Initial Environmental Examination

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India: Tripura Urban and Tourism Development Project – Water Supply project for Cluster IIIA Towns

Prepared by Tripura Urban Planning and Development Authority, Urban Development Department, Government of Tripura for the Asian Development Bank.

CURRENCY EQUIVALENTS

(as of 21 Mar 2023)

Currency Unit	–	Indian rupee (₹)
₹ 1.00	–	$0.01
$1.00	=	₹ 82.66

ABBREVIATIONS

ADB	–	Asian Development Bank
AMC	–	Ambassa Municipal Council
CPCB	–	Central Pollution Control Board
CTE	–	Consent to establish
CTO	–	Consent to operate
DBE	–	Design Basis Earthquake
DBO	–	Design, build and operate
DHQ	–	Districts headquarter
DMC	–	Dharamanagar Municipal Council
DTW	–	Deep Tube Well
DWS	–	Drinking water & sanitation
EAC	–	Expert appraisal committee
EARF	–	Environmental assessment and review framework
EHS	–	Environment, health and safety
EIA	–	Environmental impact assessment
EMP	–	Environmental management plan
EMS	–	Environmental management specialist
EPC	–	Engineering, Procurement & Construction
GLSR	–	Ground level storage reservoir
GoT	–	Government of Tripura
GRC	–	Grievance redress committee
GRM	–	Grievance redress mechanism
IEE	–	initial environmental examination
IRP	–	iron removal plant
KMC	–	Kailashahar Municipal Council
KMC	–	Kumarghat Municipal Council
MoEFCC	–	Ministry of Environment, Forest and Climate Change
NWQMP	–	National Water Quality Monitoring Programme
TSPCB	–	Tripura State Pollution Control Board
NOC	–	No objection certificate
OHS	–	Occupational health and safety
PGA	–	Peak Ground Acceleration
PIU	–	project implementation unit
PMSC	–	Project management supervision consultant
PMU	–	Project management unit
RFA	–	Recorded Forest Area
ROW	–	Right of way
SDCC	–	Sustainable Development and Climate Change Department
SGC	–	Safeguards and gender cell
SPS	–	Safeguard Policy Statement
TOR	–	Terms of Reference
TUDA	–	Tripura Urban Planning and Development Authority

TUTDP	–	Tripura Urban and Tourism Development Project
WHO	–	World Health Organization
WTP	–	Water treatment plant

WEIGHTS AND MEASURES

dBA	-	decibel
°C	-	degree Celsius
km	-	kilometer
lpcd	-	litre per capita per day
m	-	meter
mgbl	-	meter below ground level
mm	-	millimeter
MLD	-	million liters per day
km^2	-	square kilometer

NOTE

In this report, "$" refers to United States dollars.

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EXECUTIVE SUMMARY

Proposed Tripura Urban and Tourism Development Project (TUTDP) will improve the municipal infrastructure and public services and will lay the foundation for tourism development in the State of Tripura. Tripura is in the Northeast Region (NER) of India, covering an area of 10,490 square kilometers, with a population of 4.1 million (estimated 2022), and Agartala as the state's capital. The project targets key urban local bodies (ULBs) along the main national highways in Tripura, major infrastructure components of which include water supply, stormwater drainage, communal or neighborhood roads, and tourism development support.

The project is aligned with the following impact(s): clean and sustainable environment in ULBs achieved, and Tripura increasingly recognized in the India tourism industry as a new destination. The project will have the following outcome: Adequate, safe, and climate- and disaster-resilient, urban services (water, storm drainage, and municipal roads) provided and sustainable tourism improved in project areas. Project has four outputs: (i) Output 1: Municipal reforms and capacity of ULBs strengthened, (ii) Output 2: Urban infrastructure improved. The project will improve various public infrastructures, such as (i) water supply, (ii) stormwater drainage, and (iii) municipal roads, (iii) Output 3: Tourist destinations improved, and (iv) Output 4: Capacity of tourism corporation's operational services improved. The government of Tripura acting through Urban Development Department (UDD) will be the project executing agency. Tirupa Urban Development Authority (TUDA) and Tripura Tourism Development Corporation Limited (TTDCL) will be the implementing agencies.

Under phase 1 of project, 12 towns have been selected for improvement of Water Supply, Sewerage & Septage Management, Developments of Drains & Roadside Drains and Urban Transport. Tripura Urban and Tourism Development Project **(TUTDP)** will be implemented over a 5-year period. Kailashahar, Kumarghat, Dharmanagar and Ambassa are four project towns selected under this package (Cluster IIIA) Kumargaht will be the Cluster headquarter. Water supply improvement works are proposed in these four towns under the TUTDP. Following are the proposed components:

Kailashahar town - (i) New 4.5 MLD intake structure and approach bridge of length 20 m on Manu River, (ii) New 2.45 MLD WTP, (iii) Laying of 990 m, Dia. 200 mm DI K9 Raw water Transmission Main; (iv) Laying of 3.23 km, Dia. (150mm to 200mm) DI K9 Clear water Transmission main; (v) Construction of 2 nos. OHSR. one at Kalipur (Capacity 300 KL) and other at Kasherghat (Capacity 250 KL); (vi) Laying of approx. 32.58 km (Remodelling 1.58 km + Expansion 31.0 km) distribution network; and (vii) Bulk Flow meter and consumer meters.

Kumarghat town - (i) New 4 MLD intake structure and approach bridge of length 20 m on Manu River, (ii) New 2.3 MLD WTP with clear water reservoir (iii) Raw water Transmission Main from intake to WTP 100 m, Dia. 200 mm DI K9 pipe; (iv) 3.4 km, (Dia 150mm to 300mm) DI K9 Pipes - Clear water Transmission main; (v) One OHSR at Segregation Centre (Capacity 250 KL), (vi) Approx. 40.89 km (Remodelling approx.7.42 km + Expansion/new approx. 33.47 km) distribution network; and (vii) Bulk flow meter and consumer meters.

Dharmanagar town - (i) Construction of intake structure of 14 MLD and approach bridge of 15m on River Kakri/ Juri, (ii) Construction of 10.8 MLD WTP near existing WTP at College Road, (iii) Clear Water Reservoir of 6.8 Lakh litter tank within WTP campus, (iv) Laying of 100 m, Dia. 400 mm DI K9 pipe - Raw water Transmission Main; (v) Laying of 1.235 km, Dia. (150 mm and 200 mm) DI K9 Pipes - Clear water Transmission main; (vi) Construction of 2 nos. OHSR. one at Circuit House (Capacity 250 KL), one at ISBT (Capacity 350 KL); (vii) Laying of approx. 18.006

km (Expansion/ new pipeline of 2.429 km + Remodelling pipeline of 15.577 km) 90-350 mm HDPE/DI pipe distribution network; and (viii) Installation of Bulk Flow meter, consumer meters and SCADA system (at WTP).

Ambassa town - (i) New 4 nos. Deep Tube Well (DTW) with Iron Removal Plants (IRP) (ii) One new OHSR at Magazinepara (Ward 14), (iii) Approx. 4.643 km clear water transmission main, (iv) Approx. 20.25 km (4.330 km remodelling & 15.915 km expansion) water distribution pipeline and (v) bulk flow meter and consumer meter.

Screening and Categorization. assessment of potential impacts. Water Supply subproject of these towns is classified as environmental category B as per ADB's Safeguard Policy Statement (SPS), 2009, and accordingly this initial environmental examination (IEE) assesses the environmental impacts and provides mitigation and monitoring measures to ensure that there are no significant impacts as a result of the subproject. As per the Government of India environmental impact assessment (EIA) Notification, 2006, this subproject does not require EIA study or environmental clearance. During the construction phase, subproject will require permission from respective road agencies (for those roads that are not under the jurisdiction of ULB), this will be obtained prior to start of construction. Similarly, in case works require shifting of utilities such as telephone and electricity lines, permission from respective agencies will be obtained.

Description of the Environment. The subproject towns are in Tripura, Northeast India. The third-smallest state in the country, it covers 10,491 km^2 area. It is bordered by Assam and Mizoram to the east and by Bangladesh to the north, south and west. Agartala is the capital and the largest city in the state. Dharmanagar is situated at North Tripura district, south to Dharmanagar about 26 km road distance is Kailashahar and further south is Kumarghat at about 28 km by road from Kailashahar town. Both Kailashahar and Kumarghat are in Unakoti district of Tripura. Ambassa is situated in Dhalai district south of Unakoti.

North-eastern region of India extending to the Himalayan arc in the north and Burmese arc to the east is among the most seismically active regions of the world. The whole of Tripura State falls under seismic zone V and is highly vulnerable to earthquakes. Maximum hilly areas under the Unakoti district are vulnerable to earthquake. Normal annual rainfall in Tripura is 2213 mm to 2855 mm.

No proposed components are located within any forest or protected areas, and it does not fall under any buffer or eco sensitive zone or near any protected monument. The Rowa Wildlife Sanctuary is situated in Panisagar Sub-division of North Tripura district. Rowa is a small wildlife sanctuary covering an area of 0.86 square km.

Kailashahar is a town located at 24°19'36.52"N latitude and 92° 0'45.46" E longitude in Unakoti district. Kailashahar Town is the fourth largest urban center of Tripura. It is headquartered of the Unakoti district of Tripura state. The town is situated on the bank of river Manu, the longest river of Tripura. Kailashahar town area is divided into 17 wards. High flood prone areas in Kailashahar are Jalai, Latiapura, Rangautti, Durganagar and Kritantali. The district Unakoti experiences an average rainfall of 1922 to 2855 mm. Kailashahar typically receives about average 2600 mm of precipitation in a year. The main water courses of Unakoti District are Manu & Deo River. There are no air and noise polluting sources in Kailashahar other than traffic. Proposed Intake Well cum Pumping Station at Ward 16 (Sonamara, Durgapur) on Manu River southeastern part of the town, WTP is proposed in Paitur Bazar, commercial area. OHSR 1 in Kalipur near School, OHSR 2 in Kasherghat near IDSMT complex.

The Rowa Wildlife Sanctuary located about 14.5 km (aerial distance) from Kailashahar The village Uttar Unakoti Reserve Forest and Eco Park is in Kailashahar C.D. Block of Unakoti District. Unakoti means one less than a crore and it is said that these many rock cut carvings are available here.

In Kumargaht town subproject components are located within Kumarghat Municipal Council area. The Kumarghat town located at 24.9 9′ 30″ N latitude and 92° 1′ 47″E longitude. Kumarghat town has an average elevation of 36 meters. Manu and Deo are the main rivers, both flowing South to North. The district is situated in highly vulnerable intense seismic region i.e. in seismic zone – 'V'. High flood prone areas in Kumarghat Sub-Division are Nidevi, Sonaimuri, Notingcherra, Mati Colony, Kumarghat MC Ward No-6, Ward No-3 Tarapur, Indira Colony, Krishnanagar, Radhanagar, Jagannathpur and Kanchanbari. The main water courses of Unakoti District are Manu & Deo River. There are no air and noise polluting sources in Kumarghat other than traffic. Proposed Intake Well cum Pumping Station at Ward 11 on Manu River southwest part of the town, near confluence point of Manu and Deo River. WTP is also proposed near proposed intake point and one Over Head reservoir (OHT-1) proposed near Shiv Ganga Mandir, Ward no. 06 of Kumarghat Municipal Council.

The Rowa Wildlife Sanctuary is located about 20.0 km (aerial distance) from Kumarghat. The village Dakshin Unakoti Reserve Forest is located in Kumarghat C.D. Block of Unakoti District in the State of Tripura. It is governed by South Unakoti Gram Panchayat. Kumarghat, which is about 15 km away from Dakshin Unakoti Reserve Forest. Sculptured hills of Unakoti have high potential tourism in the district. Every year a big fair popularly known as 'Ashokastami Mela' is held in the month of April which is visited by thousands of pilgrims. Road distance from Kumarghat to Unakoti is about 17.5 km. Unakoti is ASI protected area.

Dharmanagar is a town with a municipal council in the North Tripura district. Dharmanagar is the second largest urban body in the state of Tripura and divided into 25. wards. Dharmanagar has average elevation of approx. 21 m. The major drainage channel of the Dharmanagar Town is Sakai Cheera, Sukna Cherra which are outfall to Juri/Kakri river flowing through Dharmanagar town. The Juri River is a trans-boundary river in India and Bangladesh. River Kakri is the earlier name of River Juri after Kakri Bridge. Proposed Intake Well cum Pumping Station at near College Route, Barua, Ward no. 10 on Kakri (Juri) River bank, WTP is proposed within the existing WTP premises, Ward no. 10. OHSR- 1 proposed near Circuit House (Ward no. 24) and OHSR-2 near ISBT (Ward no. 22).

There are no sensitive areas nearby the project sites. The Rowa Wildlife Sanctuary is located within 10 km from Dharmanagar. There are few RF like Juri RF village is located about 20 km from Dharmanagar. Choraibari RF is located about 11 km from Dharmanagar. There are no air and noise polluting sources in town other than traffic.

Ambassa Municipal Council. Situated in rural region of Tripura, it is one among the 5 blocks of Dhalai district. The Ambassa is located at 23°55'10.8"N and 91°50'42"E and average elevation of 89 m. The terrain is mostly undulating and hilly with small water streams, rivers and fertile valleys intervening. The river Dhalai passes from the north of Ambassa town. Flood Prone Zone of Ambasa area are Kulai Purba Nalichara, Paschim Balaram, Paschim, Lalchari, Vivekananda, Nagar, Shanti palli in Ambassa. Noise level monitoring has been conducted at 6 locations of Ambassa Sub-division. There are no air and noise polluting sources in town other than traffic. OHSR is proposed at Magazine Para, (Ward No. 14), DWT + IRP 1 in Dolubari, (Ward No. 1), DTW + IRP 2 in Bonkumari, Ward no. -3, DWT + IRP 3 in BK Nagar, (Ward no. -8 and DWT +IRP 4, Near Magazine Para, Jawahar Nagar, Ward No. 14

The Nearest reserves forest is Kulai Reserve Forest, which is located about 5.16 Km from Ambassa town. The total area of Kulai Reserve Forest Extension is 4489 Hectares. The Rowa Wildlife Sanctuary is situated about 49 km away from the project location. There is no archeological protected area in and around Ambassa. Shyamsundar Ashram Tila - A brick-built Buddhist monastic complex, ASI protected area is situated in Jolaibari, South Tripura and which is about 81 km away from Ambassa town and Chaturdasa Devata, ASI protected area is located about 53 km from Ambassa.

Potential Environmental Impacts and Mitigation measures. In this draft IEE, negative impacts were identified in relation to location, design, construction, and operation of the improved infrastructure. Environmental impacts as being due to the project design or location was not significant as various measures are already included in site planning and preliminary design. No impacts on forests or archeological resources envisaged. Temporary measures suggested to avoid any disturbance / damage to old buildings during laying of water lines in nearby roads. Source of water for Kumarghat and Kailashahar town is Manu River, for Dharamanagar it is Juri river and for Ambassa it is ground water. Assessment confirms the source sustainability to provide required water, and no water sharing conflicts or downstream impacts envisaged. Both Manu and Juri are perineal rivers and Water Resources Investigation Division (WRID), Agartala has provided a final water withdrawal permission based on water availability in the Manu and, Juri River for Kumargaht, Kailashahar and Dharmanagar towns upto year 2053. Source for Ambassa town is Ground water based on requirement and availability of ground water, permission from WRID for ground water extraction is also received.

Potential impacts during construction are considered significant but temporary and are common impacts of construction in urban areas, and there are well developed methods to mitigate the same. Except laying water pipelines, all other construction activities will be confined to the selected sites and the interference with the general public and community around is minimal. In these works, the temporary negative impacts arise mainly from construction dust and noise, hauling of construction material, waste, and equipment on local roads (traffic, dust, safety etc.), mining of construction material, occupational health and safety (OHS) aspects. Pipe laying works will be conducted along public roads in an urban area congested with people, activities, and traffic. Therefore, these works may have adverse, but temporary impacts arising mainly from the disturbance of residents, businesses, and traffic due to construction work; safety risk to workers, public and nearby buildings due to deep trench excavations in the road; access impediment to houses and business, disposal of large quantities of construction waste etc. Trenchless method will be adopted for water supply pipeline deeper than 3.5 m and at main road crossings in traffic areas.

Environmental Management. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels, along with the delegation of responsibility to appropriate agency. Various design related measures are already included in the project design. During construction, the EMP includes mitigation measures such as (i) proper planning and scheduling of water line works to minimize public inconvenience; (ii) measures to avoid impacts on heritage building and chance find procedures (iii) barricading, dust suppression and noise control measures; (iv) traffic management measures for works along the roads and for hauling activities; (v) occupational and community health and safety, labour welfare, (vi) provision of walkways and planks over trenches to ensure access will not be impeded; (vii) reuse of excavated materials to extent possible, (viii) spill and sediment control measures to avoid water and soil pollution, etc.,.

EMP will guide the environmentally-sound construction of the subproject. EMP includes a monitoring program to measure the effectiveness of EMP implementation and include observations on- and off-site, document checks, and interviews with workers and beneficiaries. A copy of the updated EMP/ site environmental management plan (SEMP) shall be always kept on-site during the construction period. The EMP will be included in bids and contracts, and implementation shall be binding on contractors. There are some gaps in regulatory compliance at existing WTP identified in the environmental audit.

Implementation Arrangements. Urban Development Department (UDD) of Government of Tripura (GOT) is the executing agency, and the implementing agencies are Tripura Urban Planning and Development Authority (TUDA, for urban component) and Tripura Tourism Development Corporation Limited (TTDCL, for tourism component). A project management unit (PMU) in Agartala and six project implementation units (PIUs, 3 urban and 3 tourism) will be established in Agartala, Udaipur and Kumarghat. Project management and supervision consultant (PMSC) will be engaged to assist PMU and the PIUs. At PMU, the project coordinator will be the nodal officer for environmental, social safeguards and gender and will be responsible for ensuring compliance with ADB's Safeguards Policy Statement (SPS), 2009. An environmental safeguards officer (ESO) will be engaged to support the project coordinator. Project manager or assistant project manager of PIU will be designated as safeguards focal in each PIU. PMSC team will include an Environmental Safeguards Specialist (ESS), and three support safeguards staff located in PIUs. Contractor will appoint an Environment, Health and Safety (EHS) supervisor.

Consultation, Disclosure. The stakeholders were involved in developing the IEE through FGD and public consultation at project area level, after which views expressed were incorporated into the IEE and in the planning and development of the project. Focus Group Discussions (FGDs) and consultations have been conducted in four towns: **Kailashahar** – November 2021, February, April & May 2022, and March 2023 with 115 participants (67 male and 48 female). **Kumarghat:** April 2022 and March 2023 with 108 participants (40 male and 68 female). **Dharmanagar:** January, February and April 2022 and May 2023 with 87 participants (52 male and 35 female) and **Ambassa**: March, April and September 2022 and March 2023 with 157 participants (71 male and 86 female). All participants are expressed need for the project and willingness to take it up and stakeholders were very supportive for the project and promises to extend full cooperation during the construction phase as the activities are proposed to improve the road and drainage conditions and living standard.

Monitoring and Reporting. The PMU, PIU and consultants will be responsible for monitoring and reporting. During construction, results from internal monitoring by the DBO contractor will be reflected in their monthly EMP implementation reports to the PIU. PIU with the assistance of PMSC, will monitor the compliance of contractor, prepare a quarterly environmental monitoring report (QEMR) and submit to PMU. The PMU will oversee the implementation and compliance and will submit semi-annual environmental monitoring reports (SEMR) to ADB. SEMRs will be disclosed on ADB and project websites.

Conclusions. The proposed project is unlikely to cause significant adverse impacts, and potential impacts are mainly due to construction and can be mitigated or minimized to acceptable levels through measures included in the EMP. The citizens of the Kailashahar, Kumarghat, Ambassa and Dharmanagar will be the major beneficiaries. The subproject is primarily designed to improve environmental quality and living conditions of these towns through provision of water supply. The benefits arising from this subproject include:(i) increased availability of potable water to all households including urban poor; (ii) reduced time and costs in accessing alternative sources of

water; (iii) better public health particularly reduction in waterborne and infectious diseases and (iv) reduced risk of contamination of treated water supplies.

Based on the findings of the IEE, the classification of the project as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009) or GoI EIA Notification (2006). This IEE needs to be updated during the detailed design, reviewed, and approved by ADB, and disclosed prior to start of construction.

I. INTRODUCTION

A. Tripura Urban and Tourism Development Project (TUTDP)

1. The project is aligned with the following impact(s): clean and sustainable environment in ULBs achieved, and Tripura increasingly recognized in the India tourism industry as a new destination.[1] The project will have the following outcome: Adequate, safe, and climate- and disaster-resilient, urban services (water, storm drainage, and municipal roads) provided and sustainable tourism improved in project areas.[2]

2. **Output 1:** Municipal reforms and capacity of ULBs strengthened. The project will strengthen (i) the capacity of technical staff in project management and operation and maintenance (O&M) of urban infrastructure; (ii) ULB own-source revenue generation, financial management and accounting reforms; (iii) advisory support for city-wide inclusive sanitation for ULBs that complements government financing scheme;[3] (iv) integration of climate change- and disaster resilience in urban planning with universal design consideration, and gender equality and social inclusion (GESI) analysis and (v) support to developing building regulations and building byelaws for the state.

3. **Output 2:** Urban infrastructure improved. The project will improve various public infrastructures, such as (i) water supply, (ii) stormwater drainage, and (iii) municipal roads.

4. **Output 3:** Tourist destinations improved. The project will strengthen public infrastructure that is vital for ecotourism such as (i) tourism destination development with climate resiliency and green infrastructure retrofitting; (ii) museum development at the Neermahal Palace (iii) Improved tourist accommodation and family oriented-Adventure Park; and (iv) Tourism-related goods and equipment for selected tourism destinations.

5. **Output 4**: Capacity of tourism development corporation's operational services improved. Tripura tourism through TTDCL will (i) develop a 10-year business plan including marketing and coordination with the private sector (including exploring outsourcing and O&M of tourism facilities and assets for local business, small and medium enterprise opportunities for women), (ii) demonstrating community-based tourism development (iii) stakeholder tourism capacity and skill development program, (iv) marketing and tourism promotion activities.

6. Under phase 1 of project, 12 towns have been selected for improvement of Water Supply, Sewerage & Septage Management, Developments of Drains & Roadside Drains and Urban Transport. Tripura Urban and Tourism Development Project (TUTDP) will be implemented over a 5-year period. Kailashahar, Kumarghat, Dharmanagar, and Ambassa, and are four project towns selected in this package (Package WS/03).

B. Purpose of Initial Environmental Examination Report

7. As per ADB's Safeguards Policy Statement, 2009, ADB requires the consideration of environmental issues in all aspects of the Bank's operations. Using rapid environmental

[1] Government of India, Ministry of Housing and Urban Affairs. 2015. Smart Cities Mission Guidelines. Delhi; Government of Tripura, Department of Tourism. 2020. Tourism Policy 2020–2025. Agartala.

[2] The design and monitoring framework is in Appendix 1.

[3] ADB is working with Global Water and Sanitation Center under Bill and Melinda Gates Foundation to provide CWIS support preliminary study for 2 towns that would be potentially financed in the planned Phase 2.

assessment (REA) checklist (Appendix 1*),* subproject is unlikely to cause significant adverse impacts, and classified as category B and per ADB SPS requirements this IEE is conducted.

C. Scope of IEE

8. The subproject will be implemented under the design-build-operate (DBO) modality. Thus, this IEE is based on the preliminary project design report. The IEE is conducted mainly based on field reconnaissance surveys and secondary sources of information. Stakeholder consultation was an integral part of the IEE. This IEE will be updated during the detailed design to reflect changes and submitted to ADB for approval. IEE will be further updated during implementation if there are any changes in project scope, design or sites updates will supersede the earlier version.

D. Report Structure

9. This Report contains the following sections:

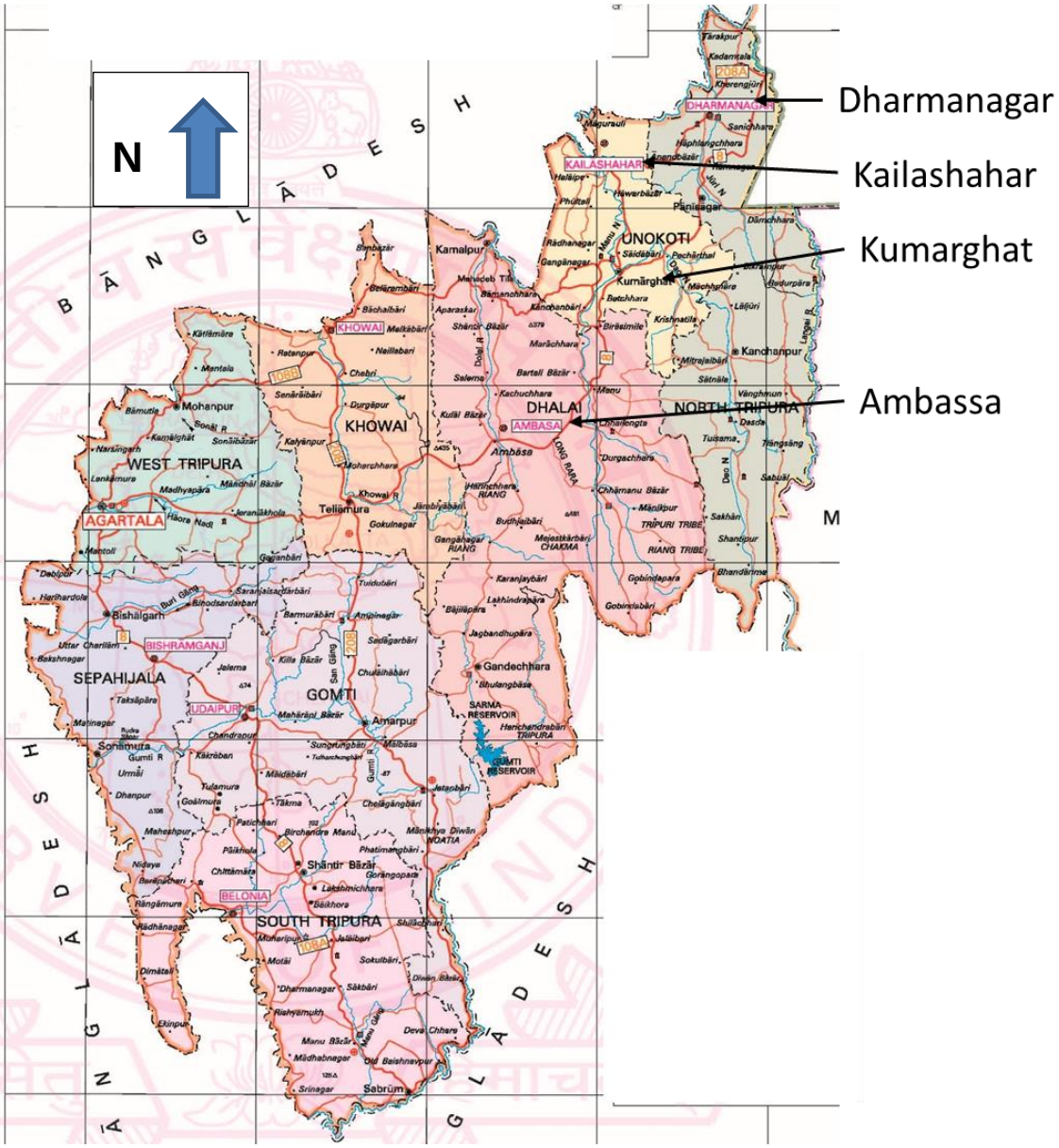
(i) Executive summary;
(ii) Introduction;
(iii) Description of the project;
(iv) Analysis of alternatives;
(v) Policy, legal and administrative framework;
(vi) Description of the environment;
(vii) Anticipated environmental impacts and mitigation measures;
(viii) Public consultation and information disclosure;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

II. DESCRIPTION OF THE PROJECT

A. Project Location

10. Project towns Kailashar, Kumarghat, Dharamagar and Ambasa are located in Tripura state in northeast India. It is bordered by Assam and Mizoram to the east and by Bangladesh to the north, south and west. Agartala is the capital and the largest city in the state. **Kailashahar** is a town located at 24°19'36.52"N and 92° 0'45.46" E and is about 140 km from Agartala. Town area is 6.19 sq. km divided into 17 wards. Population is 22,405 (2011 census). **Kumarghat** is a town located at 24.9 9′ 30″ N and 92 1′ 47″ E and is about 120 km from Agartala. Town area is 8.23 sq. km divided into 15 wards. Population is 13,054 (2011 census). **Dharmanagar** is a town located at 24°22'41.84"N, 92° 9'17.09"E, and is about 160 km from Agartala. Town area is 10.69 sq. km divided into 25 wards. Population 40,595 (2011 census). **Ambassa** is a town located at 23°55’10.8”N and 91°50’42”E E, and is about 82 km from Agartala. Town area is 15.34 sq. km divided into 15wards. Population is 16,285 (2011 census).

Figure 1: Geographical Location of Subproject towns on State map of Tripura



Source - https://surveyofindia.gov.in

B. Existing Water Supply Situation

11. **Kailashahar.** Present water supply to the town is from Manu River (intake well) and ground water (deep tube wells). Surface is treated in water treatment plant. Groundwater has high iron content, iron removal plants (IRP) provided near working tube well. Distribution system covers about 60-70 % of the population, and supply rate of 90 LPCD, supply frequency of 6-8 hours every day. Details of existing system is given in **Table 1** and service level benchmarks in **Table 2.**

12. **Kumarghat.** The present water supply to the town is from Deo River (intake well) and ground water (deep tube wells). Surface is treated in water treatment plant. Groundwater has high iron content, iron removal plants (IRP) provided near working tube well. Distribution system supply

water at the rate of 51 LPCD, supply frequency of 5 hours every day. Details of existing system is given in Table 1 and service level benchmarks in Table 2.

13. **Dharmanagar.** The present water supply to the town is from Kakri Cheera River (intake well) and ground water (deep tube wells). Surface is treated in water treatment plant. Groundwater has high iron content, iron removal plants (IRP) provided near working tube well. The distribution system supply water at the rate of 78 LPCD supply frequency of 4 hours every day. Details of existing system is given in Table 1 and service level benchmarks in Table 2.

14. **Ambassa.** The present water supply to the town is from Dhalai River (intake well) and ground water (deep tube wells). Surface is treated in water treatment plant. Groundwater has high iron content, iron removal plants (IRP) provided near working tube well. The distribution system supply water at the rate of 42 LPCD supply frequency of 5 hours every day. Details of existing system is given in Table 1 and service level benchmarks in Table 2.

Table 1: Summary of Existing Compoents in subproject towns

Component	Kailashahar	Kumargaht	Dharamanagar	Ambassa
Source - Ground water	4 DTWs-1.81 MLD at • Ramkrishna Siksha Pratisthan, RKSP (With IRP) • Near PWD Office • Near Jitudighirpar • At Vidyanagar	7 DTWs -1.40 MLD at • Red Rose Club (Ward 2) • 91 mile (Ward 7) • At PWD office (Ward 5) • Truck Syndicate (Ward10) • SE office (Ward 2) • Railway Office • At Ward 11	3 DTWs– 0.26 MLD at • Near Padampur HS school • Near Dharmanagar ISBT Bus Stand • Near Dharmanagar Railway Station	8 DTWs - 1.31 MLD at • Deep tube wells in Dalubari • Deep tube wells in B K Nagar • Deep tube wells in Dashamighat • Deep tube wells in Magazine Para • Deep tube wells in Paizabari • Deep tube wells in Ambassa Colony (Newly Sunk) • Deep tube wells in Ambedkar Nagar (Newly Sunk) • Deep tube wells in Chandraicharra (Newly Sunk)
Surface water Source	3.78 MLD - Manu River	2.46 MLD - Deo River	5.7 MLD - River Kakri Cheera/ Juri –	2.5 MLD - River Dhalai
Total water production	5.59 MLD	3.63 MLD	5.96 MLD	3.05 MLD
Intake	• Diameter: 9 m • Depth: 15 m • Capacity: 3.78 MLD • Pump Capacity: 2 nos. @ 40000 GPH • Pump Type: Vertical turbine centrifugal pump • Commissioning year: 2003	• Diameter: 5 m • Depth: 15 m • Capacity: 2.46 MLD • Pump Capacity: 2 nos. @ 60000 GPH • Pump Type: Vertical turbine centrifugal pump • Commissioning year: 2005	• Diameter: 8 m • Depth: 12 m • Capacity: 6.81 MLD • Drawl capacity: 5.7 MLD • Pump Capacity: 2 nos. @ 75000 GPH and 3 nos. @ 65000 GPH • Pump Type: Vertical turbine centrifugal pump • Commissioning year: 1994	• Diameter: 6 m • Depth: 12 m • Capacity: 2.5 MLD • Pump Capacity: 2 nos.(1W+1S) VT pump 50hp • Pump Type: Vertical turbine centrifugal pump • Commissioning year: 2011 • 2.5 MLD

Component	Kailashahar	Kumargaht	Dharamanagar	Ambassa
Raw water Transmission main - Transport of raw water from intake to Water Treatment Plant	300 mm diameter CI pipe of 400 m length.	150 mm diameter DI pipe of 300 m length	400 mm diameter CI pipe of 70 m length,	300 mm diameter CI pipe of 2.87 km length,
Iron Removal plant for deep tube wells	4 nos. of Deep Tube well (DTW), out of which DTW in Vidyanagar is newly commissioned with IRP and the rest 3 are functional with one having Iron Removal Plant (IRP).	There are 7 nos. deep Tube Wells, out of which 3 have IRPs. Due to lack of maintenance, existing packaged Iron removal plants are not functioning.	There are 3 nos. IRP, out of which 2 are functional.	Iron Removal Plants have been provided with 3 numbers of exiting DTWs are non-function now due to lack of maintenances.
Water Treatment plant (WTP) - Treatment of Raw water before storage and distribution	• Capacity: 1 MGD ~ 4.54 MLD • Treatment Unit: Cascade aerator, Flash Mixer, Clariflocculator, Rapid sand filter, Chlorination and Clear water reservoir • Commissioning year: 2003	• Capacity: 0.65 MGD ~ 2.95 MLD • Utilized capacity: 2.46 MLD • Treatment Unit: Cascade aerator, Flash Mixer, Clariflocculator, Rapid sand filter, Chlorination and Clear water reservoir • Commissioning year: 2005	• Capacity: 1.5 MGD ~ 6.81 MLD • Utilized capacity: 5.7 MLD • Treatment Unit: Cascade aerator, Flash Mixer, Clariflocculator, Rapid sand filter, Chlorination and Clear water reservoir • Commissioning year: 1994	• Installed Capacity: 0.55 MGD (2.50 MLD) • Location: Kulai Thakur Pally • Year of Construction: 2011 • Treatment Process: Conventional
Clear water reservoir (CWR) - Storage of treated water within WTP	Capacity – 1080 m^3 Commissioning year: 2003 Pumps – (1W+1S)	Capacity – 1.44 ML Commissioning year: 2005 Pumps – (2W+1S)	2 CWRs Capacity –0.45 ML Commissioning year: 1994 Pumps – (1W+1S)	-
Clear water Transmission main - Transport of treated water from WTP to water storage reservoirs	• Diameter in MM – 250-400 • Type - DI • Commissioning year - 2003 • Length in m- 3841	• Diameter in MM – 250-400 • Type - DI • Commissioning year - 2005 • Length in m- - 3600	• Diameter IN MM – 250-400 • Type - DI • Commissioning year - 1994 • Length in m - 9700	8.7 Km

<table>
<tr><th>Component</th><th>Kailashahar</th><th>Kumargaht</th><th>Dharamanagar</th><th>Ambassa</th></tr>
<tr><td>Overhead Water Storage Reservoir
- Storage of treated water for distribution</td><td>Location and capacity in KL
• ROT – 681
• Near PWD Complex – 182
• Near RKM Vidhyanagar-454
• Govindpur, Near Existing WTP -182
• Vidyanagar - 681</td><td>Location and capacity in KL
• Fishery Office– 454
• Nivedita Girls High School - 227</td><td>• Dharmanagar Court -0.454
• Dharmanagar Court -0.454
• Near Padampur HS School -0.454
• Near Dharmanagar Market -0.454
• Near Dharmanagar Govt. College -0.454
• Near Ashram Road
• Near Chandarpur Road - 0.182</td><td>Location and capacity in KL
• Bankumari – 455
• Dashamighat -182
• Ambassa --182</td></tr>
<tr><td>Distribution network
- Supply of treated water to households</td><td><table><tr><th>Dia in mm</th><th>Type</th><th>Length in m</th></tr><tr><td>110</td><td>uPVC</td><td>14267.31</td></tr><tr><td>160</td><td>uPVC</td><td>5951.65</td></tr><tr><td></td><td>Total</td><td>20218.96</td></tr></table></td><td><table><tr><th>Dia in mm</th><th>Type</th><th>Length in m</th></tr><tr><td>160</td><td>uPVC</td><td>19092</td></tr><tr><td></td><td>Total</td><td>19092</td></tr></table></td><td><table><tr><th>Dia in mm</th><th>Type</th><th>Length in m</th></tr><tr><td>110</td><td>uPVC</td><td>67040</td></tr><tr><td>160</td><td>uPVC</td><td>35784</td></tr><tr><td></td><td>Total</td><td>102824</td></tr></table></td><td><table><tr><th>dia in mm</th><th>Type</th><th>Length in m</th></tr><tr><td>40</td><td>uPVC</td><td>553</td></tr><tr><td>90</td><td>uPVC</td><td>24411</td></tr><tr><td>110</td><td>uPVC</td><td>1615</td></tr><tr><td>100</td><td>DI</td><td>207</td></tr><tr><td>125</td><td>DI</td><td>622</td></tr><tr><td>150</td><td>DI/CI</td><td>1519</td></tr><tr><td>200</td><td>DI</td><td>717</td></tr><tr><td>250</td><td>DI</td><td>60</td></tr><tr><td>300</td><td>DI</td><td>39</td></tr><tr><td colspan="2">Total</td><td>29745</td></tr></table></td></tr>
<tr><td>House Service connection</td><td>4,526 domestic water connections and 6 nos. of street hydrant points.</td><td>3,418 domestic water connections and 10 street hydrant points</td><td>7350 domestic water connections and 55 street hydrant points</td><td>2475 number of households connection</td></tr>
</table>

Source: Town DPRs

Table 2: Service Level Benchmark Status for Existing Water Supply for the towns

Service level indicators	Benchmarks	Kailashahar	Kumargaht	Dharmanagar	Ambassa
Coverage of water supply (%)	100	63.71	82.0	61.2	49.58
Per capita supply of water (lpcd)	135	90	51	78	42
Extent of metering of water connection (%)	100	0	0	0	52
Extent of non-revenue water (%)	20	60-70	60-70	About 40-50	35
Continuity of water supply (hours)	24	6-8	5	4	5
Quality of water supplied (%)	100	100 (except after supply from borewell source)	Data not available	Data not available	Not Assessed
Efficiency in redressal of customer Complaints (%)	80	Data not available	Data not available	Data not available	Not Applicable
Cost recovery in water supply services (%)	100	20-30	20% to 30%	30	20% to 30%
Efficiency in collection of water related Charges (%)	90	60-70	60% to 70%	Data not available	60% to 70%

Source: Town DPRs

C. Proposed Water Supply components

15. The objective of the proposed water supply scheme is to provide 24 x 7 water supply to the towns with sufficient pressure and minimum losses.

16. **Kailashahar.** For filling up the demand gap of 3.78 MLD, New 4.5 MLD intake at river Manu, 2.45 MLD WTP and CWR, are proposed under the project. 2 new OHSR at Kalipur campus and at Kasherghat are proposed. 32.58 km long distribution network is proposed to cover maximum area of town (1.58 km is remodeling of existing network and the balance 17.88 km is for expansion). Raw water mains of 990 m will be laid from new intake to new WTP, 3.23 km Clear water transmission mains from WTP to storage reservoirs will be laid.

17. **Kumargaht.** For filling up the demand gap of 2.82 MLD, New 4 MLD intake at river Manu, 2.3 MLD WTP and CWR, are proposed under the project. 1 new OHSR at Shiv Ganga Mandir are proposed. 40.897 km long distribution network is proposed to cover maximum area of town (7.42 km is remodeling of existing network and the balance 33.4 km is for expansion). Raw water mains of 100 m will be laid from new intake to new WTP, 3.42 km Clear water transmission mains from WTP to storage reservoirs will be laid.

18. **Dharamnagar.** For filling up the demand gap of 3.78 MLD, New 4.5 MLD intake at river Juri, 10.8 MLD WTP and CWR, are proposed under the project. 2 new OHSR at Circuit house and at ISBT are proposed. 18 km long distribution network is proposed to cover maximum area of town

(15.5 km is remodeling of existing network and the balance 2.4 km is for expansion). Raw water mains of 400 m will be laid from new intake to new WTP, 1.2 km Clear water transmission mains from WTP to storage reservoirs will be laid.

19. **Ambassa.** For filling up the demand gap, 4 New Deep tube wells with IRP, are proposed under the project. 1 new OHSR at Magazinepara are proposed. 20.24 km long distribution network is proposed to cover maximum area of town (4.3 km is remodeling of existing network and the balance 15.9 km is for expansion). Raw water mains of 4.6 km will be laid from new IRP to water storage, 3.23 km.

1. Water Demand and Source sustainability

Kailashahar and Kumarghat

20. **Water demand**: Water demand for Kailashahar and Kumargah town has been calculated based on 135 LPCD as per CPHEEO norms. Water demand includes domestic, industrial and fire demand of town. Base year, intermediate year and ultimate year is taken as 8.1 MLD for year 2023, 10.61 MLD for year 2038 and 13.33 MLD 2053 respectively for both Kailashahr and Kumarghat towns.

2. Source sustainability

21. River Manu can be considered as perennial source of water supply for the town, and it is capable to meet the water demand of the town throughout the design horizon. Hence ground water source has not been considered for the proposed water supply scheme. It is proposed to discard these ground water sources gradually.

22. At present water is already drawn from river Manu at the rate of 3.78 ML per day. An additional Intake of 4.5 ML per day is being proposed to augment the water supply system of Kailashahar town. In Kumarghat water is drawn from river Deo at the rate of 2.46 ML per day. An additional Intake of 4 ML per day has been proposed on River Manu to augment the water supply system of Kumarghat town.

23. The required water is made available from River Manu and Water Resource Investigation Division (WRID) allocated 14.3 MLD of drinking water for both Kailashahar and Kumarghat towns. (**Appendix 13**),

Dharamanagar

24. **Water demand:** Water demand for Dharmanagar town has been calculated on the basis of 135 LPCD as per CPHEEO norms. Water demand includes domestic, industrial and fire demand of town. Base year, intermediate year and ultimate year is taken as 10.47 MLD for year 2023, 14.64 MLD for year 2038 and 19,35 MLD for year 2053 respectively.

25. The required water is made available from River Kakri Cheera and Water Resource Investigation Division (WRID) allocated 20.1 MLD of drinking water for Dharmanagar towns. Table below shows present and proposed production detail from existing source.

26. Water Resources Investigation Division (WRID), Agartala has provided a final water withdrawal permission letter based on water availability in the Manu, Juri and Gomoti River (Vide memo no. F.1(40)/EE/WRID/TECH/2021/3007-09 Dated: 08.02.2023). The detailed analyses

table based on water runoff, water availability and withdrawal and water allocation letter are attached in Appendix 13.

27. As per Memo from Water Resources Investigation Department (WRID), Agartala, vide letter dated 08.02.2023 (**Appendix 13**), has allowed the withdrawal of the following quantum of water mentioned in Table below.

Table 3*:* Quantum of water withdrawal allowed for drinking water purpose (for year 2053).

Sl. No.	Name of River	Quantity of Withdrawal of Surface Water (per month)	Quantity of Withdrawal of Surface Water in MLD
1	Gumati	0.573 MCM*	19.1
2	**Juri**	**0.603 MCM***	**20.1**
3	**Manu**	**0.429 MCM***	**14.3**

**MCM represents million cubic meters.*

Ambassa

28. **Water demand:** Water demand for Ambassa town has been calculated on the basis of 135 LPCD as per CPHEEO norms. Water demand includes domestic, industrial and fire demand of town. Base year, intermediate year and ultimate year is taken as 3.49 MLD for year 2023, 5.67 MLD for year 2038 and 8.55 MLD for year 2053 respectively.

29. Present production of treated surface water from 2.5 MLD Capacity WTP, to mitigate the water demand in the year 2038 gap of 1.86 MLD, 4 nos. of DTW with IRP having capacity of 10000 GPH each has been proposed. Total production of water from 4 nos. of DTW with IRP will be 2.00 MLD. Intake and aditional WTP of Capacity 4.2 MLD is proposed to be constructed within the existing WTP Site in future to mitigate the water demand in 2053, ie., 4.17 MLD

3. Source sustainability for Ambassa Town

30. The proposed project is to augment and improve the water supply system Ambassa Municipal Council using deep tube wells as water source. Ambassa is a small town which accommodates a total population of 16127 no. for the year 2020. The present water supply to the town is from the Dhalai river and 8 Deep Tube wells.

31. An approval letter Vide memo no. F.1(40)/EE/WRID/TECH/2020/58-60 has been provided by Water resources Investigation Division, Agartala where they have provided a ground water potential map for the state of Tripura where area wise yield has been marked. 4 new tube wells are proposed to fulfill this demand gap. The document is attached in **Appendix 13.**

32. While proposing the tube wells the specified yield provided in the map has been taken into consideration. The available ground water yield of Ambassa town ranges from 50-100 m^3/hr. Therefore, it is proposed that the new tube wells may withdraw water considering sustainable discharge with 50% safety.

33. Table 4 shows summary of proposed water supply components**.**

Table 4: Summary of Proposed water supply Components

Particulate	Kailashahar	Kumargaht	Dharamanagar	Ambassa
Population				
Commissioning Year (2023)	25627	16706	52661	18501
Intermediate year (2038)	32697	23658	74571	30960
Design year (2053)	40012	71792	99512	47472
Water Demand in MLD				
Commissioning Year (2023)	4.93	3.17	10.47	3.49
Intermediate year (2038)	6.23	4.39	14.64	5.67
Design year (2053)	7.56	5.77	19.35	8.55
Source				
Source available (MLD)	1 Ground Water (Existing) – 1.81 2. Manu River (Existing) - 3.78	1 Ground Water (Existing) - 1.40 2. Deo River (Existing) - 2.95	1 Ground Water (Existing) - 0.25 2. Kakri Cheera/ Juri (Existing) -5.7	1 Ground Water (Existing) - 2 2. Dhalai River (Existing) - 4.2
Selected Source (MLD)	Manu River (Existing & New) – 7.56	Manu River (New) – 2.82 Deo River (Existing) – 2.95	Kakri Cheera/ Juri (Existing & New) – 20.1	Ground Water (Existing & New) - 4 2. Dhalai River (Existing) - 4.2
From source to consumer supply	Raw water abstraction from selected source(River / DTWs) → raw water transmission (pumping) → treatment → clear water transmission (pumping) → storage → distribution → house connections with meters			
Raw water source-intake – Pumping of Raw water from source	Intake will be on Manu River. RCC well with 8 m dia and 14 m depth from the floor level is proposed. **Capacity of the Intake- 4.5 MLD** Small approach bridge of length 20 m on Manu River is considered for pipe line crossing. Proposed intake is 3.75 km away (along the	Intake will be on Manu River. Near confluence point of River Manu & Deo. RCC well with 8 m dia. and 20.8 m depth from the floor level is proposed. **Capacity of the Intake- 4 MLD** Small approach bridge of length 20 m on Manu River is considered for pipe line crossing. Proposed intake	Intake will be on Kakri Cheera/ Juri near existing intake well. A new intake well cum pumping station of RCC well 10 m diameter and 12 m depth from the floor level is proposed for the design year 2053 on River Kakri Cheera/ **Capacity of intake - 14 MLD** – ultimate demand (2053)	No new intake

Particulate	Kailashahar	Kumargaht	Dharamanagar	Ambassa
	river) from the existing intake The intake is proposed southeastern part of the town on Manu River at Ward 16 (Sonamara, Durgapur). located upstream in respect to existing intake at a distance of approx. 3.7 km (along the river)	is 3.1 Km away (along the river) from the existing intake. The intake is proposed southwestern part of the town on Manu River at Ward 12 The proposed intake well is located in downstream in respect to existing intake at a distance of approx. 3.1 km (along the river) and near confluence point of Manu & Deo.	Average flow of water – 14 MLD Small approach bridge of length 25 m on Juri River is considered for pipe line crossing. Proposed intake is 100 m away (along the river) from existing Intake The intake is proposed south eastern part of the town on Juri River at Ward 10 The proposed intake well is located in downstream in respect to existing intake at a distance of approx. 100 m (along the river).	
Tube wells	No new tube wells, existing Tube well will not use in new system	No new tube wells, existing Tube well will not use in new system	No new tube wells, existing Tube well will not use in new system	Tube well of 49.9 m^3/h Production capacity in 10-hour operation pump set. 4 tube well produced about 2 MLD water
Raw water Transmission main **-** Transport of raw water from intake to Water Treatment Plant	Approx. 990 m – 200 mm dia. DI K9 pipe From proposed Intake to proposed WTP	Approx. 200 mm dia. DI K9 pipe of 100 m length From proposed Intake to proposed WTP	A new raw water pumping main of approx. 100 m length, 400 mm dia. DI-K9 From proposed Intake to proposed WTP	Approx. 4.643 km length DI K9- 100 to 200 mm Dia. (100 mm DI K9 - Length - 479 m. 150 mm DI K9 - Length - 3520 m 200 mm DI K9 - Length – 644 m) From IRP to Water Storage Reservoir
Iron Removal plant for deep tube wells	No new IRP	No new IRP	No new IRP	4 nos. @ 500 m^3/h for each at Dolubari area, Bankumari, BK Nagar and Magazine para.
Water Treatment plant (WTP)	Construction of 2.45 MLD conventional WTP (first	Construction of 2.3 MLD conventional WTP near	WTP of 10.8 MLD (20 hours operation**)** proposed	No new WTP is proposed

Particulate	Kailashahar	Kumargaht	Dharamanagar	Ambassa
- Treatment of Raw water before storage and distribution	module). In future new WTP will be constructed without addition of new intake. The proposed WTP is 900 m (aerial distance) from the existing intake. *WTP consists of Aeration unit, Pre-Chlorination, Alum Dosing, flash mixing, flocculation, laboratory, backwash water storage tank, Clarification, filtration, Post Chlorination, etc.* *Location* - Southeast side of Kailashahar on available Government land at Ward 15 (Near Paitur Bazar). The proposed WTP is located at which is 900 m away from the existing WTP.	the proposed intake. In future new WTP will be constructed without addition of new intake. The proposed WTP is 2.70 km (aerial distance) from the existing WTP. *WTP consists of Aeration unit, Pre-Chlorination, Alum Dosing, flash mixing, flocculation, backwash water storage tank, water testing laboratory, Clarification, filtration, Post Chlorination, etc.* southwest side of Kumarghat, on available Government land at Ward 12. The proposed WTP is located at which is 2.7 km away from the existing WTP.	for the design year 2038 and unit sizing was adjusted so that it can serve for ultimate demand of 16.8 MLD (20 hours operation) also as the availability of land near the existing WTP is limited. *WTP consists of Aeration unit, Pre-Chlorination, Alum Dosing, flash mixing, flocculation, backwash water storage tank, laboratory, Clarification, filtration, Post Chlorination, etc* Proposed WTP is adjacent to existing WTP at College Road. Construction will be on open land. The proposed WTP is located at southeastern side of Dharmanagar which is adjacent (within 50m aerial distance) to the existing WTP.	
Clear water reservoir (CWR) - Storage of treated water within WTP	1.94 Lakh liters tank Pumps: Q: 180 m 3 /hr and H: 41 m (1W+1 S) Pump type: Horizontal Split Casing Centrifugal Pump Located within the WTP	1.9 lakh liters tank Pumps: Q: 83 m 3 /hr and H: 50 m (1W+1 S) Pumps: Q: 117 m 3 /hr and H: 41 m (1W+1S) Located within the WTP	6.8 lakh L. CWR Pumps: Q:219 m3/hr and H: 50 m (2W+1S) Located within the WTP	Not proposed
Clear water Transmission main	gravity clear water transmission main – length -3.233km. 200 mm dia. – DI K9 pipe= 205 m	Gravity clear water transmission main length - 3.422 km. 300 mm dia. – DI K9 pipe= 22 m	Gravity clear water transmission main length - 1.235 km. • 358 m of 150 mm DI K-9 pipe	

Particulate	Kailashahar	Kumargaht	Dharamanagar	Ambassa
- Transport of treated water from WTP to water storage reservoirs	150 mm dia. – DI K9 pipe= 3028 m The clear water main proposed along existing local roads of Different wards- 4 nos. of the Kailashahar town	250 mm dia. - DI K9 pipe= 720 m 200 mm dia.- DI K9 pipe= 1665 m 150 mm dia.- DI K9 pipe= 1015 m The clear water main proposed along existing local roads of Different wards of the Kumarghat town	• 877 m of 200 mm DI K-9 Total= 1235 m The clear water main proposed along existing local roads of Different wards of the Dharmanagar town	
Construction of Overhead Water Storage Reservoir **-** Storage of treated water for distribution	2 no of Over Head Tanks (OHTs) with capacity of 300KL and 250 KL are proposed under this scheme to supply water in each DMA. • OHSR 1: 300 KL – 18 m Staging height • OHSR 2: 250 KL- 18 m Staging height OHSR 1: At Kalipur which is located at northeastern part of the town, at Kalipur (Ward 4) near a School OHSR 2: at Kasherghat which is located at eastern part of the town and within Kailashahar MC (Ward -13)	Total 1 no. OHSR • OHSR 1: 250 KL – 18 m Staging height at Shiv Ganga Mandir OHSR: at Shiv Ganga Mandir (Segregation Center) which is located at southwest side of the town and only 300 m away from the proposed WTP.	There are 2 numbers of OHT proposed • 250 KL of 18 m staging height at Circuit house • 350 KL of 18 m staging height at ISBT Dharmanagar OHSR 1: at Circuit house which is located at southwest side of the town OHSR 2: at ISBT Dharmanagar which is located at southern side of the town	Only one OHT, OHT-1: capacity 600 KL (18 m Staging height), Designed for 30 years by considering the 12 hrs. water demand of the year 2038. Located at Magazinepara at Ward 14
Distribution network **-** Supply of treated water at households	Total distribution network – **Approx 32.58 km** **Proposed new Approx distribution - 31.0 km** 75 mm dia HDPE = 12137 m 90 mm dia HDPE = 2293 m	Total distribution network – **approx. 40.897 km (New Pipeline-33.473 km and <u>New pipeline</u>** 110 mm dia HDPE PN-10 = 17994 m	Total distribution network – **approx. 18.006 km** length of 90-350 mm dia. HDPE/DI pipe New Pipeline- approx. 2.429 km	Total approx. 20.245 km **(4.33 km is Remodeling and 15.951 km is Expansion)** **Proposed new – Total-15.951 km**

Particulate	Kailashahar	Kumargaht	Dharamanagar	Ambassa
	110 mm dia HDPE =7900 m 125 mm dia HDPE = 1948 m 140 mm dia HDPE = 1341 m 160 mm dia HDPE =1955 m 180 mm dia HDPE = 1950m 200 mm dia HDPE = 789 m 225 mm dia HDPE = 431 m 150 mm dia DI K7=28 m 200 mm dia DI K7= 174 m 250 mm dia DI K7= 122 m 300 mm dia DI K7= 80 m **Remodeling Approx - 1.58 km** 140 mm dia HDPE = 251 m 160 mm dia HDPE = 325 m 180 mm dia HDPE = 276 m 200 mm dia HDPE = 590 m 200 mm dia DI K7= 15 m 250 mm dia DI K7= 122 m Distribution pipes will be laid along the roads, within the road right of way of existing roads of town	125 mm dia HDPE PN-10= 522 m 160 mm dia HDPE PN-10=517 m 180 mm dia HDPE PN-10= 184 m 200 mm dia HDPE PN-10 = 460 m 225 mm dia HDPE PN-10= 504 m 250 mm dia HDPE PN-10 = 742 m 200 mm dia DI K7= 1043 m 250 mm dia DI K7 = 132 m 300 mm dia DI K7= 412 m 100 mm dia DI K9= 8556 m 150 mm dia DI K9= 874 m 200 mm dia DI K9= 299 m 300 mm dia DI K9= 1234 m **<u>Remodeling of old pipeline</u>- 7.424 km)** 110 mm dia HDPE PN-10=51 m 160 mm dia HDPE PN-10=494 m 200 mm dia HDPE PN-10=202 m 225 mm dia HDPE PN-10=251 m 250 mm dia DI K7 = 740 m 150 mm dia DI K9 = 2717 m 200 mm dia DI K9= 2562 m 250 mm dia DI K9= 378 m 300 mm dia DI K9= 30 m Distribution pipes will be laid along the roads, within the road right of way of existing roads of town	Remodeling of old pipeline- approx. 15.577 km **New proposed- 2429 m** 90 mm HDPE-158 m 110 mm HDPE-1265 m 200 mm HDPE- 171 m 225 mm HDPE – 187 m 250 mm DI K7 – 335 m 300 mm DI K7 –240 m 350 mm DI K7 – 73 m **Remodeling - 15,577 m** 110 mm HDPE-108 m 125 mm HDPE- 2253 m 140 mm HDPE- 566 m 180 mm HDPE- 966 m 200 mm HDPE- 3924 m 225 mm HDPE – 2180 m 200 DI K7 – 770 m 250 DI K7 – 3131 m 300 DI K7 – 1649 m Distribution pipes will be laid along the roads, within the road right of way of existing roads of town	90 mm Dia. HDPE- 5936 m 110 mm Dia. HDPE– 1430 m 125 mm Dia. HDPE– 2241 m 160 mm Dia. HDPE – 1609 m 180 mm Dia. HDPE – 2826 m 200 mm Dia. HDPE – 1404 m 250 mm Dia. HDPE – 297 m 300 mm Dia. DI K7 – 172 m **Remodeling – Total- 4.330** 125 mm Dia. HDPE- 314 m 160 mm Dia. HDPE– 711 m 180 mm Dia HDPE- 772 m 200 mm Dia. HDPE – 1956 m 250 mm Dia. HDPE – 577 m Distribution pipes will be laid along the roads, within the road right of way of existing roads of town

Particulate	Kailashahar	Kumargaht	Dharamanagar	Ambassa
House Service connection	4526 House service connections	750 House service connections	3975 House service connections.	2978 House service connections
Magnetic Bulk Flow Meters and consumer meters - Measurement of water flow	6- Bulk water flow meter 7594 - consumer meters	4- Bulk water flow meter. 6599 -- consumer meters.	9- Bulk water flow meter. 11997 - consumer meters	10 - Bulk water flow meter 4753 - consumer meters

D. Operation and Maintenance

34. The Operator will maintain the water supply project for a period of 5 years on behalf of local body collecting the tariff from the consumers as per the tariff fixed by the Government of Tripura and with the support of balance funding for O&M from GoT. This 5 years period will be utilized to establish an efficient O&M system and also to give training to the staff of the Municipal Councils (MCs) on the project activities by enhancing their capacity on technical as well as on the administrative fields. This will enable the MCs to take over the responsibility of O&M from the Operator realizing their ownership of assets created and to render service to the public by themselves as per the powers conferred on them under 74th Constitutional Amendment.

E. Subproject Benefits

35. The subproject is primarily designed to improve environmental quality and living conditions of project towns through provision of water supply. The subproject is primarily designed to improve environmental quality and living conditions of these towns through provision of water supply. The benefits arising from this subproject include: (i) increased availability of potable water at appropriate pressure to all households including urban poor; and (ii) reduced time and costs in accessing alternative sources of water.

F. Implementation Schedule

36. Implementation of Package of cluster IIIA as DBO contract. Project will be implemented in 36 months (6 months for design and 30 months for construction). Bids are invited in month of January/ February 2023. It is assumed that the construction will be commenced from the 2nd quarter of financial year 2023-24 and will be completed by mid-2026. After that 5 years O & M is considered.

37. Following Figure 2 -18 shows existing and proposed water supply components on google earth map, proposed Intake, WTP, Raw & Clear water Transmission main and OHSRs, and area with 100m surroundings of project towns of Kailashahar town. Figure 19-30 presents maps of existing and proposed components of Kumarghat town. Figure 31-45 presents maps of existing and proposed components of Dharmanagar town. Figure 46-63 presents maps of existing and proposed components of Ambassa town.

Maps Showing existing and proposed components in Kailashahar Town

Figure 2: Existing and proposed water supply components in Kailashahar Google Earth

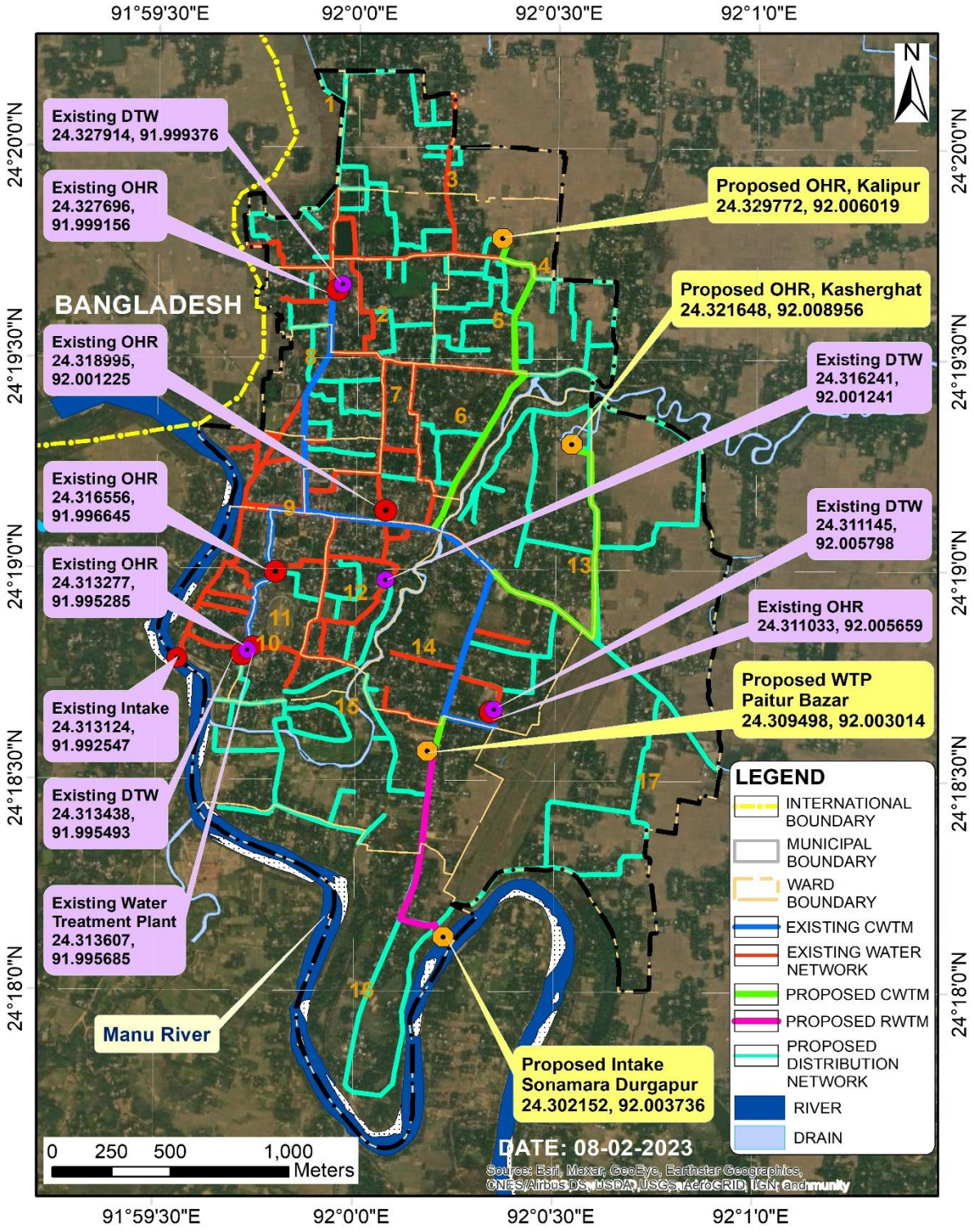


Figure 3: Existing water supply components in Kailashahar google earth

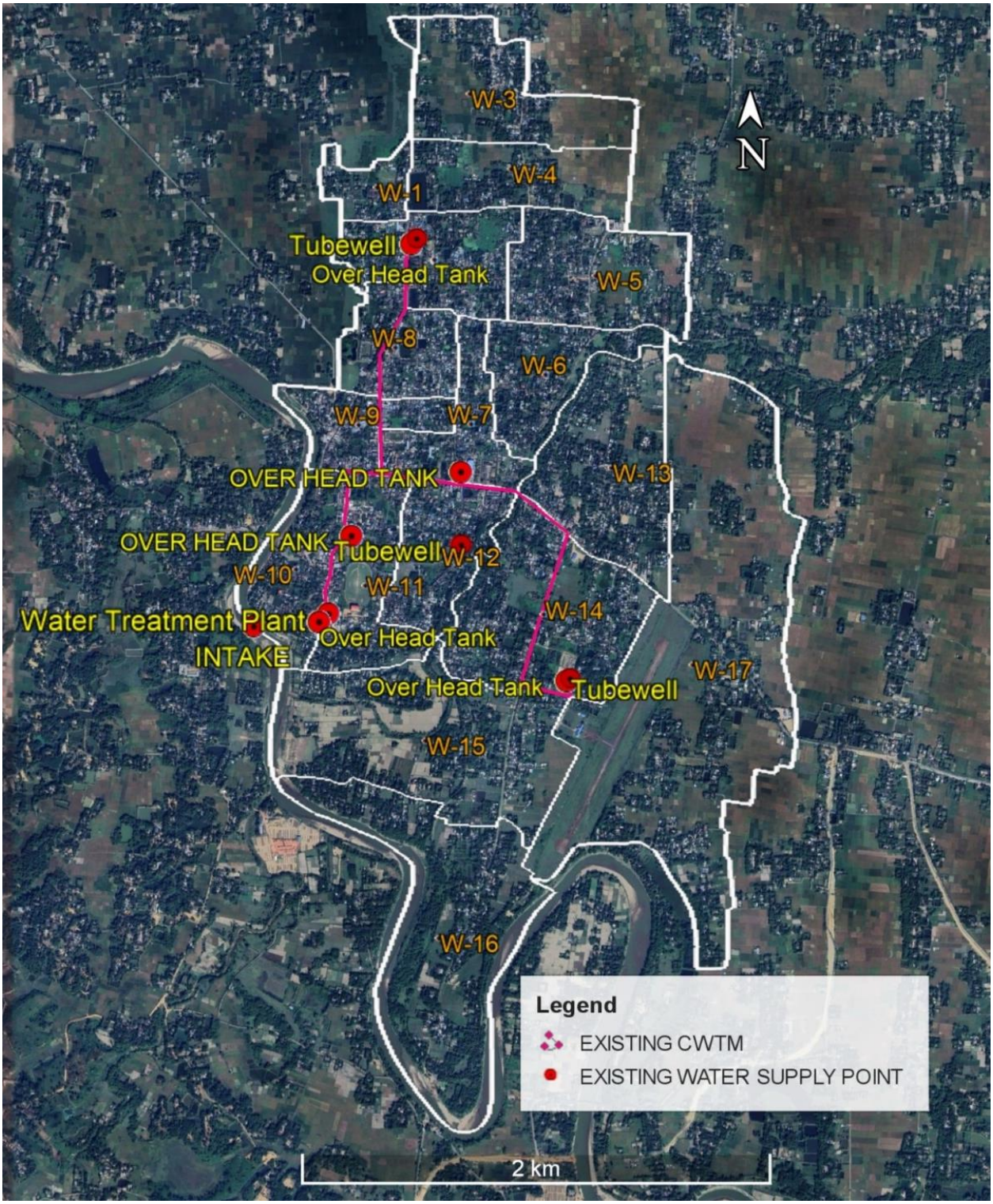


Figure 4: Proposed water supply components in Kailashahar google earth

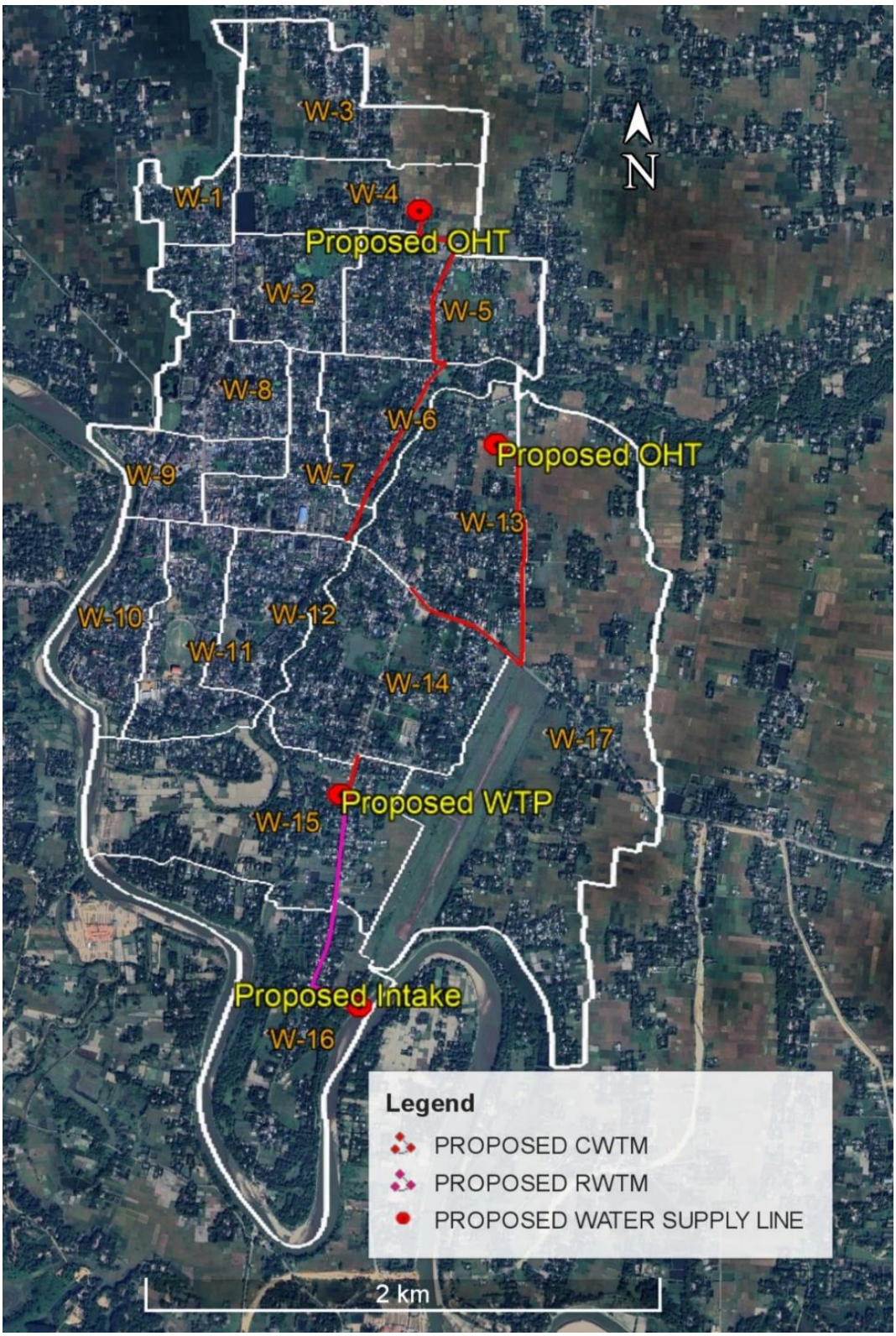


Figure 5: Existing Intake of Kailashahar on google earth



Figure 6: Existing WTP of Kailashahar on google earth

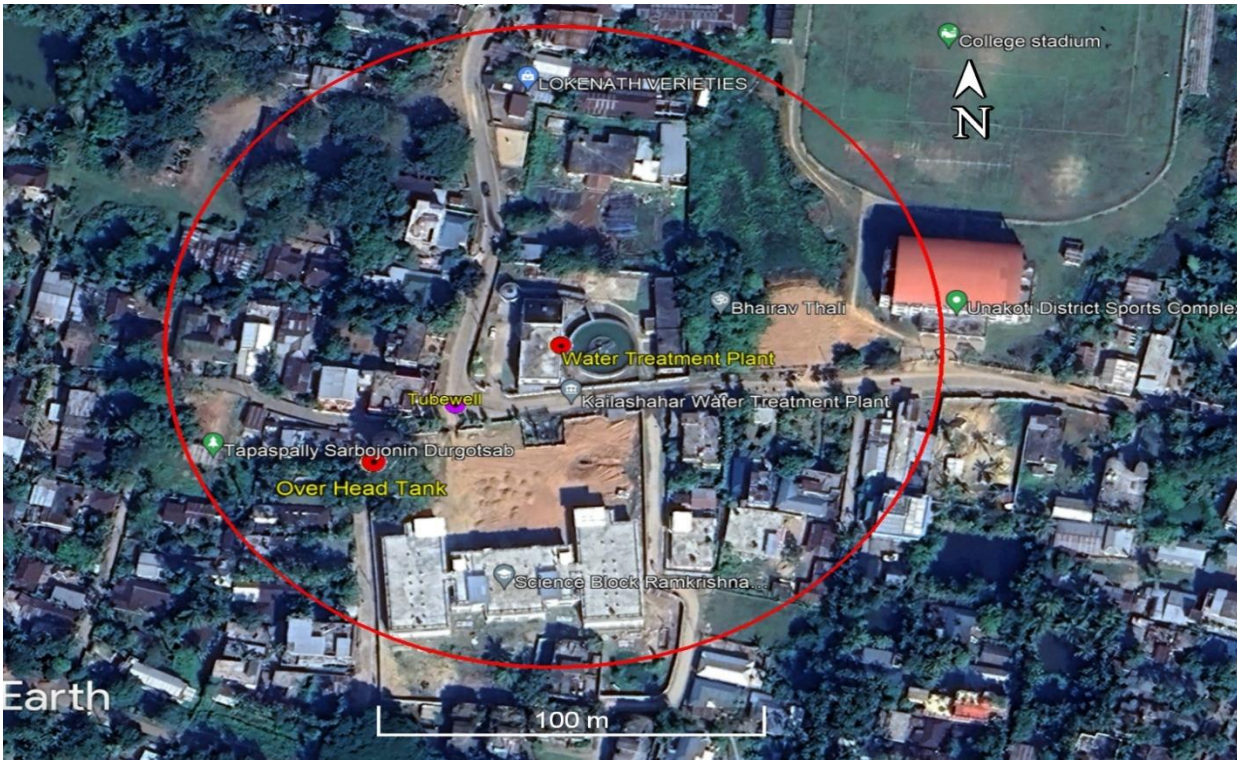
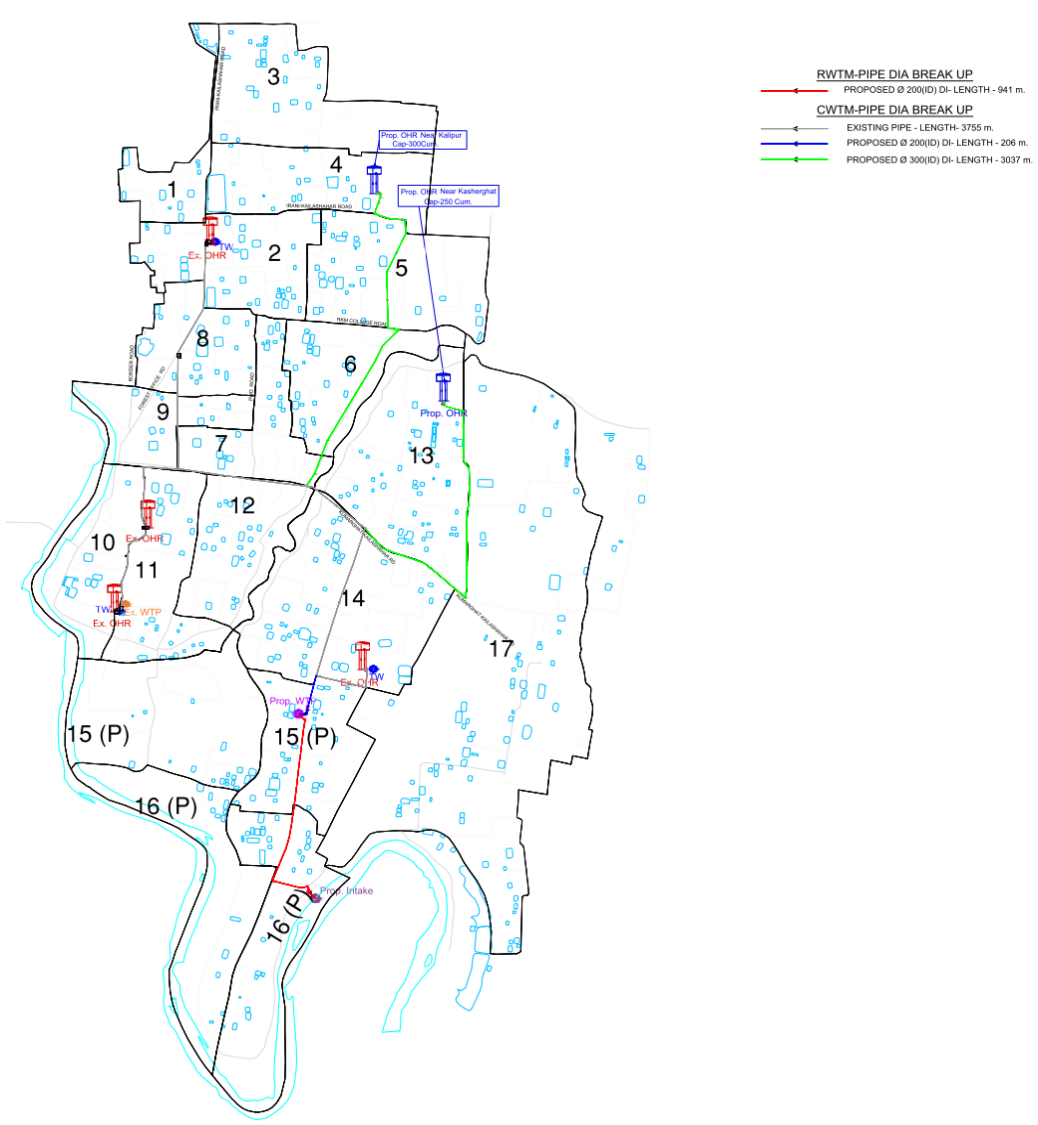


Figure 7: Proposed Clear Water & Raw Water Transmission Main Network with Intake, WTP and OHSRs- Kailashahar



Proposed component maps of Kailashahar Town

Figure 8: Proposed intake location with 100m surroundings

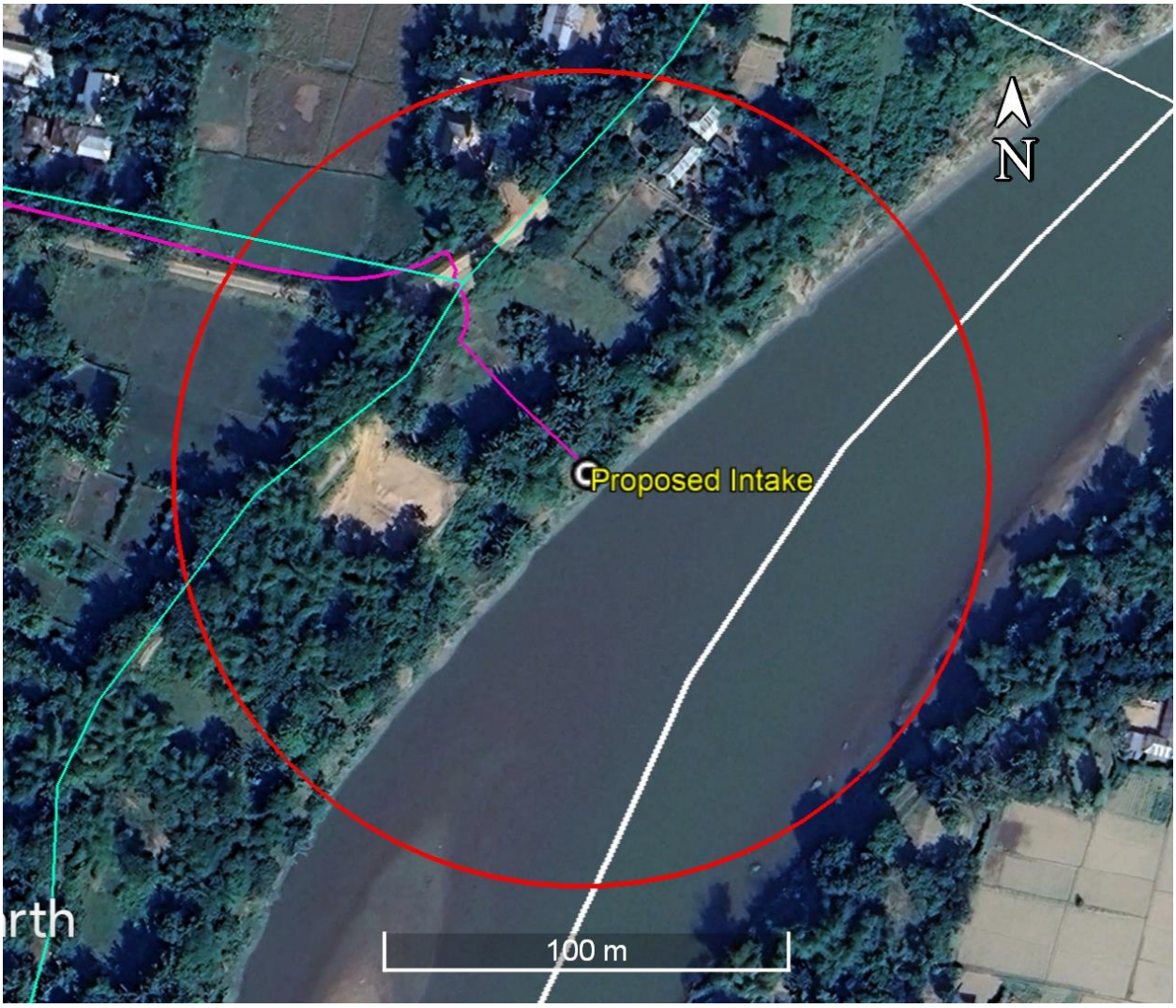


Figure 9: Proposed WTP location with 100m surroundings – Kailashahar

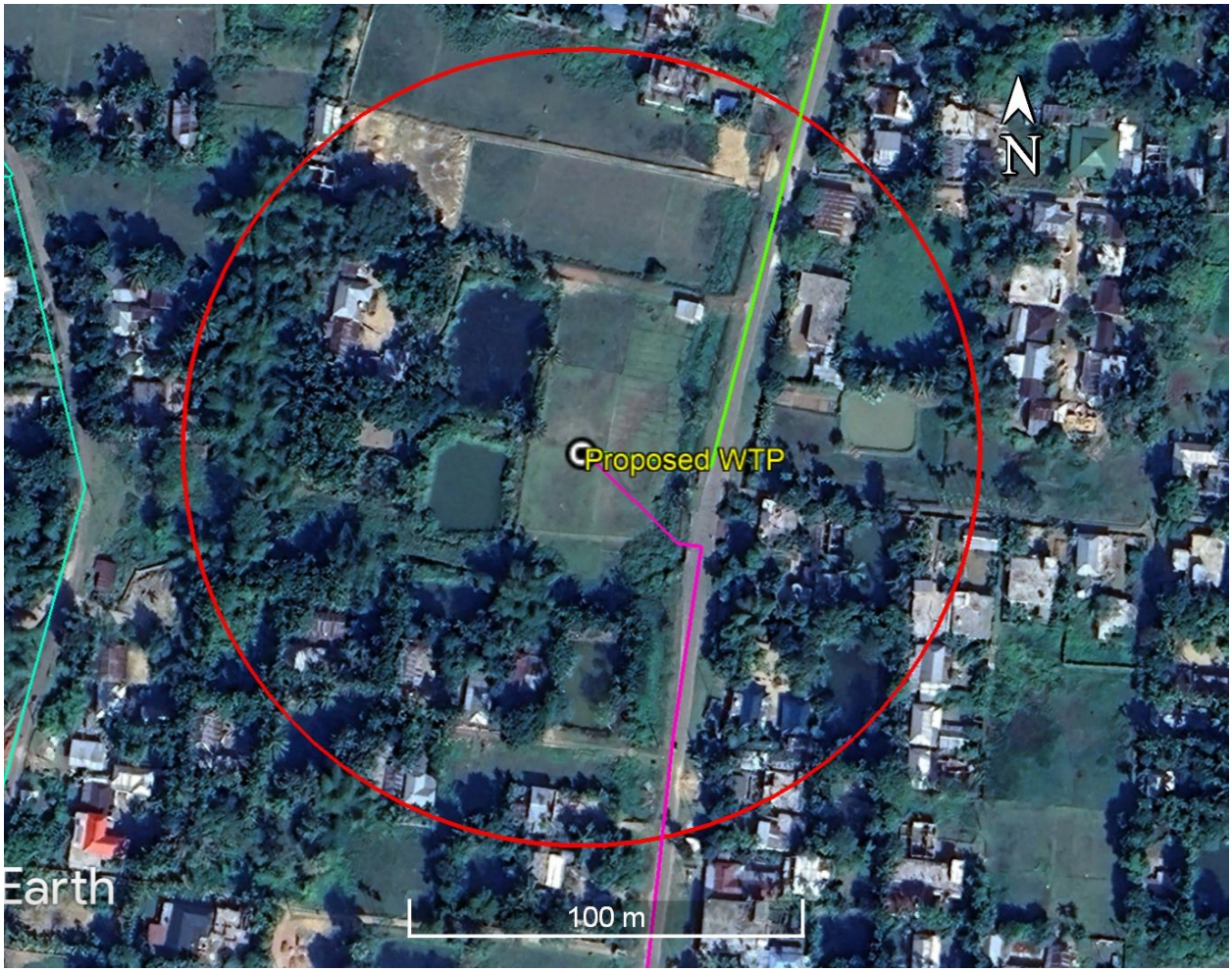


Figure 10: Alignment map of Intake to WTP Raw water transmission mains (Red) – Kailashahar

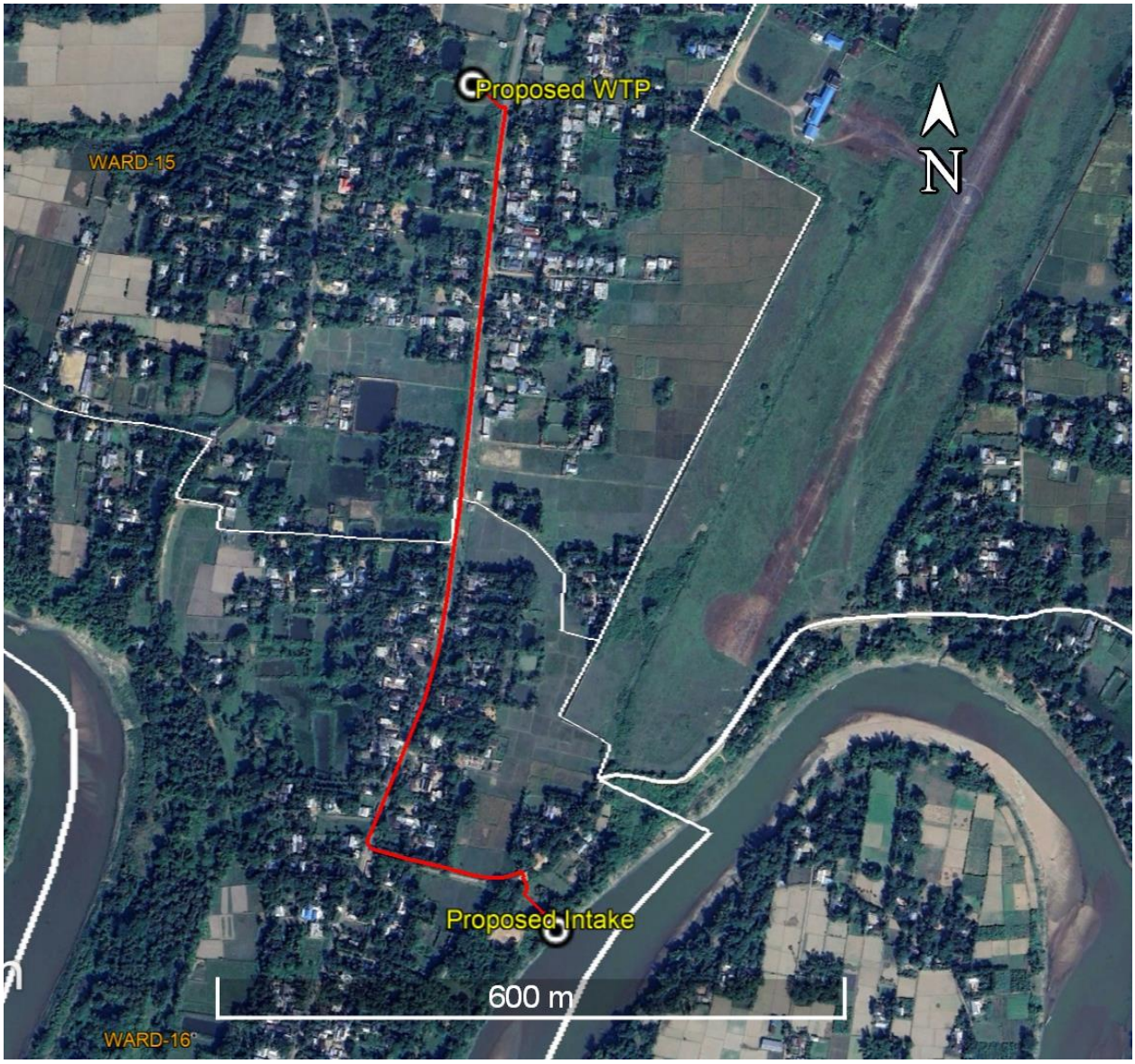
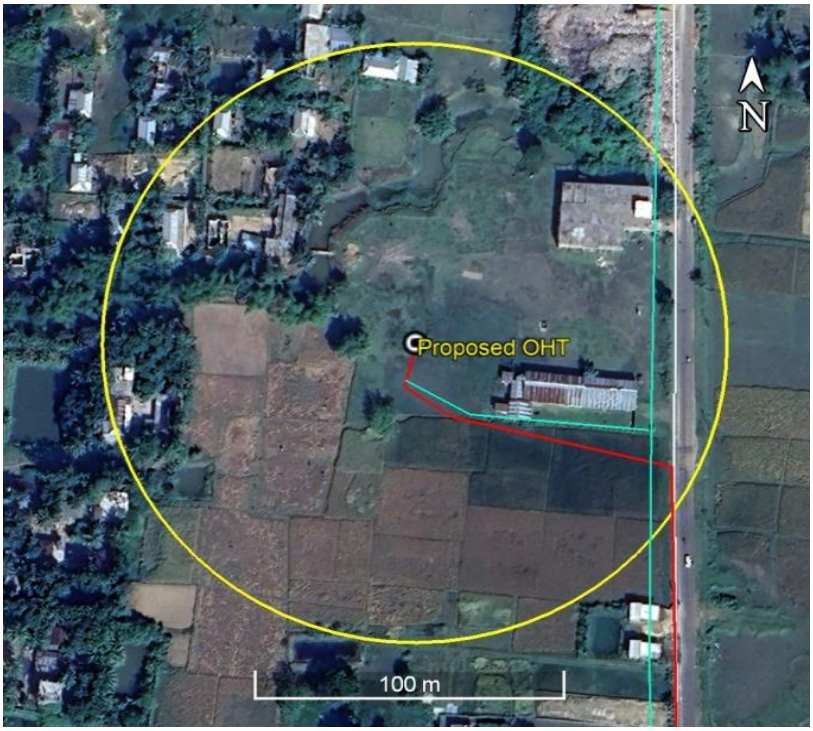


Figure 11: Proposed OHT location with 100m surroundings - Kailashahar



Proposed OHT at Kalipur



Proposed OHT at Kasherghat

Figure 12: Proposed DMA Map of Kailashahar MC

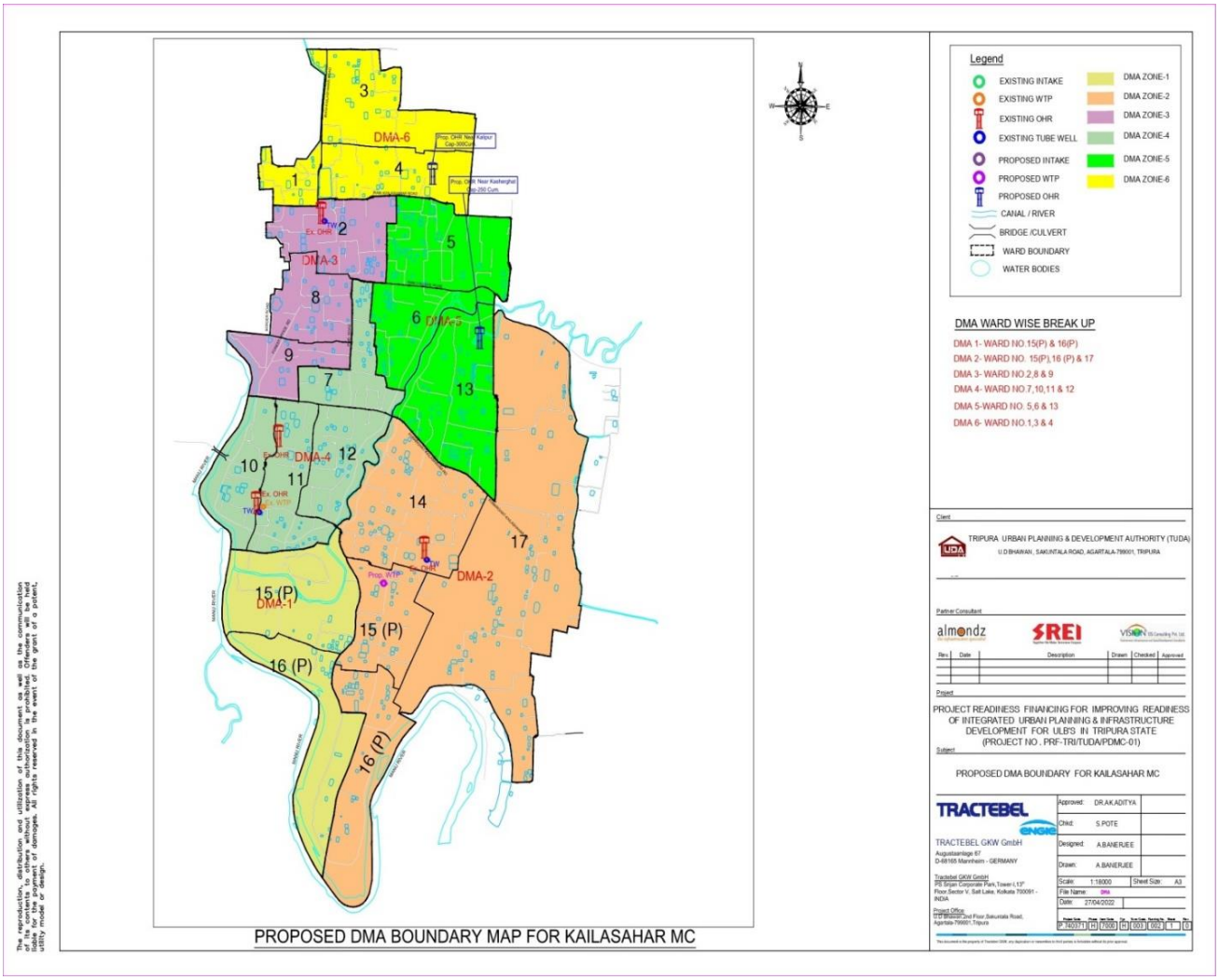


Figure 13: Proposed distribution networks - Kailashahar

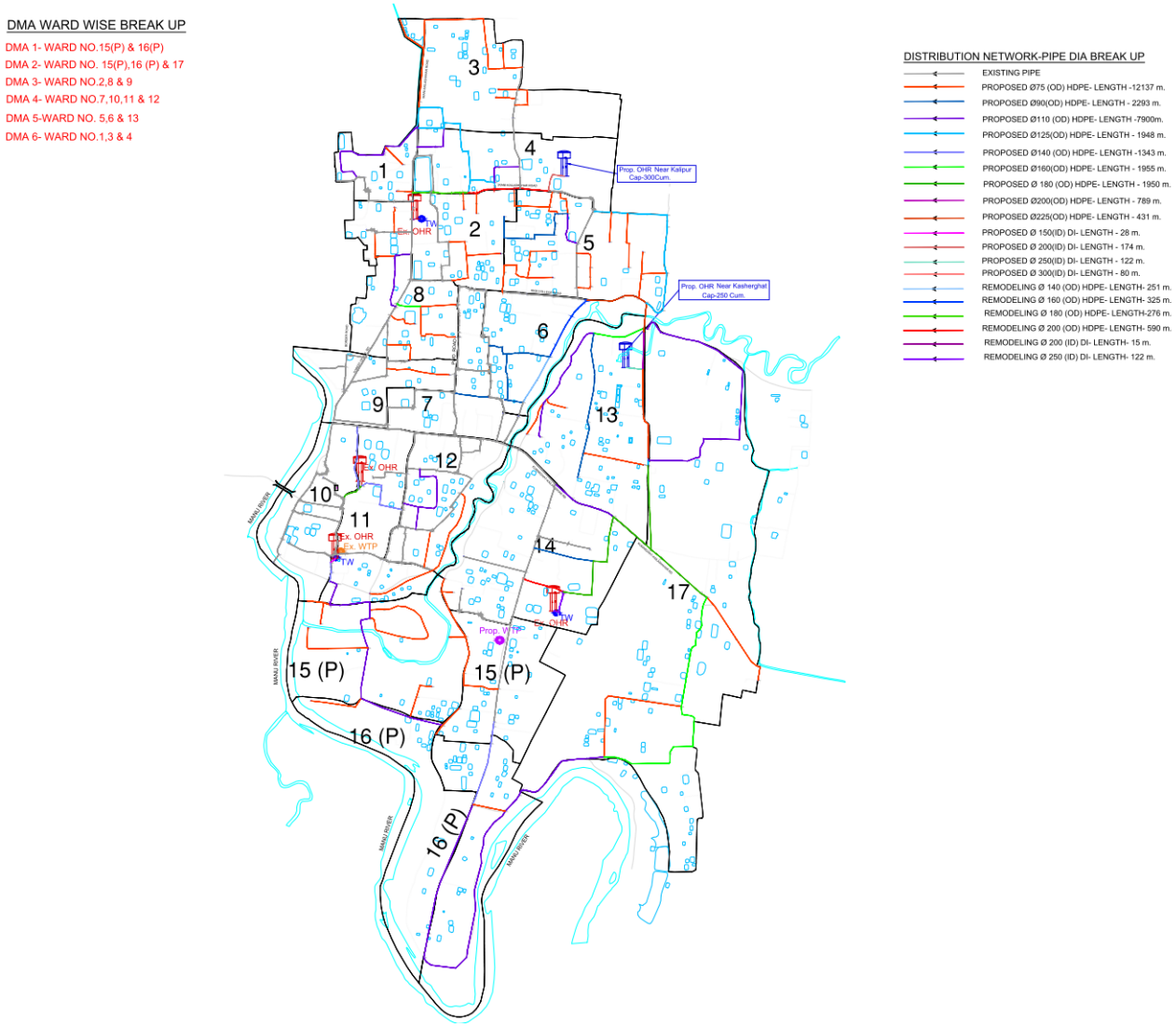


Figure 14: Proposed Intake Layout Plan for Kailashahar

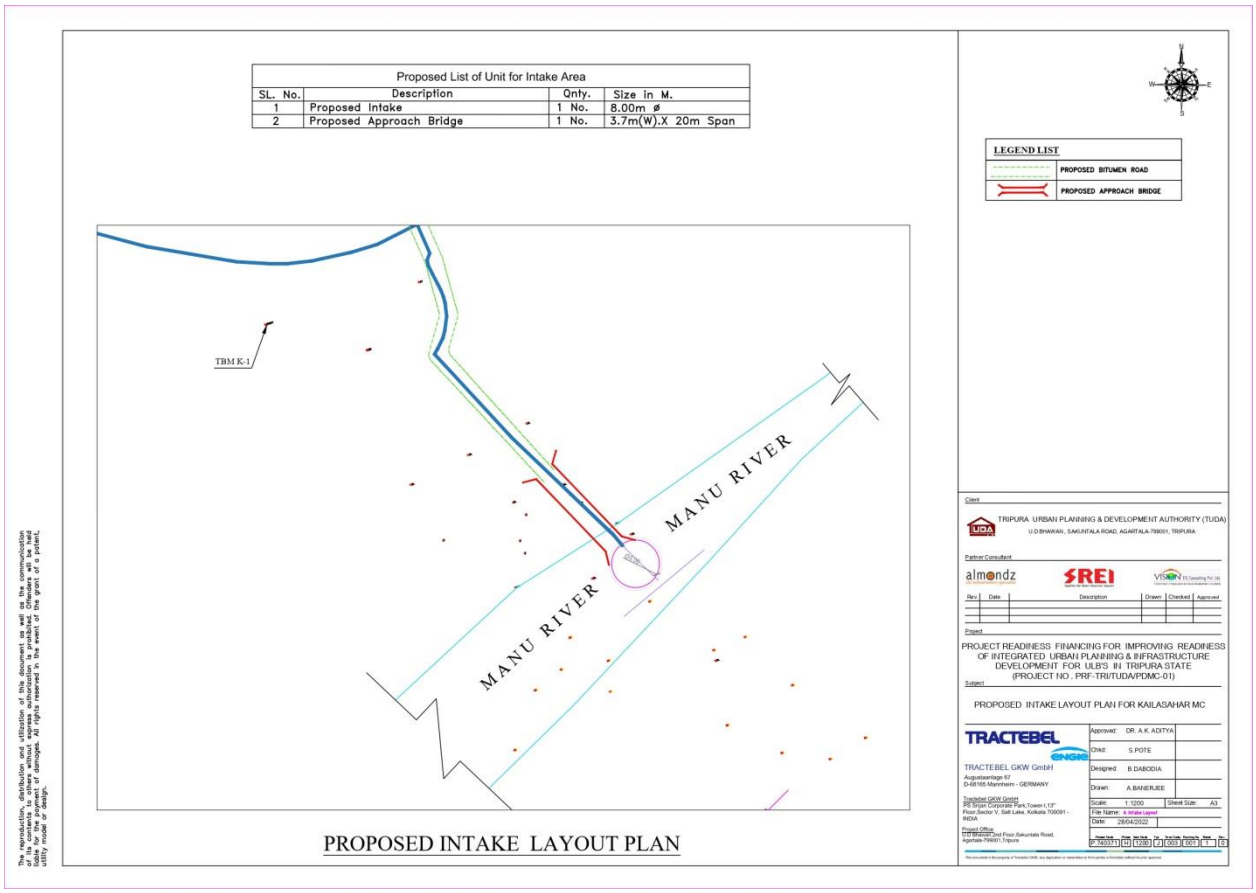
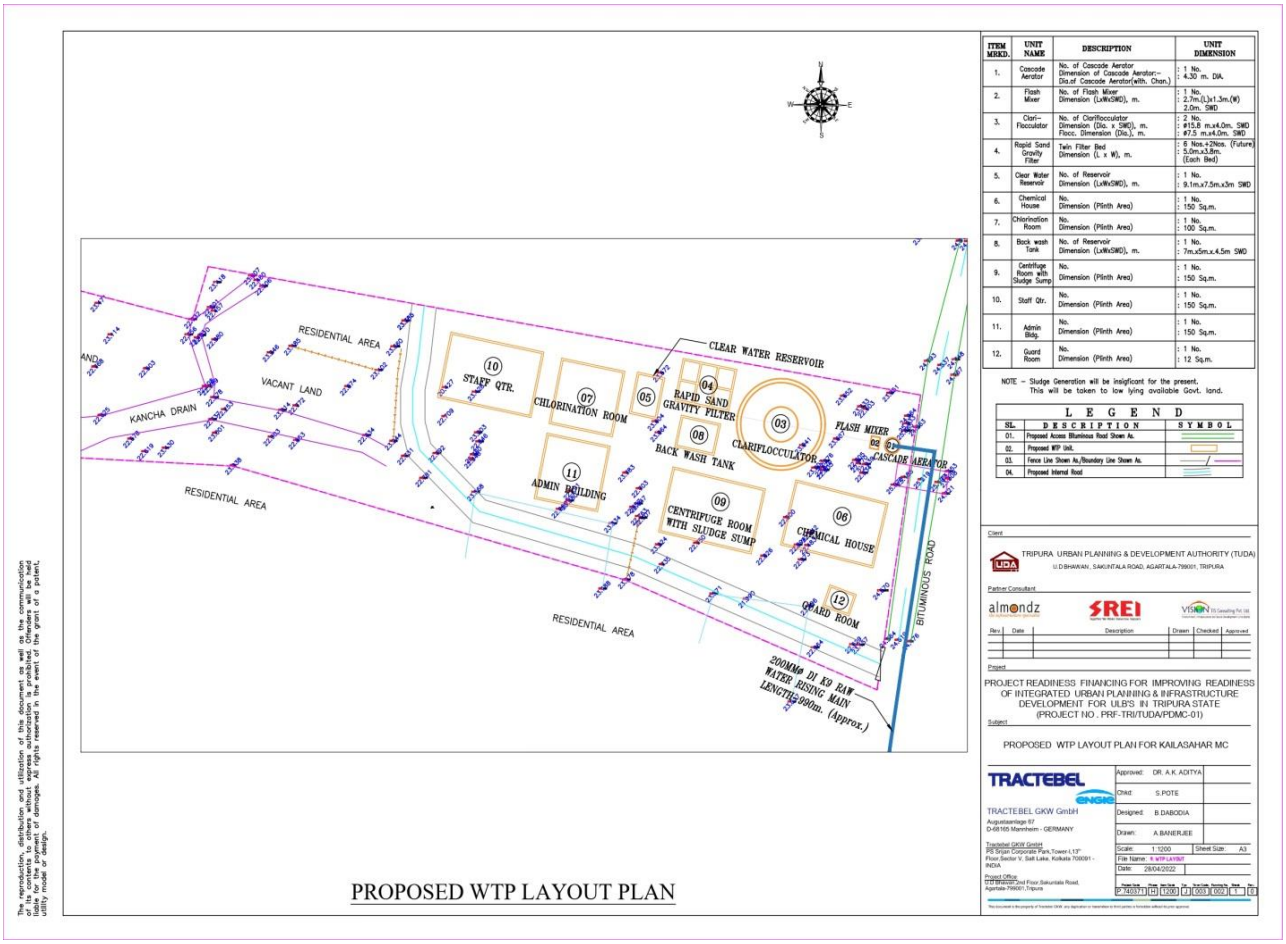


Figure 15: Layout Map of Water Treatment Plant at Kailashahar (Detailed design will be done by DBO contractor)



ITEM MRKD.	UNIT NAME	DESCRIPTION	UNIT DIMENSION
1.	Cascade Aerator	No. of Cascade Aerator Dimension of Cascade Aerator:– Dia.of Cascade Aerator(with. Chan.)	: 1 No. : 4.30 m. DIA.
2.	Flash Mixer	No. of Flash Mixer Dimension (LxWxSWD), m.	: 1 No. : 2.7m.(L)x1.3m.(W) 2.0m. SWD
3.	Clari–Flocculator	No. of Clarifloccculator Dimension (Dia. x SWD), m. Flocc. Dimension (Dia.), m.	: 2 No. : ⌀15.8 m.x4.0m. SWD : ⌀7.5 m.x4.0m. SWD
4.	Rapid Sand Gravity Filter	Twin Filter Bed Dimension (L x W), m.	: 6 Nos.+2Nos. (Future) : 5.0m.x3.8m. (Each Bed)
5.	Clear Water Reservoir	No. of Reservoir Dimension (LxWxSWD), m.	: 1 No. : 9.1m.x7.5m.x3m SWD
6.	Chemical House	No. Dimension (Plinth Area)	: 1 No. : 150 Sq.m.
7.	Chlorination Room	No. Dimension (Plinth Area)	: 1 No. : 100 Sq.m.
8.	Back wash Tank	No. of Reservoir Dimension (LxWxSWD), m.	: 1 No. : 7m.x5m.x.4.5m SWD
9.	Centrifuge Room with Sludge Sump	No. Dimension (Plinth Area)	: 1 No. : 150 Sq.m.
10.	Staff Qtr.	No. Dimension (Plinth Area)	: 1 No. : 150 Sq.m.
11.	Admin Bldg.	No. Dimension (Plinth Area)	: 1 No. : 150 Sq.m.
12.	Guard Room	No. Dimension (Plinth Area)	: 1 No. : 12 Sq.m.

