by the waste-pickers and accordingly, among these, the 5 topmost valuable items are the following:

a. Copper (from electric wire, cuprum, brass etc.) at USD $4.75/kg;
b. Aluminum type 1 (beer cans, soft drink cans, discarded food wrap foils) at USD $1.38/kg;
c. Stainless steel (robinet, shower head etc.) at USD $0.88/kg;
d. Aluminum type 2 (window frame) at USD $0.75/kg; and,
e. Plastic type 1 (bottle of drinking water) at USD $0.14/kg.

As for the organic fraction of waste (for livestock feeding), it us valued at USD $0.75 to a bucket (about 20 liters).

The different type of wastes collected at the dumpsite located in Trapeang Thom, Siem Reap, and sold to the surrounding junkshops, the value of wastes per kg and their ranking according to its value in terms of unit rate (in USD $) are described in **Table 4.3-6**.

Table 4.3-6: Summary of FGD Results: Waste-pickers - Type of Wastes Collected

Type of Wastes Collected	For selling? (tick if Yes)	Unit	Unit Rate (USD $)	Valuable (rank)
Copper (from electric wire, cuprum, brass etc.)	Yes	Kg	4.75	1
Aluminum type 1 (beer cans, soft drink cans, discarded food wrap foils)	Yes	Kg	1.38	2
Stainless steel (robinet, shower head etc.)	Yes	Kg	0.88	3
Aluminum type 2 (Window frame, bike accessories etc.)	Yes	Kg	0.75	4
Plastic type 1 (bottle of drinking water)	Yes	Kg	0.14	5
Plastic type 2 (HDPE bottles, such as soap, shampoo, etc.)	Yes	Kg	0.13	6
Tin materials (can of milk powder, fast food etc.)	Yes	Kg	0.13	7
Paper type 1(carton, paper boxes, etc.)	Yes	Kg	0.08	8

Type of Wastes Collected	For selling? (tick if Yes)	Unit	Unit Rate (USD $)	Valuable (rank)
Paper type 2 (book paper, A4 paper)	Yes	Kg	0.06	9
Plastic type 3 (plastic bag)	Yes	Kg	0.04	10
Glass bottle	Yes	Kg	0.03	11
Organic waste (for livestock feeding) for 20 liters	Yes/No	Bucket	0.75	

2. *Junkshop Owners*

Two (2) junkshop owners around the dumpsite participated in the FGD. Their shops are located in Anlong Pir Village. One has three (3) workers, while the other has no worker.

Length of Time in the Junkshop Business

The participants said that they have been running their junkshop business for about four (4) to five (5) years now, while other junkshop owner has just started his business for about five (5) months only. They collect scraps from each household in the villages and from the individual waste-pickers to sell to the main junkshops at provincial center or vice versa.

Partnership Arrangement Between Business Owners and Waste-pickers

The operation is considered as a small business and also some just has started. There are times the main junkshop owner provides advance cash for the investment. There are also times that the junkshop owners have owed money from the waste-pickers (sellers) in case they are short of the floating capital while other junkshop owners do by giving cash advance to the waste-pickers and get paid back when their scraps are available.

Buying Price and Ranking of the Most Valuable Waste

The buying price of the scraps is almost the same as the market price of other junkshops. The prices are not so much competitive. Normally, the profit range is between 30 to 600 KHR per kilogram. Sometimes, the price varies for the exported items abroad and also depends on the type of each item (waste). The most valuable item (waste) is copper material including electric wire, cuprum, and brass. The unit price per kilogram is shown in the **Table 4.3-7** below.

Table 4.3-7: Summary of FGD Results: Junkshop Owners – Waste Valuation

Item Description	Buy in (KHR/kg)	Buy in (USD $/Kg)	Sell out (KHR/kg)	Sell out (USD $/Kg)
Copper (from electric wire, cuprum, brass etc)	20,000	5	20,500	5.125
Aluminum type 1 (beer cans, soft drink cans, discarded food wrap foils, etc.)	5,500	1.33-1.38	5,350-6,600	1.34-1.65
Aluminum type 2 (window frame, bike accessories etc.)	2,500-3,500	0.63-0.88	2,600-4,000	0.65-1
All kinds of steel	1,000-1,200	0.25-0.3	1,030-1,300	0.26-0.325
Plastic type 1 (bottle of drinking water)	600	0.15	630-650	0.16

Item Description	Buy in (KHR/kg)	Buy in (USD $/Kg)	Sell out (KHR/kg)	Sell out (USD $/Kg)
Plastic type 2 (HDPE bottles, such as soap, shampoo, etc.)	600	0.15	630-700	0.16-0.175
Tin material (can of milk powder, fast food etc.)	600-700	0.15-0.18	630-800	0.16-0.2
Paper type 2 (book paper, A4 paper)	300-300	0.08	330-350	0.08-0.088
Paper type 1(carton, paper box, etc.)	200-500	0.05-0.13	600-650	0.15-0.16
Glass bottle	100	0.03	130-150	0.03-0.038

3. Waste-related Business Workers

A group of waste-related businesses near the dumpsite with two (2) workers from a junkshop participated in the FGD. The two (2) workers from the junkshop are from Anlong Pir Village.

Table 4.3-8: Summary of FGD Results: Waste-relate Business Workers

Key Questions	Responses
Type of work engaged in and type of business of the employer	Their works are scale weighing, bill checking, scrap preparing and waste-keeping/-stocking
Length in the work	One worker just started working for around half a month and the other worked been working for around one (1) month.
Terms of Employment	
Payment basis	With monthly payment basis
Amount paid	The salary is between USD $50 (KHR 20,0000) to USD $125 (KHR 500,000)
Status of employment (regular, seasonal, temporary worker)	There is no contract agreement between both parties. They work seasonally, mostly during school vacation. They are temporary workers with no signed contract.
Working Hours	
Expected work duration	Working hours are from 7-11am and 1-5 pm, 7 days per week and no day-off.
Payment on days did not go to work	During the day-off, the salary is still paid only with permission from the owner.

4. Farmers and Fisherfolks and Women's Groups

A group of 12 farmers and fisherfolks participated in the FGD. The main occupation of all participants is farming, followed by fishing. The participants are located in Trapeang Tim Village, Kandek Commune, where the landfill site option 2 was assessed. Furthermore, a group of nine (9) women also participated in the FGD to discuss the questions.

The summary of the responses of the 12 farmers and fisherfolks are detailed in **Table 4.3-9**.

Table 4.3-9: Summary of FGD Results: Farmers and Fisherfolks

Key Questions	Responses
How long have you been farming/fishing?	They have been farming and fishing for 20 to 47 years, or since they were young children. Fishing is considered as a secondary occupation.
How are your crops irrigated? Please specify provider and water source.	In the landfill site option 2 area, some farmers plant rice 3 times a year. During the dry season they get water from the 78 dam reservoirs and in rainy seasons, people use rainwater.
How will a construction of an engineered landfill potentially affect your livelihood?	For the engineered landfill to be constructed in the future, the potential effects to their livelihood identified are as follows: • Rice planting: Leachate from the landfill might affect the paddy fields and the surrounding areas including around 130 households whose primary occupation is farming. • Water sources will be extremely polluted and water will have bad smell. There will also be less amount of fish in the reservoir. • Reduced amount of water in the 78 dam reservoirs due to the demand for water for rice paddy irrigation, fishing, and livestock raising.

The summary of the responses of all the participants of this FGD are in **Table 4.3-10**. These responses were taken directly from the FGD Summary Report and were not filtered between the two site options.

Table 4.3-10: Summary of FGD Results: Farmers, Fisherfolks, and Women's Group

Key Questions	Responses
On the Environment	
Land	
In the past five (5) years, has the dumpsite area grown bigger or smaller?	Most participants said that the dumpsite area has grown bigger with more earth pits while few participants said that the dumpsite area remains the same due to the waste disposed and covered in the deep pits.
In the past five (5) years, has the dumpsite area used only for dumping waste?	Yes, absolutely. It is used for dumping waste only.
Water	
Are there nearby bodies of water? Where are they?	Surrounding the dumpsite area are some tube wells, open pits and ponds. Moreover, groundwater is the main source of water for daily use, and surface water is supplied for daily use through activities such as animal husbandry, cleaning, etc. However, waste-pickers in dumpsite need to buy drinking water. The pond is approximately 500m from the dumpsite. Most households living in the villages near the dumpsite have their own wells. As for households living near the pond, they use the pond water for livestock and for watering crops but not for drinking.

Key Questions	Responses
In the past five (5) years, what are your observations on the quality of water in these water bodies?	The leachate from the dumpsite might leak into the rice fields and ponds. Thus, the water from that area causes foul smell in the rainy season while dry season could be a bit better.
How about groundwater in the area?	The quality of ground water especially drilled wells during dry season is fine no smell affected. Therefore, in the last 4 years, the smell was so bad but currently the smell looks better as the dumpsite has managed a better leachate leakage prevention system.
Air and Noise	
In the past five (5) years, what are your observations on the quality of air here in the dumpsite?	In the dry season there is less odor, but in the rainy season there is a strong odor from the garbage. Furthermore, the smell spreads around 1km away, especially when they burn the garbage but for the waste-pickers, they are not sensitive to smell.
In the past five (5) years, what are your observations here in the dumpsite in terms of noise?	Actually, there is a bit noise from the dump truck during nighttime but it is acceptable as they live a bit far from the access road.
People	
In the past five (5) years, has the number of residents/families (if increasing or not), livelihood, income improvement, among others, changed?	The number of people living around the dumpsite seem to have increased with more income. Furthermore, many households have better living condition than before. Beside occupation as waste-pickers they have other main occupations such as farming, livestock raising, animal raising and doing small business.
On the Landfill Site Alternatives	
How will the project affect specific types of livelihood in case the dumpsite is closed down and a new landfill is on a different location instead of rehabilitation of the current dumpsite into an engineered landfill? How do you think can such impacts be mitigated?	If dumpsite was closed, all the participants said that they would go to find other jobs such as livestock feeding, rice planting, construction workers, factory workers etc. to do instead of waste-picking
Synthesis of impacts (c/o facilitator with support from documenter/s)	N/A
What assistance (i.e., services on health, water, sanitation) would you need if the impact will not be mitigated?	• Not yet aware of the form and technique of making a sanitary landfill • Requested to build the sanitary landfill that will not affect the health of the people and its surroundings. • Do not know/do not have experience and techniques to understand the landfill.

5 PRELIMINARY ENVIRONMENTAL AND SOCIAL RISKS AND IMPACTS ASSESSMENT FOR OPTION 1 AND OPTION 2

In the context of the Environmental and Social Management Framework (ESMF) and preliminary Environmental and Social Management Plan, risks associated with the solid waste and plastic infrastructure options in Siem Reap were identified.

The assessment is carried out for Option 1: Rehabilitation and extension of the existing site at Anlong Pir village; and for Option 2: closure of existing site and development of new site at Trapeang Tim village.

This preliminary risk assessment builds upon the information presented within the above environmental and social setting for both the existing landfill and the location for potential new landfill development. From a concept design perspective, the purpose of the assessment is to determine if remediation/rehabilitation and extension of the existing landfill, or development of a new sanitary landfill on a greenfield site, is preferable from an environmental and social perspective.

The risks considered most significant in relation to both options are present below and options for mitigation measures developed. The mitigation measures are first identified based on the concept design. Once a landfill site has been selected after stakeholder consultations on different landfill site options, the design will be further elaborated based on the feasibility study/detailed design, and an accompanying site-specific ESIA will be undertaken.

Site suitability assessment process

A thorough site suitability assessment process has been conducted to ensure due consideration of environmental and social aspects. Each site option has been verified against the criteria set by the Ministry of Environment (MOE) of Cambodia, and the World Bank Environmental, Health, and Safety (EHS) Guidelines for the Waste Management Facilities.

Table X: Landfill Site Suitability Assessment Process

H. Develop General Site Selection Criteria	General categories include: • Transport Related • Natural Conditions • Land Use and ownership • Public Acceptability • Public Safety • Presence of waste-pickers in existing dumpsites • Environmental Protection
I. Prioritize Criteria	Based on desired landfill service area: • Local Landfill • Regional Landfill
J. Identify Candidate Sites	Long list based on: • Select, high-priority criteria, and

	• Constraint mapping
K. Evaluate & Rank Long List Sites	Short list based on: • Site inspection, and • Weighted criteria & scoring scheme
L. Prepare Concept Design & Initial Cost Estimate	Based on: • Topography • Site Development • Phasing, and • Environmental and Social Impacts and costs
M. Prepare Feasibility Study	Including: • Work program • Cash flow forecast • Preliminary environmental and social impacts/P-ESIA
N. Final Site Selection	Decision based on meaningful consultations and engagement with neighboring communities, with commitment to develop preferred site

The thorough site technical selection process was conducted based on a two (2)-stage approach, with consideration of environmental and social aspects: (i) preparation of a modelling and negative mapping process and (ii) a series of site visits to ground-truth data and gather new information from walk-over surveys. The output of the model is a visual map of each city with colored suitability banding in four (4) categories: Restricted, Least Suitable, Suitable, and Most Suitable. Twenty-four (24) screening criteria were used in the model which are broadly divided into five (5) categories:

1. Transport (including distance from service area and access road conditions)
2. Physical site conditions for landfill development (Geotechnical/hydrological/ hydrogeological)
3. Current land use, ownership and development zoning
4. Social impacts, safety and acceptability
5. Environmental and cultural heritage

The full list of the 24 site screening criteria is detailed in **Annex A**

The output of the model includes a visual map of each city and surrounding area with colour-coded Suitability Banding in four categories: **Restricted**, **Less Suitable**, **Suitable**, **Most Suitable.** The result of the negative mapping activity is detailed in **Annex B**.

5.1 PRELIMINARY ENVIRONMENTAL IMPACTS, RISKS AND MITIGATION MEASURES

5.1.1 Environmental impacts during landfill construction

Impacts on Air Quality by Dust Emissions of Construction Works, equipment and vehicles exhaust

Inhalation of dust particles in excessive amounts can be harmful to the health of both workers and nearby residents. Activities likely to eject dust particles during construction include:

- earthworks, including excavation and construction of peripheral embankments

- action of the wind on stored materials
- road works
- site facility construction
- installation of the lining system
- vehicle movement around the site on unfinished roads

Mitigation Measures:

- Monitoring of air quality in residential areas during construction phase to be put in place
- Limit construction hours (day times)
- Stabilize the exposed surfaces
- Minimize activities that suspend dust particles
- Apply water to the areas to be excavated, loading and unloading areas and unpaved roads
- Develop a wheel wash at the entrance to public roads or exit of the landfill construction site
- Implement speed controls on-site
- Maintain enough loading capacity of lorries and barges to avoid spillage
- Cover soil stockpiles with erosion control blankets
- Use covered stockpiles to avoid wind-blown dust
- Apply good construction practices

Options Comparison and risk assessment:

Impacts on air quality can be considered *negative* and of *moderate* significance under both Option 1 – Rehabilitation and extension of current site; and Option 2 – Closure of current site and new greenfield site.

Civil works at the existing site will be required in both Option 1 (Rehabilitation and Extension) and Option 2 (Closure and new site). Dust emissions can negatively impact ambient air quality, particularly during the initial phases of construction. In case of developing Option 2, the current landfill site will still require civil works related to closure of the existing site. At the existing site, the village of Anlung Pir is located nearby the site which may be partially affected by dust during construction periods. Option 1 has the advantage of required reduced works compared to development of a new landfill site, as major infrastructure (access road; site facilities) are already in place. The overall construction period can thus be estimated shorter with Option 1. Currently, the site for Option 2 has little residential development, however city development plans foresee major commercial and residential developments in the allocated area.

Noise impacts

Construction works include noisy activities related to machine operation in addition to the noise generated from the trucks entering or leaving the site. This will result in raising the background noise levels; this in general will depend on:

- the type of equipment and vehicles used on the site;

- the ambient noise level around the site;
- the proximity of sensitive receptors;
- the length of time over which construction works are undertaken

The main activities that are associated with high noise emissions are:

- excavation and building works
- Movement of trucks carrying excavated soil and trucks bringing construction materials to the site
- Operation of standby-generators

Mitigation measures

- Generally, it is expected that the noise will not be high enough to interrupt sleep or disrupt normal activity.
- It is anticipated that construction activities will not be operational during the late hours; therefore the impact on evening averages of ambient noise will be little.
- Optimize the use of machines and noisy equipment
- In case of receiving complaints from neighboring areas regarding noisy operations acoustic barriers can be placed
- Construction works should be stopped at night-time;

Options comparison

Impacts through noise can be considered *negative* and of *moderate significance* under both Option 1 – Rehabilitation and extension of current site; and Option 2 – Closure of current site and new greenfield site:

Civil works at the existing site will be required in both Option 1 (Rehabilitation and Extension) an Option 2 (Closure and new site), since under Option 2 civil works will still be required at the current stie for to closure of the landfill. Option 1 has residential areas (Anlung Pir village) in vicinity of the site which are likely to be partially affected by noise during construction periods. However, Option 1 has a good access road to the site already in place (Road Nr 6). Option 2 will require substantially more and thus longer periods of time for construction works, as it is a greenfield site and all infrastructure including access roads and site facilities yet need to be constructed. Currently, the site for Option 2 has little residential development, however city development plans foresee major commercial and residential developments in the allocated area.

Impacts Related to Excavated Soil including Daily Waste Cover, Soil Integrity, Soil Erosion and Topsoil losses

The construction of landfill cells will involve excavations to reach the design depth for new landfill cells. The excavated spoil should be properly managed so as to minimize impacts on the surrounding environment, including:

- Limiting the landuse for the areas used to store the spoil,

- changing the topographic features of the area and, hence, changing water drainage properties which could divert surface water drainage streams to un-preferred locations,
- increasing dust emissions caused by wind erosion,
- possibility of blocking landscape view at the site were these amounts of soil are stored
- indirect environmental impacts if there is a need to transfer the soil to other locations, including limited increase of traffic, noise and air emissions released from transport.

Mitigation Measures:

- The area allocated for soil storage should be selected so that no un-favored pattern of surface water collection should be developed (e.g. stagnant water ponds for long times).
- Ensure that the height of the spoil will not cause unaccepted visual impacts to adjacent areas additional to the impacts of the landfill
- Use excavated soil in the landfill development and daily operations. There are two main uses for the spoil: usage as daily cover of waste, and usage in establishing side embankments for containing the waste.
- Use excavated soil for coverage for closing of old cells (re-cultivation layers of the final cover)
- Soil excavated in the direct vicinity of the existing dump site has to be sampled to assess the extent of contamination. If found contaminated, it shall only be used for daily operation

Options Comparison and risk assessment

Option 1 - Rehabilitation and extension of the current landfill: Impacts under Option 1 related to excavated soil will differ over the course of time and are considered *first negative/then positive* with *moderate* significance (see summary table for details).

Option 1 allows usage of excavated soil for coverage for the closing of adjacent old cells; it thus has a reduced need for transporting excavated soil, reducing traffic volume by transfer trucks, noise and air emissions released from these trucks. Excavated soil can be used for daily cover of waste in adjacent new cells. Land is generally available for storage of excavated soil at the existing site, thus no impacts on still undeveloped land (greenfield) would be foreseen.

Preliminary observations at the current indicate that there will be a deficit of soil materials for site development ranging from -27,300 m^3 to -57,400 m^3 resulting from the formation of the Facilities Area and the extended Landfill Waste Disposal Area. The soil deficit could range from -234,600 m^3 to -744,300 m^3 (for the 10-year and 20-year life) during operations due to the soil volumes required for daily/intermediate and final cover.

Option 2 – Closure of current site and new greenfield site: Impacts under Option 2 are considered *first negative/then positive* with *moderate/high* significance (see summary table for details).

Option 2 requires excavations and storage of excavated soil on undeveloped land and within the buffer zone (Zone 2) of the Tonle Sap Biosphere Reserve under UNESCO status and Cambodian legislation. In addition to the impacts of excavations on the local ecosystems, Option 2 will most likely lead to higher soil material deficits due to lower excavation feasibility due to higher groundwater table in close vicinity to Tonle Sap and increased flooding risks reduce potential excavation depths. Also, being a greenfield site where all infrastructure and facilities yet need to be developed, Option 2 will require higher amounts of transport of soil material and increased traffic with related impacts.

Water quality

The construction works may cause contamination of surface and underground water resources although this is considered as unlikely. The overall impact on water quality will be positive as the rehabilitation of the existing site will stop leakages of untreated effluents and waste waters.

Mitigation measures

- Minimize land disturbance
- Manage run-off and sediment exiting to disturbed areas
- Manage drainage within the disturbed areas
- Manage ground cover
- Good construction quality assurance procedures and protocol during installation of the basal, lateral and top containment engineering systems
- Leachate treatment

Options comparison

Impacts on water quality can be considered *first negative / then positive* and of *high significance* under Option 1 – Rehabilitation and extension of current site.

For Option 2 – Closure of current site and new greenfield site, impacts on water quality can be considered as *negative /then positive* for the existing dumpsite but *high risk* for the new landfill site. At the existing dumpsite the overall impact will be positive as the rehabilitation of the existing site will stop leakages of untreated effluents and waste waters. The new landfill will have systems for leachate treatment and treatment of effluents, but due to the close proximity to Tonle Sap/seasonal flooding, this poses a risk

Improper management of wastes

Wastes of various origin to be generated during the construction works might be improperly sorted out, stored, transported and disposed, causing pollution of air, soil and water.

Mitigation measures:

- Provide for disposal facilities with local authorities. Allow local communities to utilize any excess rock, which may be left following reuse
- All waste from the construction site will be disposed of in accordance with local environmental regulations and at sites approved by the local authorities

- Hazardous wastes (contaminated rags; oil residue, paints etc.) will be disposed as agreed with local executive and environmental authorities
- The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in waste handling, waste treatment and waste storage

Options comparison

For both Option 1 and Option 2, adequate mitigation measures will be provided during construction phase. The risk is assessed as *negative* with *moderate* significance for both options.

Disturbance to biodiversity / flora and fauna

The rehabilitation of the existing site might cause temporary disturbance to flora and fauna due to the implementation of construction works. The net impacts is expected to be positive as the current negative impacts of the existing site will be addressed through the rehabilitation

Mitigation measures

- Adequate site selection through thorough site assessment process
- Limit the construction area according to the planned detailed engineering design
- leachate collection and treatment system
- installation of lining systems
- zoning outside of vital habitats and ecosystems
- monitoring of species presence and pollution
- flood protection measures

Options comparison

Impacts on biodiversity / fauna and flora can be considered *first negative / then positive* and of *moderate significance* under Option 1 – Rehabilitation and extension of current site. The rehabilitation of the existing site might cause temporary disturbance to flora and fauna due to the implementation of construction works. The net impacts is expected to be positive as the current negative impacts of the existing site will be addressed through the rehabilitation

For Option 2 – Closure of current site and new greenfield site, impacts on biodiversity can be considered *negative* with *high risk* for the new landfill site. While the impact of the closure of the existing site will be positive, the construction of a new landfill on a greenfield site will cause damage and disturbance to flora, fauna and natural habitats in that area.

Impacts on cultural heritage

There are no cultural heritage sites located within the site of the existing dumpsite as well as the area of the site option 2 near the Tonle Sap. The closest cultural site of significance is located several kilometers away from the sites.

Due to Siem Reap Province being the center of the former Angkor empire and Angkor Wat area being the country's main cultural heritage and tourism site, there is still the likelihoods

presence of tangible or intangible cultural heritage. This impact is thus classified as a neutral with low significance, but enhancement measure will be suggested within the site specific environmental and social management plan in order to minimize any potential impacts on the tangible and intangible cultural heritage.

Options comparison and risk assessment

Option 1- Rehabilitation and extension of current site: impacts with regards to cultural heritage are considered *neutral* with *low significance.* The site has been operated since over a decade and potential areas are cultivated as agricultural land. Findings of cultural heritage are thus not expected.

Option 2 - Closure of current site and new greenfield site: impacts with regards to cultural heritage are considered *neutral* with *low significance.* The site is several kilometres away from key cultural hotspots of Siem Reap, most notably Angkor Wat. However, the site is undeveloped, and the existing flood protection earth embankment to the South does date back to Angkor times. Chances for findings of cultural heritage are considered low but cannot be entirely excluded

Mitigation Measures:

- More detailed screening for potential cultural heritage during site specific ESIA and specific mitigation measures, as appropriate- in site specific ESMP.
- Monitoring of site excavations and inclusion of chance find procedure in Contractor's contract

Risks from contemporaneous construction and operation.

There are also risks that arise from construction and operation activities overlapping in time and space (e.g. construction and operation traffic, new civil works at landfill under full operation, etc.). These risks are specifically high for Option 1 the rehabilitation of the existing dumpsite and careful phasing of the works need to be done as part of the detail design plus careful site management and supervision during construction.

Summary of environmental impacts during construction under each option and preliminary mitigation measures

Table X: The preliminary environmental and social impacts prior and during construction phase against both potential landfill site options, and preliminary mitigation measures are summarized below.

Impact	Option 1 – Rehabilitation and extension of existing dumpsite			Option 2 – Closure of existing dumpsite and new greenfield landfill at Trapeang Tim Village, Kandaek Commune			Preliminary generic mitigation Measures. Specific mitigation measures will be determined at the stage of detail design and the accompanying site-specific ESIA
	Positive/ Negative Impact	Description	Significance	Positive/ Negative Impact	Description	Significance	
Air quality	Neg	Dust generated due to the construction activities for the rehabilitation of the existing site	Moderate	Neg	Dust generated due to the construction activities the closure of the existing site and construction of a new landfill	Moderate	• Monitoring of air quality in residential areas during construction phase to be put in place • Limit construction hours (day times) • Stabilize the exposed surfaces • Minimize activities that suspend dust particles • Apply water to the areas to be excavated, loading and unloading areas and unpaved roads • Develop a wheel wash at the entrance to public roads or exit of the landfill construction site • Implement speed controls on-site • Maintain enough loading capacity of lorries and barges to avoid spillage • Cover soil stockpiles with erosion control blankets • Use hoarding to avoid wind-blown dust • Apply good construction practices
Noise	Neg	Noise will be generated due to the use of construction machinery for the rehabilitation of the existing site	Moderate	Neg	Noise will be generated due to the use of construction machinery for the closure of the existing site and construction of a new landfill	Moderate	• Construction activities will not be operational during the late hours; therefore the impact on evening averages of ambient noise will be little. • Optimize the use of machines and noisy equipment • In case of receiving complaints from neighboring areas regarding noisy

							operations acoustic barriers can be placed • Construction works should be stopped at night-time
Odor	First Neg, then Pos	Odor impact will occur, causing nuisance to neighboring communities during the implementation of the construction work for the rehabilitation of the existing site but will be significantly minimized after the works are completed	High	First Neg, then Pos	Odor impact will occur, causing nuisance to neighboring communities during the implementation of the construction work for the closure of the existing site but will be significantly minimized after the works are completed. Odor will be generated due to the use of the construction machinery (fugitive emissions) for the construction of a new landfill, but this significance is low.	High	• Application of cover for the waste at existing dumpsite for both options. • Installation of landfill gas treatment system • Leachate treatment system • Use of odour counter actant and/or masking sprays in case odor is a chronic problem.
Soil integrity	First Neg, then Pos	Soil will be damaged during the excavation works for the rehabilitation of the existing site but the overall soil quality will be improved after the works are completed.	Moderate	First Neg, then Pos	Soil will be damaged during the excavation works for the rehabilitation of the existing site but the overall soil quality will be improved after the works are completed. Soil integrity will be considerably damaged during the construction/excavation works for the construction of a new landfill.	Moderate	• Use excavated soil in the landfill operations: usage as daily cover of waste, and usage in establishing side embankments for containing the waste ▪ Use excavated soil for coverage for closing of adjacent old cells (re-cultivation layers of the final cover) • Soil excavated in the direct vicinity of the existing dump site has to be sampled to assess the extent of contamination and accompanying suitability for landfill construction.
Soil erosion	First Neg, then Pos	The excavation works can trigger soil erosion. However, upon completion of the works, the overall impact will be positive, as soil stabilization measures will be taken during the	Moderate	First Neg, then Pos	The excavation works can trigger soil erosion. However, upon completion of the works for the closure of the existing site, the overall impact will be positive, as soil stabilization measures will be taken. The	Moderate	• Installing erosion matting over the stockpiles if further surface compaction and/or seeding fails • Protect the stockpiles from flooding and run-off by placing berms or equivalent around the outside where necessary

		rehabilitation of the existing site			works for the construction of a new landfill can trigger soil erosion the risk of which will exist until the completion of the construction		• Protection of most susceptible soil surfaces • Protection of drainage channels
Topsoil losses	Pos	The existing site is significantly disturbed, and the quality of topsoil is not assessed to be high (to be reconfirmed during the detailed and site-specific ESIA).Topsoil losses may occur, however, during the construction works mobilization in relation with setting camps, materials plants and other related infrastructure	Moderate	Neg	The loss of the topsoil will occur due to the construction works on a greenfield site. The works on the closure of the existing site do not envisage to cause significant topsoil loss, as the site is disturbed by uncontrolled dumping of wastes	High	• Storage of topsoil in stockpiles • Storage locations that prevent the stockpiles being compacted by vehicle movements or contaminated • Segregation from subsoil stockpiles • No storage where there is a potential for flooding • No storage close to streams, subject to local topography.
Water quality	First Neg, then Pos	The construction works can cause contamination of surface and underground water resources; however, the overall impact will be positive as the rehabilitation of the existing site will stop leakages of untreated effluents and waste waters	High	Negative, then positive for existing dumpsite and high risk for new landfill site	The construction works can cause contamination of surface and underground water resources. At the existing dumpsite the overall impact will be positive as the rehabilitation of the existing site will stop leakages of untreated effluents and waste waters. The new landfill will have systems for leachate treatment and treatment of effluents, but due to the close proximity to Tonle Sap/seasonal flooding, this poses a risk	High	• Minimize land disturbance • Manage run-off and sediment exiting to disturbed areas • Manage drainage within the disturbed areas • Manage ground cover • Good construction quality assurance procedures and protocol during installation of the basal, lateral and top containment engineering systems • Leachate treatment
Improper management of wastes	Neg	Wastes of various origin to be generated during the construction works might be improperly sorted out, stored,	Moderate	Neg	Wastes of various origin to be generated during the construction works might be improperly sorted out, stored,	Moderate	• Provide for disposal facilities with local authorities. Allow local communities to utilize any excess

		transported and disposed, causing pollution of air, soil and water.			transported and disposed, causing pollution of air, soil and water.		rock, which may be left following reuse • All waste from the construction site will be disposed of in accordance with local environmental regulations and at sites approved by the local authorities • Hazardous wastes (contaminated rags; oil residue, paints etc.) will be disposed as agreed with local executive and environmental authorities • The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in waste handling, waste treatment and waste storage
Landscape disturbance/Visual and aesthetic impacts	Pos	The rehabilitation of the existing site is expected to cause positive impact on landscape which is currently disturbed	Moderate	First Neg, then Positive for existing dumpsite and neutral for new landfill	The closure of the existing site is expected to cause positive impact on landscape which is currently disturbed. The construction of a new landfill will cause damages to the landscape which can be mitigated visually	Moderate/ High	▪ Adequate site selection through thorough site assessment process ▪ Limit the construction area according to the planned detailed engineering design ▪ Location outside of zoning of vital habitats and ecosystems ▪ monitoring of species presence and pollution • flood protection measures, if needed.
Disturbance to biodiversity/ flora and fauna	First Neg, then Pos	The rehabilitation of the existing site might cause temporary disturbance to flora and fauna due to the implementation of construction works. The net impacts is expected to be positive as the current negative impacts of the existing site will be	Moderate	Neg	While the impact of the closure of the existing site will be positive, the construction of a new landfill on a greenfield site will cause damage and disturbance to flora, fauna and natural habitats in that area	High	• Adequate site selection through thorough site assessment process • Limit the construction area according to the planned detailed engineering design • leachate collection and treatment system • installation of lining systems • zoning outside of vital habitats and ecosystems

		addressed through the rehabilitation					• monitoring of species presence and pollution • flood protection measures
Cultural heritage	Currently not identified, TBD by the detailed ESIA	No impacts on the known Cultural Heritage sites and objects are envisaged from the rehabilitation of the existing site. To be further defined by detailed site-specific ESIA	TBD	Currently not identified, TBD by the detailed ESIA	No impacts on the known Cultural Heritage sites and objects are envisaged from the closure of the existing site and construction of a new landfill. To be further defined by detailed site-specific ESIA	TBD	
Risks from contemporaneous construction and operation.	Negative, then positive	Risks that arise from construction and operation activities overlapping in time and space (e.g. construction and operation traffic, new civil works at landfill under full operation, etc.)	High	Neutral	Risk that arise from construction and operation activities overlapping in time and space (e.g. construction and operation traffic, new civil works at landfill under full operation, etc.).	Moderate	• Phased construction planning in detailed design to minimize the risks and impacts Very careful site management and accompanying supervision

5.1.2 Environmental impacts during operations

Impacts of Landfill Leachate

The leachate can be defined as the liquid that has percolated through solid waste and extracted some waste materials. The leachate is generally characterized by its strong organic load, containing heavy metals and toxic hydrocarbons, its acidic nature and offensive smell. The water can enter the waste body from different sources to formulate the landfill leachate, including:

- The water content of the waste
- The water content of the daily soil cover
- Water entering the waste from precipitation over active waste cells
- Recycled leachate over the landfill body
- Surface water runoff that could enter the landfill body

Given the leachate properties, the impacts of leachate generation are mainly:

- The risk of being released to the adjacent soil and reach the groundwater which will cause high organic load and acidic conditions to the reached groundwater
- In case the leachate will be discharged to a wastewater treatment plant there will be high organic loading to the plant, so there will be a risk of overloading the plant.
- The leachate has an offensive odor that will be more intense besides the leachate collection pond
- If the leachate is not properly collected from the landfill body it could form stress on the base lining system, and raise the risk for loss of containment

The existing open dumpsite is operated with very little if any daily, intermediate or final cover materials in place over the disposed waste. As a result, it is conceivable that the volume or rate of leachate generated is equivalent to the rainfall depth over the entire landfill plan area; and potentially more including the ingress of groundwater and/or free liquids delivered with the waste.

Mitigation Measures:

Multiple measures are proposed and outlined below for reducing the risks related to leachate pollution:

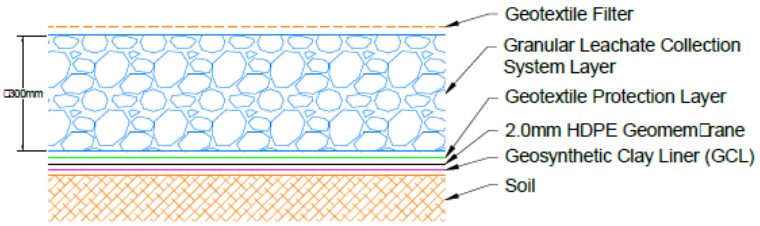
Lining and Leachate Collection System

Generally consistent with and beyond the MoE guidelines, it is proposed that the entire base area of the waste disposal landfill be graded at a minimum of 1% to 2% toward the perimeter

bund and covered by a "composite" lining system comprised of two different barrier materials, specifically:

- a 2mm thick HDPE geomembrane; immediately underlain by
- a minimum 5,000 gram/m^2 geosynthetic clay liner (GCL), also known as a "bentonite mat", (assuming that soil suitable to form the 1 m thick compacted liner is not readily available).
- A minimum 300mm thick "blanket" layer to be placed above the geomembrane as a leachate collection layer. Perforated HDPE pipes are designed to be embedded within the crushed stone in a "rib and spine" network for redundancy.

Figure X: Schematic lining and leachate collection cross section



Typical Lining and Leachate Collection Cross Section

Waste placement and daily cover

Waste placement should be done systematically within a waste disposal cell and in lifts or layers 1-3 m thick; while minimizing the plan area of waste expose and subsequent rainfall infiltration.

"Daily Cover" is typically a minimum 150 mm thick layer of soil material put on top of the most recently placed waste in order to: minimize the infiltration of rainfall (and the subsequent generation of leachate); contain windblown material and odours; eliminate vectors (birds, insects, rats, etc.); improve vehicle access above. "Intermediate Cover" is similar in nature and function to daily cover, but is intended to remain in place for a longer period of time (more than 6 months), and therefore is typically thicker (nominally 300 mm), and potentially compacted. Covert materials can typically be approximately 10% of the volume of the placed waste.

Table X: Summary of Estimated Waste Disposal, Cover and Leachate collection systems

Landfill Waste Disposal Area Feature	10-Year Life Volumes (m^3)	20-Year Life Volumes (m^3)
Required Net Waste Disposal Volume, m^3(1)	1,085,000	3,770,000
Volume of Base Lining/Leachate Collection Systems(3)	22,000	58,000

Landfill Waste Disposal Area Feature	10-Year Life Volumes (m^3)	20-Year Life Volumes (m^3)
Daily and Intermediate Cover Volume, m^3(4)	109,000	377,000
Final Capping System Volume, m^3(5)	84,000	225,000
Total Required Airspace Volume, m^3	1,300,000	4,430,000

Notes:

(1) Required waste disposal capacity from forecasted waste arisings.
(2) Perimeter and inter-cell bunds assumed to be part of site formations and not included in airspace volume.
(3) Base lining system assumed as geomembrane liner underlain by a geosynthetic clay liner (GCL). Leachate collection system assumed a 300 mm thick granular layer over entire landfill base area (bottom and side slopes).
(4) Daily and intermediate cover is estimated as 10% of the disposed waste volume.
(5) The final capping system volume is assumed as a nominally 1000 mm thick layer of soil over the entire landfill area at 3h:1v slopes.

Leachate Reduction

To minimize leachate generation at the "source" means to use one or more various means and methods to prevent rainfall from entering the placed waste. In a relatively small landfill such as that for Siem Reap, this would begin with sizing and sub-dividing the landfill cells so that they will be filled with waste to a level of at least slightly above the crest of the perimeter bund during a portion of the nominally 4- to 5-month "dry season" from November into March the following year. Once the waste level is above the crest of the perimeter bund, it can be graded and surfaced by temporary cover materials, such as plastic sheeting, which promotes rainfall to runoff rather than infiltrate. What rainfall does infiltrate into the underlying waste mass will become leachate and drain, by gravity, through the collection, removal and transmission systems to be treated.

Leachate Treatment Plant

Different options exist for treatment of leachate. One widely used practice for treating leachate in SE Asia is using passive systems consisting predominantly of ponds. However, these can be unreliable in terms of meeting the treatment objectives; require large land areas (for the ponds); and require significant operations and maintenance attention (time and expense).

One potentially suitable technology based on comparative criteria may be active biological treatment. This technology has advantages due to:

- its robustness;
- comparatively low CAPEX and OPEX; and
- a limited land area required for use.

In the specific case of the Siem Reap landfill, an envisoned conceptual leachate treatment system system could incorporate:

- a buffer pond;
- clarifiers for an active anaerobic treatment system, which is followed by:
- an activated sludge system that uses anoxic and aerobic reactors for de-nitrification and nitrification;
- removal of residual organic material; and finally followed by;
- polishing in engineered wetlands.

Detailed assessments on most suitable options for leachate treatment will be required during design stage.

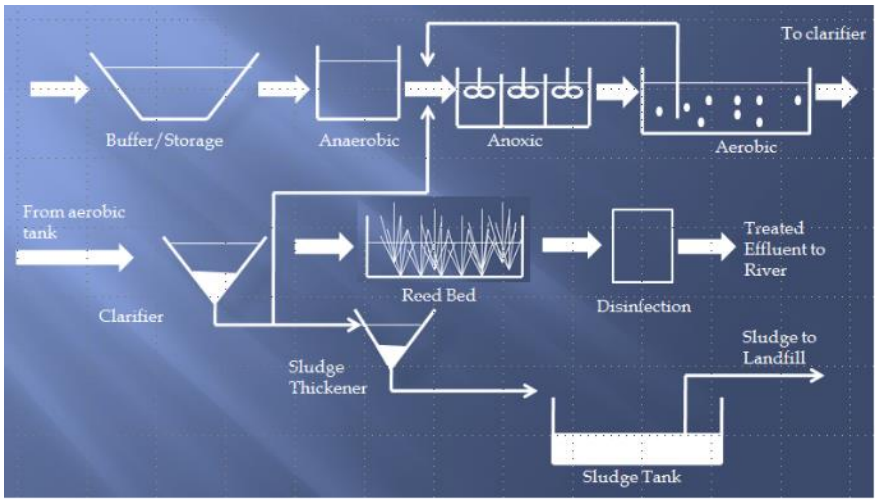


Figure X: Schematic Leachate Treatment Option

Ensure access to safe water supply for local communities

Anecdotal evidence from the local community indicates that the groundwater within the area is polluted, with potential impacts on human health given the shallow nature of the groundwater, unlined nature of the landfill, and reliance of the local community on shallow groundwater wells for water (particularly during the dry season). The rehabilitation of the current site provides substantial opportunities to mitigate and prevent pollution caused by landfill leachate.

Detailed groundwater quality assessments and linkages of groundwater sources of nearby communities to the landfill will need to be undertaken during detailed site specific ESIA and feasibility studies. In any case, remediation of the existing open leachate pond close to residential structures of Anlung Pir village would be required. Depending on the specific local situation, the development of a piped water supply system for surrounding communities from suitable water sources and treatment should be considered.

Transfer station, composting area, and waste sorting facility

The transfer station for Siem Reap should be designed so that the waste loading/unloading areas are to be covered with an adequate roof to prevent rain from getting into the waste during storage in the transfer stations. The transfer station operator should make sure that no loading/unloading or waste storage operations are taking place in open areas, especially during rainy season. The composting windrows and waste reception areas should be covered to prevent contamination of the run-off from these areas. The same applies to a waste sorting facility.

Monitoring activities

- leachate analysis (COD, BOD, pH, TDS, total N, total P, heavy metals, TPH) should be carried out on annual basis, while pH, COD and BOD should be carried out on quarterly basis.
- Groundwater analysis from X monitoring wells (one upstream of groundwater flow and two downstream). Samples from the monitoring wells should be collected on quarterly basis and analyzed against BOD, COD, pH and hardness.
- Analysis of total N, total P heavy metals and TPH should be carried out on annual basis.
- Amounts of sludge removed from leachate pond should be recorded

Options Comparison and risk assessment

Option 1 – Rehabilitation and extension of current site: Impacts on leachate pollution under Option 1 will be *positive* with *high significance*, as infrastructure for leachate collection and treatment to be developed under the project will lead to significantly reduced pollution of soil, surface water ponds and groundwater at the current site with related health benefits for the local community. Depending on the local situation of groundwater quality, alternative water supply systems may be established. The project will also need to remediate and treat existing leachate from surface leachate ponds currently present on the dumpsite.

Option 2 – Closure of current site and new greenfield site: Impacts on leachate pollution under Option 2 will be *negative for new site / positive for existing site* with *high significance*. The Site is located on a flat, low-lying area with high groundwater that is prone to annual flooding. The site is located within Zone 2 of the Tonle Sap Biosphere Reserve (Royal Decree No. NS/RKT/0401/070) 2001, which is a protected buffer zone environment restricted to education and training activities. Despite mitigation measures to be put in place, in case of leakage of inadequately treated leachate (e.g. due to flooding; high groundwater table; operational failures) the consequences of pollution on the Tonle Sap biosphere reserve would be severe. The risk is thus considered high.

Impacts on ecosystems, ground and surface water, biodiversity

Impacts on ecosystems, water sources including ground and surface water, and biodiversity of fauna and flora may happen due to:

- leakage of leachate leading to pollution of vital resources including water bodies
- landfill development (roads; cells; facilities; etc) removing or reducing natural habitats for fauna and flora
- pollution of surrounding environment and waters due to leakage of waste
- daily landfill operations impacting habitats

Mitigation measures

- daily waste coverage
- leachate collection and treatment system
- installation of lining systems
- zoning of vital habitats and ecosystems
- monitoring of species presence and pollution
- flood protection measures
- not accepting hazardous waste

Options comparison and risk assessment

Option 1 – Rehabilitation and extension of current site: The overall impact of measures on the current site will be *positive* with *high significance*, reducing pollution of the surrounding environment and water bodies.

The current site is developed and operated as open dumpsite, without any measures in place to prevent pollution. Rehabilitation of the existing site will thus positively affect the surrounding environment and water sources, with appropriate engineering measures to control of

- groundwater and surface water contamination by installation of engineered cells with impermeable base lining;
- leachate treatment through an engineered leachate collection, removal and treatment system;
- leachate generation control/reduction through temporary and permanent capping systems;

From both site visual inspection and review of satellite imagery, relatively large areas of land are available to the east and south-east of the current cell. This is largely agricultural land and increases separation distance between active cells and the villages to the west of the existing site. The potential extension sites are under productive use since at least 10 years and far from vital ecosystems, water sources, or key biodiversity zones.

Option 2 – Closure of current site and new greenfield site: The overall impact on the ecosystems, including fauna, flora, surface and groundwater, will be *negative* with high likelihood and of *high significance*

This site poses high risks of negative environmental impacts to surrounding ecosystems, biodiversity protection zones, and water sources. The Site is located on a flat, low-lying area with high groundwater that is prone to annual flooding. It is situated within the Tonle Sap reserve, which has a UNESCO biodiversity reserve status and is covered under the Cambodian Royal Decree on the Establishment and Management of Tonle Sap Biosphere Reserve (Royal Decree No. NS/RKT/0401/070). It is also reported that +/- 3km to the West of the site the Siem Reap government is planning to build a water supply plant extracting water from the Tonle Sap reservoir. The site poses a further risk of polluting fishing ponds currently used by the surrounding community.

Highly cost-intensive measures would be required to adequately protect the surrounding environment from pollution risks caused by the landfill, including the development of substantive flood protection barriers to the South of the landfill. Yet, even under consideration of potential mitigation measures, risks would be considered high due to the severity of impacts in case of pollution.

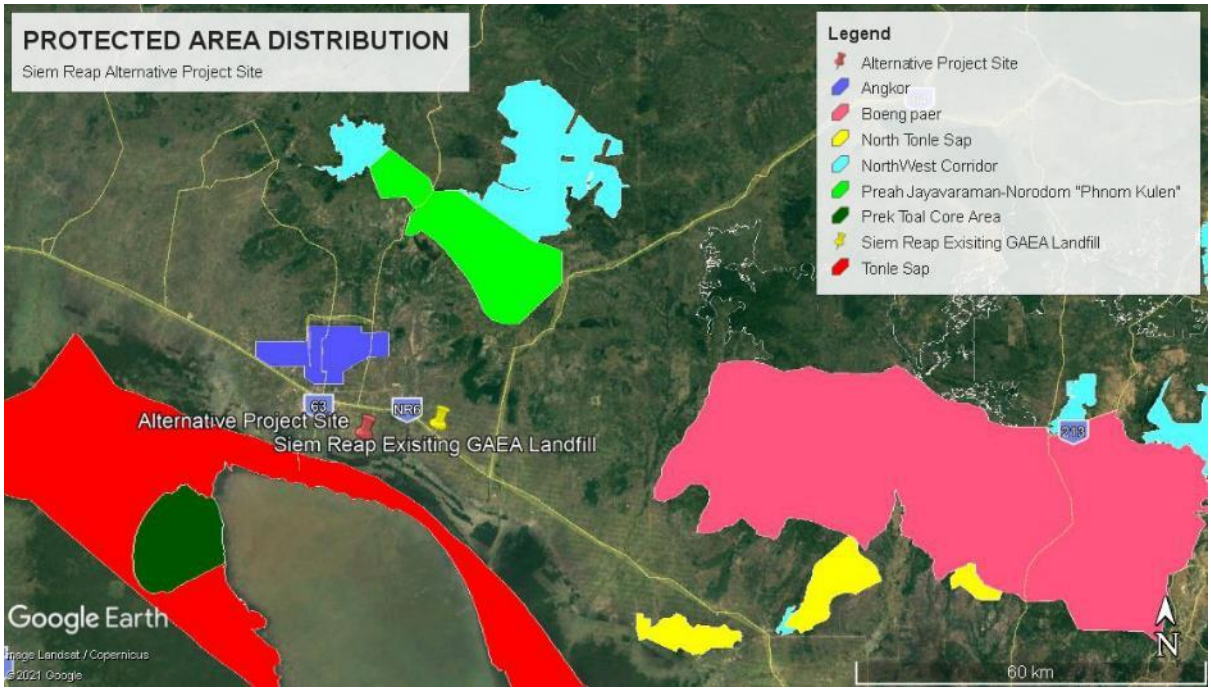


Figure 3: Landfill Site Option 2 (Red) Adjacent to UNESCO Biodiversity Reserve

The map below shows that the existing landfill site (Option 1) falls on the outer edge of the zone 1 which allows for settlement and sustainable land-use development. The potential site under Option 2 is located in the middle of Zone 2 which is set aside as a protection buffer zone

with restricted land use excluding landfill development. Under this option, the landfill site would be squeezed between the city expansion zone and the Tonle Sap UNESCO and TSBS biodiversity reserves.

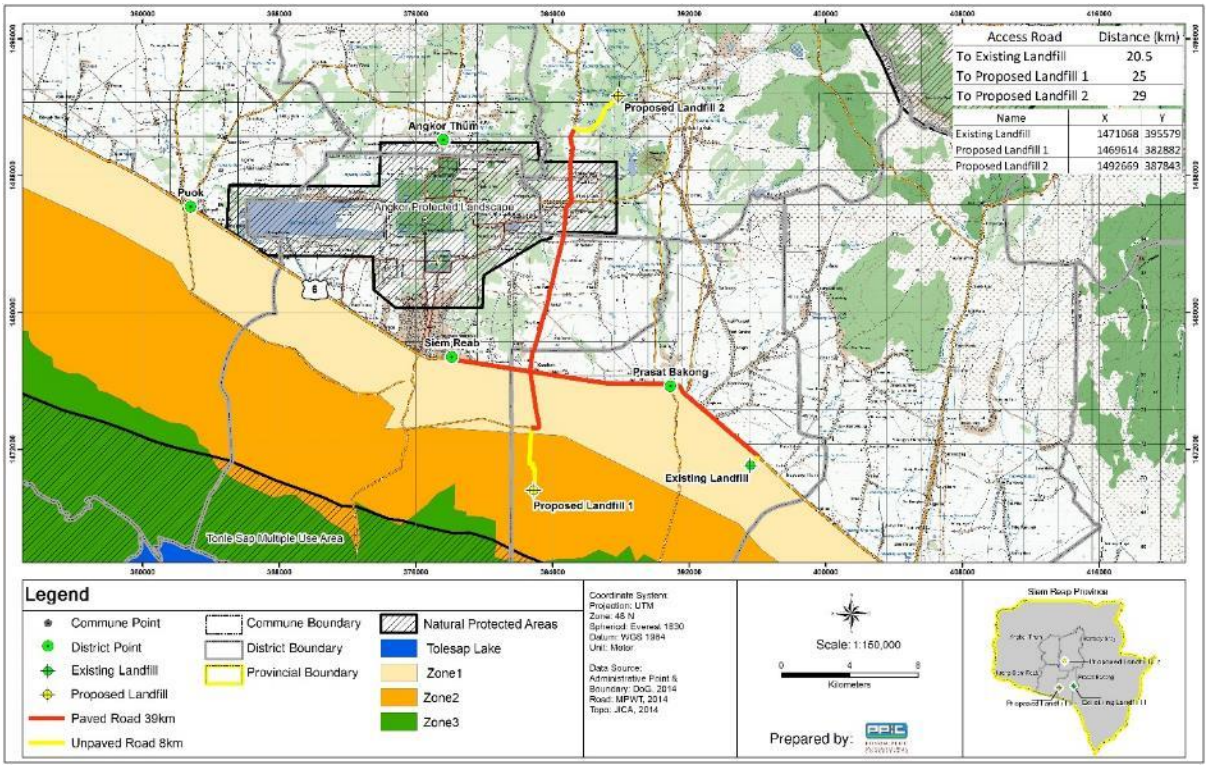


Figure 4: Tonle Sap Biosphere Reserve (TSBR) Zone Map

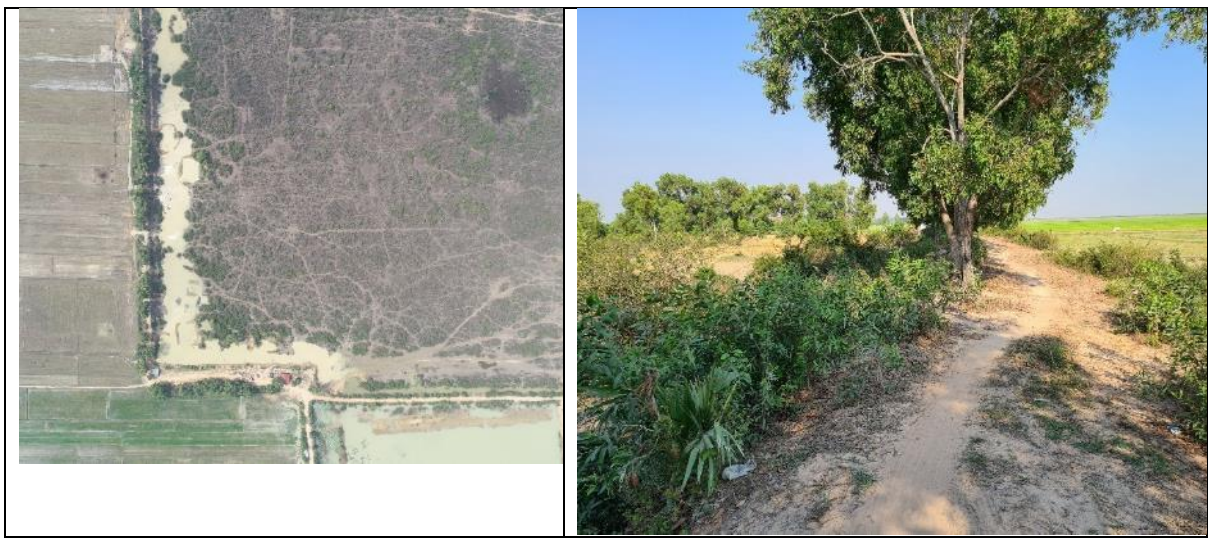


Figure X: Image of landfill site option 2 (right), including flood protection bund & rice cultivation area

Impacts of Landfill Gas

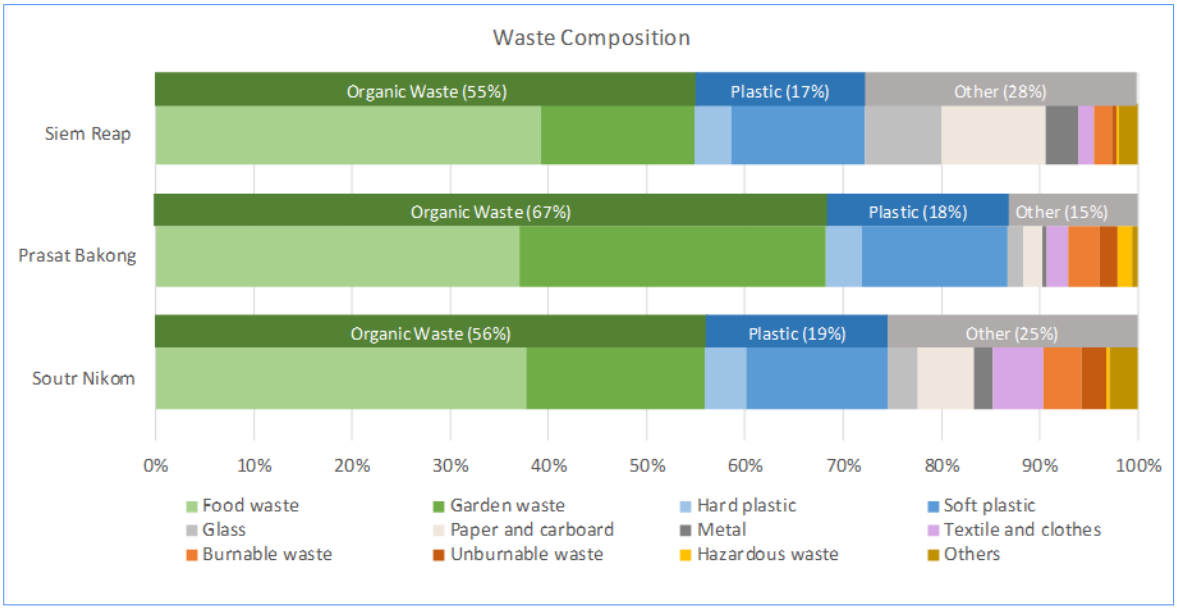
Landfill gas (LFG) is produced by the biological decomposition of organic matter within the waste mass, and is comprised of:

- from 40% to 60% as methane;
- 40% to 60% as carbon dioxide, and
- trace amounts of various other constituents.

