Initial Environmental Examination

Project Number: 48434-003
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IND: Visakhapatnam-Chennai Industrial Corridor Development Program-Project 1

Mudasarlova Lake Development Project

Prepared by Greater Visakhapatnam Municipal Corporation, Government of Andhra Pradesh for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 11 October 2018)

Currency Unit	=	Indian rupees (₹)
₹1.00	=	$0.0135
$1.00	=	₹73.785

ABBREVIATIONS

ADB	–	Asian Development Bank
ASI	–	Archeological Survey of India
CAPP	–	community awareness and public participation
CFE	–	consent for establishment
CFO	–	consent for operation
GVMC	–	Greater Visakhapatnam Municipal Corporation
DoF	–	Department of Forest
DoL	–	Department of Labour
EAC	–	Expert Appraisal Committee
EARF	–	environmental assessment and review framework
EIA	–	environmental impact assessment
EMP	–	environmental management plan
GRM	–	grievance redress mechanism
IEE	–	initial environmental examination
LARRA	–	land acquisition, rehabilitation and resettlement authority
MFF	–	multi-tranche financing facility
MoEFCC	–	Ministry of Environment and Forest, Climate Change
NGO	–	non-governmental organization
NGT	–	National Green Tribunal
GVMC	–	Greater Visakhapatnam Municipal Corporation
PMC	–	project management consultancy
PMU	–	program management unit
PPTA	–	project preparatory technical assistance
ROW	–	right of way
SPS	–	Safeguard Policy Statement
TOR	–	terms of reference
UGR	–	underground service reservoir
WTP	–	water treatment plant

WEIGHTS AND MEASURES

m^3	–	cubic meter
m^3/h	–	cubic meter per hour
cm	–	centimeter
dBA	–	decibel audible
°C	–	degree Celsius
ha	–	hectare
km	–	kilometer
m	–	meter
mm	–	millimeter
mm/hr	–	millimeters per hour

km^2	–	square kilometer
m^2	–	square meter

NOTES

(i) The fiscal year (FY) of the Government of India and its agencies ends on 31 March.
(ii) In this report, "$" refers to United States dollars.

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APPENDIXES

EXECUTIVE SUMMARY

The Urban Climate Change Resilience Trust Fund (UCCRTF) Grant of USD $5 million has been provided under the Vishakhapatnam-Chennai Industrial Corridor Development Program (VCICDP) to support the Government of Andhra Pradesh (GOAP) for climate resilient and clean energy infrastructure development, and policy and institutional reforms to stimulate economic growth and employment generation.

VCICDP will help boost manufacturing sector growth along the Visakhapatnam-Chennai Industrial Corridor (VCIC), which runs over 800 kilometer (km) from north to south covering almost the entire coastline of the state of Andhra Pradesh covering a population of 49.4 million and an area of 160,205 square kilometer (km^2). The VCIC is part of the East Coast Economic Corridor (ECE), which is India's first coastal economic corridor, and is poised to play a critical role in driving India's new "Act East Policy" and "Make in India" initiatives. The "Act East Policy" is a proactive initiative focused on, among others, increasing the integration of the Indian economy with the dynamic global production networks of the Association of Southeast Asian Nations (ASEAN). VCICDP will complement the ongoing efforts of the GOAP to enhance manufacturing sector growth and create high quality jobs in the state of Andhra Pradesh.

Greater Visakhapatnam Municipal Corporation (GVMC) is a local body under the Ministry of Administration and Urban Development (MA&UD), GOAP with the responsibility of providing basic civic services like roads, water supply & sewerage, health & sanitation and storm water disposal for the Vishakhapatnam city. This is the biggest city in the state of Andhra Pradesh and GVMC has jurisdiction over an area of 534 km^2. with a population[1] of 1,730,320.

GVMC has taken initiatives to promote climate resilient measures and actions for climate change reduction in various activities of urban management in the city of Visakhapatnam. Installation of a 2MW floating solar facility in Mudasarlova reservoir under Vishakhapatnam smart city project of Government of India is also under progress.

The Subproject. The objective of subproject is development and rejuvenation of the Mudasarlova lake, by (i) improving soil and water conservation, (ii) improving ground water recharge and (iii) increasing the green cover around the lake area. The subproject is situated within the Greater Vishakhapatnam municipal area. The Mudasarlova lake has spread over 8.1 Ha area and was constructed in 1902. The public park around the lake is one of the oldest parks in Andhra Pradesh state and used as picnic spot for local citizens. The lake also serves as drinking water reservoir for the city.

Mudasarlova Reservoir is situated just outside the eco-sensitive zone boundary of the Kambalakonda wildlife sanctuary which runs in Westerly direction all along the Southern boundary of Seethakonda resettlement framework Ravindranagar, Aarilova Colonies.

Screening and assessment of potential impacts. Asian Development Bank (ADB) requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS), 2009. The proposed subproject is a lake rejuvenation and water harvesting project. As per the Government of India environmental impact assessment (EIA) Notification, 2006, this subproject does not require EIA study or environmental clearance. The potential

[1] As per Census Year 2011.

environmental impacts of the subproject have been assessed using ADB Rapid Environmental Assessment Checklist.[2] The potential negative impacts were identified in relation to pre-construction, construction and operation.

Categorization. Based on results of the assessment and ADB SPS, 2009 the subproject is classified as environmental Category B, i.e., the subproject is judged to be unlikely to have significant adverse environmental impacts. An initial environmental examination (IEE) is required to determine whether significant environmental impacts warranting an environmental impact assessment are likely.

This IEE aims to (i) provide critical facts, significant findings, and recommended actions; (ii) present the national and local legal and institutional framework within which the environmental assessment has been carried out; (iii) provide information on existing geographic, ecological, social and temporal context including associated facilities within the subproject's area of influence; (iv) assess the subproject's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic, and physical cultural resources in the subproject's area of influence; (v) identify mitigation measures and any residual negative impacts that cannot be mitigated; (vi) describe the process undertaken during project design to engage stakeholders and the planned information disclosure measures and the process for carrying out consultation with affected people and facilitating their participation during project implementation; (vii) describe the subproject's grievance redress mechanism for resolving complaints about environmental performance; (viii) present the set of mitigation measures to be undertaken to avoid, reduce, mitigate, or compensate for adverse environmental impacts; (ix) to describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and (x) identify indicative costs and who is responsible for carrying out the mitigation and monitoring measures.

Description of the Environment. This IEE has been prepared for the proposed development and rejuvenation of Mudasarlova lake subproject. The details of activities under the proposed subproject components are:

- Soil water conservation - De silting the lake bed, disposing off the soil into low lying area, Construction of main drains including silt traps, clearing bushes/debris on the main drain which obstructs the flow to the lake.
- Groundwater recharge – roof top rain water harvesting system in the public buildings in the catchment area, contour trenches are proposed under the foothills of Kailasagiri and Kambalakonda. Check dam, diversion gallery, collector well with pump house is proposed to utilize the seepage water effectively.
- Greening the lake- 10,000 plants, mostly native varieties are proposed for planting on lake bund area in which most of the plants are medicinal plants.

Construction work is likely to commence in 2018 and will be completed in 12 months for the total development and rejuvenation of lake subproject. However individual components will be taken phase-wise in an average of 18 months construction period.

VCIC also Vizag–Chennai Industrial Corridor, is a key part of the ECEC, India's first coastal corridor. VCIC is aligned with the Golden Quadrilateral and is poised to play a critical role in driving India's Act East Policy and Make in India campaign. The nearly 800 km corridor links India with the ASEAN and East Asian economies that form the bedrock of global manufacturing

[2] Appendix - I

economy. The corridor traverses 9 districts of the state of Andhra Pradesh. VCIC intends to complement the ongoing efforts of the GOAP to enhance industrial growth and create high quality jobs.

Industrial nodes are an integral component of economic corridor development. When equipped with comprehensive infrastructure support and a business-friendly environment, nodes can serve as hubs geared to cradle industries. Through a node selection process, 4 industrial nodes were identified:

(a) Visakhapatnam Node;
(b) Kakinada Node;
(c) Amaravati Node; and
(d) Yerpedu - Srikalahasti Node.

The proposed subproject is pertaining to rejuvenation of Mudasarlova lake is falling under Vishakhapatnam node.

Potential environmental impacts. The subproject is unlikely to cause significant adverse impacts because: (i) the components will involve straightforward installation and operation, so impacts will be mainly localized; (ii) there are no significant sensitive environmental features in the project sites; and (iii) predicted impacts are site-specific and likely to be associated with the installation process and are temporary in nature. The process will involve short term storage, disposal of earth material excavated from lake, construction activities and improvement and lining of drains and tree plantation activities.

Environmental impacts as being due to the project design or location are not significant. The proposed development and rejuvenation of lake will be on a small area of the existing reservoir and its surrounding catchment area and will not impact any aquatic life or nearby biodiversity.

Potential negative impacts were identified in relation to pre-construction and operation of the improved infrastructure, but no permanent environmental impacts were identified as being due to either the subproject design or location. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. The potential impacts will be further reduced by ensuring that required design measures are considered during the detailed design phase. During the construction phase, impacts mainly arise from the construction dust and noise; in areas close to existing community settlements from the traffic and from the need to import of construction material. Impacts due to dust from construction activities are expected to be localized and temporary. Appropriate measures are suggested.

Environmental Management Plan. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels. Locations and siting of the proposed subproject will not require any additional land as the as proposed works area proposed on existing lake and its drains.

The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between program management unit (PMU), project management and supervision consultant (PMSC) and the contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the

subproject; and (v) ensure that safety recommendations are complied with. The EMP includes design and location related measures such as (i) selecting area for disposal of excavated earth material; (ii) selection of local tree species for plantation; and (iii) preparation of traffic management plan. During construction, the EMP includes mitigation measures such as (i) use of barricading, dust screens, dust-suppression methods such as watering and/or covering of stockpiles to control dust; (ii) implementation of traffic management plan in coordination with local traffic police to minimize traffic impacts; (iii) awareness campaigns and consultations to inform residents and businesses of potential disturbances; (iv) provision of walkways and planks over trenches to ensure access will not be impeded; (v) use of noise-dampening measures in areas with sensitive receptors such as hospitals, schools, places of worships and other silence-zones; and (vi) finding beneficial use of excavated materials to extent possible to reduce the quantity that will be disposed-off.

The contractor will be required to submit to, for review and approval, site environmental plan (SEP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following of the EMP to ensure no significant environmental impacts; (iii) monitoring program as per SEP; and (iv) budget for SEP implementation. No works can commence prior to approval of SEP.

A copy of the EMP approved SEP will be kept on site during the construction period always. The EMP has been made binding on all contractors operating on the site and included in the bid and contract documents. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

Consultation, disclosure and grievance redress mechanism. The stakeholders were involved in developing the IEE through focused group discussions on-site at several places in the subproject area, after which views expressed were incorporated into the IEE and in the planning and development of the project. The IEE will be made available at public locations and will be disclosed to a wider audience via the ADB and GVMC websites. A summary in local language (Telegu) will be prepared and displayed at the key locations around the subproject area and GVMC office/bulletin board. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and can participate in its development and implementation. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

Implementation Arrangements. Directorate of Industries (DOI) is the executing agency. A PMU is established within the DOI, which is under the DOI, for planning, implementation, monitoring and supervision, and coordination with GVMC. GVMC will be responsible for implementing the subproject and the PMSC will provide support in implementation of subproject under VCICDP.

GVMC will appoint competent contractor to execute the project. The contractor selection process will be as per GVMC and ADB procurement requirements. The IEE/EMP implementation will be included as a contract requirement to be followed by the contractors selected to build infrastructure. Once the development and rejuvenation related infrastructure is built, GVMC will maintain the same. The state-level a Project Steering Committee (PSC) established for the implementation of subprojects under VCICDP will provide overall policy direction as required.

Monitoring and Reporting. The PMU, GVMC and PMSC will be responsible for monitoring. The PMSC through GVMC will submit semi-annual monitoring reports to PMU, which will review and then submit to ADB. ADB will review and post the environmental monitoring reports on its website.

Conclusions and Recommendations. As per ADB SPS, 2009 the project is classified as environmental Category B and does not require further environmental impact assessment. This IEE shall be updated during the detailed design stage by the PMSC to reflect any changes, amendments and will be reviewed and approved by ADB before disclosure at the ADB website.

I. INTRODUCTION

A. Background

1. This initial environmental examination (IEE) has been prepared for the proposed Rejuvenation of Mudasarlova lake subproject. The objective of proposed subproject is to (i) improve soil and water conservation; (ii) improve ground water recharge; and (iii) increase the green cover around the lake area. The subproject will be implemented over a period of two years in middle of 2018, will be funded under the UCCRFT Grant of the Asian Development Bank (ADB).

2. ADB classified the project as environment Category B and accordingly IEE is required for this subproject. This IEE has been prepared and assesses the environmental impacts and provides mitigation and monitoring measures to ensure no significant impacts because of the project.

3. The potential environmental impacts of the subproject have been assessed using ADB Rapid Environmental Assessment Checklist (Appendix 1). Then potential negative impacts were identified in relation to pre-construction, construction and operation of the improved infrastructure, and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Thus, this IEE has been prepared in accordance with ADB SPS's, 2009 requirements for environment category B projects.

4. This IEE has been conducted mainly based on field reconnaissance surveys and secondary sources of information. No field monitoring (environmental) survey was conducted however, the environmental monitoring program developed as part of the environmental management plan (EMP) will require the contractors to establish the baseline environmental conditions prior to commencement of construction. The results will be reported as part of the environmental monitoring report and will be the basis to ensure no degradation will happen during subproject implementation. Discussions with the GOAP agencies, neighboring residents and other shops/offices in the area were conducted. Findings of detailed stakeholder consultations will be included in the updated IEE.

5. This IEE is based on the preliminary information and as the project will be design, build and operation (DBO) turnkey contract, certain details may change as the design and development of the subproject progresses. This IEE, therefore, will be required to be updated during the detailed design stage, to reflect any changes, or amendments to the subproject.

6. This Report contains the following sections:

(i) Executive summary;
(ii) Introduction;
(iii) Description of the project;
(iv) Policy, legal and administrative framework;
(v) Description of the environment;
(vi) Anticipated environmental impacts and mitigation measures;
(vii) Public consultation and information disclosure;
(viii) Grievance redress mechanism;
(ix) Environmental management plan; and
(x) Conclusion and recommendation.

II. DESCRIPTION OF THE PROJECT COMPONENTS

A. Project area and present situation

7. Mudasarlova reservoir catchment area is situated between the longitudes 83°15'50''E and 83°18'30''E and latitudes between 17°45'50''N and 17°48'5''N. It is in Visakhapatnam city limits in Visakhapatnam district of Andhra Pradesh State, India. The catchment area of the Mudasarlova reservoiris 16.4 km^2 which is located between Kailasa Konda, Kambala Konda and Simhachalam hills. Hydraulic of the lake are provide in table Table 1 and figure 1 present the location of project area. Appendix 2 presents some of the photographs of existing condition of lake.

Figure 1: Location of Mudasarlova lake

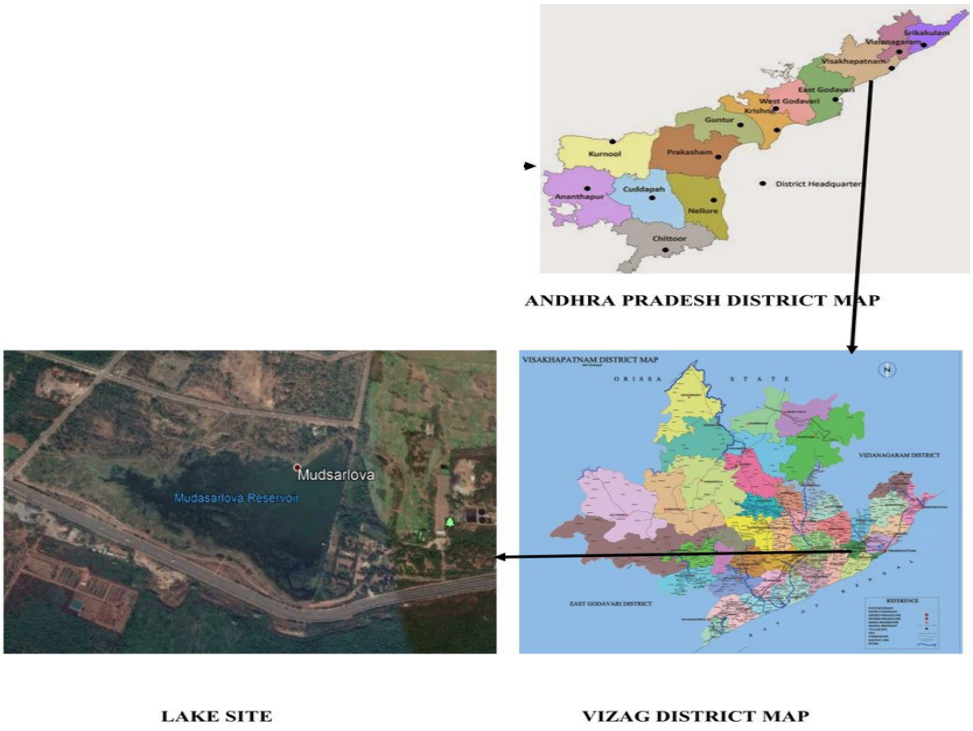


Table 1: Hydraulic of the Lake

Top of bund level	+53.04 m (174 ft)
Full tank level	+ 50.90 m (167ft)
Maximum water level	+ 51.51 m (169 ft)
Level of outlet	+ 44.20 m (145ft)
Bend length of tank	43.89 m (144 ft)
Length of tank bund	844.30 m (2770ft)
Top width of the bund	3.66 m (12ft)
Bottom width of dam	35.66 m (117 ft)
Inner slope of bund	11/2 to 1
Outer slope of bund	2 to 1
Length of shallow gallery	490.728 m (1610 ft)
Length of deep gallery	100.58 m (330 ft)
No of infiltration wells	15 nos

Sill level of gallery	+ 35.66 m (117 ft)
Sill level of deep gallery	+ 32.61 m (107ft)
Storage capacity of tank	1,500,000 m^3
Dead storage	25,000 m^3
Length of spillway	

m^3 = cubic meter; m = meter.

8. The catchment area of lake is 16.4 km^2. The catchment is predominantly covered with bushes and vegetation from hilly tops. Few places were having plantations like Pineapple, Eucalyptus and other private orchids mainly mango.

9. Urbanization and encroachments are found in the lake catchment area. The major colonies are Pineapple colony, Ramakrishnapuram, Dharapalem. Few houses and settlements are also instituted on either side of the Bus Rapid Transit System (BRTS) road. The land use of lake catchment is provided in Table 2.

Table 2: Land Use/Cover classification of Mudasarlova catchment 2017

Sl.NO	CLASSIFICATION AREA	In km^2	% AREA
1.	Forest	10.22	62.32
2.	Plantations	1.95	11.87
3.	Built Up Area	0.42	2.59
4.	Roads	0.31	1.89
5.	Bare Soils	0.11	0.70
6.	Dense Bushes	0.52	3.17
7.	Open Scrubs/Vegetation	2.56	15.61
8.	Water Body	0.31	1.89
	Total	16.40	100.0

Figure 2: land use of Mudasarlova lake catchment area

10. **Inlet and outlet arrangements**. Mudasarlova has its inlets from three major sources and outlet through a 40 m surplus weir. The drain originating from the west from Simhachalam hills and hillocks from Dharapalem serves as a major source of drain both joining together and makes a Third order stream next to Pineapple colony. This water source flows through the settlements in the catchment and finally joins with the Mudasarlova lake. Along its route it also carries the surface runoff from its catchment as well as the sullage from the settlements. There has been an opening through which the streams originating from Kailasa hills used to flow through to the Mudasarlova lake before the construction of the compound wall just at the foothills of the Kailasa hills as well as before the construction of BRTS road; this outlet has become defunct due to the construction of the compound wall and trench just upstream of the wall which does not allow the runoff water to enter the lake. Presently only two outlets, one originating from Dharapalem and the other originating from Kambalakonda hills are discharging water into the lake which have been taken for design. The rehabilitation of these drains is also necessary to make adequate supply to the lake without scouring the drain bed. Detailed survey was carried out on these drains for rehabilitation; these drains are in poor condition with siltation.

Figure 3: Google earth map showing Mudasarlova lake and its 3 inlet drains

11. **Present condition of the bund and weir.** The top of the existing bund is damaged in many places. Side slopes are covered with dense bushes and big trees and few portions are eroded. The surplus weir of the lake is in good condition. But few damages found on the sides of the wall.

12. **Lake Vegetation.** This lake has good plantation along the shoreline. Lake dry area is covered with plenty of palm trees. In between the water spread area there are some places having humps of silt and covered with tall grass.

13. **Encroachments on catchment area.** Three main colonies encroached the catchment area which serves as a main source of pollution into the lake. Few settlements found near the foothills of Simhachalam hills also letting the sullage into lake. There is no encroachment in the lake water spread area.

14. **Water quality.** Out of three inlet points, one inlet stream is joining into the lake with sullage since it is flowing through the settlements occupying both sides of the drain. The quality of the water from the inlet stream from is found to be good since it is not affected by human interventions. Though inlet is joining into the lake with sullage the final quality of water is not very much affected since some first order stream flow from the hilllocks diluted it. The overall quality of water is not potable for domestic use and is to be treated.

15. **Existing condition of drains.** The natural drains passing through the settlements are infested with some dense bushes; the runoff resulting from rainfall is majorly collected through these drains and are joining into the lake. The drain starting from the catchment point till pine apple colony is rectangular in section and is lined. The condition of the drain is not good since it is covered with dense vegetation and debris, problem of siltation and in few places problem of open defecation in the drain.

16. After which the drain is passing through dense bushes and it is visible only in few meters of overall length and finally it joins the quarry pond located before Ramakrishnapuram. After which the drain is visible and flows in between the settlements carrying sewage in dry season and mixing of storm water and sewage in monsoon season and finally it joins into the lake.

17. Another drain coming from North joins into the lake, it is pollution free, but it is not sectioned well. Other than these main drains there are few first order streams joins into the lake through culverts located along the periphery of the lake.

B. Proposed subprojects

18. The proposed project contains three areas of development, soil water conservation, groundwater recharge, greening the lake. The summary of proposed works and expected outcomes are presented in **Table 3** below.

Table 3: Proposed works and expected outcome of project

Sl. No.	Activities	Details	Expected outcome
1	De-siltation	0.22 m cum of silt over an area on 0.3 sq. km of uniform depth up to 0.75m	Increase water storage capacity unto 26%
2	Bund strengthening	Providing top width of 4m and increasing in bund height	To strengthen the bund and to avoid bund erosion
3	Construction of lined channel	Trapezoidal lined channel of 250m length, 1m bottom with, 3m top width, 0.5 m of depth, 1:2 side slope	To get adequate inflow from reserved forest to the lake
4	Clearance of vegetation	Clearing vegetation obstructing the flow into main drain of 2.90 km	To get adequate supply to the lake

19. **Soil water conservation.** The following activities are proposed under this works based on the deficiencies in the existing system.

(i) Desilting lake bed;
(ii) Strengthening of tank bund;
(iii) Vegetation and Bushes clearance in the main drain; and
(iv) Construction of lined channel for inlet drains.

20. **Desilting lake bed.** Originally the tank has the storage capacity of 1.5 cubic meter (m^3), over the years the catchment area, lake area has changed due to the interventions of human activities, infrastructure developments the present capacity of the lake at full tank level is 0.75 M.cum.

21. The lake originally serves for water supply to the city, the desilting is proposed to meet the increasing water supply demand of present and future population. From the geotechnical and geophysical report it is inferred that the weathered rocks and colluvial stratum is available at shallow depths so that more deepening of lake is not advisable in order to avoid seepage loss. However, in the middle of the lake an area of about 53,000 square meter (m^2) through which the depth of colluvial stratum is available over and above depth of 3m. Hence in this area the suggested depth of de siltation is 2 m. In other water bearing area removal of 0.75 m of silt and in dry area 0.50 m removal of silt is suggested. The total quantity of silt to be excavated is proposed as 0.261 m^3.

22. The proposed desiltation activity leads to the additional storage of 26% which will contribute to the present demand of water supply.

Figure 4: Google map showing proposed location of Desilting and Greening Zones

Strengthening of bund

23. At present, water front bund side has stone pitching, not much deficiencies identified. However, the bund at the rear side is completely covered with heavy bushes and vegetation. In between 40 m of Lake Bund is clear with less vegetation. There are irregularities found in the rear side of the bund; to the strengthen the bund, erosion and cracks are to be remedied. The excavated silt from the lake bed is to be used for bund strengthening.

Vegetation and bush clearance in the main drain

24. The main drain starting from the catchment area (Near Dharapalem) to the inlet point to the lake covering about a stretch of 2.95 km is covered with thick and thin vegetation and bushes. The initial 545 m of drain is lined and sectioned with cement concrete, but this stretch is covered entirely by bushes; in some places it is clogged by sand mounds. Clearing this bushes and vegetation all along the drain will need to be undertaken to allow uninterrupted flow.

25. One more inlet is coming from carrying natural water but it does not have a defined section, during monsoon season the inflow from area is not reaching the lake. Thus, the section is to be designed for allowing smooth flow to the lake.

Ground water recharge

Roof top harvesting structure

26. In the catchment area the colonies like Pineapple colony, Ramakrishnapuram depends on ground water for their needs but there are no such harvesting structures available. In this project it is proposed to construct number of contour trenches along the foot hills and also introduce roof top harvesting structures for the public buildings in the catchment. Then ground water potential in the Mudasarlova catchments will get enhanced sufficiently by these arrangements.

Contour trenches

27. Rainwater percolation in the open area will be natural and the percentage of rainwater percolation depends on the top soil and its compactness, slope, land use and intensity of rainfall. Runoff from the open fields takes place only when the rain fall intensity is more than 10 millimeters per hour (mm/hour) which may happen in 10 to 15 days in a year.

28. In order to catch the surface runoff, recharge trenches are better harvesting structures to conserve surface run off and recharge aquifers which could be constructed across slope at the boundary of public premises.