NOTE – Sludge Generation will be insigficant for the present.
This will be taken to low lying available Govt. land.

L E G E N D

SL.	DESCRIPTION	SYMBOL
01.	Proposed Access Bituminous Road Shown As.	
02.	Proposed WTP Unit.	
03.	Fence Line Shown As./Boundary Line Shown As.	
04.	Proposed Internal Road	

Client
TRIPURA URBAN PLANNING & DEVELOPMENT AUTHORITY (TUDA)
U.D BHAWAN, SAKUNTALA ROAD, AGARTALA-799001, TRIPURA

Partner Consultant
almondz | SREI | VISION

Rev	Date	Description	Drawn	Checked	Approved

Project
PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR ULBS IN TRIPURA STATE
(PROJECT NO . PRF-TRI/TUDA/PDMC-01)

Subject
PROPOSED WTP LAYOUT PLAN FOR KAILASAHAR MC

TRACTEBEL ENGIE
TRACTEBEL GKW GmbH
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D-68165 Mannheim - GERMANY

Tractebel GKW GmbH
PS Srijan Corporate Park,Tower-I,13th
Floor,Sector V, Salt Lake, Kolkata 700091 - INDIA

Project Office
Old Bhawan,2nd Floor,Sakuntala Road, Agartala-799001,Tripura

Approved:	DR. A.K. ADITYA
Chkd:	S.POTE
Designed:	B.DABODIA
Drawn:	A.BANERJEE
Scale:	1:1200
Sheet Size:	A3
File Name:	K WTP LAYOUT
Date:	28/04/2022

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Figure 16: Hydraulic flow diagram of proposed water Treatment plant at Kailashahar MC

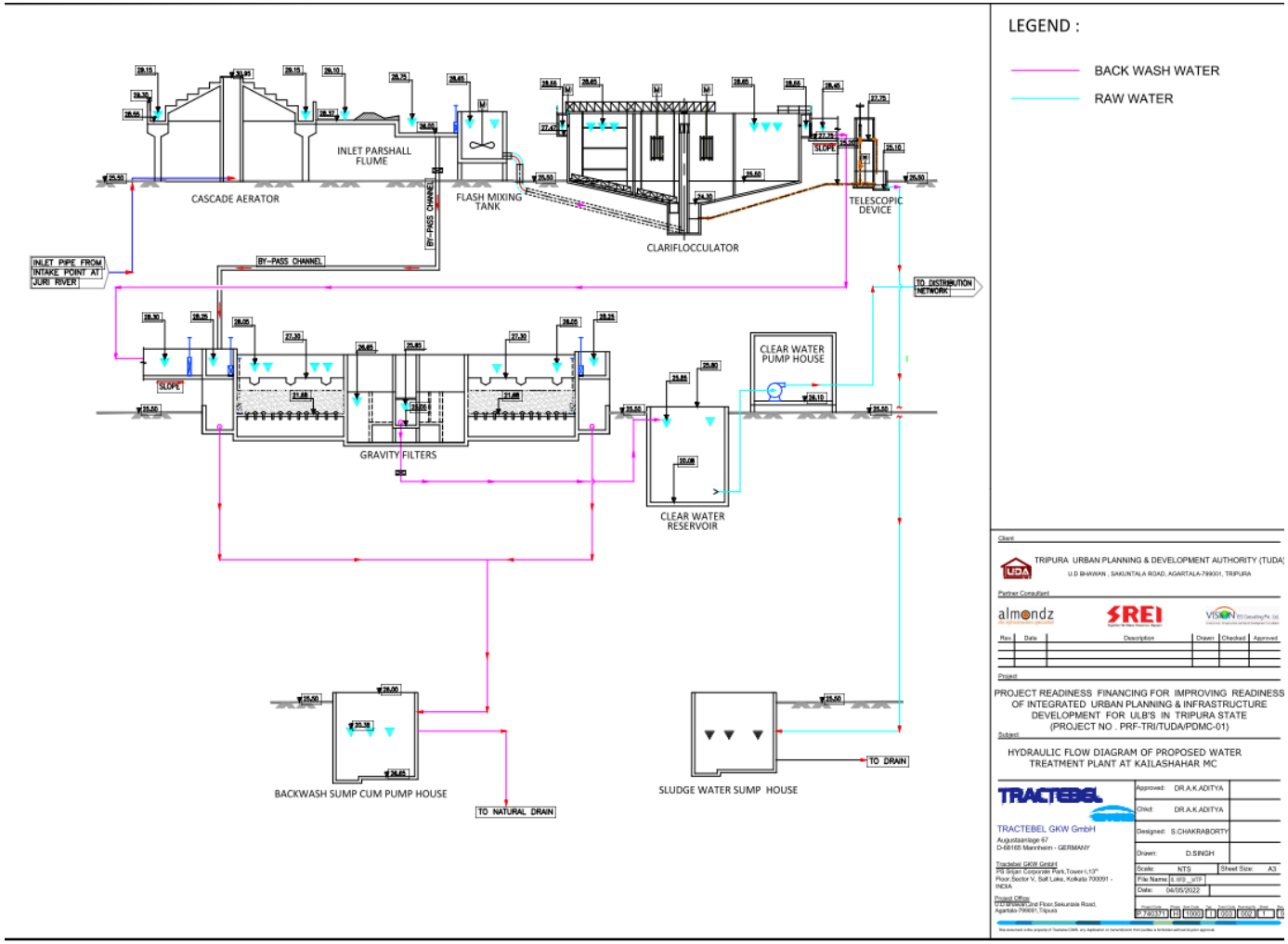


Figure 17: Proposed OHSR Layout plan– At Kalipur, Kailashahar

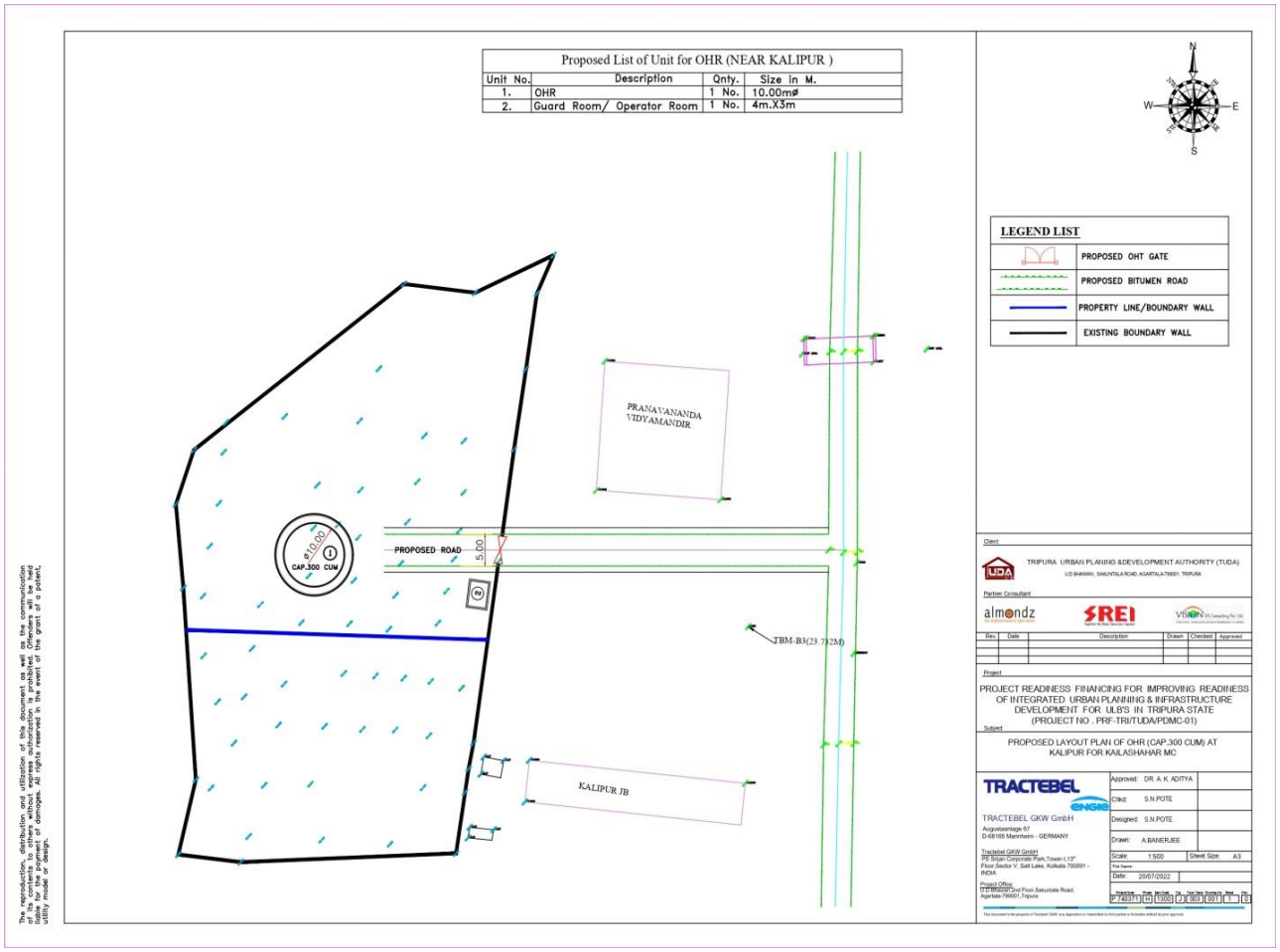
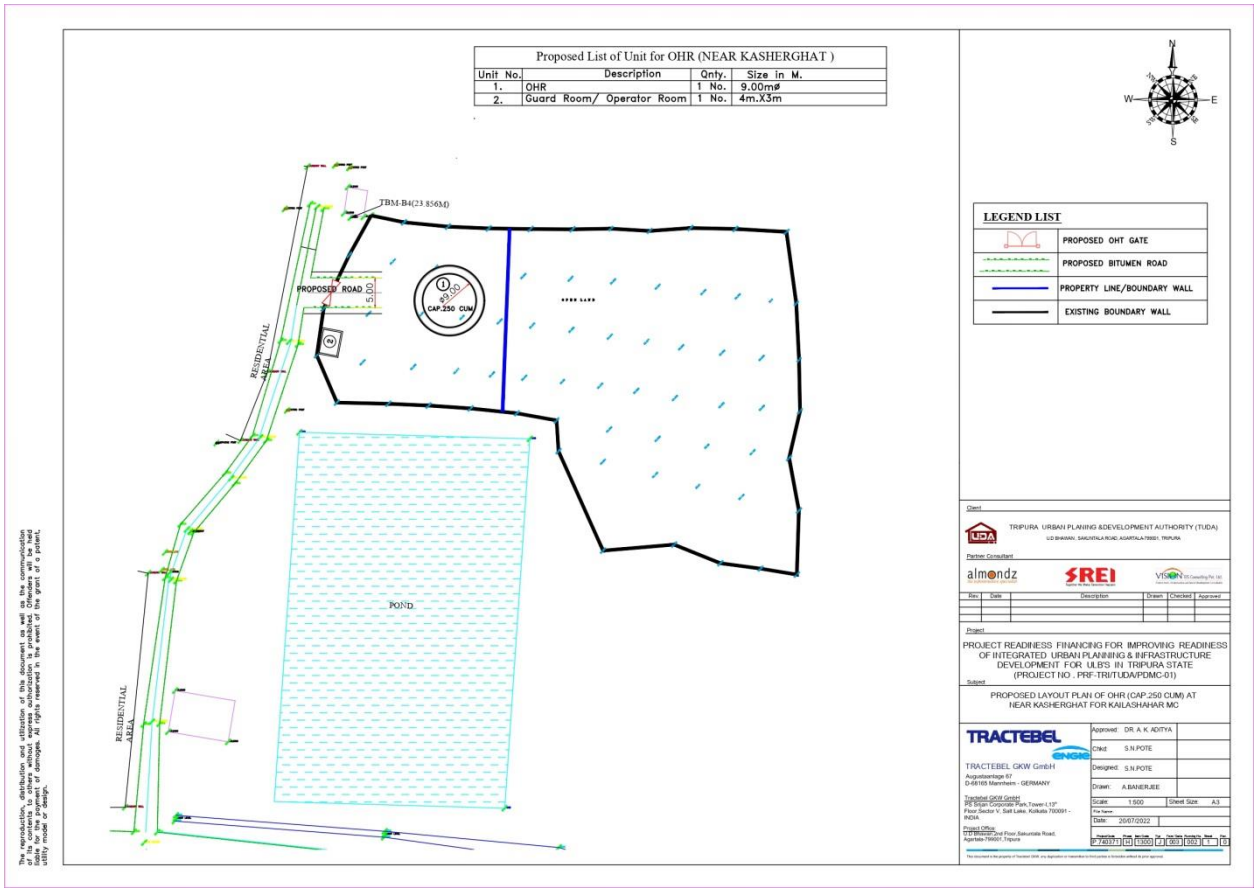


Figure 18: Proposed OHSR Layout plan– at Kasherghat, Kailashahar



Maps Showing existing and proposed components in Kumarghat Town

Figure 19: Existing and proposed water supply components in Kumarghat on google Earth

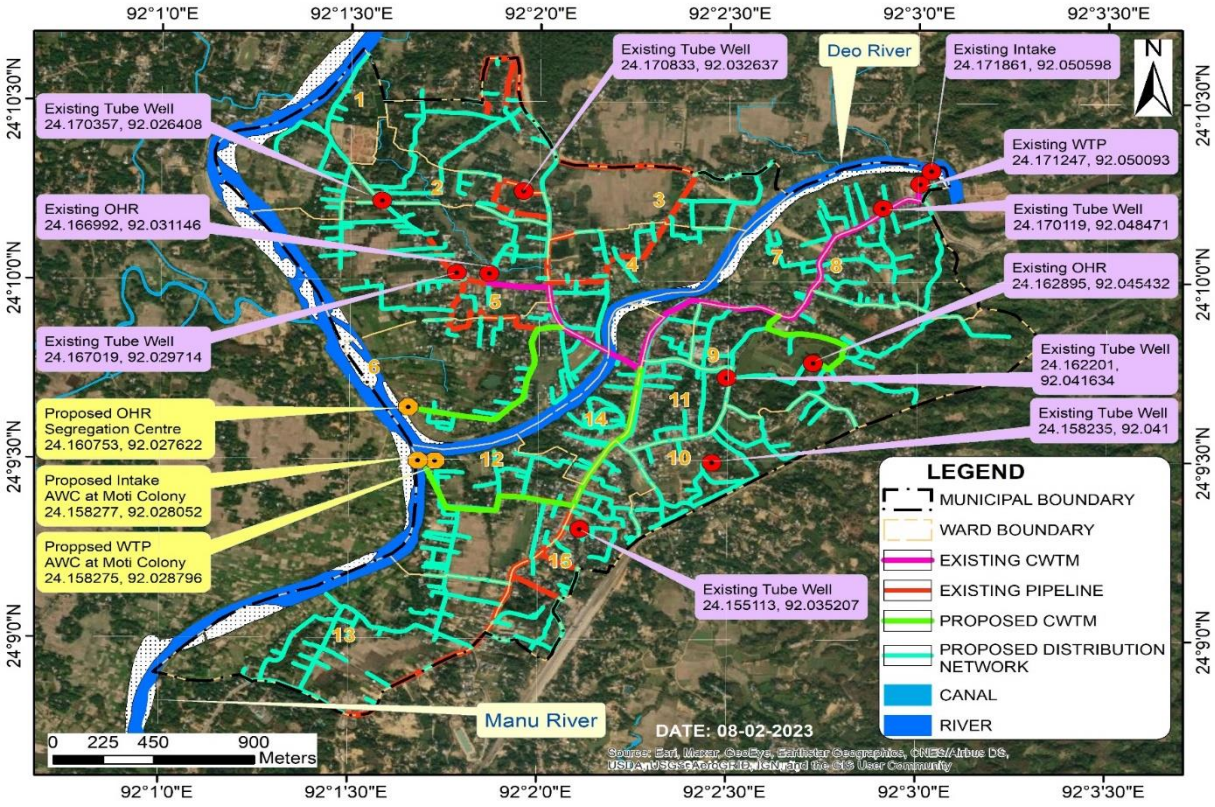


Figure 20: Existing water supply components in Kumarghat on Google Earth

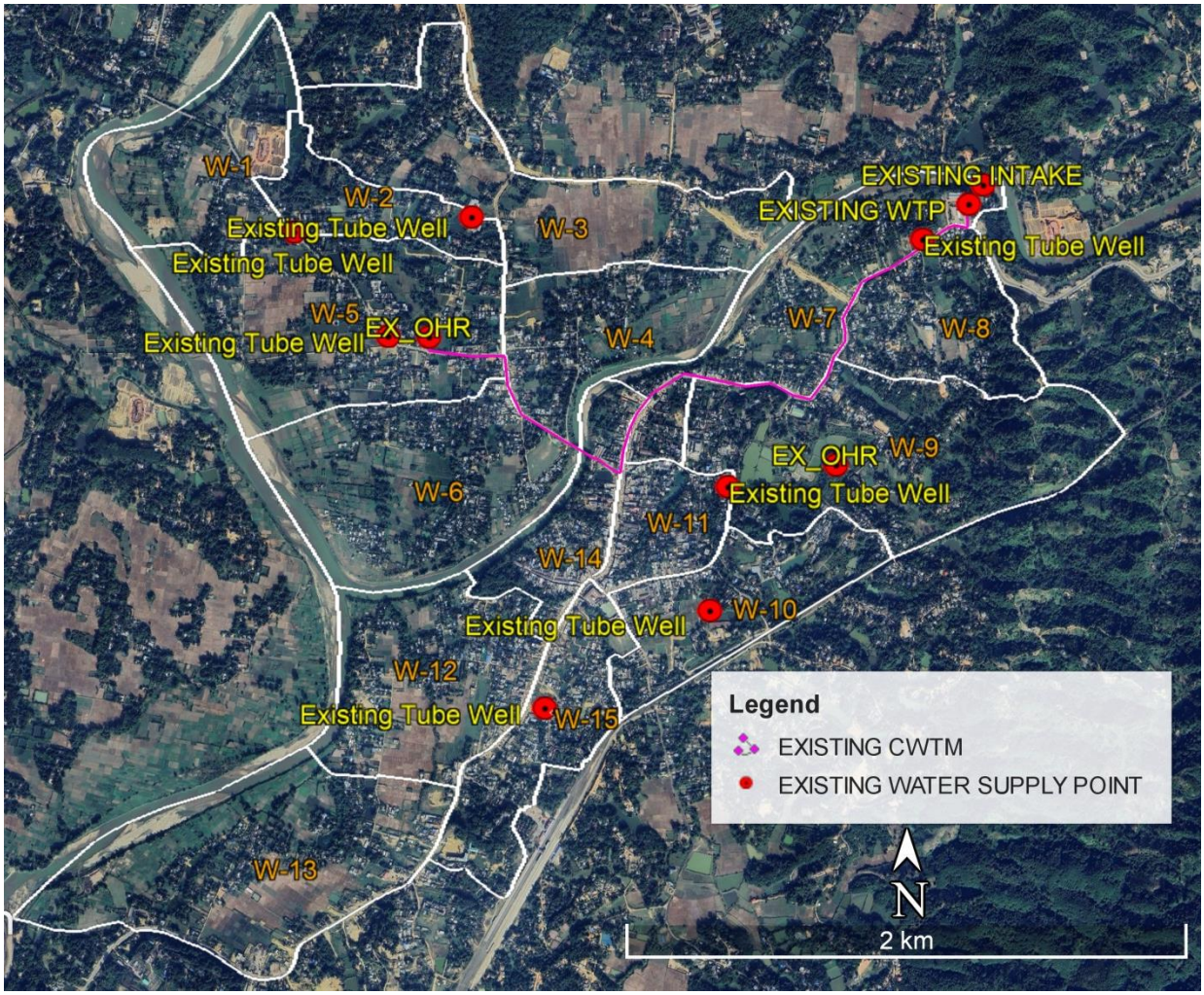


Figure 21: Proposed water supply components in Kumarghat on google earth

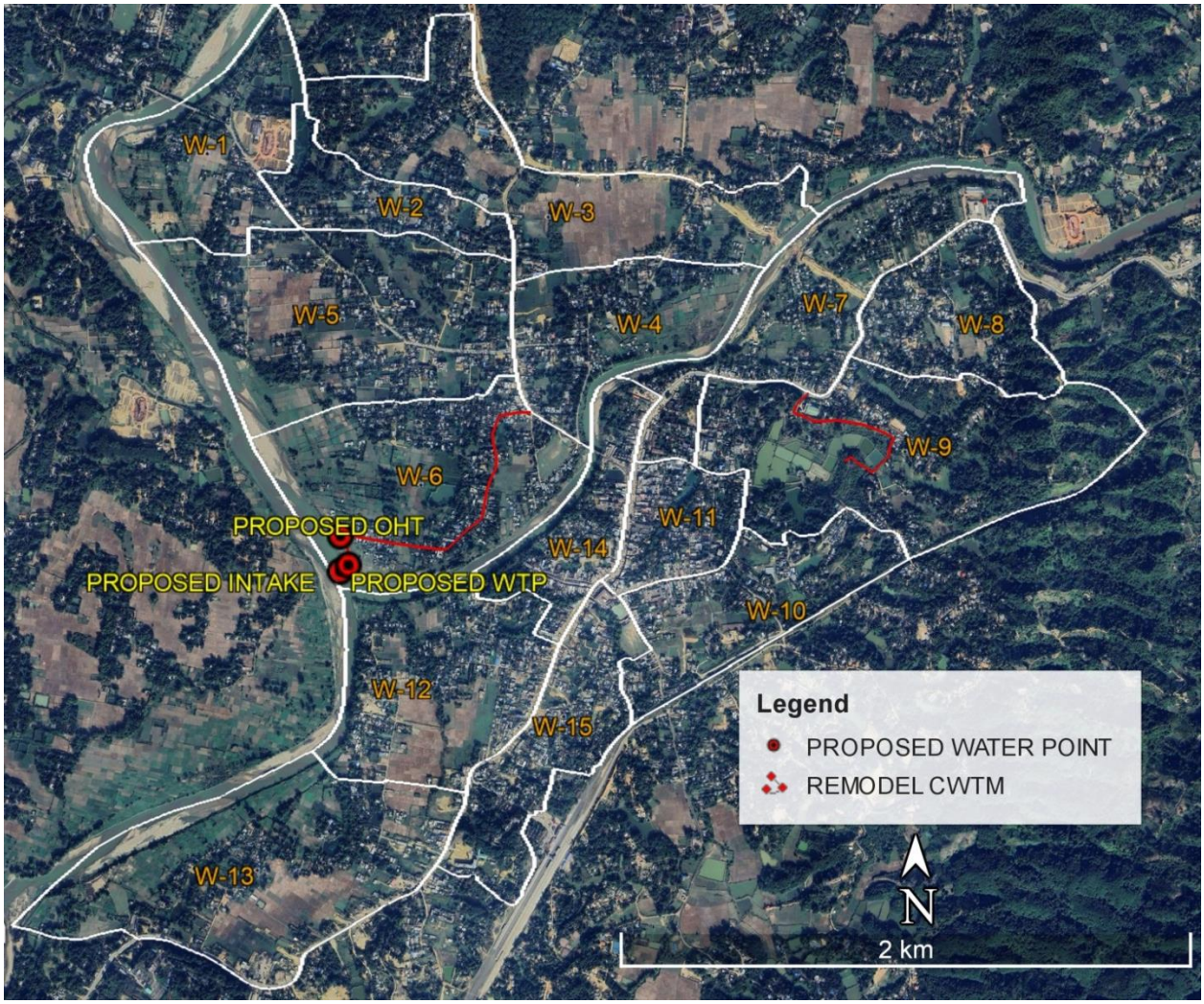


Figure 22: Existing Intake and WTP of Kumarghat on google earth



Figure 23: Proposed Intake, WTP, Clear water Transmission main and OHSR at Kumarghat

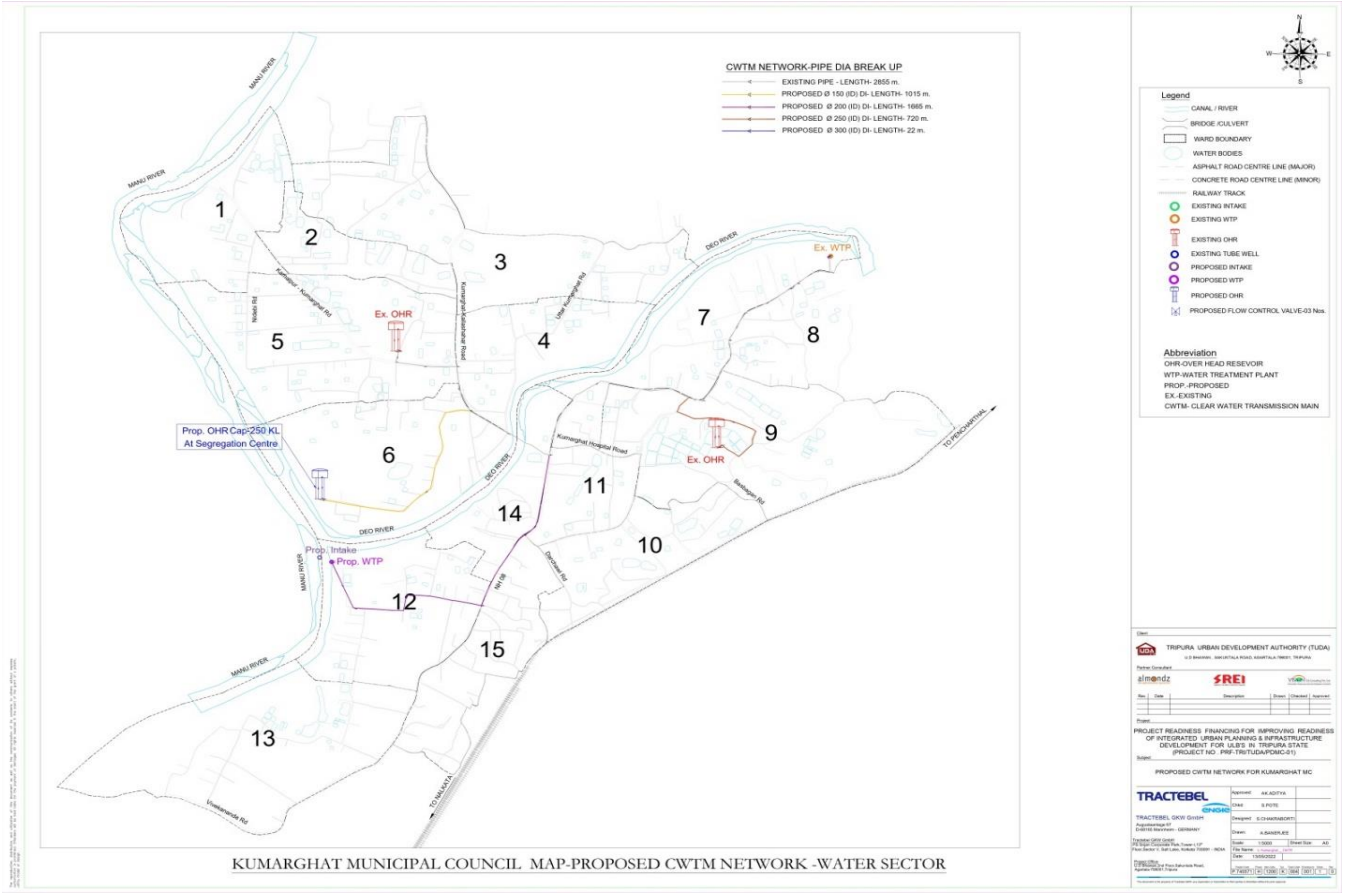


Figure 24: Proposed intake and WTP location with 100m surroundings- Kumarghat



Figure 25*:* Proposed OHSR Location with 100m surroundings, Kumarghat



Figure 26: Proposed DMA area of Kumarghat

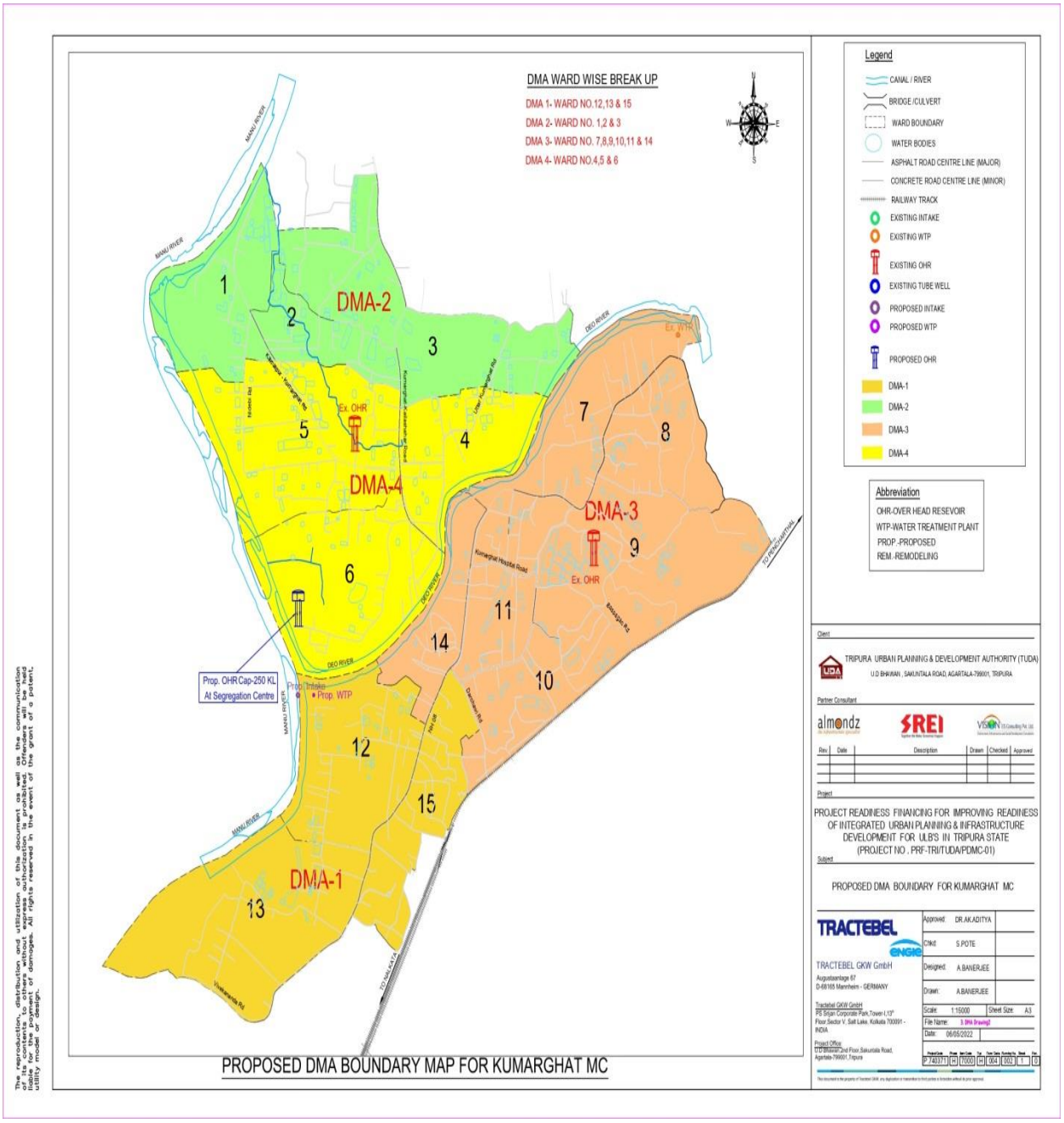


Figure 27: Proposed water supply distribution main for Kumarghat

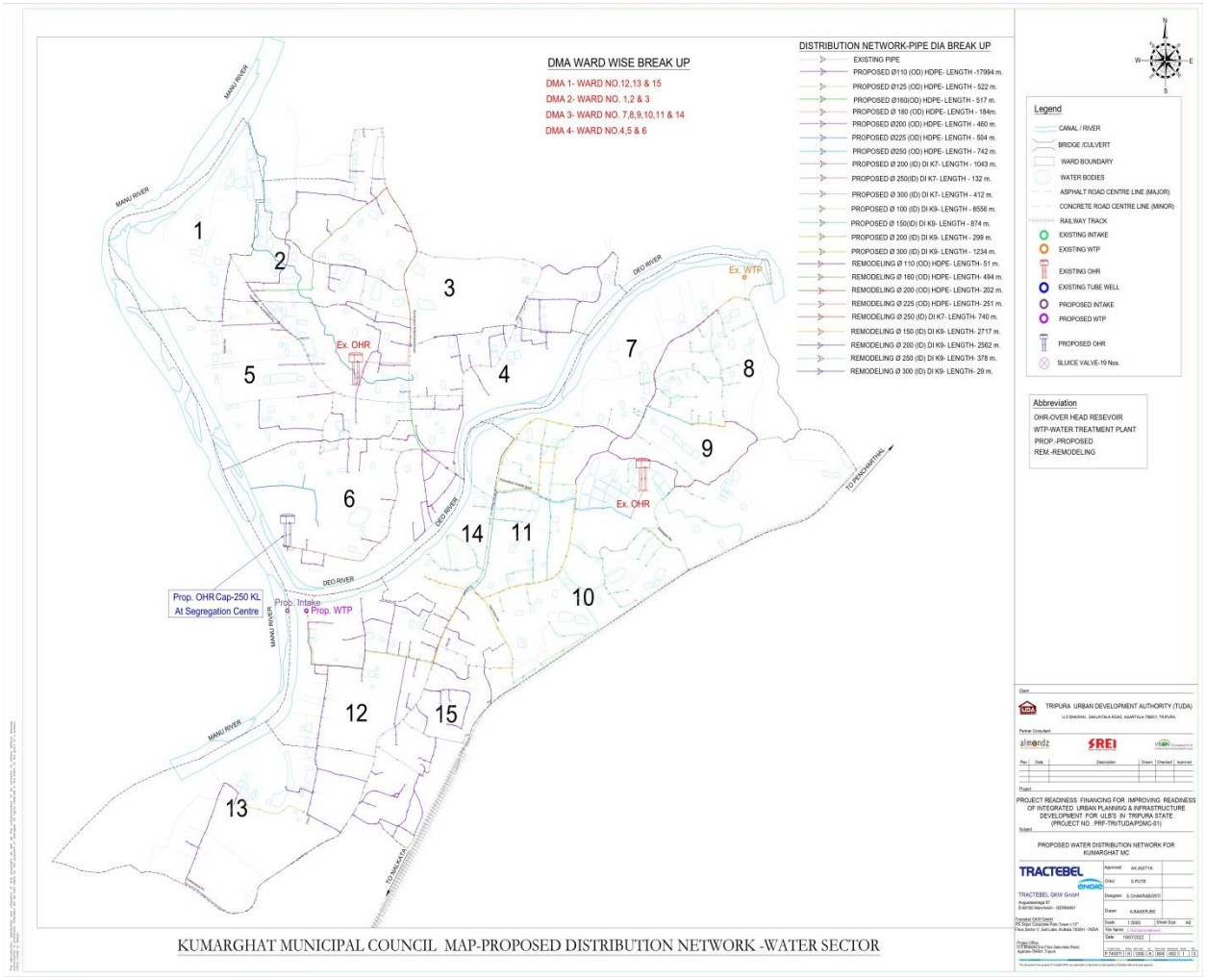
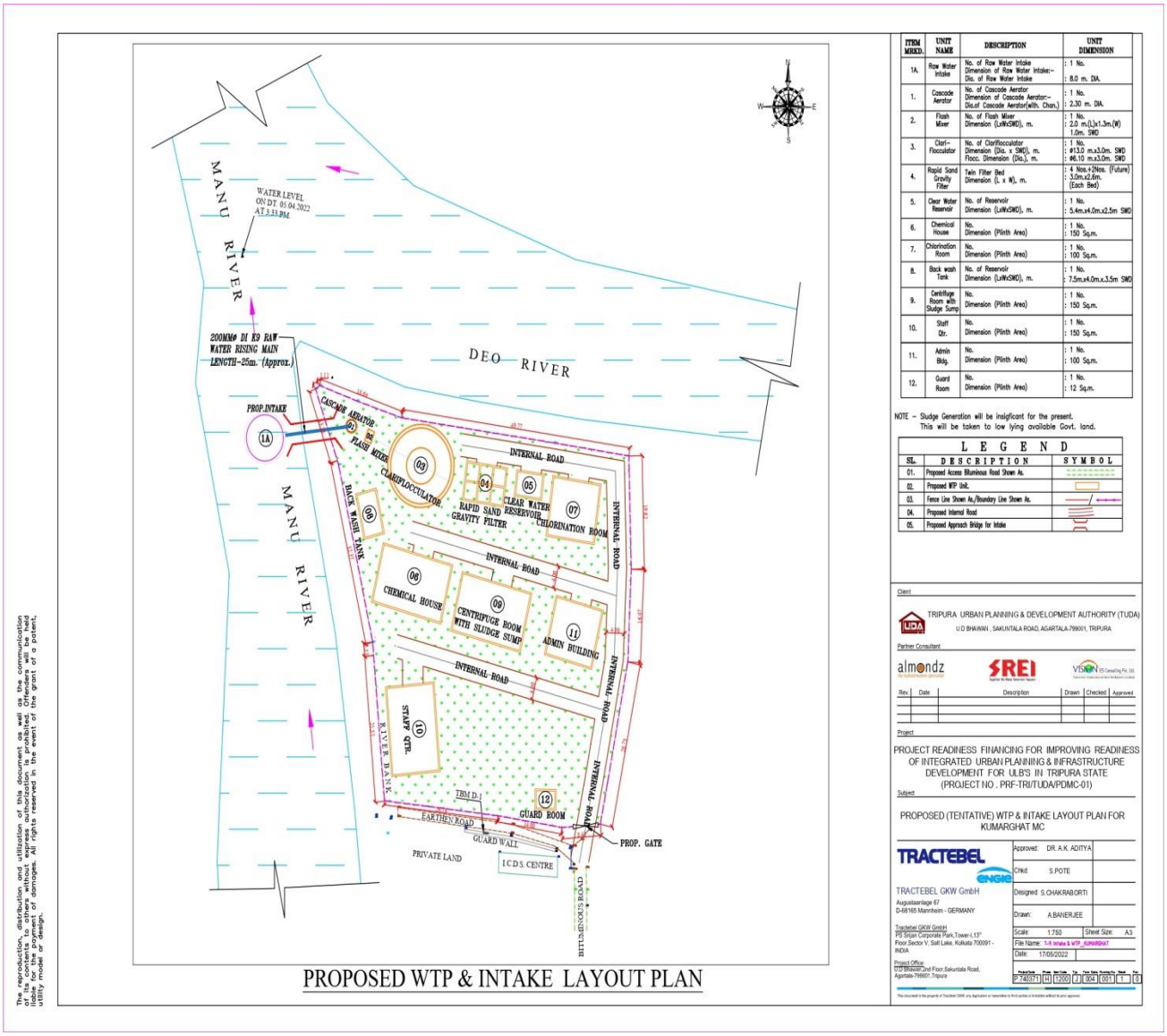


Figure 28: Proposed WTP & Intake Layout Plan for Kumarghat (Detailed design will be done by DBO contractor)



ITEM MRKD.	UNIT NAME	DESCRIPTION	UNIT DIMENSION
1A.	Raw Water Intake	No. of Raw Water Intake Dimension of Raw Water Intake:- Dia. of Raw Water Intake	: 1 No. : 8.0 m. DIA.
1.	Cascade Aerator	No. of Cascade Aerator Dimension of Cascade Aerator:- Dia.of Cascade Aerator(with. Chan.)	: 1 No. : 2.30 m. DIA.
2.	Flash Mixer	No. of Flash Mixer Dimension (LxWxSWD), m.	: 1 No. : 2.0 m.(L)x1.3m.(W) 1.0m. SWD
3.	Clari-Flocculator	No. of Clariflocculator Dimension (Dia. x SWD), m. Flocc. Dimension (Dia.), m.	: 1 No. : Φ13.0 m.x3.0m. SWD : Φ6.10 m.x3.0m. SWD
4.	Rapid Sand Gravity Filter	Twin Filter Bed Dimension (L x W), m.	: 4 Nos.+2Nos. (Future) : 3.0m.x2.6m. (Each Bed)
5.	Clear Water Reservoir	No. of Reservoir Dimension (LxWxSWD), m.	: 1 No. : 5.4m.x4.0m.x2.5m SWD
6.	Chemical House	No. Dimension (Plinth Area)	: 1 No. : 150 Sq.m.
7.	Chlorination Room	No. Dimension (Plinth Area)	: 1 No. : 100 Sq.m.
8.	Back wash Tank	No. of Reservoir Dimension (LxWxSWD), m.	: 1 No. : 7.5m.x4.0m.x.3.5m SWD
9.	Centrifuge Room with Sludge Sump	No. Dimension (Plinth Area)	: 1 No. : 150 Sq.m.
10.	Staff Qtr.	No. Dimension (Plinth Area)	: 1 No. : 150 Sq.m.
11.	Admin Bldg.	No. Dimension (Plinth Area)	: 1 No. : 100 Sq.m.
12.	Guard Room	No. Dimension (Plinth Area)	: 1 No. : 12 Sq.m.

NOTE – Sludge Generation will be insigficant for the present.
This will be taken to low lying available Govt. land.

L E G E N D		
SL.	DESCRIPTION	SYMBOL
01.	Proposed Access Bituminous Road Shown As.	
02.	Proposed WTP Unit.	
03.	Fence Line Shown As./Boundary Line Shown As.	
04.	Proposed Internal Road	
05.	Proposed Approach Bridge for Intake	

Client
TRIPURA URBAN PLANNING & DEVELOPMENT AUTHORITY (TUDA)
U.D BHAWAN , SAKUNTALA ROAD, AGARTALA-799001, TRIPURA

Partner Consultant
almondz | SREI | VISION

Rev.	Date	Description	Drawn	Checked	Approved

Project
PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR ULB'S IN TRIPURA STATE (PROJECT NO. PRF-TRI/TUDA/PDMC-01)

Subject
PROPOSED (TENTATIVE) WTP & INTAKE LAYOUT PLAN FOR KUMARGHAT MC

TRACTEBEL ENGIE
TRACTEBEL GKW GmbH
Augustaanlage 67
D-68165 Mannheim - GERMANY

Tractebel GKW GmbH
PS Srijan Corporate Park,Tower-I,13th Floor,Sector V, Salt Lake, Kolkata 700091 - INDIA

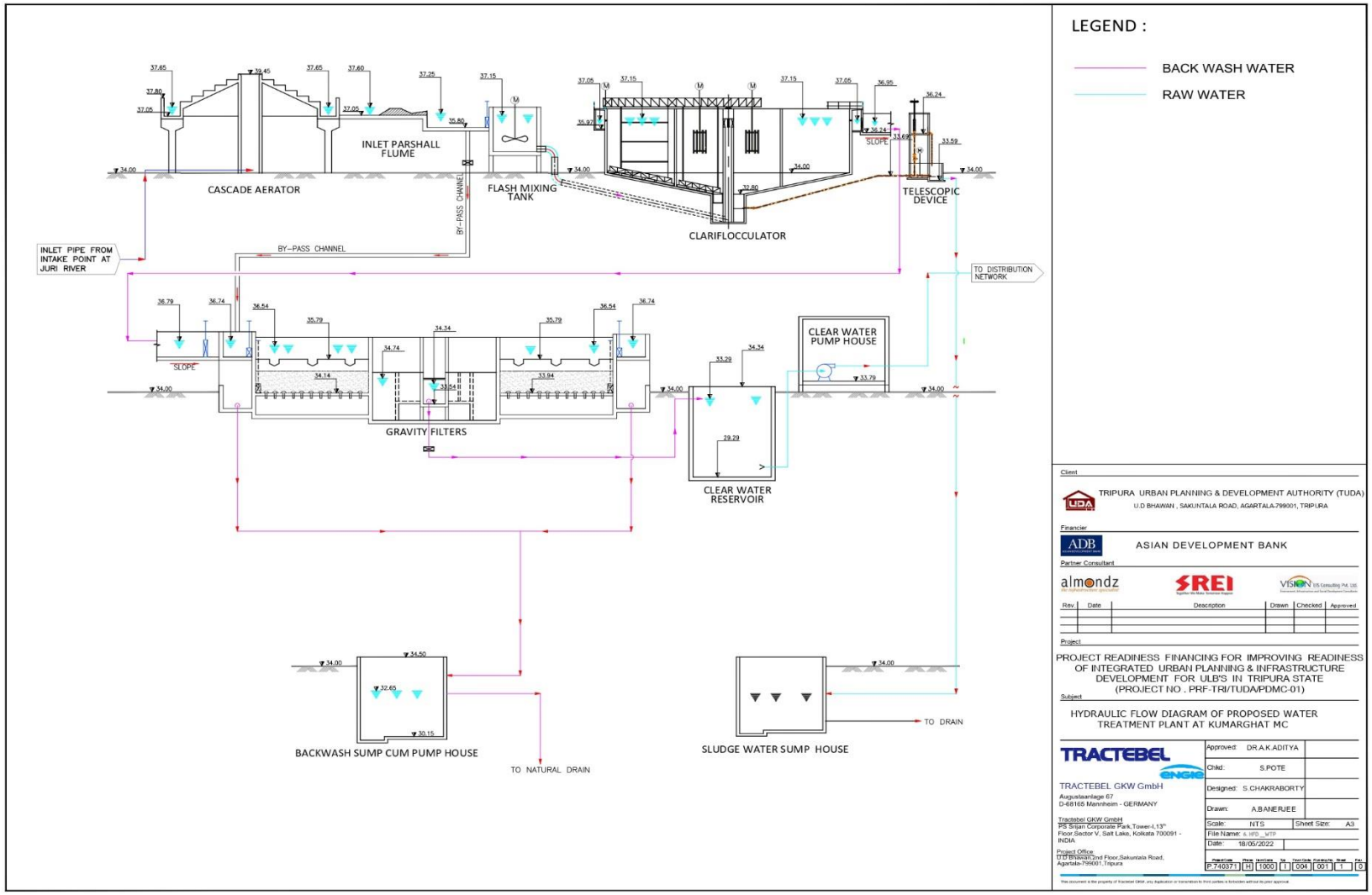
Project Office:
3rd Floor,2nd Floor,Sakuntala Road, Agartala-799001,Tripura

Approved:	DR. A.K. ADITYA
Chkd:	S.POTE
Designed:	S.CHAKRABORTI
Drawn:	A.BANERJEE
Scale:	1:750
Sheet Size:	A3
File Name:	1-A Intake & WTP_KUMARGHAT
Date:	17/05/2022

Drawing No.	Sub Code	Sr. No.	Sub Sub Sr. No.	Sub Sub Sub Sr. No.	Rev. No.
P_740371	04	1200	1	004	001	1	0

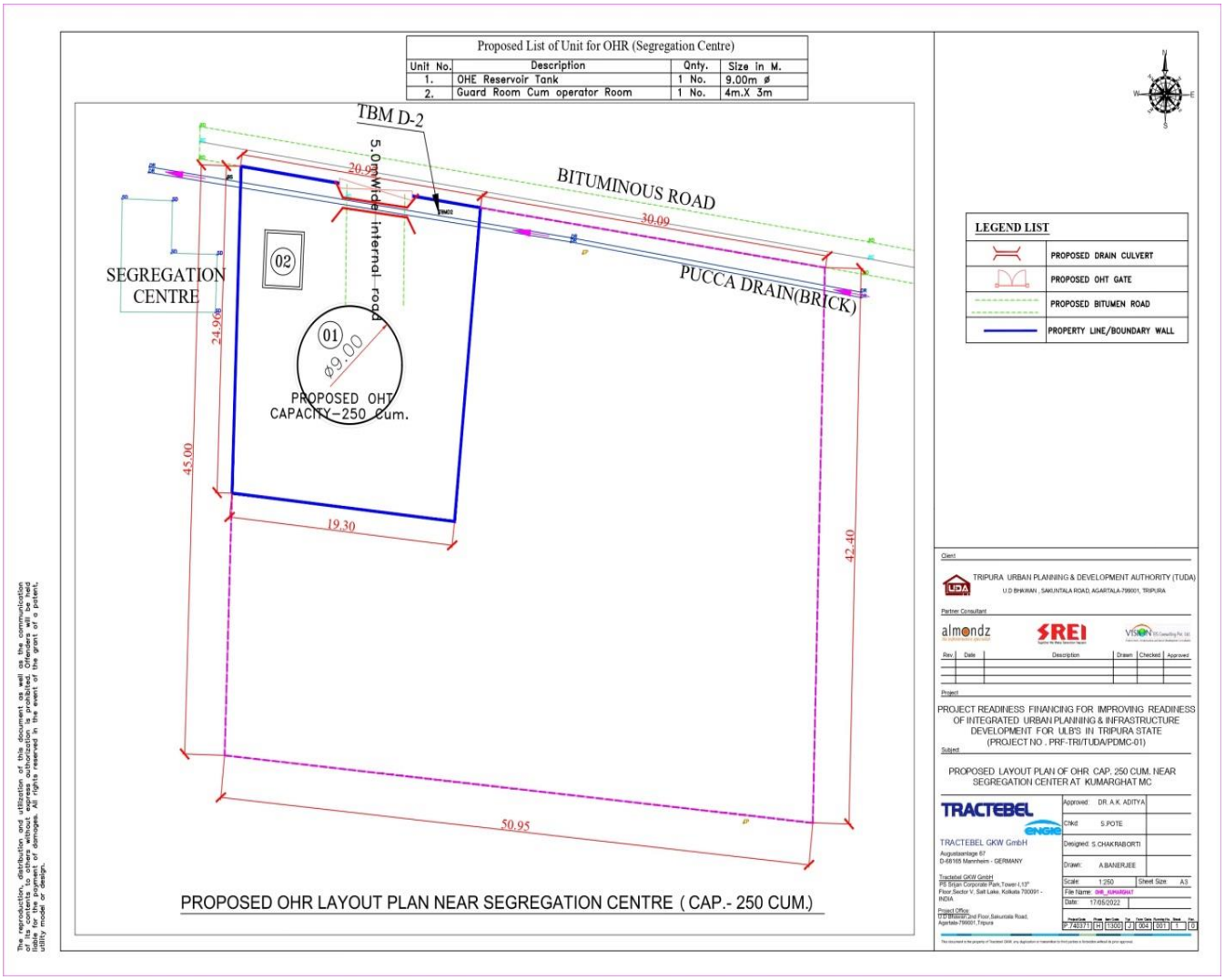
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Figure 29: Hydraulic flow diagram of proposed water Treatment plant at Kumarghat MC



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Figure 30: Proposed OHSR Layout plan– Segregation center at Kumarghat



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Maps Showing existing and proposed components in Dharmanagar Town

Figure 31: Existing and proposed water supply components in Dharmanagar on Google Earth

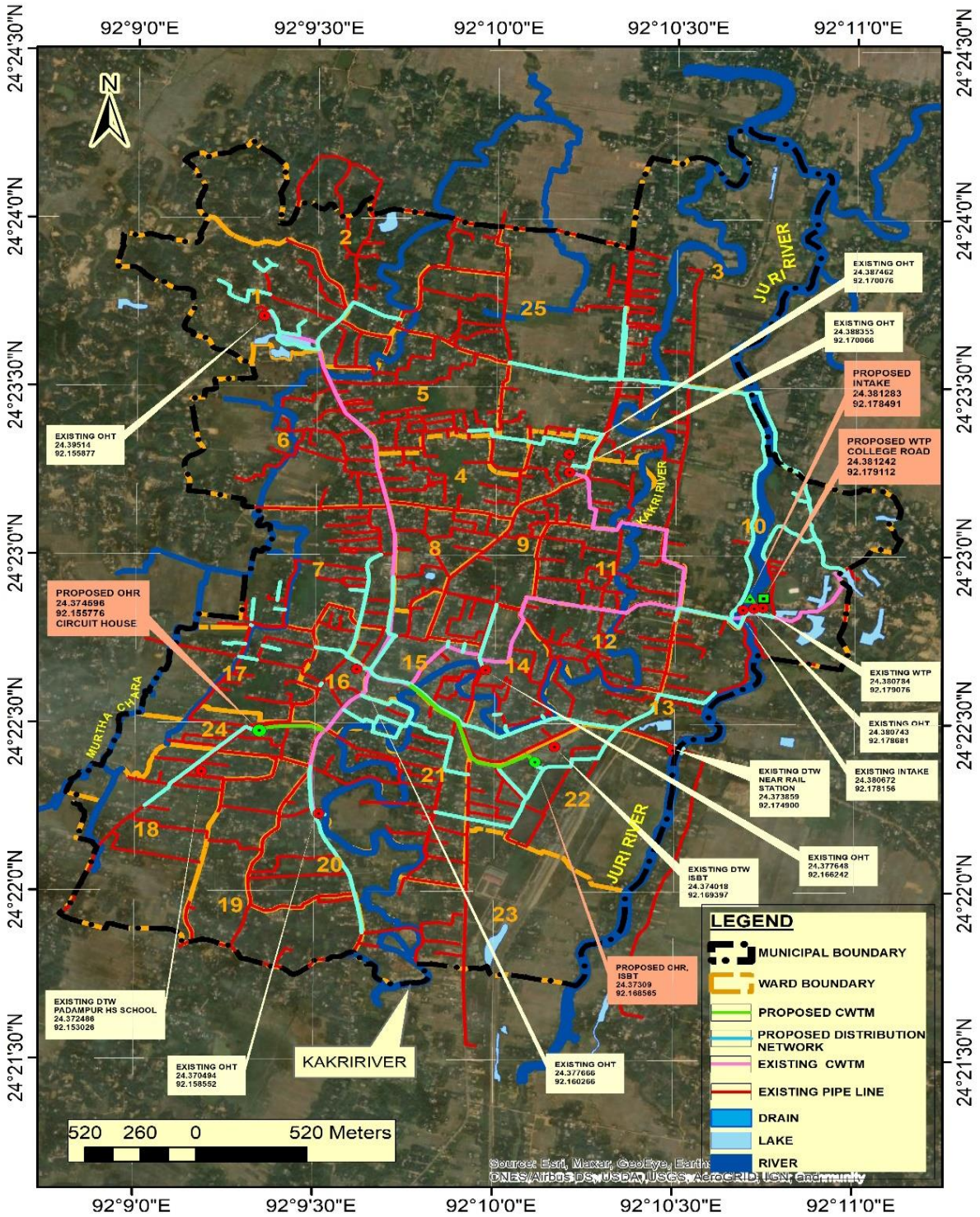


Figure 32: Existing water supply components in Dharmanagar on google earth (Google image date: January 2022)

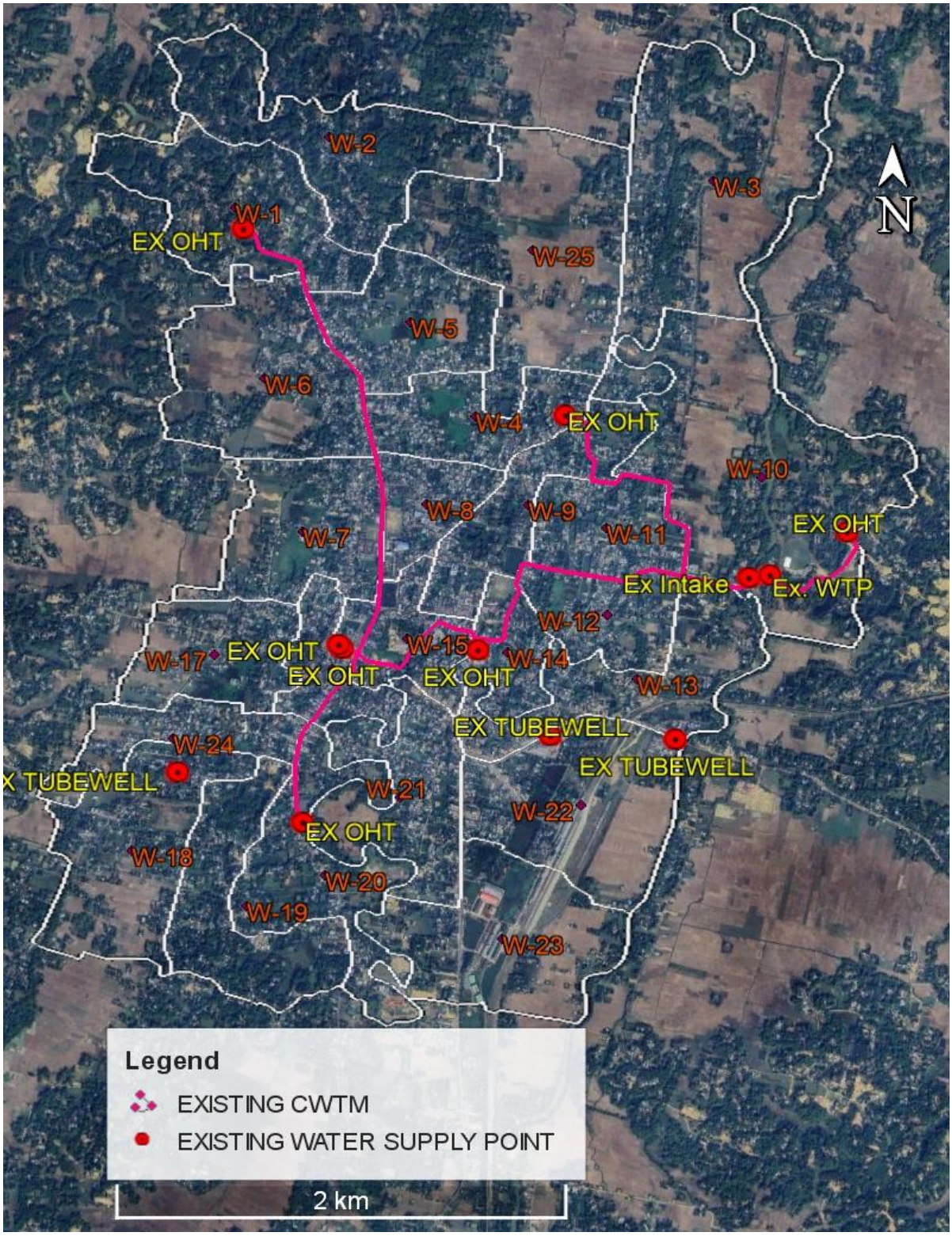


Figure 33: Proposed water supply components in Dharmanagar on google earth

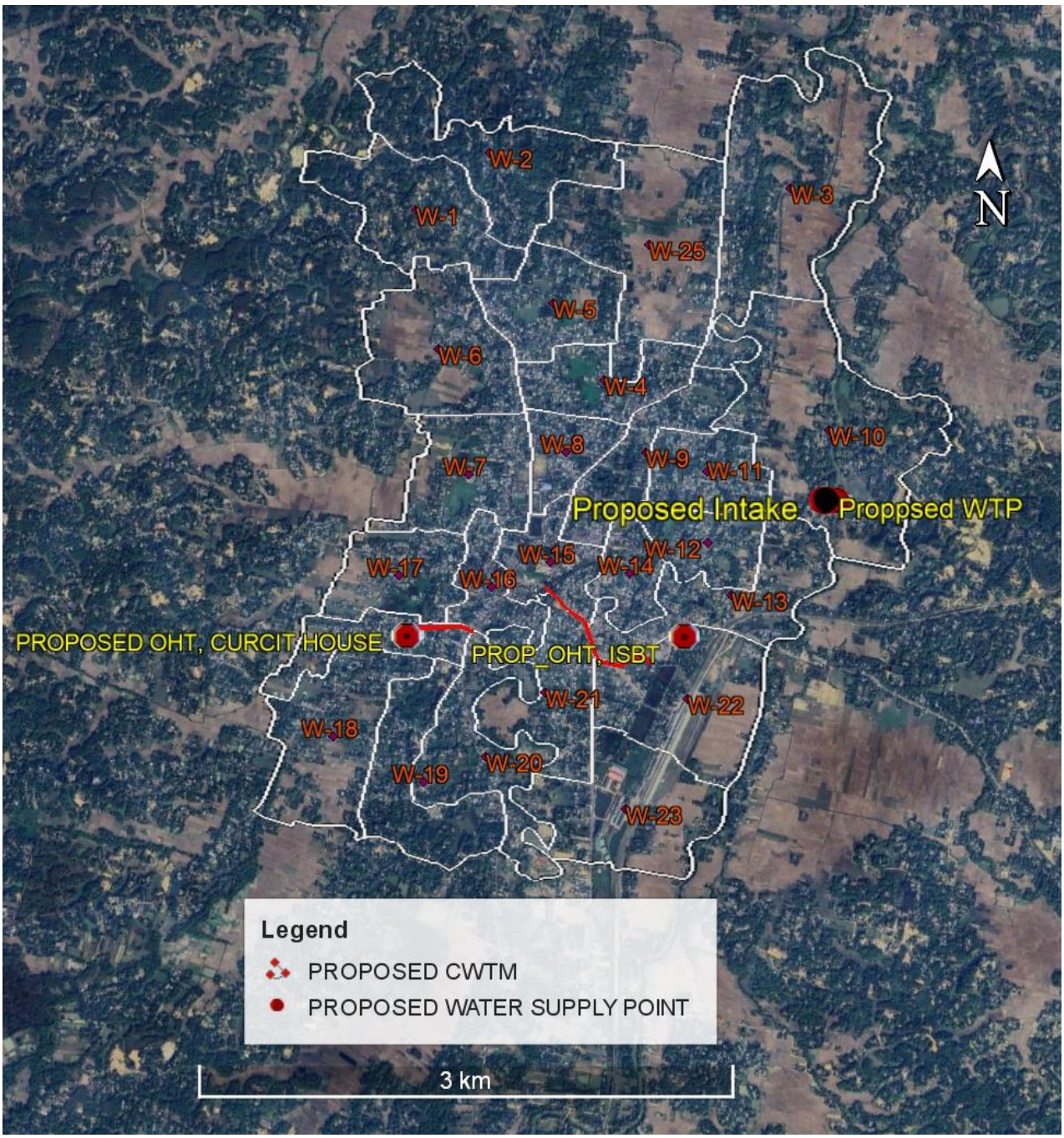


Figure 34: Existing Intake and WTP of Dharamanagar on google earth

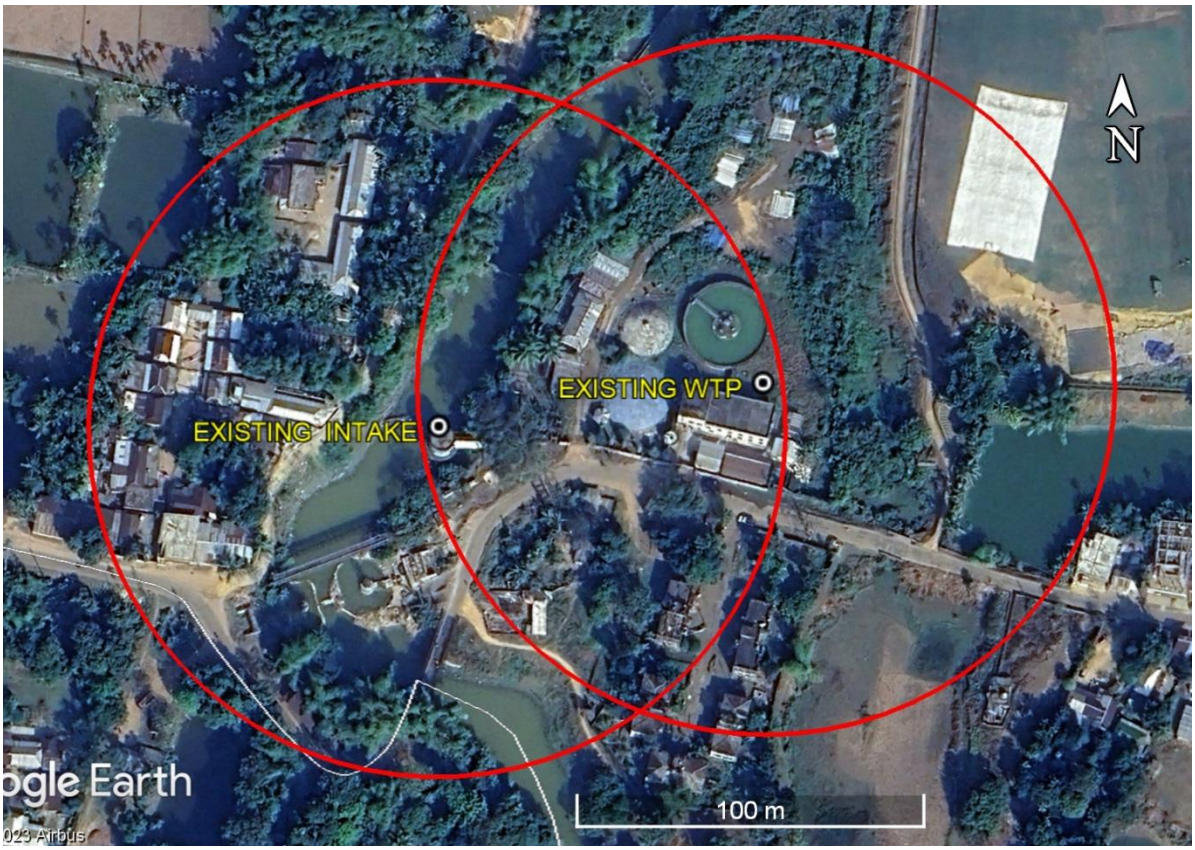


Figure 35: Proposed Intake, WTP, Clear water Transmission main and OHSRs at Dharmanagar

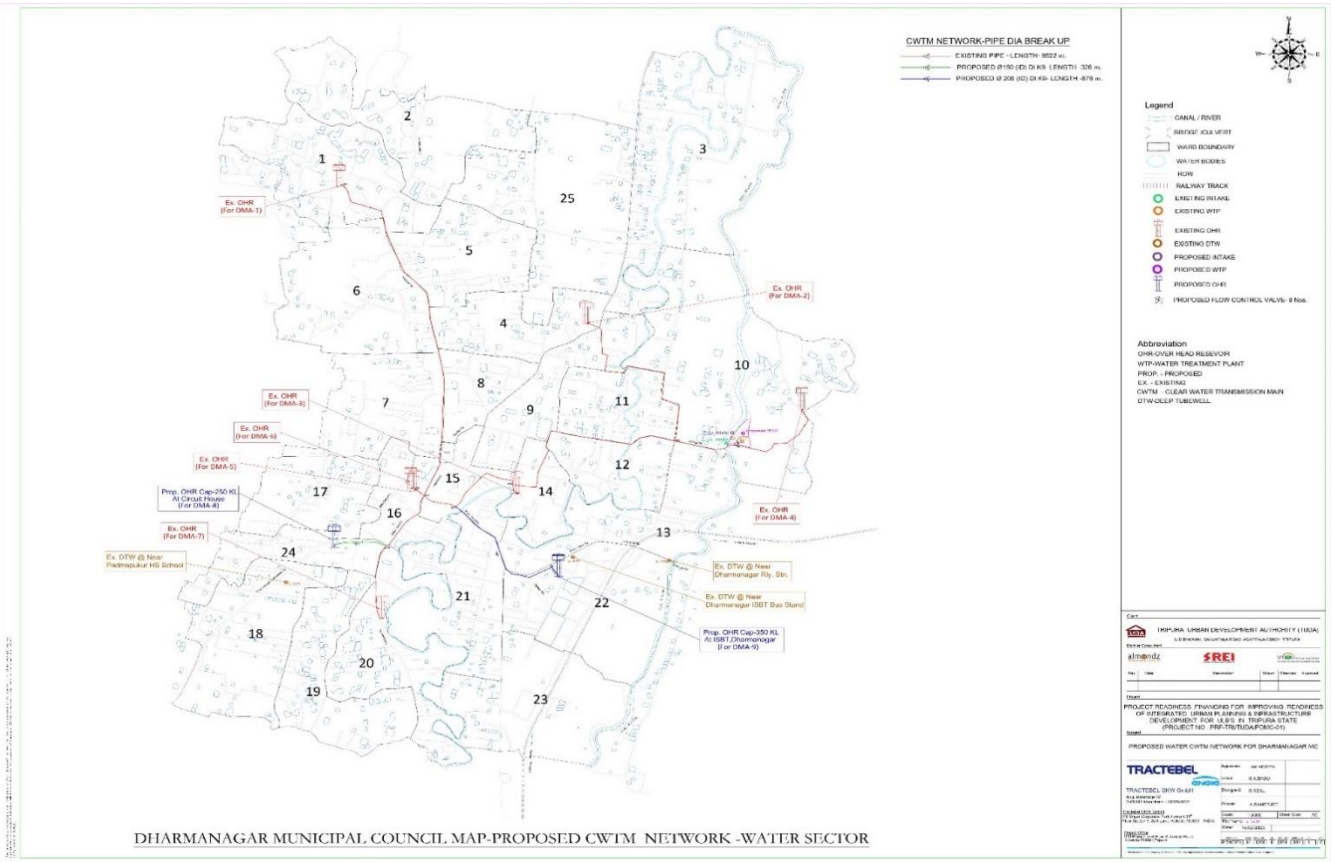


Figure 36: Proposed intake location with 100m surroundings- Dharmanagar

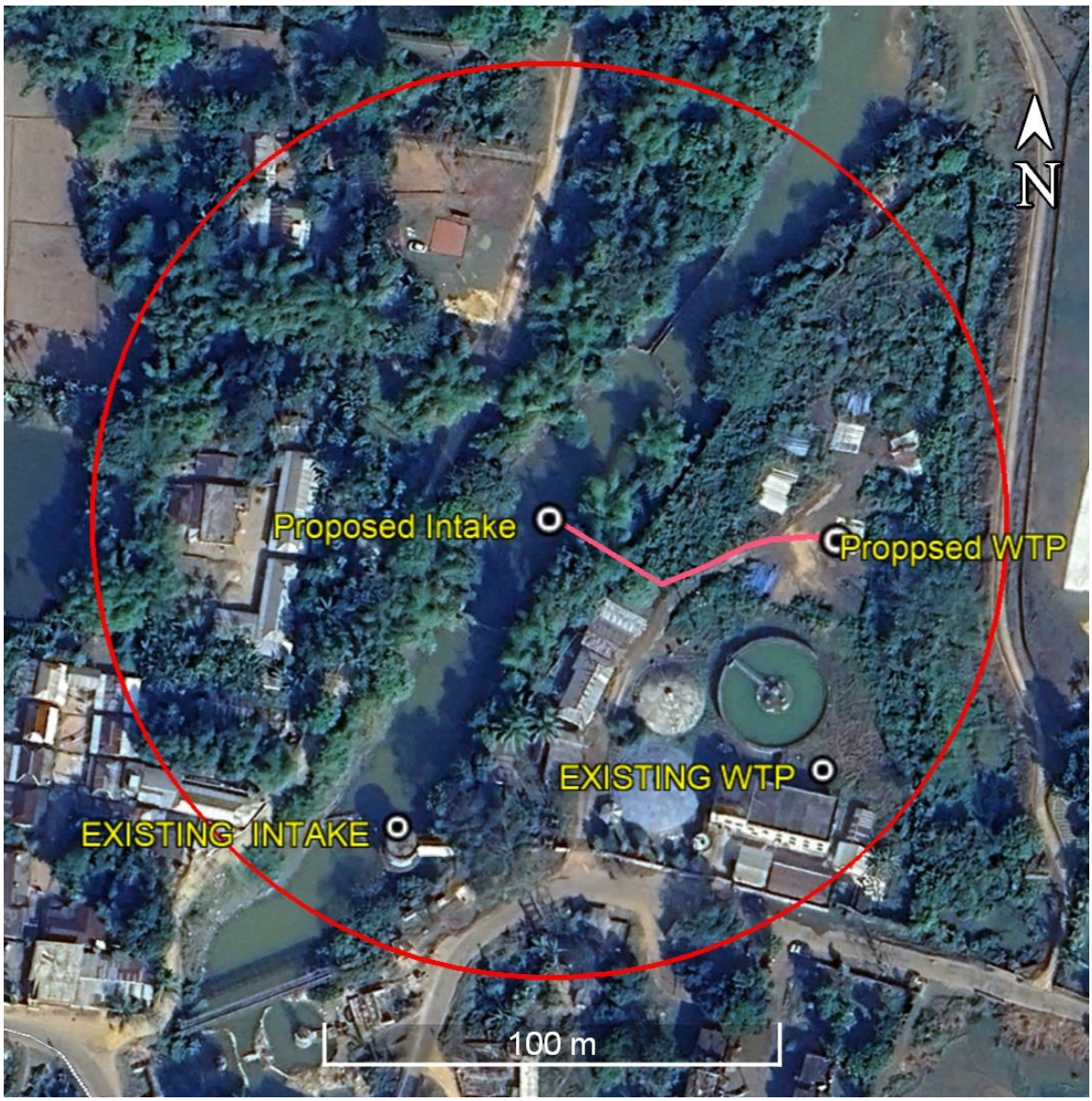


Figure 37: Proposed WTP Location with 100m surroundings- Dharmanagar

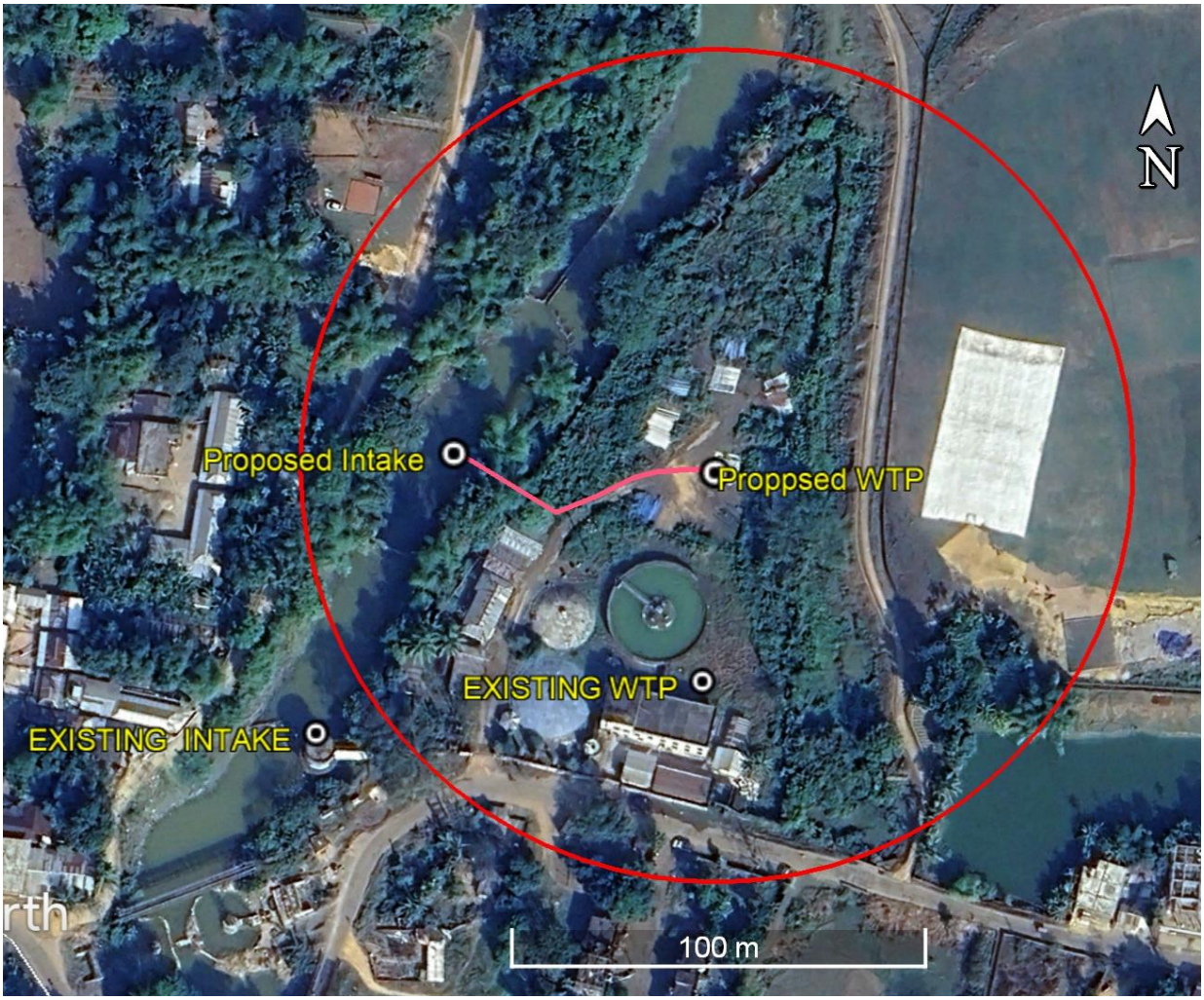
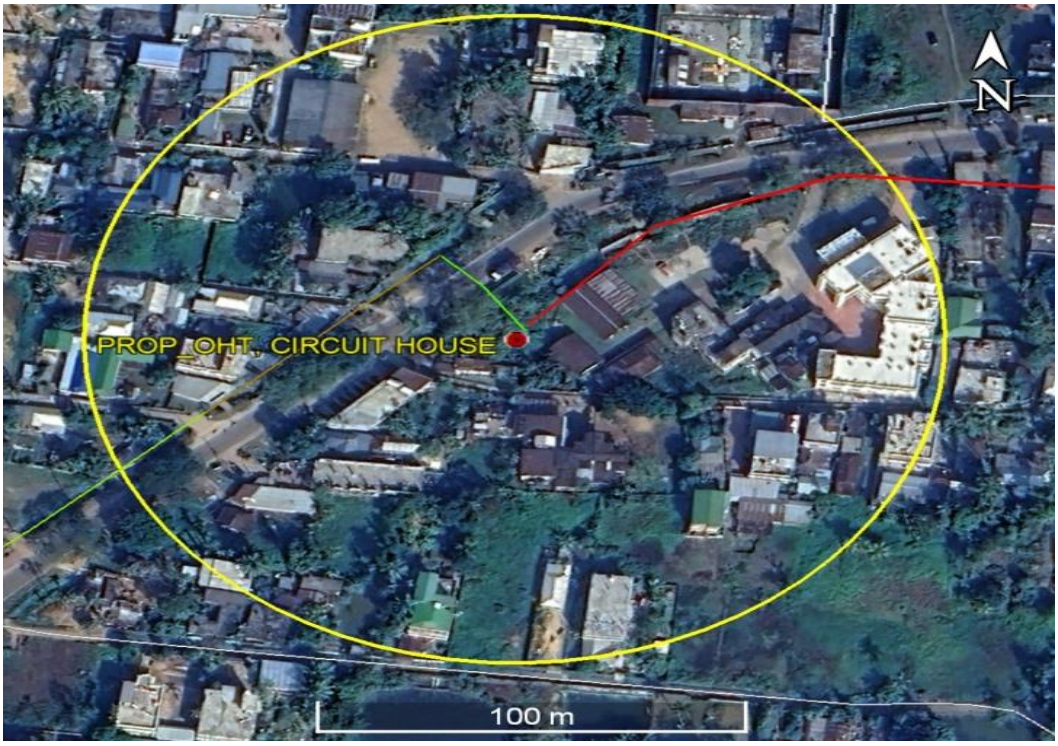


Figure 38: Proposed OHT Location – Dharmanagar



Proposed OHSR– Circuit House



Proposed OHSR– ISBT Bus stand

Figure 39: Alignment map of Intake and WTP Location – Dharmanagar

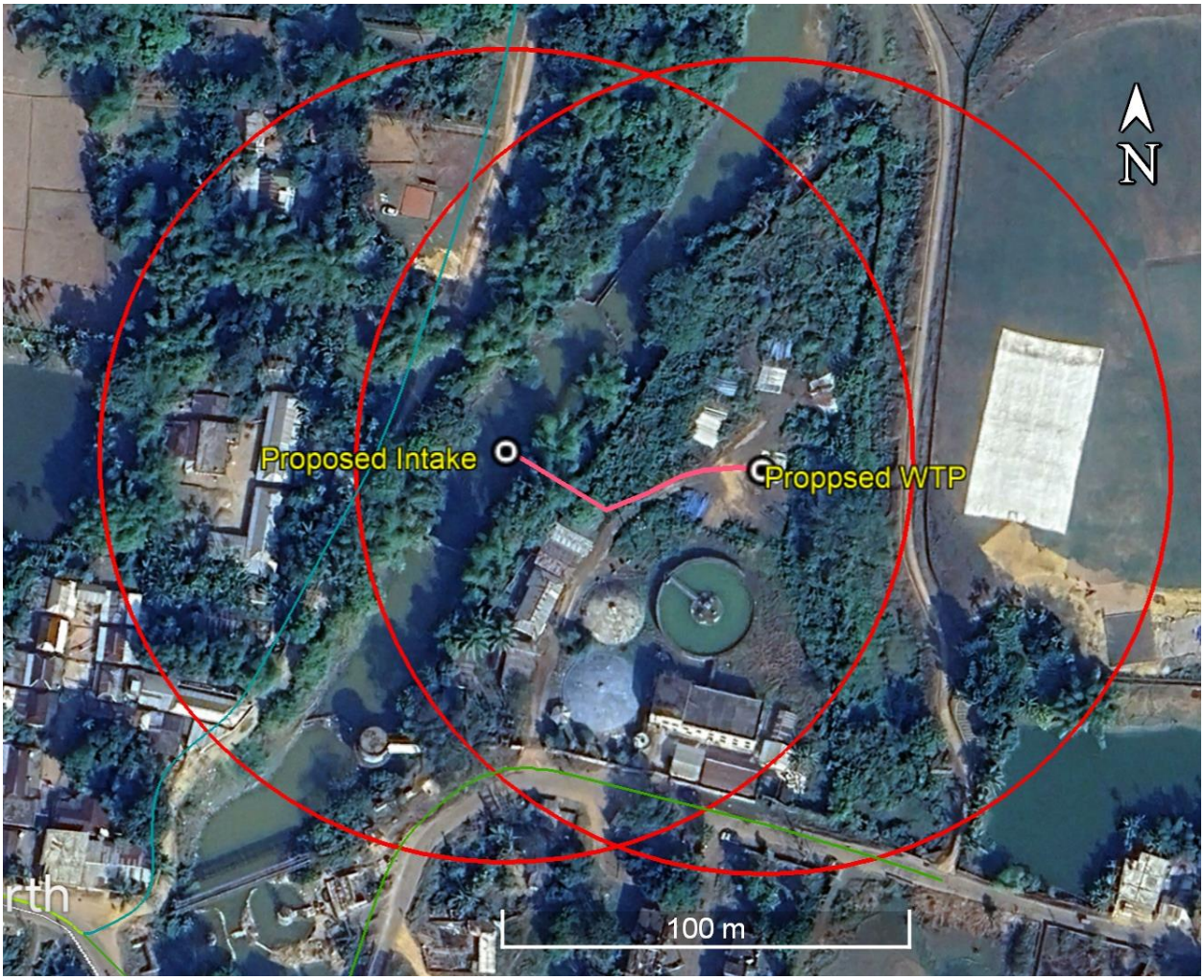


Figure 40: Proposed DMA Boundary Map of Dharmanagar

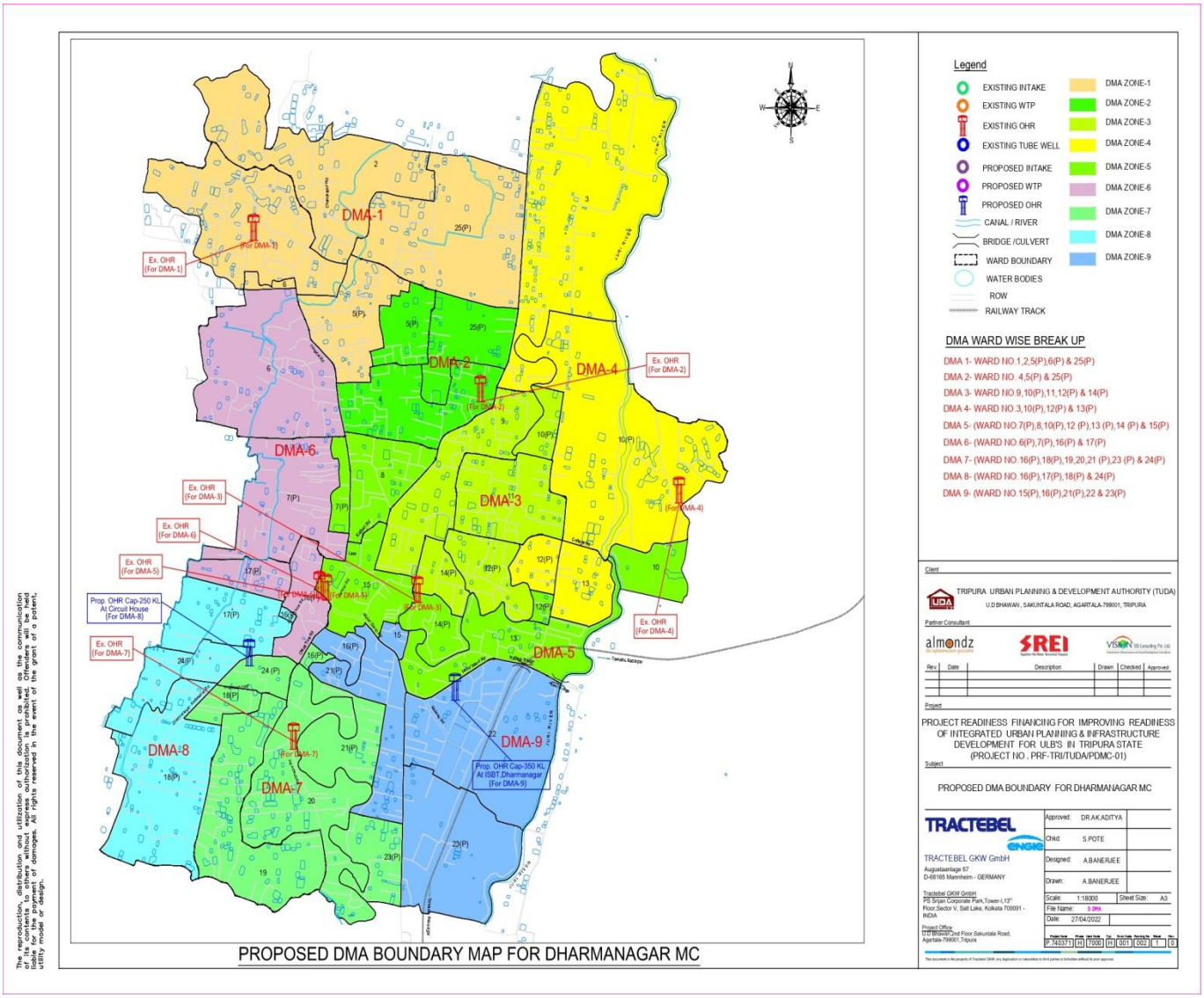


Figure 41: Proposed water supply distribution main for Dharmanagar

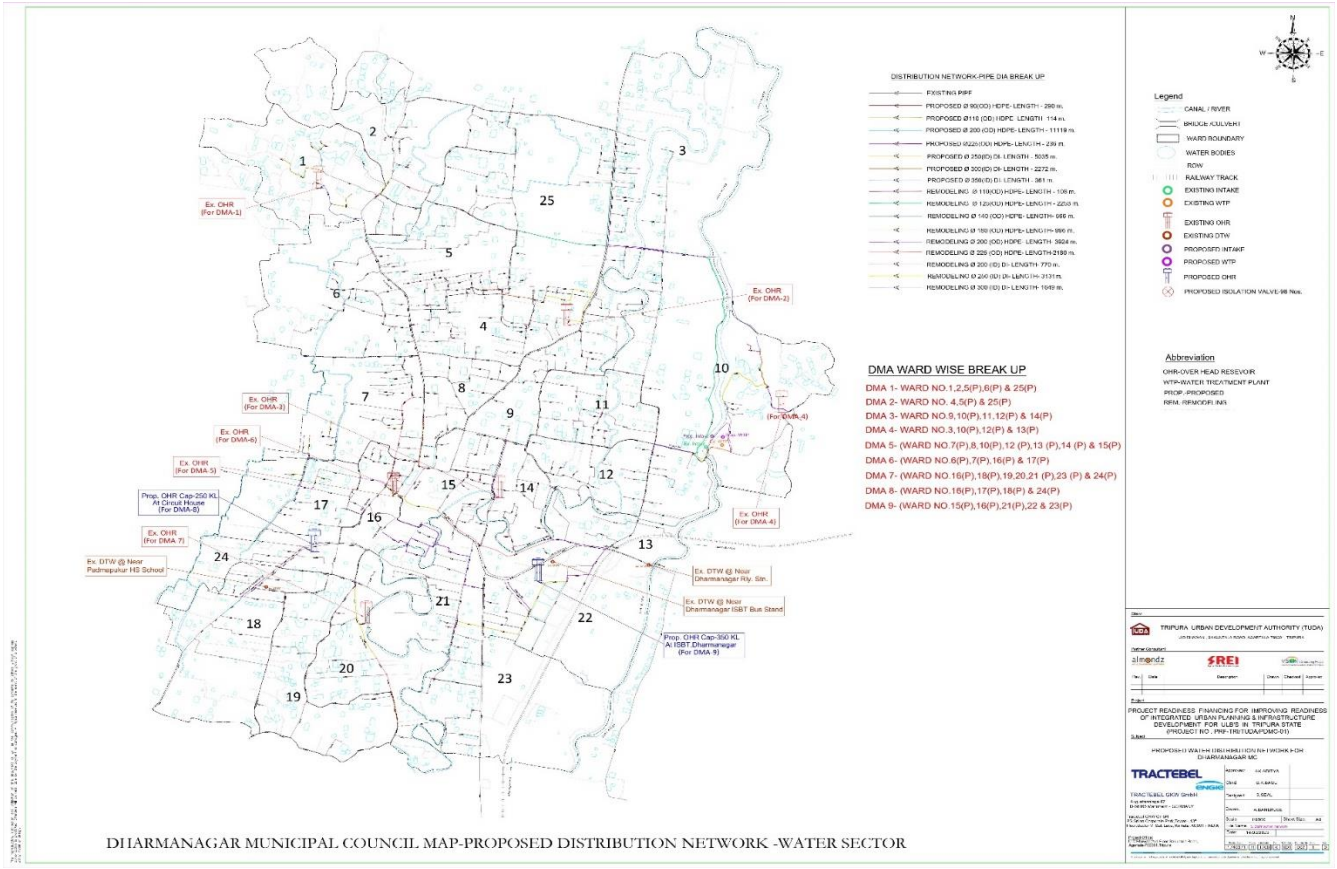


Figure 42: Proposed Intake and WTP Layout Plan for Dharmanagar (Detailed design will be done by DBO contractor)

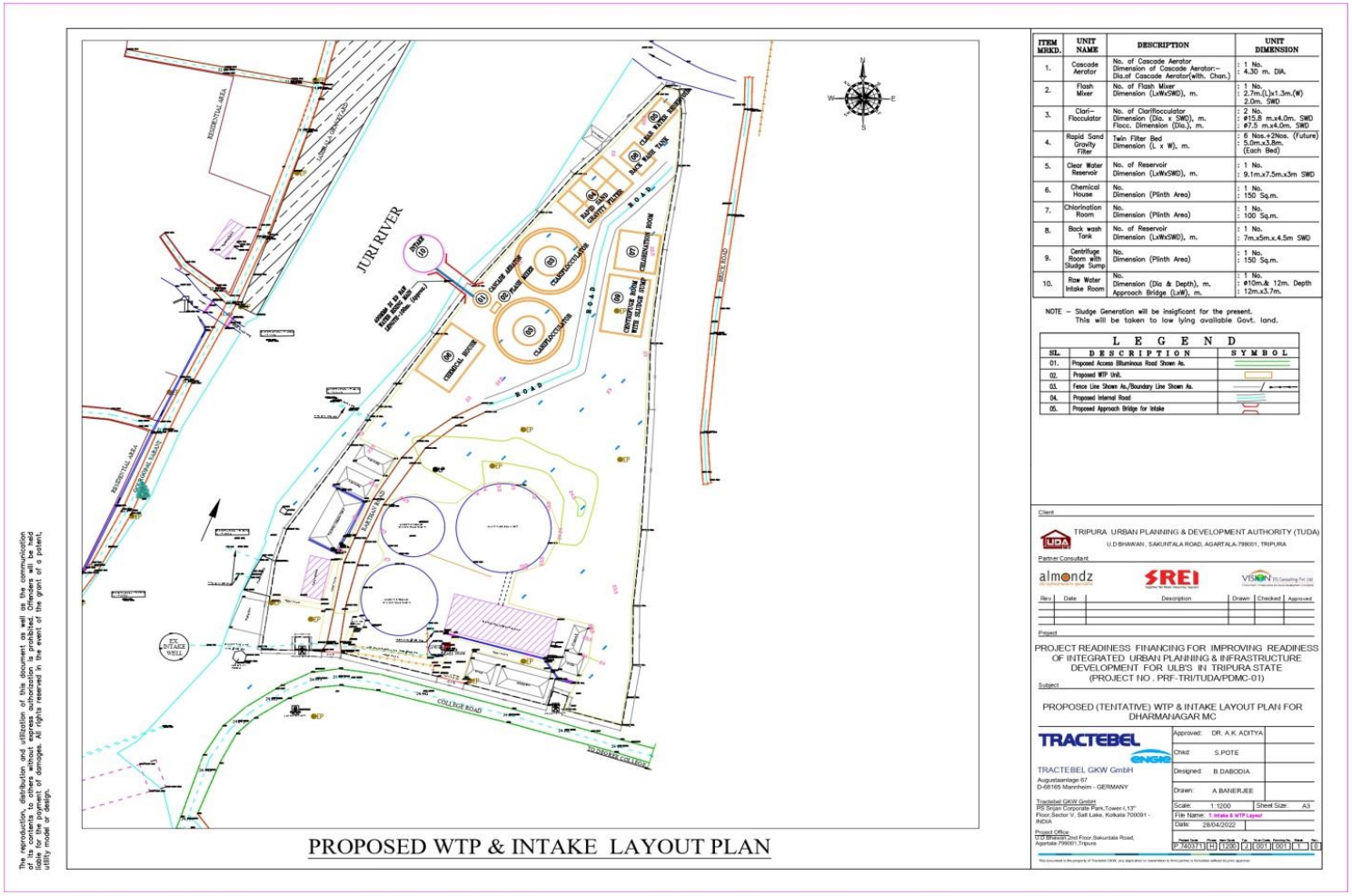
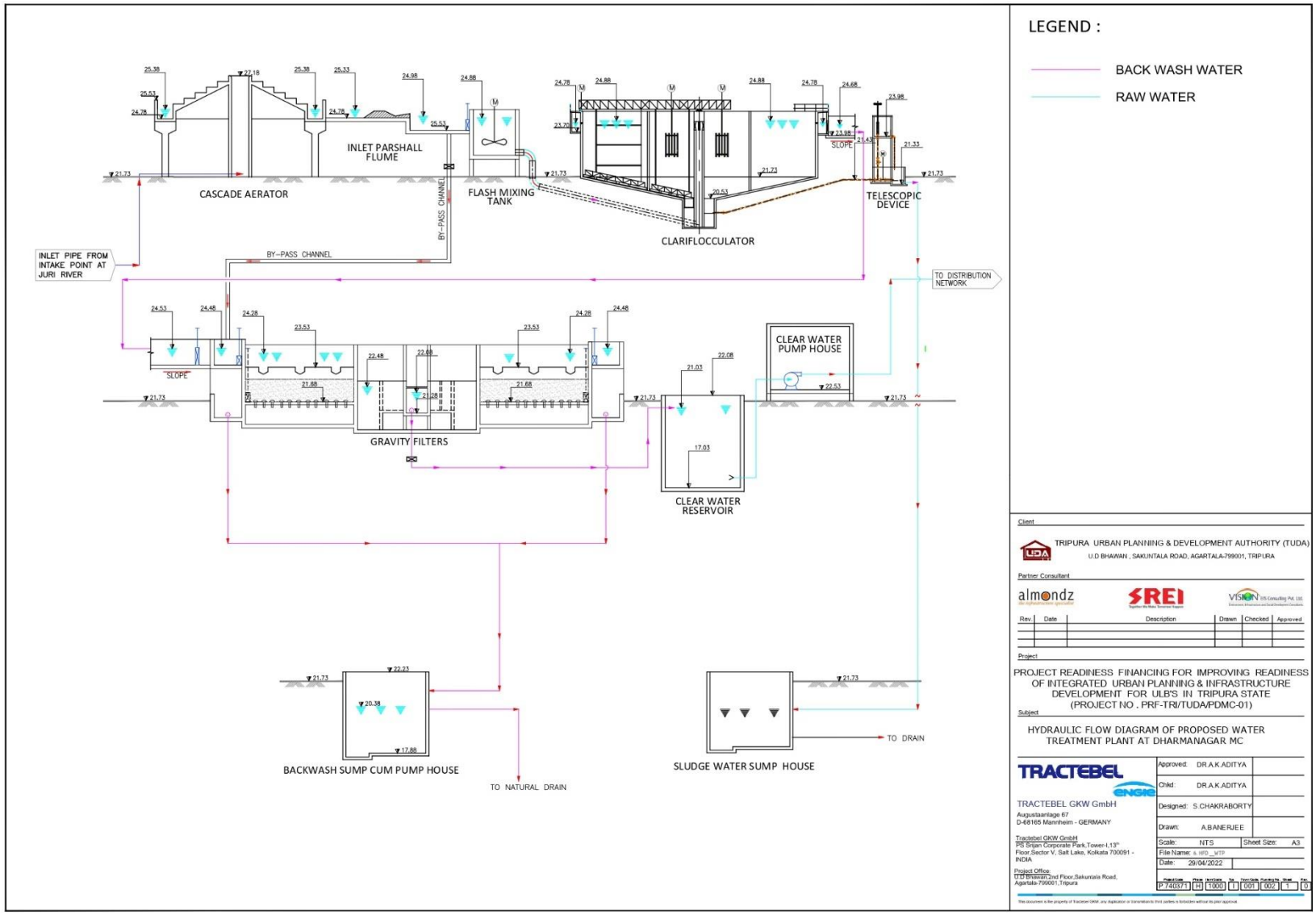


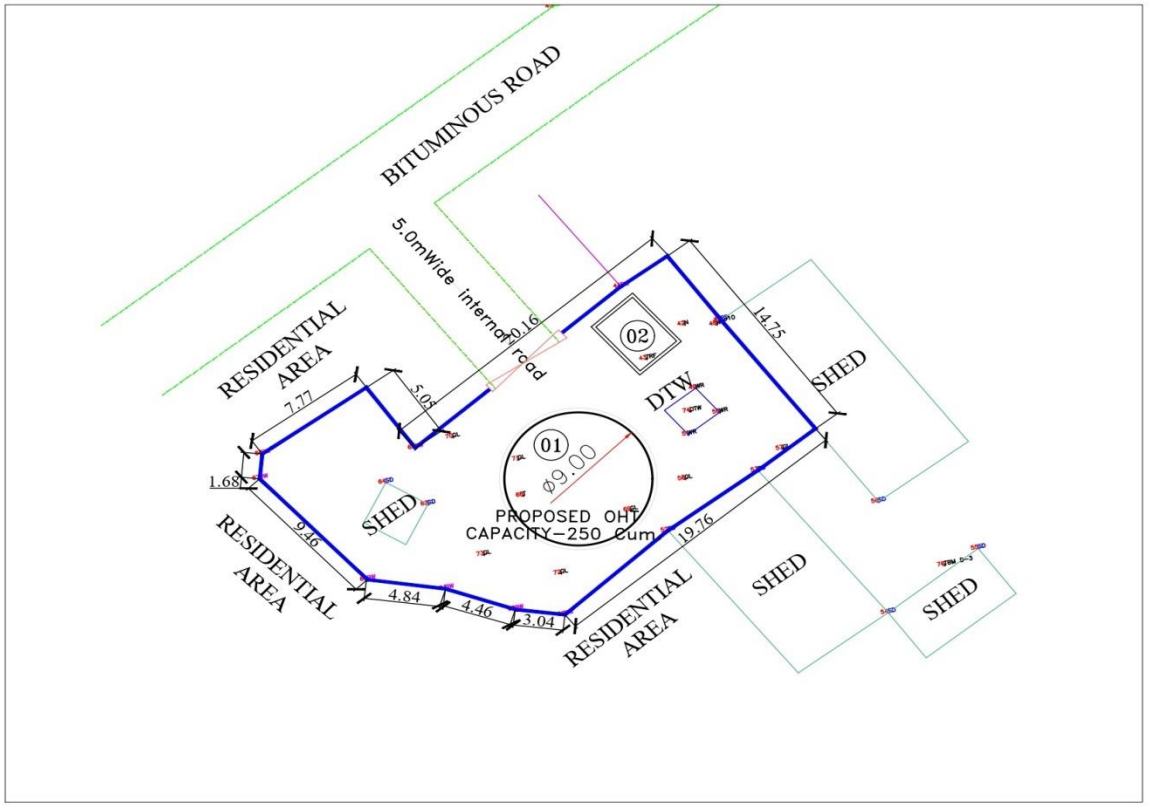
Figure 43: Hydraulic flow diagram of proposed water Treatment plant at Dharmanagar MC



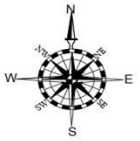
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Figure 44: Proposed OHSR Layout plan– Circuit House, Dharmanagar

Proposed List of Unit for OHR (Near Circuit House)			
Unit No.	Description	Qnty.	Size in M.
1.	OHE Reservoir Tank	1 No.	9.00m ø
2.	Guard Room Cum operator Room	1 No.	4m.X 3m



PROPOSED OHR LAYOUT PLAN NEAR CIRCUIT HOUSE (CAP.- 250 CUM.)