GHG emission from waste generation in Siem Reap have been calculated as CH4 emissions using the Tier 1 methodology provided by IPCC 2006 using the default values provided by the guidelines complementing it with national specific information. The calculation is using period of 40 years from 2022 to 2062 and available supporting data in 2019 with waste treated by composting is 25% and methane recovery from landfill gas collection is 50%.

Waste composition in Siem Reap in Siem Reap comprises of 55% organic material, as shown in the Figure below.

Figure X: Waste composition in Siem Reap



Waste composition were using the assumption of reducing organic compound by 15%. Deposited waste of waste category is calculated based on the percentage of the waste composition.. Methane recovery from landfill gas collection is using 50% landfill gas collection efficiency.

Total gross emission from three cities for the project spans of 20 years is 7,618,851.32 ton CO2eq, while gross emission after treatment of 15% composting and 50% landfill gas collection is 3,378,247.11 ton CO2eq. The project related investments will thus reduce the emission of 4,240,604.21 ton CO2eq throughout the economic life spans over 20 years with average emission reduction of212,030.21 ton CO2eq per year.

Table 11: Total Methane Generated from Solid Waste Disposal (ton CO2eq)

Summary	Total

Economic Lifetime (years)	20
Gross Emissions under baseline scenario/ no intervention (ton CO2eq)	7,618,851.32
Gross Emission under project interventions (ton CO2eq)	3,378,247.11
Net Emissions Reduction (ton CO2eq)	4,240,604.21
Average Annual Emissions reductions (ton CO2eq)	212,030.215

Mitigation Measures:

- **Landfill Gas Collection and Treatment**

Landfill gas may be collected by a series of vertical wells will be installed at a regular spacing through the waste mass. This collection system will be connected to a network of collection pipes leading into a flare for treatment and/or LFG-to-power systems. Gradual placing of gas vents and construction of the gas compression station with adequate capacity to receive the maximum flow of gas is recommended. It is recommended to perform trials to collect the gas early during the landfill operation and before the cell is completely filled. This can significantly reduce odour and GHG impact.

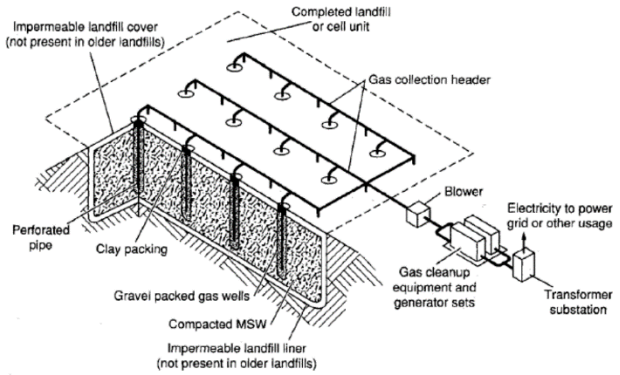


Figure 10 Landfill gas recovery and treatment system

Landfill gas treatment most commonly takes the form of destruction by flaring, with two commonly available forms of such being: (i) enclosed flares; and (ii) open flares. Enclosed flares are typically available with gas flow capacities in the range of 300 m^3/hour to 3,000 m^3/hour while open flares are typically smaller and therefore available for lesser flows.

The forecasted waste arisings from the Siem Reap landfill would likely produce sufficient gas to justify the use of an enclosed flare for only a relatively short period of time – for example less than 5-years. Multiple, smaller open flares with flow from individual or grouped wells would likely be a reasonable option that provides flexibility in both establishment/installation and operation. Installation of passive gas collection and pressure relief layer immediately beneath the geomembrane component of the capping system is preliminary recommended in

order to prevent gas pressure build-up in the event that the active extraction system is not installed or is out of service for any reason.

Examples of landfill gas control by extraction wells, landfill gas flaring and landfill gas utilization for power generation are shown in the following photos.

Photo 1: Landfill gas flare (Open Type)

Photo 2: Landfill gas to electricity generation

Photo 3: Gas wells installed at a closed cell

- **Composting facilities** and program which can be an effective measure in reducing the organic materials from the solid waste that arrives in a landfill which can lead to less GHG emission from the landfill where mixed waste often causes methane gas emission.
- Keep **records of collected gas** through the degassing system
  - Analyze ambient air quality at the landfill borders on annual basis
  - Analyze ambient air quality at the nearest farm house
  - Analyze the acidity and hardness of groundwater taken from monitoring wells upstream and downstream of the groundwater flow on quarterly basis

Options Comparison and risk assessment

Option 1 – Rehabilitation and extension of current site: Impacts on landfill gas under Option 1 will be *positive* with *moderate significance*, as infrastructure improvements and landfill gas collection and treatment systems will lead to substantial reduction of landfill gas emissions and related climate impacts.

Option 2 – Closure of current site and new greenfield site: Impacts on landfill gas under Option 2 will be *positive* with *high significance*. Closure of current landfill and development of new landfill with gas collection and treatment system will lead to significantly reduced greenhouse gas emissions compared to current status.

Odor impacts

Waste is at the moment exposed to air, fauna and waste pickers, and the site is characterized by considerable odor emissions. The existing landfill is poorly managed and there are many sources of air pollutants, which have an impact on a local community level and contribute to overall airshed degradation on a Provincial level. This is mainly because currently incoming waste is not treated or covered in any way. Once the waste is in place, continued decomposition will result in landfill gas which is a significant source of odor. Primary composting could be a significant source of odour if aeration is not efficiently performed as this may result in anaerobic decomposition of waste.

Mitigation measures

- daily waste cover (see above – impacts related to storage of excavated soil and daily waste cover)
- installation of gas collection and treatment system (see above)
- material recovery and composting facility (see above)

Options comparison and risk assessment

Option 1 – Rehabilitation and extension of current site: Impacts on Odour under Option 1 will be *positive* with *high significance*, as infrastructure improvements and mitigation measures put in place to improve the current status and reduce pollution will lead to substantial reduction of odour

Option 2 – Closure of current site and new greenfield site: Impacts on Odour under Option 2 will be *positive on the current site / neutral on new site* with *moderate significance*. The site under this option is a greenfield site, within Zone of the Tonle Sap Biosphere Reserve. While the land is currently largely unused besides fishing and farming activities, approximately 2km to the

North of the site there is ongoing construction of high value residential property, and city development plans show that the entire area up to the planned ring road is zoned for mixed commercial and residential development.

The MoE Landfill Site Requirements (2016) requires a landfill to be in distance of minimum 8km to an airport. In Siem Reap, the existing landfill is 25km in distance to the airport, and the potential new site (Option 2) also over 20km. No impacts on the airport are thus foreseen under either option.

Risks of Receiving Hazardous Wastes

While the landfill will not officially accept hazardous waste and control measures will be put in place, it is possible that the waste dumped will accidentally contain hazardous components. Co-mixing hazardous waste with MSW and/or disposing of hazardous waste at the landfill site can cause different risks to workers on the site, waste pickers, or generally anyone who may come into contact with the waste during its journey from the source of generation to the landfill.

Mitigation measures

- The municipal environmental regulations and landfill operation manual need to provide a list of acceptable and nonacceptable waste. Non-acceptable waste needs to be strictly forbidden from admission
- All workers of the landfill, transfer station, recycling and composting plants should receive adequate training on the types of hazardous waste that could be handled, the type of hazards and the appropriate methods of handling
- Awareness of hazardous waste generators regarding the sorting at source in order to avoid a mixing of hazardous and non-hazardous waste
- All workers in the landfill, recycling plant and composting plant should be provided with anti-puncture gloves, steel-toe shoes, overalls and masks. Strict supervision on the compliance of hand sorters to this should be practiced
- Prepare a documented emergency response plan to any spills or fires

Options comparison and risk assessment

The overall impacts related to risks of hazardous waste will be positive/not lead to deterioration of the current situation due to the project measures. The impact of hazardous wastes is classified as of
medium significance at either landfill Option.

Visual Impacts and Aesthetics

The most effected groups by the visual impacts of the landfill, transfer stations and material recovery plants are the inhabitants of the close neighborhood who can see the waste from their places. Also the users of roads that could view the landfill could be also impacted by the low aesthetic value of the area.

Mitigation measures:

- Daily waste coverage
- Windbreak trees
- Fencing of site and buffer zone

Options comparison and risk assessment

Option 1 – Rehabilitation and extension of current site: Visual impacts and aesthetics under Option 1 will be *positive* with *moderate significance*, as infrastructure improvements and measures put in place to improve the current status and reduce pollution will lead to improved aesthetics of the current site. The village of Anlung Pir is located at the west of the site and thus within visibility-range to the landfill and will be positively affected by the improvements.

Option 2 – Closure of current site and new greenfield site: Visual impacts and aesthetics under Option 2 will be *positive* with *moderate significance*. The site under this option is a greenfield site, within Zone of the Tonle Sap Biosphere Reserve. While the land is currently largely unused besides fishing and farming activities, approximately 2km to the North of the site there is ongoing construction of high value residential property, and city development plans show that the entire area up to the planned ring road is zoned for mixed commercial and residential development.

Impacts after Landfill Closure

Under Option 2 – development of new landfill in Trapeang Tim Village, the existing landfill site is regarded as an associated facility and will require adequate closure. Key environmental impacts without adequate closure include air pollution due to continuing waste decomposing processes, risks of open fires, and contamination of groundwater due to uncollected leachate.

The following measures will be required at the existing site to mitigate impacts:

Mitigation measures:

- Final closure cover: final closure cover is key to reduce and prevent water pollution from leachate as well as minimizing odour impacts, landfill gas generation, visual impacts, disease vectors, and prevention of slope collapsing.

- As it is not anticipated that a relatively low permeability soil is readily available, it is recommended that the geomembrane option be adopted as the capping system barrier layer material. Similarly as it is not anticipated that a relatively permeable granular material is readily available, it is recommended that a geo-composite drainage material (a geonet or similar component bonded with a geotextile filter on both sides) be used as the capping system drainage layer.
- In order to generally reduce the potential environmental impact of the overall Site, particularly the generation of leachate and gaseous emissions to the atmosphere, it is recommended that the final capping system be installed progressively through time after the waste has been placed to its ultimate level over each cell or portion thereof.
- Measures to minimize remaining leachate after closure, in addition to final cover, will depend on detailed assessments on groundwater pollution, soil permeability, and impacts on nearby residential areas such as Anlung Village. Establishment of impermeable linings may be considered, as well as development of alternative water sources for surrounding residential areas.

Summary of environmental impacts and preliminary mitigation measures during operation under each option

Table X: Summary of environmental impacts and preliminary mitigation measures during operation phases under each option

Impact	Option 1 – Rehabilitation and extension of existing site			Option 2 – Closure of existing site and new greenfield site at Trapeang Tim Village, Kandaek Commune			Preliminary generic mitigation Measures. Specific mitigation measures will be determined at the stage of detail design and the accompanying site-specific ESIA
	Positive/ Negative Impact	Description	Significance	Positive/ Negative Impact	Description	Significance	
Landfill leachate	Pos	Currently uncontrolled leakage of leachate into surface and ground water. Strongly reduced pollution due to rehabilitation and improvement of existing site. Positive impacts on current dumpsite location due to rehabilitation.	High	Neg for new site and positive for closure of existing dumpsite	Greenfield site within buffer zone of Tonle Sap Biosphere Reserve. Despite mitigation measures high risks of pollution will remain specifically due to the flooding in the area and groundwater table that causes a bigger impact in case of; failures in operations) with severe consequences on Tonle Sap ecosystem. Positive impacts on current dumpsite location due to closure.	High	• Lining and Leachate Collection System • Waste placement and daily cover • Leachate Reduction • Leachate Treatment Plant • Ensure access to safe water supply for local communities • (Ground)water quality monitoring
Ecosystems, water, biodiversity	Pos	The current site is developed and operated as open dumpsite, without any measures in place to prevent pollution. Degraded agricultural land available at site with high potential for expansion. No protected zones. Rehabilitation of the existing site and mitigation measures (incl. daily waste coverage; leachate collection system; lining; etc.) will thus positively affect the surrounding environment and water sources	High	Neg	The Greenfield landfill site Option is within buffer zone of Tonle Sap Biosphere Reserve (UNESCO and Cambodian Royal Degree). Buffer zone allows limited developments for education and sustainable development, but that does not include landfill development. Despite mitigation measures high risks of pollution will remain (flooding; high groundwater table; failures in operations) with severe consequences on Tonle Sap ecosystem and biodiversity.	High	• Thorough site assessment process to prevent sites to be located in sensitive areas • Daily waste coverage • Leachate collection and treatment system • Installation of lining systems • Location outside zoning of vital habitats and ecosystems • Monitoring of species presence and pollution • Flood protection measures • Not accepting hazardous waste

					Positive impacts on current dumpsite location due to closure		
Landfill gas	Pos	Significantly reduced emissions due to gas collection and treatment system as well as composting facilities	High	Pos	Closure of current landfill and development of new landfill with gas collection and treatment system and composting facilities will lead to significantly reduced emissions compared to current status.	High	• Landfill Gas Collection and Treatment (flaring) • Composting facilities to reduce organic fraction of waste going to landfill
Odor	Pos	Significantly reduced odor compared to current status particularly for nearby communities due to infrastructure improvements and mitigation measures incl. daily waste cover, gas collection system, and material recovery and composting facilities	High	-	Current greenfield site but entire area up to the planned ring road is planned for mixed commercial and residential development which may be impacted by odour. Positive impacts on current dumpsite location due to closure.	Moderate	• Daily waste cover • Installation of gas collection and treatment system • Material recovery and composting facility
Hazardous waste	Pos	Reduced risk for disposal of hazardous waste mixed with municipal waste due to improved operations and regulations.	Moderate	Pos	Reduced risk for disposal of hazardous waste mixed with municipal waste due to improved operations and regulations.	Moderate	• Municipal regulations for landfill operation to provide a list of acceptable and nonacceptable waste. Non-acceptable waste needs to be strictly forbidden from admission • Awareness and training to avoid a mixing of waste • All workers to be provided with protection equipment, training in waste handling, and strict supervision. • Prepare emergency response plan
Visual impacts and aesthetics	Pos	Rehabilitation of the current site and mitigation measures (incl. daily waste coverage) will lead to improvements in current aesthetics, particularly affecting nearby communities	Moderate	Neg	Greenfield site within Zone of the Tonle Sap Biosphere Reserve. While the land is currently largely unused, approximately 2km to the North residential development is ongoing, and city development plans show that the entire area zoned for mixed commercial and residential development	Moderate	• Daily waste coverage • Windbreak trees • Fencing of site and buffer zone

5.2 PRELIMINARY SOCIAL IMPACTS, RISKS AND MITIGATION MEASURES

5.2.1 Social impacts prior to landfill construction

Resettlement Impacts, economic displacement and livelihoods impacts

Impacts related to resettlement include both physical and economical displacement as well as impacts on livelihoods.

Waste pickers at the existing dumpsite: A total of 273 wastepickers were identified at existing dumpsite in Siem Reap in March 2021. The majority of the waste-pickers reside in the villages of Phnom Dey (52.8%) and Anlong Pir (47.4%). All of the interviewed waste-pickers reported that they resided in houses in surrounding villages, most notably Aulung Pir village, rather than within the boundaries of the landfill site itself. However, this does not exclude the possibility that structures existing on the dumpsite are the primary residence for some waste-pickers. This would need to be further confirmed during the site-specific ESIA and census etc as preparation of the Resettlement Plan/Livelihood Restoration Plan. It does imply that negative impact of direct physical displacement associated with either closure or and rehabilitation and expansion of the existing dumpsite would likely be low, but the significance of such resettlement would be high.

Economic displacement, livelihood impacts on waste pickers and other waste-based livelihoods: continued access to waste resources Changes in waste flows (volumes and composition) and its availability to waste-pickers has the potential to result in economic displacement/livelihood impacts.

Interviewed waste pickers generally reported as having been working on the existing dumpsite for 10 years or more. The surrounding community of those with waste-based livelihoods therefore are likely to have a strong reliance on the dumpsite and a strong sense of attachment to the area. The full extent of waste-based livelihoods economy in and around the site (including junk traders, middle-men, transport providers and peripheral supporting businesses) will be analysed as part of the preparation of the census.

While for part-time waste pickers impacts of landfill closure would be less severe due to alternative income sources, *for waste pickers who are working on full time basis*, the *significance of the potential negative impact is of high significance* on their and their families' livelihoods.

Livelihood impacts on children: A number of waste pickers at the current dumpsite are children under the age of 14 years, who cannot be integrated in sorting and material recovery facilities at the new landfill or transfer station and the new landfill whether at the existing location or a new location will have a high negative impact with high significance.

Impacts on landowners: land that would need to be acquired for the project would impact landowners. Compensation will be included in the Resettlement Plan.

Options comparison and risk assessment

Under Option 1 – Rehabilitation and extension of current dumpsite into a landfill, possible expansion areas would be mostly agricultural land, which will be a *negative impact of low significance* due to the low value of the current surrounding agricultural areas due to the pollution of the current dumpsite. There could be incidental need for acquisition of residential houses or land but as there is expectation of limited residential houses or land, this *negative impact is likely also to be of low significance* due to expected low number of residential houses or land impacted but this is to be verified during the preparation of the Resettlement Plan and compensation will also be included. The impacts on *general waste pickers will be mostly positive with high significance* as waste pickers will continue to have access to the waste resources under improved Occupational, Health and Safety conditions. *This is different for children waste pickers*, specifically under 14, who cannot be permitted to participate in waste recycling activities and *the negative impact with high significance* will require livelihood restoration support and further livelihood support options.

Under Option 2, public land is generally available but part of the Tonle Sap Biosphere Reserve. *Impact to waste pickers will be negative with high significance for this option* as the current dumpsite would be closed and transportation allowances to the material recovery facility at the new landfill site or transfer station will likely be included in the livelihood restoration plan together with possible other livelihood restoration assistance and livelihood support options which are to be defined in a livelihood restoration plan. The impact to the children waste-pickers is the same as under option 1 as children under 14 will not be permitted to participate in waste recycling activities.

Mitigation measures

- Depending on the finalization of site suitability assessment, including meaningful consultations with neighbouring communities, waste pickers and other potential affected people a potential site could be selected. Once a site has been selected, a resettlement and livelihood restoration plan will be developed and implemented in line with the Resettlement Policy Framework and Livelihood Restoration Framework and the ESF.
- This Resettlement Plan and Livelihood Restoration Plan will include full replacement costs for houses and land plots and further support and allowances and transport and livelihood restoration assistance and further livelihood support options as applicable and as per the entitlement matrix in the Resettlement Plan Framework and Livelihood Restoration Framework and the ESF and based on census and inventory of losses and meaningful consultations with project affected groups.
- For waste-pickers from Anlong Pir and Phnom Dey villages, continued access to waste resources will be part of the project either at the current dumpsite under option 1 or through provision of transportation allowances to the new landfill area to continue to work in solid waste recycling at the new material recovery facility at the landfill or transfer station (and under adequate Occupational, Health and Safety procedures). Livelihood restoration assistance will be applicable in case of lost access to waste resources as well as further livelihood support options for children waste pickers as per the Resettlement

Policy Framework and Livelihood Restoration Framework and the ESF. These will be specifically determined in the livelihood restoration plan.

- Monitoring Indicators for the implementation of the Resettlement Plans and Livelihood Restoration Plans
- Ensure awareness of job opportunities within surrounding communities and consideration for vulnerable groups through further livelihood support activities.

5.2.2 Social impacts during construction

Creation of temporary job opportunities

The construction phase of the various components of the project will involve creation of a variety of short-term jobs. The job opportunities that will be created as part of the construction works are predicted to result in improvement for the economic conditions of certain segment of the population including poor people with low and medium skills. Higher qualified professionals in engineering and other professions will also be required during this phase. The construction works will create short term temporary job opportunities for the local population who are available in the local market and are the cheapest and most economic option for the project contractor. In addition to the direct benefit of these opportunities on the local economy and local businesses, they will help in temporarily increase income for those who will benefit from the created jobs.

To maximise the job benefits for the local population, efforts should be made to ensure that these opportunities are known to the local population, which could consist of transparent information sharing about upcoming job opportunities and exploring of opportunities to encourage local firms as part of consortia for construction tenders.

<u>Options comparison and risk assessment</u>

Option 1- Rehabilitation and extension of current dumpsite into a sanitary landfill: impacts with regards to creation of temporary jobs for construction are considered *positive* with *high significance.* Particularly for lower-skill jobs, the civil works for rehabilitation and extension could provide significant job opportunities for residents of the nearby village of Anlung Pir and as well as Phnom Dey village. Many of these residents are already engaged in the local recycling sector.

Option 2 - Closure of current site and new greenfield site: impacts are considered *positive* with *moderate significance.* At the landfill site option 2, no residential areas are established at this moment thus there are no nearby communities who may benefit from civil works jobs, however residents of wider Siem Reap are anticipated to benefit from temporary jobs for construction of the new landfill site. Residents from Anlung Pir and Phnom Dey villages could take jobs related to closure of the landfill

Community Health and Safety

The construction process of the landfill expansion and the associated transfer stations, material recovery and composting facility will involve civil works including movement of heavy vehicles, transferring construction material and influx of construction workers to the construction site. The construction works will affect the traffic on the roads and are expected to result in temporary inconvenience to the neighbouring communities.

Transferring the construction materials will involve pressure on the main road with several heavy truck movements. The increased traffic pressure may result in delays for the users of the road and increase in the risk of road accidents.

The influx of workers and other individuals seeking to benefit from the potential economic gains from the project may strain the current resources of the host municipalities. The influx of individuals may also cause competition over basic facilities and services as well as Sexual Exploitation Abuse and Sexual Harassment (SEA/SH) as a result of labor influx.

The risks are considered negative with moderate significance for both options as the site locations and works are of medium size and in limited different locations.

For the labor influx and Sexual Exploitation Abuse and Sexual Harassment the negative impact risk is considered moderate as the works are of medium size in only limited different locations. There will be international/local construction works with international and close supervision on the construction sites and there are only limited construction sites which can be more easily supervised and in collaboration with communities and clear grievance redress system.

Mitigation measures

- International and close supervision of the construction works and clear obligations and code of conduct for construction firms.
- Collaborate with local communities in terms of regular information on progress and Environmental and Social compliance related to construction works.
- Establishing and enforcing a clear grievance redress to ensure grievances and complaints are well and promptly addressed.
- Monitor implementation of labor management procedures
- Communicate information about the hours of construction with the local population
- Supervise application of OH&S regulations and code of conduct on SEA/SH
- Public hearings and meaningful consultations.
- Full restriction from access to the construction site by local communities, waste pickers and any other group outside the construction team while ensuring access to material recovery facilities.

Summary of social impacts and preliminary mitigation measures prior to and during construction under each option

Table X: ***Summary of social impacts and preliminary mitigation measures prior to and during construction phases under each option***

Impact	Option 1 – Rehabilitation and extension of existing dumpsite			Option 2 – Closure of existing dumpsite and new greenfield land at Trapeang Tim Village, Kandaek Commune		
	Positive/ Negative Impact	**Description**	**Significance**	**Positive/ Negative Impact**	**Description**	**Significance**
Resettlement, economic displacement and livelihoods impacts	Negative	Acquisition of residential houses or land	Moderate	Neutral	Acquisition of residential houses or land not needed as land for option 2 is public land	Low
	Positive	General waste pickers impact will be positive as waste pickers will continue to have access to the waste resources under improved Occupational, Health and Safety conditions.	High	Negative for the different location, positive for health and safety	Impact to waste pickers will be negative for this option as the current dumpsite would be closed and transportation allowances to the material recovery facility will likely be included in a livelihood restoration plan together with possible other livelihood restoration assistance and livelihood support options	High
	Neutral for livelihoods /positive for health and safety	Children waste pickers specifically under 14, cannot be permitted to participate in waste recycling activities and will require livelihood restoration support and further livelihood support options. The discontinuing of their work at the dumpsite will have significant positive health and safety impacts.	High	Neutral for livelihoods /positive for health and safety	Children waste pickers specifically under 14, cannot be permitted to participate in waste recycling activities and will require livelihood restoration support and further livelihood support options	High
Temporary job opportunities	Positive	Rehabilitation and extension works at the dumpsite and construction of other waste facilities can provide job opportunities for residents of nearby villages. Many of these residents are already engaged in the local recycling sector.	High	Positive	Residential areas at new landfill site option further away to benefit from local job opportunities, however residents of wider Siem Reap city will still benefit. Residents from villages at existing dumpsite will have access to jobs related to closure of the landfill	Moderate
Community Health and Safety	Negative	Rehabilitation and extension works at the dumpsite and construction of other waste facilities can have negative impact to neighboring communities health and safety including impacts of influx of workers and accompanying risks to SEA/SH.	Moderate	Negative	Rehabilitation works to close the existing dumpsite and works at the new landfill location and construction of other waste facilities can have negative impact to neighboring communities health and safety including impacts of influx of workers and accompanying risks to SEA/SH.	Moderate

		The risks are considered negative with moderate significance for both options as the site locations and works are of medium size and in limited different locations.			The risks are considered negative with moderate significance for both options as the site locations and works are of medium size and in limited different locations	

5.2.3 Social impacts during operations

Community Health and Safety and Occupational Health and Safety

Health and safety impacts in Siem Reap waste management particularly concern waste pickers, waste collectors and workers, and local communities in close distance to the existing dumpsite. Waste pickers at the existing site work under very low level of health and hygiene considerations, having direct contact with waste materials and being exposed to air, water and soil pollution. Waste collectors and workers do receive some safety equipment but with very little oversight and regulation. The main affected community at risk from landfill related pollution is Aulung Pir village. The surrounding community rely on shallow groundwater wells for their domestic water supply for at least the dry season and there are complaints on power water quality that may be linked to the current lack of leachate treatment at the current dumpsite and the leachate pond that has formed. Furthermore, open waste dumping without daily waste cover attracts vermins to the site (birds, rodents and insects) which can act as disease vectors and the leachate and open waste dumping is causing odour issues.

Potential impacts on the health and safety of both the general public and on-site workers exists as a result of the nature of the waste. These are equally applicable to the landfill site, transfer stations, material recovery facility, or composting facility. Waste sorters at the MRF, in addition to regular staff on the landfill and transfer stations, are in direct contact with the waste and accordingly could be exposed to unhygienic conditions from the prolonged exposure to waste, dust and vermin.

At the current dumpsite and facilities, very little to no measures are in place to reduce OHS related risks, exposing workers and neighbouring communities to unstable slopes; regular open fires at the landfill; inhaling of toxic gases; exposure to contaminated surface water (leachate pond and open streams); disease carrying vectors.

<u>Options comparison and risk assessment</u>

Option 1- Rehabilitation and extension of current dumpsite into a sanitary landfill: impacts with regards to public health and safety are considered *positive* with *high significance.* Pollution related health and safety risks at the current site will be significantly reduced due to project interventions.

Option 2 - Closure of current dumpsite and new greenfield site at the WWPT location: Adequate closure of current site will bring health benefits to communities at the current site, as in Option 1. Currently no settlements exist at the site under Option 2, but risks can be assessed as *negative* with *moderate* significance. Limited agricultural and fishery activities are carried out by local communities. City development plans foresee major residential and commercial developments in the entire area, which can also impact new residential communities along the access road for waste vehicles. Mitigation measures will be required to prevent and reduce pollution and related community health and safety risks.

Mitigation Measures

The project foresees a wide range of measures that will significantly reduce risks related to public health and safety. These measures include:

- The application of modern landfill operations and inclusion of performance indicators for landfill management and operation performance in contracts, for instance waste compaction and daily soil coverage, will limit the potential for the development of resident populations of vermin and pests
- Landfill gas collection and composting to remove larger part of the organic fraction from landfill disposal
- Leachate collection and treatment including of the leachate pond of the existing dumpsite under both options
- Regular maintenance of the leachate treatment plant and monitoring
- lining system and daily waste cover and in case of closure final waste cover
- Fencing of site, registration, and monitoring procedures
- Material recovery facility: Provide an area for workers to sort through the waste in a controlled environment away from the landfill active face and loading areas where heavy equipment is operating, so that the sorting and material recovery facility will provide safe working conditions and promote more efficient, effective, increased recovery of recyclable materials.
- Integration of the recycling sector including waste pickers into the waste material recovery facilities through provision of personal protection equipment, training and adherence to OHS procedures
- Provision of appropriate PPEs such as protective clothing, gloves, respiratory face masks and slip resistant shoes and hard soled safety shoes

- Provide training regarding to the use of PPE and other related occupational health and safety related issues
- Conduct monitoring on waste pickers occupational health and safety issues and regular health checks
- Provision of safe water supply to surrounding communities
- Showers, washing basins, clean toilets, changing rooms, and different cleansing equipment should be available at the landfill offices as well as the recycling/composting plants

Adequate OSH measures and procedures will be required at either site option and will strongly improve the working conditions and safety compared to the current situation, impacts are thus considered *positive and of high significance.*

Creation of job opportunities

The improvement of the SWM system as a whole in Siem Reap will involve several investments including landfill rehabilitation/extension or closure/new landfill site development, transfer stations, and improved waste collection and cleanliness of streets. All of the operational activities related to the proposed investments will require additional human resources of various backgrounds and qualifications and solid waste collection activities are specifically suitable for poor people with low and medium skills. Opportunities for the informal waste pickers at the material recovery facilities and composting facilities are already included in the section on resettlement impacts, economic displacement and livelihoods impacts, where the project will specifically support the integration of informal sector into waste treatment and recycling activities.

In terms of the creation of job opportunities outside of the waste pickers impacts and opportunities, they do not differ much between the two options and are in general *positive with high significance* as enhanced waste collection and cleanliness and improved landfill management and operation will require additional job opportunities for various backgrounds and qualifications including for poor people with low and medium skills.

Measures may include:

- Ensure awareness of job opportunities within surrounding communities and consideration for poor and vulnerable groups.
- Transparent information sharing about the created job opportunities particularly in local areas
- Local sourcing of supplies and materials whenever possible

Impacts on property value

The current unsanitary landfill, operated as an open dumpsite, results in high levels of air and water pollution, odour, and visual impacts, all of which negatively affects prices of surrounding land. However, it has been widely recognized that today's state-of-the-art landfills provide a variety of economic, employment and community-enhancement benefits that typically can contribute to property values. The project foresees a wide range of measures that will positively affect land prices around the current site. These measures include:

- gas collection and treatment
- leachate collection and treatment
- lining system
- daily waste cover or in case of closure final waste cover
- waste sorting

Options comparison and risk assessment

Option 1- Rehabilitation and extension of current site: impacts with regards to land value are considered *positive* with *high significance.* Particularly the informal sector as well as residents of the nearby Aulung Pir village are expected to benefit from jobs created at the landfill and related facilities.

Option 2 - Closure of current site and new greenfield site: impacts with regards to land value are considered *negative* with *moderate significance* under this Option 2, the land surrounding the existing dumpsite is expected to also increase in value, as under Option 1. Regarding land value under the landfill site option 2, the site is placed at Buffer Zone (Zone 2) of the Tonle Sap Biosphere Reserve. The purpose of this zone is to provide a buffer to the core biosphere zone 1. Zone 2 thus permits activities related to training and education and sustainable development, however no major structures and structures impacting the environment and biodiversity. At the same time, city development plans foresee major commercial and residential developments in the area, and land prices for these developments may be negatively impacted by the landfill despite all outlined mitigation measures.

Summary of social impacts and preliminary mitigation measures during operation under each option

Table X: Summary of social impacts and preliminary mitigation measures during operation under each option

Impact	**Option 1 – Rehabilitation and extension of existing site**			**Option 2 – Closure of existing site and new greenfield site at Trapeang Tim Village, Kandaek Commune**			**Preliminary generic mitigation Measures. Specific mitigation measures will be determined at the stage of detail design and the accompanying site-specific ESIA**
	Positive/ Negative Impact	**Description**	**Significance**	**Positive/ Negative Impact**	**Description**	**Significance**	
Community Health and Safety and Occupational Health and Safety	Positive	Rehabilitation and extension of current dumpsite into a sanitary landfill will greatly reduce pollution related health and safety risks for neighboring communities and workers due to improved OHS practices. Influx of workers; increased traffic; strain the current resources of the host municipalities; SEA/SH	High	Positive for the closing and negative for new site	Adequate closure of current dumpsite will bring health and safety benefits to communities at the current dumpsite, as in Option 1. Currently no settlements exist at the site Option 2, but city development plans foresee major residential and commercial developments in the entire area. Influx of workers; increased traffic; strain the current resources of the host municipalities; SEA/SH	High	• The application of modern landfill operations and inclusion of performance indicators for landfill management and operation performance in contracts, for instance waste compaction and daily soil coverage, will limit the potential for the development of resident populations of vermin and pests • Landfill gas collection and composting to remove larger part of the organic fraction • Leachate collection and treatment • Lining system and daily waste cover and in case of closure final waste cover • Fencing of site, registration procedures • Integration of waste pickers into the waste material recovery and composting facilities through provision of PPE, training and adherence to OHS procedures • Provision of appropriate PPEs and training • Health checks • Provision of safe water supply to surrounding communities

							• Showers, washing basins, clean toilets, changing rooms, etc. at facilities
Job opportunities	Positive	In terms of the creation of job opportunities outside of the waste pickers impacts and opportunities, they do not differ much between the two options and are in general positive with high significance as enhanced waste collection and cleanliness and improved landfill management and operation will require additional job opportunities for various backgrounds and qualifications including for poor people with low and medium skills	High	Positive	In terms of the creation of job opportunities outside of the waste pickers impacts and opportunities, they do not differ much between the two options and are in general positive with high significance as enhanced waste collection and cleanliness and improved landfill management and operation will require additional job opportunities for various backgrounds and qualifications including for poor people with low and medium skills	High	• Ensure awareness of job opportunities within surrounding communities and consideration for poor and vulnerable groups. • Transparent information sharing about the created job opportunities particularly in local areas • Local sourcing of supplies and materials whenever possible
Impacts on property value	Positive	Rehabilitation and extension of current site: impacts with regards to land value are considered positive with high significance	High	Positive for existing dumpsite closure and Negative for new location	Closure of current site and new greenfield site: impacts with regards to land value are considered negative with moderate significance under this Option 2, the land surrounding the existing dumpsite is expected have positive impact with increase in value, as under Option 1. Regarding land value under the landfill site option 2, the site is placed at Buffer Zone (Zone 2) of the Tonle Sap Biosphere Reserve. At the same time, city development plans foresee major commercial and residential developments in the area. Here impact is foreseen to be negative	High	• Suitable landfill siting and selection process. • Proper mitigation of environmental and social impacts of construction and operation thereby minimizing impacts to neighboring communities and accompanying property values. • Fencing and buffer zones with measures against visual impacts (tree screens)

6 PRELIMINARY ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

6.1 BACKGROUND, OBJECTIVES OF THE PRELIMINARY ESMP AND INSTITUTIONS

The preliminary Environmental and Social Impact Assessment (P-ESIA) study for the Cambodia Solid Waste and Plastic Management Improvement Project assessed the potential impacts and recommended preliminary mitigating measures in view of the possible rehabilitation of the old dumpsite and the construction of a sanitary landfill and other related SWM facilities such as transfer stations, composting and material recovery facilities in Siem Reap. The preliminary Environmental and Social Management Plan (ESMP) shall ensure the preservation of ecological balance and environmental safety and that a sound social and environmental management plan is established for the Project.

Although the proposed Project, in general, has its direct and indirect negative social and environmental impacts, these could be minimized through sound planning and the introduction of proper construction and monitoring techniques during all phases of project implementation.

The benefits that are expected to accrue from project implementation far outweigh the expected adverse effects on the environment and people. In order to ensure that proper designs and operational standards are adhered to and that the environment and public safety is not compromised, appropriate site practices and procedures outlined in this section should be strictly followed throughout the lifetime of the project.

An organizational set-up for the ESMP will be established prior to the construction and operation of the landfill.

6.2 PRELIMINARY MATRIX OF POTENTIAL RISKS, IMPACTS AND MITIGATION MEASURES

A considerable number of potential impacts had been identified and the mitigating measures will be addressed during the design, construction and operation of the sanitary landfill facility (SLF) project including the transfer station, material recovery facility, and composting facility. This is to make sure that the project will have the least impact on the environment surrounding the site. The identified preliminary potential impacts and generic mitigating measures are tabulated in **Table 6.2-1**.

6.2.1 Preliminary Environmental Management Matrix

Table 6.2-1: Preliminary Environmental Management Matrix

Component	Potential Impact	Preliminary Mitigating Measures[44]	Institutional Responsibility	Means of supervision
Design Phase[45]				

[44] To be specified and costed as part of site-specific ESIA.

[45] [45] The table considers the impacts which can be potentially caused by the project activities. The preliminary impacts which will be addressed as a result of the implementation of the project activities, are not considered under this table.

Component	Potential Impact	Preliminary Mitigating Measures[44]	Institutional Responsibility	Means of supervision
Environmental impacts on ecosystems, surface and groundwater sources, natural habitats, biodiversity, and others	Pollution of resources with related ecological, social, and economic damages	- Main environmental risks related to locations for transfer stations, waste treatment/recycling such as the composting and material recovery facilities and landfill facilities can be mitigated through the siting process - Conduct detailed site suitability analysis - Conduct site-specific ESIA for the landfill and waste treatment facilities	National and Siem Reap provincial/municipal government	Review of site selection process documents
Impacts of Excavated Soil	Impacts on land use	- Allocate adequate areas for spoil storage in the final design - Ensure that the spoil will not cause un-favored changes to surface water drainage - The spoil height should be designed so as to have acceptable visual impacts	Detailed Design Consultant National and Siem Reap provincial/municipal government	Review of final design, site specific ESIA and tender documents
Leachate	Surface and groundwater pollution; soil pollution	Include the leachate collection and treatment system in the design and tender documents. The design should include maintenance schedule.	Detailed Design Consultant National and Siem Reap provincial/municipal government	Review of final design, site specific ESIA and tender documents
Landfill gas	Air pollution and related health impacts	Include gas collection and treatment system in the detailed design and tender documents and maintenance schedules	Design Consultant National and Siem Reap provincial/municipal government	Review of final design, site specific ESIA and tender documents
Odour impacts	Nuisance for nearby residential areas	detailed design to include landfill operation manual for waste disposal, waste compaction requirements and daily cover	Design Consultant National and Siem Reap provincial/municipal government	Review of site selection process documents
Noise impacts	Nuisance for nearby residential areas	Tender documents should include noise specification for various required equipment	Design Consultant National and Siem Reap provincial/municipal government	Review of site selection process documents
Construction Phase				
Storage of excavated soil	Pollution if soil contains hazardous elements; impacts on land use or natural habitats	- The area allocated for soil storage should be selected so that no un-favored pattern of surface water collection should be developed (e.g. stagnant water ponds for long times). - Ensure that the height of the spoil will not cause unaccepted visual impacts to adjacent areas additional to the impacts of the landfill - Use excavated soil in the landfill operations: usage as daily cover of waste, and usage in establishing side embankments for containing the waste - Use excavated soil for coverage for closing of adjacent old cells (re-cultivation layers of the final cover) - Soil excavated in the direct vicinity of the existing dump site has to be sampled to assess the extent of contamination. If found contaminated, it shall only be used for daily operation	Contractor	Field supervision National and Siem Reap provincial/municipal government

Component	Potential Impact	Preliminary Mitigating Measures[44]	Institutional Responsibility	Means of supervision
Air pollution	Dust generated from construction activities	- Stabilize the exposed surfaces - Minimize activities that suspend dust particles - Water spraying for heavily transport areas - Apply water to the areas to be excavated as well as the loading and unloading areas and unpaved roads - Develop a wheel wash at the entrance to public roads or exit of the landfill construction site - Implement speed controls on-site - Regular water spraying to those dusty static construction areas - Maintain enough loading capacity of lorries and barges to avoid spillage - Cover soil stockpiles with erosion control blankets - Use hoarding to avoid wind-blown dust - Apply good construction practices	Contractor	Field supervision National and Siem Reap provincial/municipal government
Civil works activities	Mobilization and demobilization of equipment, materials and personnel	- A transportation management plan should be developed and implemented - Spraying of water on the streets and roads when mobilization is performed during a particular hot day at least twice a day - Implement stakeholder engagement plan that includes consultation and dissemination of information regarding the mobilization and demobilization - Establish Grievance Redress Mechanism	Contractor	Field supervision National and Siem Reap provincial/municipal government
Natural landscape	Clearing of vegetation	- Minimize clearing as much as possible	Contractor	Field supervision National and Siem Reap provincial/municipal government
	Cutting of trees	- Secure the necessary permits - Conduct tree inventory - Replace cut trees	Contractor	Field supervision National and Siem Reap provincial/municipal government
Noise pollution	Construction noise during the development stages	- Avoiding evening or night-time construction work as far as possible; - Installation of noise fencing at critical/sensitive site boundaries (construction of screening mounds to shield subsequent building and construction activities) - Maintain the site roads in good condition to reduce noise and vibration from vehicle's movement - Proper scheduling of vehicle movement to avoid accumulated noise - Apply good construction practices	Contractor	Field supervision National and Siem Reap provincial/municipal government
Ecosystems, biodiversity and habitat	Biodiversity decreased due to loss of habitat	- Adequate site selection through thorough site assessment process - Limit the construction area according to the planned detailed engineering design - daily waste coverage - leachate collection and treatment system - installation of lining systems - zoning of vital habitats and ecosystems	Contractor,	Field supervision National and Siem Reap provincial/municipal government

Component	Potential Impact	Preliminary Mitigating Measures[44]	Institutional Responsibility	Means of supervision
		- monitoring of species presence and pollution - flood protection measures		
Water resources	Contamination of water resources by suspended solids during site construction activities	- Minimizing land disturbance - Isolation of areas to be excavated from surface water run-on through the use of bunds; - Use of temporary silt fences, silt traps and sedimentation ponds at the downstream end of excavation works; - Covering of stockpiles and peripheral embankments to reduce the potential for erosion and sediment entrainment; and - Re-seeding of bare areas promptly upon completion of earthmoving - Proper handling of waste to avoid spillage	Contractor	Field supervision National and Siem Reap provincial/municipal government
Water quality	Risk of surface water and groundwater quality from construction activities	- Minimize land disturbance - Manage run-off and sediment exiting to disturbed areas - Manage drainage within the disturbed areas - Manage ground cover - Good construction quality assurance procedures and protocol during installation of the basal, lateral and top containment engineering systems - Leachate treatment	Contractor	Field supervision National and Siem Reap provincial/municipal government
Traffic	Traffic congestion and accidents	- Evaluation of the transport route should be studied to mitigate any impacts on traffic and transportation - A traffic management plan should be developed and implement to ensure minimal traffic disruption - Trucks and construction vehicles in the project area will only be permitted to use the construction access roads and required to operate at specified speeds	Contractor	Field supervision National and Siem Reap provincial/municipal government
Operation Phase				
Daily waste cover	Negative perception and/or social tension	- A transportation management plan should be developed and be implemented that includes usage of material cover during material transportation - Regular spraying of water on the streets when mobilization is performed during a particular hot day at least twice a day - Implement stakeholder engagement plan that includes consultation and dissemination of information regarding the mobilization and demobilization - Establish Grievance Redress Mechanism	Operator of landfill and waste facilities	Review of performance reports against KPIs and field visits National and Siem Reap provincial/municipal government
Air pollution	Dust generated from operational activities	- Adequate site selection for LF, transfer station, MRF, composting facility - Stabilize the exposed surfaces - Water spraying for heavily transport areas - Apply water to the areas to be excavated as well as the loading and unloading areas and unpaved roads	Operator of landfill and waste facilities	Review of performance reports against KPIs and field visits; public reporting National and Siem Reap

Component	Potential Impact	Preliminary Mitigating Measures[44]	Institutional Responsibility	Means of supervision
		- Develop a wheel wash at the entrance to public roads or exit of the landfill site - Implement speed controls on-site - Maintain enough loading capacity of lorries and barges to avoid spillage - Cover soil stockpiles with erosion control blankets - Use hoarding to avoid wind-blown dust - Apply good operational practices		provincial/municipal government

Noise impacts	Noise generated from site operations and waste haulage traffic
	
	The landfilling operation will involve, *inter alia*, the extensive use of heavy and large mobile plant and equipment, including landfill compactors, bulldozers, dump trucks, excavators and front-end loaders
		- Adequate site selection for LF, transfer station, MRF, composting facility
		- Apply adequate operational hours
		- Optimize the use of machines
		  - Use of mobile noise barriers as necessary
		  - Use of modern, well-maintained vehicles and machines plant fitted with noise suppressors
		- Utilize the vehicle that has pass the emission test
			Operator of landfill and waste facilities	Review of performance reports against KPIs and field visits; public reporting
				National and Siem Reap provincial/municipal government

Impacts of landfill leachate	Risk of surface water and groundwater pollution from breach of site containment measures	- Minimize the daily exposed working face and use perimeter drains and landfill cell compaction, slopes and daily cover materials to reduce infiltration of rainfall into the deposited waste - Prevent run-on of precipitation into the active area of the landfill - Capping system and internal berms and drains during cellular filling to minimize the quantity of leachate generated - Active control of leachate levels to less than 300 mm above the top of the basal containment layer in order to minimize the head of leachate on the basal lining system - Leachate collection and abstraction system to remove leachate from the landfill. Leachate will be re-circulated through deposited waste to reduce its strength or sent to the leachate treatment ponds for treatment prior to discharge - A comprehensive monitoring plan in order to provide an early warning of any uncontrolled release of leachate from the landfill. Regular monitoring of key indicator parameters , together with more extensive analysis should contamination be detected - *If leakage is occurring, undertake intensive monitoring to establish the part of the site from which leakage is occurring. Thereafter, pump out*	Operator of landfill and waste facilities	Review of performance reports against KPIs and field visits; public reporting National and Siem Reap provincial/municipal government

Component	Potential Impact	Preliminary Mitigating Measures[44]	Institutional Responsibility	Means of supervision
		leachate from the affected area and maintain levels as low as possible - If required and appropriate, instigate remedial engineering works to isolate the area where a breach in the lining system has occurred - Maintain the effectiveness of the leachate treatment plant		
Landfill Gas	Impacts on air quality and health	- Landfill Gas Collection and Treatment - Land gas utilization - Lining system - Waste cover - Diversion of waste - Composting facility	Operator of landfill and waste facilities	Review of performance reports against KPIs and field visits; public reporting National and Siem Reap provincial/municipal government
Ecosystems, water, biodiversity	Disturbance of aquatic and terrestrial biota due to contamination of the water body and natural habitats	- Adequate site selection with lowest possible risks to ecosystems (special environmental zones, groundwater table, flood risk, etc.) - Lining system, leachate collection system, lining system - flood protection measrues - zoning of habitats - monitoring of species presence and pollution - Regular maintenance of the leachate treatment plant and ensure the compliance with the quality standard - Regular monitoring of effluent quality to ensure that the leachate treatment plant operates well	Operator of landfill and waste facilities	Review of performance reports against KPIs; field supervision; public reporting National and Siem Reap provincial/municipal government
Odor	Odors at landfill sites are generated from the decomposition of waste and are greatest during the movement and placement of waste at the composting yard and landfill.	- *Diversion of organic wastes to the composting yard where odor suppressors (i.e., phosphate rock, is mixed with the organic wastes);* - *Provision of tarpaulin covers on windrows and on matured compost;* - Acceptance only of conforming wastes for disposal - *Prompt (immediate) compaction following deposition;* - Application of daily cover, at least 100mm thick, to all exposed surfaces of waste - *Collection and venting or flaring of landfill gas to reduce odor impacts; and* - *Use of odor counter-actant and/or masking sprays – however, these are not recommended unless odor becomes a chronic problem*	Operator of landfill and waste facilities	Review of performance reports against KPIs; field supervision; public reporting National and Siem Reap provincial/municipal government
	Odor from leachate in the treatment ponds and during leachate treatment may be significant if not properly controlled.		Operator of landfill and waste facilities	Review of performance reports against KPIs; field supervision; public reporting National and Siem Reap provincial/municipal government
Visual impact	Visual impact	- Ensure proper covering of the vehicle during waste transport - Provide vehicle wheels washing bay at the exit of the landfill - Schedule waste transportation hours avoiding heavy traffic and peak hours	Operator of landfill and waste facilities	Review of performance reports against KPIs; field supervision; public reporting

Component	Potential Impact	Preliminary Mitigating Measures[44]	Institutional Responsibility	Means of supervision
				National and Siem Reap provincial/municipal government
Litter	Litter	- Proper covering of the vehicle during waste transport - Daily waste coverage - Designated unloading zones	Operator of landfill and waste facilities	Review of performance reports against KPIs; field supervision; public reporting National and Siem Reap provincial/municipal government
Hazardous waste	Hazardous waste	- The municipal regulations and landfill operation manual need to provide a list of acceptable and nonacceptable waste. Non-acceptable waste needs to be strictly forbidden from admission - Workers of the landfill, transfer station, recycling and composting plants should receive training - Awareness of hazardous waste generators regarding the sorting at source in order to avoid a mixing of hazardous and non-hazardous waste - Adequate equipment for workers - Prepare a documented emergency response plan to any spills or fires	Operator of landfill and waste facilities	Review of performance reports against KPIs; field supervision; public reporting National and Siem Reap provincial/municipal government
Traffic and transportation	Traffic congestion and site access disruption	- Implement traffic management plan	Operator of landfill and waste facilities	Review of performance reports against KPIs; field supervision; public reporting
Closure and After-use Phase				
Water quality	Due to leachate generation	Treat the leachate channelling to the leachate treatment plant prior to discharging to water bodies	Contractor	Field supervision National and Siem Reap provincial/municipal government
Air quality	Landfill gas emission	*Design a landfill gas collection system and operate in accordance with the applicable national requirements*	Contractor	Field supervision National and Siem Reap provincial/municipal government
Landslide	Due to unstable waste pile	Follow the design criteria in the landfilling method *Conduct soil cover compaction*	Contractor	Field supervision National and Siem Reap provincial/municipal government
Visual impact	Positive impact due to changes of landscape	*Provision of soil layer as part of permanent capping layers for greenery*	Contractor	Field supervision National and Siem Reap provincial/municipal government
Biodiversity	Biodiversity enhancement from revegetation at landfill area	*Cover components should be consistent with post closure use and local climatic condition*	Contractor	Field supervision National and Siem Reap provincial/municipal government

Component	Potential Impact	Preliminary Mitigating Measures[44]	Institutional Responsibility	Means of supervision
Water quantity	Decreasing run-off	Impermeable layers should be the final capping as membrane to prevent infiltration into the landfill. *Capping should be designed with proper sloping level and geo drains if necessary for run-off to flow*	Contractor	Field supervision National and Siem Reap provincial/municipal government
Change of land use	Increasing area for green open space	*It should be part of the closure plan is the monitoring arrangements on the utilization of green open space*	*Local authorities*	Field supervision

6.2.2 Preliminary Social Management Matrix

Table 6.2-2: Preliminary Social Management Matrix

Component	Potential Impact	Mitigating Measures[46]	Institutional Responsibility	Means of supervision
Pre- Construction Phase				
Resettlement Impacts, economic displacement and livelihoods impacts	Acquisition of residential houses or land Lack of access to waste resources, specifically for children waste pickers under 14. recycling activities and will require livelihood restoration support and further livelihood support options	Continued access to waste resources will be part of the project either at the current dumpsite under option 1 or through provision of transportation allowances to the new landfill area to continue to work in solid waste recycling at the new material recovery facility at the landfill or transfer station (and under adequate Occupational, Health and Safety procedures). Resettlement and livelihood restoration plan in case of economic displacement in line with the Resettlement Policy Framework and Livelihood Restoration Framework and the ESF. Livelihood restoration assistance will be applicable in case of lost access to waste resources as well as further livelihood support options for children waste pickers as per the Resettlement Policy Framework and Livelihood Restoration Framework and the ESF. These will be specifically determined in the livelihood restoration plan.	MOI, GDR (specific arrangements in RPF/LRF)	Specific arrangements in RPF/LRF
Construction Phase				
Temporary job opportunities	The civil works for rehabilitation; extension; closure of landfill and development of other waste facilities are anticipated to provide significant job opportunities for local residents	Ensure awareness of job opportunities within surrounding communities and consideration for poor and vulnerable groups. Transparent information sharing about the created job opportunities particularly in local areas Local sourcing of supplies and materials whenever possible	Project implementing agencies; local government; contractors	Review of bidding documents; review of hiring processes
Community Health and Safety	Reduced pollution at the existing dumpsite and neighboring communities Influx of workers; increased traffic; strain the current	International and close supervision of the construction works and clear obligations and code of conduct for construction firms. Collaborate with local communities in terms of regular information on progress and	Contractors; local authorities	Field supervision; progress reports

[46] To be specified and costed as part of site-specific ESIA.

