



नेपाल सरकार
खानेपानी मन्त्रालय
खानेपानी मन्त्रालय
सिंहदरबार, काठमाडौं

पत्र संख्या:- ०६६/०६६

चलानी नं:- २९१



VISIT Nepal Year 2020

फोन नं.: ४२११६९३

फ्याक्स : ९७७-१-४२११४३३

सिंहदरबार,
काठमाडौं, नेपाल ।

मिति २०७६।०९।१६

सानासहरी खा. पा. आयोजना
आयोजना व्यावस्थापन कार्यालय
दर्ता नं.: ५४६
मिति: २०७६-९-१२

श्री सहरी खानेपानी तथा सरसफाइ (क्षेत्रगत) आयोजना,
पानीपोखरी, काठमाडौं ।

विषय : प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन स्वीकृती सम्बन्धमा ।

प्रस्तुत विषयमा तहां विभाग मार्फत स्वीकृतिका लागि यस मन्त्रालयमा प्राप्त भएको सहरी खानेपानी तथा सरसफाइ (क्षेत्रगत) आयोजना, प्रस्तावक रहेको तपसील बमोजिम आयोजनाहरुको परिमार्जित प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन नेपाल सरकार (सचिवस्तर) को मिति २०७६।०९।१६ को निर्णयानुसार स्वीकृत भएको व्यहोरा निर्देशानुसार अनुरोध छ ।

आयोजनाहरु:

- १ लिवाङ्ग सहरी खानेपानी तथा सरसफाइ आयोजना, रोल्पा
- २ सिद्धनाथ बैजनाथ सहरी खानेपानी तथा सरसफाइ आयोजना, कञ्चनपुर
- ३ प्रगतिनगर सहरी खानेपानी तथा सरसफाइ आयोजना, दाङ्ग

बोधार्थ :

श्री खानेपानी तथा ढल व्यवस्थापन विभाग,
पानीपोखरी, काठमाडौं ।

संलग्न :

स्वीकृत प्रारम्भिक वातावरणीय परीक्षण (IEE) प्रतिवेदन २ प्रति ।

(मधुसुधन खनाल)
ईन्जिनियर

आ. उ. ति. वि. वि. वि.
कार्यालय
१५/११/२०७६



Government of Nepal

Ministry of Water Supply

Department of Water Supply and Sewerage Management

Urban Water Supply & Sanitation Sector Project

Project Management Office

Panipokhari, Maharajgunj, Kathmandu

Initial Environmental Examination (IEE)

of

Pragatinagar Urban Water Supply and Sanitation Project

Rapti Rural Municipality, Dang

Province no. 5



Submitted To

Ministry of Water Supply
Singhadurbar, Kathmandu

Submitted By

Project Management Office
Urban Water Supply and Sanitation Sector Project
Department of Water Supply and Sewerage Management
Panipokhari, Kathmandu

Prepared By

BDA/PEA JV

Kamaladi, Kathmandu



Building Design Authority (P.) Ltd.

Architectural, Engineering & Planning Consultants

G.P.O. Box: 2882, Kamaladi, Kathmandu, Nepal
Tel: 4-227393 / 4-245200 / 4-247706 / 4-247836
Fax: 977-01-4223630, E-mail: bda@bda.gov.np

Plush Engineers & Architects

Engineering & Architectural Design, Project Planning
& Construction, Social Economic Survey etc.

G.P.O. Box: 2882, Kamaladi, Kathmandu
Tel: 4-227393, 42477930, 4248200
Fax: 977-01-4223630, E-mail: plush@plush.com.np



Government of Nepal
Ministry of Water supply
Department of Water Supply and Sewerage
Urban Water Supply and Sanitation Sector Project
Project Management Office

Engineer

November 2019



Signature
Engineer



TABLE OF CONTENTS

कार्यकारी सारांश	VIII
Executive Summary	XXI
1. NAME AND ADDRESS OF THE INDIVIDUAL INSTITUTION PREPARING THE REPORT- 1 -	
2. SUMMARY OF THE PROPOSAL..... - 2 -	
2.1. INTRODUCTION.....	- 2 -
2.2. OBJECTIVE OF THE PROPOSAL.....	- 2 -
2.3. RELEVANCY OF THE PROPOSAL	- 2 -
2.4. RATIONALITY OF IEE	- 3 -
2.5. OBJECTIVES OF THE ENVIRONMENTAL STUDY.....	- 3 -
2.6. SCOPE OF THE STUDY	- 3 -
3. DESCRIPTION OF THE PROPOSAL..... - 5 -	
3.1. TYPE OF PROPOSAL	- 5 -
3.2. SALIENT FEATURES OF THE PROPOSAL	- 5 -
3.3. LOCATION OF THE PROJECT.....	- 6 -
3.4. IMPACT AREA DELINEATION	- 9 -
3.5. MATERIALS TO BE USED	- 9 -
3.6. ENERGY TO BE USED.....	- 9 -
3.7. HUMAN RESOURCES REQUIREMENT.....	- 10 -
3.8. METHODS ADOPTED DURING STUDY	- 10 -
3.9. ENVIRONMENTAL BASELINE INFORMATION.....	- 13 -
3.10. REVIEW OF POLICIES AND LEGISLATION.....	- 21 -
3.11. EXISTING CONDITIONS.....	- 27 -
3.12. TYPE, CATEGORY, SIZE AND MAGNITUDE OF THE PROJECT.....	- 27 -
3.13. SOURCE, ITS YIELD AND WATER QUALITY	- 28 -
3.14. PROPOSED SCHEDULE OF IMPLEMENTATION.....	- 29 -
3.15. CONSTRUCTION AND OPERATION ACTIVITIES OF THE PROJECT.....	- 36 -
3.16. COMMUNITY PARTICIPATION AND OWNERSHIP.....	- 36 -
4. IMPACTS OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT- 38 -	
4.1. BENEFICIAL IMPACTS AND AUGMENTATION MEASURES.....	- 38 -
4.2. ADVERSE IMPACTS.....	- 40 -
4.3. INDIRECT, INDUCED AND CUMULATIVE IMPACTS	- 44 -
4.4. EVALUATION OF THE IMPACTS.....	- 45 -
5. ANALYSIS OF ALTERNATIVES WITH AND WITHOUT PROJECT..... - 49 -	
5.1. WITH- AND WITHOUT-SUBPROJECT ALTERNATIVES.....	- 49 -
5.2. WITHOUT-SUBPROJECT' OR 'DO-NOTHING' ALTERNATIVE	- 48 -
5.3. WITH SUBPROJECT' LOCATION ALTERNATIVE.....	- 49 -
6. MITIGATION MEASURES FOR THE ANTICIPATED IMPACTS..... - 51 -	
6.1. CONSTRUCTION PHASE	- 51 -
6.2. OPERATION & MAINTENANCE PHASE.....	- 54 -
6.3. IMPLEMENTATION OF MITIGATION MEASURES	- 55 -
6.4. MITIGATION MEASURES FOR CUMULATIVE IMPACT	- 55 -
7. ENVIRONMENT MANAGEMENT PLAN..... - 62 -	
7.1. OBJECTIVES OF ENVIRONMENT MANAGEMENT PLAN	- 62 -
7.2. INSTITUTIONAL ARRANGEMENT	- 62 -
7.3. SAFEGUARD IMPLEMENTATION ARRANGEMENT	- 62 -

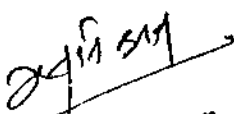
Engineer



7.4. ENVIRONMENT MANAGEMENT PLAN	- 62 -
7.5. ENVIRONMENTAL MONITORING PROGRAM	- 74 -
7.6. INSTITUTIONAL CAPACITY DEVELOPMENT PROGRAM.....	- 77 -
7.7. STAFFING REQUIREMENT AND BUDGET	- 78 -
7.8. IMPLEMENTATION SCHEDULE	- 81 -
7.9. MONITORING AND REPORTING	- 82 -
7.10. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION.....	- 83 -
7.11. GRIEVANCE REDRESS MECHANISM	- 85 -
8. CONCLUSIONS AND RECOMMENDATIONS.....	- 90 -

ANNEXES

Annex 1:	Approved ToR
Annex 2:	Environmental Standards, Sample Forms, Formats and Reporting Templates
Annex 3:	Project Location and Service Area
Annex 4:	Public Notice & Muchulka, Public Consultation minutes, Consent Letters & Recommendation Letter
Annex 5:	Water Quality Test Report
Annex 6:	Survey Questionnaire & Checklists
Annex 7:	Photographs
Annex 8:	Comments from MoWS, and Comment Incorporation Matrix


Engineer

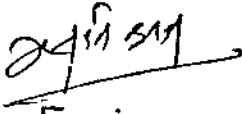


List of Table

TABLE 1.1: STUDY TEAM FOR IEE STUDY OF THE PROJECT	1
TABLE 2.1: CRITERIA FOR REQUIREMENT OF IEE FOR DRINKING WATER SUPPLY PROJECTS AS PER EPR (1997) - SCHEDULE 1, CLAUSE H, AND ITS COMPARISON WITH SITUATION OF THE PROJECT	3
TABLE 3.1: SALIENT FEATURES OF PRAGATINAGAR TOWN PROJECT	5
TABLE 3.2: SERVICE AREA, HH AND POPULATION (SURVEY YEAR, 2017).....	15
TABLE 3.3: MALE/FEMALE POPULATION AND AVERAGE HH SIZE (SURVEY YEAR 2017).....	15
TABLE 3.4: CASTE / ETHNICITY	16
TABLE 3.5: POPULATION DISTRIBUTION BY EDUCATION LEVEL	16
TABLE 3.6: OCCUPATION OF HOUSEHOLDS OF THE PROJECT AREA.....	16
TABLE 3.7: MONTHLY AVERAGE INCOME RANGE	17
TABLE 3.8: SATISFACTION IN TERMS OF WATER QUALITY	17
TABLE 3.9: DRAINAGE AND SEWERAGE FACILITY	18
TABLE 3.10: HOUSEHOLD LATRINE	18
TABLE 3.11: TYPE OF HOUSEHOLD LATRINE.....	18
TABLE 3.12: INSTITUTIONS IN THE SERVICE AREA	20
TABLE 3.13: WILLINGNESS TO PAY 5% CASH CONTRIBUTION.....	20
TABLE 3.14: THE RELEVANT ENVIRONMENTAL POLICIES, LAWS AND GUIDELINES OF NEPAL.....	23
TABLE 3.15 RELEVANT ENVIRONMENTAL QUALITY STANDARDS.....	26
TABLE 3.16: WATER QUALITY ASSESSMENT.....	28
TABLE 3.17: SUBSYSTEM-WISE POPULATION PROJECTION.....	30
TABLE 3.18: TRANSMISSION/ PUMPING MAIN.....	32
TABLE 3.19: REQUIREMENT OF RESERVOIR	32
TABLE 3.20: DISTRIBUTION PIPE NETWORK.....	33
TABLE 4.1: ECONOMIC BENEFITS FROM TIME SAVED IN COLLECTING WATER.....	38
TABLE 4.2: REA IDENTIFIED IMPACTS & MITIGATION MEASURES TAKEN DURING PROJECT PREPARATION PHASE	39
TABLE 4.3: EVALUATION OF ENVIRONMENTAL/SOCIAL IMPACTS.....	46
TABLE 6.1: IMPACTS AND MITIGATION MEASURES.....	55
TABLE 7.1: ENVIRONMENTAL MANAGEMENT PLAN	65
TABLE 7.2: ENVIRONMENTAL POLLUTION MONITORING PROGRAM	73
TABLE 7.3: ENVIRONMENTAL MONITORING COST.....	75
TABLE 7.4: TRAINING PROGRAM FOR ENVIRONMENTAL MANAGEMENT.....	77
TABLE 7.5: INDICATIVE COST OF EMP IMPLEMENTATION AND ITS MONITORING.....	78
TABLE 7.6: ENVIRONMENTAL MANAGEMENT IMPLEMENTATION SCHEDULE	80
TABLE 7.7: LISTS OF PEOPLE AND INSTITUTIONS CONSULTED	82

List of Figures

FIGURE 3.1: PROJECT AREA	7
FIGURE 3.2: PROJECT LAYOUT MAP WITH CORE AREA	8
FIGURE 3.3 DATA ON WATERBORNE DISEASES IN 2075/76.....	19
FIGURE 3.4 SCHEMATIC LAYOUT OF TREATMENT SYSTEM	31
FIGURE 7.1: GRIEVANCE REDRESS MECHANISM (FORMAL APPROACH)	87

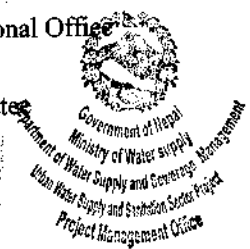

Engineer



ABBREVIATIONS

ADB	Asian Development Bank
DCC	District Coordination Committee
DED	Detailed Engineering Design
DRTAC	Design Review and Technical Audit Consultant
DSC	Design and Supervision Consultant
DSMC	Design, Supervision and Management Consultant
DTW	Design Tube Well
DWSSM	Department of Water Supply and Sewerage Management
EARF	Environmental Assessment and Review Framework
EIA	Environment Impact Assessment
EMP	Environment Management Plan
EMR	Environmental Monitoring Report
EPA	Environment Protection Act
EPR	Environment Protection Rules
ESA	Environmental Safeguard Assistant
ESE	Environmental Safeguard Expert
GoN	Government of Nepal
GRM	Grievance Redress Mechanism
HDPE	High Density Polyethylene
HHs	Households
ICG	Implementation Core Group
IEE	Initial Environmental Examination
MoFE	Ministry of Forests and Environment
MoWS	Ministry of Water Supply
NDWQS	National Drinking Water Quality Standard
NGO	Non-Governmental Organization
PMO	Project Management Office
REA	Rapid environmental assessment
RoW	Right of Way
RPMO	Regional Project Management Office
SDG	Sustainable Development Goal
SPS	Safeguard Policy Statement
TDF	Town Development Fund
ToR	Terms of Reference
UWSSP	Urban Water Supply and Sanitation Sector Project
WHO	World Health Organization
WSSDO	Water Supply and Sanitation Divisional Office
WTP	Water Treatment Plant
WUSC	Water Users and Sanitation Committee

24/11/19
Engineer



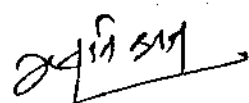
WEIGHTS AND MEASURES

C	Celsius /centigrade
dBA	decibel audible
Ha	hectare/s
Km	kilometer/s
Kph	kilometer/s per hour
M	meter/s
m ³	cubic meter/s
Amsl	above mean sea level
mg/l	milligram/s per liter
Mm	millimeter/s



[Signature]
Engineer




Engineer



कार्यकारी सारांश

पृष्ठभूमि

यस प्रस्तावित आयोजनाका प्रस्तावक शहरी खानेपानी तथा सरसफाई आयोजनाको आयोजना व्यवस्थापन कार्यालय हो । यो कार्यालय खानेपानी तथा ढल व्यवस्थापन विभाग अन्तर्गत पर्दछ । यो आयोजना साना शहर र नगरोन्मुख बस्तिहरूको खानेपानी तथा सरसफाई सेवा सुधारमा केन्द्रित रहेको छ । यो आयोजना समुदायको आवश्यकता अनुसारको माग र सोका लागि समुदायकै सक्रिय सहभागिता र व्यवस्थापनको सिद्धान्तमा आधारित छ । यो आयोजनाले नेपाल सरकारलाई दिगो विकास लक्ष्य (बुँदा ६) अनुसार सन् २०३० भित्र सबैका लागि खानेपानी तथा सरसफाईको उपलब्धता र सोको दिगो व्यवस्थापन हाँसील गर्न सहयोग पुऱ्याउनेछ । यस आयोजनाबाट प्रदेश नं. ५ को दाङ जिल्लाको राप्ती गाउँपालिका का वडा नं. ५, ७ र ८ मा पर्ने आयोजना क्षेत्रका वासिन्दा लाभान्वित हुनेछन् ।

प्रारम्भिक वातावरणीय परीक्षणको उद्देश्य

यस प्रारम्भिक वातावरणीय परीक्षणको मूल उद्देश्य भनेको यस आयोजनाका कार्यहरूबाट वातावरणमा पर्न सक्ने नकारात्मक असरहरूको पहिचान गरी ती असरहरूलाई न्यून गर्नु, निर्मूल गर्नु वा ऐनको स्वीकार्य सिमामा ल्याउन आवश्यक र उपयोगी उपाय तथा सुझावहरू योजनाबद्ध रूपमा दिनु हो ।

नेपाल सरकारका ऐन तथा कानून, र ए. डि. बि. बै.को नीति

नेपाल राष्ट्रको प्रचलित कानून, नियम तथा एशियाली विकास बैंकको नीति अनुसार कुनै पनि विकासको योजना तथा निर्णय प्रक्रियामा वातावरणीय असरहरू बारे ध्यान पुऱ्याउनु पर्ने हुन्छ । नेपाल सरकारको कानूनी प्रक्रिया अनुसार यो प्रस्तावित परियोजनाले वातावरण संरक्षण ऐन, २०५४ र वातावरण संरक्षण नियमावली, २०५४ को पालना गर्नुपर्ने हुन्छ । प्रस्तावित प्रारम्भिक वातावरणीय परीक्षणले वातावरण संरक्षण नियमावली (२०५४) को अनुसूची १ अन्तर्गत दफा-ए को उपदफा ८ को पालना गर्दछ ।

एशियाली विकास बैंकको सुरक्षण नीति कथन (जुन २००९) अनुसार यो परियोजना श्रेणी “बी” मा पर्दछ र एशियाली विकास बैंकको निर्देशिका अनुसार समेत यो प्रारम्भिक वातावरणीय परीक्षण गरिएको छ ।