LEGEND LIST	
	PROPOSED OHT GATE
	PROPOSED BITUMEN ROAD
	PROPERTY LINE/BOUNDARY WALL

Client
TRIPURA URBAN PLANNING & DEVELOPMENT AUTHORITY (TUDA)
U.D BHAWAN , SAKUNTALA ROAD, AGARTALA-799001, TRIPURA

Partner Consultant
almondz | SREI | VISION

Rev.	Date	Description	Drawn	Checked	Approved

Project
PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR ULB'S IN TRIPURA STATE (PROJECT NO . PRF-TRI/TUDA/PDMC-01)

Subject
PROPOSED LAYOUT PLAN OF OHR (CAP. 250 CUM.) NEAR CIRCUIT HOUSE

TRACTEBEL ENGIE
TRACTEBEL GKW GmbH
Augustaanlage 67
D-68165 Mannheim - GERMANY

Tractebel GKW GmbH
PS Srijan Corporate Park,Tower-I,13th Floor,Sector V, Salt Lake, Kolkata 700091 - INDIA

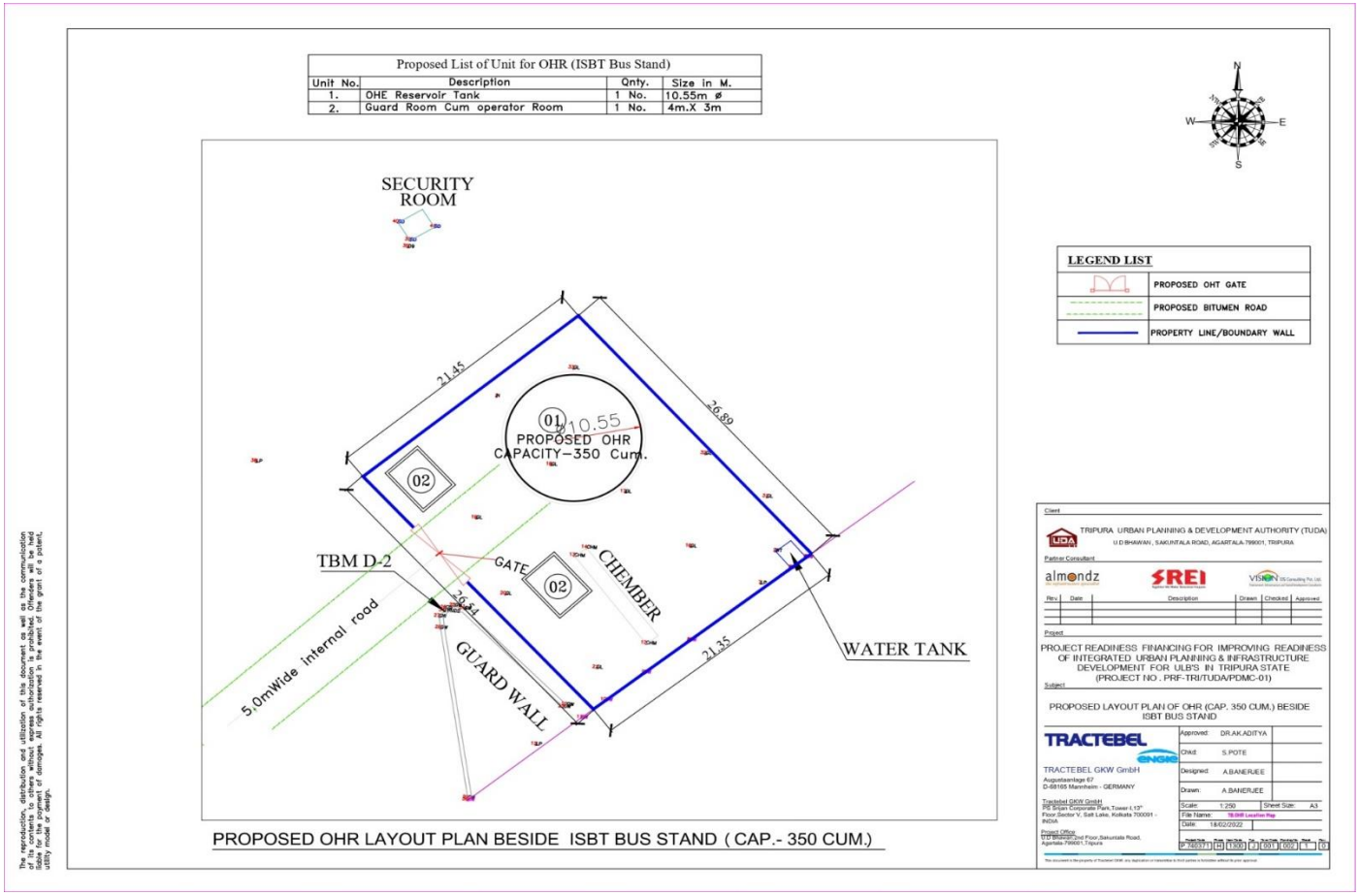
Project Office:
U.D Bhawan,2nd Floor,Sakuntala Road, Agartala-799001,Tripura

Approved:	DR.AK.ADITYA	
Chkd:	S.POTE	
Designed:	A.BANERJEE	
Drawn:	A.BANERJEE	
Scale:	1:250	Sheet Size: A3
File Name:	TB.OHR Location Map	
Date:	18/02/2022	

P_740371 | H | 1300 | J | 001 | 001 | 1 | 0

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Figure 45: Proposed OHSR Layout – ISBT Bus stand, Dharmanagar



Maps Showing existing and proposed components in Ambassa Town

Figure 46: Existing and proposed water supply components in Ambassa on google earth

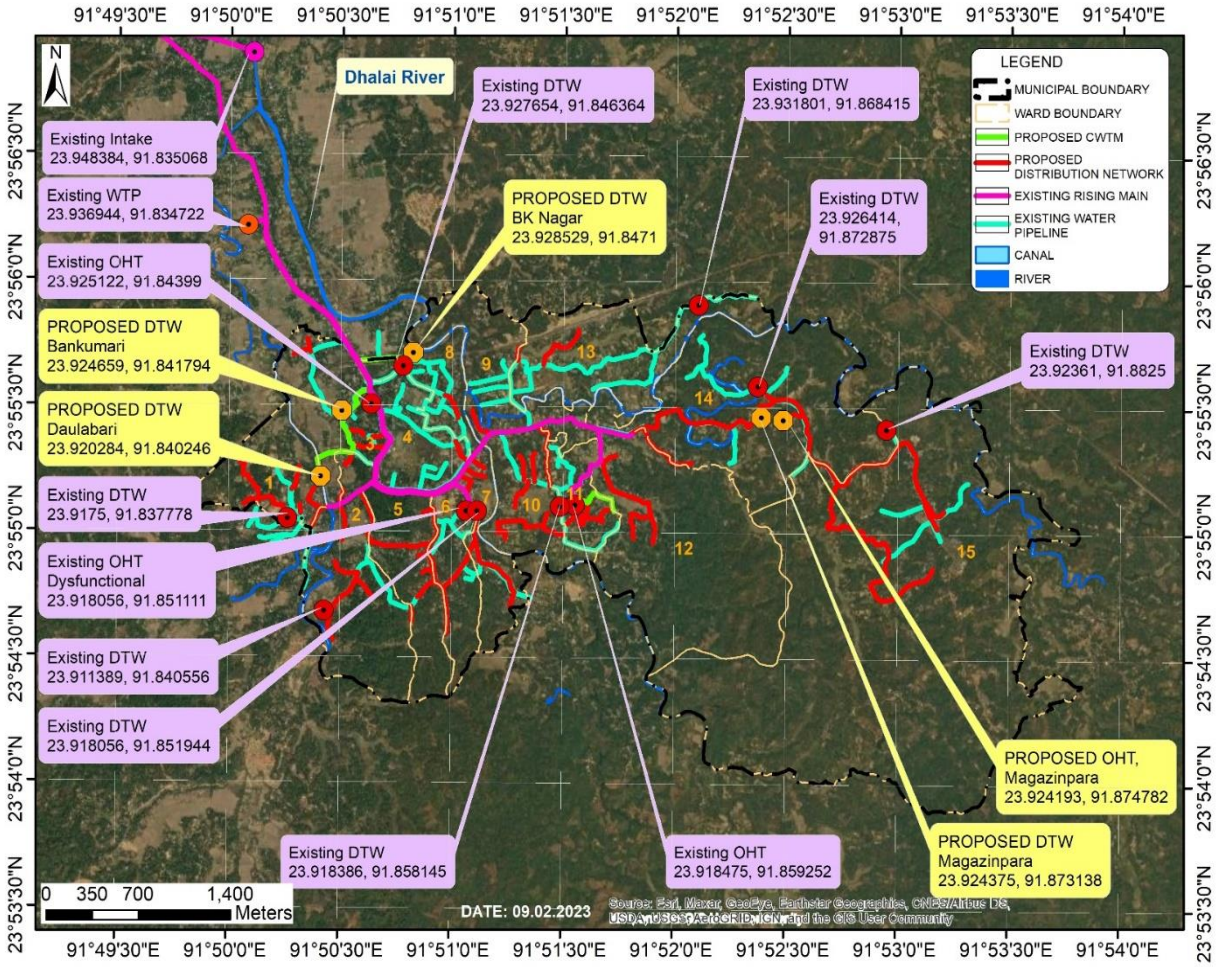


Figure 47: Existing water supply components in Ambassa on google earth

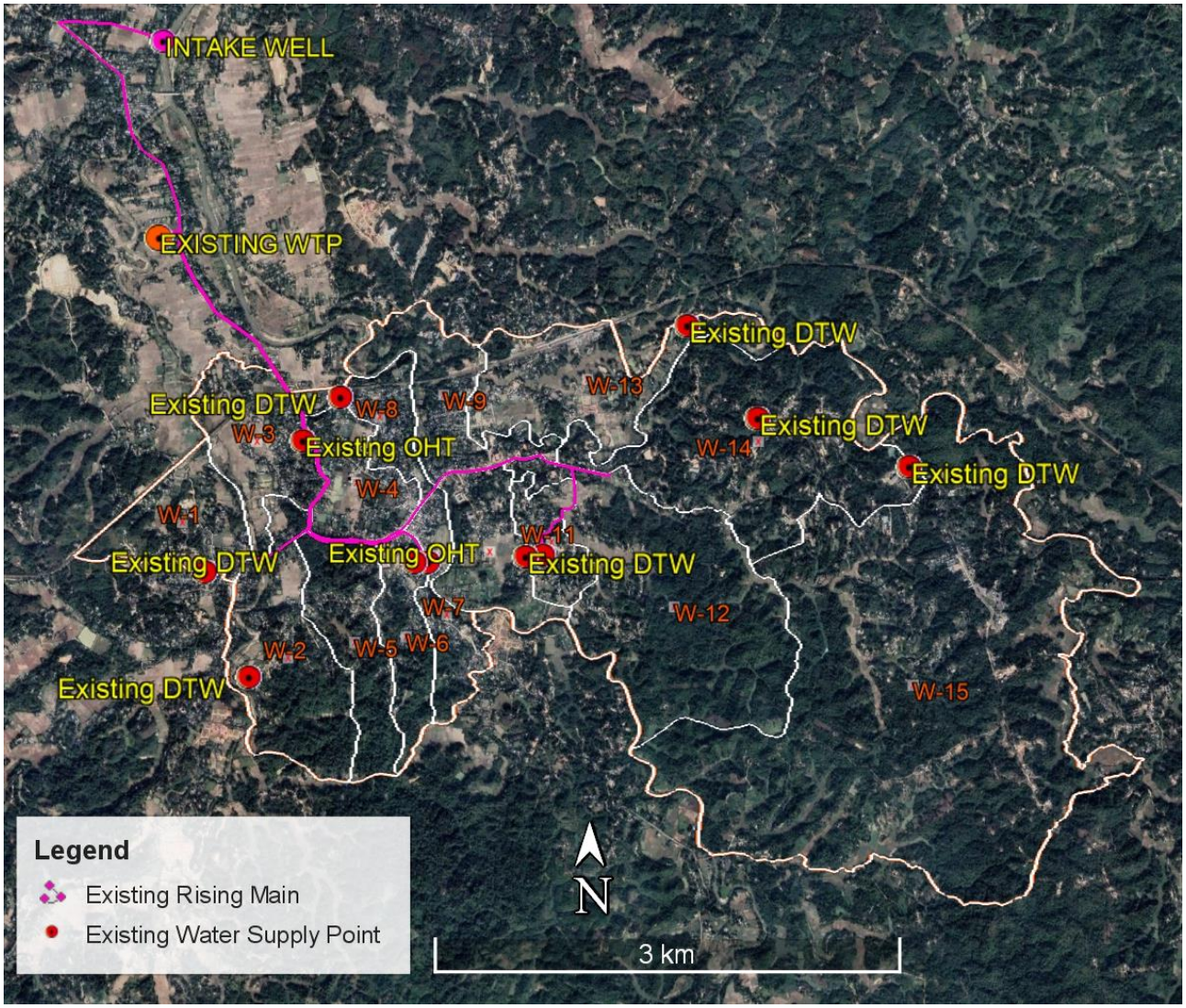


Figure 48: Proposed water supply components in Ambassa on google earth

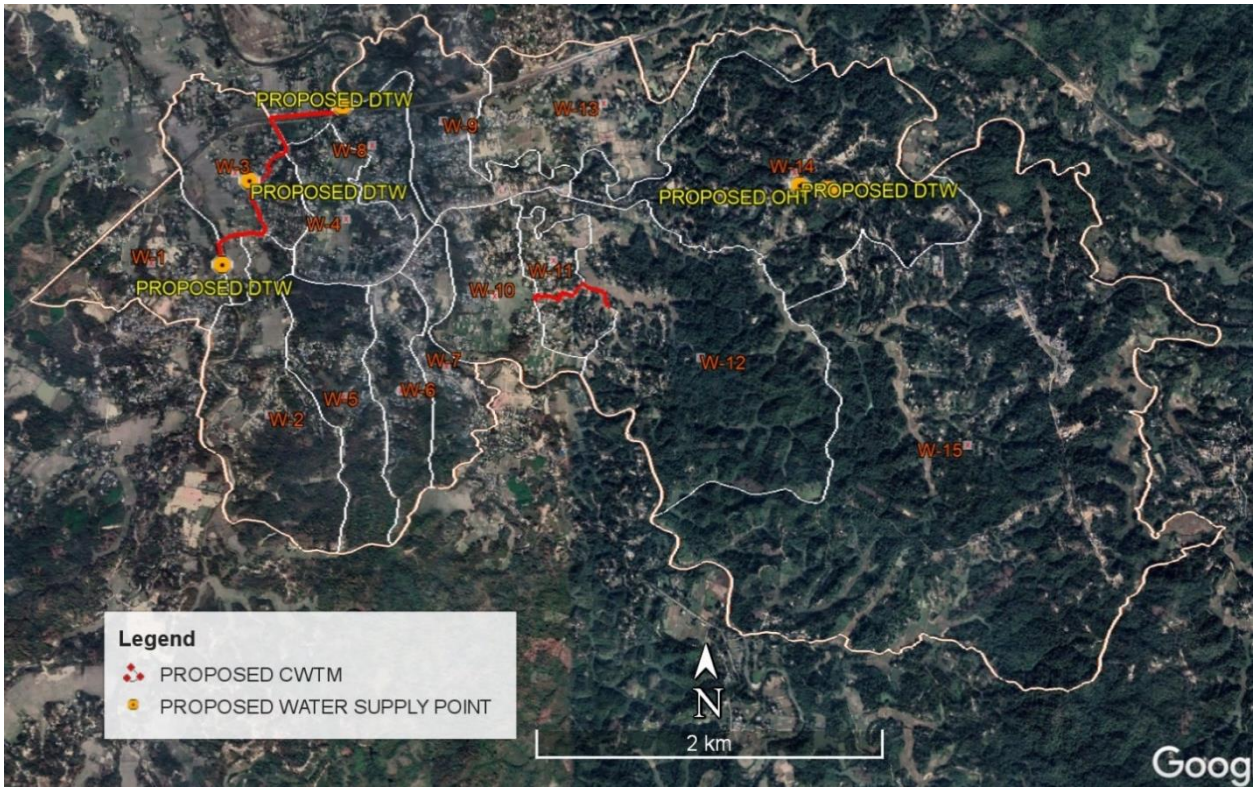


Figure 49: Existing Intake and surrounding 50 m of Ambassa on google earth

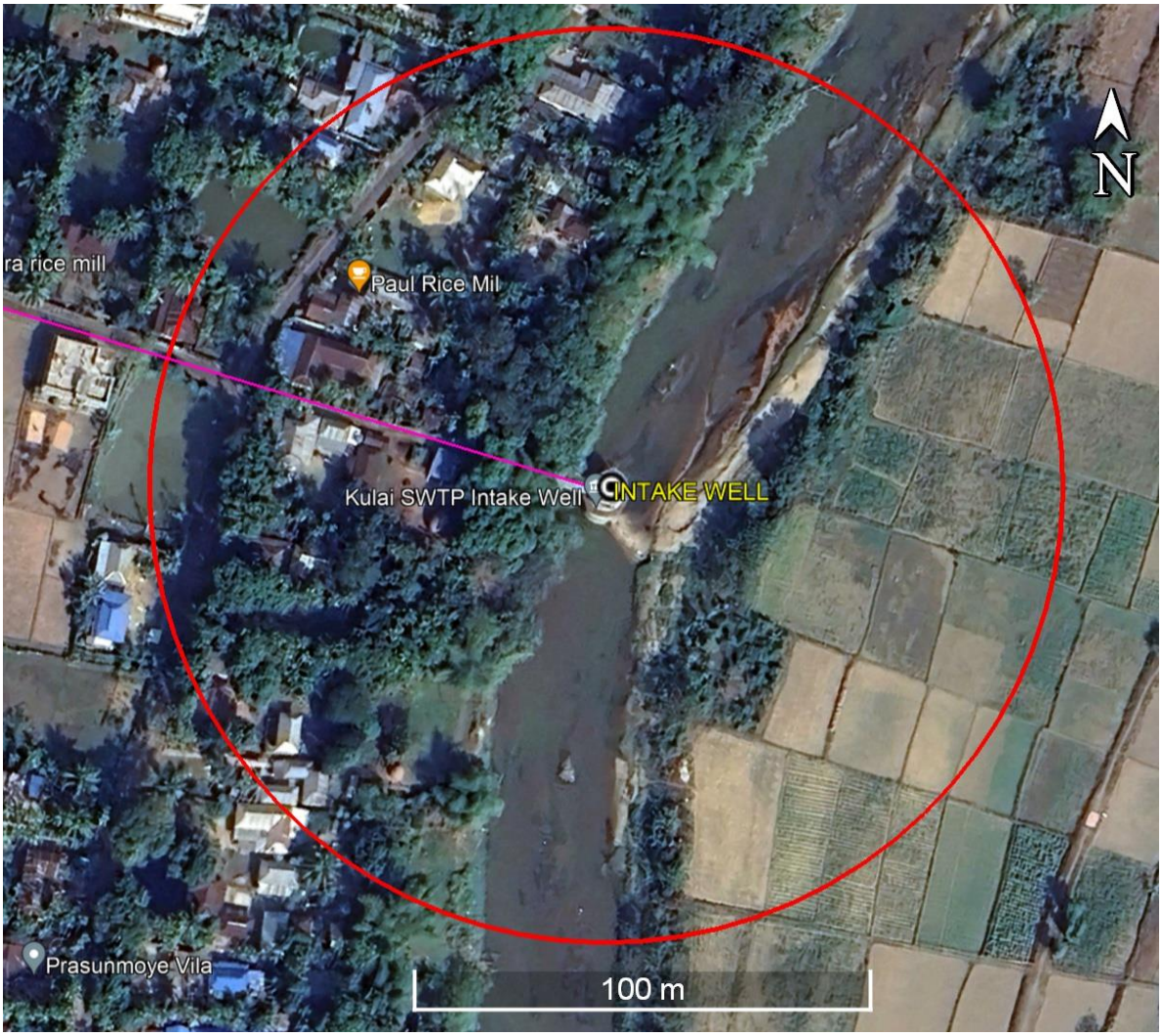


Figure 50: Existing WTP of Ambassa and surrounding 50 m on google earth

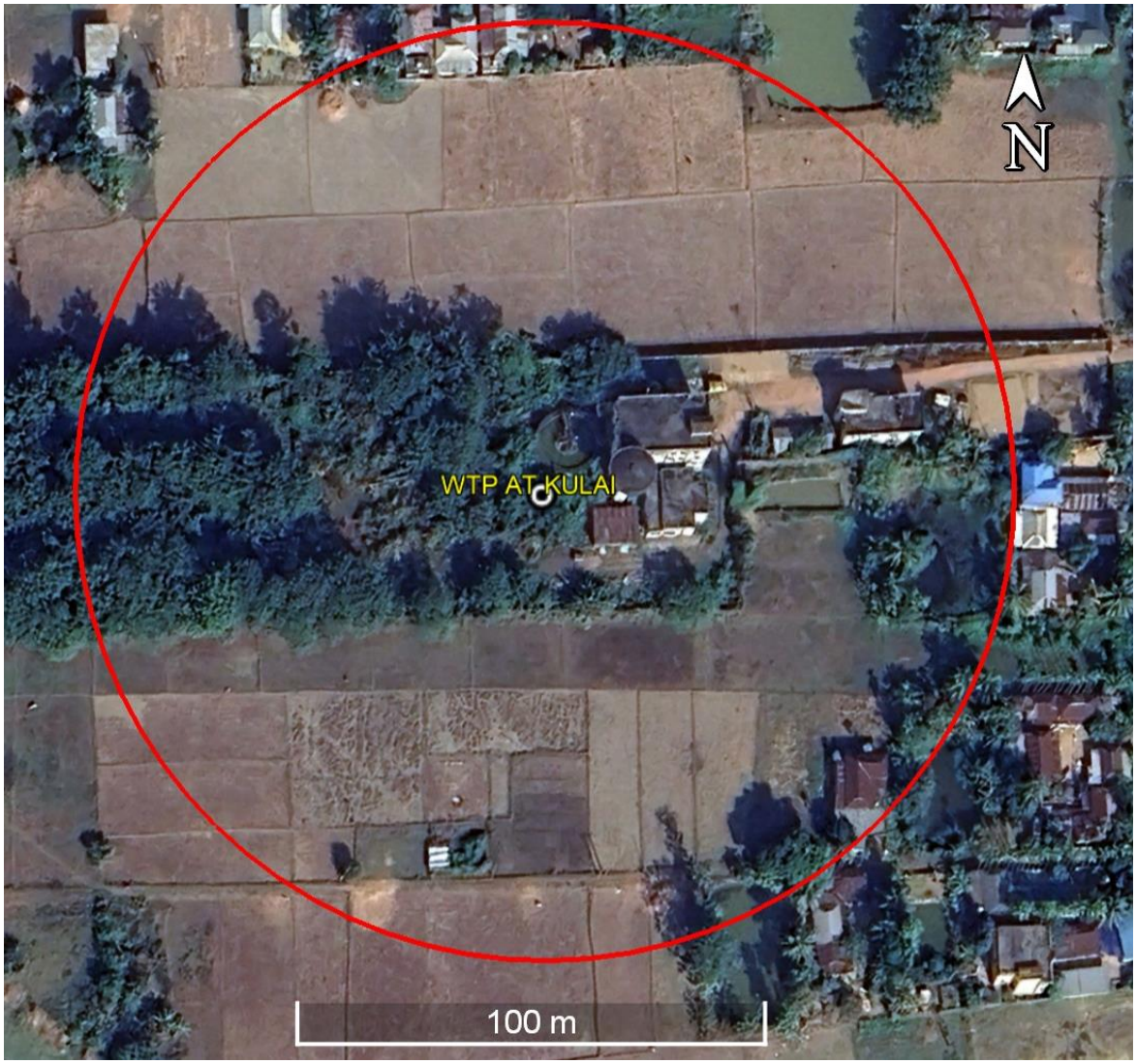


Figure 51: Proposed Clear water main, Tube well and Reservoir locations - Ambassa

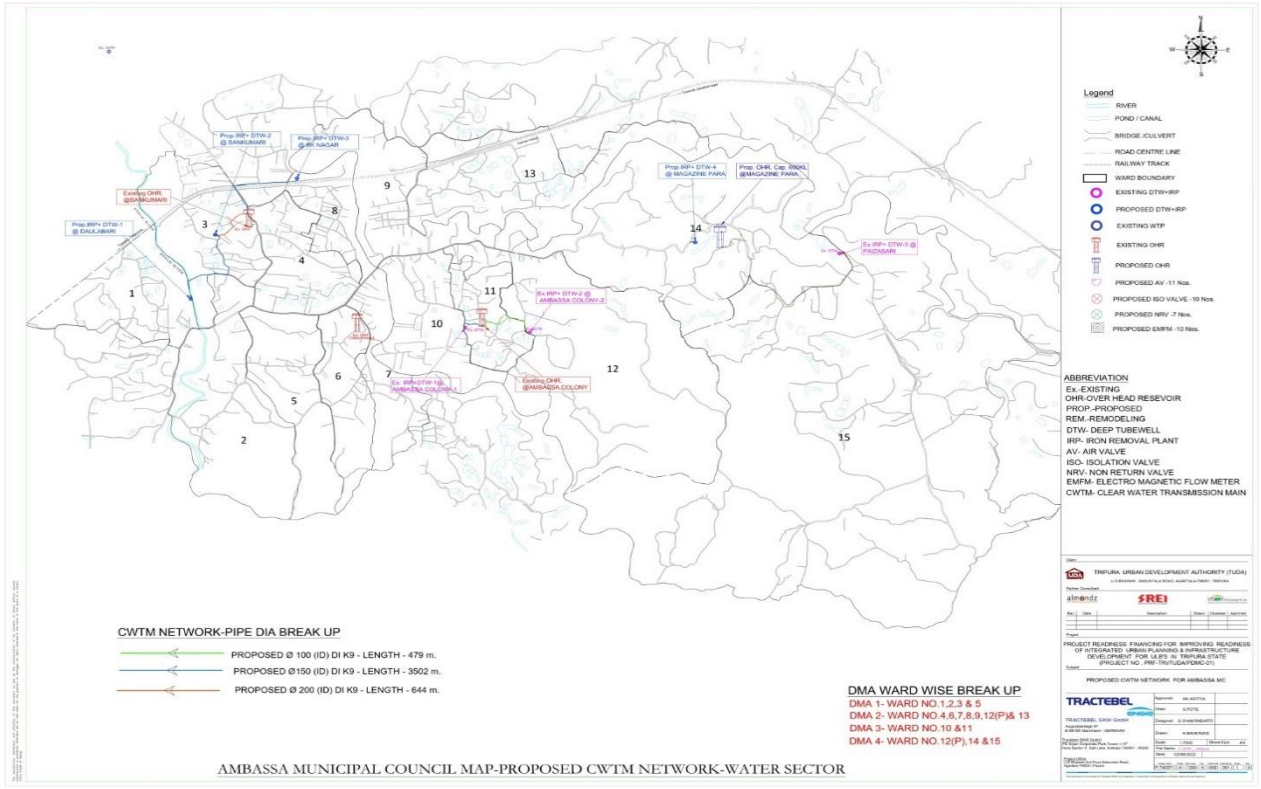


Figure 52: Proposed DTW & IRP 1- (Daulbari) location with 100m surroundings, Ambassa

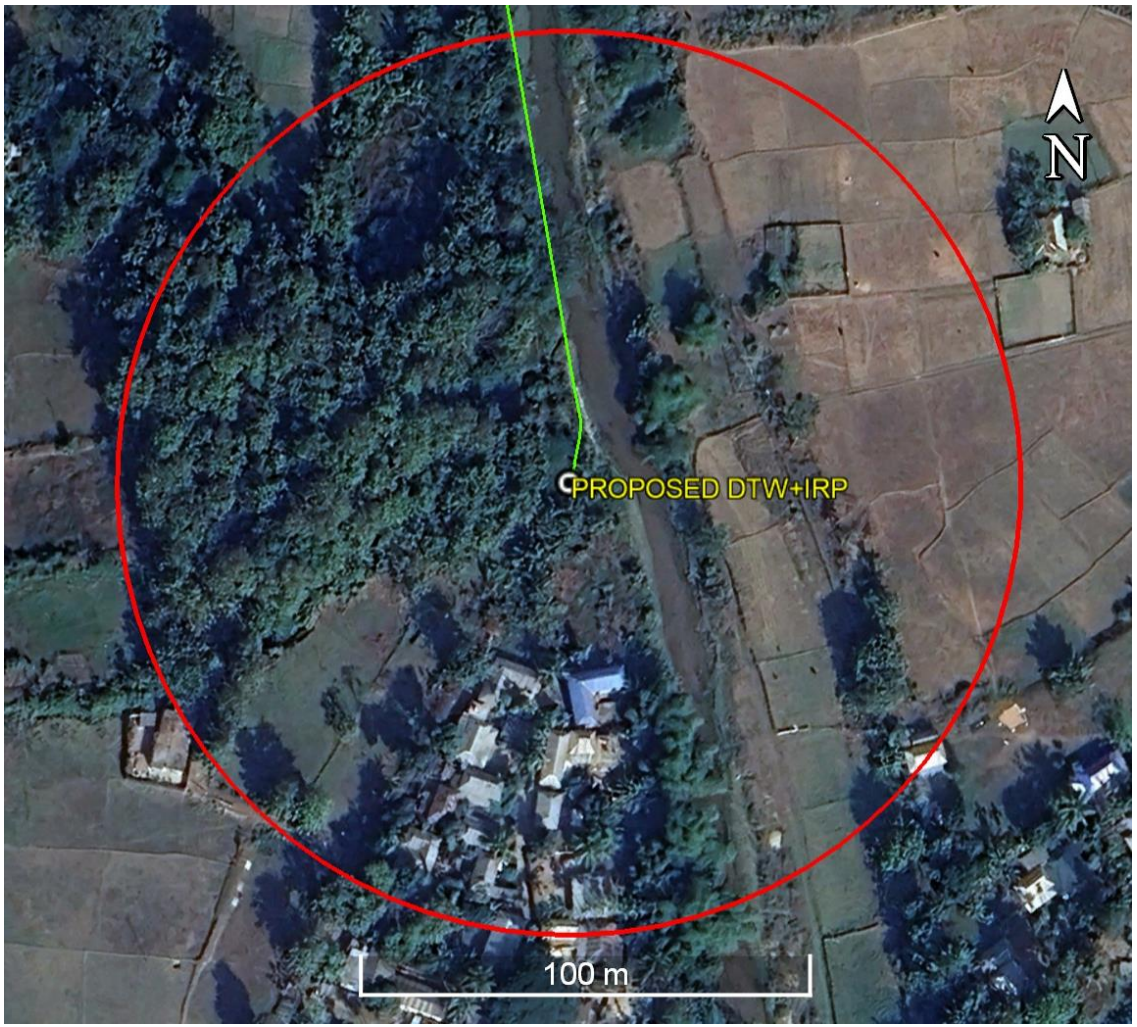


Figure 53: Proposed DTW & IRP 2- (Bankumari) location with 100m surroundings, Ambassa

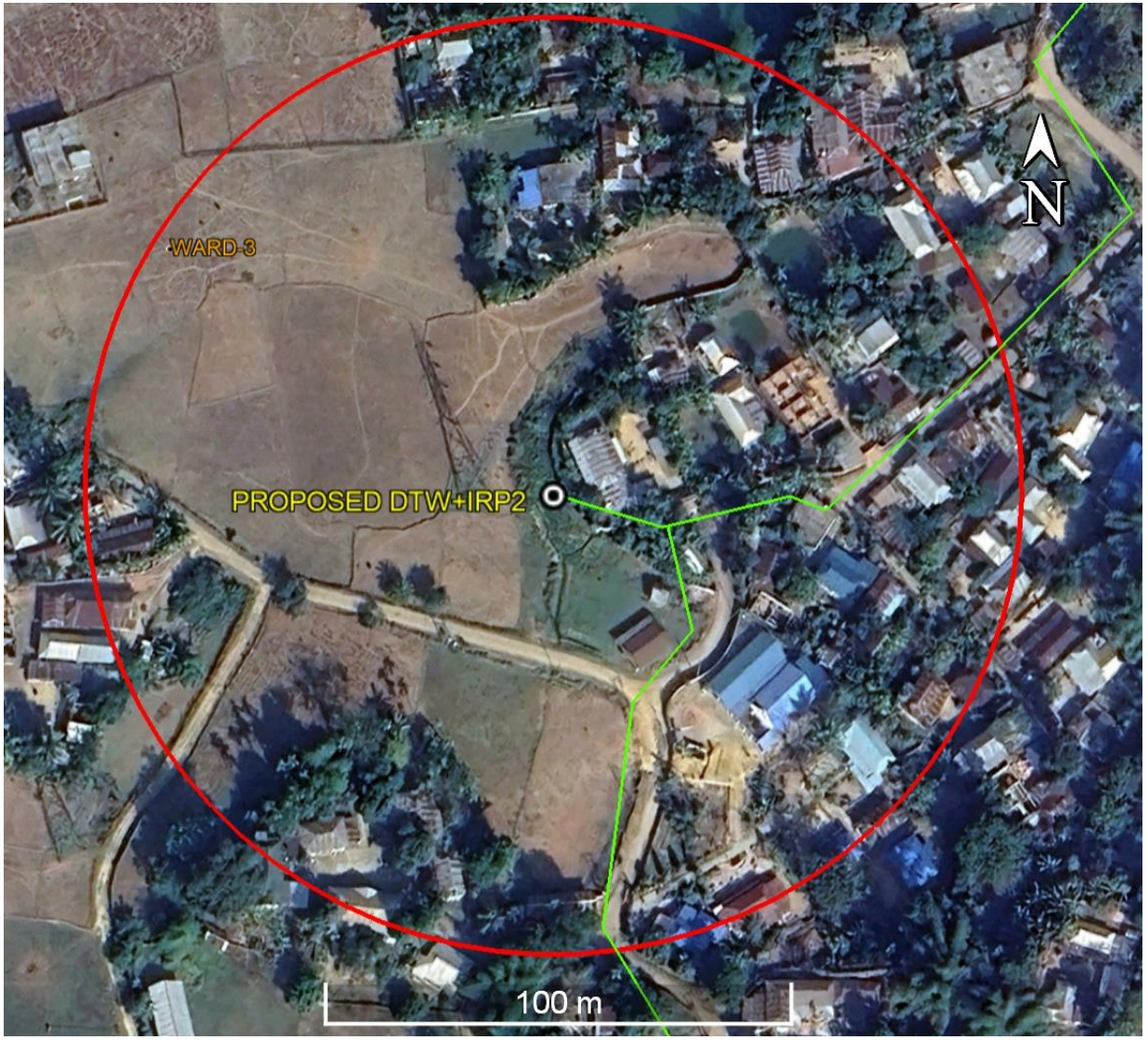


Figure 54: Proposed DTW & IRP 3- (B K Nagar) location with 100m surroundings, Ambassa



Figure 55: Proposed DTW & IRP 4- (Magazinepara), location with 100m surroundings, Ambassa



Figure 56: Proposed OHSR (Magazinepara) location with 100m surroundings, Ambassa



Figure 57: Proposed DMA area of Ambassa

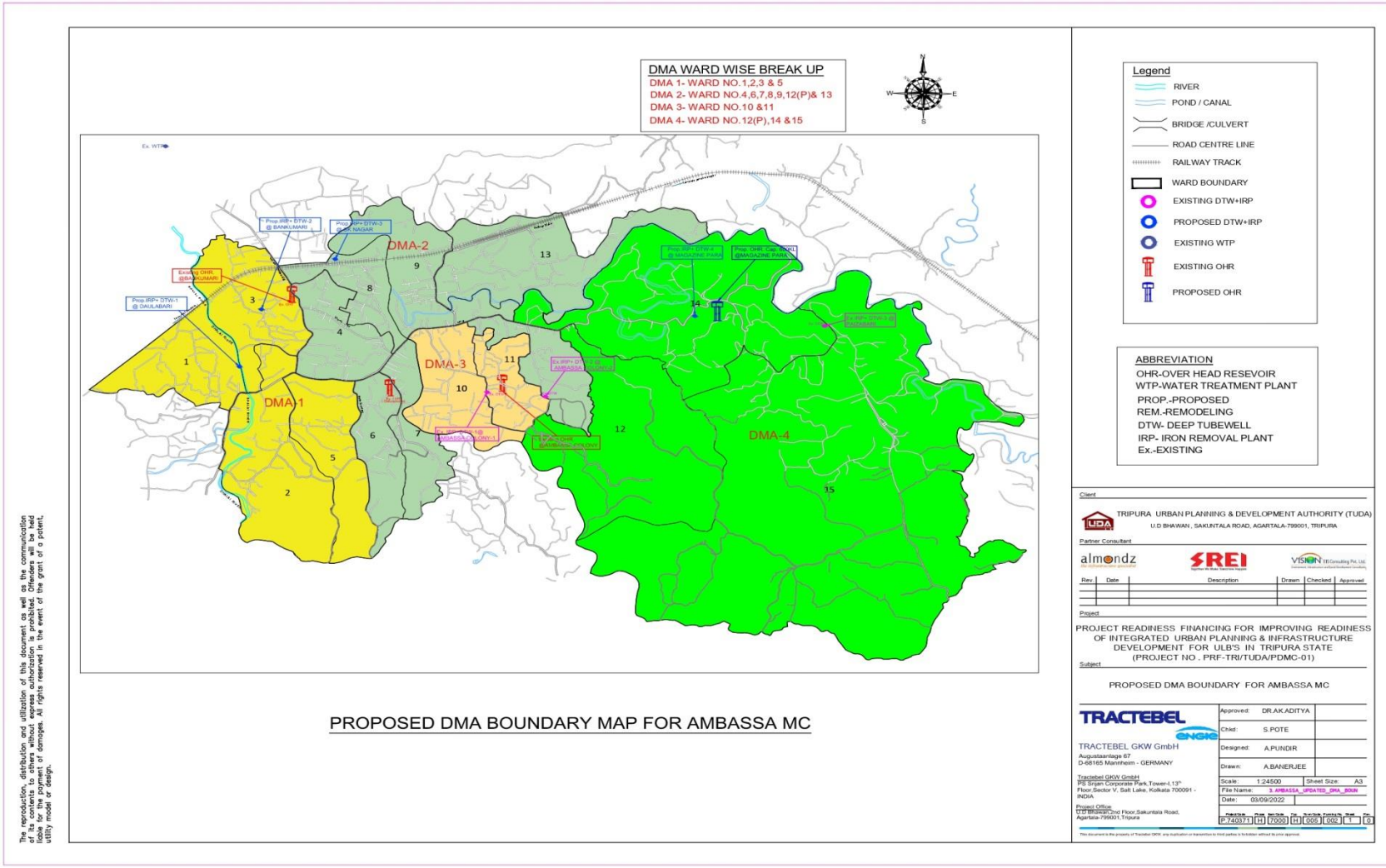


Figure 58: Water supply distribution network for Ambassa town

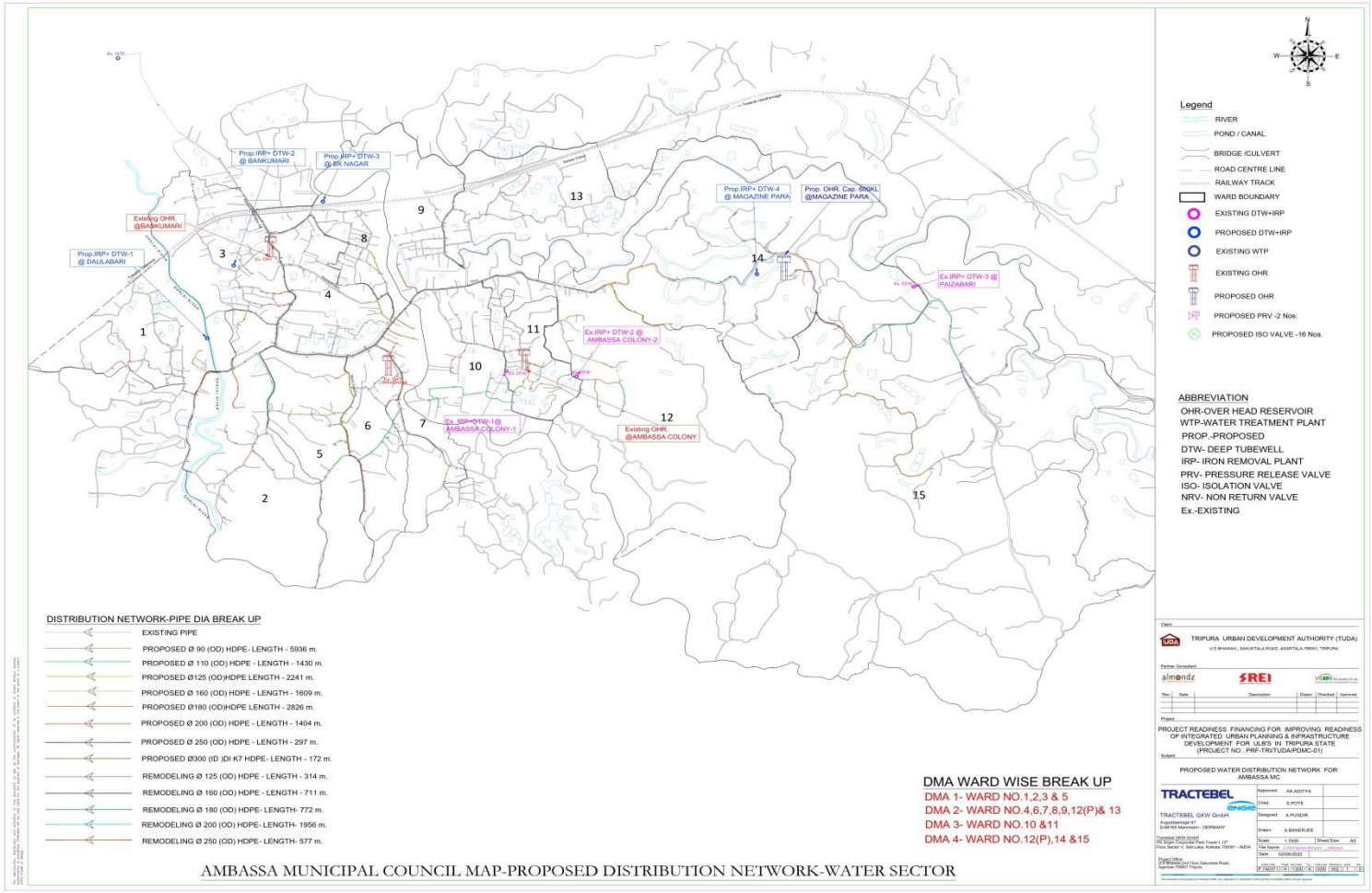


Figure 59: Layout Diagram of Proposed DTW at Daulabari, Ambassa

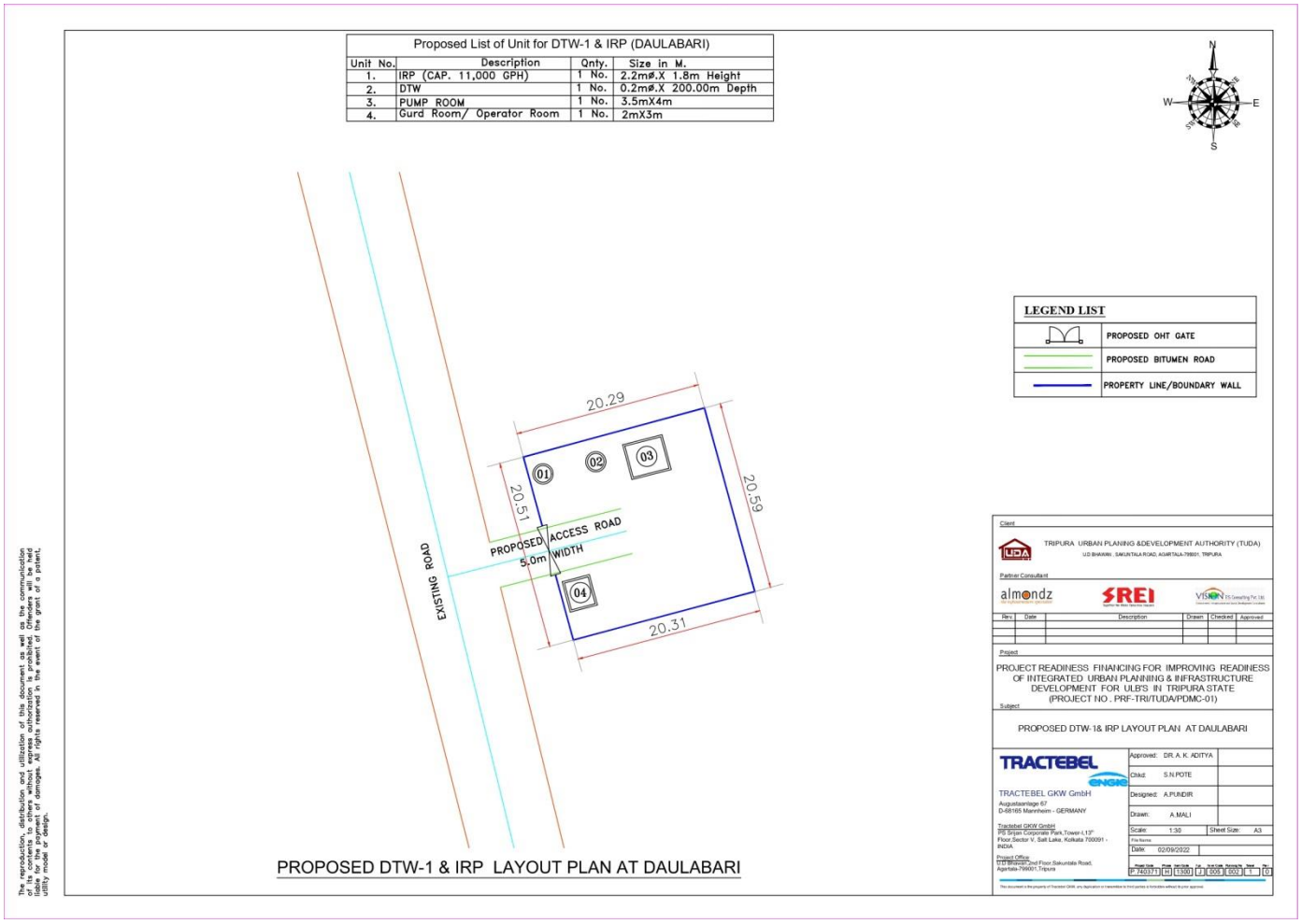


Figure 60: Layout Diagram of Proposed DTW at Bankumari, Ambassa

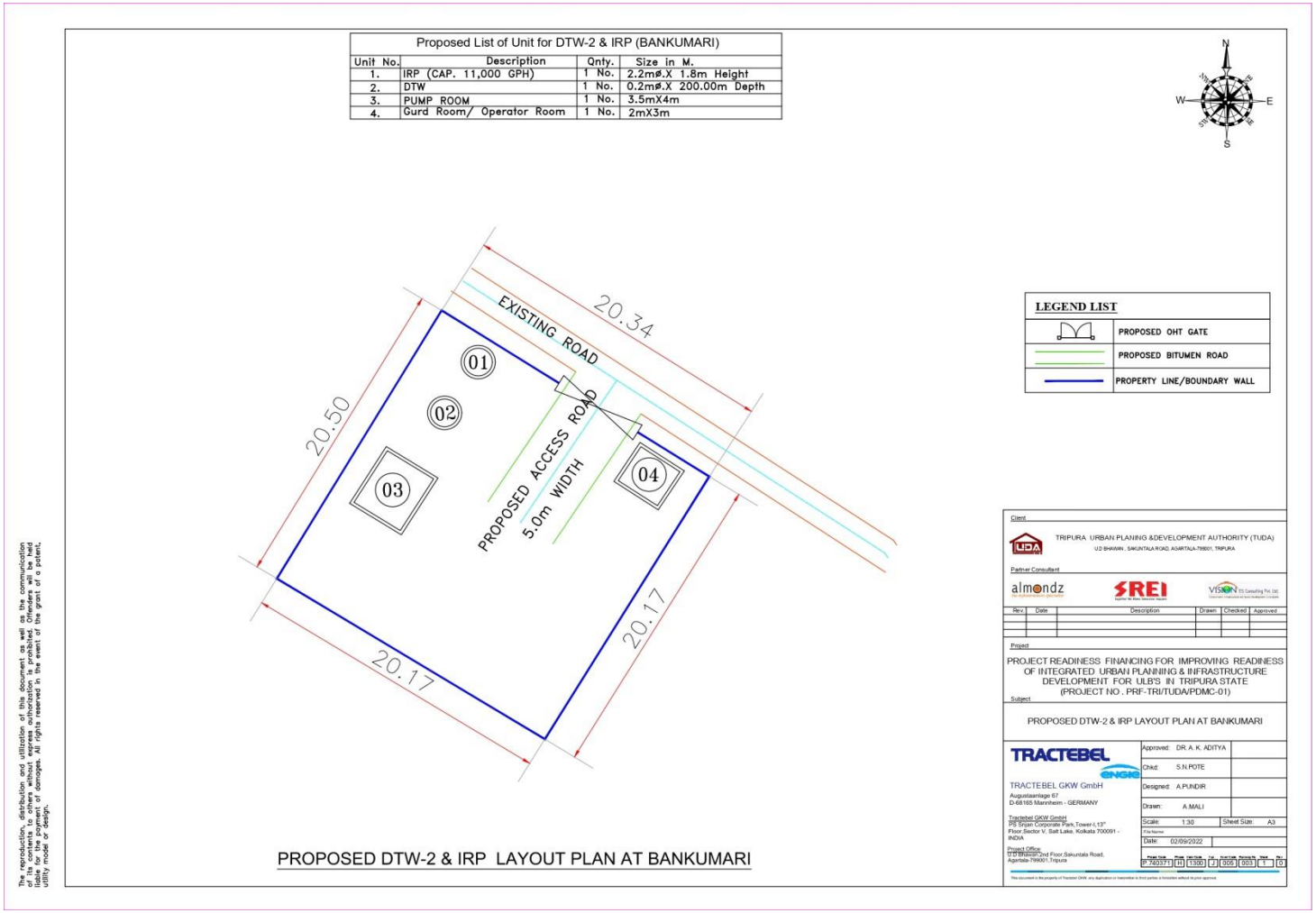


Figure 61: Layout Diagram of Proposed DTW at BK Nagar, Ambassa

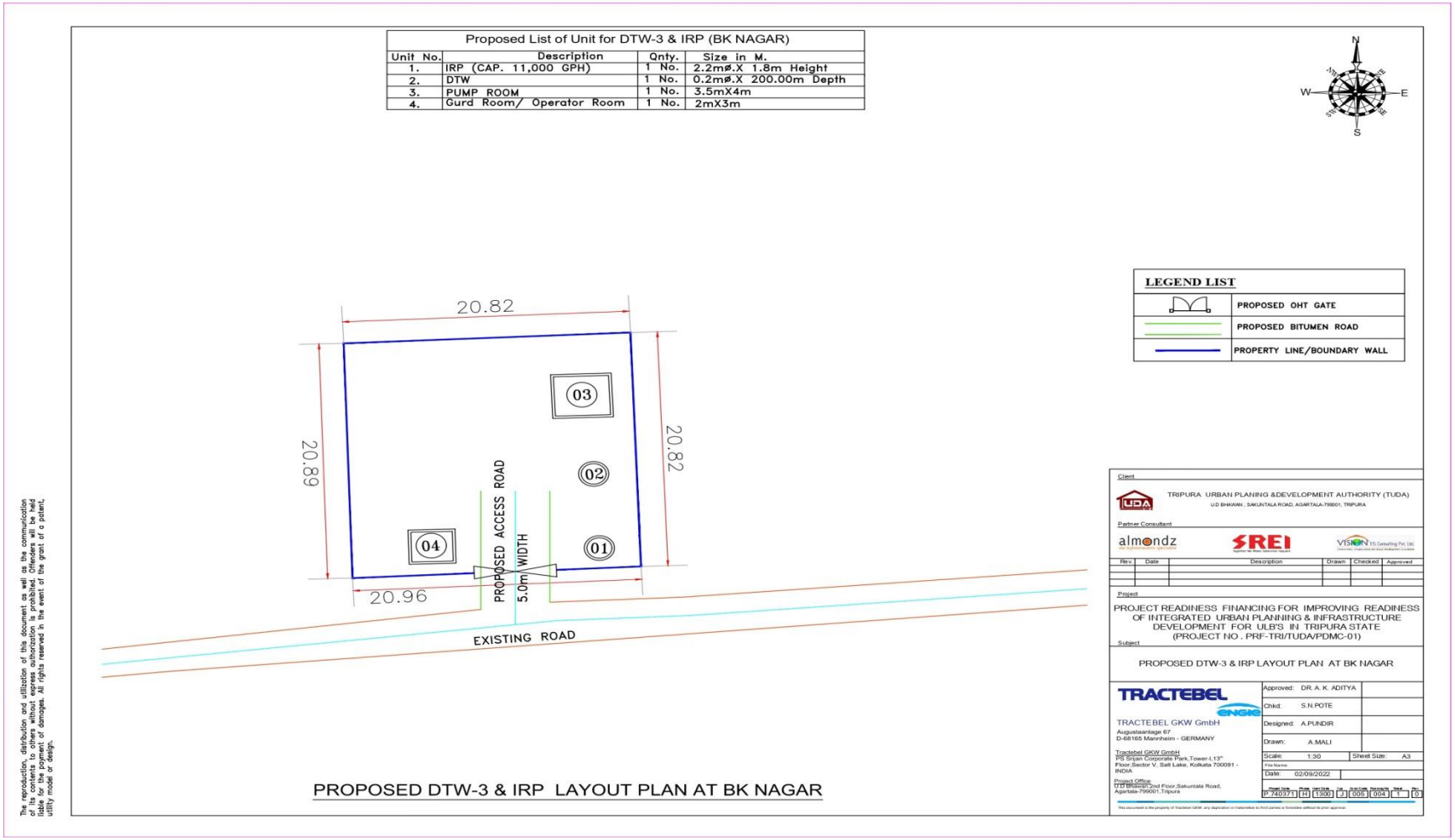


Figure 62: Layout Diagram of Proposed DTW at Magazine para, Ambassa

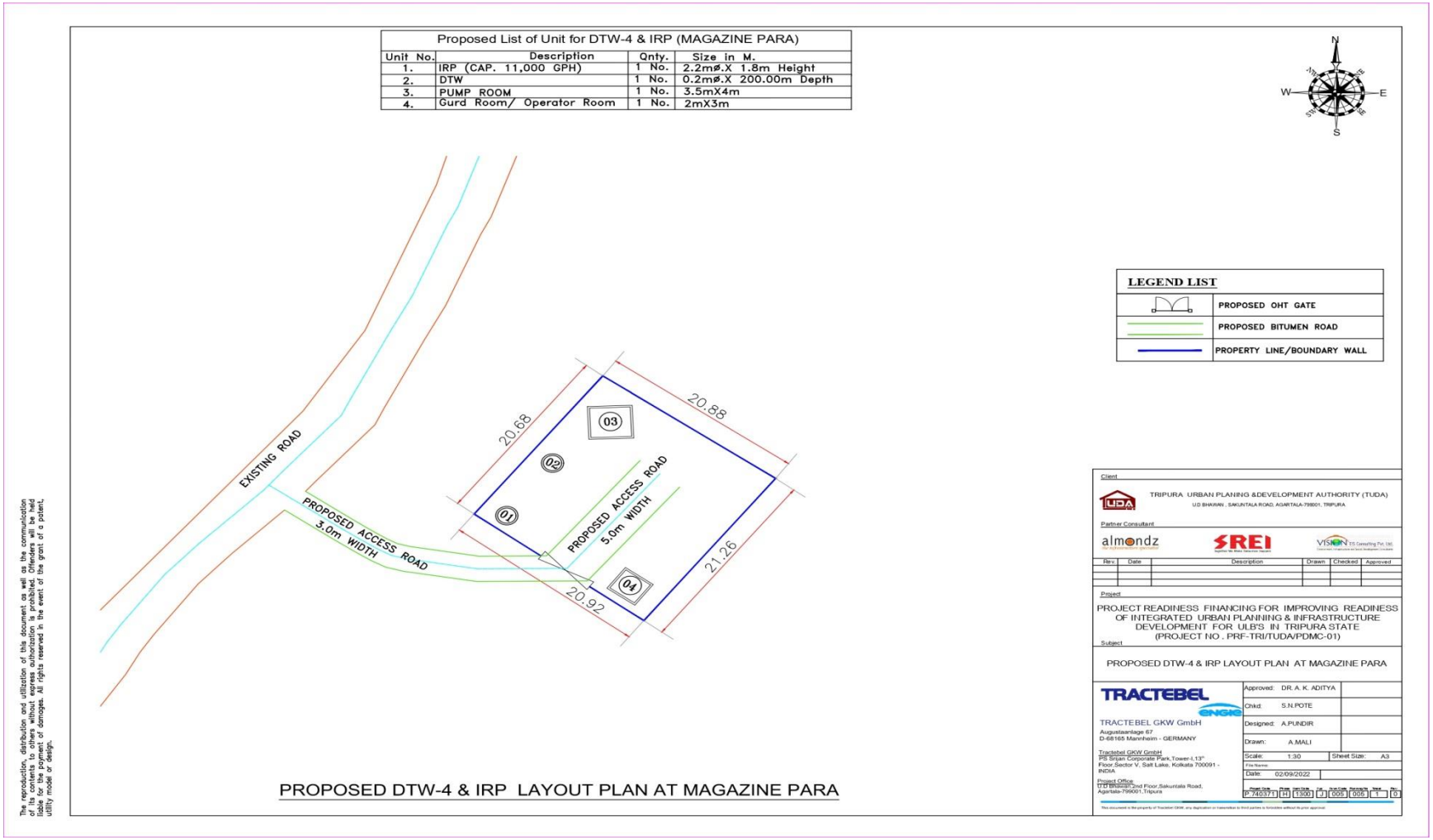
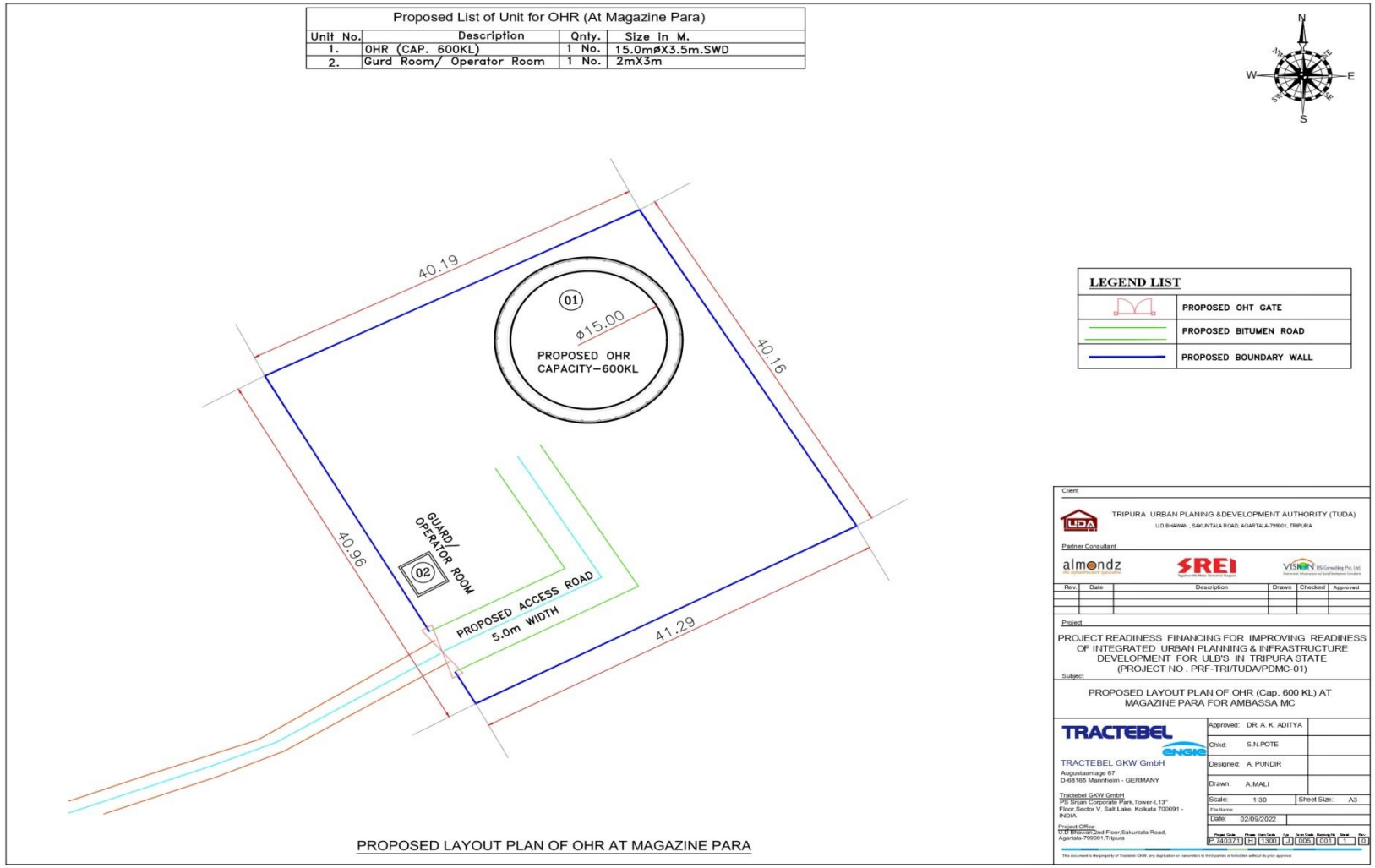


Figure 63: Layout Diagram of Proposed OHSR at Magazine Para, Ambassa



III. ANALYSIS OF ALTERNATIVES

38. Descriptions of various alternatives considered for critical components such as water source, water treatment and distribution etc. are presented in the table below.

1.	**Project Need – No Project Alternative**
Type of alternative	**'No project' / 'with project' alternative**
Description of alternatives	**No project alternative –** At present water supply is being served below 100% of the total town area, Some of existing civil structures such as storage reservoirs and other ancillary structures are not in good condition. Few reservoirs are not adequate to meet the ultimate water demand and those are meeting need repairing of civil structures. In present distribution network the tail end consumers are not getting the enough terminal pressure and discharge. Distribution of water is through distribution reservoir and only by gravity process. The schemes are manually operated and lacking in monitoring of real time quality and quantity of water supplied. Therefore, it could be stated that unaccountable flow of water in the system is very high. Living conditions due to absence of proper water supply, are unhealthy and unhygienic. Lack of infrastructure is also causing environmental pollution, overall poor quality of life. Poor environmental quality affects the urban poor people more. The project intends to provide following benefits to the people residing in the subproject area, and the "no project" alternative will deprive people of these benefits: • Increased availability of potable water at appropriate pressure to all households including urban poor • Reduced time and costs in accessing alternative sources of water. • Better public health particularly reduction in waterborne and infectious diseases; • To ensure positive impact on social status and economic standard of the people of rural areas. • To automate the operation from source to sector tank with use of SCADA and water quality monitoring • Ensure that 100% households have a metered water connection, **With project alternative** Since the existing water supply sources/systems are insufficient to accommodate growing population in the area, the proposed water supply subproject includes source augmentation to provide adequate water, water conveyance, treatment, storage, and distribution. The successful implementation of the water supply project will result in better control over the drinking water management, improved monitoring system and overall demand management along with energy reduction. Overall, **'with project alternative'** will bring about improved public health and living environment that will contribute to improved quality of life in this area. Improved water supply system will create an enabling environment for local economic development.
Selected Alternative	"Without" subprojects would yield the project area to be continuously under-serviced that puts the health of the general public at an increasing risk and could potentially worsen the living environment. This 'no project' scenario would impede further social and economic development of the district and the defer commitments to improve the proportion of the population with sustainable access to clean water. Given the large-scale benefits to the population and environment, '**With Project'** alternative is considered appropriate.

2.	**Alternative source of water**
Type of alternative	**'Water source'**
	Kailashahar The present water supply to the town is from the Manu River and 4 Deep Tube wells. The town has a total of 4,526 domestic water connections and 6 nos. of street hydrant points. Besides this few tube wells and ring wells cater to the drinking water needs of the town. Almost 63.71 % of the population is served by the central water supplies. As per the gap analysis, a new intake of 4.5 MLD capacity is required considering the existing pumps in the old intake are sufficient to pump 3.78 MLD (20 hours operation). A new intake well cum pumping station of 8 m diameter and 14 m depth from the floor level is proposed for the design year 2053 on River Manu at Ward 16. Source selection criteria is based on its ability to meet the ultimate year (2053) water demand of its respective command area. Considering water demand 135 LPCD total water demand for the year 2023 and 2053 will be approximately 4.93 MLD and 7.56 MLD. **Kumargahat** The present water supply to the town is from the Deo River and 7 Deep Tube wells. Almost 82% of the population is served by the central water supplies. As per the gap analysis, a new intake of 4 MLD capacity is required considering the existing pumps in the old intake are sufficient to pump 2.46 MLD (20 hours operation). A new intake well cum pumping station of 8 m diameter and 20.8 m depth from the floor level is proposed for the design year 2053 on River Manu. Source selection criteria is based on its ability to meet the ultimate year (2053) water demand of its respective command area. Considering water demand 135 LPCD total water demand for the year 2023 and 2053 will be approximately 4.39 MLD and 5.77 MLD respectively. **Dharmanagar** The present water supply to the town is from the Kakri Cheera river and 3 Deep Tube wells. Almost 62 % of the population is served by the central water supplies. As per the gap analysis a new intake of 16.8 MLD capacity is required considering the existing pumps in the old intake are sufficient to pump 16.8 MLD (20 hours operation). A new intake well cum pumping station of 10 m diameter and 12 m depth from the floor level is proposed for the design year 2053 on River Kakri Cheera near existing intake well.. Source selection criteria is based on its ability to meet the ultimate year (2053) water demand of its respective command area. Considering water demand 135 LPCD total water demand for the year 2023 and 2053 will be approximately 10.07 MLD and 13.43 MLD. **Ambassa** **Groundwater:** Presently source of water at Ambassa town is from Dhalai River followed a water treatment plant and 8 Deep Tube wells (DTWs) are the main sources of piped water supply in the town. Groundwater has high iron contents. Presently total water abstracted from Tube Wells is approximately 1.31 MLD (3 nos. 10000 GPH, 2 nos. 5000 GPH,2 no. 7500GPH & 1 no. 2500 GPH). **Surface Water:** At present there is a wet type of Intake well of capacity 0.55 MGD/2.5 MLD (6 m dia., commissioned in 2011) located at Harin Mara village on Dhalai River and 2870 m away from the 2.5 MLD capacity WTP to draw surface water. Dhalai River is a semi perennial source of water. Raw water transmission main is 300 mm DI (K9) of 2870 m length. Existing WTP of capacity 2.5 MLD is situated at Kulai Thakur Pally village, is in operation for

	water supply in the town. Both intake and WTP are located outside the municipal area. **Combined ground and surface source – adoption of conjunctive use:** Either the groundwater or surface water is not able to fulfil the projected town demand, and therefore it is designed to utilize both the source optimally. Given less than 100% dependability of Surface water, in the low rainfall years, the deficit from the river Dhalai will be met by tube wells and accordingly the water abstraction from groundwater sources will be increased as required.
Selected Alternative	**Selected source:** Surface water source from Manu River is selected for Kailashahar, existing Deo River and new source from Manu river is selected for Kumarghat town. Surface water source mostly comprises of Juri river as no other sources were considered for Dharamanahar town Combined ground and surface source- Existing intake wells and WTP + Proposed DTW and Existing DTW are selected for Ambassa town
3.	**Project Locations**
Description of alternatives	**Location of water intake, WTPs and Service reservoirs:** Location selection is guided by technical feasibility and system hydraulics and obviously DMA distribution. **Water Pipeline Network:** The proposed transmission and distribution network pipelines to convey water to habitations are proposed within the ROW of government owned roads.
Selected Alternative	Vacant Govt. land is selected for Intake, WTPs CWRs and Service reservoirs no alternatives are considered. **Water Pipes** will be laid at most the locations along the existing rising mains and along the roads. Distribution lines will be laid from service reservoirs to the land settlement patches. Pipes will be laid at most the locations along the existing distribution lines and at some places along the katcha path and ULB roads within RoW. Clear water pipes will be laid at most the locations along the existing pipelines and along the vacant right of way (ROW) of government roads. Distribution lines will be laid from Service Reservoirs to the land settlement patches. Pipes will be laid at most of the locations along the existing distribution lines and at some places along the katcha path and ULB roads within RoW. No land acquisition is required for laying of pipes. Water supply pipes will be laid on one or either side of the roads. There are no eco-sensitive or protected areas within the proposed project activity areas. No wildlife is also reported in the project area. During water supply pipe laying works tree cutting is not envisaged as per design.

IV. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. 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 ADB investments.

40. **Screening and categorization.** 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 impacts, and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An 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 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.
(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.** An environmental management plan (EMP), which addresses the potential impacts and risks identified by the environmental assessment, has been prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions are commensurate with the project's impact and risks.

42. **Environmental Audit of Existing Facilities.** ADB SPS, 2009 requires an environmental audit, if a subproject involves facilities and/or business activities that already exist or are under construction, including an on-site assessment to identify past or present concerns related to impacts on the environment. The objective of this compliance audit is to determine whether actions were in accordance with ADB's safeguard principles and requirements for borrowers/clients, and to identify and plan appropriate measures to address outstanding compliance issues.

43. **Public Disclosure.** ADB posts the safeguard documents on its website as well as disclose relevant information in accessible manner in local communities:

(i) for environmental category A projects, 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 implementing agency during project implementation upon receipt.

44. **Consultation and Participation.** ADB SPS require borrower to conduct meaningful consultation[4] with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

45. **Grievance Redress Mechanism.** ADB SPS requires borrowers to establish a mechanism to receive and facilitate resolution of affected people's concerns, complaints, and grievances about the subproject's performance. The grievance redress mechanism shall be scaled to the risks and adverse impacts of the subproject.

46. **Monitoring and Reporting.** The borrower shall monitor, measure, and document the implementation progress of the EMP. If necessary, the borrower shall identify the necessary

[4] As per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues

corrective actions, and reflect them in a corrective action plan. Borrower shall prepare and submit to ADB semi-annual environmental monitoring reports (including COVID 19 compliance) that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual basis until ADB issues a project completion report.

47. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, ADB SPS requires the borrower to update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

48. **Occupational Health and Safety.** ADB SPS requires the borrower[5] to ensure that workers[6] are provided with a safe and healthy working environment, taking into account risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. Borrower shall take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work, including: (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

49. **Community Health and Safety.** ADB SPS requires the borrower to identify and assess risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the subproject, and shall establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

50. **Physical Cultural Resources.** Borrower is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. ADB SPS requires that such resources likely to be affected by the subproject are identified, and qualified and experienced experts assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. When the proposed location of a subproject component is in areas where physical cultural resources are expected to be found as determined during the environmental assessment process, chance finds procedures included in the EMP.

51. **ADB SPS International Best Practice Requirements.** ADB SPS, 2009 requires that, during the design, construction, and operation of the project, the executing agency shall apply pollution prevention and control technologies and practices that are consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety (EHS) Guidelines. (IFC's General EHS

[5] In case where responsibility is delegated to subproject contractors during construction phase, borrower shall ensure that the responsibilities on occupational health and safety are included in the contract documents

[6] Including nonemployee workers engaged by the borrower/client through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

Guidelines[7] and Sector Specific [Water and Sanitation] Guidelines[8]). These standards contain performance levels and measures that are normally acceptable and applicable to projects. 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 PIUs will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMU and PIUs will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

B. National Environmental Laws

52. The implementation of the subprojects will be governed by Government of India and State of Tripura and other applicable environmental acts, rules, regulations, and standards. These regulations impose restrictions on the activities to minimize or mitigate likely impacts on the environment. It is the responsibility of the project executing and implementing agencies to ensure subprojects are consistent with the legal framework, whether applicable international, national, state, or municipal or local. Key standards include those related to drinking water quality, air quality, effluent discharge, and protected areas. Compliance is required in all stages of the subprojects including design, construction, and operation and maintenance.

53. **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.

54. **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.

[7]https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES

[8]https://www.ifc.org/wps/wcm/connect/e22c050048855ae0875cd76a6515bb18/Final%2B%2BWater%2Band%2BSanitation.pdf?MOD=AJPERES

Table 5: Relevant Rules and regulations National and International

Sr. No.	Law	Description	Applicability in the project
1.	EIA Notification	The EIA Notification of 2006 set out the requirement for environmental assessment in India. Environmental Clearance is required for certain defined activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence.	No project water supply components attract provisions of EIA notification 2006 and its amendment till date. Sand mining for construction works (if required), requires environment clearance under EIA act. (list of already approved sand mines in Tripura is available on TSPCB website[9]) PIU/PMU has to ensure that contractor is procuring mining material from approved mines only or get EC for new mines.
2.	Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments (1987)	Act was enacted to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, by Central and State Pollution Control Boards and for conferring on and assigning to CPCB/SPCBs powers and functions relating to water pollution control. Such projects have to obtain Consent to Establish (CTE) under Section 25 of the Act from Tripura State Pollution Control Board (TSPCB) before starting implementation and Consent to Operate (CTO) before commissioning.	No project water supply components attract provisions of Water act and not requiring CTE and CTO from TSPCB. No CTE and CTOs are required for WTPs in Tripura
3.	Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	This Act was enacted to achieve prevention, control and abatement of air pollution activities by assigning regulatory powers to Central and State boards for all such functions. The Act also establishes ambient air quality standards.	Following will require CTE and CTO from TSPCB: Establishment of DG sets more than 1 MVA. Batching Plant, and Hot mix plants, if any If ready mix concrete and hot mix bitumen is procured from third party, contractor must ensure that the plants, from where material is being purchased is having valid CTE & CTO and copy should be collected from third party and submitted in PIU
4.	Environment (Protection) Act, 1986 and CPCB Environmental Standards. (National Ambient Air Quality Standards 2009 and amendments)	Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards.	Ensure applicable standards for ambient air quality. Ensure Emission Limits standards for New DG Sets Ensure stack height standards Requirement for DG Sets. Error! Reference source not found. provides applicable standards for ambient air quality. Error! Not a valid result for table. provides vehicular emission norms

[9] https://tspcb.tripura.gov.in/sand-mining-ec/

Sr. No.	Law	Description	Applicability in the project
5.	Noise Pollution (Regulation and Control) Rules, 2000 amended up to 2010.	Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones.	Ensure applicable noise standards and noise limits for DG sets. Error! Reference source not found. provides applicable noise standards
6.	Central Motor Vehicle Act Central Motor Vehicle Rules and (Amendment) Rules (1988 and amendment thereafter)	Objective of this Act is to check vehicular air and noise pollution. Vehicles to be used for construction and other purposes need to meet the standards and certificates prescribed as per the Rules, 1989 to control noise, pollution, etc.	Ensure vehicle exhaust emission standards.
7.	Ancient Monuments and Archaeological Sites and Remains Act, 1958 and Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 Tripura Ancient Monuments and Archaeological Sites and Remains Act 1997	The Act designates areas within 100 meters (m) of the "protected monument/area" as "prohibited area" and beyond that up to 200 m as "regulated area" respectively. No "construction" is permitted in the "prohibited area" and any construction activity in the "regulated area" requires prior permission of the Archaeological Survey of India (ASI).	No ASI Monuments falls under impact area of any of the component of this package and no clearance from ASI is required.
8.	The Sexual Harassment of Women at workplace (Prevention, Prohibition and Redressal) Act, 2013	Whereas sexual harassment results in violation of the fundamental rights of a woman to equality under article 14 and 15 of the Constitution of India and her right to life and to live with dignity under article 21 of the Constitution and right to practice any profession or to carry on any occupation, trade or business which includes a right to safe environment free from sexual harassment	Applicable
9.	Labor Laws upto 2019	The contractor shall not make employment decisions based upon personal characteristics unrelated to job requirements. The contractor shall base the employment relationship upon equal opportunity and fair treatment and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment or retirement, and discipline. The contractor shall provide equal wages and benefits to men and women for work of equal value or type.	Applicable labor laws including amendments issued from time to time applicable to establishments engaged in construction of civil works. Error! Reference source not found. provides applicable labor laws including amendments issued from time to time applicable to establishments engaged in construction of civil works.
10	Biodiversity Act of 2002	The Biodiversity Act 2002 primarily addresses access to genetic resources and associated knowledge by foreign individuals, institutions or companies, to ensure equitable sharing of benefits arising out of the use of these resources and knowledge to the country and the people.	Not applicable

Sr. No.	Law	Description	Applicability in the project
11	Wildlife Protection Act, 1972 amendment 1991	This overarching Act provides protection to wild animals, birds, plants and matters connected with habitat protection, processes to declare protected areas, regulation of wildlife trade, constitution of state and national board for wildlife, zoo authority, tiger conservation authority, penalty clauses and other important regulations.	None of the components of the subproject are located within the protected Area. Therefore, this act is not applicable.
12	The Indian Forest Act, 1927; Forest (Conservation) Act, 1980, amended 1988; Forest (Conservation) Rules, 1981 amended 1992 and 2003; and Guidelines for Diversion of Forest Lands for Non-Forest Purpose under the Forest (Conservation) Act, 1980	The Forest (Conservation) Act prevents the use of forest land for non-forest uses without the clearance from Ministry of Environment, Forests and Climate change (MoEFCC), Govt. of India For tree felling NOC will be required	Not applicable; none of the components of the subproject are in forest.
13	Wetlands (Conservation and Management) Rules, 2010 & 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 permit any of the prohibited activities on the recommendation of Central Wetlands Regulatory Authority.	No sub project components will be planned nearby the designated wetland
14	Solid Waste Management Rules 2016	Rules to manage municipal solid waste generated; provides rules for segregation, storage, collection, processing, and disposal Responsibility of Solid Waste Generator: Segregate and store the waste generated in three separate streams namely bio- degradable, non-biodegradable and domestic hazardous wastes in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities from time to time.	Solid waste to be generated at proposed facilities shall be managed and disposed in accordance with the MSWM Rules Contractor to follow all the rules during construction works.
15	Construction and Demolition Waste Management Rules, 2016	Rules to manage construction and to waste resulting from construction, remodeling, repair, and demolition of any civil structure. Rules define “construction waste” as waste comprising of building materials, debris resulting from construction, re-modeling, repair and demolition of any civil structure.	Construction and demolition waste generated from the project construction shall be managed and disposed as per the rules
16	Hazardous Waste Rules 2016	The occupier of Hazardous waste shall be responsible for safe and environmentally sound management of hazardous and other wastes. As described in rules, including (a) prevention; (b) minimization; (c) reuse, (d) recycling; (e) recovery including co-processing; (f) safe and legal disposal.	Contractor to comply all the requirements of this Act during construction works.

Sr. No.	Law	Description	Applicability in the project
17	The Child Labour (Prohibition and Regulation) Amendment Act, 2016	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. 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	No children between the age of 14 to 18 years will be engaged in hazardous working conditions.
18	Notification from Ministry of Jal Shakti (Department of Water Resources, River Development and Ganga Rejuvenation), central ground water authority on 20th September 2020. Guidelines to regulate and control groundwater extraction in the country	No Objection Certificates for ground water extraction to industries or infrastructure projects or Mining Projects etc.- All new/existing industries, industries seeking expansion, **infrastructure projects** and mining projects abstracting ground water, unless specifically exempted, will be required to seek No Objection Certificate from Central Ground Water Authority or, the concerned State/ UT Ground Water Authority as the case may be.	**Applicable for Ambassa town** – Proposed new tube wells will require permission for groundwater withdrawal from CGWA. No new tube wells are proposed in other 3 towns.
International treaties			
19	Ramsar Convention, 1971	The Ramsar Convention is an intergovernmental treaty that provides the framework for national action and international co-operation for the conservation and wise use of wetlands and their resources. India is one of the signatories to the treaty. The Ramsar convention made it mandatory for the signatory countries to include wetland conservation in their national land use plans.	No Ramsar protected area near proposed project towns
20	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 permit any of the prohibited activities on the recommendation of Central Wetlands Regulatory Authority.	Not applicable as subprojects components of different sectors are not located within any designated wetland area.
21	Montreal Protocol 1992	India is a signatory of this convention which aims for reduction in the consumption and production of ozone-depleting substances (ODS), while recognizing differences in a nation's responsibilities. Ozone depleting substances are divided in two groups Chlorofluorocarbons (CFCs) and Hydro chlorofluorocarbons (HCFCs).	Not applicable in this project as no ODS are involved in construction works.
22	Basel Convention on Trans-boundary Movement of Hazardous Wastes, 1989	India is a signatory of this convention which aims to reduce trans-boundary movement and creation of hazardous wastes.	Contractor to follow the provisions of Hazardous Waste Rules 2016 for storage, handling, transport and disposal of hazardous waste emerged during construction works.

Sr. No.	Law	Description	Applicability in the project
23	Convention on Migratory Species of Wild Animals (CMS), 1979 (Bonn convention)	CMS, also known as Bonn convention was adopted in 1979 and entered into force on 1 November 1983, which recognizes that states must be the protectors of migratory species that live within or pass through their national jurisdictions, and aims to conserve terrestrial, marine and avian migratory species throughout their ranges. CMS Parties strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them.	Not applicable to this project as no migratory species of wild animals are reported in the project areas.

Table 6: List of NOC Required for Safeguarding the Project

S. No	Construction Activity	Statute under which Clearance is Required	Implementation
1.	Land for project activity	Allotment and approval for specific land use	ULB
2.	Road cutting for pipe laying works	Permission from ULB and PWD (where applicable)	PIU
3.	Establishment of construction camps	Allotment and approval for specific land use	Contractor
4.	NOC for disposal of excess Earth	Construction & Demolition Waste Management Rules, 2016	Contractor
5.	Tree Cutting	State forest department/Revenue	PIU
6.	Hot mix plants, Crushers, Batching plants and DG Set	Consent to establish and consent to operate under Air Act, 1981 from TSPCB	Contractor
7.	Storage, handling and transport of hazardous materials	Hazardous Wastes (Management and Handling) Rules. 2016 Manufacturing, Storage and Import of Hazardous Chemicals Rules, 1989 from TSPCB	Contractor
8.	New Sand mining, quarries and borrow areas	Environmental clearance under EIA Notification 2006	Contractor/ Third Party
9.	Use of vehicles and equipment	Pollution under control certificate (PUC) form RTO	Contractor
10.	Temporary traffic diversion measures	Temporary traffic diversion measure including use of alternate road from District traffic police	Contractor
11.	Use of highway ROW for construction area/ crossing	National Highway Authority of India	PIU
12.	NOC for construction of DTW in Ambassa	Notification from Ministry of Jal Shakti (Department of Water Resources, River Development and Ganga Rejuvenation), central ground water authority on 20th September 2020.	ULB (Already received permission from Water Resource Investigation Division, Govt. of Tripura)
13.	NOC for intake / withdrawal of river water (Kumarghat and Kailashahar for Manu River; Dharamanagar for Juri water.	For Withdrawal of water from Manu and Juri River permission is obtained from Water Resource Investigation Division (WRID)	ULB

55. PMU will be overall responsible for supervision in getting all clearances and provide details to ADB through semi-annual report. PMU will ensure availability of all necessary regulatory clearances and approvals are obtained prior to commencement of works. Respective PIUs, with support of project consultants and DBO contractors, are responsible for obtaining the clearances/permits and ensuring conditions/specifications/provisions are incorporated in the subproject design, costs, and implementation. The PIUs shall report to PMU the status of compliance to clearances/permits as part of the regular progress reporting.

V. DESCRIPTION OF THE ENVIRONMENT

A. Methodology Used for Baseline Study

56. **Data Collection and Stakeholder Consultations.** Data for this report has been primarily collected through comprehensive literature survey, discussion with stakeholder agencies, and field visits to the proposed subproject sites.

57. The literature survey broadly covered the following:

(i) Project details, reports, maps, and other documents prepared by the Govt. of Tripura
(ii) Discussions with Technical experts of the PDMC team, municipal and Nagar Panchayat authorities, relevant government agencies like Tripura State Pollution Control Board (TSPCB) etc.
(iii) Secondary data from previous project reports and published articles, and
(iv) Literature on land use, soil, geology, hydrology, climate, socioeconomic profiles, and other planning documents collected from Government agencies and websites.

B. Physical Resources

1. Location, Area and Connectivity

58. **Tripura** Project towns are in western part of Tripura State, in the northeastern part of India. It is bordered to the north, west, and south by Bangladesh, to the east by Mizoram, and to the northeast Assam. It is third smallest state in India. The capital is Agartala. Baseline status of the 4 project towns is given below.

Table 7: Baseline Characteristic of project towns

Baseline Characteristic	Kailashahar	Kumarghat	Dharmanagar	Ambassa
Location	The Kailashahar lies between 24°19'36.52"N latitude and 92° 0'45.46"E longitude. Kailashahar is a municipal council town, the headquarters of the Unakoti district. It is located along the Bangladesh border. This sub-division is bounded by Bangladesh on the north & west, Dharmanagar Subdivision is located on the eastern side and Southern side is covered by Kumarghat. The town is situated on the bank of river Manu, the longest river of Tripura.	Kumarghat lies between 24.9° 9′ 30″ N latitude and 92° 1′ 47″ E longitude. Kumarghat is a town with Municipal council located in the Unakoti district, Tripura and headquarters of Kumarghat sub-division & Rural Development Block. .	The Dharmanagar lies between 24° 22′ 42.7″ N latitude and 92°10′ 41.9″ E longitude. Dharmanagar is a town with a municipal council in the North Tripura district of Tripura. At present Dharmanagar is bound by Moulvibazar of Sylhet, Bangladesh in the North, Karimganj district of Assam in the East and Mizoram state in the South and Kailashahar subdivision of Unakoti district in the west.	Ambassa is located in between 23°55'10.8"N latitude and 91°50'42"E longitude. Ambassa is the head quarter of the Dhalai district of Tripura. Situated in rural region of Tripura, it is one among the 5 blocks of Dhalai district.
Area	The total area of the town approximately is 6.19 Sq. km. It is the fourth largest urban Centre of Tripura divided into 17 wards	The total Area of town is 8.23 Sq.km, divided into 15 wards.	The town covers an area of about 10.69 sq. km. Dharmanagar is the second largest urban body in the state of Tripura, divided into 25 wards after Agartala	It has a total area of 15.347 sq.km and divided into 15 wards
Connectivity	Kailashahar is 140 km from Agartala. India NH-44 passes through the town,. The nearest rail connection is in Kumarghat which is at a distance of around 25 Km & nearest airport is Agartala Airport although Kailashahar has also airport but it's not functional	Kumarghat is 120 km from Agartala . It is well connected by Road & Rail network. Since NH-44 passes through the town, it is well connected to Ambassa, Teliamura, Agartala, Panisagar, Dharmanagar. The nearest railway station is Kumarghat. The nearest airport is Agartala Airport.	Dharamnagar is 160 km from Agartala. It is well connected by Road & Rail network. Since NH-208 A passes through the town,. The town has good train connectivity from Dharmanagar railway station. Daily multiple passenger trains run from Dharmanagar to Assam and state capital Agartala. The nearest airport from Dharmanagar is Silchar and airfield at Agartala.	Dharamnagar is 182 km from Agartala. It is well connected by Road & National Highway 8 passes through the town. Ambassa is also connected through railways. Ambassa district has broad gauge rail connectivity on the Lumding-Agartala line. The nearest airport is Maharaja Bir Bikram Airport in Agartala.