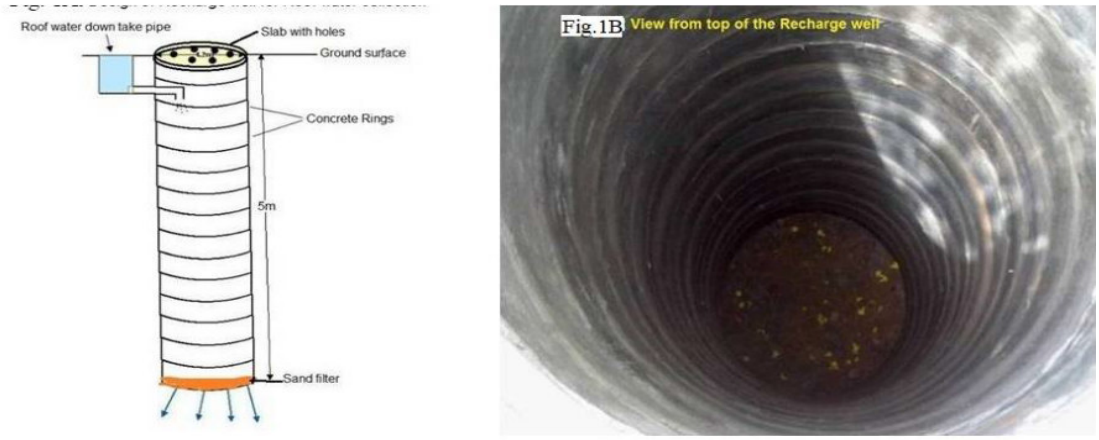
Construction of a Recharge Well

29. This structure is designed keeping the highest intensity of rain, safety of the buildings, space availability, depth to water table and subsurface geological formations. It is suggested to collect rain water from roof tops or from any other part of concrete structure of a residential/school/hospital buildings, commercial complexes and industries.

Design of Recharge well

30. The design of recharge well is similar to an open well. Each well to be constructed with dimensions of 1.2 m diameter and depth up to 3.5 m depending on the roof area from which rainwater being collected. Well design vertical cross section is shown in the figure. The well should be lined with concrete rings of 1.2 m diameter for the entire excavated depth. The photo shown as Figure 5 is after completion of the recharge well with cement rings and 0.30 m thick sand filter at the bottom. Rainwater percolation is only through the bottom of the well. The well should be covered with 3" RCC slab with 5 or 6 nos. of 1" diameter holes in it for aeration. Down take pipe from roof top should be connected to the well through subsurface at 15 centimeter (cm) to 30 cm depth from the top level of the well. At the bottom of the well, 30 cm stone pebbles are to be placed followed by 30 cm thick sand layer is to be spread to filter the fines that come along with roof water. The instantaneous holding and infiltration capacity of the well will be about 5 m^3 and infiltration capacity of each well will be about 3 to 4 cubic meter per hour (m^3/h) as per the existing subsurface soil
conditions.

Figure 5: Rain water harvesting structure



31. Total rainwater harvesting capacity of each well will be in the range of 8 to 9 m^3/h during high intensity rainfall. These Rain water harvesting structure (RWHS) are suitable to hold the roof water as well storm water drains quantity more effectively. As per the storm water runoff calculation in the urban environment, every 100 m^2 concrete/sloped roofs/asphalt surface areas create about 2.4 m^3/h during high intensity rainfall of 30 mm/hour intensity. Accordingly, each recharge well can conserve 9 m^3/h of rainwater from 375 m^2 of the above said dimensions. According to the catchment area the size of the well can be adjusted. Following is some of the additional information that could be followed as per the site condition.

- Only allow the roof rainwater or lined storm water drain into the well;
- Do not use any used water like washing or bath room water to recharge the wells; and
- Dried up well can be used as recharge well. Simply connect the roof water pipe to the well.

32. In the school or hospital premises also, recharge wells can be established adjacent to the buildings. A signed board consists of recharge well information consists of dimensions; cost and annual amount of water harvested could be placed at the well to understand the benefit of the structure to the students and visitors.

33. The message will inspire the people and adopt it at their house level.

Design of check dam to tap the lake seepage water

34. The constant flow of seepage water in the drain varying from 1 to 3 MLD; the quality of the seepage water is as good as the water in the lake; therefore it was proposed to divert this water through a infiltration gallery, collect it in a collection chamber and pump it back to the treatment unit in the park. Typical C/S details of the components are given below,

(i) Bottom width = 3.5 m with a side slope of 1:1; and
(ii) Top Width = 5.5 m with 1 m Depth.

35. It is constructed of rubble masonry with plastering; the check dam will store certain amount of water which will be withdrawn through two hume pipes on the side which will lead to the drainage gallery; the hume pipes will be of dimeter of 30 cm and length of 4m arranged in two rows.

Infiltration gallery

36. The dimensions of infiltration gallery are of 10 m length, 1.5 m depth and 1.5 m width. The gallery is filled with coarse aggregates followed by sand fill to filter the water. The water is then collected in a collection well through a 30 cm diameter HD PVC pipe.

Collector well with a pump house

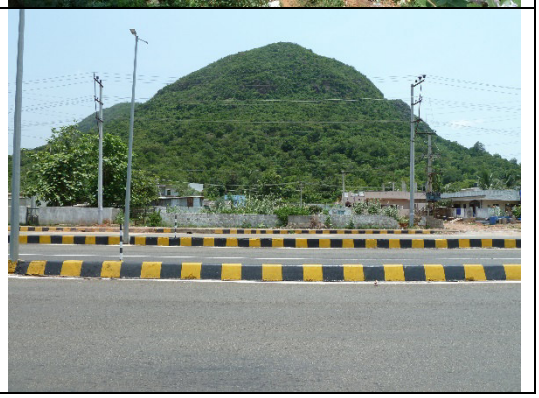
37. The collector well will have a diameter of 6 m and height of 4 m to collect and store the water. The pump house consists of vertical Multistage Inline Pump (MIP) of discharge capacity 110 m^3/h against a head of 220 m. HD PVC pipes of 30 cm is used for suction and delivery of the water.

Greening of Lake

38. Under greening the lake 7,750 plants, mostly native varieties are proposed for planting on the lake bund area in which most of the plants are medicinal plants.

Table 4: Summary of Proposed Subproject Components

Sl. No	Subproject Components	Location	Component Description	Site Photograph
1	Desilting of the Mudasarlova reservoir	In Visakhapatnam City between the longitudes 83°15'50''E and 83°18'30''E and latitudes between 17°45'50''N and 17°48'5''N	Desilting in the middle of the reservoir for 1.2 m depth covering an area of 49,000 m^2, for 0.6m depth in the slushy area of 99,000 m^2 and for 0.5 m depth in the dry area of 142,000 m^2, Excluding the area within 20m from the reservoir bund in consideration of the safety of bund.	
2	Desilting and lining of the 2,958 m long main supply channel	Western Side of the reservoir	545 m lined with concrete, 389 m rubble masonry with cement mortor lining, 2024 m rubble masonry and desilting of entire 2,958 m channel.	
3	Desilting and lining of the 400 m long supply channel	Northern Side of the reservoir	Desilting and sectioning of 400 m channel	

Sl. No	Subproject Components	Location	Component Description	Site Photograph
4	Disposing of the desilted soil	In survey number 26 and 27 of GVMC land in the Northern side of the reservoir	Disposal of cut earth of 141,904 cum to the nearby low-lying area in the northern side of the reservoir	
5	Contour trenches	On the foothills of the hills in the southern and northern side	Six numbers of contour trenches of dimension 50 m x 1.5 m x 1.5 m	

GVMC = Greater Visakhapatnam Municipal Corporation; m = meter; m^2 = square meter.

III. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Asian Development Bank (ADB) Policy

39. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, and loans involving financial intermediaries, and private sector loans.

40. **Screening and Categorization**. ADB will carry out project screening and categorization at the earliest stage of project preparation when sufficient information is available for this purpose. Screening and categorization is undertaken to (i) reflect the significance of potential impacts or risks that a project might present; (ii) identify the level of assessment and institutional resources required for the safeguard measures; and (iii) determine disclosure requirements. The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impact and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts;

(ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in Category A. An initial environmental examination (IEE) is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report;

(iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed; and

(iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

41. **Environmental Management Plan (EMP).** An EMP which addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

42. **Public Disclosure**. The IEE will be put in an accessible place (e.g., local government offices, libraries, community centers, etc.), and a summary translated into local language for the project affected people and other stakeholders. The following safeguard documents will be put up in ADB's website so that the affected people, other stakeholders, and the public can provide meaningful inputs into the project design and implementation:

(i) For environmental category A projects, a draft EIA report at least 120 days before Board consideration;
(ii) Final or updated EIA and/or IEE upon receipt; and
(iii) Environmental monitoring reports submitted by the project management unit (PMU) during project implementation upon receipt.

43. **Asian Development Bank Safeguard Policy Statement Additional Requirements on Pollution Control, Health & Safety**. During the design, construction, and operation of the project the PMU and GVMCs will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When Government of India regulations differ from these levels and measures, the PMU and GVMCs will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMU and GVMCs will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

B. National and state Environmental Laws

Applicable Environmental Safeguards Policies and Regulatory Framework

44. Implementation of VCICDP will be governed by environmental acts, rules, policies, and regulations of the Government of India. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. Many of these are cross sector and several of them are directly related to environmental issues. The most important of these is the "EIA Notification, 2006".

45. Environmental assessment. The Government of India EIA Notification of 2006 (replacing the EIA Notification of 1994), sets out the requirement for Environmental Assessment in India. This states that environmental clearance is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorized as A or B depending on the scale of the project and the nature of its impacts.

46. Category A projects require environmental clearance from the central Ministry of Environment, Forests and Climate Change (MoEFCC). The proponent is required to provide preliminary details of the project in the prescribed manner with all requisite details, after which an Expert Appraisal Committee (EAC) of the MoEFCC prepares comprehensive Terms of Reference (TOR) for the EIA study. On completion of the study and review of the report by the EAC, MoEFCC considers the recommendation of the EAC and provides the environmental clearance if appropriate.

47. Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The State level EAC categorizes the project as either B1 (requiring EIA study) or B2 (no EIA study) and prepares TOR for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the environmental clearance based on the EAC recommendation. The Notification also provides that any project or activity classified as Category B will be treated as Category A if it is in whole or in part within 10 km from the boundary of protected areas, notified areas or inter-state or international boundaries.

48. None of the components of this underground sewerage system subproject falls under the ambit of the EIA Notification 2006, and, therefore EIA Study or environmental clearance is not required for the subproject.

49. **Applicable environmental regulations.** Besides EIA Notification 2006, there are various other acts, rules, policies and regulations currently in force in India that deal with environmental issues that could apply to infrastructure development. The specific regulatory compliance requirements of the subproject are shown in Table 5.

Table 5: Applicable Government of India Environmental Legislations and Specific Requirements for the Project

Law	Description
Policy	
National Environment Policy (NEP), 2006.	○ Government of India policy at national level, and is a general guidance document ○ Subproject design shall overall be in line with the Policy principles, the most relevant policy principle for this subproject is the principle of "enhancing and conservation of environmental resources and abatement of pollution". ○ Designing the pumping and distribution system with optimal energy use, and overall resource conservation through minimizing loss of water and overall load on the system
Acts and rules	
EIA Notification	○ specifies requirements for EIA and environmental clearance (EC) ○ No activity of this subproject is listed under this act so itsnot applicable to the subproject

Law	Description
Policy	
Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments	○ Subproject do not include components that attract this Act ○ Conditions regulate the quality and quantity of effluent, the location of discharge and the frequency of monitoring of effluents. ○ The Water Act also requires the occupier of such subprojects to take measures for abating the possible pollution of receiving water bodies.
Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	○ Subproject do not include components that attract this Act ○ Act provisions will be applicable during construction works (emissions from equipment, machinery, vehicles shall confirm to emission norms) ○ (including but not limited to diesel generators and vehicles) Annexure3& 3 presents the ambient air quality standards and vehicle emission norms ○ For the subproject, the CTE and CTO from APPCB is required for (i) diesel generators; and (ii) hot mix plants, wet mix plants, stone crushers, etc. if installed for construction.
Environment (Protection) Act, 1986 and CPCB Environmental Standards.	○ Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards notified.
Noise Pollution (Regulation and Control) Rules, 2002 amended up to 2010.	○ Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones (Annexure 4) ○ Compliance with noise standards are required during construction period
National Institute of Occupational Safety and Health (NIOSH) Publication No. 98-126	○ NIOSH has laid down criteria for a recommended standard: occupational noise exposure. The standard is a combination of noise exposure levels and duration that no worker exposure shall equal or exceed. ○ Compliance with standards are required during construction period
Municipal Solid Wastes Management Rules, 2016	○ Rules to manage municipal solid waste generated; provides rules for segregation, storage, collection, processing and disposal.
Construction and Demolition Waste Management Rules, 2016	○ - Rules to manage construction & to waste resulting from construction, remodeling, repair and demolition of any BOT structure. Rules define C&D waste as waste comprising of building materials, debris resulting from construction, re-modeling, repair and demolition ○ - Construction & demolition waste generated from the project construction shall be managed and disposed as per the rules (Annexure 5)
Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016	○ According to the Rules, hazardous wastes are wastes having constituents specified in Schedule II of the Rules if their concentration is equal to or more than the limit indicated in the said schedule.
Forest (Conservation) Act, 1980 and Forest Conservation Rules, 2003 as amended	○ As per Rule 6, every user agency, who wants to use any forest land for non-forest purposes shall seek approval of the Central Government.
Wetlands (Conservation and Management) Rules, 2017	○ The Rules specify activities which are harmful and prohibited in the wetlands such as industrialization, construction, dumping of untreated waste and effluents, and reclamation. The Central Government may

Law	Description
Policy	
	permit any of the prohibited activities on the recommendation of Central Wetlands Regulatory Authority.
Indian Wildlife (Protection) Act, 1972 amended 1993 and Rules 1995; Wildlife (Protection) Amendment Act, 2002	○ An Act to provide for the comprehensive protection of wild animals, birds and plants. This would cover matters concerning Appointment of forest authorities, hunting of wild animals, protection of specified plants, conservation of national parks and sanctuaries, trade commerce in relation to plants and animals and prevention of any offences. ○ Wildlife protected areas are notified under this act. ○ No project component is situated within the protected wildlife area.
Manufacture, Storage, and Import of Hazardous Chemical Rules, 1989	○ Defines hazardous chemicals ○ stipulates rules, procedures to manufacture, storage and import of hazardous chemicals ○ requires permission, authorization from various agencies if the total storage exceeds specified quantity; requires emergency management plan
The Ancient Monument and Archaeological Sites and Remains (Amendment and Validation) Act 2010	○ The Rules designate areas within a radius of 100 m and 200 m from the "protected property/ monument/ area" as "prohibited area" and "regulated area" respectively. ○ Henceforth, no permission for construction of any public projects or any other nature shall be granted in the prohibited areas of the protected monument and protected area. ○ In respect of regulated area, the Competent Authority may grant permission for construction, reconstruction, repair and renovation based on recommendation of the National Monument Authority duly taking note of heritage bye-laws, which shall be prepared in respect of each protected monument and protected area
Fly Ash Notification, 2009	The notification states that every construction agency engaged in the construction of buildings within a radius of hundred kilometers (by road) from a coal or lignite based thermal power plant shall use only fly ash based products for construction, such as: cement/concrete, fly ash bricks or blocks or tiles or clay fly ash bricks, blocks or tiles or cement fly ash bricks or bricks or blocks or similar products or a combination or aggregate of them in every construction project.
The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 (LARR)	Private land acquisition is guided by the provisions and procedures under this Act. Before the acquisition of any land, the Government is required to consult the concerned Panchayat or Municipal Corporation and carry out a Social Impact Assessment in consultation with them. The Act provides a transparent process for land acquisition for industrialization, development of essential infrastructural facilities and urbanization by giving adequate financial compensation to the affected people. No private land acquisition is required for the sub project
The Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	It grants legal recognition to the rights of traditional forest dwelling communities.
The Child Labour (Prohibition and Regulation) Amendment	No child below 14 years of age will be employed or permitted to work in any of the occupations set forth in the Act's Part A of the Schedule or in any workshop wherein any of the processes set forth in Part B of the Schedule.

Law	Description
Policy	
Act, 2016 The Child Labour (Prohibition and Regulation) Act, 1986	Child can help his family or family enterprise, which is other than any hazardous occupations or processes set forth in the Schedule, after his school hours or during vacations
The National Green Tribunal (NGT) Act, 2010	NGT provides an effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith. NGT has jurisdiction over matters related to Water Act, 1974; Water Cess Act, 1977; Forest (Conservation) Act, 1980; Air Act, 1981; Environment (Protection) Act, 1986; Public Liability Insurance Act, 1991; and Biodiversity Act, 2002. Consequently, no other court will have jurisdiction over the matters related to environment falling under the above referred Acts. Being a dedicated tribunal for environmental matters with the necessary expertise to handle environmental disputes.
Contract Labour (Regulation and Abolition) Act, 1970	The Act provides for certain welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labor.
The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996.	Applicable to construction works and some of the provisions are as follows: ○ Contractors to obtain license from the designated Labour Officer and shall register with Department of Labour, if Inter-state migrant workmen are engaged; ○ Adequate and appropriate amenities and facilities shall be provided to workers including housing, medical aid, traveling expenses to/from home etc. ○ The employer is required to provide safety measures at construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc.; ○ Rules stipulates hours of work, night work, welfare, payment of wages, registers and records, facilities to be provided, and safety and health ○ No child labour shall be employed. ○ All construction workers be paid not less than the prescribed minimum wage. ○ Compensation for workers in case of injury by accident shall be provided as per the provisions of the Acts ○ Equal wages for work of equal nature to male and female workers; there shall be no discrimination in terms of gender
The Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979	The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home up to the establishment and back, etc.,
The Street Vendors (Protection of Livelihood	The Act aims to protect the rights of urban street vendors and regulates street vending activities. It provides for survey of street vendors and their protection

Law	Description
Policy	
and Regulation of Street Vending) Act, 2014.	from eviction or relocation; issuance of certificate for vending; provision of rights and obligations of street vendors; development of street vending plans; and organizing of capacity building programs to enable the street vendors to exercise the rights contemplated under this Act.
Minimum Wages Act, 1948.	The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employment.
Workmen Compensation Act, 1923.	The Act provides for compensation in case of injury by accident arising out of and during employment.
Equal Remuneration Act, 1979.	The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.
Permission for use of water for construction purpose from irrigation department	Use of surface water for construction activities requires prior permission from irrigation department

50. Clearances/permissions to be obtained prior to start of construction. Table 6 shows the list of clearances/permissions required for project construction. This list indicative and the contractor should ascertain the requirements prior to start of the construction and obtain all necessary clearances/permission prior to start of construction.

Table 6: Clearances and permissions required for Construction activities

Sl. No	Construction Activity	Statute under which Clearance is Required	Implementation	Supervision
1	Tree Cutting	State forest department	PIU	PIU and PMU
2	Hot mix plants, Crushers and Batching plants	Consent to establish and consent to operate under Air Act, 1981 from JSPCB	Contractor	PIU
3	Storage, handling and transport of hazardous materials	Hazardous Wastes (Management and Handling) Rules. 2016 Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989 from APPCB	Contractor	PIU
4	Sand mining, quarries and borrow areas	Permission from District Collector/ State Department of Mining	Contractor	PIU
5	New quarries and borrow areas	Environmental clearance under EIA Notification 2006	Contractor	PIU
6	Temporary traffic diversion measures	District traffic police	Contractor	PIU

C. Administrative Framework, Enforcement & Grievance Redress

51. **Government Regulatory Body**. The Andhra Pradesh Pollution Control Board (APPCB) is the main state-level regulatory agency that is responsible environment protection and pollution control. APPCB through its 19 regional offices across state regulates environmental protection related activities. Subproject towns across the VCIC are under the jurisdiction of different Regional Officer's and they will monitor the subprojects operation and compliance with the standards.

52. APPCB monitors the environmental parameters to check whether or not it meets the standards stipulated in its consent order. Surveillance monitoring by APPCB staff, at least once a year, by visiting the project sites and collecting the sample and testing at APPCB laboratory, and specific monitoring in case of public complaints.

D. International Environmental Agreements

53. India is a party to the following international convention that may apply to this subproject, especially in selection and screening of subprojects under restricted/sensitive areas. The summary of relevant international agreement is provided below in **Table** 7.

Table 7: International Agreements and Applicability to Greater Visakhapatnam Municipal Corporation (GVMC) subproject under Vishakhapatnam-Chennai Industrial Corridor Development Program (VCICDP)

Sl. No	Agreement	Requirements for the project
1.	Ramsar Convention on Wetlands of International Importance, 1971. The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. According to the Ramsar list of Wetlands of International Importance, there are 25 designated wetlands in India which are required to be protected.	There is one Ramsar Site[a] in Andhra Pradesh however it is not located within or adjacent to the subproject site.
2.	Convention on the Transboundary Movements of Hazardous Wastes and Their Disposal, 1989	To protect human health and the environment against the adverse effects of hazardous wastes. This aims at (i)reduction of hazardous waste generation, promotion of environmentally sound management (ii) restriction of transboundary movements, and (iii) a regulatory system for transboundary movements. Wastes generated from the construction sites may fall in hazardous waste category. The waste will be managed in accordance with the country laws and will be disposed within the country, and therefore will not

Sl. No	Agreement	Requirements for the project
		attract this convention.
3.	Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris 1972)	This Convention defines and provides for the conservation of the world`s heritage by listing the natural and cultural sites whose value should be preserved. Not applicable for subproject.
4.	Convention on Biological Diversity (1992)	This provides for a framework for biodiversity and requires signatories to develop a National Biodiversity Strategy and Action Plan. Not applicable for this subproject.
5.	UNFCCC, 1993	The UNFCC is an international environmental treaty with the main objective to stabilize greenhouse gas concentrations in the atmosphere at a level that will prevent dangerous human interference with the climate system. India signed the UNFC Con 10June 1992 and ratified it on 1 November 1993. The project will ensure that all construction activities will not significantly increase the GHG emissions and ensure that design of all infrastructure are resilient climate change impacts

UNFCCC = United Nations Framework Convention on Climate Change.
[a] Kolleru Lake.

54. ADB SPS, 2009 requires that during the design, construction, and operation of the project necessary compliance to all applicable laws and international conventions/treaties along with pollution prevention and control technologies and practices consistent with international good practice, are ensured.

IV. Description of Environment

A. Methodology Used for Baseline Study

55. Data collection and stakeholder consultations. Data for this study has been primarily collected through comprehensive literature survey, discussion with stakeholder agencies, and field visits to the proposed subproject sites.

B. Physical Resources

56. **Topography, drainage, and natural hazards:** The subproject is located within the GVMC area of Vishakhapatnam. Visakhapatnam is strategically located midway between Howrah and Chennai, the two of the four metropolis of the country. The city is rated as the fastest growing city on the East. The industrialization and the accompanying urbanization is responsible for the rapid growth of the city. Visakhapatnam is the second largest city in Andhra Pradesh, a sprawling industrial city and one of the emerging metropolises.

57. Visakhapatnam is located on the east coast of India, in 17° 42' North latitude and 82 degree 02' East range of hills. Based on topographical conditions, the city and its environs can be divided into four categories viz. Hilly region, Upland tracks, Rolling plains and Plains. The Kailasa and Yarada are the major hill ranges in the city. The Kailasa hill range stretches from Simhachalam to MVP Colony on the north flank of the city. The city, which appears like a small basin, is surrounded by the Yarada hill popularly known as Dolphin's nose (358 m) on the side of the Kailasgiri hills on the north, with the Bay of Bengal forming the eastern wall. The coastal line runs from northeast to southwest over 6 km. On the west there is an extensive tidal basin called Upputeru now under reclamation. Beyond Yarada there is a valley followed by another range of hills.

C. Meteorology and Climate

58. **Climate:** The city area falls under semi-arid type of climate.

59. **Rainfall:** Annual rainfall in the area has an average of 953 mm. In the Bay of Bengal, depressions are likely to be encountered in all seasons of the year with a gradual fallen pressure. On an average 4 to 5 cyclones per year occur. However, at particular locations the average frequencies may be lower. Hind casting studies indicated that the Coast is mainly affected by waves generated by cyclones from the Southeast to Southeast direction. The highest waves are experienced in the period April September when the winds are more intense and consistent. The deep sea waves with the highest and lowest period frequent from the South west quadrant. Waves of over 1.5 m in the height may be expected approximately 14% of the time. The daily record of tidal levels shows two highs and two lows. There is published evidence to indicate that strong tides as much as 60 cm more than the predicted tides may occur during the cyclones.

60. **Temperature:** Ambient air temperature ranges between 45° to 12° C. Sea surface temperature range is from 33° maximum to 20° C minimum. Monthly mean relative humidity is between 100% to 4%.

D. Air Quality and Noise

61. **Air Quality**. Air quality in the subproject area is considered to be good and better when compared to the main city area due to the absence of industries in and around the area. Primary air quality data for all subproject sites will be gathered and monitored by the contractor during implementation.