अध्ययन विधि

खानेपानी मन्त्रालयद्वारा मिति २०७५/०७/२९ मा स्वीकृत कार्यसूची (टी.ओ.आर.) का आधारमा यो प्रतिवेदन तयार गरिएको छ । यस अध्ययनले वातावरण संरक्षण ऐन (२०५३) तथा वातावरण संरक्षण नियमावली (२०५४), र साथ साथै एशियाली विकास बैंकको सुरक्षण नीति कथन (जुन २००९) का प्रावधान तथा व्याख्याहरूको पालना गरेको छ । यस अध्ययनका सिलसिलामा प्रतिवेदन अध्ययन, फिल्ड अध्ययन, संकलित तथ्यहरूको विश्लेषण तथा सूचना संप्रेषण तथा सार्वजनिक सहभागिताका क्रियाकलापहरू गरिएका छन् । सार्वजनिक सूचना प्रकाशन, सूचना टाँसको मुचुल्का र सार्वजनिक छलफल गरीसरोकारवालाहरू का सुझावहरू प्रतिवेदनमा उल्लेख गरिएको छ । भौतिक वातावरणीय अवयवहरू, जैविक वातावरणका पक्षहरू तथा सामाजिक-आर्थिक अवस्थाहरूको सुक्ष्म रूपमा अध्ययन गरी स्थानीय सरोकारवालाहरू सित आयोजना कार्यन्वयन गर्दा हुन सक्ने सकारात्मक प्रभावहरूका बारेमा छलफल गरिएको छ । यो अध्ययन विशेषत आयोजनाको प्रारम्भिक निर्माणका काम हुने ठाउँहरू - प्रत्यक्ष असर पर्ने क्षेत्र र त्यसको वरिपरि नजिकको क्षेत्रमा गरिएको छ ।

Engineer

आयोजनाका मुख्य संरचनाहरू

प्रस्तावित प्रगतिनगर खानेपानी तथा सरसफाई आयोजना भूमीगत जलस्रोतमा आधारित प्रणाली हो । यसका दुईवटा कम्पोनेन्टहरू छन्: (क) खानेपानी वितरण र (ख) सरसफाई । खानेपानी वितरण अन्तर्गत डीप ट्यूब वेल, प्रसोधन प्रणाली, पानी भण्डारण ट्याङ्की निर्माण, वितरण प्रणालीको निर्माण, पाईप विछ्याउने कार्य, घरधारा जडान एवं कार्यालय भवन निर्माणका कार्यहरू हुनेछन् । यस आयोजनाबाट वडा नं. ५ का लठुवा, प्रगतिनगर, पहरुवा, कालापानी, सिंगे, कमल रोड; त्यसै गरी वडा नं. ७ का बर्किसिसनिया, जीतपुर; र वडा नं. ८ का पिपरी, पिपरा, विजौरी, कोहलुवा वस्तीहरू गरी जम्मा २४०६ घरधारा जडान मार्फत पानी वितरण गरिनेछ । दोस्रो पाटोमा सरसफाई कार्यक्रम छ, जस अन्तर्गत घरधुरीहरूमा सरसफाईको प्रवर्धन र सार्वजनिक शौचालयको निर्माण प्रस्ताव गरिएको छ । यस आयोजनाको खानेपानी संरचनाका लागि लागत रु ४०,८५,२२,३००/- र सरसफाई तर्फको लागत रु ६९,४८,८४७/- गरी कूल लागत रु ४९,५४,७९,९४७/- रहेको छ ।

वातावरणको वर्णन

यो आयोजना दाङ जिल्लाको राप्ती गाउँपालिकामा अवस्थित छ । आयोजना क्षेत्र समुन्द्री सतहबाट २१० मिटर देखि ३०० मिटरको उचाईमा रहेको छ । आयोजना क्षेत्र भित्र मधेशको समथल भूमीमा पर्दछ । यस आयोजनाका मुख्य संरचनाहरू सार्वजनिक भूमिमा रहनेछन् । त्यसै गरी पानी वितरण पाईपलाइनहरू सार्वजनिक बाटोको अधिकार क्षेत्र (ROW) भित्र रहनेछन् । आयोजना क्षेत्रमा कालापानी सामुदायिक वन र शंकर सामुदायिक वनहरू पर्दछन् । आयोजना क्षेत्र भित्र कुनैपनि किसिमको सिमसार तथा संरक्षित क्षेत्रहरू छैनन् ।

प्रगतिनगर एक शहरोन्मुख बस्ती हो जहाँ आर्थिक कारोबार बढ्दो क्रममा छ । आयोजना क्षेत्रका घरधुरीको औसत मासिक आय करिब रु ४०,९९३/- रहेको छ । बसाई सराई तथा भाडामा बस्ने मानिसहरूको बढ्दो जनसंख्याका कारण आयोजना क्षेत्रको जनसंख्या बृद्धि उल्लेखनीय रहेको देखिन्छ । विद्यमान खानेपानी प्रणालीको क्षमता हालको जनसंख्या मध्ये ५% का लागि मात्रै पुग्ने देखिन्छ । ९३.२% घर ट्यूबवेलको पानी प्रयोग गर्दछन् । अधिकांश घरहरूमा चर्पीको व्यवस्था छ तर ४.३% अबै चर्पी बनाउन बाँकी रहेको छ । बजार क्षेत्रमा सार्वजनिक शौचालयको अभाव देखिन्छ ।

वातावरणीय प्रभाव, तथा वातावरणीय व्यवस्थापन योजना

यस आयोजनाको कार्यान्वयनले धेरै महत्वपूर्ण नकारात्मक वातावरणीय प्रभाव पर्ने देखिदैन र संभावित नकारात्मक प्रभावहरू पनि स्थानीय र सजिलै सँग निराकरण गर्न सकिने प्रकारका रहेकाछन् । आयोजनाका विभिन्न भौतिक संरचनाहरू निर्माण गर्न कूल ५,०५२ वर्ग मिटर जमीन भित्रको जग्गा मात्रै प्रयोग हुनेछ । वडा नं. ५ मा रहेको शिव मन्दिर परिसरको खाली जमीन र सोही जमीन नजिकैको शंकर माध्यामिक विद्यालयको खुल्ला जमीनमा पनि आयोजनाका केही संरचनाहरू बन्नेछन् । आयोजनाको मुख्य संरचना स्थानको छनौट उपभोक्ता समितिको सल्लाह र सुझाव अनुरूप गरिएको छ र त्यसको लागि कुनै पनि संरचना र जनसमुदायलाई विस्थापित वा पुनर्स्थापना गर्नु पर्ने देखिन्छ । आयोजनाका लागि आवश्यक पर्ने जग्गा उपभोक्ता समितिले हाशील गरिसकेको छ । खानेपानी वितरण प्रणालीका मुख्य वातावरणीय मुद्दा निर्माणसँग सम्बन्धित क्रियाकलाप जस्तै पाईप विछ्याउने, डीप-पबोरिङ कार्य,

Engineer



प्रशोधन इकाई निर्माण, भण्डारण ट्याङ्की निर्माण र पाइप लाइन बिछ्याउँदा जमीन तथा सडकको सतह खुकुलो हुदाँ हुने भूक्षय हुन सक्ने जस्ता प्रभावहरु रहेका छन् । छोटो समयको लागि हावा, पानी तथा ध्वनी प्रदूषण हुन सक्ने देखिन्छ । त्यसै गरी कामदारहरुको सुरक्षा पनि एउटा चासोको विषयको रुपमा हेरिएको छ । समग्र रुपमा हेर्दा प्रस्तावित आयोजनाबाट सो क्षेत्रका जैवीक, भौतिक, आर्थिक, सांस्कृतिक तथा सामाजिक वातावरणमा कुनै गहन प्रभावको सम्भावना निकै कम देखिन्छ ।

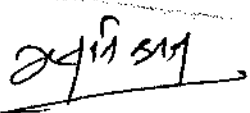
प्रारम्भिक वातावरणीय परिक्षण प्रतिवेदनको एउटा मुख्य अंशको रुपमा वातावरणीय व्यवस्थापन योजना बनाईएको छ, जसमा निम्न कुराहरु समेटिएका छन् : क) आयोजना कार्यान्वयन चरणमा पर्न सक्ने वातावरणीय प्रभाव न्यूनीकरणका उपायहरु पत्ता लगाउने, ख) जिम्मेवार निकायद्वारा वातावरणीय अनुगमन तथा न्यूनीकरणको प्रतिवेदन तयार गर्ने, ग) सूचना सम्प्रेषण तथा सार्वजनिक छलफल गर्ने, र घ) गुनासो सम्बोधन गर्ने संयन्त्र बनाउने । डिजाईनमा सूधार एवं संशोधन गरेर धेरै जसो वातावरणीय नकारात्मक असरहरुलाई न्यूनीकरण गरिएको छ ।

वातावरणीय व्यवस्थापन योजना अन्तर्गतका महत्वपूर्ण केही कार्यहरु मध्ये वडा नं. ८ को शिव मन्दिर परिसरनजिक करिब २५ मिटरको पर्खाल लगाउने, सिसहनिया क्षेत्रको बजार क्षेत्रमा सकेसम्म कम असर पर्ने गरी पाइप लाईनहरु बिछ्याउने, वडा नं. ५ मा यस गाउँपालिकाको कार्यालय रहेको परिसर नजिक रहेको प्रस्तावित खुल्ला स्थानमा कामदारका लागि व्यवस्थित रुपमा शिविर संचालन गरी सोही स्थानमा आवश्यक निर्माण सामग्री संचय गर्ने, हरियाली प्रवर्धन गर्ने; कुनै पनि क्षति भएका निजी वा सार्वजनिक संरचनालाई पहिलेकै उचित अवस्थामा पुनर्स्थापना गर्ने; निर्माण कार्यका कारण निस्कने ढुङ्गा-माटो र फोहर गाउँपालिकासितको समन्वयमा निश्चित स्वीकृत ठाउँमा मात्रै फाल्ने, र खोलानालामा फाल्न बन्देज गर्ने; तथा स्थानीय सरोकारवालाहरु सित समन्वय गरी वातावरणीय संरक्षणका विषयमा जनचेतनामूलक कार्यक्रमहरु संचालन गर्ने जस्ता कार्यहरु रहेका छन् ।

वातावरणीय व्यवस्थापन योजनालाई निर्माण कार्यको ठेक्का सम्झौताको एउटा अंशको रुपमा राखिएको छ । नकारात्मक प्रभाव न्यूनीकरणको कार्यान्वयन राम्रो संग भएको वा नभएको जाँच गर्न अनुगमन गर्नु जरुरी छ । त्यसैले निर्माण र संचालन अवधिमा हुने क्रियाकलापहरुलाई समेटेर एउटा विस्तृत अनुगमन कार्यक्रम तयार पारिएको छ । आयोजना शुरु गर्नु अगाडि आयोजना व्यवस्थापन कार्यालयले नकारात्मक प्रभाव न्यूनीकरणका उपायहरुको कार्यान्वयन गर्नका लागि कार्य योजना र वातावरणीय योजना अनुसारको अनुगमन योजना बनाइने छ । ई.एम.पि. कार्यान्वयनका लागि रु १५,००,०००/- निर्माण ठेक्कामा संलग्न गरिनेछ ।

यस आयोजनाबाट स्थानीय जनताहरुले प्रशस्त सकारात्मक फाईदा प्राप्त गर्नेछन्, जसमध्येका मुख्य फाईदाहरु निम्नानुसार छन्: क) सुधारीएको खानेपानीको सुविधामा जनताको पहुँचमा बढि हुने एवं सरसफाईको क्षेत्रमा सुधार, ख) आयोजना क्षेत्रमा रोजगार बढ्नु र सीप अभिवृद्धि हुनु र यसै गरी प्रगतिनगर शहरका बासिन्दाहरुको जीवनस्तरमा सुधार आउनु ।




Engineer ix

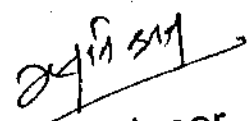


स्थानीय सहभागिता, सूचना सम्प्रेषण र गुनासो सम्बोधन

प्रारम्भिक वातावरणीय परिक्षणको प्रतिवेदन लेखन क्रममा समुदायसंग छलफल गरिएको छ । यस्ता छलफलहरु लाई पुरै आयोजना निर्माण चरणसम्म निरन्तरता दिइनेछ । मिति २०७५ पौष ३ गतेका दिन आर्थिक अभियान राष्ट्रिय दैनिकमा प्रारम्भिक वातावरणीय परिक्षणका लागि राय सुझाव पेश गर्ने सम्बन्धमा १५ दिने सार्वजनिक सूचना जारी गरियो । उक्त सूचना विभिन्न कार्यालय तथा स्थानहरुमा टाँस गरी सोको मुचुल्का गरियो । स्थानीय निकाय तथा सरोकारवालाहरुको उपस्थितिमा यस आयोजनाका बारेमा र प्रतिवेदनमा उल्लेख गरिएका वातावरणीय पक्षहरुका बारेमा जानकारी तथा छलफल पनि गरिएको छ । समुदायका कुनैपनि गुनासाहरुलाई तुरुन्तै सम्बोधन गर्ने हेतुले प्रारम्भिक वातावरणीय प्रतिवेदनमा गुनासो सम्बोधन प्रक्रिया विस्तृत रुपमा वर्णन गरिएको छ ।

निश्कर्ष तथा सुझाव

यस आयोजना बाट स्थानीय बासिन्दाहरुले चौविसै घण्टा सुरक्षित खानेपानी पाउनेछन् र सरसफाईको अवस्थामा सुधार हुनेछ जसले गर्दा आयोजना क्षेत्रका बासिन्दाहरुको जीवन स्तरमा सुधार आउनेछ । यस आयोजनाको प्रकृति, आयोजना क्षेत्रको वातावरण एवम् आर्थिक सामाजिक अवस्था र स्थलगत निरिक्षण एवम् सरोकारवाला संगको सरसल्लाहलाई मध्यनजर गर्दा यस परियोजनाबाट आयोजना क्षेत्रमा न्यून नकारात्मक वातावरणीय असर पर्ने देखिन्छ । संभावित प्रभावहरु धेरै जसो स्थानीय प्रकारका छन् र सुझाइएका प्रभाव न्यूनीकरणका उपयुक्त उपाय कार्यान्वयन गरिएमा र नियमित अनुगमन गरिएमा यी प्रभावहरुलाई सजिलै एवम् कम खर्चमा न्यूनीकरण गर्न सकिनेछ । यस आयोजना कार्यान्वयनका लागि प्रारम्भिक वातावरणीय परिक्षण मात्रै गरे पुग्ने देखिन्छ र अतिरिक्त वातावरणीय प्रभाव अध्ययन गर्नु नपर्ने देखिन्छ ।


Engineer



Executive Summary

The proponent of Pragatinagar Urban Water Supply and Sanitation Project is the Project Management Office of Urban Water Supply and Sanitation Sector Project (UWSSP) under the Department of Water Supply and Sewerage Management, Government of Nepal. The project is focused on improvement of water supply and sanitation service delivery in small-scale urban and semi-urban centers across Nepal. The project will support the GoN to achieve the targets of Sustainable Development Goals (SDG-6). The project will serve the beneficiaries of ward numbers 5, 7 and 8 of Rapti Rural Municipality of Dang district in Province 5.

Objectives of IEE

The prime objective of IEE is to identify the potential environmental impacts associated with the project, and to propose benefit augmentation measures as well as negative impact mitigation measures along with an environmental management plan so as to avoid such impacts or to limit any such impact/s within the levels acceptable as per environmental standards and thresholds of the GoN.

GoN's Legal Requirements, and Categorization

This Initial Environmental Examination (IEE) report has been prepared as per Schedule-1 of Environment Protection Rule (1997), GoN. Procedures and reporting format has been followed as per the requirements of the EPR, 1997. Pragatinagar Urban Water Supply and Sanitation Project is classified as Environment Category B as per the SPS- 2009 as no significant impacts are envisioned.

Study Methodology

The present Initial Environmental Examination report has been prepared based on the Terms of Reference (ToR) approved by the Ministry of Water Supply, GoN, on 15th November 2018. The study has followed the provisions outlined in the Environment Protection Act, 1997 and Environment Protection Rules, 1997, and Safeguard Policy Statement, 2009 of the Asian Development Bank (ADB). The major activities undertaken during the preparation of IEE are Desk Study, Literature review, Field study, Data processing, Impact Prediction and Evaluation, and Public Consultation. Publication of public notice, collection of deed or inquiry of pasting of the notice in the locality, continuous public consultations, and conducting of a formal public consultation to collect opinions and suggestions from the locals was also conducted during the IEE study period. Study of the physical, biological and socio-economic environmental aspects was conducted in relation to the project activities and potential impacts of those activities. The study has focused in the core project area as well as its surrounding area.

Major Project Components

The proposed project is ground water source based system. It has two major components; namely - (i) water supply component, and (ii) sanitation component. Under water supply component, there are activities like deep-boring, establishment of treatment units, water storage tank construction, guard house, laying of transmission & distribution network pipelines, connection of household taps, and construction of a office building of WUSC. The sanitation component comprises of household sanitation promotion works and construction of a public toilet. This project serves the settlements including Lathuwa, Pragatinagar, Paharuwa, Kalapani,

Engineer



Singe, Kamal road of ward number 5, and Barki Sishahaniya, Jitpur of ward number 7, and pipari, Bijauri, Kohaluwa of ward number 8. A total of 2406 households will have tap connections in the base year. The cost of water supply component is NRs 408,522,300 and that of sanitation component is NRs 6,948,847; and the total project cost is NRs 415,471,147.

Description of the Environment

This project is located in Rapti Rural Municipality of Dang district. The altitude of the project area ranges from 210 meters to 300 meters (amsl). The project area lies in the flat plains of inner Terai belt. The major components of this project lie in the public land. The water distribution pipelines will be within the right-of-way (ROW) of public roads. There are some community forests like Kalapani Community Forest and Shankar Community Forest within the project area. There are no designated wetlands or protected areas within or in close vicinity of the project area.