Baseline Characteristic	Kailashahar	Kumarghat	Dharmanagar	Ambassa
Topography	Kailashahar town is situated on the bank Manu River has highest elevation of 18 meter & lowest elevation as 16 meters approx. Most of the area of the town are plains. The valley / plain areas in the town consist mainly of Manu plain and partly of Deo plain. Much of these plain areas are under agricultural land due to its rich humus contents deposited by this river from the hills range.	Kumarghat town is situated on the bank Manu River About 75 percent of the geographical areas are characterized by hilly terrain covered with dense forests and only about 25 percent are plains.Kumarghat town has an average elevation of 36 meters.	Average elevation of Dharmanagar Town is 21 m above mean sea level. Undulating hilly terrain and uneven plains characterize the topography of the Sub- Division. The Kakri River passes through the heart of Dharmanagar	The Ambassa has an average elevation of 89 m. Ambasa is surrounded by hilly terrain from 3 sides. The river Dhalai passes from the north of Ambassa town. The area of Ambassa Municipal Council is mostly covered by undulating hilly land & Forest area, although there are some plain lands here and there.
Soil	In general Soil of the area is acidic having moderate to high absorptivity and low to moderate productivity. It shows low fertility of soil; however, the concentration of nitrogen is higher.	In general Soil of this district is acidic and pH varies from 4.6 – 6.9. having moderate to high absorptivity and low to moderate productivity. It shows low fertility of soil; however, the concentration of nitrogen is higher.	In general, soils of the area are acidic in nature. Nitrogen and phosphate are low, available potash is medium to high, calcium, magnesium and Sulfur are deficient in these soils. In the area lateritic soil is found in tilla (hilly / small mounds) area, younger soils or river valley soils are found along all major river courses. Clayey soils are found in paddy fields. Apart from these, sandy loam, clayey loam and loamy soils are also available.	The soil found in the hilly tracks of Ambssa in Dhalai district in particular ranges between red lateritic soil and sandy loam to silty clay soil.
Seismicity	Entire north-eastern region of India extending to the Himalayan arc in the north and Burmese arc to the east is among the most seismically active regions of the world. The whole of Tripura State falls under seismic zone V and is highly vulnerable to earthquakes. Hilly areas are highly vulnerable to earthquake. All the 4 towns are vulnerable to earthquake			
Vulnerability-landslides	Flood prone area of Kailashahar are - Jalai, Latiapura Rangautti, Durganagar and Kritantali Saiderpar	The flood prone areas of kumarghat are Nidevi, Sonaimuri, Notingcherra, Mati Colony, Kumarghat MC Ward No-6, Ward No-3 Tarapur, Indira Colony,	Flood prone areas of the Dharmanagar Municipal Council are identified and broadly grouped as follows, i) Kakri River Basin- Signal Basti, Ward-23; Back Side of	Entire Dhalai district has identified flood prone. Flood Prone Zone of Ambasa area are Kulai Purba Nalichara, Paschim Balaram, Paschim, Lalchari, Vivekananda,

Baseline Characteristic	Kailashahar	Kumarghat	Dharmanagar	Ambassa
		Krishnanagar, Radhanagar, Jagannathpur and Kanchanbari.	Assam Oil Dipo, Ward-22; Jamirala, Ward-10; Dighalbank, Ward-03 ii) Juri River Basin - West Batarasi, Ward No.23; Mantala, Ward No.18; Padmapur River Side, Ward – 20; South Nayapara, Ward-12,13,14 iii) Sukna cherra Basin- Montala, Jail Road, Ward -18; Algapur, Ward -17; Shibbari Cherepar, Ward -7; Sukanta Sarani (Back side), Ward-6 Land slide prone areas of Dharamanagar - Jaithang in Bagbassa area & Balidum in Ananda Bazar area	Nagar, Shanti palli in Ambassa.
Climatic Conditions	The climate in Tripura displays characteristics that are typical of the hilly and mountainous region. Tripura records a low average temperature of 10 degree Celsius in the winter season which rises to a maximum average of 35 degree Celsius in the summer. The altitude of the state also influences the climatic conditions. January is the coldest while July is the hottest. Humidity is generally high throughout the year. In the summer season the relative humidity is varied from 50 percent to 74 percent whereas in the rainy season it is over 85 percent. Rainy season generally starts by about the end of May, but thundershowers usually occur from April to the break of the monsoon. The rainy season continues up to September. The maximum rainfall is usually recorded during the month of June – July. The months of October and November constitute the post monsoon season. Highest rainfall is recorded in between month of May & July. Most of the towns in Tripura has almost similar climatic conditions and rainfall. Average rainfall of Tripura is 2200 mm. Average rainfall of Kailashahar, Kumarghat, Dharmanagar and Ambassa are 2855 mm, 2090 mm, 1716 mm, and 2100 mm respectively. There is no weather station in Kumarghat and Ambassa. Kumarghat is adjacent town to Kilashahar and both towns have same weather conditions. For Ambassa average rainfall data of Dhalai district is used. **Figure 64** below shows month wise rainfall and **Figure 65** depicts the month of rainy days of the project towns.			
Surface water	The State of Tripura is well endowed with surface water resources. As many as ten major rivers are reported to generate an annual flow of 793 million m^3 of water. All rivers are rain-fed and ephemeral in nature. All major rivers originate from hill ranges and show a typical drainage pattern called trellis except a few instances of dendrite pattern. Rivers in the project towns are described below. There are numerous small ponds and water bodies within the towns. **Manu River:** Manu River plays major role in Tripura region with unique features starts from its origination in the mountainous regions to moving into the plains in India and Bangladesh thereafter. Length of river is 167 km. River has Northerly flow via			

Baseline Characteristic	Kailashahar	Kumarghat	Dharmanagar	Ambassa
	Kailashahar to Bangladesh. **Kailashahar & Kumarghat** (India) and Moulvibazar (Bangladesh) are major cities near Manu River. During its course from northeastern India to neighboring country of Bangladesh, this river has a course with several tributaries until joining its course with Manumukh in Bangladesh based on Kushiyara River in the Maulvi Bazar there. As a renowned trans-boundary river, it remains crucial in India as much as in Bangladesh where the course ends. ***Tributaries -*** Kushiyara River in Maulvi Bazar region in Bangladesh remains the biggest of tributaries that merges with Manu River. Smaller ones are in the Indian regions while major ones lie in Bangladesh. Several big and small canals are connected with this prominent river that serves the important role of tributaries on various places of its course from India to Bangladesh **Deo River:** One of the important rivers of Tripura is Deo River. The length of this river is 132 Km Deo River originated from Jampui hill, northly flows through Kanchanpur valley and meets with Manu River. This perennial river is a part of Ba rak sub-basin which in turn forms a part of Meghna basin. **Kakri/ Juri River:** River Kakri/ Juri is the earlier name of River Juri after Kakri Bridge, Krishnapur. Earlier Kakri was a branch of Juri flowing from Krishnapur towards Bangladesh. But currently the Juri River after Krishnapur is almost dry and the water from Juri flows through Kakri. Presently the Kakri River has changed her name as Juri. The Juri River is a trans-boundary river in India and Bangladesh. It rises in the Jampui Hills of the Indian state of Tripura. It enters Kulaura Upazila of Maulvi Bazar District of Bangladesh. Later it joins Kushiyara River. The Juri has a length of 79 km having catchment area of 482.46 Sq. km. The annual flow in the river Juri is 15709 thousand m^3 which is 1.98 % of the total flow. The Juri River is a transboundary river in India and Bangladesh. Juri river passes through **Dharamanagar** town. **Dhalai River:** The Dhalai River (also known as Dhala River) a trans-boundary river in India and Bangladesh. It rises in the mountains of the Indian state of Tripura. It enters Kulaura Upazila of Maulvibazar District of Bangladesh. Later it joins Manu River in Rajnagar Upazila. The co-ordinates of Dhalai River at Ambassa are 23.55'128" N and 91.51'204" E in degrees minutes seconds (DMS). It originates from Atharamura Hill and is 117 km long. Some of the popular riverside townships of Dhalai River are the towns of **Ambassa,** Baralutma and Kamalpur **Figure 66** depicts the entire watershed map of entire state of Tripura depicting major rivers while **Figure 67 to 70** depicts the watershed map of Kailashahar, Kumarghat, Dharmanagar and Ambassa respectively. **Water quality data – Raw and Treated Water:** Testing results shows that treated water is exceeding the Indian standard permissible limits for Turbidity at Kailashahar, Dharamanagar and Ambassa. Residual chlorine is generally higher at treatment plant and eventually reduces while reaching consumer end. Test results is presented in **Table 8.**			
Groundwater	The State of Tripura is occupied by the rocks ranging in age from Upper Tertiary to Quaternary. Mobile trough geo-synclinal deposition of Barail group followed by flysch type of Surma &Tipam sediments, overlain by Dupitila formation, is noticed in the State. Most of the longitudinal synclinal valleys of the state are the basins of deposition of recent formation. Recent alluvium occurs along the streams and the flood plains of major rivers. Ground water occurs under unconfined condition in Dupitila, Recent & Tipam formations. Besides, it also occurs under confined to semi-confined conditions in Tipam formation at considerable depth. Recharge areas for the deeper aquifer lies in the adjacent anticlinal hills. Wherever a good thickness of impermeable clay beds underlie & overlie the saturated granular zones, auto flow			

Baseline Characteristic	Kailashahar	Kumarghat	Dharmanagar	Ambassa
	artesian conditions have been found in the valleys, which are the discharge area. The artesian flowing conditions occur in patches both at shallow depth and at deeper depth. The auto discharge of the flowing wells in the State ranges from 100 to 6000 lph. Ground water resources have been assessed block-wise for recharge worthy area. Total Annual Ground Water Recharge of the State has been assessed as 1.31bcm and Annual Extractable Ground Water Resource as 1.06bcm. The Annual Ground Water Extraction is 0.103bcm and Stage of Ground Water Extraction is 9.7 %. All the 59 assessment units have been categorized as **'Safe'**. As compared to 2020 assessment, there is no significant change in ground water recharge and ground water extraction in the State. **Groundwater Quality:** Water Quality of groundwater is assessed by DWS. It can be seen from **Table 9** that the except iron contained all tested parameters are within the limit of Indian standard and WHO acceptable standards. Overall, the ground water quality in the project areas in good except iron content.			
Air quality	There are no data on ambient air quality of Project towns, which is not subject of monitoring by the Tripura State Pollution Control Board (TSPCB) because there are no major industries located in and around. Other than traffic there is no significant source of pollution, so levels of oxides of Sulphur and nitrogen are likely to be well within the National Ambient Air Quality Standards (NAAQS). Baseline air quality will be established at specific project locations before start of the construction, this is included in the EMP. Baseline noise quality will be established at specific project locations before start of the construction, this will be included in the SEMP. Baseline monitoring will be conducted by the contractor prior to start of construction by engaging a government approved laboratory.			
Noise levels	TSPCB conducted noise level monitoring at different location in town of Tripura. Noise level data for the months of December 2020 are presented in **Table 10**. Results indicate that at Kailashahar and Kumarghat noise level are already exceeding the permissible limits in Residential and silence zone, in Kumarghat along with residential and silence zone its exceeding in commercial zone also and at Industrial and silent zone at Dharmanagar for day time. For night time Noise level are exceeding Indian permissible limits and WHO guidelines at silent zone for Dharmanagar, Kailashahar and Kumarghat and Commercial zone for Kumarghat.			
Ecological Resources	Tripura a small state of North-east of India having rich content of floral and faunal diversity. Total area of the state is 10,491.69 sq km in which forest area is 6294.29 sq km. Among the forest area percentage of Protected Areas (Pas) in Tripura is about 9.59%. There are 6(six) PAs throughout state which includes 4(four) Wildlife Sanctuary and 2(two) National Parks. National Parks are located within the Wildlife Sanctuary. Rowa and Baramura Eco Park are nearest protected areas near project towns. There are no protected areas, wetlands, mangroves, or estuaries in or within the subproject towns. Forest map of Unakoti district, where Kailashahar, Kumarghat is located, provided in **Figure 62 - 64** shows Forest map of project areas. There is no forest area nearby Kailashahar, Kumarghat, Dharmanagar and Ambassa. Rowa wildlife sanctuary (protected area) located 14 km east of Kailasahar; 20 km south west of Kumarghat; 9 km south of Dharmanagar and, 52 km south west of Ambassa. Baramura Eco Park, Teliamura, Khowai District is located 71 km south west of Kailasahar; 58 km south west of Kumarghat; 83 km south west of Dharmanagar and, 28 km south west of Ambassa			

Baseline Characteristic	Kailashahar	Kumarghat	Dharmanagar	Ambassa
	The village Uttar Unakoti Reserve Forest (RF) and Eco park is located in Kailashahar C.D.Block of Unakoti District in the State of Tripura in India. It comes under Gournagar Community Development Block. The nearest town is Kailashahar, which is about 9 km away from Uttar Unakoti Reserve Forest and distance from Kumarghat is 15 km. The village Dakshin Unakoti Reserve Forest is located in Kumarghat C.D.Block of Unakoti District in the State of Tripura. It is governed by South Unakoti Gram Panchayat. Kumarghat, which is about 15 km away from Dakshin Unakoti Reserve Forest. Deo Reserve Forest village is in Kumarghat Tehsil of North Tripura district in Tripura, India. It is situated 8 km away from sub-district headquarter Kumarghat and 35 km away from district headquarter Kailashahar. Juri RF village is located about 20 km from Dharmanagar. Choraibari RF is located about 11 km from Dharmanagar. There are few reserves forest away from the Ambassa town. Nearest is Kulai Reserve Forest, which is located about 5.16 Km from Ambassa town. **Flora:** Nearby the project sites trees are mainly Rubber Tree (*Hevea brasiliensis*), Teak (*Tectona grandis*) and bamboo. Common species noted in and around Kailashahar Kumarghat and Dharamanagar towns are, Rubber Tree (*Hevea brasiliensis*), Teak (*Tectona grandis*), Palm (*Areca catechu*), Needle wood tree (*Schima wallichii*), Garjan (*Dipterocarpus turbinatus*), Mango (*Mangifera indica*), Coconut (*Cocos nucifera*), Breadfruit (*Artocarpus integrifolia*). Common species noted in and around Ambassa town, Teak (*Tectona grandis*), Sal (*Shorea robusta*), Gamar (*Gmelina arborea*), Chamal (*Artocarpus chaplasa*), Garjan (*Dipterocarpus turbinatus*), Koroi (*Albizia procera*), Sundi (*Michelia Montana*) and Rubber Tree (*Hevea brasiliensis*). The following trees are found at proposed roads and drains in the cluster IIIA are: *Magnifera Indica, Syzygium cumini, Cerbera odollam, Tectona grandis, Neolamarckia cadamba, Cerbera odollam, Bombax ceiba, Gmelina arborea, Morinda tinctoria, Ziziphus mauritiana , Ficus religiosa, Terminalia chebula, Artocarpus heterophyllus, Delonix regia, Tamarindus indica, Mimusops elengi etc.* Common Bamboo species recorded across all the subproject towns ar Ba rak (*Bambusa balcooa*), Bari (*Bambusa polymorpha*), Mritinga (*Bambusa tulda*), Muli (*Melocanna baccifera*), Kai (*Bambusa nutans*), Paora (*Bambusa teres*), Rupai (*Dendrocalamus longispathus*), Dolu (*Neohuzeaua dullooa*), Makal (*Bambusa pallida*), Pecha (*Dendrocalamus hamiltonii*), Kailyai (*Oxytenanthera nigrociliata*), Kanak kaich (*Bambusa offinis*), Lanthi bans (*Dendrocalamus strictus*), Tetua (*Bambusa spp*.), Ish (*Bambusa spp*.), Jai (*Bambusa spp*.), Bombash (*Bambusa spp*.), Sairil/Wadu bamboo (*Melocalamus compactiflorus*), Bosai (*bambusa spp.).* **Fauna:** The subproject locations are plain agricultural and residential/commercial lands. Therefore, existence of wild fauna is not reported. Only domestic animals such as pigs, dogs, cows, buffalos, cats and goats are present in the subproject areas. Fauna in and around forest area are, Palm civet cat (*Paradoxurus hermaphroditus*), Jungle cat (*Felis chaus*), Barking Deer (*Muntiacus muntjak*), Common langur (*Presbytis entellus*), Rhesus Macaque (*Macaca mulata*), Phayre's leaf Monkey (*Trachypithecus phayer*), Spectacle Langur (*Tachypithecus obscures phayrei*).			

Baseline Characteristic	Kailashahar	Kumarghat	Dharmanagar	Ambassa
	List of some Fish Species found in **Manu River** is shown below. These are all LC (Least Concerned). *Psammogobius biocellatus*, *Glossogobius giuris*, *Chanda nama*, *Parambassis baculis*, *P. ranga*, *Securicula gora*, *A. morar*,*Rasbora daniconius*. Similarly, in **Juri river** all fishes of least concern category is reported, some of which are. *Puntius sophore*, *Puntius sarana*, *Puntius ticto*, *Puntius guganio*, *Labeo gonius*, *Labeo calbasu*, *Labeo bata*, *Labeo rohita*, *Labeo angra*, *Securicula gora*, *Salmostama phulo*, *Salmostoma bacalia*, *Dvario devario*, *Amblypharyngodon mola*, *Osteobrama cotio*, *Esomus danricus*, *Cirrhinus reba*, *Cirrhinus cirrhosis, Cyprinus carpio, Catla catla, Mystus vittatus, Hemibagrus menoda, Sperata seenghala, Channa punctatus, Channa marulius, Anabas testudineus, Notopterus chitala, Notopterus notopterus, Lepidocephalichthys, Ailia coila, Silonia silondia, Macrobrachium rosenbergii, Macrobrachium lamarrei, Clarias batrachus, Oreochromis mossambicus, Tetraodon cutcutia* etc. Common fishes of **Dhalai river** are *Puntius sarana, Puntius ticto, ,Labeo gonius, Labeo calbasu, Labeo bata, Labeo rohita, Labeo angra, Securicula gora, Salmostama phulo, Salmostoma bacalia, , Amblypharyngodon mola, , Esomus danricus, Cirrhinus reba, Cirrhinus cirrhosis, Cyprinus carpio, Catla catla, Mystus vittatus, Hemibagrus menoda, Channa punctatus, Channa marulius, Anabas testudineus, Notopterus chitala, Notopterus notopterus, Lepidocephalichthys, Ailia coila, Silonia silondia, Macrobrachium rosenbergii, Macrobrachium lamarrei, Clarias batrachus, Oreochromis mossambicus, Tetraodon cutcutia* etc. The **Rowa wildlife sanctuary** was notified in July ,1988 by the forest Department, Government of Tripura extending thereby special protection under the wildlife (protection act) 1972 over an area of 85.85 Hac. Of erstwhile protected forests (unclassified open Government Forest) in mouza Rowa of tehsil Panisagar under Dhamanagar subdivision.It is the only wildlife sanctuary in north Tripura particularly rich in birds and reptiles. Large flocks of migratory waterfowls congregate in the several water reservoirs developed in this protected area. This Sanctuary has a large wetland (approximately 20 % of the area), hygrophytes' association of ferns and water plants occur on the edges of the water bodies. **Location of Rowa wildlife sanctuary-** 14 km east of Kailasahar; 20 km southwest of Kumarghat; 9 km south of Dharmanagar and, 52 km south west of Ambassa. **Baramura Eco Park, Teliamura, Khowai District:** Rolling hills of Baramura is characterized by thickly forested hill ridges varying in altitude between 90 m to 136 m and valleys with dense bamboo patched, herbs & shrubs is home to diverse ecological biodiversity. The Baramura eco-park, nestled in the verdant forest at the fringes of Baramura –Deotamura reserve forest where Baramura hill range meets the plains at about 37 km from Agartala on the NH-44, is a manifestation of this conservation need of the ecological biodiversity of Baramura hills. **Location of Baramura Eco park:** 71 km south west of Kailasahar; 58 km south west of Kumarghat; 83 km south west of Dharmanagar and, 28 km south west of Ambassa			
IBAT screening	There is a key biodiversity area within 7 Km radius to Kailashahar town, Raj kandi Reserved Forest which is situated in Bangladesh. Other than this there is 3 protected areas and 6 nos. KBA within	No protected area or KBA is within the 10 km area from project site. 4 nos. of protected area and 7 nos. of key biodiversity area within the buffer of 10 to 50km radius of the subproject	No protected area or KBA is within the 10 km area from project site.2 nos. of protected area and 8 nos. of key biodiversity area within the buffer of 10 to 50km radius of the subproject	No protected area or KBA is within the 10 km area from project site. 4 nos. of protected area and 5 nos. of key biodiversity area within the buffer of 10 to 50km radius of the subproject

<table>
<tr><th>Baseline Characteristic</th><th>Kailashahar</th><th>Kumarghat</th><th>Dharmanagar</th><th>Ambassa</th></tr>
<tr><td></td><td>10 to 50 km radius of the subproject
A total of 40 IUCN red list (CR and EN) species reported within 50km radius. Out of these 40 IUCN red list species, 14 species are classified as Critically Endangered (CR) and 26 species are Endangered (EN). Birds are common which includes 13 species (CR-7, EN-6), 14 reptile (CR- 6, EN-8), 11 mammals (CR- 1, EN-10).
Key biodiversity area and Protected area within the 10 km area of Kailashahar town is shown in Figure 74</td><td>A total of 82 IUCN Red List (Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) species are reported within 50km radius. Out of these 82 IUCN Red listed species, 13 species are classified as Critically Endangered (CR) and 26 species are Endangered (EN) and 43 are Vulnerable species. Majorly Birds are common species which includes 25 species (CR-6, EN-6, and VU-13), 21 Reptiles (CR- 6, EN-7, and VU-8), 27 Mammals (CR- 1, EN-10, and VU-16).
Key biodiversity area and Protected area within the 10 km area of Kumarghat town is shown in Figure 75</td><td>A total of 36 IUCN red list (CR and EN) species reported within 50km radius. Out of these 36 IUCN red list species, 12 species are classified as Critically Endangered (CR) and 24 species are Endangered (EN). Mammals are common species which includes 11 species (CR-1, EN-10), 11 reptile (CR- 4, EN-7), 13 birds (CR- 7, EN-6)).
Key biodiversity area and Protected area within the 10 km area of Dharmanagar town is shown in Figure 76</td><td>A total of 80 IUCN red list (VU, CR and EN) species reported within 50 km radius. Out of these 80 IUCN red list species, 12 species are classified as Critically Endangered (CR) and 25 species are Endangered (EN). Mammals are common species which includes 11 species (CR-1, EN-10), 12 reptile (CR- 5, EN-7), 12 birds (CR- 5, EN-7)).
Key biodiversity area and Protected area within the 10 km area of Ambassa town is shown in Figure 77</td></tr>
<tr><td>Economic Development</td><td colspan="4">Land Use:
<table>
<tr><th rowspan="2">S. No</th><th rowspan="2">Land Use Category</th><th colspan="4">Percentage</th></tr>
<tr><th>Kailashahar</th><th>Kumarghat</th><th>Dharmanagar</th><th>Ambassa</th></tr>
<tr><td>1.</td><td>Residential</td><td>33</td><td>35</td><td>25.86</td><td>15.37</td></tr>
<tr><td>2.</td><td>Commercial</td><td>0.75</td><td>1</td><td>1.11</td><td>0.12</td></tr>
<tr><td>3.</td><td>Industrial</td><td>0.2</td><td>0</td><td>0.8</td><td>0</td></tr>
<tr><td>4.</td><td>Public and Semi-Public</td><td>0.24</td><td>3</td><td>32.63</td><td>0.48</td></tr>
<tr><td>5.</td><td>Mixed Use</td><td>1</td><td>1</td><td>20.11</td><td>0</td></tr>
<tr><td>6.</td><td>Recreational</td><td>0.69</td><td>6</td><td>13.58</td><td>0.93</td></tr>
<tr><td>7.</td><td>Transportation and Communication</td><td>3.89</td><td>16</td><td>5.33</td><td>4.33</td></tr>
<tr><td>8.</td><td>Primary Activity</td><td>1.43</td><td>10</td><td>0.17</td><td>11.55</td></tr>
</table></td></tr>
</table>

Baseline Characteristic	Kailashahar	Kumarghat	Dharmanagar	Ambassa

9.	Protective and Undevelopable Use Zone	8.88	21	0.02	54.29
10.	Others	49.92	7	0.4	12.94
11.	**Total**	**100**	**100**	**100**	**100.**

Source: GIS base Master plans of towns

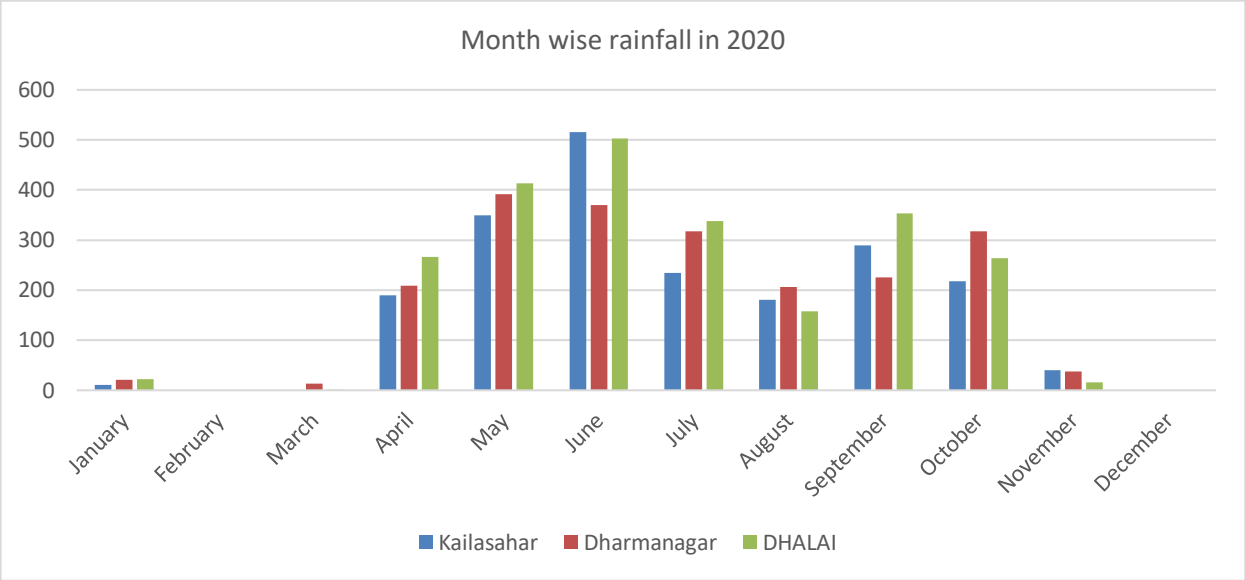
Industries. Industrial development project towns are very limited. **Table 11- 13** lists, industries near project towns). Town Map showing land use pattern are presented in **Figure 78-81**

Demographic Parameters

Parameter	Kailashahar	Kumarghat	Dharmanagar	Ambassa
House holds	5631	3214	9952	4062
Population	22405	13,054	40,595	16285
Male	11153	6,517	20,161	8523
Female	11252	6,537	20,434	7762
Children under the age of 0-6	2098	1422	3850	1867
No of Wards	15	13	25	15
Schedule Caste (% of total Population)	23.76 %	27.25 %	12.64	22.44 %
Schedule Tribe (% of total Population)	3.94 %	5.89 %	1.15	11.48 %
Hinduism (% of total Population)	(92.37%)	(96.19%),	92.37%),	95.92%),
Islam (% of total Population)	(6.88%).	(0.64%)	6.88%).	0.42%),
Others (Buddhism, Christianity, Sikhism and Jainism) (% of total Population)	Less than 1 %	Christianity (0.30%), Sikh (0.06%), Buddhist (2.64%), Jain (0.06%), Others (0.04), Not Stated (0.08%)	Less than 1 %	(2.75%), (Sikh (0.17%), Buddhist (0.70%), Jain (0.01%), others (0.01), Not Stated (0.03%)
Sex ratio (female per 100 males	1009	1003	1014	911
Total literacy rate	94.87%	93.61 %	95.12 %	84.87 %
Male literacy rate	95.98%	96.50 %	96.04 %	86.82 %

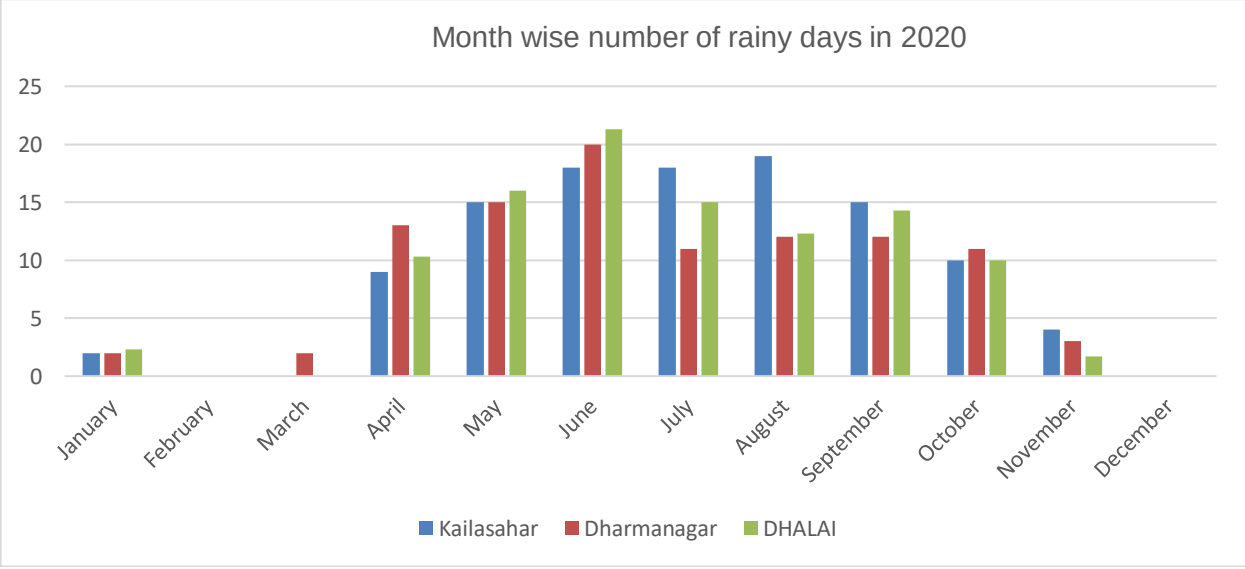
Baseline Characteristic	Kailashahar	Kumarghat	Dharmanagar	Ambassa
	Female literacy rate	93.78%.	93.15 %.	94.21 %.	82.72 %.
History and Tourism	Kailashahar was the ancient capital of the Tripuri kingdom. Its history is associated with Unakoti, noted for its 7th - 9th century AD stone and rock cut. A Shiva disciple who started the Tripurabda (Tripuri Calendar), prayed for Lord Shiva in Chhambulnagar village on the banks of the Manu River. It is speculated that Chhambulnagar, which is mentioned in Rajmala, was situated near Unakoti Hill. The prince prayed for Mahadeva in Unakoti. Kailashahar may be the legendary Chhambulnagar. Some believers thought that Har (Shiva) resides in Kailash. Therefore, the place was known as Kailash Har which was later on transformed to Kailashahar. Tripura king Adi-Dharmapha ruled there in the 7th century. He performed a yagna with pomp and gaiety. Apart from these there are few locations which are: Lakhmi Narayan Bari, Tirupati balaji Mandir: and Tea gardens	Kumarghat is dotted with temples, the most famous of which is the Bhabatarani temple. Sculptured hills of Unakoti have high potential tourism in the district. Every year a big fair popularly known as 'Ashokastami Mela' is held in the month of April which is visited by thousands of pilgrims. Temples like Kalibari, Hari mandir, Office Tilla Kalibari, Shib Bari, Ramakrishna Seba Samiti, Choto Kalibari also attract tourists. Founded in the year 1981, on Shivachaturdasi, Bhabatarini Temple is one of the revered temples in Kumarghat. Dedicated to Goddess Kali, Bhabatarini Temple witnesses large number of devotees during Shiva Chaturdashi and Kali Puja.	The beautiful water body in the Dharmanagar which is known by the name Kali Dighi. The lake is one of the major attractions of the town. It has fountains that lit up at night and is a spectacle to behold. It is a good place for taking a leisurely stroll in the evenings, enjoying the fresh air and the surrounding views. The iconic Kalibari is located in the heart of the city. Built hundreds of years back, the kalibari temple is the most revered religious spot in Dharmanagar where the presiding deity is Goddess Kali. The temple is situated on the banks of the Dighi and is thronged by visitors all year round. Located close to Kalibari is the Hari mandir, another important religious spot in Dharmanagar. The temple is situated on the banks of the Dighi and is a significant place of pilgrim spot for people of Dharmanagar.	Shyamsundar Ashram Tila - A brick-built Buddhist monastic complex, ASI protected area is situated in Jolaibari, South Tripura and which is about 81 km away from Ambassa town and also Chaturdasa Devata, ASI protected area is located about 53 km from Ambassa. Longtharai Mandir is the name of Lord Shiva in Kokborok language, according to the Tribal dialect of Tripura. This temple is one of the most popular tourist spots of the Dhalai District, about 7 km from Ambassa at Srinibash Para in Kathalbari VC. There is another Longtharai Mandir at Kumardhan Para of Balaram VC, on a hilltop at 1330 feet height, which can be reached after a short trek. The place offers a great view of the surrounding area. There is annual mela organized by the devotees at the temples on the occasion of Shiv Ratri.

Figure 64*:* Month wise rainfall data in Year 2020



(Source: https://www.agri.tripura.gov.in/sites/default/files/Station_wise.pdf)

Figure 65*:* Month wise number of rainy days in year 2020



(Source: https://www.agri.tripura.gov.in/sites/default/files/Station_wise.pdf)

Figure 66*:* Watershed Map of Tripura watershed showing important rivers and Bangladesh International Boarder

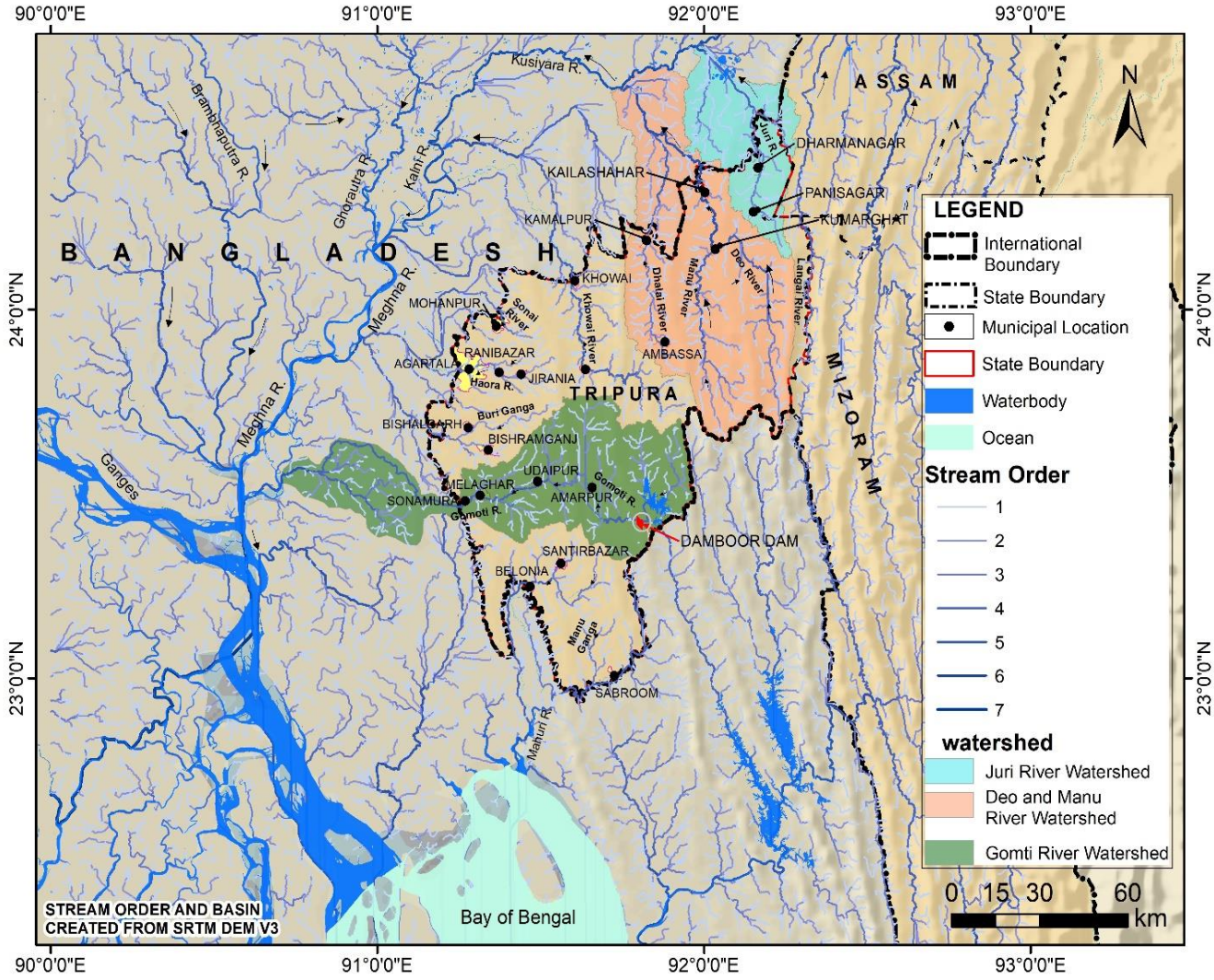


Figure 67: Waterbody Map of Kailashahar MC

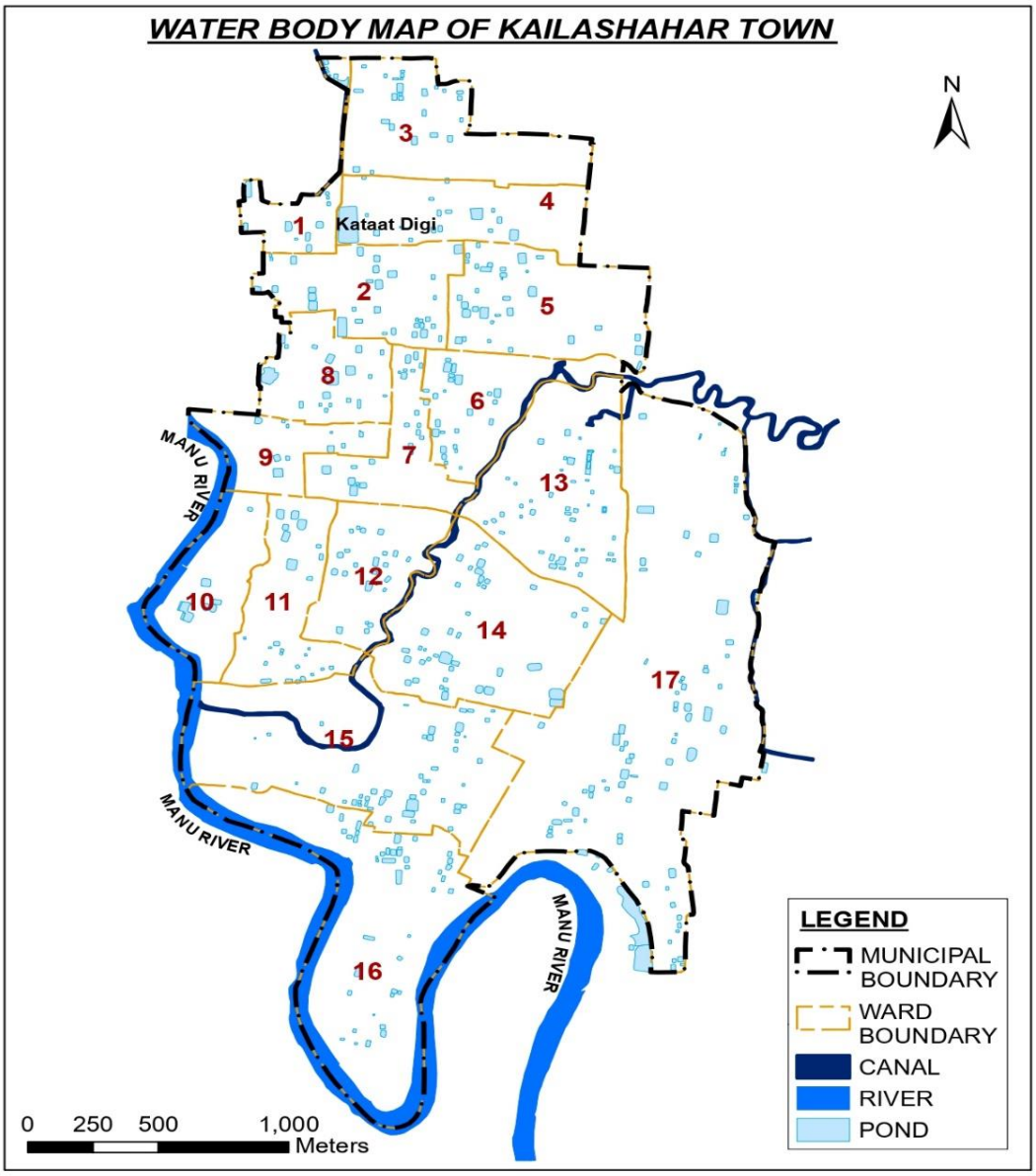


Figure 68: Waterbody Map of Kumarghat MC

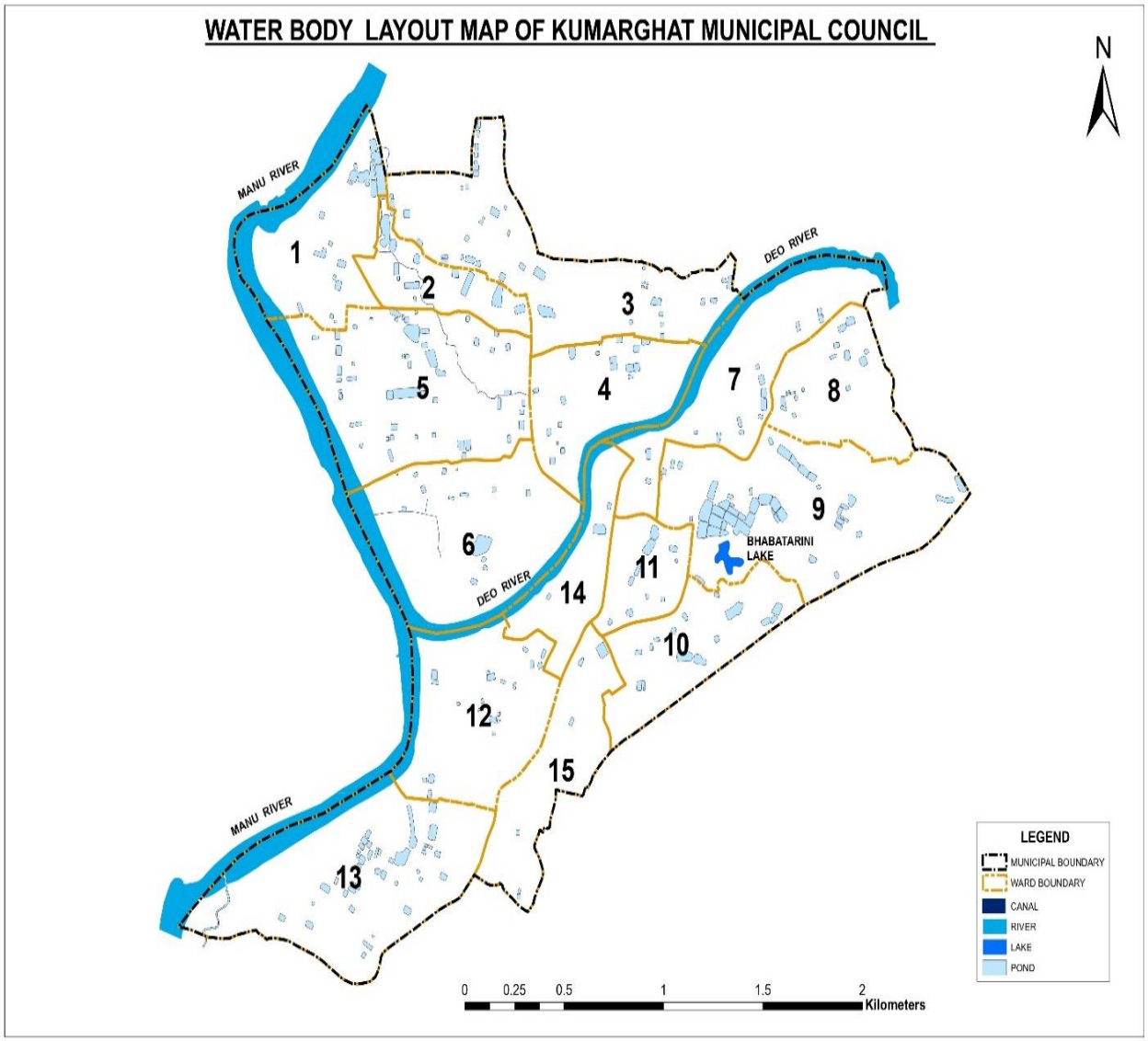


Figure 69: Waterbody Map of Dharmanagar MC

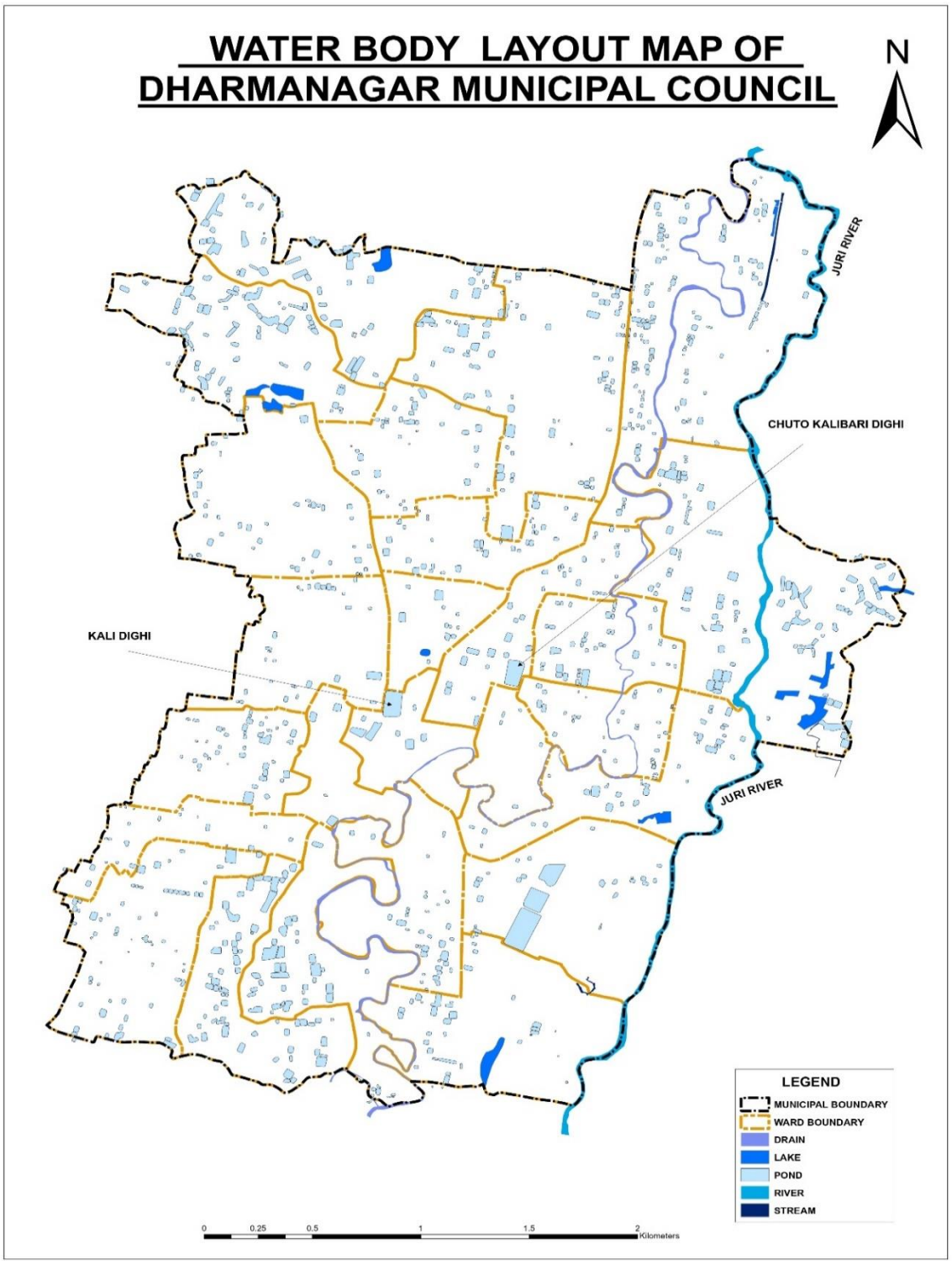


Figure 70: Waterbody map of Ambassa MC

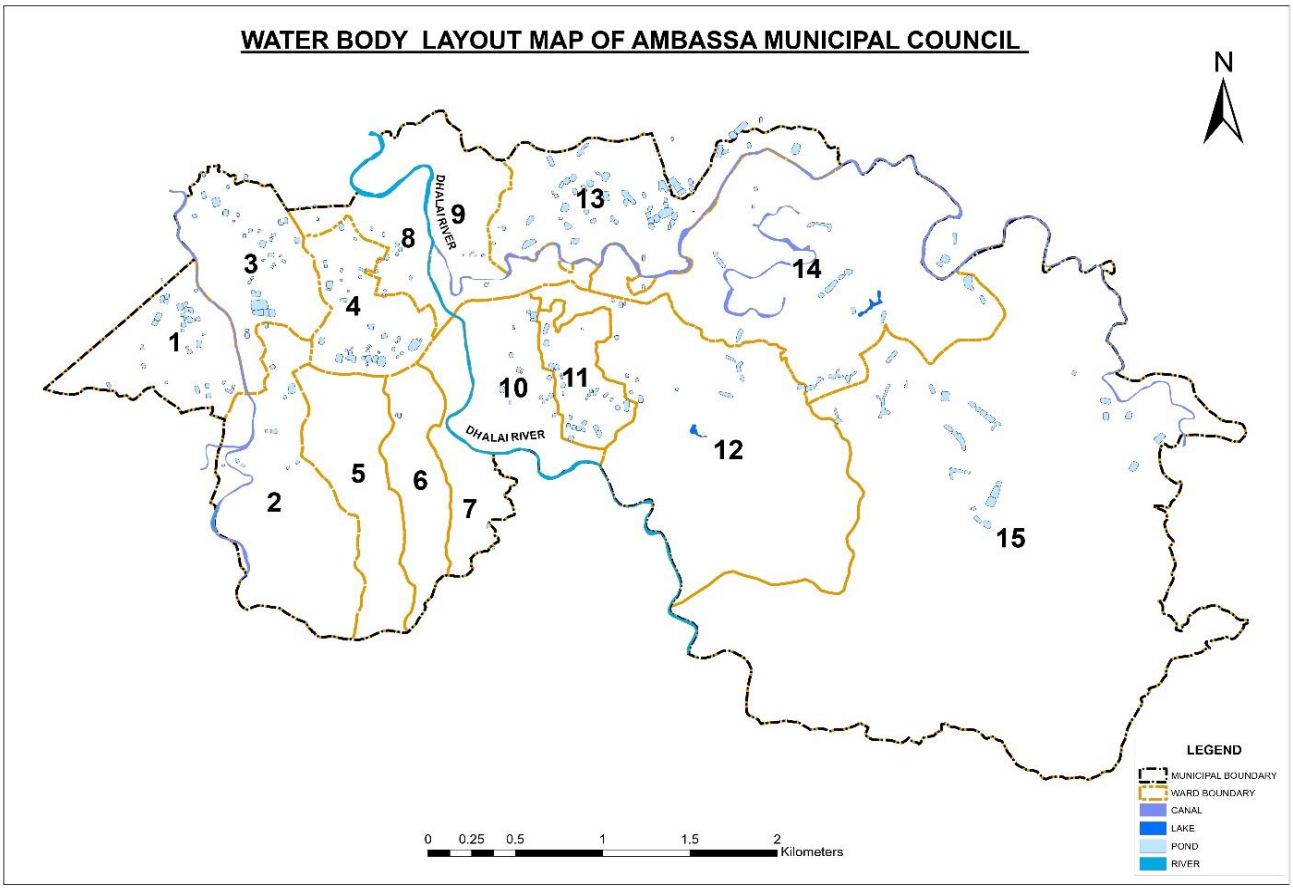


Table 8: Analytical results of Water Quality Data of Raw and WTP treated Water from project town Rivers

Date	Turbidity (NTU)		pH		Hardness (mg/l)		Total Iron (mg/l)		R. Cl (mg/l)		TDS (mg/l)		Alkalinity (mg/l)	
	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear
Kailashahar - Raw and treated water from Manu River at WTP														
21.12.2022	19.5	**1.8**	8.2	7.4	124	128	1.33	0.08	0	**0.5**				
22.12.2022	20.3	**1.2**	8	7.1	120	136	1.38	0.05	0	**0.5**				
23.12.2022	21.6	**1.6**	8	7.3	120	138	1.34	0.07	0	**0.5**				
26.12.2022	22.8	**1.7**	7.8	7.2	116	134	1.29	0.06	0	**0.5**				
27.12.2022	27.3	**1.6**	7.9	7.2	124	132	1.47	0.09	0	**0.5**				
Average	**22.3**	**1.58**	**7.98**	**7.24**	**120.8**	**133.6**	**1.362**	**0.07**	**0**	**0.5**				
Kumargaht - Raw and treated water from Deo River at WTP														
2.12.2022	80.9	0.95	8.1	7	140	170	1.62	0.09	0	**0.4**				
5.12.2022	81.6	0.86	8.5	7.3	162	172	1.594	0.184	0	**0.4**				
7.12.2022	84.2	0.97	8.1	7.4	158	176	1.34	0.163	0	**0.5**				
12.12.2022	87.3	0.8	8	7.6	152	168	1.29	0.16	0	**0.5**				
16.12.2022	88.9	0.92	7.9	7.2	106	164	1.4	0.157	0	**0.4**				
Average	**84.58**	**0.9**	**8.12**	**7.3**	**143.6**	**170**	**1.4488**	**0.150**	**0**	0.44				
Dharamanagar – Raw and treated water from Kakri River at WTP														
01.05.2021		**1.2**	6.8	7.2	138	88	0.764	0.134		**0.5**	128.27	132.80	132	74
03.05.2021	132.5	**1.3**	6.9	7.2	146	94	0.781	0.142		**0.5**	141.65	130.38	128	82
05.05.2021	136.2	**1.2**	6.8	7.2	120	76	0.784	0.129		**0.5**	133.56	127.41	108	80
25.05.2021	216.4	**1.2**	6.9	7.2	88	94	0.794	0.136		**0.5**	143.79	132.90	94	88
27.05.2021	203.7	**1.1**	6.8	7.1	92	96	0.789	0.124		**0.6**	141.64	132.38	100	90
28.05.2021	196.4	**1.2**	6.9	7.2	88	90	0.764	0.119			136.89		96	94
Ambassa – Raw and treated water from river Dhalai at WTP														
May -21	14.8	**4.2**	6.88	6.93	90	74	0.9	**0.4**	0	0.3	164	160		
National Standards for Drinking Water [a]		**1 (5[c])**		**6.5 – 8.5**		**200 (600[c])**		**0.3**		**0.2**		**500 (2000)**		
WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011[b]										**5**				

Source: DWS of respective towns; Source- DWS, Water Treatment Plant laboratory; [a] Bureau of India Standard 10500: 2012.; [b] Health-based guideline values.;[c] Figures in parenthesis are maximum limits allowed in the absence of alternate source.

Table 9: Groundwater quality results of project town

DWT at	Physical Appearance	Turbidity (NTU)	pH	Total Alkalinity (mg/l)	Total Hardness as CaCO3 (mg/l)	Calcium as Ca. (mg/l)	Magnesium as Mg. (mg/l)	TDS (mg/l)	Chloride as Cl (mg/l)	Total Iron (mg/l)	Fluoride (mg/l)	Residual Chlorine (mg/l)	Nitrate (NO3) (mg/l)	Total coliform	Fecal Coliform
Kailashahar - January 2023															
Jorapara, Chandipur Block	Clear	2.6	6.7	96	58	-	-	63.2	8.6	**1.681**	-	0		0	0
Shawtal para AWC	Clear	1.9	6.5	44	66	-	-	57.8	11.3	**1.822**		0		0	0
Zeelaparishad Office, Gournagar	Clear	2	7.3	122	86	-	-	97.8	4.9	**2.081**		0		0	0
Kumargaht- December 2022															
Masauali,	Hazy		6.5	56	140			97.24	8.6	**2.766**		0		0	0
Dharmanagar - May 2019															
Charubasa		0.58	5.61	87.1	60.6	16.4	6.22	132	15.7	**2.28**	0.06		0.22	<1.8	0.58
Tilthaibaza		1.57	5.07	25.9	40.4	8.38	3.04	92	8.36	0.15	0.06		0.13	<1.8	1.57
Ambassa (January 2023)															
Dasami Ghat	Clear	1.02	6.96		90			314		**0.55**					
Indian drinking water standards Acceptable limit and (Permissible limit)	Clear	**5**	**6.5-8.5**	**200 (600)**	**200 (600)**	**75 (200)**	**30 (100)**	**500 (2000)**	**250 (1000)**	**<0.3**	**1 (1.5)**	**0.2**		**0**	**0**
WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011[b]											**1.5**	**5**		0	0

Source : DWS of respective towns

Table 10: Noise level data of Project towns during December, 2020

Type of area	Location	Day time Measured value in dB			Day Time Standards		Night time Measured value in dB			Nighttime Standards		Activities around monitoring locations
		Lmin	*Lmax*	*Leq*	*Indian*	*WHO Guidelines*	*Lmin*	*Lmax*	*Leq*	*Indian.*	*WHO Guidelines*	
Kailashahar												
Commercial	Paiturbazar	56.94	60.92	59.06	65	70	42.48	42.6	42.57	55	55	-
Residential	Kacharghat	53.4	57.3	**55.48**	55	55	42.04	42.12	42.11	45	55	Public noise.
	Sonamukhi	54.34	58.8	**56.6**	55	55	41.2	41.5	41.35	45	45	Public noise.
Silent	District & Sessions judge Court	50.98	52.6	**51.87**	50	55	41.3	42.82	**42.11**	40	40	Vehicular movement, Public gathering.
Kumarghat												
Industrial	Kumarghat Industrial Estate	56.06	58.78	57.55	75	70	40.22	40.48	40.35	70	70	-
Commercial	Near TSCB Ltd.,	60.42	65.22	63.06	65	70	53.22	56.96	**55.27**	55	55	Vehicular movement, Public noise.
Residential	Rabindra Palli	56.3	59.46	**57.97**	55	55	41.36	41.62	41.49	45	45	
Silent	Kumarghat Rural Hospital	54.5	57.76	**56.29**	50	55	39.98	40.34	**40.16**	40	40	Public noise.
Dharamnagar												
Industrial	Kameswar Mission Tilla	55.94	60.92	58.49	75	70	49.80	54.60	52.65	70	70	-
Commercial	Old Motor Stand	57.60	62.62	60.22	65	70	48.56	54.04	51.68	55	55	-
Residential	Jamirala College Road	50.66	56.16	53.52	55	55	40.90	41.32	41.12	45	45	-
Silent	Dharmanagar District & Sessions Judge Court	53.56	57.48	**55.66**	50	55	41.00	41.50	**41.26**	40	40	Human Activity.
Ambassa												
Commercial	Ambassa Railway Station	48.48	51.2	50.36	65	70	36.28	37.8	37.19	55	55	-
	Kulai Market	50.64	55.26	53.1	65	70	36.06	38.04	37.06	55	55	-
	Ambassa Market	55.4	60.38	58.22	65	70	37.1	41.28	40.84	55	55	-
Residential	Jawahar Nagar DM Office Complex	48.52	52.06	50.34	55	55	35.72	37.42	36.69	45	45	-
	Chandraicherra	46.18	49.78	48.16	55	55	35.86	37.38	36.77	45	45	-
Silent	Dhalia District Hospital	46.58	48.1	47.46	50	55	35.9	37.2	36.69	40	40	-

Source: TSPCB Report

Figure 71: Forest map of Unakoti district

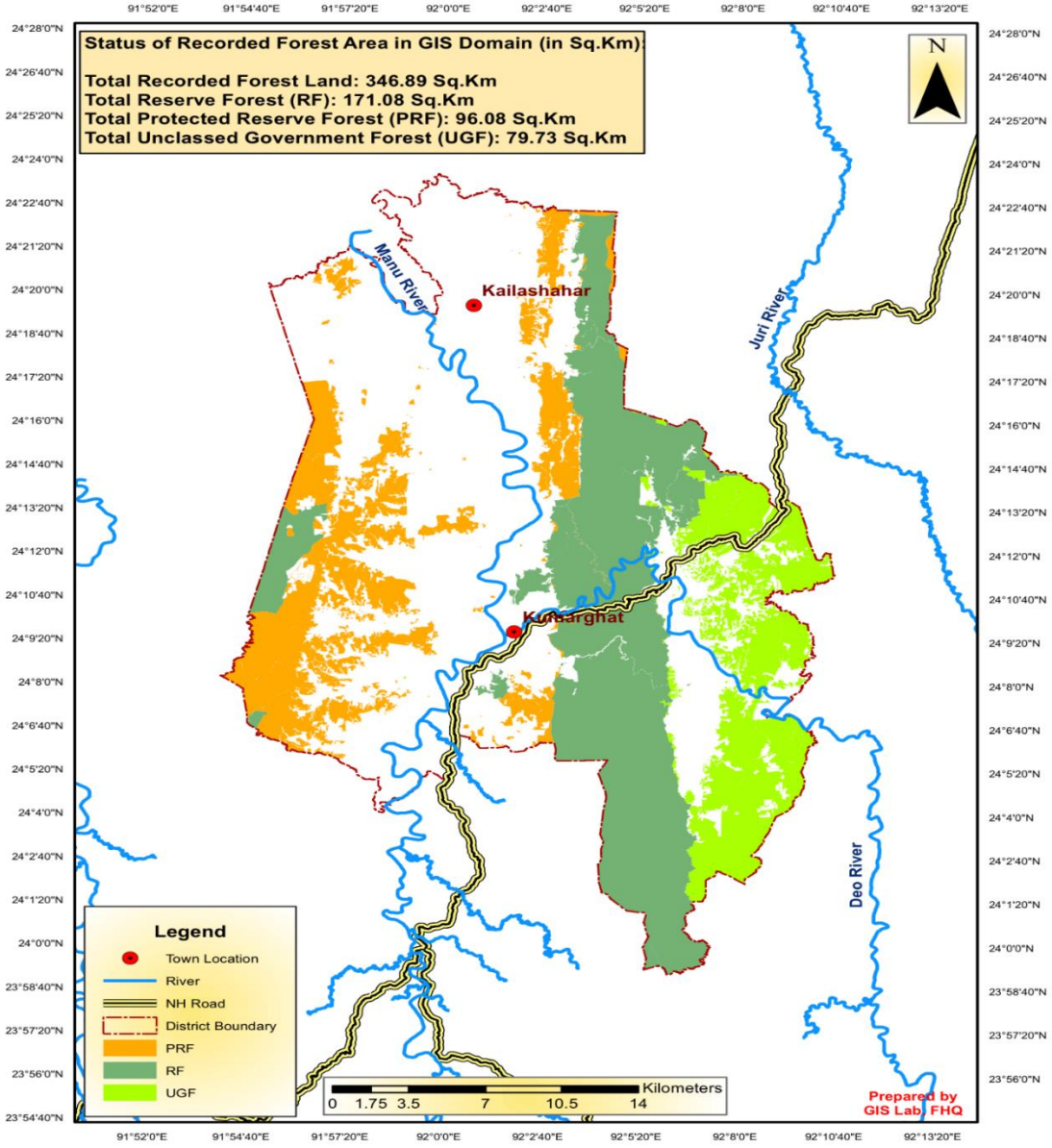


Figure 72: Forest map of North Tripura district

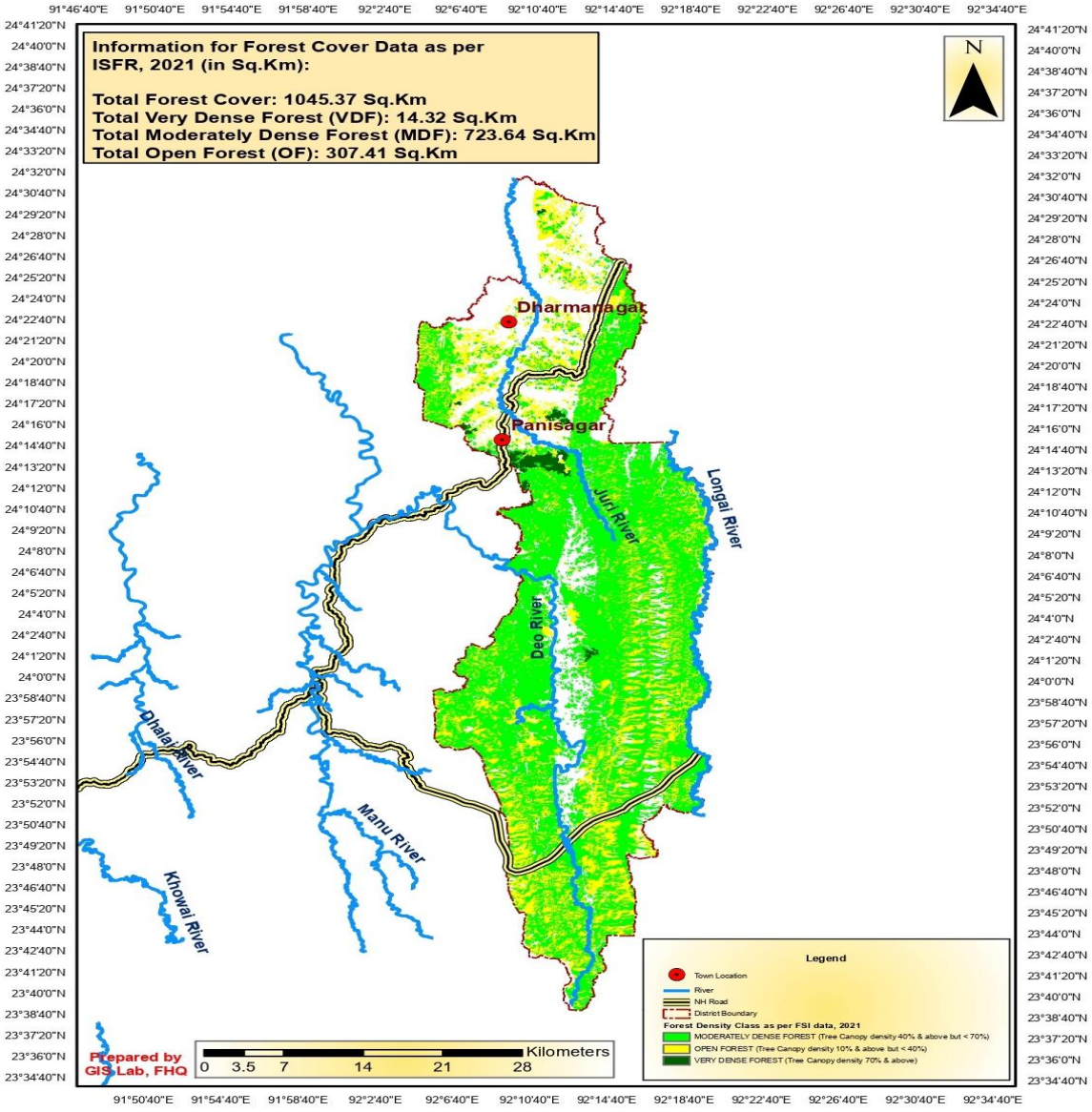


Figure 73: Forest map of Dhalai district

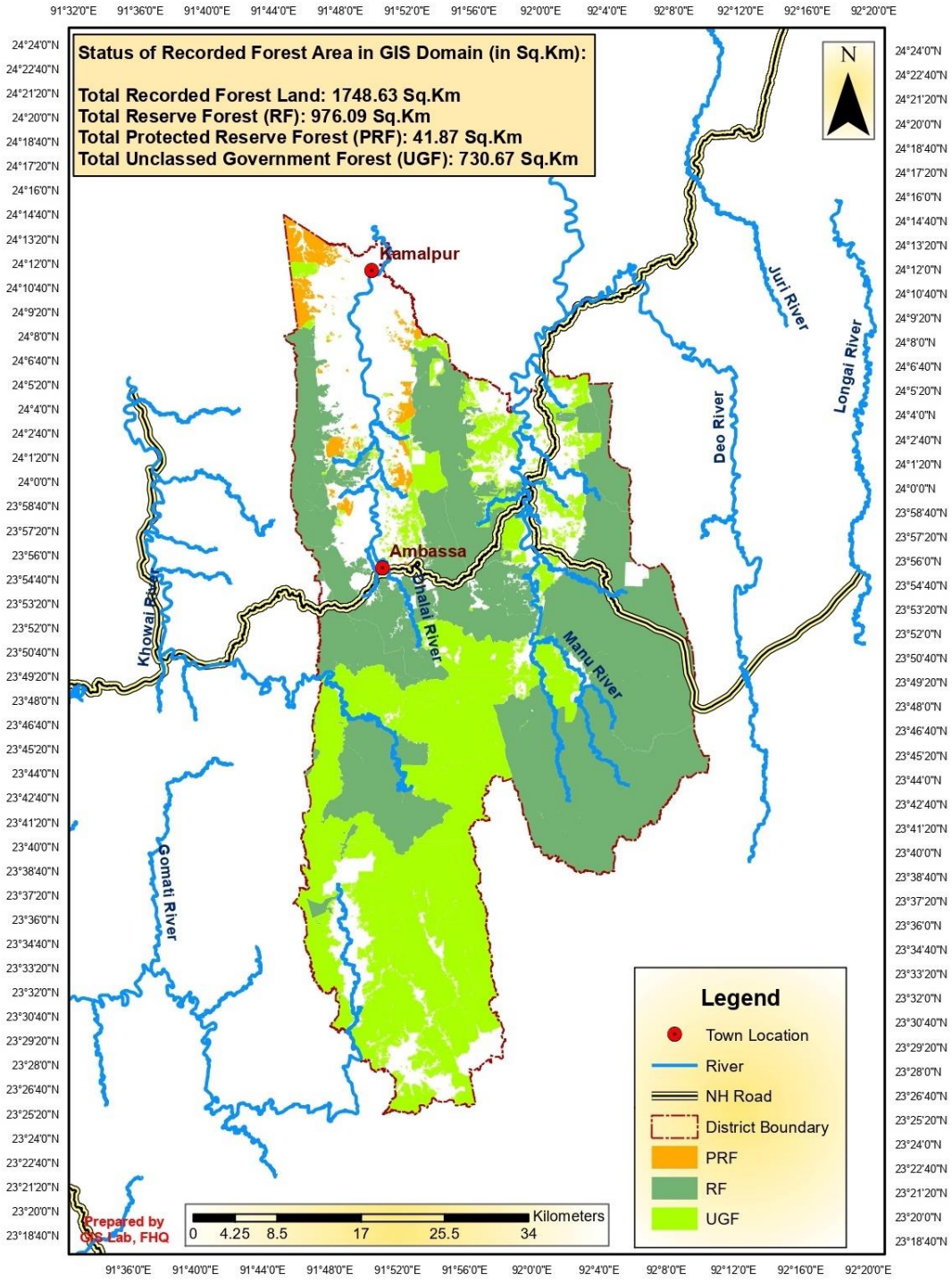
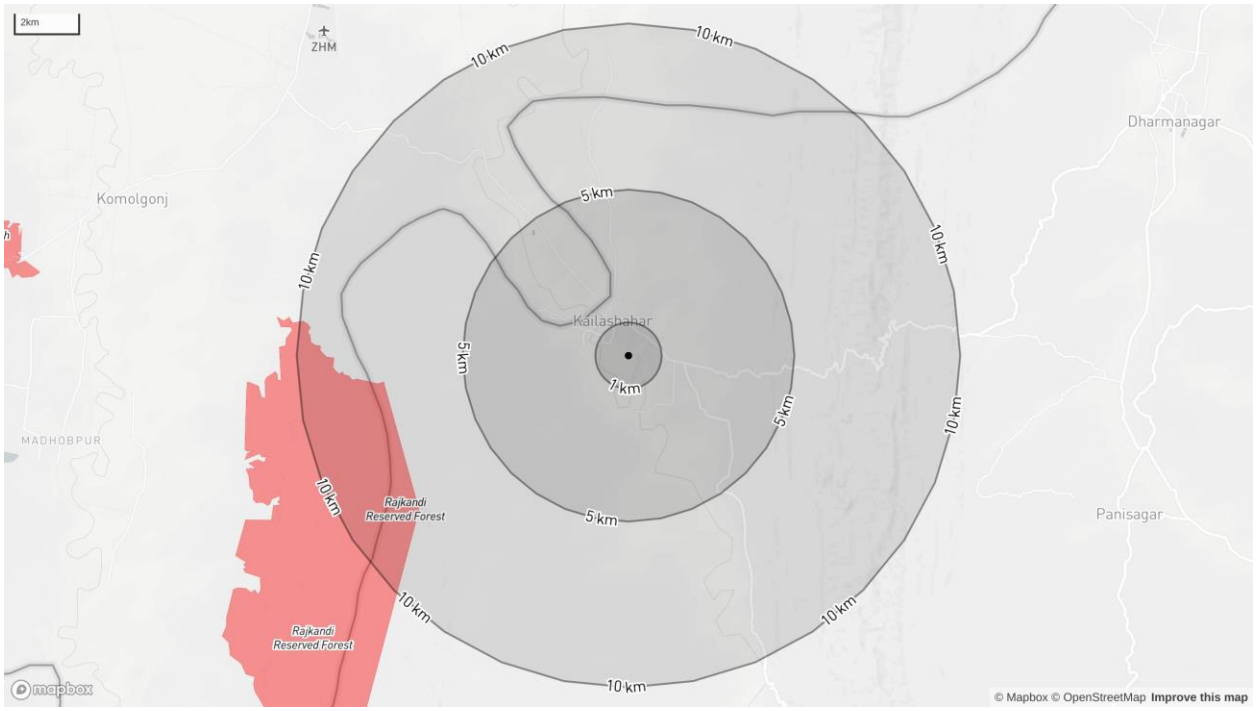
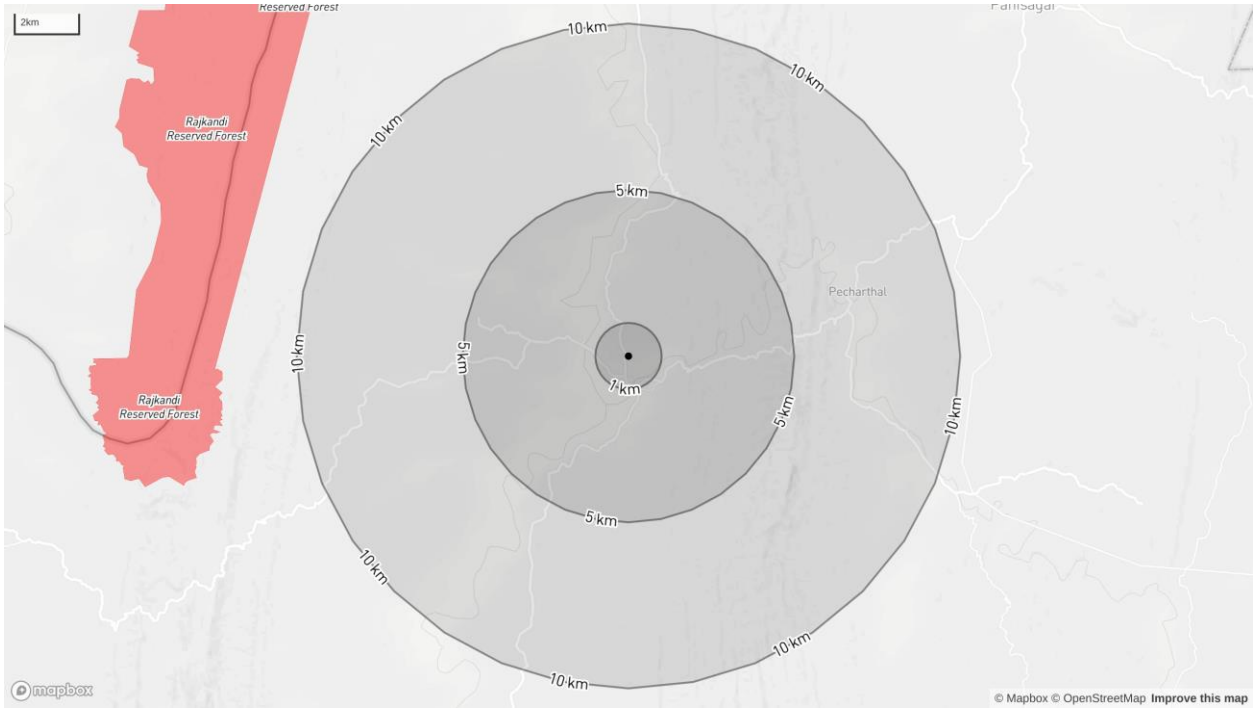


Figure 74: Key biodiversity area and Protected area within the 10 Km area of Kailashahar



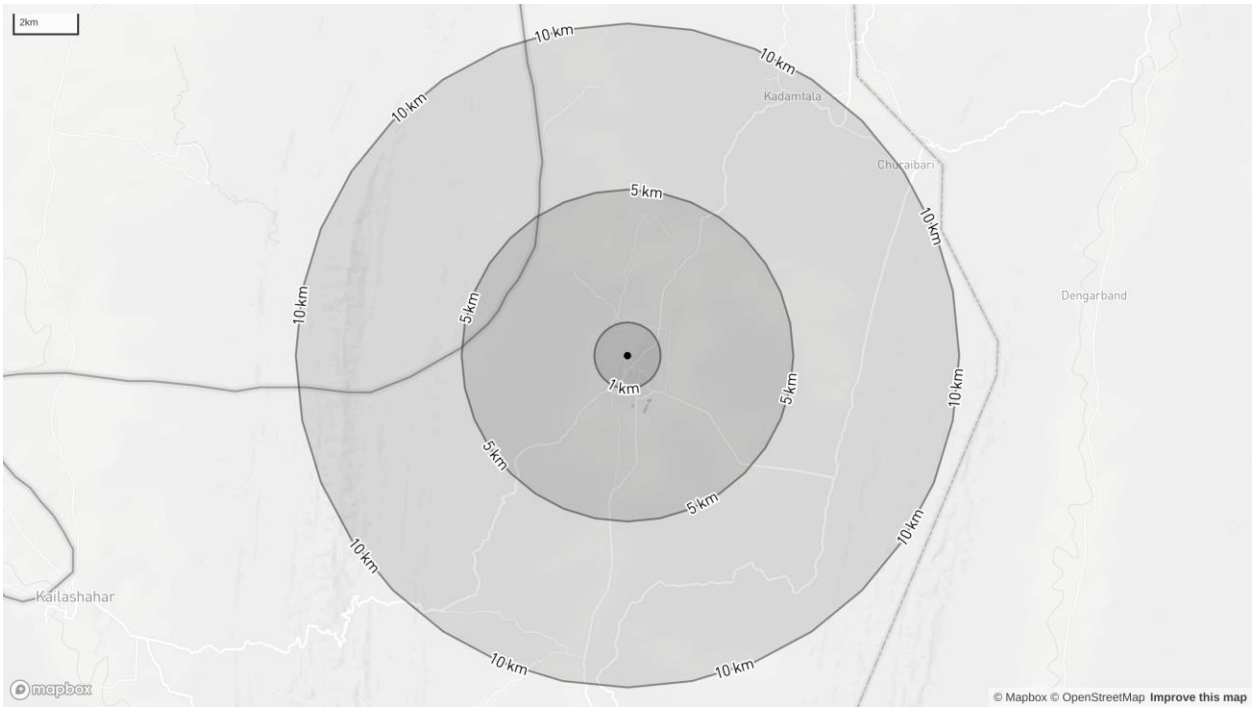
(Source IBAT)

Figure 75: Key biodiversity area and Protected area within the 10 Km area of Kumarghat



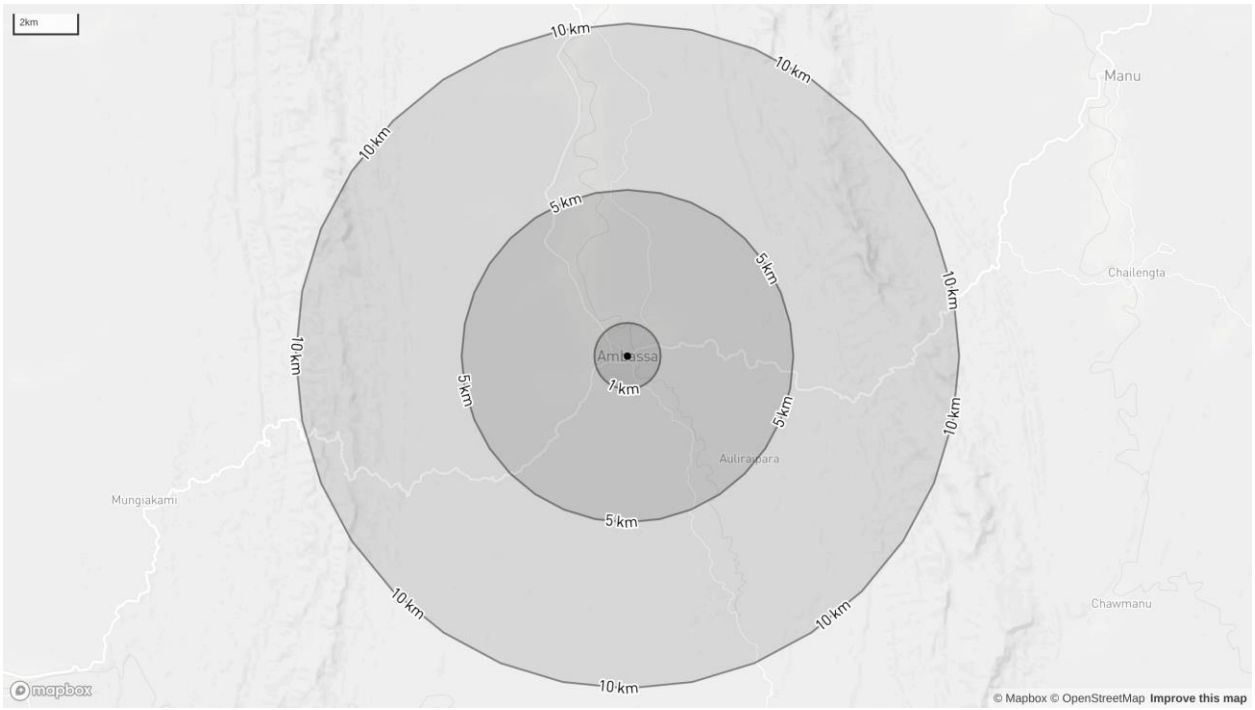
(Source IBAT)

Figure 76: Key biodiversity area and Protected area within the 10 Km area of Dharmanagar



(Source IBAT)

Figure 77: Key biodiversity area and Protected area within the 10 Km area of Ambassa



(Source IBAT)

Figure 78: Land use map of Kailashahar town

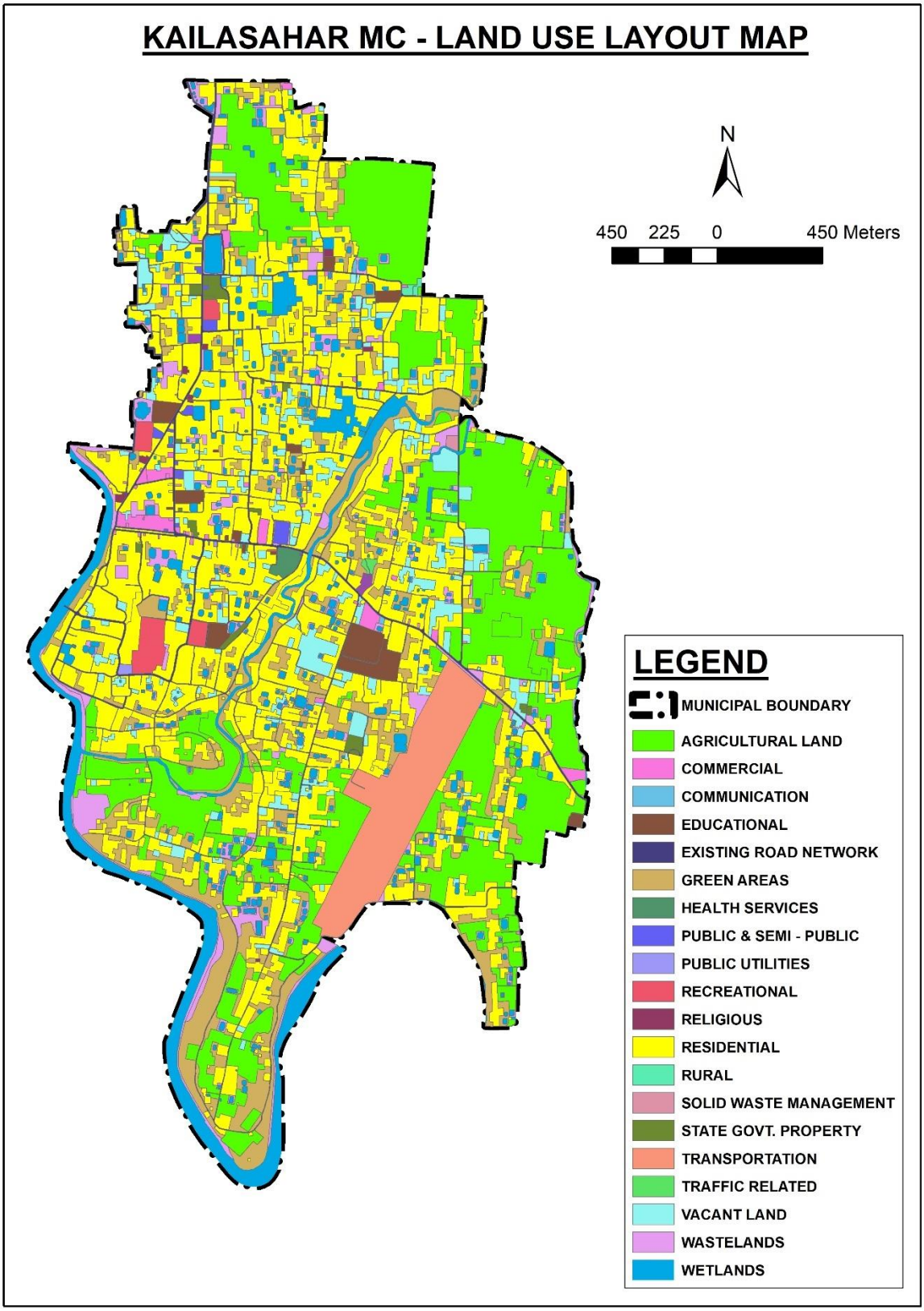


Figure 79: Land use map of Kumarghat town

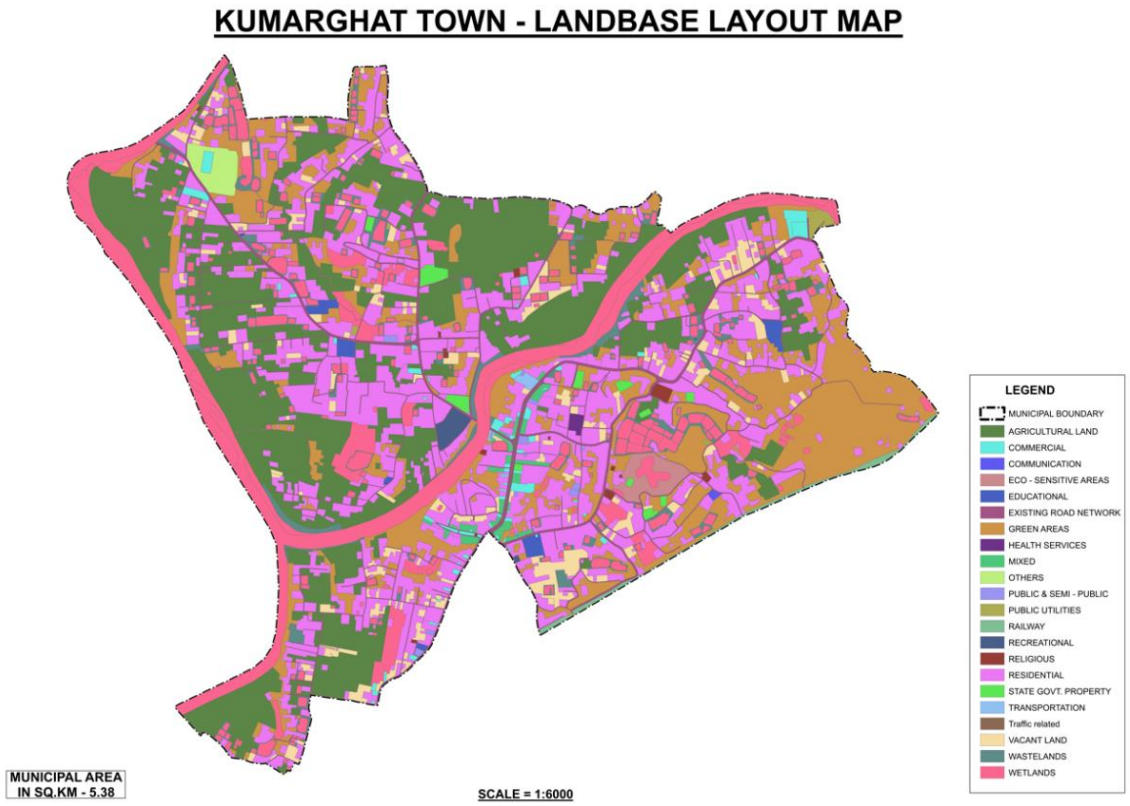


Figure 80: Land use map of Dharmanagar

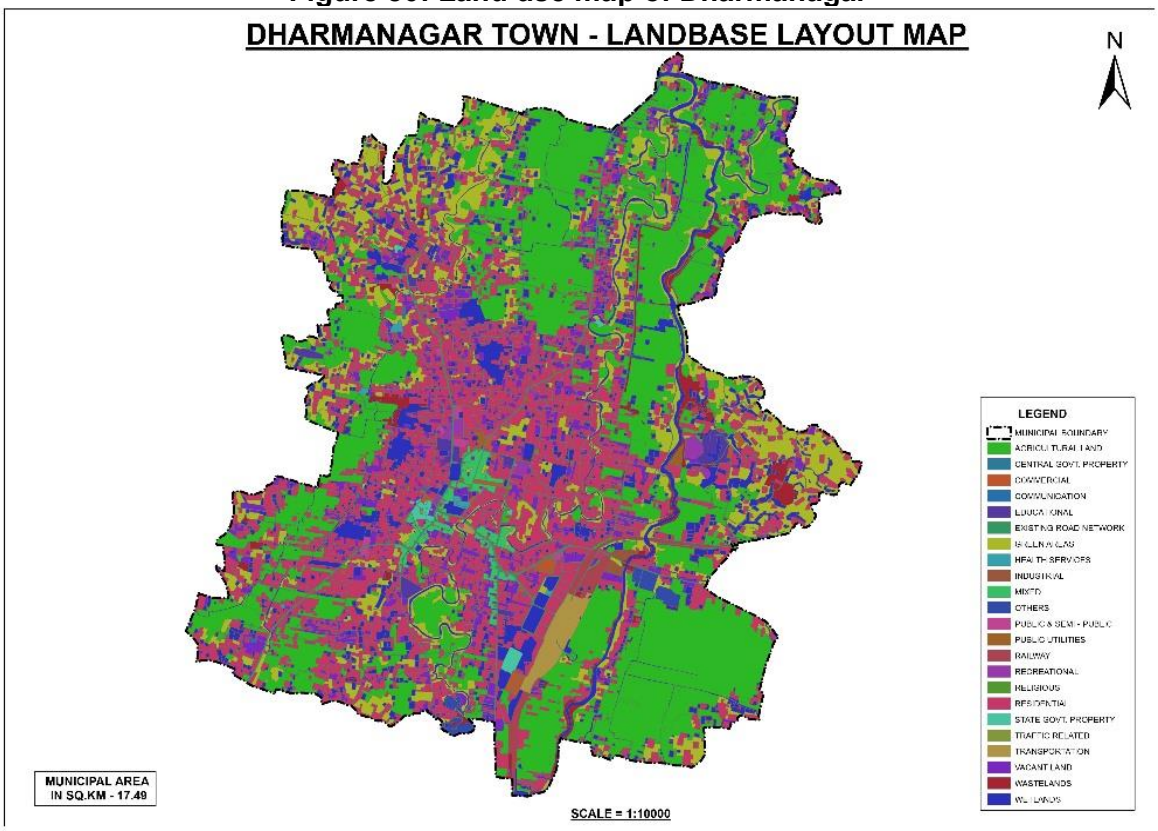
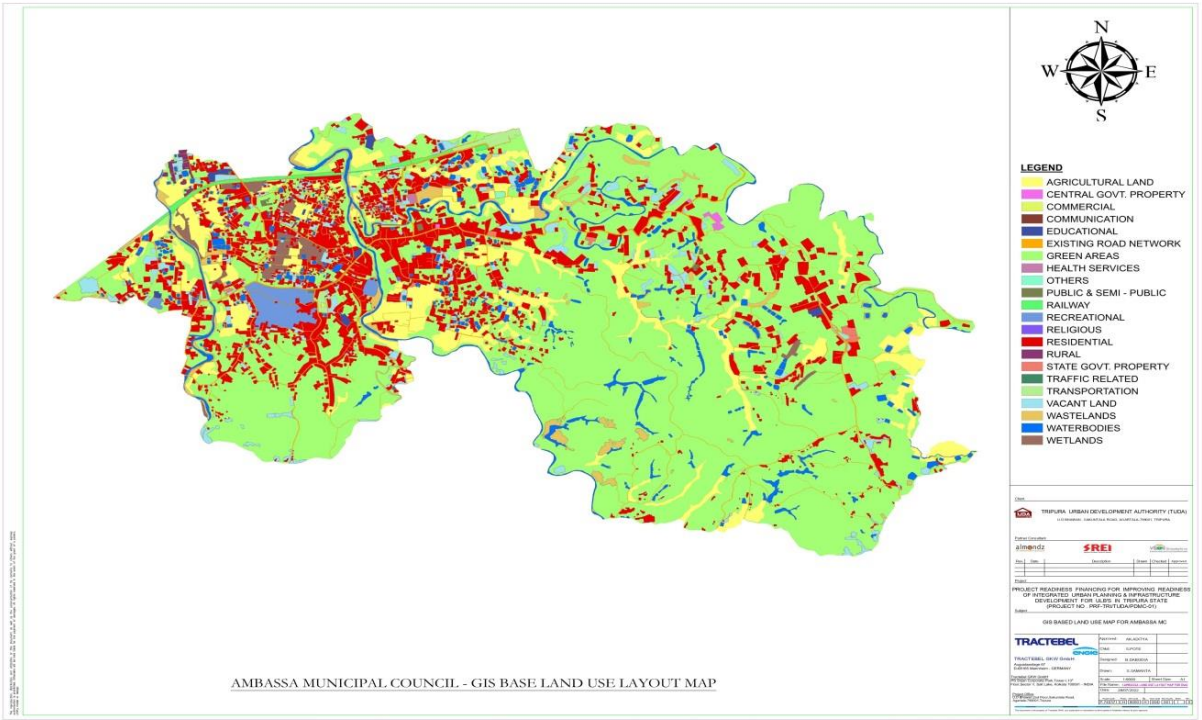


Figure 81: Land use Map of Ambassa



2. Industry & Agriculture

Table 11: Industrial status of Kailashahar area[10]

Category	No. Of Factories	Manpower
Brickfield	8	860
Tea Factory	5	575
Saw Mill/ Wood based	3	83
Engineering Factory	9	74
Printing Press	4	22
Food Processing / Ice	3	27
Water treatment / Drinking Water	1	20
Stone crushing / Paver block	1	20
	34	**1681**

Table 12: Industrial unit status of Kumarghat area

Name of the Block	Name of the Industries	Types of Industry	Manpower
Kumarghat	• M/S Rani Engineering Works • M/S Joy Spray Works • M/S Bajarangbali Mechanical Works, • M/S Joy Guru Mechanical • M/S Maa Welding Works • Notingcherra Tea Estate.	Small Scale	444

(Source: ULB and Economic Review of Tripura 2019)

Table 13: List of Major Industries in Dharmanagar

Sl.No.	Major Industrial Estate	Details
1.	Dharmanagar Industrial Estate	Types of Industries: Maruti Service Centre, Iron Fabrication & Steel Furniture, Rubber Industry, Flour Ill, Paper Plate & up, Drinking water Manufacturing unit, Food Processing Unit, Mini Dairy Plant, etc.
2.	Bamboo Cluster Incense Stick	Rolled Agarbatti/ Bamboo stick
3.	Bamboo Cluster	Handicraft Items
4.	Bio-fertilizer production centre	Bio-fertilizer
5.	Rubber Plantation	Rubber

C. Subproject Site Environmental Features

59. Features of the selected subproject sites are presented in the following table.

[10] https://unakoti.nic.in/factories-boilers/

Table 14: Site Environmental Features - Kailashahar

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
1.	Proposed Intake Well cum Pumping Station at Ward 16 (Sonamara, Durgapur) Lat: 24.309498° Long: 92.003014°	• Intake well proposed on the Manu River in southeastern part of the town. Small bridge of approx. 20 m will be constructed for carrying pipes from the intake. • The proposed intake well is located in upstream in respect to existing intake at a distance of approx. 3.7 km (along the river) • Intake Well related structure will be constructed on the available vacant government land on the bank of the river, which under the ownership of KMC. • The nearest settlement from the proposed site is 30 m. Proposed site is covered with few numbers of trees, shrubs, and bushes. There are few teak trees felling may be required for the construction of the intake well related structure like electric substation room, guard room etc.. But finalization of tree felling can be done only after finalization of design by DBO contractor. No wild fauna is reported on site • The required land area to construct the proposed electric substation room, guard room etc. will be around 60 sq.m. • Bitumen road is available in the village which will be used during the construction activity and transportation of materials. But approach road is required upto intake. • There is no designated forest area in and around the proposed project site. • No tree cutting is required	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
2.	Prop 200 DI Rising Main Raw water transmission line in Sonamara Village	Raw Water Transmission pipelines will be mostly laid along the existing road within the available RoW. The transmission main leading to Intake well to WTP, the land owned by Government. The nearest house is located at a distance of 50m from the proposed project site. No sensitive receptor exists closer/within the proposed alignment and no tree cutting will be required. No tree felling is required for construction activity. Land use around the site is residential.	
3.	WTP 2.45 MLD site Near Paitur Bazar Lat: 24.309498° Long: 92.003014°	• Proposed Water Treatment Plant (WTP) will be constructed on the available vacant government land of 1000 sqm. • The proposed WTP site is located at southeast side of Kailashahar town, near the Paitur Bazar, commercial area. The site is predominantly flat, vacant, and sparsely covered with shrubs and bushes. No tree felling is required for construction purpose. • Site is connected through single bitumen Road and it's surrounded by open land. No wild fauna is reported on site. • The site is large and green buffer zone will be developed surrounding the site. • Utility shifting is not required for the construction activity. There is an approach road to the site will be used during construction activity. • Proposed WTP site is 6.54 km (aerial distance) away from Unakoti, famous for rock art – ASI protected Heritage site • The nearby settlement from the proposed land is approximately 50-100 m. • There is no forest land near proposed WTP site.	 

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
		• Low lying site covered with aquatic weeds • There is Existing Katcha Drain carrying storm water and wastewater from nearby households with Average width 3.4 m and Outfall at Laxmi Charra • The nearby settlement from the proposed land is approximately 50-100 m.	
4.	Clear water Rising Main pipeline alignment	Clear water rising mains will be connected with the two numbers of OHSRs from WTP. The pipeline will be laid along the existing road in the available RoW. Clear water rising mains having variable dia. No tree cutting is required for laying of clear water rising main pipeline. 205 m of 200 mm DI K-9 pipe upto Indian Oil (near Motor Stand), 1450 m length of 150 mm DI K-9 upto OHT 1 (near Kalipur) 1578 m length of 150 m DI K-9 pipe upto OHT 2 (near Kasherghat)	
5	OHSR 1 in Kalipur near School (Ward no. 4) Lat: 24.329772° Long: 92.006019°	The 300-kilo liter (KL) OHSR will be constructed near the school building on available government land. The required land area to construct the proposed OHSR is 400 sq.m. Access to site is available. Road connectivity of the proposed OHSR at Kalipur town via single lane Bituminous Road. The proposed site for the OHSR is located at northeastern part of the town. The land parcel identified for Reservoir 1 at Kalipur is vacant and free from vegetation. The main school building from the proposed OHSR location is approximately 30-40m. Surrounding Land area mostly used in habitation purpose in area. No wild fauna is reported on site.	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
		No tree felling is required for construction activity. During the construction noise and dust pollution may be an issue. Mitigation measures will be applied during the construction period. Scheduling of work will be planned accordingly. Land use around the site is residential.	
6	OHSR 2 in Kasherghat near IDSMT complex (Ward no.13) Lat: 24.321648° Long: 92.008956°	The 250-kilo liter (KL) OHSR will be constructed in Kasherghat near IDSMT complex on available government land. The required land area to construct the proposed OHSR is 400 sq.m. Access to site is available. Proposed reservoir site is free of vegetation cover and land is vacant Site is mostly flat connected with city Bituminous Road. The site is vacant and surrounded by residential property on one side and road on other sides. The proposed site is located at eastern part of the town. No tree felling is required for construction activity. The required land area to construct the proposed OHSR is 400 sq.m. No additional impact on structures is anticipated at the site. There is a temporary waste segregation center near the proposed OHSR location. There is town hall which is 20m away from the proposed OHT site. The main public health care center (PHC) building from the proposed OHR location is approximately 100m. There are no designated forest areas around project area.	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
7.	Water Distribution Network in Ward no. 3 near Tilabazar HS School (110 mm dia. HDPE)	Pipes will be laid within the road right of way (ROW) - in road's earthen shoulder in wider roads, and within the carriageway in narrow roads, where there is no space. No tree cutting will be required as per preliminary design. No wildlife has been reported within the proposed water distribution network area. Tilabazar HS school is approximately 10m away from the proposed water distribution line.	
9	Water Distribution Network near International Border (Remodeling 140 mm dia. HDPE)	The pipeline will be laid along the road within the ROW. In left hand side of the road concrete drain observed. International border is only 10m away from the project site There are no trees along the road. Land use around the site is residential.	
10	Water Distribution Network in Ward no. 13 (Proposed 160 HDPE)	Pipelines will be mostly laid along the main roads. Pipes will be laid Underground. There are no trees along the road. Land use around the site is residential.	

Table 15: Site Environmental Features - Kumargaht

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
1.	Intake Well cum Pumping Station on Manu River (Ward no. 11) Lat: 24.158277°	About 400 sq. m of land owned by Kumarghat ULB on Manu River bank which is southwest part of the town. Small bridge will be constructed from intake point to land/ river bank for carrying pipe and access to intake well. The proposed intake well is located in downstream in respect to existing intake	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
	Long: 92.028052°	at a distance of approx. 3.1 km (along the river) The site is located near confluence point of Manu and Deo River. The land is vacant near the proposed intake well location and no tree cutting will be required. The required land area to construct the proposed electric substation room, guard room etc. will be around 80-100 sq.m. Earthen road is available in the village which will be used during the construction activity and transportation of materials. But approach road is required upto intake. The nearest residential unit lies at distance of 45 m from the proposed project location. No wildlife has been reported in and around the site.	
2.	Water Treatment Plant, Near Manu River bank (Ward no. 11) Lat: 24.158275° Long: 92.028796°	2500 sq. m land will be used to construct proposed water treatment plant. Site is vacant but presently some local people are using this land for agricultural purposes. The seasonal vegetables cultivated like Brinjal, potato, Green chili, Bottle gourd, pumpkin, sweet potato's etc. by the villagers The proposed WTP site is located at southwest side of Kumarghat town. The site is predominantly flat, vacant, and sparsely covered with shrubs and bushes. No tree felling is required for construction purpose. The nearby settlement from the proposed land is approximately 60-75 m. Proposed WTP site is 2.58 km (aerial distance) away from existing WTP. No tree felling is required for the construction activity. Only clearance of vegetation is required.	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
3.	Over Head reservoir-1 near Shiv Ganga Mandir (Segregation Center)(Ward no. 06) Lat: 24.160753° Long: 92.027622°	The 250-kilo liter (KL) OHSR will be constructed near segregation center in the government land. The land area of 400 Sqm is adequate to construct the proposed OHSR. The proposed site for the OHSR is located at Western part of the town. The site is vacant and surrounded by agricultural land one side and road on other sides. No sensitive receptor exists closer/within the proposed site. No tree felling is required for the construction activity. Access is available to the proposed project location.	
4.	Proposed CWRM line in Purba Ratachhara (200 mm DI)	Pipes will be laid within the road right of way (ROW) - in road's earthen shoulder, and within the carriageway in narrow roads, where there is no space. Roads in this area are quite broad everywhere and pipelines can be laid easily by the side of road on the earthen shoulder. There are no trees along the road. However, few numbers of electric pole may be required to be shifted. No tree felling is required for the construction activity.	
5.	Proposed Distribution line in Ward No. 5	Pipes will be laid within the road right of way (ROW) - in road's earthen shoulder in wider roads, and within the carriageway in narrow roads, where there is no space. Roads in the area are quite broad everywhere and pipelines can be laid easily by the side of road on the earthen shoulder. There are no trees along the road. .	

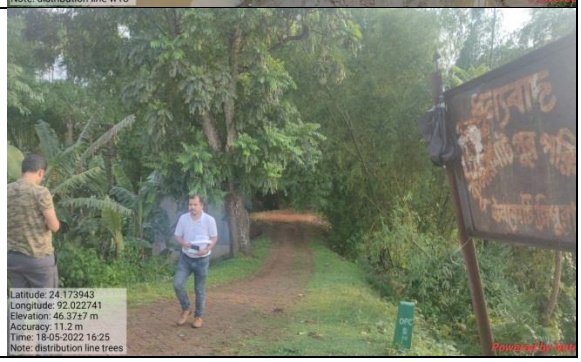
Sl. no	Project Component and location	Environmental Features of the Site	Photograph
6.	Proposed Distribution line in Ward No. 11 (110 mm HDPE)	Presently the road is an earthen road. Pipes will be laid within the carriageway in narrow roads, where there is no space. There are no trees along the road.	
7	Proposed Distribution line in Ward No. 1 (110 mm HDPE)	The road is earthen road and surrounded by residential property. Pipes will be laid within the carriageway in narrow roads, where there is no space. There are no trees along the road.	