Table 8: Applicable Ambient Air Quality Standards

Parameter	Location[a]	Applicable Standards Per ADB Safeguard Policy Statement[e] (µg/m^3)
PM_{10}	Industrial Residential, Rural and Other Areas	20 (Annual)[c] 50 (24-hr)[c]
	Sensitive Area	20 (Annual)[c] 50 (24-hr)[c]
PM_{25}	Industrial Residential, Rural and Other Areas	10 (Annual)[c] 25 (24-hr)[c]
	Sensitive Area	10 (Annual)[c] 25 (24-hr)[c]
SO_2	Industrial Residential, Rural and	50 (Annual)[b]

Parameter	Location[a]	Applicable Standards Per ADB Safeguard Policy Statement[e]
	Other Areas	20 (24-hr) [c] 500 (10-min) [c]
	Sensitive Area	20 (Annual) [b] 20 (24-hr) [c] 500 (10-min) [c]
NO_2	Industrial Residential, Rural and Other Areas	40 (Annual) [b] 80 (24-hr) [b] 200 (1-hr) [c]
	Sensitive Area	30 (Annual) [b] 80 (24-hr) [b] 200 (1-hr) [c]
CO	Industrial Residential, Rural and Other Areas	2,000 (8-hr) [b] 4,000 (1-hr) [b] 100,000 (15-min)[d]
	Sensitive Area	2,000 (8-hr) [b] 4,000 (1-hr) [b] 100,000 (15-min)[d]
Ozone (O_3)	Industrial Residential, Rural and Other Areas	100 (8-hr) [b] 180 (1-hr) [b]
	Sensitive Area	100 (8-hr) [b] 180 (1-hr) [b]
Lead (Pb)	Industrial, Residential, Rural and Other Areas	0.5 (Annual) [b] 1.0 (24-hr) [b]
	Sensitive Area	0.5 (Annual) [b] 1.0 (24-hr) [b]
Ammonia (NH_3)	Industrial Residential, Rural and Other Areas	100 (Annual) [b] 400 (24-hr) [b]
	Sensitive Area	100 (Annual) [b] 400 (24-hr) [b]
Benzene (C_6H_6)	Industrial Residential, Rural and Other Areas	5 (Annual) [b]
	Sensitive Area	5 (Annual) [b]
Benzo(o)pyrene (BaP) particulate phase only	Industrial Residential, Rural and Other Areas	0.001 (Annual) [b]
	Sensitive Area	0.001 (Annual) [b]
Arsenic (As)	Industrial Residential, Rural and Other Areas	0.006 (Annual) [b]
	Sensitive Area	0.006 (Annual) [b]
Nickel (Ni)	Industrial Residential, Rural and Other Areas	0.02 (Annual) [b]
	Sensitive Area	0.02 (Annual) [b]

62. **Noise Quality**. Noise pollution is not a problem in the area. It is expected that noise is neither a major issue in the majority of subproject area nor expected to be a problem except where the project road passes through the settlements, market areas, and junctions at village areas. At busy junction small contribution to the noise levels are expected, but still the ambient noise quality is expected to be well within the permissible limits.

During the construction period, temporary increase in the noise levels are expected due to movement of construction machineries and construction activities associated with proposed

road development. Suitable barriers in the form of noise barriers and timely scheduling of construction activities will minimize these affects to the greater extent.
Following requirements of ADB SPS, 2009, PMU and PIUs shall apply pollution prevention and control technologies and practices consistent with international good practice. When the Government of India regulations differ from these levels and measures, PMU shall achieve whichever is more stringent. Table below provides applicable standards. If less stringent levels or measures are appropriate in view of specific subproject circumstances, PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

Table 9: NATIONAL AMBIENT AIR QUALITY STANDARDS IN RESPECT OF NOISE

Area code	Category of area/zone	Limit in dB (A)	
		Day time	Night time
a	Industrial area	75	70
b	Commercial area	65	55
c	Residential area	55	45
d	Silence zone	50	40

E. Natural Hazards

63. **Monsoons and Cyclones.** In the Bay of Bengal, depressions are likely to be encountered in all seasons of the year with a gradual fall in pressure. On an average 4 to 5 cyclones per year occur. However, at locations the average frequencies may be lower. Hind casting studies indicated that the Coast is mainly affected by waves generated by cyclones from the Southeast to Southeast direction. The highest waves are experienced in the period April September when the winds are more intense and consistent. The deep sea waves with the highest and lowest period frequent from the South west quadrant. Waves of over 1.5 m in the height may be expected approximately 14% of the time. The daily record of tidal levels shows two highs and two lows. There is published evidence to indicate that strong tides as much as 60 cm in excess of the predicted tides may occur during the cyclones.

64. **Seismicity.** Earlier the city fell under the seismic zone of Category II, where earthquakes of magnitude 5.6 and above do not occur. But in recent revised seismic map by National Geophysical Research Institute, Hyderabad the zone has been elevated to Category III which suggests that earthquakes of magnitude greater than 5.6 are possible. In the recent times earth tremors are being increasingly felt particularly along the foot hills of Kailasa Hill and Yarada hills. Major fracture lineaments are noted in the structural history of the area. The small tremors and shocks experienced in the recent times as a sequel to structural movements which is indeed a rare phenomenon. The strongest earthquake recorded had a magnitude of 6.5.

F. Water Resources

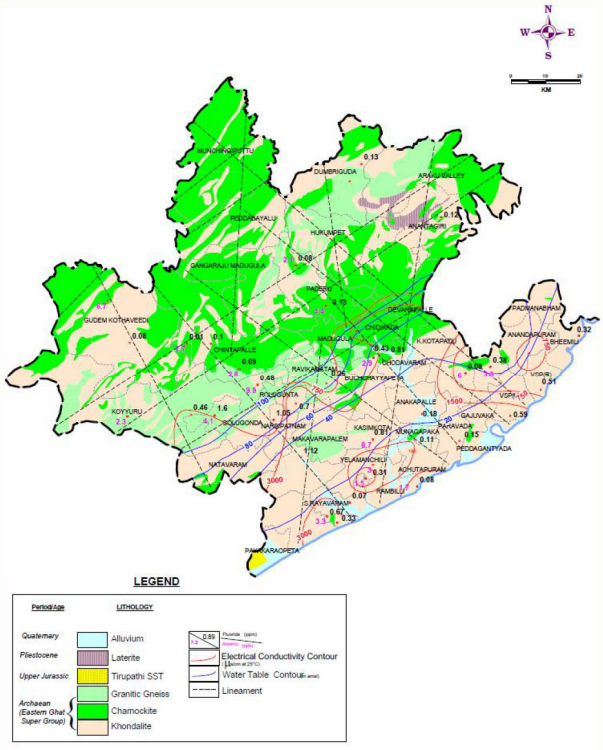
Table 10: The water sources around the project location areas are as below:

Reservoir	Distance	Water Supply (in MGD)
Godavari	156/211	15.20
Raiwada	67	15.60
Tatipudi	62	8.00
Mehadrigedda	20	8.50
Gosthani	30	5.10

Reservoir	Distance	Water Supply (in MGD)
Mudasarlova	10	0.50
Gambheeram (few months)	25	1.20
WS Schemes (lift) (villages)		3.00
Total Supply		57.50

Source: IEE,24x7 Water Supply in North West area of Visakhapatnam, 2016.

Figure 6: Hydrological Map for Visakhapatnam District



G. Biological Resources

65. **Vegetation:** The areas around the lake is vegetation covered hills, fruit orchards, and lake bund area with vegetation cover of trees like palm trees, coconut trees, mango trees, papaya trees etc.

66. Mudasarlova Reservoir is situated just outside the eco-sensitive zone boundary of the Kambalakonda wildlife sanctuary which runs in Westerly direction all along the Southern boundary of Seethakonda resettlement framework Ravindranagar, Aarilova Colonies

67. Kambalakonda Wildlife Sanctuary is situated in the heart of Visakhapatnam Mega City in Andhra Pradesh and is spread over an area of 7,139 hectares (ha) between 83.04' to 83.20' longitudes and 17.34' to 17.47' latitudes;

68. The Sanctuary has very rich bio-diversity comprising 73 tree species, 39 species of herbs and shrubs, and 18 species of climbers, 2 species of bamboos and 7 species of grasses, 23 mammal species, 7 species of reptiles and more than 90 species of birds have been documented from the sanctuary;

69. The Rainwater harvesting proposed in subproject is listed as recommended activity in eco-sensitive zone of wildlife sanctuary notification

70. **Migratory birds:** Andhra Pradesh attract several migratory birds. Andhra Pradesh has several bird sanctuaries. Atapaka Bird Sanctuary, also known as Kolleru Wildlife Sanctuary, is a largest freshwater lake located in West Godavari district of Andhra Pradesh. The sanctuary falls under Kaikalur Forest Range. It is one of the Ramsar convention wetland sites, spread over an area of 308.55 km (119.13 square mile [sq mi]). Telineelapuram and Telukunchi Bird Sanctuaries are located in Srikakulam district of Andhra Pradesh. Every year, over 3,000 pelicans and painted storks visit from Siberia to these villages during September and stay until March. Pulicat Lake Bird Sanctuary is a famous 481 km². Protected area in Nellore District of Andhra Pradeshstate. Pulicat Lake is the second largest brackish-water ecosystem in India. Central location is: 13°34′N 80° 12′E. 327.33 km² is managed by the Andhra Pradesh Forest Department and 153.67 km² is managed by the Tamil Nadu Forest Department. 108 km² is national park area. Rainfall ranges from 800 to 2,000 millimeter (mm). Temperature varies from 14 °C to 33 °C. Altitude ranges from 100' MSL to 1200' MSL. The bio diversity assessment of subproject area is done using Integrated Biodiversity Assessment Tool (IBAT). The result did not show any protected areas and key biodiversity areas within 10 km area of the subproject area.

H. Critical Habitats

71. As per Proximity report generated by the Integrated Biodiversity Assessment Tool (IBAT) no Protected Areas and Key Biodiversity Areas are within 10 km of the subproject area. Habitats critical to the survival of International Union for the Conservation of Nature (IUCN) designated Critically Endangered or Endangered species, migratory species, congregatory species and endemic or restricted range species are critical habitats.

I. Critically Endangered / Endangered Species

72. Table 11 lists the species designated by the IUCN as Critically Endangered or Endangered having recorded ranges that include the study area. Complete list of flora and fauna generated by IBAT is attached as Appendix.

Table 11: list of species designated by the Union for the Conservation of Nature as vulnerable

Scientific Name	Common Name	IUCN Red List category*
Birds		
Anhinga melanogaster	Oriental Darter	NT
Anthracoceros coronatus	Malabar Pied Hornbill	NT
Aythya ferina	Common Pochard	VU
Aythya nyroca	Ferruginous Duck	NT
Calidris ruficollis	Red-necked Stint	NT
Chaetornis striata	Bristled Grassbird	VU
Circus macrourus	Pallid Harrier	NT
Ephippiorhynchus asiaticus	Black-necked Stork	NT
Gyps bengalensis	White-rumped Vulture	CR
Gyps indicus	Indian Vulture	CR
Hydrobates monorhis	Swinhoe's Storm-petrel	NT
Limosa limosa	Black-tailed Godwit	NT
Mycteria leucocephala	Painted Stork	NT
Neophron percnopterus	Egyptian Vulture	EN
Numenius arquata	Eurasian Curlew	NT

Scientific Name	Common Name	IUCN Red List category*
Pelecanus philippensis	Spot-billed Pelican	NT
Psittacula eupatria	Alexandrine Parakeet	NT
Sterna acuticauda	Black-bellied Tern	EN
Sypheotides indicus	Lesser Florican	EN
Threskiornis melanocephalus	Black-headed Ibis	NT
Reptiles		
Eretmochelys imbricata	Hawksbill Turtle	CR

Source: As per Proximity report generated by the Integrated Biodiversity Assessment Tool (IBAT)

** Status assigned by the International Union for Conservation of Nature and Natural Resources, where -EN – Endangered; VU – Vulnerable and CR – Critically Endangered.*

J. Socioeconomic Profile

73. **Demography**: Andhra Pradesh is one of the southern states of Indian sub-continent. There is a total of 13 districts in the two regions of Coastal Andhra and Rayalaseema. The new river-front capital in between Vijayawada and Guntur of the state was named as Amaravati, which is under the jurisdiction of APCRDA. The capital of the state is Hyderabad being the common capital of both Andhra Pradesh and Telangana. It shares borders with states like Tamil Nadu, Orissa, Telangana and Karnataka. The official language of the state is Telugu.

74. As of 2011 Census of India, the state had a population of 49,386,799 with a population density of 308 per km^2. The total population constitutes 70.4% of rural population with 34,776,389 inhabitants and 29.6% of urban population with 1,4610,410 inhabitants. Visakhapatnam district has the largest urban population of 47.5% and Srikakulam district with 83.8%, has the largest rural population, among other districts in the state. Spread over an area of 160,205 km^2, the state has a population density of 308 as against 277 in 2001 Census, which is below the national average. Registered growth rate of the population is 11.10 as against 14.59 recorded in the 2001 census. Literacy rate in 2011 was 67.77% as against 60.47% recorded in 2001 census. It is an increase of 7.19%. Andhra Pradesh ranks tenth of all Indian States in the Human Development Index scores with a score of 0.416. The National Council of Applied Economic Research district analysis in 2001 reveals that Krishna, West Godavari and Chittoor are the three districts in rural affected person with the highest Human Development Index scores in ascending order.

75. **Economic Profile of Andhra Pradesh**: Andhra Pradesh has a very diverse geography which led to a very diverse economy. As many as 9 of the 13 districts have sea coast along the Bay of Bengal, which has created manufacturing and export centric industry. The fertile river plains in the delta regions of major peninsular rivers of Godavari and Krishna are rich with agriculture-based industries and the mineral deposits found in the districts of Rayalaseema, Eastern Ghats and neighboring states has led to large-scale ore exports. Visakhapatnam is an important commercial hub of the state and also IT hub of Andhra Pradesh.

76. The gross state domestic product (GSDP) of Andhra Pradesh was Rs 1.45 lakh crore in the previous fiscal year 2014-2015. Affected person targets 18.2% GSDP in 2015-2016 i.e., Rs 1.65 lakh crore Andhra Pradesh government targets to achieve 18.2% GSDP in the current fiscal by focusing on agriculture and allied sectors. Though affected person has been facing many financial constraints post bifurcation, affected person has managed to achieve 1% higher Gross Domestic Product (GDP) in the last financial year than the national average. In 2015-2016 financial year, the state aims to achieve18.2% GSDP to Rs.1.65 lakh crore from 1.45 lakh crore in the previous fiscal. Agriculture and its allied sectors in the state alone contribute 27% of

GSDP. The industrial sector of the state includes some of the key sectors like pharma, automobile, textiles etc., Sricity located in Nellore district is an integrated business city which is home to many multinational firms.

77. Andhra Pradesh is one of the store houses of mineral resources in India. Andhra Pradesh with varied geological formations, contain rich and variety of industrial minerals and building stones. The state is well connected to other states through road and rail networks. It is also connected to other countries by means of airways and seaports as well. With along seacoast along the Bay of Bengal, it also has many ports for sea trade. The state has one of the largest railway junctions at Vijayawada and one of the largest seaports at Visakhapatnam. Roads in Andhra Pradesh consist of National Highways and state highways with district roads as well. National Highway 5, with a highway network of around 1,000 km in the state, is a part of Golden Quadrilateral Project undertaken by National Highways Development Project (NHDP). It also forms part of Asian Highway 45 which comes under the Asian Highway Network.

78. Andhra Pradesh has a railway network of 5,046 km and have played a significant role in boosting the economy of the state alongside developing the industrial and the tourism sectors. Visakhapatnam Airport is the only airport in the state with international connectivity. The state has five domestic airports, Vijayawada Airport at Gannavaram, Rajahmundry Airport at Madhurapudi, Tirupati Airport at Renigunta, Cuddapah Airport and a privately owned, public use airport at Puttaparthi. There are also 16 small air strips located in the state.

79. Andhra Pradesh has one of the country's largest port at Visakhapatnam in terms of (cargo handling). The other famous ports are Krishnapatnam Port (Nellore), Gangavaram Port and Kakinada Port. Gangavaram Port is a deep-sea port which can accommodate ocean liners up to 200,000–250,000 DWT. There are 14 notified non-major ports at Bheemunipatnam, S.Yanam, Machilipatnam, Nizampatnam, Vadarevu etc.

80. There are many auto component manufacturing companies in the state, manufacturing components such as grey-iron castings, precision aluminum castings, leaf springs, oils and lubricants, diesel fuel injection equipment, electronics and auto electronics and auto electrical, front axles, gears, forging, machined components, pressed metal components, pistons, cylinder liners, nozzles, delivery valves, starter motors, alternators, electronic regulators, high pressure die castings, clutch covers, fuel filters, etc. The ideal places to locate companies in the Auto Sector are Visakhapatnam-Kakinada, Krishnapatnam-Tada-Sathiveedu and Vijayawada-Guntur corridors.

81. Andhra Pradesh is the second largest store house of Mineral Resources in India. The State has identified the Mining Sector as one of the growth engines for the overall development of industry and infrastructure. Andhra Pradesh has been producing good quality cotton with a comparatively higher output per hectare in India. The average production of medium and superior long staple cotton has crossed 2.6 million bales with cotton in abundance, Textile Industry in the State is flourishing. Andhra Pradesh has a significantly growing IT industry.

82. **Cultural and Archaeological Resources**: The following are the major cultural and archaeological resources in affected person that are ascertained as protected areas by the Archaeological Survey of India, and hence of national importance.

83. **Climate change impacts**: affected person is highly dependent on agriculture for livelihood and thus, vulnerable to climate change. Some of the projected climate risks for affected persons are increase in natural disasters such as cyclones, maximum and minimum

temperatures, changes in spatial and temporal distribution of monsoon, increase in frequency and intensity of rains, loss of rainy days, extended summers etc. Climate change will not only affect the natural resources but would also impact upon human health and availability of safe habitats in the future. These climate change risks may affect the envisioned sustainable development of affected person.

84. **Land use pattern**. According to the land use pattern of 1995 residential area constitutes 52.62% of the total developed area of 358.07 ha. The core area of town is overcrowded and very congested as a result; new extension areas are forming in the peripheral areas of the town. The commercial and industrial establishments occupy 4.36% and 4.50% of the total developed area of the town. About 11% of the developed area is under park and playgrounds, which indicates that the town has good recreational places. The circulation pattern of the town occupies about 12% of the developed area. The local planning area has about 32.53 ha of vacant land for future development.

85. **Physical or cultural heritage**. No physical or cultural heritage was observed in the municipality limits that may be impacted by the subproject. Water supply lines are proposed along the roads of densely built up areas of city. The city limit is well developed and there are no environmental hot spots along the proposed areas. There is no prohibited area or archaeological area from where water supply line is passing through. The minimum road width in the entire project area is 3 m and total closure of road is not anticipated during construction works.

V. Anticipated environmental impacts & mitigation measures

86. Potential environmental impacts of the proposed infrastructure components are presented in this section. Mitigation measures to minimize/mitigate negative impacts, if any, are recommended along with the agency responsible for implementation. Monitoring actions to be conducted during the implementation phase is also recommended to reduce the impact.

87. Screening of potential environmental impacts are categorized into four categories considering subproject phases: location impacts and design impacts (pre-construction phase), construction phase impacts and operations and maintenance phase impacts.

(i) **Location impacts** include impacts associated with site selection and include any potential impacts on adjacent environment including biodiversity impacts;
(ii) **Design impacts** include impacts arising from design, including technology used, scale of operation/throughput, waste production, discharge specifications, pollution sources and ancillary services;
(iii) **Construction impacts** include impacts caused by site clearing, earthworks, machinery, vehicles and workers. Construction site impacts include erosion, dust, noise, traffic congestion and waste production; and
(iv) **O&M impacts** include impacts arising from the operation and maintenance activities of the infrastructure facility. These include routine management of operational waste streams, and occupational health and safety issues.

88. Screening of environmental impacts has been based on the impact magnitude and impact duration.

89. This section of the IEE reviews possible project-related impacts, in order to identify issues requiring further attention and screen out issues of no relevance. ADB SPS, 2009 require

that impacts and risks will be analyzed during pre-construction, construction, and operational stages in the context of the project's area of influence.

90. The ADB Rapid Environmental Assessment Checklist has been used to screen the project for environmental impacts and to determine the scope of the IEE.

91. This subproject is a lake conservation project and (i) most of the individual elements involve straightforward works within lake or its associated drains, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the works which are localized and temporary and will not have significant impacts; (iii) being located on a manmade reservoir, any potential biodiversity impact has been screened using the Integrated Tool on Biodiversity Assessment[1] (IBAT) and the study reveals that there are no potential impacts on biodiversity. The subproject will be on the reservoir owned by the GVMC and used for water supply for the Visakhapatnam urban area. The access to the subproject location and its drains is through public rights-of-way (ROW) and existing drains hence, land acquisition and encroachment on private property will not occur.

92. The subproject implementation will result in increasing water storage area, improved soil conservation, water harvesting and plantation of 2,700 new trees around the lake.

A. Pre-Construction Impacts – Design & Location

93. **Design of the Proposed Components**. Technical design of the (i) water harvesting structures, and (ii) delisting of drains and lining of drains will follows the relevant design guidelines. The selection of 2,700 tree species for plantation will be done with the guidance of local forest department. Subproject will consider following environmental considerations:

(i) Minimizing cutting of trees;
(ii) Dredging of lake will be done section wise to avoiding damage to aquatic life;
(iii) No above ground structure will be construction on public lands;
(iv) The dredging material will be dumped on low lying areas of GVMC; and
(v) The tree will be planted on the existing bunds of the lake.

94. **Proposed Subproject Locations and Impacts.** Location impacts are associated with planning particularly on the site selection, and include impacts due to encroaching on sensitive areas, and impacts on the people who might lose their homes or livelihoods. The site presently has some trees and bushes around it which will be avoided during the transportation of construction equipment and dredging material. Adjacent land is owned by GVMC and temporary storage will not require any disturbance.

95. **Utilities**. Proposed works on the reservoir and drains will be on the available lake and drains lands, so no shifting of utilities (telephone lines, sewers and pipelines). However, in same case if these may require shifting due to change in alignment or due to construction of new culvert on roads. To mitigate the adverse impacts due to relocation of the utilities, the contractor, in collaboration with GVMC shall:

(i) Identify the locations and operators of these utilities to prevent unnecessary disruption of services during construction phase;
(ii) Conduct detailed site surveys with the construction drawings and discuss with the respective agencies before site clearance and start of excavation work; and

[1] IBAT Report for Mudasarlova Reservoir is attached as Appendix.

(iii) Instruct construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.

96. Notice will be given to the consumers about the likely disruptions, and if the disruption extends over a day, then alternative arrangements will be provided. Following measures are to be implemented to minimize the inconvenience:

(i) provide prior information to public on likely disturbances; and
(ii) make temporary arrangements for water supply in the affected area (for example, through mobile tankers) if the water supply service is disrupted over 24 hours.

97. **Site selection of construction stockpile areas, storage areas, and disposal areas.** Consider sites that will not result in destruction of property, vegetation, irrigation, and drinking water supply systems. Residential areas shall not be considered for setting up camps to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals near the forest, water bodies, swamps, or in areas which will inconvenience the community. All locations would be included in the design specifications and on plan drawings. Construction work camps, if required shall be located at least 200 m from residential areas. Material stockpiles shall be protected by bunds during the monsoon to arrest the silt laden runoff into drains. The subproject is likely to generate soil from excavations, which needs to be disposed safely.

98. **Site selection of sources of materials**. The material used for the construction of subproject components are mainly sand, coarse aggregate fine aggregate and gravel for construction works. Following measures are to be implemented:

(i) Contractor should procure these materials only from the quarries permitted/licensed by Mines and Geology Department;
(ii) Contractor should, to the maximum extent possible, procure material from existing authorized quarries;
(iii) It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of Department of Mines & Geology and local revenue administration; and
(iv) Contractor should submit the details of sources and copies of approvals, permissions to GVMC, and should start procurement only after the respective source is approved by GVMC.

B. Construction Impacts

99. **Dredging of lake.** Dredging of lake, cleaning of vegetation and repairing of drains including transport of machineries to site, disposal of dredged material are main construction activities proposed in subproject. Other proposed activities are:

- Soil conservation and Plantation; and
- Construction of roof top rain water harvesting and rain water collection wells.

100. The subproject location has an existing lake area and no additional access is required to be constructed. The drains will be repaired on the available ROW

101. Earth work excavation, required, will be undertaken by machine. Excavated material will be stocked within that area.

102. Although construction of the subproject components involves simple techniques of BOT work, the construction at lake premises will require avoidance of any waste material or chemical getting disposed in the reservoir. The transportation of materials dredging works will result in impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration.

103. **Air Quality**. The construction work will not use and the impact on air quality is expected in the form of dust or transportation impacts which will be minimal and temporary. Emissions from construction vehicles, equipment, and machinery used for excavation and transportation may induce impacts short term and temporary air quality impacts in the construction sites.

104. **Surface Water Quality**. Run-off from stockpiled materials and chemical contamination from stored material during construction works can contaminate reservoir surface water quality. As the rainfall in the project areas is mostly confined to monsoon, these potential impacts are short-term and temporary. However, to ensure that these are mitigated, construction contractor will be required to:

(i) All earthworks be conducted during the dry season to prevent the problem of soil run-off during monsoon season;
(ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
(iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
(iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
(v) Dispose any wastes generated by construction activities in designated sites; and
(vi) Conduct surface quality inspection according to the environmental management plan (EMP).

105. **Noise and Vibration Levels**. Al the construction works will be conducted during the day time and any sensitive receptors will be avoided. Increase in noise level may be caused by excavation, transportation of equipment, materials, and people. This impact is negative but short-term, and reversible by mitigation measures. The construction contractor will be required to:

(i) Plan activities in consultation with GVMC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; and
(ii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimise sound impact to surrounding sensitive receptor.

106. **Socio-Economic Employment**. Manpower will be required during the 24 months of construction and tree plantation stage. This can result in generation of temporary employment and increase in local revenue. Thus, potential impact is positive and long-term. The construction contractor will be required to employ local labour force, or to the maximum extent possible to increase local employment opportunities temporarily.

107. **Occupational Health and Safety**. Workers need to be mindful of the occupational hazards which can arise from working in the reservoir area and electrical installation works. Potential impacts are negative and long-term but reversible by mitigation measures. The construction contractor will be required to:

(i) Comply with all national, state and local labour laws (see Appendix 7);
(ii) Develop and implement site-specific occupational health and safety (OH&S) Plan which will include measures such as: (a) identification of potential hazards and safety issues; (b) ensuring all workers are provided with and use personal protective equipment; (c) OH&S Training[2] for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
(iii) Ensure that qualified first-aid is provided always. Equipped first-aid stations shall be easily accessible throughout the site;
(iv) Secure all installations from unauthorized intrusion and accident risks;
(v) Provide supplies of potable drinking water;
(vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
(vii) Provide Health and Safety (H&S) orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
(viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
(ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
(x) Ensure moving equipment is outfitted with audible back-up alarms;
(xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the public as appropriate; and
(xii) Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

C. Operation and Maintenance Impacts

108. Once the dredging, construction and plantation work is over, the operation and maintenance of the developed infrastructure will be done by the contractor under the supervision of GVMC. The subproject will require minimal maintenance and the potential impacts during this stage are expected to be negligible.

109. No biodiversity impacts are expected due to the subproject components. An ibat study done for the area also indicates that no critical or endangered species of plant or animal will be impact due to the subproject components and activities.

[2] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Overview

110. The active participation of stakeholders including local community, non-government organization (NGOs) / community-based organizations (CBOs), and the media in all stages of project preparation and implementation is essential for successful implementation of the project. It will ensure that the subprojects are designed, constructed, and operated with utmost consideration to local needs, ensures community acceptance, and will bring maximum benefits to the people. Public consultation and information disclosure is a must as per the ADB policy.