Component	Potential Impact	Mitigating Measures[46]	Institutional Responsibility	Means of supervision
	resources of the host municipalities; SEA/SH	Environmental and Social compliance related to construction works. Establishing and enforcing a clear grievance redress to ensure grievances and complaints are well and promptly addressed. Monitor implementation of labor management procedures Communicate information about the hours of construction with the local population Supervise application of OH&S regulations and code of conduct on SEA/SH Public hearings and meaningful consultations. Full restriction from access to the construction site by local communities, waste pickers and any other group outside the construction team while ensuring access to material recovery facilities.		
Cultural heritage	Damages to cultural heritage	More detailed screening for potential cultural heritage during site specific ESIA and specific mitigation measures, as appropriate- in site specific ESMP. Monitoring of site excavations and inclusion of chance find procedure in Contractor's contract	Contractors, local authoririte s	Field supervision; progress reports
Operation phase				
Community Health and Safety and OHS	Greatly reduced pollution related health and safety risks for neighboring communities and workers due to improved OHS practices. Influx of workers; increased traffic; strain the current resources of the host municipalities; SEA/SH	The application of modern landfill operations and inclusion of performance indicators for landfill management and operation performance in contracts, for instance waste compaction and daily soil coverage, will limit the potential for the development of resident populations of vermin and pests Landfill gas collection and composting to remove larger part of the organic fraction from landfill disposal Leachate collection and treatment including of the leachate pond of the existing dumpsite under both options Regular maintenance of the leachate treatment plant and monitoring lining system and daily waste cover and in case of closure final waste cover Fencing of site, registration, and monitoring procedures Material recovery facility: Provide an area for workers to sort through the waste in a controlled environment away from the landfill active face and loading areas where heavy equipment is operating, so that the sorting and material recovery facility will provide safe working conditions and promote more efficient, effective, increased recovery of recyclable materials.	Project implementing agencies; local government; contractors	Field supervision; progress reports

Component	Potential Impact	Mitigating Measures[46]	Institutional Responsibility	Means of supervision
		Integration of the recycling sector including waste pickers into the waste material recovery facilities through provision of personal protection equipment, training and adherence to OHS procedures Provision of appropriate PPEs such as protective clothing, gloves, respiratory face masks and slip resistant shoes and hard soled safety shoes Provide training regarding to the use of PPE and other related occupational health and safety related issues Conduct monitoring on waste pickers occupational health and safety issues and regular health checks Provision of safe water supply to surrounding communities Showers, washing basins, clean toilets, changing rooms, and different cleansing equipment should be available at the landfill offices as well as the recycling/composting plants		
Job opportunities	Enhanced waste collection and cleanliness and improved landfill management and operation will require additional job opportunities for various backgrounds and qualifications including for poor people with low and medium skills	Ensure awareness of job opportunities within surrounding communities and consideration for poor and vulnerable groups. Transparent information sharing about the created job opportunities particularly in local areas Local sourcing of supplies and materials whenever possible	Solid Waste Operators; local authorities	Progress reports; field visits

ANNEXES

ANNEX A: SITE SUITABILITY CRITERIA

Table A-0-1: Site Suitability Criteria

No.	Siting Criteria	Details/Description
	Transport Related	
1	Waste haul distance/time	Site accessible should be within 30 minutes travel time, otherwise lager vehicle or transfer station required.
2	Transfer station	Location within 2 hours of landfill or consider transfer by rail or barge.
3	Roads	Public road should be paved, with OK with, slope, etc. New access road <10km and <3km (large and small landfill)
	Nature Conditions	
4	Topography	• Gentle topography, use cell/bund method • Leachate collection layer at 2% gradient
5	Groundwater	• 10-year seasonal high groundwater >1.5m below base • >1m of low permeable soil above GWT or use plastic liner
6	Soils	…
6a	Earthwork Balance	On-site source of site formation, bunds, Final Cover (60cm), Intermediate Cover (30cm), and (prefer) Daily Cover (15cm)
6b	Alternatives and Details	• Daily cover can be alternative and/or reused materials • Assume 1 cu.m. cover soil for every 6 cu.m. waste
7	Climatic Conditions	Not in area of high winds (results in blowing litter)
8	Geology	No underlying limestone, carbonated, fissure or porous rock >1.5m thick at uppermost layer
9	Streams	No perennial stream <300m downgradient of site
10	Geology (Seismic Risk)	No significant seismic risk in region of landfill or consider more conservative design to address such
11	Geology (Faults)	No faults or significant fractures within 500m of landfill area (gas and leachate migration concerns)
12	Floodplain	…
12a	10-year	No siting within 10-year floodplain
12b	100-year	If within 100-year floodplain, provide design to eliminate potential for “washout”
	Land Use	
13	Landfill Capacity	…
13a	Land Area	Land area for 10-year landfill capacity, including 2 to 4 hectares Facilities area; 2 to 4 hectares for LTP; 10% for buffer
13b	Waste Disposal Volume	Recommended 10-25m deep, density 800-1000 kg per cu.m., with soil:refuse ratio of 1:6
14	Groundwater Recharge	Site area should not be within 10-year groundwater recharge area or pending water supply development
	Public Acceptability	
15	Residential	No residential development within 250 m
16	Visual	• Landfill not visible from residential areas <1km away • Landscaping, bund screen, curved road may be required
17	Socio-political / Cultural	…
17a	Socio-political Sites	>1km from socio-politically sensitive (memorials, churches, schools, etc.) sites
17b	Cultural Sites	Avoid access roads passing by culturally sensitive sites

No.	Siting Criteria	Details/Description
17c	Presence of waste-pickers	Presence of waste pickers at possible new landfill site.
Safety		
18	Water Supply	No private or public drinking, irrigation, or livestock water supply well within 500m downgradient of the site
19	Obstructing Infrastructure	No major infrastructure (power lines, gas, sewer, water, etc.) crossing the site
20	Mines	• Underlying underground mines not adversely affected • No underlying minable resources
21	Airports	No siting within 3kkm of a turbojet airport and 1.6km of piston-type airport
Environmental		
22	Wetland	No important biodiverse wetland or reproductive value within landfill area
23	Endangered Species (Fauna)	No rare or endangered species breeding area or protected habitat area within the site (or provide alternative habitat)
24	Forest (Flora)	No significant protected forest within 500m of landfill area
25	Leachate Treatment	Treat landfill leachate as efficiently and effectively as practically possible

Source: Pre-feasibility Study on the Cambodia Solid Waste and Plastic Management Improvement Project (ESC, 2021)

ANNEX B: SIEM REAP SITE SUITABILITY MAP

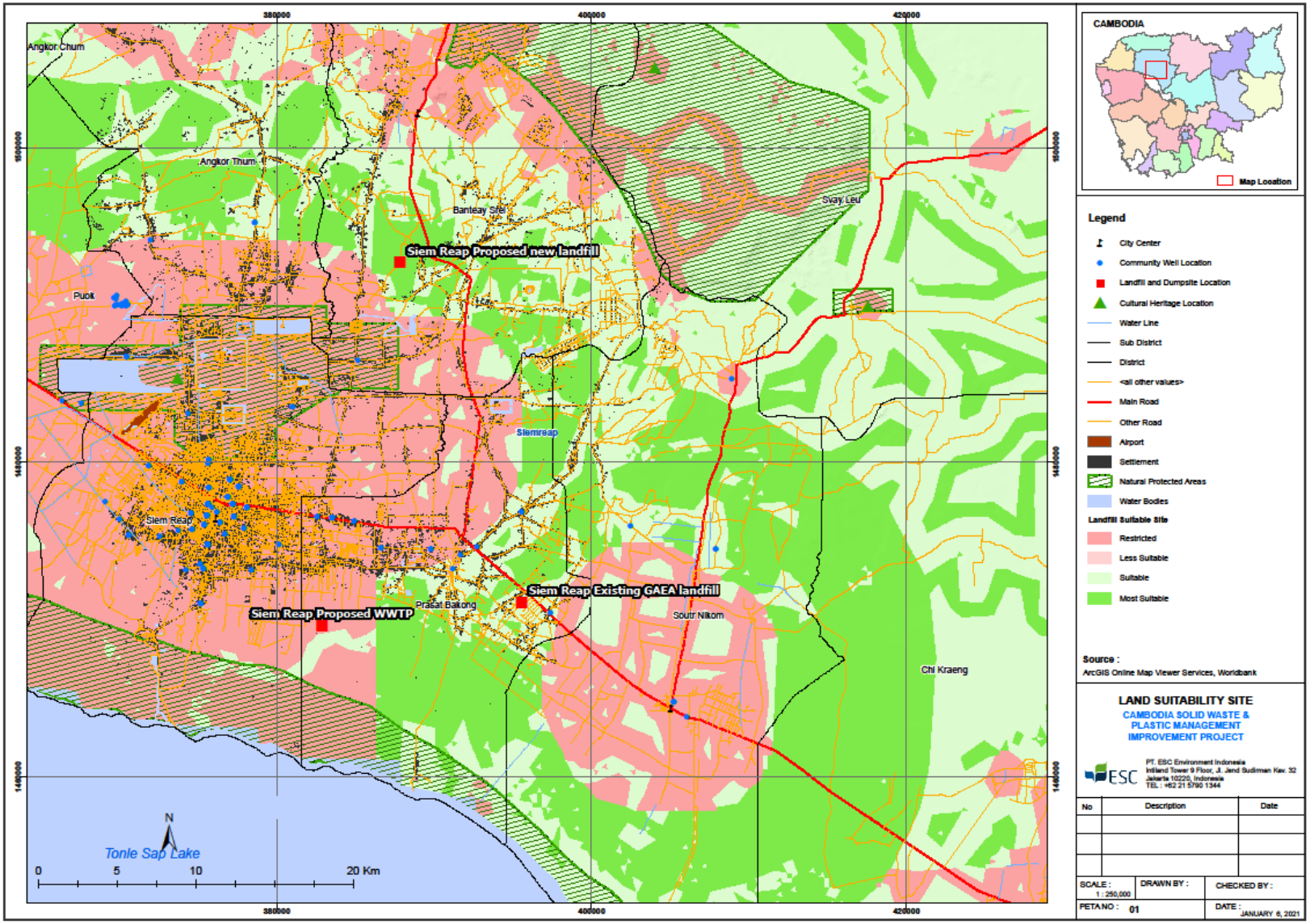


Figure B-1: Site Suitability Map for Siem Reap

ANNEX C: SUMMARY OF RELEVANT NATIONAL POLICIES, LAWS, AND REGULATIONS

The hierarchy of legislation in Cambodia is Royal Decree, Sub-decree, Ministerial Decision and Regulation. A Royal Decree ratifies laws passed by parliament, which can be supplemented by a sub-decree and/or "Prakas" or ministerial decisions. These laws allow sub-decrees and regulations to be passed, which can stipulate procedures and standards to be met to ensure compliance with the law. In addition, there are several guidance documents that are designed to support best practices as required in Cambodia.

Policies on Environmental Impact Assessments

Cambodia's main legal framework for addressing environmental protection and management of natural resources and public consultation is the Law on Environmental Protection and Natural Resource Management ('the Environment Law'), which was adopted in 1996. This law, along with other regulations and sub-decrees of the RGC related to solid waste management and social safeguards.

6.2.2.1 Sub-decree 72 on Environmental Impact Assessment Process (1999) and Prakas 21 on the Classification of Environmental Impact Assessment for Development Projects (2020)

The sub-decree prescribes the conduct of assessment to determine the risks and impacts of proposed projects, both public and private, particularly in the natural resources, ecosystem, health and public welfare. Apart from risks and impacts to public welfare and health briefly included in the sub-decree, the assessment on social components are not explicitly stated.

In 2020, Prakas No. 021 amended the listing of impact classifications of development projects and identified the documentary requirements depending on the scale of risk and impacts as presented in **Table C-0-1**. The Prakas provides that these documents will be submitted by project proponents to the EIA Department of the MOE.

Table C-0-1: Risk Categorization of Environmental and Social Impacts

Category	Documentary Requirements
Minor Environmental and Social Impacts	• Environmental protection agreement / contract • Environmental Management Plan
Moderate Environmental and Social Impacts	Initial environmental and social impact assessment
Serious Environmental and Social Impacts	Full environmental and social assessment

Source: Prakas 21, Article 4-7

The risk classification for development projects that may be relevant to the landfill infrastructure and associated facilities are summarized in **Table C-0-2**.

Table C-0-2: Classification of EIA for Development Projects Relevant to Solid Waste and Plastics Management and Associated Facilities

Type of Infrastructure	Size / Area	Risk Classification
Dumpsites	All sizes	IEIA / Medium Environmental and Social Impacts
Industrial waste dumping sites	All sizes	Full EIA / Serious Environmental and Social Impacts

Type of Infrastructure	Size / Area	Risk Classification
Solid waste recycling and incinerating factories	All sizes	IEIA / Medium Environmental and Social Impacts
Business in collecting, stocking and processing all types of used car tires	All sizes	Environmental protection contract, and EMP / Minor Environmental and Social Impacts
Construction of all kinds of buildings (i.e., offices, multipurpose buildings, commercial buildings, condominiums, building blocks, flats and villas, supermarkets and other buildings)	3,000 – 15,000 sq.m.	Environmental protection contract, and EMP / Minor Environmental and Social Impacts
	15,000 – 45,000 sq.m.	IEIA / Medium Environmental and Social Impacts
	> 45,000 sq.m.	Full EIA / Serious Environmental and Social Impacts

Source: Prakas 21 Appendix

6.2.2.2 Prakas 376 on General Guideline for Preparing Initial Environmental Impact Assessment and Full Environmental Impact Assessment Report (2009)

The Prakas aims to provide general guidelines on the development of initial Environmental Impact Assessments (IEIA) and full Environmental Impact Assessment (FEIA). In the Prakas, among the definitions provided for the IEIA and FEIA covers the identification, prediction and analysis of potential adverse environmental and social impacts. The declaration specifies the basic contents of IEIA/FEIA Reports, as specified in **Table C-0-3**. The checklist template for scoping impacts and mitigating measures also includes the analysis of socioeconomic aspects. While the Sub-decree 72 does not explicitly specify the assessment of social components, the guidelines in this Prakas includes such aspects.

Table C-0-3: Proposed Outline of IEIA/FEIA Reports

Chapter	Contents
Chapter 1: Introduction	• Project overview and rationale • Objectives • Methodology and Scope of study
Chapter 2: Legal frameworks	Description of laws, sub-decrees and various policies related to project type
Chapter 3: Project description	• Background and experiences of the project owners/company; • Project site (attached with local administration map and project location); • Project type/scope and schedule of project activities (project pre-operation, operation and closure) • Work plan

Chapter 4: Description of Existing Environment	Description of the natural environment and socio-economic aspects based on primary and secondary data on the following:
	• Natural Environment
	  ○ Physical Resources
	  ○ Biological Resources
	• Socioeconomic aspects

Chapter 5: Public Participation	Details public consultation and participation activities and conclusions
Chapter 6: Environmental Impacts and Mitigation Measures	Describes both positive and negative environmental and socio-economic impacts arising from their activities for project phases, including positive and negative impacts, and cumulative impacts.
Chapter 7: Environmental Management Plan (EMP)	Summary of the following: • Main negative environmental impacts and mitigation measures, • Trainings to be provided

Chapter	Contents
	• Environmental monitoring program for the construction, operation and closure periods, including agencies responsible, monitoring parameters, methodology, environmental standards, and reporting periods.
Chapter 8: Economic Analysis and Environmental Value	Description of the benefits of the project in relation to scope and value of environmental damage arising from the project activities
Chapter 9: Conclusions and Recommendations	Conclusion of the assessment

Source: Prakas 376 Appendix

6.2.2.3 Guidebook on Environmental Impact Assessment in the Kingdom of Cambodia (2012)

The Guidebook was anchored primarily on the Sub-decree 72 on Environmental Impact Assessment Process (1999), Prakas 376 on General Guideline for Preparing Initial Environmental Impact Assessment and Full Environmental Impact Assessment Report (2009), and United Nations Environment Programme (UNEP) documents. It lays out the institutional arrangements of the process, along with the principles and process of initial and full EIAs from proposal, screening, scoping, assessment, mitigation measures, report preparation, review and decision, monitoring, and public participation (RGC and MoE, 2012):

- Project Proposal: The proposed investment project is to be discussed with the Ministry of the Environment. Projects worth less than USD $2 million, can be proposed to the Department of Environment at the Provincial or Municipal Levels.
- Project Screening: The screening process on whether to require an initial or fill EIA varies depending on the nature and scale of the proposed projects. The parameters of the process is defined in Sub-decree 72 on Environmental Impact Assessment Process (1999). For proposed projects outside of the list provided of the sub-decree,
    - *Full EIA Report*: Projects with *serious* environmental impact to natural resources, ecosystem, health and public welfare;
    - *Initial EIA Report:* Projects with *medium* environmental impact to natural resources, ecosystem, health and public welfare; and
    - *No EIA Required:* Projects determined by government as special and urgently needed, projects required to develop an environmental management plan; projects with *minor* environmental impact (but an environmental protection contract will be required), projects deemed necessary to react to a declared state of emergency and approved by the Royal Government.
- Project Scoping: Activities under this stage (i.e., determining parameters, defining scope, agreement on methods, etc.) are to be conducted with the following stakeholders: EIA Department of MOE, Project Owner, EIA consultant and experts, responsible agencies, project-affected communities, and community / public beneficiaries.
- Impact Assessment: The assessment should analyze the following: (1) type of impact, (2) prediction of possible scale and scope of impact (i.e., direct, indirect, cumulative, residual), and (3) impact notions.
- Mitigating Measures: In identifying the measures to avoid or reduce environments that may be brought about by the project (from design and development stages, to

operations). Insights from public consultation and experiences from previous projects of similar nature must be considered.

- Report Writing, Report Review, and Decision: The guidelines in the development of the IEIA / FEIA is detailed in the MOE Prakas 376 on the General Guidelines for Developing Initial and Full Environmental Impact Assessment Reports, including process for EIA clearance and the entities involved, proposed outline, and a checklist for scoping of adverse environmental impacts and mitigating measures.
- Monitoring on Environmental Management Plan: Project monitoring should also assess the impacts initially identified and verify the predictions and implementation of mitigating measures identified, Proponents are to submit every three (3) or six (6) months to be submitted to MOE.

Applicability of Relevant Laws to Project

The pertinent laws and regulations in Solid Waste Management, Environmental Management and Protection, Environmental Impact Assessments, Labor, Working Conditions, and Occupational Health and Safety, Land Acquisition and Resettlement, Stakeholder Engagement and Public Consultation, Vulnerable Groups and Cultural Heritage are enumerated in **Table C-0-4**.

Table C-0-4: Relevant Laws, Policies, and Regulations in Cambodia

Policy	Summary	Applicable?
Solid Waste Management		
Law on Environmental Protection and Natural Resource Management (1996)	The law serves as the legal basis for the development and updating of environmental plans at the national and regional levels every five years. The law also includes the formulation of sub-decrees on Air Pollution Monitoring and Noise Disturbance, Water Pollution Control, and Environmental Impact Assessment Process. The law emphasizes the protection of environmental and natural resources and provides due consideration to environmental impact assessment, natural resource management, sustainability and conservation, public participation and suppression of any acts that may contribute harm to the environment;	Yes
Sub-decree 182 (2019)	The sub-decree consolidates the responsibility and accountability on the operation and management of city assets and services to the Municipal administration under the Public Works, Transport, Sanitation, Environment, and Public Order Office, as stated in Article 24.	Yes
Sub-decree 113 on Management of Urban Garbage and Solid Wastes relegating solid waste management under the	The sub-decree regulates solid waste, garbage, and hazardous waste management. The Sub-decree was set with proper technical manners and safe ways to ensure the protection of human health and to conserve biodiversity. The Sub-decree on Solid Waste Management is comprised of six (6) chapters: (i) General Provision; (ii) Household Waste Management; (iii) Hazardous Waste Management; (iv) Monitoring and Inspection	Yes

Policy	Summary	Applicable?
responsibility of the municipality (2015)	of Hazardous Waste Management; (v) Penalty; and (vi) Final Provision The sub-decree aims to enhance the management of garbage and solid waste of downtowns with effective, transparency and accountability, referring to ensure aesthetics, public health and environmental protection.	
Sub-decree 168 on Plastic Bag Management (2017)	The sub-decree aims to increase effectiveness of plastic reduction on importation, production, distribution and the use of plastic bag in order to improve the public health, environment and landscape	Yes
Sub-Decree 235 on Management of Sewer System and Waste Water Treatment System (2017)	The sub-decree aims to improve the management of drainage system and wastewater systems efficiently, transparently and accountably to ensure the safety of public health and biodiversity conservation	Yes
Sub-Decree 16 on E-Waste management (2016)	The sub-decree covers all the activities regarding disposal, storage, collection, transport, recycling, dumping of electrical and electronic equipment (EEE) waste.	Yes
Sub-decree 113 on Management of Urban Garbage and Solid Waste (2015)	The sub-decree aims to regulate the solid waste management with proper technical manner and safe way in order to ensure the protection of human health and the conservation of bio-diversity	Yes
Sub-decree 80 on Solid Waste Management in Provinces and Cities (2003)	The joint sub-decree of the Ministry of Interior and Ministry of the Environment aims to improve the responsibility of authorities and institutions involved in solid waste management for environmental and efficient implementation of solid waste management in provinces and cities.	Yes
Sub-decree 36 on Solid Waste Management (1999)	The sub-decree establishes technical and safety regulations of all activities in solid waste management related to health, safety and biodiversity conservation. The sub-decree also relegates the collection, transport, storage, recycling, minimizing and dumping of waste to the respective governments of provinces and cities.	Yes
Interministerial Prakas 195 of MOE, MOI and MEF on solid waste management fees (2018)	The prakas determines the maximum fees of solid waste management in Municipalities as per the article of the sub-decree. The fees apply to the services of cleaning, garbage collection, transportation and landfill. There is no mention about pre-sorting, recycling or compost. The MA has the possibility to request a fee higher than the one of the decrees. This request shall be approved by the Ministry of Economy and Finance and the Ministry of Environment.	Yes

Policy	Summary	Applicable?
	Through this interministerial Prakas, the national administration focuses more on the affordability of the population. The income generated by the service is personal income of the MA. The MA may utilize additional sources to support the service. In particular, transfer budget (or subventions) is authorized.	
Joint Declaration MOE and MOI on Household Waste Management	The prakas aims to: (i) Protect and promote environmental quality and public health through the prevention, reduction, and control point sources and non-point sources of pollution; (ii) Assess the environmental impact of all proposed projects prior to the issuance of a decision by the RGC; (iii) Ensure the rational and sustainable conservation, development, management, and use of the natural resources of the Kingdom of Cambodia; (iv) encourage and enable the public to participate in environmental protection and natural resource management; and (v) suppress any acts that cause harm to the environment.	Yes
Technical guideline on municipal solid waste management (2016)	The guidelines include the technical directions and detailed instructions related to the operations, maintenance, and closing of landfills, including composing methods, management and treatment of medical and chemical waste, as well as information on environmental education. These guidelines were developed through the support of the European Union, Ministry of the Environment, and Cambodian Education and Waste Management Organization (COMPED).	Yes
Prakas 447 on Battery Waste Management (2016)	The prakas focuses on safe battery management, laying out specific guidelines on the collection, storage, treatment, delivery and disposal of batteries by households and businesses	Yes
Prakas 387 on standard consumption for toxic substances or hazards permitted disposal (2015)	The prakas aims on restricting the amount of toxic chemicals or hazardous substances contained in hazardous waste which is allowed to be disposed in sanitary landfills and standards of the quantity of toxic chemicals or hazardous substances allowed in soils as stipulated in this prakas.	Yes
Interministerial Prakas 73 on sanitation budget for solid and liquid waste management (2015)	The Interministerial Prakas stipulates the use of budget package for environment sanitation service for solid waste and Waste-water management at the municipality urban at sub-national level.	Yes
Announcement No 09 Reduction of plastic bags consumption and packaging material that is	The announcement aims to reduce plastic consumption and help communities producing straws using non-plastic materials to have better living conditions. Factories can stop producing single-use plastic products, and people will also turn to use products made out of natural plants. Doing so, it would help the	Yes

Policy	Summary	Applicable?
indecomposable (2012)	economic conditions of families in communities that produce straws and bags made out of paper and trees.	
Guidelines on Environmental Management	Environmental management guidelines on solid waste is to ensure the protection of the public health, environment and the conservation of bio-diversity by avoiding polluting by solid waste, with the main goals of: • Encourage to carry out the principle for the avoidance/reduction of waste amount, reuse, recycling and the disposal of waste in a proper technical manner and safe way • Encourage all citizens and members of the public from different levels to understand and to be familiar with the importance of environmental and natural resources protection for present, future generations and environmentally sustainable development; and • Encourage proper waste management plan to a sustainable development of the Country, protecting its natural asset and concurrently creating jobs.	Yes
Guideline on Plastic Waste Management (2017)	Cambodia issued the guidelines on Plastic Waste Management to effectively manage solid waste and plastic. In 2017, the government promulgated a sub-degree on management of plastic bags that prohibits the importation, local production, and use of plastic bags thicker than 0.03 mm and wider than 25 cm. Besides national initiatives, Cambodia also seeks international collaboration and encourages sub-national initiatives, private sector and civil societies to tackle the challenge.	Yes
Environmental Management and Protection		
Law on Nature Protection Area (2008)	In 2008 the Law on Natural Protected Areas introduced an additional three (3) categories to natural protected areas, bringing the total number of categories to eight (8). While the character and protection purposes of each category are defined in the law, four (4) styles of zones management may also be applied when deemed necessary. The eight (8) categories of natural protected areas (with their purpose) are as follows: (1) National park (2) Wildlife sanctuary – wildlife preservation and protection (3) Protected landscape – protected scenic view areas to be maintained as scenic spots for leisure and tourism (4) Multi-purpose-use management area – accessible areas for economic development and leisure activities with the assurance of natural stability of water, forestry, wildlife and fishery resources (5) Biosphere reserve – an area of biodiversity conservation and support of sustainable development and activities.	Yes

Policy	Summary	Applicable?
	This reserve, Tonle Sap, is close to Battambang and Kampong Thom provinces. Its inclusion as a special entity in the law demonstrates its importance for Cambodia (6) Natural heritage site – natural or semi-natural sites unique in ecosystem, beauty or cultural value (7) Marine park – coastal areas with plants, wildlife and fish, with historical or cultural value (8) Ramsar site – areas recognized for the importance of their wetlands and surrounding environment, including wildlife, habitats and ecosystems. It is estimated that 30% of Cambodia's surface may be considered as wetland, and other areas may be brought under the Ramsar convention in future.	
Law on Water Resources Management (2007)	Requires license/permit/written authorization for the: (i) abstraction & use of water resources other than for domestic purposes, watering for animal husbandry, fishing & irrigation of domestic gardens and orchards; (ii) extraction of sand, soil & gravel from the beds & banks of water courses, lakes, canals & reservoirs; (iii) filling of river, tributary, stream, natural lakes, canal & reservoir; and (iv) discharge, disposal or deposit of polluting substances that are likely to deteriorate water quality and to endanger human, animal and plant health. (Articles 12 & 22) Its Article 24 stipulates that Ministry of Water Resources and Meteorology (MOWRAM), in collaboration with other concerned agencies, may designate a floodplain area as flood retention area.	Yes
Law on Forest enacted by National Assembly (2002)	The law defines the framework for management, harvesting, use, development and conservation of the forests. Its policy objective is to ensure the sustainable management of forests for their social, economic and environmental benefits, including conservation of biological diversity and cultural heritage. Under this law the state ensures customary user rights of forest products and by-products for local communities. The Forestry Law states the roles and responsibilities for the management of all forests. It states that the management of forests is under the jurisdiction of the Ministry of Agriculture Forestry and Fisheries (MAFF) (except for management of flooded forests which is covered by a different law). Furthermore, it delegates the authority to manage Protected Areas to the Ministry of Environment. Article 4 under the Forestry Law states that prior to major forest ecosystem related activity that may significantly impact on the environment and social conditions, and environmental and social impact assessment should be conducted.	Yes
Sub-decree 42 Air Pollution	The sub-decree aims to protect the quality of the environment quality and public health from air pollutants and noise	Yes

Policy	Summary	Applicable?
Monitoring and Noise Disturbance (2000)	disturbance through monitoring, curbing and mitigating activities. The sub-decree regulates air and noise pollution from mobile and fixed sources through monitoring, curb and mitigation activities to protect the environmental quality and public health. It contains the following relevant standards: i. Ambient air quality standard; ii. maximum allowable noise level in public and residential areas. Article 3 A. "Source of pollution" is defined and separates mobile sources (including transport) and fixed sources such as factories and construction site Article 3 B. "Pollutant" is defined as smoke, dust, ash particle substance, gas, vapor, fog, odor, radio-active substance	
Sub-decree on Water Pollution Control (1999)	The sub-decree appoints the responsibility of establishing the water environment management and protection guidelines, particularly on water quality and wastewater disposal. The sub-decree regulates activities that cause pollution in public water areas in order to sustain good water quality so that the protection of human health and the conservation of biodiversity are ensured. Its Annexes 2, 4 and 5 provide the industrial effluent standards, including effluent from wastewater stabilization ponds, water quality standards for public waters for the purpose of biodiversity conservation, and water quality standards for public waters and health, respectively.	Yes
Environmental Impact Assessment		
Sub-decree 72 on Environmental Impact Assessment Process (1999)	The sub-decree institutionalizes the conduct of environmental impact assessment for "every private and public project and activity." It specifies the type of projects/activities that require IEIA/EIA and provides for the steps that must be undertaken by the project owner. It also upholds the importance of public participation in the process. Based on the list of projects that require IEIA/EIA, applicable ones for this project are waste processing, burning activities (all sizes) and wastewater treatment plants (all sizes) under Other Industries; drainage systems (>5,000 ha) and buildings (height ≥ 12 meters or floor ≥ 8,000 sq.m.) and dumping site under Infrastructure.	Yes
Joint Prakas between MOE and Ministry of Economy and Finance on the Establishment of Service Fee for Reviewing Report of EIA and Monitoring	The objectives of this law are to protect and upgrade the environment quality and public health by means of prevention, reduction and control of pollution, to make assessment impacts to environment, before issuance of decision by the Royal Government on all submitted proposed projects, to ensure and manage the use of natural resource of the Kingdom of Cambodia. This law encourages and provides possibility to public to participate in the protection of environment.	Yes

Policy	Summary	Applicable?
the Project implementation (2000)		
Prakas on Delegation of Power to Municipal/Provincial Department of Environment to Decide on Project Development (2005)	Municipal-Provincial Departments of Environment to be tasked to review, and comment on any investment involving the Initial Environmental Impact Assessments (IEIA) or Full Environmental Impact Assessment (EIA) report of private individuals or private companies, joint-venture companies, public companies or ministries/government agencies	Yes
Prakas 376 on General Guideline for Preparing Initial Environmental Impact Assessment and Full Environmental Impact Assessment Report (2009)	The Prakas aims to provide general guidelines on the development of initial Environmental Impact Assessments (IEIA) and full Environmental Impact Assessment (EIA).The declaration specifies the basic contents of IEIA/EIA Reports, which should include: (i) introduction; (ii) legal framework; (iii) project description; (iv) description of the existing environment; (v) public participation; (vi) assessment of, and mitigation measures for, significant environmental impacts; (vii) environmental management plan; (viii) cost-benefit analysis; and (ix) conclusion and recommendations.	Yes
Guidebook on Environmental Impact Assessment in the Kingdom of Cambodia (2012)	It was anchored primarily on the Sub-decree 72 on Environmental Impact Assessment Process (1999), Prakas 376 on General Guideline for Preparing Initial Environmental Impact Assessment and Full Environmental Impact Assessment Report (2009), and United Nations Environment Programme (UNEP) documents. It lays out the institutional arrangements of the process, along with the principles and process of initial and full EIAs from proposal, screening, scoping, assessment, mitigation measures, report preparation, review and decision, monitoring, and public participation	Yes
Prakas 21 on the Classification of Environmental Impact Assessment for Development Projects (2020)	The Prakas provides an amended listing of the environment and social impact classification of projects to identify whether the documents required from them by the Ministry of Environment as part of the procedures of the Environmental Impact Assessment for Development Projects in Cambodia: • Minor or small impact: Environmental Protection Contracts and Environment Management Plan • Moderate impact: Initial Environmental and Social Impact Assessment • Serious or serious impact: Full Environmental and Social Impact Assessment	Yes

Policy	Summary	Applicable?
National Environment Strategy and Action Plan 2016–2023 (NESAP)	Developed in line with Article 59 of the Constitution of the Kingdom of Cambodia, the Law on Environmental Protection and Natural Resource Management, and in accordance with the Royal Government of Cambodia's key development policies and strategic plans. It focuses on the furtherance of efforts to strengthen collaborations led by the National Council for Sustainable Development (NCSD) in promoting cross-sectoral coordination, with emphasis on cross-cutting themes, such as gender and capacity development, application of relevant policy and economic tools, and in mainstreaming the environmental and natural resources sustainability into the Cambodia's development framework.	Yes
Cambodia Climate Change Strategic Plan 2014–2023	Provides a national perspective and framework for addressing climate change. It identifies entry-points for a structured and coherent approach to integrate climate change into national development processes. It specifically recommends the integration of climate change into Environmental Impact Assessment processes as one of the strategies to promote climate resilience.	Yes
Law on Disaster Management (2015)	Aims to regulate disaster management in the Kingdom of Cambodia, both natural and caused by humans. Among the mainstreaming themes that it recommends to be pursued include the mainstreaming of disaster risk reduction in the conduct of EIA for new development projects.	Yes
Environmental Guidelines on Solid Waste Management in Kingdom of Cambodia (2006)	Seeks to ensure the protection of environment, public health, and conservation of biodiversity through the effective management of solid waste.	Yes
Labor, Working Conditions, and Occupational Health and Safety		
Labor Law of Cambodia (1997)	This law governs relations between employers and workers resulting from employment contracts to be performed within Cambodia. The key sections include: • Minimum Wage: A guaranteed minimum wage that ensures a decent standard of living is protected by the Code. The minimum wage is set by the Ministry of Labor in consultation with the National Council on Minimum Wage and Labor Advisory Committee through a Prakas. Minimum wage is determined considering the needs and cost of living of the workers and their families, and economic factors (Chapter VI, Section 1). • Child Labor: The minimum allowable age for wage employment is set at fifteen (15) years, and eighteen (18) years for hazardous work. Children between twelve (12) to	Yes

Policy	Summary	Applicable?
	fifteen (15) years old can be hired to do *light work*[47] as long as the nature of work fulfils the following: (1) work is not hazardous to their health or mental and physical development., (2) work will not affect their regular school attendance, their participation in guidance programs or vocational training approved by a competent authority. For child laborers from 15 to 17 years old cannot perform night work, Employers found to be employing children less than eighteen years of age under conditions contrary to the provisions of the Code are liable to a fine of thirty-one to sixty days of the base daily wage (Chapter VI, Section 8). • Health and Safety of Worker: The key provisions relate to the quality of the premises; cleaning and hygiene; lodging of personnel, if applicable (such as workers camp); ventilation and sanitation; individual protective instruments and work clothes; lighting and noise levels in the workplace. Article 230: Work places must guarantee the safety of workers. However, the only specific occupational health and safety Prakas relates to the garment industry and brick manufacture (Chapter VIII) • Work-Related Accidents: All occupational illness, as defined by law, shall be considered a work-related accident. The law sets out how accidents should be managed in terms of compensation (Chapter IX).	
Prakas No. 002 on Category of Occupation and Light Work Permitted for Children (2008)	Light work for child laborers aged 12 to 15 years old, pertaining to those that does not affect the health as well as mental and physical development of the employed children and does not affect their regular school attendance, involvement in orientation programs, or vocational trainings required by the competent authorities, includes working at some shopping malls such as selling booth, vegetables and fruit selling stall, or news stand and stall of other similar goods; receiving, packing, selecting and classifying goods as well as assembling light things, including opening or taking goods out of the package; and lifting, carrying and holding light things, among others. Those who employ children from 12 to 15 years old for light work shall allow their parents or guardian to understand the terms and conditions of employment, including the children's working time, school attending time, vulnerability to work-related accidents and diseases, adopted measures on hygiene and work safety. Work hours for these children shall not exceed four (4) hours for school days, and seven (7) hours for school-free days. They are	Yes

[47] Light work is not defined under the 1997 Labor Law. A Prakas was released by MLVT was released in 2008 defining the parameters of the term.

<table>
<tr><th>Policy</th><th>Summary</th><th>Applicable?</th></tr>
<tr><td></td><td>also prohibited from working between 8:00 pm to 6:00 am. They are entitled to two (2) consecutive days off per week.</td><td></td></tr>
<tr><td>Prakas No. 106 on the Prohibition of Hazardous Child Labor (2004)</td><td>The Ministry of Social Affairs, Labour, Vocational Training and Youth Rehabilitation released a prakas in 2004 prohibiting the employment of children below 18 years old on jobs involving hazardous works involving construction and demolition (with exception to designated safe areas with permit from labor inspector), exposure to hazardous chemicals and substances, exposure to fumes, dust gas and other ambient substances, heavy machinery and equipment.

Employers considering to employ children of 16 years of age to do hazardous work are required to secure a permit from the Ministry and must adhere to the following:
• No work between 10:00pm to 5:00am
• Children undergo training
• Consultation with Labor Advisory Committee
• Annual health checkups with Department of Labor Health to certify that they are in the proper health condition to engage in hazardous work

As noted by the International Labor Organization, the existing Labor Code only covers the formal sector and does not apply to the informal sector where child labor mostly occurs.</td><td>Yes</td></tr>
<tr><td>Joint Prakas No. 330 on the Establishment of Enterprise’s Infirmary (2000) and the Guidelines for the Establishment of Enterprise Infirmaries (2017)</td><td>To further qualify the provision of the Labor law that requires enterprises, with at least 50 workers are obligated to establish a permanent infirmary on-site operating during working hours with a physicians and nurses onboard, Ministry of Labour and Vocational Training, and the Ministry of Health released a Joint Prakas. This policy establishes the guidelines and minimum standards on infirmaries in enterprises to provide procedures for primary health care and first aid for workers and ensure the health and safety responsibility of employers as provided by the 1997 Labor Law. The required number of qualified clinical staff, and their respective average working hours in the infirmary is as follows:

<table>
<tr><th>Number of Employees in the Enterprise</th><th>Number of Doctors</th><th>Number of Nurses</th><th>Average Attendance of Working Clinical Staff in working hours (in hours)</th></tr>
<tr><td>50 – 300</td><td>1 doctor or intern</td><td>1</td><td>2</td></tr>
<tr><td>301 – 600</td><td>1 doctor</td><td>1</td><td>2</td></tr>
<tr><td>601 – 900</td><td>1 doctor</td><td>2</td><td>3</td></tr>
</table>
</td><td>Yes</td></tr>
</table>

<table>
<tr><th>Policy</th><th>Summary</th><th>Applicable?</th></tr>
<tr><td></td><td>
<table>
<tr><td>901 – 1400</td><td>1 doctor</td><td>2</td><td>4</td></tr>
<tr><td>1401 – 2000</td><td>1 doctor</td><td>2</td><td>6</td></tr>
<tr><td>Over 2000</td><td>1 doctor</td><td>3</td><td>8</td></tr>
</table>
On the other hand, for enterprises with less fifty employees, they must be equipped with the following:
• > 20 employees: first-aid kit, and medical assistant
20 – 49 employees: first-aid station equipped with clinical tools, equipment and medicine, and nurse</td><td></td></tr>
<tr><td>Prakas No. 176 on Education on Hygiene and Occupational Safety for Workers, Shop Stewards and Unions (2013)</td><td>The MoLVT Prakas 176 (2013) emphasizes the obligation of employers to train workers in hygiene and occupational safety and to implement a general training program are detailed in Article 5 of the Prakas, which include the following:
• Physical risk,
• Chemical risk,
• Biological risk,
• Risk related to the use of machinery,
• Risk of heavy lifting by machinery,
• Risk related to the driving of machinery in the enterprise/establishment,
• Risk related to electricity,
• Fire or explosion risk,
• Risk of falling from high place,
• Risk of heavy lifting by human force,
• Risk of isolated work,
• Risk of work in area with limited ventilation,
• Risk of night work,
• Hygiene of food and nutrition,
• Risk of work attitude,
• Safety of building and entry and exit,
• Mental tension from work (stress resulting from work), and</td><td>Yes</td></tr>
<tr><td>Sub-Decree No. 01 on Establishment of the Social Security Schemes on Health for Persons Defined by the Provisions of the Labor Law (2016)</td><td>The sub-decree implements a social security scheme on Occupational Risk and Health Care under the National Social Security Fund that establishes social security nets for work-related accidents, as well as for personal health and non-work-related injuries through the payment of contributions to the National Social Security Fund Invalid source specified..</td><td>Yes</td></tr>
<tr><td colspan="3">Land Acquisition and Resettlement</td></tr>
<tr><td>Constitution of Cambodia (1993)</td><td>The 1993 Constitution of Cambodia establishes the basic governing principles in land acquisition and ownership:
• Right to land ownership: “All persons, individually or collectively, shall have the right to ownership. Only Khmer legal entities and citizens of Khmer nationality shall the right to own land. Legal private ownership shall be protected by the law.” (Article 44)
• Eminent Domain: “Right to confiscate properties from any person shall be exercised only in the public interest as</td><td>Yes</td></tr>
</table>

Policy	Summary	Applicable?
	provided by law and shall require fair and just compensation in advance" (Article 44)	
Land Law (2001)	The rights to land and property in Cambodia are governed by the 2001 Land Law, as grounded on the constitution of Cambodia. The law defines the scope of ownership of immovable properties, such as land, trees and fixed structures. It also covers the following • Eminent Domain (Article 5), • Definition of Public Properties (Article 15), • Legal Possession of Land (Article 6-7), • Types of Private Land Ownership (Article 106-113, 139-140), • Types of invalid land possession (Article 18-19), • Extraordinary acquisitive possession (Article 29-34, 38), • Disqualification from compensation from eminent domain acquisition (Article 8,18-19, 108), • Ownership of Indigenous Minorities (Article 25-26), and • Social Land Concessions (Articles 50, 51).	Yes
Sub-decree No. 19 on Social Land Concession (2003)	The sub-decree provides the criteria, procedure and mechanism for grading social land concessions or "legal mechanism to transfer private state land for social purposes to the poor who lack land for residential and/or family farming purposes". The program may be implemented locally, through the commune council in their local social land concession program, or by national agencies, through the National Social Land Concession Committee.	No
Prakas No. 6 on Measures to Crack Down on Land Grabbing and Encroachment (2007)	The Prakas defines the right-of-way (ROW) dimensions roads and railways, which amends Sub-decree No. 197 ROW dimensions. The latter policy provides that compensation for structures and assets located in ROWs will not be subject to any compensation.	Yes
Circular No. 2 on Measures against Illegal Holding of State Land (2007)	The circular sets the definition, measures and procedures for reclamation of state-owner lands under illegal possession. The circular reiterates that those considered as illegal occupants of state land will not be entitled for any compensation as provided by the 2001 Land Law. However, for poor and landless families "may receive preferential treatment in obtaining appropriate size of land for making their livelihood based on their actual situation" (CLP, 2007). For lands where indigenous groups have asserted collective ownership, the claim of the State over the land must be postponed until it is legally registered as State-owned.	Yes
Expropriation Law (2010)	The law defines the principles, mechanisms, and procedures of expropriation, and defining fair and just compensation for any construction, rehabilitation, and public physical infrastructure	Yes

Policy	Summary	Applicable?
	expansion project for the public and national interests and development of Cambodia.	
SOP for Land Acquisition and Involuntary Resettlement (2018)	The Standard Operating Procedures (SOP) for Land Acquisition and Involuntary Resettlement (LAR) reflects RGC's laws and regulations relating to the acquisition of land and the involuntary resettlement of AP and the safeguard policies and procedures of Development Partners (DPs) as applied to public infrastructure investment projects. The document provides that in the context of involuntary resettlement, indigenous peoples and communities are classified among the vulnerable groups who are likely to be more adversely affected by the impacts of involuntary resettlement. This is because IPs often have traditional land rights but do not have formal titles. Thus, particular attention and assistance is required for these communities. Among its resettlement planning considerations include the primacy of avoiding customary lands, and should be included in siting considerations The document also sets out some information and parameters to be included in an Indigenous Peoples Plan. The SOP notes that the IPP is a separate document from the Resettlement Plans, but its compensation packages should be reflected in the detailed resettlement plan. (Paragraph 48, 54, 56-57, 95-97). Where appropriate, the SOP includes references to international good practices in resettlement planning, implementation, monitoring and reporting. The SOP has been promulgated under Sub Decree No. 22 ANK/BK on 22 February 2018 and applies to all externally financed projects in the Kingdom of Cambodia. The General Department of Resettlement (GDR) of the Ministry of Economy and Finance (MEF) is responsible for providing guidance and clarification to users of the SOP.	Yes
Community Health and Safety		
Sub-decree 42 Air Pollution Monitoring and Noise Disturbance (2000)	Among the provisions in the sub-decree includes the standards on air pollution monitoring and noise disturbance, including the maximum noise limit per type of vehicle, and maximum noise limit in residential areas and public places at various times of the day.	Yes
Stakeholder Engagement and Public Consultation		
Guidebook on Environmental Impact Assessment in the Kingdom of Cambodia (2012)	The guidebook defines Public Participation as "Participation by stakeholders in the consultation regarding a development project. The stakeholders include: relevant ministries/institutions, local authorities, relevant government departments, company owner, consulting firm, representatives of impacted population, and representative of involved NGOs in the project area." Stakeholder engagement was highlighted in	Yes

Policy	Summary	Applicable?
	the stages of project scoping, mitigation measurement, report review, and project monitoring. It provides that the identification of mitigating measures on environmental impacts should also be based on the results of public consultation.	
Prakas on Public Participation (2017)	The Ministry of Environment released a ministerial declaration to establish the key principles to ensure public participation in the EIA process: Principle of Access to Information; Principle of Public Participation; Principle of Access to Social Justice and Effective Remedies; and Principle of Gender Equality in Public Participation; and Principle of Promoting Indigenous People in Public Participation. Avenues for public participation for each stage of the EIA are as follows: • Project Screening: Project owners are to provide relevant information about to project to project-affected people (PAP), relevant ministries, and other stakeholders. Following this, the project owners are to provide a document indicating the current environmental and social conditions; • Project Scoping: Required the development of a Public Participation Plan by the project proponent to guide those to conduct the EIA preparation; • Project Investigation and Report Preparation: Meetings and consultations with the PAPs and project stakeholders shall be conducted following the MOE Procedure of Public Participation. A separate activity informing the PAPs of the potential impacts of the project should also be conducted. A consultation workshop with PAPs and stakeholders should be organized prior to the submission of the EIA report. The insights from all stakeholder engagement activities should be incorporated in said report; • Report Review: The EIA Working Group assigned to review and provide feedback on the EIA report will receive inputs from the EIA Department and other relevant ministries on their comments on the report. The EIA Department of the MOE will be consulting with PAPs and other stakeholders in providing such inputs to the EIA Working Group; and • Monitoring and Compliance: Project proponents and the respective contractors, should ensure that public participation and stakeholder engagement is retained throughout the activities from approval of the project down to the operation and closure of the project. Among its key principles in ensuring public participation in the EIA process including the Principle of Promoting Indigenous People in Public Participation, thus highlighting the importance of the representation and participation of indigenous peoples in following steps of projects subject to the I/EIA process:	Yes

Policy	Summary	Applicable?
	Screening, Scoping, Investigation and Report Participation, Report Review, and Monitoring and Compliance.	
Vulnerable Groups		
Law on the Protection and the Promotion of the Rights of People with Disabilities (2009)	The law defines persons with disabilities as "any persons who lack, lose, or damage any physical or mental functions, which result in a disturbance to their daily life or activities, such as physical, visual, hearing, intellectual impairments, mental disorders and any other types of disabilities toward the insurmountable end of the scale". The law also established the Disability Action Council (DAC) as the national coordination and advisory mechanism on disability issues (Article 5) and the Disability Rights Administration under the Department of Rehabilitation of the Ministry of Social Affairs, Veterans and Youth Rehabilitation (MOSVY). It sets out the basic rights of people with disabilities in livelihoods, physical and mental rehabilitation, healthcare, public accessibilities, education, and employment and vocational training, thus ensuring equal employment opportunities and reduction in discrimination.	Yes
National Aging Policy 2017 – 2030	This serves as an umbrella policy and overarching roadmap to address the multi-dimensional, emerging, and evolving issue of aging in Cambodia. Its three (3) fundamental concepts are to eliminate age-based discrimination, to ensure gender equality with the emerging feminization of aging, and to promote intergenerational relations so as to maintain the strength of the joint family system, a hallmark of Khmer culture. The policy also defines the cut-off age of the older population as those aged 60 years old and above.	Yes
Law on Suppression of Human Trafficking and Sexual Exploitation (2008)	All forms of human trafficking and sexual exploitation, including forced labor or services, slavery or practices similar to slavery, debt bondage, involuntary servitude, and child labor, for profit-making is declared unlawful under this law. In the explanatory note on the law by the Ministry of Justice, forced labor is defined as all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.	Yes
National Policy for the Development of Indigenous Peoples (2009)	The policy serves as an umbrella framework for government policies related to indigenous peoples and communities, particularly in culture, education, health, environment, land, agriculture, water resources, infrastructure, justice, tourism, industry and mines and energy. The defines the parameters of the registration of indigenous communities as legal entities to enable them to formally own their communal land and assets, and allow them to participate in economic development. The policy details strategy across these sectors, including the use of local languages in public consultation, primary education, and	Yes

Policy	Summary	Applicable?
	the media, and the conduct of impact assessments for all infrastructure projects.	
Policy on procedures of registration of Land of Indigenous communities (2009)	This policy emphasizes the rights of indigenous groups to collective ownership of land through institutionalizing the parameters of the registration of lands under collective ownership of indigenous communities as specified in the 2001 Land Law. The sub-decree highlights the distinction of the registration of indigenous communities as collective ownership as different from the registration of individual privately owned land parcels given that the former belongs to a community as a whole, and will require a separate sub-decree to detail the specific land titling procedure given the parameters of their land ownership.	Yes
Law on the Prevention of Domestic Violence and the Protection of Victims (2005)	establishes the legal mechanisms in preventing domestic violence and protecting victims and assigns "legal qualification as the judiciary police and can act as the complaining party instead of the victims" to the Ministry of Women's Affairs. The scope of the law includes domestic violence and acts affecting life, physical integrity, torture, and sexual aggression, towards husband or wife, dependents, and any persons living under a single roof and who are dependent of the households. The law sets out the intervening measures by commune authorities, municipal administrators, and courts for cases of domestic violence	Yes
Cultural Heritage		
Royal Decree on the Establishment of Protected Cultural Zones in the Siem Reap/Angkor Region and Guidelines for their Management (1993)	The decree established five (5) cultural zones and what structures are within them: 1. Core Zone: Monumental sites 2. Buffer Zone: Protected Archaeological Reserves 3. Protected Cultural Landscapes 4. Sites of Archaeological, Anthropological or Historic Interest, or sites outside of the core and buffer zones 5. Socio-Economic and Cultural Development Zone	Yes
No. 70 SSR government Decision (2004)	The decision defined the land use in the Angkor Park, wherein its Zones 1 and 2 are considered State properties.	Yes
Law on Protection of Cultural Heritage (1996)	The law details provisions for the protection of natural cultural heritage and property, whether movable or immovable, publicly or privately owned. against illegal destruction, modification, alteration, excavation, alienation, exportation or importation. It stipulates the following: • Definition of Cultural Property: Cultural property is defined (Chap. 1, Article 4) • Chance Discoveries: in the event of discovery of any cultural property during construction, it must immediately	Yes

Policy	Summary	Applicable?
	be turned over to and local police, to the Provincial Governor, then to cultural heritage authorities (i.e., APSARA) without delays. Within 30 days that the item is verified as cultural property by the authorities, a temporary suspension of construction works and an announcement of safeguarding measures will be taken (Section 7, Article 37-39).	
Royal Decree on the creation of the APSARA National Authority (1995)	The decree serves as the legal basis in the establishment of the Authority for the Protection of the Site and Management of the Region of Angkor (APSARA) that has the jurisdiction in the protection and conservation of the Angkor Heritage Sites,	Yes

ANNEX D: FORMS USED FOR THE PRIMARY DATA GATHERING ACTIVITIES

Annex D.1: Guidelines for the Interviewers

Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures
CAMBODIA SOLID WASTE AND PLASTIC MANAGEMENT IMPROVEMENT PROJECT

Guidelines for Interviewers

1. **INTRODUCE YOURSELF.**

2. **BRIEFLY DISCUSS THE PROJECT.**

The proposed project focuses on improving solid waste and plastic management in Cambodia.

Municipalities where potential investments in landfills under the project would take place are required to **undergo a thorough landfill site suitability and selection process**. This assessment is being undertaken on the basis of detailed site suitability criteria. The assessment elaborates advantages and disadvantages, including basic environmental, geo-technical, social, transport, logistical aspects, available infrastructure and possibly ownership characteristics.

Currently, the preparation is in the phase of preparing the feasibility study and preliminary environmental and social impact assessment to inform the site selection process and social/environmental risks and protection measures for landfill site development.

Landfill Site Suitability Assessment Process

Three (3) sites are being considered for siting and development of a new, engineered landfill, including:

i. Rehabilitation of the existing dumpsite at Anlong Pi Village approximately 20 km east-southeast of Siem Reap City;

ii. Proposed Site No. 1 at a proposed wastewater treatment plant at Trapang Tim Village about 11 km south-southeast of Siem Reap City; and

iii. Proposed Site No. 2, approximately 20 km northeast of Siem Reap City and 7 km southwest of Banteay Srei.

3. **EXPLAIN THE PURPOSE OF THE ACTIVITY**

The purpose of the survey and the Environmental and Social Studies is to help identify the environmental and social baseline conditions, risks, potential impacts, and mitigating measures, which will all be used as:

i. Input to the landfill site suitability analysis to evaluate the three site options for landfill development and identification of proper protection measures.

ii. Results of the survey will be presented as part of the conduct of public consultations and stakeholder consultations, which is planned to be held in May 2021.

4. **HIGHLIGHT THE FOLLOWING IMPORTANT DETAILS.**

    i. It is important that the respondents understand that there is no final site yet and that site alternatives are still being assessed and undergoing feasibility study.

    ii. Access to recyclables by waste pickers will be provided regardless of the final location.

    iii. The purpose of the survey is not intended for land acquisition and resettlement and other related compensation, but rather to inform the land suitability assessment.

5. **CONFIRM IF RESPONDENT OR PARTICIPANT HAS ANY QUESTIONS OR CLARIFICATIONS.**

6. **ASK INFORMED CONSENT TO PARTICIPATE AND TO RECORD CONVERSATION.**

    Ensure that the participants understand the following:

    i. The information gathered through this baseline survey will be used internally in preparing the reports, plans, and other related documentation;

    ii. These reports may be shared to external stakeholders provided that the results are in summarized form and no respondents will be identified in these reports; and

    iii. Participation to the baseline survey is voluntary and that respondents may withhold any information and may choose to stop at any point of the survey/interview.

7. **ASK IF PARTICIPANT WOULD BE WILLING TO PARTICIPATE IN A FOCUS GROUP DISCUSSION.**

    Mark the forms of the willing participants. Make sure that the contact details of these respondents are collected. From this pool, the FGD participants will be randomly selected per identified strata.

Annex D.2: Socioeconomic and Perception Survey Form

Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures
CAMBODIA SOLID WASTE AND PLASTIC MANAGEMENT IMPROVEMENT PROJECT

FORM 1A-_____

Baseline Information Form for Potentially-Affected Persons in Proposed Project Alternative Sites

WASTE PICKERS

A. PART A – INTRODUCTION AND INFORMED CONSENT

Introduce yourself. Ask for consent and to speak with waste pickers and explain that the baseline survey is being conducted to obtain information on the basic profile of the persons working within the vicinity of the dumpsite in Siem Reap and other proposed locations for landfill development for the ***"Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures"***.

Baseline Survey ID number	
Name of Enumerator	
Date and time of survey	

INFORMED CONSENT

I, _____, hereby give my consent to be part of the baseline survey being conducted by CEST and KCC on behalf of the Government's Development Partner as part of the preliminary Environmental and Social Impact Assessment for the ***Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures"*** I understand that:

(1) the information gathered through this baseline survey will be used internally in preparing the reports, plans and other related documentation;

(2) these reports may be shared to external stakeholders provided that the results are in summarized form and no respondents will be identified in these reports; and

(3) the participation to the baseline survey is voluntary and that I may withhold any information I feel uneasy to share to other people and may also choose to stop at any point in the census when I feel uncomfortable about the questions being asked.

☐ YES ☐ NO

For respondents who respond with "NO", please ask why the person did not consent to the baseline survey, if possible.

If **NO**, reason:

_____

If **YES**, kindly ask the respondent to sign with name below then proceed with the baseline survey.