Table 16: Site Environmental Features - Dharmanagar

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
1.	Intake Well cum Pumping Station near College Route, Barua. (Ward no. 10) Lat: 24.381283° Long: 92.178491°	About 150 sq. m of land owned by Dharmanagar ULB in Kakri (Juri) River bank at Barua which will be used to construct the electric substation, guard room and pumping house. The proposed intake well is located in downstream in respect to existing intake at a distance of approx. 100 m (along the river). Small bridge will be constructed from intake point to land/ river bank for carrying pipe and access to intake well. Earthen road is available in the village which will be used during the construction activity and transportation of materials. But approach road needs to be construct upto intake. There is a scattered forest area observed near the proposed intake well location and no tree cutting will be required. Access to	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
		site is available. The nearest residential unit lies at distance of about 50 m from the proposed project location. No wildlife has been reported in and around the site.	
2.	Water Treatment Plant, Within the existing WTP Premises (Ward no. 10) Lat: 24.381242° Long: 92.179112°	<u>Water Treatment Plant, Within the existing WTP campus (Ward no. 10)</u> 4662 sq. m land will be used to construct proposed water treatment plant. Site is vacant & covered with shrubs, bushes, and the nearest residential unit lies at distance of about 125 m from the project site. The proposed WTP site is located at southeast side of Dharmanagar town. The site is predominantly flat, vacant, and sparsely covered with shrubs and bushes. No tree felling is required for construction. Proposed WTP site is adjacent to the existing WTP (approx. 50m). In the nearby areas of the land is open and flat, there is an approach road to the site. No tree felling is required for the construction activity Land Requirement for the intake well and pumping station is 150 m^2 near the existing intake location and for WTP is 4662 m^2 which is available with ULB for the project. The site is selected beside the existing WTP in the same campus. The location is selected so that the distance from the intake source is minimized. The following environment base line status. - • Land Use: - The land is moist with few shrubs and grasss • Topography: - Flat type with mild undulations • Soil Type: - Lateritic Soil can be found • Erosion Potential: - Since	 

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
		there is very less undulations thus the erosion potential for WTP is less whereas in intake location near the Juri river the chance of erosion is high • Flora: Few local Shrubs and grasses are found in the proposed WTP land • Tree Felling: As such no tree felling is required only vegetation clearance is noted in the site • CPR: - Since the land is government and inside the existing WTP land thus there are no Common property resources. • Utilities: - As such none is found near the proposed site • Ground Water Depth: - 30ft BGL • GW Drinkable Depth: - 150 – 200 ft BGL • Potential Waterbodies: - Juri river is in the nearby vicinity • Location wrt town: - The location is near to the existing WTP nearby Juri river Blasting Need: No as such blasting is required grit/sand blasting to be done prior pipe fitting activity.	
3.	Over Head water storage reservoir- OHSR- 1 near Circuit House (Ward no. 24) Lat: 24.374596° Long: 92.155776°	<u>Over Head water storage reservoir- OHSR- 1 near Circuit House (Ward no. 24)</u> The OHSR -1 is proposed at Jail Road in the government land. The land area of 400 Sqm is adequate to construct the proposed Reservoir. Common birds like, Black drongo, Yellow-footed green pigeon, Coppersmith barbet and common	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
		myna were observed near proposed site. Land required for the Overhead Reservoir is 400 m^2 for which the land in the Circuit house is proposed. The reservoir is to be constructed in the government land having site boundary which will act as pollution prevention wall. • Land Use: - The land is within the circuit house campus. • Topography: - Flat type only. • Soil Type: - Lateritic Soil • Erosion Potential: - No as such • Flora: Few Shrubs and grasses are found in the campus • Birds: House sparrow Black drongo, Yellow footed green pigeon, coppersmith barbet • Tree Felling: As such no tree felling is required in the site • CPR: - Since the land is government and inside the circuit house, no such is found. • Utilities: - As such none is found • Ground Water Depth: - 30ft BGL • GW Drinkable Depth: - 150 – 200 ft BGL • Potential Waterbodies: - No as such • Location wrt town: - The location is inside the circuit house. • Blasting Need: No as such blasting is required grit/sand blasting to be done prior pipe fitting activity.	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
4.	Over Head water storage reservoir (OHSR)-2 near ISBT (Ward no. 22) Lat: 24.37309° Long: 92.168565°	**<u>Over Head water storage reservoir (OHSR)-2 near ISBT (Ward no. 22)</u>** The OHSR-2 is proposed within ISBT campus and sufficient land is available with no tree cutting requirements. Common birds like Coppersmith barbet, Oriental magpie-robin and Laughing Dove were observed near proposed site. Land required for the Overhead Reservoir is 400 m^2 for which the land is selected inside the ISBT, Dharmanagar is proposed. The reservoir is to be constructed in the government land which is bus terminal and bordered by side wall • Land Use: - The land is open and covered. • Topography: - Flat type only. • Soil Type: - Lateritic Soil can be found • Erosion Potential: - No as such • Flora: Few Shrubs are found in the campus • Birds: Megpai Robin, laughing dove, coppersmith barbet • Tree Felling: As such no tree felling is required in the site • CPR: - Since the land is government and inside the ISBT, all the properties like bus shed, lamp post are Common property resources • Utilities: - Presence of flood light and street lamp show wire cabling might be present underground. • Ground Water Depth: - 30ft BGL • GW Drinkable Depth: - 150 – 200 ft BGL	 

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
		• Potential Waterbodies: - No as such • Location wrt town: - The location is in the Inter-state bus terminal, Dharmanagar. • Blasting Need: No as such blasting is required grit/sand blasting to be done prior pipe fitting activity. • Site Condition: Since the site is in open space thus, during construction period disturbance from the public can be predicted for which confinement is required during construction phase.	
5	Proposed Distribution line Near ISBT	Pipes will be laid within the road right of way (ROW) - in road's earthen shoulder in wider roads, and within the carriageway in narrow roads, where there is no space. Roads in the area are quite broad everywhere and pipelines can be laid easily by the side of road on the earthen shoulder. There are no trees along the road.	
6	Remodeling of Distribution line near Golden Valley School	Pipeline will be laid in the left-hand side of the road. No trees will be cut due to the construction activity. All sites are located within the urban areas Land use around the site is residential	

Table 17: Site Environmental Features - Ambassa

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
1.	OHSR location at Magazine Para, Beside Department of Agriculture District Biofertilizer Production Centre, Sadhutila, Jawahar Nagar. (Ward No. 14) (Lat: 23.924193° Long: 91.874782°)	Only OHSR is proposed at Magazine Para on government land. The site is vacant with shrubs cover. There are 3 no. of trees around the location, which may cut, if required. One abandoned building of Department of Agriculture District Biofertilizer Production Centre is present beside the proposed site which is approx. 5m away from the proposed OHSR site. Land use around the site is residential. Access available to site. No sensitive receptor exists closer/within the proposed site.	
2.	Deep Tube Well + IRP 1 in Dolubari (Ward No. 1) (Lat: 23.920284° Long: 91.840246°)	Proposed Deep Tube Well with IRP will be installed in Dolubari. All the land are flat and not under any productive use. No sensitive receptor or habitation exists closer/ within the proposed site and no tree cutting will be required. Vegetation/ scrub needs to be removed before construction Access available to site. Rail track is present near the proposed site in a Tilla. There is no notable or significant archeological place or protected monuments or areas in and around project area. Land use around the site is residential.	
3.	Deep Tube Well + IRP 2 in Bonkumari (Ward no. -3) (Lat: 23.924659° Long: 91.841794°)	Deep Tube Well with IRP will be installed near an Anganwadi School. Measures should be taken during the construction period to control the air and noise pollution. Small patch of land with grass cover, grazed by cows. Access is available. Bitumen road is noted. No tree cutting will be required. High extension electric line is present on the proposed site which needs to shifted before construction. Land use around the site is residential.	
4.	Deep Tube Well + IRP 3 in BK Nagar (Ward no. -8) (Lat: 23.928529° Long: 91.8471°)	Deep Tube Well with IRP will be installed in BK Nagar. Two trees, are present near the site. The proposed DTW will be installed in government vacant land. Land use around the site is residential.	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
		Heaps of straws are stacked in the proposed site. No sensitive receptor exists closer/within the proposed site and no tree cutting will be required. Access available to the site.	
5	Deep Tube Well+IRP 4 Near Magazine Para, Jawahar Nagar. (Ward No. 14) (Lat: 23.924375° Long: 91.873138°)	Deep Tube Well with IRP will be installed in Magazine para. Land is vacant with no trees only few shrubs. Water pipes are lying on the proposed site. These are DWS materials, needs to be removed before start of construction. No sensitive receptor or habitation exists closer/ within the proposed site and no tree cutting will be required. Access – main bitumen road available to the site There is no designated forest land near the proposed DTW location.	
6	Water Distribution Network near Jawar Nagar.	Water supply pipelines will be laid within the RoW of PWD roads. Land use of the area is mainly commercial. Auto stand is present. Few vendors sell vegetables on the side of the roads. One vendor has a small movable shop, beside the road. There are no trees along the road. No sensitive receptor exists closer/within the proposed site.	

Sl. no	Project Component and location	Environmental Features of the Site	Photograph
7.	Water Distribution Network near B.K Nagar	Pipes will be laid within the road and within the carriageway in narrow roads. There are no trees along the road. Church is present just beside the road. One water tank is present within 1 meter of the road. Land use of this area is residential. Measures should be taken during the construction period to protect this structure from being damaged.	

Table 18: Sensitive Receptors in the Project Influence area - Kailashahar

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
1	School	Near pipe laying area, old Kalibari	5 m	
2	School	Ward No. 03 near pipe laying area	Adjacent to the road	
3	School	Near OHSR 1 in Kalipur	70 m	

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
4	School	Near OHSR 1 in Kalipur	50 m	
5	Mission Ashram	Ward no. 14 near pipe laying area	20 m	
6	Temple	Ward No. 04 near pipe laying area	10m	

Table 19: Sensitive Receptors in the Project Influence area – Kumarghat

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
1	Anganwadi Centre	R.D. Block	Adjacent to the road	

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
2	Anganwadi Centre	Moti Colony	Adjacent to the road	
3.	School	Ward No. 5,	Adjacent to the road	
4	School	Pabiachora	More than 5m	
5	Temple	Ward No. 10	Adjacent to the road	
6	Temple	Ward No. 05	5m	

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
				
7	Temple	Ward No. 13	5m	

Table 20: Sensitive Receptors in the Project Influence area - Dharmanagar

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
1	School	Near Dharmanagar ISBT	100 m	
2	School	Post Office Road	Adjacent to the road	

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
3	Temple	Barua	5m	

Table 21: Sensitive Receptors in the Project Influence area - Ambassa

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
1	Church	B.K Nagar	Within 1.5 meters	
2	Water Reservoir or Tank (Common Property Resource)	B.K Nagar	Within 1 meter	
4	School	Bhowlia Basti	Within 5 meters	

Sl. no	Name of structure	Location	Approximate Distance from construction activity site	Photographs
5	Church	Bhowlia Basti	Within 5 meters	
6	Anganwari School	Bonkumari	Within 25 meters	

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Introduction

60. 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.

61. 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 loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site.

(ii) **Design impacts** include impacts arising from Investment Program design, including technology used, scale of operation/throughout, waste production, discharge specifications, pollution sources and ancillary services.

(iii) **Pre-construction impacts** include impacts which are anticipated during construction works but planning are required for proposed mitigation measures before start of construction works i.e. during SIP period such as taking consents from various departments, planning for construction and workers camps, deployment of safety officer, arrangement of required barricades and caution boards etc.

(iv) **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.

(v) **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.

62. Screening of environmental impacts has been based on the impact magnitude (negligible/moderate/severe - in the order of increasing degree) and impact duration (temporary/permanent).

63. 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 analysed during pre-construction, construction, and operational stages in the context of the project's area of influence. The ADB Rapid Environmental Assessment Checklist (**Appendix 1)** has been used to screen the project for environmental impacts and to determine the scope of the IEE.

B. Design and Location Impacts

64. **Design and Location of the Proposed Components**. Technical design of the (i) intake facilities at river; (ii) Deep tube well & IRP, (iii) raw water main, (iv) water treatment plant with clear water reservoir; (v) clear water mains, (vi) Intermediate Overhead Water Storage Reservoirs and other items like water distribution network, flow meters, follows the relevant national planning and design guidelines, focusing on providing a robust system which is easy to operate, sustainable, efficient, and economically viable. Following environmental considerations are included in the project:

(i) Improving water supply system with ground water based sources (Deep Tube Wells) in Ambassa town to meet the present and projected water demand
(ii) Improving water supply system with Surface water based sources (River intake and WTP) in Kailashahar, Kumargaht and Dharamnagar towns to meet the present and projected water demand
(iii) Designing the entire system to maintain optimal flow and terminal pressure, and optimizing the overall energy usage;
(iv) Reducing the incidence of water borne diseases by providing 100% population including urban poor with potable water supplies;
(v) Preparation and implementation of a water quality surveillance program to ensure that supplied water meets the drinking water standards;
(vi) Using low-noise and energy efficient pumping systems;
(vii) Installing low noise-producing pumps and motors etc., in enclosed buildings with noise reducing walls, and maintaining adequate buffer to the nearby inhabited areas;
(viii) Provision of appropriate personal protection equipment to the workers and staff.

C. Water Source Sustainability

Kailashahar and Kumarghat

65. Manu River is perineal River; sufficient water is available throughout the year. For getting allocation permission and sustainability of water supply source request letter has been send to PWD (Water Resource), Govt. of Tripura. For the present water supply scheme at Kailashaher and

Kumarghat water demand from Manu River for the projected year 2053 is 7.56 and 5.77 MLD. At present water is already drawn from river Manu at the rate of 3.78 ML per day for Kalashahar and 2.46 MLD from Deo River from Kumarghat. An additional Intake of 4.5 ML per day for Kailasharh and 4.0 MLD for Kumarghat has been proposed to augment the water supply system of Kailashahar and Kumarghat towns.

66. Manu River water withdrawal/ intake permission is already received from Water Resource Investigation Division., Govt. of Tripura (Error! Reference source not found.).

67. Water Resource Investigation Division has allowed the withdrawal of 0.429 MCM/ 14.3 MLD of river water for drinking purpose for Kailashahar and Kumarghat town. It shows that quantum of water required for ADB funded scheme with respect to the allowed withdrawal water is secured. It has been found that in between the months of November and March there is a deficit of water availability in the Manu River. After gap analysis it has been found that the town of Kailashahar requires a surface water withdrawal of 2.45 MLD and 3.78 MLD for the year 2038 and 2053 respectively which is equivalent to 0.073 MCM and 0.113 MCM per month. Requirement of water for ADB funded scheme in Kailashahar which is 2.45 MLD less than the available runoff of 544 MLD in river during November. Similarly for December to March the requirement is less than the available runoff. Hence the availability of surface water from river Manu is secured.

68. After gap analysis it has been found that the town of Kumarghat requires a withdrawal of 1.93 MLD and 3.31 MLD for the year 2038 and 2053 respectively which is equivalent to 0.057 MCM and 0.099 MCM per month. Requirement of water for ADB funded scheme in Kumarghat which is 1.93 MLD less than the available runoff of 544 MLD in river during November. Similarly for December to March the requirement is less than the available runoff. Hence the availability of water from river Manu is secured.

Dharamanagar

69. Juri River is perineal River, sufficient water is available throughout the year. For getting allocation permission and sustainability of water supply source request letter has been send to PWD (Water Resource), Govt. of Tripura. For the present water supply scheme at Dharmanagar water demand from Juri for the projected year 2053 is 19.35 MLD. At present water is already drawn from river Kakri/ Juri at the rate of 5.7 ML per day. An additional Intake of 14 ML per day has been proposed to augment the water supply system of Dharmanagar town.

70. Juri River water withdrawal permission is received from Water Resource Investigation Division (WRID), Govt. of Tripura **(**Error! Reference source not found.). They have allowed the withdrawal of 0.603 MCM/ 20.1 MLD of river water for drinking purpose for Dharmanagar town. It shows that quantum of water required for ADB funded scheme with respect to the allowed withdrawal water is secured. It has been found that in between the months of November and February there is a deficit of water availability in the Juri River. After gap analysis it has been found that the town of Dharmanagar requires a withdrawal of 8.94 MLD and 13.65 MLD for the year 2038 and 2053 respectively which is equivalent to 0.268 MCM and 0.409 MCM per month. Requirement of water for ADB funded scheme` in Dharmanagar which is 8.94 MLD less than the available runoff of 614.3 MLD in river during November. Similarly for December to February the requirement is less than the available runoff. Hence the availability of surface water from river Juri is secured.

Ambassa

71. The proposed project is to augment and improve the water supply system in Ambassa MC using deep tube wells as water source. Ambassa is a small town which accommodates a total population of 18,501 no. for the year 2023. The present water supply to the town is from the Dhalai river and 8 nos. Deep Tube wells.

72. Water supply at Ambassa town is through piped system using ground water and as well as surface water. At present river water intake from Dhalai river and 8 nos. of deep tube well is the main source of the system. The existing water treatment plant is not capable to cater the required amount of water. Hence additional deep tube wells have been proposed with IRP.

73. An approval letter vide memo no. F.1(40)/EE/WRID/TECH/2020/58-60 has been provided by Water resources Investigation Division, Agartala where they have provided a ground water potential map for the state of Tripura where yield wise areas have been marked. The detailed report is attached in **Appendix 13.**

74. While proposing the tube wells the specified yield provided in the map has been taken into consideration. As per Annexure I of permission letter the available ground water yield of Ambassa town ranges from 50-100 m^3/hr. The proposed four deep tube wells require a yield of 49.9 m^3/hr each which is less than the available yield.

75. After the analyzing the existing water supply system, it has been noticed that the present DWS water supply scheme is not efficient to supply water with adequate pressure in Ambassa town and existing distribution network cover approx. 49.5 % of the town area. For Independent Water supply scheme, it is decided to construct the 4 DTWs with IRPs & 1 OHSR with detention time of 10 hrs. and water shall be supplied to consumer through distribution network of HDPE and DI K9/ K7 pipe.

76. As per presented above, in terms of water availability and quality of water, selected source is adequate and suitable to meet the project water demand, and there are unlikely to be any issues related source sustainability during the project life cycle.

77. **Design Period:** The design period adopted for the Water Supply system is 30 years for mechanical component, and 15 years for OHSR and distribution system.

D. Environmental Audit of Existing Infrastructure

78. It is designed to utilize existing water supply infrastructure like WTP (in all four tows), clear water reservoirs, pump houses etc. with necessary improvements. As per the ADB SPS 2009, these are associated facilities and therefore the component operation shall comply with the ADB and applicable environmental laws of India. Besides, ADB SPS lays emphasis on impacts and risks on biodiversity and natural resources, pollution prevention abatement including hazardous waste, occupational health and safety, community health and safety, and physical cultural resources. A primary environmental audit is conducted to (i) assess the compliance of the existing infrastructure with environmental legislations and (ii) improve environmental performance to minimize future potential liabilities. Detailed shall be carried out during detailed design stage (to be done by DBO contractor).

79. All the existing infrastructure facilities are in urban areas within towns. There are no environmentally sensitive or protected areas in or near the vicinity of the sites. Table 22 below

shows summary of audit for existing components that will be used in new water supply scheme. Appendix 6 shows preliminary environment audit of existing WTPs at Kailashahar, Kumarghat, Dharamnagar and Ambassa.

Table 22: Environmental Audit of Existing water supply components

Infrastructure	Details	Designed Rehabilitation	Compliance with environmental regulatory framework	Environmental Concerns
Kailashahar				
4.54 MLD WTP	Existing WTP of capacity 4.54 MLD on Manu River.	No Change in existing WTP A new WTP has been proposed in another location.	CTE and CTO are not required in for WTP in Tripura	WTP has Backwash Tank of 119 m² but it is not fully functional. Sludge from WTP is dewatered, store within campus for a short period and finally utilize/ dispose at designated place after getting NOC from concerned authority.
	Treated water quality	-	Yes – with drinking water standards (IS 10500-2012)	Only few parameters are tested –. All parameters except Turbidity and Residual chlorine are within acceptable limit.
Intake well cum raw water pumping station	• Pump Capacity: 2 nos. @ 40000 GPH Pump Type: Vertical turbine centrifugal pump	No rehabilitation work required and performance is satisfactory as per DWS and KMC	No requirements under existing laws	Occupational health and safety, public safety during the construction works Disposal of discarded material, waste oils, mechanical and electrical parts.
Transmission and distribution	The exisiting clear water transmission main was analysed and found hydraulically sufficient based on the assumed pipe alignment and diameter. The total length of the distribution network is about 20.2 km	• Replacement: new pipes will be laid in the place of existing pipes • Pipes will be left as it is in the ground, no rehabilitation / removal proposed	No requirements under existing laws	Data and information on exact alignment and diameter of pipes are not available with DWS Accidental disturbance / need to remove in narrow roads Occupational health and safety, public safety during trenching
Kumarghat				

Infrastructure	Details	Designed Rehabilitation	Compliance with environmental regulatory framework	Environmental Concerns
2.91 MLD WTP	Existing WTP of capacity 2.91 MLD on Deo River.	No Change in existing WTP A new WTP has been proposed on Manu River	CTE and CTO are not required in for WTP in Tripura	WTP has Backwash Tank of 100 m² but it is not fully functional. Sludge from WTP is dewatered, store within campus for a short period and finally utilize/ dispose at designated place after getting NOC from concerned authority.
	Treated water quality	-	Yes – with drinking water standards (IS 10500-2012)	Only few parameters are tested –. All parameters are within acceptable limit.
Intake well cum raw water pumping station	• Pump Capacity: 2 nos. @ 60000 GPH Pump Type: Vertical turbine centrifugal pump	• No rehabilitation work required and performance is satisfactory as per DWS and KMC	No requirements under existing laws	Occupational health and safety, public safety during the construction works Disposal of discarded material, waste oils, mechanical and electrical parts.
Transmission and distribution	The total length of the distribution network is about 19.09 km	• Replacement; new pipes will be laid in the place of existing pipes • Old Pipes will be left as it is in the ground, no rehabilitation / removal proposed	No requirements under existing laws	Data and information on exact alignment and diameter of pipes are not available with DWS Accidental disturbance / need to remove in narrow roads Occupational health and safety, public safety during trenching
Dharmanagar				
6.81 MLD WTP/ Utilized 5.7 MLD	Existing WTP of capacity 6.81 MLD/ Utilizable withdrawal capacity is 5.7 MLD	No Change in existing WTP A new WTP has been proposed near present location.	CTE and CTO are not required in for WTP in Tripura	WTP has Backwash Tank of 250 m² but it is not fully functional. Sludge from WTP is dewatered, store within campus for a short period and finally utilize/ dispose at designated place after getting NOC from concerned authority.
	Treated water quality	-	Yes – with drinking water standards (IS 10500-2012)	Only few parameters are tested –. All parameters except Turbidity and Residual chlorine are within acceptable limit.

Infrastructure	Details	Designed Rehabilitation	Compliance with environmental regulatory framework	Environmental Concerns
Intake well cum raw water pumping station	• Pump Capacity: 2 nos. @ 75000 GPH and 3 nos. @ 65000 GPH Pump Type: Vertical turbine centrifugal pump	No rehabilitation work required and performance is satisfactory as per DWS and DMC	No requirements under existing laws	Occupational health and safety, public safety during the construction works Disposal of discarded material, waste oils, mechanical and electrical parts.
Transmission and distribution	• The exisiting clear water transmission main was analysed and found hydraulically sufficient based on the assumed pipe alignment and diameter. • The total length of the distribution network is about 103 km	• Replacement; new pipes will be laid in the place of existing pipes • Pipes will be left as it is in the ground, no rehabilitation / removal proposed	No requirements under existing laws	Data and information on exact alignment and diameter of pipes are not fully available with DWS Accidental disturbance / need to remove in narrow roads Occupational health and safety, public safety during trenching
Ambassa				
2.5 MLD WTP	Existing WTP of capacity 2.5 MLD on Dhailai River.	No Change in existing WTP	CTE and CTO are not required in for WTP in Tripura	WTP has Backwash Tank of 100 m² but it is not fully functional. Sludge from WTP is dewatered, store within campus for a short period and finally utilize/ dispose at designated place after getting NOC from concerned authority.
	Treated water quality	-	Yes – with drinking water standards (IS 10500-2012)	Only few parameters are tested –. All parameters except Turbidity and Residual chlorine are within acceptable limit.

Infrastructure	Details	Designed Rehabilitation	Compliance with environmental regulatory framework	Environmental Concerns
Deep tube well and Iron removal plant	There are 8 nos. deep Tube Wells, out of which new 3 IRPs under working condition. Due to lack of maintenance, existing packaged Iron removal plants are not functioning	Since ground water source will be utilized repairing of IRPs are required.	No requirements under existing laws	Iron sludge will be disposed at designated place after getting NOC from concerned authority
Intake well cum raw water pumping station	• Pump Capacity: 2 nos. @ 40000 GPH Pump Type: Vertical turbine centrifugal pump	No rehabilitation work required and performance is satisfactory as per DWS and AMC	No requirements under existing laws	Occupational health and safety, public safety during the construction works Disposal of discarded material, waste oils, mechanical and electrical parts.
Transmission and distribution	The exisiting raw and clear water transmission main was analysed and found hydraulically sufficient based on the assumed pipe alignment and diameter. • The total length of the distribution network is about 30 km	• Replacement; new pipes will be laid in the place of existing pipes • Pipes will be left as it is in the ground, no rehabilitation / removal proposed	No requirements under existing laws	Data and information on exact alignment and diameter of pipes are not available fully with DWS Accidental disturbance / need to remove in narrow roads Occupational health and safety, public safety during trenching

80. The environmental concerns are mainly related to occupational health and safety, oils, fuels and chemical handlings, waste management etc. wastewater (backwash and clarifier water) and sludge management systems of WTP are not functional properly, it needs upgradation. No new works are proposed in existing WTPs.

81. The DBO contractor will conduct technical assessment WTP during the detailed design phase including quality of treated water, backwash and sludge handling system, chemical handling etc., and prepare a service improvement plan and based on the requirement the Department of water supply (DWS) will upgrade these systems as required and report to PMU, PMU will ensure that necessary corrective actions are taken.

82. A work specific environmental management plan needs to be prepared for these aspects. **Appendix 6** shows environment audit of existing WTPs.

1. Energy Efficiency

83. To optimize the power consumption, the hydraulic design shall follow optimal approach, and the following shall also be considered in design and selection of pumping systems. According to Manual for the Development of Municipal Energy Efficiency Projects in India (jointly developed by Bureau of Energy Efficiency (BEE) and International Finance Corporation in 2008), energy savings, at minimum, of 25% to 40% is possible with appropriate measures. The following measures shall be considered and incorporated into the subproject designs:

(i) Installation of Energy Efficient Motors;
(ii) Efficient Pumping system operation.
(iii) Installation of Variable Frequency Drives (VFDs).

84. **Wastewater and Sludge from Water Treatment Plant - treatment and disposal**. Effective sludge disposal system will be made within the proposed WTPs. The process wastewater will be generated from the following WTP units, and the same will be conveyed to a sump from where the clarified water will be pumped back to inlet. There will be no wastewater release from the WTP, and the settled sludge will be further processed. DBO contractor will develop final sludge management plan.

85. Sludge from the water treatment plant will emanate mainly from clarifloculator. The sludge valve from clarifloculator shall be motorized knife gate valve with timer operation (duration & interval). The timers will be set by operator depending upon the raw water quality (mainly turbidity & suspended solids). The sludge will be collected in a sludge sump. The sludge will be pumped by means of positive displacement pumps (screw pumps) to centrifuge. Before entering the centrifuge, polyelectrolyte will be dosed into the sludge. Polyelectrolyte dosing system with solution tank and dosing pumps shall be housed in centrifuge building. The solids which will come out of the centrifuge (located on the 1st floor of centrifuge building) will have concentration of 18 to 20% and shall be disposed off into low lying area for landfilling. The concentrate will be recycled to inlet of treatment plant.

86. The backwash wastewater from filters shall be collected in the sump and shall be pumped back to cascade aerator of the WTP. All other sludge lines from inlet chambers, flash mixer, and chemical tanks shall be drained into clarifier sludge sump, occasionally.

87. Dried sludge will be used as soil conditioner. Periodic testing of dried sludge will be conducted to ensure that it does not contain heavy metals that make it unsuitable for food crops. Tests will be conduct to confirm the concentrations below the following standards. As there are no specific standards notified for sludge reuse, the compost quality standards notified under the Municipal Solid Waste Management and Handling Rules, 2000, 2016 have been adopted here. The MSWMH Rules stipulate that “In order to ensure safe application of compost, the following specifications for compost quality shall be met, namely:

Parameters Concentration Not to Exceed[a] (mg/kg dry basis, except pH value and C/N ratio)	
Arsenic	10.00
Cadmium	5.00
Chromium	50.00

Copper	300.00
Lead	100.00
Mercury	0.15
Nickel	50.00
Zinc	1000.00
C/N ratio	20-40
pH	5.5-8.5
[a]Compost (final product) exceeding the above stated concentration limits shall not be used for food crops. However, it may be utilized for purposes other than growing food crops.	

88. **Tree Cutting at Selected Project Sites**. At Kailashahar the identified intake well support structure (electric substation, guard room etc.) and at Ambassa the OHTs and DWTs site has few trees, mostly rubber plantation. Preliminary estimate indicates that 12-15 trees need to be felled but final number will be depending on final design of DBO contractor. Following measures need to be implemented to compensate for the loss of any tree cover.

(i) Minimize removal of trees by adopting to site condition and with appropriate layout design;
(ii) Obtain prior permission for tree cutting;
(iii) Plant and maintain 5 trees for each tree that is removed.

89. **Development of Water Treatment Plant Site**. The WTPs site are identified and proposed within the MC land. Few vegetation/ scrubs need to be removed before construction. As per local enquiries carried out during field visits, the sites are not prone for flooding, and barren land. The proposed WTP site is required to be developed including proper drainage infrastructure.

90. **Structure in seismic zone V- Design impact & mitigation**: While a structure is designed all possible load combination are considered those may come into structure. This includes seismic load also. In zone V the ground vibration is maximum. Corresponding to this the Peak Ground Acceleration (PGA) is provided in the relevant code for seismic design (Indian Standard, IS 1893: 2002, 2016). As per this PGA and the seismic acceleration response curve is given in the code and other factors like Response Reduction Factor and Importance Factor as per the same code the seismic analysis is done and structures are designed accordingly. As the ground acceleration is maximum in zone V, the cost of the structure also becomes high for provision of higher reinforcement etc. As per the seismic design philosophy laid in IS: 1893- 2002 and 2016, the structure is designed such a way that it can withstand all Design Basis Earthquake (DBE) which are basically minor and medium ground slaking and it should not collapse but have cracks which are reparable during Maximum Considered Earthquake (MCE) which are basically major slaking. Thus, as per the provision of the seismic code the structure is designed in such a way that in no case it will collapse. The present structures are also designed in line with the above provision of the IS 1893.

91. **Design Period.** The design period adopted for the Water Supply system is 30 years for pumping main and distribution system and 15 years for pumping machinery and OHSRs.

E. Pre-construction Impacts

92. **Utilities.** Telephone lines and wires, water lines within the proposed subproject locations may require to be shifted in few cases. Mitigation of adverse impacts due to relocation of the utilities, contractor will (i) identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction

phase; (ii) provide prior notice (at least one week in advance) to affected areas and (iii) require DBO contractors to prepare and implement a contingency plan to include actions to be done in case of unintentional interruption of services.

93. **Physical Cultural Resources.** There are no notable or significant archeological places or protected monuments or areas in and around the project locations in the town. Therefore, no impacts envisaged but risk of uncovering archaeological remains, given the long history of town, during the excavations cannot be ruled out completely. DBO contractors therefore should follow the below measures in conducting any excavation work:

(i) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
(ii) Stop work immediately to allow further investigation if any finds are suspected;
(iii) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol

94. **Site selection for equipment lay-down and storage area**. Improper selection will effect local environment and inconvenience public. Priority is to locate these near the subproject locations. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and result in destruction of property, vegetation and drinking water supply systems. Residential areas are not 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). Disposal sites shall not be located near water bodies or in areas which are inconvenience the community. Following mitigation measures are to be implemented:

(i) Choice of location for equipment lay-down and storage areas must take into account distances to adjacent land uses, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.
(ii) Storage areas shall be secure to minimize the risk of crime. They shall also be safe from access by children or animals etc.
(iii) Residents living adjacent to the construction site must be notified of the existence of the hazardous storage area.
(iv) Equipment lay-down and storage areas must be designated, demarcated and fenced if necessary.
(v) Fire prevention facilities must be present at all storage facilities.
(vi) Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage areas.
(vii) These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.
(viii) Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.
(ix) Staff dealing with these materials or substances must be aware of their potential impacts and follow the appropriate safety measures.

95. **Sources of Materials**. Since the construction work is not heavy, moderate amount of sand and coarse aggregate will be required for this sub-project, which will be sourced from quarries. Quarries inevitably cause few physical changes; as construction materials are excavated from the ground, leaving large cavities, or levelling hillsides, etc. The physical damage caused by quarries is controlled by allowing them to operate within specific limited areas only, so the damage is restricted in extent and not allowed to spread indiscriminately. Contractor should avoid new borrow pits/quarries as far as possible, if necessary, all the permissions, including conduct of environmental assessment, and environmental clearance as necessary shall be obtained prior to start of quarrying activity. The contractor should also make a concerted effort to re-use as much excavated material from this sub-project as possible. It is the DBO Contractor's responsibility to verify the suitability of all material sources and to obtain the approvals prior to procurement of material. The DBO Contractor will be required to:

(i) Obtain construction materials only from government approved quarries with prior approval of cluster-PIU;
(ii) Cluster-PIU to review, and ensure that proposed quarry sources have all necessary clearances/ permissions in place prior to approval;
(iii) Contractor to submit to Cluster-PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit);
(iv) Avoid creation of new borrow areas, quarries etc., for the project; if unavoidable, contractor to obtain all clearances and permissions as required under law, including Environmental Clearance prior to approval by cluster-PIU.

DBO contractors

96. **Maintaining Core Labor Standard**. The Contractor and PMU/PIU are responsible for ensuring that international CLS[11] as reflected in national labor laws and regulations are adhered to. PIU is ultimately responsible for monitoring compliance with national labor laws and regulations, provided that these national laws are consistent with CLS. ADB will carry out due diligence – during loan review missions - to ensure that executing and implementing agencies and contractors comply with applicable (national) core labor standards and labor laws. PMU or PIU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all: (i) applicable labor laws and core labor standards on: (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste; and (c) elimination of forced labor; and (ii) the requirement to disseminate information on sexually transmitted diseases including HIV/AIDS to employees and local communities surrounding the project sites. These will be monitored as part of the project's safeguards reporting requirements.

F. Construction Impacts

1. Construction of river intakes – Kailashahar, Kumarghat and Dharmanagar

97. Construction of intake well in the rivers may lead to degradation of water quality due to increase in turbidity and chemical contamination from fuels and lubricant used in construction work. Increase in silt content and water turbidity, chemical quality can affect the aquatic life. Though

[11] Core Labor Standards (CLSs) are a set of four internationally recognized basic rights and principles at work: (i) freedom of association and the right to collective bargaining; (ii) elimination of all forms of forced or compulsory labor; (iii) effective abolition of child labor; and (iv) elimination of discrimination in respect of employment and occupation.

there are no notable aquatic life, to ensure that any negative impacts are mitigation, the contractor will be required to:

(i) Select a construction methodology that is least disturbing, and appropriate for the in-situ soil condition.
(ii) Schedule the construction works during low water level period –(November - February); ensure that works are completed during the same period to prior to onset of monsoon; confirm with concerning authorities on release of water; avoid scheduling the works during water release period.
(iii) Erect temporary barriers to form enclosed construction area with least disturbance
(iv) Avoid/minimize use of fuels, chemicals and lubricants; ensure no spillage

2. Construction methodology of production tube well - Ambassa

(i) Drilling work of pilot hole is to be taken up and completed up to recommend depth at respective point
(ii) After the completion of pilot hole drilling, it is to be electrically logged, in order to identify the promising aquifers for screening it. Based on the physical observation of formation material (drill cuttings) and the Electro logging Test Results, corrected lithological log is to be prepared for recommending lowering of well pipe Assembly. Based on the study of Mechanical Analysis of Aquifer material for grain size distribution, the slot size & gravel size should be selected and recommended.
(iii) On confirmation of well pipe Assembly, Pilot hole is to be reamed (enlarged) to 500 mm diameter for lowering 250 mm pipe diameter or hole diameter of 600 mm for lowering 300 mm pipe diameter, as the case may be, up to the total recommended depth of tube well.
(v) On lowering the pipe assembly into the enlarged hole, space between the (slotted & blank) pipe and enlarged hole should be packed with proper size gravel from the bottom of well up to the bottom of clay packing below ground level.
(vi) From the top of the gravel packing, up to the ground level, perfect clay packing between Pipe and Hole is to be provided, for sanitary as well as water quality protection of well.
(vii) Well, is to be developed through backwashing prior to compressor development test.
(viii) Production tube well is to be developed using Airline pipe by using appropriate capacity of compressor for getting sand free discharge (or Well is to be developed at least for 40 to 50 hours whichever is less). Water samples should be collected for analyzing chemical and biological parameters.
(ix) Production tube well is to be developed (10 to 15 hours depending on the observation of sand free discharge it is indicative) through over pumping before conducting Pump Test. Thereafter Pump Test is to be conducted for yield test (5-to-6-hour continuous pumping) to recommend appropriate size & capacity of pump to be installed before putting the well. Water samples should be collected for analyzing chemical and biological parameters.

98. **Beside DTW or OHSR Iron Removal Plant (IRP) will be installed.** The Iron Removal Filters are designed to remove the Excess Iron content present in the feed water with minimum pressure drop. Most iron filtration systems operate on the principal of oxidizing the iron (oxidation) to convert it from a ferrous (dissolved or soluble) to a ferric or undissolved state. Iron removal plants can be based on different filtration media, depending on the iron and manganese concentration, the oxygen level, CO2 content and hardness of the water. As per the certification of

CSIR-IMMT Bhubaneswar that Iron Removal Plant (IRP) of Resin based ion exchange technology is capable to remove high Iron contented ground water of DTW to acceptable limit as per BIS standard. Therefore, it is proposed to install resin-based Iron Removal Plant for Ambassa. The plant should be capable of treating water from maximum level of contamination 10.00 ppm for iron in raw water of DTWs bored at different sites up to 0.3 ppm and be able to purify in the specified standards for Iron, Manganese & Bacteriological contamination as per BIS standard.

99. **Other civil works** in the subproject include Intake, WTP an CWR (at Kailashahar, Kumargaht and Dharamanagar) OHSRs pump room, guard room and laying of pipes etc. at the identified sites. Present construction works are confined to sites, and construction includes general activities like site clearance, excavation for foundations, and creation of concrete structures, etc. Since these works are confined to the boundary of identified sites, there is no direct interference of construction work with the surrounding land use. However, construction dust, noise, use of local roads for transportation of construction material, waste, labour camps etc., will have negative impacts, which needs to be avoided or mitigated properly.

100. The open cut trenching method of pipe laying involves excavation for laying pipes along the roads, placing pipes in the trench, jointing, and testing, and refilling with the excavated soil. Pipes are normally placed by approx. 1 to 1.2 m below the existing ground level or road level and a clearance of 200 mm is left between the pipe and each side of the trench to allow backfilling. Trenches will be around 1 – 1.2 m deep and 500-800 mm wide. Earthwork excavation is being undertaken by machine (backhoe excavator) or manually, while pipe laying works include laying pipes at required gradient, fixing collars, elbows, tees, bends and other fittings including conveying the material to work spot and testing for water tightness. Sufficient care is being taken while laying so that existing utilities and cables are not damaged and pipes are not thrown into the trenches or dragged, but carefully laid in the trenches. As trenches are only 1-1.2 m deep, there risk of collapse of trenches or damage to surrounding buildings is minimal. However, necessary precautions are being taken depending on the soil conditions, and if required measures such as bracing or shoring in the trench will be provided. Once they are laid, pipes will be joined as per specification and then tested for any cracks of leakages. About 85%-95% of the excavated soil will be used for refilling the trench after placing the pipe and the residual soil of 5-15% will be disposed of. Therefore, residual soil after pipe laying and refilling is not significant.

101. Although pipe laying work involves quite simple techniques of civil work, the invasive nature of excavation and pipeline alignment in the built-up areas of towns where there are a variety of human activities, 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, however, needs to be mitigated.

102. Anticipated impacts during the construction phase are discussed below along with appropriate mitigation measures to avoid, minimize, or mitigate those impacts to acceptable levels

103. **Physical Cultural Resources.** There are no notable or significant archeological places or protected monuments or areas in and around the project locations in the subproject towns. Therefore, no impacts envisaged but risk of uncovering archaeological remains, given the long history of town, during the excavations cannot be ruled out completely. DBO Contractors therefore should follow the below measures in conducting any excavation work:

(i) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;

(ii) Stop work immediately to allow further investigation if any finds are suspected;
(iii) Inform local Archaeological Department if a find is suspected and take any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol

1. DBO contractors

104. **Air Quality**. Construction work, especially from earthwork activities, coupled with dry and windy working conditions, material and debris transport, and works along the public roads carrying significant traffic, have high potential to generate dust. Also, emissions from construction vehicles, equipment, and machinery used for excavation and construction induce impacts on the air quality. Anticipated impacts include dust and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons. Dust generation from construction work in individual and confined work sites like intake, WTP and OHSRs etc., are mainly during the initial construction phase of earth work, as the site is confined, dust can be effectively controlled with common measures. Dust generation will be significant during pipeline laying along the roads. Increase in dust/ particulate matter in ambient air is detrimental and may have adverse impacts on people and environment. To mitigate the impacts, DBO contractors are required to:

2. For all construction works

(i) Provide a dust screen around the construction sites at intake, WTP and OHSRs work sites
(ii) Damp down the soil and any stockpiled material on site by water sprinkling;
(iii) Use tarpaulins to cover the loose material (soil, sand, aggregate etc.,) when transported by trucks;
(iv) Clean wheels and undercarriage of haul trucks prior to leaving construction site/quarry;
(v) Control dust generation while unloading the loose material (particularly aggregate, soil) at the site by sprinkling water and unloading inside the barricaded area;
(vi) Stabilize surface soils where loaders, support equipment and vehicles will operate by using water and maintain surface soils in a stabilized condition
(vii) Apply water and maintain soils in a visible damp or crusted condition for temporary stabilization;
(viii) Apply water prior to levelling or any other earth moving activity to keep the soil moist throughout the process;
(ix) Cover the soil stocked at the sites with tarpaulins;
(x) Control access to work area, prevent unnecessary movement of vehicle, public trespassing into work areas; limiting soil disturbance will minimize dust generation
(xi) Ensure that all the construction equipment and machineries are fitted with pollution control devises, which are operating correctly, and have a valid pollution under control (PUC) certificate.

3. For pipeline works

(i) Barricade the construction area using caution tape and 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/demarcated area;
(iv) Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area;
(v) Carry out work in night time at the places having sensitive receptor for less

disturbance of traffic activity.

(vi) Undertake the work section wise: 100 – 200 m section should be demarcated and barricaded;

(vii) Conduct work sequentially - excavation, pipe laying, backfilling; conduct pipe testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done;

(viii) Tree cutting must be avoided and if un-avoidable then 1:5 ratio for plantation must be maintained with proper channels.

(ix) Remove the excavated soil of first section to the disposal site; as the work progresses, sequentially, by the time second section is excavated, the first section will be ready for backfilling, use the freshly excavated soil for backfilling, this will avoid stocking of material, and minimize the dust;

(x) Water bodies must not be disturbed, for passing pipeline

(xi) Backfilled trench at any completed section after removal of barricading will be the main source of dust pollution. The traffic, pedestrian movement and wind will generate dust from backfilled section. Road restoration shall be undertaken immediately.

105. **Noise and Vibration Levels**. WTP. Intake, OHSR, IRP and DTW site are in isolated areas, and pipeline networks are located predominantly in a rapidly developing urban area. Pipeline sites are located close to habitation areas, where there are houses, religious places and businesses. The sensitive receptors are the general population in these areas. Increase in noise level may be caused by excavation, particularly breaking of cement concrete or bitumen roads for laying of pipeline, operation of construction equipment like concrete mixers, and the transportation of equipment, materials, and people. Vibration generated from construction activity will have impact on nearby buildings. This impact is negative but short-term, and reversible by mitigation measures. The DBO Contractor will be required to:

(i) Plan activities in consultation with Cluster-PIU 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 receptor like school, religious places;

(iii) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s;

(iv) Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach;

(v) Near school, Anganwadi, religious places and health center work need to be completed in shorter period. Noise generation should be restricted near the above sensitive receptors. Work should be carried out during day time only and non-school hours.

(vi) Consult local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

106. **Surface Water Quality**. Run-off from stockpiled materials and chemicals from fuels and lubricants during construction works can contaminate downstream surface water quality of the streams. It is important that runoff from the construction areas, which may contain silt and chemical

traces do not enter these water bodies. Impact will be temporary, and may not be significant, but needs to be mitigated. DBO 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) 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) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
(v) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
(vi) Store fuel, construction chemicals etc., on an impervious floor, also avoid spillage by careful handling
(vii) Dispose any wastes generated by construction activities in designated sites; and
(viii) Conduct surface quality inspection according to the environmental management plan (EMP).

107. **Pollution of River water during construction.** Construction of intake well in the river and construction of pipe-supporting bridge may lead to degradation of water quality due to increase in turbidity and chemical contamination from fuels and lubricants used in construction work. Increase in silt content and water turbidity, chemical quality can affect the aquatic life, silting/chocking of spill ways/ canals etc. Though the work is small scale, to ensure that any negative impacts are mitigated, the contractor is required to:

(i) Select a construction methodology that is least disturbing, and appropriate for the in-situ soil condition, and able to complete the construction work in minimum time
(ii) Schedule the construction works during low flow period and ensure that works are completed during the same period to prior to onset of monsoon
(iii) Erect temporary barriers to form enclosed construction area with least disturbance
(iv) Allow adequate time settle the distributed solids to prior to pumping out water; only clear/clarified water shall be pumped back into the water body/reservoir; any silt laden water should be pumped to a silt pond
(v) Avoid/minimize use of fuels, chemicals and lubricants; ensure no spillage; and have an equipment spill and containment plan and appropriate materials on-site
(vi) Clean up the site after construction; excavated soil, debris, material shall be cleared from the river bed/bank properly
(vii) Conduct water quality inspection according to the Environmental Monitoring Plan (EMP)

108. **Groundwater Quality**. Another physical impact that is often associated with excavation is the effect on drainage and the local water table if groundwater and surface water collect in the voids. In the sub-project area, groundwater depth is shallow, there are few water bodies and ponds, and it also receives high rainfall during the monsoon. Conducting excavation works during non-monsoon season will certainly help, but due to high water table, water may collect in pits as they are excavated. The water collected in excavated pits will contain silt and disposal of this in drainage channels lead to silting. To avoid this the contractor needs to be implement the following measures:

(i) Create a temporary drainage channel around the work area to arrest the entry of runoff from upper areas into the work area

(ii) Pump out the water collected in the pits / excavations to a temporary sedimentation pond; dispose of only clarified water into drainage channels/streams after sedimentation in the temporary ponds

(iii) Consider safety aspects related to pit collapse due to accumulation of water

109. **Storage and Disposal of excavated earth**. A large quantity of soil will be excavated for pipe laying, construction of WTP, CWR, OHSR, pump house and others. Some part of this excavated soil will be reused for backfilling and/or surface levelling; rest of the soil will need to be disposed in other locations. Proper storage and disposal plan from contractor is required before start of the work. Prior permission from landowner/concerned authority for storage and disposal of excess earth is required. Prior to the commencement of works, contractor will follow all the prescribed rules[12] and shall identify a debris disposal site in consultation with the PIU/ULB and adhering to following criteria:

(i) The site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected, top-soil stripping, stacking and preservation should be undertaken prior to initiation of any activities.

(ii) Debris disposal site shall be at least 200 m away from any surface water body.

(iii) No residential areas shall be located within 200 m downwind side of the site.

(iv) The site is minimum 250 m. away from sensitive locations like hospitals, religious places, ponds/lakes or other water bodies.

(v) The local governing body and community shall be consulted while selecting the site.

(vi) Contractor is required to prepare plan for disposal of construction and demolition waste including excavated earth in the designated site/sites and submit the plan in PIU. Which to be approved by Municipal Council as per Construction and Demolition Waste Rules 2016

(vii) Soil storage site should be properly demarcated by fencing and information board should be placed at entrance

(viii) At soil storage site, soil should be covered by tarpaulin or regular water sprinkling should be done to reduce dust emission

(ix) At soil disposal site the disposed soil should be levelled on daily basis and no heap or mound should be left at end of the day.

110. **Generation of Construction Wastes.** Solid wastes to be generated from the construction activities are muck from tube well drilling, excess excavated earth (spoils), riverbed earth, discarded construction materials, cement bags, wood, steel, oils, fuels, and other similar items. Domestic solid wastes may also be generated from the workers' camp. Improper waste management could cause odor and vermin problems, pollution and flow obstruction of nearby watercourses and could negatively impact the landscape. The following mitigation measures to minimize impacts from waste generation shall be implemented by the contractor:

(i) Prepare and implement a Construction Waste Management Plan;

(ii) As far as possible utilize the debris and excess soil, river bed earth in construction purpose, for example for raising the ground level or construction of access roads etc.;

(iii) Avoid stockpiling any excess spoils at the site for long time. Excess excavated soils should be disposed at approved designated areas immediately;

(iv) If disposal is required, the site shall be selected preferably from barren, infertile lands; site should be located away from residential areas, few water bodies and

[12] Construction and Demolition Waste Management Rules 2016 and Solid Waste Management Rules

any other sensitive land uses;

(v) During construction of tube well – waste water generate from construction activity will be channelized to pit and later muck will be collected from the pit for disposal;

(vi) Domestic solid wastes should be properly segregated in biodegradable and non-biodegradable for collection and disposal to designated solid waste disposal site; create a compost pit at workers' camp sites for disposal of biodegradable waste; non-biodegradable / recyclable material shall be collected separately and sold in the local recycling material market;

(vii) Residual and hazardous wastes such as oils, fuels, and lubricants shall be disposed of in disposal sites approved by TSPCB;

(viii) Prohibit burning of construction and/or domestic waste;

(ix) Ensure that wastes are not haphazardly thrown in and around the project site, provide proper collection bins, and create awareness to use the dust bins;

(x) Conduct site clearance and restoration to original condition after the completion of construction work; Cluster-PIU to ensure that site is properly restored prior to issuing of construction completion certificate.

111. **Management Plan for Night works** (if required). Following requirements should be fulfilled for construction works at night hours-

(i) Night works should be avoided at construction sites specially in residential areas and should be performed only when day works are not possible due to excessive traffic/public/pedestrian movement, site of cultural or religious importance, where there is huge crowd during day hours or any other unavoidable circumstances.

(ii) Limit construction activities at night. When necessary, ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures. Consult community regarding appropriate timing of noisy activities and avoid noisy activities at night. Use noise-control methods (barriers/ shelter/ muffling devices) and maintain a buffer zone if possible. Minimize project transportation, particularly heavy vehicles, through residential areas. Use of high noise generating equipment shall be stopped during night time.

(iii) Safety gear can greatly affect worker visibility. The decision and maneuver distance – how long it takes a driver to notice the worker and make any path or speed changes – is over 5 times greater with reflective clothing than with regular, dark-colored – or even orange-colored – clothes. With this increased decision and maneuver distance, workers, motorists, and equipment are much less likely to have a collision – chances of damage, injury, or death are reduced.

(iv) Reflective clothing isn't the only available technique to increase visibility at night. Flashing lights on a worker's body or clothing, reflective tape on equipment, and especially proper work area lighting are all good ways to increase visibility.

(v) Proper lighting at night includes several different levels and designations of lighting. In order to understand appropriate lighting levels for night work, we first need to talk about how it is measured. Lighting is typically measured by what are called "foot-candles". One foot-candle is the luminance cast on a 1 square foot surface by a single candle's light.

(vi) Visibility & Training: There are two main ways to ensure that motorists and workers experience the safest possible night-time work zone. First is proper safety training, and second is improving visibility throughout the work zone and especially at critical areas like traffic control workers' stations and on any people or equipment.

(vii) Through proper training and lighting, night time construction can happen as safely as construction in the daytime. This allows contractors and agencies to take

advantage of working with fewer delays for the travelling public and for construction workers to work more safely in lower volume traffic.

(viii) Preferably electrical connections are available for running equipment otherwise sound proof/super silent Diesel Generator set should be available

(ix) Sound level should not increase as per following-

Type of area of work	Maximum noise level dB(A)
Industrial	70
Commercial	55
Residential	45
Silence zone	40

(x) Illumination should be as follows-

Minimum illumination (lx)	Areas to be illuminated	Type of work activity
54	Illumination throughout the work area	General work area lighting, and performance of visual tasks of large size, or medium contrast, or low require accuracy
108	Illumination of work area and areas adjacent to equipment	Performance of visual tasks of medium size, or low to medium contrast, or medium required accuracy
216	Illumination of task	Performance of visual tasks of small size, or low contrast or high required accuracy or fine finish

(xi) As far as possible ready-mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site;

(xii) All the noise activity like hammering, cutting, crushing, running of heavy equipment should be done in day time and avoided in night time;

(xiii) Workers engaged in night works should have adequate rest/sleep in day time before start of night works;

(xiv) Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night;

(xv) All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent/retro-reflective arrangements;

(xvi) Workers should be trained before start of night works about risks and hazards of night works and their mitigation measures and should be provided all the protective aids (PPEs) including fluorescent/retro-reflective vests;

(xvii) Horns should not be permitted by equipment and vehicles;

(xviii) Workers should not shout and create noise;

(xix) First aid and emergency vehicles should be available at site;

(xx) Emergency preparedness plan should be operative during night works;

(xxi) Old persons and pregnant women and women having small kids should not work in night time;

(xxii) All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise;

(xxiii) All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night works;

(xxiv) PIU site engineers and contractors' safety personnel should closely monitor the safety of works continuously and noise and illumination levels on hourly basis and

maintain photographic and videographic records as well as register the observations;

(xxv) Night works should be stopped early in the morning at least one hour before start of pedestrian/traffic movement;

(xxvi) After completion of night works all the site should be cleaned and maintained obstruction free for day time movement of vehicles and pedestrians;

(xxvii) Drivers and workers should be alert and responsive during night works;

(xxviii) All the wages to workers working in night hours should be as per the applicable labour acts;

(xxix) Avoid any nuisance which may create problems to nearby habitants and work peacefully during night hours; and

(xxx) Night works should not be conducted near hospitals and during peak seasons such as peak tourist season, students' exam times etc.

112. **Accessibility**. Excavation along the roads for laying of distribution and transmission pipeline, hauling of construction materials and operation of equipment on-site can cause traffic problems. Roads connecting sites are narrow and carry considerable local traffic, mainly comprise bicycles, 2 wheelers, Mini trucks, auto rickshaws, buses etc., Works related to all the remaining components will be confined to the selected sites, therefore there is no direct interference of these works with the traffic and accessibility. Hauling of construction material, equipment, construction waste, etc., to and from the work site may increase the road traffic on local roads, which are not in good condition. This will further inconvenience the local community and road users. Potential impact is negative but short term and reversible by mitigation measures. Accordingly, Traffic Management Plan (TMP) be prepared covering requirement of traffic diversion or control. Sample Traffic Management Plan template attached as Error! Reference source not found. The DBO contractors will be required to:

113. Hauling (material, waste/debris and equipment) activities:

(i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;

(ii) Schedule transport and hauling activities during non-peak hours;

(iii) Locate entry and exit points in areas where there is low potential for traffic congestion;

(iv) Drive vehicles in a considerate manner; and

(v) Notify affected public by public information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

114. Pipeline works

(i) Confine work areas along the roads to the minimum possible extent; all the activities, including material and waste/surplus soil stocking should be confined to this area. Proper barricading / use of caution tape should be provided; avoid material/surplus soil stocking in congested areas – immediately removed from site/ or brought to the site as and when required

(ii) In case of presence of community structures, health facility or religious places, plan work activity in the night time using proper equipment's and alternative access should be provided.

(iii) Leave spaces for access between mounds of soil to maintain access to the houses/ properties

(iv) Provide pedestrian access in all the locations; provide wooden/metal planks over the open trenches at each house to maintain the access.
(v) Inform the affected local population, sensitive receptors 1-week in advance about the work schedule
(vi) Plan and execute the work in such a way that the period of disturbance/ loss of access is minimum.
(vii) Keep the site free from all unnecessary obstructions;
(viii) Coordinate with Traffic Police for temporary road diversions, where necessary, and for provision of traffic aids if transportation activities cannot be avoided during peak hours.

115. **Landscape and Aesthetics.** The construction works may require cutting of trees and will produce 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. Haphazard disposal of these will have negative impacts on Landscape and overall aesthetics. These impacts are negative but are of short-term and reversible by mitigation measures. The DBO contractors will be required to:

- ✓ Prepare and implement spoils management plan;
- ✓ Avoid stockpiling of excess excavated soils;
- ✓ Coordinate with ULB for beneficial uses of excess excavated soils or immediately dispose to designated areas;
- ✓ Recover used oil and lubricants and reuse or remove from the sites;
- ✓ Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- ✓ Minimize removal of vegetation and disallow cutting of trees;
- ✓ If tree-removal will be required, obtain tree-cutting permit from the Forest Department;
- ✓ Plant five native trees for every one that is removed.
- ✓ Remove all wreckage, rubbish, or temporary structures which are no longer required; and
- ✓ Request PIU to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

116. **Socio-Economic – Income**. All the project components are located on government lands and there is no requirement for land acquisition or any resettlement. Resettlement and social issues are being studied in a parallel resettlement planning study of this subproject. Blocking of access to the business / livelihood activities, especially during pipeline laying along the roads, may impact the income of households. However, access will be maintained during pipeline works, no notable impact is envisaged. The DBO contractors will be required to:

- ✓ Prepare and implement spoils management plan;
- ✓ Leave spaces for access between mounds of soil;
- ✓ Provide walkways and metal sheets where required to maintain access across for people and vehicles;
- ✓ Increase workforce in the areas with predominantly institutions, place of worship, business establishment, hospitals, and schools;
- ✓ Consult businesses and institutions regarding operating hours and factoring this in work schedules;
- ✓ Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.
- ✓ Notify community/ water users in advance about likely interruptions in water supply.
- ✓ Provide alternate sources of clean water until water supply is restored.

1. **Socio-Economic – Employment**. Manpower will be required during the 30-months construction stage. This can result in generation of temporary employment and increase in local revenue. Thus, potential impact is positive and long-term. The DBO contractors will be required to employ local labor force as far as possible.

117. **Occupational Health and Safety**. Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures. The DBO contractors will be required to:

a. Comply with all national, state, and local labour laws **(Appendix 5);**
b. Develop and implement site-specific occupational health and safety (OHS) Plan along with COVID-19 SOP which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment; (c) OHS Training[13] including COVID 19 for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
c. Ensure availability of first aid box at work site;
d. Ensure the workers follow COVID 19 SOP and implement accordingly (COVID 19 SOP guideline attached in **Appendix 12**);
e. Provide medical insurance coverage for workers
f. Maintain Safe distance at work and use of Mask should be encouraged for safeguard from COVID-19
g. Secure all installations from unauthorized intrusion and accident risks;
h. Provide health and safety 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;
i. Make sure vaccination against COVID-19 is done for the labourers
j. Ensured the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
k. Ensured moving equipment is outfitted with audible back-up alarms;
l. 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 general public as appropriate;
m. 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.
n. Provide supplies of potable drinking water;
o. Provide clean eating areas where workers are not exposed to hazardous or noxious substances

[13] 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; 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.

118. **Work within River for intake construction.** Since during construction of intake worker should have to work within the river, special precaution particularly using safety equipment and training on swimming and mitigation under emergency is necessary.

119. **Community Health and Safety**. Pipeline works along the road, and hauling of equipment and vehicles have potential to create safety risks to the community. Hazards posed to the public, specifically in high-pedestrian areas may include traffic accidents and vehicle collision with pedestrians. Potential impact is negative but short-term and reversible by mitigation measures. The DBO contractors will be required to:

- ✓ Restrict construction vehicle movements to defined access roads and demarcated working areas (unless in the event of an emergency);
- ✓ Restrict meetings in crowded places and follow COVID-19 SOP for safeguarding against COVID-19
- ✓ Enforce strict speed limit (20-30 kmph) for playing on unpaved roads, construction tracks;
- ✓ Night-time driving will be by exception only, as approved by the PIU to minimise driving risk and disturbance to communities;
- ✓ Adopt standard and safe practices for micro tunneling;
- ✓ Temporary traffic control (e.g. flagmen) and signs will be provided where necessary to improve safety and provide directions;
- ✓ All drivers will undergo safety and training; along with COVID-19 awareness
- ✓ Public access to all areas where construction works are on-going will be restricted through the use of barricading and security personnel;
- ✓ Warning signs, blinkers will be attached to the barricading to caution the public about the hazards associated with the works, and presence of deep excavation;
- ✓ The period of time when the pipeline trench is left open will be minimized through careful planning;
- ✓ Control dust pollution – implement dust control measures as suggested under air quality section;
- ✓ Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure;
- ✓ Provide road signs and flag persons to warn of on-going trenching activities.

120. **Social and Cultural Resources.** Significant negative social impacts in project are not anticipated. Site of social/cultural importance (schools, hospitals, and religious places) may be distributed by noise, dust, safety risks and impeded access. There are schools located close to the project sites, and these may pose safety risks to school children, staff and visitors. This short-term impact, mitigated by the following mitigation measures.

- ✓ Avoiding working at sensitive times,
- ✓ Limiting dust by removing waste soil quickly, bringing sand to site only when necessary, covering and watering stockpiles, and covering soil and sand when carried on trucks;
- ✓ Using modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensuring they are maintained to manufacturers' specifications.
- ✓ Implement community health and safety measures recommended above; isolate work site from the school access road; provide proper barricading to prevent entry of children / public into work site; create awareness

121. **Construction Camps.** Contractor will set up a construction camp within the WTP, tube well locations or OHSRs site – for temporary storage of construction material (pipes, cement, steel, fixtures, fuel, lubricants etc.,), and stocking of surplus soil, and also include separate living areas for migrant workers. The contractor is however encouraged to engage local workers as much as possible. Operation of work camps cause temporary air, noise and water pollution, and may become a source of conflicts, and unhealthy environment if not operated properly. Potential impacts are negative but short-term and reversible by mitigation measures. The DBO contractors is required to:

- ✓ As far as possible locate the camp site within the work sites; if any camp to be established outside these, then select a camp site away from residential areas (at least 50 m buffer shall be maintained)
- ✓ Avoid tree cutting for setting up camp facilities
- ✓ Ensured that a proper compound wall is provided, and erect a wind/dust screen around
- ✓ 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
- ✓ Construction camp must be safeguarded from COVID -19 including safe eating area, maintaining Hygiene inside camp, ensure physical distancing measures
- ✓ Separate the workers living areas and material storage areas clearly with a fencing and separate entry and exit
- ✓ Provide proper temporary accommodation with proper materials, adequate lighting and ventilation, appropriate facilities for winters and summers; ensure conditions of livability at work camps are maintained at the highest standards possible at all times;
- ✓ Consult cluster-PIU before locating project offices, sheds;
- ✓ Minimize removal of vegetation and disallow cutting of trees
- ✓ Ensure conditions of livability at work camps are always maintained at the highest standards possible; 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 allowed as accommodation for workers
- ✓ Camp shall be provided with proper drainage, there shall not be any water accumulation
- ✓ Ensure COVID vaccination is done for all the labours involved in the work
- ✓ Provide drinking water, water for other uses, and sanitation facilities for employees
- ✓ Prohibit employees from cutting of trees for firewood; contractor should be provided proper facilities including cooking fuel (oil or gas; fire wood not allowed)
- ✓ Train employees in the storage and handling of materials which can potentially cause soil contamination
- ✓ Recover used oil and lubricants and reuse or remove from the site
- ✓ Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit for biodegradable waste, and non-biodegradable / recyclable waste shall be collected and sold in local market
- ✓ Remove all wreckage, rubbish, or temporary structures which are no longer required

122. At the completion of work, camp area shall be cleaned and restored to pre-project conditions and submit report to PIU; PIU to review and approve camp clearance and closure of work site Guidelines for setting up camp is attached as **Appendix 11.**

G. Operation and Maintenance Impacts

123. Operation and Maintenance of the water supply system will be carried out by DBO contractor for first 5 years than DWS directly or through an external operator. Operation will involve intake of water through pumping, treatment of water in the WTP, disinfection with chlorine, conveying clear

water by pumping from clear water reservoir to respective OHSRs and finally distribution of water at DMA areas.

124. Following measures are suggested for implementation/ compliance during the operation phase:

- ✓ Ensure that water supplied to the consumers at all times meet the drinking water standards (Appendix 8); carry out regular sampling and testing, and disseminative information;

125. During the system design life (15/30 years for mechanical/civil components) it shall not require major repairs or refurbishments and should operate with little maintenance beyond routine actions required to keep the equipment in working order. The stability and integrity of the system will be monitored periodically to detect any problems and allow remedial action if required. Any repairs will be small-scale involving manual, temporary, and short-term works involving regular checking and recording of performance for signs of deterioration, servicing, and replacement of parts.

126. Recurrence of pipe bursting and leakage problems can be managed by the leak detection and water auditing surveys. DWS will ensure that the leak detection and rectification time is minimized.

1. Water treatment Plant:

127. Impact of WTP operation is from (i) generation of wastewater and sludge, (ii) noise from operation of pumps and motors, (iii) chlorine gas leakage risk, and (iv) consumption of electricity. All of these are duly considered in the design of WTP, and various measures such as the following are already incorporated into the project design:

- Recirculation and recovery of wastewater including backwash water generated from treatment process - backwash water from filter beds will be sent to a sump, and after allowing adequate time for settlement of solids, clarified water will be pumped back to WTP inlet. This arrangement will avoid pollution and also minimize wastage of water.
- Collection of accumulated sludge, thickening, drying and reuse
- Designing the entire system to maintain optimal flow and terminal pressure, and optimizing the overall energy usage;
- Using low-noise and energy efficient pumping systems;
- Installing the noise-producing pumps and motors etc., in enclosed buildings with noise reducing walls, and also maintaining adequate buffer to the nearby inhabited areas;
- Provision of appropriate personal protection equipment to the workers and staff
- Developing chlorine facility with all necessary safety measures.

128. Since backwash water will be recovered and recirculated in the WTP, no wastewater will be generated from water treatment process. Water treatment process will generate sludge from sedimentation of particulate matter in raw water, flocculated and precipitated material resulting from chemical coagulation, residuals of excess chemical dosage, plankton etc.; and waste from rinsing and back washing of filter media containing debris, chemical precipitates, straining of organic debris and plankton. In the WTP sludge will be collected, thickened, and disposed of or reused as soil conditioner. Sludge will be tested periodically for heavy metal concentration.

129. The backwash water from proposed WTP will be stored within the premises for further recirculation. It helps to minimize the raw water demand. For reuse and recirculation of the back wash water, proper recirculation system will be installed in the proposed WTP. The minimal sludge

will be generated from the WTP. The dried sludge will be collected stored in separate place in plant and disposed into city landfill (periodically) or nearby abandoned quarries after obtaining permission from the ULB or in the area identified by the KMC & DMC at maximum distance of 25 km from the WTP site.

130. Water supply system will be operated using the standard operating procedures following an operating manual, which will be prepared by the DBO contractor. This will cover all necessary items such as preventive maintenance, periodic maintenance and emergency maintenance, replacement of pumps, motors, and other electro-mechanical parts as per the design life to optimize energy use and system efficiency etc., Adequate resources – technical and financial, has been taken into consideration in the project design. Manual will also include safety awareness and mock drills for chlorine safety. Thus, considering the design and proposed operational procedures, it is unlikely that there will be any significant negative impacts due to WTP operation.

2. Operation System of Water Treatment Plant

131. The operation of the water treatment plant shall be fully automated with PLC and SCADA system installed in place. The control of the PLC and SCADA system will be made from the administrative building located within the WTP area.

132. The extent of automation considered in the WTP are summarized below:

- ✓ Ultrasonic flow meter will be provided in the Parshall flume to measure the flow and will display the flow in the PLC panel.
- ✓ Dosing of alum and lime will be done through gravity from the chemical house. The dosing rate will be adjusted based on the turbidity in the raw water. The dosing rate may be controlled through PLC panel. All the drives for agitation shall start/ stop from the PLC panel.
- ✓ Chlorination will be controlled depending on the residual chlorine in the clear water reservoir and adjustment can be done automatically from the chlorine control panel/ PLC panel.
- ✓ The loss of head and rate of flow will be measured continuously for each filter bed and will display the status locally as well as in the PLC. When the loss of head of each bed exceeds the pre-determined value, the inlet gate of that particular filter bed will get close and initiate the bed to backwash mode.
- ✓ Pumps inside the clear water reservoir will “start”/ “stop” automatically based on the level of water in the back wash tank.
- ✓ All the valves will be operated with electrical actuator. However, the manual over-ride facility will also be made available in the system.
- ✓ All the sludge lines will have to be operated manually depending upon the sludge accumulated in the various units, like flash mixer, clariflocculator etc. The sludge accumulation will be assessed from the telescopic sludge bleeding arrangement. All the sludge line valves will also be provided with electrical actuator.
- ✓ Turbidity meters shall be provided at outlet of Plate settler and rapid gravity filters.
- ✓ In case of auto mode, entire operation will perform automatically through PLC panel and in case of manual mode operation will be performed locally through local push button station.

133. **Use of Chlorine as Disinfectant**. It is proposed to use chlorine at WTP to disinfect the water prior to supply to consumers. There is invariably a safety risk when considerable quantities of chlorine are handled at the WTP. Chlorine cylinders will be brought by trucks to the site,

installed and operated to disinfect the water supplies. Since facilities are located in the rural area, precautions are needed to ensure the safety of both workers and villagers.

134. At WTP automation of chlorination system including automatic dosing & change-over, leak detection and neutralizing system is proposed to be provided.

3. Control Philosophy

135. The system is designed for 1-stream each working in pre & post chlorination system and 1-stream as standby in both pre & post chlorination system. In this system the following main equipment have been incorporated:

- 2 nos. tonner manifold systems with pressure indicator, pressure switch and motorized valve.
- Ball valve on chlorine gas line
- Chlorine gas filter
- Pressure reducing valve
- Floor mounted vacuum type chlorinator with remote vacuum regulator, pressure relief valve, vacuum indicator, flow meter, automatic flow control valve, vacuum relief valve, drain valve, check valve and injector
- Electrical auto change-over device
- Pipes, fittings and valves
- Suitable booster pump with motor (1 working and 1 standby)
- Pressure indicator on booster pump delivery
- Common relay-based starter cum control panel with annunciator for chlorination.

4. System Description

136. Chlorine gas will be drawn from the Ton Container. This system is equipped with pressure indicator, pressure switch and electrical auto change-over device. The pressure indicator will locally indicate the duty tonner pressure and pressure switch will give a low alarm at the control panel indicating that the duty tonner is empty and also will enable auto change of tonner manifold with the help of motorized valve.

137. A pressure switch and motorized valve are provided on each manifold. When the system is started both manifolds are full, but only one manifold will open as it is selected first which is referred as manifold - I. It shall remain open till the time the tonner connected to manifold - I is empty. As soon as the pressure on the manifold - I falls below the pre-set point, the motorized valve will close automatically on manifold - I and open the motorized valve on manifold - II. Meanwhile the operator should change manifold - I with fresh tonner. Once the manifold - I also become empty the control panel resets itself and open manifold - I.

138. The chlorine gas coming out of the tonner passes through gas filter and pressure reducing valve where the chlorine gas pressure is reduced to 2 to 2.5 kg/cm^2. The chlorine gas then enters the vacuum regulator. The vacuum is created by the water flowing through the injector. Water for the injector is supplied by the booster pump. The chlorine gas, under vacuum, flows through the flow meter, flow control valve to the injector. In the injector chlorine gas mixes with water and the concentrated chlorine solution is conveyed to the dosing point through diffuser. The flow is automatically adjusted as per the flow of water in the channel. For these 4 to 20 mA signals has to be provided from channel. A manual override is also provided for adjusting the flow manually.

139. Following safety features are provided in the system:

- Gas filters are provided in the gas line to filter any ferric chloride impurities in the chlorine gas.
- The remote vacuum regulator is incorporated for utmost safe operation. Unless vacuum is created on the downstream side, no chlorine gas would enter the chlorinator. If a leak develops between the downstream side of the system and the injector, the remote vacuum regulator will automatically shut the flow of chlorine gas into chlorinator.
- A pressure relief valve is provided in the vacuum regulator/ chlorinator for venting of any pressurized chlorine coming into the chlorinator.
- A vacuum relief valve is provided in the chlorinator to release the excess vacuum in the system especially when the system is not working. This will avoid deformation of PTFE diaphragms in the system.
- A check valve provided in the vacuum line to prevent back flow of water into the chlorinator.
- A drain valve is provided on the check valve, which automatically drains out any water accumulated in the check valve.

5. Leak Absorption System

140. The main equipment of the chlorine leak absorption system is as under:

- Blower with motor and piping
- FRP frontal hood is provided in front of every tonner. The hood is in two halves. The bottom half is placed on the floor on top of the duct. The top half of the hood is placed on the bottom half.
- The duct is connected to the absorption system/ blower. When a tonner develops a leak the same will be sucked through the duct.
- Pumps will pump supply and spray caustic solution for absorption of chlorine from the gas and finally clean air free form chlorine will be discharge from top of the FRP absorption tower.
- A chlorine leak detector provided in the tonner/ chlorinator room shall detect a leak and give out a signal to the control panel.

141. The blower shall suck the leaked chlorine gas along with air and deliver the same to the caustic pit.

142. Chlorine cylinders (called tonners of capacity 900 kg) will be procured from nearest manufacturing unit and stored at the site. Tonners sufficient for a month will be stored in the storage; i.e. 2-3 cylinders will be stored at the WTP.

143. To avoid any risk to workers and public, the chlorination facility at the WTP should be designed developed with all appropriate safety features and equipment at the site to meet with any accidental eventuality, which may include:

(i) Chlorine neutralization pit with a lime slurry feeder;
(ii) Chlorine absorption and neutralization facility;
(iii) Proper ventilation, lighting, entry and exit facilities;
(iv) Visible and audible alarm facilities to alert chlorine gas leak;
(v) Facility for isolation in the event of major chlorine leakage;
(vi) Eye wash and shower facility;

(vii) Personal protection and safety equipment for the operators in the chlorine plant (masks, oxygen cylinders, gloves, etc.);
(viii) Provide training to the staff in safe handling and application of chlorine; this shall be included in the contract of Chlorinator supplier;
(ix) Supplier of Chlorinator equipment shall provide standard operating manual for safe operation and as well as maintenance and repairs; preferably these shall be provided both in English and Bengali Languages.

144. **Handling and safe disposal of sludge from WTP-** Surface water Treatment for potable supplies typically involves coagulation, flocculation, Sedimentation, and filtration processes for removing colloidal as well as suspended solids from raw water. All water treatment plants (WTPs) produce waste/residue known as Water Treatment Sludge (WTS) during the purification of raw water. The sludge produced in a typical WTP generally consists of about 45-65% fine sand in grain size range 150-75µ. Silica, alumina, ferric oxide and lime constitute the major percentage of chemical components present in the sludge. Lead, chromium, arsenic, barium and other metals may be present in significant concentration. Therefore, Simple method of discharging sludge directly into nearby hydric bodies or dumping in the landfill sites is not sustainable solution. This is necessary to develop suitable sludge management plan for sustainable development. Recycling the sludge in building and construction industry could be a safe disposal option and utilization of sludge/waste from WTPs would also prevent the excessive exploitation of raw materials and pave the way for sustainable development. Other options of sludge utilization in wastewater treatment, in removal of heavy metals from aqueous solutions and in nutrient reduction from laden soils and runoffs also possess great potential to reduce the burden on safe disposal.

145. Utilization of WTS in brick making, in ceramics making, in the manufacture of cement and cementitious materials and as a substitute to building materials could provide safe disposal route. Reuse in wastewater treatment, in removal of heavy metals from aqueous solutions and in nutrient reduction from laden soils and runoffs are also some of the possible alternatives. It is required to explore suitable option for developing sustainable sludge management strategies under stringent environmental norms. Municipal Council is required to prepare a plan for safe handling and disposal of sludge from WTP. During trial commissioning sludge coming out from WTP needs to be tested in lab for the constituents and if it is not having heavy metals or having these in safe limits can be disposed in land fill sites otherwise other safe disposal options should be explored as indicated above.

146. **Iron Removal Plant (IRP)** - Resin Based Technology. The material of the INDION ISR resin is designed in such a manner that the precipitated Iron from the water does not get deposited or get coated over the resin surface, hence the Iron precipitates can be easily washed off by backwash flow (INDION ISR Treated Water). If the water contains impurities other than Iron like Turbidity, COD, Oil and Grease, acidic pH (< 7), Heavy metals, Chlorine, Hydrogen Sulphide, etc. then it will hamper INDION ISR performance gradually. The parameters should be NIL in water before passing through INDION ISR.Considering the above factors, the replacement frequency can be considered as 3 years for inlet Iron content > 3 ppm and 4 to 5 years for inlet Iron content < 3 ppm.

147. **Waste generation during operation and disposal of sludge/other waste generated during operation.** Basic theory of conversion of dissolved Iron with iron specific resin is as follows: Iron Specific Resin has manganese dioxide as a catalytic moiety which works as a catalyst to promote iron oxidation. Basically, iron and oxygen are attracted to manganese dioxide where dissolved iron (Fe+2) converts to insoluble iron (Fe+3) which can be filtered through the resin.

During backwash, the surface of resin is scoured, converting it to manganese dioxide, which is further used for oxidation of iron. Back wash water is nontoxic and less in volume can be discharged safely. Backwash water will be temporarily stored in a tank and clarified water will be discharged into drains, and the sediment will be disposed off along with solid waste.

6. Interception and Diversion

148. Major drains running the core area of the town are identified for interception and diversion to the proposed STP site. Other drains are far away from the core area and it may not be feasible to tap the wastewater in the drains for conveying them to the STP site due to fund constraints.

149. **Repairs and Maintenance of water supply system.** Repair works could cause some temporary disruption of activities at locations of social and cultural importance such as schools, health services, religious places, tourist sites etc., so the same precautions as employed during the construction period should be adopted. All MC needs to require its O & M contractor to:

(i) Consult the town authorities to identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity;
(ii) Complete work in these areas quickly;
(iii) Consult MC authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.
(iv) Extra precaution to be taken during any repairing work near sensitive receptors. All mitigation measures as mentioned in construction phase, same will be applicable for O & M phase.

150. **Increase wastewater generation and safe disposal**. With enhanced water supply in three project towns, volume of wastewater will be increased. As per generic consideration, about 80% of water is generated as wastewater. At present there is no sewerage system is these towns. Individual households discharge sewage into septic tanks, and gray water (from kitchen and bath) is discharged into open drains. To an extent, there is also direct discharge of sewage and disposal of supernatant from septic tanks into open drains. Open drains are intended for surface runoff during rains, and discharge of wastewater into these drains is polluting the receiving waters and also creating unhealthy conditions. Considering this, Government of Tripura proposed to implement a project under AMRUT program of Government of India.

151. This project includes interception of major drains in the core area and the collection and conveyance of the intercepted wastewater to the final intercepting point by gravity sewer and collection of wastewater in the collection well at the final intercepting point. From the final intercepting point the wastewater will be conveyed by means of 200 mm DI K9 mains through pumping to the proposed STP. At STP, the wastewater will be treated by Moving Bed Bioreactor (MBBR) technology and septage as collected from septic tanks will be cotreated in the same STP, and treated wastewater meeting the discharge standards. The treated effluent shall be discharged into the river or to the land for agriculture purpose depending upon the need of public in the nearby area.

152. Major drains in the core area of the towns are identified for interception and diversion to the proposed STP site. Other drains are far away from the core area, and it may not be feasible to tap the wastewater in the drains for conveying them to the STP site due to fund constraints. Interception and treatment details of 4 project towns under cluster IIIA is given below. Tendering

has been done for “proposed interception and diversion of major drains of core areas and providing STP & Co-treatment of septage and disposal” packages for the towns and construction will be started around June 2023 and expected to be commissioned by May 2025.

153. **Project Benefits.** The citizens of the Kailashahar, Kumarghat, Dharamanagar and Ambassa municipal areas will be the major beneficiaries of the improved water supply, as they will be provided with a constant supply of better-quality water, piped into their homes. This should improve the environment, should deliver major improvements in individual and community health and well-being. Diseases due to poor quality water, such as diarrhea and dysentery, should be reduced, so people should spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health.

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Overview

154. The active participation of stakeholders in all stages of project preparation and implementation is essential for successful implementation of the project. It ensures 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 are a must as per the ADB policy.

B. Public Consultation

155. The public consultation and disclosure program are a continuous process throughout the project implementation, including project planning, design, and construction.

1. Consultation during Project Preparation

156. Institutional consultations were conducted with the project agencies, and Government Departments of Tripura, Tripura State Pollution Control Board, etc. The subproject proposal is formulated in consultation with the local bodies in the project area to suit their requirements. The following methodologies have been used for carrying out public consultation:

(i) Local communities, individuals affected and owners and employees of affected commercial establishments who are directly or indirectly affected were given priority while conducting public consultation.
(ii) Walk-through and informal group consultations in the proposed subproject area.
(iii) The local communities had been informed through public consultation about the project and its benefits.
(iv) The environmental concerns and suggestions made by the participants were listed and discussed. The suggestions were incorporated in the EMP.

157. The main objectives of the consultation programs were to inform stakeholders on adverse environmental & social impacts, efforts to minimize and mitigate negative impacts while making people aware of the Water supply project benefits. Different techniques of consultation with stakeholders were used during project preparation (interviews, official meeting, public meetings, etc.). A socio-economic household survey has been conducted in the project area, covering sample households, to understand the household characteristics, health status, and the

infrastructure service levels, and also the demand for infrastructure services. General public and the people residing along the project activity areas were also consulted during visits to the project sites. The stakeholders were involved in developing the IEE through focus group discussions (FGD) and public consultation at project area level, after which views expressed were incorporated into the IEE and in the planning and development of the project.

158. A workshop on Environment and Social safeguards has been arranged on 19th-20th December 2022 at Agartala for all the ULBs (main stakeholders) and project executing and implementation agencies. The primary intent of the orientation workshop was to enhance the knowledge base of the ULB officials, TUDA officials and officials of UDD on the mentioned disciplines. Focus Group Discussions (FGD) have been carried out at different locations (wards) of the project area.

159. In Kailashahar Stakeholder Consultation has been carried out at 3 locations: with 52 nos. of participants. Among 52 participants, female no. covers 31%. FGD has also been carried out with 63 persons, out of which almost 60% are female. In **Kumargaht** Stakeholder Consultation has been carried out at 2 locations; with 45 nos. of participants (Female- 40%). In FGDs Total 63 persons participated in discussion, out of which almost 79% are female. In **Dharamanagar** FGDs was conducted along the project alignment in month on January, February and April 2022 with 50 participant 60% are female. Stakeholder consultation was attended by 37 stakeholders (13% female). In **Ambassa** Focus group discussion has been conducted along the project alignment in the month of March & April 2022 with 106 participants (31 Male and 75 Female, Female-70%). Stakeholder consultation was attended by 51 stakeholders (Female- 21%).

160. Important issues or concerns that were raised by the stakeholders during consultations along with photographs and attendance sheets are provided in **Appendix 9**. All participants are expressed need for the project and willingness to take it up and stakeholders were very supporting of the project and promises to extend full cooperation during the construction phase as the activities are proposed to improve the water supply service levels and the living standards. Quality of supplied water is more or less good, only concentration of iron is high. Further a project-level consultation meeting will also be conducted in the project area.

161. **Summary of Stakeholder Consultation**. It was observed that people are willing to extend their cooperation as the proposed activities are to enhance the infrastructure service levels and the living standard of the public. The public expressed their concern regarding the nuisance and disturbance (dust, road closure and traffic management activities) during construction. Team explained about EMP which will be implemented during construction. Following are the observations made by the stakeholders. Project team responded to the queries.

- The project area has insufficient and inadequate drinking water supply. Households are facing severe water crisis during the summer season when the ground water level drops.
- High iron content in drinking water.
- The representative from community raised issue regarding the existing water supply quality is not up to the mark. People are concerned about the poor supply (two times in a day for 4-5 hour each time) and quality of water.
- People are supportive of the project and understand that proposed works will improve health and environmental conditions of town and chances of waterborne diseases will be mitigated.
- Women had heard about the proposed project and welcomed it as women are facing many problems in fetching water for hours.
- Aware of short-term impacts during the works such as dust generation, noise level,

access problem, inconvenience for public and movement of vehicle. People demanded for the measures of dust suppression such as water sprinkler to control dust and noise during construction phase. Project team informed stakeholders of the proposed mitigation measures.

- It was also informed no road closures anticipated due to this work, and if needed during the construction phase, alternative access will be provided. Short term impact explained to local public and it assured that the measures will be included in the Environment Management Plan.
- Stakeholder expressed their concern regarding water charges, affordability, disturbance, and loss of business due to the work in market areas, dust, road closure etc.).
- Stakeholders also indicated that a public notice on works, and awareness programs to be conducted
- The project team explained the proposed mitigation measures to mitigate / minimize such issues. Attention of stakeholders drawn to the EMP, and explained to them how the construction phase issues by avoided, minimized, or mitigated and managed.

2. Consultation during Implementation

162. Prior to start of construction, PIU in coordination with the local bodies will conduct information dissemination sessions at various places and solicit the help of the local community, leaders/ prominent for the project work. Focus group meetings will be conducted to discuss and plan construction work (mainly pipeline work) with local communities to reduce disturbance and other impacts and regarding the project grievance redress mechanism. A constant communication strategy will be established with the affected communities to redress the environmental issues likely to surface during construction phase. Consultation will continue during implementation and reported through environmental monitoring reports to ADB, semi-annually during construction and annually during operation until project completion.

C. Information Disclosure

163. Executive summary of the IEE will be translated in Bengali (local language) and will be made available at the offices of PMU, PIU, Nagar Panchayet and will be displayed on the notice boards. Hard copies of the IEE will be accessible to citizens to disclose the document and at the same time creating wider public awareness. Electronic version of the IEE in English and Executive Summary in Bengali will be placed in the official website of the TUDA (PIU), UDD (PMU) after approval of the IEE by Government and ADB. Stakeholders will also be made aware of grievance register and redress mechanism.

164. Public information campaigns to explain the project details to a wider population is being conducted. Public disclosure meetings will be conducted at key project stages to inform the public of progress and future plan. Prior to start of construction, the cluster- PIU will issue Notification on the start date of implementation in local newspapers. A board showing the details of the project will be displayed at the construction site for the information of general public.

165. Local communities will be continuously consulted regarding location of construction camps, access and hauling routes and other likely disturbances during construction. The road closure together with the proposed detours will be communicated via advertising, pamphlets, radio broadcasts, road signage, etc.

VIII. GRIEVANCE REDRESS MECHANISM

A. Common Grievances Redress Mechanism

166. A project will put in place a common GRM to receive, evaluate, and facilitate the resolution of social, environmental or any other project-related grievances. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. The public awareness campaign will generate awareness of the project and its grievance redress procedures. The campaign will ensure that the poor, vulnerable, and others know about the GRM.

167. The GRM will provide an accessible, inclusive, gender sensitive and culturally appropriate platform for receiving and facilitating the resolution of affected persons' grievances related to the project. The multi-tier GRM for the project is outlined below, each tier having time-bound schedules and with responsible persons identified to facilitate and address grievances at each stage. ULB-wide public awareness campaigns will ensure that awareness of grievance redress procedures is generated through the campaign. The project coordinator (urban and tourism), supported by independent consultants (social and environment), will be responsible for timely grievance redress on environmental and social safeguards issues.

168. Besides the project's grievance redress mechanism, the state also has a centralized public grievance redress monitoring system (CPGRMS) where the general public can file grievances through a dedicated web portal (grievance.tripura.gov.in). The general administrative (administrative reforms) department is the nodal agency, and an officer of the rank of joint secretary is responsible for its functioning. Each department of the state has nominated officers to receive the grievances. TUDA and DOT have nominated officers of the rank of Deputy Director as nodal officers, whose names and contact details are provided on its website. The affected persons can also lodge their complaints through this online portal.

169. **Information to the stakeholders about the GRM**: The stakeholders, including affected persons, will be informed about the GRM under the project and of the state through public consultations, disclosures, and distribution of public information booklets (PIB). In the case of illiterate DPs, the information will be provided verbally during meetings with them.

170. **Who can complain:** A complaint can be registered by stakeholders directly or indirectly affected by the project. A representative can register a complaint on behalf of the affected person or group, provided that the affected person or group identifies the representative and submits evidence of the authority to act on their behalf.

171. **What the Grievance/Complaint should contain:** Any comments, complaints, queries and suggestions pertaining to safeguard compliance - environment, involuntary resettlement, and indigenous people, design-related issues, compensation, service delivery or any other issues or concerns related to the project. The complaint must contain the complainant's name, date, address/contact details, location of the problem area, and the problem. A sample grievance registration form is provided in Appendix 10.

172. **Where and how to file a Complaint:** The complaint can be filed both online and offline. The people can submit their complaints at the contractor's site office or at PIU/PMU office. In

addition, they can also have grievances/suggestions/queries submitted through phone or e-mails or the state grievance portal.

173. **Grievance redress /Problem solving through participatory Process:** The PMU and PIUs must make efforts to resolve the problems and conflicts amicably through a participatory process with the community and the ULBs. In case of immediate and urgent grievances in the complainant's perception, the contractor and supervision personnel from the PIU will provide the most easily accessible or first level of contact to resolve grievances quickly. Contact phone numbers and names of the concerned staff and contractors will be posted and displayed at all construction sites.

174. **Grievance Redressal Committee:** The GOT will establish the grievance redressal committees at the site, PIU and PMU levels to provide a mechanism to mediate conflict and disputes concerning compensation payments and cut down on lengthy litigation. The following will be the composition of the GRCs.

175. **Site-level GRC (1st level) -** The site-level GRC will comprise a Junior Engineer. PIU, a field engineer of PSMC, safeguard support staff of PSMC, and a representative from the affected community (as and when required). The contractor's site engineer and EHS cum social supervisor will jointly support in meetings, consultations, and site-level grievance resolution. The effort will be made to resolve issues on-site, in consultation with each other and within five days of receipt of a complaint/grievance.

176. **PIU-level GRC (2nd level) -** All grievances that cannot be redressed within five days at the field level will be brought to the notice of the PIU-level GRC established in each PIU. The PIU-level within two days of receipt of the complaint to determine the merit of each grievance brought to the committee. GRC at the PIU-level will be headed by Project Manager (executive/ assistant engineer)- focal for safeguards, and include the construction manager of PSMC, safeguards specialists of PSMC, and the Project Manager of the concerned contractor as members. The PIU-level GRC will also co-opt the representative of line departments (PWD, ULB) and a representative from the affected community, as and when required, including indigenous peoples communities or civil society organization working with indigenous peoples, as and when required.[14]

177. **PMU-Level GRC (3rd level) -** In case the grievances are not addressed at the PIU-level within 10 days of receipt, the same shall be brought to the notice of the PMU-level GRC. The PMU-level GRC will comprise of Project Director as chairman, a Co-Project Director as co-chairman, a Project Coordinator (Urban and Tourism) as member secretary, environment safeguards officer of PMU and social, gender officer of PMU, women representatives from the line departments (ULB, PWD, Environment and Forests) and representative of affected community (including indigenous people community)[15]. The committee can co-opt any other member required for the resolution of the grievances. The GRC at the PMU-level will resolve the grievance within 15 days of receiving the complaint.

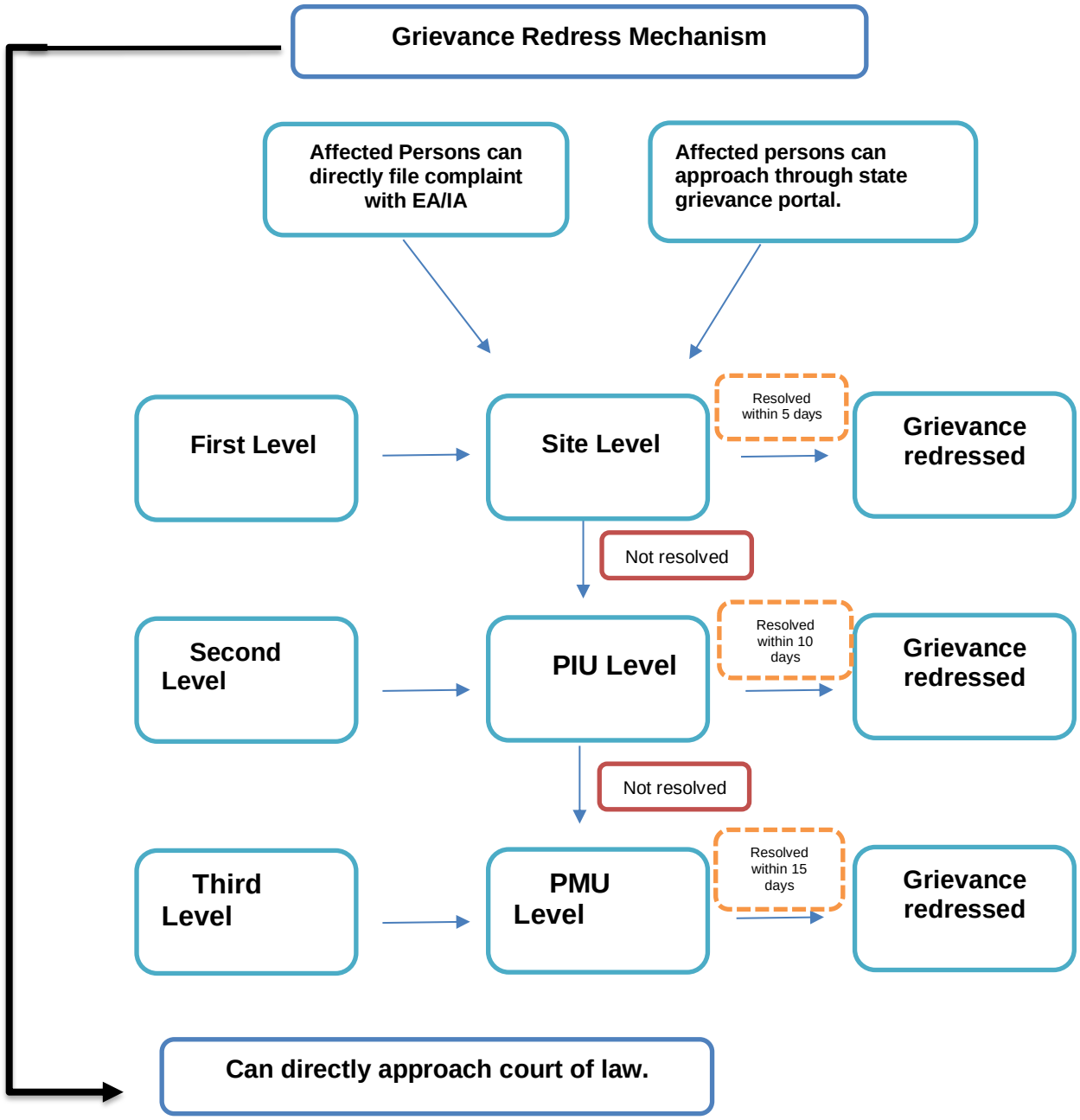
178. The complainant will be informed in writing about the resolution of their complaint or the decision of the grievance redress committees. The complainants are free to approach the court of

[14] In case of any components with impact on indigenous people, GRC will have representative from affected indigenous people community or NGO working with indigenous people groups.

[15] In case of any components with impact on indigenous people, GRC will have representative from affected indigenous people community, including at least one female indigenous person or NGO working with indigenous people groups.

law at any time of their own will at any stage, and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

Figure 82: Grievance Redressal Mechanism (GRM)



179. **Documentation.** PMU, with the support of PIUs, will be responsible for the timely registration of grievances, related disclosure, and communication with the aggrieved party. PMU will also ensure that all the details from submission to resolution are well recorded and documented.

180. **Record-keeping.** PIUs 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 final outcome. The number of

grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMU and PIUs and reported in monitoring reports submitted to ADB on a semiannual basis.

181. **Periodic review and documentation of lessons learned.** The Project Coordinator, PMU, will periodically review the functioning of the GRM in each town and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

182. **Costs.** All costs related to the resolution of grievances (meetings, consultations, communication and reporting/ information dissemination as well as costs incurred by affected persons to attend GRC meetings, if any) will be borne by PMU.

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Environmental Management Plan

183. An environmental management plan (EMP) is being developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

184. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between Project Management Unit (PMU), Project Implementation Unit (PIU) / TUDA, ULBs (Nagar Panchayat/ Municipal Council), Consultants and 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 sub project; and (v) 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.

185. The DBO contractors will submit to Cluster - PIUs, for review and approval, a Site-Specific Environmental Management Plan (SEMP) 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 SEMP; and (iv) budget for SEMP implementation. The approved Site-Specific Environmental Management plans will be disclosed in the project website & website links will be provided in Semi-annual Environment Monitoring Report.

186. A copy of the EMP/approved SEMP will be kept on site during the construction period at all times. The approved EMP to be 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.