111. Most of the main stakeholders have already been identified and consulted during preparation of this IEE, and any others that are identified during project implementation will be brought into the process in the future. Primary stakeholders of the subproject are: nearby residents, irrigation department staff and community people where water harvesting pits would be constructed.

B. Public Consultation

112. Consultations were held with the residents of Ramakrishnapuram and officials of GVMC. The western main supply channel of 2,958 m passes through the middle of the Ramakishnapuram settlement and along the bus rapid transit system (BRTS) road adjacent to 2 other settlement viz. Pineapple Colony and Dharapalem.

113. Consultations with the residents of Ramakrishnapuram was held on 26 May 2018 in the presence of Assistant Executive Engineer, GVMC, jurisdictional Work Inspectors, GVMC and chaired by local Community Leader. The participants comprising of 10 women from the settlement were explained about the proposed project and the subproject components, in particular the improvements proposed for the western main supply channel that passes through the settlement. The participants were explained that the 369 m length of the channel that passes through the settlement would be desilted for 0.5 m, filled with 0.2 m river sand and 0.3 m of stone bed. Further, the present earthen channel will be lined with rubble masonry with cement mortar. They were assured that the proposed works will not affect the houses abetting the channel. The works will be carried out in a proper manner and issues related to noise and dust and waste management will be addressed properly during construction.

There were no major concerns from the participants, who were keen to know when they would get the underground sewer network. The GVMC officials informed the participants that the sewer main laying work has been completed and hence in a few months they would be getting individual house connections. Currently the households have septic tanks and discharge waste water into the supply channel. Participants reported that they have no problem with drinking water as it is supplied through tankers by GVMC and for other requirements, GVMC has provided with hand pumps in the settlement. Solid waste bins have been provided in strategic location by GVMC and they are collected on a daily basis. The participants were asked why they dump solid waste into the channel when there is system in place. The participants reported that it is other who through solid waste into the channel. Most of the women work either as house maids or as attenders in school or as casual laborers. The men work either in private sector organizations or operate Auto- Rickshaws or as laborers.

Participants in the consultations

GVMCs Solid Waste Collection in Progress

On 27 May 2018, GVMC official visited all the 53 houses abetting the channel and individually informed each household about the proposed improvements to the channel that would be carried out without any impact to their structures and surrounding environment. There is no private land involved in this project.

114. Future consultations will be conducted and recorded after the detailed design is completed. Any suggestions or grievances relating to environmental issues will be addressed through proper mitigation measures as outlined in the EMP. Government regulatory agencies such as GVMC, affected person irrigation department, and Archeology Survey of India, etc., were consulted during the project preparation.

C. Information Disclosure

115. Executive summary of the IEE will be translated in Telegu and made available at the offices of GVMC and in the subproject area. Electronic version of the IEE in English and Executive Summary in Telegu will be placed in the official website of the GVMC & PMU after approval of the IEE by Government and ADB. Stakeholders will also be made aware of grievance register and redress mechanism.

VII. GRIEVANCE REDRESS MECHANISM

A. Redress of Grievances

116. To ensure that public grievance and/or complaint on environmental (and social) issues are addressed during the implementation of the subproject, GVMC has established a grievance redress mechanism (GRM).[3]

117. The GRM shall provide an accessible platform for receiving and facilitating resolution of affected person's grievances related to the project/subproject. According to ADB SPS 2009, the GRM will address concerns and complaints promptly, using an understandable and transparent

[3] GRM G.O. attached as Appendix.

process that is gender responsive, culturally appropriate and readily accessible to the affected persons at no costs and without retribution. GRM on environmental safeguards will cover matters that may be raised on environmental issues such as increased level of dust and noise causing inconvenience to local people, traffic, or other relevant issues.

118. **Project GRM**. Project GRM is established at three levels as indicated below and covers both environment and social issues. The GRM will be disclosed to the affected communities and households prior to the mobilization of contractors in any subproject areas. The Project grievance redress committee, supported by the PMSC consultants as well as the PMU and GVMC safeguard officers will be responsible for timely grievance redress on environmental and social safeguards issues and responsible for registration of grievances, related disclosure and communication with the aggrieved party. Contact details, procedures and complaint mechanism will be disclosed to the project affected communities at accessible locations and through various methods such as leaflets, direct communication, sign boards etc.

(i) **1st Level Grievance.** The phone number of the GVMC office shall be made available at the construction site signboards. The contractors and GVMC safeguard officer can immediately resolve grievances on-site in consultation with each other and will be required to do so within seven days of receipt of a complaint/grievance;

(ii) **2nd Level Grievance.** All grievances that cannot be redressed within seven days at field/ward level will be reviewed by the GRC at District level headed by District Commissioner with support from GVMC designated safeguard officer and PMSC environment and social specialists. GRC will attempt to resolve them within 15 days. The GVMC designated safeguard officer will be responsible to see through the process of redressal of each grievance; and

(iii) **3rd Level Grievance.** All grievances that cannot be redressed within 15 days shall be reviewed at the PMU level with support from PMSC environment and social specialist. The PMSC designated safeguard officer will be responsible to see through the process of redressal of each grievance.

B. Grievance Redressal Committee

119. Grievance Redressal Committee (GRC) will be established at GVMC level to receive, evaluate and facilitate the resolution of displaced persons concerns, complaints and grievances. The GRC is aimed to provide a trusted way to voice and resolve concerns linked to the project, and to be an effective way to address displaced person's concerns without allowing it to escalate resulting in delays in project implementation. The Project Director, PMU will be the appellate authority who will be supported by the Safeguard Officer of PMU and Team Leader of the external monitoring consultant. This will be the highest grievance redressal mechanism at the project level.

120. The GRC will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. The GRC is not intended to bypass the government's inbuilt redressal process, nor the provisions of the statute, but rather it is intended to address displaced persons concerns and complaints promptly, making it readily accessible to all segments of the displaced persons and is scaled to the risks and impacts of the project.

121. The GRC will continue to function, for the benefit of the APs, during the entire life of the project including the defects liability period. The response time prescribed for the GRCs would

be four weeks. The GRC, PMU and GVMC will meet at least once every month in the first year of project implementation.

122. **Capacity Building**. GVMC Environmental Officer will be further trained by PMSC's environmental safeguards officer on safeguards issues of the projects, EMP of VCICDP and ADB Safeguards Policy. Safeguards training will also be conducted by PMU safeguards expert to the relevant project team members. The targeted participants of the briefings would be PMU staff, resettlement implementation support NGO or agency and GVMC staff. The GVMC safeguards officer will be further supported by the PMSC experts through on the job training for updating IEEs, EMP implementation, complaint resolution and report writing on safeguards.

123. **Disclosure of Information**: GVMC through its Safeguards Officer will inform the APs on grievance redress procedure, who to contact and when, where and how to file a grievance, time likely to be taken for redressal of minor and major grievances, etc. Grievances received and responses provided will be documented and provided to the APs during the process. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the field offices of GVMC.

124. **Review of the Process**: GVMC will periodically review the implementation of the GRM and record information on the effectiveness of the mechanism, especially on the Projects ability to prevent and address grievances.

125. **Cost of Implementation**. Costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by GVMC. The cost of implementation will be taken from the administration cost included in the total cost of the implementation for the project.

126. **Grievances will first be brought to the attention of the implementing Non-government organization (NGO).** Grievances not redressed by the NGO will be brought to the Grievance Redress Committee (GRC) established in each Investment Program district. The GRC process is designed to be transparent, gender responsive, culturally appropriate and commensurate to the risks and adverse impacts of the project, as well as readily accessible to all segments of the affected people. Affected people are to be appropriately informed about the mechanism through media and public outlets. And to ensure that all views incorporated in implementation process.

127. **Only major grievances shall be placed before the Grievance Redressal Committee (GRC).** The GRC will determine the merit of each grievance and attempt to resolve the same within a month from the date of lodging of complaints, failing which the grievance shall be addressed to the Deputy Commissioner. The GRC shall forward grievances of serious nature immediately on receipt of complaint to the Deputy Commissioner. The Deputy Commissioner will hear appeals against the decisions of GRC. The decision of Deputy Commissioner is final and cannot be contested in any other forum except in the Courts of Law.

128. **Record-keeping.** The GVMC will keep records of grievances received, including contact details of the complainant, the date the complaint was received, the nature of the grievance, agreed corrective actions and the date these were affected and the outcome. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the GVMC office, and on the GVMC website, as well as reported in monitoring reports submitted to ADB on a semi-annual basis.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A. Implementation Arrangements

129. The subproject will be carried out under the oversight of the GVMC. The DOI has been appointed as the EA and will be responsible for the management, coordination and execution of all the activities funded under the project.

130. The GVMC staff will include a Safeguard Officer, who will be an Assistant Engineer rank officer, and will be responsible for all environment, health and safety, social, and grievance redress tasks. The Safeguard Officer will be a qualified engineer (preferably an environmental engineer). The Safeguard Officer can also be deputed from GVMC. Environmental and Social Safeguard Specialists of the PMSC will assist the Safeguard Officer .

B. Environmental Management Plan

131. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

132. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMU, GVMC, consultants and contractors. The EMP will ensure that the activities are undertaken in a responsible non-detrimental manner; (i) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (ii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iii) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (iv) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries.

133. The contractor will be required to submit to GVMC, for review and approval, a site environmental plan (SEP) including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEP; and (iv) budget for SEP implementation. No works can commence prior to approval of SEP.

134. A copy of the EMP/approved SEP will be kept on site during the construction period at all times. The EMP included in the bid and contract documents. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

135. For works, the contractor will be required to (i) carry out all the mitigation and monitoring measures set forth in the approved SEP; and (ii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE and SEP. The contractor shall allocate budget for compliance with these SEP measures, requirements and actions.

136. The following tables show the potential environmental impacts, proposed mitigation measures and responsible agencies for implementation and monitoring.

Table12: Design Stage Environmental Management Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Cost and Source of Funds
Design and planning of dredging works	Haphazard disposal of dredging material Impact on aquatic life of lake	(i) Identify the low-lying area for disposal of excess earth material generated from lake bed dredging. (ii) Divide lake in 3-4 section and work section wise in such manner that at least one section of lake of always filled with water	GVMC – to include in bidding documents. Contractor – to ensure during implementation.	Contractor Cost
Cleaning and repairing of drains	Use of existing ROW for drains.	(i) Avoid any private land / irrigated land.	GVMC	Contractor Cost
Tree plantation	Introduction of alien species	(i) Consult forest department and government university for selecting species of tree to be planted on lake bunds	GVMC	Contractor Cost
Project siting	Loss of tree cover	(i) Minimize removal of trees by adopting to site condition and with appropriate layout design (ii) Obtain prior permission from Tree Officer, Forest Department for tree cutting (iii) Transfer the trees in area reserved for tree plantation area, if tree cutting is required.	GVMC	Contractor Cost.
Socio cultural resource	Chance finds	(i) Develop a protocol for use by the construction contractors in conducting any work, to ensure that any chance finds are recognised, and measures are taken to ensure they are protected and conserved. This should involve: o Conduct awareness training to contractor & supervision staff prior to start of excavation o Stopping work immediately to allow further investigation if any finds are suspected;	GVMC	Contractor Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Cost and Source of Funds
		○ Calling in the ASI if a find is suspected, and taking any action they require to ensure its removal or protection in situ		

Table 13: Environmental Management Plan of Anticipated Impacts during Pre-Construction

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Cost and Source of Funds
Utilities	Telephone lines, electric poles and wires, within proposed project area	(i) Identify the locations and operators of these utilities to prevent unnecessary disruption of services during construction phase (ii) Conduct detailed site surveys with the construction drawings and discuss with the respective agencies before site clearance and start of excavation work; and (iii) Instruct construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.	Contractor in collaboration with GVMC	Contractor Cost
Construction work camps, stockpile areas, storage areas, and disposal areas.	Conflicts with local community; disruption to traffic flow and sensitive receptors	(i) Select a camp site away from residential areas (at least 50 m buffer shall be maintained) or locate the camp site within the existing facilities of GVMC (ii) Avoid tree cutting for setting up camp facilities (iii) Camp site shall not be located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas (iv) Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit	Construction Contractor	Contractor Cost
Sources of	Extraction of	(i) Contractor should procure these	Construction Contractor	Contractor Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Implementation	Cost and Source of Funds
Materials	materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	materials only from the quarries permitted/licensed by Mines and Geology Department. (ii) Contractor should, to the maximum extent possible, procure material from existing quarries, and creation of new quarry areas should be avoid as far as possible. (iii) It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of Department of Mines & Geology and local revenue administration. (iv) Contractor should submit the details of sources and copies of approvals, permissions to GVMC, and should start procurement only after the respective source is approved by GVMC		
Consents, permits, clearances, NOCs, etc.	Failure to obtain necessary consents, permits, NOCs, etc. can result to design revisions and/or stoppage of works	(i) Obtain all necessary consents, permits, clearance, NOCs, etc. prior to award of DBO operator Ensure that all necessary approvals for construction to be obtained by contractor are in place before start of construction (ii) Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. (iii) Include in detailed design drawings and documents all conditions and provisions if necessary	GVMC	Contractor Cost

Table14: Environmental Management Plan of Anticipated Impacts during Construction

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
EMP Implementation Training	Irreversible impact to the environment, workers, and community	(i) Project manager and all key workers will be required to undergo EMP implementation including spoils management, Standard operating procedures (SOP) for construction works; occupational health and safety (OH&S), core labor laws, applicable environmental laws, etc	Construction Contractor	EMP Implementation Budget
Sources of Materials	Extraction of materials can damage environment	(i) Procurement of material only after the respective source is approved by GVMC (ii) Submit to GVMC monthly documentation of sources of materials.	Construction Contractor	Contractor Cost
Air Quality	Emissions from construction vehicles, equipment, and machinery used for installation resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons.	(i) Barricade the construction area using hard barricades (of 2 m height in Mild Steel (MS) frame and 1 mm MS sheet) on both sides and provide dust/wind screen (such geo textile fabric) up to 3 m height (1m above the hard barricading) (ii) Initiate site clearance and excavation work only after barricading of the site is done (iii) Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes etc.,), to the barricaded area (iv) Damp down the soil and any stockpiled material on site by water sprinkling; (v) Apply water and maintain soils in a visible damp or crusted	Construction Contractor	Contractor Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		condition for temporary stabilization (vi) Apply water prior to leveling or any other earth moving activity to keep the soil moist throughout the process (vii) Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area (viii) Cover the soil stocked at the sites with tarpaulins (ix) Control access to work area, prevent unnecessary movement of vehicle, public trespassing into work areas; limiting soil disturbance will minimize dust generation (x) Undertake the work section wise: 100 – 200 m section should be demarcated and barricaded		
Surface / Reservoir water quality	Mobilization of settled silt materials, and chemical contamination from fuels and lubricants during movement of construction equipment and dredging can contaminate nearby surface water quality.	(i) All earthworks be conducted during the dry season to prevent the problem of soil run-off during monsoon season (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (iii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, only designated disposal areas shall be used; (iv) Identify construction	Construction Contractor	Contractor Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		waste/excess disposal sites prior to start of work (v) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (vi) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (vii) Dispose any wastes generated by construction activities in designated sites; and (viii) Conduct surface quality inspection according to the Environmental Management Plan (EMP).		
Noise Levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people	(i) Plan activities in consultation with GVMC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance (ii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and use portable street barriers to minimize sound impact to surrounding sensitive receptors (iii) Utilizing modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions and ensuring that these are maintained to manufacturers' specifications always.	Construction Contractor	Contractor Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		(iv) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at 10 m or more from the vehicle/s. (v) Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity (vi) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach		
Soil Quality	Excavation can disturb the original topography of the area which can further lead to soil erosion; Soil contamination due to dispersion of construction material and Oil leaks/spillages from vehicles and machinery operating at site.	(i) Re-vegetation shall be done in the area after the completion of construction in order to reduce the risk of soil erosion; (ii) Excavated material will be stock piled and used for backfilling of foundations, trenches etc.; (iii) Temporary paved areas shall be constructed to be used while refuelling the machineries. In case of any accidental spill, the soil will be cut and stored securely for disposal with hazardous waste; (iv) All construction material shall be stored in a designated/demarcated storage area within the site and covered with tarpaulin sheet to avoid dispersal with wind.		Contractor Cost
Socio-Economic - Employment	Generation of temporary employment and increase in local	(i) Employ local labor force, or to the maximum extent possible to increase local employment opportunities temporarily	Construction Contractor	Contractor Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
	revenue			
Landscape and aesthetics	Impacts due to excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items.	(i) Prepare and implement spoils management plan (Annexure5); (ii)Avoid stockpiling of excess excavated soils; (iii) Coordinate with for beneficial uses of excess excavated soils or immediately dispose to designated areas; (iv) Recover used oil and lubricants and reuse or remove from the sites; (v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (vi) Remove all wreckage, rubbish, or temporary structures which are no longer required; and (vii) Request PMU/ to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.	Construction Contractor	Contractor Cost
Socio-Economic – Employment	Generation of temporary employment and increase in local revenue	(i) Employ local labour force as far as possible (iii) Comply with labor laws	Construction Contractor	Contractor Cost
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians during material and waste transportation	(i) Consult PIU before locating project offices, sheds, and construction plants; (ii) Select a camp site away from residential areas (at least 100 m buffer shall be maintained) or locate the camp site within the existing facilities of City	Construction Contractor	Contractor Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		Corporation (iii) Avoid tree cutting for setting up camp facilities (iv) Provide a proper fencing/compound wall for camp sites (v) Camp site shall not be located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas (vi) Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit (vii) Ensure conditions of livability at work camps are maintained at the highest standards possible at all times; living quarters and construction camps shall be provided with standard materials (as far as possible to use portable ready to fit-in reusable cabins with proper ventilation); thatched huts, and facilities constructed with materials like GI sheets, tarpaulins, etc., shall not be used as accommodation for workers (viii) Camp shall be provided with proper drainage, there shall not be any water accumulation (ix) Provide drinking water, water		

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		for other uses, and sanitation facilities for employees (x) Prohibit employees from cutting of trees for firewood; contractor should provide cooking fuel (cooking gas); fire wood not allowed (xi) Train employees in the storage and handling of materials which can potentially cause soil contamination (xii) Wastewater from the camps shall be disposed properly either into sewer system; if sewer system is not available, provide on-site sanitation with septic tank and soak pit arrangements (xiii) Recover used oil and lubricants and reuse or remove from the site; (xiv) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit for bio degradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market (xv) Remove all wreckage, rubbish, or temporary structures which are no longer required; and (xvi) At the completion of work, camp area shall be cleaned and restored to pre-project		

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		conditions, and submit report to PIU; PIU to review and approve camp clearance and closure of work site		
Occupational Health and Safety	Occupational hazards which can arise during work	(i) Comply with all national, state and local labour laws (see Appendix 7) (ii) Develop and implement site-specific occupational health and safety (OH&S) Plan which will include measures such as: (a) identification of potential hazards and safety issues (b) ensuring all workers are provided with and use personal protective equipment; (c) OH&S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents (iii) Ensure that qualified first-aid is provided always. Equipped first-aid stations shall be easily accessible throughout the site (iv) Secure all installations from unauthorized intrusion and accident risks (v) Provide supplies of potable drinking water (vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances (vii) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at	Construction Contractor	Contractor Cost

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		the site, personal protective protection, and preventing injuring to fellow workers (viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions may be present. Ensure also that visitor/s do not enter hazard areas unescorted (ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas (x) Ensure moving equipment is outfitted with audible back-up alarms (xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the public as appropriate; and (xii) Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.		

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
Post-construction clean-up	Damage due to debris, spoils, excess construction materials	(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required (ii) All excavated roads shall be reinstated to original condition. (iii) All disrupted utilities restored (iv) All affected structures rehabilitated/ compensated (v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. (vi) All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be top soiled and re-grassed (vii) The contractor must arrange the cancellation of all temporary services. (viii) Restore the work sites to pre-project conditions; GVMC to approve in writing that site is restored	Construction Contractor	Contractor Cost

Table 15: Operation Stage Environmental Management Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
Occupational health and safety	Health, social and economic impacts on the workers	• Provide appropriate PPE to workers & training on its proper use • Use fall protection equipment when working at heights. • Maintain work areas to	Contractor / GVMC	Operating costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Cost and Source of Funds
		minimize slipping and tripping hazards. • Implement a training program for operators who work with chlorine regarding safe handling practices and emergency response procedures.		
Public inconvenience & safety during repair and maintenance works	Traffic disruption, dust, safety risk etc	• As the work will be like laying of pipes, the issues will be similar, but confined to very small area where the repair work is being implemented • Implement the measures as suggested in the construction stage EMP	Contractor / GVMC	Operating costs
Ecology	Modification of habitat	• Minimal clearance of ground vegetation such as shrubs and bushes during site clearance activities and ensure re-vegetation of cleared areas. • Periodic Bird/animals carcass survey to be undertaken during operation phase	GVMC	Operating costs

Table16: Construction Stage Environmental Monitoring Plan

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
Construction disturbances, nuisances, public & worker safety,	All work sites	Implementation of dust control, noise control, traffic management, & safety measures.	Regularly as required during construction; checklist to be filled monthly once	Supervising staff and safeguards specialists	Part of TOR of GVMC, PMC and PMU
Ambient air quality	6 locations (1 at lake site, 3 drains and the other 2 locations will be	• PM10, PM2.5NO2, SO2, CO, HC	Once before start of construction Monthly during construction (2-year construction period	Construction Contractor	Contractor cost (part of BOQ items) 150 samples x 5,000 per sample

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
	selected close to the distribution work sites)		considered)		= ₹750,000
Ambient noise	6 locations (1 at lake site, 3 drains and the other 2 locations will be selected close to the distribution work sites)	• Day time and night time noise levels (24 hours)	Once before start of construction Monthly during construction (2 year construction period considered)	Construction Contractor	Contractor cost (part of BOQ items) 150 samples x 1500 per sample = ₹225,000
Surface / Reservoir water quality	2 locations (locations to be selected prior to start of construction)	• pH, Oil & grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalnity	Once before start of construction & Quarterly once during construction (24)	Construction Contractor	Contractor cost (part of BOQ items) 18 samples x 4000 per sample = I₹72,000

C. Environmental Management Plan (EMP) Compliance Responsibilities

137. PMU/GVMC Responsibilities. Safeguard Officer will be supported by PMSC, which will be staffed with an Environmental Specialist.

Contractor's responsibilities.

Bidding stage:

(i) Understand the EMP requirements and allocate necessary resources (budget, staff, etc.); and
(ii) Understand the regulatory compliance requirements related to labour welfare, safety, environment etc.

Construction stage:

(i) Ensure that all regulatory clearances (both projects related, and contractor related) are in place before start of the construction work;
(ii) Mobilize EHS supervisor prior to start of work;
(iii) Confirm with GVMC availability of rights of way at all project sites prior to start of work;
(iv) Prepare the following duly incorporating EMP measures, and submit to the GVMC:
  (a) Construction waste management (CWM) plan
  (b) Occupational Health & Safety (OHS) Plan
(v) Implement the mitigation measures as per the EMP including CWM & OHS Plans;
(vi) Follow the EMP measures/guidelines for establishment of temporary construction camps, construction waste disposal sites, and material borrow areas, etc.;
(vii) Implement EMP and ensure compliance with all the mitigation and enhancement measures;
(viii) Conduct environmental monitoring (air, noise, water etc.,) as per the EMP;
(ix) Undertake immediate action as suggested by GVMC / PMU / PMC to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation;
(x) Submit monthly compliance reports on EMP implementation;
(xi) Act promptly on public complaints and grievances related to construction work and redress in a timely manner in coordination with GVMC;
(xii) Comply with applicable government rules and regulations; and
(xiii) Site clean-up and restoration.

D. Monitoring and Reporting

138. Prior to commencement of the works, the contractor will submit a compliance report to GVMC that all identified pre-construction mitigation measures as detailed in the EMP are undertaken. Contractor should confirm that the EHS supervisor is mobilized. GVMC with the assistance of the PMSC will review the report and permit commencement of works.

139. **During construction**, results from internal monitoring by the contractor will be reflected in their monthly EMP implementation reports to the GVMC. GVMC will review and advise contractors for corrective actions if necessary. A Semi-annual Environmental Monitoring Report summarizing compliance and corrective measures taken, will be prepared by PMC and submitted to GVMC.PMU will submit to ADB the semi-annual (6-monthly) EMR. Once concurrence from the ADB is received the report will be disclosed on the GVMC / PMU website.

140. ADB will review project performance against the commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system

E. Environmental Management Plan (EMP) Implementation Cost

141. Most of the mitigation measures require the contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. The costs which are specific to EMP implementation will be included in the contractor costs.

IX. CONCLUSION AND RECOMMENDATIONS

142. The process described in this document has assessed the environmental impacts of all elements of the Mudasarlova lake development and rejuvenation, by (i) improving soil and water conservation; (ii) improving ground water recharge; and (iii) increasing the green cover around the lake area. in Visakhapatnam. All potential impacts were identified in relation to pre-construction, construction, and operation phases. Planning principles and design considerations have been reviewed and incorporated into the site planning and design process wherever possible; thus, environmental impacts as being due to the project design or location were not significant.

143. The subproject activities are mainly located in the Reservoir area and there are no nationally protected monuments in the subproject area.

144. During the construction phase, impacts mainly arise from the construction dust and noise; Anticipated impacts during operation and maintenance are minimal.

145. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation.

146. The project's grievance redress mechanism will provide the citizens with a platform to redress of their grievances, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

147. The EMP will assist the GVMC, PMSC and the construction contractor in mitigating the environmental impacts and guide them in the environmentally sound execution of the proposed project.

148. A copy of the EMP/approved SEP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

149. The subproject will provide better and enhanced storage of water in lake, more green area, and improve the ground water recharge in the area. There impacts associated with the subproject implementation are not significant and can be mitigated through adequate mitigation measures during the installation and commissioning phase.

150. Therefore, as per ADB SPS, 2009 the project is classified as environmental category B and does not require further environmental impact assessment. However, to conform to government guidelines, the project requires; open access clearance for power transmission to the grid; tree cutting permission as applicable.

151. This IEE shall be updated during the detailed design stage by the PMSC to reflect any changes, amendments and will be reviewed and approved by ADB.

RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLISTS

URBAN DEVELOPMENT

Instructions:

- This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional and Sustainable Development Department.
- This checklist is to be completed with the assistance of an Environment Specialist in a Regional Department.
- This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on (i) involuntary resettlement, (ii) indigenous peoplesplanning,(iii)povertyreduction,(iv)participation,and(v)genderand development.
- Answer the questionsassumingthe"withoutmitigation"case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: IND: Visakhapatnam–Chennai Industrial Corridor Development Program (Tranche 2) - the development and rejuvenation of Mudasarlova lake area

Sector Division SARD/SAUW

SCREENING QUESTIONS	Ye	N	REMARKS
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Densely populated?		✓	The lake area is more than 10 kms away from the main cit. No negative impacts are envisaged as the lake development work will be done in and around the lake area where there is less population. The ground water recharge pits will be constructed with support of the neighbouring community for enhanced ground water recharge in the catchment. Minimal road disruption is expected and measures such as best activity scheduling, traffic management, etc. will be employed to minimize the impact to acceptable levels.
▪ Heavy with development activities?		✓	The area is free from any major activities.
▪ Adjacent to or within any environmenta	✓		Mudasarlova Reservoir is situated just outside the Eco-sensitive zone boundary of the Kambalakonda WildlifeSanctuarywhich runs inWesterly direction all along the Southern boundary of

SCREENING QUESTIONS	Ye	N	REMARKS
lly sensitive areas?			Seethakonda RF Ravindranagar, Aarilova Colonies.
▪ Cultural heritage site		✓	No cultural heritage site is located nearby the project area
▪ Protected Area		✓	
▪ Wetland		✓	
▪ Mangrove		✓	
▪ Estuarine		✓	
▪ Buffer zone of protected area	✓		Mudasarlova Reservoir is situated just outside the Eco-sensitive zone boundary of the Kambalakonda wildlife sanctuary which runs in Westerly direction all along the Southern boundary of Seethakonda RF Ravindranagar, Aarilova Colonies KambalakondaWildlifeSanctuaryissituatedintheheartofVisakhapatnamMegaCityin Andhra Pradesh and is spread over an area of 7139 hectares between 83.04' to 83.20' Longitudes and 17.34' to 17.47' Latitudes; The Sanctuaryhas very richbio-diversity comprising73 tree species, 39speciesof herbsandshrubs,and18speciesofclimbers,2speciesofBamboosand7speciesofgrasses,23mammalspecies,7 species of reptiles and more than 90 species of birds have been documented from the Sanctuary; *The Rainwater harvesting proposed in subproject is listed as recommended activity in eco-sensitive zone of wildlife sanctuary notification and will further enhance the implementation of desired actions in the region.* Mitigation measures will be implemented per EMP and Government of India/IFC EHS Guidelines (most stringent) so that the noise level does not to exceed 55dB(A) daytime at the nearest receptor and there is no more than a 3dB increase over the background noise level.
▪ Special area for protecting biodiversity		✓	
▪ Bay		✓	
B. Potential Environmental Impacts Will the Project cause…			
▪ Impacts on the sustainability of associated sanitation and solid waste		✓	No such negative impact is anticipated.

SCREENING QUESTIONS	Ye	N	REMARKS
disposal systems and their interactions with other urban services.			
▪ Deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed?		✓	Sanitation problems may occur for temporary phase during construction which may be avoided by strict implication of EMP
▪ Degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?		✓	The proposed work are entirely in developed urban area so project will not cause and degradation of land and ecosystem
▪ Dislocation or involuntary resettlement of people		✓	The sub-project will not involve any involuntary resettlement impact
▪ Degradation of cultural property, and loss of cultural heritage and tourism revenues?		✓	No historical/cultural/ monuments/ areas exist in or close vicinity of the subproject components. Hence no such impacts are anticipated.

SCREENING QUESTIONS	Ye	N	REMARKS
▪ Occupation of low-lying lands, floodplains and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to pollutive industries?		✓	No such impact is anticipated
▪ Water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality, and pollution of receiving waters?		✓	No chances of surface or ground water pollution is anticipated as proposed subprojectinvolvesonly dredging of lake and drains and constructionof rain water harvesting systems.
▪ Air pollution due to urban emissions?	✓		Minor impacts during construction phase are anticipated as per nature of work.
▪ Social conflicts between construction workers from other areas and local workers?		✓	No such conflicts are anticipated.Preference will be given tolocallaborersandmigratorylabour shallbeemployedinunavoidablecircumstances only.
▪ Road blocking and temporary flooding due to land excavation during rainy season?		✓	The project area is well connected with the city roads and have sufficient area for work and storage of material, so no such impact in anticipated.
▪ Noise and dust from construction activities?	✓		Minor noise and dust from construction activities is anticipated whichshallbetemporaryinnature coincidingonlywiththedurationofconstruction activities.
▪ Traffic disturbances	✓		The transportation ofconstructionmaterialand wastes shall be site specific and restricted to daily requirementswhich

SCREENING QUESTIONS	Ye	N	REMARKS
due to construction material transport and wastes?			isnotexpectedtoresult into trafficdisturbances.However,trafficdiversion plan, if required, will be prepared by contractor in consultationwithEngineertoavoidtraffic disturbances.
▪ Temporary silt runoff due to construction?	✓		Temporarysiltrunoffmaybethereduringrainy season. Majority of the works shall be carried out during dry periods to avoid such impacts. To avoid silt flow in drains, during construction, silt fencing arrangementswillbeprovidedatthebanksof drains.
▪ Hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation?		✓	Not anticipated as per nature of work
▪ Water depletion and/or degradation?		✓	Not anticipated as per nature of work
▪ overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization?		✓	Not anticipated as per nature of work
▪ contamination of surface and ground waters due to improper waste disposal?	✓		Not anticipated as per nature of work
▪ pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems?		✓	Not anticipated as per nature of work. The lake does not support any fish population.
Climate Change	**Ye**	**N**	Remarks

SCREENING QUESTIONS	Ye	N	REMARKS
and Disaster Risk Questions			
▪ The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.			
▪ Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix 4A below)		✓	Theareaisnotsubjecttofloods, landslides,tropicalcyclonewinds, stormsurges,tsunamiorvolcanic eruptionsandlocalizedclimate changes. The sub-project area falls in low damage seismic zone-II as per seismic zonation map of India.
▪ Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (e.g., changes in rainfall patterns disrupt reliability of water supply;		✓	No

SCREENING QUESTIONS	Ye	N	REMARKS
sea level rise creates salinity intrusion into proposed water supply source)?			
▪ Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g.,high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		✓	No
▪ Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by using water from a vulnerable source that is relied upon by many user groups, or encouraging settlement in earthquake zones)?		✓	No

SOME OF THE PHOTOS OF EXISTING CONDITIONS OF MUDASARLOVA LAKE

	
Overview of existing condition of lake	Inlet 1 to lake (Main drain 1)
	
Catchment area of drain 2	Drain 3
	
Ongoing construction of 2MW floating solar park on lake	Existing water supply structure on lake

NATIONAL AMBIENT AIR QUALITY STANDARDS

Sl	Pollutants	Time weighted average	Concentration in ambient air		Method of measurement
			Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Areas	
1	Sulphur Dioxide (SO_2) $\mu g/m^3$	Annual 24 hours	50 80	20 80	Improved West and Geake-Ultraviolet fluorescence
2	Nitrogen Dioxide (NO_2) $\mu g/m^3$	Annual 24 hours	40 80	30 80	Modified Jacob and Hochheiser (Na-Arsenite) Chemiluminescence
3	Particulate Matter (Size less than 10 µm) or PM10 $\mu g/m^3$	Annual 24 hours	60 100	60 100	Gravimetric -TOEM -Beta attenuation
4	Particulate Matter (Size less than 2.5 µm) or PM2.5 $\mu g/m^3$	Annual 24 hours	40 60	40 60	Gravimetric -TOEM -Beta attenuation
5	Carbon Monoxide (CO) mg/m^3	8 hours 1 hours	02 04	02 04	Non Dispersive Infra Red (NDIR) Spectroscopy

NATIONAL AMBIENT AIR QUALITY STANDARDS IN RESPECT OF NOISE

Area code	Category of area/zone	Limit in dB (A)	
		Day time	Night time
a	Industrial area	75	70
b	Commercial area	65	55
c	Residential area	55	45
d	Silence zone	50	40

SAMPLE OUTLINE SPOILS (CONSTRUCTION WASTE) MANAGEMENT PLAN

- The Spoil Management Plan should be site specific and be part of the monthly Construction Management Plan.
- The contractor, in consultation with the PIU, has to find out appropriate location/s for the disposal of the excess soil generated. The spoils should be deposited only at these sites.
- Further precautions need to be taken in case of the contaminated spoils
- The vehicle carrying the spoil should be covered properly.
- The spoils generating from each site should be removed on the same day or immediately after the work is complete. The site / road should be restored to the original condition.

I. Spoils information

The spoil information contains the details like a) The type / material, b) Potential contamination by that type, c) Expected volume (site / component specific), d) Spoil Classification etc.

II. Spoils management

The Spoil Management section gives the details of a) Transportation of spoil b) disposal site details c) Precautions taken d) Volume of contaminated spoil, if present, d) Suggested reuse of disposal of the spoil

III. Documentation

The volume of spoil generated (site specific, date wise), site disposed, reuse / disposal details should be documented properly.

VEHICLE EXHAUST EMISSION NORMS

1. Passenger Cars

Norms	CO(g/km)	HC+ NOx(g/km)
1991Norms	14.3-27.1	2.0(Only HC)
1996 Norms	8.68-12.40	3.00-4.36
1998Norms	4.34-6.20	1.50-2.18
India stage 2000 norms	2.72	0.97
Bharat stage-II	2.2	0.5
Bharat Stage-III	2.3	0.35 (combined)
Bharat Stage-IV	1.0	0.18 (combined)

2. Heavy Diesel Vehicles

Norms	CO(g/kmhr)	HC (g/kmhr)	NOx (g/kmhr)	PM(g/kmhr)
1991Norms	14	3.5	18	-
1996 Norms	11.2	2.4	14.4	-
India stage 2000 norms	4.5	1.1	8.0	0.36
Bharat stage-II	4.0	1.1	7.0	0.15
Bharat Stage-III	2.1	1.6	5.0	0.10
Bharat Stage-IV	1.5	0.96	3.5	0.02

Source: Central Pollution Control Board

CO = Carbon Monixide; g/kmhr = grams per kilometer-hour; HC = Hydrocarbons; NOx = oxides of nitrogen; PM = Particulates Matter

SALIENT FEATURES OF MAJOR LABOR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN CONSTRUCTION OF CIVIL WORKS

(i) Workmen Compensation Act, 1923 - The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

(ii) Payment of Gratuity Act, 1972 - Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years' service or more or on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

(iii) Employees' PF and Miscellaneous Provisions Act, 1952 - The Act provides for monthly contributions by the employer plus workers @10 % or 8.33 %. The benefits payable under the Act are: (a) Pension or family pension on retirement or death as the case may be; (b) deposit linked insurance on the death in harness of the worker; (c) payment of PF accumulation on retirement/death etc.

(iv) Maternity Benefit (Amendment) Act 2017- The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.

(v) Contract Labour (Regulation and Abolition) Act, 1970 - The Act provides for certain welfare measures to be provided by the Contractor to contract labor and in case the Contractor fails to provide, the same are required to be provided by the Principal Employer by Law. The principal employer is required to take Certificate of Registration and the Contractor is required to take a License from the designated Officer. The Act is applicable to the establishments or Contractor of principal employer if they employ 20 or more contract labor.

(vi) Minimum Wages Act, 1948 - The employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employment.

(vii) Payment of Wages Act, 1936 - It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.

(viii) Equal Remuneration Act, 1979 - The Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees in the matters of transfers, training and promotions etc.

(ix) Payment of Bonus Act, 1965 - The Act is applicable to all establishments employing 20 or more workmen. The Act provides for payments of annual bonus subject to a minimum of 8.33 % of wages and maximum of 20 % of wages to employees drawing Rs. 3,500/- per month or less. The bonus to be paid to employees getting Rs. 2,500/- per month or above up to Rs.3,500/- per month shall be worked out by taking wages as Rs.2,500/- per month only. The Act does not apply to certain establishments. The newly set up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of the Act.

(x) Industrial Disputes Act, 1947 - The Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

(xi) Industrial Employment (Standing Orders) Act, 1946 - It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the employer on matters provided in the Act and get the same certified by the designated Authority.

(xii) Trade Unions Act, 1926 - The Act lays down the procedure for registration of trade unions of workmen and employees. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities.

(xiii) Child Labor (Prohibition and Regulation) Act, 1986 - The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labor is prohibited in Building and Construction Industry.

(xiv) Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979 - The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The inter-state migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home up to the establishment and back, etc

(xv) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996 - All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay Cess at rate not exceeding 2% of the cost of construction as may be notified by the Government. The employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for workers near the workplace etc. The employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

SAMPLE GRIEVANCE REGISTRATION FORM

(To be available in Telegu and English)

The _____Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date	Place of registration	Project Town Project:			
Contact information/personal details					
Name		Gender	* Male * Female	Age	
Home address					
Place					
Phone no.					
E-mail					
Complaint/suggestion/comment/question Please provide the details (who, what, where, and how) of your grievance below: If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)	
Mode of communication: Note/letter E-mail Verbal/telephonic	
Reviewed by: (Names/positions of officials reviewing grievance)	
Action taken:	
Whether action taken disclosed:	Yes No
Means of disclosure:	

SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name

Contract Number

NAME: _____ DATE: _____

TITLE: _____ DMA: _____

LOCATION: _____ GROUP: _____

WEATHER:

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Monitoring Items	Compliance
Compliance marked as Yes / No / Not applicable (NA) / Partially Implemented (PI)	
EHS supervisor appointed by contractor and available on site	
Construction site management plan (spoils, safety, schedule, equipment etc.,) prepared	
Traffic management plan prepared	
Dust is under control	
Excavated soil properly placed within minimum space	
Construction area is confined; no traffic/pedestrian entry observed	
Surplus soil/debris/waste is disposed without delay	
Construction material (sand/gravel/aggregate) brought to site as and when required only	
Tarpaulins used to cover sand and other loose material when transported by vehicles	
After unloading , wheels and undercarriage of vehicles cleaned prior to leaving the site	
No AC pipes disturbed/removed during excavation	
No chance finds encountered during excavation	
Work is planned in consultation with traffic police	
Work is not being conducted during heavy traffic	
Work at a stretch is completed within a day (excavation, pipe laying and backfilling)	
Pipe trenches are not kept open unduly	
Road is not completely closed; work is conducted on edge; at least one line is kept open	
Road is closed; alternative route provided and public informed, information board provided	

Pedestrian access to houses is not blocked due to pipe laying	
Spaces left in between trenches for access	
Wooden planks/metal sheets provided across trench for pedestrian	
No public/unauthorized entry observed in work site	
Children safety measures (barricades, security) in place at works in residential areas	
Prior public information provided about the work, schedule and disturbances	
Caution/warning board provided on site	
Guards with red flag provided during work at busy roads	
Workers using appropriate PPE (boots, gloves, helmets, ear muffs etc)	
Workers conducting or near heavy noise work is provided with ear muffs	
Contractor is following standard and safe construction practices	
Deep excavation is conducted with land slip/protection measures	
First aid facilities are available on site and workers informed	
Drinking water provided at the site	
Toilet facility provided at the site	
Separate toilet facility is provided for women workers	
Workers camps are maintained cleanly	
Adequate toilet and bath facilities provided	
Contractor employed local workers as far as possible	
Workers camp set up with the permission of PIU	
Adequate housing provided	
Sufficient water provided for drinking/washing/bath	
No noisy work is conducted in the nights	
Local people informed of noisy work	
No blasting activity conducted	
Pneumatic drills or other equipment creating vibration is not used near old/risky buildings	

Signature

_____

Sign off

_____ _____

Name **Name**

Position **Position**

QUARTERLY REPORTING FORMAT FOR Project Implementation Unit (PIU)

1. Introduction

- Description of sub-project implemented by PIU
- Environmental category of the sub-project
- Details of site personnel and/or consultants responsible for environmental monitoring
- Sub-project status

No.	Sub-Project Name	Subproject status	List of Works	Progress of Works
		Design☐ **Preconstruction☐** **Construction☐** **Operational Phase☐**		

2. Compliance status with National/ State/ Local statutory environmental requirements

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

3. Compliance status with environmental loan covenants, if any

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

4. Compliance status with the environmental management and monitoring plan

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.

- There should be reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:
    - What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries;
    - If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
    - adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
    - Are their designated areas for concrete works, and refuelling;
    - Are their spill kits on site and if there are site procedure for handling emergencies;
    - Is there any chemical stored on site and what is the storage condition?
    - Is there any dewatering activities if yes, where is the water being discharged;
    - How are the stockpiles being managed;
    - How is solid and liquid waste being handled on site;
    - Review of the complaint management system;
    - Checking if there are any activities being under taken out of working hours and how that is being managed.

Semi Annual Monitoring Report

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with EMP

No.	Sub-Project Name	EMP Part of Contract Documents (Y/N)	EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

5. Approach and methodology for environmental monitoring of the project

- Brief description on the approach and methodology used for environmental monitoring of each sub-project

6. Monitoring of environmental impacts on project surroundings (ambient air, water quality and noise levels)

- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 µg/m^3	SO_2 µg/m^3	NO_2 µg/m^3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 μg/m^3	SO_2 μg/m^3	NO_2 μg/m^3

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity μS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			pH	Conductivity μS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Noise Quality Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Monitoring Results)	
			Day Time	Night Time

7. Summary of key issues and remedial actions

- Summary of follow up time-bound actions to be taken within a set timeframe.

8. Appendixes

- Photos
- Summary of consultations conducted, if any
- Copies of environmental clearances and permits
- Sample of environmental site inspection report
- Other

PUBLIC INFORMATION NOTICE TEMPLATE

Public Announcement
Rejuvenation of Mudasarlova lake
Greater Visakhapatnam Manipal corporation

Under this project, works are being conducted by xxxx Contractor Rejuvenation of Mudasarlova lakein Vishakhapatnam

As part of this, construction works will be conducted in ……areas ……. From……to (provide dates).

We request you to kindly co-operate for smooth implementation of the works.

We also request you to drive vehicles / pedestrians to walk carefully

Inconvenience caused is regretted.

PIU - Contact No.
Contractor – Contact no.

IBAT Study for Mudasarlova lake

Proximity report generated by the Integrated Biodiversity Assessment Tool

Site name	Mudasarlova Reservoir Andhra Pradesh
Latitude/Longitude	17° 45' 55" North, 83° 17' 43" East
Date generated	25th April 2018
Generated by	asiandb
Company	ADB

About this report

This report presents the results of a proximity analysis to identify the biodiversity features and species which are located within 1 km, 5 km and 10 km.

Data used to generate this report

IUCN and UNEP-WCMC, 2017. *The World Database on Protected Areas (WDPA) [On-line], March 2018.*

BirdLife International (on behalf of the KBA Partnership), 2016. *Key Biodiversity Areas: December 2016 version.*

IUCN, 2017. *The IUCN Red List of Threatened Species grid analysis of range maps. Version 2017-3 (December).*

Limitations

This report provides an indication of the potential biodiversity-related features - protected areas, key biodiversity areas and species - close to the specified location. It provides an early indication of potential biodiversity concerns, and can provide valuable guidance in making decisions. For example, this information can be helpful when assessing the potential environmental risk and impact of a site, categorising investments/projects, preparing the terms of reference for an impact assessment, focusing attention on key species of conservation concern and sites of known conservation value, and reviewing the results of an impact assessment.

The report does not provide details of potential indirect, downstream or cumulative impacts. Furthermore, the report should be regarded as a “ first-step”, providing a set of conservation values sourced from global data sets, and is not a substitute for further investigation and due diligence, especially concerning national and/or local conservation priorities.

For ultimate accuracy, distance calculations are performed by reprojecting the spatial data (as shown through the map viewer) to an equal distance projection, and so may not match precisely the results shown on the map.

Protected Areas and Key Biodiversity Areas

The following sites are found within the selected buffer distances:

Features within 1 km

There are no features within 1 km.

Features within 5 km

There are no features within 5 km.

Features within 10 km

There are no features within 10 km.

IUCN RED LIST OF THREATENED SPECIES

Given suitable habitat, the following species are potentially found close to the area of interest:

Taxonomic group	Scientific Name	Common Name	IUCN Red List category
Amphibians	*Duttaphrynus melanostictus*	Black-spectacled Toad	LC
Amphibians	*Duttaphrynus scaber*		LC
Amphibians	*Duttaphrynus stomaticus*		LC
Amphibians	*Euphlyctis cyanophlyctis*		LC
Amphibians	*Euphlyctis hexadactylus*	Indian Green Frog	LC
Amphibians	*Fejervarya limnocharis*	Asian Grass Frog	LC
Amphibians	*Hoplobatrachus crassus*	Jerdon's Bullfrog	LC
Amphibians	*Hoplobatrachus tigerinus*	Indian Bullfrog	LC
Amphibians	*Hydrophylax malabaricus*		LC
Amphibians	*Microhyla ornata*	Ant Frog	LC
Amphibians	*Polypedates maculatus*	Himalayan Tree Frog	LC
Amphibians	*Sphaerotheca breviceps*		LC
Amphibians	*Sphaerotheca dobsonii*		LC
Amphibians	*Sphaerotheca rolandae*		LC
Amphibians	*Uperodon globulosus*		LC
Amphibians	*Uperodon systoma*	Marbled Balloon Frog	LC
Amphibians	*Uperodon taprobanicus*	Sri Lankan Bullfrog	LC
Birds	*Accipiter badius*	Shikra	LC
Birds	*Acridotheres fuscus*	Jungle Myna	LC
Birds	*Acridotheres tristis*	Common Myna	LC
Birds	*Acrocephalus dumetorum*	Blyth's Reed-warbler	LC
Birds	*Acrocephalus stentoreus*	Clamorous Reed-warbler	LC
Birds	*Actitis hypoleucos*	Common Sandpiper	LC
Birds	*Aegithina tiphia*	Common Iora	LC
Birds	*Aethopyga siparaja*	Crimson Sunbird	LC
Birds	*Alauda gulgula*	Oriental Skylark	LC
Birds	*Alcedo atthis*	Common Kingfisher	LC
Birds	*Alcedo meninting*	Blue-eared Kingfisher	LC
Birds	*Alcippe poioicephala*	Brown-cheeked Fulvetta	LC
Birds	*Amandava amandava*	Red Avadavat	LC
Birds	*Amaurornis phoenicurus*	White-breasted Waterhen	LC
Birds	*Anas crecca*	Common Teal	LC
Birds	*Anas poecilorhyncha*	Indian Spot-billed Duck	LC
Birds	*Anastomus oscitans*	Asian Openbill	LC
Birds	*Anhinga melanogaster*	Oriental Darter	NT
Birds	*Anthracoceros albirostris*	Oriental Pied Hornbill	LC
Birds	*Anthracoceros coronatus*	Malabar Pied Hornbill	NT

Birds	*Anthus godlewskii*	Blyth's Pipit	LC
Birds	*Anthus richardi*	Richard's Pipit	LC
Birds	*Anthus rufulus*	Paddyfield Pipit	LC
Birds	*Aquila rapax*	Tawny Eagle	LC
Birds	*Ardea alba*	Great White Egret	LC
Birds	*Ardea cinerea*	Grey Heron	LC
Birds	*Ardea intermedia*	Intermediate Egret	LC
Birds	*Ardea purpurea*	Purple Heron	LC
Birds	*Ardeola grayii*	Indian Pond-heron	LC
Birds	*Artamus fuscus*	Ashy Woodswallow	LC
Birds	*Arundinax aedon*	Thick-billed Warbler	LC
Birds	*Asio flammeus*	Short-eared Owl	LC
Birds	*Athene brama*	Spotted Owlet	LC
Birds	*Aythya ferina*	Common Pochard	VU
Birds	*Aythya fuligula*	Tufted Duck	LC
Birds	*Aythya nyroca*	Ferruginous Duck	NT
Birds	*Bubo bengalensis*	Rock Eagle-owl	LC
Birds	*Bubo coromandus*	Dusky Eagle-owl	LC
Birds	*Bubulcus ibis*	Cattle Egret	LC
Birds	*Burhinus indicus*	Indian Thick-knee	LC
Birds	*Butastur teesa*	White-eyed Buzzard	LC
Birds	*Butorides striata*	Green-backed Heron	LC
Birds	*Cacomantis merulinus*	Plaintive Cuckoo	LC
Birds	*Cacomantis passerinus*	Grey-bellied Cuckoo	LC
Birds	*Cacomantis sonneratii*	Banded Bay Cuckoo	LC
Birds	*Calandrella dukhunensis*	Eastern Short-toed Lark	LC
Birds	*Calidris alba*	Sanderling	LC
Birds	*Calidris minuta*	Little Stint	LC
Birds	*Calidris pugnax*	Ruff	LC
Birds	*Calidris ruficollis*	Red-necked Stint	NT
Birds	*Calidris temminckii*	Temminck's Stint	LC
Birds	*Calliope calliope*	Siberian Rubythroat	LC
Birds	*Caprimulgus affinis*	Savanna Nightjar	LC
Birds	*Caprimulgus asiaticus*	Indian Nightjar	LC
Birds	*Caprimulgus indicus*	Jungle Nightjar	LC
Birds	*Carpodacus erythrinus*	Common Rosefinch	LC
Birds	*Cecropis daurica*	Red-rumped Swallow	LC
Birds	*Centropus sinensis*	Greater Coucal	LC
Birds	*Ceryle rudis*	Pied Kingfisher	LC
Birds	*Chaetornis striata*	Bristled Grassbird	VU