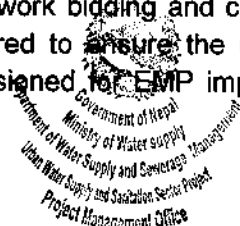
Pragatinagar is a rapidly growing urban center with increasing economic activities. The average monthly income of the households of the project area is NRs 40,193. The growth in population of the project area is also contributed by the increasing trend of urban immigration and rental population. The existing water supply system has coverage of only 5% and around 93% of the households depend on water from tubewell for drinking water. Most of the households of the project area have toilets, but around 4.3% of the households still lack proper toilet facilities. There is also lack of adequate public toilet in the market area.

Environmental Impacts and Environment Management Plan

The implementation of this project will not have major significant impacts on the environment, and the potential impacts are also local in extent and those can be mitigated with applicable mitigation measures. A total of 5,052 square meters of land will be required for construction of different project components. There will be need of acquiring the open land of Shiv Mandir premises in ward 5, and also a portion of open land of nearby Shankar Secondary School will need to be acquired. The sites required for the construction of the project units have been selected in close consultations with the WUSC, and there is no need of relocation of any structure, and there is no any resettlement needs. The WUSC has obtained the permissions and agreements for the use of the required land. Degradation of land surface due to excavations works to be carried out for tubewell construction, making of project components, and laying of the pipelines is one of the major concerns of the project works. There will be short term concerns of ambient air pollution, noise nuisance and water pollution in relation to the project works. The concerns of occupational, health and safety (OHS) along with community health and safety is among the major socio-economic concerns.

An environmental management plan (EMP) is included as an integral part of this IEE report, which includes; (i) mitigation measures for environmental impacts during implementation, (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting, (iii) public consultation and information disclosure, and iv) a grievance redress mechanism. Most of the impacts and their significance have been reduced by amending the designs and locations. The EMP will be included in civil work bidding and contract documents. An environmental monitoring plan has also been prepared to ensure the monitoring of EMP works. Indicative cost of NRs 1,500,000 has been provisioned for EMP implementation under this IEE report.

Engineer



Some of the major environmental mitigations proposed include construction of an approximately 25 m long wall along the boundary of Shivalaya in ward number 8; to take high precautions and undertake stakeholder consultations to minimize any damage during pipelaying works in market areas of Sisahaniya/Kalapni areas; proper stockpiling in the campsite proposed in the proposed open land near the rural municipality office at ward 5; greenery promotion works; reinstatement of any damaged public or private property to acceptable state; sprinkling of water at dry sites/roads under dry conditions to reduce dust nuisance; prohibition of disposal of spoil or waste onto water bodies, and disposal only in designated sites in coordination with the rural municipality office; and conducting environmental awareness activities in coordination with local stakeholders.

The major benefits for the local citizens due to implementation of this project will be; (i) improved access to the quality drinking water supply and sanitation services, (ii) increased employment opportunities and skill enhancement in the project area, and (iii) improvement in quality of life of the citizens of Pragatinagar service area.

Public Consultation, Information Disclosure, and Grievance Redress Mechanism

Public consultations were continuously carried out during preparation of the project and IEE report. A public notice was issued on 18th December 2018 in a national daily *Arthik Abhiyan* to collect suggestions and opinions from the local stakeholders. A public consultation was carried out and information were provided in details regarding the project components, its activities and associated environmental impacts. Details of the draft IEE report were discussed and shared. On-going consultations will be carried throughout the project implementation period. A grievance redress mechanism is described to ensure any public grievances are addressed quickly.

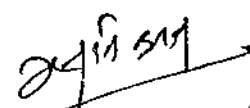
Conclusions

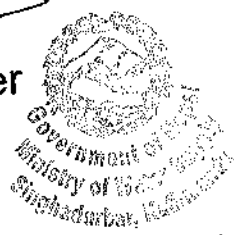
Pragatinagar Urban Water Supply and Sanitation Project will bring a series of benefits to the local people. However, there are some risks in the commencement of the project on time and sustainability of the project which requires to be identified and measures taken to mitigate them. But the analysis shows that project benefits outweigh the risks and these potential risks can be overcome through proper planning, coordination and management. Therefore the proposed subproject is unlikely to cause significant adverse impacts. Based on the findings of IEE, there are no significant adverse impacts and the classification of the subproject as Category "B" is confirmed. No further special study or detailed Environmental Impact Assessment (EIA) needs to be undertaken.



[Signature]
Engineer




Engineer



1. NAME AND ADDRESS OF THE INDIVIDUAL INSTITUTION PREPARING THE REPORT

The name of the proposal is 'Initial Environmental Examination (IEE) of Pragatinagar Urban Water Supply and Sanitation Project'. It lies in Rapti Rural Municipality in Dang district of Province 5.

1.1. Name and Address of the Proponent

The project falls under the Urban Water Supply and Sanitation Sector Project (UWSSP). The Department of Water Supply and Sewerage Management (DWSSM) is the proponent of the project. DWSSM will be the responsible agency for the implementation of the proposal. The name and address of the proponent is given below;

Project Management Office
Urban Water Supply and Sanitation Sector Project
Department of Water Supply and Sewerage Management
Ministry of Water Supply, Government of Nepal

Address of the Proponent:

Panipokhari, Kathmandu, Nepal
Phone: 977 1 4423848, 977 1 4412348
Fax: 977 1 4413280
email: info@uwssp.gov.np; website: www.uwssp.gov.np

1.2. Consultant Preparing the Report

BDA/PEA (JV) has worked on behalf of the proponent for conducting IEE studies and preparing IEE report using all the prevalent guidelines, acts, policies and regulations. The name and address of the consultant is given below;

	Building Design Authority (P.) Ltd. Architectural, Engineering & Planning Consultants P.O. Box : 2882, Kamaladi, Kathmandu, Nepal Tel : 4-227383 / 4-248200 / 4-247706 / 4-247939 Fax: 977-01-4223836. E-mail: bda@bda.com.np	Plush Engineers & Architects Engineering & Architectural Design, Project Planning & Evaluation, Socio Economic Survey etc. P. O. Box : 2882, Kamaladi, Kathmandu Tel : 4247706, 4227383, 42477939, 4248200	
w	w	w	w
b	d	a	j
c	o	m	p

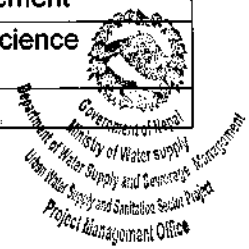
The following team completed this IEE study;

Table 1.1: Study Team for IEE Study of the Project

SN	Name of Expert	Designation	Expertise field
1	Yogesh Shakya	IEE Team Leader	Environmental Management
2	Giri Bahadur Sunar	Social Safeguards Specialist	Socio-economist
3	Manoj Kumar Sharma	Engineer	Contract Management
4	Sheela Sharma / Rocky Mitra	Asst. Environmental Specialist	Environmental Science
5	Elena Pudasainee	Support Staff	



24/11/19
Engineer
- I -



2. SUMMARY OF THE PROPOSAL

2.1. Introduction

Along with the Third Small Towns Water Supply and Sanitation Sector Project, the Urban Water Supply and Sanitation (Sector) Project (UWSSSP) will support the Government of Nepal (GoN) in providing water supply and sanitation facilities and services to around 22 additional small towns in Nepal. Asian Development Bank (ADB) has already supported the GoN through successful implementation of earlier two phases of projects in over 50 towns. Drawing experience from the past projects, the new phase project will fund physical investments in water and sanitation infrastructure in selected small towns in Nepal and non-physical investments in institutionalizing sector reforms, capacity building, project management and service delivery improvement.

UWSSP will be funded by a loan using a sector lending approach of ADB. The Executing Agency is the Ministry of Water Supply (MoWS) and the implementing agency is the Department of Water Supply and Sewerage Management (DWSSM).

The outcome will be inclusive and sustainable water supply and sanitation service delivery in selected small towns in Nepal. The project will have 3 outputs; (i) Improved water supply and sanitation infrastructure in selected small towns; (ii) Strengthened sector policy, institutional framework, service delivery and project implementation; and (iii) Improved project implementation and financing platform. The IEE is based on an assessment of these components, focused on output (i), within the project area.

2.2. Objective of the Proposal

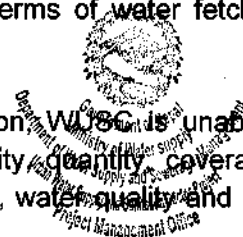
The objective of the proposal is to ensure adequate and safe drinking water to the targeted population of the project area. It is envisioned that the project implementation will also improve the condition of women and all beneficiaries in terms of water fetching, family hygiene and sanitation; and as a whole - the project will improve the quality of life.

2.3. Relevancy of the Proposal

Pragatinagar is a growing small town with dense settlement pattern in core project service area. The existing Pragatinagar Water Supply System was constructed under WSSDO and handed over to WUSC in B.S 2065. Although this piped water supply services is available, its design limits have been exhausted and there is a demand for its rehabilitation and extension in terms of water quality. Hence, the objective of the proposal is to ensure adequate and safe drinking water to the targeted population of the project area. It is envisioned that the project implementation will also improve the condition of women and all beneficiaries in terms of water fetching, family hygiene and sanitation.

Due to high in-migration ratio and increase of rented population, WUSC is unable to serve enough water supplies. The level of services in terms of quality, quantity, coverage is quite insufficient. Considering the present service level, water demand, water quality and condition of

Engineer



existing system, there is need for a water supply to upgrade the existing water supply situation in order to meet growing water demand in the service area.

2.4. Rationale of IEE study

The proposed water supply and sanitation project is need to be studied from the environmental point of view as per Section 3 of Environment Protection Act 1997, and Clause H of Schedule 1 of the Environment Protection Rules, 1997 (including amendments). Relevancy of environmental assessment of water supply projects is defined basically based on the population of the beneficiaries as it determines the scale of the project and its activities. Hence IEE is relevant in terms the population of the people to be served by the project as indicated in criteria 8 of of Schedule 1 of EPR as mentioned in Table 2 below;

Table 2.1: Criteria for Requirement of IEE for Drinking Water Supply Projects as per EPR (1997) - Schedule 1, Clause H, and its comparison with situation of the Project

Clause Number	Particulars	Status for proposed Project
Sub-Clause 8	Supply of drinking water to population ranging between 5,000 and 50,000	Within Limits (33,394 permanent and 325 rented; in total 33,719 population for design year)

The design year population of the project is 33,719. As the design population of the proposed project is above threshold of 5,000 an environmental assessment is required. However, since it falls within the range of 5,000 to 50,000 - it falls under the threshold need for IEE as per definitions provided in the EPR 1997 (and its amendments).

2.5. Objectives of IEE

IEE is a tool for incorporating environmental concerns at the project level and is carried out as a part of the detailed study. The objectives are;

- To establish baseline environmental status of the project area
- To identify, predict and evaluate the potential beneficial and adverse impacts of the project on the physical, biological and socio-economical resources in the project area
- To suggest enhancement measures to augment the benefits of the project and to propose suitable mitigation measures to avoid, minimize and compensate the adverse impacts of the project.
- To prepare appropriate Environmental Management Plan (EMP).
- To inform public about the proposed project and its impact on their livelihood.
- To prepare an IEE as per the EPR, 1997.

2.6. Scope of the Study

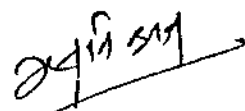
The scope of the study is to study and prepare the IEE report as per the format indicated by EPR (1997). The task during the preparation of this report included description of the project with reference to the physical, biological and social environment, and identification of potential



impacts, mitigation measures, monitoring plan and other related topics. However, the study does not limit itself only here, but has strived to completeness and objectiveness.

The study focused in the zone of influence of the project area. Its impacts zones were studied with respect to the activities related to the project. Physical, biological and socio-economic aspects of the environment and the associated concerns were studied. The current studies were conducted as per the ToR of Pragatinagar Urban Water Supply and Sanitation Project which has been approved by MoWS. The impacts of providing infrastructure in the areas were assessed. Under the environmental impacts, adverse as well as beneficial ones, and its mitigation measures as well as augmentation measures relating to all the project activities during design, construction and operation phases were considered. The Environmental Management Plan with a Monitoring Plan was prepared. The report has been conducted fulfilling the requirements of ADB's Safeguard Policy Statement 2009 and GoN's Environment Protection Rules (1997 and amendments).

Discussions with the locals, consultations with the key persons, coordination with related stakeholders, surveys and specific studies are the range of activities of this IEE study.


Engineer



3. DESCRIPTION OF THE PROPOSAL

3.1. Type of Proposal

The project has been conceptualized as ground water based water supply system integrated with sanitation improvement in the project area. The focus of outputs is on water supply and sanitation status improvement in household level under a community owned water supply system management approach.

3.2. Salient Features of the Proposal

There have been some changes in the project design with respect to the salient feature of the approved ToR of this IEE report. This is because the ToR was prepared based on draft Detailed Engineering Design Report of the project. After consultations with the locals/WUSC, there were some changes in the final DEDR report of the project, and hence the design was updated.

Table 3.1: Salient Features of Pragatinagar Town Project

SN	Items	Description
1	Name of the Project	Pragatinagar Urban Water Supply and Sanitation Project, Pragatinagar, Dang
2	Type	Ground (Pumping) scheme
3	Study Level	Detailed Engineering Design Report
4	Location Area	
	Province	Number 5
	District	Dang
	Rural Municipality	Rapti Rural Municipality
	Wards	Parts of Ward No. 5, 7 and 8
5	Available Facilities	
	Road	East West Highway
	Nearest Airport	Nepalgunj (nearly 150 Km)
	Existing Water Supply System	Partially covered by piped water supply system; Spring sources are used
	Electricity/Communication	Available
	Health Services/Banking Facilities	Available
6	Source Characteristics	
	Source Name	Deep Tube Well
	Source Type	Groundwater
	Source Location	Kalapani in Ward # 5 and Pipari in Ward # 8, Rapti Rural Municipality
	Proposed Tapping yield (lps)	Kalapani DTW :16.57 lps (Pumping) Pipari DTW :3 x 14.95 lps (Pumping)
7	Project Components	
	Storage Tank	RCC Overhead Tank 200 Cum : 1 # (Proposed) RCC Overhead Tank 450 Cum : 1 # (Proposed) RCC Ground Tank 200 Cum : 1 # (Proposed) Total 850 Cum
	Valve Chamber (Nos.)	Type I (1500x900x1000) : 2 # Type 2 (900 x900x1000) : 1 #
	Pipe Valves (125mm dia)	40 #
	Community Stand Posts	Nil

SN	Items	Description
	Household Connection (Nos.)	2406 for base year
	Water supply	24 hour supply of potable water as per NDWQS
	Total Length of pipe (Km)	Transmission : 2.474 Km Distribution : 66.093 Km
	Treatment Unit	Aerator, Pressure filter and Disinfection unit
	Fire Hydrants	8 numbers
8	Social Status	
	Survey Year Population (2017)	11,908 (permanent), 135 (floating); Total 12,043
	Base Year Population (2019)	13,037 (permanent), 145 (floating); Total 13,182
	Design Year Population (2039)	33,394 (permanent), 325 (floating); Total 33,719
	Adopted Annual Growth Rate %	4.79 (Average)
	Household Numbers (2017)	2,156
	Average Family Sizes	5.52
9	Total Water Demand	
	Base year 2019 (m ³ /day)	Total 1,396.25
	Design year 2039 (m ³ /day)	Total 3,978.46
10	Total Cost of the Project (NRs.)	415.471 million with 15% contingencies & 13% VAT
	Water Supply Sector	NRs. 408.522 million
	Sanitation Sector	NRs. 6.949 million
11	Cost Sharing Arrangement for water supply component (NRs)	408.522 million
	1) GoN Grant @ 70%	NRs. 285.966 million
	2) WUSC Contribution	
	a) Upfront cash contribution @ 5%	NRs. 20.426 million
	b) Loan through TDF @ 25%	NRs. 102.131 million
12	Cost Sharing Arrangement for Sanitation Component (NRs)	6.949 million
	1) GoN Grant @ 85%	NRs. 5.907 million
	2) Local Body @ 15%	NRs. 1.042 million
13	Per capita investment (for water supply sector)	Base Year : NRs. 31,518.07 (considering permanent and floating population both) Design Year : NRs. 12,321.57 (considering permanent and floating population both)
14	Project Status	Detailed Engineering Design Phase with construction period of 18 months

3.3. Location of the Project

Pragatinagar town project lies in Rapti Rural Municipality in Dang district of Rapti Zone in province number 5. The project town is wards 5, 7 and 8 of Rapti Rural Municipality. Rapti Rural Municipality is formed by merging Sisahaniya VDC, Lalmatiya VDC and wards 1 and 2 of Hansipur VDC. It surrounded by Arghakhanchi district in the East, Bangachuli Rural Municipality in the North, Lamahi Municipality in the West and Gadhwara Rural Municipality in the South. Pragatinagar is one of the emerging towns of Dang district, located at East-West Highway at around 6 kilometers east of Lamahi. Pragatinagar town is located in east of Deukhuri valley in the Terai region bordering India. The location of the project area is 27°51'34" North Latitude and 82°39'14" East Longitude. Pragatinagar town is located about 36km away from Ghorahi, the headquarters of Dang District.