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

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

Table 23: Design Stage Environmental Impacts and Mitigation Measures

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsibility of Monitoring	Cost and Source of Funds
Location impacts of proposed components	Nearby community may be affected due to increased pollution during construction and operation	Sites should be selected so that nearby community may have no or minimum impact due to proposed works Mitigation measures are prepared and included in design and EMP is attached with contract documents	Contractor / cluster-PIUs/ PIU	PMU	Project Costs
Seismic sensitivity	Damage to infrastructure and potential risks: project area in High earthquake risk zone (Zone V)	Designs of project component structures shall comply with relevant codes of design such as Bureau of Indian Standard (BIS) specifications for earthquake resistant design (IS: 1893: Criteria for earthquake resistant design of structures).	DBO Contractor	PMU	DBO Contractor
River Intakes (at Kailashahar, Kumarghat and Dharmanagar)	Water quality and ecological impacts	▪ Do not utilize the environmental flow for supply; ensure that environmental flow is available in the river all times ▪ Design inlet of intake pipe in the river with appropriate screen to avoid entry of aquatic organisms into inlet ▪ Select a construction methodology that is least disturbing, and appropriate for the in-situ soil condition, and able to complete the construction work prior to onset of monsoon ▪ Schedule the construction works during low water level period – late winter months to pre monsoon (November - March); ensure that works are completed during the same period to prior to onset of monsoon; ▪ Erect temporary barriers to form enclosed construction area with least disturbance ▪ Allow adequate time to settle the distributed solids to prior to pumping out water; only clear/clarified water shall be pumped back into the reservoir; any silt laden water should be pumped to a silt pond ▪ Avoid/minimize use of fuels, chemicals and lubricants; ensure no spillage ▪ Clear the work site after completion at least to pre project conditions, ensure that there are no materials, debris, spills etc., and prior to removal of temporary barriers / coffer dam ▪ Implement work site safety at works in water body	Cluster PIU	PMU	Project Costs

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsibility of Monitoring	Cost and Source of Funds
Groundwater source (Ambassa)	Groundwater contamination	(i) Prepare a source protection plan for existing wells (ii) Prevent flow of untreated wastewater in the drains (iii) Measures should be taken to control the open defecation, and to close all unsafe latrines (for example pit latrines). (iv) Awareness programs shall be conducted regarding the sanitation practices and its effect on groundwater quality	DBO Contractor	PMU	DBO Contractor
Water Treatment Plant (WTP) design (at Kailashahar, Kumarghat and Dharamanagar)	Inefficient treatment, treated water characteristics not satisfying the standards	▪ Design treatment process that is suitable for raw water source characteristics duly considering the seasonal variation in quality if any ▪ Duly consider quality of groundwater that will be supplemented for surface water supply variations ▪ Treated water and supplied water at consumer end should meet the drinking water standards all times	DBO Contractor	PMU	DBO Contractor
	Design to prevent pollution due to wastewater and sludge	▪ Ensure that the following are included in the WTP design: ▪ Backwash water reuse system and sludge recovery and disposal system ▪ Backwash recycling components: Filter backwash holding tank, recovered water storage tank and pumping for recycling ▪ Sludge management system components: Gravity thickeners for sludge from clarifiers, mechanical sludge dewatering system, storage facility for dewatered sludge ▪ Disposal of sludge at a landfill or the disposal site provided by the ULB	DBO Contractor	PMU	DBO Contractor
	Sludge management	▪ Prepare sludge management plan for safe handling and disposal of sludge from WTP ▪ Estimate the quantity of sludge / solids generated from the WTP during the detailed design phase, and likely composition based on the raw water quality and process chemicals ▪ Minimize the quantity of solids generated by the water treatment process through optimizing coagulation processes; ▪ Recover process chemicals to the extent possible to minimize / prevent the disposal ▪ Carryout pre-treatment prior to disposal	DBO Contractor		DBO Contractor

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsibility of Monitoring	Cost and Source of Funds
		▪ Dispose dried sludge / solids from WTP at approved solid waste landfill / disposal site identified by ULB; this should be identified during the detailed design phase ▪ Evaluate the option of land application during the operation stage; conduct quality tests on the first batch of sludge generated from the WTP, check for physico-chemical characteristics including heavy metals ▪ Manage hazardous/harmful waste if any, as per the Hazardous Waste Management Rules ▪ Employ safe and beneficial methods for disposal of dried sludge: in building and construction industry, brick / tile manufacturing etc.,			
Existing WTPs	Environment and health impacts due to improper disposal of wastewater and sludge, poor chemical handling, waste management and occupational health and safety	(i) Conduct detailed technical assessment of WTP during the detailed design phase and identify the improvements required. (ii) Conduct raw and treated water quality monitoring (at inlet and outlet) (iii) Undertake necessary improvements at the WTPs either part of the project or through DWS ▪ Ensure that WTPs are improved as required, and ensure that treated water quality meets the drinking water standards, and waste management, material management and health and safety practices are improved	PIU / DWS	PMU	DWS / PMU costs
Design of water supply system	Source sustainability and efficiency	▪ Select sustainable water source ▪ The entire system is designed to maintain optimal flow and terminal pressure, and optimizing the overall energy usage ▪ To meet the drinking water standards, implementation of a water quality surveillance program ▪ Using low-noise and energy efficient pumping systems ▪ Installing the noise-producing pumps and motors etc., in enclosed buildings with noise reducing walls, and also maintaining adequate buffer to the nearby inhabited areas ▪ Provision of appropriate personal protection equipment to the workers and staff	Contractor / cluster-PIUs/ PIU	PMU	Project Costs
Chlorine gas usage as disinfectant at Water Treatment	Chlorine handling and application risk – health and safety risk to workers and	In final design, the following measure will be provided at the chlorine application unit: (i) Chlorine neutralization pit with a lime slurry feeder (ii) Chlorine absorption and neutralization facility	Contractor / cluster-PIUs/ PIU	PMU	Project Costs

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsibility of Monitoring	Cost and Source of Funds
Plant (WTP) (at Kailashahar, Kumarghat and Dharmanagar)	general public	(iii) Proper ventilation, lighting, entry and exit facilities (iv) Visible and audible alarm facilities to alert chlorine gas leak (v) Facility for isolation in the event of major chlorine leakage (vi) Eye wash and shower facility (vii) Personal protection and safety equipment for the operators in the chlorine plant (masks, oxygen cylinders, gloves, etc.,) (viii) Provide training to the staff in safe handling and application of chlorine; this shall be included in the contract of Chlorinator supplier (ix) Supplier of Chlorinator equipment shall provide standard operating manual for safe operation and as well as maintenance and repairs; preferably these shall be provided both in English and Bengali Languages. Guidelines for safety for Chlorine usage attached in **Appendix 7.**			
Layout plan of intake, WTP and OHSRs	Tree cutting	▪ Minimize removal of trees by adopting to site condition and with appropriate layout design of work sites ▪ Obtain prior permission for tree cutting ▪ Plant and maintain 5 trees for each tree that is removed	Contractor / cluster-PIUs/ PIU	PMU	Project Costs
Energy Efficiency	Loss of natural resources	▪ Use energy efficient electrical equipment Provision of use of energy efficient equipment in contract agreements and BOQ	Contractor / cluster-PIUs/ PIU	PMU	No cost required
Incorporating EMP and Health and Safety requirements into Contractor Bid Document	Implementation of the EMP	▪ The EMP should be included in the Bid Document so that the selected Contractor understands the issues and makes necessary plans to prepare and implement the EMP	Contractor / cluster-PIUs/ PIU	PMU	Project Costs
	Implementation of the Health and Safety measures by contractor	▪ Health and safety requirements should be incorporated as part of the contract bid document so that the selected Contractor understands the issues and makes necessary plans to prepare and implement the health and safety requirements.	Contractor / cluster-PIUs/ PIU	PMU	Project Costs
Physical Cultural resource	Encroachment/ damage to protected monuments and chance finds	▪ Create awareness among the workers, supervisors and engineers about the chance finds during excavation work; ▪ Stop work immediately to allow further investigation if any finds are suspected;	Contractor / cluster-PIUs/ PIU	PMU	Project Costs

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsibility of Monitoring	Cost and Source of Funds
		▪ Inform local Archaeological Department / Museum office if a find is suspected and take any action, they require to ensure its removal or protection in situ; and prepare a chance find protocol			

Table 24: Pre-Construction Stage Environmental Impacts and Mitigation Measures

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsible for Monitoring	Cost and Source of Funds
Legal compliance - Consents, permits, clearances, NOCs, etc.	Environmental legal non-compliance may attract legal actions Failure to obtain necessary consents, permits, NOCs etc. can result to design revisions and/or stoppage of works	▪ All necessary consents, permits, clearance, NOCs, etc. prior to award of civil works must be obtained ▪ All necessary approvals for construction will be obtained by contractor before start of construction ▪ It is acknowledged in writing and report on compliance of all obtained consents, permits, clearance, NOCs, etc. are provided. ▪ Detailed design drawings and documents are included.	Cluster-PIUs, PIU and PMSC	PMU	Cost of obtaining all consents, permits, clearance, NOCs, etc. prior to start of civil works responsibility of PIU./ Cluster- PIU
Environmental monitoring of baseline conditions of air, noise, water and soil	To establish base line environmental conditions	▪ Environmental monitoring through NABL approved laboratory	DBO contractors	PMU	Contractor
Utilities	Telephone lines, electric poles and wires, water lines within proposed project area	▪ Operators of these utilities have been preliminary identified and included in the detailed design documents to prevent unnecessary disruption of services during construction phase; ▪ DBO contractors will prepare and implement a contingency plan to include actions to be taken in case of unintentional interruption of services. ▪ Consult with and prior information to affected households and business (at least	DBO Contractor	PMSC and PIU	Project Cost

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsible for Monitoring	Cost and Source of Funds
		1 week prior) on the intended utility shifting and likely disruptions in services			
Construction work camps, stockpile areas, storage areas, and disposal areas.	Conflicts with local community; disruption to traffic flow and sensitive receptors	(i) Construction camp to be set up near major work site WTP, DTW and OHSRs (ii) If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems; (iii) Do not consider residential areas; (iv) Extreme care will be taken in selecting sites to avoid direct disposal waste/ excess earth near water body which may inconvenience the community. If required, for excess spoil disposal, (a) sites will be selected from barren, infertile lands. In case agricultural land selected, written consent will be taken from landowners; (b) debris disposal site will be selected 200 m away from surface water bodies; (c) no residential areas be located within 50 m downwind side of the site; and (d) site will be selected 100 m away from sensitive locations like settlements, ponds/lakes or other water bodies.	DBO Contractor	PMSC and PIU	roject Cost
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging,	• Construction materials are obtained only from government approved quarries with prior approval of cluster-PIUs/ PIU • Cluster-PIUs ensured that quarry sources have all necessary clearances/ permissions in place prior to approval • Contractor submits to PIU on a monthly basis documentation on material obtained from each source (quarry/ borrow pit) • Creation of new borrow areas, quarries etc., to be avoided for the project (work is small); if unavoidable, contractor to obtain all	DBO Contractor	PMSC and PIU	Project Cost

Field	Anticipated Impact	Mitigation Measures	Responsibility of Mitigation	Responsible for Monitoring	Cost and Source of Funds
	and water pollution.	clearances and permissions as required under law, including Environmental Clearance prior to approval by PIU			

Table 25: Construction Stage Environmental Impacts and Mitigation Measures

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
Environmental Management Plan (EMP) Implementation Training along with COVID 19 safety	Irreversible impact to the environment, workers, and community, Impact due to effect of COVID 19	▪ Project manager and all key workers will have undergone training on EMP implementation including spoils/waste management, Standard operating procedures (SOP) for construction works; occupational health and safety (OHS) including COVID-19(SOP), core labor laws, applicable environmental laws, etc.	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.
Air Quality	Emissions from construction related vehicles, equipment, machinery, resulting to dusts and increase in concentration of	For all construction works ▪ The soil and stockpiled material are damped down on site by water sprinkling ▪ Tarpaulins are used to cover the loose material (soil, sand, aggregate etc.,) when transported by trucks; ▪ A dust screen around the construction sites specifically at WTP, OHSRs site to be provided ▪ Wheels and undercarriage of haul trucks are cleaned prior to leaving construction site/quarry ▪ Sprinkling water and unloading inside the barricaded area will be made to Control dust generation while unloading the loose material (particularly aggregate, soil) at the site ▪ Water is used to maintain soils in a visible damp or crusted condition for temporary stabilization ▪ Water to be used prior to leveling or any other earth moving activity to keep the soil moist throughout the process	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
	vehicle related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons	▪ Tarpaulins are used to cover the soil stocked at the sites ▪ Access to be controlled to work area, preventing unnecessary movement of vehicle, public trespassing into work areas; limiting soil disturbance to minimize dust generation ▪ All construction equipment and machineries should be fitted with pollution control devices and have a valid pollution under control (PUC) certificate **Pipeline works** ▪ Barricading the construction area using barricade or use of caution tape ▪ Confine all the material, excavated soil, debris, equipment, machinery (excavators, cranes etc.,), to the barricaded/ demarcated area ▪ Limit the stocking of excavated material at the site; remove the excess soil from the site immediately to the designated disposal area ▪ Undertake the work section wise: 100 – 200 m section should be demarcated and barricaded ▪ Conduct work sequentially - excavation, pipe laying, backfilling; conduct pipe testing section-wise (for a minimum length as possible) so that backfilling, stabilization of soil can be done. ▪ Remove the excavated soil of first section to the disposal site; as the work progresses, sequentially, by the time second section is excavated, the first section will be ready for back filling, use the freshly excavated soil for backfilling, this will avoid stocking of material, and minimize the dust. ▪ Backfilled trench at any completed section after removal of barricading will be the main source of dust pollution. The traffic, pedestrian movement and wind will generate dust from backfilled section. Road restoration shall be undertaken immediately.			
Ground Water Quality	Contamination of ground water quality due to spillage of oil and lubricants	▪ Prepare and implement a spills management plan; ▪ Provide impermeable liner on the ground and place layer of mortar or concrete over it in the oil and lubricants storage areas, provide spillage trap in oil and lubricant store, use dip tray and pump to pour oil from oil and lubricant drums; ▪ Dispose any oil contaminated wastes generated by construction activities in scientific manner; and ▪ Conduct ground water quality monitoring according to the EMP	DBO contractors	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
Surface water quality	Mobilization of settled silt materials, and chemical contamination from fuels and lubricants during construction can Contaminate nearby surface water quality. Ponding of water in the pits/foundation excavations	(i) All earthworks to be conducted during the dry season to prevent the problem of soil run-off during monsoon season; (ii) Stockpiling of earth fill especially during the monsoon season will be avoided unless covered by tarpaulins or plastic sheets; (iii) Excess spoils and debris will be re-used in the construction works. Only designated area, if required, will be used for soil disposal (iv) Install temporary silt traps or sedimentation basins (v) Storage areas for fuels and lubricants will be selected away from any drainage leading to water bodies. (vi) Fuel, construction chemicals etc., will be stored on an impervious floor, also spillage is avoided by careful handling (vii) Construction wastes to be disposed in designated sites; (viii) Temporary drainage channels will be created around the work area to arrest the entry of runoff from upper areas into the work area (ix) The water collected in the pits / excavations will be pumped to a temporary sedimentation pond; dispose of only clarified water then dispose into drainage channels / streams after sedimentation in the temporary ponds (x) Safety aspects will be considered related to pit collapse due to accumulation of water (xi) During construction of intake river bed earth needs to be removed quickly to control turbidity in the river water (xii) During construction of tube well – waste water generate from construction activity will be channelized to pit and later muck will be collected from the pit for disposal (xiii) During development of tube well, waste water will be drained to nearby *nallaha* (xiv) Conduct surface quality inspection according to the EMP.	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.
Noise Levels	Increase in noise level due to earth-moving and excavation equipment, and the	(i) Activities to be planned in consultation with Cluster-PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Horns will be not used unless it is necessary to warn other road users or animals of the vehicle's approach; (iii) Vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers are used in construction equipment to minimize sound impact to surrounding sensitive receptor;	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
	transportation of equipment, materials, and people	(iv) Maximum sound levels to be maintained which not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. (v) Mitigate the sound from tube well drilling operation (vi) Local communities will be consulted in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals. (vii) Night time work will be avoided			
Waste and debris management	Impacts due to excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty paint containers, spoils, oils, lubricants, and other similar items.	▪ Construction Waste Management Plan to be prepared and implemented ▪ As far as possible the debris and excess soil will be utilized in construction purpose, for example for raising the ground level or construction of access roads etc. ▪ Not to store any construction materials and spoil materials nearby the sensitive receptors; ▪ Construction waste will be not disposed near the sensitive receptors like school, Anganwadi and religious places ▪ Muck from construction activity of tube well will be disposed in designated area after receiving of NOC ▪ Stockpiles, lubricants, fuels, and other materials will be located away from steep slopes and water bodies; ▪ For disposal, the site selected will be preferably from barren, infertile lands; site would be located away from residential areas, forests, water bodies and any other sensitive land uses; ▪ Domestic solid wastes will be properly segregated into biodegradable and non-biodegradable for collection and disposal to designated solid waste disposal site; compost pit to be created at workers' camp sites for disposal of biodegradable waste; non-biodegradable / recyclable material will be collected separately and sold in the local recycling material market; ▪ Residual and hazardous wastes such as oils, fuels, and lubricants to be disposed of through approved vendors of Pollution Control Board; ▪ Burning of construction and/or domestic waste are prohibited; ▪ Wastes will be not haphazardly dumped/ thrown within and around the project site and adjacent areas; proper collection bins to be provided, and awareness to be created to use the dust bins. (viii) Site clearance and restoration will be done immediately after the completion of construction work to restore to the original condition; cluster-PIU ensures that site is properly restored prior to issuing of construction completion certificate.	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure at specified project location	▪ Prepare a list of affected utilities and operators if any; and ▪ Prepare a contingency plan to include actions to be done in case of unintentional interruption of service	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.
Accessibility	Traffic problems and conflicts near project locations and haul road Impact on access to house and road user particularly during laying of pipes	**Hauling (material, waste/debris and equipment) activities** ▪ Transportation routes to be planned so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites ▪ Transport and hauling activities will be scheduled during non-peak hours; ▪ Entry and exit points will be in areas where there is low potential for traffic congestion; ▪ Vehicles to be driven in a considerate manner ▪ Affected public will be notified by public information notices, providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints. ▪ Separate demarcated access will be temporarily arranged for nearby sensitive receptors like school. Anganwadi, religious places & health center located adjacent to the proposed construction areas. **Pipeline works** ▪ Confine work areas along the roads to the minimum possible extent; all the activities, including material and waste/surplus soil stocking should be confined to this area. Proper barricading should be provided; avoid material/surplus soil stocking in congested areas – immediately removed from site/ or brought to the as and when required ▪ Leave spaces for access between mounds of soil to maintain access to the houses / properties ▪ Provide pedestrian access in all the locations; provide wooden/metal planks over the open trenches at each house to maintain the access.	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		▪ Inform the affected local population 1-week in advance about the work schedule ▪ Avoid work during day time when community facilities such as educational institutes, healthcare centres, religious places, markets will be operating. Also provide alternative access. ▪ Plan and execute the work in such a way that the period of disturbance/ loss of access will be minimum. ▪ Keep the site free from all unnecessary obstructions; ▪ Coordinate with Traffic Police for temporary road diversions, where necessary, and for provision of traffic aids if transportation activities cannot be avoided during peak hours			
Landscape and aesthetics – waste generation	Impacts due to excess excavated earth, excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty paint containers, spoils, oils, lubricants, and other	(i) Construction Waste Management Plan to be prepared and implemented (ii) As far as possible the debris and excess soil will be utilized in construction purpose, for example for raising the ground level or construction of access roads etc. (iii) River bed earth from construction activity of intake will be disposed in designated area after receiving of NOC (iv) Muck from construction activity of tube well will be disposed in designated area after receiving of NOC (v) Stockpiles, lubricants, fuels, and other materials will be located away from steep slopes and water bodies; (vi) For disposal, the site selected will be preferably from barren, infertile lands; site would be located away from residential areas, forests, water bodies and any other sensitive land uses; (vii) Domestic solid wastes will be properly segregated into biodegradable and non-biodegradable for collection and disposal to designated solid waste disposal site; compost pit to be created at workers' camp sites for disposal of biodegradable waste; non-biodegradable / recyclable material will be collected separately and sold in the local recycling material market; (viii) Residual and hazardous wastes such as oils, fuels, and lubricants to be disposed of through approved vendors of Pollution Control Board; (ix) Burning of construction and/or domestic waste are prohibited; (x) Wastes will be not haphazardly dumped/ thrown within and around the project site and adjacent areas; proper collection bins to be provided, and awareness to be created to use the dust bins.	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
	similar items.	(xi) Site clearance and restoration will be done immediately after the completion of construction work to restore to the original condition; cluster-PIU ensures that site is properly restored prior to issuing of construction completion certificate.			
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure at specified project location	(i) Prepare a list of affected utilities and operators if any; and (ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of service	DBO Contractor	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.
Ecological Resources Terrestrial	Loss of vegetation and tree cover	(i) Minimize removal of vegetation and disallow cutting of trees; (ii) If tree-removal will be required, obtain tree-cutting permit and (iii) Plant 5 native trees for every one that is removed.	DBO contractors	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.
Land use	Environmental Issues due to land use change	The impact due to change in land use will be negligible due to this project.	DBO contractors	PMSC and PIU	Not applicable
Socio-Economic – Income.	Impede the access of residents and customers to nearby shops	(i) Prepare and implement spoils management plan (Error! Reference source not found.). Contractor to Implement RP and to follow mitigation measures prescribed such as- (ii) Leave spaces for access between mounds of soil; (iii) Provide walkways and metal sheets where required for people; (iv) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (v) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and	DBO contractors	PMSC and PIU	Contractor costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		(vi) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.			
Socio-Economic - Employment	Generation of temporary employment and increase in local revenue	(i) Employ local labor force as far as possible; and (ii) Comply with labor laws (See Error! Reference source not found. of this IEE)	DBO contractors	PMSC and PIU	Contractor costs
Occupational Health and Safety	Occupational hazards which can arise during work, safe from COVID 19	(i) All national, state and local core labor laws to be complied with (see Error! Reference source not found. of this IEE). Labour license and Workmen Compensation policy to be obtained by contractor before start of construction (ii) Develop and implement site-specific occupational health and Site-specific occupational health and safety (OHS) Plan and Supplementary H & S plan for COVID 19 to be developed and implemented (**Appendix 12** shows COVID 19 SOP guideline) which included measures such as: (a) excluding public from the site; (b) maintaining social distancing for protection from COVID 19 infection; (c) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose mask, face mask and ear plugs; (d) OHS Training and COVID 19 awareness H & S training for all site personnel; (e) complete COVID 19 vaccinations for workers, (f) documented procedures to be followed for all site activities including follow of SOP for COVID 19 to be developed for the project and H & S plan; and (g) documentation of work-related accidents; (iii) Availability of First aid box/ facility throughout the project period; (iv) Medical insurance and tie-up with local hospitals to be provided for workers; (v) All installations will be secured from unauthorized intrusion and accident risks; (vi) Potable drinking water to be provided for the workers; (vii) Clean eating areas to be provided where workers are not exposed to hazardous or noxious substances;	DBO contractors	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		(viii) To provide health and safety orientation training including COVID 19 risk and mitigation 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; (ix) Visibility of workers to be ensured using high visibility vests when working in or walking through heavy equipment operating areas; (x) Moving equipment will be outfitted with audible back-up alarms; (xi) Sign boards will be provided for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage is in accordance with international standards and are well known to, and easily understood by workers, visitors, and the general public as appropriate; (xii) Workers will be disallowed exposure to noise level greater than 85 dB (A) for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively. Standard Operating Procedure (SOP) for the project and Supplementary H & S plan for COVID 19 will be prepared which cover, (xiii) General instruction to follow to prevent the spread of COVID-19 in construction workplace (xiv) Worksite prevention practice at work site, office, during meeting, travelling, etc. (xv) Precaution to be taken at workmen habitat/ camp (xvi) Use of PPEs: face mask – hand gloves, maintaining social distancing, disinfection, requirement of awareness covered under the H & S plan.			
Community Health and Safety.	Traffic accidents and vehicle collision with pedestrians during material and waste transportation and	(i) Movements of construction vehicles are restricted to defined access roads and demarcated working areas (unless in the event of an emergency) (ii) strict speed limit (20-30 kmph) is enforced for plying on unpaved roads, construction tracks (iii) Night-time haulage is by exception only, as approved by the cluster-PIU to minimize driving risk and disturbance to communities (iv) Safe practices are adopted for micro tunneling- (in case of major road crossing) (v) Temporary traffic control (e.g. flagmen) and signs will be provided where necessary to improve safety and provide directions (vi) Restrict speed of the vehicle and equipment near sensitive receptors	DBO contractors	PMSC and PIU	Cost for Implementation of mitigation measures responsibility of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
	pipe laying work	(vii) Separate barricading needs to be provided near adjacent sensitive receptors like school, Anganwadi, health center and religious places; (viii) All drivers should pass through safety and training sessions (ix) Public access will be restricted using barricade and security personnel at pipe laying work locations (x) Warning signs, blinkers will be attached to the barricading to caution the public about the hazards associated with the works, (xi) The period of time when the pipeline trench is left open will be minimized through careful planning (xii) Control dust pollution –dust control measures will be implemented as suggested under air quality section (xiii) Vehicles will be regularly maintained and manufacturer- approved parts will be used to minimize potentially serious accidents caused by equipment malfunction or premature failure. Road signs and flag persons will be there to warn of on-going trenching activities. (xiv) Road signs and flag persons will be provided to warn of on-going trenching activities.			
Safety of sensitive groups (children, elders etc.) and others pedestrians in narrow streets	Trench excavation in narrow streets will pose high risk to children and elders in the locality	(i) Provide prior information to the local people about the nature and duration of work (ii) Conduct awareness program on safety during the construction work (iii) Undertake the construction work stretch-wise; excavation, pipe laying and trench refilling should be completed on the same day (iv) Provide barricades, and deploy security personnel to ensure safe movement of people and to prevent unnecessary entry and to avoid accidental fall into open trenches (v) Implement additional safety features for working near the schools; isolate work site from the school access road; provide proper barricading to prevent entry of children / public into work site; create awareness among school children and staff on construction safety.	DBO contractors	PMSC and PIU	Cost for Implementation of mitigation measures responsibility of contractor.
Work Camps and worksites	Temporary air and noise pollution from machine operation,	(i) Camp site will be established near major construction i.e WTP, OHSRs site (ii) No Tree will be cut for settling of camp. (iii) Camp site will not be located near (100 m) water bodies, flood plains flood prone/low lying areas, or any ecologically, socially, archeologically sensitive areas (iv) The workers living areas and material storage areas will be separated clearly	DBO contractors	PMSC and PIU	Cost for implementation of mitigation measures responsibili

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
	water pollution from storage and use of fuels, oils, solvents, and lubricants. Unsanitary and poor living conditions for workers	(v) Proper temporary accommodation with proper materials, adequate lighting and ventilation to be provided, appropriate facilities will be provided for winters and summers; conditions of livability at work camps should be ensured and maintained at the highest standards possible at all times; (vi) Cluster-PIU should be consulted before locating project offices, sheds, and construction plants; (vii) Removal of vegetation is minimized and cutting of trees disallowed without permission from concerned authorities (viii) Camp should be protected from COVID 19 health risk. All Health and safety procedure to be followed for operation of camp (H & S plan for COVID 19 will be used as ref. document) during stay, cooking, eating, use of toilet- common space etc. (ix) Self- hygiene, regular disinfection of entire camp and toilet, maintaining of social distancing to be continued for protection from COVID 19 infection (x) Unknown person will be not allowed within the camp (xi) Camps will be provided with proper drainage, without any water accumulation (xii) Maintenance of hygienic environment at staying area, cooking area and toilet (xiii) Drinking water, water for other uses, and sanitation facilities for employees to be provided (xiv) Employees will be prohibited from cutting of trees for firewood; contractor provided proper facilities including cooking fuel (oil or gas; fire wood not allowed) (xv) Employees will be trained in the storage and handling of materials which can potentially cause soil contamination (xvi) Used oil and lubricants will be recovered and removed from the site (xvii) Solid waste to be managed according to the following preference hierarchy: reuse, recycling and disposal to designated areas; provide a compost pit is provided for biodegradable waste, and non-biodegradable / recyclable waste are collected and sold in local market (xviii)All wreckage, rubbish, or temporary structures which no longer required should be removed (xix) At the completion of work, camp area will be cleaned and restored to pre-project conditions, and report will be submitted to Cluster-PIU; they will review and approve camp clearance and closure of work site Guideline for worker's camp attached as **Appendix 12.**			ty of contractor.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
Impacts due to night works (if required as per nature of works and feasibility at site)	Occupational hazards which can arise during work at night in extreme and unavoidable cases	(i) Contractors should have hand held noise level meter for measurement of noise during night hours (ii) Contractors should have hand held lux meter for the measurement of illumination during night hours (iii) Preferably electrical connections are available for running equipment's otherwise sound proof/super silent Diesel Generator set should be available (iv) Sound level should not increase as per EMP (v) Illumination should be adequate as required according to nature of works (vi) As far as possible ready-mix concrete from batching plant to be used, otherwise the concrete should be prepared away from residential areas and brought to the site (vii) All the noise activity like hammering, cutting, crushing, running of heavy equipment's should be done in day time and avoided in night time (viii) Workers engaged in night works should have adequate rest/sleep in day time before start of night works (ix) Worker engaged for night works should have previous experience of night works and should be physically fit for such works including clear vision in night (x) All the necessary provisions of traffic aids such as traffic signals, road signage, barricades, cautions boards, traffic diversion boards etc. should be available with fluorescent /retro-reflective arrangements (xi) Workers should be trained before start of night works about risks and hazards of night works and their mitigation measures and should be provided all the protective aids (PPEs) including fluorescent/retro-reflective vests (xii) Horns should not be permitted by equipment and vehicles (xiii) Workers should not shout and create noise (xiv) First aid and emergency vehicles should be available at site (xv) Emergency preparedness plan should be operative during night works (xvi) Old persons and pregnant women and women having small kids should not work in night time (xvii) All the vehicles and equipment being used at night works should have adequate type of silencers/enclosures/mufflers to reduce noise (xviii)All the vehicles should be checked for working head lamps, tail lamps, inner lights etc. before start of night work. Management Plan for night works is attached in **Ground water extraction permission.**	DBO contractors	PMSC and PIU	Cost for Implementation of mitigation measures responsibility of contractor.



F.1(40)/EE/ WRID/TECH/2020/.....58-60
Government of Tripura
Office of the Executive Engineer
Water Resource Investigation Division
Kunjaban:Agartala

Dated 8th

To
The Chief Planner,
Tripura Urban Planning & Development Authority
(Project Coordinator, PMU,ADB Project)
Agartala-799001.

Sub: - Loan 6037 IND : Tripura Urban & Tourism Development Project (TUTDP): Re
Water allocation permission and sustainability of water supply source permis
towns in Tripura State.
Ref: - Letter No. F.03(09-TUDA/ Project/2021/P-I/2995-97 dtd. 25/03/2022 of Tripu
Planning and Development Authurity (TUDA).

Sir,

1. Kindly refer to the above on the subject at issue. In this connection , I am directe
you that according to dynamic ground water resources estimation report of
Groud Water availability for future uses for 16 towns as stated in the under r
letter is in safer side. So, there is no bar for extraction of Ground Water.

2. The proposed water supply scheme based on surface water resources from
Manu and Gumati through intake well for Dharmanagar, kailashahar, Kuma
Udaipur is insignificant in lean period. A calculation sheet of runoff of the each
with monthwise percentage of rainfall is enclosed herewith which may kindly be s

3. Regarding Water resource data like HFL, LWL, Discharge of 3 rivers as stated
rainfall data from 2009-2018 of different sub-Divisions are enclosed herewith.

4. The Deep Tube Well yield map of Tripura is enclosed herewith.

Enclo: As Stated Above(34 no pages).

Yours faithfully,

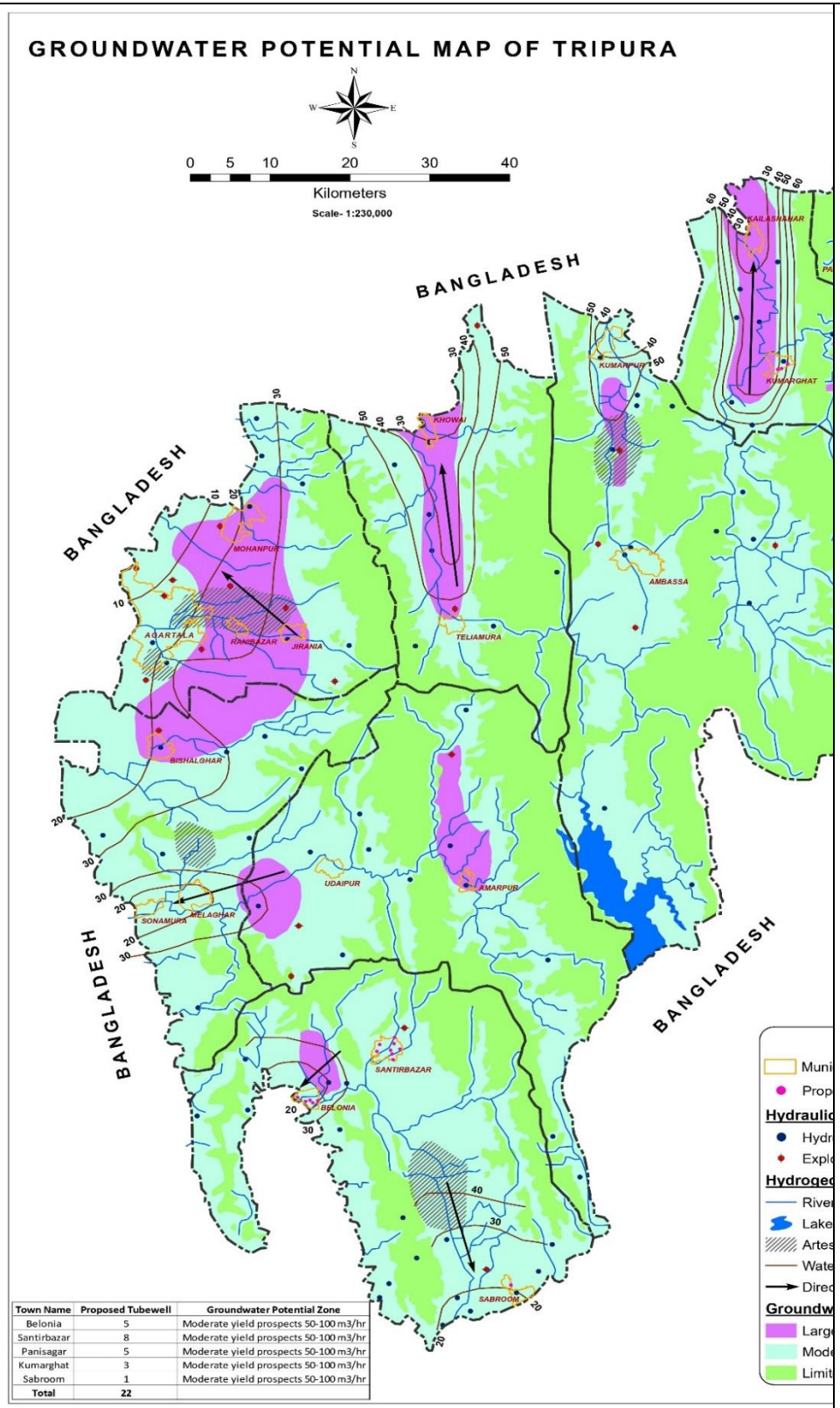
(Er. B. SAHA)
Executive Engineer
Water Resource Investigation
Kunjaban , Agartala

① TL, PDMC
② TA-1
11/4/22

Copy to :-
1. The Chief Engineer, PWD, WR, Tripura, Visvesaraya Complex, Kunjaban
Tripura(W) for favour of his kind information please.
2. The Superintending Engineer, O/O the Additional Chief Engineer, P&DUnit,
Visvesaraya Complex, Kunjaban, Agartala, Tripura(W) for favour of his kind
please.

Executive Engineer
Water Resource Investigation
Kunjaban , Agartala

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Town Name	Proposed Tubewell	Groundwater Potential Zone
Belonia	5	Moderate yield prospects 50-100 m3/hr
Santirbazar	8	Moderate yield prospects 50-100 m3/hr
Panisagar	5	Moderate yield prospects 50-100 m3/hr
Kumarghat	3	Moderate yield prospects 50-100 m3/hr
Sabroom	1	Moderate yield prospects 50-100 m3/hr
Total	**22**	

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
		~~Ground water extraction permission~~			
Social and Cultural Resources	Risk of archaeological chance finds	(i) Consult with concerned religious authorities, nearby people and devotees in pre-construction phase and explain the work method and duration of proposed works, take their suggestions and comments and incorporate in design the mitigation measures required (ii) Adjacent to religious/social sites, undertake excavation and construction work in such a way that no structural damage is caused to the religious building. (iii) Observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and do not make any disturbance/hindrance/obstacles during such time to the religious places, (iv) Provide proper signage, barricades etc. to protect public and devotees from dangers of construction works.	DBO contractors	PMSC and PIU	Cost for Implementation of mitigation measures responsibility of contractor.
Monsoon preparedness	Disruption of utilities and water logging in trenches	(i) As for a possible avoid trench works and excavation works (pipe laying) during monsoon season to avoid any water logging and accident due to it (ii) if open trenches are not avoidable during monsoon, keep ready all the mitigations measure to avoid water logging such as dewatering pumps and sufficient pipes, traffic assistance, barricades etc. (iii) Guidelines for safety during monsoon is attached as Error! Reference source not found.**.**	DBO contractors	PMSC and PIU	Cost for Implementation of mitigation measures responsibility of contractor.
Chance Finds	There are no protected properties in the subproject sites. However, in case of chance finds, contractor	(i) Consult Archaeological Survey of India (ASI) or Tripura State Archaeology Department (Ministry of Education) to obtain an expert assessment of the archaeological potential of the site (ii) In case of chance finds, works must be stopped immediately until such time chance finds are cleared by experts	DBO contractors	PMSC and PIU	

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Responsible for Monitoring	Cost and Source of Funds
	s will be required to follow a protocol as defined in the mitigation measures.				
Submission of EMP implementation report	Unsatisfactory compliance to EMP	(i) Appointment of Environment, Health and Safety cum social Supervisor to ensure EMP implementation (ii) Timely submission of monitoring reports including pictures	DBO contractors	PMSC and PIU	Contractor cost
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) after completion of work; (ii) All excavated roads shall be reinstated to original condition. (iii) All disrupted utilities will be restored (iv) All affected structures will be 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) The contractor must arrange the cancellation of all temporary services. (vii) Request Cluster-PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.	DBO contractors	PMSC and PIU	Cost for implementation of mitigation measures responsibility of contractor.

Table 26: Operation Stage Environmental Impacts and Mitigation Measures

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation		Cost and Source of Funds
WTP and intake operation – malfunction and effect on efficiency (Kailashahar, Kumarghat, and Dharamanagar	Public health, safety and environmental impacts	(i) Operate as per the Operational Manual following Standard Operating Procedures as per the WTP design (ii) Undertake preventive and periodic maintenance activities as required (iii) Ensure periodic training to staff in WTP, intake operation, especially in chemical handling and dosing, filter backwash, etc., (iv) Replace pumps, motors, and other parts as per the operating life prescribed by manufacturer (v) Maintain the mechanical parts as per the maintenance plan to avoid any hazards (vi) Ensure that all safety apparatus at WTP, intake including personal protection equipment is in good condition all times; and are at easily accessible and easily identifiable place; periodically check the equipment, and conduct mock drills to deal with emergency situations (vii) Ensure that backwash recirculation system and sludge management system are operated as per the manual	Operator/DBO contractor	PMU	Operating costs
Existing WTPs	Environment and health impacts	(i) Ensure WTPs are delivering water quality meeting drinking water standards (IS 10500-2012) (ii) Ensure that backwash water and sludge is managed properly; no untreated discharge/disposal into environment (viii) Ensure proper chemical handling, overall housekeeping, and health and safety practices	Operator / DWS	PMU	Operating costs
Operation of DTW & IRP, pumping of water (Ambassa)	Public health, safety and environmental impacts • Over abstraction of groundwater through tube well resulting land subsidence • Contaminated groundwater from nearby polluted sources • Noise from pumping will be nuisance to	(iii) Over pumping should be avoided. (iv) Conduct water quality monitoring at strategic points in the distribution system (v) Ensure standard water quality (surveillance procedures and protocols as a key obligation of the contractor with third party checks (vi) Nearby polluted sources should be checked and avoided. (vii) Maintain the mechanical parts as per the maintenance plan to avoid any hazards (viii) Follow MoUD's CPHEEO Manual on Operation and Maintenance of Water Supply Systems (ix) Prevent, minimize, and control potential impacts associated with the storage, handling and use of disinfection chemicals	Operator/DBO contractor	ULB- MC	Operating costs

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation		Cost and Source of Funds
	surrounding receptors				
Check for blockage and leakage problems reducing the water losses	Loss of water, increased demand and inconvenience to consumers and general public	Effectiveness of leak detection and water auditing to reduce the water losses	Operator/DBO contractor	ULB- MC	Operating costs
Monitoring of Plantation	Loss of Trees	(i) Monitoring of survival of trees should be done at regular interval and suitable mitigation measures should be taken to protect the trees. (ii) Efforts will be made for proper maintenance of planted trees, shrubs and grasses to maintain greenery and aesthetics (iii) Planted tree should be covered with fence or net	Operator/DBO contractor	ULB- MC	Operating costs
Construction disturbances, nuisances, public & worker safety	All work sites	Implementation of dust control, noise control, traffic management, & safety measures. Site inspection checklist to review implementation is appended at Error! Reference source not found.	Operator/DBO contractor	ULB- MC	No cost required
Achieving targeted sludge reuse	Violation of ULB commitment under the project. Moreover, o land has been identified for safe sludge disposal. Hence, it is imperative to achieve the targeted sludge reuse under the project.	(i) Ensure that the targeted sludge reuse is achieved throughout the project period	Operator/DBO contractor	ULB- MC	O&M Contractor
Routine maintenance of WTP, DTW and other facilities to ensure delivery	Health impact due to supply of unsafe drinking water in the system	(i) Ensure periodical maintenance and cleaning of OHSRs, DTW, WTP to ensure delivery of safe drinking water Periodical testing of treated water to ensure treated water quality meets the required standards	Operator/DBO contractor	ULB- MC	O&M Contractor

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation		Cost and Source of Funds
of safe drinking water					
Occupational health and safety	Health, social and economic impacts on the workers	(i) Provide appropriate PPE and training on its proper use and maintenance. (ii) Provide specific training on COVID 19 issues and availability of relevant specific PPEs for protection (COVID 19 H & S plan as ref material) (iii) Strictly follow H & S protocol as developed for COVID 19 pandemic (iv) Use fall protection equipment when working at heights. (v) Maintain work areas to minimize slipping and tripping hazards. (vi) Implement a training program for operators who work with chlorine regarding safe handling practices and emergency response procedures. Prepare escape plans from areas where there might be a chlorine emission. (vii) Install safety showers and eye wash stations near the chlorine equipment and other areas where hazardous chemicals are stored or used. (viii) Prohibit eating, smoking, and drinking except in designated areas. Guidelines for safety for Chlorine usage attached in **Appendix 7**	DBO contractors		Operating costs
Asset management	Reduction in NRW Increased efficiency of the system	(i) Preparation and implementation of O&M Manual	ULB- MC		To be identified
Increased in sewage generation	Water pollution, and impacts on public health and environment	Sanitation and sewerage/septage facilities needs to be improved/provided in the project area to suit the increased sewage generation	ULB- MC		To be identified

Table 27: Construction Stage Environmental Monitoring Plan

Monitoring field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Surface water	Manu, Deo, Dhalai and Kakri River River (intake, WTP inlet and WTP outlet)	pH, TDS, Oil and grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity, including other essential parameters as per drinking water standards IS 10500-2012	Once during detailed design for assessment of WTPs	DBO Contractor	PMSC and PIU	Project costs

Monitoring field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Groundwater	Ambassa town – selected DTWs	Essential parameters as per drinking water standards IS 10500-2012	Once during detailed design for assessment of WTPs	DBO contractor	PMSC and PIU	Project costs
Construction disturbances, nuisances, public and worker safety,	All work sites	Implementation of dust control, noise control, traffic management, and safety measures. Site inspection checklist to be developed	Weekly during construction	Supervising staff and safeguards specialists	PMSC, PIU and ULB	No costs required
Tree cutting	WTP, Pipe laying, construction/ labour camps and CWR site	Tree cutting permit taken, Tree cutting done	Continuous	Supervising staff, EHS officer and safeguards specialists	PMSC, PIU and ULB	Contractor
Construction, Labour Camp, storage yard Management	Construction, Labour Camp, storage yard sites	As per SEMP	Weekly	EHS officer, Environment Specialist of consultant	PMSC, PIU and ULB	contractor
Solid waste management	Construction, Labour Camp, storage yard Management	As per SEMP	Weekly	EHS officer, Environment Specialist of consultant	PMSC, PIU and ULB	contractor
Construction and demolition waste management	All construction site	As per SEMP and applicable rules and regulations	Monthly	EHS officer, Environment Specialist of consultant	PMSC, PIU and ULB	contractor

Monitoring field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Consent to establish of batching plants, crusher, hot mix plant. DG sets etc.	Batching plants, crusher, hot mix plants etc.	Copies of Consents	Periodically	EHS officer, Environment Specialist of consultant		No cost required for monitoring cost for obtaining CTE/CTO from PMU and for others from Contractor
Ambient air quality	**Kailashahar** 4 locations, (WTP-1, OHSRs- 2, pipe line-1) **Kumarghat** 4 locations, (WTP-1, 1 OHSR- 1, pipe line-2) **Dharamanagar** 4 locations, (WTP-1, OHSRs- 2, pipeline-1) **Ambassa** 4 locations, (OHSR-1 and DTW – 1, pipe line-2)	PM_{10}, $PM_{2.5}$ NO_2, SO_2, CO	(i) Once before start of construction. (ii) Yearly 3 times (for seasons: pre-monsoon, post-monsoon and winter) during construction (2.5-years period considered)	DBO contractors	PMSC and PIU	Cost for implementation of monitoring measures responsibility of contractor
Ambient noise level	**Kailashahar** 4 locations, (WTP-1, OHSRs- 2, pipe line-1) **Kumarghat** 4 locations, (WTP-1, 1 OHSR- 1, pipe line-2) **Dharamanagar** 4 locations, (WTP-1, OHSRs- 2, pipeline-1) **Ambassa** 4 locations, (OHSR-1 and DTW – 1, pipe line-2)	Day time and nighttime noise levels	(i) Once before start of construction. (ii) Yearly 3 times (for seasons: pre-monsoon, post-monsoon and winter) during construction (2.5-years period considered)	DBO contractors	PMSC and PIU	Cost for implementation of monitoring measures responsibility of contractor

Monitoring field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Surface water quality	Kailashahar, Kumarghat, and Dharamanagar One location (River intake point) 1 – if required (suspected river contamination) Ambassa 1 – if required (suspected river contamination)	pH, TDS, Oil and grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity	(i) Once before start of construction (ii) Yearly 3 times (for seasons: pre-monsoon, post-monsoon and winter) during construction (2.5-years period considered)	DBO contractors	PMSC and PIU	Cost for implementation of monitoring measures responsibility of contractor
Chance Finds	Areas protected by ASI or Tripura Education Dept	Chance finds protocol	Before finalization of detailed design, consult with ASI or Concerned Dept. State of Tripura	DBO contractors	PMSC and PIU	Cost for implementation of monitoring measures responsibility of contractor

Table 28: Operation Stage Environmental Monitoring Plan

Monitoring Field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Monitoring of quality of water supplied to consumers	Consumer end-random sampling in all zones	pH, Nitrite, Nitrate, Turbidity BOD, Total Alkalinity, Total coliform and Faecal coliform	Quarterly once	Contractor / ULB	ULB/ DWS	O&M costs (water quality will be tested at the internal laboratory part of WTP)
Monitoring of quality of River water (Kailashahar, kumarghat and Dharamanagar)	Intake location	pH, TDS, Oil and grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity pesticides, heavy metals	Monthly once	Contractor / ULB	ULB/ DWS	O&M costs (water quality will be tested at the internal laboratory part of WTP)
Source water quality (Ambassa)	On 4 DTW locations	pH, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity, heavy metals and pesticides	Yearly twice (pre and post monsoon)	Contractor / ULB	ULB/ DWS	O&M costs

Monitoring Field	Monitoring Location	Monitoring Parameters	Frequency	Responsibility	Monitoring	Cost and Source of Funds
Sludge quality and suitability as manure	WTP	Analysis for concentration of heavy metals and confirm that value is within the following limits (all units are in mg/kg dry basis except pH) Arsenic - 10.00 Cadmium - 5.00 Chromium - 50.00 Copper - 300.00 Lead - 100.00 Mercury - 0.15 Nickel - 50.00 Zinc - 1000.00 PH - 5.5-8.5	Half-Yearly once	Contractor / ULB	ULB/ DWS	O&M costs (testing to be done at an accredited external laboratory)

B. Implementation Arrangements

189. Urban Development Department (UDD) of Government of Tripura (GOT) is the executing agency, and the implementing agencies are Tripura Urban Planning and Development Authority (TUDA, for urban component) and Tripura Tourism Development Corporation Limited (TTDCL, for tourism component). A Project Management Unit (PMU) will be established with the secretary, UDD as the project director and secretary, Department of Tourism (DOT), GOT, as co-project director. The PMU will also include two additional project directors (one each for urban and tourism), a project coordinator, and an additional project coordinator. Six project implementation units (PIUs) will be established to cover urban and tourism components separately and will be located at Agartala, Udaipur and Kumarghat. Project Management & Supervision Consultant (PMSC) will be engaged to assist PMU and the PIUs for project implementation of the project.

190. At PMU, the project coordinator at PMU will be the nodal officer for environmental, social safeguards and gender and will be responsible for ensuring compliance with ADB's Safeguards Policy Statement (SPS), 2009, during the project implementation, including the monitoring and reporting. PMU will engage a qualified and experienced consultant, designated as environmental safeguards officer (ESO), to support project coordinator in environmental safeguards tasks. Project manager or assistant project manager of PIU will be designated as safeguards focal in each PIU. PMSC team will include an Environmental Safeguards Specialist (ESS), and three support safeguards staff, located in PIUs and will provide all necessary support and expert guidance to PMU and PIUs. Contractor will appoint an Environment, Health and Safety (EHS).

191. **Project Management Unit (PMU).** The PMU will be responsible for planning, management, coordination, supervision and progress monitoring. The PMU has the responsibility of fulfilling environmental requirements of the government and ensuring effective implementation of the environmental management provisions in the IEEs, EMPs and civil works contracts. The following are the key environmental safeguard tasks and responsibilities of the ESO at the PMU:

(i) ensure project compliance with the statutory environmental requirements, ADB SPS 2009, and loan covenants
(ii) ensure that draft IEEs prepared based on preliminary designs are updated to reflect the final subproject detailed designs, and are approved by ADB and disclosed prior to bid invitation (for works contracts) and commencement of works (for design-build contract)
(iii) ensure that IEEs including EMPs are included in bidding documents and contracts
(iv) Ensure that baseline monitoring as suggested in the EMPs are conducted and base values established prior to commencement of works
(v) Ensure that detailed environmental audit conducted for existing facilities and corrective actions are included in project for implementation
(vi) coordinate with design engineers to avoid potential environmental impacts
(vii) ensure that SEMPs are submitted by contractor and cleared by PIU prior to commencement of works
(viii) ensure that construction works are not commenced until all applicable government clearances, permits (including those required by construction contractor) are obtained;
(ix) Oversee and ensure that contractors and their subcontractors comply with labor laws and rules
(x) ensure that the IEEs including EMPs are updated in case of any change project scope, design or location during implementation

(xi) confirm compliance with all measures and requirements set forth in the IEEs, the EMPs and any corrective or preventive actions set forth in safeguard monitoring reports;
(xii) finalize environmental sections quarterly progress reports, and environmental monitoring reports for submission to ADB
(xiii) ensure availability of budget for safeguards activities
(xiv) ensure adequate awareness campaigns, information disclosure among affected communities and timely disclosure of final IEEs/EMPs and SEMRs, including corrective action plans, if any, in project website and in a form accessible to the public;
(xv) assist in setting up of grievance redress mechanism (GRM), identifying grievance redressal committee (GRC) members and developing capacity of GRC members, PIUs, consultants, and contractors in addressing environmental safeguards-related issues/concerns/complaints;
(xvi) ensure any grievances brought about through the GRM are redressed in a timely manner;
(xvii) organize periodic capacity building and training programs on safeguards for PMU, PIUs and contractors.

192. **Project Implementation Units.** The PIUs will be responsible for the day-to-day activities of project implementation in the field and will have direct supervision of all contractors. PIUs will oversee and monitor the day-to-day progress and implementation including environmental safeguards. The following are the key environmental safeguard tasks and responsibilities of the SO safeguards focial at the PIU with the PMDC's support environmental engineer:

(i) Promptly report to PMU on any changes in project design / location / scope during the design verification and implementation phase and coordinate with PMC to update IEEs and EMPs
(ii) Liaise with local offices of regulatory agencies and ensure that clearances /approvals are obtained timely;
(iii) Take necessary action for obtaining right-of-way prior to start of works;
(iv) Review and approve contractor SEMPs;
(v) Oversee implementation of SEMPs by contractors
(vi) Ensure that contractors and their subcontractors comply with labor legislations and standards; ensure that workers are accommodated, paid and treated according to the requirements
(vii) ensure strict implementation of occupational health and safety requirements
(viii) Review monthly reports from contractors on EMP implementation, and support PMU in preparing quarterly reports and SEMRs
(ix) Ensure continuous public consultation and awareness;
(x) Coordinate grievance redress process and ensure timely actions by all parties; and
(xi) Support all other environmental safeguards-related activities and tasks of the PMU as may be needed.
(xii) recommend issuance of construction work completion certification to the contractor upon verification of satisfactory post-construction clean-up.

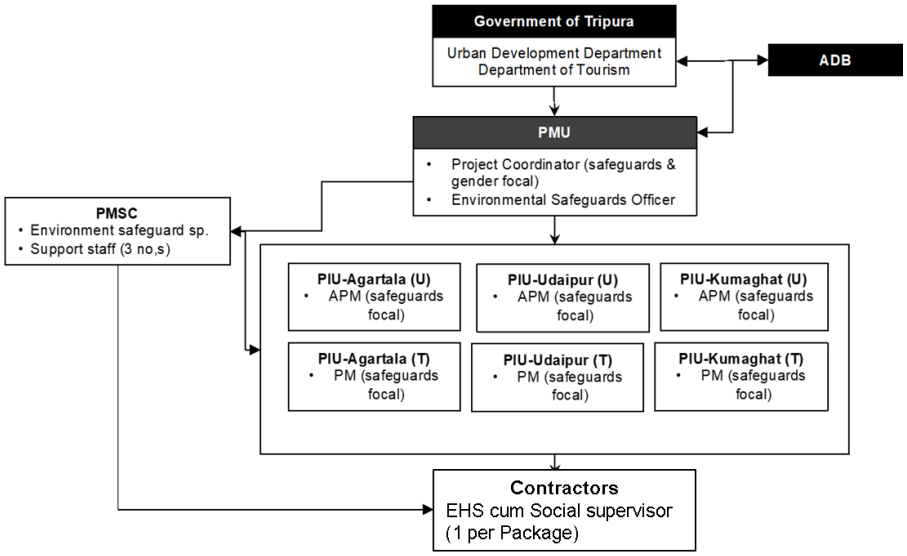
193. **Project Management and Supervision Consultant.** The PMU and PIUs will be supported by PMSC's Environmental specialist and three support environmental engineers. Key tasks of will include, but not limited to, the following:

(i) Assist in preparing, updating, reviewing, implementing, monitoring, and reporting of all tasks related to e`nvironmental safeguards as required
(ii) Monitoring of EMP implementation, regulatory compliance, grievance redress, reporting etc.,
(iii) Provide all necessary support and expert guidance to ESO and SO in managing environmental safeguards tasks
(iv) Work closely with design teams to include environmental considerations in subproject location, design and technical specifications
(v) Update IEEs and EMPs as needed to reflect detailed designs, changes in design verification and/or implementation phase of subprojects
(vi) Assist in public consultations, feedback and reporting
(vii) Ensure that the relevant provisions of EMPs, including costs of implementing the EMPs, are fully included in bid and contract documents, particularly in the bill of quantities and cost line items;
(viii) Identify statutory clearances / permissions / approvals required and assist in obtaining them;
(ix) Assist in including standards/conditions of regulatory clearances and consents, if any, in the project design;
(x) Conduct training, capacity building activities for PMU, PIU and contractors
(xi) Ensure compliance with ADB's disclosure requirements as per the SPS;
(xii) Assist PMU/PIUs in reviewing and approving contractor SEMPs, and other associated plans
(xiii) Carry out site verification, and monitor the EMP implementation and ensure compliance by the contractors and subcontractors;
(xiv) Ensure that contractors and their subcontractors comply with labor legislations; ensure that workers are paid and treated according to the labor legislations
(xv) Identify any non-compliances or unanticipated impacts and recommend corrective actions
(xvi) Prepare environmental safeguards section in quarterly reports
(xvii) prepare semiannual environmental monitoring reports
(xviii) Assist in operating GRM effectively
(xix) Advise contractor on appropriate actions on grievances, ensure timely resolution and proper documentation; and
(xx) Support all other environmental safeguards-related activities and tasks of the PMU and PIUs as may be needed.

194. **Contractor.** The approved draft IEEs and EMPs are to be included in bidding and contract documents. The PMU and PIUs will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable laws and regulations relating to environment, health and safety; (ii) reinstate pathways, other local infrastructure, and agricultural land to at least to their pre-project condition upon the completion of construction; (iii) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation, international treaties for construction and maintenance activities;(b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; (c) no discrimination in respect of employment and occupation; (d) allow freedom of association and effectively recognize the right to collective bargaining, and (e) elimination of forced labor; and (iv) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites. The contractor will be required to appoint a full time Environment, Health and Safety (EHS) cum social Supervisor on-site to implement the EMP. EHS cum social Supervisor will assist contractor in the following:

(i) Prepare SEMP and submit to PMU/PIU for approval prior to start of construction
(ii) Comply with the measures forth in the IEEs, the EMPs, and SEMRs
(iii) Ensure implementation of SEMP and report to PIU/PMC on any new or unanticipated impacts
(iv) Ensure that necessary pre-construction and construction permits are obtained
(v) Ensure to adequately record the condition of roads, agricultural land and other infrastructure prior to starting to transport materials and construction; and
(vi) Conduct orientation, daily briefing sessions, toolbox talks, to workers on environment, health and safety;
(vii) provide appropriate worker facilities at the workplace and labor camps as per the requirements and contractual provisions;
(viii) Carry out site inspections on a regular basis and prepare site-inspection checklists/reports;
(ix) Record EHS incidents and undertake remedial actions;
(x) Conduct environmental monitoring (air, noise, etc.,) as per the monitoring plan
(xi) Prepare monthly EMP monitoring reports and submit to PIU
(xii) Comply with labor legislations, and ensure that subcontractors also implement labor legislations requirements, through cascading of requirements to subcontractors—HR policy, labor management requirements, any worksite specific grievance redress mechanism.
(xiii) Work closely with PIU and PMC to ensure communities are aware of project related impacts, mitigation measures, and GRM; and
(xiv) Receive, record, and redress grievances in an effective and timely manner.
(xv) Provide the PIU/ PMU with a written notice of any unanticipated environmental, impacts that arise during construction, implementation or operation of the Project that were not considered in the IEE, the EMP;
(xvi) Reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition upon the completion of construction;
(xvii) Site clearance and restoration after the completion of works

Figure 83: Implementation arrangement for Environment and Social Safeguard



ADB = Asian Development Bank; APM = Assistant project manager; EHS = Environment, Health & Safety; IA – Implementing Agency; PIU = Project Implementation Unit; PMSC = Project Management and Supervision Consultant; PMU = Project Management Unit; PM = project manager

C. Capacity Building and Training

195. Safeguard Specialist/ Environment and Social Nodal Officer of PIU, Assistant Engineer Environment (AEE)/ Environment Safeguard Officer at Cluster-PIUs will be trained by Environmental Safeguard Specialist by PMSC on safeguards issues related to the project, EMP, SEMP and GRM. The SEMP, IPPF and GESI action plan will provide indicative capacity building program which included modules on: (i) introduction and sensitization to ADB SPS on environmental, involuntary resettlement and indigenous people policies and requirements; (ii) project related requirements as provided in the EMP, SEMP, IPPF and GESI action plan, (iii) review, updating and preparation of the IEEs, SEMPs, RPs, DDRs and IPPs (as required) upon the completion of project detailed design; (iv) improved coordination within nodal departments; (v) monitoring and reporting system; and (vi) project GRM.

196. The estimated cost is ₹3,00,000 (excluding trainings of contractors which is e part of EMP implementation cost during construction) to be covered by the project's capacity building program. The detailed cost and specific modules are being customized for the available skill set after assessing the capabilities of the target participants and the requirements of the project by the Environment Safeguard specialist (ESS) of PMSC.

Table 29: Outline Capacity Building Program on EMP Implementation

Description	Participants and Venue	Estimate (Rs)	st and Source of Funds
1. Introduction and Sensitization to Environmental Issues (1 day) - ADB Safeguards Policy Statement - Government of India and Tripura state applicable safeguard laws, regulations and policies including but not limited to core labor standards, OHS, etc. - Incorporation of EMP into the project design and contracts - Monitoring, reporting and corrective action planning	All staff and consultants involved in the project At PIU-PMU (combined program for all subprojects in one cluster)	150,000	Included in the overall program cost
2. EMP implementation (1/2 day) - EMP mitigation and monitoring measures - Roles and responsibilities - Public relations, - Consultations - Grievance redress - Monitoring and corrective action planning - Reporting and disclosure - Construction site standard operating procedures (SOP) Health & safety, specifically health risk from COVID 19. -- Chance find (archeological) protocol -Traffic management plan Waste management plan - Site clean-up and restoration	All Cluster-PIU staff, contractor staff and consultant involved in the subproject At PIU- cluster- PIUs	150,000 (Lump sum)	Included in subproject cost estimates
3. Contractors Orientation to Workers (1/2 day) - Environment, health and safety in project construction -Health impact and protection from COVID 19	Once before start of work, and thereafter regular briefing every month once. Daily briefing / tool box talk on safety prior to start of work All workers (including unskilled laborers)	100,000	Contractor's cost

D. Monitoring and Reporting

197. Immediately after mobilization and prior to commencement of the works, the contractor is to submit a compliance report to cluster-PIU that all identified pre-construction mitigation measures as detailed in the EMP will be undertaken. Contractor should confirm that the staff for EMP implementation (EHS supervisor/officer) is mobilized. Cluster-PIU is required to review, and approve the report and permit commencement of works.

198. During construction, results from internal monitoring by the contractor is to be reflected in their monthly EMP/SEMP implementation reports to the Cluster-PIU/PIU. PMSC is required to review and advise contractors for corrective actions if necessary. Quarterly report summarizing compliance and corrective measures taken is to be prepared by PMSC team at PIU and to be submitted to PMU. During operation, the contractor is required to conduct management and monitoring actions as per the operation stage EMP, and submit to PIU a quarterly report on EMP implementation and compliance.

199. Based on monthly and quarterly reports and measurements, PMU/PIU (assisted by PMSC) is required to submit semi-annual environmental monitoring report (SEMR). Once concurrence from the ADBis received the report will be disclosed on TUDA/PMU websites.

200. ADB will review project performance against the TUTDP 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.

201. ADB's monitoring and supervision activities will be carried out on an on-going basis until a Project Completion Report (PCR) is issued. ADB issues a PCR within 1-2 years after the project is physically completed and in operation.

E. Environmental Management Plan Implementation Cost

202. Most of the mitigation measures require the contractors to adopt good site practices, 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 and are not covered elsewhere in the projects are given below. Table 30 indicates cost estimate to implement EMP.

Table 30: Cost Estimates to Implement the Environmental Management Plan

	Particulars	Stages	Unit	Total No.				Rate (INR)	Cost (INR)	Costs Covered By
				Kailashahar	Kumarghat	Dharamanagar	Ambassa			
A.	**Implementation staff**									
1	Environment, Health and Safety cum social Supervisor	Construction	Per month (Effective work period for the town)	30	30	30	24	60,000	68,40,000	DBO contractor
	Subtotal (A)								**68,40,000**	
B.	**Mitigation Measures**									
1	Consent for establishments and consent for operation from TSPCB	Pre-construction	Lumpsum	1,00,000	1,00,000	1,00,000			3,00,000	Project cost
2	Provision for tree cutting and compensatory plantation measures (1: 5 ratio replantation)	Construction	Per tree	80	30	50	50	1,000	2,10,000	Contract
3	Traffic management at work sites (Pavement Markings, Channelizing Devices, Arrow Panels and Warning Lights)	Construction	Lump sum	1,00,000	120000	120000	80000	Lump sum	4,20,000	Contract
4	Provision for COVID-19 preventive measures e.g., mask, sanitizer, etc.	Construction	Lump sum	70,000	70000	70000	50000	Lump sum	2,60,000	Health & Safety budget
	Subtotal (B)								**11,90,000**	
C.	**Monitoring Measures**									

	Particulars	Stages	Unit	Total No.				Rate (INR)	Cost (INR)	Costs Covered By
1	Air quality monitoring	Construction	per sample	34	34	34	34	10,000	13,60,000	Contract
2	Noise levels monitoring	Construction	Per sample	34	34	34	34	1500	2,04,000	Contract
3	Surface water monitoring	Construction	Per sample	17	17	17	9	8000	4,80,000	Contract
4	Source water quality, water quality at consumer end	Operation	Lumpsum / year	80,000	80,000	80,000	40,000		2,80,000	Contract
5	COVID-19 health monitoring at operating sites	Construction	Per thermal gun	5	5	5	5	5000	1,00,000	Item rate contract
	Subtotal (C)								**24,24,000**	
D.	**Capacity Building**									
1	Introduction and Sensitization to Environmental Issues	Pre-construction	Lump sum	1,50,000	1,50,000	1,50,000	1,50,000	Lump sum	6,00,000	PIU
2	EMP implementation	Pre-construction	Lump sum	1,50,000	1,50,000	1,50,000	1,50,000	Lump sum	6,00,000	PIU
3	Contractors Orientation to Workers on EMP implementation	Prior to dispatch to worksite	Lump sum	1,00,000	1,00,000	1,00,000	1,00,000	Lump sum	4,00,000	Contract
	Subtotal (D)								**16,00,000**	
E	**Civil Works**									
1	Water Sprinkling for dust suppression	Construction	KL	1500	2000	1000	1000	120	660000	Civil works contract under DBO Contractor
2	Rainwater Harvesting for water conservation	Construction at proposed WTP sites	Nos.	1	1	1		438819	1316457	Civil works contract under

	Particulars	Stages	Unit	Total No.				Rate (INR)	Cost (INR)	Costs Covered By
										DBO Contractor
	Subtotal								**1976457**	
F	**Barricading**									
1	Providing and fixing Barricading using 40 mm dia M.S. pipe vertical and horizontal posts	Construction	m	Already included in Civil cost						Civil works contract under DBO Contractor
2	Providing and fixing using 40 mm dia M.S. pipe ("B" class) as vertical post and PVC tape	Construction	m	Already included in Civil cost						Civil works contract under DBO Contractor
	Subtotal									
G	**Grievance Redressal Mechanism**			**350000**	**350000**	**350000**	**350000**	Lumpsum	**1400000**	Civil works contract under DBO Contractor
	Total (A+B+C+D)							**INR**	**1,54,30,457**	
							Contractor Cost	**INR**	1,42,30,457	
							PIU Cost	**INR**	12,00,000	
							Total	**INR**	1,54,30,457	

X. CONCLUSION AND RECOMMENDATIONS

203. The process described in this document has assessed the environmental impacts of all elements of the proposed water supply subproject for Cluster IIIA towns. All potential impacts are 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.

204. The main design impacts of water supply system in general are due to abstraction of water. The Raw water source is River Manu for Kailashahar and Kumarghat and River Juri for Dharmanagr flowing near towns, which has abundant quantity of water throughout the year, even during the lean flow season. The Quality of raw water is good and is suitable for drinking water supply after conventional treatment and disinfection. For Ambassa town ground water is selected as source after studying the sustainability of tube wells. Locations for main subproject components intake, DWT, IRP, WTP and OHSRs are selected on Govt. land. NOC have been obtained for the lands. Overall, there are no notable sensitive environmental features near the project sites.

205. Construction activities will be confined to the selected sites, and the interference with the general public and community around will be minimal. There will be temporary negative impacts, arising mainly from construction dust and noise, hauling of construction material, waste, and equipment on local roads (traffic, dust, safety etc.), mining of construction material, occupation health and safety aspects including COVID 19 risks and prevention. During the construction phase of pipeline work along the public roads, impacts will arise from the construction dust and noise; from the disturbance of residents, businesses, traffic by the construction work, and from the need to dispose of moderate quantities of waste soil. The social impacts (access disruptions) due to construction activities are expected to be minimal. Trenchless technology will be suggested at critical sections where pipeline crosses the main transportation corridors. These are all general impacts of construction in urban and habitation areas, and there are well developed methods of mitigation that are suggested in the EMP.

206. Anticipated impacts of water supply during operation and maintenance will be related to ground water withdrawal, storage, and distribution. Water supply system will be operated using the standard operating procedures following an operating manual, which will be prepared by the Contractor. Thus, considering the design and proposed operational procedures, it is unlikely that there will be any significant negative impacts due to operation of water supply system. The Contractor / Operator will implement the operation stage EMP.

207. The EMP will assist the project agencies and contractor in mitigating the environmental impacts and guide them in the environmentally sound execution of the proposed project. A copy of the EMP/approved SEMP shall be always kept on-site during the construction period. 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.

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

209. The project will benefit the general public by contributing to the long-term improvement of water supply system and community livability in the project area, Kailashahar, Kumarghat, Dharmanagar and Ambassa towns. The potential adverse environmental impacts are mainly related to the construction period, which can be minimized by the mitigating measures and environmentally sound engineering and construction practices.

210. **Conclusion.** Therefore, as per ADB SPS, the project is classified as environmental category B and does not require further environmental impact assessment. However, to conform to government guidelines. As per requirement, this IEE shall be updated after finalization of design by DBO contractor and later in case of change in location or scope of the package during implementation. Report will be reviewed and approved by PIU/PMSC before sending to ADB.

211. **Conclusions and Recommendations.** The following are recommendations applicable to the subproject to ensure no significant impacts:

(i) Obtain all statutory clearances at the earliest time possible and ensure conditions/provisions are incorporated in the detailed design;
(ii) Include this IEE in bid and contract documents;
(iii) PMU to ensure adequate treatment capacity and treatment efficiency of WTP meeting National standards in compliance with government regulations.
(iv) Update/revise this IEE based on detailed design and/or if there are unanticipated impacts, change in scope, alignment, or location;
(v) Conduct safeguards induction to the contractor upon award of contract;
(vi) Ensure that the construction and demolition waste generated from demolition is existing structure to be reused and disposed as per guidelines stipulated in Construction and Demolition Waste Management Rules 2016
(vii) Ensure contractor appointed qualified environment, health, and safety (EHS) officers prior to start of works;
(viii) Timely disclosure of information and establishment of GRM;
(ix) Involvement of contractors, including subcontractors, in first level GRM;
(x) Strictly supervise EMP implementation;
(xi) Continuous consultations with stakeholders;
(xii) Documentation and reporting on a regular basis as indicated in the IEE.
(xiii) Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation.

Appendix 1: REA Checklist

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST - KAILASHAHAR

Country/Project Title: India/ Tripura Urban & Tourism Development Project
Sector: Water Supply

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting **Is the project area**			
Densely populated?		✓	Kailashahar is not densely populated. The subproject area comprises different part of the town. Project locations supports open area, residential and commercial areas.
Heavy with development activities?		✓	The area comprises of residential structures, commercial establishments, and open area. The developmental activities such as construction works are ongoing at an average pace.
Adjacent to or within any environmentally sensitive areas?		✓	Water supply work will be carried out within Kailashahar town and outskirt of the town (specifically intake and WTP linked to Manu River). There is no forest area nearby.
Cultural heritage site		✓	Unakoti, famous for rock art - ASI protected Heritage site is located about 5.6 km (aerial distance) from Kailashahar Water supply project components are not located nearby the ASI protected area
Protected Area		✓	No work components within ASI protected area.
Wetland		✓	None
Mangrove		✓	Not Applicable
Estuarine		✓	Not Applicable
Buffer zone of protected area		✓	Water supply project component locations not within buffer zone of protected area
Special area for protecting biodiversity		✓	None of the subproject component sites are adjacent to or within any special area for protecting biodiversity
Bay		✓	Not Applicable
SCREENING QUESTIONS	**Yes**	**No**	**REMARKS**
B. Potential Environmental Impacts **Will the Project cause…**			
Pollution of raw water supply from upstream waste water discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Not expected as per site conditions. Water surveillance program will be included to monitor the raw water quality.
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	No impact expected. No cultural monuments and historical sites near project locations.
Hazard of land subsidence caused by excessive ground water pumping?		✓	Not applicable; subproject does not involve groundwater abstraction.
Social conflicts arising from displacement of communities?		✓	Project does not involve land acquisition /displacement. No social conflicts envisaged
Conflicts in abstraction of raw water for water supply with		✓	Project involves construction of new intake on River Manu. which has abundant quantity of water throughout

SCREENING QUESTIONS	Yes	No	REMARKS
other beneficial water uses for surface and ground waters?			the year, even during the lean flow season (February to May). One intake already existing on River Manu. There is no ground water abstraction as a part of this sub project.
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		✓	Quality of raw water is in general, of acceptable quality and that can be used for potable purposes after conventional treatment and disinfection. Water quality testing would be done before treatment and after treatment.
Delivery of unsafe water to distribution system?		✓	Water will be treated and disinfected prior to supply. The water treatment plant will ensure all quality criteria set by CPCB for drinking water standards.
Inadequate protection of intake works or wells, leading to pollution of water supply?		✓	Water quality surveillance program will be included to monitor the raw water quality.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	Not applicable; subproject does not involve groundwater abstraction
Excessive algal growth in storage reservoir?		✓	Regular cleaning of storage tanks will be conducted during operation
Increase in production of sewage beyond capabilities of community facilities?	✓		Sanitation and Septage management system will be developed in the project area
Inadequate disposal of sludge from water treatment plants?		✓	Appropriate provisions for sludge drying and disposal is included in the project
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	Adequate buffer will be provided around WTP with noise control walls to minimize noise propagation. Already one WTP is existing in Kailashahar A green belt area will be developed surrounding the boundary wall of the water treatment plant. Trees with thick canopy will be planted in order to reduce the noise levels reaching the nearby surroundings.
Impairments associated with transmission lines and access roads?	✓		Temporary impairments are anticipated along the pipeline routes during construction stage.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		✓	Measures for safe handling, storage and usage of chlorine are included.
Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		✓	Operation and Maintenance recommended by the manufacturers, and the existing norms and guidelines for ensuring the safety of workers will be followed. Measures for safe handling, storage and usage of chlorine are included.
Dislocation or involuntary resettlement of people		✓	There is no resettlement of people for project implementation.
Social conflicts between construction workers from other areas and community workers?		✓	The contractor will be utilizing the local labour force as far as possible; in case if it is unavoidable, labour camps and facilities will be provided appropriately. No conflicts envisaged
Noise and dust from construction activities?	✓		All the construction machineries employed will comply with noise emission standards of Central Pollution Control Board.

SCREENING QUESTIONS	Yes	No	REMARKS
			Dust suppression measures such as water sprinkling will be employed
Increased road traffic due to interference of construction activities?	✓		Excavation and laying pipelines along public roads will interfere with the traffic. Construction material transport will increase traffic on the local roads. Proper traffic management and construction planning will be ensured to minimize the interference
Continuing soil erosion/silt runoff from construction operations?	✓		Construction work during monsoon shall be carried out with due care so that silt run off due to construction operation is prevented. No construction will be allowed during rains.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	The Contractor shall prepare an O&M manual for approval of the Employer and training will be given to the staff operating the plant to ensure proper O&M.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	Not envisaged. Online monitoring of process water is proposed as part of the subproject and ensured by the Contractor. Care should be taken during O&M period to ensure that corrosive chemicals are not entered in distribution networks.
Accidental leakage of chlorine gas?		✓	There is risk that inappropriate handling, storage or use of chorine may cause serious accidents due to leakage causing severe health risks. Measures for safe handling, storage and usage of chlorine are included in EMP.
Excessive abstraction of water affecting downstream water users?		✓	Manu River stores enough water throughout the year, and the water abstraction for the project is negligible even during lean seasons and hence extraction will not affect any downstream users.
Competing uses of water?		✓	Adequate capacity of raw River water is already available.
Increased sewage flow due to increased water supply	✓		Sanitation & sewerage / septage needs to be improved
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	✓		Sanitation & sewerage/ septage needs to be improved. Additional wastewater and appropriate sludge treatment (septage management) and disposal facility will be part of this subproject.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	No as such impact anticipated
Social conflicts if workers from other regions or countries are hired?		✓	No such conflicts are anticipated. Preference will be given to local laborers and migratory labour shall be employed in unavoidable circumstances only.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as		✓	No as such impact anticipated

SCREENING QUESTIONS	Yes	No	REMARKS
explosives, fuel and other chemicals during operation and construction?			
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		✓	No such impact is anticipated in case of the proposed work. Community safety will be maintained during construction.

A Checklist for Preliminary Climate Risk Screening

Screening Questions		Score	Remarks[16]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1	As per local enquiries carried out during field visits and from the vulnerability mapping of the district for flood prone areas indicates that the subproject components are not located in the flood prone/tropical cyclone areas Tripura is highly vulnerable to earthquakes as it lies in seismic zone V, which is classified as High Damage Risk Zone in India.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance	0	

[16] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Screening Questions		Score	Remarks[16]
	(scheduling and cost) of project output(s) ?		
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g., annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): **Medium Risk**

Other Comments: Nil

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST - KUMARGHAT

Country/Project Title: India/ Tripura Urban & Tourism Development Project

Sector: Water Supply

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting **Is the project area…**			
Densely populated?		✓	Kumarghat is not densely populated. The subproject area comprises different part of the town, Project locations supports open area, residential and commercial areas.
Heavy with development activities?		✓	The town area comprises of residential structures, commercial establishments and open area. The developmental activities such as construction works are ongoing at an average pace.
Adjacent to or within any environmentally sensitive areas?		✓	Water supply work will be carried out within town.
Cultural heritage site		✓	Unakoti, famous for rock art - ASI protected Heritage site is located about 17.5 km (aerial distance) from Kumarghat. Water supply project components are not located nearby the ASI protected area
Protected Area		✓	No work components within ASI protected area.
Wetland		✓	None
Mangrove		✓	Not Applicable
Estuarine		✓	Not Applicable
Buffer zone of protected area		✓	Water supply project component locations not within buffer zone of protected area
Special area for protecting		✓	None of the subproject component sites are adjacent to or

SCREENING QUESTIONS	Yes	No	REMARKS
biodiversity			within any special area for protecting biodiversity
Bay		✓	Not Applicable
SCREENING QUESTIONS	**Yes**	**No**	**REMARKS**
B. Potential Environmental Impacts **Will the Project cause…**			
Pollution of raw water supply from upstream waste water discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Not expected as per site conditions. Water surveillance program will be included to monitor the raw water quality.
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	No impact expected. No cultural monuments and historical sites near project locations.
Hazard of land subsidence caused by excessive ground water pumping?		✓	No excessive pumping of ground water is planned. DTW will be constructed at different areas of the town
Social conflicts arising from displacement of communities?		✓	Project does not involve land acquisition /displacement. No social conflicts envisaged
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	No surface water intake is planned. There will be ground water abstraction through deep tube well as a part of this sub project. No conflicts expected.
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		✓	Raw water is ground water from deep tube well and will be passed through IRP. After release from IRP water will be stored for distribution. Ground water generally free from pathogens and satisfactory for distribution. Water quality testing should be done before storage and distribution.
Delivery of unsafe water to distribution system?		✓	Raw Ground water will be passed through IRP and distribution of unsafe water not expected.
Inadequate protection of intake works or wells, leading to pollution of water supply?		✓	Water quality surveillance program will be included to monitor the raw water quality.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	Over pumping will be not allowed
Excessive algal growth in storage reservoir?		✓	Regular cleaning of storage tanks will be conducted during operation
Increase in production of sewage beyond capabilities of community facilities?	✓		Sanitation and Septage management system will be developed in the project town
Inadequate disposal of sludge from water treatment plants?		✓	Appropriate provisions for sludge drying and disposal is included in the project
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	No new treatment plant will be constructed under the project
Impairments associated with transmission lines and access roads?	✓		Temporary impairments are anticipated along the new transmission line routes during construction stage.
Health hazards arising from inadequate design of facilities		✓	Measures for safe handling, storage and usage of chlorine are included.

SCREENING QUESTIONS	Yes	No	REMARKS
for receiving, storing, and handling of chlorine and other hazardous chemicals.			
Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		✓	Operation and Maintenance recommended by the manufacturers, and the existing norms and guidelines for ensuring the safety of workers will be followed. Measures for safe handling, storage and usage of chlorine are included.
Dislocation or involuntary resettlement of people		✓	There is no resettlement of people for project implementation.
Social conflicts between construction workers from other areas and community workers?		✓	The contractor will be utilizing the local labour force as far as possible; in case if it is unavoidable, labour camps and facilities will be provided appropriately. No conflicts envisaged
Noise and dust from construction activities?	✓		All the construction machineries employed will comply with noise emission standards of Central Pollution Control Board. Dust suppression measures such as water sprinkling will be employed
Increased road traffic due to interference of construction activities?	✓		Excavation and laying pipelines along public roads will interfere with the traffic. Construction material transport will increase traffic on the local roads. Proper traffic management and construction planning will be ensured to minimize the interference
Continuing soil erosion/silt runoff from construction operations?	✓		Construction work during monsoon shall be carried out with due care so that silt run off due to construction operation is prevented. No construction will be allowed during rains.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	The Contractor shall prepare an O&M manual for approval of the Employer and training will be given to the staff operating the plant to ensure proper O&M.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	Not envisaged. Online monitoring of process water is proposed as part of the subproject and ensured by the Contractor. Care should be taken during O&M period to ensure that corrosive chemicals are not entered in distribution networks.
Accidental leakage of chlorine gas?		✓	There is risk that inappropriate handling, storage or use of chlorine may cause serious accidents due to leakage causing severe health risks. Measures for safe handling, storage and usage of chlorine are included in EMP.
Excessive abstraction of water affecting downstream water users?		✓	No abstraction of surface water.
Competing uses of water?		✓	Adequate capacity of ground water is already available.
Increased sewage flow due to increased water supply	✓		Sanitation & sewerage / septage needs to be improved
Increased volume of sullage (wastewater from cooking and washing) and sludge from	✓		Sanitation & sewerage/ septage needs to be improved. Additional wastewater and appropriate sludge treatment (septage management) and disposal facility will be part of

SCREENING QUESTIONS	Yes	No	REMARKS
wastewater treatment plant			this subproject.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	No as such impact anticipated
Social conflicts if workers from other regions or countries are hired?		✓	No as such conflicts are anticipated. Preference will be given to local laborers and migratory labour shall be employed in unavoidable circumstances only.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?		✓	No as such impact anticipated
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		✓	No such impact is anticipated in case of the proposed work. Community safety will be maintained during construction.

A Checklist for Preliminary Climate Risk Screening

Screening Questions		Score	Remarks[17]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1	As per local enquiries carried out during field visits and from the vulnerability mapping of the district for flood prone areas indicates that the subproject components are not located in the flood prone/tropical cyclone areas Tripura is highly vulnerable to earthquakes as it lies in seismic zone V, which is classified as High Damage Risk Zone in India.
	Would the project design (e.g. the clearance for	0	

[17] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

	bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?		
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g., prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g., annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): **Medium Risk**

Other Comments: Nil

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST - DHARMANAGAR

Country/Project Title: India/ Tripura Urban & Tourism Development Project
Sector: Water Supply

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting ***Is the project area…***			
• Densely populated?		✓	Dharmanagar town is not densely populated. The subproject area comprises different part of the city, Project locations supports open area, residential and commercial areas.
• Heavy with development activities?		✓	The area comprises of residential structures, commercial establishments and open area. The developmental activities such as construction works are ongoing at an average pace.
• Adjacent to or within any environmentally sensitive areas?		✓	Water supply work will be carried out within Dharmanagar town and outskirt of the town (specifically intake and WTP linked to Juri River). There is no forest area nearby.
• Cultural heritage site		✓	Sculptures and rock reliefs of Unakoti Tirtha, Unakuti Range ASI protected heritage site is located at Unakoti district , 21 km from Dharmanagar Water Treatment Plant- intake, pipeline is not located nearby the ASI protected area
• Protected Area		✓	No as such protected area nearby the proposed water supply components
• Wetland		✓	None
• Mangrove		✓	Not Applicable
• Estuarine		✓	Not Applicable
• Buffer zone of protected area		✓	Water supply project component locations not within buffer zone of protected area
• Special area for protecting biodiversity		✓	None of the subproject component sites are adjacent to or within any special area for protecting biodiversity
• Bay		✓	Not Applicable
B. Potential Environmental Impacts ***Will the Project cause…***			
Pollution of raw water supply from upstream waste water discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Not expected as per site conditions. Water surveillance program will be included to monitor the raw water quality.
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	No impact expected. No cultural monuments and historical sites near project locations.
Hazard of land subsidence caused by excessive ground water pumping?		✓	Not applicable; subproject does not involve groundwater abstraction.
Social conflicts arising from displacement of communities?		✓	Project does not involve land acquisition /displacement. No social conflicts envisaged

SCREENING QUESTIONS	Yes	No	REMARKS
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	Project involves construction of new intake on River Juri, which has abundant quantity of water throughout the year, even during the lean flow season (February to May). One intake already existing on River Juri. There is no ground water abstraction as a part of this sub project.
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		✓	Quality of raw water is in general, of acceptable quality and that can be used for potable purposes after conventional treatment and disinfection. Water quality testing should be done before treatment and after treatment.
Delivery of unsafe water to distribution system?		✓	Water will be treated and disinfected prior to supply. The water treatment plant will ensure all quality criteria set by CPCB for drinking water standards.
Inadequate protection of intake works or wells, leading to pollution of water supply?		✓	Water quality surveillance program will be included to monitor the raw water quality.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	Not applicable; subproject does not involve groundwater abstraction
Excessive algal growth in storage reservoir?		✓	Regular cleaning of storage tanks will be conducted during operation
Increase in production of sewage beyond capabilities of community facilities?	✓		Sanitation and Septage management system will be developed in the project area
Inadequate disposal of sludge from water treatment plants?		✓	Appropriate provisions for sludge drying and disposal is included in the project
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	Adequate buffer will be provided around WTP with noise control walls to minimize noise propagation. Already one WTP is existing in Dharmanagar. A green belt area will be developed surrounding the boundary wall of the water treatment plant. Trees with thick canopy will be planted in order to reduce the noise levels reaching the nearby surroundings.
Impairments associated with transmission lines and access roads?	✓		Temporary impairments are anticipated along the rising main pipeline routes during construction stage.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		✓	Measures for safe handling, storage and usage of chlorine are included.
Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		✓	Operation and Maintenance recommended by the manufacturers, and the existing norms and guidelines for ensuring the safety of workers will be followed. Measures for safe handling, storage and usage of chlorine are included.
Dislocation or involuntary resettlement of people		✓	There is no resettlement of people for project implementation.
Social conflicts between construction workers from other areas and community workers?		✓	The contractor will be utilizing the local labour force as far as possible; in case if it is unavoidable, labour camps and facilities will be provided appropriately. No conflicts envisaged

SCREENING QUESTIONS	Yes	No	REMARKS
Noise and dust from construction activities?	✓		All the construction machineries employed will comply with noise emission standards of Central Pollution Control Board. Dust suppression measures such as water sprinkling will be employed
Increased road traffic due to interference of construction activities?	✓		Excavation and laying pipelines along public roads will interfere with the traffic. Construction material transport will increase traffic on the local roads. Proper traffic management and construction planning will be ensured to minimize the interference
Continuing soil erosion/silt runoff from construction operations?	✓		Construction work during monsoon shall be carried out with due care so that silt run off due to construction operation is prevented. No construction will be allowed during rains.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	The Contractor shall prepare an O&M manual for approval of the Employer and training will be given to the staff operating the plant to ensure proper O&M.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	Not envisaged. Online monitoring of process water is proposed as part of the subproject and ensured by the Contractor. Care should be taken during O&M period to ensure that corrosive chemicals are not entered in distribution networks.
Accidental leakage of chlorine gas?		✓	There is risk that inappropriate handling, storage or use of chorine may cause serious accidents due to leakage causing severe health risks. Measures for safe handling, storage and usage of chlorine are included in EMP.
Excessive abstraction of water affecting downstream water users?		✓	Juri River stores enough water throughout the year, and the water abstraction for the project is negligible even during lean seasons and hence extraction will not affect any downstream users.
Competing uses of water?		✓	Adequate capacity of raw River water is already available.
Increased sewage flow due to increased water supply	✓		Sanitation & sewerage / septage needs to be improved
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	✓		Sanitation & sewerage/ septage needs to be improved. Additional wastewater and appropriate sludge treatment (septage management) and disposal facility will be part of this subproject.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	No as such impact anticipated
Social conflicts if workers from other regions or countries are hired?		✓	No such conflicts are anticipated. Preference will be given to local laborers and migratory labour shall be employed in unavoidable circumstances only.

SCREENING QUESTIONS	Yes	No	REMARKS
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?		✓	No as such impact anticipated
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		✓	No such impact is anticipated in case of the proposed work. Community safety will be maintained during construction.

A Checklist for Preliminary Climate Risk Screening

Screening Questions		Score	Remarks[18]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1	As per local enquiries carried out during field visits and from the vulnerability mapping of the district for flood prone areas indicates that the subproject components are not located in the flood prone/tropical cyclone areas Tripura is highly vulnerable to earthquakes as it lies in seismic zone V, which is classified as High Damage Risk Zone in India.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future	0	

[18] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Screening Questions		Score	Remarks[18]
	climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.
Result of Initial Screening (Low, Medium, High): **Medium Risk**
Other Comments: Nil

RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST - AMBASSA

Country/Project Title: India/ Tripura Urban & Tourism Development Project
Sector: Water Supply

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting **Is the project area…**			
Densely populated?		✓	Ambassa is not densely populated. The subproject area comprises different part of the town, Project locations supports open area, residential and commercial areas.
Heavy with development activities?		✓	The area comprises of residential structures, commercial establishments and open area. The developmental activities such as construction works are ongoing at an average pace.
Adjacent to or within any environmentally sensitive areas?		✓	Water supply work will be carried out within town.
Cultural heritage site		✓	Shyamsundar Ashram Tila - A brick-built Buddhist monastic complex, ASI protected area is situated in Jolaibari, South Tripura and which is about 81 km away from Ambassa town. Chaturdasa Devata, ASI protected area is located about 53 km from Ambassa. Water supply project components are not located nearby any ASI protected area
Protected Area		✓	No work components within ASI protected area.
Wetland		✓	None
Mangrove		✓	Not Applicable
Estuarine		✓	Not Applicable
Buffer zone of protected area		✓	Water supply project component locations not within buffer

SCREENING QUESTIONS	Yes	No	REMARKS
			zone of protected area
Special area for protecting biodiversity		✓	None of the subproject component sites are adjacent to or within any special area for protecting biodiversity
Bay		✓	Not Applicable
SCREENING QUESTIONS	**Yes**	**No**	**REMARKS**
B. Potential Environmental Impacts Will the Project cause…			
Pollution of raw water supply from upstream waste water discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Not expected as per site conditions. Water surveillance program will be included to monitor the raw water quality.
Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	No impact expected. No cultural monuments and historical sites near project locations.
Hazard of land subsidence caused by excessive ground water pumping?		✓	No excessive pumping of ground water is planned. DTW will e constructed at different areas of the town
Social conflicts arising from displacement of communities?		✓	Project does not involve land acquisition /displacement. No social conflicts envisaged
Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	Project involves rehabilitation of existing intake on River Dhalai, which has abundant quantity of water throughout the year, even during the lean flow season (February to May). There will be ground water abstraction through deep tube well as a part of this sub project. No conflicts expected.
Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		✓	Raw water is ground water from deep tube well and will be passed through IRP. After release from IRP water will be stored for distribution. Ground water generally free from pathogens and satisfactory for distribution. Water quality testing should be done before storage and distribution.
Delivery of unsafe water to distribution system?		✓	Raw Ground water will be passed through IRP and distribution of unsafe water not expected.
Inadequate protection of intake works or wells, leading to pollution of water supply?		✓	Water quality surveillance program will be included to monitor the raw water quality.
Over pumping of ground water, leading to salinization and ground subsidence?		✓	Over pumping will be not allowed
Excessive algal growth in storage reservoir?		✓	Regular cleaning of storage tanks will be conducted during operation
Increase in production of sewage beyond capabilities of community facilities?	✓		Sanitation and Septage management system will be developed in the project town
Inadequate disposal of sludge from water treatment plants?		✓	Appropriate provisions for sludge drying and disposal is included in the project
Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	No new treatment plant will be constructed under the project
Impairments associated with	✓		Temporary impairments are anticipated along the new

SCREENING QUESTIONS	Yes	No	REMARKS
transmission lines and access roads?			transmission line routes during construction stage.
Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		✓	Measures for safe handling, storage and usage of chlorine are included.
Health and safety hazards to workers from the management of chlorine used for disinfection and other contaminants?		✓	Operation and Maintenance recommended by the manufacturers, and the existing norms and guidelines for ensuring the safety of workers will be followed. Measures for safe handling, storage and usage of chlorine are included.
Dislocation or involuntary resettlement of people		✓	There is no resettlement of people for project implementation.
Social conflicts between construction workers from other areas and community workers?		✓	The contractor will be utilizing the local labour force as far as possible; in case if it is unavoidable, labour camps and facilities will be provided appropriately. No conflicts envisaged
Noise and dust from construction activities?	✓		All the construction machineries employed will comply with noise emission standards of Central Pollution Control Board. Dust suppression measures such as water sprinkling will be employed
Increased road traffic due to interference of construction activities?	✓		Excavation and laying pipelines along public roads will interfere with the traffic. Construction material transport will increase traffic on the local roads. Proper traffic management and construction planning will be ensured to minimize the interference
Continuing soil erosion/silt runoff from construction operations?	✓		Construction work during monsoon shall be carried out with due care so that silt run off due to construction operation is prevented. No construction will be allowed during rains.
Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulations in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?		✓	The Contractor shall prepare an O&M manual for approval of the Employer and training will be given to the staff operating the plant to ensure proper O&M.
Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	Not envisaged. Online monitoring of process water is proposed as part of the subproject and ensured by the Contractor. Care should be taken during O&M period to ensure that corrosive chemicals are not entered in distribution networks.
Accidental leakage of chlorine gas?		✓	There is risk that inappropriate handling, storage or use of chorine may cause serious accidents due to leakage causing severe health risks. Measures for safe handling, storage and usage of chlorine are included in EMP.
Excessive abstraction of water affecting downstream water users?		✓	Abstraction of surface water not considered under proposed project.
Competing uses of water?		✓	Adequate capacity of ground water is already available.
Increased sewage flow due to increased water supply	✓		Sanitation & sewerage / septage needs to be improved

SCREENING QUESTIONS	Yes	No	REMARKS
Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	✓		Sanitation & sewerage/ septage needs to be improved. Additional wastewater and appropriate sludge treatment (septage management) and disposal facility will be part of this subproject.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	No as such impact anticipated
Social conflicts if workers from other regions or countries are hired?		✓	No as such conflicts are anticipated. Preference will be given to local laborers and migratory labour shall be employed in unavoidable circumstances only.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?		✓	No as such impact anticipated
Community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?		✓	No such impact is anticipated in case of the proposed work. Community safety will be maintained during construction.

A Checklist for Preliminary Climate Risk Screening

Screening Questions		Score	Remarks[19]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1	As per local enquiries carried out during field visits and from the vulnerability mapping of the district for flood prone areas indicates that the subproject components are not located in the flood prone/tropical cyclone areas Tripura is highly vulnerable to earthquakes as it lies in

[19] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

			seismic zone V, which is classified as High Damage Risk Zone in India.
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	0	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	0	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): **Medium Risk**

Other Comments: Nil

Appendix 2: National Ambient Air Quality Standards

Parameter	Location [a]	India Ambient Air Quality Standard ($\mu g/m^3$)[b]	WHO Air Quality Guidelines ($\mu g/m^3$)			Applicable Per ADB SPS[e] ($\mu g/m^3$)
			Global Update [c] 2005	Second Edition 2000[d]	Air Pollution Guideline 2021	
PM_{10}	Industrial Residential, Rural and Other Areas	60 (Annual) 100 (24-hr)	20 (Annual) 50 (24-hr)	-	15 (Annual) 45 (24-hr)	20 (Annual) 50 (24-hr)
	Sensitive Area	60 (Annual) 100 (24-hr)	20 (Annual) 50 (24-hr)	-		20 (Annual) 50 (24-hr)
PM_{25}	Industrial Residential, Rural and Other Areas	40 (Annual) 60 (24-hr)	10 (Annual) 25 (24-hr)	-	05 (Annual) 15 (24-hr)	10 (Annual) 25 (24-hr)
	Sensitive Area	40 (Annual) 60 (24-hr)	10 (Annual) 25 (24-hr)			10 (Annual) 25 (24-hr)
SO_2	Industrial Residential, Rural and Other Areas	50 (Annual) 80 (24-hr)	20 (24-hr) 500 (10-min)	-	40 (24-hr) 500 (10-min)	50 (Annual) 20 (24-hr) 500 (10-min)
	Sensitive Area	20 (Annual) 80 (24-hr)	20 (24-hr) 500 (10-min)	-		20 (Annual) 20 (24-hr) 500 (10-min)
NO_2	Industrial Residential, Rural and Other Areas	40 (Annual) 80 (24-hr)	40 (Annual) 200 (1-hr)	-	10 (Annual) 25 (24-hr) 200 (1-hr)	40 (Annual) 80 (24-hr) 200 (1-hr)
	Sensitive Area	30 (Annual) 80 (24-hr)	40 (Annual) 200 (1-hr)	-		30 (Annual) 80 (24-hr) 200 (1-hr)
CO	Industrial Residential, Rural and Other Areas	2,000 (8-hr) 4,000 (1-hr)	-	10,000 (8-hr) 100,000 (15-min)	4 mg/ m^3 (24-hr) 10 mg/ m^3 (8-hr)	2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min)
	Sensitive Area	2,000 (8-hr) 4,000 (1-hr)	-	10,000 (8-hr) 100,000 (15-min)	35 mg/ m^3(1-hr) 100 mg/ m^3(15-minute)	2,000 (8-hr) 4,000 (1-hr) 100,000 (15-min)
Ozone (O_3)	Industrial Residential, Rural and Other Areas	100 (8-hr) 180 (1-hr)	100 (8-hr)		60 (peak season) 100 (8-hr)	100 (8-hr) 180 (1-hr)
	Sensitive Area	100 (8-hr) 180 (1-hr)	100 (8-hr)			100 (8-hr) 180 (1-hr)
dLead (Pb)	Industrial, Residential, Rural and	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual)		0.5 (Annual) 1.0 (24-hr)

Parameter	Location [a]	India Ambient Air Quality Standard ($\mu g/m^3$)[b]	WHO Air Quality Guidelines ($\mu g/m^3$)			Applicable Per ADB SPS[e] ($\mu g/m^3$)
			Global Update [c] 2005	Second Edition 2000[d]	Air Pollution Guideline 2021	
	Other Areas					
	Sensitive Area	0.5 (Annual) 1.0 (24-hr)		0.5 (Annual)		0.5 (Annual) 1.0 (24-hr)
Ammonia (NH_3)	Industrial Residential, Rural and Other Areas	100 (Annual) 400 (24-hr)				100 (Annual) 400 (24-hr)
	Sensitive Area	100 (Annual) 400 (24-hr)				100 (Annual) 400 (24-hr)
Benzene (C_6H_6)	Industrial Residential, Rural and Other Areas	5 (Annual)				5 (Annual)
	Sensitive Area	5 (Annual)				5 (Annual)
Benzo(o) pyrene (BaP) particulate phase only	Industrial Residential, Rural and Other Areas	0.001 (Annual)				0.001 (Annual)
	Sensitive Area	0.001 (Annual)				0.001 (Annual)
Arsenic (As)	Industrial Residential, Rural and Other Areas	0.006 (Annual)				0.006 (Annual)
	Sensitive Area	0.006 (Annual)				0.006 (Annual)
Nickel (Ni)	Industrial Residential, Rural and Other Areas	0.02 (Annual)				0.02 (Annual)
	Sensitive Area	0.02 (Annual)				0.02 (Annual)

[a] *Sensitive area refers to such areas notified by the India Central Government.*

[b] *Notification by Ministry of Environment and Forests, Government of India Environment (Protection) Seventh Amendment Rules, 2009*

[c] *WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. Global update 2005. WHO 2006*

[d] *Air Quality Guidelines for Europe Second Edition. WHO 2000*

[e] *Per ADB SPS, the government shall achieve whichever of the ambient air quality standards is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency of the government will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS*

Appendix 3: Ambient Noise Quality Standards

Receptor/ Source	**India National Noise Level Standards** (dBA)		**WHO Guidelines Value For Noise Levels Measured Out of Doors** (One Hour LA_q in dBA)		**Applicable Per ADB SPS (dBA)**	
	Day	**Night**	**07:00 – 22:00**	**22:00 – 07:00**	Day time	Night time
Industrial area	75	70	70	70	70	70
Commercial area	65	55	70	70	65	55
Residential Area	55	45	55	45	55	45
Silent Zone	50	40	55	45	50	40

Appendix 4: Vehicle Exhaust Emission Norms

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

Appendix 5: Labor laws

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 Act, 1951 - 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.

Appendix 6: AUDIT REPORT OF EXISTING WTPS and INTAKES

Introduction

It is proposed to develop water supply system in Kailashahar, Kumarghat, Dharmanagar and Ambassa towns. Since existing WTPs are working fine it is proposed to utilized the existing Intakes and WTP along with proposed WTPs and Intakes for the project towns. Sustainability of new water supply infrastructure of intended purpose and benefits (improved environmental conditions, public health etc.) would accrue only with a properly functioning treatment facility. Therefore, the existing WTPs and Intake are an associated facility as per the ADB Safeguard Policy Statement 2009. Compliance with the environmental safeguards will ensure the subproject sustainability.