Birds	*Chalcophaps indica*	Grey-capped Emerald Dove	LC
Birds	*Charadrius alexandrinus*	Kentish Plover	LC
Birds	*Charadrius dubius*	Little Ringed Plover	LC
Birds	*Charadrius mongolus*	Lesser Sandplover	LC
Birds	*Chlidonias hybrida*	Whiskered Tern	LC
Birds	*Chloropsis jerdoni*	Jerdon's Leafbird	LC
Birds	*Chrysocolaptes festivus*	White-naped Woodpecker	LC
Birds	*Ciconia ciconia*	White Stork	LC
Birds	*Cinnyris asiaticus*	Purple Sunbird	LC
Birds	*Circaetus gallicus*	Short-toed Snake-eagle	LC
Birds	*Circus aeruginosus*	Western Marsh-harrier	LC
Birds	*Circus macrourus*	Pallid Harrier	NT
Birds	*Cisticola juncidis*	Zitting Cisticola	LC
Birds	*Clamator coromandus*	Chestnut-winged Cuckoo	LC
Birds	*Clamator jacobinus*	Jacobin Cuckoo	LC
Birds	*Columba livia*	Rock Dove	LC
Birds	*Copsychus saularis*	Oriental Magpie-robin	LC
Birds	*Coracias affinis*	Indochinese Roller	LC
Birds	*Coracias benghalensis*	Indian Roller	LC
Birds	*Coracina macei*	Indian Cuckooshrike	LC
Birds	*Corvus macrorhynchos*	Large-billed Crow	LC
Birds	*Corvus splendens*	House Crow	LC
Birds	*Coturnix coromandelica*	Rain Quail	LC
Birds	*Coturnix coturnix*	Common Quail	LC
Birds	*Cuculus micropterus*	Indian Cuckoo	LC
Birds	*Cuculus poliocephalus*	Lesser Cuckoo	LC
Birds	*Culicicapa ceylonensis*	Grey-headed Canary-flycatcher	LC
Birds	*Cyanecula svecica*	Bluethroat	LC
Birds	*Cyornis poliogenys*	Pale-chinned Flycatcher	LC
Birds	*Cyornis rubeculoides*	Blue-throated Blue-flycatcher	LC
Birds	*Cyornis tickelliae*	Tickell's Blue-flycatcher	LC
Birds	*Cypsiurus balasiensis*	Asian Palm-swift	LC
Birds	*Dendrocitta formosae*	Grey Treepie	LC
Birds	*Dendrocitta vagabunda*	Rufous Treepie	LC
Birds	*Dendrocopos macei*	Fulvous-breasted Woodpecker	LC
Birds	*Dendrocygna bicolor*	Fulvous Whistling-duck	LC
Birds	*Dendrocygna javanica*	Lesser Whistling-duck	LC
Birds	*Dicaeum agile*	Thick-billed Flowerpecker	LC
Birds	*Dicaeum erythrorhynchos*	Pale-billed Flowerpecker	LC
Birds	*Dicrurus aeneus*	Bronzed Drongo	LC

Birds	*Dicrurus caerulescens*	White-bellied Drongo	LC
Birds	*Dicrurus hottentottus*	Hair-crested Drongo	LC
Birds	*Dicrurus leucophaeus*	Ashy Drongo	LC
Birds	*Dicrurus macrocercus*	Black Drongo	LC
Birds	*Dicrurus paradiseus*	Greater Racquet-tailed Drongo	LC
Birds	*Dumetia hyperythra*	Tawny-bellied Babbler	LC
Birds	*Egretta garzetta*	Little Egret	LC
Birds	*Elanus caeruleus*	Black-winged Kite	LC
Birds	*Ephippiorhynchus asiaticus*	Black-necked Stork	NT
Birds	*Eremopterix griseus*	Ashy-crowned Sparrow-lark	LC
Birds	*Eudynamys scolopaceus*	Western Koel	LC
Birds	*Eumyias thalassinus*	Verditer Flycatcher	LC
Birds	*Falco amurensis*	Amur Falcon	LC
Birds	*Falco peregrinus*	Peregrine Falcon	LC
Birds	*Falco tinnunculus*	Common Kestrel	LC
Birds	*Francolinus pictus*	Painted Francolin	LC
Birds	*Francolinus pondicerianus*	Grey Francolin	LC
Birds	*Fregetta tropica*	Black-bellied Storm-petrel	LC
Birds	*Fulica atra*	Common Coot	LC
Birds	*Gallicrex cinerea*	Watercock	LC
Birds	*Gallinago stenura*	Pintail Snipe	LC
Birds	*Gallinula chloropus*	Common Moorhen	LC
Birds	*Galloperdix lunulata*	Painted Spurfowl	LC
Birds	*Gallus gallus*	Red Junglefowl	LC
Birds	*Geokichla citrina*	Orange-headed Thrush	LC
Birds	*Glaucidium radiatum*	Jungle Owlet	LC
Birds	*Gracupica contra*	Asian Pied Starling	LC
Birds	*Gymnoris xanthocollis*	Chestnut-shouldered Bush-sparrow	LC
Birds	*Gyps bengalensis*	White-rumped Vulture	CR
Birds	*Gyps indicus*	Indian Vulture	CR
Birds	*Halcyon pileata*	Black-capped Kingfisher	LC
Birds	*Halcyon smyrnensis*	White-breasted Kingfisher	LC
Birds	*Haliaeetus leucogaster*	White-bellied Sea-eagle	LC
Birds	*Haliastur indus*	Brahminy Kite	LC
Birds	*Harpactes fasciatus*	Malabar Trogon	LC
Birds	*Hemiprocne coronata*	Crested Treeswift	LC
Birds	*Hemipus picatus*	Bar-winged Flycatcher-shrike	LC
Birds	*Hierococcyx sparverioides*	Large Hawk-cuckoo	LC
Birds	*Hierococcyx varius*	Common Hawk-cuckoo	LC
Birds	*Himantopus himantopus*	Black-winged Stilt	LC

Birds	*Hirundo rustica*	Barn Swallow	LC
Birds	*Hirundo smithii*	Wire-tailed Swallow	LC
Birds	*Hydrobates monorhis*	Swinhoe's Storm-petrel	NT
Birds	*Hydrophasianus chirurgus*	Pheasant-tailed Jacana	LC
Birds	*Hydroprogne caspia*	Caspian Tern	LC
Birds	*Hypothymis azurea*	Black-naped Monarch	LC
Birds	*Ictinaetus malaiensis*	Black Eagle	LC
Birds	*Iduna caligata*	Booted Warbler	LC
Birds	*Irena puella*	Asian Fairy-bluebird	LC
Birds	*Ixobrychus cinnamomeus*	Cinnamon Bittern	LC
Birds	*Ixobrychus flavicollis*	Black Bittern	LC
Birds	*Jynx torquilla*	Eurasian Wryneck	LC
Birds	*Ketupa zeylonensis*	Brown Fish-owl	LC
Birds	*Kittacincla malabarica*	White-rumped Shama	LC
Birds	*Lalage melanoptera*	Black-headed Cuckooshrike	LC
Birds	*Lanius cristatus*	Brown Shrike	LC
Birds	*Lanius schach*	Long-tailed Shrike	LC
Birds	*Lanius vittatus*	Bay-backed Shrike	LC
Birds	*Larus brunnicephalus*	Brown-headed Gull	LC
Birds	*Larus ichthyaetus*	Pallas's Gull	LC
Birds	*Larvivora brunnea*	Indian Blue Robin	LC
Birds	*Leptocoma zeylonica*	Purple-rumped Sunbird	LC
Birds	*Lewinia striata*	Slaty-breasted Rail	LC
Birds	*Limosa limosa*	Black-tailed Godwit	NT
Birds	*Lonchura punctulata*	Scaly-breasted Munia	LC
Birds	*Lonchura striata*	White-rumped Munia	LC
Birds	*Loriculus vernalis*	Vernal Hanging-parrot	LC
Birds	*Machlolophus xanthogenys*	Black-lored Tit	LC
Birds	*Malacocincla abbotti*	Abbott's Babbler	LC
Birds	*Merops orientalis*	Asian Green Bee-eater	LC
Birds	*Merops philippinus*	Blue-tailed Bee-eater	LC
Birds	*Metopidius indicus*	Bronze-winged Jacana	LC
Birds	*Microcarbo niger*	Little Cormorant	LC
Birds	*Micropternus brachyurus*	Rufous Woodpecker	LC
Birds	*Milvus migrans*	Black Kite	LC
Birds	*Mirafra affinis*	Jerdon's Bushlark	LC
Birds	*Mixornis gularis*	Pin-striped Tit-babbler	LC
Birds	*Monticola cinclorhyncha*	Blue-capped Rock-thrush	LC
Birds	*Monticola solitarius*	Blue Rock-thrush	LC
Birds	*Motacilla alba*	White Wagtail	LC

Birds	*Motacilla cinerea*	Grey Wagtail	LC
Birds	*Motacilla citreola*	Citrine Wagtail	LC
Birds	*Motacilla flava*	Western Yellow Wagtail	LC
Birds	*Motacilla maderaspatensis*	White-browed Wagtail	LC
Birds	*Muscicapa dauurica*	Asian Brown Flycatcher	LC
Birds	*Mycteria leucocephala*	Painted Stork	NT
Birds	*Neophron percnopterus*	Egyptian Vulture	EN
Birds	*Numenius arquata*	Eurasian Curlew	NT
Birds	*Numenius phaeopus*	Whimbrel	LC
Birds	*Nycticorax nycticorax*	Black-crowned Night-heron	LC
Birds	*Oceanites oceanicus*	Wilson's Storm-petrel	LC
Birds	*Oriolus xanthornus*	Black-hooded Oriole	LC
Birds	*Orthotomus sutorius*	Common Tailorbird	LC
Birds	*Otus bakkamoena*	Indian Scops-owl	LC
Birds	*Otus scops*	Eurasian Scops-owl	LC
Birds	*Pandion haliaetus*	Osprey	LC
Birds	*Parus major*	Great Tit	LC
Birds	*Passer domesticus*	House Sparrow	LC
Birds	*Pastor roseus*	Rosy Starling	LC
Birds	*Pavo cristatus*	Indian Peafowl	LC
Birds	*Pelargopsis capensis*	Stork-billed Kingfisher	LC
Birds	*Pelecanus philippensis*	Spot-billed Pelican	NT
Birds	*Pellorneum ruficeps*	Puff-throated Babbler	LC
Birds	*Perdicula asiatica*	Jungle Bush-quail	LC
Birds	*Perdicula erythrorhyncha*	Painted Bush-quail	LC
Birds	*Pericrocotus cinnamomeus*	Small Minivet	LC
Birds	*Pericrocotus ethologus*	Long-tailed Minivet	LC
Birds	*Pericrocotus flammeus*	Scarlet Minivet	LC
Birds	*Pernis ptilorhynchus*	Oriental Honey-buzzard	LC
Birds	*Phaenicophaeus tristis*	Green-billed Malkoha	LC
Birds	*Phaenicophaeus viridirostris*	Blue-faced Malkoha	LC
Birds	*Phalacrocorax carbo*	Great Cormorant	LC
Birds	*Phoenicopterus roseus*	Greater Flamingo	LC
Birds	*Phoenicurus ochruros*	Black Redstart	LC
Birds	*Phylloscopus affinis*	Tickell's Leaf-warbler	LC
Birds	*Phylloscopus burkii*	Green-crowned Warbler	LC
Birds	*Phylloscopus griseolus*	Sulphur-bellied Warbler	LC
Birds	*Phylloscopus humei*	Hume's Leaf-warbler	LC
Birds	*Phylloscopus occipitalis*	Western Crowned Leaf-warbler	LC
Birds	*Phylloscopus trochiloides*	Greenish Warbler	LC

Birds	*Picoides nanus*	Indian Pygmy Woodpecker	LC
Birds	*Picus chlorolophus*	Lesser Yellownape	LC
Birds	*Pitta brachyura*	Indian Pitta	LC
Birds	*Ploceus philippinus*	Baya Weaver	LC
Birds	*Pluvialis squatarola*	Grey Plover	LC
Birds	*Podiceps cristatus*	Great Crested Grebe	LC
Birds	*Pomatorhinus horsfieldii*	Indian Scimitar-babbler	LC
Birds	*Porphyrio porphyrio*	Purple Swamphen	LC
Birds	*Prinia hodgsonii*	Grey-breasted Prinia	LC
Birds	*Prinia inornata*	Plain Prinia	LC
Birds	*Prinia socialis*	Ashy Prinia	LC
Birds	*Prinia sylvatica*	Jungle Prinia	LC
Birds	*Psilopogon haemacephalus*	Coppersmith Barbet	LC
Birds	*Psilopogon zeylanicus*	Brown-headed Barbet	LC
Birds	*Psittacula cyanocephala*	Plum-headed Parakeet	LC
Birds	*Psittacula eupatria*	Alexandrine Parakeet	NT
Birds	*Psittacula krameri*	Rose-ringed Parakeet	LC
Birds	*Ptyonoprogne concolor*	Dusky Crag Martin	LC
Birds	*Pycnonotus cafer*	Red-vented Bulbul	LC
Birds	*Pycnonotus flaviventris*	Black-crested Bulbul	LC
Birds	*Pycnonotus jocosus*	Red-whiskered Bulbul	LC
Birds	*Pycnonotus luteolus*	White-browed Bulbul	LC
Birds	*Rallina eurizonoides*	Slaty-legged Crake	LC
Birds	*Recurvirostra avosetta*	Pied Avocet	LC
Birds	*Rhipidura albicollis*	White-throated Fantail	LC
Birds	*Rhipidura aureola*	White-browed Fantail	LC
Birds	*Sarkidiornis melanotos*	African Comb Duck	LC
Birds	*Saxicola caprata*	Pied Bushchat	LC
Birds	*Saxicoloides fulicatus*	Indian Robin	LC
Birds	*Sitta frontalis*	Velvet-fronted Nuthatch	LC
Birds	*Spatula clypeata*	Northern Shoveler	LC
Birds	*Spatula querquedula*	Garganey	LC
Birds	*Spilopelia senegalensis*	Laughing Dove	LC
Birds	*Spilopelia suratensis*	Western Spotted Dove	LC
Birds	*Sterna acuticauda*	Black-bellied Tern	EN
Birds	*Streptopelia decaocto*	Eurasian Collared-dove	LC
Birds	*Strix leptogrammica*	Brown Wood-owl	LC
Birds	*Strix ocellata*	Mottled Wood-owl	LC
Birds	*Sturnia malabarica*	Chestnut-tailed Starling	LC
Birds	*Sturnia pagodarum*	Brahminy Starling	LC

Birds	*Sylvia curruca*	Lesser Whitethroat	LC
Birds	*Sypheotides indicus*	Lesser Florican	EN
Birds	*Taccocua leschenaultii*	Sirkeer Malkoha	LC
Birds	*Tachybaptus ruficollis*	Little Grebe	LC
Birds	*Tadorna ferruginea*	Ruddy Shelduck	LC
Birds	*Tephrodornis pondicerianus*	Common Woodshrike	LC
Birds	*Tephrodornis virgatus*	Large Woodshrike	LC
Birds	*Terpsiphone paradisi*	Indian Paradise-flycatcher	LC
Birds	*Thalasseus bengalensis*	Lesser Crested Tern	LC
Birds	*Threskiornis melanocephalus*	Black-headed Ibis	NT
Birds	*Treron bicinctus*	Orange-breasted Green-pigeon	LC
Birds	*Treron phoenicopterus*	Yellow-footed Green-pigeon	LC
Birds	*Tringa erythropus*	Spotted Redshank	LC
Birds	*Tringa glareola*	Wood Sandpiper	LC
Birds	*Tringa nebularia*	Common Greenshank	LC
Birds	*Tringa ochropus*	Green Sandpiper	LC
Birds	*Tringa totanus*	Common Redshank	LC
Birds	*Turdoides striata*	Jungle Babbler	LC
Birds	*Turdus unicolor*	Tickell's Thrush	LC
Birds	*Turnix suscitator*	Barred Buttonquail	LC
Birds	*Turnix sylvaticus*	Common Buttonquail	LC
Birds	*Turnix tanki*	Yellow-legged Buttonquail	LC
Birds	*Tyto alba*	Common Barn-owl	LC
Birds	*Upupa epops*	Common Hoopoe	LC
Birds	*Vanellus indicus*	Red-wattled Lapwing	LC
Birds	*Vanellus malabaricus*	Yellow-wattled Lapwing	LC
Birds	*Zapornia akool*	Brown Crake	LC
Birds	*Zosterops palpebrosus*	Oriental White-eye	LC
Fishes	*Ablennes hians*	Flat Needlefish	LC
Fishes	*Acanthopagrus berda*	Picnic Seabream	LC
Fishes	*Acanthopagrus longispinnis*	Bengal Yellowfin Seabream	DD
Fishes	*Acanthurus lineatus*	Lined Surgeonfish	LC
Fishes	*Acanthurus mata*	Elongate Surgeonfish	LC
Fishes	*Acanthurus triostegus*	Convict Surgeonfish	LC
Fishes	*Acentronura tentaculata*	Shortpouch Pygmy Pipehorse	LC
Fishes	*Aesopia cornuta*	Unicorn Sole	LC
Fishes	*Aetobatus flagellum*	Longhead Eagle Ray	EN
Fishes	*Aetobatus narinari*	Spotted Eagle Ray	NT
Fishes	*Aetobatus ocellatus*	Spotted Eagle Ray	VU
Fishes	*Aetomylaeus maculatus*	Mottled Eagle Ray	EN

Fishes	*Aetomylaeus nichofii*	Banded Eagle Ray	VU
Fishes	*Albula oligolepis*	Smallscale Bonefish	DD
Fishes	*Alectis ciliaris*	African Pompano	LC
Fishes	*Alepes vari*	Herring Scad	LC
Fishes	*Alepisaurus ferox*	Long Snouted Lancetfish	LC
Fishes	*Alopias pelagicus*	Pelagic Thresher	VU
Fishes	*Alopias superciliosus*	Bigeye Thresher Shark	VU
Fishes	*Alopias vulpinus*	Common Thresher Shark	VU
Fishes	*Ambassis gymnocephalus*	Bald Glassy Perchlet	LC
Fishes	*Ambassis urotaenia*	Bleeker's Glass Perchlet	LC
Fishes	*Amblyeleotris wheeleri*	Gorgeous Prawn-goby	LC
Fishes	*Amblypharyngodon microlepis*	Indian Carplet	LC
Fishes	*Anacanthus barbatus*	Bearded Leatherjacket	LC
Fishes	*Anguilla bengalensis*	Indian Mottled Eel	NT
Fishes	*Anguilla bicolor*	Shortfin Eel	NT
Fishes	*Anguilla marmorata*	Marbled Eel	LC
Fishes	*Anoplogaster cornuta*	Common Fangtooth	LC
Fishes	*Anoxypristis cuspidata*	Narrow Sawfish	EN
Fishes	*Antennatus nummifer*	Big-spot Angler	LC
Fishes	*Aphareus furca*	Small-toothed Jobfish	LC
Fishes	*Aphareus rutilans*	Rusty Jobfish	LC
Fishes	*Aplocheilus lineatus*	Striped panchax	LC
Fishes	*Aprion virescens*	Green Jobfish	LC
Fishes	*Argyropelecus hemigymnus*	Half-naked Hatchetfish	LC
Fishes	*Argyrops spinifer*	King Soldier Bream	LC
Fishes	*Aristostomias lunifer*		LC
Fishes	*Arius arius*	Threadfin Sea Catfish	LC
Fishes	*Arnoglossus macrolophus*	Large-crested Lefteye Flounder	LC
Fishes	*Arothron leopardus*	Banded Leopardblowfish	DD
Fishes	*Atelomycterus marmoratus*	Coral Catshark	NT
Fishes	*Aurigequula fasciata*	Threadfin Ponyfish	LC
Fishes	*Auxis rochei*	Bullet Tuna	LC
Fishes	*Auxis thazard*	Frigate Tuna	LC
Fishes	*Avocettina infans*	Avocet Snipe Eel	LC
Fishes	*Awaous grammepomus*	Scribbled Goby	LC
Fishes	*Awaous melanocephalus*	Largesnout Goby	DD
Fishes	*Bagarius yarrelli*		NT
Fishes	*Bahaba chaptis*	Chaptis Bahaba	DD
Fishes	*Balistes rotundatus*		LC
Fishes	*Bangana ariza*	Ariza Labeo	LC

Fishes	*Bathygobius fuscus*	Brown Frillfin	LC
Fishes	*Bathyuroconger vicinus*	Large-toothed Conger	LC
Fishes	*Benthalbella infans*	Zugmayer's Pearleye	LC
Fishes	*Benthosema pterotum*	Skinnycheek Lanternfish	LC
Fishes	*Beryx splendens*	Splendid Alfonsino	LC
Fishes	*Bostrychus sinensis*	Four-eyed Sleeper	LC
Fishes	*Bothus pantherinus*	Leopard Flounder	LC
Fishes	*Brachirus pan*	Pan Sole	LC
Fishes	*Brachypleura novaezeelandiae*	Yellow-dappled Flounder	LC
Fishes	*Bregmaceros nectabanus*		LC
Fishes	*Brevitrygon imbricata*	Scaly Whipray	DD
Fishes	*Callionymus sagitta*	Arrow-headed Darter Dragonet	LC
Fishes	*Canthigaster petersii*		LC
Fishes	*Caranx sexfasciatus*	Bigeye Trevally	LC
Fishes	*Carcharhinus albimarginatus*	Silvertip Shark	VU
Fishes	*Carcharhinus amblyrhynchoides*	Graceful Shark	NT
Fishes	*Carcharhinus amboinensis*	Pigeye Shark	DD
Fishes	*Carcharhinus brevipinna*	Spinner Shark	NT
Fishes	*Carcharhinus dussumieri*	Widemouth Blackspot Shark	NT
Fishes	*Carcharhinus falciformis*	Silky Shark	VU
Fishes	*Carcharhinus hemiodon*	Pondicherry Shark	CR
Fishes	*Carcharhinus limbatus*	Blacktip Shark	NT
Fishes	*Carcharhinus longimanus*	Oceanic Whitetip Shark	VU
Fishes	*Carcharhinus macloti*	Hardnose Shark	NT
Fishes	*Carcharhinus melanopterus*	Blacktip Reef Shark	NT
Fishes	*Carcharhinus sealei*	Blackspot Shark	NT
Fishes	*Carcharhinus sorrah*	Spottail Shark	NT
Fishes	*Carcharodon carcharias*	Great White Shark	VU
Fishes	*Caulophryne jordani*	Fanfin Angler	LC
Fishes	*Centriscus scutatus*	Grooved Razorfish	LC
Fishes	*Centropyge fisheri*	Hawaiian Flame Angelfish	LC
Fishes	*Cephalopholis formosa*	Bluelined Hind	LC
Fishes	*Ceratias holboelli*	Deepsea Angler	LC
Fishes	*Chaenogaleus macrostoma*	Hooktooth Shark	VU
Fishes	*Chaenophryne ramifera*		LC
Fishes	*Chaetodon andamanensis*	Yellow Butterflyfish	DD
Fishes	*Chaetodon auriga*	Threadfin Butterflyfish	LC
Fishes	*Chaetodon collare*	Red-tailed Butterflyfish	LC
Fishes	*Chaetodon decussatus*	Indian vagabond Butterflyfish	LC
Fishes	*Chaetodon lunula*	Redstriped Butterflyfish	LC

Fishes	*Chaetodon octofasciatus*	Eight-striped Butterflyfish	LC
Fishes	*Chaetodon rafflesii*	Raffle's Butterflyfish	LC
Fishes	*Chaetodon semeion*	Decorated Butterflyfish	LC
Fishes	*Chaetodon triangulum*	Herringbone Butterflyfish	LC
Fishes	*Chaetodon trifasciatus*	Pinstriped Butterflyfish	LC
Fishes	*Chaetodon vagabundus*	Criss-cross Butterflyfish	LC
Fishes	*Channa gachua*	Dwarf Snakehead	LC
Fishes	*Channa marulius*		LC
Fishes	*Chascanopsetta lugubris*	Pelican flounder	LC
Fishes	*Chauliodus sloani*	Sloane's Viperfish	LC
Fishes	*Chelon macrolepis*	Largescale Mullet	LC
Fishes	*Chelon melinopterus*	Otomebora Mullet	LC
Fishes	*Chelonodon patoca*	Milkspotted Puffer	LC
Fishes	*Chiloscyllium griseum*	Grey Bamboo Shark	NT
Fishes	*Chiloscyllium indicum*	Ridgebacked Bamboo Shark	NT
Fishes	*Chiloscyllium plagiosum*	Whitespotted Bamboo Shark	NT
Fishes	*Chiloscyllium punctatum*	Grey Carpetshark	NT
Fishes	*Chlorophthalmus agassizi*	Agassiz's Thread-sail Fish	LC
Fishes	*Chrysiptera unimaculata*	One-spot Demoiselle	LC
Fishes	*Cirrhinus mrigala*	Mrigal	LC
Fishes	*Cirrhinus reba*	Reba Carp	LC
Fishes	*Cocotropus roseus*	Velvetfish	LC
Fishes	*Coilia neglecta*	Neglected Grenadier Anchovy	LC
Fishes	*Cookeolus japonicus*	Longfinned Bullseye	LC
Fishes	*Coryphaena equiselis*	Pompano Dolphinfish	LC
Fishes	*Coryphaena hippurus*	Common Dolphinfish	LC
Fishes	*Cosmocampus investigatoris*	Investigator Pipefish	LC
Fishes	*Cryptopsaras couesii*	Triplewart Seadevil	LC
Fishes	*Cubiceps pauciradiatus*	Bigeye Cigarfish	LC
Fishes	*Cyclothone acclinidens*	Bent-tooth Bristlemouth	LC
Fishes	*Cyclothone braueri*	Brauer's Eye-nosed Fish	LC
Fishes	*Cyclothone microdon*	Small-toothed Portholefish	LC
Fishes	*Cyclothone pallida*	Bicolored Bristlemouth	LC
Fishes	*Cyclothone pseudopallida*	Slender Bristlemouth	LC
Fishes	*Desmodema polystictum*	Polka-dot Ribbonfish	LC
Fishes	*Diaphus splendidus*		LC
Fishes	*Diplophos taenia*	Pacific Portholefish	LC
Fishes	*Diretmus argenteus*	Silver Spinyfin	LC
Fishes	*Ditropichthys storeri*	Doublekeeled whalefish	DD
Fishes	*Doryrhamphus excisus*	Bluestripe Pipefish	LC