29/11/2019
Engineer



Project Management Office

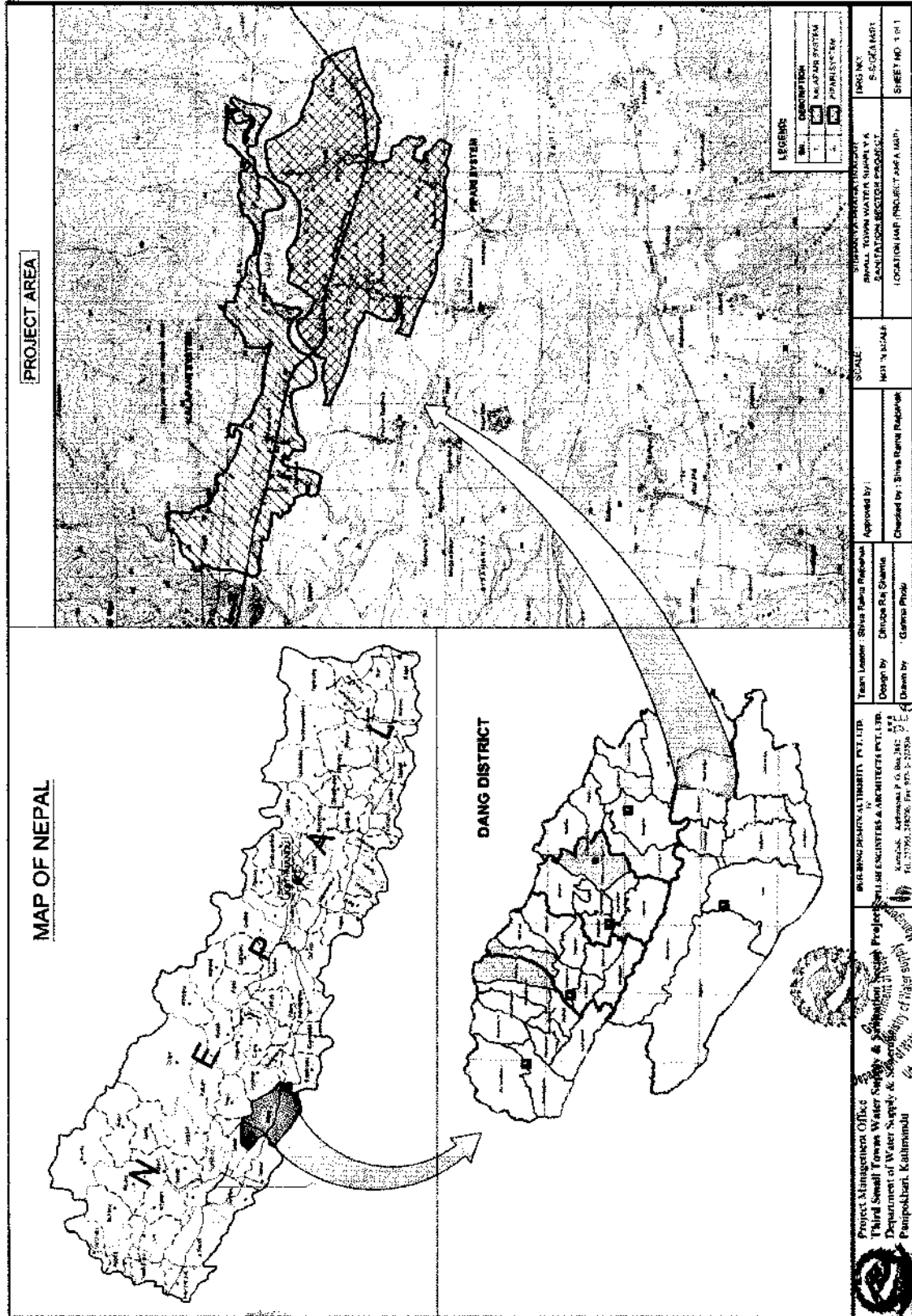


Figure 3.1: Project Area

Government of Nepal
Ministry of Water Supply
Sanitation, Kathmandu

Engineer

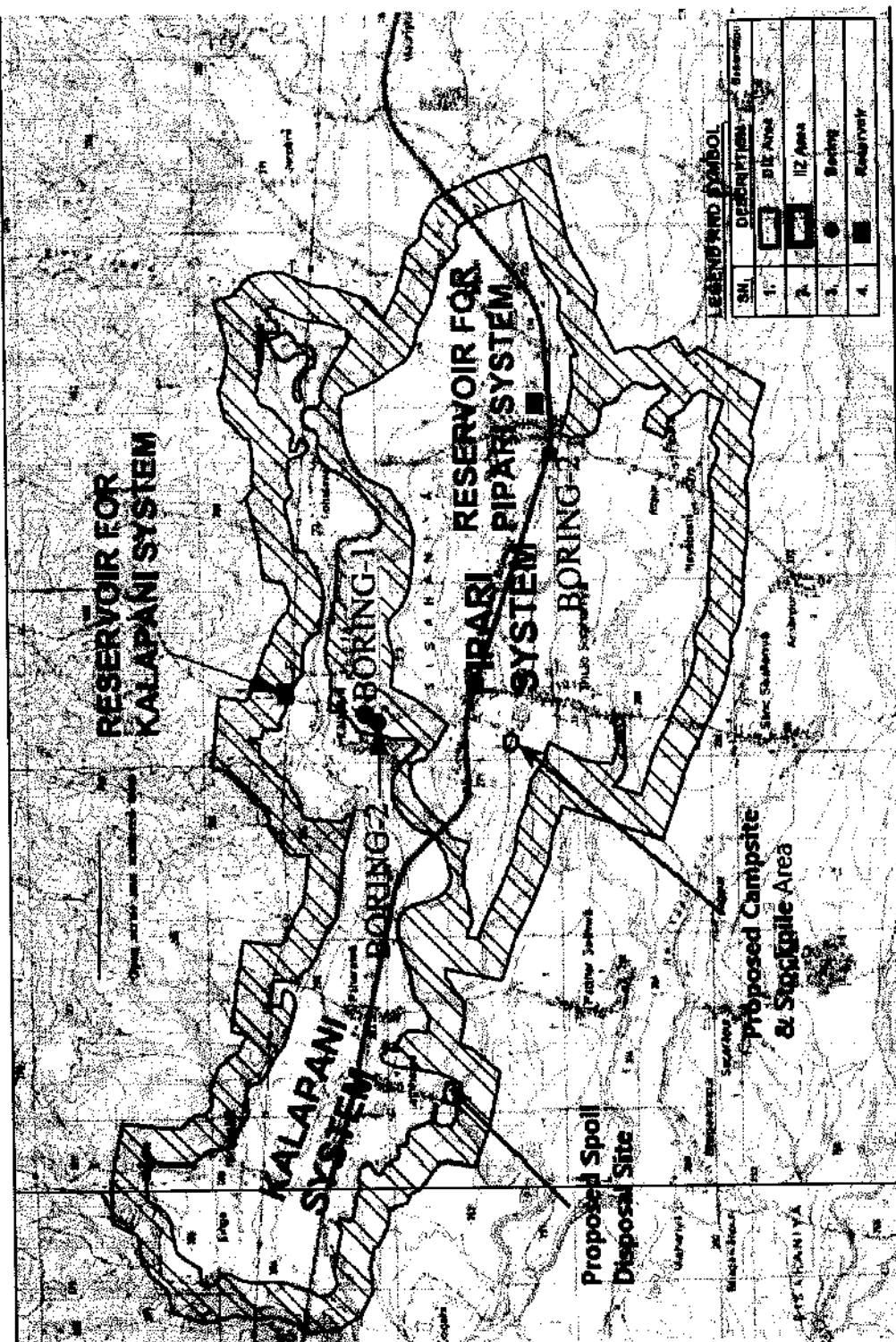


Figure 3.2: Project Layout Map with Core Area and Surrounding Area

[Signature]
Engineer



Government of Nepal
Ministry of Water supply
Water supply and Sanitation Sector Project
Project Management Office

3.4. Impact Area Delineation

In order to specify the area that would be covered by the assessment, the geographical boundary of the influence area was delineated on the topographical map and google map. Depending upon the nature and extent of the expected impact area, the Zone of Influence (Zoi) was categorized into Core Area and Surrounding Area.

(a) Core Area

The areas directly affected by the project activities are demarcated as Core Area. The service area that is ward boundary of wards 5, 7 & 8 are delineated as Core Area as all the project activities take place within these areas.

(b) Surrounding Area

The area around the Core Area that could be indirectly affected due to project construction and implementation activities such as mobility of people, equipment, vehicles, noise, dust, vibration are demarcated as the Surrounding Area. Thus, the area within 200 m of buffer around the Core Area is delineated as Surrounding Area.

3.5. Materials required for the project

The required materials have been divided into two categories; (1) Local materials and locally manufactured products, and (2) Imported manufacture products. The materials as aggregates, sand, stone, timber, bricks are considered to be local materials and locally manufactured products are considered as GI pipes and fittings, HDPE (PE) Pipes and fittings, cement and reinforcement bars. The materials as DI pipes and fittings, water meters, electrical equipment including generators, mechanical equipment, and all kinds of valves are considered as imported manufactured products. It is estimated that there will be need of around 900 m³ of gravel, 6000 bags of cement, 700 m³ of sand and 95 tons of rod for the construction works.

3.6. Energy To Be Used

Diesel and petrol for vehicles and generators, LPG for cooking in the campsites, and electricity for lighting and motors are the basic needs during construction phase. Regular electricity from national grid will be required for the operation phase.



[Signature]
Engineer



3.7. Human Resources Requirement

The proposed Pragatinagar Urban Water Supply and Sanitation Project, entails both skilled and unskilled laborers for its construction and operation in the proposed site. As such for this work a total of around 4500 man-days of skilled labors and 30,000 man-days of unskilled labors person days are required. The laborers estimation were made on the basis of rate analysis. As far as possible, the labourers and workers will be hired from the local market and its adjoining area.

3.8. Methods Adopted During Study

The present Initial Environmental Examination report has been prepared based on the Terms of Reference (ToR) approved by the Ministry of Water Supply, Government of Nepal. The study has followed the provisions outlined in the Environment Protection Act, 1997 and Environment Protection Rules, 1997 and Safeguard Policy Statement, 2009 of the Asian Development Bank (ADB). The principal steps undertaken in the IEE methodology to accomplish the assignment are briefly discussed below.

3.8.1 Desk Study

Existing secondary data relevant to the proposed project was collected from various published and unpublished sources from different governmental and non-governmental organizations. All related maps, aerial photographs; newspaper articles were gathered and studied. The engineering report of the project and other relevant documents were thoroughly reviewed. Policies, legislations and guidelines relevant to the project were also referred. Specifically, water supply, sanitation, urban aspects and biodiversity aspects were considered.

The desk study also involved the preparation of questionnaires/checklists/matrices for detailed field study to collect primary data in order to specify the area that would be covered by the assessment, the geographical boundary of the influence area was delineated on the topographical map.

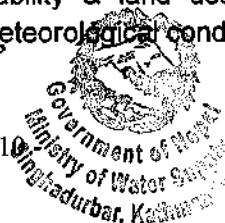
3.8.2 Field Work

Detailed field investigations were carried out to collect baseline information on the physical, biological, socio-economic and cultural environment of the project area. The local communities and key persons were consulted to understand the social, biological and physical nature of the area. Walk-through survey was conducted in the project area. Checklists, forms and questionnaires were used to collect the primary information. Field works were conducted during last quarter of 2018, and during 1st quarter of 2019. Followings are the studies covered;

Study of Physical Environment:

An extensive Physical Environment survey was carried out by delineating the project impact area to collect the baseline information on physical environment. In-situ measurements and samplings were carried out for field assessment of physical environment. Topographic and geomorphic features were observed and documented. Physical features such as topography, climate & meteorology, air quality, erosion and land stability & land use pattern were observed and recorded. Similarly, data on rainfall and other meteorological conditions were collected.

24/11/2019
Engineer.



Study of Biological Environment

The vegetation survey was carried out by walkover survey throughout the project direct impact areas. Type of vegetation and forest were identified based on the species composition. Biodiversity values of the indirect impact area were estimated as low, moderate, and high applying standard tools. Ethno-botanical information was obtained. The protected vegetation (rare, endangered, indigenous etc.) of the influence area as per IUCN Red Book, CITES Appendices, and GoN list species were enumerated based on consultation with the local people in the direct impact areas of the project. Wildlife bio-diversity in the indirect impact areas was studied in the field interacting with local people (for habitat continuity) methods to identify linkages between wildlife habitats and proposal activities. The indicator wildlife and threatened or endangered species (as per IUCN Red Book, CITES Appendices, and GoN list) in the area were discussed with the local communities.

Study of Socio Economic and Cultural Environment

Household survey with questionnaires was conducted by interviewing to obtain information on socio-economic and cultural environment like demography, ethnicity, education, health, and sanitation, drinking water condition of the project area, irrigation facility, local traditions, religion, land holding pattern, income and expenditure and to acquire their perception towards proposed project, etc. The survey covered 100% of the total HHs of service area. Consultations were held to interact with local people and stakeholders in order to collect information on migratory pattern of local people, settlements, agriculture, information on beneficiary families and to obtain suggestions and comments from all relevant stakeholders through.

Direct observation (walkover survey) was done to collect information on the cultural sites, and public institutions such as temples, cremation grounds, and festival sites, historical and archaeological sites, school, and health post within the direct project affected areas. Consultation with local elites and key person interviews were conducted to assess the current situation of these facilities and the general water/sanitation status of the communities of the project area.

3.8.3 Data processing

The information obtained from the desk study and field works were processed in a standard format to maintain consistency. The data were tabulated and maps were interpreted. The impacts were then evaluated. The mitigations and monitoring measures were then proposed based on the impacts identified during the study.

3.8.4 Impact Prediction and Evaluation

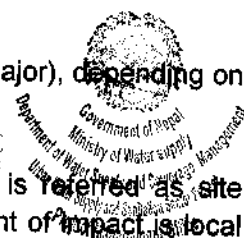
The impacts are evaluated based on their impact levels, coverage of area and duration of the impacts. The evaluation will be used to emphasize the need to address the concerns. Magnitude, geographical extent and duration of impacts are defined below;

Magnitude: This can be low-L (minor), medium-M (moderate), and high-H (major), depending on the scale or severity of change.

Geographical extent: If the action is confined to the sub-project area, it is referred as site specific (Ss), if it occurs outside area but close to sub-project area, the extent of impact is local (Lc), if it occurs far away from the sub-project, it is referred as regional (R).



29/11/19
Engineer



Duration: It can be short term (St - i.e. less than 3 years), medium term (Mt - i.e. 3-20 years), and long term (Lt - i.e. more than 20 years).

For the Impact evaluation the matrix method with numerical ranking is used for the quantitative ranking of the predicted impacts. The numerical scale mentioned in the National EIA Guidelines 1993 has been adopted for this sub-project. The numerical scale is as:

Magnitude		Extent		Duration	
High	60	Regional	60	Long Term	20
Moderate	20	Local	20	Medium Term	10
Minor	10	Site Specific	10	Short Term	05

3.8.5 Consultation and Information Dissemination

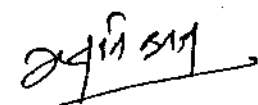
Public consultation and information dissemination process is necessary to inform the local people and concerned agencies about the project and to obtain their concerns, issues and suggestions. The methods adopted for conducting public consultations included holding meetings with district officials, concerned departments, institutions and NGOs. Key informant consultations and meetings were also held with the stakeholders within the project area.

A 15 days' public notice was published on 18th December 2018 in a national daily newspaper *Aarthik Abhiyan* seeking written opinions from Rural Municipality office/ward offices, DCCs, schools, local health centers and related local organizations as well as concerned people. A copy of the *Public Notice* was also posted in the notice board of the rural municipality office, ward offices and other public areas in the project area and the deed of inquiry was collected.

A public consultation was carried out on 8th Chaitra 2075 in the meeting hall of the rural municipality office, ward 5. The major concerns raised during the public consultations were community health and safety during construction works, prioritization for local employment, and campsite management in relation to the project activities. The minutes of public consultation is provided in Annex 5. A recommendation letter from the rural municipality office has also been received.

The final IEE report, after incorporating the comments from the concerned department and ADB, will be made available in their respective websites and will be made available to anyone interested upon request.




Engineer



3.9. Environmental Baseline Information

3.9.1 Physical Environment

3.9.1.1 Topography, Geology and Soils

The project area lies in Rapti Rural Municipality in Dang district of Province 5. The altitude of the project area varies from 210 to 300 m above the mean sea level. Since the topography of the area is almost flat, the large portion of land faces flooding problem during rainy season.

Geologically it is situated in the foothill of Siwalik range. The underlain formation of the area consists of cobbles, gravels and sand with pockets of clay. The area is rich in groundwater potential. The shallow as well as deep aquifers are being extracted for drinking and irrigation purposes. The project major riveres of the project area are Bhulke khola, Gopi khola and Dolai khola.

3.9.1.2 Land Use

The major chunk of land is used for agricultural purpose. The service area is surrounded by commercial areas and agricultural lands where different crops are grown. The bazaar area has grid pattern roads. No planned land use has been observed. There is around 5% forest cover and 1.5% surface water bodies in the project area. Settlements are found along the road-sides, and at flat lands of hill-elevations. No specific area has been designated for industries. There are a few small scale industries as well. In Pragatinagar, agriculture is the main occupation where the main product being paddy, maize and wheat. Cash crops like potatoes, green vegetables and spices are also widely cultivated. Horticulture and livestock raising including poultry is practiced but not in a commercial scale. The people of this area have been also been attracted towards foreign work providing remittances.

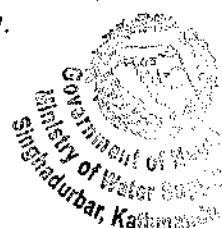
3.9.1.3 Climate

The temperature of the project area rises to about 33.9°C in summer while in winter it drops to about 5.4°C. About eighty percent of the total annual rainfall occurs during the monsoon season (June to September). The project area is located in relatively flat plain of inner Terai belt.

3.9.1.4 Air Quality

There are no industries in the project area. Air pollution is caused by fugitive dust from vehicles movements particularly over unpaved roads and grounds, and some constructions activities. The roadway linking to the project area are not black topped, as a result area around the roadways are polluted by dust and smoke emitted by the vehicle that runs on the roadways. Gas emissions come from household cooking, open burning, and moving vehicles. Emissions from these sources are scattered/ spread apart both in terms of locations and timing. From field observation, the ambient air quality of the area is considered to be under normal and acceptable levels.

The air quality of the area can be considered to be fair. Vehicular movement is regular. However, the topography of the area also facilitates for free air circulation. No major point sources of air pollution are present in the project area. Visual inspection will be done for monitoring the air quality.