Name of Plant and address:	**1 MGD/ / 4.54 MLD Water Treatment Plant, Kailashahar, Tripura**	**0.65 MGD/ 2.91 MLD Water Treatment Plant, Kumarghat, Tripura**	**1.5 MGD/ 6.81 MLD Water Treatment Plant, Dharmanagar, Tripura**	**2.5 MLD Water Treatment Plant, Ambassa, Tripura**
1. Capacity:	1 MGD/ 4.54 MLD	0.65 MGD	1.5 MGD/ 6.81 MLD (utilized capacity 5.7 MLD)	2.5 MLD
2. Technology:	(Conventional Water Treatment Plant) Cascade aerator, Flash Mixer, Clariflocculator, Rapid sand filter, Chlorination and Clear water reservoir	Conventional Water Treatment Plant	Conventional Water Treatment Plant	Conventional Water Treatment Plant
3. Executing agency:	Kailashahar Municipal Council	ULB	ULB	ULB
4. Implementing agency:	DWS, Kailashahar, Tripura	DWS, Kumarghat, Tripura	DWS, Dharmanagar, Tripura	DWS, Ambassa, Tripura
5. Asset owner	DWS Kailashahar, Tripura	DWS, Kumarghat, Tripura	DWS Dharmanagar, Tripura	DWS Ambassa, Tripura
6. Project name under which this WTP was constructed:	Construction of 1 MGD Water Treatment Plant in the town of Kailashahar, Tripura.	Not available	Construction of 1.5 MGD Water Treatment Plant in the town of Dharmanagar, Tripura.	Construction of 0.55 MGD/2.5 MLD Water Treatment Plant in the town of Ambassa, Tripura.
7. Date of start of the construction of WTP:	2000	2002	1991	2009

Name of Plant and address:	1 MGD/ / 4.54 MLD Water Treatment Plant, Kailashahar, Tripura	0.65 MGD/ 2.91 MLD Water Treatment Plant, Kumarghat, Tripura	1.5 MGD/ 6.81 MLD Water Treatment Plant, Dharmanagar, Tripura	2.5 MLD Water Treatment Plant, Ambassa, Tripura
8. Status of work progress of WTP: (completed/ uncompleted components with %)	Completed in 2003	Completed - 2005	Completed in 1994	Completed in 2011
9. Nos., locations and capacities of Pumping station	RWPS: 3 nos. (2W + 1S) @ 40 HP each VT Pumps CWPS: 3 nos. (2W + 1S) @ 100 HP each HSC Pumps	RWPS:3 nos. (2W + 1S) @ 40 HP each VT Pumps CWPS: 3 nos. (2W + 1S) @ 100 HP each HSC Pumps	2 nos. 75000 GPH Centrifugal pump 3 nos. 65000 GPH VT Pump.	2 nos. (2W + 1S) @ 50 HP each VT Pumps
10. Areas of different units of plant (sq. m):	Aerator: 18 m², Clariflocculator: 456 m², Filter beds and disinfection unit: 368 m², Backwash Tank: 119 m², CWPS with reservoir: 286 m², Administrative Building: 380 m²	Aerator: 15 m², Clariflocculator: 400 m², Filter beds and disinfection unit: 330 m², Backwash Tank: 100 m², CWPS with reservoir: 250 m², Administrative Building: 320 m²	Aerator: 24 m², Clariflocculator: 700 m², Filter beds and disinfection unit: 550 m², Backwash Tank: 250 m², CWPS with reservoir: 350 m², Administrative Building: 450 m²	Aerator: 15 m², Clariflocculator: 400 m², Filter beds and disinfection unit: 350 m², Backwash Tank: 100 m², CWPS with reservoir: 150 m², Administrative Building: 250 m²
11. Total Area of land used for WTP:	2160 m²	2000	3000 m²	1500 m²
12. Land ownership details: (Khasra nos.)	ULB	ULB	ULB	ULB
13. O&M period of contract:	Information not available	Information not available	Information not available	Information not available
14. Status of Consent to Establish (CTE) from Pollution Control Board: obtained/not obtained (attach copy)	Not required	Not required	Not required	Not required

Name of Plant and address:	1 MGD/ / 4.54 MLD Water Treatment Plant, Kailashahar, Tripura	0.65 MGD/ 2.91 MLD Water Treatment Plant, Kumarghat, Tripura	1.5 MGD/ 6.81 MLD Water Treatment Plant, Dharmanagar, Tripura	2.5 MLD Water Treatment Plant, Ambassa, Tripura
15. Validity of CTE:	Not applicable	Not applicable	Not applicable	Not applicable
16. Status of Consent to Operate (CTO) from Pollution Control Board: obtained/not obtained	Not applicable	Not applicable	Not applicable	Not applicable
17. Validity of CTO:	Not applicable	Not applicable	Not applicable	Not applicable
18. Details of total covered area with this WTP: (ward nos.)	Ward 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16	1,2,3,4,5,6, 7,8,9,10,11,12,13,14,15	Ward 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16, 17, 18, 20,21,22,23	
19. Total Population covered (number and %):	63.71 % of town population	82%	61.20 %	49 %
20. Whether trail run completed, if yes give date, if no give tentative date:	2003	2005 completed	1994	Done
21. Treatment Efficiency	WTP is designed to treat water parameter as per Government of India's drinking water standard IS 10500 The raw water quality and treated quality results shows the WTP is treating raw water as per required standards	WTP is designed to treat water parameter as per Government of India's drinking water standard IS 10500 The raw water quality and treated quality results shows the WTP is treating raw water as per required standards	WTP is designed to treat water parameter as per Government of India's drinking water standard IS 10500	WTP is designed to treat water parameter as per Government of India's drinking water standard IS 10500
22. Is there facility of laboratory for testing these	Yes	Yes	Yes	Yes

Name of Plant and address:	1 MGD/ / 4.54 MLD Water Treatment Plant, Kailashahar, Tripura	0.65 MGD/ 2.91 MLD Water Treatment Plant, Kumarghat, Tripura	1.5 MGD/ 6.81 MLD Water Treatment Plant, Dharmanagar, Tripura	2.5 MLD Water Treatment Plant, Ambassa, Tripura
parameters, if yes, give details				
23. What are the proposals/methods for reuse/disposal of treated sludge from WTP:	Sludge is disposed in an adjacent sludge disposal pond and backwash is disposed to river	Sludge is disposed in an adjacent sludge disposal pond and backwash is disposed to river	Sludge is disposed in an adjacent sludge disposal pond and backwash is disposed to river	Sludge is disposed in an adjacent sludge disposal pond and backwash is disposed to river
24. Is this plant anywhere related/ dependent on proposed WTP.	Yes	Yes	Yes	Yes
25. Status and type of electricity connection: (connection number and approved load, KW)	Available- 500 KVA	Available	Available	Available
26. Whether DG set installed, if yes give capacity and type of DG set:	No	No	No	No
27. Numbers of employees proposed for operation of plant (designation wise numbers of employees):	Pump operator (Govt.): - 02 Helper: - 06 Pump Operator (Agency):- 04	Pump operator (Govt.): - 03 Helper: -05 Pump Operator (Agency):- 07	Pump operator (Govt.): - 02 Helper: -04 Pump Operator (Agency):- 06	Pump operator (Govt.): - 02 Helper: -04 Pump Operator (Agency):- 06
28. Is rainwater harvesting system established, if yes, provide details, drawing and cost of rainwater harvesting	No	No	No	No

Name of Plant and address:	1 MGD/ / 4.54 MLD Water Treatment Plant, Kailashahar, Tripura	0.65 MGD/ 2.91 MLD Water Treatment Plant, Kumarghat, Tripura	1.5 MGD/ 6.81 MLD Water Treatment Plant, Dharmanagar, Tripura	2.5 MLD Water Treatment Plant, Ambassa, Tripura
29. Power generation system installed, if yes, give details:	No	No	No	No
30. Is O&M manual prepared by contractor (submitted/ approved):	Yes	Yes	Yes	Yes
31. Is Emergency operating system prepared for O&M:	No	No	No	No
32. Whether provisions for odour control taken in design, if yes, give details:	No	No	No	No
33. If provisions taken to protect inconvenience to nearby habitants, give details:	No nearby habitation. Plantation in and around WTP	No nearby habitation. Plantation in and around WTP	No nearby habitation. Plantation in and around WTP	No nearby habitation. Plantation in and around WTP
34. Any other related information	NA	NA	NA	NA

Details of Existing intake

Town name	Kailashahar	Kumarghat,	Dharmanagar	Ambassa
Source of raw water	Manu River	Deo River	Kakri Cheera river	River Dhalai
Location of intake	Govindopur, Ward-10, KMC	Deo river	Kakri Cheera river	River Dhalai
Capacity of intake	4.5 MLD	2.46 MLD	5.7 MLD	0.55 MGD
Year of construction	2003	2005	1994	2011
Average hours of operation/day	22	16	16	16

Existing Conditions	Operational	Operational	Operational	Operational
Type of pumps	Vertical Turbine Centrifugal Pumps	Vertical turbine centrifugal pump	Vertical Turbine Centrifugal Pumps	Vertical Turbine Centrifugal Pumps
Electric Consumption	No separate record	No separate record	No separate record	No separate record
Numbers of employees for operation and maintenance of Intake (designation wise numbers of employees)	1 Operator	2 Operators	1 Operator	1 Operator
Proposal under present scheme (/repair/additional intake/no change):	No Change	No Change	No Change	No Change

Analytical results of Water Quality Data of Raw and WTP treated Water from project town Rivers

Date	**Turbidity (NTU)**		**pH**		**Hardness (mg/l)**		**Total Iron (mg/l)**		**R. Cl (mg/l)**		**TDS (mg/l)**		**Alkalinity (mg/l)**	
	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear
Kailashahar - Raw and treated water from Manu river at WTP														
21.12.2022	19.5	1.8	8.2	7.4	124	128	1.33	0.08	0	**0.5**				
22.12.2022	20.3	1.2	8	7.1	120	136	1.38	0.05	0	**0.5**				
23.12.2022	21.6	1.6	8	7.3	120	138	1.34	0.07	0	**0.5**				
26.12.2022	22.8	1.7	7.8	7.2	116	134	1.29	0.06	0	**0.5**				
27.12.2022	27.3	1.6	7.9	7.2	124	132	1.47	0.09	0	**0.5**				
Average	**22.3**	**1.58**	**7.98**	**7.24**	**120.8**	**133.6**	**1.362**	0.07	**0**	**0.5**				
Kumargaht - Raw and treated water from Deo river at WTP														
2.12.2022	80.9	0.95	8.1	7	140	170	1.62	0.09	0	**0.4**				
5.12.2022	81.6	0.86	8.5	7.3	162	172	1.594	0.184	0	**0.4**				
7.12.2022	84.2	0.97	8.1	7.4	158	176	1.34	0.163	0	**0.5**				
12.12.2022	87.3	0.8	8	7.6	152	168	1.29	0.16	0	**0.5**				
16.12.2022	88.9	0.92	7.9	7.2	106	164	1.4	0.157	0	**0.4**				
Average	**84.58**	**0.9**	**8.12**	**7.3**	**143.6**	**170**	**1.4488**	**0.150**	**0**	**0.44**				
Dharamanagar – Raw and treated water from Kakri River at WTP														

Date	Turbidity (NTU)		pH		Hardness (mg/l)		Total Iron (mg/l)		R. Cl (mg/l)		TDS (mg/l)		Alkalinity (mg/l)	
	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear	Raw	Clear
01.05.2021		1.2	6.8	7.2	138	88	0.764	0.134		**0.5**	128.27	132.80	132	74
03.05.2021	132.5	1.3	6.9	7.2	146	94	0.781	0.142		**0.5**	141.65	130.38	128	82
05.05.2021	136.2	1.2	6.8	7.2	120	76	0.784	0.129		**0.5**	133.56	127.41	108	80
25.05.2021	216.4	1.2	6.9	7.2	88	94	0.794	0.136		**0.5**	143.79	132.90	94	88
27.05.2021	203.7	1.1	6.8	7.1	92	96	0.789	0.124		**0.6**	141.64	132.38	100	90
28.05.2021	196.4	1.2	6.9	7.2	88	90	0.764	0.119			136.89		96	94
Ambassa – Raw and treated water from river Dhalai at WTP														
May -21	14.8	4.2	6.88	6.93	90	74	0.9	**0.4**	0	0.3	164	160		
National Standards for Drinking Water [a]		1 (5[c])		6.5 – 8.5		200 (600[c])		0.3		0.2		**500 (2000)**		
WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011[b]										**5**				

Source: DWS of respective towns ; Source- DWS, Water Treatment Plant laboratory; [a] Bureau of India Standard 10500: 2012.; [b] Health-based guideline values' Figures in parenthesis are maximum limits allowed in the absence of alternate source.

Results shows that treated water is exceeding the Indian standard (acceptable limits) for Turbidity at Kailashahar, Dharmanagar and Ambassa., but below the permissible limit. Residual chlorine is generally higher at WTP and eventually reduces while reaching consumer end.

Source and Intake- Kailashahar

	
Existing Intake of Kailashahar on google earth	**Existing WTP of Kailashahar on google earth**

Location of Existing Intake and WTP





Photograph of Existing WTP- Kailashahar



Photograph of Existing WTP- Kumarghat



Existing WTP



Existing WTP at Dharmanagar

1. 

Photo of Existing WTP – Dharmanagar



Existing WTP 2,5 MLD – Ambassa

	
Existing Intake and surrounding 50 m of Ambassa on google earth - 40	**Existing WTP of Ambassa and surrounding 50 m on google earth**

Existing WTP at Ambassa

Law, Rules, and Regulations	Description and Requirement	WTP at Kailashahar, Kumarghat, Dharamanagar and Ambassa
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant[20] N/A = not applicable (state justification)
EIA Notification	The EIA Notification of 2006 states that environmental clearance is required for certain Defined activities/projects.	N/A Environmental clearance is not Required as WTPs are not listed in the EIA Notification's "Schedule of Projects Requiring Prior

[20]Compliant = There is sufficient and appropriate evidence to demonstrate that the particular regulatory requirement has been complied with; non-compliant = clear evidence has been collected to demonstrate the particular regulatory requirement has not been complied with.

Law, Rules, and Regulations	Description and Requirement	WTP at Kailashahar, Kumarghat, Dharamanagar and Ambassa
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant[20] N/A = not applicable (state justification)
		Environmental Clearance"
Manufacture, Storage, and Import of Hazardous Chemical Rules, 1989	Storage of chlorine (threshold quantity greater than 10 tons but less than 25 tons) in WTPs will require clearance from PESO	N/A Less than 10 tons of Chlorine is stored at WTP required no permit
Water (Prevention and Control of Pollution) Act of 1974, Rules of 1975, and amendments	Consent to operate from TSPCB	N/A CTE and CTO is not required in Tripura for WTP
Air (Prevention and Control of Pollution) Act of 1981, Rules of 1982 and amendments.	Consent to operate from TSPCB	NA
Environment (Protection) Act, 1986 and CPCB Environmental Standards	Emissions and discharges from the facilities to be created, refurbished, or augmented shall comply with the notified standards. a. Wastewater disposal standards	N/A
Noise Pollution (Regulation and Control) Rules, 2002 amended up to 2010	Applicable ambient noise standards with respect to noise for different areas/zones	Y No source of noise
National Institute of Occupational Safety and Health (NIOSH) Publication No. 2002-149	Compliance with NIOSH Guidance for Controlling Potential Risks to Workers Exposed to Class B Biosolids	N Training and proper PPEs are required
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.	N/A No Component of WTP is in forest land,
Ancient Monuments and Archaeological Sites and Remains Rules of 1959	No development activity is permitted in the "protected area," and all development activities likely to damage the protected property are not permitted in the "controlled area" without prior permission of the Archaeological Survey of India (ASI). Protected property includes the site, remains, and monuments protected by ASI or the State Department of Archaeology.	N/A

Law, Rules, and Regulations	Description and Requirement	WTP at Kailashahar, Kumarghat, Dharamanagar and Ambassa
		Y = compliant (if applicable, specify expiration date of permit/clearance) N = non-compliant[20] N/A = not applicable (state justification)
The Child Labor (Prohibition and Regulation) Act, 1986	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 are present.	Y No children are engaged at WTP site.

Corrective Action Plan

The environmental concerns are mainly related to occupational health and safety, public safety, disposal of debris, discarded materials etc. The sludge management systems of WTP are very old and not functional properly, its need to upgradation. Treated water quality rresults shows that Turbidity in treated water is exceeding the acceptable limit of Indian standard but below the permissible limits at Kailashahar, Dharamanagar and Ambassa.

No new works are proposed in existing WTPs in this project. The Department of water resource will update these systems and report to PMU, PMU has to ensure all systems are working properly for existing WTPs. A work specific environmental management plan needs to be prepared in these aspects.

Appendix 7: Guidelines for Safety in Chlorine Usage

Instructions for Storage and Handling of Chlorine Cylinders

(Based on the 'Manual on Operation and Maintenance of Water Supply Systems' published by the Central Public Health and Environmental Engineering Organization (CPHEEO) in 2005)

1.1 Storage Area

- Obtain storage license from controller of explosives under Gas Cylinder Rules 2004 if the quantity of Cl2 containers to be stored is more than 5 Nos.
- Storage area should be cool, dry, well ventilated, and clean of trash and protected from external heat sources. Please refer to Manual on "Water Supply and Treatment", (1999 Edition), for further details.
- Ventilation must be sufficient to prevent accumulation of vapour pockets. The exhaust should be located either near the floor or duct be provided extending to the floor. All fan switches should be outside the storage area.
- Do not store container directly under the sun.
- Weather cock should be installed near the storage to determine wind direction.
- The storage building should be of non-combustible construction with at least two exits opening outside.
- Neutralization system should be provided.
- Continuous monitoring of chlorine leak detection equipment with alarm should be installed in the storage area.
- The area should be free and remote from elevators, gangways or ventilating system to avoid dangerous concentration of Chlorine during leak.
- Two portable foam type fire extinguishers should be provided in the premises.
- Corrosive substances shall not be stored nearby which react violently with each other.
- Unauthorized person should not be allowed to enter into the storage area.
- The floor level of storage shed should be preferably 30 cms (at least one foot) higher from the ground level to avoid water logging.
- Ensure that all containers are properly fitted with safety caps or hooks.

1.2. Cylinder & Drum Containers

- Store chlorine cylinders upright and secure them so that they do not fall.
- Drum containers should be stored on their sides on rails, a few inches above the floor. They should not be stacked one upon the other. They should be stored such that the valves are in vertical plane.
- Keep enough space between containers so as to have accessibility in case of emergency.
- Store the containers in a covered shed only. Keep them away from any source of heat as excessive heat may increase the pressure in container which will result into burst.
- Do not store explosives, acids, turpentine, ether, anhydrous ammonia, finely divided metals or other flammable material in the vicinity of Chlorine.
- Do not store containers in wet and muddy areas.
- Store filled and empty containers separately.
- Protective covers for valves are secured even when the containers are empty,

except during use in the system.

- Never use containers as a roller to move other equipment.
- Never tamper with fusible plugs of tonners.
- Check leakages every day by means of ammonia torch. However, it should not be touched to brass components like valves of container for safety.
- Never carry out any welding work on the chlorine system as combustion of steel takes place at 2510C in presence of chlorine.
- The boxes containing emergency kit, safety applications and self-contained breathing apparatus should be kept in working order in an easily approachable area.

1**.3. Use of Cylinders & Drum Containers in Process System**

- Use containers in the order of their receipt, as valve packing can get hardened during prolonged storage and cause gas leaks.
- Do not use oil or lubricant on any valve of the containers.
- Badly fitting connections should not be forced and correct tool should always be used for opening and closing valves. They should never be hammered.
- The area should be well ventilated with frequent air changes.
- Transport the cylinders to the process area by using crane, hoist or railings etc.
- The drum containers should be kept in a horizontal position in such a way that the valves are in a vertical plane. The upper valve gives out gas and the lower one gives out liquid chlorine.
- The cylinder should be kept in upright position in order to release gas from the valve. For liquid chlorine withdrawal, it should be inverted with the help of an inverted rack.
- Connect the containers to the system by using approved accessories.
- Use copper flexible tube, with lead washer containing 2 to 4% antimony or bonded asbestos or teflon washer. Use yoke clamp for connecting chlorine container.
- Never use rubber tubes, PVC tubes etc. for making connections.
- Use the right spanner for operating the valve. Always keep the spanner on the valve spindle. Never use ill fitting spanner.
- After making the flexible connection, check for the leakage by means of ammonia torch but it should not come in contact with a valve.
- Keep minimum distance between the container valve and header valve so that during change-over of the container, minimum amount of gas leaks.
- The material of construction of the adopter should be same as that of valve outlet threads. o. The valve should not be used as a regulator for controlling the chlorine. During regulation due to high velocity of Chlorine, the valve gets damaged which in turn can cause difficulty in closing.
- The tools and other equipment used for operating the container should be clean and free of grease, dust or grit.
- Wear breathing apparatus while making the change-over of the container from the process header.
- Do not heat the container to withdraw more gas at faster rate.
- Use pressure gauge and flow measuring device to control the flow and to know the quantity of gas left in the container.
- Use an inverted U type barometric leg or vacuum breaking arrangement for connecting the container to the process piping.
- Withdrawal of the gas should be stopped when the gas pressure inside the

container is between 0.1 to 0.5 kg/cm2 approximately.

- If withdrawal of the gas from the container connected to the process system has to be suspended for long intervals, it should be disconnected from the system, and the valve cap and hood replaced.
- Gas containers should be handled by trained persons only.

1.4. Disconnecting Containers from Process System

- Use breathing apparatus before disconnecting the container.
- First close the container valve fully. After removal of chlorine the process valve should be closed.
- Remove the flexible connection, plug the flexible connection in order to avoid entry of humid air. Replace the valve cap or hood on the container.
- Put the tag on the empty container & bring it to storage area marked for empties. e. Check for the leakage.

1.5. Loading and Unloading of Containers

- The handling of containers should be done under the supervision of trained and competent person.
- It should be done carefully with a crane, hoist or slanted ramp. Do not use magnet or sharp object for lifting the containers.
- Small cylinders should not be lifted by means of valve caps as these are not designed to carry the weight.
- The containers should not be allowed to strike against each other or against any hard object.
- Vehicles should be braked and isolated against any movement.
- After loading, the containers should be secured properly with the help of wooden wedges, rope or sling wire so that they do not roll away.
- The containers should never be dropped directly to the ground or on the tyre from the vehicle.
- There should be no sharp projection in the vehicle.
- Containers must have valve caps and plugs fitted properly.
- Check containers for leakage before loading/unloading.

1.6. Transportation of Container

- The name of the chemical along with diamond pictorial sign denoting the dangerous goods should be marked on the vehicle.
- The name of the transporter, his address and telephone number should be clearly written on the vehicle.
- The vehicle should not be used to transport any material other than what is written on it. d. Only trained drivers and cleaners should transport hazardous chemical
- The driver should not transport any leaking cylinder.
- The cylinder should not project outside the vehicle.
- The transporter must ensure that every vehicle driver must carry “Trem Card” (Transport Emergency Card) and ‘Instructions in writing booklet’ and follow them.
- Every driver must carry safety appliances with him, viz; Emergency kit, breathing apparatus etc.
- The vehicles must be driven carefully, specially in crowded localities and on bumpy roads. Do not apply sudden brakes.
- Check for the leakage from time to time.
- In the case of uncontrollable leakage, the vehicle should be taken to an open area

where there is less population.

1.7. Emergency Kit: It consists of various tools and appliances like gaskets, yokes, studs, tie rods hoods, clamps, spanners, mild steel channels, screws, pins, wooden pegs etc. of standard sizes. Separate kits are used for cylinders and tonners. All the gadgets are designed for using in controlling or stopping the leakages from valves, fusible plug and side walls of cylinders and containers used for handling chlorine.

- Leakage may occur through the valve. There are basically four types of valve leaks.
  - Valve packing
  - Valve seat
  - Defective inlet thread
  - Broken valve thread
- Leakage may occur through container wall. For controlling such leakages, clamps are used for cylinders and chain and yoke arrangement is used for tonner. Sometimes wooden peg is used by driving into the leaking hole as a temporary arrangement.
- Leakage may occur through fusible plug.
  - If the leakage is through the threads of fusible plug, yoke, hood and cap nut arrangement is used to control the leak.
  - If fusible metal itself in the plug is leaking, yoke and stud arrangement is used to control the leak.

2. First Aid to be Provided for a Person Affected by Chlorine

a. General Remove the affected person immediately to an uncontaminated area. Remove contaminated clothing and wash contaminated parts of the body with soap and plenty of water. Lay down the affected person in cardiac position and keep him warm. Call a physician for medical assistance at the earliest. Caution: Never attempt to neutralize chlorine with other chemicals.

b. Skin Contact Remove the contaminated clothes, wash the affected skin with large quantity of water. Caution: No ointment should be applied unless prescribed by the physician.

c. Eye Contact If eyes get affected with liquid chlorine or high concentration of chlorine gas, they must be flushed immediately with running water for atleast 15 minutes keeping the eyelids open by hand. Caution: No ointment should be used unless prescribed by an eye specialist.

d. Inhalation If the victim is conscious, take him to a quiet place and lay him down on his back, with head and back elevated (cardiac position). Loosen his clothes and keep him warm using blankets. Give him tea, coffee, milk, peppermint etc. for making good effect on breathing system. If the victim is unconscious, but breathing, lay him down in the position mentioned above and give oxygen at low pressure until the arrival of doctor. If breathing has stopped, quickly stretch him out on the ground or a blanket if available, loosen his collar and belt and start artificial respiration without delay. Neilson arm lift back pressure method is useful. Automatic artificial respiration is preferable if available. Continue the respiration until the arrival of the doctor. Amboo bag can also be used for this purpose.

3. On-Site Emergency Plan to Cover the Leakage of Chlorine

3.1. Introduction As chlorine is a hazardous chemical, handling and storage of it demand adequate precautions to avoid possible hazards. Leakage of chlorine may develop into a major emergency. Therefore, the emergency procedure to cover this eventuality is essential. It is drawn

in the form of on-site emergency plan. The elements of onsite emergency plan are as follows:

3.2. Identification of Hazard Chart
In this case the site risk is evaluated by the expert and the extent of the probable damage is calculated on the basis of stored chlorine quantity, nearby population, wind direction, type of equipment failure etc. For this purpose, hazard analysis is conducted in which case all the hazardous properties of chlorine are considered. If evacuation is required, the range of it is calculated.

3.3. Appointing Key Persons In order to control the incident like chlorine leakage, it is essential to appoint various persons with their well-defined responsibilities. Taking into account the various activities likely to be involved, the following key persons are appointed (i) Site Controller, (ii) Incident controller, (iii) Shift Executive In charge, (iv) Communication Officer, (v) Safety Officer, (vi) Fire and Security Officer, (vii) Utilities and Services In charge, (viii) Traffic Controller, (ix) First Aider

3.4. Assembly Points These points are set up where persons from the plant would assemble in case of chlorine leakage. At these points the in-charge for counting the heads will be available.

3.5. Emergency Control Centre
The control centre is the focal point in case of an emergency from where the operations to handle the emergency from are directed and coordinated. It contains site plan, telephone lines, public address system, safety equipment, first aid boxes, loud speaker, torches, list of essential telephone numbers, viz. fire brigade, police, hospital, civil defence, collector, factory inspector, organizational authorities, chlorine suppliers, mutual aid group, social workers, list of key persons and their addresses, copy of chemical fact sheet, location plan of fire hydrant, details of dispersion model of chlorine gas, population distribution pattern, location of alarm system.

3.6. Procedure to Meet Emergency
The actions to be taken by the staff and authority are given below; Emergency Alarm: An audible emergency alarm system is installed throughout the plant. On hearing the alarm the incident controller will activate the public address system to communicate with the staff about the emergency and give specific instructions for evacuations etc. anyone can report the occurrence of chlorine leakage to section in-charge or incident controller through telephone or intercom or in person.

3.7. Communication
Communication officer shall establish the communication suitable to that incident.

3.8. Services
For quickness and efficient operation of emergency plan the plant is divided into convenient number of zones and clearly marked on the plan. These are emergency services viz. firefighting, first aid, rescue, alternative source of power supply, communication with local bodies etc. The incident controller will hand over the charge to the site controller of all these coordinating activities, when the site controller appears on the site. The site controller will coordinate all the activities of the key persons. On hearing the emergency alarm system all the key persons will take their charge. Incase of their absence other alternatives are nominated. The person nominated for personnel and administration purposes will be responsible for informing all statutory authorities, keeping account of all persons in the plant including contract labour, casual workers and visitors. He will be responsible for giving information to press or any outside agencies. He is also responsible for organizing canteen facilities and keeping informed the

families of affected persons. The person nominated as security officer should guide police, fire fighting and control the vehicle entries. The site controller or any other nominated person will announce resumption of normalcy after everything is brought under control. The onsite emergency plan needs to be evaluated by mock drill. Any weaknesses noticed during such drills should be noted and the plan is modified to eliminate the weaknesses.

3.9. Emergency

Measures In case of leakage or spillage of Chlorine, the following emergency measures should be taken:

- Take a shallow breath and keep eyes opened to a minimum.
- Evacuate the area.
- Investigate the leak with proper gas mask and other appropriate Personal protection.
- The investigator must be watched by a rescuer to rescue him in emergency.
- If liquid leak occurs, turn the containers so as to leak only gas.
- In case of major leakage, all persons including neighbours should be warned.
- As the escaping gas is carried in the direction of the wind all persons should be moved in a direction opposite to that of the wind. Nose should be covered with wet handkerchief.
- Under no circumstances should water or other liquid be directed towards leaking containers, because water makes the leak worse due to corrosive effect.
- The spillage should be controlled for evaporation by spraying chilled water having temperature below 9.4oC. With this water crystalline hydrates are formed which will temporarily avoid evaporation. Then try to neutralize the spillage by caustic soda or soda ash or hydrated lime solution carefully. If fluroprotein foam is available, use for preventing the evaporation of liquid chlorine.
- Use emergency kit for controlling the leak.
- On controlling the leakage, use the container in the system or neutralize the contents in alkali solution such as caustic soda, soda ash or hydrated lime. Caution: Keep the supply of caustic soda or soda ash or hydrated lime available. Do not push the leaking container in the alkali tank. Connect the container to the tank by barometric leg.
- If container commences leak during transport, it should be carried on to its destination or manufacturer or to remote place where it will be less harmful. Keeping the vehicle moving will prevent accumulation of high concentrations.
- Only specially trained and equipped workers should deal with emergency arising due to major leakage.
- If major leak takes place, alert the public nearby by sounding the siren.
- Any minor leakage must be attended immediately or it will become worse.
- If the leakage is in the process system, stop the valve on the container at once.

3.10. Safety Systems Required at Chlorination Plant

The following safety systems should be kept ready at the chlorination plant:

- Breathing apparatus.
- Emergency kit.
- Leak detectors.
- Neutralisation tank.

- Siren system.
- Display of boards in local language for public cautioning, first aid and list of different authorities with phone numbers.
- Communication system.
- Tagging system for equipment's.
- First aid including tablets and cough mixtures.
- Exhaust fans.
- Testing of pressure vessels, chlorine lines etc. every year as per factory act.
- Training & mock drill.
- Safety showers.
- Eye fountain.
- Personal protective equipment.
- Protecting hoods for ton-containers.
- Fire extinguishers.

Appendix 8: Drinking Water Standards

Group	National Standards for Drinking Water[a]			WHO Guidelines for Drinking-Water Quality, 4th Edition, 2011[b]	Applicable Per ADB SPS [c, d]
	Parameter	Unit	Max. Concentration Limits[d]		
Physical	Turbidity	NTU	1 (5)	-	1 (5)
	pH		6.5 – 8.5	none	6.5 – 8.5
	Color	Hazen units	5 (15)	none	5 (15)
	Taste and Odor		Agreeable	-	Agreeable
	TDS	mg/l	500 (2,000)	-	500 (2,000)
	Iron	mg/l	0.3	-	0.3
	Manganese	mg/l	0.1 (0.3)	-	0.1 (0.3)
	Arsenic	mg/l	0.01 (0.05)	0.01	0.01
	Cadmium	mg/l	0.003	0.003	0.003
	Chromium	mg/l	0.05	0.05	0.05
	Cyanide	mg/l	0.05	none	0.05
	Fluoride	mg/l	1 (1.5)	1.5	1 (1.5)
	Lead	mg/l	0.01	0.01	0.01
	Ammonia	mg/l	0.5	none established	0.5
Chemical	Chloride	mg/l	250 (1,000)	none established	250 (1,000)
	Sulphate	mg/l	200 (400)	none	200 (400)
	Nitrate	mg/l	45	50	45
	Copper	mg/l	0.05 (1.5)	2	0.05 (1.5)
	Total Hardness	mg/l	200 (600)	-	200 (600)
	Calcium	mg/l	75 (200)	-	75 (200)
	Zinc	mg/l	5 (15)	none established	5 (15)
	Mercury	mg/l	0.001	0.006	0.001
	Aluminum	mg/l	0.1 (0.3)	none established	0.1 (0.3)
	Residual Chlorine	mg/l	0.2 (1.0)	5	0.2
Micro Germs	E-coli	MPN/100ml	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample	Must not be detectable in any 100 ml sample
	Total Coliform	MPN/100ml			

Note-

[a] Bureau of India Standard 10500: 2012. Value within bracket indicated values permissible limits in absence of alternative source

[b] Health-based guideline values.

[c] Per ADB SPS, the government shall achieve whichever of the standards is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency of the government will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

[d] Figures in parenthesis are maximum limits allowed in the absence of alternate source.

Appendix 9: Stakeholder Consultations

Summary of Consultation with Stakeholders – Kailashahar

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
13th April 2022	ULB office, Kailashahar	6 M=5 F=01	Elected representatives, Chairperson of ULB	Present drinking water supply source and its condition Need of improvement of the present situation Briefing on project objectives probable implementation procedures Potential positive and negative impacts due to project implementation	Kailashahar is operating the water supply system for the town, but capacity to be further built. The Chairman of the ULB expressed need for the project and willingness to take it up; The Chairman of the ULB expressed need for the project and willingness to take it up; Kailashahar ULB is operating the water supply system for the town, but capacity to be further built.
13th April 2022	Bimal Sinha Housing Complex-Ward no. 12	10 M=6 F=4	Community members	• Briefing on project objectives probable implementation procedures • Relevant information of the upcoming road and drain project and benefits of the project. • Information on the benefits of the subproject	• People are fed up with water logging, frequent traffic jams and wanted that the subproject may be executed on a fast track so that this problem is eliminated. • Generally, all the people

				in terms of economic and environmental enhancement People in general were very enthusiastic about the benefits of the subproject in terms of water logging and also an improvement in the environmental quality.	consulted were well aware about the proposed subproject. • Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle.
19th March 2023	ULB office, Kailashahar	19 M=13, F=6	Elected representatives, Engineers, Chairperson of ULB, ADB Team	• Briefing on project objectives probable implementation procedures • Discussion about requirement of the project and willingness of residents to pay for improved services of Storm water drainage, Benefits of road and storm water drainage.	• Residents expressed their views about the willingness to engage with the project and explore job opportunities. • As regards the storm water drainage and road project, it has been told by the residents that it will improve the roads and condition of low laying areas. • It was told by the residents that the condition of storm water drainage condition is not up to the mark; the low-lying areas generally get flooded during rainy season.

					• Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle.
19th March 2023	Durgapur Ward no. 15	17 M=12, F=5	Community Consultation	• Detailed discussion about current level of service of Water supply and condition of storm water drainage in the town/ Present Road condition and storm water management problem. Tentative Project implementation period and possible inconveniences during the construction period shared during consultation with community present from the locality •	• Few people have told that they are aware of the proposed subproject, • All the residents expressed their concerned about the poor drainage condition and road connectivity. • Residents expressed their views about the willingness to engage with the project and explore job opportunities
20th May 2022	Sonamara, Durgapur	08 M=5 F=3	Community members	Briefing on project objectives probable implementation procedures Present drinking water supply source and its condition- only 1	The area has insufficient and inadequate drinking water supply. The area faces severe water crisis during the summer season when the ground

				hours of supply per day Briefing on project objectives probable implementation procedures Potential positive and negative impacts due to project implementation Relevant information of the upcoming project and benefits of the project. No adverse impacts on structures, livelihoods anticipated. Construction of assets may cause some public inconveniences for a shorter period	water level drops. High iron content in drinking water. Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle. The representative from community raised issue regarding the existing water supply quality is not upto the mark.
20th May 2022	Kubjar	8 M=6 F=2	Community members	Briefing on project objectives probable implementation procedures Status of existing drinking water supply system Relevant information of the upcoming project and benefits of the project. Present drinking water supply	Women had heard about the proposed project and welcomed it as women are facing many problems in fetching water for hours. Some participants did not have water connections. The women were happy to learn about the

				source and its condition- only one hour of water supply per day Potential positive and negative impacts due to project implementation Area to be covered under this project	proposed project Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle. No adverse impacts on structures, livelihoods anticipated.



Figure 84: Consultation at ULB office



Public Consultation at Sonamara, Durgapur



Public Consultation at Kubjar

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Kailashahar Ward No. –

Date: - 13/04 Place: -

Sl No.	Name (in CAPITAL LETTER)	Contact No.	Signature
1	Chaitali Jai Deb Laskar	9436130825	
2	Kailasha	8974480400	
3	Likim Sinha	7308552717	
4	Jaydeep Das.	9612799093	
5	Subrata Deb.	8415861186	
6	Siddhartha Roy	9862982012	

Stakeholder Consultation with Honorable Chairperson & Counsellors of KMC, (13-04-2022)

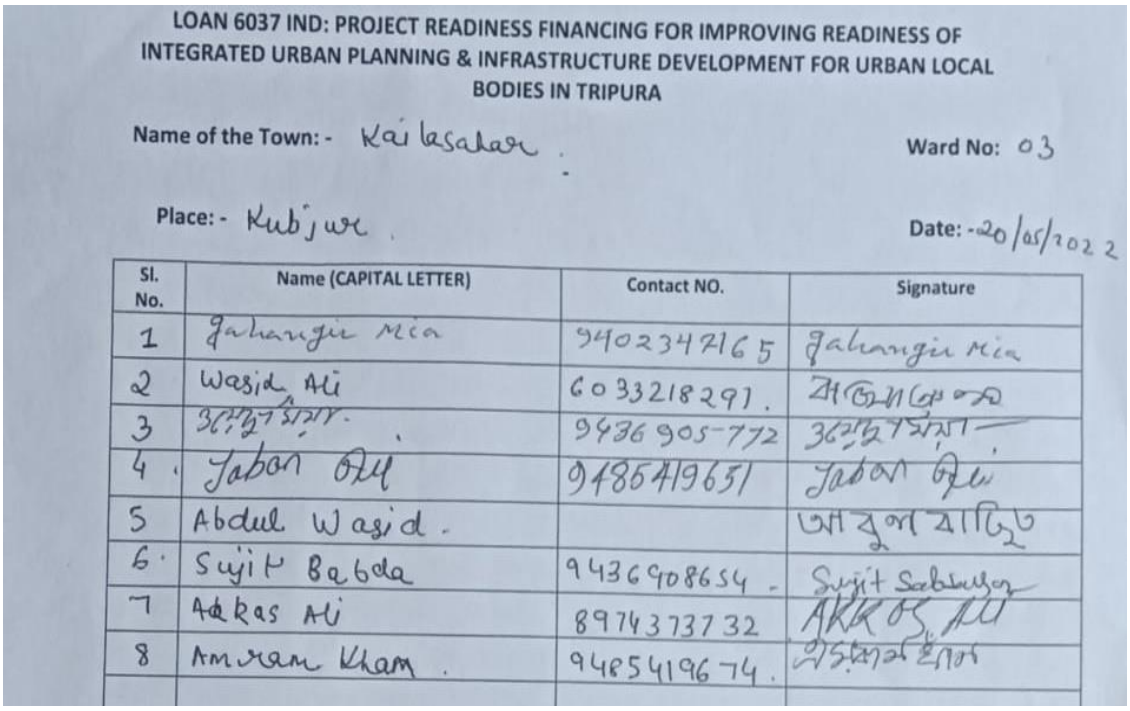
LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Kailashahar Ward No. – 16

Date: - 20/05/2022 Place: - Sonamura, Durgapur.

Sl No.	Name (in CAPITAL LETTER)	Contact No.	Signature
1	Shrijan Bibi	9402347265.	
2	Manjibari	9862045882.	Manjil Ali
3	Ahmed Ali	9436906201	Ahmed Ali
4	ABDUL HASAN	8414951556	ABDUL
5	ABOR ALI	9362 8974544523.	
6	Sultana Begum		Sultana Begum
7	Nilufa Begum	8974485184.	Lilufa Begum
8	Nasira Begum		

List of Participants in Consultation Meeting at Sonamara, Durgapur



LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Kailasahar. Ward No: 03

Place: - Kubjar. Date: -20/05/2022

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
1	Jahangir Mia	9402347165	Jahangir Mia
2	Wasid Ali	6033218291.	
3		9436905772	
4.	Jabar Ali	9485419651	Jabar Ali
5	Abdul Wasid.		
6.	Sujit Babda	9436908654.	Sujit Sabalkar
7	Akkas Ali	8974373732	AKKAS ALI
8	Amiram Kham.	9485419674.	

List of Participants in Consultation Meeting at Kubjar

Summary of Focus Group discussion held at Kailashahar

Focus-group discussions with affected persons and other stakeholders were conducted to learn their views and concerns. General public and the people residing along the project activity areas were also consulted during visits to the project sites.

Summary of Outcome

Sl. no	Date and place of consultation	Persons consulted	Topics discussed during FGD	Outcome of FGD/ consultation
1	09.11.2021 Hawkers Market	Total=07 M-07 F-00	Discussed about present water supply system and its quality & proposed works and its advantages, their willingness to project work, temporary inconveniences during pipe laying works, contractor's cooperation, willingness to pay for sustainability of the project	People are concerned about the poor supply (1 hour water supply per day) and quality of water. Water supply is erratic and quality is poor. People demand 24x7 supply connections to be provided to their area under the proposed project.
2	03.02.2022 Ward No-10, 14, 15, 17	Total=08 M-00 F-08	Present Status of Water Supply in the town. Proposed works under this project Quality of present Water Supply	People are concerned about the poor supply (two times in a day for 1 hour each time) and quality of water. People are supportive of the project.

Sl. no	Date and place of consultation	Persons consulted	Topics discussed during FGD	Outcome of FGD/ consultation
			Environment & Health impacts of proposed projects	People are agreeing with the proposed water supply works and understand that proposed works will improve health and environmental conditions of town and chances of waterborne diseases will be mitigated at some extent.
3	03.02.2022 Ward No-10, 11, 14, 15, 17 (Serial no.3 and 4 of above table)	Total=17 M-00 F-17	Present water supply system, Awareness of the project –including Project Coverage area, Dust and noise pollution and disturbances during construction work,	People are concerned about the poor water quality issue. People demanded for the measures of dust suppression such as water sprinkler to control dust and noise during construction phase. People are supportive of the project.
4	03.02.2022 Ward No- 15, 14, 16	Total=7 M-00 F-7	Present Status of Water Supply in the town, Awareness of the project-including Project Coverage area, Present drinking water problem-quantity and quality	People are supportive of the project and indicated their willingness to participate in the project to make It successful (especially women) People are aware of the proposed Project. Quality of present water supply is not good and sufficient water is not supplied, proposed water supply works will provide good and sufficient quantity of water, which will save time and energy of people presently spent to collect water from existing supply
5	13.04.2022 Bimal Sinha Housing Complex, Harijon Colony	Total=10 M-05 F-05	Present Status of Water Supply in the town Environment & Health impacts of proposed project	People are concerned about the poor supply (two times in a day for 1 hour each time) and quality of water. Water supply is erratic and quality is poor. Proposed water supply will improve health conditions and living standards of people due to supply of good quality water round the clock
6	09.11.2021 Consultation with ULB representatives	Total=12 M-12 F-00	Present drinking water supply source and its condition. Need of improvement of the present situation Briefing on project objectives probable	The ULB representative expressed need for the project and willingness to take it up Kailashahar is operating the water supply system for the town, but capacity to be further built.

Sl. no	Date and place of consultation	Persons consulted	Topics discussed during FGD	Outcome of FGD/ consultation
			implementation procedures	People were briefed about the complaint redress mechanism.
7.	20.05.2022 Consultation with Honorable Vice-Chairperson, counsellors and DY-CEO of KMC (Serial no. 8 and 9 of above table	Total=12 M-12 F-00	Present drinking water supply source and its condition Need of improvement of the present situation Briefing on project objectives probable implementation procedures	Kailashahar is operating the water supply system for the town, but capacity to be further built. The Chairman of the ULB expressed need for the project and willingness to take it up The prime concern and apprehension of the ULB Chairman regarding the project was whether it will be a financial burden on the MC

Annexure

Photographs of Key Informants Interview and Focus Group discussion



Hawkers Market, Dated- 09-11-2021





Ward no – 10,14,15,17 Dated- 03-02-2022



Ward no – 14,17, Dated- 03-02-2022



Ward No – 15,14,16, Dated- 03-02-2022





Bimal Sinha Housing Complex, Harijon Colony, Dated- 13-04-2022

<u>Stakeholder Consultation</u>



Consultation with the Honorable Chairperson & Counsellors of Kailashahar Municipal Council Dated- 13-04-2022



Consultation with the Honorable Vice-Chairperson & Counsellors of Kailashahar Municipal Council Dated- 20-05-2022

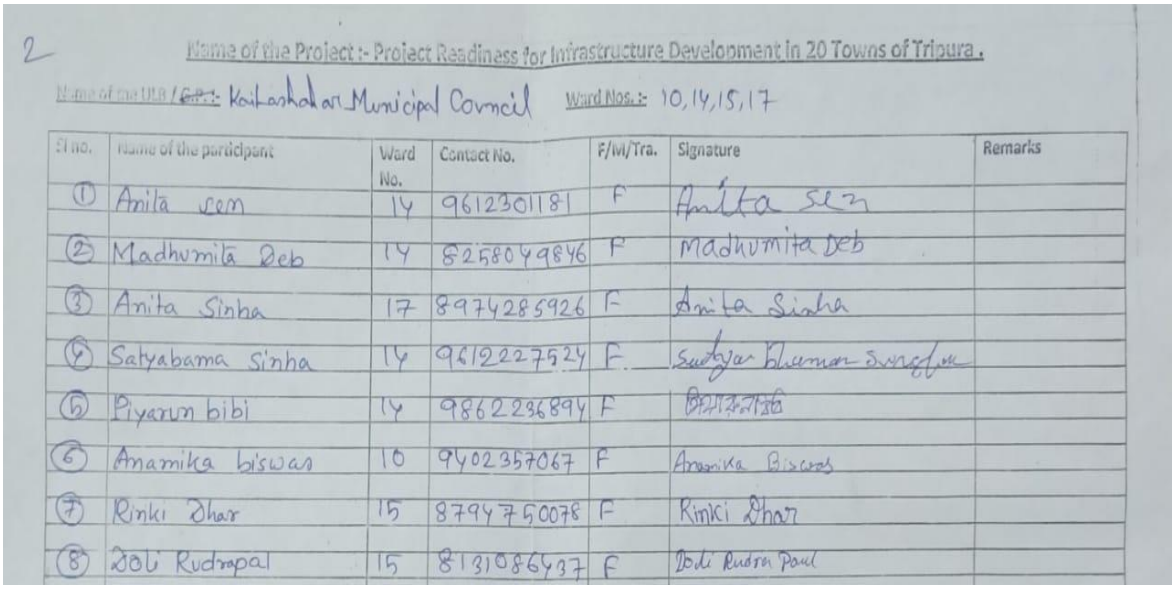


Consultation with representatives of Kailashahar Municipal Council, Dated- 09-11-2021



Consultation with Dy-CEO of KMC, Dated- 20-05-2022

Attendance Sheet of Focus Group Discussion (FGD)



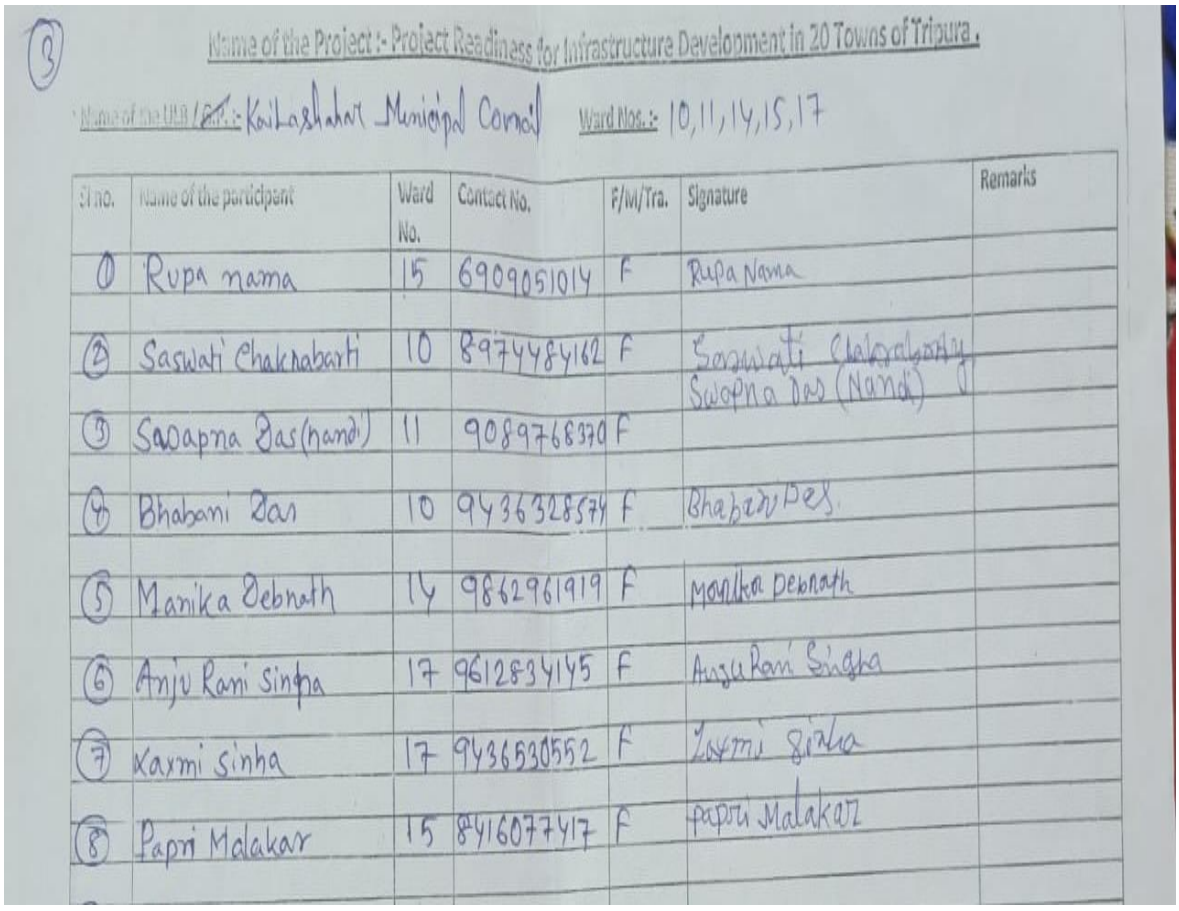
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Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / ~~GP~~ :- Kailashahar Municipal Council Ward Nos. :- 10,14,15,17

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
①	Anita sen	14	9612301181	F	Anita Sen	
②	Madhumita Deb	14	8258049846	F	Madhumita Deb	
③	Anita Sinha	17	8974285926	F	Anita Sinha	
④	Satyabama Sinha	14	9612227524	F	Satyabama Sinha	
⑤	Piyarun bibi	14	9862236894	F	[illegible]	
⑥	Anamika biswas	10	9402357067	F	Anamika Biswas	
⑦	Rinki Dhar	15	8794750078	F	Rinki Dhar	
⑧	Dali Rudrapal	15	8131086437	F	Dali Rudra Paul	

Ward no – 10,14,15,17 (03-02-2022)



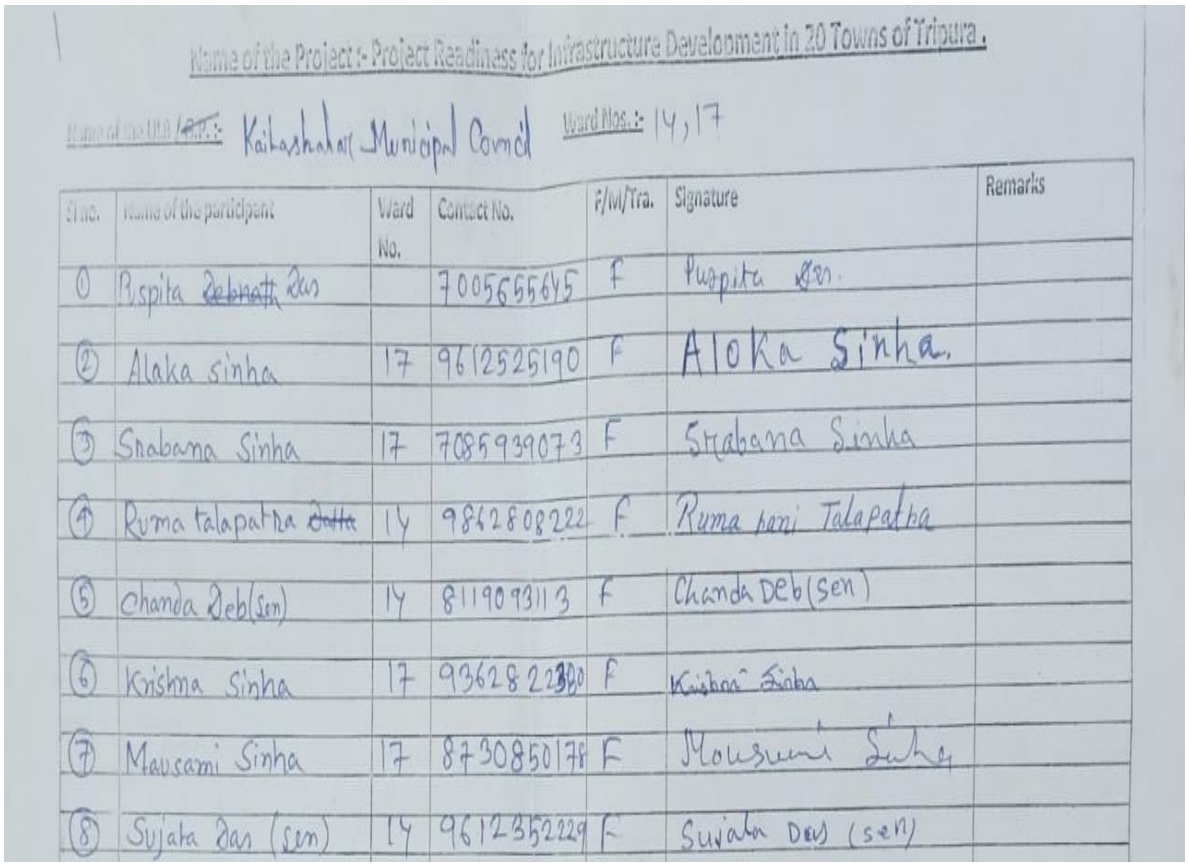
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Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / ~~GP~~ :- Kailashahar Municipal Council Ward Nos. :- 10,11,14,15,17

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
①	Rupa nama	15	6909051014	F	Rupa Nama	
②	Saswati Chakrabarti	10	8974484162	F	Saswati Chakrabarty	
③	Sapna Das(nandi)	11	9089768370	F	Swapna Das (Nandi)	
④	Bhabani Das	10	9436328574	F	Bhabani Das	
⑤	Manika Debnath	14	9862961919	F	Manika Debnath	
⑥	Anju Rani Sinha	17	9612834145	F	Anju Rani Sinha	
⑦	Laxmi sinha	17	9436530552	F	Laxmi Sinha	
⑧	Papri Malakar	15	8416077417	F	Papri Malakar	

Ward No – 10, 11,14,15,17 (03-02-2022)



Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB :- Kailashahar Municipal Council Ward Nos. :- 14, 17

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
①	Puspita ~~Debnath~~ Das		7005655645	F	Puspita Das.	
②	Alaka sinha	17	9612525190	F	Aloka Sinha.	
③	Srabana Sinha	17	7085939073	F	Srabana Sinha	
④	Ruma talapatra ~~Dutta~~	14	9862808222	F	Ruma rani Talapatra	
⑤	Chanda Deb(sen)	14	8119093113	F	Chanda Deb(sen)	
⑥	Krishna Sinha	17	9362822300	F	Krishna Sinha	
⑦	Mausami Sinha	17	8730850178	F	Mousumi Sinha	
⑧	Sujata Das (sen)	14	9612352229	F	Sujata Das (sen)	

Ward no – 14,17 (03-02-2022)

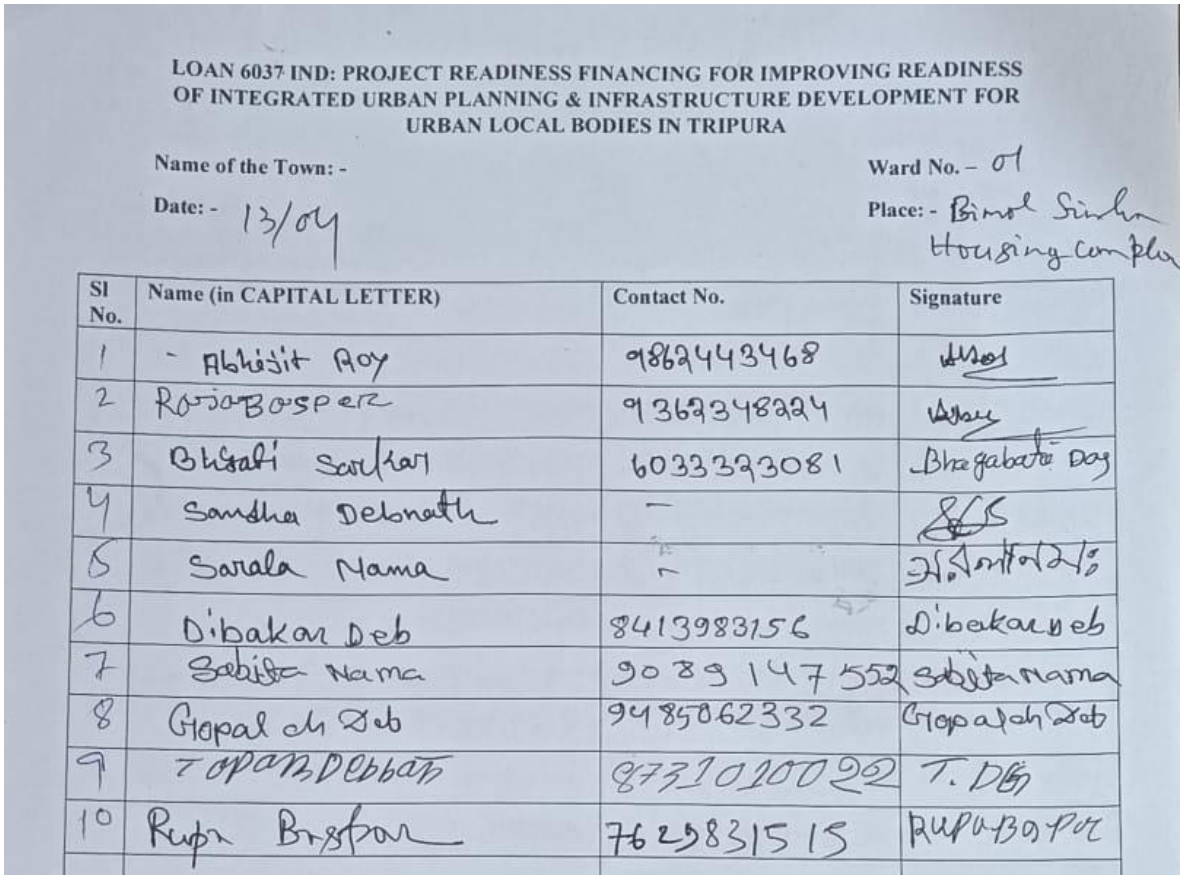
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Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB :- Kailashahar Municipal Council. Ward Nos. :- 15, 14, 16

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Mani Debnath	15	9436963262	F	মনি দেবনাথ	
2	Barnali Roy Datta	14	8974484622	F	Barnali Roy Datta	
3	Sampa Sutradhar	14	9402518010	F	Sampa Sutradhar	
4	Biva Malakar	15	9862657617	F	Biva Malakar	
5	Anita Malakar	14	9774686628	F	অনিতা মালাকার	
6	Sabita Ghosge	16	7629000811	F	সবিতা ঘোষ	
7	Chinu Rani Gope	16	8415866288	F	চিনু রানী গোপ	

Ward No – 15,14,16 (03-02-2022)



LOAN 6037-IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: -

Ward No. – 01

Date: - 13/04

Place: - Bimal Sinha Housing Complex

Sl No.	Name (in CAPITAL LETTER)	Contact No.	Signature
1	Abhijit Roy	9862443468	
2	Rosia Bosper	9362348324	
3	Bhakti Sarkar	6033323081	Bhagabata Das
4	Sandha Debnath	–	
5	Sarala Nama	–	
6	Dibakar Deb	8413983156	Dibakar Deb
7	Sabita Nama	9089147552	Sabita nama
8	Gopal ch Deb	9485062332	Gopal ch Deb
9	Topan Debbarma	8731010022	T. DB
10	Rupa Bhattacharjee	7629831515	RUPA BHATTACHARJEE

Bimal Sinha Housing Complex, Ward No-01, (13-04-2022)

CONSULTATIONS AT KUMARGHAT

STAKEHOLDER CONSULTATIONS

Summary of Consultation with Stakeholders

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
7th April 2022	ULB office, Kumarghat	17 M=09 F=08	Consultation with all honorable counsellor of Kumarghat MC	Briefing on project objectives probable implementation procedures Briefing on project objectives probable implementation procedures Potential positive and negative impacts due to project implementation Relevant information of the upcoming project and benefits of the project. Information on perceived benefits from the proposed subproject including reduction in water logging in rainy seasons. Availability of labour during construction time	The prime concern and apprehension of the ULB Chairperson regarding the project was when construction work will start. The Chairperson of the ULB expressed need for the project and willingness to take it up; Operation and maintenance of the facilities developed under the project and community participation; Kumarghat ULB is operating the water supply system for the town, but capacity to be further built.
18th May 2022	Sarada Pally, Moti Colony	21 M=04 F=17	Community members	Status of existing drinking water supply system; Need for improvements to present system; Area to be covered under the project Briefing on project objectives probable implementation procedures	People were happy that the entire community would be benefited from the upgraded water supply. Women had heard about the proposed project and welcomed it as women are facing many problems in fetching water for hours.

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
					Some participants did not have water connections. The women were happy to learn about the proposed project.
18th May 2022	Halaimura	09 M=02 F=07	Community members	Status of existing drinking water supply system; Need for improvements to present system; Area to be covered under the project Briefing on project objectives probable implementation procedures	The area has insufficient and inadequate drinking water supply. Water from two tube wells is presently supplied to the area/ community. The area faces severe water crisis during the summer season when the ground water level drops. Women had heard about the proposed project and welcomed it as women are facing many problems in fetching water for hours



Figure 1: Consultation at ULB office



Figure 2: Public Consultation at Sarada Pally, Ward no. 12



Figure 3: Public Consultation at Halaimura, Ward no. 06

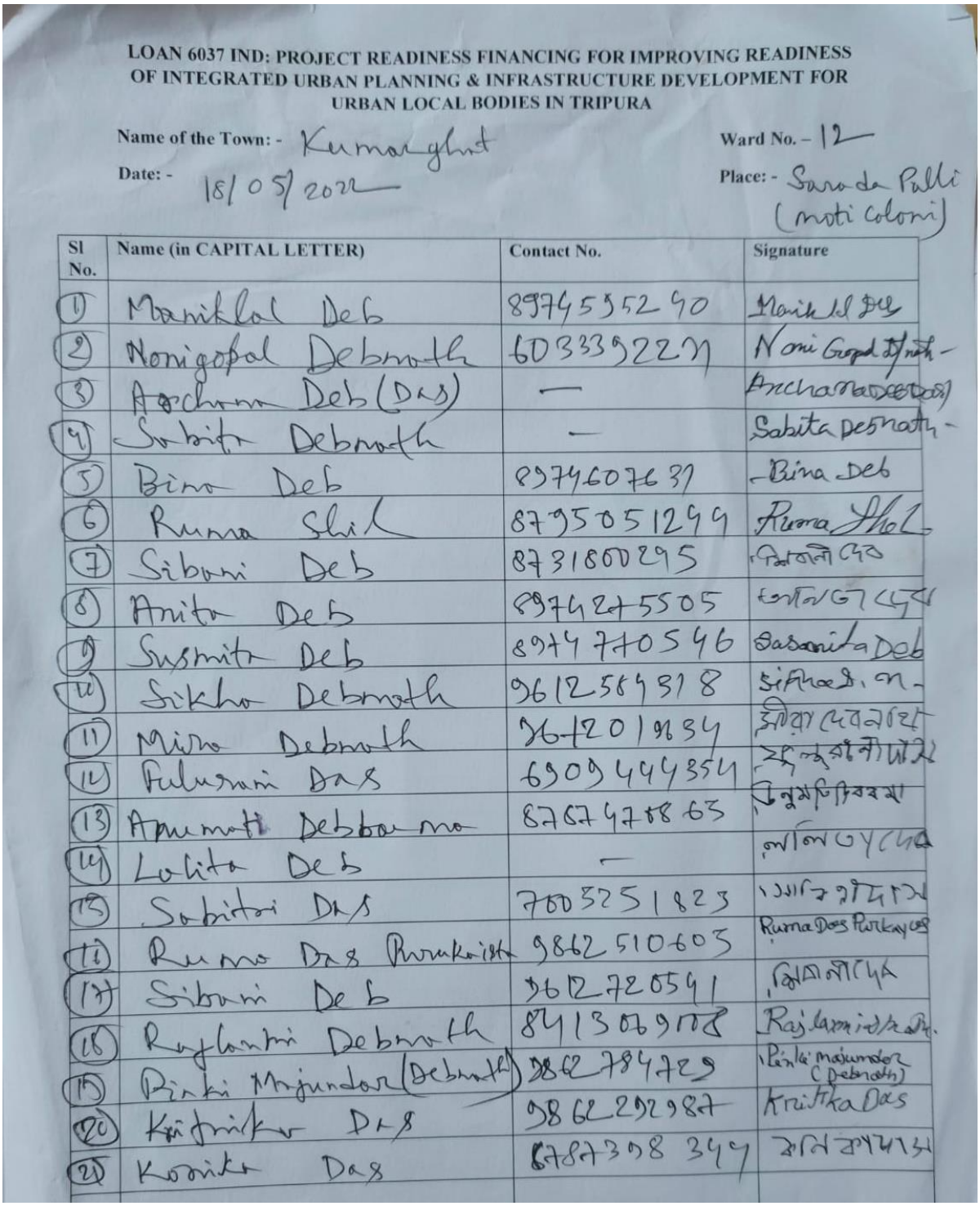
LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Kumarghat **Ward No. –**

Date: - 07/04 **Place: -**

Sl No.	Name (in CAPITAL LETTER)	Contact No.	Signature
1	Biswajit Das	[illegible]8534	
2.	Ritu Pal Deb	9862200582	
3	Himadri Das	8132022208	
4.	Nidhu Bhushan Paul	8837072227	
5	Tulan Das	9366133502	
6	Gobinda Das	9862200371	
7.	Shuktajay Chakma.	9485060835	
8.	Dilip Bh. Deb.	7360794531	
9)	Lili Ghar.	8787456406	
10)	Simon Deb (DOS)	9612741748	
11)	Jayanti Rani Das Bhowmik.	7085530308	
12	Bijaya Sinha	8014410994	
13.	Rina Rani Sarkar (Nama)	9612530304	
14.	Pranati Sucklabaidya.	6909276552	07/04/2022
15.	Anu malakar	8119905296	07-04-2022
16.	Ramesh Majumdar	8132022251	
17.	Dipankar Goswami	7005354961	

List of Participants in Consultation Meeting at ULB office



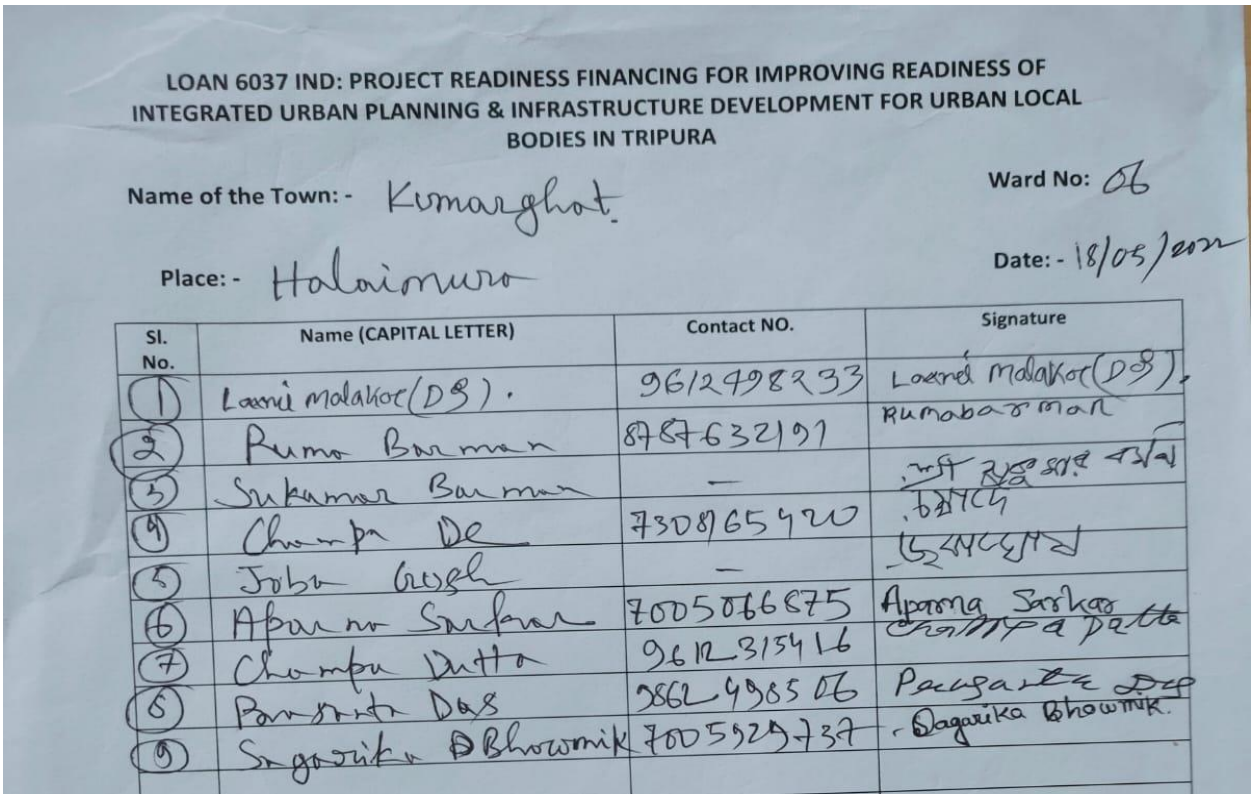
LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Kumarghat Ward No. - 12

Date: - 18/05/2022 Place: - Sarada Palli (moti Colony)

Sl No.	Name (in CAPITAL LETTER)	Contact No.	Signature
1	Manikal Deb	8974595240	Manikal Deb
2	Monigopal Debnath	6033392277	Moni Gopal Debnath
3	Archana Deb (Das)	—	Archana Deb (Das)
4	Sabita Debnath	—	Sabita Debnath
5	Bina Deb	8974607637	Bina Deb
6	Rumu Shil	8795051249	Rumu Shil
7	Sibani Deb	8731800295	[illegible]
8	Anita Deb	8974275505	[illegible]
9	Susmita Deb	8974770546	Susmita Deb
10	Sikha Debnath	9612584318	Sikha Deb.
11	Mina Debnath	9612018434	[illegible]
12	Fulmani Das	6909444354	[illegible]
13	Apumati Debbarma	8767478863	[illegible]
14	Lalita Deb	—	[illegible]
15	Sabitri Das	7005251823	[illegible]
16	Rumu Das Purkaistha	9862510603	Rumu Das Purkaistha
17	Sibani Deb	9612720541	[illegible]
18	Rajlakshmi Debnath	8413069708	Rajlakshmi Deb.
19	Rinki Majumdar (Debnath)	9862784729	Rinki Majumdar (Debnath)
20	Kritika Das	9862292987	Kritika Das
21	Konika Das	6787308349	[illegible]

List of Participants in Consultation Meeting at Moti Colony



LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Kumarghat Ward No: 06

Place: - Halaimura Date: - 18/05/2022

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
1	Laxmi Malakar (DS).	9612798233	Laxmi Malakar (DS).
2	Rumo Barman	8787632191	Rumabarman
3	Sukumar Barman	—	
4	Champa De	7308765420	
5	Joba Ghosh	—	
6	Aparna Sarkar	7005066875	Aparna Sarkar
7	Champa Dutta	9612315416	Champa Dutta
8	Parmita Das	9862498506	Parmita Das
9	Sagarika Bhowmik	7005929737	Sagarika Bhowmik.

List of Participants in Consultation Meeting at Halaimura

Summary of Focus Group discussion Held at Kumarghat

Summary Outcome

Sl. no	Date and place of consultation	Persons consulted	Topics discussed during consultation	Outcome of consultation
1	12.04.2022 Ward No-7	Total=08 M-00, F-08	Discussed about: project objectives probable implementation procedures, present drinking water supply source and its conditions, potential positive and negative impacts due to project implementation, relevant information of the upcoming project and benefits of the project.	• The prime concern of stakeholders regarding the project when construction work will start. • They expressed need for the project and willingness to take it up • Operation and maintenance of the facilities developed under the project and community participation will largely succeed the project
2	12.04.2022 Ward No-1,5,8,9,12	Total=11 M-00, F-11	Discussed about: Awareness about the subproject and extent of	• People are concerned about the poor supply and quality of water.

Sl. no	Date and place of consultation	Persons consulted	Topics discussed during consultation	Outcome of consultation
			the project impact and development, benefits of the subproject for the economic and social upliftment of community at large, possibility of local disturbances due to project construction work, water logging and drainage problem if any	• People are supportive of the project. • People agree with the proposed water supply works and understand that proposed works will improve economic, health and environmental conditions • People agreed that local disturbance is minimum in terms of the long term benefit of the project • Water logging and drainage problems should be permanently mitigated
3	13.04.2022 Ward No-6	Total=21 M-00, F-21	Discussed about: Drinking water problem including Other Public Health related problems, encountered if any, Socio-Economic status, necessity of this project, employment potential in the project	• People are concerned about the insufficient quantum of available water and also its quality issue. • People are mainly dependent on rubber plantation, some people are service holders(Govt & Private) • People demanded for the measures of dust suppression during implementation of the project • People are supportive of the project and interested to work as unskilled labour during project construction period
4	13.04.2022 Ward No- 15	Total=14 M-04, F-10	Discussed about: the subproject and extent of the project impact and development, benefits of the subproject for the economic and social upliftment of community at large, overall impact of the project**.**	• People welcome the proposed water supply project • They are aware of the benefits of the proposed Project. • People are aware of the socio-economic benefits out of the project as implementation of the project will create job opportunities in local scale

Sl. no	Date and place of consultation	Persons consulted	Topics discussed during consultation	Outcome of consultation
				• Stakeholders are aware of the overall positive impact of the project and hence they welcome the implementation of the project
5	12.04.2022 Meeting with project beneficiaries at Pabiacherra	Total=05 M-05, F-00	Discussed about: the subproject and extent of the project impact and development, benefits of the subproject for the economic and social upliftment of community at large, labour availability in the Project area or requirement of outside labour, possibility of Local disturbances due to Project Construction Work	• Beneficiaries became aware of the sub project in terms socio –economic benefits • All agreed that the project will have net positive impact on their livelihood and health • They agreed that the project would surely help in socio-economic upliftment • Stakeholders confirmed about availability of unskilled local labour • Stakeholders agreed to bear on the temporary local disturbance due to project construction work for permanent potable water solutions
6	07.04.2022 Consultation with Honorable Chairperson	Total=04 M-04, F-00	Discussed about: the sub project and extent of the project impact and development, benefits of the subproject for the economic and social upliftment of community at large, labour availability in the Project area or requirement of outside labour, possibility of local disturbances due to Project Construction Work, water logging and drainage problem if any, drinking water problem, other problems, encountered, if any, ADB safeguard policy,	• The prime concern and apprehension of the ULB Chairperson regarding the project when construction work will start. • The Honorable Chairperson person is aware about this sub projects, and willing to provide all types of support during execution of work. • He is also aware about the upliftment benefits of the community due to implementation of the project • As per his understanding, community is ready accept the disturbance during project construction

Sl. no	Date and place of consultation	Persons consulted	Topics discussed during consultation	Outcome of consultation
			Socio-Economic status, necessity of this project, employment potential in the project	for permanent benefits out of this project • Water logging and drainage problem should also be properly addressed also apart from this water supply project • Safeguard policy of ADB was acceptable to him and community as it has long term benefits • During construction phase local people may be hired which can increase their earning potential and eventually standard of living and provide assistance to all those persons • Employment generation potential was agreed by him

Photographs of Key Informants Interview and Focus Group discussion



Ward No-07, Dated-12-04-2022



Ward No- 06, Dated- 13-04-2022



Ward No- 15, Dated- 13-04-2022



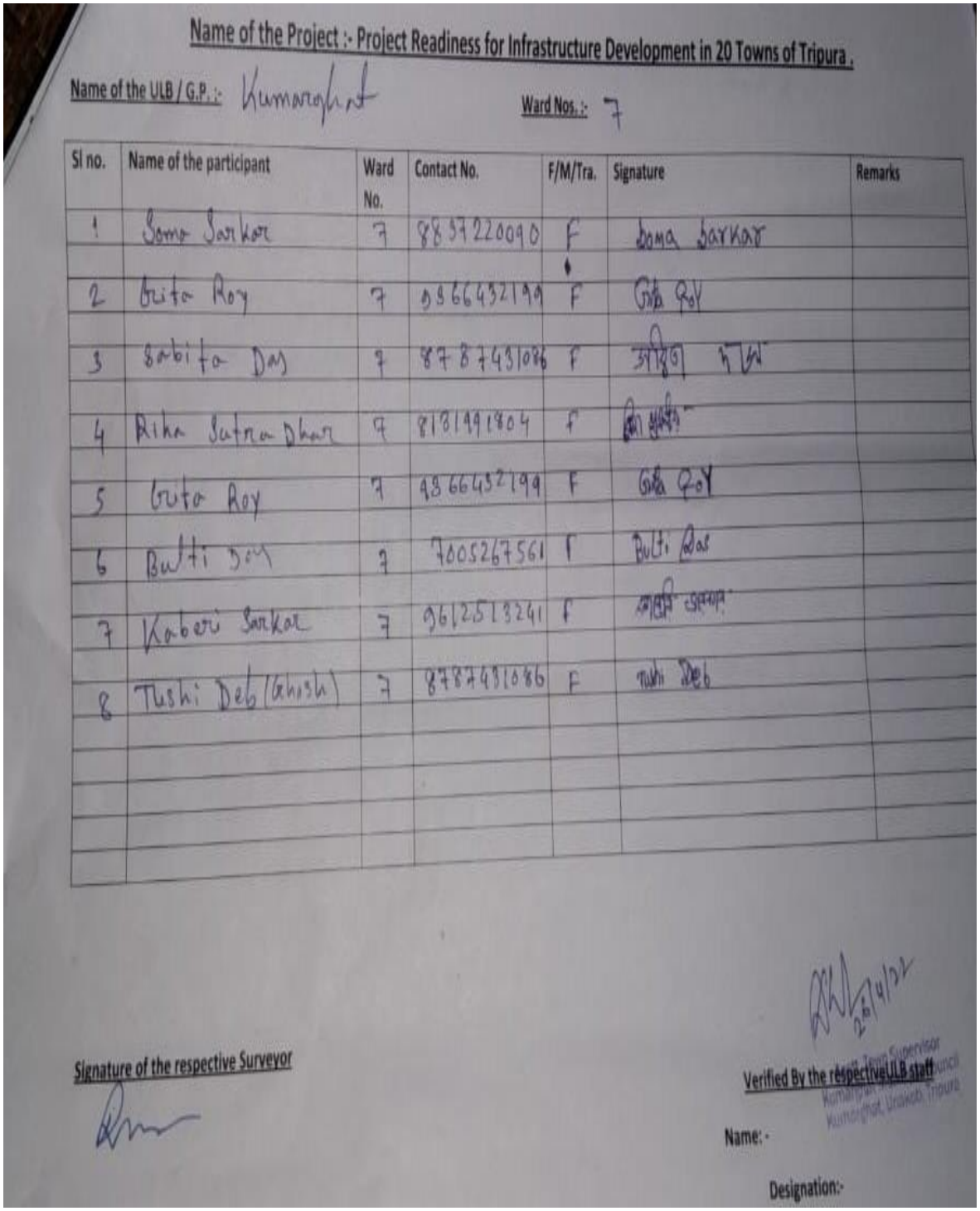
Ward No- 01, 05, 08,09, 12, Dated- 12-04-22





Consultation with Honourable Chairperson of Kumarghat Municipal Council, Dated- 07-04-2022

Annexure
Attendance Sheet of Focus Group Discussion (FGD)



Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura .

Name of the ULB / G.P. :- Kumarghat Ward Nos. :- 7

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Soma Sarkar	7	8837220090	F	Soma Sarkar	
2	Gita Roy	7	9966432199	F	Gita Roy	
3	Sabita Das	7	8787491086	F	[illegible]	
4	Rika Sutradhar	7	8131991804	F	[illegible]	
5	Gita Roy	7	9366432799	F	Gita Roy	
6	Butti Das	7	7005267561	F	Butti Das	
7	Kaberi Sarkar	7	9612513241	F	[illegible]	
8	Tushi Deb (Ghosh)	7	8787491086	F	Tushi Deb	

Signature of the respective Surveyor

Verified By the respective ULB staff

Name:-

Designation:-

Ward No- 07 (12-04-2022)



Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura .

Name of the ULB / G.P. :- Kumarghat

Ward Nos. :-

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Archana Bhowmik (Debnath)	15	9862479974	F	Archana Bhowmik (Debnath)	
2	Jouti Debnath	12	9862787791	F	Jouti Debnath	
3	Sukriti Rani Das (Deb)	12	9774607913	F	Sukriti Rani Das (Deb)	
4	Rupa Bhowmik (Sarkar)	8	6909822829	F	Rupa Bhowmik Sarkar	
5	Monti Saha	8	9366753105	F	Monti Saha	
6	Rima Rani Saha	9	7629072266	F	Rima Rani Saha	
7	Suparna Saha	8	8794597273	F	Suparna Saha	
8	Rumu Saha	9	9863111961	F	Rumu Saha	
9	Dipu Saha	10	9612155433	F	Dipu Saha	
10	Mousumi Chowdhury (Das)	1	8974508911	F	Mousumi Chowdhury (Das)	
11	Soma Saha.	5	7629820893	F	Soma Saha	

Signature of the respective Surveyor

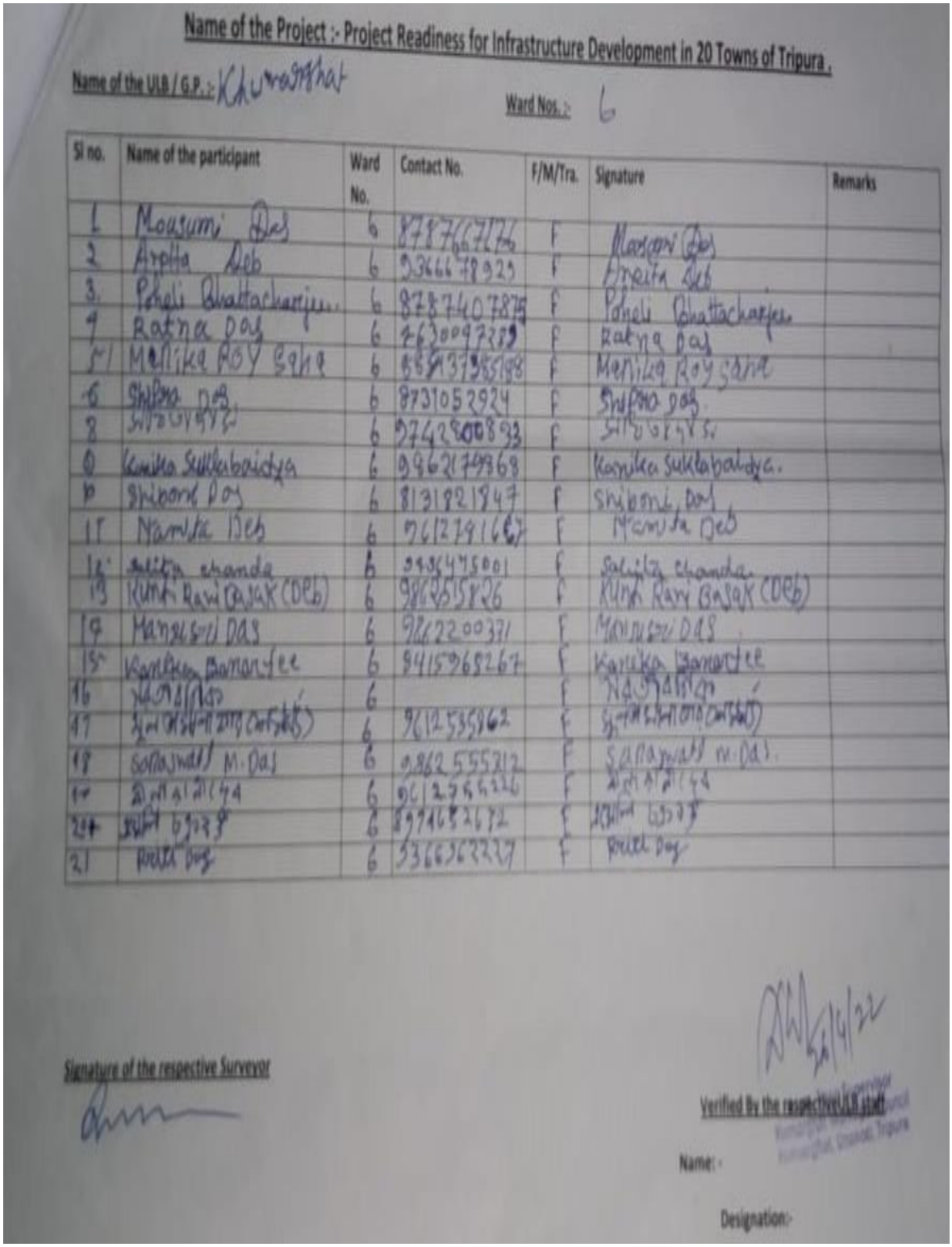
Verified By the respectiveULB staff

Name :-

Designation :-

Signature with Seal :-

Ward No- 01, 05, 08,09, 12 (12-04-2022)



Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura .

Name of the ULB / G.P. :- Kumarghat

Ward Nos. :- 6

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Mousumi Das	6	8787667776	F	Mousumi Das	
2	Arpita Deb	6	9366678923	F	Arpita Deb	
3	Paheli Bhattacharjee	6	8787407875	F	Paheli Bhattacharjee	
4	Ratna Das	6	8730097389	F	Ratna Das	
5	Monika Roy Saha	6	8837385188	F	Monika Roy Saha	
6	Swapna Das	6	8731052924	F	Swapna Das	
7	[illegible]	6	9742800893	F	[illegible]	
8	Kanika Sukhabaidya	6	9862799368	F	Kanika Sukhabaidya	
9	Shibani Das	6	8131821847	F	Shibani Das	
10	Mamita Deb	6	7612791667	F	Mamita Deb	
11	Sulata chanda	6	9365475001	F	Sulata chanda	
12	Kum. Rani Basak (Deb)	6	9862515826	F	Kum. Rani Basak (Deb)	
13	Manasi Das	6	9862200371	F	Manasi Das	
14	Kanika Banerjee	6	8415965267	F	Kanika Banerjee	
15	[illegible]	6		F	[illegible]	
16	[illegible]	6	9612535862	F	[illegible]	
17	Saraswati M. Das	6	9862555212	F	Saraswati M. Das	
18	[illegible]	6	9612566226	F	[illegible]	
19	[illegible]	6	8974652672	F	[illegible]	
20	Rinki Dey	6	9366362227	F	Rinki Dey	

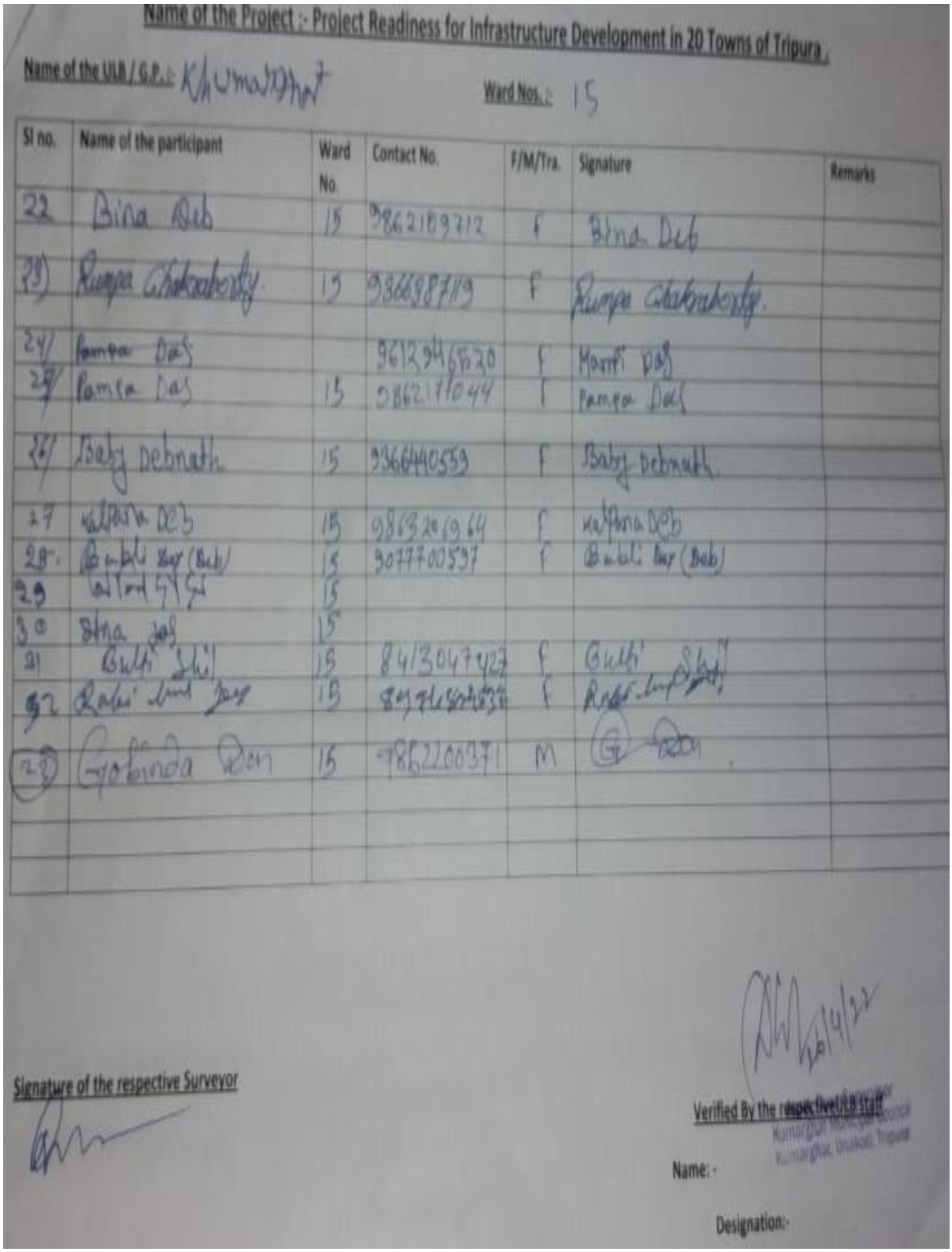
Signature of the respective Surveyor

Verified By the respective ULB staff

Name:-

Designation:-

Ward No- 06 (13-04-2022)



Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P.:- Kumarghat Ward Nos.:- 15

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
22	Bina Deb	15	9862189712	F	Bina Deb	
23	Rupa Chakraborty	15	9366987119	F	Rupa Chakraborty	
24	Pampa Das		9612946820	F	Pampa Das	
25	Pampa Das	15	9862170444	F	Pampa Das	
26	Baby Debnath	15	9366440559	F	Baby Debnath	
27	Kalpana Deb	15	9863209664	F	Kalpana Deb	
28	Babli Bar (Deb)	15	9077700537	F	Babli Bar (Deb)	
29	[illegible]	15				
30	Bina Das	15				
31	Gulti Shil	15	8413047427	F	Gulti Shil	
32	Rabi Lal Das	15	[illegible]	F	Rabi Lal Das	
33	Gobinda Deb	15	9862200371	M	Gobinda Deb	

Signature of the respective Surveyor

Verified By the respective ULB Staff

Name:-

Designation:-

Ward No-15, (13-04-2022)

CONSULTATION AT DHARAMANAGAR
Summary of Consultation with Stakeholders

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
12th April 2022	ULB office, Dharmanagar	4 M=04 F=00	Consultation with Honorable Chairperson and CEO of Dharmanagar MC	Briefing on project objectives probable implementation procedures Present drinking water supply source and its condition Potential positive and negative impacts due to project implementation Relevant information of the upcoming project and benefits of the project. Potential positive and negative impacts due to project implementation	The prime concern and apprehension of the ULB Chairperson regarding the project when construction work will start. The Chairperson of the ULB expressed need for the project and willingness to take it up; Operation and maintenance of the facilities developed under the project and community participation Operation and maintenance of the facilities developed under the project and community participation
19th May 2022	Ramkrishna Sarani	8 M=5 F=3	Community members	Briefing on project objectives probable implementation procedures Present water supply situation: only an hour of supply in a day Information on the benefits of the subproject in terms of economic and	The proposed scheme is planned to provide the drinking water in the daily basis. In the initial period we will decrease the frequency and the final will be daily water supply for the peoples. Generally, all the people consulted

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
				environmental enhancement Information on the benefits of the subproject in terms of economic and environmental enhancement Frequency of distribution is not constant in the locality Leakages in the existing water supply line in their locality.	were well aware about the proposed subproject. Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle. In addition, people belong to labour force wanted that they shall be provided employment during the subproject execution.

	
Consultation at ULB office	**Public Consultation Near Dharmanagar ISBT**

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Dharmanagar Ward No. –

Date: - 12/04 Place: -

Sl No.	Name (in CAPITAL LETTER)	Contact No.	Signature
	Pradyut De Sarkar	8837007493	12/04/22
	L. Darlong CEO/SDM Dharmanagar	9436904704.	
	Manisankar Gupta	9436173683	21/04/22
	Dipanjay Gupta	8415903530	

List of Participants in Consultation Meeting at ULB office

LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Dharmanagar Ward No. – 22

Date: - 10/05/2022 Place: - Ramkrishna Sarani (Station Road)

Sl No.	Name (in CAPITAL LETTER)	Contact No.	Signature
1	Prosenjit Pal Chowdhuri	8131966650	Prosenjit 18/5/22
2	Jamindar Chandra Pal	9863987829	Jamindar ch. Pal
3	Roma Pal	8131858916	Roma Pal.
4	Sima Pal Roy	9862613088	Sima Paul (Roy)
5	Satyajit Paul	9863250089	Satyajit Paul
6	Shyamal Paul	9862616593	Shyamal Paul.
7	Komala Devi	–	
8	Asis Shai	7005664738	Asim Shai

List of Participants in Consultation Meeting Near Dharmanagar ISBT

Summary Outcome

Sl. no	Date and place of consultation	Persons consulted	Topics discussed During consultation	Outcome of consultation
1	09.01.2022 Ward No-18	Total=12 M-03 F-09	Discussed about: present water supply system and its quality & proposed works and its advantages, their willingness to project work, temporary inconveniences during pipe laying works, contractor's cooperation, willingness to pay for sustainability of the project	• People are concerned about the poor supply (1 hour water supply per day) and quality of water. Water supply is erratic and quality is poor. • People demand 24x7 supply connections to be provided to their area under the proposed project.
2	03.02.2022 Ward No-1	Total=09 M-00 F-09	Discussed about: Present Status of Water Supply in the town. Proposed works under this project Quality of present Water Supply Environment & Health impacts of proposed projects	• People are concerned about the poor supply and quality of water. • People are supportive of the project. • People agree with the proposed water supply works and understand that proposed works will improve health and environmental conditions of town and chances of waterborne diseases will be mitigated at some extent.
3	03.02.2022 Ward No-2	Total=14 M-03 F-11	Discussed about: Present water supply system, Awareness of the project – including Project Coverage area, Dust and noise pollution and disturbances during construction work,	• People are concerned about the poor water quality issue. • People demanded for the measures of dust suppression during implementation of the project • People are supportive of the project.
4	03.02.2022 Ward No- 13	Total=10 M-09 F-01	Discussed about: Present Status of Water Supply in the town, Awareness of the project-including	• People are supportive of the project and indicated their willingness to participate in the project to make It successful

Sl. no	Date and place of consultation	Persons consulted	Topics discussed During consultation	Outcome of consultation
			Project Coverage area, Present drinking water problem-quantity and quality	• People are aware of the proposed Project. • Quality of present water supply is not good and sufficient water is not supplied, proposed water supply works will provide good and sufficient quantity of water, which will save time and energy of people present spent to collect water from existing supply
5	12.04.2022 at Durgapur	Total=09 M-08 F-01	Discussed about: Present Status of Water Supply in the town and Environment & Health impacts of proposed project	• People are concerned about the poor supply and quality of water. Water supply is erratic and quality is poor. • Proposed water supply will improve health conditions and living standards of people due to supply of good quality water round the clock
6	12.04.2022 - Near Rajbari Tri-Junction	Total=05 M-05 F-00	Discussed about: Present drinking water supply source and its condition. Need of improvement of the present situation Briefing on project objectives probable implementation procedures	• The beneficiaries expressed need for the project and willingness to take it up • Dharmanagar is operating the water supply system for the town, but capacity to be further built. • People were briefed about the complaint redress mechanism.
7.	12.04.2022 – Thana corner	Total=05 M-05 F-00	Discussed about: Present drinking water supply source and its condition Need of improvement of the present situation Briefing on project objectives probable implementation procedures	• The beneficiaries expressed need for the project and willingness to take it up • Content of iron in water reported by beneficiaries • Dharmanagar is operating the water supply system for the town, but capacity to be further built. • People were briefed about the environmental & social impact of the project and

Sl. no	Date and place of consultation	Persons consulted	Topics discussed During consultation	Outcome of consultation
				long-term benefit of the project

Annexure

Photographs of Key Informants Interview and Focus Group discussion



Ward No-18, Dated-09-01-2022



Ward No- 01, Dated- 03-02-2022



Ward No- 02, Dated- 03-02-2022



Ward No- 13, Dated- 03-02-2022





Durgapur, Ward No- 13, Dated-12-04-2022





Near Rajbari Trijunction, Dated 12-04-2022



Dharmanagar Market, Dated- 08-11-2021

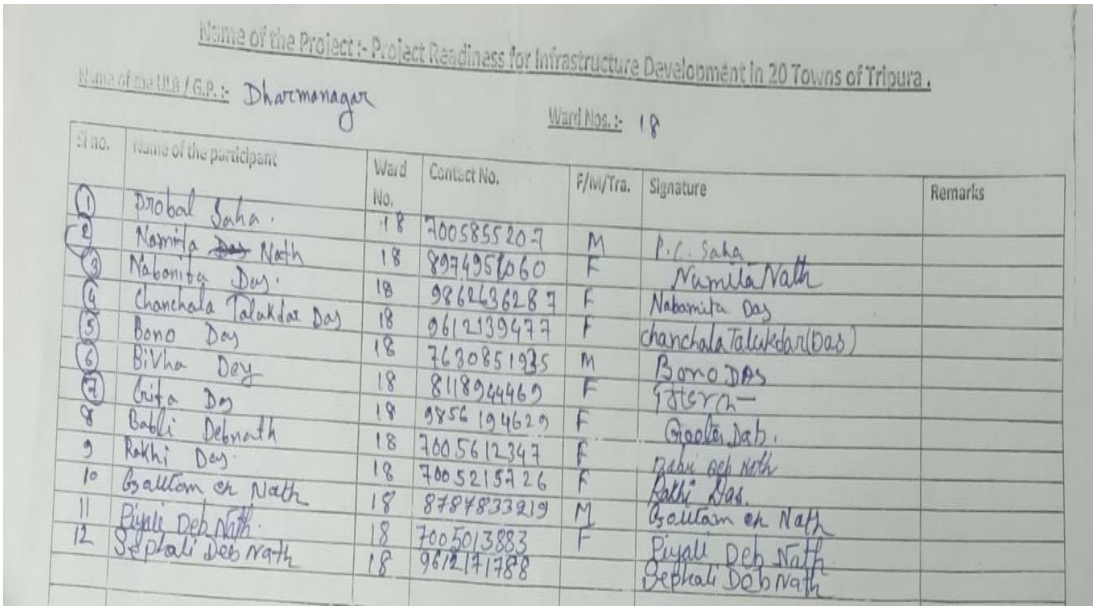
Stakeholder Consultation





Consultation with Dharmanagar Market Committee, Dated- 08-11-2021

Attendance Sheet of Focus Group Discussion (FGD)

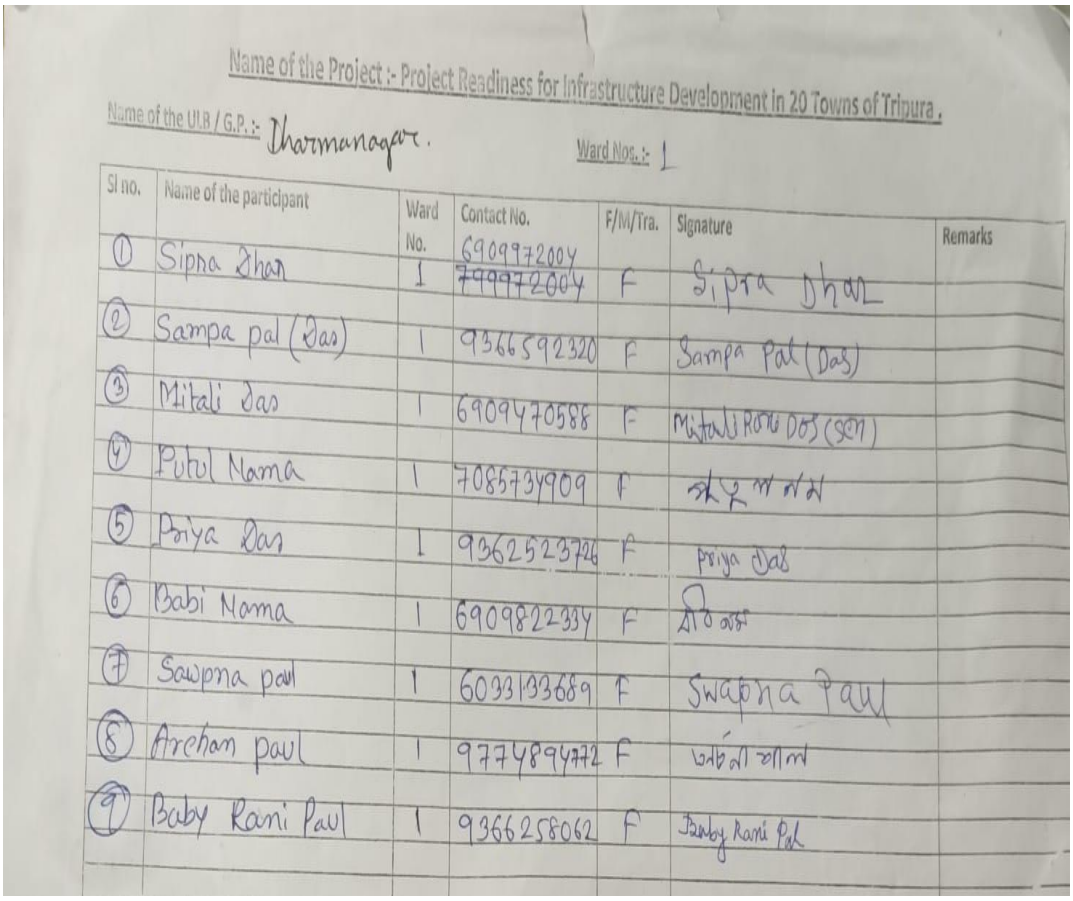


Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P. :- Dharmanagar Ward Nos. :- 18

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Probal Saha.	18	7005855207	M	P. C. Saha	
2	Namita ~~Das~~ Nath	18	8974950160	F	Namita Nath	
3	Nabanita Dey.	18	9862636287	F	Nabanita Dey	
4	Chanchala Talukdar Das	18	9612139477	F	Chanchala Talukdar(Das)	
5	Bono Dey	18	7630851935	M	Bono Das	
6	Bivha Dey	18	8118944469	F	Bitha	
7	Gita Dey	18	9856194629	F	Gopta Deb.	
8	Babli Debnath	18	7005612347	F	Babli Deb Nath	
9	Rakhi Dey	18	7005215726	F	Rakhi Das.	
10	Gautam Deb Nath	18	8787833219	M	Gautam Deb Nath	
11	Piyali Deb Nath	18	7005013883	F	Piyali Deb Nath	
12	Sephali Deb Nath	18	9612171788		Sephali Deb Nath	

Ward No-18 (09-01-2022)



Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P. :- Dharmanagar. Ward Nos. :- 1

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Sipra Dhar	1	6909972004 7999972004	F	Sipra Dhar	
2	Sampa pal (Das)	1	9366592320	F	Sampa Pal (Das)	
3	Mitali Das	1	6909470588	F	Mitali Rani Das (Sen)	
4	Putul Nama	1	7085734909	F	[illegible]	
5	Priya Das	1	9362523726	F	Priya Das	
6	Babi Nama	1	6909822334	F	[illegible]	
7	Sawpna paul	1	6033133689	F	Swapna Paul	
8	Archan paul	1	9774894772	F	[illegible]	
9	Baby Rani Paul	1	9366258062	F	Baby Rani Pal	

Ward No- 01 (03-02-2022)

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P.:- Dharmonagar Ward Nos.:- 2

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1.	GOPAL GOWELA	2	9863338838	M	[illegible]	
2.	MIHIR DAS	2	7005268258	M	Mihir Das	
3.	Jayanti Growala	2	9862538838	F	[illegible]	
4.	Anjali Ghosh	2	9362118174	F	Anjali Ghosh	
5.	Manju Malakar	2	9485153086	F	Manju malakar	
6.	~~Rumi Malakar~~	2			~~Manju Malakar~~	
7.	Moyna Growela	2	9862362978[illegible]	F	Moyna Growal	
8.	Runu Malakar	2	7085244183	F	[illegible]	
9.	Narayan Malakar	2	9436367497	M	[illegible]	
10	Sathi Malakar	2	9612301270	F	[illegible]	
11	Dipali Rani Das	2	9436726393	F	Dipali Rani Das	
12	Bithi Dutta	2	6033193211	F	Bithi Dutta	
13	Purnima Malakar	2	9862084[illegible]	F	[illegible]	
14	Kalpana Malak Das	2	9774693488	F	Kalpana malak (Das)	
15	Pranati Ghosh	2	7628930003	F	Pranati Ghosh	

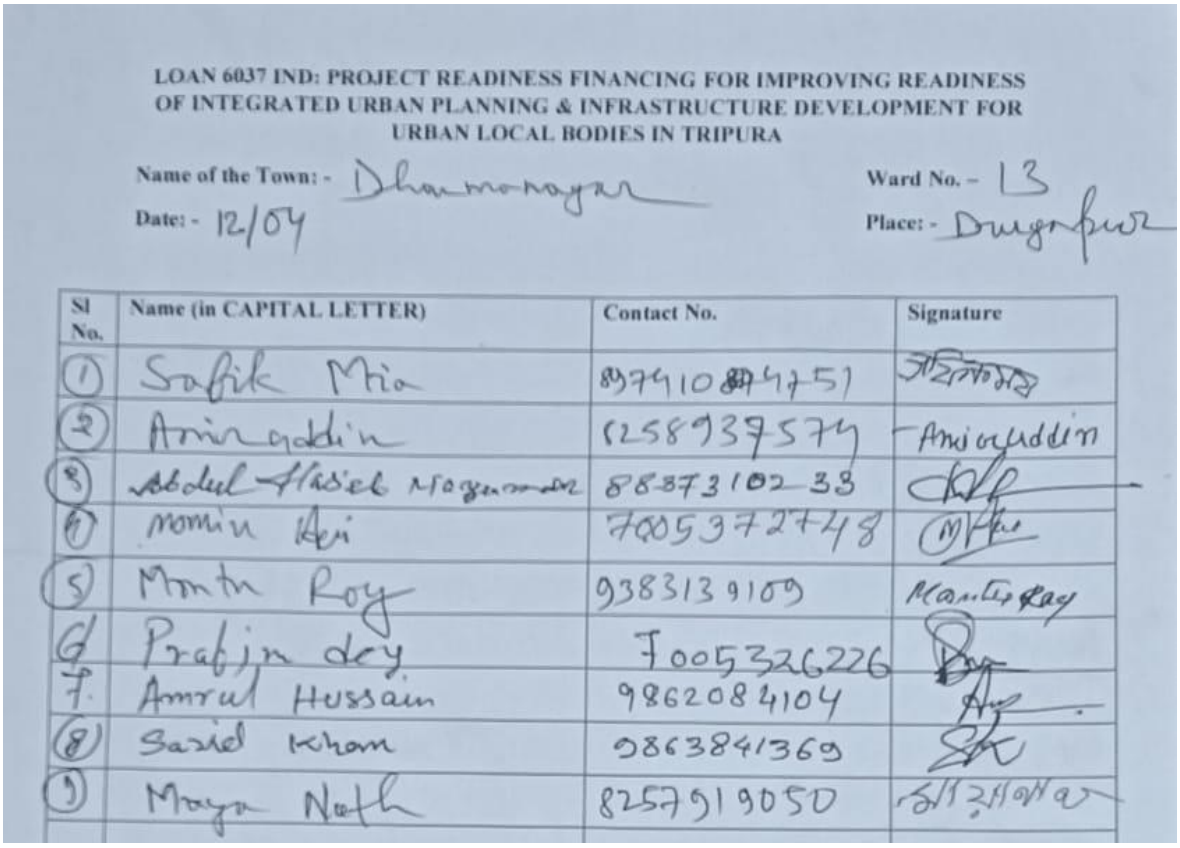
Ward No- 02 (03-02-2022)

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura.