Name and signature of respondent: _____ Date signed: _____

Name of Respondent	
Address	
Contact Number	

3

PART B – PROFILE OF THE RESPONDENT

This part will be gathering the demographic profile of the respondent. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Name	_____ (Family Name) _____ (First Name) *If interviewee is not the household head,* **relationship of the respondent to household**: ☐1 Spouse ☐2 Child ☐3 Sibling ☐4 Parent of Household Head ☐5 Others, please specify: _____
2. Gender	☐1 Male ☐2 Female
3. Age	_____ years old
4. Marital Status	☐1 Single ☐2 Married ☐3 Separated ☐4 Divorced ☐5 Widow/er ☐6 Others, please specify: _____
5. Ethnicity	☐1 Khmer ☐2 Chinese ☐3 Vietnamese ☐4 Others, please specify: _____
6. Religion	☐1 Buddhism ☐2 Islam ☐3 Christian ☐4 Others, please specify: _____
7. Place of Origin	☐1 Within Siem Reap ☐6 Others, please specify: _____
8. Length of residency	☐1 Less than one year ☐2 1 to 3 years ☐3 4 to 6 years ☐4 7 to 10 years ☐5 Over 10 years
9. Reason for establishing residence on current location *(Select all that apply)*	9.1 Economic Reason ☐1 Proximity to livelihood ☐2 Rent free/Affordable rental fee ☐3 Others, please specify: _____ 9.2 Social Reason ☐1 Family ties ☐2 Near school ☐3 Got married ☐4 Others, please specify: _____
10. Social Safety Nets / Government Support / Transfers	☐1 Conditional Cash Transfer ☐5 Village Government certification ☐2 IDPoor Transfers ☐6 None ☐3 National Social Security Fund ☐7 Others, please specify: ☐4 People with Disability Fund _____
11. Type	☐1 Waste picker ☐2 Waste collectors ☐3 Other businesses ☐4 Resident ☐5 Worker in waste-related business (i.e. Recycling center, Junk shop, Dismantling shop) ☐6 Owner of waste-related business (i.e. Recycling center, Junk shop, Dismantling shop) ☐7 Others, please specify: _____

PART C – INFORMATION ON WASTE PICKERS

This part will be gathering information on the working conditions of waste pickers in the existing dumpsite in Siem Reap. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Shift	☐1 Morning: start at: _____, end at _____ ☐2 Evening: start at: _____, end at _____
2. Schedule	☐1 Weekdays ☐2 Weekends
3. Frequency of waste picking	☐1 Once a week ☐3 Four to six times per week ☐2 Two to thrice per week ☐4 Daily
4. How long have you been working at the dumpsite?	_____ months / years
5. Estimated earnings from waste picking	_____ Riels *(weekly/monthly)* _____ USD *(weekly/monthly)*
6. Where do you bring the waste you picked up? *(Select all that apply)*	☐1 Recycling centre ☐4 Waste collectors / consolidators ☐2 Junk shop ☐5 Reused by household ☐3 Dismantling shop ☐6 Others, please specify: _____

7. Type, Volume, and Price of waste/s gathered *(Select all that apply)*

Type of Waste	*kg per shift / day*	*price sold per kg*
☐1 Plastics		
☐2 Metal		
☐3 Paper / Cardboard		
☐4 Electronic Waste		
☐5 Glass		
☐6 Textile / Fiber		
☐7 Wood		
☐8 Others, please specify: _____		

8. Are there other HH members working in the dumpsite?	☐1 Yes, kindly specify name and their age: 1. _____ 4. _____ 2. _____ 5. _____ 3. _____ 6. _____ ☐2 No
9. Do you have other sources of income?	☐1 Yes, if so, please specify these and the respective arrangement for each income source: 1. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal 2. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal 3. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal 4. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal ☐2 No

10. Is waste picking your primary source of income?	☐1 Yes ☐2 No, please specify your primary income source: _____
11. Have you borrowed money in the past year?	☐1 Yes ☐2 No *If yes:* 11.1 Where did you get the loan from? *(Select all that apply)* ☐1 Family ☐2 Friends or Neighbours ☐3 Bank, please specify: _____ ☐4 Microfinance Institutions, please specify: _____ ☐5 Informal lenders ☐6 Others, please specify: _____ 10.2 How much have you loaned in total? _____ riels / _____ USD 10.3 What is the interest rate per month / year? _____ riels / _____ USD 10.4 What did you use the loan for? *(Select all that apply)* ☐1 Daily living expenses (i.e. food, rent) ☐2 Hospitalization ☐3 Medicine ☐4 Capital for business ☐5 Pay off other debts ☐6 Augment income due to impacts of the pandemic (i.e. income loss) ☐7 Others, please specify: _____ 10.5 Have you paid off your loan? ☐1 Yes ☐2 No 10.6 How long is the terms of the loan? _____ month/s or year/s 10.7 Did any of these loans require any collateral? ☐1 Yes, please specify: _____ ☐2 No
12. Provision of Protective Equipment	☐1 Yes ☐2 No

13. Experience of disease/s since you started working in the dumpsite	☐1 Diarrhea ☐2 Dengue ☐3 Cholera ☐4 Malaria ☐5 Asthma ☐6 Respiratory Tract Infection ☐7 Urinary Tract Infection ☐7 Others, please specify: _____
14. Residence near the dumpsite	☐1 Yes, permanent ☐2 Yes, temporary, please specify location: _____ ☐3 No, please specify location: _____
15. Membership in any organization	☐1 Yes, if so, please specify: _____ ☐2 Not a member, why not? _____
16. Closure of Dumpsite	If the dumpsite were to close, how would you be affected? _____ _____ _____ _____

FORM 1B-_____

Baseline Information Form for Potentially-Affected Persons in Proposed Project Alternative Sites

OTHER WORKERS IN THE DUMPSITE

PART A – INTRODUCTION AND INFORMED CONSENT

Introduce yourself. Ask for consent and to speak with workers in the dumpsite, including GAEA staff, and waste-related businesses (i.e., truck drivers, etc.) and explain that the baseline survey is being conducted to obtain information on the basic profile of the persons within the vicinity of the dumpsite in Siem Reap for the ***"Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures".***

Baseline Survey ID number	
Name of Enumerator	
Date and time of survey	

INFORMED CONSENT

I, _____, hereby give my consent to be part of the baseline survey being conducted by CEST and KCC on behalf of the Government's Development Partner as part of the preliminary Environmental and Social Impact Assessment for the ***Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures"*** I understand that:

(1) the information gathered through this baseline survey will be used internally in preparing the reports, plans and other related documentation;

(2) these reports may be shared to external stakeholders provided that the results are in summarized form and no respondents will be identified in these reports; and

(3) the participation to the baseline survey is voluntary and that I may withhold any information I feel uneasy to share to other people and may also choose to stop at any point in the census when I feel uncomfortable about the questions being asked.

☐ YES ☐ NO

For respondents who respond with "NO", please ask why the person did not consent to the baseline survey, if possible.

If **NO**, reason:

_____

If **YES**, kindly ask the respondent to sign with name below then proceed with the baseline survey.

Name and signature of respondent: _____ Date signed: _____

Name of Respondent	
Address	
Contact Number	

PART B – PROFILE OF THE RESPONDENT

This part will be gathering the demographic profile of the respondent. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Name	_____ (Family Name) _____ (First Name) *If interviewee is not the household head,* **relationship of the respondent to household**: ☐1 Spouse ☐2 Child ☐3 Sibling ☐4 Parent of Household Head ☐5 Others, please specify: _____
2. Gender	☐1 Male ☐2 Female
3. Age	_____ years old
4. Marital Status	☐1 Single ☐2 Married ☐3 Separated ☐4 Divorced ☐5 Widow/er ☐6 Others, please specify: _____
5. Ethnicity	☐1 Khmer ☐2 Chinese ☐3 Vietnamese ☐4 Others, please specify: _____
6. Religion	☐1 Buddhism ☐2 Islam ☐3 Christian ☐4 Others, please specify: _____
7. Place of Origin	☐1 Within Siem Reap ☐6 Others, please specify: _____
8. Length of residency	☐1 Less than one year ☐2 1 to 3 years ☐3 4 to 6 years ☐4 7 to 10 years ☐5 Over 10 years
9. Reason for establishing residence on current location *(Select all that apply)*	9.1 Economic Reason ☐1 Proximity to livelihood ☐2 Rent free/Affordable rental fee ☐3 Others, please specify: _____ 9.2 Social Reason ☐1 Family ties ☐2 Near school ☐3 Got married ☐4 Others, please specify: _____
10. Social Safety Nets / Government Support / Transfers	☐1 Conditional Cash Transfer ☐5 Village Government certification ☐2 IDPoor Transfers ☐6 None ☐3 National Social Security Fund ☐7 Others, please specify: ☐4 People with Disability Fund _____
10. Type	☐1 Waste picker ☐2 Waste collectors ☐3 Other businesses ☐4 Resident ☐5 Worker in waste-related business (i.e. Recycling center, Junk shop, Dismantling shop) ☐6 Owner of waste-related business (i.e. Recycling center, Junk shop, Dismantling shop) ☐7 Others, please specify: _____

PART C – INFORMATION ON WORKERS

This part will be gathering information on the working conditions of those workers who are engaged in businesses operating at the dumpsite in Siem Reap. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Employer	☐1 Recycling centre ☐2 Junk shop ☐3 Dismantling shop ☐4 Waste collectors / consolidators ☐5 Reused by household ☐6 Others, please specify: _____
2. Status of Employment	☐1 Full-time ☐2 Part-time
3. Schedule	☐1 Weekdays ☐2 Weekends Please specify number of days per week: _____
4. Estimated earnings	_____ Riels *(weekly/monthly)* _____ USD *(weekly/monthly*
5. Salary Arrangement	☐1 Daily ☐3 Bi-monthly ☐5 Commission based ☐2 Weekly ☐4 Monthly ☐6 Others, please specify: _____
6. Where do you bring the waste you picked up? *(Select all that apply)*	☐1 Recycling centre ☐2 Junk shop ☐3 Dismantling shop ☐4 Waste collectors / consolidators ☐5 Traders / Buyers ☐6 Reused by household ☐7 Others, please specify: _____
7. Type, Volume, Price of waste/s gathered *(Select all that apply)*	

Type of Waste	*kg per shift / day*	*price sold per kg*
☐1 Plastics		
☐2 Metal		
☐3 Paper / Cardboard		
☐4 Electronic Waste		
☐5 Glass		
☐6 Textile / Fiber		
☐7 Wood		
☐8 Others, please specify: _____		

8. Residence near the dumpsite	☐1 Yes, permanent ☐2 Yes, temporary ☐3 No, please specify: _____
9. Do you have other sources of income?	☐1 Yes, if so, please specify these and the respective arrangement for each income source: 1. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal 2. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal 3. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal 4. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal ☐2 No

10. Have you borrowed money in the past year?	☐1 Yes ☐2 No *If yes:* 10.1 Where did you get the loan from? *(Select all that apply)* ☐1 Family ☐2 Friends or Neighbours ☐3 Bank, please specify: _____ ☐4 Microfinance Institutions, please specify: _____ ☐5 Informal lenders ☐6 Others, please specify: _____ 10.2 How much have you loaned in total? _____ riels / _____ USD 10.3 What is the interest rate per month / year? _____ riels / _____ USD 10.4 What did you use the loan for? *(Select all that apply)* ☐1 Daily living expenses (i.e., food, rent) ☐2 Hospitalization ☐3 Medicine ☐4 Capital for business ☐5 Pay off other debts ☐6 Augment income due to impacts of the pandemic (i.e. income loss) ☐7 Others, please specify: _____ 10.5 Have you paid off your loan? ☐1 Yes ☐2 No 10.6 How long is the terms of the loan? _____ month/s or year/s 10.7 Did any of these loans require any collateral? ☐1 Yes, please specify: _____ ☐2 No
11. Provision of Protective Equipment	☐1 Yes ☐2 No
12. Membership in any organization	☐1 Yes, if so, please specify: _____ ☐2 Not a member, why not? _____
14. Closure of Dumpsite	If the dumpsite were to close, how would you be affected?

Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures
CAMBODIA SOLID WASTE AND PLASTIC MANAGEMENT IMPROVEMENT PROJECT

12

FORM 1C-_____

Baseline Information Form for Potentially-Affected Persons in Proposed Project Alternatives Sites

WASTE-RELATED BUSINESSES

PART A – INTRODUCTION AND INFORMED CONSENT

Introduce yourself. Ask for consent and to speak with the owner or manager of the nearby waste-related businesses and explain that the baseline survey is being conducted to obtain information on the basic profile of the persons working within the vicinity of the dumpsite in Siem Reap for the ***"Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures".***

Baseline Survey ID number	
Name of Enumerator	
Date and time of survey	

INFORMED CONSENT

I, _____, hereby give my consent to be part of the baseline survey being conducted by CEST and KCC on behalf of the Government's Development Partner as part of the preliminary Environmental and Social Impact Assessment for the ***Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures"*** I understand that:

(4) the information gathered through this baseline survey will be used internally in preparing the reports, plans and other related documentation

(5) these reports may be shared to external stakeholders provided that the results are in summarized form and no respondents will be identified in these reports, and

(6) the participation to the baseline survey is voluntary and that I may withhold any information I feel uneasy to share to other people and may also choose to stop at any point in the census when I feel uncomfortable about the questions being asked.

☐ YES ☐ NO

For respondents who respond with "NO", please ask why the person did not consent to the baseline survey, if possible.

If **NO**, reason:

_____

If **YES**, kindly ask the respondent to sign with name below then proceed with the baseline survey.

Name and signature of respondent: _____ Date signed: _____

Name of Respondent	
Address	
Contact Number	

PART B – PROFILE OF THE RESPONDENT

This part will be gathering the demographic profile of the respondent. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Name	_____ (Family Name) _____ (First Name) *If interviewee is not the household head,* **relationship of the respondent to household**: ☐1 Spouse ☐2 Child ☐3 Sibling ☐4 Parent of Household Head ☐5 Others, please specify: _____
2. Gender	☐1 Male ☐2 Female
3. Age	_____ years old
4. Marital Status	☐1 Single ☐2 Married ☐3 Separated ☐4 Divorced ☐5 Widow/er ☐6 Others, please specify: _____
5. Ethnicity	☐1 Khmer ☐2 Chinese ☐3 Vietnamese ☐4 Others, please specify: _____
6. Religion	☐1 Buddhism ☐2 Islam ☐3 Christian ☐4 Others, please specify: _____
7. Place of Origin	☐1 Within Siem Reap ☐6 Others, please specify: _____
8. Length of residency	☐1 Less than one year ☐2 1 to 3 years ☐3 4 to 6 years ☐4 7 to 10 years ☐5 Over 10 years
9. Reason for establishing residence on current location *(Select all that apply)*	9.1 Economic Reason ☐1 Proximity to livelihood ☐2 Rent free/Affordable rental fee ☐3 Others, please specify: _____ 9.2 Social Reason ☐1 Family ties ☐2 Near school ☐3 Got married ☐4 Others, please specify: _____
10. Social Safety Nets / Government Support / Transfers	☐1 Conditional Cash Transfer ☐5 Village Government certification ☐2 IDPoor Transfers ☐6 None ☐3 National Social Security Fund ☐7 Others, please specify: ☐4 People with Disability Fund _____
10. Type	☐1 Wastepicker ☐2 Waste Collectors ☐3 Other businesses ☐4 Resident ☐5 Worker in waste-related business (i.e. Recycling center, Junk shop, Dismantling shop) ☐6 Owner of waste-related business (i.e. Recycling center, Junk shop, Dismantling shop) ☐7 Others, please specify: _____

PART C – INFORMATION ON OWNERS OF BUSINESSES OPERATING AT / AROUND THE DUMPSITE

1. Type of Business	☐1 Recycling center ☐4 Waste collectors / consolidators ☐2 Junk shop ☐5 Food kiosk ☐3 Dismantling shop ☐7 Others, please specify: _____
2. Number of Employees	Number of full-time employees: _____ Number of part-time employees: _____
3. Typical Salary Arrangement and Average Salary	**Full-time Employees** ☐1 Daily: _____ ☐2 Weekly: _____ ☐3 Bi-monthly: _____ ☐4 Monthly: _____ ☐5 Commission based: _____ ☐6 Others, please specify: _____ **Full-time Employees** ☐1 Daily: _____ ☐2 Weekly: _____ ☐3 Bi-monthly: _____ ☐4 Monthly: _____ ☐5 Commission based: _____ ☐6 Others, please specify: _____
4. Schedule of Operations	☐1 Weekdays only: starting at _____, end at _____ ☐2 Weekends only: starting at _____, end at _____ ☐3 Daily: starting at _____, end at _____
5. Estimated Income	_____ Riels *(weekly/monthly)* _____ USD *(weekly/monthly)*
6. Start Year of Business	Year _____
7. Type, Volume and Price of waste/s gathered *(Select all that apply)*	*Type of Waste* / *kg per shift / day* / *price sold per kg* ☐1 Plastics ☐2 Metal ☐3 Paper / Cardboard ☐4 Electronic Waste ☐5 Glass ☐6 Textile / Fiber ☐7 Wood ☐8 Others, please specify: _____
8. Rank where you get most of the waste from (by volume).	___1 Waste pickers ___2 Waste consolidators / middlemen ___3 Junkshop / Dismantling shop ___4 Others, please specify: _____
9. Where do you bring the waste you collected?	☐1 Recycling center ☐3 Dismantling shop ☐2 Junk shop ☐4 Waste collectors / consolidators ☐7 Others, please specify: _____

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(Select all that apply)	
10. Do you have other sources of income?	☐1 Yes, if so, please specify these and the respective arrangement for each income source: 1. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal 2. _____: ☐1 Full-time ☐2 Part-time ☐3 Seasonal ☐2 No
11. Have you borrowed money in the past year?	☐1 Yes ☐2 No *If yes:* 11.1 Where did you get the loan from? *(Select all that apply)* ☐1 Family ☐2 Friends or Neighbours ☐3 Bank, please specify: _____ ☐4 Microfinance Institutions, please specify: _____ ☐5 Informal lenders ☐6 Others, please specify: _____ 11.2 How much have you loaned in total? _____ riels / _____ USD 11.3 What is the interest rate per month / year? _____ riels / _____ USD 11.4 What did you use the loan for? *(Select all that apply)* ☐1 Daily living expenses (i.e. food, rent) ☐2 Hospitalization ☐3 Medicine ☐4 Capital for business ☐5 Pay off other debts ☐6 Augment income due to impacts of the pandemic (i.e. income loss) ☐7 Others, please specify: _____ 11.5 Have you paid off your loan? ☐1 Yes ☐2 No 11.6 How long is the terms of the loan? _____ month/s or year/s 11.7 Did any of these loans require any collateral? ☐1 Yes, please specify: _____ ☐2 No
12. Residence near the dumpsite	☐1 Yes, permanent ☐2 Yes, temporary ☐3 No, please specify: _____
13. Provision of Protective	☐1 Yes

Equipment to Employees	☐$_2$ No
14. Membership in any organization	☐$_1$ Yes, if so, please specify: _____ ☐$_2$ Not a member, why not? _____
15. Closure of Dumpsite	If the dumpsite were to close, how would you be affected? _____ _____ _____

FORM 1D-_____

Baseline Information Form for Potentially-Affected Persons in Proposed Project Alternative Sites

HOUSEHOLDS WITHIN 1-KM RADIUS OF ANLONG PI DUMPSITE IN TRAPEANG THUM COMMUNE

PART 1 – INTRODUCTION AND INFORMED CONSENT

Introduce yourself. Ask for consent and to speak with the head of household (male or female household) of residences within the 1-km radius of the Anlong Pi Dumpsite and explain that the household survey is being done to collect socio-economic information for the ***"Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures"*** on the households potentially affected by the proposed landfill site alternative.

Baseline Survey ID number	
Name of Enumerator	
Date and time of survey	

INFORMED CONSENT

I, _____, hereby give my consent to be part of the baseline survey being conducted by CEST and KCC on behalf of the Government's Development Partner as part of the preliminary Environmental and Social Impact Assessment for the ***Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures"*** I understand that:

(1) the information gathered through this baseline survey will be used internally in preparing the reports, plans and other related documentation;

(2) these reports may be shared to external stakeholders provided that the results are in summarized form and no respondents will be identified in these reports; and

(3) the participation to the baseline survey is voluntary and that I may withhold any information I feel uneasy to share to other people and may also choose to stop at any point in the census when I feel uncomfortable about the questions being asked.

☐ YES ☐ NO

For respondents who respond with "NO", please ask why the person did not consent to the baseline survey, if possible.

If **NO**, reason:

_____

If **YES**, kindly ask the respondent to sign with name below then proceed with the baseline survey.

Name and signature of respondent: _____ Date signed: _____

Name of Respondent	
Address	
Contact Number	

PART 2 – RESPONDENT'S PROFILE

This part will be gathering the demographic profile of the respondent. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Name	_____ _____ *(Family Name)* *(First Name)* *If interviewee is not the household head,* **relationship of the respondent to household**: ☐1 Spouse ☐2 Child ☐3 Sibling ☐4 Parent of Household Head ☐5 Others, please specify: _____
2. Gender	☐1 Male ☐2 Female
3. Age	_____ years old
4. Marital Status	☐1 Single ☐2 Married ☐3 Separated ☐4 Divorced ☐5 Widow/er ☐6 Others, please specify: _____
5. Ethnicity	☐1 Khmer ☐2 Chinese ☐3 Vietnamese ☐4 Others, please specify: _____
6. Religion	☐1 Buddhism ☐2 Islam ☐3 Christian ☐4 Others, please specify: _____
7. Place of Origin	☐1 Within Siem Reap ☐6 Others, please specify: _____
8. Length of residency	☐1 Less than one year ☐2 1 to 3 years ☐3 4 to 6 years ☐4 7 to 10 years ☐5 Over 10 years
9. Reason for establishing residence on current location *(Select all that apply)*	9.1 Economic Reason ☐1 Proximity to livelihood ☐2 Rent free/Affordable rental fee ☐3 Others, please specify: _____ 9.2 Social Reason ☐1 Family ties ☐2 Near school ☐3 Got married ☐4 Others, please specify: _____
10. Social Safety Nets / Government Support / Transfers	☐1 Conditional Cash Transfer ☐5 Village Government certification ☐2 IDPoor Transfers ☐6 None ☐3 National Social Security Fund ☐7 Others, please specify: ☐4 People with Disability Fund _____
11. Have you borrowed money in the past year?	☐1 Yes ☐2 No *If yes:* 11.1 Where did you get the loan from? *(Select all that apply)* ☐1 Family ☐2 Friends or Neighbours ☐3 Bank, please specify: _____ ☐4 Microfinance Institutions, please specify: _____ ☐5 Informal lenders ☐6 Others, please specify: _____

	11.2 How much have you loaned in total? _____ riels / _____ USD 11.3 What is the interest rate per month / year? _____ riels / _____ USD 11.4 What did you use the loan for? *(Select all that apply)* ☐1 Daily living expenses (i.e., food, rent) ☐2 Hospitalization ☐3 Medicine ☐4 Capital for business ☐5 Pay off other debts ☐6 Augment income due to impacts of the pandemic (i.e., income loss) ☐7 Others, please specify: _____ 11.5 Have you paid off your loan? ☐1 Yes ☐2 No 11.6 How long is the terms of the loan? _____ month/s or year/s 11.7 Did any of these loans require any collateral? ☐1 Yes, please specify: _____ ☐2 No

PART 3 – INFORMATION ON LAND AND RESIDENCE

This part will be gathering information on the residence and living conditions of the respondent. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Do you own the land where you are residing right now?

☐1 Yes ☐2 No

1.1 If yes, what legal documents do you possess?

☐1 Land title ☐6 Others, please specify: _____

1.2 If no, who owns the land that you currently occupy?

Please specify: _____

2. What is the use of your current structure?

☐1 Residential ☐2 Commercial ☐3 Institutional

☐4 Residential/commercial ☐5 Residential/institutional

3. Do you own this structure where you are residing right now?

☐1 Yes ☐2 No

If, yes:

☐1 Only owner ☐2 Co-owner

If no, please answer items 3.1 to 3.3

3.1. What type of arrangement do you have with structure owner?

☐1 Tenant/Renter/Lessee, please specify rent per month: _____

☐2 Rent free occupant

☐3 Caretaker

☐4 Sharer

☐5 Occupant without owner's permission

3.2. What proof do you have to show arrangement with owner?

☐1 Written contract

☐2 Verbal arrangement

3.3. If written contract, what are the terms?

☐1 Annual contract

☐6 Others, please specify: _____

4. Type of structure/dwelling unit

☐1 Temporary/Moveable

☐2 Semi permanent

☐3 Permanent

4.1 Estimated size of structure/dwelling unit

☐1 16 sqm and below

☐2 17 to 30 sqm

☐3 32-49 sqm

☐4 50 sqm and above

4.2 Housing materials used

☐1 Local materials (palm, bamboo)

☐2 Light materials (i.e. scrap materials, wood)

☐3 Strong materials (concrete, galvanized iron)

☐4 Mix of light and strong

4.3 Other structures separate from the house owned by the household? *(Select all that apply)*

☐1 Store

☐2 Pig pen

☐3 Storage/warehouse

☐4 Others, please specify: _____

5. What natural hazards have you experienced in your village and how often do they occur? *(Select all that apply)*

☐1 Floods, please specify frequency: _____

☐2 Drought, please specify frequency: _____

☐3 Others, please specify: _____

PART 4 – INFORMATION ON HOUSEHOLD INCOME AND EXPENDITURE

This part will be gathering information on the income and expenditure of the household. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

Sources of income for the household

Income Sources	Monthly estimate		Tick if *main / primary* income source	Tick if *second* main income source
	Riels	US $		
1. Head of household's salary			☐1	☐2
2. Spouse's salary			☐1	☐2
3. Other salary (specify) No. of members contributing aside from HH and HH spouse: _____			☐1	☐2
4. Business (junk shops, stores)			☐1	☐2
5. Transfer income (pension/ other government benefits)			☐1	☐2
6. Remittances (money sent from family members abroad)			☐1	☐2
7. Seasonal employment, short term employment			☐1	☐2
8. Other, please specify: _____			☐1	☐2
How much do you earn from waste picking? (weekly/monthly): _____				

Monthly expenditures of the household for the following items

Types of expenses	Riels	US $
The amount spent on food/drink (per day)		
The amount spent on clothes/shoes (per year)		
The amount spent on education, books, equipment (per semester)		
The amount for healthcare (per illness, ask instances per year)		
The amount for leisure (per year)		
The amount for energy for electricity (per month)		
Water consumption (per month)		
Telecommunications consumption (per month)		
The amount spent for public transportation (per day)		
The amount spent on petrol for motorcycle or car (per week or per day)		
Furniture/household (per year)		
Property tax/rent for the house (per day)		
Savings (Monthly)		
Community contributions/religious donations/charity		
Others, specify_____		

Decision-making: Family household/finance

1. In your family/household, who decides whether to let children continue schooling or send to higher education?

☐1 Husband only

☐2 Wife only

☐3 Both husband and wife

☐6 Others, please specify: _____

2. In your family/household, who decides how income of household/family member is managed for household expenses?

☐1 Both husband and wife pool their income together for household expenses

☐2 Husband collects income from wife and other members for household expenses

☐3 Husband gives his income to wife and wife managers the fund for household expenses

☐6 Others, please specify: _____

PART 5 – INFORMATION ON HOUSEHOLD

This part will be gathering the profile of the household and its members. Fill-out each cell with the details of each household member using the numbers in the table headings.

Composition of household/ family members

Number of Household members: _____

1. Household members and educational attainment

No.	Name			Sex 1 - Male 2 - Female	Age 1 - 6 y/o or less 2 - 7-12 y/o 3 - 13-17 y/o 4 - 18-20 y/o 5 - 21-40 y/o 6 - 41-60 y/o 7 - 61 y/o or above	Ethnicity 1 - Khmer 2 - Chinese 3 - Vietnamese 4 - Others, please specify	Relationship to Household head 1 - Head of family 2 - Spouse 3 - Son/daughter 4 - Father/mother 5 - Sister/brother 6 - Grandchildren 7 - Grandparents 8 - Other relative 9 - Non-relative, specify	Educational Attainment 1 - No Education 2 - Primary School 3 - Secondary School 4 - High School 5 - Bachelor's and above 6 - Others, please specify	If ongoing education, location of school? 1 - Within neighbourhood or village 2 - Near village 3 - Another city/ municipality 4 - Overseas 5 - Others, please specify
	Last Name	First Name	Middle Name						
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

2. Information on Employment

No.	Name of employable household member	Employment status 1. Employed 2. Not employed	Occupation	Monthly income (in Riel or in US $)	Is Income fixed? 1. Yes 2. No	Mode of salary 1. Daily 2. Weekly 3. Bi-monthly 4. Monthly 6. Commission basis 7. Others	Type of employment 1. Owner/employer 2. Self-employed 3. Government 4. Private	Status of employment 1. Permanent 2. Temporary 3. Casual 4. Contractual 5. Seasonal 6. Others 7. Not applicable
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

3. Skills, Membership in Organisations and Vulnerability

No.	Name			Skills	Membership in organisations	Location of organisation	Vulnerability (solo parent, elderly, female-headed household, PWD, minor)	Who takes care of the vulnerable member?
	Last Name	First Name	Middle Name					
1								
2								
3								
4								
5								

PART 6 – INFORMATION ON HEALTH AND ACCESS TO HEALTHCARE FACILITIES

This part will be gathering information on the health conditions and availability of health services for the responding households. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Morbidity: Health problems experienced in the past one year in your household/family
(Select all that apply)

Communicable Diseases	Non-communicable Diseases	Others
☐1 Diarrhea	☐8 Dengue	☐14 None
☐2 Flu	☐9 Malaria	☐15 Others, please specify:
☐3 Typhoid fever	☐10 Heart ailments	_____
☐4 Pneumonia	☐11 Hypertension	
☐5 Tuberculosis	☐12 Diabetes	
☐6 HIV/AIDS	☐13 Cancer	
☐7 Sexually Transmitted Disease		

2. Mortality: Observed causes of death in your community *(Select all that apply)*

☐1 HIV/AIDS ☐2 Malaria ☐3 Dengue ☐4 Typhoid fever ☐5 Diarrhea
☐6 Skin diseases ☐7 Pneumonia ☐8 Flu ☐9 Traffic accident ☐10 Cancer
☐11 Heart ailments ☐12 Hypertension ☐13 Diabetes ☐14 None
☐15 Others, please specify: _____

3. Access to health facilities

3.1 Available health care providers regularly being accessed

☐1 Referral hospital ☐2 Public hospital ☐3 Private hospital
☐4 Local Clinic ☐5 Traditional Healers ☐6 Others, please specify: _____

3.2 Availability of doctor/health care worker at the health facility

☐1 Daily ☐2 Weekly ☐3 Monthly

3.3 Services that the health facility provides (encircle all that applies)

☐1 Medical Consultation (including pre-natal care) ☐2 Vaccination
☐3 Maternity/lying-in ☐4 Free medicines
☐5 Family planning services ☐6 Medical missions
☐7 Others, please specify: _____

3.4 Where is the nearest medical facility in your area?
Please specify: _____

3.5 Has your household received any health programs of the national or local government?
Please specify: _____

PART 7 – INFORMATION ON HOUSEHOLD UTILITIES

This part will be gathering information on utilities used by the household, such as water, electricity, and sanitation. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1.1 Source of drinking water

☐1 Piped connection, please specify provider: _____
☐2 Shared with neighbour (i.e., community faucet)
☐3 Deep well
☐4 Shallow well
☐5 Buy from water vendors
☐6 Others, please specify: _____

1.2 Source of water for household use (i.e., bathing, laundry, cleaning etc.)

☐1 Piped connection, please specify provider: _____
☐2 Shared with neighbour (i.e., community faucet)
☐3 Deep well
☐4 Shallow well
☐5 Buy from water vendors
☐6 Others, please specify: _____

1.3 Has your household experienced any illness because of unclean drinking water?

☐1 Yes, please specify sickness: _____
☐2 No

1.4 Is your water supply affected by natural hazards, such as flooding or drought?

☐1 Yes ☐2 No

1.4.1 If yes, how is it affected?

☐1 Water supply interruption
☐2 Poor water quality
☐3 Others, please specify: _____

3. Source of electricity

☐1 Own electric meter for power connection, please specify provider: _____
☐2 Shared connection
☐3 No connection (i.e. gas/kerosene, rechargeable battery, LPG, oil)
☐6 Others, please specify: _____

4. Sanitation

☐1 Own water sealed toilets (inside house)
☐2 Open pit
☐3 Communal/village toilet
☐4 No toilet
☐6 Others, please specify: _____

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5. Cooking
☐1 Gas (LPG)
☐2 Kerosene
☐3 Charcoal
☐4 Fire Wood
☐45 Electricity
☐6 Others, please specify: _____
6. Solid waste disposal/management practice
☐1 Collected by LGU
☐2 Burnt
☐3 Compost/buried
☐4 Thrown anywhere
☐6 Others, please specify: _____

PART 8 - INFORMATION ON PROJECT AWARENESS AND PERCEPTION

This part will look into the awareness and perceptions of the household on the proposed project to improve solid waste and plastic management. Fill-out blanks or tick the box, as appropriate. Unless otherwise stated, please tick **one** box only.

In the latter part of this section, explain that there are alternative sites being considered and all measures will be taken to ensure that there is no impact related to access to recyclables.

1. Have you heard about the proposal for a sanitary landfill in the area?
☐1 Yes, if so where did you hear about the project? _____
☐2 No
2 What benefits or positive impacts do you think can be derived from the project and proposed landfill site alternatives?
☐1 Employment/business opportunities
☐2 Improvement of public services (e.g., road system, etc)
☐3 Improvement of waste management facility (landfill)
☐4 None
☐5 I don't know
☐6 Others, please specify:
_____
_____
_____
_____

3 What are your overall concerns and issues (negative impacts) about the project?

☐1 My livelihood will be affected.

☐2 My business will be negatively affected.

☐3 My house will be negatively affected

☐4 Possible adjustment caused by the project

☐6 Others, please specify:

_____
_____
_____
_____
_____

4 Do you think the government or project proponent can address your concerns and mitigate the negative effects of the projects?

☐1 Yes ☐2 No

Why or why not?

_____
_____

5. What would you recommend addressing your issues and concerns?

_____
_____
_____
_____

FORM 1E-_____

Baseline Information Form for Potentially Affected Persons in Proposed Project Alternatives for

HOUSEHOLDS IN KANDEK COMMUNE

PART 1 – INTRODUCTION AND INFORMED CONSENT

Introduce yourself. Ask for consent and to speak with the head of household (male or female household head) and explain that the household survey is being done to obtain socio-economic information for the ***"Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures"*** on the households potentially affected by the proposed landfill site alternative.

Baseline Survey ID number	
Name of Enumerator	
Date and time of survey	

INFORMED CONSENT

I, _____, hereby give my consent to be part of the baseline survey being conducted by CEST and KCC on behalf of Government's Development Partner as part of the preliminary Environmental and Social Impact Assessment for the ***Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures"*** I understand that:

(1) the information gathered through this baseline survey will be used internally in preparing the reports, plans and other related documentation;

(2) these reports may be shared to external stakeholders provided that the results are in summarized form and no respondents will be identified in these reports; and

(3) the participation to the baseline survey is voluntary and that I may withhold any information I feel uneasy to share to other people and may also choose to stop at any point in the census when I feel uncomfortable about the questions being asked.

☐ YES ☐ NO

For respondents who respond with "NO", please ask why the person did not consent to the baseline survey, if possible.

If **NO**, reason:

_____

If **YES**, kindly ask the respondent to sign with name below then proceed with the baseline survey.Name and signature of respondent: _____ Date signed: _____

Name of Respondent	
Address	
Contact Number	

PART 2 – RESPONDENT'S PROFILE

This part will be gathering the demographic profile of the respondent. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only. IF THE RESPONDENT ALSO PARTICIPATED IN THE CONDUCT OF THE INVENTORY, PLEASE PROCEED TO PART 3.

1. Name	_____ (Family Name) _____ (First Name) *If interviewee is not the household head,* **relationship of the respondent to household**: ☐1 Spouse ☐2 Child ☐3 Sibling ☐4 Parent of Household Head ☐5 Others, please specify: _____
2. Gender	☐1 Male ☐2 Female
3. Age	_____ years old
4. Marital Status	☐1 Single ☐2 Married ☐3 Separated ☐4 Divorced ☐5 Widow/er ☐6 Others, please specify: _____
5. Ethnicity	☐1 Khmer ☐2 Chinese ☐3 Vietnamese ☐4 Others, please specify: _____
6. Religion	☐1 Buddhism ☐2 Islam ☐3 Christian ☐4 Others, please specify: _____
7. Place of Origin	☐1 Within Siem Reap ☐6 Others, please specify: _____
8. Length of residency	☐1 Less than one year ☐2 1 to 3 years ☐3 4 to 6 years ☐4 7 to 10 years ☐5 Over 10 years
9. Reason for establishing residence on current location *(Select all that apply)*	9.1 Economic Reason ☐1 Proximity to livelihood ☐2 Rent free/Affordable rental fee ☐3 Others, please specify: _____ 9.2 Social Reason ☐1 Family ties ☐2 Near school ☐3 Got married ☐4 Others, please specify: _____
10. Social Safety Nets / Government Support / Transfers	☐1 Conditional Cash Transfer ☐5 Village Government certification ☐2 IDPoor Transfers ☐6 None ☐3 National Social Security Fund ☐7 Others, please specify: ☐4 People with Disability Fund _____
11. Have you borrowed money in the past year?	☐1 Yes ☐2 No *If yes:* 11.1 Where did you get the loan from? *(Select all that apply)* ☐1 Family ☐2 Friends or Neighbours ☐3 Bank, please specify: _____ ☐4 Microfinance Institutions, please specify: _____

	☐5 Informal lenders ☐6 Others, please specify: _____ 11.2 How much have you loaned in total? _____ riels / _____ USD 11.3 What is the interest rate per month / year? _____ riels / _____ USD 11.4 What did you use the loan for? *(Select all that apply)* ☐1 Daily living expenses (i.e., food, rent) ☐2 Hospitalization ☐3 Medicine ☐4 Capital for business ☐5 Pay off other debts ☐6 Augment income due to impacts of the pandemic (i.e., income loss) ☐7 Others, please specify: _____ 11.5 Have you paid off your loan? ☐1 Yes ☐2 No 11.6 How long is the terms of the loan? _____ month/s or year/s 11.7 Did any of these loans require any collateral? ☐1 Yes, please specify: _____ ☐2 No

PART 3 – INFORMATION ON LAND AND RESIDENCE

This part will be gathering information on the residence and living conditions of the respondent. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Do you own the land where you are residing right now?

☐1 Yes ☐2 No

1.1 If yes, what legal documents do you possess?

☐1 Land title ☐6 Others, please specify: _____

1.2 If no, who owns the land that you currently occupy?

Please specify: _____

2. What is the use of your current structure?

☐1 Residential ☐2 Commercial ☐3 Institutional

☐4 Residential/commercial ☐5 Residential/institutional

3. Do you own this structure where you are residing right now?

☐1 Yes ☐2 No

If, yes:

☐1 Only owner ☐2 Co-owner

If no, please answer items 3.1 to 3.3

3.1. What type of arrangement do you have with structure owner?

☐1 Tenant/Renter/Lessee, please specify rent per month: _____

☐2 Rent free occupant

☐3 Caretaker

☐4 Sharer

☐5 Occupant without owner's permission

3.2. What proof do you have to show arrangement with owner?

☐1 Written contract

☐2 Verbal arrangement

3.3. If written contract, what are the terms?

☐1 Annual contract

☐6 Others, please specify: _____

4. Type of structure/dwelling unit

☐1 Temporary/Moveable

☐2 Semi permanent

☐3 Permanent

4.1 Estimated size of structure/dwelling unit

☐1 16 sqm and below

☐2 17 to 30 sqm

☐3 32-49 sqm

☐4 50 sqm and above

4.2 Housing materials used

☐1 Local materials (palm, bamboo)

☐2 Light materials (i.e., scrap materials, wood)

☐3 Strong materials (concrete, galvanized iron)

☐4 Mix of light and strong

4.3 Other structures separate from the house owned by the household? *(Select all that apply)*

☐1 Store

☐2 Pig pen

☐3 Storage/warehouse

☐4 Others, please specify: _____

5. What natural hazards have you experienced in your village and how often do they occur? *(Select all that apply)*

☐1 Floods, please specify frequency: _____

☐2 Drought, please specify frequency: _____

☐3 Others, please specify: _____

PART 4 – INFORMATION ON HOUSEHOLD INCOME AND EXPENDITURE

This part will be gathering information on the income and expenditure of the household. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

Sources of income in agriculture

1. Do you earn a living by farming?

☐1 Yes ☐2 No

If yes, please answer 1.1 to 1.6:

1.1 How long have you been engaged in farming?

_____ months / years

1.2 Do you own the land you are farming?

☐1 Yes, please specify area: _____ (ha / sqm)

☐2 No

1.3 How much do you earn from farming?

_____ per day / month

1.4 When do you farm?

☐1 Wet Season ☐2 Dry Season ☐3 Both

1.5 What farming equipment do you own? *(Select all that apply)*

☐1 Oxcart ☐4 Plow

☐2 Harrow ☐5 Tractor

☐3 Water Pump ☐6 Others, please specify: _____

1.6 Are you a member of any farmers' organization or cooperative?

☐1 Yes ☐2 No

2. Do you earn a living by livestock farming?

☐1 Yes ☐2 No

If yes, please answer 2.1 to 2.4:

2.1 How long have you been engaged in livestock farming?

_____ months / years

2.2 What animals do you raise *(Select all that apply)*

☐1 Poultry ☐2 Hog

☐3 Cattle ☐4 Others, please specify: _____

2.3 How much do you earn from livestock farming?

_____ per day / month

2.4 Are you a member of any livestock farmers' organization or cooperative?

☐1 Yes ☐2 No

3. Do you earn a living by fishing?

☐1 Yes ☐2 No

If yes, please answer 3.1 to 3.5:

3.1 How long have you been engaged in fishing?

_____ months / years

3.2 Where do you fish? *(Select all that apply)*

☐1 Tonle Sap Lake ☐3 Ponds
☐2 Rivers / Creeks ☐4 Others, please specify: _____

3.3 How much do you earn from fishing?

_____ per day / month

3.4 What fishing equipment do you own? *(Select all that apply)*

☐1 Boat ☐4 Scale
☐2 Fish graders ☐5 Aeration Device
☐3 Fish Pump ☐6 Others, please specify: _____

3.5 Are you a member of any fisherfolks' organization or cooperative?

☐1 Yes ☐2 No

Sources of income of the household

Income Sources	Monthly estimate		Tick if *main / primary* income source	Tick if *second* main income source
	Riels	US $		
1. Head of household's salary			☐1	☐2
2. Spouse's salary			☐1	☐2
3. Other salary (specify) No. of members contributing aside from HH and HH spouse: _____			☐1	☐2
4. Business (junk shops, stores)			☐1	☐2
5. Transfer income (pension/ other government benefits)			☐1	☐2
6. Remittances (money sent from family members abroad)			☐1	☐2
7. Seasonal employment, short-term employment			☐1	☐2
8. Other, please specify: _____			☐1	☐2

How much do you earn from waste picking? (weekly/monthly): _____

Monthly expenditures of the household for the following items

Types of expenses	Riels	US $
The amount spent on food/drink (per day)		
The amount spent on clothes/shoes (per year)		
The amount spent on education, books, equipment (per semester)		
The amount for healthcare (per illness, ask instances per year)		
The amount for leisure (per year)		
The amount for energy for electricity (per month)		
Water consumption (per month)		
Telecommunications consumption (per month)		
The amount spent for public transportation (per day)		
The amount spent on petrol for motorcycle or car (per week or per day)		
Furniture/household (per year)		
Property tax/rent for the house (per day)		
Savings (Monthly)		
Community contributions/religious donations/charity		
Others, specify_____		

Decision-making: Family household/finance

1. In your family/household, who decides whether to <u>let children continue schooling or send to higher education</u>?

☐1 Husband only

☐2 Wife only

☐3 Both husband and wife

☐6 Others, please specify: _____

2. In your family/household, who decides <u>how income of household/family member is managed</u> for household expenses

☐1 Both husband and wife pool their income together for household expenses

☐2 Husband collects income from wife and other members for household expenses

☐3 Husband gives his income to wife and wife managers the fund for household expenses

☐6 Others, please specify: _____

PART 4 – INFORMATION ON HOUSEHOLD

This part will be gathering the profile of the household and its members. Fill-out each cell with the details of each household member using the numbers in the table headings.

Composition of household/ family members

Number of Household members: _____

1. Household members and educational attainment

No.	Name			Sex 1 - Male 2 - Female	Age 1 - 6 y/o or less 2 - 7-12 y/o 3 - 13-17 y/o 4 - 18-20 y/o 5 - 21-40 y/o 6 - 41-60 y/o 7 - 61 y/o or above	Ethnicity 1 - Khmer 2 - Chinese 3 - Vietnamese 4 - Others, please specify	Relationship to Household head 1 - Head of family 2 - Spouse 3 - Son/daughter 4 - Father/mother 5 - Sister/brother 6 - Grandchildren 7 - Grandparents 8 - Other relative 9 - Non-relative, specify	Educational Attainment 1 - No Education 2 - Primary School 3 - Secondary School 4 - High School 5 - Bachelor's and above 6 - Others, please specify	If ongoing education, location of school? 1 - Within neighbourhood or village 2 - Near village 3 - Another city/ municipality 4 - Overseas 5 - Others, please specify
	Last Name	First Name	Middle Name						
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

2. Information on Employment

No.	Name of employable household member	Employment status 1. Employed 2. Not employed	Occupation	Monthly income (in Riel or in US $)	Is Income fixed? 1. Yes 2. No	Mode of salary 1. Daily 2. Weekly 3. Bi-monthly 4. Monthly 6. Commission basis 7. Others	Type of employment 1. Owner/employer 2. Self-employed 3. Government 4. Private	Status of employment 1. Permanent 2. Temporary 3. Casual 4. Contractual 5. Seasonal 6. Others 7. Not applicable
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

3. Skills, Membership in Organisations and Vulnerability

No.	Name			Skills	Membership in organisations	Location of organisation	Vulnerability (solo parent, elderly, female-headed household, PWD)	Who takes care of the vulnerable member?
	Last Name	First Name	Middle Name					
1								
2								
3								
4								
5								

PART 5 – INFORMATION ON HEALTH AND ACCESS TO HEALTHCARE FACILITIES

This part will be gathering information on the health conditions and availability of health services for the responding households. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1. Morbidity: Health problems experienced in the past one year in your household/family
(Select all that apply)

Communicable Diseases	Non-communicable Diseases	Others
☐1 Diarrhea	☐8 Dengue	☐14 None
☐2 Flu	☐9 Malaria	☐15 Others, please specify:
☐3 Typhoid fever	☐10 Heart ailments	_____
☐4 Pneumonia	☐11 Hypertension	
☐5 Tuberculosis	☐12 Diabetes	
☐6 HIV/AIDS	☐13 Cancer	
☐7 Sexually Transmitted Disease		

2. Mortality: Observed causes of death in your community *(Select all that apply)*

☐1 HIV/AIDS ☐2 Malaria ☐3 Dengue ☐4 Typhoid fever ☐5 Diarrhea
☐6 Skin diseases ☐7 Pneumonia ☐8 Flu ☐9 Traffic accident ☐10 Cancer
☐11 Heart ailments ☐12 Hypertension ☐13 Diabetes ☐14 None
☐15 Others, please specify: _____

3. Access to health facilities

3.1 Available health care facilities regularly being accessed

☐1 Referral hospital ☐2 Public hospital ☐3 Private hospital
☐4 Local Clinic ☐5 Traditional Healers ☐6 Others, please specify: _____

3.2 Availability of doctor/health care worker at the health facility

☐1 Daily ☐2 Weekly ☐3 Monthly

3.3 Services that the health facility provides (encircle all that applies)

☐1 Medical Consultation (including pre-natal care) ☐2 Vaccination
☐3 Maternity/lying-in ☐4 Free medicines
☐5 Family planning services ☐6 Medical missions
☐7 Others, please specify: _____

3.4 Where is the nearest health facility in your area?
Please specify: _____

3.5 Has your household received any health programs of the national or local government?
Please specify: _____

PART 6 – INFORMATION ON HOUSEHOLD UTILITIES

This part will be gathering information on utilities used by the household, such as water, electricity, and sanitation. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

1.1 Source of drinking water

☐1 Piped connection, please specify provider: _____
☐2 Shared with neighbour (i.e., community faucet)
☐3 Deep well
☐4 Shallow well
☐5 Buy from water vendors
☐6 Others, please specify: _____

1.2 Source of water for household use (i.e. bathing, laundry, cleaning etc.)

☐1 Piped connection, please specify provider: _____
☐2 Shared with neighbour (i.e., community faucet)
☐3 Deep well
☐4 Shallow well
☐5 Buy from water vendors
☐6 Others, please specify: _____

1.3 Has your household experienced any illness because of unclean drinking water?

☐1 Yes, please specify sickness: _____
☐2 No

1.4 Is your water supply affected by natural hazards, such as flooding or drought?

☐1 Yes ☐2 No

1.4.1 If yes, how is it affected?

☐1 Water Supply Interruption
☐2 Poor Water Quality
☐3 Others, please specify: _____

2. Source of electricity

☐1 Own electric meter for power connection, please specify provider: _____
☐2 Shared connection
☐3 No connection (i.e. gas/kerosene, rechargeable battery, LPG, oil)
☐6 Others, please specify: _____

3. Sanitation

☐1 Own water sealed toilets (inside house) ☐4 No toilet
☐2 Open pit ☐6 Others, please specify: _____
☐3 Communal/village toilet

4. Cooking

☐1 Gas (LPG)

☐2 Kerosene

☐3 Charcoal

☐4 Fire Wood

☐45 Electricity

☐6 Others, please specify: _____

5. Solid waste disposal/management practice

☐1 Collected by LGU

☐2 Burnt

☐3 Compost/buried

☐4 Thrown anywhere

☐6 Others, please specify: _____

PART 8 - INFORMATION ON PROJECT AWARENESS AND PERCEPTION

This part will look into the awareness and perceptions of the household on the proposed project. Fill-out blanks or tick the box as appropriate. Unless otherwise stated, please tick **one** box only.

In the latter part of this section, explain that there are alternative sites being considered and all measures will be taken to ensure that there is no impact related to access to recyclables.

1. Have you heard about the proposal for a sanitary landfill in the area?

☐1 Yes, if so where did you hear about the project? _____

☐2 No

2 What benefits or positive impacts do you think can be derived from the project?

☐1 Employment/business opportunities

☐2 Economic progress of the community/city/municipality?

☐3 Improvement of public services (e.g., road system, etc)

☐4 Improvement of proper waste management facility (landfill)

☐5 None

☐6 I don't know

☐7 Others, please specify:

_____

_____

_____

_____

_____

3. What are your overall concerns and issues (negative impacts) about the project?

☐1 My livelihood will be affected.

☐2 My business will be negatively affected.

☐3 My house will be negatively affected

☐4 Possible adjustment caused by the project

☐6 Others, please specify:

_____
_____
_____
_____
_____

4. Do you think the government or project proponent can address your concerns and mitigate the negative effects of the projects?

☐1 Yes ☐2 No

Why or why not?

_____
_____

5. What would you recommend addressing your issues and concerns?

_____
_____
_____
_____

Annex D.3: Focus Group Discussion Guide

Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures
CAMBODIA SOLID WASTE AND PLASTIC MANAGEMENT IMPROVEMENT PROJECT

FORM 2-_____

Focus Group Discussion Guide

A. Target participants

- Waste pickers – Children : 14 years old and below; mix of boys and girls
- Waste pickers – Youth : 15-20 years old; male and female
- Waste pickers – Women : 20 years old and above
- Waste pickers – Men : 20 years old and above
- Waste pickers – Other vulnerable groups : elderly, PWDs
- Workers of surrounding waste-related businesses
- Owners of surrounding waste-related businesses
- Farmers and fisherfolk from the immediate surrounding community
- Women's group/s from the immediate surrounding community

B. Venue

- The venue should be convenient for participants and accessible by public transportation.
- The location should be safe, especially for young and female participants.
- The venue should be in a space with sufficient ventilation and big enough for participants to practice physical distancing.
- Drinking water must be available during the FGD.
- Clean and accessible toilets must also be available for the participants and facilitators.

C. Logistical requirements

- Staff: 1 facilitator and 1 documenter
- Equipment: laptop, projector, voice recorder, batteries, still camera and/or video camera
- Supplies: Pens, markers, notepads, sticker paper for name tags, manila paper
- PPEs: alcohol in spray bottles, hand sanitizers, wet wipes, face masks

D. Program flow

- Introduction of participants and facilitator and documenter/s
- Welcome remarks and sharing of the objective/s of the FGD
- Ground rules:
  1. Put mobile phones on silent mode.
  2. Listen to each other.
  3. Treat each other with respect.
  4. Sexist jokes are not allowed.
  5. Work through all the activities even if you find them very simple.
  6. Never ridicule an answer.
  7. Respect different perspectives.
  8. Share only what you are comfortable sharing.
  9. One person speaks at a time.
  10. Do not personalize conflict.
  11. Do not label, stereotype, or call people names (do not use derogatory or insulting words when talking to or calling on a person).
  12. Speak for yourself, not for others.
  13. What is said in this group stays there, unless everyone agrees to change that.

E. Objectives of the FGD

- Determine who among the participants/groups depend on the dumpsite for their livelihood.
- Determine who among the users lives and has assets on the dumpsite
- Determine how a possible closure of the dumpsite may impact livelihoods
- Determine how a possible rehabilitation of the dumpsite with continuing landfill operations may impact livelihoods (specifically for children)
- Determine how the construction of a new engineered landfill may impact livelihoods (specifically farmers and fisherfolks) and nearby residents
- Identify mitigation measures (i.e., livelihood intervention) to minimize, if not completely prevent, such impacts.

F. Documentation

- Request the participants to sign the attendance sheet.
- Perform audio recording of the whole session. If possible, also do video recording of the whole session.
- Complement the audio/visual recording with handwritten notes of the session.
- Take photos of the session.

G. Discussion Guide

For waste pickers

- How long have you been working as a waste picker?
- Please detail the steps you do in waste picking (from collecting waste down to their sale). How often do you do these steps per week?
  Note: For this question, participants may be divided into groups, provided with manila paper and markers each, and asked to draw the steps.
- Please locate the site where livelihood activities are commonly conducted (within the dumpsite).
  Note: For this question, provide participants with manila paper and markers. Have them nominate a participant who would be the one to draw a map of the dumpsite as they see it. Ask them to identify sites where livelihood activities are commonly conducted. Suggest to come up with symbols or legends to represent different activities.
- What type of waste they collect and type of waste they sell? Around how much do you earn per kg? What is the most valuable waste?
  Note: For this question, the following table may be helpful:

Type of waste collected	For selling? (tick if Yes)	Earning per kg (in riel/USD)	Valuable (rank)

- Where do you sell the waste that you collect?
- Do you have any form of partnership with waste collectors?
- Do the waste collectors borrow money from the buyer or pay with waste collection (in kind)? Form of other support and partnership?

For owners of businesses around the dumpsite that are related to waste collection

- How long have you been in this business? Please detail the steps you do from acquiring consolidated waste from waste pickers. What type of waste do you buy from them? Around how much do you earn per kg? What is the most valuable waste?
  Note: For these questions, ask participants to define the different types of business they engage in. Then identify the kinds of waste that they buy from waste pickers, how much in terms of quantity and how much they pay for it. Participants with similar businesses may be grouped together and be provided with manila paper and markers. ***Facilitator should be able to establish if in the end, waste collected from waste pickers are re-sold (if so, in what form) or if they (the business) come up with a new product to be sold.***
- Do you have any form of partnership with the waste pickers? Have there been instances where waste pickers borrow money from you or ask for other forms of favor?

For workers in businesses around the dumpsite

- Ask participants what type of work they engage in and the type of business of their employer.
- How many years have you been working there?
- Terms of employment:
  - How are you paid?
  - How much are you paid?
  - Are you hired as a regular, seasonal, temporary worker? Elaborate.
  - Working hours:
    - From what time up to what time are you expected to work?
    - Do you also get paid on days when you did not go to work?

For farmers and fisherfolks

- How long have you been farming / fishing?
- How are your crops irrigated? Please specify provider and water source.
- How will a construction of an engineered landfill potentially affect your livelihood?

For All Participants

<u>On the environment</u>

What are the changes in the environment that you have observed in the past 5 years in the area?

<u>Land</u>

- *Land area*: Has the dumpsite area grown bigger or smaller?
- *Land use*: Is the dumpsite area used only for dumping waste?

<u>Water</u>

- Are there nearby bodies of water? Where are they? (For this question, participants may be asked to draw a map. For waste pickers, earlier map may be used).
- What are your observations on the quality of water in these water bodies?
- How about groundwater in the area?

<u>Air and Noise</u>

- What are your observations on the quality of air here in the dumpsite?

- What are your observations here in the dumpsite in terms of noise?

People

- Has the number of residents/families (if increasing or not), livelihood, income improvement, among others, changed?

On the landfill site alternatives

- How will the project affect specific types of livelihood in case the dumpsite is closed down and a new landfill is on a different location instead of rehabilitation of the current dumpsite into an engineered landfill? How do you think can such impacts be mitigated?
- Synthesis of impacts (c/o facilitator with support from documenter/s)
- What assistance (i.e. services on health, water, sanitation) would you need if the impact will not be mitigated?

Annex D.4: Key Informant Interview Guide

Environmental and Social Studies to Identify Environmental and Social Baseline Conditions, Risks, Potential Impacts, and Mitigating Measures
CAMBODIA SOLID WASTE AND PLASTIC MANAGEMENT IMPROVEMENT PROJECT

FORM 2-_____

Key Informant Interview Discussion Guide

A. Target participants

- Village chief of Anlong Pi Village
- Commune leader of Trapheang Thom Commune
- GAEA Officials
- Social Affairs Department, Provincial Government of Siem Reap
- Local Administration Unit, Provincial Government of Siem Reap

Note: Members of the Village Development Committee (VDC) and Commune Council may join during the KII.

B. Venue

The venue may be in the office of the subject or in a place with sufficient ventilation and ample space to practice physical distancing.

C. Logistical requirements

- Staff: 1 interviewer and 1 documenter
- Equipment: laptop, projector, voice recorder, batteries, still camera and/or video camera
- Supplies: Pens, notepads
- PPEs: alcohol in spray bottles, hand sanitizers, wet wipes, face masks

D. KII flow

- Introduction of interviewer and documenter
- Sharing of the KII objectives
- Presentation of the proposed project (using PPT)

E. Objectives of the KII

- Determine the current situation on the dumpsite.
- Determine plans on or related to SWM at the village and commune levels (and possibly district and provincial levels as well).
- Determine plans or current programs for groups that depend on the dumpsite for their livelihood.
- Determine views/opinions of local leaders on the proposed project.
- Explain that the information will be used for baseline environmental and social surveys to inform the suitability analysis for finding a site for new landfill development.
- Explain that the results of the environmental and social analysis will be presented in public consultations in May.

F. Discussion Guide

- What is the current situation on the dumpsite?
- Does the commune have specific programs targeted to waste pickers, including programs specific to child waste pickers, education, and community integration?
- Does the village/commune have plans on or related to SWM? Is it included in the VDC plan/Commune Investment Plan? Could the study team be provided with a copy of said documents?