Engineer

3.9.1.4 Noise level

The sources of noise in the project area are the construction activities and vehicle movement. The anthropogenic noise is confined in few clustered settlements and in market places and only in the daytime. At nighttime, noise is generated with the arrivals and departures of buses at the bus park. From field observation, noise level in Pragatinagar town is within the national and international permissible standards at daytime and nighttime.

3.9.1.5 Water Quality

Water quality of the existing tube well located in the project site was found to comply with the NDWQS. Besides, the quality of water in the proposed tube well may not show exactly the same results as the existing tube well. It is thus advisable to treat the water in order to prevent adverse effect in the public health. The ground of Terai generally shows the increase in iron and turbidity occasionally. Hence, the water treatment system consisting of aeration, filtration and disinfection is recommended to comply with the requirements of the NDWQS for drinking water. On the other hand, surface water sources like Dolai river, Bhulke Khola and Gopi Khola river are also present in the project area.

3.9.1.6 Solid Waste Management

There is no institutional system of solid waste management. The locals practise pit composting and informal waste workers collect recyclables like paper, bottles, metal, etc from households and markets. While discussing with the officials of rural municipality they have requested for a tractor with trailer for prompt service. Similarly few hand carts (wheel barrows) and collection bins (115 ltrs capacity) are proposed. Besides training program shall be conducted regarding the solid waste management to concerned rural municipality officials, users and WUSC members and other members of Tole Lane Organizations. These awareness programs will help to reduce, reuse and recycle the waste from the households.

3.9.2 Biological Environment

Forests, bush land, grass land and the riverine water bodies are the primary habitat sites for the flora and fauna in the project area. The agricultural area and settlements also provide habitats to fauna accustomed with the human settlements only. Most of the floral species in the agricultural lands are exotic species with limited local flora of ethno-botanical and agro-economic values only.

3.9.2.1 Flora and Fauna In Project Area

The project area has forest area as well. Shree Kalapani Community Forest, and Shree Shankar Community Forest are the community forests within the project area.

Flora of the project area consist of *Calotropis gigantean*, *Woodfordia fruticosa*, *Euphorbia hirta*, *Mimosa rubicaulis*, *Adhatoda vasica*, *Thespesia lampas*, *Buddleia paniculata*, *Colebrookea oppositifolia*, etc. and herbaceous species like *Eragrostis cyanosuroides*, *Cyperus rotundus*, *Eulaliopsis binnata*, *Achyranthes bidentata*, *Cissampelos pareira*, *Phoenix humilis*, etc. and seedlings of woody species. Invasive species found in the area were *Lantana camara*, *Ipomoea fistulosa*, etc.


Engineer - 14 -



Crane, White-rumped vultures, *Panther tigris*, *Varanus bengalensis*, Vulture, *Macaca mulatta* (Monkey), *Felis chaus* (Jungle Cat) are the wild animals reported in the proposed road area. Similarly birds are *Lophura lencomelana* (kalij pheasant), *Lophophorus* (Danphe), *Columba livia* (Pigeon), etc. White-rumped vultures are the endangered species.

3.9.2.2 Non-Timber Forest Products

Non-timber forest products (NTFPs) are defined as any kind of product derived from forest species other than timber and fuelwood. The main NTFP species found in the project area are: *Shorea robusta*, *Dalbergia sisso*, *Acacia catech*, *Bamboo species*, etc. Other species are Rice-bean *Vigna umbellata*, *Bombax ceiba*, harro (*Terminalia chebula*), barro (*Terminalia bellirica*), amala (*Emblica officinalis*), kurilo (*Asparagus racemosus*), sikakai (*Acacia concinna*), pipala (*Piper longum*) and sarpagandha (*Rauwolfia serpentine*). Harro (*Terminalia chebula*) and Barro (*Terminalia bellirica*) are endangered species.

There is no declared protected area or wetland within or in close periphery of the project area. The core project area doesn't lie within demarcated chure area.

3.9.3 Social and Cultural Environment

3.9.3.1 Household and Population

The household survey was conducted in the service area of the project. During household's survey done by the consultants the households within service area were accounted as 2,156 and permanent population 11,908. People from nearby rural areas have come to settle in the market centers of the municipality. The evidence of past few years indicates that immigration will be in growing rate. It is estimated that around 50 households have come for immigration from nearby places every year. This aspect has been addressed during projection of population for estimation of demand for the design year. The ward numbers and the cluster settlements is presented in table below;

Table 3.2: Service Area, HH and population (Survey year, 2017)

Town	Ward No.	HHs	Population		
			Permanent	Rented	Total
Pragatinagar, Rapti Rural Municipality	5	862	4702	103	4805
	7	326	1883	2	1885
	8	968	5323	30	5353
	Total	2156	11908	135	12043

Source: Socio-economic Survey, August 2017

Among the total permanent population (11,908) in the service area, 6,038 are male and 5,870 are female. Male population is slightly higher (50.7%) than the female population (49.3%).

Table 3.3: Male/female population and Average HH size (Survey year 2017)

Town	Ward No.	HHs	Population			Average HH Size
			Male	Female	Total	
Pragatinagar, Rapti Rural Municipality	5	862	2349	2353	4702	5.5
	7	326	954	929	1883	5.8
	8	968	2735	2588	5323	5.5
	Total	2156	6038	5870	11908	5.5

Source: Socio-economic Survey, August 2017



Engineer

3.9.3.2 Caste and Ethnicity

The proposed project service area comprises multi caste / ethnic groups. Each caste and ethnicity is characterized by its own customs, traditions, culture and nature of occupation with which they are associated. Janjati comprises 75.0 percent of total families, Brahmin/Chhetri are the next major group with 19.2 percent, followed by Dalit which constitutes about 4.6 percent.

Table 3.4: Caste / Ethnicity

Ethnicity	Rapti Rural Municipality			Total	Percentage
	Ward No.				
	5	7	8		
Brahmin/Chhettri	192	59	163	414	19.2
Janjati	629	253	734	1616	75.0
Dalit	36	10	54	100	4.6
Other	5	4	17	26	1.2
Total	862	326	968	2156	100.0

Source: Socio-economic Survey, August 2017

3.9.3.3 Educational Status

Pragatinagar has 10 educational institutions including schools and colleges. About 91.9 percent people on the project area (ward 5, 7 & 8) of Pragatinagar are literate.

Table 3.5: Population Distribution by Education Level

Educational Status	Ward No.5		Ward No.7		Ward No.8		Total	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%
Illiterate	17	6.2	13	13.0	23	7.4	53	7.7
Literate	29	10.6	20	20.0	48	15.4	97	14.2
Primary	51	18.6	22	22.0	64	20.6	137	20.0
Secondary	73	26.6	17	17.0	73	23.5	163	23.8
SLC	47	17.2	3	3.0	57	18.3	107	15.6
Intermediate or equivalent	27	9.9	11	11.0	22	7.1	60	8.8
Bachelor's degree or equivalent	4	1.5	5	5.0	1	0.3	11	1.6
Master's degree or equivalent	1	0.4	3	3.0	1	0.3	5	0.7
Above Master's degree	2	0.7	0	0.0	0	0.0	2	0.3
Total	249	100.0	94	100.00	289	100.00	633	100.0

Household Sample Survey, August 2017

3.9.3.4 Occupation

Although, the economy of the area is gradually shifting from rural agricultural economy to trade/business and service based, majority of the households are still dependent on agriculture. As the socio-economic data shows, nearly 49.4 percent of the households have agriculture as main occupation in service area followed by 30 percent in service and 15 percent in page work. The percent of household by occupation is illustrated in the table below;

Table 3.6: Occupation of Households of the Project Area

SN	Occupation	Rapti Rural Municipality			Total	Percent
		Ward Number				
		5	7	8		
1	Agriculture	359	183	522	1064	49.4
2	Business	116	24	74	214	9.9
3	Services	134	21	244	399	18.5

Engineer

SN	Occupation	Rapti Rural Municipality			Total	Percent
4	Industry	1	1	1	3	0.1
5	Foreign Employment	72	21	47	140	6.5
6	Wages	165	76	76	317	14.7
7	Others	4	0	1	5	0.2
8	Do Nothing	11	0	3	14	0.6
	Total	862	326	968	2156	100

Source: Socio-economic Survey, August 2017

3.9.3.5 Economic Characteristics

Economic condition of the families in service area is satisfactory in terms of their monthly income level. The distribution of households by income range is shown in Table V-6, which indicates that 51.3 percent of them have income range NRs. 2001-50000 per month. Likewise, 26.1 percent of households fall under the income range NRs. 7501-20000 categories. As the data shows 20.8 percent of households have highest income level (more than NRs.50,000 per month), whereas 0.2 percent of the households have lowest income level i.e. less than NRs. 5,000 per month. Finding of socio-economic census survey depicts that the household average monthly income is NRs. 40,193.88

Table 3.7: Monthly Average Income Range

SN	Income Range (NRs.)	Ward No.			Total	%
		5	7	8		
1	<5000	3		1	4	0.2
2	5000-7500	34	1		35	1.6
3	7501-20000	326	13	224	563	26.1
4	20001-50000	398	13	695	1106	51.3
5	>50000	101	299	48	448	20.8
	Total	862	326	968	2156	100

Source: Socio-economic Survey, August 2017

3.9.3.6 Existing Water Supply Condition

Existing water supply system cover 17 public taps in Kolwaha and Jutpani in ward no. 8 and 14 public taps in Singhe village in ward no. 8. No private taps were seen during the observation. Water is supplied 24 hours a day except during dry season. In dry season of months, water is supplied 2 hours in the morning and 2 hours in the evening. Regarding the perception of beneficiaries toward water quality 77.9 percent of the respondents feel the quality of supplied water is satisfactory or moderate and only 9.3 percent of them feel highly satisfactory, where as 12.8 percent of the respondents said the water quality is unsatisfactory.

Table 3.8: Satisfaction in terms of Water Quality

SN	Water Quality	Ward No.			Total	Percent
		5	7	8		
1	Good	9	14	177	200	9.3
2	Satisfactory	821	248	611	1680	77.9
3	Unsatisfactory	32	64	180	276	12.8
	Total	862	326	968	2156	100.0

Source: Socio-economic Survey, August 2017

Engineer

3.9.3.7 Existing Sanitation Condition

In general the overall sanitation condition of the project area was observed satisfactory. Most of the households in the market area have permanent type of private latrine and others have temporary type of private latrine. It was reported that all the colleges / schools, hospital and government offices have toilets. Lined drain is observed in limited part of the core bazaar area. No water logged area is found as sufficient natural slope exists. The proper management of solid waste by the different agencies has not been developed till now in this town. People were found to manage solid waste in the pits prepared in the backyard of their house.

Regarding the drainage facility, 97.2 percent of the respondents reported that they do not have access to drainage, whereas nearly 2.8 percent of them have access to it. The sewerage system has not been developed in the service area so far.

Table 3.9: Drainage and Sewerage Facility

Facility Type	Drainage	Ward No.			Total	Percent
		5	7	8		
Drainage and Sewerage	Yes	46	4	10	60	2.8
	No	816	322	958	2096	97.2
	Total	862	326	968	2156	100

Source: Socio-economic Survey, 2017

Access to Household Latrine

The access of household to toilet facility is shown in table below, which reveals that 95.7 percent (2064 out of 2156) of the households have household toilet.

Table 3.10: Household Latrine

Toilet	Ward No.			Total	Percent
	5	7	8		
Yes	849	293	922	2064	95.7
No proper latrine	13	33	46	92	4.3
Total	862	326	968	2156	100.0

Source: Socio-economic Survey, August 2017

Among the households with access to household latrine, 78.8 percent of them have ventilated type of latrine, 13.1 percent have water seal type and 6.8 percent have pit latrine as shown in table 3.11 below. The households with water seal latrines and cistern flush latrines have septic tanks while others do not have proper septic facility as they have pit latrines.

Table 3.11: Type of Household Latrine

SN	Toilet Type	Ward No.			Total	
		5	7	8	No.	Percent
1	Pit Latrine	62	23	56	141	6.8
2	Ventilated Pit	663	242	721	1626	78.8
3	Water Seal	112	27	131	270	13.1
4	Cistern Flush	12	1	14	27	1.3
	Total	849	293	922	2064	100

Source: Socio-economic Survey, August 2017

Engineer

3.9.3.8 Existing Health Situation

Ghorahi-based Rapti Sub-Regional Hospital of Dang district is set to be upgraded to a teaching hospital in line with the government policy to have one such hospital in Mid-West Region. Most people visit district hospital, apart from these, there are two Health Offices in the project area providing health facilities to the resident.

Most of people are found aware in health and hygiene. People are aware about hand washing before touching and eating food, and after defecation etc.

Waterborne Diseases In the Project Area

Available data from District Hospital Dang shows that water borne diseases are occurred in the project area. Waterborne diseases can have a significant impact on the local economy. People who are infected by a waterborne disease are usually confronted with financial burden. This is especially the case in poor households.

Total 503 numbers of water born/related diseases infected persons were found treated by District Hospital last year. Out of the total incidents, 164 incidents were diarrheas, 99 incidents were reported as typhoid, 58 and 53 were suffered from worm and dysentery respectively. Likewise, 45 water related cholera and 33 skin diseases were also reported in the project area. District Hospital has recorded water born / related disease data in last year 2075/76 as illustrated in the figure following;

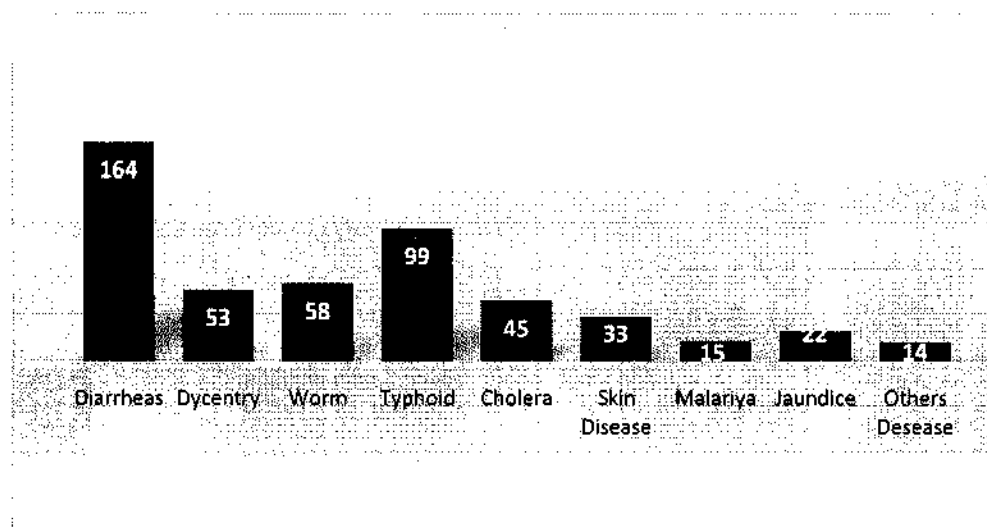


Figure 3.3 Data on Waterborne Diseases In 2075/76 (Source: District Hospital, Dang)

3.9.3.9 Existing Institutions

Ghorahi is the districts headquarter of Dang district. District level government offices and other institutions have been established in the service area. There are total 6 government offices including office of Rural Municipality. Besides these, a significant number of government and private institutions / organizations are in the town. Among them 11 are financial institutions, 10 educational institutions i.e. college / schools, 8 health intuitions (hospital / health centre) and 1 I/NGOs (International/Non Governmental Organizations). The details of the institutions in the service area are presented in table following;



[Signature]
Engineer



Table 3.12: Institutions in the service Area

S.N.	Type of Institution	Sub-type	Number
1	Government Office	Shishniya Police bid, Shree Shankar Bank Karyalaya, Gau Palika Office etc.	6
2	Financial	Bank	3
		Cooperative / Insurance	8
3	Education	Government / Public College / School	4
		Private/ Boarding school/hostel	6
4	Health	Health Post	2
		Private Clinic / Medical Store	5
5	I/NGO	International / National level Organization	1
6	Small Cottage Industries		9
7	Hotel / Lodges		2
Total			46

Source: Socio-economic Survey, 2017

3.9.3.10 Willingness to Pay

Willingness to Pay 5 percent Cash Contribution

As the social census survey data shows, more than 99.2 percent of the beneficiary's HHs would willingly to pay 5% up-front cash contribution if they have been assured that the new water supply system would function and operate with proven water quality without interruptions.

Table 3.13: Willingness to pay 5% Cash Contribution

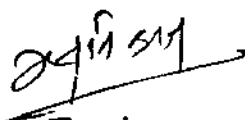
SN	Willingness to 5% Cash Contribution	Ward No.			Total	Percent
		5	7	8		
1	Yes	851	324	963	2138	99.2
2	No	7		2	9	0.4
3	Can't	4	2	3	9	0.4
Total		862	326	968	2156	100

Source: Socio-economic Survey, August 2017

There will be awareness programs on water and sanitation aspects to encourage people to participate in this project. The WUSC will have the right to make provisions of subsidy for the ultra poor families who cannot pay for the water supply facilities as per.

3.9.3.11 Cultural Aspects

There are many temples and religious sites present in the project area. Siddheshwor temple and Shivalaya temple premises are among the significant temples of the project area. Siddheshwor temple and Shivalaya are in ward number 8. The local visitors visit the Shiva temple on daily basis. Haneshwor Mahadev temple, and Paharuwa Shiva Dhaam are the nearby cultural sites near the project area. The temples of the project site are not of archaeological significance.


Engineer



3.10. Review of Policies and Legislation

3.10.1 Nepal's Environmental Policy Framework

Most of the national policies and laws of the Government of Nepal (GoN) are in favor of environmentally sound economic development and growth. Followings are the summaries of the relevant policies, acts and regulations and guidelines that have been reviewed during the preparation of the IEE report.

The Constitution of Nepal

The Constitution defines that each person shall have the right to live in a healthy and clean environment (Clause 1 of Article 30). The victim of environmental pollution and degradation shall have the right to be compensated by the pollutant as provided for by law (Clause 2 of Article 30). It prescribes for the State to give priority to the protection of the environment and prevention of its further damage due to physical development activities. Proceeding from, and conformable to, the Constitution, the Government of Nepal has passed a series of environmental laws, policies and implementing regulations and standards. Among these, the basic legislation that provides the framework within which environmental assessment is carried out in Nepal.