Name of the ULB / G.P.:- Dharmonagar ULB Ward Nos.:- 13

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Chitra Chakroborty	13	9862290437	F		
2	Abdul Majid		9862703997	M	Abdul Majid	
3	Arkas Ali		8413838118	M	Arkas Ali	
4	Rafik Uddin		9862982913	M	[illegible]	
5	Sulaman Ahammad		7005804915	M	Sulaman Ahamed	
6	Abdul Karib		9862128477	M	Abdul Karim	
7	Mithu chakraborty		9862618942	M	Mithu Chakraborty	
8	Sanjay Acharjee		9101564942	M	Sanjay Acharjee	
9	Rafel Ahmed.		9436137595	M	Rafel Ahmed.	
10	Imran Choudhury		6009233859	M	Imran Choudhury	

Ward No-13, (03-02-2022)



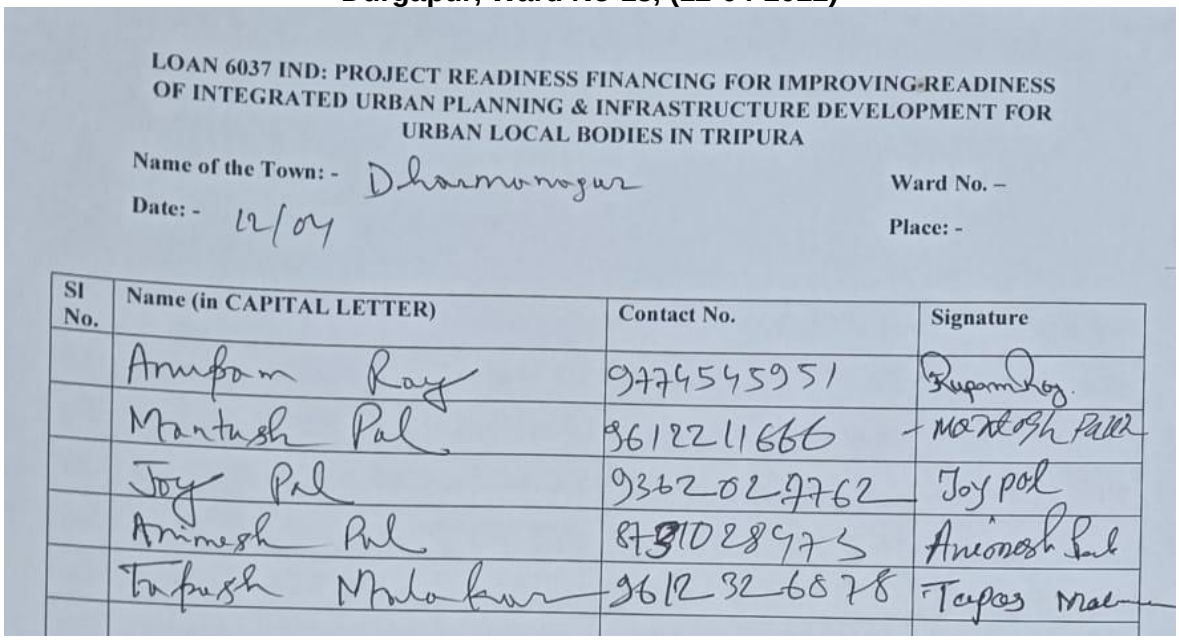
LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Dharmanagar Ward No. - 13

Date: - 12/04 Place: - Durgapur

Sl No.	Name (in CAPITAL LETTER)	Contact No.	Signature
1	Safik Mia	8974108[illegible]751	
2	Aminuddin	8258937574	Aminuddin
3	Abdul Hasek Mozumder	8887310233	
4	Nomin Ali	7005372748	
5	Montu Roy	9383139109	Montu Roy
6	Prabin dey	7005326226	
7	Amrul Hussain	9862084104	
8	Sazid Khan	9863841369	
9	Maya Nath	8257919050	

Durgapur, Ward No-13, (12-04-2022)



LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Dharmanagar Ward No. -

Date: - 12/04 Place: -

Sl No.	Name (in CAPITAL LETTER)	Contact No.	Signature
	Anupam Roy	9774545951	Anupam Roy
	Mantush Pal	9612211666	Mantosh Pal
	Joy Pal	9362027762	Joy pal
	Animesh Pal	8794028475	Animesh Pal
	Tapash Malakar	9612326878	Tapas Mal

Near Rajbari Tri-Junction, (12-04-2022)

CONSULTATION AT AMBASSA

Summary of Consultation with Stakeholders

Date	Location	No. of Participants	Participants	Topics Discussed	Issues
13th Sept 2022	Dalubari-Ward no. 1	6 M=2 F=4	Community members	• Briefing on project objectives probable implementation procedures • Present drinking water supply source and its condition • Briefing on project objectives probable implementation procedures • Potential positive and negative impacts due to project implementation • Relevant information of the upcoming project and benefits of the project. • No adverse impacts on structures, livelihoods anticipated. • People are willing to cooperate by all means to implement the project successfully	• The area has insufficient and inadequate drinking water supply. The area faces severe water crisis during the summer season when the ground water level drops. • Short term impact on air quality-dust generation, noise level, access problem, inconvenience for public and movement of vehicle. • The representative from community raised issue regarding the supplied water quality. Which is not upto the mark. • Some participants did not have water connections. The women were happy to learn about the proposed project.

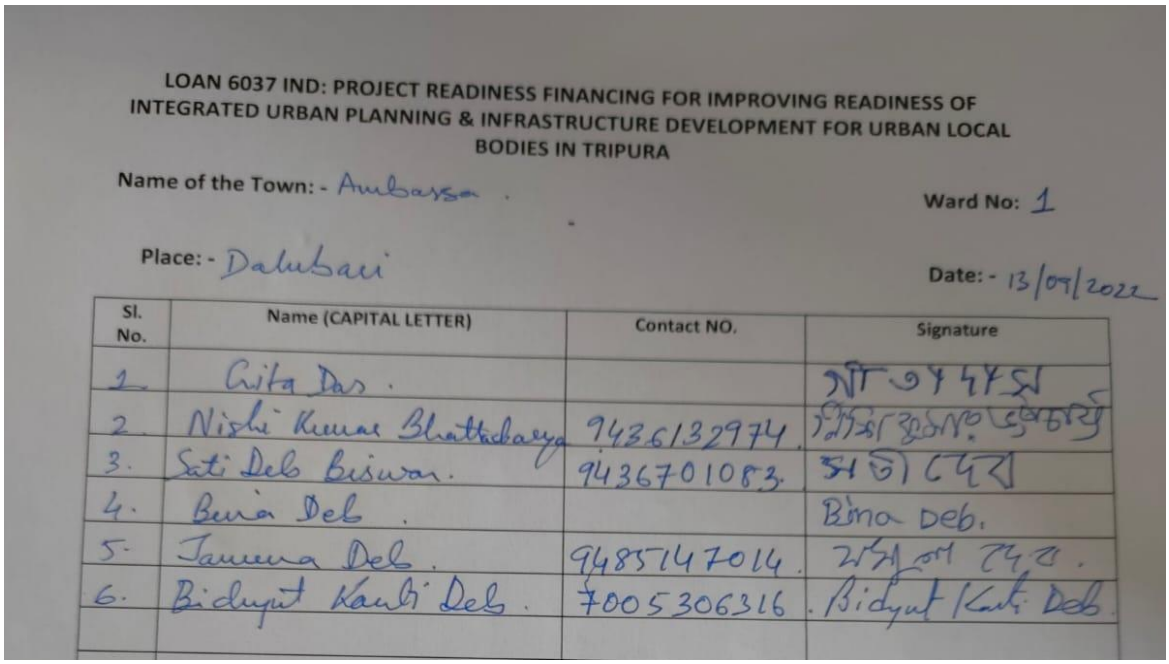
Date	Location	No. of Participants	Participants	Topics Discussed	Issues
13th September 2022	Kanchanpur market area	6 M=6 F=0	Shopkeepers	• Briefing on project objectives probable implementation procedures • Relevant information of the upcoming project and benefits of the project. • Present drinking water supply source and its condition- only half an hours of supply per day • Potential positive and negative impacts due to project implementation • Area to be covered under this project	• The area has insufficient and inadequate drinking water supply. The area faces severe water crisis during the summer season when the ground water level drops. • Pond water uses for the domestic use purpose. • Short term impact on air quality- dust generation, noise level, access problem, inconvenience for public and movement of vehicle. • No adverse impacts on structures, livelihoods anticipated.



Public Consultation at Dalubari, Ward no-1



Public Consultation at Kanchanpur market area



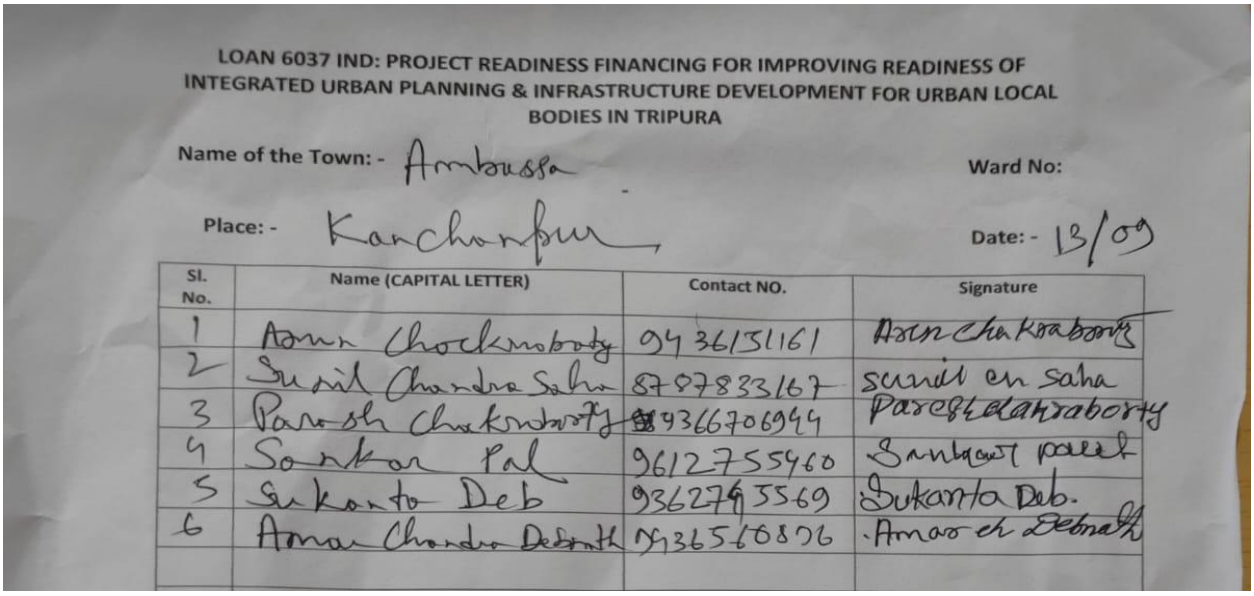
LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Ambassa Ward No: 1

Place: - Dalubari Date: - 13/09/2022

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
1.	Gita Das.		
2.	Nishi Kumar Bhattacharya	9436132974.	
3.	Sati Deb Biswas.	9436701083.	
4.	Bina Deb.		Bina Deb.
5.	Jamuna Deb.	9485147014.	
6.	Bidyut Kanti Deb.	7005306316.	Bidyut Kanti Deb.

List of Participants in Consultation Meeting at at Dalubari



LOAN 6037 IND: PROJECT READINESS FINANCING FOR IMPROVING READINESS OF INTEGRATED URBAN PLANNING & INFRASTRUCTURE DEVELOPMENT FOR URBAN LOCAL BODIES IN TRIPURA

Name of the Town: - Ambassa Ward No:

Place: - Kanchanpur Date: - 13/09

Sl. No.	Name (CAPITAL LETTER)	Contact NO.	Signature
1	Asim Chakraborty	9436131161	Asim Chakraborty
2	Sunil Chandra Saha	8787833167	sunil ch saha
3	Paresh Chakraborty	9366706944	Paresh Chakraborty
4	Sankar Pal	9612755460	Sankar pall
5	Sukanta Deb	9362793569	Sukanta Deb.
6	Amar Chandra Debnath	9365760876	Amar ch Debnath

List of Participants in Consultation Meeting at Kanchanpur

Summary of Focus Group discussion held at Ambassa

Focus-group discussions with affected persons and other stakeholders were conducted to learn their views and concerns. General public and the people residing along the project activity areas were also consulted during visits to the project sites.

Summary of Outcome

Sl. no	Date and place of consultation	Persons consulted	Topics discussed during consultation	Outcome of consultation
1	03.03.2022 Ward No-1,2,5,6,9,10, 11,13,14	Total=70 M-00, F-70	• Discussed about: project objectives, probable implementation procedures, present drinking water supply source and its conditions, • Potential positive and negative impacts due to project implementation, relevant information of the upcoming project and benefits of the project. •	• Beneficiaries expressed their satisfaction about the upcoming water supply project • The prime concern of stakeholders regarding the project when construction work will be started. • They expressed need for the project and willingness to take it up • Beneficiaries are well aware about the short term negative and long term positive impacts of the upcoming water supply project. They expressed their believes only on sustainable positive long term impacts • Beneficiaries are confident about their socio-economic upliftment due to implementation of this project
2	12.04.2022	Total=32 M-28, F-04 Meeting with project beneficiaries at ULB office	• Discussed about: Project related information, All types of developmental activities in different sectors planned for Ambassa to get feedback from the participants and also to get an idea of the status of existing infrastructural facilities like existing conditions of roads, water supply, public amenities, drainage structures etc. • Briefed about the project, ADB safeguard framework and likely proposed project interventions (w/s, Drainage, SWM	• During the consultation it has come out that iron contamination is high in the water almost in every wards. • The Supply of water is very irregular in ward no-07. Duration of day to day drinking water supply is very less. Duration of drinking water supply is 30 minutes per day. People of ward no. 07 & 11 informed that they suffer due to less availability of water • Most of the people demanded to install modified machineries to improve water quality and adequate water supply.

Sl. no	Date and place of consultation	Persons consulted	Topics discussed during consultation	Outcome of consultation
			and other urban amenities), water scarcity especially in dry season. •	• They were overall enthusiastic about the upcoming water supply project which they believed that would increase the upper limit of per captia water supply, provide socio-economic upliftment, water scarcity problem, • Hopeful about improvement of internal roads, drainage and urban amenities in the town
3	12.04.2022 Ward No-6	Total=04 M-03, F-01 Stakeholder consultation meeting with Honourable Chairperson & Respected SDM of Ambassa	• Briefing on project objectives probable implementation procedures • Present drinking water supply source and its condition • Potential positive and negative impacts due to project implementation • Relevant information of the upcoming project and benefits of the project • Potential positive and negative impacts due to project implementation	• The prime concern and apprehension of the ULB Chairperson regarding the project when construction work will start. • The Chairperson of the ULB expressed need for the project and willingness to take it up; • Operation and maintenance of the facilities developed under the project and community participation • Operation and maintenance of the facilities developed under the project and community participation

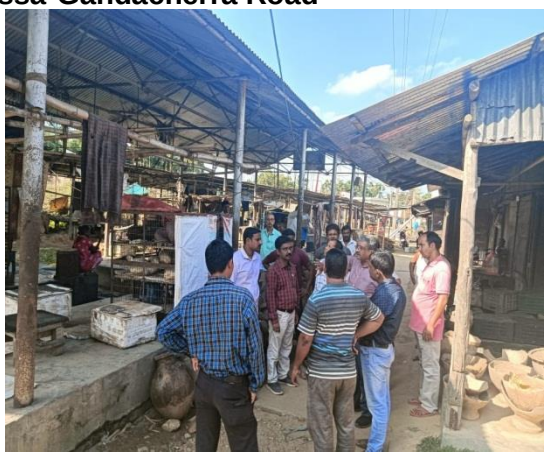
Focus Group discussion and Stakeholder consultations, Photo and Attendance





Dashamighat Market, Ambassa-Gandacherra Road





Dalubari Market





Dalubari **Ambassa Market area**



Near Fish Market



Near Motor Stand





Kalibari Market

Consultation Photo and Signature Sheet



Ward No-01,02, Dated- 03.03.2022



Ward No-05,06, Dated- 03.03.2022



Ward No-13,09, Dated- 03.03.2022



Ward No-10,11,13,14, Dated- 03.03.2022

Attendance Sheet of Focus Group Discussion (FGD)

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura .

Name of the ULB / G.P. :- Ramthakur [illegible]/Navodhya/Bhisti/[illegible] Ward Nos. :- 1/2

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Gayatri Shaha	[illegible]	[illegible]		[illegible]	
2	[illegible]	[illegible]	8119933522		Mamita Sukla Baidya	
3	Rubi Deb	1	8787991435		Rubi Deb	
4	Aparna Sulabaidhya	1	9366196606		[illegible]	
5	Dipali Das	1	8732861174		Dipali Das	
6	Saraswati Das	1	9436528102		Saraswati Das.	
7	Hena Deb	1			Hena Deb.	
8	Rashmi Debnath	1	9436351228		Rashmi Debnath	
9	Sampa Biswas(Das)	1	9436499441		Sampa Biswas(Das)	
10	Anjana Biswas	1	8414039537		Anjana Biswas.	
11	Rakhi Debnath	1	[illegible]		[illegible]	
12	Saraswati Shaha	1	6009518842		Saraswati Saha (Roy)	
13	Rita chakrabarty	1	[illegible]		Rita Chakrabarty	
14	Aparna Choudhury	1	9366835171		Aparna choudhury.	
15	Joyashree paul	1	8974653979		Joyashri paul.	
16		1	[illegible]		[illegible]	
17	Rupa Deb		8974218469		Rupa Deb	
18	Sumiti Das	2	9402339537		[illegible]	
19	Jumuna Deb	1	9485147014		[illegible]	
20	Kabita Das	1			Kabita Das.	

Pinki Nath
Signature of the respective Surveyor

Verified By the respectiveULB staff

Name: -

Designation:-

Signature with Seal: -

SUJIT CHOUDHURY
Assistant Town Supervisor
Ambassa Municipal Council

Ward No-01,02, Dated- 03.03.2022

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura .

Name of the ULB / G.P. :- Ambasha Ward Nos. :- 5/6

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Sabitri Das	6	9612533744	F	Sabitri Das	
2	Shilpi Deb	5	6033289127	F	Shilpi Dey (Chakraborty)	
3	Dipti Deb	5	9436477329	F	Dipti Deb	
4	Arati Debnath	5	8414928857	F	Arati Debnath	
5	Surabala Das	6	9402117092	F	[illegible]	
6	Bulti Das	5	8837401982	F	Bulti Das	
7	Silpi Dey	5	9612032548	F	Shilpi Deb	
8	Nandita Das	5	9366169509	F	Nandita Das.	
9	Maya Nath (Bhaumik)	5	9366625679	F	[illegible]	
10	Sabita Debnath	5	9436710175	F	Sabita Debnath	
11	Sabita Chakrborti	6	8414832802	F	Sabita Chakraborty	
12	Bharati Chakraborti	5	8731893671	F	[illegible]	
13	Maya Rani Sharma	6			[illegible]	

Mamata Debnath
Signature of the respective Surveyor

SUJIT CHOUDHURY
Assi... Town Supe...or
Am... ...icipal C...

Verified By the respectiveULB staff

Name:-

Designation:-

Signature with Seal:-

7/3/22

Ward No-05,06, Dated- 03.03.2022

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura .

Name of the ULB / G.P. :-

Ward Nos. :- 13,9

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Sima Debnath	13	9862265662		Sima Debnath	
2	Suchitra Pal	13	7085487677		Suchitra Paul	
3	Arpita Pal	13	9612534840		Arpita Paul	
4	Rupu Deb	13	8414063543		Rupu deb	
5	Sima Rudrapal	13	7005229708		Sima Rudra Paul.	
6	Kabita Pal (Shil	13			কবিতা পাল (শীল)	
7	Basanti Pal	13	9612873546		বাসন্তী পাল	
8	Lilima Rudra Pal	13	7005417429		Lilima Rudra paul.	
9	Aparna Debnath	13	9366289356		Aparna Debnath	
10	Purnima Deb	13	8732861470		Purnima Deb	
11	Monika Sharma	13			মনিকা শর্মা	
12	Bishaka Rudrapal	13	7005567727		বিশাখা রুদ্রপাল	
13	kalpana pal	13	8131062161		Kalpana Paul	
14	Nilu Shil	13	~~8787835877~~		নিলু শীল	
15	Roma Pal	13	8787825877		রোমা পাল	
16	Gowri Pal	13	9436980714		Gouri paul	
17	Prabhati Das	07	8729993572		Prabhati Das	
18	Pritashi Das	09			Pritashi Das	
19	Manju Rani Pal	09	8414041339		Manju Rani Paul	
20	Rashmani Majumder	09	7629045091		রশ্মনি মজুমদার	
21		13	9600961589		৬০০৯৬১৫৮৯	

Pinki Nath
Signature of the respective Surveyor

Verified By the respective ULB staff

Name: -

Designation:-

Signature with Seal: -

SUJIT CHOUDHURY
Assistant Town Supervisor
Ambassa Municipal Council

Ward No-13,09, Dated- 03.03.2022

Name of the Project :- Project Readiness for Infrastructure Development in 20 Towns of Tripura .

Name of the ULB / G.P. :- Ambasa Dhalai Tripura

Ward Nos. :- 11 / 10 / 13 / 14

Sl no.	Name of the participant	Ward No.	Contact No.	F/M/Tra.	Signature	Remarks
1	Aparna Paul	11	9612621366		Aparna Paul	
2	Rakhi Rudra Paul	11	7085815015		Rakhi Rudra Paul.	
3	Mamata Rudra Paul	11	9436757012		Mamata Rudra Pal.	
4	Ratna Barua.	11	8131824104		Ratna Barua	
5	Rina Rani Rudra Paul	11	9862956613		Rina Rani Rudra Paul	
6	Bulti Paul	11	9485072457		Bulti Paul.	
7	Priyanka Rani Paul	10	7005617533		Priyanka Rani Paul	
8	Rajasree Paul	10	8974887413		Rajashree Paul	
9	Dipti Das (Rudra Paul)	10	8974219425		Dipti Das (Rudra Paul)	
10	Anju Paul	11	9436560452			
11	Sukriti Paul	11	8414012769			
12	Archana Dey	13	7005534432		Archana Dey	
13	Sharbani Das	14	8415815710		Sharbani Das	
14	Sankari Paul	10/11	8837088700		Sankari Paul.	
15	Pinki Rudra Paul	11	9612131444		Pinky Rudra Paul	
16	Sipra Debnath (Das)	10	9612608510		Shipra Debnath (Das)	

Mamata Debnath

Signature of the respective Surveyor

Verified By the respective ULB staff

Name: -

Designation:-

7/3/22

Signature with Seal: - SUJIT CHOUDHURY
Assistant Town Supervisor
Ambassa Municipal Council

Ward No-10,11,13,14, Dated- 03.03.2022

Appendix 10: Sample Grievance Registration Form

(To be available in Bengali 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:	

অভিযোগ নিবন্ধন ফর্মের নমুনা

..... প্রকল্পকে বাস্তবায়িত করার লক্ষে অভিযোগ, পরামর্শ, অনুসন্ধান এবং মন্তব্যের জন্য স্বাগত।

আমরা অভিযোগকারীকে অভিযোগ সহ নাম জানাতে উৎসাহিত করি এবং আপনার সাহচর্যে এসে এর শোধন ও প্রতিক্রিয়া জানাতে সক্ষম হই।

অবশ্যই আপনি আপনার ব্যক্তিগত বিষয় বিস্তারিত ভাবে যুক্ত করতে ইচ্ছাপ্রকাশ করবেন। যে তথ্য আপনি দেবেন, তা অবশ্যই গোপন থাকবে। তাই অনুগ্রহ করে আপনার নাম লিখে / টাইপ করে জানান।

তারিখ	নিবন্ধনের জায়গা	প্রকল্পের শহর প্রকল্পঃ			
যোগাযোগের তথ্য / বিস্তারিত ব্যক্তিগত তথ্য					
নাম		লিঙ্গ	পুরুষ মহিলা	বয়স	
বাড়ীর ঠিকানা					
জায়গা / স্থান					
ফোন নঃ					
ই-মেল					
যেকোন অভিযোগ / পরামর্শ / মন্তব্য / প্রশ্ন অনুগ্রহ করে নিচে বিস্তারিতভাবে (কে, কি, কোথায় এবং কেমন করে) আপনার অভিযোগ জানান যদি কোন সংযুক্তি / চিরকুট / চিঠি অন্তর্ভুক্ত করতে চান, অনুগ্রহ করে সেখানে টিক দিন।					
আপনার অভিযোগ / মন্তব্যের হালনাগাদ (আপডেট) বা প্রতিক্রিয়া কিভাবে পেতে চান?					

Office ব্যবহারের জন্যঃ

অভিযোগ নিবন্ধনকারী আধিকারিকের নামঃ	
যোগাযোগ ব্যবস্থাঃ চিরকুট / চিঠি- ই-মেল- মৌখিক / টেলিফোন-	
নিবন্ধকৃত অভিযোগ পর্যালোচনাকারী আধিকারিকের নাম ও পদঃ	
অভিযোগের বিরুদ্ধে গৃহীত ব্যবস্থা-	
গৃহীত ব্যবস্থা প্রকাশ্যে আনা হয়েছে কি না	হ্যা না
প্রকাশের উপায়	

Appendix 11: Guidelines for Workers Camps

(Based on IFC benchmark standards for workers accommodation)

Guidelines for Workers' Accommodation

1. Availability of sufficient number of clean rooms for the workers with adequate facilities of ventilation, Drinking water, Electricity/fan/light (natural and artificial lighting) etc. in each room.
2. Camps should not be subjected to periodic flooding nor located within 200 feet of swamps, pools, sink holes or other surface collections of water. All sites should be graded, ditches and rendered free from depressions in which water may become a nuisance.
3. Accessibility to an adequate and convenient supply of potable water to the workers. Depending upon the climate, weather conditions and accommodation standards, 80 to 180 litres per persons per day water should be available and drinking water should meet the national/WHO drinking water standards.
4. Camp site should be adequately drained to avoid the accumulation of stagnant water.
5. All tanks used for the storage of drinking water should be constructed and covered as to prevent water stored therein from becoming polluted or contaminated.
6. All sites should be adequate in size to prevent overcrowding of necessary structures.
7. Camps should have Crèche facility for children with necessary arrangements.
8. The grounds and open areas surrounding the shelters should be maintained in a clean and sanitary condition free from rubbish, debris, waste papers, garbage or other refuse.
9. Beds, cots, or bunks, and suitable storage facilities such as wall lockers for clothing and personal articles should be provided in every room used for sleeping purposes.
10. A separate bed for each worker should be provided. Double deck bunks are not advisable for the safety and hygiene reasons and their use should be minimized. If they are used there must be enough clear space between the lower and upper bunk of the bed. Standard range is 0.7 to 1.10 meters. Triple deck bunks are prohibited.
11. All heating, cooking, and water heating equipment should be installed in accordance with State and local ordinances, codes, and regulations governing such installations. If a camp is used during cold weather, adequate heating equipment should be provided.
12. If food is provided, it should cater for different cultural needs. Kitchens should be provided with facilities to maintain adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean running water and materials for hygiene drying.
13. All kitchen floors, ceiling and wall surface adjacent to or above food preparation and cooking areas should be built using durable, non-absorbent, easily cleanable, non-toxic materials.
14. No person with any communicable disease shall be employed or permitted to work in the preparation, cooking, serving, or other handling of food, foodstuffs, or materials used therein, in any kitchen or dining room operated in connection with a camp or regularly used by persons living in a camp.
15. There should be recreation facilities for the camp workers i.e. TV/sports/newspaper/magazine etc.
16. There should be facility of mosquito's prevention and control i.e. use of mosquito net/coil/electric repellent/pesticide etc.
17. Sanitary and toilet facilities should be constructed of the materials that are easily cleanable. Standard range of the toilets varies from 1 unit for 6 persons to 15 persons. For urinals, standards are 1 unit for 15 persons.
18. There is no need to provide separate urinals in any place where less than 50 workers are

employed or where the latrines are connected to water borne sewage system.

19. Sanitary and toilet facilities should be designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors.
20. Separate toilet and bathing facilities should be available for Men and women. These facilities shall be distinctly marked "for men" and "for women" by signs printed in English and in the native language of the persons using the facilities, and/or marked with easily understood pictures or symbols.
21. Workers' gender, religious, cultural and social backgrounds should be respected. In particular, workers should be provided with the possibility of celebrating religious holidays and observances.
22. No pets, birds or livestock should be kept or fed unless approved by management or camp operator.
23. There should be proper arrangement of colour coded dustbins i.e., Green for wet/biodegradable wastes, blue for dry/non-biodegradable waste and red for safe disposal of domestic hazardous waste i.e. sanitary napkins and diapers.
24. There should be adequate facility for waste water management (i.e. septic tanks/soak pits) and for disposal of Municipal solid waste (i.e. composting).
25. The person in charge of managing the accommodations has a specific duty to report to the health authorities the outbreak of any contagious diseases, food poisoning and any other important casualties.
26. Guidance on the detrimental effects of the abuse of alcohol and drugs and other potentially harmful substances and the risk, concerns related to HIV/AIDS and other health risk related activities should be provided to the workers through group/individual orientations and should also be displayed at camps as visual boards.
27. Workers should have easy access to medical facilities and medical staff where possible female doctors/nurses should be available for female workers. Regular health check up should be done for the workers. First-AID Kit/Health care facilities should be available in the camps. There should be proper demarcation/display of First Aid facility and First Aider.
28. A specific fire safety plan should be prepared including training of fire wardens, periodic testing and monitoring of fire safety equipment.

    All key contacts, emergency contact number, including nearby hospital should be posted in a prominent place and in all languages present e.g., at camp gate and throughout the camp.

Appendix 12: Guidelines for Prevention and Control of COVID-19

Introduction:

Construction worksite and other workplaces are relatively close settings, with shared spaces like work area,pathways, Worker camp, Site office and material handling area etc. and COVID-19 infection can spread relatively fast among workers, staffs and visitors.

There is a need to prevent spread of infection and to respond in a timely and effective manner in case suspect case of COVID-19 is detected in these settings, so as to limit the spread of infection.

Principles of Worker Protection:

- Consistently practice social distancing.
- Cover coughs and sneezes.
- Maintain hand hygiene.
- Clean surfaces frequently.

Maximum Precaution for Persons/Labourers Reporting To Work:

- IF SICK, STAY HOME!
- IF SICK, GO HOME!
- IF SOMEONE SICK, SEND THEM HOME!

Covid-19 Typical Symptoms:

- Fever
- Cough
- Shortness of Breath
- Sore Throat

Morning and evening temperature screening of all persons at the worksite is done by EHS officer with Infrared Thermometer and register was also maintained.

Self-Attestation By Persons/Labour Prior To Work:

Prior to starting a work, each labour /worker will self-attest to the supervisor and the documents is collected by EHS Officer. It consists the following points,

- No signs of COVID-19 symptoms within the past 24 hours.
- No contact with an individual diagnosed with COVID-19. (contact means living with a positive person, being within 6 ft. of positive person OR sharing things of positive person).
- Not undergone quarantine or isolation (in case of any labourer /worker who has been quarantined or isolated previously, the engagement shall be only after obtaining the requisite clearance from trained and registered medical practitioner). The self-attestation would be verified by EHS officer deployed at site through discussions with laborers /workers and/or preliminary checks such as temperature checks, etc. prior to their engagement at site.
  Persons/Labourers showing COVID-19 symptoms or not providing self-attestation will be directed to leave the work site and report to the fever clinic/quarantine Centre immediately. Labour not to return to the work site until cleared by fever clinic/quarantine Centre.

General Guidelines:

- No hand shake is permissible at site, office.
- Non-essential physical work that requires close contact between workers will not be carried out.
- Hand sanitizer is used before entry of the site.
- No unauthorized person will enter the work site other than mentionedby supervisor during start of work.
- All individual work group meetings/ talks will follow social distancing.
- Worksite had COVID-19 safety guidelines.
- All restroom /toilet facilities will be properly cleaned, and hand washing facilities provided with soap, hand sanitizer.
- Water bottle present at site will not be shared.
- Social Distancing will be maintained during breaks and lunch.
- Coughing or sneezing must cover with a personal handkerchief and then wash hands. Coughing or sneezing in hands was avoided.
- Avoid touching eyes, nose, and mouth with hands.
- If family member is feeling ill, stay home.
- Separate disposal bins were placed for collection of used masks/used hand tissues, etc.
- Spitting will be strictly prohibited.

Work-Site Prevention Practices:

- At the start of each day, confirmation will be taken from all employees that they are healthy and all workers will be informed about reusable and disposable PPE.
- Outside person(s) will be strictly prohibited at worksite.
- Use of eye protection (reusable safety goggles/face shields) is recommended.
- In work conditions where required **social distancing is impossible** to achieve, such employees will be supplied with appropriate PPE's.
- All employees will drive to work site in a single occupant vehicle.
- Workers will maintain separation of 6 feet from each other wherever possible.
- High contact surfaces will be properly disinfected in order to minimize the spread of germs in the areas that people touch frequently.
- The contactless temperature checks was done for the workers prior to site entrance and after site works to identify persons showing signs of being unwell with the COVID-19 symptoms.

Washing Facility:

- Worksites already have access to toilet and hand washing facility.
- At entrances and exits hand cleaning facilities is provided.
- All onsite workers help to maintain and keep work area clean.

Labour Camp

- follows a zero-tolerance policy on wearing of masks.
- Masks provided to all the persons/labourers for use at the camp site as well as at the worksite.

Toilet Facility

- The number of people using Toilet facility will be limited at any one time.
- Hands washing must be done before and after using the facilities.

Eating/snacks Arrangements

- Dedicated eating areas is marked on camp and workers also instructed to reduce

food waste and contamination.

- Hand cleaning facilities or hand sanitizer is available at the entrance of worker dining room.
- Workers seated at a distance of 2 meters apart from each other while eating.
- Drinking water provided with proper cleaning measures and consists of tap mechanism.
- All areas used for eating is thoroughly cleaned at the end of each break and shift.

EHS Officer will ensure compliances with prevention issues at the labour camp.

Training

- All workers get training by EHS officer on above requirements before start of any construction activities.
- During construction period frequent visual and verbal reminders will be given to workers forimproving compliance with hand hygiene practices and thus reduce rates of infection.

Emergency Contact

- Emergency contact number(s) at work site and labour camp for reporting COVID-19 symptoms is provided.

COVID-19 Safety Coordinator(s)		
Name	**Title/Facility Location**	**Contact Information (office location, phone, email address)**

Sequence of operation performed regarding COVID-19 safety performed at site:-

- Before entering the worksite for the first time the workers must fill and sign the self-declaration form and also submit the vaccination certificate.
- Before starting each day work the workers body temperature is monitored. If workers body temperature was found higher, then he was not allowed to work at site and he will be consult with doctor as per guidelines.
- Along with body temperature measurement workers hand also sanitized with hand sanitizer.
- With face mask workers, supervisors & officials were only allowed at worksite.
- If any situation suffocation problem is arise then the worker is instructed to maintain proper distance from others and work individually.
- During the work wherever possible social distance was maintained. But during construction activities where social distancing is not possible to maintain, there proper PPE’s was used.
- During lunch or tiffin time the worker was instructed to clean his hand with hand wash and water.
- Worker camp areas and work location were disinfected time to time.
- Before leaving the worksite the workers body temperatures was again measured and noted on the register.

Appendix 13: Water Allocation Permission

Government of Tripura
Office of the Executive Engineer
Water Resource Investigation Division
Visveswaraya Complex,
Kunjaban: Agartala

File No. 1(40) /EE/WRID/TECH/2021/3007-09 Dated: 08-02-2023

To
The Chief Planner
Tripura Urban Planning & Development Authority (TUDA)
2nd floor, U.D. Bhawan, Shakuntala Road,
Near Rabindra Satabarshiki Bhawan, Agartala, 799001.

Subject:- Regarding water allocation for water supply projects under ADB loan under TUDA, UD Deptt.

Reference:-1. Letter no. F.03(09)- TUDA/Project/ 2021 /P-1/ 6207-10 dated: 20/01/2023
2. TO Letter no. F.1(40)/EE/WRID/TECH/2020/454-56 dated:- 11/05/2022

Sir,

Kindly refer to above on the subject at issue. In this connection, I am directed to inform you that the withdrawal of surface water from the river Gumati, Juri & Manu for construction of water treatment plant in the town of Kailashahar, Kumarghat, Dharmanagar & Udaipur at the following rate is allowed for drinking water purposes. Therefore, it is requested to go ahead for construction of Treatment plant. This is in partial modification of this office letter no. 1(40) /EE/WRID/TECH/2021/2896-98 Dated: 24-01-2023.

Sl. No.	Name of River	Quantity of withdrawal of Surface water(per month)	Remarks
1.	Gumati	0.573 MCM	
2.	Juri	0.603 MCM	
3.	Manu	0.429 MCM	

Yours faithfully,
8/2/23
(Er. B. SAHA)
Executive Engineer
Water Resource Investigation Division
Kunjaban : Agartala

Copy to:-

1. The Chief Engineer, PWD(WR), Visvesaraya Complex, Kunjaban, Agartala, (W) Tripura for favour of his kind information please. This has a ref. to his discussion over phone on 6th and 8th February, 2023.
2. The Additional Chief Engineer, P& D Unit, PWD(WR), Kunjaban, Agartala for favour of his kind information please.

Executive Engineer
Water Resource Investigation Division
Kunjaban : Agartala.

MONTH WISE YIELD DISTRIBUTION AT KAILASHAHAR BASED ON RAIN FALL DATA FROM 2009 TO 2018
OF MANU RIVER, CATCHMENT AREA= 2278.00 Sqkm

MONTH (1)	% OF ANNUAL RF (2)	RUNOFF MCM (3)	Water requirment for surface water schemes under PWD (WR)(IN MCM) (4)	Water requirment for surface water schemes under PWD (DWS) (IN MCM) (5)	Water requirement for Kailashahar Town under ADB project as proposed by Authority (Design year 2053) (6)	Total surface water requirment (WR+DWS+ADB) in MCM for operating the existing/ proposed schemes (7)	Balance water in MCM (8)	Remarks (9)
June	18.43	429.02	91.28	0.39	0.429	92.099	336.921	Surplus
July	12.48	290.53	91.28	0.39	0.429	92.099	198.431	Surplus
Aug	14.33	333.5	91.28	0.39	0.429	92.099	241.401	Surplus
Sept	11.57	269.34	91.28	0.39	0.429	92.099	177.241	Surplus
Oct	5.86	136.36	91.28	0.39	0.429	92.099	44.261	Surplus
Nov	0.7	16.32	91.28	0.39	0.429	92.099	-75.779	Deficit
Dec	0.87	20.25	91.28	0.39	0.429	92.099	-71.849	Deficit
Jan	0.12	2.77	91.28	0.39	0.429	92.099	-89.329	Deficit
Feb	0.87	20.22	91.28	0.39	0.429	92.099	-71.879	Deficit
March	2.38	55.5	91.28	0.39	0.429	92.099	-36.599	Deficit
April	11.3	263.17	91.28	0.39	0.429	92.099	171.071	Surplus
May	21.09	491.02	91.28	0.39	0.429	92.099	398.921	Surplus
Total	100	2328	1095.36	4.68	5.148	1100.04		

MONTH WISE YIELD DISTRIBUTION AT DHARMANAGAR BASED ON RAIN FALL DATA FROM 1977 TO 2009 OF JURI / KAKRI RIVER, CATCHMENT AREA= 488.00 Sqkm

MONTH (1)	% OF ANNUAL RF (2)	RUNOFF MCM (3)	Water requirment for surface water schemes under PWD (WR) (IN MCM) (4)	Water requirment for surface water schemes under PWD (DWS) (IN MCM) (5)	Water requirement for Dharmanagar Town under ADB projct as proposed by Authority (Design year 2053) (in MCM) (6)	Total surface water requirment (WR+DWS+ADB) in MCM for operating the existing/ proposed schemes (in MCM) (7)	Balance water in MCM (8)	Remarks (9)
June	17.338415	211.38563	31.39	0.245	0.603	32.238	179.1476	Surplus
July	17.25728	210.39646	31.39	0.245	0.603	32.238	178.1585	Surplus
Aug	14.173918	172.80488	31.39	0.245	0.603	32.238	140.5669	Surplus
Sept	11.247413	137.12565	31.39	0.245	0.603	32.238	104.8877	Surplus
Oct	7.0275527	85.678172	31.39	0.245	0.603	32.238	53.44017	Surplus
Nov	1.5124172	18.439013	31.39	0.245	0.603	32.238	-13.799	Deficit
Dec	0.4582968	5.5874406	31.39	0.245	0.603	32.238	-26.6506	Deficit
Jan	0.2739231	3.3396021	31.39	0.245	0.603	32.238	-28.8984	Deficit
Feb	1.3622053	16.607668	31.39	0.245	0.603	32.238	-15.6303	Deficit
March	3.6462793	44.454529	31.39	0.245	0.603	32.238	12.21653	Surplus
April	8.7775959	107.01426	31.39	0.245	0.603	32.238	74.77626	Surplus
May	16.924704	206.34178	31.39	0.245	0.603	32.238	174.1038	Surplus
Total	100	1219.1751	376.68	2.94	7.236	386.856		

Ground water extraction permission

F.1(40)/EE/ WRID/TECH/2020/.....58-60
Government of Tripura
Office of the Executive Engineer
Water Resource Investigation Division
Kunjaban:Agartala

TUDA RECEIVED Date. 11/04 GOVT. OF TRIPURA

Dated 8th April ,2022

To
The Chief Planner,
Tripura Urban Planning & Development Authority
(Project Coordinator, PMU,ADB Project)
Agartala-799001.

Sub: - Loan 6037 IND : Tripura Urban & Tourism Development Project (TUTDP): Regarding Water allocation permission and sustainability of water supply source permission for 20 towns in Tripura State.

Ref: - Letter No. F.03(09-TUDA/ Project/2021/P-I/2995-97 dtd. 25/03/2022 of Tripura Urban Planning and Development Authurity (TUDA).

Sir,

1. Kindly refer to the above on the subject at issue. In this connection , I am directed to inform you that according to dynamic ground water resources estimation report of 2020, the Groud Water availability for future uses for 16 towns as stated in the under referrence's letter is in safer side. So, there is no bar for extraction of Ground Water.

2. The proposed water supply scheme based on surface water resources from river Juri, Manu and Gumati through intake well for Dharmanagar, kailashahar, Kumarghat and Udaipur is insignificant in lean period. A calculation sheet of runoff of the each river along with monthwise percentage of rainfall is enclosed herewith which may kindly be seen.

3. Regarding Water resource data like HFL, LWL, Discharge of 3 rivers as stated above and rainfall data from 2009-2018 of different sub-Divisions are enclosed herewith.

4. The Deep Tube Well yield map of Tripura is enclosed herewith.

Enclo: As Stated Above(34 no pages).

① TL, PDMC
② TR-I for info pl.
11/4/22

Yours faithfully,

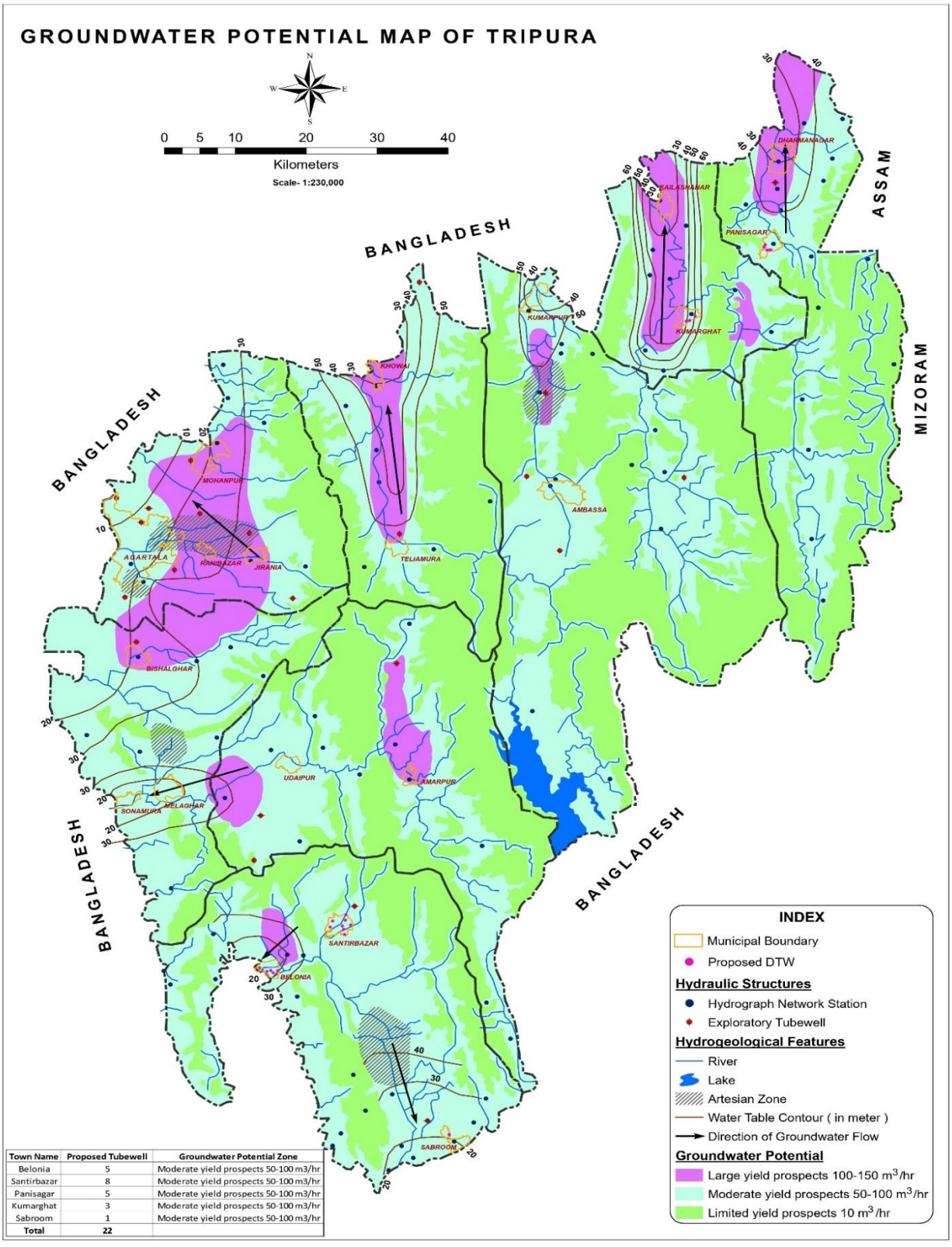
4/4/22

(Er. B. SAHA)
Executive Engineer
Water Resource Investigation Division
Kunjaban , Agartala

Copy to :-

1. The Chief Engineer, PWD, WR, Tripura, Visvesaraya Complex, Kunjaban, Agartala, Tripura(W) for favour of his kind information please.
2. The Superintending Engineer, O/O the Additional Chief Engineer, P&DUnit, PWD(WR) Visvesaraya Complex, Kunjaban, Agartala, Tripura(W) for favour of his kind information please.

Executive Engineer
Water Resource Investigation Division
Kunjaban , Agartala



Town Name	Proposed Tubewell	Groundwater Potential Zone
Belonia	5	Moderate yield prospects 50-100 m3/hr
Santirbazar	8	Moderate yield prospects 50-100 m3/hr
Panisagar	5	Moderate yield prospects 50-100 m3/hr
Kumarghat	3	Moderate yield prospects 50-100 m3/hr
Sabroom	1	Moderate yield prospects 50-100 m3/hr
Total	**22**	

Appendix 14: IBAT Assessment Checklists of Project Towns

Kailashahar

IBAT

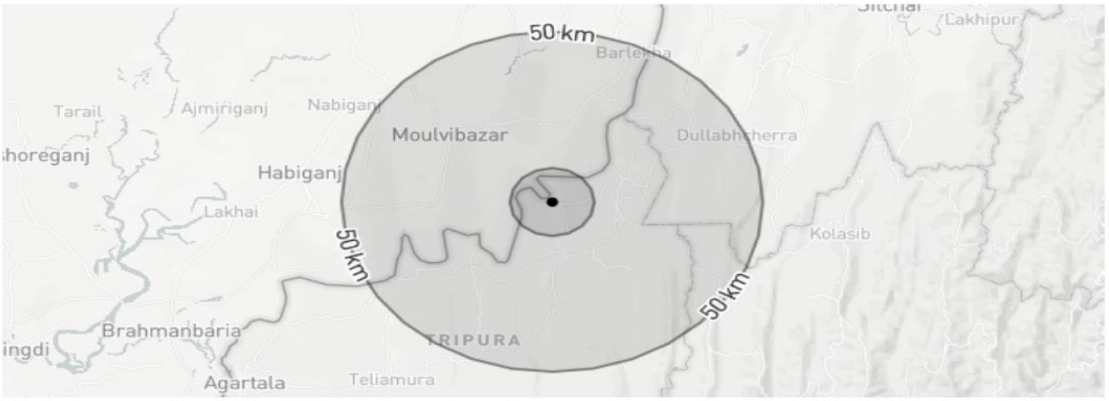
Integrated Biodiversity Assessment Tool
World Bank Group Biodiversity Risk Screen

KAILASHAHAR WATER SUPPLY

- **Country:** India
- **Location:** [24.3, 92]
- **IUCN Red List Biomes:** Marine, Freshwater, Terrestrial
- **Created by:** Govind Rathore

Overlaps with:

Protected Areas	1 km: **0**	10 km: **0**	50 km: **3**	**3**
World Heritage (WH)	1 km: **0**	10 km: **0**	50 km: **0**	**0**
Key Biodiversity Areas	1 km: **0**	10 km: **1**	50 km: **6**	**7**
Alliance for Zero Extinction (AZE)	1 km: **0**	10 km: **0**	50 km: **0**	**0**
IUCN Red List				**40**
Critical Habitat				**Likely**



Displaying project location and buffers: 1 km, 10 km, 50 km

WORLD BANK GROUP

This report is based on IFC Performance Standard 6 (PS6) but applies to World Bank Environmental and Social Standard 6 (ESS6)

KNOW YOUR ENVIRONMENT | BirdLife | IUCN | CONSERVATION INTERNATIONAL | UN environment programme WCMC

About this report

The recommendations stated alongside any Protected Areas and Key Biodiversity Areas identified in this report are determined by the following:

Protected Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies a designation that includes either 'natural' or 'mixed world heritage site'.
- 'Assess for Critical Habitat' is stated if the report identifies a Strict Nature Reserve, Wilderness Area or National Park as coded by IUCN protected area categories Ia, Ib and II.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of protected area.

Key Biodiversity Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies an Alliance for Zero Extinction site.
- 'Assess for Critical Habitat' is stated if the report identifies Critically Endangered or Endangered species OR species with restricted ranges OR congregatory species as coded in the IUCN Red List of Threatened Species.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of Key Biodiversity Area.

IBAT provides initial screening for Critical Habitat values. Performance Standard 6 (PS6) defines these values for Critical Habitat (PS6: para. 16) and legally protected and internationally recognized areas (PS6: para. 20). PS6 will be triggered when IFC client activities are located in modified habitats containing "significant biodiversity value," natural habitats, Critical Habitats, legally protected areas, or areas that are internationally recognized for biodiversity. References to PS6 and Guidance Note 6 (GN6) are provided to guide further assessment and detailed definitions where necessary. Please see https://www.ifc.org/ps6 for full details on PS6 and GN6.

This report identifies restricted range species according to the KBA Standard definition (hyperlink KBA Standard https://portals.iucn.org/library/sites/library/files/documents/2016-048.pdf):

Species having a global range size less than or equal to the 25th percentile of range-size distribution in a taxonomic group within which all species have been mapped globally, up to a maximum of 50,000 km2. If all species in a taxonomic group have not been mapped globally, or if the 25th percentile of range-size distribution for a taxonomic group falls below 10,000 km2, restricted range should be defined as having a global range size less than or equal to 10,000 km2. For coastal, riverine and other species with linear distributions that do not exceed 200 km width at any point, restricted range is defined as having a global range less than or 15 equal to 500 km linear geographic span (i.e. the distance between occupied locations furthest apart).

Note, sites supporting restricted range species can qualify as KBAs under criterion B2. These are sites that hold a significant proportion of the global population size of multiple restricted-range species, and so contribute significantly to the global persistence of biodiversity at the genetic and species level.

The report screens for known risks within a standard 50km buffer of the coordinates used for analysis. This buffer is not intended to indicate the area of impact. The report can be used to:

- Scope risks to include within an assessment of risks and impacts

- Identify gaps within an existing assessment of risks and impacts
- Prioritize between sites in a portfolio for further assessment of risks and impacts
- Inform a preliminary determination of Critical Habitat
- Assess the need for engaging a biodiversity specialist
- Identify additional conservation experts or organizations to inform further assessment or planning

WARNING: IBAT aims to provide the most up-to-date and accurate information available at the time of analysis. There is however a possibility of incomplete, incorrect or out-of-date information. All findings in this report must be supported by further desktop review, consultation with experts and/or on-the-ground field assessment as described in PS6 and GN6. Please consult IBAT for any additional disclaimers or recommendations applicable to the information used to generate this report.

Please note, sensitive species data are currently not included in IBAT reports in line with the Sensitive Data Access Restrictions Policy for the IUCN Red List. This relates to sensitive Threatened species and KBAs triggered by sensitive species.

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Nilssonia nigricans	Black Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Indotestudo elongata	Elongated Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Pangshura sylhetensis	Assam Roofed Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Manis pentadactyla	Chinese Pangolin	MAMMALIA	CR	Decreasing	Terrestrial
Manouria emys	Asian Giant Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Aythya baeri	Baer's Pochard	AVES	CR	Decreasing	Freshwater
Houbaropsis bengalensis	Bengal Florican	AVES	CR	Decreasing	Terrestrial
Gyps bengalensis	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial

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Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Sarcogyps calvus	Red-headed Vulture	AVES	CR	Decreasing	Terrestrial
Ardea insignis	White-bellied Heron	AVES	CR	Decreasing	Terrestrial, Freshwater
Emberiza aureola	Yellow-breasted Bunting	AVES	CR	Decreasing	Terrestrial, Freshwater
Gyps tenuirostris	Slender-billed Vulture	AVES	CR	Decreasing	Terrestrial
Pelochelys cantorii	Asian Giant Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Marine, Freshwater
Cyrtodactylus montanus		REPTILIA	CR	Unknown	Terrestrial
Cuon alpinus	Dhole	MAMMALIA	EN	Decreasing	Terrestrial
Cuora amboinensis	Southeast Asian Box Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Elephas maximus	Asian Elephant	MAMMALIA	EN	Decreasing	Terrestrial
Geoclemys hamiltonii	Spotted Pond Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Hardella thurjii	Crowned River Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Morenia petersi	Indian Eyed Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Panthera tigris	Tiger	MAMMALIA	EN	Decreasing	Terrestrial

IBAT

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Varanus flavescens	Yellow Monitor	REPTILIA	EN	Decreasing	Terrestrial
Nilssonia gangetica	Indian Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nilssonia hurum	Indian Peacock Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nycticebus bengalensis	Bengal Slow Loris	MAMMALIA	EN	Decreasing	Terrestrial
Hoolock hoolock	Western Hoolock Gibbon	MAMMALIA	EN	Decreasing	Terrestrial
Platanista gangetica	Ganges River Dolphin	MAMMALIA	EN	Decreasing	Freshwater
Axis porcinus	Hog Deer	MAMMALIA	EN	Decreasing	Terrestrial, Freshwater
Trachypithecus phayrei ssp. phayrei		MAMMALIA	EN	Decreasing	Terrestrial
Cuora mouhotii	Keeled Box Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Urogymnus polylepis	Giant Freshwater Whipray	CHONDRICHTHYES	EN	Decreasing	Marine, Freshwater
Perdicula manipurensis	Manipur Bush-quail	AVES	EN	Decreasing	Terrestrial, Freshwater
Sterna acuticauda	Black-bellied Tern	AVES	EN	Decreasing	Terrestrial, Freshwater

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Haliaeetus leucoryphus	Pallas's Fish-eagle	AVES	EN	Decreasing	Terrestrial, Freshwater
Aquila nipalensis	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
Leptoptilos dubius	Greater Adjutant	AVES	EN	Decreasing	Terrestrial, Freshwater
Laticilla cinerascens	Swamp Grass-babbler	AVES	EN	Decreasing	Terrestrial, Freshwater
Tor putitora		ACTINOPTERYGII	EN	Decreasing	Freshwater
Trachypithecus phayrei	Phayre's Leaf-monkey	MAMMALIA	EN	Decreasing	Terrestrial
Trachypithecus pileatus ssp. pileatus	Blond-bellied Langur	MAMMALIA	EN	Decreasing	Terrestrial

Restricted Range Species

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Pterorana khare	Indian Flying Frog	AMPHIBIA	LC OR LR/LC	Decreasing	Terrestrial, Freshwater
Bengala elanga	Bengala Barb	ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
Hemibagrus menoda		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
Xenentodon cancila		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater

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Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Batasio batasio		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
Psilorhynchus homaloptera	Homaloptera minnow	ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
Oreichthys cosuatis		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
Oryzias dancena	Indian Ricefish	ACTINOPTERYGII	LC OR LR/LC	Stable	Marine, Freshwater
Pseudosphromenus cupanus	Spiketail Paradise Fish	ACTINOPTERYGII	LC OR LR/LC	Stable	Freshwater
Oryzias carnaticus	Spotted Ricefish	ACTINOPTERYGII	LC OR LR/LC	Unknown	Marine, Freshwater
Macrobrachium scabriculum		MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Macrobrachium rude		MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Macrobrachium rosenbergii	Giant River Prawn	MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Acrocephalus orinus	Large-billed Reed-warbler	AVES	LC OR LR/LC	Unknown	Terrestrial, Freshwater
Pila olea		GASTROPODA	DD	Unknown	Freshwater
Lymnaea horae		GASTROPODA	DD	Unknown	Freshwater
Parreysia corbis		BIVALVIA	DD	Unknown	Freshwater
Parreysia annandalei		BIVALVIA	DD	Unknown	Freshwater

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Psilorhynchus amplicephalus		ACTINOPTERYGII	DD	Unknown	Freshwater
Pseudolaguvia virgulata		ACTINOPTERYGII	DD	Unknown	Freshwater

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Biodiversity features which are likely to trigger Critical Habitat

Protected Areas

The following protected areas are found within 1 km and 10 km and 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance	IUCN Category	Status	Designation	Recommendation
Barshijora Eco-Park	50 km	Not Reported	Proposed	Eco Park	Assess for biodiversity risk
Lawachara	50 km	II	Designated	National Park	Assess for critical habitat
Rema Kalenga	50 km	II	Designated	Wildlife Sanctuary	Assess for critical habitat

Key Biodiversity Areas

The following key biodiversity areas are found within 1 km and 10 km and 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance	IBA	AZE	Recommendation
Rajkandi Reserved Forest	10 km	Yes	No	Assess for biodiversity risk
Hail Haor	50 km	Yes	No	Assess for critical habitat
Hakaluki Haor	50 km	Yes	No	Assess for critical habitat
Innerline (West) and Katakhal Reserve Forests	50 km	Yes	No	Assess for critical habitat

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Area name	Distance	IBA	AZE	Recommendation
Innerline, Katakal and Barak Reserve Forests	50 km	No	No	Assess for critical habitat
Lawachara / West Bhanugach Reserved Forest	50 km	Yes	No	Assess for critical habitat
Rema-Kalenga Wildlife Sanctuary	50 km	Yes	No	Assess for biodiversity risk

Species with potential to occur

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
REPTILIA	111	22	6	8	8	3	85	1
MAMMALIA	107	27	1	10	16	8	71	1
AVES	430	27	7	6	14	22	381	0
CHONDRICHTHYES	1	1	0	1	0	0	0	0
ACTINOPTERYGII	73	4	0	1	3	5	60	4
LILIOPSIDA	64	2	0	0	2	0	60	2
MAGNOLIOPSIDA	105	3	0	0	3	1	96	5
MALACOSTRACA	22	0	0	0	0	2	13	7
INSECTA	106	0	0	0	0	1	105	0
GASTROPODA	64	0	0	0	0	0	55	9

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
AMPHIBIA	29	0	0	0	0	0	29	0
BIVALVIA	42	0	0	0	0	0	36	6
POLYPODIOPSIDA	3	0	0	0	0	0	3	0
ARACHNIDA	3	0	0	0	0	0	3	0

Recommended citation

IBAT PS6 & ESS6 Report. Generated under licence 30102-38077 from the Integrated Biodiversity Assessment Tool on 23 December 2022 (GMT). www.ibat-alliance.org

Recommended Experts and Organizations

For projects located in Critical Habitat, clients must ensure that external experts with regional expertise are involved in further assessment (GN6: GN22). Clients are encouraged to develop partnerships with recognized and credible conservation organizations and/or academic institutes, especially with respect to potential developments in natural or Critical Habitat (GN6: GN23). Where Critical Habitats are triggered by priority species, species specialists must be involved. IBAT provides data originally collected by a large network of national partners, while species information is sourced via the IUCN Red List and affiliated Species Specialist Groups. These experts and organizations are listed below. **Please note that this is not intended as a comprehensive list of organizations and experts. These organizations and experts are under no obligation to support any further assessment and do so entirely at their discretion and under their terms. Any views expressed or recommendations made by these stakeholders should not be attributed to the IFC or IBAT for IFC partners.**

Birdlife Partners

URL: https://www.birdlife.org/worldwide/partnership/birdlife-partners

Directory for Species Survival Commission (SSC) Specialist Groups and Red List Authorities

URL: https://www.iucn.org/commissions/ssc-groups

Kumarghat

IBAT

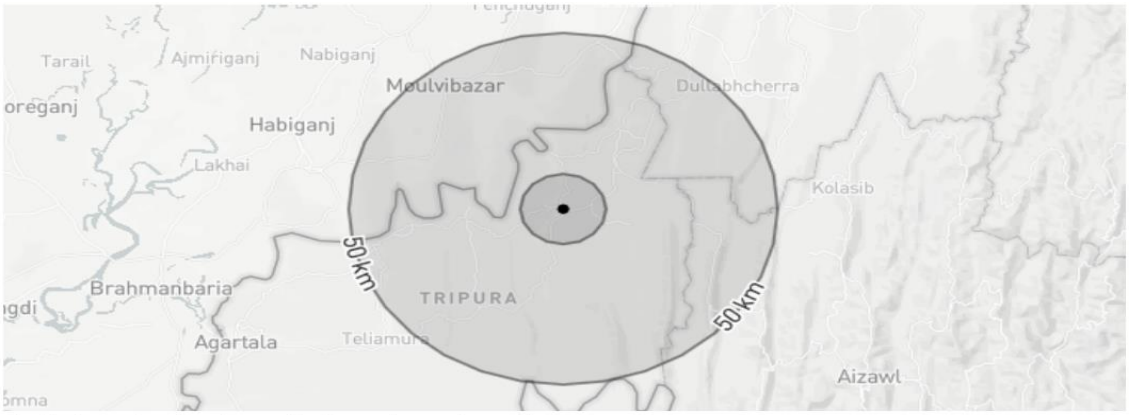
Integrated Biodiversity Assessment Tool
World Bank Group Biodiversity Risk Screen

KUMARGHAT ROADS AND DRAIN PROJECT

- **Country:** India
- **Location:** [24.2, 92]
- **IUCN Red List Biomes:** Marine, Freshwater, Terrestrial
- **Created by:** Govind Rathore

Overlaps with:

Protected Areas	1 km: **0**	10 km: **0**	50 km: **4**	**4**
World Heritage (WH)	1 km: **0**	10 km: **0**	50 km: **0**	**0**
Key Biodiversity Areas	1 km: **0**	10 km: **0**	50 km: **8**	**8**
Alliance for Zero Extinction (AZE)	1 km: **0**	10 km: **0**	50 km: **0**	**0**
IUCN Red List				39
Critical Habitat				Likely



Displaying project location and buffers: 1 km, 10 km, 50 km

WORLD BANK GROUP

This report is based on IFC Performance Standard 6 (PS6) but applies to World Bank Environmental and Social Standard 6 (ESS6)

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About this report

The recommendations stated alongside any Protected Areas and Key Biodiversity Areas identified in this report are determined by the following:

Protected Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies a designation that includes either 'natural' or 'mixed world heritage site'.
- 'Assess for Critical Habitat' is stated if the report identifies a Strict Nature Reserve, Wilderness Area or National Park as coded by IUCN protected area categories Ia, Ib and II.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of protected area.

Key Biodiversity Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies an Alliance for Zero Extinction site.
- 'Assess for Critical Habitat' is stated if the report identifies Critically Endangered or Endangered species OR species with restricted ranges OR congregatory species as coded in the IUCN Red List of Threatened Species.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of Key Biodiversity Area.

IBAT provides initial screening for Critical Habitat values. Performance Standard 6 (PS6) defines these values for Critical Habitat (PS6: para. 16) and legally protected and internationally recognized areas (PS6: para. 20). PS6 will be triggered when IFC client activities are located in modified habitats containing "significant biodiversity value," natural habitats, Critical Habitats, legally protected areas, or areas that are internationally recognized for biodiversity. References to PS6 and Guidance Note 6 (GN6) are provided to guide further assessment and detailed definitions where necessary. Please see https://www.ifc.org/ps6 for full details on PS6 and GN6.

This report identifies restricted range species according to the KBA Standard definition (hyperlink KBA Standard https://portals.iucn.org/library/sites/library/files/documents/2016-048.pdf):

Species having a global range size less than or equal to the 25th percentile of range-size distribution in a taxonomic group within which all species have been mapped globally, up to a maximum of 50,000 km2. If all species in a taxonomic group have not been mapped globally, or if the 25th percentile of range-size distribution for a taxonomic group falls below 10,000 km2, restricted range should be defined as having a global range size less than or equal to 10,000 km2. For coastal, riverine and other species with linear distributions that do not exceed 200 km width at any point, restricted range is defined as having a global range less than or 15 equal to 500 km linear geographic span (i.e. the distance between occupied locations furthest apart).

Note, sites supporting restricted range species can qualify as KBAs under criterion B2. These are sites that hold a significant proportion of the global population size of multiple restricted-range species, and so contribute significantly to the global persistence of biodiversity at the genetic and species level.

The report screens for known risks within a standard 50km buffer of the coordinates used for analysis. This buffer is not intended to indicate the area of impact. The report can be used to:

- Scope risks to include within an assessment of risks and impacts

- Identify gaps within an existing assessment of risks and impacts
- Prioritize between sites in a portfolio for further assessment of risks and impacts
- Inform a preliminary determination of Critical Habitat
- Assess the need for engaging a biodiversity specialist
- Identify additional conservation experts or organizations to inform further assessment or planning

WARNING: IBAT aims to provide the most up-to-date and accurate information available at the time of analysis. There is however a possibility of incomplete, incorrect or out-of-date information. All findings in this report must be supported by further desktop review, consultation with experts and/or on-the-ground field assessment as described in PS6 and GN6. Please consult IBAT for any additional disclaimers or recommendations applicable to the information used to generate this report.

Please note, sensitive species data are currently not included in IBAT reports in line with the Sensitive Data Access Restrictions Policy for the IUCN Red List. This relates to sensitive Threatened species and KBAs triggered by sensitive species.

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Parreysia annandalei		BIVALVIA	DD	Unknown	Freshwater
Badis chittagongis		ACTINOPTERYGII	DD	Unknown	Freshwater

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Psilorhynchus amplicephalus		ACTINOPTERYGII	DD	Unknown	Freshwater
Pseudolaguvia virgulata		ACTINOPTERYGII	DD	Unknown	Freshwater

IBAT

Biodiversity features which are likely to trigger Critical Habitat

Protected Areas

The following protected areas are found within 1 km and 10 km and 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance	IUCN Category	Status	Designation	Recommendation
Barshijora Eco-Park	50 km	Not Reported	Proposed	Eco Park	Assess for biodiversity risk
Lawachara	50 km	II	Designated	National Park	Assess for critical habitat
Pablakhali	50 km	II	Designated	Wildlife Sanctuary	Assess for critical habitat
Rema Kalenga	50 km	II	Designated	Wildlife Sanctuary	Assess for critical habitat

Key Biodiversity Areas

The following key biodiversity areas are found within 1 km and 10 km and 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance	IBA	AZE	Recommendation
Gumti Wildlife Sanctuary	50 km	Yes	No	Assess for critical habitat
Hail Haor	50 km	Yes	No	Assess for critical habitat
Hakaluki Haor	50 km	Yes	No	Assess for critical habitat

Area name	Distance	IBA	AZE	Recommendation
Innerline (West) and Katakhal Reserve Forests	50 km	Yes	No	Assess for critical habitat
Innerline, Katakal and Barak Reserve Forests	50 km	No	No	Assess for critical habitat
Lawachara / West Bhanugach Reserved Forest	50 km	Yes	No	Assess for critical habitat
Rajkandi Reserved Forest	50 km	Yes	No	Assess for biodiversity risk
Rema-Kalenga Wildlife Sanctuary	50 km	Yes	No	Assess for biodiversity risk

Species with potential to occur

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
REPTILIA	110	21	6	7	8	4	84	1
MAMMALIA	106	27	1	10	16	7	72	0
AVES	442	25	6	6	13	21	396	0
ACTINOPTERYGII	85	5	0	2	3	5	68	7
CHONDRICHTHYES	1	1	0	1	0	0	0	0
LILIOPSIDA	63	2	0	0	2	0	59	2
MAGNOLIOPSIDA	68	1	0	0	1	1	61	5

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
MALACOSTRACA	24	0	0	0	0	2	14	8
INSECTA	106	0	0	0	0	1	105	0
GASTROPODA	64	0	0	0	0	0	55	9
AMPHIBIA	30	0	0	0	0	0	30	0
BIVALVIA	44	0	0	0	0	0	38	6
POLYPODIOPSIDA	3	0	0	0	0	0	3	0
ARACHNIDA	3	0	0	0	0	0	3	0

Recommended citation

IBAT PS6 & ESS6 Report. Generated under licence 30102-38078 from the Integrated Biodiversity Assessment Tool on 23 December 2022 (GMT). www.ibat-alliance.org

Recommended Experts and Organizations

For projects located in Critical Habitat, clients must ensure that external experts with regional expertise are involved in further assessment (GN6: GN22). Clients are encouraged to develop partnerships with recognized and credible conservation organizations and/or academic institutes, especially with respect to potential developments in natural or Critical Habitat (GN6: GN23). Where Critical Habitats are triggered by priority species, species specialists must be involved. IBAT provides data originally collected by a large network of national partners, while species information is sourced via the IUCN Red List and affiliated Species Specialist Groups. These experts and organizations are listed below. **Please note that this is not intended as a comprehensive list of organizations and experts. These organizations and experts are under no obligation to support any further assessment and do so entirely at their discretion and under their terms. Any views expressed or recommendations made by these stakeholders should not be attributed to the IFC or IBAT for IFC partners.**

Birdlife Partners

URL: https://www.birdlife.org/worldwide/partnership/birdlife-partners

Directory for Species Survival Commission (SSC) Specialist Groups and Red List Authorities

URL: https://www.iucn.org/commissions/ssc-groups

Dharamanagar

IBAT

Integrated Biodiversity Assessment Tool

PROXIMITY REPORT
DHARMANAGAR SUB PROJECTS

Country: India

Location: [24.4, 92.2]

Date of analysis: 12 January 2023 (GMT)

Buffers applied: 1 km | 10 km | 50 km

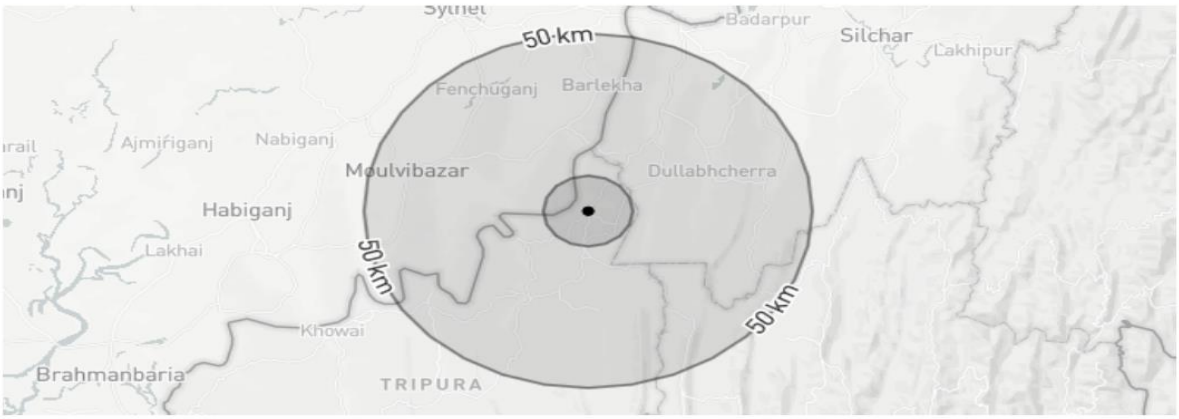
IUCN Red List Biomes: Marine, Freshwater, Terrestrial

Generated by: Govind Rathore

Organisation: ADB

Overlaps with:

Protected Areas	2
Key Biodiversity Areas	8
IUCN Red List	82



Displaying project location and buffers: 1 km, 10 km, 50 km

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About this report

This report presents the results of [30102-38584] proximity analysis to identify the biodiversity features and species which are located within the following buffers: 1 km, 10 km, 50 km.

This report is one part of a package generated by IBAT on 12 January 2023 (GMT) that includes full list of all species, protected areas, Key Biodiversity Areas in CSV format, maps showing the area of interest in relation to these features, and a 'How to read IBAT reports' document.

WARNING: IBAT aims to provide the most up-to-date and accurate information available at the time of analysis. There is however a possibility of incomplete, incorrect or out-of-date information. All findings in this report must be supported by further desktop review, consultation with experts and/or on-the-ground field assessment. Please consult IBAT for any additional disclaimers or recommendations applicable to the information used to generate this report.

Please note, sensitive species data are currently not included in IBAT reports in line with the Sensitive Data Access Restrictions Policy for the IUCN Red List. This relates to sensitive Threatened species and KBAs triggered by sensitive species.

Data used to generate this report

- UNEP-WCMC and IUCN, 2023. Protected Planet: The World Database on Protected Areas (WDPA)[On-line], Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net - January 2023.
- BirdLife International (on behalf of the KBA Partnership), 2022. Key Biodiversity Areas - November 2022.
- IUCN, 2022. IUCN Red List of Threatened Species - December 2022.
- IUCN. The IUCN Red List of Threatened Species. Version 2019-3. (2019). https://www.iucnredlist.org
- IUCN. Threats Classification Scheme (Version 3.2). (2019)
- Strassburg, B.B.N., Iribarrem, A., Beyer, H.L. et al. Global priority areas for ecosystem restoration. Nature 586, 724–729 (2020). https://doi.org/10.1038/s41586-020-2784-9

IBAT

Protected Areas

The following protected areas are found within 1 km, 10 km, 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Within buffer of
Barshijora Eco-Park	50 km
Lawachara	50 km

Key Biodiversity Areas

The following key biodiversity areas are found within 1 km, 10 km, 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance
Bauwwa Beel	50 km
Hail Haor	50 km
Hakaluki Haor	50 km
Innerline (West) and Katakhal Reserve Forests	50 km
Innerline, Katakal and Barak Reserve Forests	50 km
Lawachara / West Bhanugach Reserved Forest	50 km
Rajkandi Reserved Forest	50 km
Son Beel	50 km

IUCN Red List of Threatened Species

The following threatened species are potentially found within 50km of the area of interest.

IBAT

For the full IUCN Red List please refer to the associated csv in the report folder.

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Nilssonia nigricans	Black Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Indotestudo elongata	Elongated Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Pangshura sylhetensis	Assam Roofed Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Manis pentadactyla	Chinese Pangolin	MAMMALIA	CR	Decreasing	Terrestrial
Manouria emys	Asian Giant Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Aythya baeri	Baer's Pochard	AVES	CR	Decreasing	Freshwater
Houbaropsis bengalensis	Bengal Florican	AVES	CR	Decreasing	Terrestrial
Gyps bengalensis	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial
Sarcogyps calvus	Red-headed Vulture	AVES	CR	Decreasing	Terrestrial
Ardea insignis	White-bellied Heron	AVES	CR	Decreasing	Terrestrial, Freshwater
Emberiza aureola	Yellow-breasted Bunting	AVES	CR	Decreasing	Terrestrial, Freshwater
Gyps tenuirostris	Slender-billed Vulture	AVES	CR	Decreasing	Terrestrial

IBAT

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Cyrtodactylus montanus		REPTILIA	CR	Unknown	Terrestrial
Cuon alpinus	Dhole	MAMMALIA	EN	Decreasing	Terrestrial
Cuora amboinensis	Southeast Asian Box Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Elephas maximus	Asian Elephant	MAMMALIA	EN	Decreasing	Terrestrial
Hardella thurjii	Crowned River Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Morenia petersi	Indian Eyed Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Panthera tigris	Tiger	MAMMALIA	EN	Decreasing	Terrestrial
Varanus flavescens	Yellow Monitor	REPTILIA	EN	Decreasing	Terrestrial
Nilssonia gangetica	Indian Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nilssonia hurum	Indian Peacock Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nycticebus bengalensis	Bengal Slow Loris	MAMMALIA	EN	Decreasing	Terrestrial
Hoolock hoolock	Western Hoolock Gibbon	MAMMALIA	EN	Decreasing	Terrestrial
Platanista gangetica	Ganges River Dolphin	MAMMALIA	EN	Decreasing	Freshwater

IBAT

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Axis porcinus	Hog Deer	MAMMALIA	EN	Decreasing	Terrestrial, Freshwater
Trachypithecus phayrei ssp. phayrei		MAMMALIA	EN	Decreasing	Terrestrial
Cuora mouhotii	Keeled Box Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Perdicula manipurensis	Manipur Bush-quail	AVES	EN	Decreasing	Terrestrial, Freshwater
Sterna acuticauda	Black-bellied Tern	AVES	EN	Decreasing	Terrestrial, Freshwater
Haliaeetus leucoryphus	Pallas's Fish-eagle	AVES	EN	Decreasing	Terrestrial, Freshwater
Aquila nipalensis	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
Leptoptilos dubius	Greater Adjutant	AVES	EN	Decreasing	Terrestrial, Freshwater
Laticilla cinerascens	Swamp Grass-babbler	AVES	EN	Decreasing	Terrestrial, Freshwater
Tor putitora		ACTINOPTERYGII	EN	Decreasing	Freshwater
Trachypithecus phayrei	Phayre's Leaf-monkey	MAMMALIA	EN	Decreasing	Terrestrial
Trachypithecus pileatus ssp. pileatus	Blond-bellied Langur	MAMMALIA	EN	Decreasing	Terrestrial
Crocodylus palustris	Mugger	REPTILIA	VU	Stable	Terrestrial, Freshwater

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Helarctos malayanus	Sun Bear	MAMMALIA	VU	Decreasing	Terrestrial
Lutrogale perspicillata	Smooth-coated Otter	MAMMALIA	VU	Decreasing	Terrestrial, Marine, Freshwater
Macaca arctoides	Stump-tailed Macaque	MAMMALIA	VU	Decreasing	Terrestrial
Neofelis nebulosa	Clouded Leopard	MAMMALIA	VU	Decreasing	Terrestrial
Panthera pardus	Leopard	MAMMALIA	VU	Decreasing	Terrestrial
Prionailurus viverrinus	Fishing Cat	MAMMALIA	VU	Decreasing	Terrestrial, Freshwater
Rhinoceros unicornis	Greater One-horned Rhino	MAMMALIA	VU	Increasing	Terrestrial, Freshwater
Trachypithecus pileatus	Capped Langur	MAMMALIA	VU	Decreasing	Terrestrial
Ursus thibetanus	Asiatic Black Bear	MAMMALIA	VU	Decreasing	Terrestrial
Macaca leonina	Northern Pig-tailed Macaque	MAMMALIA	VU	Decreasing	Terrestrial
Arctictis binturong	Binturong	MAMMALIA	VU	Decreasing	Terrestrial
Rusa unicolor	Sambar	MAMMALIA	VU	Decreasing	Terrestrial
Aonyx cinereus	Asian Small-clawed Otter	MAMMALIA	VU	Decreasing	Terrestrial, Marine, Freshwater

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Pangshura tecta	Indian Roofed Turtle	REPTILIA	VU	Decreasing	Terrestrial, Freshwater
Liotelphusa quadrata		MALACOSTRACA	VU	Unknown	Freshwater
Wallago attu		ACTINOPTERYGII	VU	Decreasing	Freshwater
Ophiophagus hannah	King Cobra	REPTILIA	VU	Decreasing	Terrestrial
Elaphe taeniura	Cave Racer	REPTILIA	VU	Decreasing	Terrestrial
Python bivittatus	Burmese Python	REPTILIA	VU	Decreasing	Terrestrial
Ortygornis gularis	Swamp Francolin	AVES	VU	Decreasing	Terrestrial, Freshwater
Aythya ferina	Common Pochard	AVES	VU	Decreasing	Terrestrial, Marine, Freshwater
Mulleripicus pulverulentus	Great Slaty Woodpecker	AVES	VU	Decreasing	Terrestrial
Buceros bicornis	Great Hornbill	AVES	VU	Decreasing	Terrestrial
Aceros nipalensis	Rufous-necked Hornbill	AVES	VU	Decreasing	Terrestrial
Rhyticeros undulatus	Wreathed Hornbill	AVES	VU	Decreasing	Terrestrial
Columba punicea	Pale-capped Pigeon	AVES	VU	Decreasing	Terrestrial

IBAT

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Gallinago nemoricola	Wood Snipe	AVES	VU	Decreasing	Terrestrial, Freshwater
Sterna aurantia	River Tern	AVES	VU	Decreasing	Terrestrial, Marine, Freshwater
Clanga clanga	Greater Spotted Eagle	AVES	VU	Decreasing	Terrestrial, Freshwater
Leptoptilos javanicus	Lesser Adjutant	AVES	VU	Decreasing	Terrestrial, Marine, Freshwater
Turdus feae	Grey-sided Thrush	AVES	VU	Decreasing	Terrestrial
Pellorneum palustre	Marsh Babbler	AVES	VU	Decreasing	Terrestrial
Clanga hastata	Indian Spotted Eagle	AVES	VU	Decreasing	Terrestrial
Arctonyx collaris	Greater Hog Badger	MAMMALIA	VU	Decreasing	Terrestrial
Tropidophorus assamensis	North-Eastern Waterskink	REPTILIA	VU	Unknown	Terrestrial, Freshwater
Oryza malampuzhaensis		LILIOPSIDA	VU	Decreasing	Terrestrial
Lissemys punctata	Indian Flapshell Turtle	REPTILIA	VU	Decreasing	Terrestrial, Freshwater
Xenochrophis cerasogaster	Painted Keelback	REPTILIA	VU	Decreasing	Freshwater

IBAT

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Schizothorax plagiostomus	Snow Trout	ACTINOPTERYGII	VU	Decreasing	Freshwater
Capricornis sumatraensis	Mainland Serow	MAMMALIA	VU	Decreasing	Terrestrial
Hoolock hoolock ssp. hoolock	Western Hoolock Gibbon	MAMMALIA	VU	Decreasing	Terrestrial
Paris polyphylla	Love Apple	LILIOPSIDA	VU	Decreasing	Terrestrial
Dalbergia thomsonii		MAGNOLIOPSIDA	VU	Unknown	Terrestrial
Bagarius bagarius		ACTINOPTERYGII	VU	Decreasing	Freshwater

Recommended citation

IBAT Proximity Report. Generated under licence 30102-38584 from the Integrated Biodiversity Assessment Tool on 12 January 2023 (GMT). www.ibat-alliance.org

How to use this report

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.

Ambassa

IBAT

Integrated Biodiversity Assessment Tool

PROXIMITY REPORT
AMBASSA PROJECTS

Country: India

Location: [23.9, 91.8]

Date of analysis: 12 January 2023 (GMT)

Buffers applied: 1 km | 10 km | 50 km

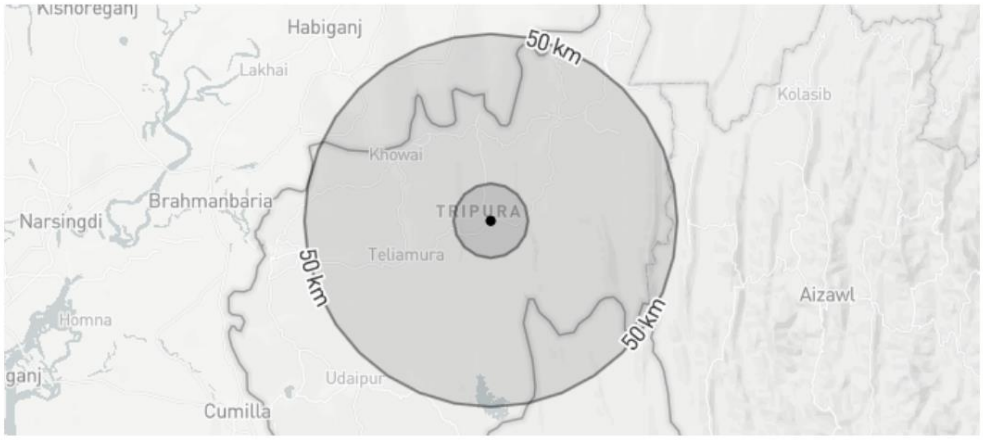
IUCN Red List Biomes: Marine, Freshwater, Terrestrial

Generated by: Govind Rathore

Organisation: ADB

Overlaps with:

Protected Areas	4
Key Biodiversity Areas	5
IUCN Red List	80



Displaying project location and buffers: 1 km, 10 km, 50 km

About this report

This report presents the results of [30102-38577] proximity analysis to identify the biodiversity features and species which are located within the following buffers: 1 km, 10 km, 50 km.

This report is one part of a package generated by IBAT on 12 January 2023 (GMT) that includes full list of all species, protected areas, Key Biodiversity Areas in CSV format, maps showing the area of interest in relation to these features, and a 'How to read IBAT reports' document.

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Please note, sensitive species data are currently not included in IBAT reports in line with the Sensitive Data Access Restrictions Policy for the IUCN Red List. This relates to sensitive Threatened species and KBAs triggered by sensitive species.

Data used to generate this report

- UNEP-WCMC and IUCN, 2023. Protected Planet: The World Database on Protected Areas (WDPA)[On-line], Cambridge, UK: UNEP-WCMC and IUCN. Available at: www.protectedplanet.net - January 2023.
- BirdLife International (on behalf of the KBA Partnership), 2022. Key Biodiversity Areas - November 2022.
- IUCN, 2022. IUCN Red List of Threatened Species - December 2022.
- IUCN. The IUCN Red List of Threatened Species. Version 2019-3. (2019). https://www.iucnredlist.org
- IUCN. Threats Classification Scheme (Version 3.2). (2019)
- Strassburg, B.B.N., Iribarrem, A., Beyer, H.L. et al. Global priority areas for ecosystem restoration. Nature 586, 724–729 (2020). https://doi.org/10.1038/s41586-020-2784-9

Protected Areas

The following protected areas are found within 1 km, 10 km, 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Within buffer of
Lawachara	50 km
Pablakhali	50 km
Rema Kalenga	50 km
Satchari	50 km

Key Biodiversity Areas

The following key biodiversity areas are found within 1 km, 10 km, 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance
Gumti Wildlife Sanctuary	50 km
Hail Haor	50 km
Lawachara / West Bhanugach Reserved Forest	50 km
Rajkandi Reserved Forest	50 km
Rema-Kalenga Wildlife Sanctuary	50 km

IUCN Red List of Threatened Species

The following threatened species are potentially found within 50km of the area of interest.

For the full IUCN Red List please refer to the associated csv in the report folder.

IBAT

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Nilssonia nigricans	Black Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Indotestudo elongata	Elongated Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Manis pentadactyla	Chinese Pangolin	MAMMALIA	CR	Decreasing	Terrestrial
Manouria emys	Asian Giant Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Aquilaria malaccensis	Agarwood	MAGNOLIOPSIDA	CR	Decreasing	Terrestrial
Aythya baeri	Baer's Pochard	AVES	CR	Decreasing	Freshwater
Gyps bengalensis	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial
Ardea insignis	White-bellied Heron	AVES	CR	Decreasing	Terrestrial, Freshwater
Emberiza aureola	Yellow-breasted Bunting	AVES	CR	Decreasing	Terrestrial, Freshwater
Gyps tenuirostris	Slender-billed Vulture	AVES	CR	Decreasing	Terrestrial
Pelochelys cantorii	Asian Giant Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Marine, Freshwater
Cyrtodactylus montanus		REPTILIA	CR	Unknown	Terrestrial

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Sterna aurantia	River Tern	AVES	VU	Decreasing	Terrestrial, Marine, Freshwater
Clanga clanga	Greater Spotted Eagle	AVES	VU	Decreasing	Terrestrial, Freshwater
Leptoptilos javanicus	Lesser Adjutant	AVES	VU	Decreasing	Terrestrial, Marine, Freshwater
Clanga hastata	Indian Spotted Eagle	AVES	VU	Decreasing	Terrestrial
Arctonyx collaris	Greater Hog Badger	MAMMALIA	VU	Decreasing	Terrestrial
Tropidophorus assamensis	North-Eastern Waterskink	REPTILIA	VU	Unknown	Terrestrial, Freshwater
Oryza malampuzhaensis		LILIOPSIDA	VU	Decreasing	Terrestrial
Lissemys punctata	Indian Flapshell Turtle	REPTILIA	VU	Decreasing	Terrestrial, Freshwater
Xenochrophis cerasogaster	Painted Keelback	REPTILIA	VU	Decreasing	Freshwater
Schizothorax plagiostomus	Snow Trout	ACTINOPTERYGII	VU	Decreasing	Freshwater
Beilschmiedia assamica		MAGNOLIOPSIDA	VU	Unknown	Terrestrial
Capricornis sumatraensis	Mainland Serow	MAMMALIA	VU	Decreasing	Terrestrial

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Macaca leonina	Northern Pig-tailed Macaque	MAMMALIA	VU	Decreasing	Terrestrial
Arctictis binturong	Binturong	MAMMALIA	VU	Decreasing	Terrestrial
Rusa unicolor	Sambar	MAMMALIA	VU	Decreasing	Terrestrial
Aonyx cinereus	Asian Small-clawed Otter	MAMMALIA	VU	Decreasing	Terrestrial, Marine, Freshwater
Pangshura tecta	Indian Roofed Turtle	REPTILIA	VU	Decreasing	Terrestrial, Freshwater
Wallago attu		ACTINOPTERYGII	VU	Decreasing	Freshwater
Ophiophagus hannah	King Cobra	REPTILIA	VU	Decreasing	Terrestrial
Elaphe taeniura	Cave Racer	REPTILIA	VU	Decreasing	Terrestrial
Python bivittatus	Burmese Python	REPTILIA	VU	Decreasing	Terrestrial
Ortygornis gularis	Swamp Francolin	AVES	VU	Decreasing	Terrestrial, Freshwater
Aythya ferina	Common Pochard	AVES	VU	Decreasing	Terrestrial, Marine, Freshwater
Mulleripicus pulverulentus	Great Slaty Woodpecker	AVES	VU	Decreasing	Terrestrial
Buceros bicornis	Great Hornbill	AVES	VU	Decreasing	Terrestrial
Gallinago nemoricola	Wood Snipe	AVES	VU	Decreasing	Terrestrial, Freshwater

IBAT

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Trachypithecus phayrei	Phayre's Leaf-monkey	MAMMALIA	EN	Decreasing	Terrestrial
Trachypithecus pileatus ssp. pileatus	Blond-bellied Langur	MAMMALIA	EN	Decreasing	Terrestrial
Crocodylus palustris	Mugger	REPTILIA	VU	Stable	Terrestrial, Freshwater
Helarctos malayanus	Sun Bear	MAMMALIA	VU	Decreasing	Terrestrial
Lutrogale perspicillata	Smooth-coated Otter	MAMMALIA	VU	Decreasing	Terrestrial, Marine, Freshwater
Macaca arctoides	Stump-tailed Macaque	MAMMALIA	VU	Decreasing	Terrestrial
Neofelis nebulosa	Clouded Leopard	MAMMALIA	VU	Decreasing	Terrestrial
Panthera pardus	Leopard	MAMMALIA	VU	Decreasing	Terrestrial
Prionailurus viverrinus	Fishing Cat	MAMMALIA	VU	Decreasing	Terrestrial, Freshwater
Trachypithecus pileatus	Capped Langur	MAMMALIA	VU	Decreasing	Terrestrial
Ursus thibetanus	Asiatic Black Bear	MAMMALIA	VU	Decreasing	Terrestrial
Dipterocarpus costatus		MAGNOLIOPSIDA	VU	Decreasing	Terrestrial
Dipterocarpus turbinatus		MAGNOLIOPSIDA	VU	Decreasing	Terrestrial

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Axis porcinus	Hog Deer	MAMMALIA	EN	Decreasing	Terrestrial, Freshwater
Trachypithecus phayrei ssp. phayrei		MAMMALIA	EN	Decreasing	Terrestrial
Cuora mouhotii	Keeled Box Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Amblyceps arunchalensis		ACTINOPTERYGII	EN	Unknown	Freshwater
Urogymnus polylepis	Giant Freshwater Whipray	CHONDRICHTHYES	EN	Decreasing	Marine, Freshwater
Perdicula manipurensis	Manipur Bush-quail	AVES	EN	Decreasing	Terrestrial, Freshwater
Asarcornis scutulata	White-winged Duck	AVES	EN	Decreasing	Terrestrial, Freshwater
Sterna acuticauda	Black-bellied Tern	AVES	EN	Decreasing	Terrestrial, Freshwater
Haliaeetus leucoryphus	Pallas's Fish-eagle	AVES	EN	Decreasing	Terrestrial, Freshwater
Aquila nipalensis	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
Leptoptilos dubius	Greater Adjutant	AVES	EN	Decreasing	Terrestrial, Freshwater
Laticilla cinerascens	Swamp Grass-babbler	AVES	EN	Decreasing	Terrestrial, Freshwater
Tor putitora		ACTINOPTERYGII	EN	Decreasing	Freshwater

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Cuon alpinus	Dhole	MAMMALIA	EN	Decreasing	Terrestrial
Cuora amboinensis	Southeast Asian Box Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Elephas maximus	Asian Elephant	MAMMALIA	EN	Decreasing	Terrestrial
Hardella thurjii	Crowned River Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Morenia petersi	Indian Eyed Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Panthera tigris	Tiger	MAMMALIA	EN	Decreasing	Terrestrial
Varanus flavescens	Yellow Monitor	REPTILIA	EN	Decreasing	Terrestrial
Nilssonia gangetica	Indian Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nilssonia hurum	Indian Peacock Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nycticebus bengalensis	Bengal Slow Loris	MAMMALIA	EN	Decreasing	Terrestrial
Hoolock hoolock	Western Hoolock Gibbon	MAMMALIA	EN	Decreasing	Terrestrial
Platanista gangetica	Ganges River Dolphin	MAMMALIA	EN	Decreasing	Freshwater

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Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Nilssonia nigricans	Black Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Indotestudo elongata	Elongated Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Manis pentadactyla	Chinese Pangolin	MAMMALIA	CR	Decreasing	Terrestrial
Manouria emys	Asian Giant Tortoise	REPTILIA	CR	Decreasing	Terrestrial
Aquilaria malaccensis	Agarwood	MAGNOLIOPSIDA	CR	Decreasing	Terrestrial
Aythya baeri	Baer's Pochard	AVES	CR	Decreasing	Freshwater
Gyps bengalensis	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial
Ardea insignis	White-bellied Heron	AVES	CR	Decreasing	Terrestrial, Freshwater
Emberiza aureola	Yellow-breasted Bunting	AVES	CR	Decreasing	Terrestrial, Freshwater
Gyps tenuirostris	Slender-billed Vulture	AVES	CR	Decreasing	Terrestrial
Pelochelys cantorii	Asian Giant Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Marine, Freshwater
Cyrtodactylus montanus		REPTILIA	CR	Unknown	Terrestrial

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Hoolock hoolock ssp. hoolock	Western Hoolock Gibbon	MAMMALIA	VU	Decreasing	Terrestrial
Paris polyphylla	Love Apple	LILIOPSIDA	VU	Decreasing	Terrestrial
Dalbergia thomsonii		MAGNOLIOPSIDA	VU	Unknown	Terrestrial
Bagarius bagarius		ACTINOPTERYGII	VU	Decreasing	Freshwater

Recommended citation

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How to use this report

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.

Appendix 15: 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	

	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 & when required only	
Tarpaulins used to cover sand & other loose material when transported by vehicles	
After unloading , wheels & undercarriage of vehicles cleaned prior to leaving the site	
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 & 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 & 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 & safe construction practices	

	Compliance
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 & 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

_____

_____

_____

Name Name

Position Position