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- Does the village/commune have plans for groups that depend on the dumpsite for their livelihood? Is it included in the VDC plan/Commune Investment Plan?
- What are your views/opinions regarding the proposed project and the possible landfill site alternatives?
- Could you describe the quality of the environment in the area (in the area where the dumpsite is and its surrounding areas) before the dumpsite was established and now?
- How has the dumpsite affected its surrounding area? The community? The residents? (Positive and Negative)

G. Documentation

- Write down the full name and designation of the subject.
- Perform audio recording of the whole session. If possible, also do video recording of the whole session.
- Complement the audio/visual recording with handwritten notes of the session.
- Take photos of the session.

ANNEX E: DETAILED RESULTS OF THE PRIMARY DATA GATHERING ACTIVITIES

Annex E.1: Socioeconomic and Perception Survey Results Summary Report

Preparation Studies for Environmental and Social Framework Documents for Proposed World Bank Financed Solid Waste and Plastic Management Improvement in Cambodia

Cambodia Solid Waste and Plastic Management Improvement Project

Results of the Socioeconomic Surveys

A total of 141 individuals participated in the socioeconomic and perception survey. Respondents were selected using stratified random sampling to ensure that sampling covers the different types of households, specifically vulnerable/disadvantaged groups (i.e., waste-pickers, residents at and near the existing dumpsite, farmers, fisherfolk, local communities at the proposed WWTP site), as well as businesses, both formal and informal and may be directly or indirectly engaged in waste-related businesses. The sampling was also informed by the result of the inventory of potentially project affected persons/households (PPAP/PPAH) per the possible identified project impact areas, as well as on official data on households in the target area.

Table 1 below presents a breakdown of the respondents to the socioeconomic and perception survey.

Table 1. Number of Sample Respondents

Respondent Groups	Total Pop. / HH	Sample Size
Waste pickers	273	75
Junk shops	12	11
Households within the 1-km Radius of the Anlong Pir Dumpsite in Trapeang Thom Commune	2,325	35
Households in Kandaek Commune	3,950	20
	TOTAL	**141**

The succeeding sections present the preliminary result of the survey with waste pickers.

1. Respondent's Profile

A total of 75 waste pickers participated in the socioeconomic and perception survey. They all come from the different villages in Trapeang Thom Commune, Prasat Bakong District, Siem Reap Province. Phnom Dei Village has the highest number of respondents (n=38) compared to the other villages, followed by Anlong Pir (n=28). Only three (3) respondents are from the villages of Suong, Rokakambot, and Lovea. Majority (67%, or 50) of the 75 respondents are female.

Table 2. Distribution of Sample Respondents per Village

Village	Gender		Total
	Male	Female	
Phnom Dei	11	27	38
Anlong Pir	11	17	28
Suong	0	3	3
Rokakambot	2	1	3
Lovea	1	2	3
TOTAL	**25**	**50**	**75**

The socio-demographic profile of the respondents is described in **Table 3** below. Of the 75 total number of respondents who are waste pickers, almost a third (33%) are males while a great majority (67%) are females. The respondents were divided into three age groups: 15-30 years of age with 26 respondents (35%), 31-50 years of age with 41 respondents (55%) and 8 respondents (11%) who are

between 51-70 years of age. With regards to the marital status, the respondents were categorized as single (18.7%), married (80%) and divorced (1.3%). All respondents are Khmer with Buddhism belief. Regarding the place of origin, almost all (98.7%) are from Siem Reap province with the exception of only 1.3% who indicated coming from another place (Poipet city) with length of residency is over 10 years.

Table 3. Respondent's Profile

No	Particular	Unit	No. of Reporting	% of Total
1	Total of Respondents	Person	75	100
2	Sex of Respondent	Male	Female	Total
	Number of reporting	25	50	75
	% of respondents	33	67	100
3	Ages of respondents	15-30 Years	31-50 Years	51-70 Years
	Number of reporting	26	41	8
	% of respondents	35	55	11
4	Marital Status	Single	Married	Divorced
	Number of reporting	14	60	1
	% of respondents	18.7	80	1.3
5	Ethnicity	Khmer		
	Number of reporting	75		
	% of respondents	100		
6	Religion	Buddhism		
	Number of reporting	75		
	% of respondents	100		
7	Place of origin	Within Siem Reap	Other	
	Number of reporting	74	1	
	% of respondents	98.7	1.3	
8	Length of residency	Over 10 years		
	Number of reporting	75		
	% of respondents	100		

2. Current Residence Reason

Generally, the waste pickers who have resided in the current residence in the villages around the dumpsite pertained to both economic and social reasons. Regarding to economic reason, in **Table 4** revealed that 100% of waste pickers associated with the proximity to livelihood. For social reason, in **Table 5** indicated that 96% of waste pickers have lived there because of family ties while other 4% married their wives and husbands over there.

Table 4. Economic Reason

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Proximity to livelihood	75	100	100	100

Table 5. Social Reason

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Family ties	72	96	96	96
Got married	3	4	4	100
Total	**75**	**100**	**100**	

3. Social Safety Nets

Actually, to tackle the food security challenges, the Royal Government of Cambodia (RGC) focuses on food-based social safety nets in the sectors of nutrition and productive assets/livelihoods support to enable longer-term, nationally owned food security solutions. The government has policy to provide social safety net through various programs to identified vulnerable people such poor, poorest, elderly and disabled people in community. In the **Table 6** showed that 16 respondents (21.3%) got support from government through ID Poor program while 59 respondents (78.7%) mentioned that they did not get any support from government for social safety nets.

Table 6. Social Safety Nets

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
ID Poor Transfer (Poor ID Card Holders)	16	21.3	21.3	21.3
None	59	78.7	78.7	100
Total	**75**	**100**	**100**	

4. Solid Waste-Picking Shifts

Basically, based on the results from KIIs and FGDs and the results from the interviews of waste pickers, they gave similar information on the schedules of shifts for picking solid waste. Accordingly, the schedule of the waste picking is divided into 3 shifts which include solid waste picking in morning, afternoon and night times. Based on **Table 7**, among 75 respondents, 72 respondents (96%) said that they pick solid waste in the morning between 5 am to 12 am. However, during the morning time, most people leave from their house in different times for the dumpsite as mentioned in **Table 7**. 38 people leave their homes at 7 am, 17 people at 6 am and others at 12 pm, 2 pm and 3 pm.

As shown in **Table 8,** among the 75 respondents, 67 respondents (89.3 %) said that they pick waste in the afternoon/evening time between 1pm – 7pm. Most of respondents who pick waste in the afternoon/evening, go to the dumpsite between 1pm – 5pm and 1pm - 6pm while **Table 9** indicated that among 75 respondents, 6 respondents (8%) pick waste at night time between 3pm – 7am. Most of respondents who pick waste at night time, go to the dumpsite between 5pm – 8pm.

Table 7. Shifts for Solid Waste-Picking in the Morning

Time	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
5 am - 12 am	3	4.0	4.2	4.2
6 am - 12 am	17	22.7	23.6	27.8
7 am- 12 am	38	50.7	52.8	80.6
8 am - 12 am	12	16.0	16.7	97.2
10 am -12 am	2	2.7	2.8	100.0

Time	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Total	**72**	**96.0**	**100.0**	

Table 8. Shifts for Solid Waste-Picking in the Afternoon

Time	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
1pm – 3pm	3	4.0	4.5	4.5
1 pm - 4pm	7	9.3	10.4	14.9
1pm - 5pm	25	33.3	37.3	52.2
1pm - 6pm	11	14.7	16.4	68.7
1pm - 7pm	4	5.3	6.0	74.6
2 pm - 4pm	4	5.3	6.0	80.6
2 pm – 5pm	11	14.7	16.4	97.0
2 pm - 6pm	2	2.7	3.0	100.0
Total	**67**	**89.3**	**100.0**	

Table 9. Shifts for Solid Waste-Picking at Night

Time	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
7pm - 7am	1	1.3	16.7	16.7
5 pm - 6am	1	1.3	16.7	33.3
5 pm – 8 pm	2	2.7	33.3	66.7
3 pm - 12 am	1	1.3	16.7	83.3
6 pm - 12 am	1	1.3	16.7	100.0
Total	**6**	**8.0**	**100.0**	

5. Solid Waste-Picking Schedule

Based on **Table 3** where the length of residency was described in the respondent's profile, 100% of respondents have lived in the villages nearby the dumpsite for over 10 years. Generally, they have all picked waste at dumpsite for between 28 months to 180 months (**Table 12**). **Table 10** showed that nearly 100% of respondents, pick waste at weekday while few respondents mentioned that they pick waste at weekend only. Furthermore, **Table 11** indicated that around 70% of respondents pick waste every day (daily), nearly 20% of respondents pick waste four to six times per week, and around 10% of respondents pick waste twice or thrice per week while around 1% of respondents pick waste once a week.

Table 10. Schedules for Waste-Picking

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Weekday	72	96.0	96.0	96.0
Weekend	3	4.0	4.0	100.0
Total	**75**	**100.0**	**100.0**	

Table 11. Frequency of Waste-Picking

Frequency (How often)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Once a week	1	1.3	1.3	1.3
Twice or thrice per week	8	10.7	10.7	12.0
Four to six times per week	14	18.7	18.7	30.7
Daily (everyday)	52	69.3	69.3	100.0
Total	**75**	**100.0**	**100.0**	

Table 12. Duration of Waste-Picking

Month	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
28	1	1.3	1.3	1.3
36	1	1.3	1.3	2.7
48	1	1.3	1.3	4.0
60	9	12.0	12.0	16.0
72	3	4.0	4.0	20.0
84	2	2.7	2.7	22.7
96	8	10.7	10.7	33.3
108	1	1.3	1.3	34.7
120	23	30.7	30.7	65.3
134	2	2.7	2.7	68.0
144	10	13.3	13.3	81.3
156	8	10.7	10.7	92.0
168	4	5.3	5.3	97.3
180	2	2.7	2.7	100.0
Total	**75**	**100.0**	**100.0**	

6. Earnings from Waste-Picking

The amount of income from waste picking per person depends on quantity of the available type of valuable waste that has been picked up from the dumpsite; the unit price of each waste where they sell out, number of waste pickers of per household and duration of waste picking. Generally, they sell out the waste once a week or a month and sell daily for the organic waste. Some of the waste pickers sell their waste to the local junkshop nearby the village or sometime in the provincial center due to different unit rate compared to the local junk shop.

Waste pickers who sell their waste to local junk shop because they have no transportation mean or owners of local junk shop directly buy at their homes while other waste pickers who have transportation mean, always sell their waste at junk shops in provincial center. The fact is that, the waste -sale price at junk shops in provincial center seems to be higher than local junk shops. **Table 13** indicated that the waste pickers can earn from waste picking ranging from 60,000 riels (USD 15) to 1,600,000 riels (USD 400) per month. Totally, most waste pickers can earn between 200,000 riels (USD 50) to 300,000 riels (USD 75) per month.

Table 13. Earning from Waste-Picking per Month

Amount (Riel)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
60,000	1	1.3	1.3	1.3
100,000	4	5.3	5.3	6.7
120,000	1	1.3	1.3	8.0
160,000	2	2.7	2.7	10.7
200,000	12	16.0	16.0	26.7
250,000	3	4.0	4.0	30.7
260,000	1	1.3	1.3	32.0
300,000	15	20.0	20.0	52.0
350,000	1	1.3	1.3	53.3
400,000	8	10.7	10.7	64.0
480,000	4	5.3	5.3	69.3
500,000	6	8.0	8.0	77.3
600,000	8	10.7	10.7	88.0
800,000	5	6.7	6.7	94.7
900,000	1	1.3	1.3	96.0
1,200,000	1	1.3	1.3	97.3
1,400,000	1	1.3	1.3	98.7
1,600,000	1	1.3	1.3	100.0
Total	**75**	**100.0**	**100.0**	

7. Venue for Selling Waste

The location of junk shop is located nearby the dumpsite while main junk shop located in the provincial center. The local junk shop has the service of buying directly from the waste pickers' houses.

As mentioned in point 6, there are two options for selling their waste, first option is to sell to local junk shop and second option is to sell to junk shop at provincial center. **Table 14** showed that among 72 respondents interviewed, 63 respondents (87.5%) sold their waste-to-waste junk shop at Angkrong commune (collectors/consolidators) while 9 respondents (12.5%) sold their waste to local junk shops.

Table 14. Place for Selling Waste

	Responses		Percent of Cases
	No	Percent	
Local junk shop	9	12.5%	12.5%
Junk shop (waste collectors/consolidators)	63	87.5%	87.5%
Total	**72**	**100.0%**	**100.0%**

8. Type, Volume, and Price for Waste

The twelve (12) types of waste picked by waste pickers are found in **Table 15** for details. In terms of volume, the 75 waste pickers picked PET bottle (Plastic type 1) with average weight of around 304kg per shift/month and average price sold is 477riels/kg (USD 0.12). 74 waste pickers picked Plastic type 2 (HDPE bottle such as soap bottles...) with average weight of around 213kg per shift/month and average price sold is 497riels/kg (USD 0.12). Only one waste picker picked Plastic type 3 (Plastic bag)

with average weight of around 50kg per shift/month and average price sold is 300riels/kg (USD0.073). 65 waste pickers picked Aluminum type 1 (beer can, soft drink can) with average weight of around 14kg per shift/month and average price sold is 5,031 riels/kg (USD1.22). 55 waste pickers picked Copper (from electrical wire) with average weight of around 2kg per shift/month and average price sold is 19,382riels/kg (USD19.32). 11 waste pickers picked Stainless steel (Robinet, shower) with average weight of around 3kg per shift/month and average price sold is 3,500riels/kg (USD0.78). 56 waste pickers picked Reinforcement bar with average weight of around 21kg per shift/month and average price sold is 875riels/kg (USD0.21). 69 waste pickers picked Tin material (can of milk) with average weight of around 52kg per shift/month and average price sold is 499 riels/kg. 16 waste pickers picked organic waste with average weight of around 28 bucket per shift/month and average price sold is 300riels/kg (USD0.073). 60 waste pickers picked Paper type 1 (cardboard) with average weight of around 117kg per shift/month and average price sold is 240 riels/kg (USD0.058). 61 waste pickers picked Paper type 2 with average weight of around 32kg per shift/month and average price sold is 270 riels/kg (USD0.065) and 64 waste pickers picked Glass bottle with average weight of around 222kg per shift/month and average price sold is 100 riels/kg (USD0.024).

Table 15. Type, Volume and Price of Waste

Type of waste	Frequency (Number)	Kg/shift/month	Price sold per Kg	
			In Riels	In USD
Plastic type 1 (PET bottle)	75	304	477	0.12
Plastic type 2 (HDPE bottle such as soap bottle...)	74	213	497	0.12
Plastic type 3 (Plastic bag)	1	50	300	0.08
Aluminum can (beer can, soft drink can)	65	14	5,031	1.26
Copper (electric wire…)	55	2	19,382	4.85
Stainless steel (Robinet, shower)	11	3	3,500	0.88
Reinforcement bar	56	21	875	0.22
Tin material (can of milk)	69	52	499	0.12
Organic wastes (bucket)	16	28	3,000	0.75
Paper type 1 (cardboard)	60	117	240	0.06
Paper type 2	61	32	270	0.07
Glass bottle	64	222	100	0.03
Total	**607**			

Note: USD1=4100 riel

9. Other Sources of Income

Beside source of income from waste picking, the waste pickers have other sources of income coming from construction work, fishing, hotel/restaurant/house works, livestock raising, local farming work, remittance, rice farming and small-scale business. Among 75 respondents interviewed, 49 respondents have other sources of income. The kinds of job for other sources of income, are mostly part time jobs while few respondents work full-time jobs (**Table 16**). Among 49 respondents who have other sources of income, 30 respondents work for both seasons while other 19 respondents work for only rainy season (**Table 17**).

Table 16. Other Source of Income

Other sources of income	Kind of job		Total
	Full time	Part time	
Construction	6	7	13
Fishing	0	1	1
Hotel /Restaurant/House	1	0	1
Livestock raising	1	9	10
Local farming	0	1	1
Remittances from relative	0	1	1
Rice farming	1	20	21
Small scale business	1	0	1
Total	**10**	**39**	**49**

Table 17. Season for Other Source of Income

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Rainy season	19	25.3	38.8	38.8
Both	30	40.0	61.2	100.0
Total	**49**	**65.3**	**100.0**	

10. Primary Source of Income in Waste-Picking

Based on **Table 18** indicated that among 75 respondents who are waste pickers, 48 respondents (64%) whose primary source of income depend on waste picking completely while other 27 respondents (36%) do not depend on waste picking. Furthermore, they also mentioned that the primary sources of income besides waste picking are from construction, restaurant, livestock raising, rice farming and small business (**Table 19**).

Table 18. Primary Source of Income on Waste-Picking

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	48	64.0	64.0	64.0
No	27	36.0	36.0	100.0
Total	**75**	**100.0**	**100.0**	

Table 19. Primary Source of Income besides Waste-Picking

Jobs	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Construction	13	17.3	48.1	48.1
Restaurant	1	1.3	3.7	51.9
Livestock raising	1	1.3	3.7	55.6
Rice farming	10	13.3	37.0	92.6
Small business	2	2.7	7.4	100.0
Total	**27**	**36.0**	**100.0**	

11. Access Credit from Various Sources

Among 75 waste pickers interviewed, 35 respondents (46.7%) had borrowed money in the past year from various sources while 40 respondents (53.3%) did not borrow money from any source (**Table**

20). In addition, among 35 respondents who borrowed money, 22 respondents (62.9%) were loaned from Microfinance institutions, 11 respondents (31.4%) were loaned from private banks while only one respondent (2.9%) was loaned from family and informal lender respectively (**Table 21**).

Table 20. Access Credit in the Past Year

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	35	46.7	46.7	46.7
No	40	53.3	53.3	100.0
Total	**75**	**100.0**	**100.0**	

Table 21. Sources of Loan

Loaning sources	Responses		Percent of Cases
	No	Percent	
Loan from family	1	2.9%	2.9%
Loan from private bank	11	31.4%	31.4%
Loan from Microfinance Institutions	22	62.9%	62.9%
Loan from informal lender	1	2.9%	2.9%
Total	**35**	**100.0%**	**100.0%**

The borrowed amounts range from 200 - 20,000 USD (**Table 22**), while the interest payment ranges from 10 – 260 USD per month (**Table 23**). The money was borrowed in the purposes of Daily living expense, Capital for business, paying off other debts, Income augmenting due to impact of the pandemic and Others (**Table 24**). The terms of loan are from 12 – 84 months (**Table 25**) and to get loan approved, the land title/collateral was required.

Table 22. Amount Loaned

Amount (USD)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
200	1	1	3	3
1,000	2	3	6	9
1,200	1	1	3	11
1,500	2	3	6	17
1,600	1	1	3	20
2,000	3	4	9	29
2,500	2	3	6	34
3,000	3	4	9	43
4,000	1	1	3	46
4,500	1	1	3	49
5,000	8	11	23	71
5,500	1	1	3	74
7,000	2	3	6	80
8,000	1	1	3	83
9,000	1	1	3	86
10,000	3	4	9	94
20,000	2	3	6	100
Total	**35**	**47**	**100**	

Table 23. Interest Rate

Amount (USD)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
10.0	1	1.3	2.9	2.9
12.0	1	1.3	2.9	5.7
15.0	2	2.7	5.7	11.4
16.8	1	1.3	2.9	14.3
20.0	1	1.3	2.9	17.1
22.5	2	2.7	5.7	22.9
30.0	1	1.3	2.9	25.7
33.8	1	1.3	2.9	28.6
37.5	2	2.7	5.7	34.3
39.0	1	1.3	2.9	37.1
45.0	2	2.7	5.7	42.9
46.0	3	4.0	8.6	51.4
52.0	1	1.3	2.9	54.3
58.5	1	1.3	2.9	57.1
65.0	5	6.7	14.3	71.4
71.5	1	1.3	2.9	74.3
91.0	2	2.7	5.7	80.0
100.0	1	1.3	2.9	82.9
117.0	1	1.3	2.9	85.7
130.0	3	4.0	8.6	94.3
260.0	2	2.7	5.7	100.0
Total	**35**	**46.7**	**100.0**	

Table 24. Purpose of Loan

	Responses		Percent of Cases
	N	Percent	
Daily living expense	4	11.4%	12.1%
Capital for business	2	5.7%	6.1%
Paying off other debts	1	2.9%	3.0%
Augment income due to impact of the pandemic	1	2.9%	3.0%
Others	27	77.1%	81.8%
Total	**35**	**100.0%**	**106.1%**

Table 25. Term of Loan

Month	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
12	7	9.3	20.0	20.0
24	7	9.3	20.0	40.0
36	6	8.0	17.1	57.1
48	3	4.0	8.6	65.7
54	1	1.3	2.9	68.6
60	8	10.7	22.9	91.4
72	2	2.7	5.7	97.1
84	1	1.3	2.9	100.0

Month	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Total	35	46.7	100.0	

12. Experience of Disease

Waste pickers are vulnerable and easily get various diseases because they work and have food at unhygienic places. **Table 26** showed that among 75 respondents, 38 respondents experienced various diseases. Among the 38 respondents, 4 respondents got diarrhea and other 4 respondents got dengue fever while 30 respondents got other diseases. **Table 27** presents the other diseases experienced by them. There are seven kinds in other diseases such as stomach, flue, headache, high blood pressure, low blood sugar, neck lump and typhoid fever.

Table 26. Kinds of Disease Experienced

	Responses		Percent of Cases
	No	Percent	
Diarrhea	4	10.5%	11.4%
Dengue	4	10.5%	11.4%
Others	30	78.9%	85.7%
Total	38	100.0%	108.6%

Table 27. Other Disease Experienced

	Frequency (Number)	Percent	Valid Percent
Stomach	1	1.3	1.3
Flue	4	5.3	5.3
Headache	18	24.0	24.0
High Blood Pressure	4	5.3	5.3
Low blood sugar	1	1.3	1.3
Neck Lump	1	1.3	1.3
Typhoid fever	1	1.3	1.3
Total	30	40	40

13. Membership of Organization

As shown in **Table 28** below, among the 75 respondents, only 7 respondents (9%) are members of CP chicken farm, while 68 respondents (91%) are not members of any organization because they are busy picking waste, so they do not get information from those organizations and moreover they do not have free time to attend meetings with those organizations either.

Table 28. Membership of Organization

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	7	9	9	9
No	68	91	91	100
Total	75	100	100	

14. Closure of Dumpsite

The anticipated impacts of dumpsite closure are shown in **Table 29** below. Out of 75 respondents, 46 (61.3%) and 19 (25.3%) said they would lose their income and jobs from waste picking, respectively If the dumpsite is closed. In addition, there are 3 respondents (4%) also mentioned that they will

increase debt at private banks if they lose their jobs and income from waste picking. Meanwhile, only one respondent said that if the dumpsite was closed, the waste-picking would return to school, while 6 respondents (8%) said that they have no idea about this case.

Table 29. Anticipated Impacts of Dumpsite Closure

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Children return to school	1	1.3	1.3	1.3
Lose job	19	25.3	25.3	26.7
Lose income	46	61.3	61.3	88.0
Increase debt	3	4.0	4.0	92.0
No idea	6	8.0	8.0	100.0
Total	**75**	**100.0**	**100.0**	

The following sections present the preliminary results of the survey with households living 1-km from existing dumpsite.

1. Sample Distribution of the Respondents

The data were obtained from thirty-five (35) interviewed residents of existing dumpsite from only one village inside the project study area located in Trapeang Thom commune, Prasat Bakong district, Siem Reap province. The sample respondents were randomly selected from among the villagers who are living 1-km from existing dumpsite and the contact numbers of those residents that were provided by village chiefs. Based on **Table 30**, there were 16 females (45.71%) out of those 35 respondents.

Table 30. Sample Distribution of Respondents per Village by Sex

	Village
	Anlong Pir
Male	19
Female	16
Total	**35**

2. Profile of Respondents

Table 30 presents that the total 35 respondents including 19 males (54.29%) and 16 females (45.71%). The ages of the sample respondents are divided into three age groups, 25-30 years of age with 6 respondents (17%), 31-50 years of age with 20 respondents (57%) and 9 respondents (26%) are between 51-70 years of age as shown in **Table 31**. The marital status of respondents is: married (97%) and divorced (3%) as shown in **Table 32**. 100% of respondents are Khmer with Buddhism belief as shown in **Table 33** and **Table 34**. Regarding to place of origin, approximately 97% of them come from Siem Reap province while 3% from another place (Battambang province) as shown in **Table 35** and length of residency with over 10 years is 94%, 4-6 years is 3% and 7-10 years is 3% as shown in **Table 36**.

Table 31. Ages of Respondents by Village

Age	Village
	Anlong Pir
25	2
26	2
28	1
30	1
31	2
34	1
36	2
37	1
38	1
39	1
40	4
41	2

Age	Village
	Anlong Pir
42	1
44	1
45	2
48	1
49	1
51	1
52	1
55	1
57	2
59	1
60	2
62	1
Total	**35**

Table 32. Marital Status of Respondents by Village

	Village
	Anlong Pir
Married	34
Window/er	1
Total	**35**

Table 33. Ethnicity of Respondent by Village

	Ethnicity
	Khmer
Anlong Pir	35
Total	**35**

Table 34. Religion of Respondents by Village

	Religion
	Buddhism
Anlong Pir	35
Total	**35**

Table 35. Places of Origin of the Respondents

	Village
	Anlong Pir
Within Siem Reap	34
Other	1
Total	**35**

Table 36. Length of Residency

	Village
	Anlong Pir
4 to 6 years	1
7 to 10 years	1

	Village
	Anlong Pir
Over 10 years	33
Total	**35**

3. Current Residence Reason

The households who have established the current residence in the villages around the existing dumpsite pertained to both economic and social reasons. Regarding to economic reason, **Table 37** shows that 100% of respondents associated to the proximity to livelihood. For social reason, **Table 38** indicates that 82.9% of respondents have lived over there because of family ties while only 17.1% said that they got married there.

Table 37. Economic Reason

	Frequency	Percent	Valid Percent	Cumulative Percent
Proximity to livelihood	35	100.0	100.0	100.0

Table 38. Social Reason

	Frequency	Percent	Valid Percent	Cumulative Percent
Family ties	29	82.9	82.9	82.9
Got married	6	17.1	17.1	100.0
Total	**35**	**100.0**	**100.0**	

4. Social Safety Nets

The government has policy to provide social safety nets through various programs to identified vulnerable people such poor, poorest, elderly and disabled people in community. **Table 39** shows that 4 respondents (11.4%), getting support from government through ID Poor program while 31 respondents (88.6%) mentioned that they did not get any support from government for social safety nets.

Table 39. Social Safety Nets

	Frequency	Percent	Valid Percent	Cumulative Percent
ID Poor Transfer (Poor ID card Holders)	4	11.4	11.4	11.4
None	31	88.6	88.6	100.0
Total	**35**	**100.0**	**100.0**	

5. Access Credit from Various Sources

Among the 35 respondents interviewed, 22 respondents (62.9%) borrowed money in the past years from various sources while 13 respondents (37.1%) did not borrow money from any source as shown in **Table 40** below.

Table 40. Access Credit in the Past Years

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	22	62.9	62.9	62.9

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
No	13	37.1	37.1	100.0
Total	**35**	**100.0**	**100.0**	

In addition, among 22 respondents who have borrowed money, 17 respondents (77.3%) who availed loan from microfinance institutions (MFIs), while 4 respondents (18.2%), availed loan from private banks while only one respondent (4.5%) was loaned from family as shown in **Table 41** below.

Table 41. Sources of Loan

	Responses		Percent of Cases
	No	Percent	
Loan from family	1	4.5%	4.5%
Loan from bank	4	18.2%	18.2%
Loan from MFIs	17	77.3%	77.3%
Total	**22**	**100.0%**	**100.0%**

The average amount of loan is from 250 to 15,000 USD as shown in **Table 42**. While the interest fee is between 10 to 195 USD per month as shown in **Table 43**. The money was borrowed in the purposes of daily living expense, hospitalization, capital for business and paying off other debts due to impact of the pandemic and others as shown in **Table 44**. The length of loan is from 18 – 60 months as shown in **Table 45** and the collateral is required.

Table 42. Amount Loaned

Amount (USD)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
250	1	2.9	4.5	4.5
750	2	5.7	9.1	13.6
1,600	1	2.9	4.5	18.2
2,000	1	2.9	4.5	22.7
2,500	1	2.9	4.5	27.3
3,000	2	5.7	9.1	36.4
3,500	1	2.9	4.5	40.9
4,000	1	2.9	4.5	45.5
5,000	4	11.4	18.2	63.6
6,000	3	8.6	13.6	77.3
8,000	1	2.9	4.5	81.8
10,000	3	8.6	13.6	95.5
15,000	1	2.9	4.5	100.0
Total	**22**	**62.9**	**100.0**	

Table 43. Interest Rate

Amount (USD)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
10	1	2.9	4.5	4.5
15	2	5.7	9.1	13.6
24	1	2.9	4.5	18.2
25	1	2.9	4.5	22.7

Amount (USD)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
30	1	2.9	4.5	27.3
39	1	2.9	4.5	31.8
45	1	2.9	4.5	36.4
52	1	2.9	4.5	40.9
70	1	2.9	4.5	45.5
85	1	2.9	4.5	50.0
88	1	2.9	4.5	54.5
90	1	2.9	4.5	59.1
100	2	5.7	9.1	68.2
104	1	2.9	4.5	72.7
110	1	2.9	4.5	77.3
130	1	2.9	4.5	81.8
132	1	2.9	4.5	86.4
150	1	2.9	4.5	90.9
160	1	2.9	4.5	95.5
195	1	2.9	4.5	100.0
Total	**22**	**62.9**	**100.0**	

Table 44. Purpose of Loan

	Responses		Percent of Cases
	No	Percent	
Daily living expense	4	16.0%	18.2%
Hospitalization	1	4.0%	4.5%
Capital for business	5	20.0%	22.7%
Paying off other debts	1	4.0%	4.5%
Others	14	56.0%	63.6%
Total	**25**	**100.0%**	**113.6%**

Table 45. Term of Loan

Month	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
18	1	2.9	4.5	4.5
24	3	8.6	13.6	18.2
36	5	14.3	22.7	40.9
48	7	20.0	31.8	72.7
60	6	17.1	27.3	100.0
Total	**22**	**62.9**	**100.0**	

6. Land and Residence Ownership

Table 46 shows the reported landholding for residing of the sample respondents. 33 respondents (94.3%) own the land where they are residing while only 2 respondents do not own the land because they live with their parents' house. The majority of the legal document for land possessing is the land title as shown in **Table 47**.

Table 46. Land Ownership

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	33	94.3	94.3	94.3
No	2	5.7	5.7	100.0
Total	**35**	**100.0**	**100.0**	

Table 47. Possessing Legal Document

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Land title	33	94.3	100.0	100.0

7. Current House/Structure Use

Table 48 shows that 100% of respondents living around 1 km from the existing dumpsite, use their current houses in the purpose for only residing. Regarding to ownership, 100% of respondents own their properties as shown in **Table 49**. In addition, among 35 respondents, 33 respondents (94.3%) are owners while 2 respondents (5.7%) are co-owners as shown in **Table 50**.

Table 48. Purpose of House/Structure Use

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Residential	35	100.0	100.0	100.0

Table 49. House/Structure Ownership

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	35	100.0	100.0	100.0

Table 50. Type of Ownership

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Only owner	33	94.3	94.3	94.3
Co-owner	2	5.7	5.7	100.0
Total	**35**	**100.0**	**100.0**	

8. Type of House/Dwelling

Table 51 indicates that 100% of respondents around the existing dumpsite are living in the permanent houses. About size of house, **Table 52** reflects that among 35 respondents, 18 respondents (51.4%), are living in the permanent houses with size of 32-49 sqm, 14 respondents are living in houses with size of 50 sqm and above and 2 respondents are living in houses with size between 17 to 30 sqm while only one respondent is living in house with size of 16 sqm.

Table 51. Type of House/Dwelling Unit

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Permanent	35	100.0	100.0	100.0

Table 52. Size of House/Dwelling Unit

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
16 sqm and below	1	2.9	2.9	2.9
17 to 30 sqm	2	5.7	5.7	8.6
32-49 sqm	18	51.4	51.4	60.0
50 sqm and above	14	40.0	40.0	100.0
Total	**35**	**100.0**	**100.0**	

Furthermore, based on **Table 53**, there are 24 respondents (68.6%) whose houses were made from mix of light and strong material, followed by 8 respondents (22.9%) with light materials while 3 respondents (8.6%) with strong materials. Regarding to other structures separated from the house, among 35 respondents, there are 9 respondents (52.9%) built pig pens separated from their houses and 6 respondents (35.3%) built stores separated from their houses while only one respondent (5.9%) had the storage/warehouse and others built separately from the house as shown in **Table 54**.

Table 53. Housing Materials

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Light materials	8	22.9	22.9	22.9
Strong materials	3	8.6	8.6	31.4
Mix of light and strong	24	68.6	68.6	100.0
Total	**35**	**100.0**	**100.0**	

Table 54. Other Structures Separated from the Houses

Other structure	Responses		Percent of Cases
	N	Percent	
Store	6	35.3%	40.0%
Pig pen	9	52.9%	60.0%
Storage/warehouse	1	5.9%	6.7%
Others	1	5.9%	6.7%
Total	**17**	**100.0%**	**113.3%**

9. Natural Hazards

There are two kinds of natural hazards that people living in villages around existing dumpsite experienced. Based on **Table 55** shows that 35 respondents (79.5%) have experienced the natural hazard related to drought, followed by 9 respondents (20.5%) have experienced the flood.

Table 55. Natural Hazard Experienced in the Village

	Responses		Percent of Cases
	No	Percent	
Flood	9	20.5%	25.7%
Drought	35	79.5%	100.0%
Total	**44**	**100.0%**	**125.7%**

Furthermore, regarding to flood hazard, it always floods residence and rice fields during the rainy season which lasts between 5 days to 10 days per year as shown in **Table 56**. About drought hazard, it always takes place at the beginning and middle of wet season between 2-4 months per year that

ruins the rice fields and makes a shortage of the water for animals and biodiversity as shown in **Table 57**.

Table 56. Frequency of Flood

Days	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
5	2	5.7	22.2	22.2
7	3	8.6	33.3	55.6
8	1	2.9	11.1	66.7
10	3	8.6	33.3	100.0
Total	**9**	**25.7**	**100.0**	

Table 57. Frequency of Drought

Months	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
2	19	54.3	54.3	54.3
3	15	42.9	42.9	97.1
4	1	2.9	2.9	100.0
Total	**35**	**100.0**	**100.0**	

10. Sources of Household Income

Based on **Table 58**, there are seven (7) types of income sources of households who are living around 1-km radius from the dumpsite which included 3 types of income sources such as head of household's salary, spouse's salary and seasonal employment are regarded as crucial incomes beside that, there are 2 more types such as other salary and others are regarded as supplementary important income while other 2 types such as business and remittances are regarded as tertiary important income.

For crucial incomes, there are 28 respondents got income from head of household's salary which included 25 respondents said that it is main primary income source and other 3 respondents said that it is second primary income source with average of 209 USD per month, 10 respondents got income from spouse's salary which included 100% of those respondents said that it is second primary income source with average of 104 USD per month and 9 respondents got income from seasonal employment which included 8 respondents said that it is main primary income source and only one respondent said that it is second primary income source with average of 1,317 USD per month.

Regarding to supplementary important income, 7 respondents got income from other salary which included 2 respondents said that it is main primary income source and 5 respondents said that it is second primary income source with average of 124 USD per month and 5 respondents got income from others which included 2 respondents said that it is main primary income source and 3 respondents said that it is second primary income source with average of 758 USD per month.

About tertiary important income, there is only one respondent got income from business which included one respondent said that it is main primary income source with average of 300 USD per month and another respondent got income from remittances which included one respondent said that it is second primary income source with average of 25 USD per month. Furthermore, there are

also 10 respondents mentioned that they earned from waste picking with average income of 38 USD per month.

Table 58. Income Sources

Income Sources	Frequency (Number)	Main primary income source	Second primary income source	Average monthly income (Riel)	Average monthly income (USD)
Head of household's salary (riel/month)	28	25	3	836,774	209
Spouse's salary (riel/month)	10		10	417,200	104
Other salary (riel/month)	7	2	5	495,000	124
Business (junk shop, store) (riel/month)	1	1		1,200,000	300
Remittances (riel/months)	1		1	100,000	25
Seasonal employment (riel/month)	9	8	1	9,227,500	1,317
Other (riel/month)	5	2	3	3,030,000	758
Earn from waste picking	***10***			***150,000***	***38***

11. Expenditure of Household

Table 59 presents the source and corresponding annual expense of the respondents. The sources of expense are food/drinks, clothes/shoes, education/books/equipment, healthcare, leisure, electricity, water consumption, telecommunication consumption, petrol for car or motorcycle, furniture, saving and community contribution/religious donation/charity. All respondents (100%) paid for food/drinks in average of 3,007.60 USD per year, all respondents (100%) paid for clothes/shoes in average of 78.31 USD per year, 24 respondents (69%) paid for education/books/equipment in average of 309.92 USD per year, all respondents (100%) paid for healthcare in average of 147.14 USD per year, 21 respondents (60%) paid for leisure in average of 297.62 USD per year, all respondents (100%) paid for electricity in average of 98 USD per year, 2 respondents (5.7%) paid for water consumption in average of 191 USD per year, all respondents (100%) paid for telecommunication consumption in average of 51.48 USD per year, 29 respondents (83%) paid for petrol for car or motorcycle in average of 492.75 USD per year, 3 respondents (8%) paid for furniture in average of 90.399 USD per year, 2 respondents (6%) paid for saving in average of 315 USD per year and only one respondent (3%) paid for community contribution/religious donation/charity in average of 30 USD per year .

Table 59. Types of Expenditure

Type of expense	Frequency (Number)	Annual average expense (Riel)	Annual average expense (USD)
The amount spent on food/drinks	35	12,030,400	3,007.60
The amount spent on clothes/shoes	35	313,240	78.31
The amount spent on education/books/equipment	24	1,239,680	309.92
The amount for healthcare	35	588,560	147.14
The amount for leisure	21	1,190,480	297.62
The amount for energy for electricity	35	393,120	98.28
The amount spent for water consumption	2	765,600	191.40
The amount spent for telecommunication consumption	35	205,920	51.48
The amount spent on petrol for motorcycle or car	29	1,971,000	492.75
The amount spent for furniture	3	30,133,320	7533.33
The amount for saving	2	1,260,000	315

Type of expense	Frequency (Number)	Annual average expense (Riel)	Annual average expense (USD)
The amount for community contribution/religious donation/charity	1	120,000	30

12. Decision Making

Decision making on children for schooling is different from household to household. Some households make decision by both father and mother and other households make decision by only father or only mother. **Table 60** shows that among 35 respondents, 19 respondents (54.3%), both father and mother are decision makers, 11 respondents (31.4%), their decision made by others and 4 respondents (11.4%), fathers are decision makers while one respondent (2.9%), only mother is a decision maker.

Table 60. Decision Making on Children for Schooling

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Father only	4	11.4	11.4	11.4
Mother only	1	2.9	2.9	14.3
Both father and mother	19	54.3	54.3	68.6
Others	11	31.4	31.4	100.0
Total	**35**	**100.0**	**100.0**	

Relates to decision on household expense management, **Table 61** illustrates that 17 respondents (48.6%) give their wives the money to be managed for households' expenses and other 15 respondents (42.9%), both husbands and wives share their income and expenses while 2 respondents mentioned that others (children give money and mothers manage money for households' expenses), and only one respondent said that husband collects income from wife and other members for households' expenses.

Table 61. Decision Making on Household Expenses

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Both husband and wife share their income together for household expense	15	42.9	42.9	42.9
Husband collects income from wife and other members for household expense	1	2.9	2.9	45.7
Husband gives his income to wife and wife manages fund for household expenses	17	48.6	48.6	94.3
Others	2	5.7	5.7	100.0
Total	**35**	**100.0**	**100.0**	

13. Health Morbidity

Based on **Table 62** indicates that among 35 respondents, 31 respondents have experienced communication disease which included Flu (16 respondents), Typhoid fever (6 respondents), Diarrhea (5 respondents) and Pneumonia (4 respondents). Regarding to Non-communicable disease, **Table 63** also shows that 21 respondents have experienced hypertension (10 respondents), kidney stone and general disease (Others) (4 respondents), Diabetes (3 respondents) and heart problem (2 respondents) and none (2 respondents).

Table 62. Communicable Disease

	Responses		Percent of Cases
	No	Percent	
Diarrhea	5	16.1%	21.7%
Flu	16	51.6%	69.6%
Typhoid fever	6	19.4%	26.1%
Pneumonia	4	12.9%	17.4%
Total	**31**	**100.0%**	**134.8%**

Table 63. Non-Communicable Disease

	Responses		Percent of Cases
	No	Percent	
Heart problems	2	9.5%	11.8%
Hypertension	10	47.6%	58.8%
Diabetes	3	14.3%	17.6%
None	2	9.5%	11.8%
Others (Kidney stone, General diseases)	4	19.0%	23.5%
Total	**21**	**100.0%**	**123.5%**

14. Dead Morbidity

Table 64 presents morbidity causing the death. The led death morbidity is traffic accident with 23.5%, followed by old age and thunderstruck with 22.9% beside heart problem and hypertension are also the main death morbidities with 14.3% and 15.2 % respectively. Among that death morbidity, the diabetes is also morbidity for the death with 12.4 %. As dengue, typhoid, and cancer morbidities are lower percentage for the death.

Table 64. Cause of Death Morbidity

	Responses		Percent of Cases
	N	Percent	
Dengue	3	2.9%	8.6%
Typhoid fever	1	1.0%	2.9%
Traffic accident	25	23.8%	71.4%
Cancer	8	7.6%	22.9%
Heart problem	15	14.3%	42.9%
Hypertension	16	15.2%	45.7%
Diabetes	13	12.4%	37.1%
Others	24	22.9%	68.6%
Total	**105**	**100.0%**	**300.0%**

15. Access to Health Center

Table 65 shows that among 35 respondents, 20 respondents (57.1%), have problem with health, they always went to see the doctor at referral hospital, followed by 9 respondents (25.7%) went to see the doctor at private hospital/clinic while 5 respondents (14.3%) said that they went to see the

doctor at public hospital and only one respondent just went to buy medicine from pharmacy (other). Furthermore, **Table 66** indicates that, 100 % of respondents consult with doctors when they are sick.

Table 65. Available Health Care Facilities

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Referral hospital	20	57.1	57.1	57.1
Public hospital	5	14.3	14.3	71.4
Private hospital	9	25.7	25.7	97.1
Others	1	2.9	2.9	100.0
Total	**35**	**100.0**	**100.0**	

Table 66. Availability of Doctor/Health Care Worker

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Daily	35	100.0	100.0	100.0

Table 67 indicates available services related to health facilities such as vaccination (28.6%), maternity/lying-in (25.7%), pre-natal care (20%), free medicine (17.1%) and family planning service (8.6%).

Table 67. Provided Health Facilities Service

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Pre-natal care	7	20.0	20.0	20.0
Maternity/lying-in	9	25.7	25.7	45.7
Vaccination	10	28.6	28.6	74.3
Free medicine	6	17.1	17.1	91.4
Family planning service	3	8.6	8.6	100.0
Total	**35**	**100.0**	**100.0**	

16. Access to Utilities

The wells are the main sources for households' drinking water for those living within 1-km radius from the dumpsite. Generally, the well's water gets boiled before drinking. Based on **Table 68**, among 35 respondents, 29 respondents (82.9%), use water from the deep wells and 5 respondents (14.3%) use water from shallow wells while only one respondent (2.9%) buys water from vendor. Moreover, the well's water is not only used for drinking but also for the consumption. **Table 69** indicates that among 35 respondents, 30 respondents (85.7%), consume water from the deep wells while 5 respondents (14.3%), consume water from the shallow wells.

Table 68. Source of Drinking Water

	Frequency	Percent	Valid Percent	Cumulative Percent
Deep wells	29	82.9	82.9	82.9
Shallow wells	5	14.3	14.3	97.1
Buying from water vendors	1	2.9	2.9	100.0
Total	**35**	**100.0**	**100.0**	

Table 69. Source of Water for Household's Use

	Frequency	Percent	Valid Percent	Cumulative Percent
Deep wells	30	85.7	85.7	85.7
Shallow wells	5	14.3	14.3	100.0
Total	**35**	**100.0**	**100.0**	

Regarding water use, most households use water from wells. Generally, some households boil water from wells before drinking and other households, maybe directly drink water (raw water) from the wells. Based on **Table 70** illustrates that among 35 respondents, only 3 respondents (8.6%) got illness related to kidney stone caused by unclean drinking water while more than 90% of respondents have no problem with unclean drinking water.

Table 70. Illness Caused by Unclean Drinking Water

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	3	8.6	8.6	8.6
No	32	91.4	91.4	100.0
Total	**35**	**100.0**	**100.0**	

Natural hazard always take place in both dry and rainy seasons. Generally, it seriously affects households living condition in that area especially water supply. Based on **Table 71**, among 35 respondents, 11 respondents (31.4%) faced problem with water supply caused by natural hazard while 24 respondents (68.6%) have no problem on this case. In addition, **Table 72** indicates that natural hazard affected poor water quality (25.7%) and water supply interruption (5.7%).

Table 71. Water Supply Affected by Natural Hazard

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	11	31.4	31.4	31.4
No	24	68.6	68.6	100.0
Total	**35**	**100.0**	**100.0**	

Table 72. Specified Affected Water Supply

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Water supply interruption	2	5.7	18.2	18.2
Poor water quality	9	25.7	81.8	100.0
Total	**11**	**31.4**	**100.0**	

17. Sources of Electricity

All households living in the area have access to electricity provided by Electricity of Cambodia (EDC). In term of connection, 74.3% households own electric meter for power connection which means that they are directly connected to EDC while the rest of the households (25.7%) have shared connection from neighbors, relatives or parents.

Table 73 below presents the sources of electricity.

Table 73. Source of Electricity

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Own electric meters for power connection	26	74.3	74.3	74.3
Shared connection	9	25.7	25.7	100.0
Total	**35**	**100.0**	**100.0**	

18. Sanitation

With regards to the sanitation of households living within 1-km radius of existing dumpsite, **Table 74** shows that 31 out of 35 respondents (88.6%) own water sealed toilet while 4 respondents (11.4%) use relative's toilet such as children's toilet, parents' toilet and sister's toilet.

Table 74. Sanitation

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Own water sealed toilet	31	88.6	88.6	88.6
Others	4	11.4	11.4	100.0
Total	**35**	**100.0**	**100.0**	

19. Cooking

For cooking, majority of the respondents use gas (51.4%), firewood (34.3%), charcoal (11.4%) and electricity (2.9%), respectively as shown in **Table 75** below.

Table 75. Cooking

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Gas	18	51.4	51.4	51.4
Charcoal	4	11.4	11.4	62.9
Fire wood	12	34.3	34.3	97.1
Electricity	1	2.9	2.9	100.0
Total	**35**	**100.0**	**100.0**	

20. Solid Waste Disposal

In terms of household disposal of solid waste, 80% of the respondents were found to practice burning of solid waste while 20% of them are still throwing away or burying at the free (open) space of land plot (others) as shown in **Table 76** below.

Table 76. Solid Waste Disposal

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Burning	28	80.0	80.0	80.0
Others	7	20.0	20.0	100.0
Total	**35**	**100.0**	**100.0**	


21. Project Awareness and Perception

All respondents said that they do not know or have heard about the sanitary land fill from the local authorities or any source in the area as shown in **Table 77** below. Furthermore, only the existing dumpsite is known to them and that they have no knowledge as to where the sanitary landfill will be located by the project.

Table 77. Hearing about Sanitary Landfill Proposal

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
No	35	100.0	100.0	100.0

Although all respondents said they do not know about the project's proposed landfill (**Table 77**), they understand the benefit or positive impact that could be derived from this project. Based on **Table 78**, majority of respondents were clear about the improvement of proper waste management facility will take place. Only one respondent indicated that this will create employment/business opportunity; while 8.6% did not indicate any benefit; 5.7% said that it will improve hygiene and health; and still 10 of them said that they do not know.

Table 78. Benefit or Positive Impact

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Employment/business opportunities	1	2.9	2.9	2.9
Improvement of proper waste management facility	19	54.3	54.3	57.1
None	3	8.6	8.6	65.7
Don't know	10	28.6	28.6	94.3
Others	2	5.7	5.7	100.0
Total	**35**	**100.0**	**100.0**	

The perception on the overall concern or negative impacts on the proposed landfill are enumerated **i**n **Table 79** below**.** Almost a third (31.4%) of respondents were concerned that their houses will be negatively affected by the proposed landfill; 17.1% said that there will be negative consequences for their livelihood; 11.4% perceived that the negative impact will be properly mitigated by the project while only 2.9% believed that their business will be negatively affected.

Table 79. Overall Concern or Negative Impact

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
My livelihood will be affected	6	17.1	17.1	17.1
My business will be negatively affected	1	2.9	2.9	20.0
My house will be negatively affected	11	31.4	31.4	51.4
Possible adjustment caused by the project	4	11.4	11.4	62.9
Others	13	37.1	37.1	100.0
Total	**35**	**100.0**	**100.0**	

In line with the issues and concerns on the dumpsite, almost half (45.7%) of the respondents recommended that the project has to address the foul odor from the dumpsite *(reducing the smell)* and properly manage to avoid affecting the health of people living around there*;* 17.1 % were for the closure of the dumpsite and mentioned that the existing dumpsite being managed by private companies should be closed due to its negative health impact and water pollution, and to find a

better place for the new dumpsite (new landfill) which is far from the residential areas. There were, however, 37.1% who still have no idea on this case (See **Table 80** below).

Table 80. Recommendation for Issue and Concern

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Closure	6	17.1	17.1	17.1
Reducing the smell	16	45.7	45.7	62.9
No idea	13	37.1	37.1	100.0
Total	**35**	**100.0**	**100.0**	

The following sections present the preliminary result of the survey with junkshop owners.

1. Sample Distribution of the Respondents

The data were obtained from eleven (11) interviewed junkshop owners from the different villages inside Puok district and Siem Reap city of Siem Reap province. The interview was conducted from the list of the junkshop owners that were provided by Provincial Department of Environment. Based on **Table 81**, there are 3 females (27%) out of 11 junkshop owners from 6 communes/sangkats.

Table 81. Sample Distribution of Respondents per Commune/Sangkat by Sex

Commune/sangkat	Sex		Total
	Male	Female	
1. Chreay	1	0	1
2. Damdaek	1	0	1
3. Kok Chork	2	1	3
4. Sala Kamreuk	0	1	1
5. Slor Kram	2	1	3
6. Trapeang Thom	2	0	2
Total	**8**	**3**	**11**

2. Profile of Respondents

Table 1 presents that the total 11 respondents are the junkshop owners including 8 males (73%) and 3 females (27%). The ages of the sample respondents are divided into two age groups, 30-50 years of age with 6 respondents (54.5%) and 51-80 years of age with 5 respondents (45.5%) as shown in **Table 82**. The marital status of respondents is married (100%) as shown in **Table 83**. 100% of respondents are Khmer with Buddhism belief as shown **Table 84** and **Table 85**. Regarding to place of origin, 64% come from Siem Reap province while 36 % come from other places such as Phnom Penh, Battambang, Kampong Cham and Kampong Thom with length of residency of over 10 years (10 respondents) and 4-6 years (one respondent) as shown **Table 86** and **Table 87**.

Table 82. Age of Respondents by Commune/Sangkat

Age	Commune/sangkat						Total
	Chreav	Damdaek	Kork Chork	Sala Kamreuk	Slor Kram	Trapeang Thom	
37	0	0	0	0	0	1	1
40	0	1	0	0	0	0	1
43	0	0	1	0	0	0	1
45	0	0	0	1	0	0	1
48	0	0	0	0	1	0	1
50	0	0	1	0	0	0	1
56	1	0	0	0	0	0	1
58	0	0	0	0	0	1	1
60	0	0	r1	0	0	0	1
66	0	0	0	0	1	0	1
71	0	0	0	0	1	0	1
Total	**1**	**1**	**3**	**1**	**3**	**2**	11

Table 83. Marital Status of Respondent by Commune/Sangkat

Commune/sangkat	Marital Status
	Married
Chreay	1
Damdaek	1
Kork Chork	3
Sala Kamreuk	1
Slor Kram	3
Trapeang Thom	2
Total	**11**

Table 84. Ethnicity of Respondent by Commune/Sangkat

Commune/sangkat	Ethnicity
	Khmer
Chreay	1
Damdaek	1
Kork Chork	3
Sala Kamreuk	1
Slor Kram	3
Trapeang Thom	2
Total	**11**

Table 85. Religion of Respondent by Village

Commune/sangkat	Ethnicity
	Buddhism
Chreay	1
Damdaek	1
Kork Chork	3
Sala Kamreuk	1
Slor Kram	3
Trapeang Thom	2
Total	**11**

Table 86. Place of Origin of the Respondents

Commune/sangkat	Place of origin		Total
	Within Siem Reap	Others	
Chreay	1	0	1
Damdaek	1	0	1
Kork Chork	0	3	3
Sala Kamreuk	1	0	1
Slor Kram	3	0	3
Trapeang Thom	1	1	2
Total	**7**	**4**	**11**

Table 87. Length of Residency

Commune/sangkat	Length of residency		Total
	4 to 6 years	Over 10 years	
1. Chreay	0	1	1
2. Damdaek	0	1	1
3. Kork Chork	0	3	3
4. Sala Kamreuk	0	1	1
5. Slor Kram	0	3	3
6. Trapeang Thom	1	1	2
Total	**8**	**10**	**11**

3. Current Residence Reason

The junkshop owners who come to do business in Siem Reap province pertained to economic reasons only about social reason was not reflected. Regarding to economic reason, in **Table 88** shows that 100% of junkshop owners associated to the proximity to livelihood while none of respondents said that it is related to social reason.

Table 88. Economic Reason

	Frequency	Percent	Valid Percent	Cumulative Percent
Proximity to livelihood	11	100.0	100.0	100.0

4. Social Safety Nets

Actually, Junk shop owners who are doing business on solid waste have better living condition if compared to other residences around dumpsite or waste pickers, so they are rare to get any support from government through social safety nets program. Based on **Table 89**, 100 % of respondents did not get from government support.

Table 89. Social Safety Nets

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
None	11	100.0	100.0	100.0

5. Type of Business

There are many types of shops related to solid waste such as recycling center, junkshop, dismantling shop, waste collectors/consolidators, food kiosk and others. But based on **Table 90**, there are only two type of business operation for solid waste in Siem Reap in which included junkshop (72.7%) and waste collector/consolidator (27.3%).

Table 90. Type of Business

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Junkshop	8	72.7	72.7	72.7
Waste collector/consolidators	3	27.3	27.3	100.0
Total	**11**	**100.0**	**100.0**	

6. Employee

There are two types of employees who are full-time and part time employed by business owners. Based on **Table 91**, among 11 junkshop owners, 8 of them have full-time employees ranging from 1-3 employees. There are 7 business owners also employed part-time employees for running their business as shown in **Table 92**.

Table 91. Full-Time Employees

No. of Employee	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
1	2	18.2	25.0	25.0
2	2	18.2	25.0	50.0
3	4	36.4	50.0	100.0
Total	**8**	**72.7**	**100.0**	

Table 92. Part-Time Employees

No. of Employee	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
1	1	9.1	14.3	14.3
2	4	36.4	57.1	71.4
3	2	18.2	28.6	100.0
Total	**7**	**63.6**	**100.0**	

7. Typical Salary

Table 93 presents typical salary for full time employees. There are 8 employees received monthly salary from business owners with total amount ranging from 110 USD - 175 USD. In the contrary, for part time employees, **Table 94** shows that there is only one employee received weekly payment with total amount of 45 USD while 6 employees received daily payment with total amount ranging 6.25 USD -7.5 USD.

Table 93. Typical Salary for Full-Time Employees

USD	Typical salary for full-time employees
	Monthly
110	1
120	1
125	1
130	1
150	2
160	1
175	1
Total	**8**

Table 94. Typical Salary for Part-Time Employees

USD	Typical salary for full-time employees		Total
	Daily	Weekly	
45	0	1	1
6.25	1	0	1
6.5	1	0	1

USD	Typical salary for full-time employees		Total
	Daily	Weekly	
6.75	1	0	1
7.5	3	0	3
Total	**6**	**1**	**7**

8. Schedule of Operation

Based on **Table 95** shows that the business operation of all shops is daily. Among 11 junkshops, 5 junkshops operate business in term of getting purchased waste from 7:00 am to 5:30 pm, followed by 3 junkshops operate business from 7:00 am to 5:00 pm and 2 junkshops operate business from 7:00 am to 5:00 pm except only one junkshop operates business from 7:00 am to 6:00 pm.