National Environmental Policy, 2076 BS (2019 AD)

The policy has versioned for the management of pollution, waste maintenance of greenery to ensure people's right to live in hygienic and healthy environment. Similarly, the policy has objective of mainstreaming the environmental concerns in developmental activities. It has emphasized to promote reuse and recycle of the waste. To prevent, control and minimize the pollution has proposed following policies and strategies:

- Efficient structure will be formed to prevent, control and minimize the pollution
- Promotion of environment friendly vehicles.
- Waste segregation as well as promotion of reuse and recycle technique similarly, proper disposal of the remaining solid waste has to be ensured.
- To maintain the hygienic aquatic environment direct release of polluted water, sewage and solid waste to the water body will be prevented.

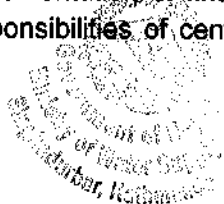
While managing the solid and liquid waste, appropriate mitigation measures will be imposed to the source and minimize the potential adverse impacts on downstream area.

Third Three Year Interim Plan/14th Periodic Plan of Nepal (2073/74 – 2075/76)

The interim plan provides the most recent guidance for development sector priorities highlighting, in particular, the need of environment friendly planning and technology. It proposes the strategies also for internalization of environmental management in development projects. It calls also for a stronger partnership among developmental agencies, including the local stakeholders, for implementation of environmental activities.

National Urban Water Supply and Sanitation Sector Policy, 2009

The policy is formulated to provide the overall policy support and guidance towards achieving equity in service delivery by ensuring that the financially marginalized households within the system areas are mainstreamed as valid customers of service through design and implementation of financial incentives where so required. It aims to ensure that the roles and responsibilities of central and local government bodies, external development partners, private



[Signature]
Engineer 21 -



sector including NGOs and user groups are clearly defined in scheme implementation and regulation and performance management in accordance with national decentralization policy.

Land Acquisition, Resettlement and Rehabilitation Policy, 2015

The policy is based on the principles that the assessment of land requirements needs to be carried out based on the alternatives having minimum impacts of land loss, and also the need of resettlement and rehabilitation works to ensure livelihoods of the affected persons and family is improved or at least restored at pre-project level. It also indicates the need to conduct social impacts assessment to identify impacts on affected people, community and vulnerable group. In case of Land acquisition and ownership transfer, land can be acquired also through voluntary donation which will be accepted only if the land provider has agreed without any pressure, and in presence of local authorities to donate land for the purpose. On the humanitarian ground, the policy also bases on the value that for revenue generating project, the project should create conducive situation in which the benefits generated by the project can be drawn-out to the affected people.

National Forest Policy (2075 BS)

The policy focuses on coordination and partnership between all the three levels of government in Nepal - the federal government, the provincial government and the local government for sustainable and participatory management of the forests, protected areas, watersheds and biodiversity. Conservation of the forest area and its multiple utility has been taken as one of the eleven objectives of the policy. Active role of the local government in forest management and compensatory plantation works have also been pronounced in this policy.

3.10.2 Nepal's Environmental Legal Frameworks

Environment Protection Act (EPA), 2054 B.S. (1997 A.D), which requires a proponent to undertake IEE or environmental impact assessment (EIA) of the proposed project and have the IEE or EIA report approved by the concerned sector agency or Ministry of Forests and Environment (MoFE), respectively, prior to implementation. The EPA: (i) sets out the review and approval process of IEE and EIA reports, that involve informing and consulting stakeholders; (ii) stipulates that no one is to create pollution that would cause significant adverse impacts on the environment or harm to public life and health, or to generate pollution beyond the prescribed standards; (iii) specifies for the Ministry in charge of environment (currently the MoFE) to conduct inspection of approved projects to ensure that pollution prevention, control or mitigation is carried out according to the approved IEE or EIA report; (iv) provides for the protection of objects and places of national heritage and places with rare plants, wildlife and biological diversity; and (v) states that any person/party affected by pollution or adverse environmental impact caused by anybody may apply to the prescribed authority for compensation to be recovered from the polluter/pollution generator.

Environment Protection Rules (EPR) 1997 (and its amendments), define the implementing rules and regulations of the IEE/EIA process, elaborating the provisions in the EPA. The preparation, review and approval of IEE and EIA reports are dealt with in Rules 3 to 7 and 10 to 14. Schedule 1 and Schedule 2 list down the projects of activities that are required IEE and EIA, respectively, as amended in 2007. Other environmental acts, rules, plans, policies, guidelines that are relevant to the project are presented in Table 3.15;

24/11/2019
Engineer

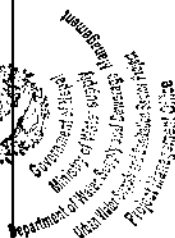


Table 3.14: The Relevant Environmental Policies, Laws and Guidelines of Nepal

Act/Rule Policy/Law/Guideline	Year	Relevant Provisions	Remarks
Labour Act Labour Rules	2017 2018	The Act emphasizes OHS Policy; Safety & Health Committee; OHS arrangements including child care center; workplace safety; environment of work place; and specific Labour Audit Additional rest period for certain female employees. Specific provisions relating to the safety of the works having health hazards are also there in the Act	
Water Resources Act	2049 B.S. (1992 A.D.)	A comprehensive law on the development, use and conservation of water resources in Nepal, it aims to minimize damage to water bodies by requiring the conduct of EIA & preparation of EIA Report before granting license to use water resources for any purpose. Proponents shall make sure that the beneficial use of water resources does not cause damage to other water uses/users (Article 4). Article 17 requires proponents to apply for any necessary land acquisition accordingly. Article 18 requires the compliance to quality standards in making use of water resources. Article 19 prohibits the pollution of water resources. Under the Act are two regulations for drinking water purposes: (i) Water Resources Regulation, 1993, setting out the implementation procedures for the Act; and (ii) the Drinking Water Regulation, 1998, which specifies compliance with the drinking water quality standards and control of water pollution (or sanitation) as it affects drinking water.	
Forest Act	2049 B.S. (1993 A.D.)	The Act prohibits the extraction of boulders, rocks, pebbles, sand or soil from national forests, defined as all forests, excluding private forests, whether marked or unmarked with forest boundary, to include waste or uncultivated lands, or unregistered lands surrounded by the forest or situated near adjacent forests as well as paths, streams rivers, lakes, riverine lands within the forest.	No trees will be cut. EMP stipulates no illegal quarrying of natural aggregate materials.
National Environmental Policy and Action Plan. (NEPAP) 1994	2049 B.S. (1993 A.D.)	Of its five objectives, most relevant to the Project are to: (i) mitigate adverse environmental impacts; and (ii) safeguard national & cultural heritage & preserve biodiversity within & outside protected areas.	Project will not have significant impacts on physical cultural heritage & biodiversity. EMP provides measures to mitigate some of the possible impacts.



Engineer

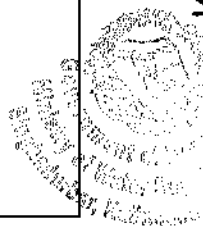


Act/Law/Guideline	Year	Relevant Provisions	Remarks
National EIA Guidelines	2050 B.S. (1993 A.D.)	Chapter 3 of this guideline described an Initial Environmental Examination report must be prepared for those projects which may cause significant impact on environment, whose impact may be known easily and for which mitigation measures may be revealed easily, as mentioned in Schedule-1.	EMP prescribes environmental impact and mitigation measures and their performance monitoring.
Local Government Operations Act	2017	The Local Government Operation Act, 2017 empowers the local government for the conservation of local natural resources and implementation of environmental conservation activities along with prime responsibility of conducting development projects which includes water supply, sanitation and awareness activities. Provides basis for Local Government to monitor the environmental performance of the projects. EMP provides the responsibilities of LGs in EMP implementation.	
Child Labor Prohibition and Regulation Act	2056 B.S. (2001 A.D.)	The section 3 of the act prohibits a child from engaging in work, sub clause 1 of the clause 3 states "Nobody shall engage in work a child who has not completed fourteen years of age as a labor and sub clause 2 states "Nobody shall engage a child in a risk full occupation on work set forth in the Schedule". The section 4 states "Child not to be engaged in work against his will by temptation or fear or pressure or by any other means"	
Implementation Directives for the National Drinking Water Quality Standards	2063 B.S. (2005 A.D.)	It sets out the water sampling, testing, analysis, monitoring and surveillance procedures to certify that the quality of supplied drinking water conforms to the National drinking Water Quality Standards.	Monitoring of the quality of supplied water is prescribed in the EMP following the NDWQS Directives.
Updated Development Plan for Small Towns Water Supply and Sanitation Sector	15-Yr 2067 B.S. (2010/11 B.D.)	The Plan defines the population threshold of "small towns" to be in the range of 5,000 to 40,000. Reference to Schedules 1 and 2 of the EPR, as amended in 2007, places water supply projects in small towns under Schedule 1 or within the threshold of water supply projects requiring only an IEE. The Plan emphasizes monitoring and evaluation as an important component of a project to determine the overall impact of a project.	EMP prescribes environmental effects and performance monitoring.

Pragatinagar Urban Water Supply and Sanitation Project
Ministry of Water Supply and Sanitation
Department of Water Supply and Sanitation
Pragatinagar Urban Water Supply and Sanitation Project



Act/Rule Policy/Law/Guideline	Year	Relevant Provisions	Remarks
Solid Waste Management Act	2068 B.S. (2011 A.D.)	Article 4 provides that the management of hazardous, medical, chemical or industrial waste rests upon the generators of such wastes. Management should be as prescribed in the Act. Article 5 provides that individuals and entities have the duty to reduce the amount of solid waste generated while carrying out work or business.	EMP prescribes eco-friendly management of solid and hazardous wastes.
Forest Act	2076 BS	It stipulates that the GoN can develop a land use plan of a forest in order to maintain the balance of environment and development. It also provisions that the government can develop a specific forest conservation plan for a particular section of a national forest. It also states that the forest area can be used with approval for national priority projects.	
Environment Protection Act	2076 BS	The act emphasis on new aspects like provisions of Preliminary Environmental Study, IEE and EIA under the jurisdiction of local government, provincial government, and central government. Need of Strategic Environmental Assessment for policies/plans/programs, and considerations of climate change for projects are among the newly enforced aspects of this act.	



[Signature]
Engineer



3.10.3 International Conventions

Nepal is party to the following international environmental agreements that have broad relevance to works and environmental assessment of works under the Project: (i) World Heritage Convention, in 2036 B.S. (1978 A.D.); (ii) Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention), in (2045 B.S.) 1987 A.D.; and (iii) Convention on Biodiversity, in 2050 B.S. (1992 A.D.); and (iv) Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal, in (2053 B.S.) 1996 A.D. The relevance of the aforementioned environmental agreements to the Subproject are on their emphasis for human activities (such as development projects) to: (i) take on/institute measures to protect the local, as well as global, natural resources and/or environment; (ii) prevent and/or reduce the causes of climate change; and (iii) anticipate and mitigate the adverse impacts of climate change. The country is also committed to the Sustainable Development Goals, the sixth goal of which is to "ensure access to clean water and sanitation for all" focusing on water governance and promotion of climate change adaptation.

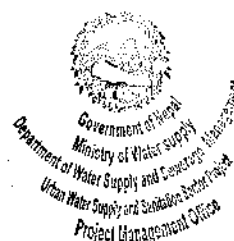
The Pragatinagar Urban Water Supply and Sanitation Project does not and will not break or go against Nepal's commitment to these international agreements. It supports the country's effort to meet its committed target for SDG 6th.

3.10.4 Relevant Standards

Table 3.15 Relevant Environmental Quality Standards

Particulars	National Standards	International Standards
Ambient air quality	National Ambient Air Quality Standards, for Nepal, 2003	WHO Air Quality Guidelines, Global Update, 2005
Noise	National Noise Standard Guidelines, 2012	WHO Guideline Values on Noise Level
Drinking water quality	National Drinking Water Quality Standards, 2006	WHO Guidelines for Drinking-water Quality, Fourth Edition, 2011

* For surface and ground water quality monitoring, the National Drinking Water Quality Standard shall be applied since these resources are used for drinking.



[Signature]
Engineer



3.11. Existing Conditions

3.11.1 Existing Water Supply

The existing Pragatinagar Water Supply System was constructed under WSSDO and handed over to WUSC in B.S 2065. The system partially covered by piped water supply system. There are two existing water supply scheme (Dhaberi & Singe scheme) which covers the part of the Rapti Rural Municipality. Both the schemes serve about 110 households and coverage is about 5% of the total households of the proposed project area. Although, both the scheme is working satisfactorily, the source used have limited yields to allow the extension of the service areas.

The existing water supply scheme covers parts of ward 5, 7 & 8 of Rapti Rural Municipality, which supplies water through nearly 390 private and community taps. The present water supply situation is not satisfactory. The town project areas have piped water system to serve some households and the remaining of the community depends upon springs and streams. The quality of water delivered through the existing system in the project area is not satisfactory. Treatment facilities are not provided.

3.11.2 Existing Sanitation Situation

Pragatinagar Town is declared ODF zone, the overall sanitation condition of the project are observed satisfactory. Most of the households in the core areas have permanent type of private latrine like water seal latrine and cistern flush latrine. Others have pit latrines and ventilated pit latrines. Public institutions and government offices have proper permanent toilets.

Poor drainage and cases of water logging have been reported in the project area. Institutional waste management system, and urban drainage systems are yet to be developed in the project area.

3.12 Size and Magnitude of Operation of Project

The water supply system has been designed for a base year population of 12,043 for the year 2019. The system has been designed to tap ground water and using different water source points for a total design year population of 33,719 in 2039. The design is targeted to supply 24 hours continuous supply with potable water as recommended by NDWQS guidelines.

Three number of water reservoir tanks have been proposed at different locations considering in mind the elevation difference of the service area. The capacity of 200 cum & 450 cum overhead tank and 200 cum capacity of ground tank with total 850 cum storage capacity of reservoirs are proposed for the collection and storage of water. A total of 2.474 km of transmission mains and 66.069 km of distribution lines will serve household connection to 2406 households in the base year.



24/11/2019
Engineer



3.13 Description of the Project

3.13.1 Water source and water quality

The existing water sources in the project area are;

- Kalapani which serves ward 5; DTW: 16.57 lps (proposed)
- Pipari which serves ward 8; DTW: 3×14.95 lps (proposed)
- Dhaberi which serves ward 8; dry season tapping 2 lps (presently used)
- Singe which serves ward 8; dry season tapping 0.8 lps
- Dolai River; 75 lps (potential source)

Dolai River which flows through the project area from north-east to south-west (with discharge of 75 lps as measured during field study) could be one of the water source for the proposed system. Although this river is perennial, the flow in the river decreases considerably during dry season will be able to meet the demand of the service areas. Besides, the quality of water deteriorates considerably during rainy season thus by requiring extensive water treatment.

Water Quality Assessment

Certified laboratory was used to conduct chemical, bacteriological and physical tests of the ground water sources. Samples from source were collected on September 2017 and February 2018 for conducting laboratory analysis to test for other physical and chemical parameters with respect to the Nepal Drinking Water Quality Standard (NDWQS) guidelines for potable drinking water. The following table exhibits the finding with respect to the NDWQS.

Table 3.16: Water Quality Assessment

SN	Parameters	Units	Test methods	Observed Values		NDWQS, Nepal
				Sept 2017	Feb 2018	
1	pH at 27°C		Electrometric, 4500 – H ⁺ B, APHA	7.1	7.8	6.5 – 8.5
2	Electrical Conductivity	µS/cm	Conductivity Meter, 2510 B, APHA	510	357	1500
3	Turbidity	NTU	Nephelometric, 2130 B, APHA	<1	2	5
4	Total Hardness as CaCO ₃	mg/l	EDTA Titrimetric, 2340 C, APHA	271	212	500
5	Total Alkalinity as CaCO ₃	mg/l	Titrimetric, 2320 B, APHA	295	223	-
6	Chloride	mg/l	Argentometric Titration, 4500 – Cl ⁻ B, APHA	2.98	4.93	250
7	Ammonia	mg/l	Direct Nesslerization, 4500 – NH ₃ C, APHA	0.17	0.05	1.5
8	Nitrate	mg/l	UV Spectrophotometric Screening, 4500 – NO ₃ B, APHA	4.58	4.93	50
9	Nitrate	mg/l	NEDA, Colorimetric, 4500 – NO ₂ ⁻ B, APHA	0.02	0.05	-

Engineer



SN	Parameters	Units	Test methods	Observed Values		NDWQS
10	Calcium	mg/l	EDTA Titrimetric, 3500 –Ca B & 3500 –Mg B APHA	85.77	60.92	200
11	Magnesium	mg/l		14.10	14.58	-
12	Arsenic	mg/l	SDDC, 3500 - As, C: APHA	N.D. (<0.01)	N.D. (<0.01)	0.05
13	Iron	mg/l	Direct Air – Acetylene AAS, 3111 B, APHA	0.07	N.D. (<0.05)	0.3
14	Manganese	mg/l		N.D. (<0.02)	N.D. (<0.02)	0.2

Source: WQ test reports, September 2017 and February 2018

3.13.2 Project Sub-Systems and Project Components

Pragatinagar Town Water Supply and Sanitation Sector Project have been conceptualized as a piped water supply system considering conjunctive use of ground source of water. Deep tubewells are proposed as source and the water table of the deep aquifer is expected to be around 120 m which is based on the scenarios of the tubewells installed in the west, northeast and east of the project area within the periphery of 4-5 Km. The project has two sub-systems as described below;

3.13.2.1 Project Sub-systems

Thus considering the topography, landuse, settlement pattern and use of existing facilities; two (2) water supply sub-systems based on decentralized distribution system are proposed and are briefly described below;

Kalapani System:

This is a pumping system. This system is proposed to serve northern part of Dolai River in Kohalwa-Jutpani, Kalapani, Singe, Paharwaha and Lathuwa areas of wards 5 and 8 of Rapti Rural Municipality. This system is designed to cater 9,442 permanent and 69 rented (total 9,511) population. The groundwater will be extracted through a tube well as water source. The water is pumped from tube well to the 200 Cum overhead RCC reservoir. The water from the overhead reservoir is supplied to the service areas through gravity.