Fishes	*Dysalotus alcocki*		LC
Fishes	*Echiostoma barbatum*	Threadfin Dragonfish	LC
Fishes	*Eleotris fusca*	Brown Spinecheek Gudgeon	LC
Fishes	*Engyprosopon grandisquama*	Largescale Flounder	LC
Fishes	*Entomacrodus epalzeocheilos*	Fringelip Rockskipper	LC
Fishes	*Entomacrodus striatus*	Blackspotted Rockskipper	LC
Fishes	*Epinephelus bleekeri*	Duskytail Grouper	NT
Fishes	*Epinephelus coioides*	Orange-spotted Grouper	NT
Fishes	*Epinephelus erythrurus*	Cloudy Grouper	DD
Fishes	*Epinephelus lanceolatus*	Giant Grouper	VU
Fishes	*Esomus danrica*	Flying barb	LC
Fishes	*Etelis coruscans*	Deepwater Longtail Red Snapper	LC
Fishes	*Eubleekeria splendens*	Splendid Ponyfish	LC
Fishes	*Euprotomicrus bispinatus*	Pygmy Shark	LC
Fishes	*Eusphyra blochii*	Winghead Shark	EN
Fishes	*Euthynnus affinis*	Kawakawa	LC
Fishes	*Exocoetus volitans*	Tropical Two-wing Flyingfish	LC
Fishes	*Exyrias puntang*	Puntang Goby	LC
Fishes	*Forcipiger flavissimus*	Big long-nosed Butterflyfish	LC
Fishes	*Galeocerdo cuvier*	Tiger Shark	NT
Fishes	*Gazza minuta*	Toothed Ponyfish	LC
Fishes	*Gephyroberyx darwinii*	Big Roughy	LC
Fishes	*Gigantactis vanhoeffeni*		DD
Fishes	*Glaucostegus granulatus*	Sharpnose Guitarfish	VU
Fishes	*Glaucostegus obtusus*	Widenose Guitarfish	VU
Fishes	*Glaucostegus typus*	Giant Shovelnose Ray	VU
Fishes	*Glossogobius giuris*	Bareye Goby	LC
Fishes	*Glyphis gangeticus*	Ganges Shark	CR
Fishes	*Grammatobothus polyophthalmus*	Threespot Flounder	LC
Fishes	*Gymnocaesio gymnoptera*	Slender Fusilier	LC
Fishes	*Gymnocranius griseus*	Grey Large-eye Bream	LC
Fishes	*Gymnura poecilura*	Longtail Butterfly Ray	NT
Fishes	*Gymnura tentaculata*	Tentacled Butterfly Ray	DD
Fishes	*Gymnura zonura*	Zonetail Butterfly Ray	VU
Fishes	*Hemigymnus fasciatus*	Barred thicklip wrasse	LC
Fishes	*Hemigymnus melapterus*	Blackedge thicklip wrasse	LC
Fishes	*Hemipristis elongata*	Snaggletooth Shark	VU
Fishes	*Heniochus acuminatus*	Pennant Coral Fish	LC
Fishes	*Heniochus pleurotaenia*	Indian Ocean Bannerfish	LC
Fishes	*Himantolophus groenlandicus*	Atlantic Football-Fish	LC

Fishes	*Himantura marginata*	Blackedge Whipray	DD
Fishes	*Himantura uarnak*	Reticulate Whipray	VU
Fishes	*Hippichthys heptagonus*	Reticulated Freshwater Pipefish	LC
Fishes	*Hippocampus histrix*	Thorny Seahorse	VU
Fishes	*Hippocampus kelloggi*	Great Seahorse	VU
Fishes	*Hippocampus trimaculatus*	Three-spot Seahorse	VU
Fishes	*Idiacanthus fasciola*	Ribbon Sawtail Fish	LC
Fishes	*Inegocia japonica*	Japanese Flathead	LC
Fishes	*Iniistius dea*	Black-spot tuskfish	LC
Fishes	*Istigobius ornatus*	Ornate Goby	LC
Fishes	*Istiompax indica*	Black Marlin	DD
Fishes	*Istiophorus platypterus*	Sailfish	LC
Fishes	*Isurus oxyrinchus*	Shortfin Mako	VU
Fishes	*Isurus paucus*	Longfin Mako	VU
Fishes	*Johnius coitor*	Big-eyed Jewfish	LC
Fishes	*Kajikia audax*	Striped Marlin	NT
Fishes	*Kali indica*		LC
Fishes	*Katsuwonus pelamis*	Skipjack Tuna	LC
Fishes	*Kuhlia mugil*		LC
Fishes	*Kuhlia rupestris*	Jungle Perch	LC
Fishes	*Kumococius rodericensis*	Spiny Flathead	LC
Fishes	*Labeo bata*	Minor Carp	LC
Fishes	*Labeo boggut*	Boggut labeo	LC
Fishes	*Lagocephalus inermis*	Smooth Blaasop	LC
Fishes	*Lagocephalus lagocephalus*	Oceanic Puffer	LC
Fishes	*Lagocephalus lunaris*	Lunartail Puffer	LC
Fishes	*Lagocephalus sceleratus*	Silver-cheeked Toadfish	LC
Fishes	*Lagocephalus spadiceus*	Half-smooth Golden Pufferfish	LC
Fishes	*Lamiopsis temminckii*	Broadfin Shark	EN
Fishes	*Lamnostoma orientalis*	Oriental Snake Eel	LC
Fishes	*Lamnostoma polyophthalma*	Ocellated Sand-eel	LC
Fishes	*Leiognathus equulus*	Common Ponyfish	LC
Fishes	*Lepidocephalus guntea*	Peppered Loach	LC
Fishes	*Lepidocephalus thermalis*		LC
Fishes	*Liza tade*		DD
Fishes	*Loxodon macrorhinus*	Sliteye Shark	LC
Fishes	*Lutjanus johnii*	John's Snapper	LC
Fishes	*Lutjanus lunulatus*	Lunartail Snapper	LC
Fishes	*Lutjanus lutjanus*	Bigeye Snapper	LC
Fishes	*Maculabatis gerrardi*	Whitespotted Whipray	VU

Fishes	*Manta birostris*	Giant Manta Ray	VU
Fishes	*Megachasma pelagios*	Megamouth Shark	LC
Fishes	*Megalops cyprinoides*	Indo-Pacific Tarpon	DD
Fishes	*Megatrygon microps*	Smalleye Stingray	DD
Fishes	*Melanocetus johnsonii*	Humpback Anglerfish	LC
Fishes	*Melanocetus murrayi*		LC
Fishes	*Melanostomias paucilaternatus*		LC
Fishes	*Microlophichthys microlophus*		LC
Fishes	*Mobula eregoodootenkee*	Longhorned Pygmy Devil Ray	NT
Fishes	*Mobula japanica*	Spinetail Devil Ray	NT
Fishes	*Mobula kuhlii*	Shortfin Devil Ray	DD
Fishes	*Mobula tarapacana*	Sicklefin Devil Ray	VU
Fishes	*Mobula thurstoni*	Bentfin Devil Ray	NT
Fishes	*Monopterus albus*	Rice swampeel	LC
Fishes	*Mugil cephalus*	Flathead Mullet	LC
Fishes	*Mustelus mosis*	Arabian Smoothhound	DD
Fishes	*Narcine lingula*	Chinese Numbfish	DD
Fishes	*Narcine maculata*	Darkspotted Electric Ray	DD
Fishes	*Narcine timlei*	Brown Numbfish	DD
Fishes	*Narke dipterygia*	Spottail Sleeper Ray	DD
Fishes	*Naso brevirostris*	Palefin Unicornfish	LC
Fishes	*Naso unicornis*	Bluespine Unicornfish	LC
Fishes	*Nebrius ferrugineus*	Tawny Nurse Shark	VU
Fishes	*Negaprion acutidens*	Sharptooth Lemon Shark	VU
Fishes	*Nemacheilus denisoni*		LC
Fishes	*Nematalosa galatheae*	Galathea Gizzard Shad	LC
Fishes	*Nemichthys scolopaceus*	Slender Snipe Eel	LC
Fishes	*Nemipterus furcosus*	Fork-tailed Threadfin Bream	LC
Fishes	*Nemipterus peronii*	Notchedfin Treadfin Bream	LC
Fishes	*Nemipterus zysron*	Slender Threadfin Bream	LC
Fishes	*Neoceratias spinifer*		LC
Fishes	*Neopomacentrus taeniurus*	Freshwater Damsel	DD
Fishes	*Neotropius atherinoides*		LC
Fishes	*Neotrygon kuhlii*	Bluespotted Maskray	DD
Fishes	*Notopterus notopterus*		LC
Fishes	*Odontaspis noronhai*	Bigeye Sand Tiger	DD
Fishes	*Omobranchus ferox*	Gossamer Blenny	LC
Fishes	*Omobranchus punctatus*	Japanese Blenny	LC
Fishes	*Omobranchus smithi*		VU
Fishes	*Ompok bimaculatus*		NT

Fishes	*Ophiocara porocephala*	Spangled Gudgeon	LC
Fishes	*Ophisternon bengalense*	Bengal mudeel	LC
Fishes	*Oreichthys cosuatis*		LC
Fishes	*Oryzias dancena*	Indian ricefish	LC
Fishes	*Osteobrama vigorsii*	Godavari Osteobrama	LC
Fishes	*Ostorhinchus lateralis*	Humpback Cardinal	LC
Fishes	*Oxyurichthys microlepis*	Maned Goby	LC
Fishes	*Oxyurichthys ophthalmonema*	Eyebrow Goby	LC
Fishes	*Oxyurichthys tentacularis*		DD
Fishes	*Paracaesio sordida*	Dirty Ordure Snapper	LC
Fishes	*Parachaetodon ocellatus*	Sixspine Butterflyfish	LC
Fishes	*Parachiloglanis hodgarti*	Torrent Catfish	LC
Fishes	*Paragaleus randalli*	Slender Weasel Shark	NT
Fishes	*Paralepis elongata*	Barracudina	LC
Fishes	*Pateobatis jenkinsii*	Jenkins' Whipray	VU
Fishes	*Pellona ditchela*	Indian Pellona	LC
Fishes	*Pentherichthys atratus*		LC
Fishes	*Photonectes margarita*		LC
Fishes	*Photostomias atrox*		LC
Fishes	*Pisodonophis boro*		LC
Fishes	*Platycephalus indicus*	Bartail Flathead	DD
Fishes	*Platytroctes apus*	Legless Searsid	LC
Fishes	*Plectorhinchus gibbosus*	Brown Sweetlips	LC
Fishes	*Plicofollis dussumieri*	Blacktip Sea Catfish	LC
Fishes	*Pomacanthus annularis*	Bluering Angelfish	LC
Fishes	*Pomacanthus imperator*	Emperor Angelfish	LC
Fishes	*Pomacanthus semicirculatus*	Semicircle Angelfish	LC
Fishes	*Pomacanthus xanthometopon*	Yellowface Angelfish	LC
Fishes	*Pomadasys argenteus*	Silver Javelin	LC
Fishes	*Poromitra megalops*	Ridgehead	DD
Fishes	*Prionace glauca*	Blue Shark	NT
Fishes	*Pristipomoides filamentosus*	Crimson Jobfish	LC
Fishes	*Pristipomoides multidens*	Goldbanded Jobfish	LC
Fishes	*Pristipomoides sieboldii*	Lavender Jobfish	LC
Fishes	*Pristipomoides zonatus*	Oblique-banded Snapper	LC
Fishes	*Pristis clavata*	Dwarf Sawfish	EN
Fishes	*Pristis pristis*	Largetooth Sawfish	CR
Fishes	*Pristis zijsron*	Green Sawfish	CR
Fishes	*Psammogobius biocellatus*	Sleepy Goby	LC
Fishes	*Psenes arafurensis*	Banded Driftfish	LC

Fishes	*Pseudapocryptes elongatus*		LC
Fishes	*Pseudocarcharias kamoharai*	Crocodile Shark	NT
Fishes	*Puntius vittatus*		LC
Fishes	*Pygoplites diacanthus*	Royal Angelfish	LC
Fishes	*Rachycentron canadum*	Cobia	LC
Fishes	*Rasbora daniconius*	Slender Barb	LC
Fishes	*Rastrelliger faughni*	Island Mackerel	DD
Fishes	*Rastrelliger kanagurta*	Indian Mackerel	DD
Fishes	*Remora brachyptera*	Spearfish Remora	LC
Fishes	*Rhabdosargus sarba*	Goldlined Seabream	LC
Fishes	*Rhina ancylostoma*	Bowmouth Guitarfish	VU
Fishes	*Rhincodon typus*	Whale Shark	EN
Fishes	*Rhizoprionodon acutus*	Milk Shark	LC
Fishes	*Rhizoprionodon oligolinx*	Grey Sharpnose Shark	LC
Fishes	*Rhynchobatus laevis*	Smoothnose Wedgefish	VU
Fishes	*Rogadius pristiger*	Thorny Flathead	LC
Fishes	*Rondeletia loricata*	Redmouth Whalefish	LC
Fishes	*Salmophasia balookee*	Bloch Razorbelly Minnow	LC
Fishes	*Sarda orientalis*	Oriental Bonito	LC
Fishes	*Saurida tumbil*	Greater Lizardfish	LC
Fishes	*Scartella emarginata*	Maned Blenny	LC
Fishes	*Scarus quoyi*	Quoy's Parrotfish	LC
Fishes	*Scatophagus argus*	Spotted Scat	LC
Fishes	*Scoliodon laticaudus*	Spadenose Shark	NT
Fishes	*Scomberomorus commerson*	Narrow-barred Spanish Mackerel	NT
Fishes	*Scomberomorus guttatus*	Indo-Pacific King Mackerel	DD
Fishes	*Scomberomorus koreanus*	Korean Seerfish	LC
Fishes	*Scomberomorus lineolatus*	Streaked Seerfish	LC
Fishes	*Scopelarchoides danae*		LC
Fishes	*Scopelarchus analis*	Blackbelly Pearleye	LC
Fishes	*Scopeloberyx robustus*	Longjaw Bigscale	DD
Fishes	*Scorpaenopsis venosa*	Raggy Scorpionfish	LC
Fishes	*Searsia koefoedi*	Koefoed's Searsid	LC
Fishes	*Setarches guentheri*	Deepwater Scorpionfish	LC
Fishes	*Sperata aor*	Long-whiskered Catfish	LC
Fishes	*Sphyrna lewini*	Scalloped Hammerhead	EN
Fishes	*Sphyrna mokarran*	Great Hammerhead	EN
Fishes	*Stegostoma fasciatum*	Zebra Shark	EN
Fishes	*Sternoptyx diaphana*	Diaphanous Hatchet Fish	LC
Fishes	*Sternoptyx pseudobscura*	Highlight Hatchetfish	LC

Fishes	*Stomias affinis*		LC
Fishes	*Stylephorus chordatus*	Tube-eye	LC
Fishes	*Synagrops japonicus*		LC
Fishes	*Synodus oculeus*	Large-eye Lizardfish	LC
Fishes	*Taaningichthys bathyphilus*	Deepwater Lanternfish	LC
Fishes	*Taenioides cirratus*	Whiskered Eel Goby	DD
Fishes	*Taeniura lymma*	Bluespotted Fantail Ray	NT
Fishes	*Taeniurops meyeni*	Blotched Fantail Ray	VU
Fishes	*Takifugu oblongus*	Lattice Blaasop	LC
Fishes	*Telatrygon zugei*	Sharpnose Stingray	NT
Fishes	*Tenualosa ilisha*	Hilsa	LC
Fishes	*Terapon theraps*	Largescaled Terapon	LC
Fishes	*Tetraodon fluviatilis*	Green Pufferfish	LC
Fishes	*Tetraroge niger*		LC
Fishes	*Thamnaconus melanoproctes*	Blackvent Filefish	DD
Fishes	*Thryssa gautamiensis*	Gautama Thryssa	DD
Fishes	*Thryssa mystax*	Moustached Thryssa	LC
Fishes	*Thunnus albacares*	Yellowfin Tuna	NT
Fishes	*Thysanophrys celebica*	Celebes Flathead	LC
Fishes	*Torpedo panthera*	Panther Torpedo	DD
Fishes	*Torquigener hypselogeneion*	Orange-spotted Toadfish	LC
Fishes	*Toxotes jaculatrix*	Banded Archerfish	LC
Fishes	*Triaenodon obesus*	Whitetip Reef Shark	NT
Fishes	*Trigonolampa miriceps*	Threelights Dragonfish	LC
Fishes	*Tylerius spinosissimus*	Spiny Blaasop	LC
Fishes	*Uraspis helvola*	Whitetongue Jack	LC
Fishes	*Urogymnus asperrimus*	Porcupine Ray	VU
Fishes	*Valenciennellus tripunctulatus*	Constellationfish	LC
Fishes	*Vinciguerria nimbaria*	Frilled Lighthouse Fish	LC
Fishes	*Wallago attu*		NT
Fishes	*Xestochilus nebulosus*		LC
Fishes	*Xiphasia setifer*	Hairtail Blenny	LC
Fishes	*Xiphias gladius*	Swordfish	LC
Fishes	*Xiphocheilus typus*	Blue-toothed tuskfish	LC
Fishes	*Zebrasoma desjardinii*	Indian Sailfin Tang	LC
Fishes	*Zebrasoma scopas*	Brushtail Tang	LC
Fishes	*Zenarchopterus dispar*	Feathered River-garfish	LC
Fishes	*Zenarchopterus gilli*		LC
Fishes	*Zenopsis conchifer*	Silvery John Dory	LC
Invertebrates	*Aciagrion occidentale*		LC

Invertebrates	*Acisoma panorpoides*	Grizzled Pintail	LC
Invertebrates	*Acropora irregularis*		DD
Invertebrates	*Aethriamanta brevipennis*		LC
Invertebrates	*Agriocnemis pygmaea*	Wandering Midget	LC
Invertebrates	*Allopatides dendroeides*		DD
Invertebrates	*Anax ephippiger*	Vagrant Emperor	LC
Invertebrates	*Anax guttatus*	Lesser Green Emperor	LC
Invertebrates	*Anax indicus*		LC
Invertebrates	*Archibasis oscillans*		LC
Invertebrates	*Arctides regalis*	Royal Spanish Lobster	LC
Invertebrates	*Assiminea woodmasoniana*		LC
Invertebrates	*Auriculastra subula*		LC
Invertebrates	*Bellamya bengalensis*		LC
Invertebrates	*Biarctus sordidus*	Pygmy Slipper Lobster	LC
Invertebrates	*Bithynia cerameopoma*		LC
Invertebrates	*Bithynia pulchella*		LC
Invertebrates	*Bohadschia vitiensis*	Brown Sandfish	DD
Invertebrates	*Brachydiplax sobrina*		LC
Invertebrates	*Brachythemis contaminata*		LC
Invertebrates	*Bradinopyga geminata*		LC
Invertebrates	*Ceriagrion cerinorubellum*		LC
Invertebrates	*Ceriagrion coromandelianum*		LC
Invertebrates	*Ceriagrion olivaceum*		LC
Invertebrates	*Cerithium coralium*	Coral Cerith	LC
Invertebrates	*Clenchiella microscopica*		LC
Invertebrates	*Coeliccia didyma*		LC
Invertebrates	*Coeloseris mayeri*		LC
Invertebrates	*Conus achatinus*		LC
Invertebrates	*Conus acutangulus*		LC
Invertebrates	*Conus amadis*		LC
Invertebrates	*Conus arenatus*	Sand-dusted Cone	LC
Invertebrates	*Conus articulatus*		LC
Invertebrates	*Conus aulicus*		LC
Invertebrates	*Conus bengalensis*	Bengal Cone	LC
Invertebrates	*Conus betulinus*		LC
Invertebrates	*Conus biliosus*		LC
Invertebrates	*Conus canonicus*		LC
Invertebrates	*Conus capreolus*		DD
Invertebrates	*Conus caracteristicus*	Characteristic Cone	LC
Invertebrates	*Conus catus*		LC

Invertebrates	*Conus chaldaeus*		LC
Invertebrates	*Conus collisus*	Stigmatic Cone	LC
Invertebrates	*Conus consors*		LC
Invertebrates	*Conus coromandelicus*		LC
Invertebrates	*Conus coronatus*		LC
Invertebrates	*Conus cumingii*	Cuming's Cone	LC
Invertebrates	*Conus ebraeus*		LC
Invertebrates	*Conus eburneus*		LC
Invertebrates	*Conus episcopatus*		LC
Invertebrates	*Conus eximius*		LC
Invertebrates	*Conus figulinus*		LC
Invertebrates	*Conus flavidus*	Yellow Pacific cone	LC
Invertebrates	*Conus geographus*		LC
Invertebrates	*Conus glans*		LC
Invertebrates	*Conus hyaena*	Hyena Cone	LC
Invertebrates	*Conus inscriptus*	Engraved Cone	LC
Invertebrates	*Conus leopardus*		LC
Invertebrates	*Conus litoglyphus*		LC
Invertebrates	*Conus litteratus*		LC
Invertebrates	*Conus lividus*		LC
Invertebrates	*Conus longurionis*		LC
Invertebrates	*Conus loroisii*		LC
Invertebrates	*Conus malacanus*	Malacca Cone	LC
Invertebrates	*Conus maldivus*	Maldive Cone	LC
Invertebrates	*Conus marmoreus*	Marbled Cone	LC
Invertebrates	*Conus miles*		LC
Invertebrates	*Conus miliaris*		LC
Invertebrates	*Conus mitratus*		LC
Invertebrates	*Conus monile*	Necklace Cone	LC
Invertebrates	*Conus nussatella*		LC
Invertebrates	*Conus obscurus*		LC
Invertebrates	*Conus pertusus*		LC
Invertebrates	*Conus quercinus*		LC
Invertebrates	*Conus rattus*		LC
Invertebrates	*Conus recluzianus*		LC
Invertebrates	*Conus sponsalis*	Sponsal Cone	LC
Invertebrates	*Conus striatellus*		LC
Invertebrates	*Conus striatus*		LC
Invertebrates	*Conus sulcatus*		LC
Invertebrates	*Conus suratensis*		LC

Invertebrates	*Conus terebra*		LC
Invertebrates	*Conus tessulatus*		LC
Invertebrates	*Conus textile*		LC
Invertebrates	*Conus tulipa*		LC
Invertebrates	*Conus vexillum*		LC
Invertebrates	*Conus virgo*		LC
Invertebrates	*Conus voluminalis*		LC
Invertebrates	*Conus zeylanicus*		LC
Invertebrates	*Copera marginipes*		LC
Invertebrates	*Copera vittata*		LC
Invertebrates	*Cratilla lineata*		LC
Invertebrates	*Cratilla metallica*		LC
Invertebrates	*Diplacodes trivialis*		LC
Invertebrates	*Ellobium aurisjudae*	Judas Ear Cassidula	LC
Invertebrates	*Epophthalmia vittata*		LC
Invertebrates	*Ferrissia verruca*		LC
Invertebrates	*Fungia cyclolites*		LC
Invertebrates	*Fungia fragilis*		LC
Invertebrates	*Gabbia orcula*		LC
Invertebrates	*Gabbia stenothyroides*		LC
Invertebrates	*Gabbia travancorica*		LC
Invertebrates	*Gibbularctus gibberosus*		LC
Invertebrates	*Gyraulus convexiusculus*		LC
Invertebrates	*Heliopora coerulea*	Blue Coral	VU
Invertebrates	*Holothuria arenicola*		DD
Invertebrates	*Holothuria atra*	Lollyfish	LC
Invertebrates	*Holothuria edulis*	Pinkfish	LC
Invertebrates	*Holothuria flavomaculata*		LC
Invertebrates	*Holothuria fuscocinerea*		LC
Invertebrates	*Holothuria fuscogilva*		VU
Invertebrates	*Holothuria hilla*		LC
Invertebrates	*Holothuria impatiens*	Bottleneck Sea Cucumber	DD
Invertebrates	*Holothuria inhabilis*		LC
Invertebrates	*Holothuria lessoni*	Golden Sandfish	EN
Invertebrates	*Holothuria leucospilota*	White Thread Fish	LC
Invertebrates	*Holothuria moebii*		LC
Invertebrates	*Holothuria pardalis*		LC
Invertebrates	*Holothuria pervicax*		LC
Invertebrates	*Holothuria rigida*		LC
Invertebrates	*Holothuria scabra*	Golden Sandfish	EN

Invertebrates	*Holothuria spinifera*		DD
Invertebrates	*Indoplanorbis exustus*		LC
Invertebrates	*Intha umbilicalis*		LC
Invertebrates	*Iravadia rohdei*		LC
Invertebrates	*Ischnura senegalensis*	Tropical Bluetail	LC
Invertebrates	*Labidodemas rugosum*		LC
Invertebrates	*Lamellidens corrianus*		LC
Invertebrates	*Lestes concinnus*	Dusky Spreadwing	LC
Invertebrates	*Lestes elatus*	Emerald Spreadwing	LC
Invertebrates	*Lestes umbrinus*		DD
Invertebrates	*Littoraria undulata*		LC
Invertebrates	*Lymnaea acuminata*		LC
Invertebrates	*Lymnaea biacuminata*		DD
Invertebrates	*Lymnaea luteola*		LC
Invertebrates	*Lymnaea persica*		LC
Invertebrates	*Lyriothemis cleis*		LC
Invertebrates	*Mekongia crassa*		LC
Invertebrates	*Melampus sincaporensis*		LC
Invertebrates	*Melanoides tuberculata*		LC
Invertebrates	*Millepora platyphylla*	Firecoral	LC
Invertebrates	*Millepora tenera*		LC
Invertebrates	*Neritina violacea*	Red-mouth Nerite Snail	LC
Invertebrates	*Neurobasis chinensis*		LC
Invertebrates	*Onychargia atrocyana*		LC
Invertebrates	*Orthetrum chrysis*		LC
Invertebrates	*Orthetrum luzonicum*		LC
Invertebrates	*Paelopatides insignis*		DD
Invertebrates	*Palinustus waguensis*	Japanese Blunthorn Lobster	LC
Invertebrates	*Paludomus inflatus*		DD
Invertebrates	*Paludomus tanschuaricus*		LC
Invertebrates	*Pantala flavescens*	Wandering Glider	LC
Invertebrates	*Panulirus homarus*	Scalloped Spiny Lobster	LC
Invertebrates	*Panulirus ornatus*	Ornate Spiny Lobster	LC
Invertebrates	*Panulirus penicillatus*	Pronghorn Spiny Lobster	LC
Invertebrates	*Panulirus polyphagus*	Mud Spiny Lobster	LC
Invertebrates	*Panulirus versicolor*	Painted Spiny Lobster	LC
Invertebrates	*Parreysia bonneaudi*		LC
Invertebrates	*Parreysia corrugata*		LC
Invertebrates	*Parreysia favidens*		LC
Invertebrates	*Pearsonothuria graeffei*	Blackspotted Sea Cucumber	LC