Table 95. Daily Operation

Hour	Frequency	Percent	Valid Percent	Cumulative Percent
7:00 am – 5:00 pm	3	27.3	27.3	27.3
7:00 am – 5:30 pm	5	45.5	45.5	72.7
7:00 am – 6:00 pm	1	9.1	9.1	81.8
7:30 am – 5:00 pm	2	18.2	18.2	100.0
Total	**11**	**100.0**	**100.0**	

9. Estimated Income

Income earned of each junkshop is based on scope of business operation. If junkshop is big and more capital investment, the income will be high. On the contrary, if junkshop is small and less capital investment, the income will be low accordingly. **Table 96** indicates that among 11 junkshops, 3 junkshops can earn income from waste business operation around 1,500 USD per month while other 5 junkshops can earn income from business operation ranging between 300 USD to 1,300 USD per month.

Table 96. Estimated Income

Income (USD)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
300	1	9.1	9.1	9.1
350	1	9.1	9.1	18.2
400	1	9.1	9.1	27.3
500	1	9.1	9.1	36.4
900	1	9.1	9.1	45.5
1000	1	9.1	9.1	54.5
1200	1	9.1	9.1	63.6
1300	1	9.1	9.1	72.7
1500	3	27.3	27.3	100.0
Total	**11**	**100.0**	**100.0**	

10. Year of Business Operation

Most junkshop owners have residence in Siem Reap except few junkshops only who migrated from various provinces which included Phnom Penh, Battambang, Kampong Cham and Kampong Thom. Generally, they have lived there for over 10 years while some junkshops have just lived for 4-6 years. Regarding to year of business operation, **Table 97** indicates that the long-term junkshop has started

their business operation since 1989 (around 32 years ago) and new junkshop just started their business in 2020 (around 1 year ago) while the rest has started business operation between 2000 to 2017 (21 years to 4 years).

Table 97. Year of Business Operation

Year	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
1989	1	9.1	9.1	9.1
2000	1	9.1	9.1	18.2
2003	1	9.1	9.1	27.3
2010	1	9.1	9.1	36.4
2012	1	9.1	9.1	45.5
2015	1	9.1	9.1	54.5
2016	2	18.2	18.2	72.7
2017	2	18.2	18.2	90.9
2020	1	9.1	27.3	100.0
Total	**11**	**100.0**	**100.0**	

11. Type, Volume and Price for Waste

All the junkshops in Siem Reap are purchasing all the waste from small junkshops around dumpsite and also from middleman. Based on **Table 98**, 6 types of waste were collected and purchased by business owners. Generally, scopes of buying waste and price of each junk shop in province are different. There are 11 business owners purchased Aluminum with minimum weight of around 6 kg per shift/day and maximum weight of around 500kg per shift/day with minimum price is 1.05 USD per kg and maximum price 1.5 USD per kg. There are 11 business owners purchased plastic with minimum weight of around 20 kg per shift/day and maximum weight of around 500kg per shift/day with minimum price is 0.11 USD per kg and maximum price 1.5 USD per kg. There are 11 business owners purchased metal with minimum weight of around 10 kg per shift/day and maximum weight of around 700kg per shift/day with minimum price is 0.16 USD per kg and maximum price 0.3 USD per kg. There are 11 business owners purchased paper cardboard with minimum weight of around 30 kg per shift/day and maximum weight of around 500kg per shift/day with minimum price is 0.08 USD per kg and maximum price 0.16 USD per kg. There are 5 business owners purchased electronic waste with minimum weight of around 50 kg per shift/day and maximum weight of around 200kg per shift/day with minimum price is 5.08 USD per kg and maximum price 5.13 USD per kg. There are 8 business owners purchased glass with minimum weight of around 250 kg per shift/day and maximum weight of around 650kg per shift/day with minimum price is 0.03 USD per kg and maximum price 0.05 USD per kg.

Table 98. Type, Volume and Price of Waste

Type of Waste	Frequency (Number)	Kg per shift/day		Price sold per Kg (USD)	
		Min	Max	Min	Max
Aluminum	11	6	500	1.05	1.50
Plastic	11	20	500	0.11	1.50
Metal	11	10	700	0.16	0.30
Paper cardboard	11	30	500	0.08	0.16
Electronic waste	5	50	200	5.08	5.13
Glass	8	250	650	0.03	0.05

12. Access Credit from Various Source

As shown in **Table 99**, among 11 junkshop owners interviewed, 5 junkshop owners (45.5%) had borrowed money in the past year from various sources to extend their business while other 6 junkshop owners (54.5%) said that they did not borrow money from any source.

Table 99. Access Credit in the Past Year

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	5	45.5	45.5	45.5
No	6	54.5	54.5	100.0
Total	**11**	**100.0**	**100.0**	

Moreover, **Table 100** indicates that among the 5 respondents who borrowed money from the various sources, 3 junkshop owners (60%) availed loan from private banks which included ACLEDA and ABA banks while 2 junkshop owners (40%) availed loan from MFI and others such as LOLC micro-finance.

Table 100. Sources of Loan

	Responses		Percent of Cases
	No	Percent	
Loan from bank	3	60.0%	60.0%
Loan from MFI	1	20.0%	20.0%
Loan from others	1	20.0%	20.0%
Total	**5**	**100.0%**	**100.0%**

Related to amount loaned, **Table 101** shows that 2 junkshop owners have been loaned in the total amount of 10,000 USD, followed by 2 junkshop owners have been loaned between 50,000 USD to 54,000 USD respectively while only one junkshop owner has been loaned around 1,000 USD. About interest payment, **Table 102** indicates that 2 junkshop owners paid interest around 150 USD per month and other 2 junkshop owners paid interest between 1,200 to 1,300 USD.

Table 101. Amount Loaned

Amount (USD)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
1,000	1	9.1	20.0	20.0
10,000	2	18.2	40.0	60.0
50,000	1	9.1	20.0	80.0
54,000	1	9.1	20.0	100.0
Total	**5**	**45.5**	**100.0**	

Table 102. Payment for Interest Rate

Amount (USD)	Frequency	Percent	Valid Percent	Cumulative Percent
30	1	9.1	20.0	20.0
150	2	18.2	40.0	60.0
1,200	1	9.1	20.0	80.0
1,300	1	9.1	20.0	100.0
Total	**5**	**45.5**	**100.0**	

Concerning to purposes of loan, Table 103 shows that 5 junkshop owners who borrowed money from private banks and MFI are for business extension's capital and regarding to term of loan, **Table 104** also indicates that 2 junkshop owners were provided loan for the period of 120 months and other 2 junkshop owners are around 48 months while only one junkshop owner is about 6 months.

Table 103. Purpose of Loan

	Responses		Percent of Cases
	No	Percent	
Capital for business	5	100.0%	60.0%

Table 104. Term of Loan

Month	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
6	1	9.1	20.0	20.0
48	2	18.2	40.0	60.0
120	2	18.2	20.0	100.0
Total	**5**	**45.5**	**100.0**	

13. Closure of Dumpsite

Generally, the big junkshops or waste consolidators that are located in the town center of Siem Reap province always purchase the collected waste from small junkshops around dumpsite or middleman to export to Thailand or Vietnam. Continuously, the small junkshops or middleman directly get waste from waste pickers at dumpsite or homes inside the village to sell to big junkshops or waste consolidators. **Table 105** indicates the feeling of junkshop owners at Siem Reap in case the dumpsite was closed. There are 5 junkshop owners mentioned that if the dumpsite was closed, they have no matter on solid waste buying because currently they have never bought from waste pickers at dumpsite and 3 junkshop owners said that in case of dumpsite closure, they will buy waste from home inside the villages instead while other 3 junkshop owners also said that it will not be affected because they have bought waste from only middleman.

Table 105. Closure of Dumpsite

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Buy from home inside the village instead	3	27.3	27.3	27.3
Never bought wastes from waste picker	5	45.5	45.5	72.7
Not affected, buy from other middleman	3	27.3	27.3	100.0
Total	**11**	**100.0**	**100.0**	

The following sections present the preliminary result of the survey with households living in Kandaek Commune.

1. Sample Distribution of the Respondents

The data were obtained from twenty (20) interviewed residence of alternative proposed sanitary landfill (Landfill site option at the proposed WWTP) in Trapeang Tim Village, Kandaek commune, Prasat Bakong district, Siem Reap province. The sample respondents were randomly selected from among the villagers who are living around the mentioned site and the contact numbers of those residences that were provided by village chiefs. Based on **Table 106**, there were 2 females (10%) out of the 20 respondents.

Table 106. Sample Distribution of Respondents per Village by Sex

		Village
		Trapeang Tim
Sex	Male	18
	Female	2
Total		**20**

2. Profile of Respondents

Table 106 presents the total 20 respondents including 2 females (10%) and 18 males (90%). The ages of the sample respondents are divided into two age groups, 24-50 years of age with 11 respondents (60%) and 8 respondents (40%) are between 51-70 years of age as shown in **Table 107**. The marital status of respondents is married (95%) and divorced (5%) as shown in **Table 108**. All of the respondents (100%) is Khmer with Buddhism belief as shown in **Table 109** and **Table 110**. Regarding to place of origin, they are all (100%) from Siem Reap province as shown in **Table 111** and length of residency with over 10 years is 95%, and 7-10 years is 5% as shown in **Table 112**.

Table 107. Ages of Respondents by Village

Age	Village
	Trapeang Tim
24	1
32	1
38	1
40	2
41	1
42	2
46	1
47	1
48	1
50	1
55	3
58	1
63	1
66	1
70	2

Age	Village
	Trapeang Tim
Total	20

Table 108. Marital Status of Respondents by Village

	Village
	Trapeang Tim
Married	19
Widow/er	1
Total	20

Table 109. Ethnicity of Respondent by Village

	Ethnicity
	Khmer
Trapeang Tim	20
Total	20

Table 110. Religion of Respondents by Village

	Religion
	Buddhism
Trapeang Tim	20
Total	20

Table 111. Places of Origin of the Respondents

	Village
	Trapeang Tim
Within Siem Reap	20
Total	20

Table 112. Length of Residency

	Village
	Trapeang Tim
7 to 10 years	1
Over 10 years	19
Total	20

3. Current Residence Reason

The households who have established the current residence in the villages where landfill site option is, pertained to economic reasons only while social reason was not reflected. Regarding to economic reason, **Table 113** shows that 100% of respondents associated to the proximity to livelihood.

Table 113. Economic Reason

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Proximity to livelihood	20	100.0	100.0	100.0

4. Social Safety Nets

The government has policy to provide social safety nets through various programs to identified vulnerable people such poor, poorest, elderly and disabled people in community. **Table 114** shows that 1 respondent (5%), getting support from government through ID Poor program while 19 respondents (95%) mentioned that they did not get any support from government for social safety nets.

Table 114. Social Safety Nets

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
ID Poor Transfer (Poor ID card holder)	1	5.0	5.0	5.0
None	19	95.0	95.0	100.0
Total	**20**	**100.0**	**100.0**	

5. Access Credit from Various Source

As shown in **Table 115**, among 20 respondents interviewed, 8 respondents (40%) had borrowed money in the past year from various sources to do business, support family for daily expense and others while other 12 respondents (60%) did not borrow money from any source.

Table 115. Access Credit in the Past Year

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	8	40.0	40.0	40.0
No	12	60.0	60.0	100.0
Total	**20**	**100.0**	**100.0**	

Moreover, **Table 116** indicates that among the 8 respondents who borrowed money from the various sources, 4 respondents (50%) availed loan from MFIs which included PRASAC and LOLC, followed by 2 respondents (25%) availed loan from private banks including ACLEDA and Hathakasekor while other 2 respondents (25%) availed loan from family and neighbor respectively.

Table 116. Sources of Loan

	Responses		Percent of Cases
	No	Percent	
Loan from family	1	12.5%	12.5%
Loan from friend or neighbor	1	12.5%	12.5%
Loan from banks	2	25.0%	25.0%
Loan from MFIs	4	50.0%	50.0%
Total	**8**	**100.0%**	**100.0%**

Related to amount loaned, **Table 117** shows that one respondent has been loaned in the total amount of 50,000 USD, followed by one respondent has been loaned 12,000 USD while 6 respondents have been loaned between 250 USD to 4,000 USD. About interest payment, **Table 118** indicates that 2 respondents paid interest between 180 USD to 290 USD per month, followed by 6 respondents paid interest between 5 USD to 75 USD per month.

Table 117. Amount Loaned

Amount (USD)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
250	1	5.0	12.5	12.5
1,000	1	5.0	12.5	25.0
1,700	1	5.0	12.5	37.5
2,000	1	5.0	12.5	50.0
3,500	1	5.0	12.5	62.5
4,000	1	5.0	12.5	75.0
12,000	1	5.0	12.5	87.5
50,000	1	5.0	12.5	100.0
Total	**8**	**40.0**	**100.0**	

Table 118. Payment for Interest Rate

Amount (USD)	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
5	1	5.0	12.5	12.5
25	1	5.0	12.5	25.0
26	1	5.0	12.5	37.5
53	1	5.0	12.5	50.0
60	1	5.0	12.5	62.5
75	1	5.0	12.5	75.0
180	1	5.0	12.5	87.5
290	1	5.0	12.5	100.0
Total	**8**	**40.0**	**100.0**	

Concerning to purposes of loan, **Table 119** shows that 8 respondents who borrowed money from private bank and MFI are for business extension's capital and supporting daily living expense. Regarding to term of loan, **Table 120** also indicates that 3 respondents were loaned for the period of 60 months, 3 respondents are between 30 months to 48 months while other 2 respondents are between 4 months to 6 months.

Table 119. Purposes of Loan

	Responses		Percent of Cases
	No	Percent	
Daily living expense	1	12.5%	12.5%
Capital for business	1	12.5%	12.5%
Others	6	75.0%	75.0%
Total	**8**	**100.0%**	**100.0%**

Table 120. Term of Loan

Month	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
4	1	5.0	12.5	12.5
6	1	5.0	12.5	25.0
30	1	5.0	12.5	37.5
36	1	5.0	12.5	50.0
48	1	5.0	12.5	62.5
60	3	15.0	37.5	100.0

Month	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Total	8	40.0	100.0	

6. Land and Residence Ownership

Table 121 shows the reported landholding for residing of the sample respondents. 19 respondents (95%) own the land where they are residing while only one respondent does not own the land. The majority of the legal documents for land possessing is land title as shown in **Table 122**.

Table 121. Land Ownership

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	19	95.0	95.0	95.0
No	1	5.0	5.0	100.0
Total	20	100.0	100.0	

Table 122. Possessing Legal Document

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Land title	20	100	100.0	100.0

7. Current House/Structure Use

Table 123 shows that 100% of respondents living around landfill site option, use their current houses in the purpose for only residing. Regarding to ownership, 100% of respondents own their properties as shown in **Table 124**. In addition, 20 respondents (100%) are owners as shown in **Table 125**.

Table 123. Purpose of House/Structure Use

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Residential	20	100.0	100.0	100.0

Table 124. House/Structure Ownership

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	20	100.0	100.0	100.0

Table 125. Type of Ownership

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Only owner	20	100.0	100.0	100.0

8. Type of House/Dwelling

Table 126 indicates that 50% of the respondents around the landfill site option are living in the permanent houses, followed by 45% of respondents living in semi-permanent houses while only one respondent living in temporary/movable house. About size of house, **Table 127** reflects that among 20 respondents, 9 respondents (45%) are living in the houses with sizes of 32-49 sqm, followed by 6 respondents (30%) are living in houses with sizes of 50 – 49 sqm and above and 4 respondents (20%) are living in houses with sizes of 17 – 30 sqm while one respondent is living in house with size of l16 sqm and below.

Table 126. Type of House/Dwelling Unit

	Frequency (Nmuber)	Percent	Valid Percent	Cumulative Percent
Temporary/moveable	1	5.0	5.0	5.0
Semi-permanent	9	45.0	45.0	50.0
Permanent	10	50.0	50.0	100.0
Total	**20**	**100.0**	**100.0**	

Table 127. Sizes of House/Dwelling Unit

	Frequency (Nmuber)	Percent	Valid Percent	Cumulative Percent
16 sqm and below	1	5.0	5.0	5.0
17 to 30 sqm	4	20.0	20.0	25.0
32-49 sqm	9	45.0	45.0	70.0
50 sqm and above	6	30.0	30.0	100.0
Total	20	100.0	100.0	

Furthermore, **Table 128** indicated that 13 respondents (65%) have houses made from mix of light and strong materials, followed by 7 respondents (35%) had houses made from light material and strong material, respectively. On separate structure from the houses, 8 out of 20 respondents mentioned that they built stores and pig pens as shown in **Table 129**.

Table 128. Housing Materials

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Light materials	3	15.0	15.0	15.0
Strong materials	4	20.0	20.0	35.0
Mix of light and strong	13	65.0	65.0	100.0
Total	**20**	**100.0**	**100.0**	

Table 129.Other Structures Separated from the Houses

Other structure	Responses		Percent of Cases
	No	Percent	
Store	4	50.0%	57.1%
Pig pen	4	50.0%	57.1%
Total	8	100.0%	114.3%

9. Natural Hazard

Only one kind of natural hazard was experienced by the people living in villages around the landfill site option. **Table 130** shows that 100% of respondents have experienced natural hazard related to flood.

Table 130. Natural Hazard Experienced in the Villages

	Responses		Percent of Cases
	No	Percent	
Flood	20	100.0%	100.0%
Total	**20**	**100.0%**	**100.0%**

Furthermore, regarding to flood hazard, it always floods residence and rice fields during the wet season which lasts between 2 days to 14 days per year as shown in **Table 131**. 8 respondents (40%) experienced flood within 14 days, followed by 7 respondents (35%) are within 2 days and 2 respondents (10%) are within 5 days while the rest experienced from 3-7 days.

Table 131. Frequency of Flood

Day	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
14	8	40.0	40.0	40.0
2	7	35.0	35.0	75.0
3	1	5.0	5.0	80.0
4	1	5.0	5.0	85.0
5	2	10.0	10.0	95.0
7	1	5.0	5.0	100.0
Total	**20**	**100.0**	**100.0**	

10. Source of Household Income

Based on **Table 132**, there are six types of income sources of households who are living around landfill site option including head of household's salary is regarded as crucial incomes, then spouse's salary is also regarded as supplementary important income while others, transferred income, other members' salary and seasonal employment are regarded as tertiary important income.

For crucial incomes, there are 15 respondents got income from head of household's salary which included 14 respondents said that it is main primary income source and one respondent said that it is second primary income source with average of 260 USD per month.

Regarding to supplementary important income, 6 respondents got income from Spouse's salary which included 100% of respondents said that it is main primary income source with average of 180 USD per month.

About tertiary important income, there are 9 respondent got income from other members' salary, Seasonal employment, transferred income and others which included 6 respondents said that it is main primary income source and 3 respondents said that it is secondary income source with average of 150 USD per month, 182 USD per month, 925 USD per month and 392 USD per month.

Table 132. Income Sources

Income Sources	Frequency (Number)	Main primary income source	Secondary income source	Average monthly income	
				Riel	USD
Head of household's salary (Riel per month)	15	14	1	1,040,000	260
Other salary's member (Riel per month)	2	2		600,000	150
Seasonal employment (Riel per month)	2	1	1	728,000	182
Spouse's salary (Riel per month)	6	6		720,000	180
Transfer income (Riel per month)	2	2		3,700,000	925
Other (Riel per month)	3	1	2	1,568,000	392

11. Expenditure of Household

Table 133 presents the source and corresponding annual expense of the respondents. The sources of expense are food/drinks, clothes/shoes, education/books/equipment, healthcare, leisure, electricity, water consumption, telecommunication consumption, petrol for car or motorcycle, furniture and saving. All respondents (100%) paid for cloth/shoe in average of 140 USD per year, all respondents (100%) paid for telecommunication consumption in average of 85 USD per year, 11 respondents (55%) paid for education/books/equipment in average of 508 USD per year, all respondents (100%) paid for energy for electricity in average of 224 USD per year, 2 respondents (10%) paid for furniture in average of 6,750 USD per year, 18 respondents (90%) paid for healthcare in average of 124 USD per year, all respondents (100%) paid for leisure in average of 188 USD per year,19 respondents (95%) paid for petrol for motorcycle or car in average of 762 USD per year, one respondents (5%) paid for saving in average of 1,200 USD per year and all respondents (100%) paid for food/drink in average of 1,935 USD per year,

Table 133. Types of Expenditure

Type of expense	Frequency (Number)	Annual average expense	
		(Riel)	(USD)
The amount spent for clothes/shoes	**20**	560,000	140
The amount spent for telecommunication consumption	**20**	340,000	85
The amount spent on education/book/equipment	11	2,032,000	508
The amount for energy for electricity	**20**	896,000	224
The amount spent for furniture	2	27,000,000	6,750
The amount for healthcare	18	496,000	124
The amount for leisure	**20**	752,000	188
The amount spent on petrol for motorcycle or car	19	3,048,000	762
The amount for saving	1	4,800,000	1,200
The amount spent on food/drink	**20**	256,000	1935

12. Decision Making

Regarding to children for schooling, some households make decision by both father and mother and other households make decision by only father or only mother. **Table 134** shows that among 20 respondents, 15 respondents (75%), both father and mother make decision while 5 respondents (25%), only father makes decision.

Table 134. Decision Making on Children for Schooling

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Father only	5	25	25	25
Both father and mother	15	75	75	100
Total	**20**	**100**	**100**	

Relates to decision on household expense management, **Table 135** illustrates that 13 respondents (65%), both husbands and wives share their income and expenses while 7 respondents (35%), husband gives his income to wife and wife manages fund for household expenses.

Table 135. Decision Making on Household Expenses

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Both husband and wife pool their income together for household expense	13	65.0	65.0	65.0
Husband gives his income to wife and wife manages fund for household expenses	7	35.0	35.0	100.0
Total	**20**	**100.0**	**100.0**	

13. Health Morbidity

Related to communication disease, **Table 136** indicates that 15 respondents experienced flu, followed by 6 respondents experienced diarrhea and 4 respondents experienced typhoid fever while 3 respondents experienced pneumonia. Regarding to Non-communicable disease, **Table 137** also shows that 5 respondents experienced hypertension and one respondent experienced diabetes while another respondent said none.

Table 136. Communicable Disease

	Responses		Percent of Cases
	No	Percent	
Diarrhea	6	21.4%	30.0%
Flu	15	53.6%	75.0%
Typhoid fever	4	14.3%	20.0%
Pneumonia	3	10.7%	15.0%
Total	**28**	**100.0%**	**140.0%**

Table 137. Non-Communicable Disease

	Responses		Percent of Cases
	No	Percent	
Hypertension	5	71.40%	83.30%
Diabetes	1	14.30%	16.70%
None	1	14.30%	16.70%
Total	**7**	**100.00%**	**116.70%**

14. Dead Morbidity

Table 138 presents morbidity causing the death. The led death morbidity is traffic accident and others with 24.3% respectively, followed by diabetes with 14.9% and hypertension with 13.5% while heart problem and cancer are also the main death morbidities with 12.2% and 10.8 % respectively.

Table 138. Causes of Death Morbidity

	Responses		Percent of Cases
	No	Percent	
Traffic accident	18	24.30%	90.00%
Cancer	8	10.80%	40.00%

	Responses		Percent of Cases
	No	Percent	
Heart problem	9	12.20%	45.00%
Hypertension	10	13.50%	50.00%
Diabetes	11	14.90%	55.00%
Others	18	24.30%	90.00%
Total	**74**	**100.00%**	**370.00%**

15. Access to Health Center

Based on **Table 139** shows that among 20 respondents, 12 respondents (60%), have problem with health, they always went to see the doctor at referral hospital, followed by 8 respondents (40%) went to see the doctor at private hospital/clinic. Furthermore, **Table 140** indicates that, 100 % of respondents consult with doctors when they are sick.

Table 139. Available Health Care Facilities

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Referral hospital	12	60	60	60
Private hospital	8	40	40	100
Total	**20**	**100**	**100**	

Table 140. Availability of Doctor/Health Care Worker

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Daily	20	100.0	100.0	100.0

Table 141 indicates available services related to health facilities such as vaccination and maternity/lying-in (40%) respectively, free medicine (10%) and family planning service (10%).

Table 141. Provided Health Facilities Service

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Maternity/lying-in	8	40	40	40
Vaccination	8	40	40	80
Free medicine	2	10	10	90
Family planning service	2	10	10	100
Total	**20**	**100**	**100**	

16. Access to Utilities

The wells are the main sources for households' drinking water for those living around the landfill site option. Generally, the well's water gets boiled before drinking. Based on **Table 142Error! Reference source not found.**, among 20 respondents, 17 respondents (85%), use water from the deep wells and 3 respondents (15%) use water from shallow wells. Moreover, the well's water is not only used for drinking but also for the consumption. **Table 143** indicates that among 20 respondents, 17 respondents (85%), consume water from the deep wells while 3 respondents (15%), consume water from the shallow wells.

Table 142. Source of Drinking Water

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Deep wells	17	85.0	85.0	85.0
Shallow wells	3	15.0	15.0	100.0
Total	**20**	**100.0**	**100.0**	

Table 143. Source of Water for Household's Use

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Deep wells	17	85.0	85.0	85.0
Shallow wells	3	15.0	15.0	100.0
Total	**20**	**100.0**	**100.0**	

Regarding to water use, most households use water from wells. Generally, some households boil water from wells before drinking and other households, maybe directly drink water (raw water) from the wells. Based on **Table 144** illustrates that among 20 respondents, only one respondent (5%) got illness related to kidney stone caused by unclean drinking water while more than 90% of respondents have no problem with unclean drinking water.

Table 144. Illness Caused by Unclean Drinking Water

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	1	5.0	5.0	5.0
No	19	95.0	95.0	100.0
Total	**20**	**100.0**	**100.0**	

Natural hazard always takes place in both dry and wet seasons. Generally, it seriously affects households living conditions in that area especially water supply. Based on **Table 145**, among 20 respondents, 8 respondents (40%) faced problem with water supply caused by natural hazard while 12 respondents (60%) have no problem on this case. In addition, **Table 146** indicates that natural hazard affected water supply interruption.

Table 145. Water Supply Affected by Natural Hazard

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	8	40.0	40.0	40.0
No	12	60.0	60.0	100.0
Total	**20**	**100.0**	**100.0**	

Table 146. Specified Affected Water Supply

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Water supply interruption	8	40.0	100.0	100.0
Total	**8**	**40.0**	**100.0**	

17. Source of Electricity

Table 147 presents the sources of electricity. Generally, 100 % of households who are living in that area access to electricity provided by Electricity of Cambodia (EDC). In term of connection, some

households (95%) own electric meter for power connection, it means that they are directly connected from EDC while other households (5%) have shared connection from neighboring, relatives or parents.

Table 147. Source of Electricity

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Own electric meters for power connection	19	95.0	95.0	95.0
Shared connection	1	5.0	5.0	100.0
Total	**20**	**100.0**	**100.0**	

18. Sanitation

Related to sanitation of households living around landfill site option, **Table 148** shows that among 20 respondents, 18 respondents (90%) own water sealed toilet while 2 respondents (10%) use parents' toilet.

Table 148. Sanitation

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Own water sealed toilet	18	90.0	90.0	90.0
Others	2	10.0	10.0	100.0
Total	**20**	**100.0**	**100.0**	

19. Cooking

There are many ways for cooking. Based on **Table 149**, many respondents prefer to use gas and fire wood (40%) respectively for cooking, followed by 20% of respondents use charcoal.

Table 149. Cooking

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Gas	8	40.0	40.0	40.0
Charcoal	4	20.0	20.0	60.0
Fire wood	8	40.0	40.0	100.0
Total	**20**	**100.0**	**100.0**	

20. Solid Waste Disposal

Based on **Table 150** shows that among 20 respondents, 19 respondents (95%) burn solid waste while only one respondent (5%) has solid waste collected by LGU.

Table 150. Solid Waste Disposal

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Collected by LGU	1	5.0	5.0	5.0
Burning	19	95.0	95.0	100.0
Total	**20**	**100.0**	**100.0**	

21. Project Awareness and Perception

Based on **Table 151**, 90 % of respondents knew or heard about sanitary landfill from local authorities in the area while only two respondents (10%) said no.

Table 151. Hearing about Sanitary Landfill Proposal

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Yes	18	90	90	90
No	2	10	10	100
Total	**20**	**100**	**100**	

Even though, most respondents knew about the project for proposed landfill as shown in **Table 151**, but some respondents understand that if a sanitary landfill is proposed, the benefit or positive impact can be derived from the project. Based on **Table 152**, among 20 respondents, 5 respondents (25%) understood that improvement of proper waste management facility will take place while 14 respondents (70%) said none and one respondent does not know.

Table 152. Benefit or Positive Impacts

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Improvement of proper waste management facility	5	25	25	25
None	14	70	70	95
I don't know	1	5	5	100
Total	**20**	**100**	**100**	

The overall concern or negative impact can occur for proposed landfill. Based on **Table 153** among 20 respondents, 9 respondents (45%) understood that the proposed landfill will not affect their livelihood, followed by 8 respondents (40%) understood that their houses will be negatively affected while 2 respondents (10%) understood that their livelihood will be seriously affected and only one respondent understood that it will be properly mitigated by project.

Table 153. Overall Concern or Negative Impact

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
My livelihood will be affected	2	10	10	10
My house will be negatively affected	8	40	40	50
Possible adjustment caused by the project	1	5	5	55
Others (will not affect livelihood)	9	45	45	100
Total	**20**	**100**	**100**	

With respect to the issues and concerns on the proposed landfill, as shown in **Table 154** below**,** 30% mentioned that if proposed landfill is implemented, new technology should be applied, while another 30% indicated that they do not agree with the proposed project. 20% said that the proposed

project should avoid affecting the paddy fields and water body; 5% agreed with the proposed location; and another 5% indicated about health being affected; with 10% having no idea, respectively.

Table 154. Issue and Concern

	Frequency (Number)	Percent	Valid Percent	Cumulative Percent
Agree with the propose location	1	5	5	5
Avoid to affect to the paddy field and water body	4	20	20	25
Do not agree with the propose project	6	30	30	55
Health affected	1	5	5	60
New technology should be applied	6	30	30	90
No idea	2	10	10	100
Total	**20**	**100**	**100**	

Annex E.2: Focus Group Discussion Results Summary Report

Cambodia Solid Waste and Plastic Management Improvement Project

Results of the Focus Group Discussions

A. Overview of the Focus Group Discussions (FGDs)

Due to the COVID-19 emergency situation, the Government of Cambodia has imposed restrictions on the travel to the project site to conduct face-to-face onsite focus group discussions. This activity was conducted via online by the consultant from CEST and KCC team, commissioned by the World Bank.

The blended approach was implemented which means that the consultants were offsite while the participants were onsite at the venue and this was made possible with the assistance from the local government of Siem Reap and the participating communes and villages. The onsite focus group discussions were gathered in one place observing the COVID-19 health and safety protocols on disinfection, social distancing and wearing of face mask to avoid further transmission of the viral infections.

With the necessary adjustments made in conformity with the prevailing COVID-19 restrictions in Cambodia, the consultant facilitated the conduct of the focus group discussions via online platform where the interviewer/facilitator was mediated through an internet-based communication platform. The process include posting and asking the key questions to draw out the participants' insights on the potential risks and impacts and plans regarding old dumpsite and the proposed new landfill in line with the solid waste and plastic management project of the government. Local language was used in the conversation to facilitate greater understanding, dialogue and participation throughout the session.

The participants were waste-pickers, workers in waste –related business, owners of waste related business, farmers and fisherfolk and women's group. The waste-picker identified from different categories such as children with 14 years old and below, youth 15-20 years old both male and female, women with 20 years old and above and other vulnerable groups (elderly, PWDs). They are located in Along Pir and Phnom Dei villages, Trapeang Thom commune while Farmers and fisherfolk and women's group were from Tropheang Teom Village, Kandek Commune.

B. Summary of FGD Results

1. Waste-pickers

The participants of this FGD were waste-pickers - further classified into five (5) groups: (a) Children with 14 years old and below (boys and girls), (b) youth 15-20 years old (male and female), (c) women 15-20 years, (d) men 15-20 years old, (e) vulnerable groups (elderly, PWDs).

Categories and Key Questions	Responses
Length of time working as a waste-picker	The participants have been working as waste-pickers from two (2) months to 13 years while elderly people have worked since the dumpsite started opening in 2007.
Steps in waste-picking (from collecting waste down to their sale) and Frequency of doing these steps per week	Generally, wastes are collected after being dumped by the truck, then the collected wastes are sundried at the dumpsite or at home. After that, the waste-pickers transport collected wastes to their home.

Categories and Key Questions	Responses
	Two (2) weeks later, the dried wastes are segregated and transported to sell at junkshop located in Kantraing commune, Bakong District, Siem Reap Province.
Location site where livelihood activities are commonly conducted (within the dumpsite)	The waste-pickers set-up a tent or an umbrella for their leisure time with their family. There are approximately 50 to 60 tents/umbrellas at the dumpsite. There are also drinks stalls for them inside dumpsite.
Where do you sell the waste that you collect?	After two (2) weeks of waste-picking, generally, they transport solid waste to sell at the following places: Angkrang market located in Angkrang village, Kantraing commune, Bakong district, Siem Reap province. Except for some of them who sell to the nearby junkshop because they have no means of transportation and/or their homes are also close to that junkshop, while others have buyers who directly buy at home.
On the arrangement for waste-picking at the dumpsite	The waste-pickers are free to pick up solid waste in the dumpsite. There is no established grouping arrangement. There are no "written" rules or regulations, so to speak. But they follow and observe "first come, first pick up" norm. Scavenging solid waste is according to the ability of the individual waste-picker. The one who grabs the best location, where the waste is being dumped, picks the most. There is no form of arrangement fellow waste-pickers or waste-pickers and waste truck drivers.
On waste-pickers' borrowing money from the buyer or pay with waste collection (in kind) and form of other support and partnership	The participants said that they do not borrow money from any buyers in terms of solid waste trade. Only one of them had experienced borrowing money in advance from a junkshop without any interest as his family urgently needed some cash.

Type of Wastes Collected

There are 11 types of waste collected by the waste-pickers and accordingly, among these, the 5 topmost valuable items are the following:

a. Copper (from electric wire, cuprum, brass etc.) at US$ 4.75/kg;
b. Aluminum type 1 (Beer cans, Soft drink can, discarded food wrap foils) at US$1.38/kg;
c. Stainless steel (Robinet, shower head etc.) at 0.88/kg;
d. Aluminum type 2 (Window frame) at 0.75/kg; and,
e. Plastic type 1 (Bottle of drinking water) at 0.14/kg. As for the organic fraction of waste (for livestock feeding) for 20 litres of volume, this is either sold or not but has a given value of US$ 0.75 to a bucket.

The different type of wastes collected at the dumpsite located in Trapeang Thom, Siem Reap and sold to the surrounding junkshops, the value of wastes per kg and their ranking according to its value in terms of unit rate (in US$) are described in the table below.

Type of Wastes Collected	For selling? (tick if Yes)	Unit	Unit Rate (USD)	Valuable (rank)
Copper (from electric wire, cuprum, brass etc.)	Yes	Kg	4.75	1
Aluminum type 1 (Beer cans, Soft drink can, discarded food wrap foils)	Yes	Kg	1.38	2

Type of Wastes Collected	For selling? (tick if Yes)	Unit	Unit Rate (USD)	Valuable (rank)
Stainless steel (Robinet, shower head etc.)	Yes	Kg	0.88	3
Aluminum type 2 (Window frame,	Yes	Kg	0.75	4
Plastic type 1 (Bottle of drinking water)	Yes	Kg	0.14	5
Plastic type 2 (HDPE bottle such as soap, shampoo etc…)	Yes	Kg	0.13	6
Tin materials (can of milk powder, fast food etc…)	Yes	Kg	0.13	7
Paper type 1(Carton, paper boxes, etc)	Yes	Kg	0.08	8
Paper type 2 (Book paper,A4 paper)	Yes	Kg	0.06	9
Plastic type 3 (Plastic bag)	Yes	Kg	0.04	10
Glass bottle	Yes	Kg	0.03	11
Organic waste (for livestock feeding) for 20 litres of volume	Yes/No	Bucket	0.75	

2. Junkshop Owners

A group of junkshop owners around the dumpsite with two (2) owners were the participants of this FGD. The owners were located in Anlong Pir village in which one of the owners had three (3) workers while the other no workers.

Length of Time in the Junkshop Business

The participants said that they have been running their junkshop business for about four (4) to five (5) years now while other junkshop owners have just started the business for about five (5) months only. They collect scraps from each household in the villages and from the individual waste-pickers to sell to the main junkshops at provincial center or vice versa.

Partnership Arrangement Between Business Owners and Waste Pickers

The operation is considered as a small business and also some just has started. There are times the main junkshop owner provided advance cash for the investment. There are also times that the junkshop owners have owed money from the waste-pickers (sellers) in case they are short of the floating capital while other junkshop owners do by giving cash advance to the waste-pickers and get paid back when their scraps are available.

Buying Price And Ranking Of The Most Valuable Waste

The buying price of the scraps is almost the same as the market price of other junkshops. The prices are not so much competitive. Normally, the profit range is between 30 Khmer Riels to 600 Khmer Riels per kilogram. Sometimes, the price varies for the exported items abroad and also depends on type of each item (waste). The most valuable item (waste) is copper material including electric wire, cuprum, brass, etc; and the unit price per kilogram is shown in the table below.

Item description	Buy in (Riel/kg)	Buy in (USD/Kg)	Sell out (Riel/kg)	Sell out (USD/Kg)
Copper (from electric wire, cuprum, brass etc)	20,000	5	20,500	5.125
Aluminum type 1 (Beer cans, Soft drink can, discarded food wrap foils…)	5,500	1.33-1.38	5,350-6,600	1.34-1.65

Item description	Buy in (Riel/kg)	Buy in (USD/Kg)	Sell out (Riel/kg)	Sell out (USD/Kg)
Aluminum type 2 (Window frame, bike accessories etc.)	2,500-3,500	0.63-0.88	2,600-4,000	0.65-1
All kinds of steel	1,000-1,200	0.25-0.3	1,030-1,300	0.26-0.325
Plastic type 1 (Bottle of drinking water)	600	0.15	630-650	0.16
Plastic type 2 (HDPE bottle such as soap, shampoo etc…)	600	0.15	630-700	0.16-0.175
Tin material (can of milk powder, fast food etc.)	600-700	0.15-0.18	630-800	0.16-0.2
Paper type 2 (Book paper, A4 paper)	300-300	0.08	330-350	0.08-0.088
Paper type 1(Carton, paper box, etc.)	200-500	0.05-0.13	600-650	0.15-0.16
Glass bottle	100	0.03	130-150	0.03-0.038

3. Workers in Waste-related Businesses

A group of waste-related businesses nearby the dumpsite with two (2) workers from a junkshop were the participants of this FGD. The two workers from the junkshop were located in Anlong Pir village.

Key Questions	Responses
Type of work engaged in and type of business of the employer	Their works are scale weighing, bill checking, scrap preparing and waste-keeping/-stocking
Length in the work	One worker just started working for around half a month and the other worked been working for around one (1) month.
Terms of Employment	
Payment basis	With monthly payment basis
Amount paid	The salary is between 50 US dollar (20,0000 Riels) to 125 US dollar (500,000 Riels)
Status of employment (regular, seasonal, temporary worker)	There is no contract agreement between both parties. They work seasonally, mostly during school vacation. They are temporary workers with no signed contract.
Working Hours	
Expected work duration	Working hours start from 7-11am and 1-5 pm, 7 days per week and no day-off.
Payment on days did not go to work	During the day-off, the salary is still paid only with permission from the owner.

4. Farmers, Fisherfolks, and Women's Group

A group of 12 farmers and fisherfolks were the participants for this FGD. The main occupation of all participants were farmer and second occupation as fisherfolk. The participants were located in Trapeang Toem village, Kandek commune where the landfill site alternative was proposed. Furthermore, a group of nine (9) women was also call to join this FGD to discuss the questions related to the proposed landfill.

The summary of the responses of the 12 farmers and fisherfolks are in the table below.

Key Questions	Responses
How long have you been farming/fishing?	They have been farming and fishing for between 20 to 47 years since they grew up. As the fishing is secondary occupation.

Key Questions	Responses
How are your crops irrigated? Please specify provider and water source.	In the proposed sanitary landfill area, some farmers are planting rice 3 times per year. During the dry season they get water source from 78 dam reservoirs and in rainy season, people use rain water.
How will a construction of an engineered landfill potentially affect your livelihood?	For the engineered landfill to be constructed in the future, the anticipated potential affect to their livelihood identified are as follows: • Rice planting: Leaking of the leachate from the landfill might affect the paddy fields and the surrounding areas including around 130 households whose priority occupations are farmers. • The water quality will be extremely polluted causing bad smell, and less amount of fish in the reservoir • Reducing the amount of water inside the 78 dam resevoirs due to the need of water for rice paddy irrigation, fishing and drinking water for animals.

The summary of the responses of all the participants of this FGD are in the table below.

Key Questions	Responses
On the Environment	
Land	
In the past five (5) years, has the dumpsite area grown bigger or smaller?	Most participants mentioned up that the dumpsite area has grown bigger with more earth pits while few participants said that the dumpsite area is still the same due to the waste disposed into the deep pits and get covered.
In the past five (5) years, has the dumpsite area used only for dumping waste?	Yes, absolutely it is used for dumping waste only.
Water	
Are there nearby bodies of water? Where are they?	Surrounding the dumpsite area, there are some tube wells, open pits and ponds. Moreover, groundwater is the main source of water for daily use, and surface water is supplied for daily use through activities such as animal husbandry, cleaning, etc. However, waste-pickers in dumpsite need to buy drinking water. The pond is approximately 500m from the dumpsite. Furthermore, most households living in the villages near the dumpsite have their own wells. As for households living near the pond, they use the pond water for raising animals, watering crops and domestic livestock, but not for drinking.
In the past five (5) years, what are your observations on the quality of water in these water bodies?	The leachate from the dumpsite might leak into the rice fields and ponds. Thus, the water from that area causes bad smell in the rainy season while dry season could be a bit better.
How about groundwater in the area?	The quality of ground water especially drilled wells during dry season is fine no smell affected. Therefore, in the last 4 years, the smell was so bad but currently the smell looks better as the dumpsite has managed a better leachate leakage prevention system.
Air and Noise	
In the past five (5) years, what are your observations on the quality of air here in the dumpsite?	In the dry season there is less odor, but in the rainy season there is a strong odor from the garbage. Furthermore, the smell spreads around 1km away, especially when they burn the garbage but for the waste-pickers, they are not sensitive to smell.
In the past five (5) years, what are your observations here in the dumpsite in terms of noise?	Actually, there is a bit noise from the dump truck during night time but it is acceptable as they live a bit far from the access road.
People	

Key Questions	Responses
In the past five (5) years, has the number of residents/families (if increasing or not), livelihood, income improvement, among others, changed?	The number of people living around the dumpsite seem to have increased with more income. Furthermore, many households have better living condition than before. Beside occupation as waste-pickers they have other main occupations such as farming, livestock raising, animal raising and doing small business.
On the Landfill Site Alternatives	
How will the project affect specific types of livelihood in case the dumpsite is closed down and a new landfill is on a different location instead of rehabilitation of the current dumpsite into an engineered landfill? How do you think can such impacts be mitigated?	If dumpsite was closed, all the participants said that they would go to find other jobs such as livestock feeding, rice planting, construction workers, factory workers etc. to do instead of waste-picking
Synthesis of impacts (c/o facilitator with support from documenter/s)	N/A
What assistance (i.e. services on health, water, sanitation) would you need if the impact will not be mitigated?	• Not yet aware of the form and technique of making a sanitary landfill • Requested to build the sanitary landfill that will not affect the health of the people and its surroundings. • Do not know/do not have experience and techniques to understand the landfill.

Annexes

FGD Result (Group 1)

Name of Village:	Anlong Pir	**Village code:**	.....
Name of Commune:	Tropeang Thom		
District:	Prasat Bakong		
Province:	Siem Reap		

Date of Interview:	18 April 2021
Name of Interviewer:	Mr. Chhun Bunmeng
Note taker:	Mrs. Kun Chantrea
Facilitator:	Ms. Chhun Sokhom

Title of FGD:	Waste pickers – Children: 14 years old and below; boys and girls
Place of Interview:	Rest hall near dumpsite in Anlong Pir Village
Date:	18 April 2021
Starting time:	8:30 am
Completion time:	10:00 am

Participants' Profile

	Name	Sex	Age	Highest Level of Education Attained	No. of Family Members
1	Sanh Sokneang	Female	13	Grade 5	5
2	Bros Bora (*farmer*)	Male	13	Grade 4	6
3	In Hun	Male	10	Grade 3	6
4	Brors Sreylai	Female	14	Grade 6	6
5	Khoeun Vanndet	Male	13	Grade 4	4
6	Khoeun Seyha	Male	10	Grade 1	4
7	Thai Thy	Male	13	Grade 6	6

Participants' Response

1. How long have you been working as a waste picker?

They all mentioned up that they have been working as waste pickers for between 2 to 4 years.

2. Please detail the steps you do in waste picking (from collecting waste down to their sale). How often do you do these steps per week?

Generally, they collect waste after being dumped by the truck then get it sundried at the dumpsite or at home. After that, they transport it to their home. Two weeks later, the solid waste collected

will be transported to at junk shop that is located in Kantraing commune, Bakong district, Siem Reap province.

3. **Please locate the site where livelihood activities are commonly conducted (within the dumpsite).**

They just have tents or umbrellas for their leisure time and use them as shelters in sunny or rainy days.

4. **What type of waste they collect and type of waste they sell? Around how much do you earn per kg? What is the most valuable waste?**

Types of Waste collected	For selling? (tick if Yes)	Unit	Unit Rate (USD)	Valuable (rank)
Copper (from electric wire, cuprum, brass etc)	Yes	Kg	4.75	1
Aluminum type 1 (Beer cans, Soft drink can, discarded food wrap foils…)	Yes	Kg	1.38	2
Stainless steel (Robinet, shower head etc.)	Yes	Kg	0.88	3
Aluminum type 2 (Window frame,	Yes	Kg	0.75	4
Plastic type 1 (Bottle of drinking water)	Yes	Kg	0.14	5
Plastic type 2 (HDPE bottle such as soap, shampoo etc…)	Yes	Kg	0.13	6
Tin material (can of milk powder, fast food etc…)	Yes	Kg	0.13	7
Paper type 1(Caton, paper box, etc)	Yes	Kg	0.08	8
Paper type 2 (Book paper, A4 Paper)	Yes	Kg	0.06	9
Plastic type 3 (Plastic bag)	Yes	Kg	0.04	10
Glass bottle	Yes	Kg	0.03	11
Organic waste (for livestock feeding) for 20 litres of volume	**Yes/No**	**Bucket**	**0.75**	

Note: the value of organic waste could not be ranked against other waste because it has a different unit.

5. **Where do you sell the waste that you collect?**

The collected waste is sold at Angkrang market in Angkrang village, Kantraing commune, Bakong district, Siem Reap province.

6. **Do you have any form of partnership with waste collectors or waste truck driver?**

At the landfill, they are free to pick up solid waste, no groups are divided .no rules, no regulations, no terns are divided, fisrt come, first pick up. Picking up solid waste according to the ability of the individual waste picker, the one who grabs the best location, where the waste is being dumped, picks the most. So, there are no forms of partnerships between waste pickers and waste pickers or waste pickers and waste truck drivers.

7. **Do the waste collectors borrow money from the buyer or pay with waste collection (in kind)? Form of other support and partnership?**

They did not borrow money from buyers.

FGD Result (Group 2)

Name of Village:	Anlong Pir	**Village code:**	.....
Name of Commune:	Trapeang Thom		
District:	Prasat Bakong		
Province:	Siem Reap		

Date of Interview:	18 April 2021
Name of Interviewer:	Mr. Chhun Bunmeng
Note taker:	Mrs. Kun Chantrea
Facilitator:	Ms. Chhun Sokhom

Title of FGD:	Waste pickers – Youth: 15-20 years old; male and female
Place of Interview:	Rest hall near dumpsite in Anlong Pir Village
Date:	18 April 2021
Starting time:	10:20 AM
Completion time:	11:40 AM

Participants' Profile

	Name	Sex	Age	Highest Level of Education Attained	No. of Family Members
1	Vath Sreyvy	Female	16	Grade 6	5
2	Bros Brem	Male	15	Grade 7	6
3	Heng Sokha	Male	19	Grade 9	5
4	Moeun Sophorn	Male	15	Grade 9	6
5	Seng Chanveasna	Male	17	Grade 6	5

Participants' Response

1. **How long have you been working as a waste picker?**

They have been working as waste pickers for 1, 3, 5, and 10 years.

2. **Please detail the steps you do in waste picking (from collecting waste down to their sale). How often do you do these steps per week?**

Generally, they collect waste after being dumped by the truck then get it sundried at the dumpsite or at home. After that, they transport it to their home. two weeks later, the solid waste collected will be transported to be sold at junk shop that is located in Kantraing commune, Bakong district, Siem Reap province.

3. Please locate the site where livelihood activities are commonly conducted (within the dumpsite).

They just have a tent or umbrella for their leisure time with their family.

4. What type of waste they collect and type of waste they sell? Around how much do you earn per kg? What is the most valuable waste?

Types of Waste collected	For selling? (tick if Yes)	Unit	Unit Rate (USD)	Valuable (rank)
Copper (from electric wire, cuprum, brass etc)	*Yes*	Kg	4.75	1
Aluminum type 1 (Beer cans, Soft drink can, discarded food wrap foils…)	*Yes*	Kg	1.38	2
Stainless steel (Robinet, shower head etc.)	*Yes*	Kg	0.88	3
Aluminum type 2 (Window frame,	*Yes*	Kg	0.75	4
Plastic type 1 (Bottle of drinking water)	*Yes*	Kg	0.14	5
Plastic type 2 (HDPE bottle such as soap, shampoo etc…)	*Yes*	Kg	0.13	6
Tin material (can of milk powder, fast food etc…)	*Yes*	Kg	0.13	7
Paper type 1(Caton, paper box, etc)	*Yes*	Kg	0.08	8
Paper type 2 (Book paper, A4 Paper)	*Yes*	Kg	0.06	9
Plastic type 3 (Plastic bag)	*Yes*	Kg	0.04	10
Glass bottle	*Yes*	Kg	0.03	11
Organic waste (for livestock feeding) for 20 litres of volume	***Yes/No***	**Bucket**	**0.75**	

Note: the value of organic waste could not be ranked against other waste because it has a different unit.

5. Where do you sell the waste that you collect?

Collected wate is sold at Angkrang market in Angkrang village, Kantraing commune, Bakong district, Siem Reap province and at Svay Thom village.

6. Do you have any form of partnership with waste collectors or waste truck driver ?

At the dump site, free waste collection, no close connection been arranged among them. No prioritized groups are appointed.

7. Do the waste collectors borrow money from the buyer or pay with waste collection (in kind)? Form of other support and partnership?

One of them used to borrow money from a Junk shop owner without interest or signed agreement.

FGD Result (Group 3)

Name of Village:	Anlong Pir	**Village code:**	.....
Name of Commune:	Trapeang Thom		
District:	Prasat Bakong		
Province:	Siem Reap		

Date of Interview:	18 April 2021
Name of Interviewer:	Mr. Chhun Bunmeng
Note taker:	Mrs. Kun Chantrea
Facilitator:	Ms. Chhun Sokhom

Title of FGD:	Waste pickers – Women: 20 years old and above
Place of Interview:	Rest hall near dumpsite in Anlong Pir Village
Date:	18 April 2021
Starting time:	13:30 pm
Completion time:	15:00pm

Participants Profile

	Name	Sex	Age	No. of Family Members
1	Chin Savoeun	Female	42	8
2	Som Lis	Female	37	4
3	Hinh MaLai	Female	36	4
4	Kin Savoeun	Female	40	-
5	Chhiv Sar	Female	28	-
6	Chhiv Sang	Female	37	-
7	Kong Srey	Female	33	-
8	Chorm Sros	Female	35	-

Participants' Response

1. **How long have you been working as a waste picker?**

They have been working as waste pickers for between 2 months to 13 years.

2. **Please detail the steps you do in waste picking (from collecting waste down to their sale). How often do you do these steps per week?**

Firstly, they wear the gloves and boots, then wait for the dump truck to arrive. They collect waste after being dumped and then let it dry at the dumpsite or at home. After that, they transport it to their home. two or four weeks later. The dry solid waste is segregated and then transport to sell at junk shops.

3. Please locate the site where livelihood activities are commonly conducted (within the dumpsite).

They just have a tent or umbrella for their leisure time with their family. There are 50 to 60 tents or umbrellas at dump site. There are also drinks stalls for them inside dumpsite compound.

4. What type of waste they collect and type of waste they sell? Around how much do you earn per kg? What is the most valuable waste?

Types of Waste collected	For selling? (tick if Yes)	Unit	Unit Rate (USD)	Valuable (rank)
Copper (from electric wire, cuprum, brass etc)	*Yes*	Kg	4.75	1
Aluminum type 1 (Beer cans, Soft drink can, discarded food wrap foils…)	*Yes*	Kg	1.38	2
Stainless steel (Robinet, shower head etc.)	*Yes*	Kg	0.88	3
Aluminum type 2 (Window frame,	*Yes*	Kg	0.88	4
Plastic type 1 (Bottle of drinking water)	*Yes*	Kg	0.15	5
Plastic type 2 (HDPE bottle such as soap, shampoo etc…)	*Yes*	Kg	0.13	6
Tin material (can of milk powder, fast food etc…)	*Yes*	Kg	0.13	7
Paper type 1(Caton, paper box, etc)	*Yes*	Kg	0.08	8
Paper type 2 (Book paper, A4 Paper)	*Yes*	Kg	0.06	9
Plastic type 3 (Plastic bag)	*Yes*	Kg	0.04	10
Glass bottle	*Yes*	Kg	0.03	11
Organic waste (for livestock feeding) for 20 litres of volume	***Yes/No***	**Bucket**	**0.75**	

Note: the value of organic waste could not be ranked against other waste because it has a different unit.

5. Where do you sell the waste that you collect?

Some of them sell at the nearby junkshop because they have no means of transportation and their home also close to that junkshop, while others have buyers to directly buy at home.

6. Do you have any form of partnership with waste collectors or waste drunk driver?

At the dump site, free waste collection, no function divided. Besides, they had to grab each other when the dump truck arrived. Whoever grabs a good place will get a lot, while those who do not win will just stand and watch others picking up the waste.

7. Do the waste collectors borrow money from the buyer or pay with waste collection (in kind)? Form of other support and partnership?

They did not borrow money from buyers.

FGD Result (Group 4)

Name of Village:	Anlong Pir	**Village code:**	.....
Name of Commune:	Trapeang Thom		
District:	Prasat Bakong		
Province:	Siem Reap		

Date of Interview:	18 April 2021
Name of Interviewer:	Mr. Chhun Bunmeng
Note taker:	Mrs. Kun Chantrea
Facilitator:	Ms. Chhun Sokhom

Title of FGD:	Waste pickers – Men: 20 years old and above
Place of Interview:	*Rest hall near dumpsite in Anlong Pir Village*
Date:	18 April 2021
Starting time:	15:30 pm
Completion time:	17:00 pm

Participants Profile

	Name	Sex	Age	No. of Family Members
1	Ngin Phouen	Male	73	8
2	It Soth	Male	50	3
3	Khean Norn	Male	53	5
4	Chhin Kosal	Male	-	4
5	Heang Han	Male	-	5
6	Toeum Vun	Male	-	4
7	Toeum Von	Male	-	5
8	Horn Hot	Male	-	4
9	Chan Ra	Male	-	6
10	Sim Rin	Male	-	5

Participants' Response

1. **How long have you been working as a waste picker?**

They have been working as waste pickers since the dumpsite started in 2007.

2. **Please detail the steps you do in waste picking (from collecting waste down to their sale). How often do you do these steps per week?**

Firstly, they wear the gloves and boots, then wait for the dump truck. They collect waste after the dump truck dumped and then let it dry at the dumpsite or at home. After that, they transport it to

their home. from two to four weeks later, the solid waste is segregated and transported to be sold at junk shop at Phnom Dey village.