Pipari System:

This is a pumping system. This system is proposed to serve southern part of Dolai River in Bijauri, Baraki-Sisahaniya, Jitpur, Pipara, Pipari, Pragatinagar and Kamal Road areas of wards 5, 7 and 8 of Rapti Rural Municipality. This system is designed to cater 23,952 permanent and 256 rented (total 24,208) population. The groundwater will be extracted through a tube well as water source. The water is pumped from tube well to the 170 Cum ground RCC reservoir. The water from the ground reservoir is pumped to the 450 Cum overhead RCC reservoir so that sufficient head is available at the consumers' area. The water from the overhead reservoir is supplied to the service areas through gravity.

Engineer - 29 -



Government of Nepal
Ministry of Water Supply
Urban Water Supply and Sanitation Sector Project
Project Management Office

The sub-system-wise population and its projects are provided in the table below;

Table 3.17: Subsystem-wise Population Projection

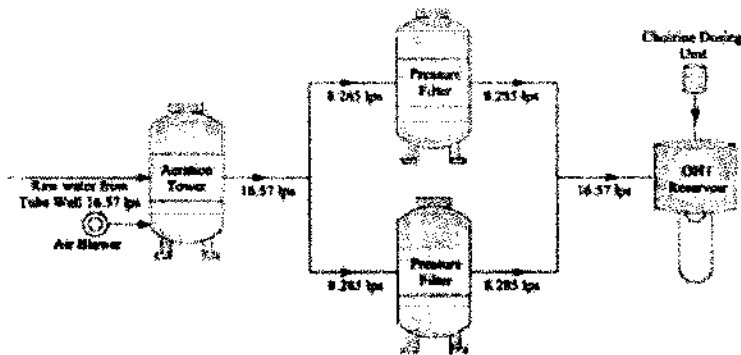
Distribution System	Survey Year (2017)			Base Year (2019)			Design Year (2039)		Total
	Population			Population			Population		
	Own House	Floating	Total	Own House	Floating	Total	Own House	Floating	
Kalapani	4214	34	4248	4526	36	4562	9442	69	9511
Pipari	7694	101	7795	8511	109	8620	23952	256	24208
Total	11908	135	12043	13037	145	13182	33394	325	33719

3.13.2.2 Components of the Project

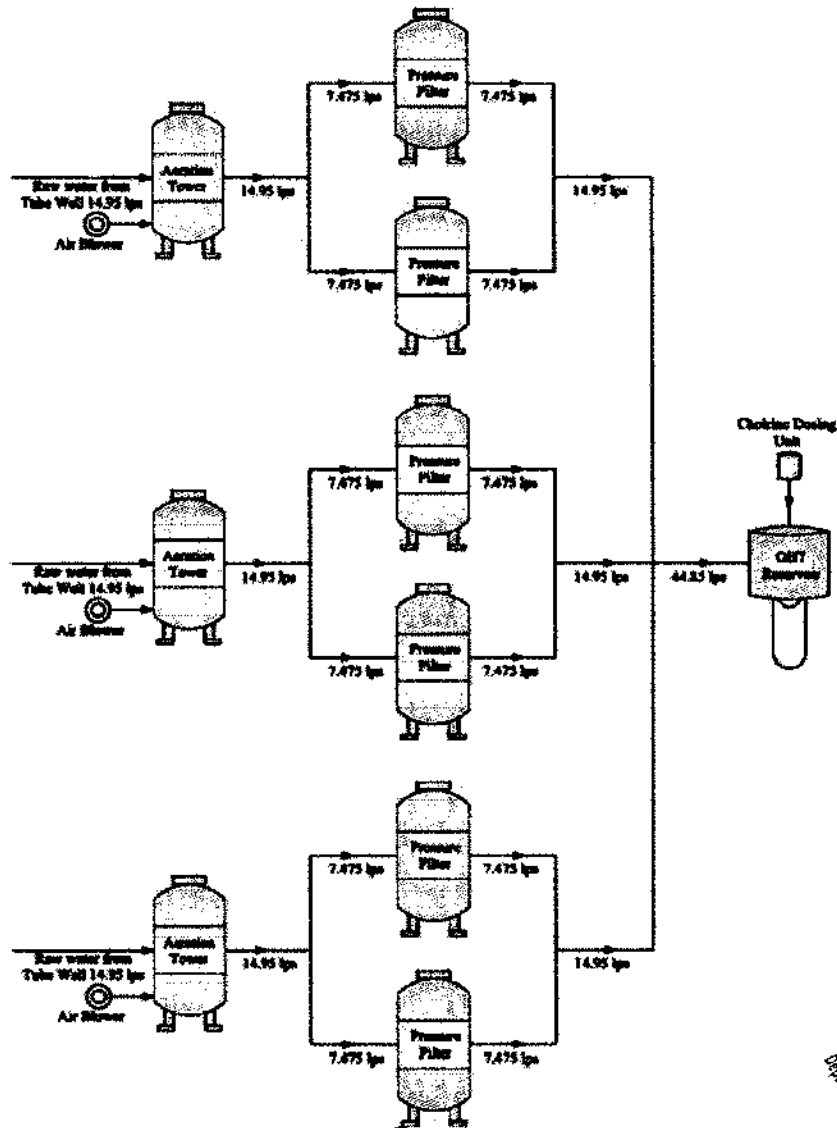
The water treatment process has been selected based on the raw water quality. The proposed treatment process aims to remove the high concentrations of iron and turbidity present in the raw water. It also kills pathogenic organisms present in raw water and ensures the presence of residual chlorine to kill the pathogenic organisms during the conveyance of treated water in pipelines. The treatment process consists of lime dosing, aeration towers, pressure filters and disinfection with associated accessories like air blowers/compressors, valves and pipes. The schematic diagrams of the proposed treatment plant are shown in the figure below;

15/1/54

Secretary of Water Supply
Government of Madras
Kannur, Kottayam



Schematic Diagram of Treatment Process – Kalapani System



Schematic Diagram of Treatment Process – Pipari System

Figure 3.4 Schematic Layout of Treatment System

Engineer



The project components are detailed in the sub-section below;

i. Transmission mains

The transmission main conveys the water from the tube well to overhead service reservoirs. Since the water is conveyed by pumping it is also known as pumping main. Pipe sizes are so selected that velocity of water within the pipes remain within the range of 0.5 m/s to 1.5 m/s. DI pipes are proposed to use in both the systems. The water is pumped from the tube well with sufficient head so that the water passes through the water treatment plant and delivers it into the ground reservoir/sump well. The water is then pumped again from ground reservoir/sump well to overhead reservoir. The total transmission main pipe length of the proposed systems is 2.474 km. Thrust blocks are also provided to restrain the pumping mains in both the systems.

Table 3.18: Transmission/ Pumping Main

SN	Systems	Length of Pipes (m)
1	Kalapani	705
2	Pipari	1769
Total		2474

ii. Service Reservoirs

The service reservoir is required to store the water to meet the hourly fluctuation of consumers' water demand. This allows the peak flow in the distribution network. The total storage requirement for the system at the end of design period i.e. 2039 is calculated as 850 Cum. Existing reservoirs made of ferrocement are very small in capacity and have not been utilized in the proposed system.

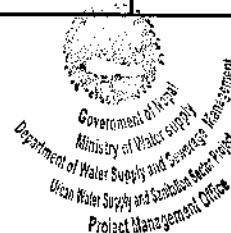
The reservoirs will be constructed of RCC and is designed as overhead tank as the terrain suggests. However, a ground based reservoir of 200 Cum capacity has provided prior to the overhead reservoir in Pipari system so that the capacity of the overhead reservoir can be optimized. The following table summarizes the requirement of reservoir tanks for the various systems.

Table 3.19: Requirement of Reservoir

SN	Systems	Reservoir Size (Cum)	Type	Remarks
1	Kalapani	200	RCC – OHT	Proposed
2	Pipari	450	RCC – OHT	Proposed
		200	RCC – Ground	Proposed
Total		850		



[Signature]
Engineer



iii. Distribution Network

The distribution system comprises of pipe network, which consists of mainly loops and branch. The water is supplied from the service reservoir to the consumers by the distribution pipe network. This network is analyzed using EPANET 2, a design analytical software tool. Distribution pipes are laid both sides of the all metalled and major roads. Single line pipes are proposed in earthen and other roads. HDPE pipes are predominantly used. Pipe of class and size lesser than 6 kgf and 50 mm is not proposed. Existing pipes will not be used as these are leaking and found substandard (class of 4 kgf). The length of the distribution network pipes proposed for various systems is shown in the table below. The total distribution pipe length of the proposed systems is 66.093 km.

Table 3.20: Distribution Pipe Network

SN	Systems	Length of Pipes (m)
1	Kalapani	29637
2	Pipari	36456
Total		66093

iv. House Connections

The system has been designed, predominantly as house to house connections. The system has been analyzed for a design capacity of providing a total of 6981 house connections at the end of design period. However, initially during construction phase, only 2406 house connections are provided to satisfy the need for the base year population.

v. Appurtenances

These will primarily comprise of valve chambers in flow control valves for controlling flow in the pipeline. Altogether 125 valve chambers and 25 pipe valve boxes are expected in the system. Other appurtenances as air valves, scour valves, fire hydrants will be provided at suitable locations. Some road crossing has been initially provided. This will also facilitate for less road cuttings during the operational phase

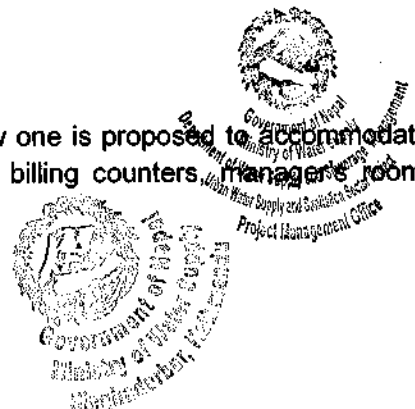
vi. Guard House:

There is no guard house in the existing systems. Two guard houses are proposed in the Pragatinagar Urban Project, one each for Kalapani System and Pipari system. These guard houses are to be located at the reservoir sites. The guard house is one storey building with a guard room, toilet and bath room.

vii. Office Building:

There is no office building in the existing system. Thus new one is proposed to accommodate the required facilities like water quality testing laboratory, billing counters, managers room,

Engineer



meeting hall and store room. The building will be of two storeys. The ground floor coverage will be around 1700 square feet.

viii. O&M Equipment and Tools

An assessment was done for the needed items. The UWSSP has also some guide lines on it. Besides the following equipment have been also considered in the project so that project works during construction period and for operational activities are effectively carried out.

- a) Leakage detecting equipment- 1 set
- b) Submersible sludge pump- 1 no
- c) Electro-fusion machine for joining the HDPE pipes including portable Generator - 1 set
- d) Water quality testing laboratory equipment - 1 set
- e) Other Tools and Plants like: electric pipe cutters, pipe wrenches etc.

ix. Sanitation Improvement

This component comprises waste water management, solid waste management, etc and is described below;

a. Individual Household Toilet Improvement

It was learnt, some of the households have prepared pit latrines with bamboo, shrubs cover. The wall of pits is not found properly protected. Similarly toilets as such were also found made temporarily e.g. from bamboo, wooden post etc. Thus training programme in association with local bodies will be carried out for the proper construction of local material eg, cement plaster in bamboo woven to make wall, strengthening pit wall by locally available stone, use of RCC rings and cover and its molding methods etc. Accordingly awareness campaign is also carried out regarding public sanitation and health.

b. Design of Low Cost Latrine for Low Income Household

There are a few types of latrines that may be adopted for low income household and range from pit latrines to septic tank latrines. The type of latrines the people will construct depends largely on the financial capacity of the consumers. The other factors as culture, tradition of the people, ground condition, climate and availability of space also play a vital role. There are three distinct income groups in the project area. People with higher income tend to build better sanitation facilities with more contribution, people with medium income like to improve but with little contribution while low income people want to have latrines constructed but do not want to contribute.

(xi) Land Availability for Project Components

All the structural components of the project will be built on the land acquired by the WUSC. These lands are selected on the basis of technical feasibility and it is kept in mind that potential environmental impacts are minimized. The distribution lines will be through the RoW of public roads. Around 5,052 square meters of land is required for the project components, which is a very small portion (around 0.07%) of the total area of the project's service area.



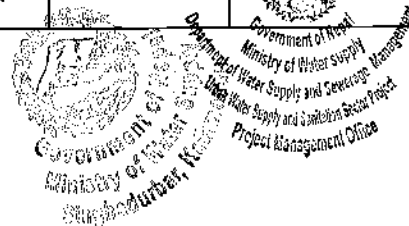
24/11/19
Engineer



Table3.21: Land Requirement Site and Proposed Structures for the project

S.N.	Component	Sub-component	Required Land	Land Ownership	Remarks
1.	Kalapani System	-Bore hole - Lime Dosing Unit - Aeration Tower - Pressure Filter - Sump Well - Generator -Tubewell-1 -Tubewell-2	832+181.53=1,013.53 Sq.m	Kalapani Community Forest	-Kalapani Community Forest Users Group has given permission to use 4 kattha land (Annex-2)
		-200 Cum OHT -Operator / Guard House	675.05 Sq.m	Kalapani Community Forest	
2.	Pipari-Chowk System	-Bore hole - Lime Dosing Unit - Aeration Tower - Pressure Filter -Tubewell	1,174.25 Sq.m	Shankar Community Forest	Shankar Community Forest Users Group has given permission for use of 1 kattha land
3.	Pipari (Shivamandir)	-Bore hole -Lime Dosing Unit - Aeration Tower - Pressure Filter - Sump Well - Generator Operator /Guard House - Office Building -Tubewell -450 Cum OHT	1083.41 Sq.m	Shiva Mandir and Shankar Secondary School	Shiva Mandir Management Committee has given permission for use 2 Kattha10 Dhur land and Shankar Sec. School has given consent for use of 10 Dhur land
		-Bore hole - Lime Dosing Unit - Aeration Tower - Pressure Filter -Tubewell	342.25 Sq.m		
4.	Sanitation	Public Toilet with capacity of 100 users at Service Centre	763.20 Sq.m	Government owned land	Received land used permission letter.
Total			5051.69 Sq.m		

Signature
Engineer



3.14 Proposed Schedule of Implementation

The exact schedule for implementation of the project will be known after the work has been assigned to the contractor. It is proposed that the project's construction period will be of 18 months. For the feasibility study, detailed engineering design study and construction, three years period has been assigned. Therefore the base year for the project has been assumed as the year 2019 and considering design period as 20 years the design year has been taken as the year 2039.

The main task associated with the project will be as follows:

- Detailed Engineering Design & Preparation of its report
- Preparation of Working Drawings
- Preparation of Quantity and Cost Estimates
- Carrying out of Economic and Financial Analysis and level of Water Tariff
- Preparation of Socio Technical Profile
- Environmental Study of the Sub Project Area
- Preparation of Tender Documents
- Awarding of Contract
- Construction
- Operation and Maintenance

The project has been designed with the principle of active community participation from the design stage itself. The implementation strategy of the project is based on the community management approach, which includes encouraging the financial responsibility towards the improved facility. Therefore, user participation at the outset of the planning and design exercise is an essential requirement. The community has to contribute 50% of the total construction cost. Out of which 5% has to be deposited before implementation of the project as upfront cash. Another 35% - 45% to be contributed taking the loan from TDF. The loan should be recovered within the time frame of 15 years with 5 years of grace period, along with the interest of 5% per annum through their affordable water tariffs. Tariff raised by the service has to support towards maintenance of the supply system of the water supply system. DWSSM is acting as the initiator/coordinator for the purpose.

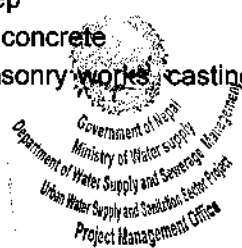
3.15 Construction and Operation Activities of the Project

The construction phase will include following activities;

- Excavation and surface clearing activities
- Boring, and earthworks for construction of treatment plant/reservoirs and pipeline extension
- Trench works for pipelaying works will be 90cm deep
- Machinery works like cutting of iron-rods, mixing of concrete
- Manual works assisted by equipment use; like masonry works, casting, pipeline laying, plumbing
- Transportation activities for construction materials
- Stockpiling of construction materials/fuel



24/11/19
Engineer



- Spoil disposal as there will be generation of around 1,000 m³ of spoil
- Temporary construction facilities like campsite, rented rooms for constructor's and consultant's teams, and stockpile site for construction materials are required for the construction phase of the project.

The operation phase will include following activities;

- Operation of electrical pumps/DG sets
- Disinfection of water using Bleaching powder
- Water Quality Laboratory operation
- Backwash of treatment plant
- Disposal of effluents/slurry.

3.16 Community Participation and Ownership

One of the major financial objectives of the project is to encourage the financial responsibility of the consumer for the improved facilities by requiring co-financing of 30% of the capital cost of water supply, with additional 30% cost recovery of the loan funds for the construction. Up front cash is 5 % of total cost.

There are quite a few clubs and local NGOs in the project area doing social programs. They will be effective for future use especially in awareness generating programs provided they are given training. School children and community social workers will be used in awareness generating programs. Commitment for contribution and participation is found high for the project. All surveyed household samples are willing to contribute for the development of the water supply project. The works of collecting cash is already commenced. During the field visit, contribution aspects were also discussed. It has been said that there would not be any problem for collecting cash from the community.