Invertebrates	*Pila virens*		LC
Invertebrates	*Pisidium prasongi*		LC
Invertebrates	*Polycheles typhlops*		LC
Invertebrates	*Polymesoda bengalensis*	Bengali Geloina	LC
Invertebrates	*Polymesoda expansa*	Marsh Clam	LC
Invertebrates	*Pomacea lineata*		LC
Invertebrates	*Pseudagrion rubriceps*		LC
Invertebrates	*Rhinocypha biforata*		LC
Invertebrates	*Rhyothemis variegata*		LC
Invertebrates	*Sermyla riqueti*		LC
Invertebrates	*Stenothyra blanfordiana*		LC
Invertebrates	*Stereomastis nana*		LC
Invertebrates	*Stereomastis phosphorus*	Pink Blind Lobster	LC
Invertebrates	*Stichopus chloronotus*	Greenfish	LC
Invertebrates	*Stichopus herrmanni*	Curryfish	VU
Invertebrates	*Stichopus horrens*	Selenka's Sea Cucumber	DD
Invertebrates	*Stichopus monotuberculatus*		DD
Invertebrates	*Tarebia granifera*		LC
Invertebrates	*Thelenota ananas*	Prickly Redfish	EN
Invertebrates	*Thelenota anax*	Amberfish	DD
Invertebrates	*Thenus indicus*	Mud Bug	DD
Invertebrates	*Thiara rudis*		LC
Invertebrates	*Tholymis tillarga*	Old World Twister	LC
Invertebrates	*Tramea basilaris*	Keyhole Glider	LC
Invertebrates	*Tramea limbata*	Ferruginous Glider	LC
Invertebrates	*Trithemis aurora*		LC
Invertebrates	*Trithemis kirbyi*	Orange-winged Dropwing	LC
Invertebrates	*Trithemis pallidinervis*	Dancing Dropwing	LC
Invertebrates	*Tubipora musica*	Organ Pipe Coral	NT
Invertebrates	*Urothemis signata*		LC
Invertebrates	*Willemoesia leptodactyla*		LC
Invertebrates	*Zygonyx torridus*	Ringed Cascader	LC
Invertebrates	*Zyxomma petiolatum*	Long-tailed Duskdarter	LC
Mammals	*Anathana ellioti*	Madras Treeshrew	LC
Mammals	*Aonyx cinereus*	Asian Small-clawed Otter	VU
Mammals	*Axis axis*	Chital	LC
Mammals	*Balaenoptera acutorostrata*	Common Minke Whale	LC
Mammals	*Balaenoptera edeni*	Bryde's Whale	DD
Mammals	*Balaenoptera musculus*	Blue Whale	EN
Mammals	*Bandicota bengalensis*	Lesser Bandicoot Rat	LC

Mammals	*Bandicota indica*	Greater Bandicoot Rat	LC
Mammals	*Bos gaurus*	Gaur	VU
Mammals	*Boselaphus tragocamelus*	Nilgai	LC
Mammals	*Canis aureus*	Golden Jackal	LC
Mammals	*Cuon alpinus*	Dhole	EN
Mammals	*Cynopterus sphinx*	Greater Shortnosed Fruit Bat	LC
Mammals	*Eonycteris spelaea*	Dawn Bat	LC
Mammals	*Felis chaus*	Jungle Cat	LC
Mammals	*Feresa attenuata*	Pygmy Killer Whale	DD
Mammals	*Funambulus palmarum*	Common Palm Squirrel	LC
Mammals	*Funambulus pennantii*	Five-striped Palm Squirrel	LC
Mammals	*Globicephala macrorhynchus*	Short-finned Pilot Whale	DD
Mammals	*Grampus griseus*	Risso's Dolphin	LC
Mammals	*Herpestes edwardsii*	Indian Grey Mongoose	LC
Mammals	*Herpestes smithii*	Ruddy Mongoose	LC
Mammals	*Hipposideros speoris*	Schneider’s Leaf-nosed Bat	LC
Mammals	*Hystrix indica*	Indian Crested Porcupine	LC
Mammals	*Indopacetus pacificus*	Indo-pacific Beaked Whale	DD
Mammals	*Kogia breviceps*	Pygmy Sperm Whale	DD
Mammals	*Kogia sima*	Dwarf Sperm Whale	DD
Mammals	*Lagenodelphis hosei*	Fraser's Dolphin	LC
Mammals	*Lepus nigricollis*	Indian Hare	LC
Mammals	*Lutrogale perspicillata*	Smooth-coated Otter	VU
Mammals	*Macaca mulatta*	Rhesus Monkey	LC
Mammals	*Manis crassicaudata*	Indian Pangolin	EN
Mammals	*Megaderma lyra*	Greater False Vampire	LC
Mammals	*Megaptera novaeangliae*	Humpback Whale	LC
Mammals	*Mellivora capensis*	Honey Badger	LC
Mammals	*Mesoplodon densirostris*	Blainville's Beaked Whale	DD
Mammals	*Mesoplodon ginkgodens*	Ginkgo-toothed Beaked Whale	DD
Mammals	*Moschiola indica*	Indian Chevrotain	LC
Mammals	*Muntiacus vaginalis*	Northern Red Muntjac	LC
Mammals	*Murina cyclotis*	Round-eared Tube-nosed Bat	LC
Mammals	*Mus booduga*	Little Indian Field Mouse	LC
Mammals	*Mus musculus*	House Mouse	LC
Mammals	*Mus platythrix*	Brown Spiny Mouse	LC
Mammals	*Mus terricolor*	Earth-colored Mouse	LC
Mammals	*Myotis montivagus*	Burmese Whiskered Myotis	LC
Mammals	*Neophocaena phocaenoides*	Indo-Pacific Finless Porpoise	VU
Mammals	*Orcaella brevirostris*	Irrawaddy Dolphin	EN

Mammals	*Orcinus orca*	Killer Whale	DD
Mammals	*Panthera pardus*	Leopard	VU
Mammals	*Paradoxurus hermaphroditus*	Common Palm Civet	LC
Mammals	*Peponocephala electra*	Melon-headed Whale	LC
Mammals	*Physeter macrocephalus*	Sperm Whale	VU
Mammals	*Pipistrellus ceylonicus*	Kelaart's Pipistrelle	LC
Mammals	*Pipistrellus tenuis*	Least Pipistrelle	LC
Mammals	*Prionailurus bengalensis*	Leopard Cat	LC
Mammals	*Prionailurus rubiginosus*	Rusty-spotted Cat	NT
Mammals	*Prionailurus viverrinus*	Fishing Cat	VU
Mammals	*Pseudorca crassidens*	False Killer Whale	DD
Mammals	*Pteropus giganteus*	Indian Flying Fox	LC
Mammals	*Rattus rattus*	House Rat	LC
Mammals	*Ratufa indica*	Indian Giant Squirrel	LC
Mammals	*Rhinolophus lepidus*	Blyth's Horseshoe Bat	LC
Mammals	*Rhinolophus pusillus*	Least Horseshoe Bat	LC
Mammals	*Rhinolophus rouxii*	Rufous Horseshoe Bat	LC
Mammals	*Rousettus leschenaultii*	Leschenault’s Rousette	LC
Mammals	*Rusa unicolor*	Sambar	VU
Mammals	*Scotophilus heathii*	Greater Asiatic Yellow House Bat	LC
Mammals	*Semnopithecus entellus*	Northern Plains Gray Langur	LC
Mammals	*Stenella attenuata*	Pantropical Spotted Dolphin	LC
Mammals	*Stenella coeruleoalba*	Striped Dolphin	LC
Mammals	*Stenella longirostris*	Spinner Dolphin	DD
Mammals	*Steno bredanensis*	Rough-toothed Dolphin	LC
Mammals	*Suncus murinus*	House Shrew	LC
Mammals	*Sus scrofa*	Wild Boar	LC
Mammals	*Taphozous longimanus*	Long-winged Tomb Bat	LC
Mammals	*Tatera indica*	Indian Gerbil	LC
Mammals	*Tetracerus quadricornis*	Four-horned Antelope	VU
Mammals	*Tursiops aduncus*	Indo-Pacific Bottlenose Dolphin	DD
Mammals	*Tursiops truncatus*	Common Bottlenose Dolphin	LC
Mammals	*Viverricula indica*	Small Indian Civet	LC
Mammals	*Vulpes bengalensis*	Bengal Fox	LC
Mammals	*Ziphius cavirostris*	Cuvier's Beaked Whale	LC
Plants	*Acmella paniculata*	Panicled Spot Flower	LC
Plants	*Acrostichum aureum*	Golden Leather Fern	LC
Plants	*Aegialitis rotundifolia*		NT
Plants	*Aegiceras corniculatum*		LC
Plants	*Anacyclus pyrethrum*	Atlas Daisy	VU

Plants	*Avicennia alba*		LC
Plants	*Avicennia marina*	Gray Mangrove	LC
Plants	*Avicennia officinalis*		LC
Plants	*Brownlowia tersa*		NT
Plants	*Bruguiera cylindrica*		LC
Plants	*Bruguiera gymnorhiza*	Oriental Mangrove	LC
Plants	*Bruguiera parviflora*	Smallflower Bruguiera	LC
Plants	*Carex baccans*	Crimson Seeded Sedge	LC
Plants	*Carex hebecarpa*		LC
Plants	*Ceratopteris thalictroides*		LC
Plants	*Ceriops decandra*		NT
Plants	*Ceriops tagal*		LC
Plants	*Commelina caroliniana*		LC
Plants	*Commelina subulata*		LC
Plants	*Crotalaria quinquefolia*		LC
Plants	*Cyanotis arcotensis*		LC
Plants	*Cyclosorus interruptus*	Hottentot Fern	LC
Plants	*Cyperus amabilis*		LC
Plants	*Cyperus arenarius*		LC
Plants	*Cyperus castaneus*		LC
Plants	*Cyperus clarkei*		LC
Plants	*Cyperus compactus*		LC
Plants	*Cyperus cyperoides*		LC
Plants	*Cyperus diffusus*	Dwarf Umbrella Grass	LC
Plants	*Cyperus digitatus*	Finger Flatsegde	LC
Plants	*Cyperus distans*	Slender Cyperus	LC
Plants	*Cyperus dubius*		LC
Plants	*Cyperus esculentus*	Yellow Nutsedge	LC
Plants	*Cyperus longus*	Sweet Cyperus	LC
Plants	*Cyperus michelianus*	Souchet De Michel	LC
Plants	*Cyperus nutans*		LC
Plants	*Cyperus pilosus*		LC
Plants	*Cyperus pulchellus*		LC
Plants	*Cyperus tenuispica*		LC
Plants	*Cyperus tuberosus*	Nut Grass	LC
Plants	*Diplazium esculentum*		LC
Plants	*Dopatrium nudicaule*		LC
Plants	*Echinochloa frumentacea*		LC
Plants	*Eclipta prostrata*	Eclipte Blanche	LC
Plants	*Eleocharis geniculata*	Canada Spikesedge	LC

Plants	*Eleocharis spiralis*		LC
Plants	*Elytrophorus spicatus*	Spike Grass	LC
Plants	*Emilia zeylanica*		LC
Plants	*Equisetum giganteum*	Southern Giant Horsetail	LC
Plants	*Eragrostis japonica*	Pond Lovegrass	LC
Plants	*Eriocaulon parviflorum*		LC
Plants	*Eriocaulon truncatum*	Short Pipe-Wort	LC
Plants	*Eriochloa procera*	Spring Grass	LC
Plants	*Excoecaria agallocha*		LC
Plants	*Fimbristylis acuminata*		LC
Plants	*Fimbristylis alboviridis*		LC
Plants	*Fimbristylis bisumbellata*	Fimbristylis à Deux Ombelles	LC
Plants	*Fimbristylis cinnamometorum*		LC
Plants	*Fimbristylis complanata*		LC
Plants	*Fimbristylis dipsacea*	Harper's Fimbristylis	LC
Plants	*Fimbristylis ferruginea*	West Indian Fimbry	LC
Plants	*Fimbristylis littoralis*	Lesser Fimbristylis	LC
Plants	*Fimbristylis ovata*		LC
Plants	*Fimbristylis polytrichoides*		LC
Plants	*Fimbristylis schoenoides*	Ditch Fimbry	LC
Plants	*Fimbristylis tetragona*		LC
Plants	*Fuirena cuspidata*		LC
Plants	*Fuirena pubescens*	Fuirène Pubescent	LC
Plants	*Fuirena umbellata*	Yefen	LC
Plants	*Halodule pinifolia*	Species code: Hp	LC
Plants	*Halodule uninervis*	Species code: Hu	LC
Plants	*Halodule wrightii*	Species code: Hw	LC
Plants	*Halophila beccarii*	Ocean Turf Grass	VU
Plants	*Halophila ovalis*	Species code: Ho	LC
Plants	*Halophila ovata*	Species code: Hq	LC
Plants	*Hemarthria compressa*	Whip Grass	LC
Plants	*Heritiera littoralis*		LC
Plants	*Homonoia riparia*	Willow-Leaved Water Croton	LC
Plants	*Hoppea dichotoma*		LC
Plants	*Hydrobryopsis sessilis*		LC
Plants	*Hydrocotyle javanica*		LC
Plants	*Hydrocotyle sibthorpioides*		LC
Plants	*Hygrophila balsamica*		LC
Plants	*Hygrophila difformis*		LC
Plants	*Hygrophila quadrivalvis*		LC

Plants	*Isachne albens*		LC
Plants	*Isachne globosa*	Swamp Millet	LC
Plants	*Isachne pulchella*		LC
Plants	*Justicia quinqueangularis*		LC
Plants	*Kyllinga melanosperma*		LC
Plants	*Kyllinga nemoralis*	White Water Sedge	LC
Plants	*Lemna gibba*	Fat Duckweed	LC
Plants	*Leptochloa fusca*		LC
Plants	*Leptochloa neesii*	Umbrella Canegrass	LC
Plants	*Leptochloa panicea*	Mucronate Sprangletop	LC
Plants	*Lindernia oppositifolia*		LC
Plants	*Lipocarpha chinensis*		LC
Plants	*Ludwigia hyssopifolia*	Seed Box	LC
Plants	*Ludwigia perennis*		LC
Plants	*Lumnitzera racemosa*		LC
Plants	*Medicago sativa*	Alfalfa	LC
Plants	*Myriophyllum indicum*		LC
Plants	*Myriophyllum oliganthum*		LC
Plants	*Myriophyllum tuberculatum*		LC
Plants	*Nymphoides hydrophylla*		LC
Plants	*Nymphoides indica*	Water-snowflake	LC
Plants	*Nymphoides parvifolia*		LC
Plants	*Ophioglossum lusitanicum*	Least Adder's-tongue	LC
Plants	*Phyla nodiflora*	Turkey Tangle Frogfruit	LC
Plants	*Polytrias indica*	Batiki Bluegrass	LC
Plants	*Prunus bifrons*		DD
Plants	*Pycreus polystachyos*	Bunchy Flat Sedge	LC
Plants	*Queenslandiella hyalina*	Queensland Sedge	LC
Plants	*Rhizophora apiculata*		LC
Plants	*Rhizophora mucronata*	Mangrove	LC
Plants	*Scyphiphora hydrophylacea*		LC
Plants	*Sonneratia apetala*		LC
Plants	*Thelypteris xylodes*		LC
Plants	*Xylocarpus granatum*		LC
Plants	*Xyris indica*		LC
Reptiles	*Acrochordus granulatus*	Wart Snake	LC
Reptiles	*Astrotia stokesii*	Stokes' Sea Snake	LC
Reptiles	*Atretium schistosum*	Olive Keelback Water Snake	LC
Reptiles	*Barkudia melanosticta*	Russell's Legless Skink	DD
Reptiles	*Calodactylodes aureus*	Indian Golden Gecko	LC

Reptiles	*Caretta caretta*	Loggerhead Turtle	VU
Reptiles	*Chamaeleo zeylanicus*	Asian Chameleon	LC
Reptiles	*Chitra indica*	Indian Narrow-headed Softshell Tu	EN
Reptiles	*Crocodylus palustris*	Mugger	VU
Reptiles	*Crocodylus porosus*	Salt-water Crocodile	LR/lc
Reptiles	*Cyrtodactylus nebulosus*	Clouded Indian Gecko	LC
Reptiles	*Dermochelys coriacea*	Leatherback	VU
Reptiles	*Enhydrina schistosa*	Beaked Sea Snake	LC
Reptiles	*Eretmochelys imbricata*	Hawksbill Turtle	CR
Reptiles	*Eublepharis hardwickii*	Eastern Indian Leopard Gecko	LC
Reptiles	*Eutropis allapallensis*	Schmidt's Mabuya	LC
Reptiles	*Eutropis carinata*	Keeled Indian Mabuya	LC
Reptiles	*Eutropis trivittata*	Three-banded Mabuya	LC
Reptiles	*Grypotyphlops acutus*	Beaked Worm Snake	LC
Reptiles	*Hemidactylus frenatus*	Common House Gecko	LC
Reptiles	*Hemidactylus maculatus*	Spotted Leaf-toed Gecko	LC
Reptiles	*Hemidactylus subtriedrus*	Madras Blotched Gecko	DD
Reptiles	*Hemidactylus treutleri*		LC
Reptiles	*Hydrophis caerulescens*	Dwarf Sea Snake	LC
Reptiles	*Hydrophis cantoris*	Gunther's Sea Snake	DD
Reptiles	*Hydrophis cyanocinctus*	Bluebanded Sea Snake	LC
Reptiles	*Hydrophis fasciatus*	Striped Sea Snake	LC
Reptiles	*Hydrophis gracilis*	Graceful Small Headed Seasnake	LC
Reptiles	*Hydrophis lapemoides*	Persian Gulf Sea Snake	LC
Reptiles	*Hydrophis mamillaris*	Bombay Sea Snake	DD
Reptiles	*Hydrophis ornatus*	Ornate Reef Sea Snake	LC
Reptiles	*Hydrophis platurus*	Yellow-bellied Sea Snake	LC
Reptiles	*Hydrophis spiralis*	Yellow Sea Snake	LC
Reptiles	*Hydrophis stricticollis*	Collared Sea Snake	DD
Reptiles	*Kerilia jerdoni*	Jerdon's Sea Snake	LC
Reptiles	*Lapemis curtus*	Spine-bellied Sea Snake	LC
Reptiles	*Laticauda colubrina*	Yellow-lipped Sea Krait	LC
Reptiles	*Laticauda laticaudata*	Brown-lipped Sea Krait	LC
Reptiles	*Lepidochelys olivacea*	Olive Ridley	VU
Reptiles	*Lissemys punctata*	Indian Flapshell Turtle	LR/lc
Reptiles	*Lycodon travancoricus*	Travancore Wolf Snake	LC
Reptiles	*Oligodon taeniolatus*	Streaked Kukri Snake	LC
Reptiles	*Ophiophagus hannah*	King Cobra	VU
Reptiles	*Pangshura tentoria*	Indian Tent Turtle	LR/lc
Reptiles	*Psammophilus blanfordanus*	Blanford's Rock Agama	LC

Reptiles	*Pseudocerastes persicus*	Perisan Horned Viper	LC
Reptiles	*Sitana ponticeriana*	Fan Throated Lizard	LC
Reptiles	*Thalassophina viperina*	Viperine Sea Snake	LC
Reptiles	*Trimeresurus gramineus*	Common Bamboo Viper	LC
Reptiles	*Uropeltis ellioti*	Elliot's Earth Snake	LC
Reptiles	*Varanus bengalensis*	Common Indian Monitor	LC
Reptiles	*Varanus salvator*	Common Water Monitor	LC

About IBAT

The Integrated Biodiversity Assessment Tool (IBAT) provides key decision-makers with access to critical information on biodiversity priority sites to inform risk management and decision-making processes that address potential biodiversity impacts. Developed through a partnership of BirdLife International, Conservation International, International Union for Conservation of Nature (IUCN) and United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), the vision of IBAT is that decisions affecting critical natural habitats are informed by the best scientific information and in turn decision makers will support the quest to collect and enhance the underlying datasets and maintain that scientific information.

G.O. Grievance Redress Mechanism

GOVERNMENT OF ANDHRA PRADESH
ABSTRACT
VCICDP - Establishment of Project Grievance Redress Mechanism (GRM) at three levels to cover both environmental and social issues - Orders - Issued.
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INDUSTRIES AND COMMERCE (INFRA) DEPARTMENT
G.O.RT.No. 163 Dated: 08-06-2018
Read the following:
1. Facility Administrative Manual (FAM) of VCICDP.
2. From the Commissioner of Industries, Vijayawada, 15/1/2014/11427/VCIC-GRM. Dated:31-05-2018
&&&
ORDER:
In the reference 2nd read above, the Commissioner of Industries has stated that at Sl. No. 95, Page No. 42 of the Facility Administrative Manual of the VCICDP, the Project Grievance Redress Mechanism (GRM) is envisaged, wherein, it is directed to establish Project GRM at three levels to cover both Environmental and Social issues.
2. The Commissioner of Industries has proposed for establishment of Project Grievance Redress Mechanism at three levels with the following provisions and requested the Government to take a view on the establishment of Project GRM and issue orders:-
a. The GRM shall be established and disclosed to the project affected communities.
b. The Project Grievance Redress Committee, supported by the consultants of PMSC and Safeguard officers of both the PMU and PIUs, will be responsible for timely redress of grievances on Environmental and Social Safeguards issues.
c. The Grievance Redress Committee is also responsible for Registration of Grievances, Related Disclosure and Communication with the aggrieved parties.
d. A complaint register shall be maintained at the field unit, PIU and PMU levels with details of 1. Complaint lodged, 2. Date of Personal Hearing, 3. Action Taken and 4. Date of communication sent to the complainant.
e. Contact Details, Procedure and Complaint Mechanism shall be disclosed to the Project Affected Communities at accessible locations and through various Media (Leaflets, Newspapers etc.,)
3. Government after careful examination of the proposal, hereby establish the Project Grievance Redress Mechanism at three levels is as follows:-
1st Level Grievance:
The Contact Number of the PIU office should be made available at the construction site signboards. The contractor and field unit staff can immediately resolve onsite, seek the advice of the PIU Safeguard Manager as required, within seven (7) days of receipt of the complaint / grievance.
2nd Level Grievance:
All grievances that could not be redressed within seven (7) days at Field / Ward level shall be reviewed by the GRC at District Level headed by Joint Collector of the respective District. GRC shall attempt to resolve them within

fifteen (15) Days. The Safeguard Manager of the PIU shall be responsible to see through the process of redressal of each grievance.
(P.T.O)
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3rd Level Grievance:
All grievances that cannot be redressed within fifteen (15) days at District Level shall be reviewed by the Grievance Redressal Committee (GRC) at State Level headed by the Project Director, VCICDP PMU, with support from District GRC, PMU, Social Safeguards and Gender Officer (SSGO), Environmental Safeguard Officer of PMU. Environmental and Social Safeguard Specialists of PMSC shall coordinate the GRC to ensure that the grievances be resolved within fifteen (15) days. The SSGO of PMU shall be responsible to see through the process of redressal of each grievance pertaining to the Social Safeguards
4. Government hereby constitute the Grievance Redressal Committee (GRC) at District level with the following composition:
1. Joint Collector of the Concerned District — Chairman
2. Project Engineer of the concerned field unit — Member Secretary
3. Revenue Divisional Officer (RDO) or sub-collector of the division — Member
4. Project Director, DRDA — Member
5. Chief Executive Officer, Zilla Parishad — Member
6. District Panchayat Officer — Member
7. District Education Officer — Member
8. District Medical and Health Officer — Member
9. District level representative of DISCOM — Member
10. Superintendent Engineer, RWS Panchayat Raj Department — Member
11. Three members from affected persons, with at least one of them a woman DP — Member
12. Team Leader of the resettlement plan implementation support NGO or Agency — Member
5. The functions of the Grievance Redressal Committee (GRC) at District

level are as follows:
a) GRC at District Level shall receive, evaluate and facilitate the resolutions of displaced person's concerns, complaints and grievances.
b) The GRC shall provide an opportunity to the affected persons to have their grievances redressed prior to approaching the State Level LARR Authority, constituted by the GOAP in accordance with Section 51 (1) of the RFCTLARR Act, 2013.
c) The GRC is aimed to provide a trusted way to voice and resolve concerns linked to the project, and to be an effective way to address displaced person's concerns without allowing it to escalate resulting in delays in project implementation.
d) The GRC shall meet once in every month and review and redress any grievances / complaints. Periodical monthly reports shall be submitted to the Project Director, VCICDP PMU in the prescribed proforma.
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e) The GRC will continue to function, for the benefit of the displaced persons, during the entire life of the project including the defects liability period. The entire resettlement component of the project has to be completed before the construction starts, and pending grievances resolved. Other than disputes relating to ownership rights and apportionment issues on which the LARR Authority has jurisdiction.
f) GRC will review grievances involving all resettlement benefits, relocation and payment of assistances.
g) The GRCs will function out of each district where the subprojects are being implemented. The existing setup for coordination, monitoring and grievance redress at district level which meets once a month, will be used for VCICDP.
h) An annual fund of Rs.1.00 Lakhs shall be allocated to each GRC for their operations like convening monthly review meetings, preparing and distributing broachers, leaflets etc.
6. The Project Director, PMU, VCICDP shall be the Appellate Authority and shall be supported by the Safeguards Officer of PMU, VCICDP and the Team Leader of PMSC. This shall be the highest Grievance Redressal Mechanism at the project level.
7. The Project Monitoring Unit (PMU), Project Implementing Units (PIUs) and Grievance Redressal Committees (GRCs) shall update the status of complaints / grievances in the VCIC Web-Site.
5. The Project Director, PMU, VCICDP shall take further necessary action in the matter, accordingly.
(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)
S.SOLOMON AROKIARAJ
SECRETARY TO GOVERNMENT & CIP
To
The Project Director, Project Monitoring Unit, VCICDP, Vijayawada.
The Chairman and all the members through PD, PMU, Vijayawada.
Copy to:
The District Collectors, Visakhapatnam, East Godavari, Krishna and SPS Nellore.
P.S. to Minister for Industries
P.S. to Prl. Secretary to CM (GSP)

Sc/Sf
//FORWARDED BY: ORDER//
SECTION OFFICER