3. **Please locate the site where livelihood activities are commonly conducted (within the dumpsite).**

They just have a tent or umbrella for their leisure time with their family.

4. **What type of waste they collect and type of waste they sell? Around how much do you earn per kg? What is the most valuable waste?**

Types of Waste collected	For selling? (tick if Yes)	Unit	Unit Rate (USD)	Valuable (rank)
Copper (from electric wire, cuprum, brass etc)	*Yes*	Kg	4.75	1
Aluminum type 1 (Beer cans, Soft drink can, discarded food wrap foils…)	*Yes*	Kg	1.30	2
Stainless steel (Robinet, shower head etc.)	*Yes*	Kg	0.88	3
Aluminum type 2 (Window frame,	*Yes*	Kg	0.63	4
Plastic type 1 (Bottle of drinking water)	*Yes*	Kg	0.15	5
Plastic type 2 (HDPE bottle such as soap, shampoo etc…)	*Yes*	Kg	0.13	6
Tin material (can of milk powder, fast food etc…)	*Yes*	Kg	0.13	7
Paper type 1(Caton, paper box, etc)	*Yes*	Kg	0.08	8
Paper type 2 (Book paper, A4 Paper)	*Yes*	Kg	0.06	9
Plastic type 3 (Plastic bag)	*Yes*	Kg	0.04	10
Glass bottle	*Yes*	Kg	0.03	11
Organic waste (for livestock feeding) for 20 litres of volume	***Yes/No***	**Bucket**	**0.75**	

Note: the value of organic waste could not be ranked against other waste because it has a different unit.

5. **Where do you sell the waste that you collect?**

The buyers will come to directly buy at their homes. All buyers come from Angkrang market in Angkrang village, Kantraing commune, Bakong district, Siem Reap province.

6. **Do you have any form of partnership with waste collectors or waste drunk driver?**

At the dump site, free waste collection system, no prioritized groups have been appointed.

7. **Do the waste collectors borrow money from the buyer or pay with waste collection (in kind)? Form of other support and partnership?**

They do not borrow money from buyers.

FGD Result (Group 5)

Name of Village:	Anlong Pir	**Village code:**	.....
Name of Commune:	Trapeang Thom		
District:	Prasat Bakong		
Province:	Siem Reap		

Date of Interview:	18 April 2021
Name of Interviewer:	Mr. Chhun Bunmeng
Note taker:	Mrs. Kun Chantrea
Facilitator:	Ms. Chhun Sokhom

Title of FGD:	Waste pickers – Other vulnerable groups: elderly, PWDs
Place of Interview:	Rest hall near dumpsite in Anlong Pir Village
Date:	19 April 2021
Starting time:	15:30 pm
Completion time:	17:00 pm

Participants' Profile

	Name	Sex	Age	No. of Family Members
1	Nil Sat	Female	73	5
2	Heng Chan	Female	-	-
3	Sar Roeum	Female	-	-
4	Chet Sao	Female	-	-
5	Heng Yom	Female	-	-
6	Nil Dorm	Female	-	-
7	Las Ky	Female	-	-
8	Chhoun Chun	Female	-	-
9	Chhoeung Yong	Female	-	-
10	Prom Korn	Female	-	-

Participants' Response

1. How long have you been working as a waste picker?

They have been working as waste pickers since the dumpsite started in 2007.

2. Please detail the steps you do in waste picking (from collecting waste down to their sale). How often do you do these steps per week?

They collect waste after being dumped by the truck and then let it dry at the dumpsite or at home. After that, they transport it to their home. two or four weeks later, the solid waste is segregated and transported to be sold at junk shop in Phnom Dey village.

3. Please locate the site where livelihood activities are commonly conducted (within the dumpsite).

They just have a tent or umbrella for their leisure time with their family.

4. What type of waste they collect and type of waste they sell? Around how much do you earn per kg? What is the most valuable waste?

Types of Waste collected	For selling? (tick if Yes)	Unit	Unit Rate (USD)	Valuable (rank)
Copper (from electric wire, cuprum, brass etc)	*Yes*	Kg	4.75	1
Aluminum type 1 (Beer cans, Soft drink can, discarded food wrap foils…)	*Yes*	Kg	1.30	2
Stainless steel (Robinet, shower head etc.)	*Yes*	Kg	0.88	3
Aluminum type 2 (Window frame,	*Yes*	Kg	0.63	4
Plastic type 1 (Bottle of drinking water)	*Yes*	Kg	0.15	5
Plastic type 2 (HDPE bottle such as soap, shampoo etc…)	*Yes*	Kg	0.13	6
Tin material (can of milk powder, fast food etc…)	*Yes*	Kg	0.13	7
Paper type 1(Caton, paper box, etc)	*Yes*	Kg	0.08	8
Paper type 2 (Book paper, A4 Paper)	*Yes*	Kg	0.06	9
Plastic type 3 (Plastic bag)	*Yes*	Kg	0.04	10
Glass bottle	*Yes*	Kg	0.03	11
Organic waste (for livestock feeding) for 20 litres of volume	***Yes/No***	**Bucket**	**0.75**	

Note: the value of organic waste could not be ranked against other waste because it has a different unit.

5. Where do you sell the waste that you collect?

Buyers will come to their home to buy. Buyers come from Angkrang market in Angkrang village, Kantraing commune, Bakong district, Siem Reap province.

6. Do you have any form of partnership with waste collectors or waste drunk driver?

At the dump site, free waste collection, no partnership among them has been formed. No nepotism. No favoritism.

7. Do the waste collectors borrow money from the buyer or pay with waste collection (in kind)? Form of other support and partnership?

They do not borrow money from buyers.

FGD Result (Group 6)

Name of Village:	Anlong Pir	**Village code:**	.....
Name of Commune:	Trapeang Thom		
District:	Prasat Bakong		
Province:	Siem Reap		

Date of Interview:	19 April 2021
Name of Interviewer:	Mr. Chhun Bunmeng
Note taker:	Mrs. Kun Chantrea
Facilitator:	Ms. Chhun Sokhom

Title of FGD:	For owners of businesses around the dumpsite that are related to waste collection
Place of Interview:	At their house in Anlong Pir Village
Date:	19 April 2021
Starting time:	9:00 am
Completion time:	10:00 am

Participants' Profile

	Name	Sex	Age	No. of Family Members
1	Sy Keut	Male	58	5
2	Yuon Sina	Male	37	4

Participants' Response

1. **How long have you been in this business? Please detail the steps you do from acquiring consolidated waste from waste pickers. What type of waste do you buy from them?**

   - Having had the business for 4 to 5 years and other junkshop just started business for around 5 months.
   - With 4 outsourced workers.
   - Collect scraps from each household and sell it to main junkshops at provincial center or sometime the waste pickers bring it to the junkshop by themselves.

2. **Around how much do you earn per kg? What is the most valuable waste?**

The buying price is almost the same as other junkshops and unlimited to the quantity of scraps. Normally, the profit range is from 30 riels to 600 riels per kilogram; sometime it varies for the exported ones and depends on the items.

Item description	Buy in (Riel/kg)	Buy in (USD/Kg)	Sell out (Riel/kg)	Sell out (USD/Kg)
Copper (from electric wire, cuprum, brass etc)	20,000	5	20,500	5.125
Aluminum type 1 (Beer cans, Soft drink can, discarded food wrap foils…)	5,500	1.33-1.38	5,350-6,600	1.34-1.65
Aluminum type 2 (Window frame, bike accessories etc.)	2,500-3,500	0.63-0.88	2,600-4,000	0.65-1
All kinds of steel	1,000-1,200	0.25-0.3	1,030-1,300	0.26-0.325
Plastic type 1 (Bottle of drinking water)	600	0.15	630-650	0.16
Plastic type 2 (HDPE bottle such as soap, shampoo etc…)	600	0.15	630-700	0.16-0.175
Tin material (can of milk powder, fast food etc…)	600-700	0.15-0.18	630-800	0.16-0.2
Paper type 2 (Book paper, A4 paper)	300-300	0.08	330-350	0.08-0.088
Paper type 1(Carton, paper box, etc)	200-500	0.05-0.13	600-650	0.15-0.16
Glass bottle	100	0.03	130-150	0.03-0.038

3. Do you have any form of partnership with the waste picker? Have there been instances where waste pickers borrow money from you or ask for other forms of favor?

As it is small business and just recently operate this business, the main junkshop has provided some money to us for investment, and sometime owed to the seller first (waste pickers). While another local junkshop has provided some money to the sellers (waste pickers) and get back with the scraps.

FGD Result (Group 7)

Name of Village:	Anlong Pir	**Village code:**	.....
Name of Commune:	Trapeang Thom		
District:	Prasat Bakong		
Province:	Siem Reap		

Date of Interview:	19 April 2021
Name of Interviewer:	Mr. Chhun Bunmeng
Note taker:	Mrs. Kun Chantrea
Facilitator:	Ms. Chhun Sokhom

Title of FGD:	For workers in businesses around the dumpsite
Place of Interview:	Rest hall near dumpsite in Anlong Pir Village
Date:	19 April 2021
Starting time:	7:30 am
Completion time:	9:00 am

Participants' Profile

	Name	Sex	Age	Highest Level of Education Attained	No. of Family Members
1	Tann Rithy	Male	14	Grade 4	8
2	-	Female	20	Grade 11	8

Participants' Response

1. **Ask participants what type of work they engage in and the type of business of their employer.**
   - Work in scale weighing section and billing.
   - Scrap packaging and waste keeping/ stocking.
2. **How many years have you been working there?**
   - Started work for around half a month
   - Started work for around one month
3. **Terms of employment:**
   a. **How are you paid?**

   With monthly payment.

   b. **How much are you paid?**

   The salary is between 50 US dollars (20,000 Riel) to 125 US dollars (500,00 Riels).

c. Are you hired as a regular, seasonal, or temporary worker? Please elaborate.

- There is no contract agreement between both parties.
- Working as seasonal period during school vacation.
- Temporary worker, no contract.

4. Working hours:

a. From what time up to what time are you expected to work?

Working hours start from 7-11 am and 1-5 pm, 7 days per week and no day-off.

b. Do you also get paid on days when you did not go to work?

During the day off, the salary is still paid in case there is a permission from the owner.

FGD Result (Group 8 and 9)

Name of Village:	Anlong Pir	**Village code:**	.....
Name of Commune:	Trapeang Thom		
District:	Prasat Bakong		
Province:	Siem Reap		

Date of Interview:	19 April 2021
Name of Interviewer:	Mr. Chhun Bunmeng
Note taker:	Mrs. Kun Chantrea
Facilitator:	Ms. Chhun Sokhom

Title of FGD 8:	Farmers and fisherfolk from the immediate surrounding community
Place of Interview:	Tropheang Teom Village, Kandek Commune
Date:	19 April 2021
Starting time:	2:00 pm
Completion time:	3:15 pm

Title of FGD 9:	Women's group from the immediate surrounding community
Place of Interview:	Tropeang Teom Village, Kandek Commune
Date:	19/04/2021
Starting time:	3:30 pm
Completion time:	4:50 pm

Participants' Profile

	Name	Sex	Age	No. of Family Members
1	Seang Sim	Male	50	6
2	Vy Hun	Male	39	3
3	San Phat	Male	59	8
4	Kaom Lous	Male	63	3
5	Mao Chan	Male	50	3
6	Sam Piseth	Male	41	4
7	Kaom Lai	Male	40	4
8	Sok Yun	Male	50	4
9	Ros Vichhun	Male	35	3
10	Nat Nuon	Male	36	3
11	Theuon Kea	Male	37	4
12	Eun Sam An	Male	40	5

Participants' Profile for FGD 9

	Name	Sex	Age	No. of Family Members
1	Kaom Reuy	Female	-	-
2	Korng Ny	Female	-	-
3	Rae Vuon	Female	-	-
4	Chhuon Reung	Female	-	-
5	Song Pum	Female	-	-
6	Kaom Vann	Female	-	-
7	Ros Mao	Female	-	-
8	Suong Mai	Female	-	-
9	Nob Por	Female	-	-

Participants' Response

For Farmers and Fisherfolks

1. How long have you been farming/fishing?

They have been farming and fishing for between 20 to 47 years since they grew up. The fishing is their secondary occupation.

2. How are your crops irrigated? Please specify provider and water source.

In the proposed sanitary landfield location, some households are planting rice 3 times per year. During the dry season they get the water source from 78 Dam reservoir; and rain water is used by farmers in the rainy season.

3. How will a construction of an engineered landfill potentially affect your livelihood?

For Farmers and Fisherfolks

- If the proposed sanitary landfill area, there might be some concerns which will affect their livelihood as below:
- Rice planting: Afraid that there might be leachate leakage flowing into their paddy fields and it will affect the annual rice yields and environmentally affect the villagers'health .
- The amount of water inside the 78 dam resevoir will be reduced which will affect the irrigation system, fishing opportunity and drinking water for animals and livestocks.
- The water quality will be extremly polluted which causes stench to the surrounding areas and fishing yields will be less.

For Women's Group

- Water quality: People living around the area are using the water for daily consumption, they are afraid that it will affect the yield of crops as there might have the leachate leakage flowing into their paddy fields.
- Health issues: Illness might arise due to possible increase of mosquitoes which will cause dengue fever

- Amount of fish in the reservoir will be cut down and the fear of toxic fish cannot be eaten.
- During rainy season, it might cause flooding in the nearby villages, so the waste will be floating everywhere in those villages.

For All Participants

On Environment (changes over the past 5 years)

1. **Land**

   a. **Land Area: Has the dumpsite area grown bigger or smaller?**

   Most participants mentioned up that the dumpsite area has grown bigger with more earth pits while few participants said that the area of dumpsite is still the same due to the waste disposed into the deep pit and get covered layer by layer.

   b. **Land Use: Is the dumpsite area used only for dumping waste?**

   Yes, absolutely, it is used for dumping waste only.

2. **Water**

   a. **Are there nearby bodies of water? Where are they?**

   Surrounding the dumpsite area, there are some tube wells, open pits and ponds. Moreover, groundwater is the main source of water for daily use, and surface water is supplied for daily use through activities such as animal husbandry, cleaning, etc. However, waste pickers in dumpsite still buy drinking water. The pond is approximately 500m from the Dumpsite. Furthermore, most households living in the villages near the dumpsite have their own wells. As households living near the pond, they use the pond water for raising animals, watering crops and domestic livestock, but not for drinking.

   b. **What are your observations on the quality of water in these bodies?**

   The leachate from the dumpsite is leaking into the rice fields and ponds. Thus, the water from that area causes bad smell in the rainy season while dry season , the smell becomes a bit better.

   c. **How about groundwater in the area?**

   The quality of ground water especially drilled wells during dry season is fine, no smell affected. Therefore, in last 4 years, the smell was so bad but currently, the smell looks better as the dumpsite has reduced the leakage problem.

3. **Air and Noise**

   a. **What are your observations on the quality of air here in the dumpsite?**

   In the dry season there is less odor, but in the rainy season there is a strong odor from the garbage. Furthermore, the smell is around 1km away, especially when they burn the garbage but for the waste pickers, they are not sensitive to smell.

b. What are your observations here in the dumpsite in terms of noise?

Actually, there is a bit noise from the dump truck during night time but it is acceptable as they live a bit far from the access road.

4. People

a. Has the number of residents/families (if increasing or not), livelihood, income improvement, among others, changed?

People living around the dumpsite seem to have the increased income. Furthermore, many households have living better condition than before. Beside occupation as waste pickers they have other main occupations such farming, livestock raising, animal raising and doing small business.

At the Existing Dumpsite

5. How will the project affect specific types of livelihood in case the dumpsite is closed down and a new landfill is on a different location instead of rehabilitation of the current dumpsite into an engineered landfill? How do you think can such impacts be mitigated?

If dumpsite was closed, all the participants said that they would go to find other jobs such as livestock feeding, rice planting, construction worker, factory etc to do instead of waste picking.

6. Synthesis of impacts (c/o facilitator with support from documenter/s)

N/A

7. What assistance (i.e., services on health, water, sanitation) would you need if the impact will not be mitigated?

- Not yet aware of the form and technique of making a sanitary landfill
- Do not know, do not have experience and techniques to understand the landfill
- Requested to build the landfill which will not affect people's health , animals, birds and the surrounding environment,

Annex E.3: Key Informant Interview Results Summary Report

Cambodia Solid Waste and Plastic Management Improvement Project

Results of the Key Informant Interview

A. Overview of the Key Informant Interviews (KII)

Due to the COVID-19 emergency situation, the Royal Government of Cambodia (RGC) has imposed restrictions on the travel to the project site to conduct face-to-face onsite interview session. This activity was conducted via online by the consultant from CEST and KCC, commissioned by the World Bank.

The blended approach was implemented which means that the consultants were offsite while the participants were onsite at the venue and this was made possible with the assistance from the local government of Siem Reap and the participating communes. The onsite key informants were gathered in one place observing the COVID-19 health and safety protocols on disinfection, social distancing and wearing of face mask to avoid further transmission of the viral infections.

With the necessary adjustments made in conformity with the prevailing COVID-19 restrictions in Cambodia, the consultant facilitated the conduct of the key informant interview session via online platform where the interviewer/facilitator was mediated through an internet-based communication platform. The process include posting and asking the key questions to draw out the participants' insights on the potential risks and impacts and plans regarding old dumpsite and the proposed new landfill in line with the solid waste and plastic management project of the government. Local language was used in the conversation to facilitate greater understanding, dialogue and participation throughout the session.

The participants were represented by the Commune and Village Chiefs of the following: Trapeang Thom, Kandaek, Trapeang Toeum, Phnom Dei, Anlong Pir, Roka Kambot, La Vea, Soung.

B. Summary of KII Results

Key Questions	Response	Response Made By
What is the current situation on the dumpsite?	During interview with all key informants, they all have raised their concerns related to the following: dumpsite entrance pathway; waste odor during wet season; air and water pollution; and waste management capacity at dumpsite of private companies. • **Dumpsite entrance pathway:** The situation of the entrance pathway located around 600 m from NR 6 to existing dumpsite is not good because this pathway is bumpy with many potholes and dusty condition which has caused difficulty in transporting solid waste to the dumpsite. Furthermore, the dust from the pathway has affected health of people living along. Thus, they are all requesting for the rehabilitation of this pathway by paving concrete road if the project really aims to improve the existing dumpsite. • **Waste odor during wet season:** The waste odor during wet season is described as much worse than during the dry season and the odor is diffused approximately up to 2 km radius from the dumpsite. Before, the people living in the villages around dumpsite found it difficult to live with the	All Participants

Key Questions	Response	Response Made By
	presence of the dumpsite but currently, it has been observed that villagers have seemingly adapted to the present situation they are in. • **Water pollution:** During wet season, the leachate from dumpsite flowed into surrounding small canals, rice fields and farmlands. People who have lands around there cannot do farming activities. Fish was also extinguished. Furthermore, the water in small canals cannot be used for animals because it has been leachate polluted. • **Air pollution:** Frequently, in the dry season, the waste was burned in the dumpsite. The smoke emitted from waste burning seriously polluted the surrounding environment and affected health of people living around the dumpsite. • **Waste management capacity at dumpsite:** The dumpsite covers approximately 17 ha of land in which 8 ha belong to CINTRI and 9 ha belong to GAEA. As observed, the actual situation of waste management of both companies still remains poor, especially that the wastes are scattered around the area.	
Does the commune have specific programs targeted to waste pickers, including programs specific to child waste pickers, education, and community integration?	We do not have specific programs targeted to waste pickers, including children waste pickers, education, and community integration. Generally, the relevant local authorities do not allow the children who are studying to pick waste in the dumpsite because we worry about the effect to their study. But currently, because of COVID 19 outbreak, all schools in province have been closed for a while. Now we see there are some children going to the dumpsite to pick waste for additional income. Even local authorities have no specific programs targeting waste pickers, but they are enhancing the living condition of waste pickers through cooperation with LEAP project. The Livelihood Enhancement and Association of the Poor - LEAP Project is working with the purpose to improve access of the poor and vulnerable households in communities to financial service, opportunities for generating income. More than 70% of households of waste pickers are the targeted group of the project.	Mr. Soy Seiha, Trapeang Thom Commune Chief
Does the village/commune have plans on or related to SWM? Is it included in the VDC plan/Commune Investment Plan? Could the study team be provided with a copy of said documents?	The dumpsite at Trapeang Thom commune is being operated by two private companies, GAEA and CINTRI within 8 ha and 9 ha of land, respectively, with direct technical management aspect from relevant provincial departments and provincial hall; thus, commune level has no role or responsibility in managing this dumpsite. It means that it is not within the capacity of the commune. Regarding SWM plan, the commune did not integrate into commune investment plan (CIP).	Mr. Soy Seiha, Trapeang Thom Commune Chief
Does the village/commune have plans for groups that depend on the dumpsite for their livelihood? Is it included in the VDC plan/Commune Investment Plan?	Commune has no plan to integrate in to CIPs for group that depends on the dumpsite for their livelihood, but commune is enhancing the living condition of waste pickers through cooperation with LEAP project and other local NGOs.	Mr. Soy Seiha, Trapeang Thom Commune Chief
What are your views/opinions regarding the proposed project and the possible landfill site alternatives?	<u>On the Existing Dumpsite</u> The dumpsite area is located in Anlong Pir village, since it has been going on for more than ten (10) years. It cannot be acceptable due to the dumpsite condition which has not been properly implemented by private companies and does not comply with the terms of the contract between the companies and	All Participants

Key Questions	Response	Response Made By
	relevant provincial departments / provincial hall. Meanwhile, this is being agreed among local authority, waste picker and private companies to operate the dumpsite by allowing waste pickers to enter the dumpsite to collect valuable waste before being covered by soil. If not allowed to pick up, they will protest against dumping operation here, as they get part of the revenue from the dumpsite. Therefore, there is an understanding between the local people and the dumping company to make this place work until now. On the Propose Landfill Currently, this area is a potential eco-tourist area by connecting to the Tonle Sap Lake and otherwise this area is a flooded forest during the rainy season and is becoming an important fish conservation area. Nearly 100% of people living inside this area are farmers with main occupation in farming and fishing. Generally, they are able to plant rice 3 times per year by depending on water source for irrigation from 78 dam. The 78 dam is the main water source for rice fields, animals and fishing. If proposed landfill will be placed near the dam, the people would worry about losing water source for rice fields and fishing opportunity also.	
Could you describe the quality of the environment in the area (in the area where the dumpsite is and its surrounding areas) before the dumpsite was established and now?	Before dumpsite establishment: **1. Anlong Pir village** It did not affect people living in the village for environmental aspect, they could cultivate and do fishing, etc. **2. Phnom Dei village** There was no bad impact to people living in the village for environmental issue and the health situation was normal condition. Current situation after established dumpsite: **1. Anlong Pir village** There are a lot of exposure from the sanitation sector such as bad smell spreading around 2 to 3 km around the dumpsite, the water quality around the dumpsite is not so good due to the leakage of some leachate flowing into the stream, drilled wells, ponds. It has affected the paddy fields, reducing rice yields and has also affected drinking water; especially in the rainy season, water in the village cannot be consumed and some people usually get diarrhea and flu. **2. Phnom Dei village** There is foul odor and some people complained on the stench, but now people are accustomed to the smell of rubbish and there are health problems for people with chickenpox.	Mr. Chhim Ley, Anlong Pir Village Chief Mr. Lios Pheum, Phnom Dei Village Chief
How has the dumpsite affected its surrounding area? The community? The residents? (Positive and Negative)	**Positive Impacts:** Can create jobs and additional income for people as well as provide convenience for people to dump garbage. Most of the villagers, about 70%, choose to collect scrap metal. Some of the families go together to earn their living and can collect some organic waste for raising animals. **Negative Impacts:**	Mr. Chhim Ley, Anlong Pir Village Chief Mr. Lios Pheum, Phnom Dei Village Chief

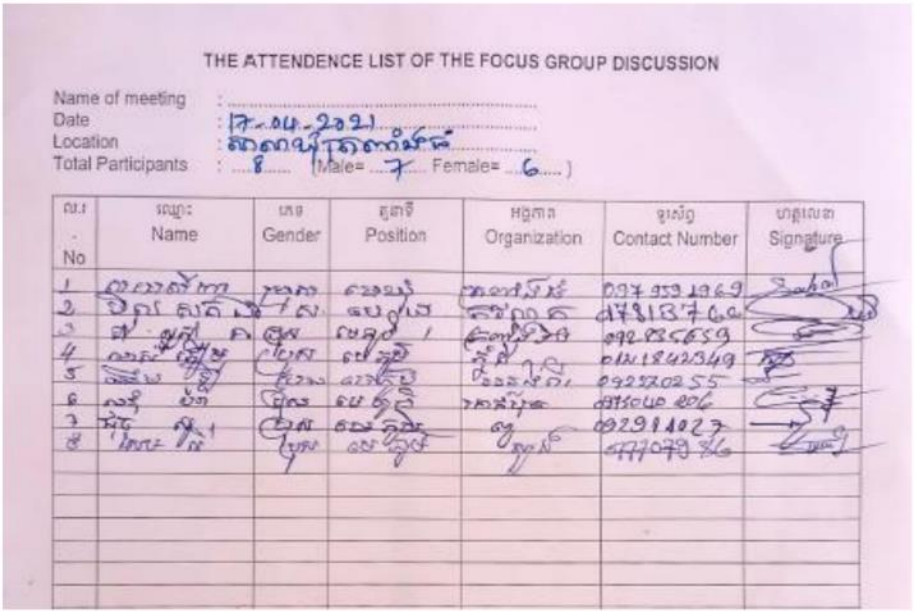
Key Questions	Response	Response Made By
	During the rainy season, the quality of leachate leaking from dumpsite affects the quality of groundwater, such as unusable water from the well; some crops are damaged; and, rice yields are reduced. And, there are flies from the dumpsite coming to the villages.	

C. Participants

The participants were composed of a total of eight (8) key representatives from the eight villages surrounding the dumpsite in Trapeang Thom with seven (7) males and one (1) female in attendance. The list of the KII participants is found in the table below.

	Name	Sex	Age	Position	Address	Phone Number
1	Soy Seiha	M	N/A	Commune chief	Trapeang Thom	097 959 1969
2	Meol Sokongkea	F	N/A	Commune chief	Kandaek	017 813 766
3	Khaom Luos	M	N/A	Village chief	Trapeang Toeum	092 835659
4	Lios Pheum	M	N/A	Village chief	Phnom Dei	012 184234
5	Chhim Ley	M	N/A	Village chief	Anlong Pir	092 270 255
6	Chhum Ya	M	N/A	Village chief	Roka Kambot	097 304 206
7	Chuch So	M	N/A	Village chief	La Vea	092 911 027
8	Saem Ly	M	N/A	Village chief	Soung	077 707 986

D. Attendance Sheet



THE ATTENDENCE LIST OF THE FOCUS GROUP DISCUSSION

Name of meeting :
Date : 17-04-2021
Location :
Total Participants : 8 (Male= 7 Female= 6)

No	Name	Gender	Position	Organization	Contact Number	Signature
1					097 959 1969	
2					017813766	
3					092835659	
4					012184234	
5					092270255	
6					097304206	
7					092911027	
8					077707986	

ANNEX F: SOCIO-ECONOMIC SURVEY METHODOLOGY

Annex F.1: Preliminary Socio-Economic Survey

The conduct of socioeconomic survey (SES) and household (HH) survey focused on the collection of information on the socioeconomic and demographic characteristics in the primary impact area/s, their current situation at home, as well as their economic status.

A prepared questionnaire was administered by the social survey team, which covers the PAPs and PAHs of the existing dumpsite and the proposed landfill site. The survey on the latter primarily covers the residents but was further delineated as soon as the site has been defined. The target respondents in the existing dumpsite were the waste-pickers currently engaged in waste picking in the existing dumpsite and other actors in the waste management chain, such as waste collectors/haulers; junk shop owners; and owners of informal businesses. Respondents were also drawn up from the inventory of the PAP/PAH consolidated by the Study Team. The sample size of the household respondents was determined per identified project impact area.

Sampling

Respondents were selected using stratified random sampling to ensure that sampling covers the different types of households, specifically vulnerable/disadvantaged groups (i.e., waste-pickers, farmers, fisherfolk), as well as businesses, both formal and informal and may be directly or indirectly engaged in waste-related businesses. The sampling was also informed by the result of the inventory of potentially project affected persons/households (PPAP/PPAH) per the possible identified project impact areas, as well as on official data on households in the target area.

Conduct of Preliminary Socioeconomic Survey

Project of this nature may have very significant impacts on the socioeconomic and health status of receptors in and around the project area. A very important aspect of the Project is its social acceptability, which can be gauged through the attitude of the residents within or near the Project. Part of the data gathering process will be an opinion poll among residents within the impact zone to measure the reactions of those potentially affected by the Project's presence.

The activities included in the conduct of preliminary survey for the people component are discussed below:

1. ***Demographic data of impact area***: These include the number of households and household size; land area, population; population density/growth; gender and age profile; and literacy rate and profile of educational attainment. Discussion on how the project would affect existing properties in the area in terms of relocation and devaluation will be included in the report.
2. ***In-migration patterns as a result of project implementation***: The data needed for the assessment are settlements map, census of population/property that will be displaced

or disturbed, and housing ownership profile/availability of housing and number of informal settlers, if any.

3. ***Impacts on indigenous peoples (IPs) and culture/lifestyle***: Demographic data on IPs will be collected to determine the probable change in their lifestyle if the project will be implemented.
4. ***Threat to delivery of basic services/resource competition***: Discussion of the availability of public services in terms of: water supply, power supply, communications/transportation, health resources (government and private), peace and order/crime, education facilities, and recreational facilities/sports facilities will be part of the study.
5. ***Threat to public health and safety***: Discussion on public health vis-à-vis the current health conditions in the area as well as analysis of diseases that may be affected by climate change will be considered. The statistical data/information related to public services needed are: literacy rate or profile of educational attainment; morbidity and mortality rates (infants and adults – 5-year trend); common diseases in the area including endemic diseases; environmental health and sanitation profile; crime rate; and food security.
6. ***Generation of local benefits from the project***: The socioeconomic data that will be needed are: main sources of income; employment rate/profile; sources of livelihood; poverty incidence; commercial establishments and activities; and banking and financial institutions. The objectives are: enhancement of employment and livelihood opportunities; increase business opportunities and associated economic activities; and increase revenue of local government units.

Traffic congestion: Traffic impact assessment, if applicable, including capacity of road system in terms of load/count will be done.

Annex F.2: Design of the Social Survey

In line with the Preparation Studies, the conduct of the social survey will be anchored on the following objectives:

- Establish the conditions in the project area/s by conducting socioeconomic profiling of the project-affected persons in the existing dumpsite and in the proposed site of the sanitary landfill in Siem Reap;
- Determine the potential socioeconomic and environmental impacts of the proposed sanitary landfill;
- Identify the perception and level of awareness of the PAPs and the impacted communities of the project; and,
- Inform the development of the Environment and Social Impact Assessment and the formulation of the Environmental and Social Management Framework.

With this, primary data and information gathering are to be conducted through an inventory of project-affected persons (PAP), socioeconomic survey (SES), key informant interviews (KII), and focus group discussions (FGD). **Table 1** summarizes the target respondents and

pertinent information to be gathered for each method, while the succeeding subsections detail the proposed topics and key questions.

Table 1: Primary Data Gathering Matrix

Method	Target Respondents/ Participants	Data and Information to be gathered
Key Informant Interviews	• Commune leaders • Village chiefs of: o Villages surrounding the existing dumpsite o Villages surrounding the proposed landfill	• Existing situation of the SWM (including practices) in the area • Existing plan/s on SWM in the area • Programs for the sectors that depend on the existing dumpsite for their livelihood (i.e., waste-pickers, haulers, junkshop owners)
Socio-Economic Survey	PAPs / PAHs in: Existing dumpsite and surrounding areas: • 55 waste-pickers[1], • 5 waste collectors and haulers, • 5 junk shop owners, • 5 people involved in animal husbandry, • 5 informal sellers and kiosk owners near the dumpsite, and • 5 other individuals / businesses whose incomes depend on the dumpsite Proposed Sanitary Landfill Site: • Household residents of the villages within one (1) km radius of the proposed site [2]	• Demographic data (i.e. Land area, population, HH population and size, population density/growth gender, age profile, literacy rate, profile of educational attainment, etc.) • Sources of Income • Living conditions • Assets • Expenditure • Future Plans after closure of dumpsite • Potential impacts during SLF construction and operation
Focused Group Discussion	• Waste-pickers • Children • Fisherfolks • Women's groups • Other vulnerable sectors identified • Local authorities	• Existing organization and system of the waste picking and recyclables market • Perceived impacts of the proposed project (i.e., closure and rehabilitation of the dumpsite and construction of a new landfill in a new location • Proposed livelihood interventions of the government

[1] Number of target waste-pickers to be surveyed is still preliminary and is based on the total number of waste-pickers identified from the 25 January 2021 site visit that found 273 total waste-pickers. Per discussion with the World Bank and the Engineering Consultant, the survey of 20% of the total population shall suffice.

[2] Similar to the computation of the sample size for the waste-pickers, the Study Team shall cover 10-20% of the household population through random sampling. The sample size shall be computed as soon as the proposed site is finalized.

ANNEX G: PUBLIC CONSULTATION MEETINGS AND STAKEHOLDER ENGAGEMENT

Preparation Studies for Environmental and Social Framework Documents for Proposed World Bank Financed Solid Waste and Plastic Management Improvement in Cambodia

Public Consultation Meeting and Stakeholder Engagement Report

I. Brief Overview of the Proposed Cambodia Solid Waste and Plastic Management Improvement Project

The World Bank (WB) and the Royal Government of Cambodia (RGC) are working to prepare the proposed Cambodia Solid Waste and Plastic Management Improvement Project (CSWPMIP) with the objective of improving the solid waste, plastic management, and capacity in selected municipalities in Cambodia. The Project will finance solid waste management investments in (regional) landfills, other solid waste infrastructure, cost-effective treatment/recycling, regulations, and capacity building at national and local levels together with supporting the improvement of the performance of private sector.

The project will be implemented over a six-year period. Participating municipalities preliminarily identified for solid waste infrastructure financing under the Project are the following: (a) Siem Reap Town in Siem Reap province, (b) Chbar Mon Town in Kampong Speu province, and (c) Ta Khmao Town in Kandal province.

A pre-feasibility study is being undertaken to inform the Project preparation as well as the preparation of an Environmental and Social Management Framework (ESMF) with Resettlement Policy Framework (RPF), a Preliminary Environmental and Social Impact Assessment (ESIA) for Siem Reap and a Stakeholder Engagement Plan (SEP). These include a detailed assessment of site suitability for landfill and waste treatment and material recovery facilities (MRF) for recyclables and composting facilities.

II. Description of the Public Consultation Meetings and Stakeholder Engagements

As part of the process to develop a Stakeholder Engagement Plan (SEP) for the Project, the Ministry of Interior (MOI), together with the Ministry of Public Works and Transport (MPWT) and the Ministry of Environment (MOE), have proposed to organize public consultation and stakeholder engagement activities in Siem Reap, Kampong Speu and Kandal with the possible project-affected communities.

The main objective of the public consultations and stakeholder engagements is to inform and discuss with different groups of stakeholders on the project design, specifically:

a) objective, components and activities as well as eligibility criteria;
b) infrastructure investments in solid waste disposal and recycling, composting;
c) site suitability process for landfill investments and site options;
d) Potential risks and impacts and foreseen mitigation measures and accompanying documents to be disclosed and consulted;
e) stakeholder engagement process with interested and potentially project affected stakeholder; and,
f) grievance mechanism and preferred ways of stakeholder engagement and communication.

III. Schedule

In coordination with the MOI and the local authorities, the public consultations and stakeholder engagements were held at the provincial hall (with provincial authority, district/municipality, communes, villages, and relevant line departments) and at the locations of the Trapeang Thom commune office near

the current dumpsite (Landfill Site Option 1) and at Trapeang Tim village, Kandaek commune (Landfill Site Option 2) in Siem Reap from November 29 to December 1, 2021.

As for Kampong Speu, the public consultation and the stakeholder engagements were held in the morning on December 7, 2021 at Sovannkiri Pagoda participated by representatives from MOI, Chbar Mon Municipality, Sangkat, villages, waste-pickers and the residents living near the existing dumpsite. In the afternoon, the team conducted the site visit to the new landfill site option led by a deputy governor of Kampong Speu. Similar public consultation and stakeholder engagements were also held at Preah Puth Andet Pagoda in Kandal province on December 9, 2021

Registration and inquiry on COVID-19 with body temperature checking, alcohol spraying were conducted on the participants and compliance with preventive health and safety measures, including social/physical distancing was ensured throughout all sessions.

A summary of the schedule and venues of the public consultations and stakeholder engagements can be found in **Table 1**.

Table 1: Summary of Public Consultation and Stakeholder Engagement Schedules

Province	Sessions	Type of Meeting (No. of Participants)	Schedule	Venue
Siem Reap	1. Meeting with government municipal, Bakong district, Kandaek, Trapeang Thom communes and village chiefs and line departments DPWT, DOE, and DOH.	Physical (33) Online (>20)	November 29, 2021 8:30 – 11:30 AM	Siem Reap Provincial Hall
	2. Kandaek Commune Chief, Trapeang Tim village chief, residents and community at proposed WWTP site	Physical (33)	November 29, 2021 2:00 – 5:00 PM	Kandaek Commune
	3. Trapeang Thom commune chief, 6 village chiefs, line departments, DPWT and DOE, waste-pickers and neighboring communities	Physical (38)	November 30, 2021 8:00 – 11:30 AM	Trapeang Thom Commune
	4. Vulnerable groups, children at the existing dumpsite, 6 village chiefs	Physical (39)	November 30, 2021 2:30 – 4:30 PM	
	5. Sub-National Level (provincial, municipal, district Levels), line departments, DPWT, DOE, and DOH waste-pickers, neighboring communities, GAEA, CINTRI) joined with business, tourism sector, residents, NGOs, any other interested stakeholders	Hybrid: Physical (33) Online (>20)	December 1, 2021 8:30 – 11:30 AM	Siem Reap Provincial Hall
Kampong Speu	1. Sangkat Chbar Mon Chief, Sampov village chief, residents, community at existing dumpsite, vulnerable groups, children at the existing dumpsite	Physical (80)	December 7, 2021 8:00 – 11:30 AM	Sovannkiri Pagoda
	2. Site Visit for Site Option (Vice Governor, MOI, WB, KCC, ESC)	Physical (~10)	December 7, 2021 2:00 – 5:00 PM	New Site Option Location
Kandal	1. Prek Ho commune chief, Prek Ho Keut 1 village chief, residents, community at existing dumpsite, vulnerable groups, children at the existing dumpsite	Physical (53)	December 9, 2021 1:30 – 5:00 PM	Preah Puth Andet Pagoda

IV. Agenda

The Public Consultations followed the following program and agenda:

- Arrival and Registration
- Singing of the Cambodian National Anthem,
- Opening Remarks
- Welcome Remarks
- Overview of the Project and Brief Result of the Study
- Overview of the Public Consultation and Stakeholders Engagement Workshop and Open Ceremony
- Overview Of Project Objective, Components, Activities, and Applicable Environmental and Social Standards
- Process for Landfill Site Suitability Analysis and Selection and Preliminary Conclusion
- Possible Landfill and Waste Treatment Facilities, Pollution Clean-Up and Management
- Open Forum / Question and Answer
- Closing

After the presentations, the community facilitator led the exchanges and discussions in the open forum with the question and answer (Q&A) session. All issues, concerns, ideas and suggestions of the stakeholders/participants raised during the open forum were captured and documented in the minutes of the public consultation meetings.

See **ANNEX A to H** for the photo documentation and attendance list for the respective sessions listed in **Table 1**.

See **ANNEX I** for the Sample Public Consultation Announcements posted at each venue ahead of the meeting.

See **ANNEX J** for the Program of the Public Consultations. A similar program in Siem Reap was adapted for the other consultations with some flexibility according to time and audients involved.

Siem Reap Public Consultations and Stakeholder Engagement

Minutes of the Meetings

November 29, 2021 | 8:30 – 11:30 AM	**Siem Reap Provincial Hall**

See photos and attendance list in ANNEX A.

Remarks by Siem Reap authority representative, Sok Thol, Director of Provincial Administration: Siem Reap is the one of the world's tourism destinations and shared the largest income for the province. There are ongoing projects being undertaken in the province such as:

1. Thirty-eight (38) roads of USD$150 million financed by the government. It has now reached 90% of civil work.
2. JICA Smart City Project
3. Auto parking project and battery used-bikes/cars project in Siem Reap
4. CSWPMIP Team: Meeting, data collection, and field visits with the support of Siem Reap authority. Current dumpsite in Anlong Pir Village, Trapeang Thom commune (8-ha land with possible expansion) with approximate 456 households (HHs) equating to about 2,186 possible project-affected persons (PPAPs) and at Trapeang Tim Village, Kandaek Commune (58-ha land) with approximate 210 households equating to about 1,050 PPAPs and another location at Romchek Village, Romchek Commune, Banteay Srei District (50-ha land)which is adjacent to forest community and Apsara Zone. Several discussions were carried out in the past. Siem Reap Governor wanted to rehabilitate the current dumpsite as the new one (Proposed WWTP site in Kandaek commune) is sensitive and in the flood area.

Medical waste is still an area of concern. The support from WB is important to address environmental and social concerns arising from the dumpsite and poor waste management, which was also highlighted in the Smart City Project of Siem Reap.

Remarks and Opening Ceremony by Suon Samrith, Deputy Director of Department of Function and Resources, General Department of Administration (GDA), MOI: The project preparation has started since early 2021. A pre-feasibility study is underway with learning from international experiences in the region. The main focus is on improving of environmental conditions of the current open dumpsite. The three (3) provinces of Siem Reap, Kandal and Kampong Speu are included. The main objectives of the RGC are to:

1. Improve waste management and expand to other target areas
2. Implement waste management policies, and
3. Build the capacity development at national and provincial levels.

The MOI expressed their gratefulness to the Siem Reap authority, relevant sub-national level authority and the WB for possibility to finance the project to improve waste management system in the country.

Remarks by Katelijn Van den Berg (WB): This mission aims at consulting with provincial authority, and meeting with commune authority, and all stakeholders. Site suitability assessment is underway to identify positive and negative issues as it is sensitive infrastructure both on environmental and social issues. All stakeholders will be encouraged to express their concerns. Now, the project is at:

1. Preparation of the project by the WB and RGC,
2. Ongoing feasibility study, siting options by ESC and CEST/KCC consulting firms, and
3. Parallel environmental and social (E&S) studies by CEST/KCC on potential risks and impacts and measures.

The detailed studies and engineering design will be carried out, once financing is secured, including further consultations with PPAPs. It is important to highlight that part of the community discussion is to obtain feedback. In January and February 2022, further studies will be carried out and consultations will be again held. Specific design and E&S studies will be prepared in detail. The participants are encouraged to raise questions.

Virtual Presentation by Nigel Landon (ESC), consultant firm on the plan and results of the pre-feasibility studies: Virtual presentation of the plan which is split into three sections: (1) the project objectives; components and activities, (2) landfill site suitability assessment and selection process, and (3) possible landfill and waste treatment and recycling facilities (ref. PTT material developed by the team).

Presentation by Yim Mongteoun (KCC): The project's ESF relevant standards (all except ESS 9) and ESF instruments being prepared (ESMF, RPF, IPPF, LMP, and preliminary ESIA).

Questions (Concerns) and Answer
Facilitated by Mr. Pum Thol, Community Facilitator

1. **So Platong (Bakong District Governor)**: He agreed and expressed happiness with the result of preliminary study for improving on existing dumpsite because sanitary landfill can reduce impacts and risks as much as possible. He also mentioned that storage (packaging), transport, and landfill management are key for solid waste management (SWM). Improving the current dumpsite would result in (1) reducing impacts and (2) rehabilitating and improving physical facilities. Bakong District will join hands with all stakeholders to realize the project.
2. **Nhet Bol (MOE):** Open dumpsite and sanitary landfill are different. The ADB and WB are supporting the CSWPMIP. Once the project is confirmed for the implementation, capacity and budget are needed for district/municipal administration. Without supporting budget for operation, the management of sanitary landfill may fail. He expressed concern on the management of the sanitary landfill's sustainability especially the budget for operation. If not available, the planned sanitary landfill will become an open dumpsite which is a waste of money.
3. **Sok Thol (Director of Siem Reap Provincial Administration):** SWM has common problems regarding to the development especially in developing countries. One of the problems is budget which is the cause of the failure.
4. **Kim San (Provincial Official)**: When are the CH4 and Compost received and how will this be shared to users?

   Katelijn Van den Berg (WB) responded that the municipality will establish, with the support of the WB, fee collection to pay for the private collection firm. There are a lot of the requirements for the collection contract, including performance indicators. Technical assistance support will provide GIS-based maps for easy waste and fee collection, and planning. Regarding the question from Kim San on CH4 and Compost, based on the public consultations conducted at the local level, it will depend on how

much interest or requirement there is (both energy and compost). However, CH4 and Compost should be prioritized to the nearby community and more benefits from recyclables.

5. **Siem Reap Authority:** In 2035, incoming tourists will increase up to 10 million. Waste management is a core agenda of the Siem Reap province. There are gaps in capacity and financial transfer to districts/sub-national administrations. They confirmed their support to the project.
6. **Provincial Investment and Planning Office of Siem Reap Province:** How to manage renewable energy from CH4 and compost?

   Katelijn Van den Berg (WB) replied that this is one of the objectives of the community consultation and the answer to this question shall be verified later on.
7. **Commune authority on the current dumpsite:** There is both concern and happiness to have a better to have sanitation system. He is happy with the project, if the management system is good – if it reduces pollution, and is well-managed. He mentioned that people always complain about the existing dumpsite so when they hear about the future rehabilitation of the dumpsite, they are happy with the project.

The MOI advised all local authorities to disseminate message to PPAPs and villagers about the project and willingness of the government to support the project.

November 29, 2021 | 2:00 – 5:00 PM Trapeang Tim Village, Kandaek Commune, Bakong District

See photos and attendance list in ANNEX B.

Commune Chief: The Commune Chief opened the consultation. She informed that they now throw garbage at Trapeang Thom commune, but it is not well-managed and the amount of garbage is increasing. With support of the WB, this project is now coming to fruition.

Suon Samrith (Deputy Director of Department of Function and Resources, GDA-MOI): With the WB (potential) financing, we have been preparing the project and are here to collaborate on the project today. As a cultural heritage designated-province, we chose a project for solid and plastic waste improvement. Today, we arrive at this project's preparation stage. We need to understand your interest, impression, recommendation, concerns and challenges. For project efficiency, we need to hear your voices/expressions.

Katelijn Van den Berg (WB): WB plans to work together with local authorities to improve solid waste management in Siem Reap, Kandal and Kampong Speu. The project aims at improving the collection of waste, treating leachate and disposing in a sanitary manner. Please contribute your voice to this consultation process.

Chhim Seiha's presentation: Today's participation is very important. We are in the process of selecting a site. However, no decision has been made on the location yet. We aim to support the management of solid and plastic waste in five (5) provinces. This consultation is important in the process of identifying a site. Three (3) sites are being introduced in Siem Reap, in which the new one (nearby WWTP site) is less favorable, as it is close to the Tonle Sap Biosphere Reserve (TSBR). The existing one in Anlong Pir village appears to be feasible with existing roads where people can continue to work at the same site.

15-min Tea Break: Before the break, one of the participants suggests that the explanation should be clearer and more concise as it is confusing. In answering the question, KCC mentioned that the project

will make a sanitary landfill that can prevent groundwater pollution, lead to reduced odors, and make the site more hygienic, etc. KCC also clarified that the site has not been selected yet. The current site is less favorable. All concerns expressed in the consultation will be taken into consideration.

During discussions there was an initial question about the size of the landfill. KCC answered that the size should be bigger than 10 ha, to enable to make the landfill size feasible and that should last for more than 10 years. The nine (9) standards relevant to the project were then presented.

Question (Concern) and Answer

1. **Why is only one village invited to this meeting and no other villages out of the 10 villages of the Commune (Kandaek)?**

   KCC responded that only one village (community) is invited to discuss the potential siting because the community is living/working close to the potential site for rehabilitation. KCC also indicates that the project aims at developing a sanitary landfill. The project has not come to a conclusion for site selection yet. However, three (3) sites were introduced by the Siem Reap authority as potential sites for further study.

2. **Concerns regarding the size of the land requirement for the landfill. They also indicated that they do not want to have any landfill in the village because the construction of the facilities would limit our access to water for dry-season rice cultivation. It may also hamper the environment. The community is less concerned about the environmental impacts, because from the presentation, they feel they can trust the engineering solutions and E&S safeguarding measures presented. The rice fields are dependent on an abundant water resources, thanks to the 78 dikes built to retain the water for dry season uses.**

   KCC repeated, in response to the community, that we have not decided on the site yet. Once the site is selected, it will be built to meet sanitary conditions. The concerns about the lack of water for rice field are well taken into consideration by the project team, in the meantime.

Katelijn Van den Berg (WB) concluded the consultation by thanking everyone for their participation. This was followed by Suon Samrith (MOI) thanking everyone for their feedback and informed the participants that the preparation of this project will go through rounds of consultations and in-depth studies. He indicated that the process of project preparation is rigorous and requires careful thought, considering all factors. As for the project, the study team will try their best to minimize the impacts on the people which is why the people were asked what they think the advantages and disadvantage of this project could be. A good point from the discussion today was that the participants provided positive feedback on the project which will improve sanitation at the landfill.

November 30, 2021 | 8:00 – 11:30 AM	**Trapeang Thom Commune, Prasat Bakong District**

See photos and attendance list in ANNEX C.

The emcee introduced the purpose of the consultations and key speakers from the authority (Trapeang Thom Commune chief), the WB (Katelijn Van den Berg), the MOI (Suon Samrith), and Provincial Department of Environment (PDOE). The key message of the first part of the session is the presentation of the main objective of the CSWPMIP. The speakers encouraged participants, primarily waste-pickers and PPAPs living in and surrounding the current dumpsite, to raise their concerns and expectations from the proposed project.

Katelijn Van den Berg (WB): The WB is working with the government to prepare this project for the improved management, collection, recycling and disposal of waste. No site has been finalized yet as the WB and the study team are taking into consideration different criteria for site identification. The purpose of today's consultation is to listen to comments and concerns and questions and to share the results of the study related to site identification.

Suon Samrith (MOI): I come here to attend this consultation, just to understand your concern. We make the dumpsite better, improve sanitation. This is the target province for the sanitary landfill and it will help improve the sanitation for you and your children. We would like to understand the impacts on you and we thank you for your concerns, to avoid and minimize the impacts on your livelihood.

MOE Representative: What are the impacts of sanitation on your livelihood and the quality of air, water etc.? This project is being introduced to lessen the impacts on your livelihood. There are three (3) site options here. As an example (photo), this site always has flies and fire and creates bad smelling water from your well. This project wants to obtain your feedback to improve the project design. For example, if the site is enlarged, it may impact your livelihoods. Your feedback to contribute to this meeting will help us manage the risks and impacts.

Question (Concerns) and Answer

1. **Sok Yath, waste-picker from Anlong Pir village:** She suggested to provide medicines and PPE for waste-pickers.

   Katelijn Van den Berg (WB) responds that as part of the project, there will be PPE, health check and health benefits for waste-pickers.

2. **Moeun Sokleang, waste-picker from Anlong Pir village:** She suggested to improve access road to the current dumpsite. The current access road from NR6 to the site is difficult for trucks and WPs to move waste and recycling materials.

   CSWPMIP team member replied that the road rehabilitation is part of the rehabilitation of the dumpsite.

3. **Kim Sa Um, from Phnom Dei village:** She raised a concern on the leakage of leachate which might pollute underground water (wells). She also raised concern about the bad smell from the discharge of waste.

   Katelijn Van den Berg (WB) responded that the design of the landfill will address this matter, including clean water. There will be possibility for supplying pipe water.

4. **Sem Sorn, from Phnom Dei village**: Can we all have access to waste-picking as we are do now? She also requested for drilled well.

   CSWPMIP team member replied that the project will not remove access to waste-picking, except for kids below age that is prescribed by the Cambodian labor law. They would be provided livelihood restoration. Again, some health care considerations and preventions will be considered for all waste-pickers, including PPE.

Katelijn Van den Berg (WB) concluded the consultation by thanking everyone for their participation followed by Suon Samrith (MOI) thanking WB, authority and relevant stakeholders for attending the

consultations. Both WB and MOI representatives assured that all comments will be taken into consideration and will be incorporated into the design. The project ensures no harm to livelihoods of the waste-pickers.

November 30, 2021 | 1:30 – 5:00 PM	**Trapeang Thom Commune, Prasat Bakong District**

See photos and attendance list in ANNEX D.

The session was dedicated to gather feedback from vulnerable groups and children. The facilitator explained the positive and negative impacts caused by the current dumpsite and the rehabilitation works which would be financed by the project. All children (at secondary level from Anlong Pir village) and handicapped participants were encouraged to express their understanding on health impacts, social and environmental consequences from the current dumpsite and the benefits from improving the facilities. Most of the children and handicapped women understood the consequences and expressed strong support to the project.

Among the participants, six (6) children are directly working in the current dumpsite. They were asked to stand upfront of the meeting stage and tell their story involving waste-picking activities. All of them are of age 14 and below. They said they have volunteered to work in the field (some of them to join their mothers) and earn for their families. The children expressed that they are not happy and not willing to continue picking waste. When they were informed that they were not allowed to work in the field, most of them expressed happiness and said that they wanted to spend more time in school.

Question (Concern) and Answer

A handicapped woman requested to improve the current dumpsite as presented by ESC consultant.

Chhorng Phalla, teacher from the Anlong Pir School, said that she does not know how waste-picking and poor sanitation has impacted the kids' health. She expressed that she strongly supports the project to improve the current dumpsite as sometimes they can smell the dumpsite in school.

Katelijn Van den Berg (WB) appreciated the kids' reading the proposed layout for the sanitary landfill and expressed that she wishes all the kids to be successful at school. Suon Samrith (MOI) applauded their courage in speaking up and showing their knowledge, comprehension and concerns.

December 1, 2021 | 8:30 – 11:30 AM	**Siem Reap Provincial Hall**

See photos and attendance list in ANNEX E.

Remarks by representative from the provincial hall: The authority welcomed and thanked the WB for making effort to help the province to address waste management issues. Plastic waste is a big concern due to rapid increasing of uses of plastic for packaging and in daily life. The same for the battery waste. The provincial administration committed to supporting this project and ready to work with all stakeholders.

Remarks by Katelijn Van den Berg (WB): She thanked all key ministries and stakeholders including local authorities. The project focuses on waste management and improvement in Siem Reap, Kandal and Kampog Speu. She explained to the key components of the project, including support for infrastructure development, capacity development, waste information and fee collection system for local municipality.

Remarks and opening ceremony by Suon Samrith (MOI): Highlighted the components of the projects, the needs for improving SWM in Cambodia, and strong commitment made by the Royal Government of Cambodia to support the project through MOI as key counterpart.

Question (Concern) and Answer

1. **Meng Kry (Deputy Governor of Siem Reap Municipality):** Garbage is a term, easy to say but implementation and operation is difficult (collect and manage). The challenges are with people in the Kandaek commune (Bakong District). The current open dumpsite is causing a problem. But for this project with the proposed sanitary landfill, people will support if it is well managed according to the plan. People who are living around the current dumpsite used to eat their meals inside a mosquito net because of flies from the dumpsite. Local community needs to disseminate further information about health issues and the plan for sanitary landfill. At the provincial level, there will be a unit and M&E system to be established, and the contract arrangement with private companies. Technical support is needed in this area. For waste management, what can be done? The current land is 8 hectares and only 2 hectares are reserved. Is that sufficient? Currently, average waste generated is around 350 tons to 500 tons per day as a result of influx of tourists. What will be done with the capacity of the site and how long it will be filled up? If the government plans to buy additional land that is okay. He mentioned about the contract, and recommended to buy or reserve some spare land by the working team at provincial level as the land price in future will be very high and think ahead of amount of waste can be disposed depending on the life span of landfill.

   Katelijn Van den Berg (WB) responded that WB will provide technical support to the municipal waste management unit to work with the private sector. The support to the municipality will include the performance indicators, transport and landfilling system (to collect fees and use the revenue to pay the contractors). Cost recovery is important and must assess how much costs are recovered from fee collection from households. This is to achieve a better environment would require a better financial health. The municipality is conducting inventory on the different types of dwellings etc. to allow a fee collection system to work.

   Suon Samrith (MOI) adds that 113 Sub-decree allows municipal and district governors to manage garbage, but its implementation is inconsistent. The contract is for 10 years according to the sub-decree. But in reality, in some locations this is for 30 to 50 years, as the contracts were entered before 113 sub-decree. So, there will be a solid waste committee at MOI. Our inter-ministerial committee (MEF, MOE, and MOI) created a contract template for all districts/municipalities.

2. **Representative from Provincial Hall:** There should be environmental and health mechanism to reduce impacts on environment and to ensure health of people is well safeguarded. All authorities are here today the local authorities need to plan well in advance for potential impacts to land. Since the land-use plan for Siem Reap city is being prepared, securing/expansion of landfill size should be part of the local land-use plan. Furthermore, there is a ring road project there, so the price of land there will be increased. The authorities should secure the land as soon as possible. There are people who support and do not support the project so the provincial authorities need to plan mechanism to deal with it. Garbage is thrown there. There should be local incentives (i.e., infrastructure investment to meet the need of local people). This is to identify the sub-projects to support local community.

Katelijn Van den Berg (WB) responded that the land needs to be bigger than 2 hectares to secure landfill that can live longer than 10 years, and this financing will need to be part of the WB financing. It is important to minimize and reduce the amount of waste. As mentioned, the waste will increase, waste management is important. The first and second components are to raise awareness (recycling etc.) for reducing the amount of waste. There will be different opinions among communities that is why community consultation is important for site selection process. We can bring some community members to visit real sanitary landfill to see how it looks like similar to Indonesia. Community input is important as a part of site selection process. The process of consultation (current and planned in January/February 2022) important for site identification. 100% support by communities is not expected but their concerns will be acknowledged and addressed so the landfill can benefit the environment and the community through employment generation.

3. **Trapeang Thom Commune Chief:** My vision for a long time is to turn the current dumpsite into a sanitary landfill, and it has been 13 years. As the Provincial authorities said, we need to find a way to secure additional land, due to a planned expansion. The current dumpsite area is not classified in APSARA area, so it can be more developed than the city now. The land price is increasing (from 5 to 7, to 10 now USD$15 per sq.m.). In the past, when there were demonstrations from local villagers, the province let MOI to resettle it. My request is to ensure that the ministries work closely with the waste-collecting companies.

4. **Provincial Department of Environment:** We are happy with the proposed project. At the same time Smart City Project also contains a component related to waste collection. We request that the system under the proposed project is well connected to the Smart City Project. How about neighboring districts, shall the capacity development extended to them to ensure that they can benefit from the project in the same manner? For plastic waste, plastic materials are to be exported, there should be support provided to them (local) to be active (particularly since its export has been closed until now due to COVID-19 pandemic).

5. **A female villager:** Requested the companies to stop children from entering the dumpsite to collect recyclable materials. They have to go to school at this age.

6. **Village chief:** For this project, I am happy because people complained about water, garbage coming to their home and rice fields. I am happy to see this project coming soon.

7. **GAEA Representative:** We own the landfill in Bakong district. How much land is needed and where? When will this be functioned for GAEA to operate? Will the company pay for use of the landfill? And how the company will be collecting the fees?

   Suon Samrith (MOI) responded that waste management is under the authorities of district and province, so this will be supported by MOI's working group with WB.

8. **Siem Reap Vice Governor:** We encourage local authorities to disseminate information to people. We requested a detailed report for a year and a monthly report of waste collection and discharge data from GAEA. A way forward, the province will collect the fees, and GAEA will transport garbage.

Kampong Speu Public Consultations and Stakeholder Engagement

Minutes of the Meeting

December 7, 2021 | 8:00 – 11:30 AM	**Sovannkiri Pagoda, Sangkat Chbar Mon**

See photos and attendance list in ANNEX F.

Sangkata Chbar Mon Chief: It is a good opportunity for my people to attend this consultation and hear directly from the WB and CSWPMIP study team. We would like to welcome all delegates and wish the consultation to be fruitful.

Chbar Mon Municipal Vice Governor: The consultation focuses on new site for a sanitary landfill. The current dumpsite is managed by the provincial authority and DoE, with several people living and working at the dumpsite. If the project doesn't move the current dumpsite, are you happy? Yes, we are, they replied. If the project improves the current dumpsite, are you happy? Yes, we are, they replied. The project will ensure impacts are mitigated and impacts on livelihoods are compensated. Are you happy? Yes, we are, they replied. We will discuss the project, what to be done and your role in improving SWP management in our villages.

Katelijn Van den Berg (WB): The project targets three provinces in Cambodia, including collection, transport and disposal at sanitary landfill. Environmental impacts are under studies and will be mitigated. The same for social and livelihoods of people who benefit from the current dumpsite. Here we have national stakeholders and provincial authorities joining us. So, we would like to hear your concerns regarding the project and components.

Suon Samrith (MOI): The project aims at improving collection, transport and disposal management. So, your role is to cooperate with the project, especially waste storage. The project will also improve the environmental and social conditions of people working and living at and around the dumpsite. Your inputs are beneficial to improve the project design, which participation is core agenda of the decentralization and deconcentrating policy of the RGC. So please speak up and share your ideas. We will record your ideas and concerns for the sake of the project design. At this stage, we don't know where the new site will be yet. Thus, improvement of the current one is necessary. I thank you all for joining the discussion and thank all provincial and local authority and the WB for spending time and resources with us today.

Emcee: Can you read the slides? One of the participants: I am illiterate.

KCC presented the project activities and components, landfill siting options, landfill selection, recovery facilities, landfill investment; results of pre-feasibility studies and the ESF instruments.

Question (Concern) and Answer

1. **Mrs. Nol Pheth, 59 years old**: expressed waste storage, packaging, and health issues from dumpsite.

2. **Mr. Meas Sorn, 77 years old, from Khpong village**: Recycling of waste, waste storage, composting, methane gas (CH4) can be extracted for cooking. Improvement of the current dumpsite will be improving the environmental conditions and public health. I am happy with the plan for the improvement of the dumpsite.

3. **Ms. Chort Nhoeun**: Improve the current dumpsite can improve the living conditions of people.

4. **Mrs. Norng Sreyneang, migrated from another province and lives in Kampong Speu**: No further comments, but happy if the current dumpsite is improved. People will benefit from the project, but I don't know what the specific benefits are.

5. **Mr. Chab Phoeun, 76 years old, Vice chief of Khpong village**: I support the plan for improving the current dumpsite. Three villages (including pagoda) surrounding the dumpsite are severely affected by the pollution, especially on people's health. People noticed the increasing of flies from the dumpsite, smoke and odor.

6. **Mrs. Keo Kuntheary, 57 years old**: I support the plan for improving the site although some negative impacts to people.

7. **Mr. Run Makara, 28 years old, waste-picker**: The presentation is very clear because waste-pickers will be safer while collecting waste. I am happy and will support the improvement of the dumpsite. He suggested to have PPE when the project is implemented.

8. **Mr. Baing Ly, 66 years old, village chief of Tamol village**: Landfill will be fenced and covered properly. If the project improves the current dumpsite to a sanitary landfill, will all WPs be having the chance to work there? How do we separate waste? Waste transport was poorly covered, waste dropping on the roads. I would like to request the waste collection company to improve the transport system, especially avoiding waste dropping on the roads.

   Katelijn Van den Berg (WB) responded that all concerns raised will be based on the project design.

9. **Ms. Soeun Ly, 69 years old**, one of the villagers suggested that waste-pickers do not allow kids to pick waste. They should go to school.

10. **A female villager**: I am old and taking care of grandchildren. When I go to landfill, how can I look after them if the project will not allow kids to enter the landfill? After school, they join me to landfill. But they did not do waste-picking.

11. **Mr. Chhuorn Nat, Sampov village chief, one of the villages surrounding the current dumpsite**: We can smell from the dumpsite although we are 2km away. I support the plan to improve the environmental conditions.

12. **Mr. Chuon Sok, a handicapped villager**: I suggest waste collection company to keep and cover waste properly to avoid waste dropped and scattered on the roads.

Katelijn Van den Berg (WB) concluded by thanking the participants for their expressing their concerns and suggestions and said that these will be incorporated into the project design. The Chbar Mon Municipality Vice Governor thanked WB and MOI for supporting the consultation and expressed gladness that the project selected Chbar Mon to be part of the CSWPMIP. He also said that once the project is decided, he and the Sangkat authority will strongly support as waste-sorting, recycling, and dumpsite improvement will benefit their villages.

Suon Samrith (MOI) informed that they will be back for more consultations to see how the consultation results will fit in the project design.

Kandal Public Consultations and Stakeholder Engagement

Minutes of the Meeting

December 9, 2021 | 1:30 – 5:00 PM	**Preah Puth Andet Pagoda, Sangkat Prek Ho**

See photos and attendance list in ANNEX H.

Emcee: The involvement of the authority (Sangkat Prek Ho chief, Prek Ho Keut 1 village chief, etc.) is essential and the representatives of the villagers and the community in the vicinity of the existing dumpsite and waste-pickers as well.

Representatives from the WB (Katelijn Van den Berg), the MOI (Suon Samrith), and the Ta Khmao Municipality (Lay Samrith, Vice Governor) were the speakers for the session. The key message of the presentation is the project's objective to improve solid waste and plastic management in Kandal and to rehabilitate the current dumpsite with infrastructure such as material recovery, composting and waste treatment facilities. Speakers encouraged participants, primarily waste-pickers and people living at and around the current dumpsite, to express their concerns and expectations of the proposed project.

Ta Khmao Municipality Vice Governor: The consultation is for a sanitary landfill. The current dumpsite is managed by the provincial authority. In the city of Ta Khmao, there are two (2) garbage collection companies – CINTRI and Po Seng Tara. CINTRI obtained their license to continue from Khim Sunny Company and is currently in a 28-year contract from January 1, 2012 to December 31, 2039. The collection and transportation by CINTRI company is carried out in seven (7) Sangkats of Ta Khmao City. As for the Po Seng Tara company, they collect garbage in Sangkat Roka Khpos and Sangkat Sitbo. However, in Sangkat Koh Anlong Chen, there is no garbage collection service. Ta Khmao has a population of over 100,000 and only has 2 hectares of dumpsite, which is too small to accommodate the current amount of garbage. The amount of garbage increases from 116 tons per day in 2018, 150 tons per day in 2019, to 279 tons per day in 2021. The increase of waste in Ta Khmao City is a concern for the future and the current dumpsite is too small to handle such amount of waste in the future. The provincial administration should consider finding another location to serve as a sanitary landfill.

Katelijn Van den Berg (WB): We are working to improve solid waste and plastic management in Cambodia. The project targets three provinces: Siem Reap, Kandal and Kampong Speu. The project aims to improve waste collection, leachate treatment, waste recycling and sanitary disposal. Environmental impacts are being studied and will be mitigated, as well as the social and livelihood aspects of the people who benefit from the current dumpsite. We have been joined by national stakeholders and provincial authorities. We would like to hear your concerns about the project and its components.

Suon Samrith (MOI): We have come here to attend the public consultation to understand your concerns and expectations regarding the proposed project. We invite you to share your comments, concerns and questions. We will record yours in the interest of project design. The project will also improve the existing dumpsite on the environmental and social conditions of the people working and living at and around the existing dumpsite, the project will not allow children under the age of 14 to work at the landfill if the current dumpsite is rehabilitated. The project has also thought about how to get these children to school. Currently, we are studying the location of a new landfill that is larger than the current one, but we have not yet decided on where the location will be. However, the environmental and social improvement of the current dumpsite is necessary.

Chhim Seyha (PPIC): A presentation on project activities and components, landfill location options, landfill selection, and recovery facilities was given. No decision has been made on the location to support solid and plastic waste management in Kandal province yet. The existing one might be rehabilitated and it is a place for material recovery, composting and waste treatment facilities, while waste-pickers can continue to work at the same site.

Question (Answer) and Concern

1. **Ly Samrot, resident of Prek Ho Lech:** He lives close to the dumpsite but is not a waste-picker while he does sometimes goes to dumpsite to collect garbage. He is in favor of a new sanitary landfill project, but he is afraid that he will not be able to collect the garbage anymore because the new landfill could be far from his home. He proposed a project to help him and other villagers to collect garbage more easily and in a more hygienic and safer way if the current dumpsite is rehabilitated.

2. **Sok Raksmey (Deputy Chief of Sangkat Prek Ho):** When will the implementation of this project start? Because the project has been delayed for a long time or it is still under consideration? People living around the dumpsite are very concerned about the access road to the dumpsite, the lack of sanitation, the stench and the flies that endanger their health. The access road is damaged every year and people often block the road so that the authorities find a solution for them.

   Katelijn Van den Berg (WB) responded that the study for the project is still in progress. Due to the COVID-19 pandemic, progress on the study has been delayed. The problem with the project is that the current dumpsite is so small that cannot accommodate the current volume of waste. Choosing a new location is difficult due to the rapid growth of the city, urban expansion, and especially in the flooded area, so relocation has not yet been determined.

3. **San Isal, a dumpsite employee:** She is disabled as a result of a traffic accident on the way to the dumpsite, she is concerned about losing her job if the dumpsite is moved. She cannot travel far from her home, as she cannot travel to the new landfill, which can be very far from her home

   Katelijn Van den Berg (WB) responded that a site for a new location for the proposed sanitary landfill must be found, as the current dumpsite is only 2 hectares in size, will not be able to meet the demand. However, the current site can be rehabilitated and used for material recovery, composting and recycling which can reduce the amount of waste and the non-recyclable waste will be dumped at a new site. We have decided and taken into account different criteria for the identification of the site. According to the World Bank's guidelines, people affected by the project will be compensated, and the rehabilitation of existing dumpsite is more likely to improve the environmental and social conditions. The project is therefore seeking your comments and concerns to improve the project design. For example, closing the existing dumpsite may impact your livelihoods. Your input at this meeting will help us manage the risks and impacts. You can express your concerns and impressions freely.

4. **Prach Mart, resident of Prek Ho Lech village:** She has been working at the dumpsite for six years. She said that the transportation of waste is not well covered, with waste falling on the road. She requested the waste collection company to improve the transportation system, especially by preventing waste from falling on the roads. The current dumpsite is unsanitary, with flies and odors. She enjoys working at the current dumpsite and earning money to help her children for their study. She is happy if the current dumpsite is improved/rehabilitated.

Yin Somean (WB) responded that environmental remediation at the dumpsite is also part of the project. The whole area will be covered with soil to prevent plastic waste from flying away, as well as odors and flies. The collection of waste in the city, its transportation to the landfill and the improvement of the access roads are parts of the project.

5. **Sok Him, villager of Prek Ho Keut:** The access road to the dump is very damaged. We request the project to rebuild the access road to avoid any accidents. Many workers and school children are using this road. She requested the project to help the children living near the dumpsite and who do not have enough money to go to school.

   Chhim Seiha (PPIC) responded that the project has also considered the rehabilitation of the access road, with budget allocated for the construction of the access road. He assured that the project has considered thoroughly the environmental and social impacts, if the project has serious environmental and social impacts, the project will not be implemented then.

   Katelijn Van den Berg (WB) added that at the dumpsite, it has been observed that children under 14 years of age are collecting the garbage, which harms their health and puts them at risk of dropping out of school. According to the CSWPMIP, children are not allowed to collect garbage. Through this project, the children will receive materials and funds for their education instead.

6. **Thor Sopheap (DOE)**: Based on experience, how far away from a residential area should a landfill be built?

   Chhim Seiha (PPIC) answered that it depends on the standards that have been applied, the distance between the landfill and the residential area should be from 1km to 1.5km. The distance to the residential area and the density would be taken into account when choosing the location of the landfill.

   Yin Somean (WB) added as an example, the landfill in Indonesia is only 300m from the city center, but does not affect the people living there. The construction of a sanitary landfill depends on the budget. If there is a lot of money, we can build a very hygienic landfill with modern equipment to prevent all environmental and social impacts.

   Katelijn Van den Berg (WB) followed up that the CSWPMIP team is studying a sanitary landfill which is different from the current dumpsite. The sanitary landfill is the process of waste collection, waste recycling, composting, landfill cell development, leachate collection system, and treatment system, and it has proven a safe working environment for waste pickers to help access recyclables.

7. **Lay Samrith (Ta Khmao Municipality Vice Governor):** The current dumpsite used to be very far from the city, so people did not want to live near it. But now, houses, buildings including Boreys (blocks of houses) have settled near the dumpsite. I want to thank the World Bank and the study team for visiting the site for proposing a sanitary landfill. Is the site suitable for a landfill? Will there be a strengthening of the national legislative, policy and institutional framework that do not allow people to settle near the landfill? If so, how far from the landfill will that be - 300m? 500m? Or will they be allowed to build their houses nearby? The provincial and municipal governments of Ta Khmao strongly support this project.

   Suon Samrith (MOI) replied that for the study of the project, we have already considered that the current dumpsite will be prepared as waste recycling and composting facilities with management

measures, and the new landfill will have the applied standards of the WB's guideline for managing the landfill in a hygienic way. To make the project effective, we have prepared all stakeholders to participate in its implementation: The MOI will provide planning, consulting services, and contract development with private operators; the MOE will develop and strengthen national legislation, regulations, policies, and guidelines for solid waste and plastic management; the MPWT will develop landfill and landfill infrastructure such as composting, recovery facilities, transfer stations, and will be responsible for cleaning up the existing dumpsite.

Katelijn Van den Berg (WB) concluded by thanking the participants for their time and that all their concerns and suggestions will be taken into consideration and incorporated into the design and studies of the project.

Suon Samrith (MOI) followed by thanking WB, the authorities, and the stakeholders for their participation in the consultations. Kandal Municipality Vice Governor also thanked WB and MOI for their support in the consultations and expressed happiness that the project has chosen Kandal for the CSWPMIP. He also said that if the project is implemented, the municipality will strongly support it.

ANNEXES

ANNEX A
November 29, 2021 | 8:30 – 11:30 AM **Siem Reap Provincial Hall**

Photo Documentation

Photo 1. Open remarks by Siem Reap (SR) Provincial Authority representative.

Photo 2. Participants from MOI, SR authority, all relevant districts, communes, and villages, MOE and PDE, PDPWT, CEST, ESC, KCC, and the WB study team members.

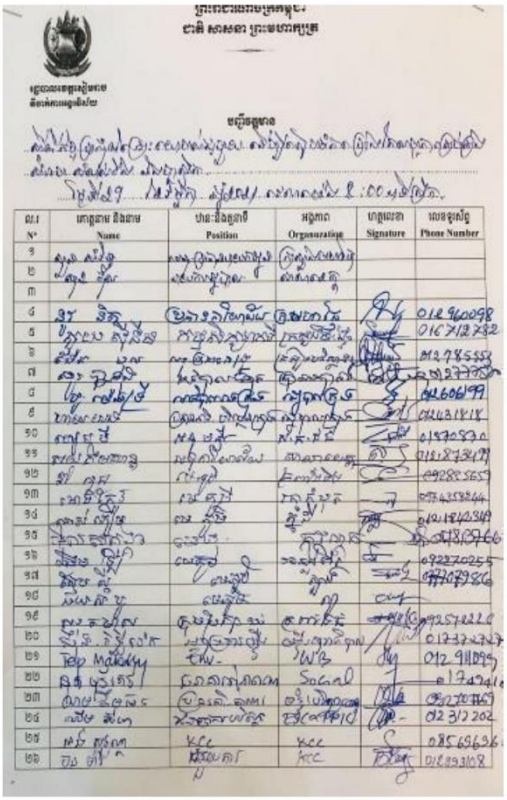
Photo 3. Social distancing in the meeting room.

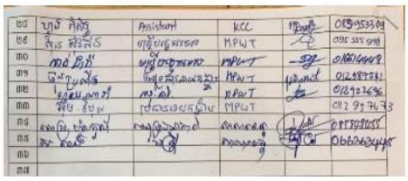
Photo 4. Virtual presentation made by Nigel Landon (ESC)

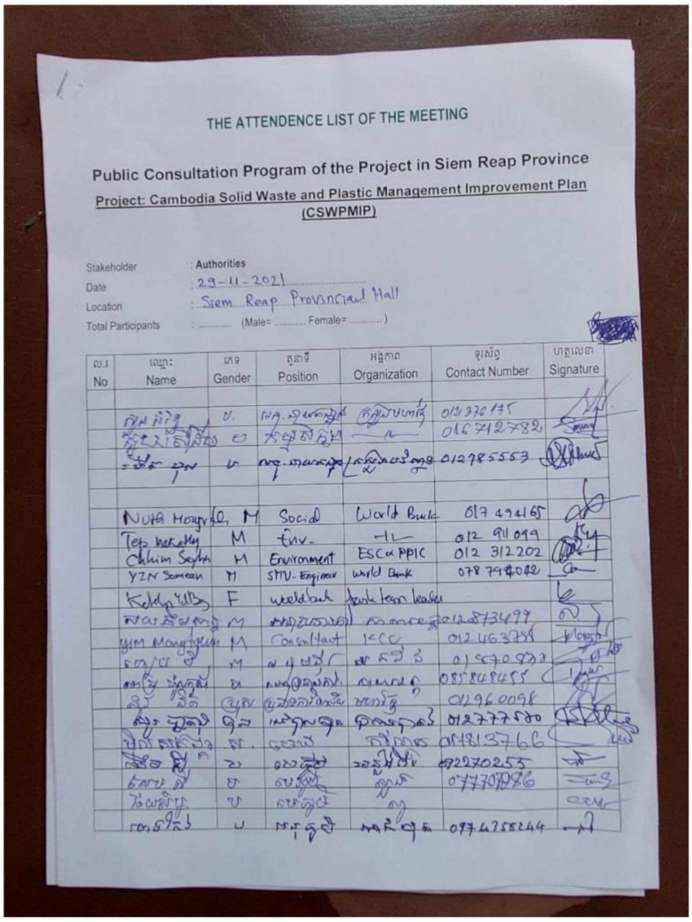
Photo 5. Remarks addressed by MOI representative

Photo 6. Project and purposes of the consultations and stakeholder engagement made by Katelijn Van den Berg(WB).

Registration and Attendance List







THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Siem Reap Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder : Authorities
Date : 29-11-2021
Location : Siem Reap Provincial Hall
Total Participants : .... (Male= .... Female= ....)

លរ No	ឈ្មោះ Name	ភេទ Gender	តួនាទី Position	អង្គភាព Organization	ទូរស័ព្ទ Contact Number	ហត្ថលេខា Signature
	[illegible]	ប.	[illegible]	[illegible]	012376175	
	[illegible]	[illegible]	[illegible]	— " —	016712782	
	[illegible]	[illegible]	[illegible]	[illegible]	012785553	
	Nuth Mongr[illegible]	M	Social	World Bank	017 494165	
	Tep [illegible]	M	Env.	-11-	012 911099	
	Chhim Sepha	M	Environment	ESC & PPIC	012 312202	
	YIN Somean	M	SMU-Engineer	World Bank	078 79[illegible]042	
	[illegible]	F	worldbank	bank team leader		
	[illegible]	M	[illegible]	[illegible]	012873499	
	Yim Mong[illegible]	M	Consultant	KCC	012463758	
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ANNEX B
November 29, 2021 | 2:00 – 4:00 PM **Trapeang Thom Village, Kandaek Commune**

Photo Documentation

Photo 1. Registration and temperature check.

Photo 2. Participants from local villages.

Photo 3. Each participant received some snacks.

Photo 4. Women (and elderly persons) were encouraged to join and raised their concerns.

Photo 5. Katelijn Van den Berg (WB) introduced the project objectives, components and activities.

Photo 6. Discussion led by a professional community facilitator.

Registration and Attendance List

THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Siem Reap Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder: Communities
Date: 29-11-2021
Location: Kandaek Commune
Total Participants .... (Male= .... Female= ....)

N°o	Name	Gender	Position	Organization	Contact Number	Signature
	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
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	[illegible]	[illegible]				[illegible]
	[illegible]	[illegible]				[illegible]
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THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Siem Reap Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder: Authorities
Date: ....
Location: ....
Total Participants .... (Male= .... Female= ....)

No	Name	Gender	Position	Organization	Contact Number	Signature
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	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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	[illegible]	[illegible]	[illegible]	[illegible]	092 85 56 59	[illegible]

ANNEX C
November 30, 2021 | 8:00 – 11:30 AM **Trapeang Tim Village, Prasat Bakong District**

Photo Documentation

Photo 1. Registration and COVID-19 measures, including social distancing was carried out.

Photo 2. Majority of the participants were women and around 20% were elderly people.

Photo 3. Remarks made by the MOI representative.

Photo 4. Remarks by Katelijn Van den Berg (WB)

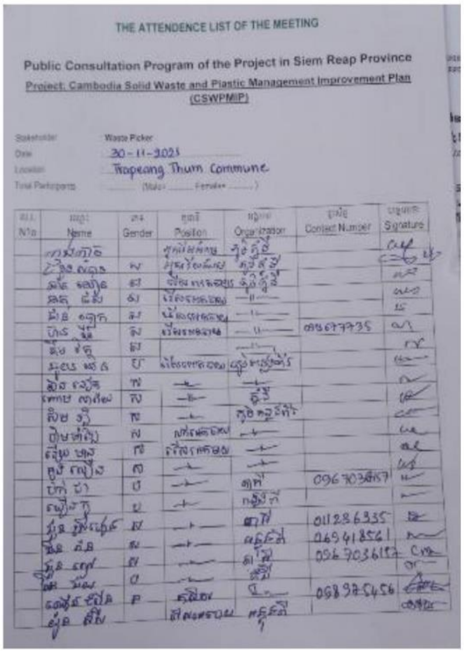
Photo 5. Participants focused on the discussion.

Photo 6. Some women attended with kids during the public consultation meeting.

Photo 7. A participant raising concerns about health issues and smell from the current dumpsite.

Photo 8. Nearly all participants raised hands to show support to the project.

Registration and Attendance List



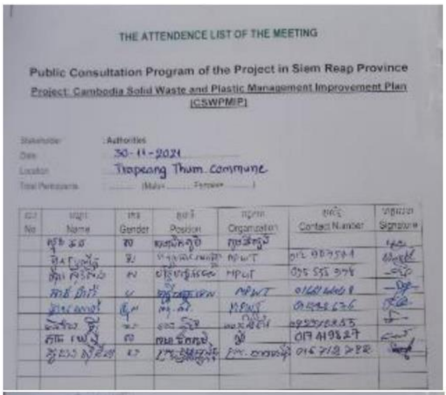
THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Siem Reap Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder: Waste Picker
Date: 30-11-2021
Location: Trapeang Thum Commune
Total Participants: .... (Male: .... Female: ....)

No	Name	Gender	Position	Organization	Contact Number	Signature



THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Siem Reap Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder: Authorities
Date: 30-11-2021
Location: Trapeang Thum Commune
Total Participants: .... (Male: .... Female: ....)

No	Name	Gender	Position	Organization	Contact Number	Signature

No	Name	Gender	Position	Organization	Contact Number	Signature

ANNEX D

November 30, 2021 | 1:30 – 5:30 PM **Trapeang Thom Commune, Prasat Bakong District**

Photo Documentation

Photo 1. Arrival and registration of school kids from Anlong Pir village.

Photo 2. Kids are concentrating on the consultations

Photo3. Opening remarks by respective agencies and local authority.

Photo 4. Remarks by Provincial Department of Environment.

Photo 5. Message from Commune Chief.

Photo 6. Two handicap women attended the meeting.

Photo 7. Kid expressed concern on health issues.

Photo 8. Six kids directly involved in waste-picking at the current dumpsite.

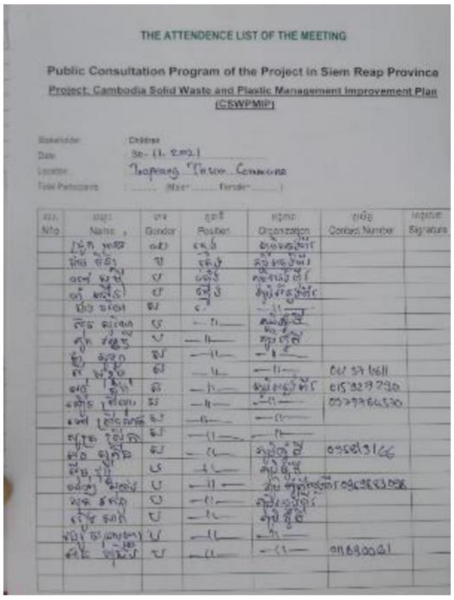
Photo 9. Expression from teacher of secondary school (Trapeang Thom Commune).

Photo 10. Kids join their mothers to earn from waste collection

Photo 11. Communities living around the current dumpsite expressed concerns on health from flies, smoke, smell, and underground water pollution.

Photo 12. Snacks being provided during the consultation.

Registration and Attendance List


THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Siem Reap Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

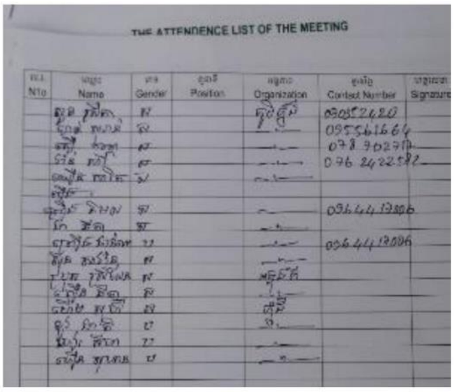
Stakeholder: Children

Date:

Location: Trapeang Thom Commune

Total Participants: (Male: Female:)

N1o	Name	Gender	Position	Organization	Contact Number	Signature


THE ATTENDENCE LIST OF THE MEETING

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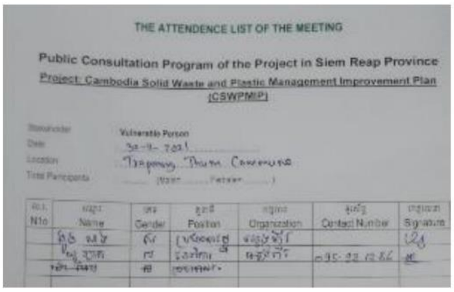

THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Siem Reap Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder: Vulnerable Person

Date:

Location: Trapeang Thom Commune

Total Participants: (Male: Female:)

N1o	Name	Gender	Position	Organization	Contact Number	Signature

ANNEX E
December 1, 2021 | 8:00 – 11:30 AM **Siem Reap Provincial Hall**

Photo Documentation

Photo 1. Room arrangement and social distancing.

Photo 2. Arrival of stakeholders and start of the session.

Photo 3. National anthem.

Photo 4. Opening remarks by respective agencies (left to right: WB, MOI, and Siem Reap authority).

Photo 5. Representatives from private waste collector (GAEA).

Photo 6. Representative from COMPED, environmental sanitation NGO.

Photo 7. Representative from CINTRI, Siem Reap.

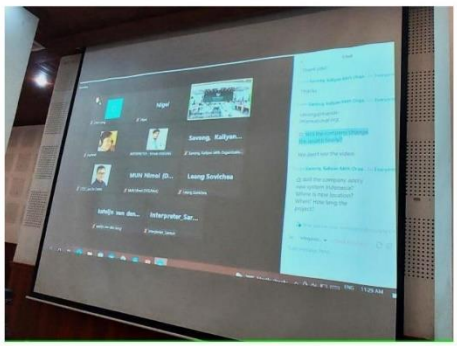
Photo 8. Presentation on siting options, results of pre-feasibility studies and solutions and good practices.

Photo 9. Request from a female villager to GAEA to stop kids from entering dumpsite because they did not go to school.

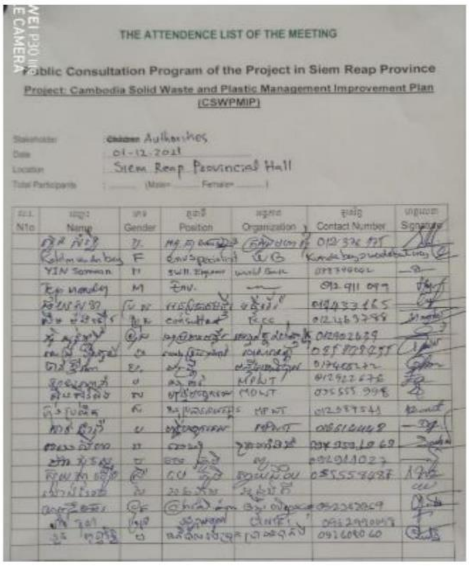
Photo 10. Support from village chief to the proposed project.

Photo 11. Questions posted via Zoom chat.

Photo 12. Questions posted via Zoom chat.



Registration and Attendance List



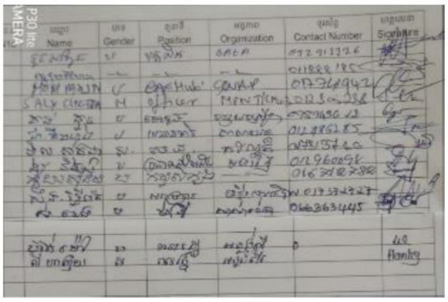
THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Siem Reap Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder: Authorities
Date: 01-12-2021
Location: Siem Reap Provincial Hall
Total Participants: ____ (Male= ____ Female= ____)

N1o	Name	Gender	Position	Organization	Contact Number	Signature



Name	Gender	Position	Organization	Contact Number	Signature

ANNEX F
December 7, 2021 | 8:00 – 11:30 AM **Sovannkiri Pagoda, Sangkat Chbar Mon**

Photo Documentation

Photo 1. Stand-up for the national anthem.

Photo 2. Opening remarks by the representative from MOI.

Photo 3. Remarks made by Katelijn Van den Berg (WB) on the project activities, objectives and scope.

Photo 4. Representative of handicapped people attended the consultation.

Photo 5. Elderly villagers who are involved in waste-picking attended the public consultation meeting.

Photo 6. Women and kids were encouraged to speak up and be heard.

Photo 7. Kids age below 14 participated in the consultation. Some of them involved in waste-picking.

Photo 8. COVID-19 preventive measures at the consultation site.

Photo 9. Village chief raised concerns, suggestions and expressed support.

Photo 10. Villager shared thoughts during the meeting.

Photo 11. She migrated from another province and currently works at the dumpsite.

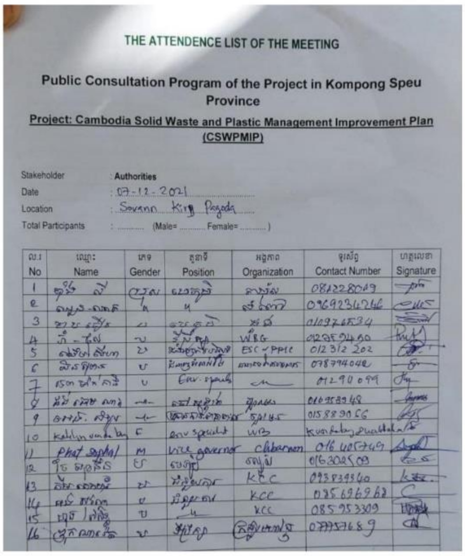
Photo 12. She said kids should spend more time at school rather than picking waste.

Photo 13. A male waste-picker expressed support to the plan for improving current dumpsite.

Photo 14. Closing remarks by representative from MOI.

Preparation Studies for Environmental and Social Framework Documents for Proposed World Bank Financed Solid Waste and Plastic Management Improvement in Cambodia

Registration and Attendance List



THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Kompong Speu Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder : Authorities
Date : 07-12-2021
Location : Sovann Kiri Pagoda
Total Participants : .... (Male= .... Female= ....)

No	Name	Gender	Position	Organization	Contact Number	Signature
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2	[illegible]	[illegible]	[illegible]	[illegible]	0969234246	[illegible]
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8	[illegible]	[illegible]	[illegible]	[illegible]	01095894 8	[illegible]
9	[illegible]	[illegible]	[illegible]	[illegible]	015889066	[illegible]
10	Kathlyn [illegible]	F	env specialist	WB	[illegible]	[illegible]
11	Phat Sophal	M	Vice governor	Chbarmon	016 405749	[illegible]
12	[illegible]	[illegible]	[illegible]	[illegible]	016302509	[illegible]
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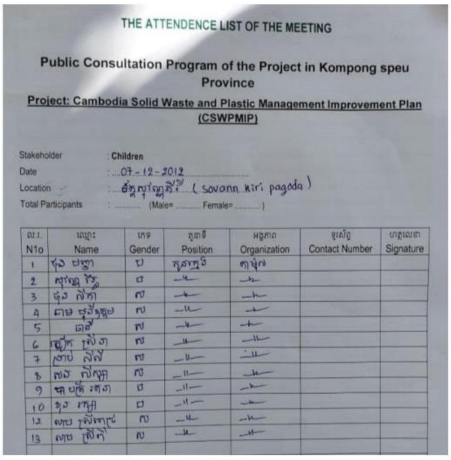

THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Kompong speu Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder : Children
Date : 07-12-2012
Location : [illegible] (Sovann Kiri pagoda)
Total Participants : .... (Male= .... Female= ....)

N1o	Name	Gender	Position	Organization	Contact Number	Signature
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4	[illegible]	[illegible]	-"-	-"-		
5	[illegible]	[illegible]	-"-	-"-		
6	[illegible]	[illegible]	-"-	-"-		
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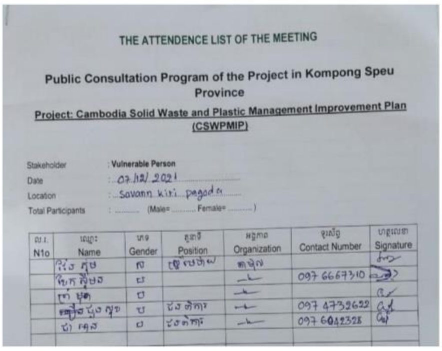

THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Kompong Speu Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder : Vulnerable Person
Date : 07/12/2021
Location : Sovann Kiri pagoda
Total Participants : .... (Male= .... Female= ....)

N1o	Name	Gender	Position	Organization	Contact Number	Signature
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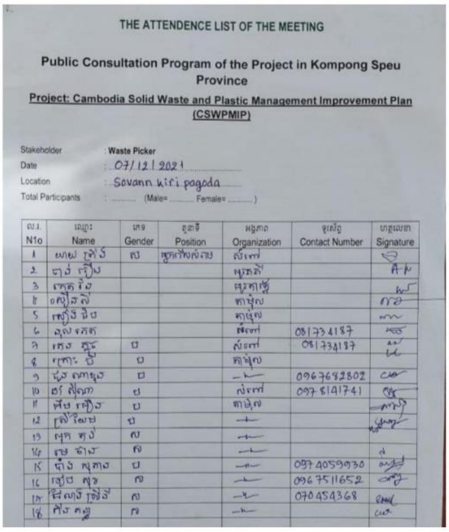
THE ATTENDENCE LIST OF THE MEETING
Public Consultation Program of the Project in Kompong Speu Province
Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)
Stakeholder : Waste Picker
Date : 07/12/2021
Location : Sovann kiri pagoda
Total Participants : .... (Male= .... Female= ....)
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Gender
Position
Organization
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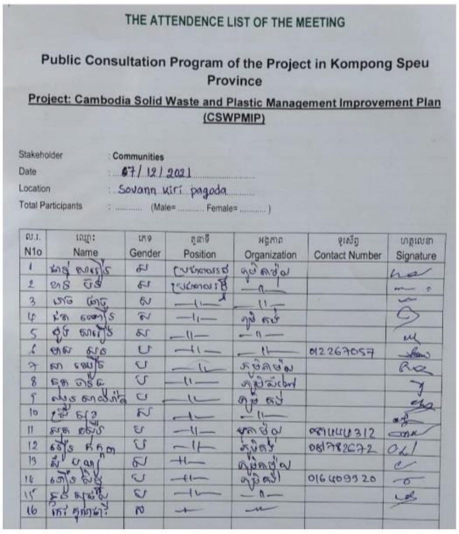
THE ATTENDENCE LIST OF THE MEETING
Public Consultation Program of the Project in Kompong Speu Province
Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)
Stakeholder : Communities
Date : 07/12/2021
Location : Sovann kiri pagoda
Total Participants : .... (Male= .... Female= ....)
N1o
Name
Gender
Position
Organization
Contact Number
Signature
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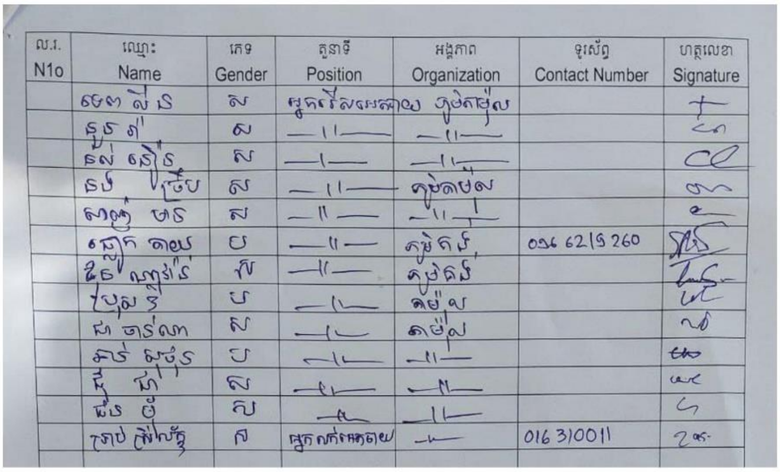
016409920


N1o
Name
Gender
Position
Organization
Contact Number
Signature
096 6219 260
016 310011

ANNEX G
December 7, 2021 | 2:00 – 5:00 PM **New Site Option Location in Kampong Speu**

Current conditions of the site:

- Access road from Road No. 44 is a kind of laterite road with good condition
- Distance from Road No. 44 is roughly 4 km
- The access road is 10m wide
- The site is surrounded by rice fields
- Site Size/area is 15.2 ha
- Residential area is less than 1 km (500m) away
- Around 7km from the current dumpsite
- It is a private land but can be transferred to public land (Provincial Department of Environment)
- The site is a flooded area in rainy season
- The site is a kind of Sand-clay which is suitable for landfill
- Groundwater level might be high which is not appropriate for landfill
- Road from laterite road connected to site is roughly 500m

Photo Documentation










ANNEX H
December 9, 2021 | 1:30 – 5:00 PM **Preah Puth Andet Pagoda, Sangkat Prek Ho**

Photo Documentation

Photo 1. Arrival and registration of stakeholder from Prek Ho village.

Photo 2. Opening Remarks by the MOI representative.

Photo 3. Remarks made by Katelijn

Photo 4. A villager raised concern about road condition of access road and health issue from the current dump site.

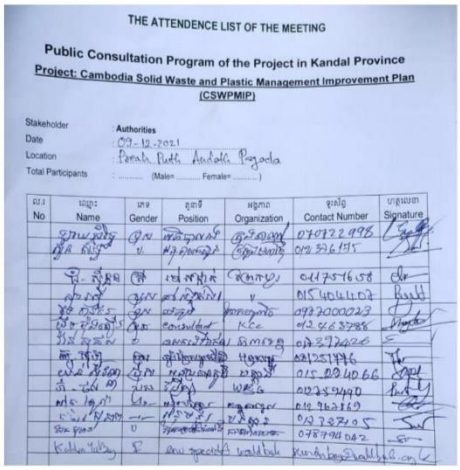
Photo 5. Question asked by Kandal Municipality

Photo 6. A villager raised the concern of losing his job if the current dumpsite is removed.

Photo 7. A local expressed her support to the plan for improving the current dumpsite.

Photo 8. Children brought by mothers to the public consultation meeting.

Registration and Attendance List



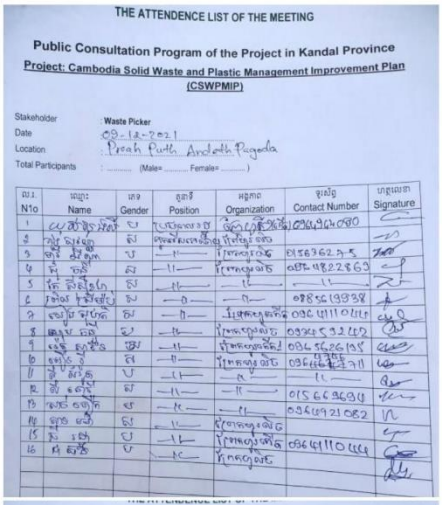
THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Kandal Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder: Authorities
Date: 09-12-2021
Location: Preah Puth Andath Pagoda
Total Participants: ..... (Male= ..... Female= .....)

លរ No	ឈ្មោះ Name	ភេទ Gender	តួនាទី Position	អង្គភាព Organization	លេខទូរស័ព្ទ Contact Number	ហត្ថលេខា Signature



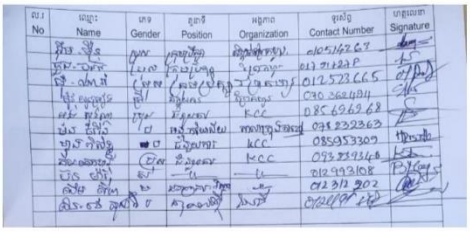
THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Kandal Province

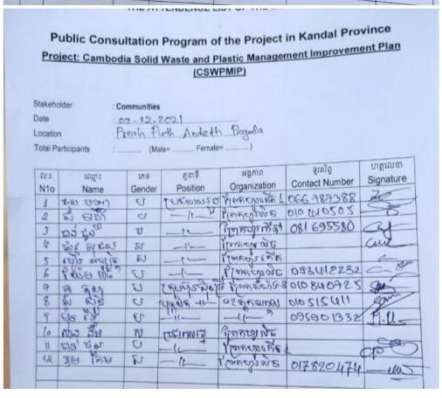
Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder: Waste Picker
Date: 09-12-2021
Location: Preah Puth Andath Pagoda
Total Participants: ..... (Male= ..... Female= .....)

លរ N1o	ឈ្មោះ Name	ភេទ Gender	តួនាទី Position	អង្គភាព Organization	លេខទូរស័ព្ទ Contact Number	ហត្ថលេខា Signature



លរ No	ឈ្មោះ Name	ភេទ Gender	តួនាទី Position	អង្គភាព Organization	លេខទូរស័ព្ទ Contact Number	ហត្ថលេខា Signature

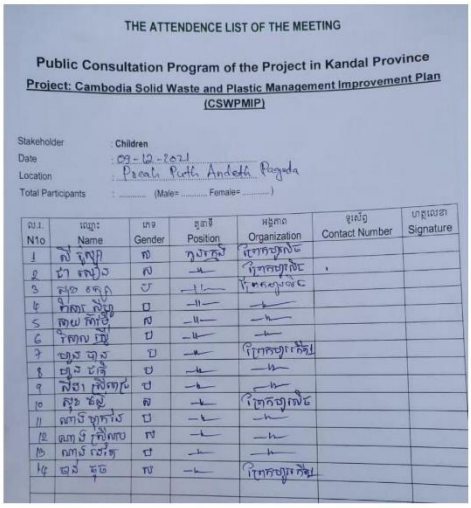


Public Consultation Program of the Project in Kandal Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder: Communities
Date: 09-12-2021
Location: Preah Puth Andath Pagoda
Total Participants: ..... (Male= ..... Female= .....)

លរ N1o	ឈ្មោះ Name	ភេទ Gender	តួនាទី Position	អង្គភាព Organization	លេខទូរស័ព្ទ Contact Number	ហត្ថលេខា Signature



THE ATTENDENCE LIST OF THE MEETING

Public Consultation Program of the Project in Kandal Province

Project: Cambodia Solid Waste and Plastic Management Improvement Plan (CSWPMIP)

Stakeholder : Children
Date : 09-12-2021
Location : Preah Preth Andoth Pagoda
Total Participants : ..... (Male= ..... Female= .....)

ល.រ. N1o	ឈ្មោះ Name	ភេទ Gender	តួនាទី Position	អង្គភាព Organization	ទូរស័ព្ទ Contact Number	ហត្ថលេខា Signature
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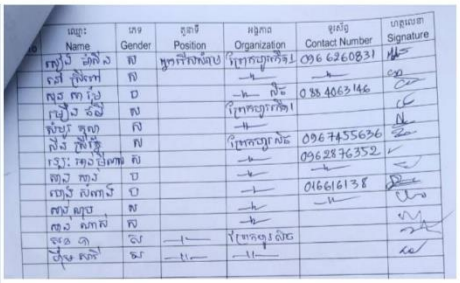

ល.រ. N1o	ឈ្មោះ Name	ភេទ Gender	តួនាទី Position	អង្គភាព Organization	ទូរស័ព្ទ Contact Number	ហត្ថលេខា Signature
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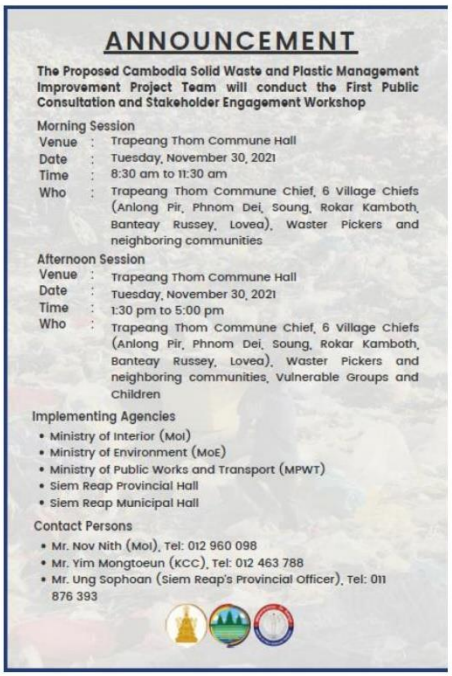
					096 6260831	
					0884063146	
					096 7455636	
					096 2876352	
					016616138	

ANNEX I
Sample Public Consultation Announcements



ANNOUNCEMENT

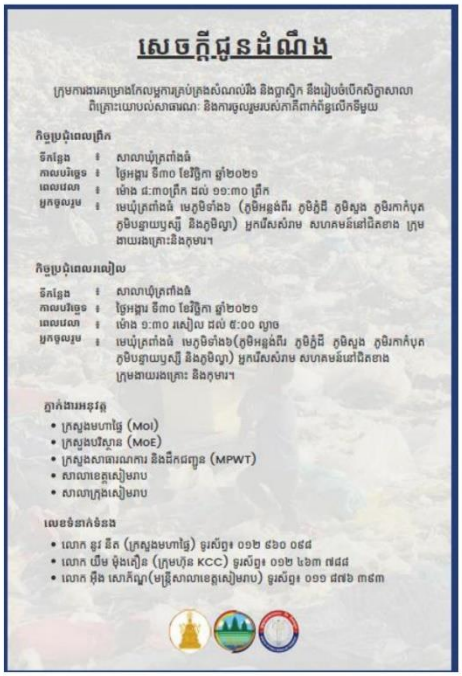
The Proposed Cambodia Solid Waste and Plastic Management Improvement Project Team will conduct the First Public Consultation and Stakeholder Engagement Workshop

Morning Session
Venue : Trapeang Thom Commune Hall
Date : Tuesday, November 30, 2021
Time : 8:30 am to 11:30 am
Who : Trapeang Thom Commune Chief, 6 Village Chiefs (Anlong Pir, Phnom Dei, Soung, Rokar Kamboth, Banteay Russey, Lovea), Waster Pickers and neighboring communities

Afternoon Session
Venue : Trapeang Thom Commune Hall
Date : Tuesday, November 30, 2021
Time : 1:30 pm to 5:00 pm
Who : Trapeang Thom Commune Chief, 6 Village Chiefs (Anlong Pir, Phnom Dei, Soung, Rokar Kamboth, Banteay Russey, Lovea), Waster Pickers and neighboring communities, Vulnerable Groups and Children

Implementing Agencies
- Ministry of Interior (MoI)
- Ministry of Environment (MoE)
- Ministry of Public Works and Transport (MPWT)
- Siem Reap Provincial Hall
- Siem Reap Municipal Hall

Contact Persons
- Mr. Nov Nith (MoI), Tel: 012 960 098
- Mr. Yim Mongtoeun (KCC), Tel: 012 463 788
- Mr. Ung Sophoan (Siem Reap's Provincial Officer), Tel: 011 876 393



សេចក្តីជូនដំណឹង

ក្រុមការងារគម្រោងកែលម្អការគ្រប់គ្រងសំណល់រឹង និងប្លាស្ទិក នឹងរៀបចំបើកសិក្ខាសាលា ពិគ្រោះយោបល់សាធារណៈ និងការចូលរួមរបស់ភាគីពាក់ព័ន្ធលើកទីមួយ

កិច្ចប្រជុំពេលព្រឹក
ទីតាំង ៖ សាលាឃុំត្រពាំងធំ
កាលបរិច្ឆេទ ៖ ថ្ងៃអង្គារ ទី៣០ ខែវិច្ឆិកា ឆ្នាំ២០២១
ពេលវេលា ៖ ម៉ោង ៨:៣០ព្រឹក ដល់ ១១:៣០ ព្រឹក
អ្នកចូលរួម ៖ មេឃុំត្រពាំងធំ មេភូមិទាំង៦ (ភូមិអន្លង់ពីរ ភូមិភ្នំដី ភូមិសួង ភូមិការកំបុត ភូមិបន្ទាយឬស្សី និងភូមិល្វា) អ្នករើសសំរាម សហគមន៍នៅជិតខាង ក្រុមងាយរងគ្រោះនិងកុមារ។

កិច្ចប្រជុំពេលរសៀល
ទីតាំង ៖ សាលាឃុំត្រពាំងធំ
កាលបរិច្ឆេទ ៖ ថ្ងៃអង្គារ ទី៣០ ខែវិច្ឆិកា ឆ្នាំ២០២១
ពេលវេលា ៖ ម៉ោង ១:៣០ រសៀល ដល់ ៥:០០ ល្ងាច
អ្នកចូលរួម ៖ មេឃុំត្រពាំងធំ មេភូមិទាំង៦(ភូមិអន្លង់ពីរ ភូមិភ្នំដី ភូមិសួង ភូមិការកំបុត ភូមិបន្ទាយឬស្សី និងភូមិល្វា) អ្នករើសសំរាម សហគមន៍នៅជិតខាង ក្រុមងាយរងគ្រោះ និងកុមារ។

ភ្នាក់ងារអនុវត្ត
- ក្រសួងមហាផ្ទៃ (MoI)
- ក្រសួងបរិស្ថាន (MoE)
- ក្រសួងសាធារណការ និងដឹកជញ្ជូន (MPWT)
- សាលាខេត្តសៀមរាប
- សាលាក្រុងសៀមរាប

លេខទំនាក់ទំនង
- លោក នួរ នីត (ក្រសួងមហាផ្ទៃ) ទូរស័ព្ទ៖ ០១២ ៩៦០ ០៩៨
- លោក យឹម ម៉ុងតឿន (ក្រុមហ៊ុន KCC) ទូរស័ព្ទ៖ ០១២ ៤៦៣ ៧៨៨
- លោក អ៊ឹង សោភ័ណ្ឌ(មន្ត្រីសាលាខេត្តសៀមរាប) ទូរស័ព្ទ៖ ០១១ ៨៧៦ ៣៩៣

ANNEX J
Program and Agenda of the Public Consultations

Proposed Cambodia Solid Waste and Plastic Management Improvement Project

Siem Reap Public Consultation and Stakeholder Engagement

Internal Meeting
Venue: Siem Reap Provincial Hall / Date: 29 November 2021 / Time: 8:30 am to 11:30 am

PROGRAM OF ACTIVITY

Time	Topic	In-Charge/Speaker
8:00 am- 8:30 am	• Arrival and Registration of Participants	KCC Team
8:30 am- 8:40 am	• Opening Ceremony and Singing of the Cambodia Anthem	
8:40 am - 9:00 am	• Welcome Remarks	Municipal Governor and Provincial Governor of Siem Reap
9:00 am - 9:10 am	• Overview of the Public Consultation and Stakeholders Engagement Workshop	MoI
9:10 am - 9:25 am	• Overview of Project Objective, Components, Activities, Implementation Arrangements and Applicable Environmental and Social Standards	Nigel Landon, ESC
9:25 am – 9:40 am	• Break	
9:40 am – 09:55 am	• Process for Landfill Site Suitability Analysis and Selection And Preliminary Conclusion	Nigel Landon, ESC
09:55 am – 10:15 am	• Possible Landfill and Waste Treatment Facilities and Pollution Clean-Up and Management	Nigel Landon, ESC
10:15 am – 10:30am	• Environmental and Social Studies and Stakeholder Engagement and Consultation Plan	Dr Yim Mongtoeun, KCC
10:30 am – 11:25 am	• Open Forum and questions and answers	Participants
11:25 am – 11:30 am	• Closing	MoI

Master of Ceremony: **Yim Mongtoeun, KCC**
Moderator/Facilitator: **Phum Tol**