24/11/19
Engineer



4. IMPACTS OF THE IMPLEMENTATION OF THE PROPOSAL ON THE ENVIRONMENT

The potential impacts of the proposed Pragatinagar Urban Water Supply and Sanitation Project are physical, biological, and socio-cultural in nature. They can occur at various phases of the project such as design, preconstruction, construction and operation and maintenance phases. The magnitude of the impacts can be small, moderate, or high depending upon its severity, and can be temporary or long term, reversible or irreversible, local or wide. The impacts need not necessarily be limited to negative ones but can be positive as well. The objective of Environment Management is to attempt to augment positive impacts and to minimize negative impacts by sustainable mitigation measures.

4.1 Beneficial Impacts and Augmentation Measures

4.1.1 Construction Phase

i. Employment Generation and Increase in Income

One of the major direct beneficial impacts of the water supply and sanitation project during construction stage is the creation of employment opportunity to the local community. As such for this work a total of 6,500 man-days of skilled labors and 43,000 man-days of unskilled labors person days are required. This will increase local income level and this will therefore increase economic activities and enterprise development with multiplier effect. In order to augment the impact, the local people particularly poor; dalits, ethnic minority and women will be given priority for employment and on-the-job trainings.

ii. Skill Enhancement

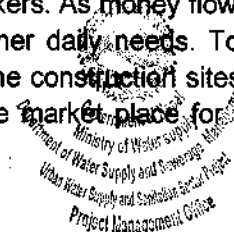
Although many people in the project area are found unskilled at present, the construction of the water supply system and the distribution network is likely to enhance their skills in plumbing, fittings and other construction works. Furthermore, the project will also give on job practical training to the workers which will enhance their technical skills. The skill and knowledge acquired from the project during construction will enhance employment opportunities of local people who can earn livelihoods from similar projects in the future. Workers especially pipe laying persons will be given on-the-job training on plumbing bathroom fittings, and other construction activities in order to augment the impact.

iii. Enterprise Development and Business Promotion

Most of the service areas of Pragatinagar town have mixed urban and semi-urban characteristics. During construction period, different types of commercial activities will come into operation in order to cater the demand and requirement of workers. As money flow begins, they will regularly demand different food items, beverages and other daily needs. To meet these demands, small shops and restaurants around the vicinity of the construction sites are likely to open. At present, Bhalubang, Sishaniya, and Lahamai are the market place for selling green



Signature
Engineer



vegetables. Similarly, people earn 20,000 to 45,000 Rs. yearly from milk production. Along with the implementation of the project, these avenues will also gain local market, and as economic status of locals will be improved, it will help in further expansion of these agro-businesses. This will increase local trade and business in the belt.

4.1.2 Operation and Maintenance Phase

i. Improvement in health and saving of time

After the water supply and sanitation project is complete, the people living within the project area will benefit from the supply of sufficient quantity and good quality water and improved sanitary conditions. Women and girl child will be directly benefited as they have to spend less time in fetching water and thus have more time for study, other household and income generating activities. The time savings of households is taken as time in collecting households' daily water requirements. It is estimated that every household will save in average of 70 working days of time value after the service from the project has started. Table below shows the annual economic value to time saved based on shadow labour price.

Table 4.1: Economic Benefits from Time Saved in Collecting Water

Time Savings per Household per year (Working Days)	Shadow price of labor per day (Rs)	Economic Value: Benefit/year (Rs)
70	350	24379

Source: Socio-economic Survey 2017

This shows that in average, a household of service area will save time worth NRs 24,379 per year with the reduced time for water fetching after the implementation of the project. The impact will be augmented through regular maintenance of the water supply and sanitation system by the users group (WUSC).

ii. Development of Market center

The availability of good supply of drinking water will accelerate the rate of development of Pragatinagar as a leading market centre. The project area already has 3 banks, 8 micro-finance institutions, 5 private clinics, and some governmental & educational institutions. The implementation of this project will attract more of investments. The local agricultural products, human skill and new economic avenues will be promoted in the local markets.

iii. Appreciation of Land Value

One of the benefits of the project is that land price will increase due to the availability of reliable safe drinking water and sanitation system. The unavailability of good drinking water could be one of the reasons for some persons to opt for conducting their business in the project area. Upon completion of the present project, migration from nearby hills is expected. In order to promote land development in the area, the local people will be aware that high value lands are acceptable to the banks and microfinance institutions to provide loans for them to start their own economic/social ventures.

[Signature]
- 39 -
Engineer



iv. Women Empowerment

Women will largely benefit from this project, as they are the ones who spend a great deal of time in fetching water. With the operation of the water supply scheme, time will be saved. As contaminated water can lead to diseases the women of the family also have to spend a good deal of their time to care for the sick family members. With the improvement of water supply, there will be marked reduction in the occurrence of infectious disease in the area. This will provide more time to spend on other economic and social activities leading to empowerment. In order to augment the impact, the water supply system will be regularly maintained so that it operates smoothly and health and awareness programmes will be given to the local people

v. Quality of Life Values

The project is not expected to adversely affect any cultural or recreational resources but will increase the existing quality of life values due to improvement in personal, household and community hygiene practices and health. It is estimated that the delivery of clean drinking water through the projects will reduce health expenditures by 25%. The project will help to enhance the quality of life of people in many ways, like by providing opportunities for jobs, providing good quality water, and improved sanitation & hygiene practices.

4.2 Adverse Impacts

4.2.1 Pre-construction Phase

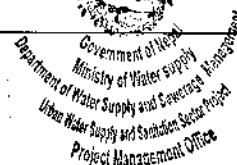
The pre-construction works involves field survey and investigation, development of design & detailed drawings, carrying out cost estimate etc. This also includes discussion with WUSC and revision of design if necessary. As there will be no construction activities involved; there will be no construction related adverse impacts. The Rapid Environmental Assessment (REA) Checklist for water supply and sanitation was used to identify potential impacts/issues/concerns of the project as per design. REA identified the issues and concerns that were considered during design phase are listed in Table 4.2 below;

Table 4.2: REA Identified Impacts & Mitigation Measures Taken During Project Preparation Phase

REA identified Impacts/Issues/Concerns	Measures taken during FS/DED to mitigate impacts/issues/concerns
Unsatisfactory raw water quality	During the detailed engineering design stage, water sample from existing tubewells was tested. This information has guided design of water treatment.
Delivery of unsafe water to the distribution System	Design proposes basic treatment using pressure filter, softening and disinfection. This IEE proposes "hands on" training by a licensed & accredited laboratory for the first few years of operation under the Water Safety Plan included in the project design & continuing training thereafter.
Health hazards arising from inadequate design of facilities for receiving, storing and handling of CI & other chemicals	Design has included a "housed" dosing unit.
Delivery of water to distribution system which is corrosive due to inadequate attention of feeding of corrective chemicals	Design has proposed DI and HDPE pipes. The PE pipes of class 6kgf is chosen to avoid any leakage issues



[Signature]
Engineer



Contamination of drinking water source and other environmental receptors from household and public toilets	The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m down-stream of the drinking water source.
--	---

4.2.2 ConstructionPhase

4.2.2.1 Physical Environment

i. Erosion and land surface disturbance

Around 3,000 sq.m. of land will be used for the project structures. Excavation and digging of trenches during construction may lead to erosion and caving thereby causing soil erosion, silt runoff, and unsettling of street surfaces. Topsoil may be lost, and this needs special care during construction period. Haphazard disposal of the excavated earth can disturb the local land surfaces. These activities will cause nuisance and discomfort to the locals. Forest area of Kalapani area, Pipari area, Kohalwa-Jutpani area, Baraki-Sisahaniya area and Kamal road area are some of the places where these disturbances can occur.

Though there is very little intervention on the forest or agricultural land, at some places laying of pipelines may need short term interventions in agricultural land parcels, and in open lands of forest.

ii. Underground Water Quality and State of Water table

Due to the continual extraction of ground water, there will be fluctuation in ground water level. As the water is proposed to be extracted from the depth of about 120m, below the impervious strata, there shall be insignificant effect to the existing shallow tube wells which are generally at the level of 10 to 15m.

iii. Damage to the Existing Facilities

During the construction time, while excavating the earth, existing water supply distribution pipe lines and telecommunication cable may get damaged in few places particularly in the bazaar area in spite of great care. A repair team will be on standby for the repair of water supply pipe line for immediate repairs. Such damages are likely at Kohalwa-Jutpani area, Baraki-Sisahaniya area and Kamal road of the project service area.

iv. Air pollution and Noise nuisance

The construction activity will comprise of construction of deep tube wells and laying of transmission and distribution pipes, construction of storage reservoirs, construction of office building along with generator & guard houses, and transport & installation of pumps. Most of the works do not involve heavy machines except in constructing deep tube well which will produce some extent of noise for a certain period of time. There will be some activities such as

- 41 -
Engineer



transportation, loading/unloading of construction materials viz. sand and aggregates, stockpiling of construction waste and construction materials and earthworks. These will cause effect into air quality due to dust generation and vehicular emission as well as noise pollution.

v. Impact on water bodies

There will be some impacts on water bodies located within the project area during the construction phase. Possible activities, which may influence the water quality, are listed below.

- Washing of vehicles, and other washing activities directly on local surface water bodies,
- Sediment and excavated materials may be transported to the water bodies due to rain,
- Leakage and disposal of oil and grease from construction equipment

vi. Waste Disposal

Haphazard disposal of solid waste from workers' campsites in the vicinity of water bodies and at open spaces could be a concern. Chances of open defecation by outside workers will also be a concern to local environment. Construction waste from campsites and construction sites are also sometimes disturbing the local environment. Assuming that per capita waste generation of a worker is 0.25 kg/day, and expecting that there will be around 45 persons in a campsite including the labourers, helpers and supervisors, it is expected that there will be generation of around 11.25 kg of waste per day. Though this waste is not a big volume, if not managed, it will deteriorate the local environment.

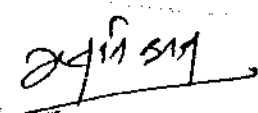
4.2.2.2 Biological Environment

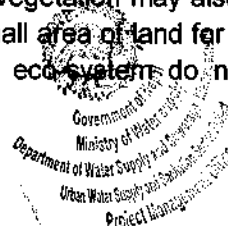
The service area falls in a built up area with agricultural land with sparse forest areas. Only minor impact on vegetation is anticipated and that is also only during the construction period. The source of water of Kalapani system is located within the forest area. Thus, some vegetation cover loss will be there. However, site has been selected to avoid any tree cutting. Open land parcels of Shree Kalapani Community Forest, and Shree Shankar Community Forest are proposed to be used. Most of the pipelines pass along the roadside and only a few numbers of plants and bushes have to be cleared up within the transmission pipe line stretches. The potential environmental impacts of the project on local flora and fauna during construction and post construction phases will be low as it involves no tree felling along the distribution line, and no loss of agriculture lands. Some of the impacts that may likely to occur are described below;

i. Loss of vegetation cover

The loss of vegetation cover due to earthwork primarily in the direct impact area of the treatment plants and deep tube well sites includes shrub clearance only. The source of water of Kalapani system is located in the forest area of ward number 5 of Rapti Rural Municipality. Thus, some vegetation cover loss will be there. Some of the topsoil and vegetation may also be lost during pipe laying works. The project components require a very small area of land for implementation and environmental impacts on the vegetation and natural eco system do not seem to be significant.




Engineer



ii. Impact on Fauna

The project site is within the built up area except for some sites like the deep tube well sites. Population dynamics of resident and migratory birds and reptiles at the some project sites may be affected during the construction period due to various construction activities. But these effects will be of temporary in nature. The condition will be normal after construction is over. The workers should not be allowed to hunt birds

iii. Impact on aquatic life

Some of the construction activities and protection works are proposed at the bank of the river. Dolai river, which flows through the project area form North to South, and Bhulke Khola and Gopi Khola river are the surface water sources that face risk of pollution due to project activities. The construction activities will physically disturb the water quality for a certain period of time and may cause adverse impact on aquatic life. But these effects will be temporary in nature and local in scale.

4.2.2.3 Socio-economic Environment

i. Disturbance to community activities

Construction activities, particularly construction works on roads will cause disturbances to the community activities, festivals and social events. The free movement of vehicular traffic and pedestrians will be affected. Noise produced due to the operation of machines may disturb the neighbourhood in construction areas. Kalapani area, Pipari area, Kohalwa-Jutpani area, Baraki-Sisahaniya area and Kamal road area are some of the places where these disturbances are likely to occur.

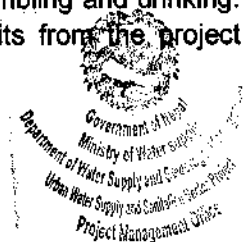
ii. Crop Loss

It is estimated that around 500 m of pipelines may need to pass through agricultural land at different stretches. The project team will chose the timing of laying of pipelines in consultation with the locals so as to avoid any loss of crops. However, some unavoidable cases may be there as the laying of pipelines may continue for over six months.

iii. Social Dispute and Dissatisfaction

There will be influx of outside workforce. Any non-social or uncoordinated activities by these workforce can cause problems with the local community. There is a possibility of social dispute in the community due to irresponsible behaviour of the workers such as gambling and drinking. On the other hand, the local population may not get employment benefits from the project causing dissatisfaction and conflicts in the area.

[Signature]
Engineer



iv. Occupational health and safety (OHS)

Health and safety of workers, particularly of those involved in concreting, trench cutting, formwork and rebar fixing in the overhead tank is of prime concern. Accidents in the work places, cases of water borne diseases, occurrence of communicable/water borne diseases, and exposure to risky working environment are the major OHS aspects.

v. Community health and safety

Since some of the construction works take place near the settlements, and the pipelaying works will be through the settlements, there are chances that the local people may face small accidental risks. This is critical primarily for children and old-aged people. Chances of communicable diseases are also a concern. Stock-piles sites, spoil disposal sites and movement of vehicles for construction activities are some of the aspects of construction works which may pose threat to health and safety of the community. As per the public consultation, the community people also seem aware of this aspect in relation to the construction phase of the project.

vi. Resettlement, relocation and compensation issue

The major structures are to be constructed on public land or on land belonging to WUSC. Similarly, the distribution system network falls within the public property line/RoW. Therefore resettlement or relocation is not required. However some cases of loss of crops during pipelaying, damage to compound wall may arise. These will be avoided as far as possible.

4.2.3 Operation & Maintenance Phase

i. Risks from exposure to chemicals

Chlorine and Bleaching Powder are toxic and the workers will have to deal with it during the operation of the system. Ingestions, inhalations, application to body parts, especially to the eyes, nose, and mouth are of extreme hazard to the workers handling chlorine and bleaching powder.

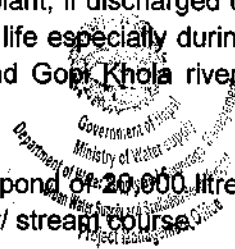
ii. Impact on water bodies and aquatic life

The effluent produced from the periodic backwashing of the filter plant, if discharged directly to the river course may cause harm to the water bodies and aquatic life especially during the dry season when the flow will be less. Dolai river, Bhulke Khola and Gopi Khola river may be susceptible to such impacts.

As the backwash water mainly contains suspended solids a small pond of 20,000 litre capacity will be constructed for decantation and will be drained off to the river/ stream course.



- 44 -
Signature
Engineer



- To avoid the impact to aquatic life, the effluent and sludge should be disposed off only in designated areas and regular monitoring of the river or stream water quality should be done.
- Haphazard disposal of effluents and sludge from the treatment plant will not only be a nuisance to the public but also affect the aquatic life by eventually finding its way to nearby water bodies.

iii. Impact of use of diesel generators

Use of generators is foreseen to be likely. The use of diesel generators will have some noise nuisance, and air pollutant emissions. This will be a nuisance for the locals within the close vicinity. However, this impact has been predicted to be of low significance.

4.3 Indirect, Induced and Cumulative Impacts

4.3.1 During Construction

4.3.1.1. Indirect and Induced Impacts:

The vehicular movements that will be generated from the simultaneous construction of different components in different sites will create choke points at the narrow access roads and slow down mobility of people, goods and services, particularly in the market area. Coupled with disruption of economic activities and social services the local socio-economy may be negatively affected.

4.3.1.2. Cumulative Impacts:

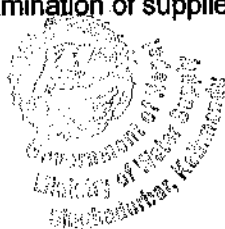
There are no known ongoing or proposed large scale developments in Pragatinagar town as yet. Extension of the main road is proposed. Hence, cumulative impacts may arise in case of air pollution, and labour interactions.

Assuming all components are started simultaneously or almost simultaneously, without mitigation, cumulative impacts will be "significant" in magnitude during the peak construction period (about first four months of construction period). After this period, magnitude of cumulative impacts will lessen to "moderate" magnitude. The significant cumulative impacts would be dust, noise, road space limitation leading to slow mobility, access blocking, disruption of social services and economic activities, community and workers' health and safety hazards, generation of solid wastes and spoils.

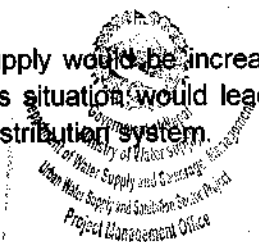
4.3.2 During Operation

4.3.2.1. Indirect and Induced Impacts:

The indirect and induced impact of a reliable and sufficient water supply would be increased generation of wastewater and sewage. If inadequately managed, this situation would lead to contamination of supplied water through leaks or broken pipes in the distribution system.



[Signature]
- 45 -
Engineer



With reliable and sufficient access to safe and potable water, the indirect positive impacts will be improved public hygiene and sanitation, leading to overall improvement in public health and quality of life. Enhancement measures include ensuring the quality of supplied water meets NDWQS through implementation of quality monitoring as prescribed in the EMP. Induced impacts of improved water supply system include rural-urban migration, more land conversion from rural to urban uses.

4.3.2.2. Cumulative Impacts:

The cumulative impact would be the increment in urban growth that will be driven by the availability of a reliable water supply system. The land use pattern will gradually be modifying towards urban settlements pattern which might reduce the available agricultural land.

4.4 Evaluation of the Impacts

The impacts are evaluated based on their impact levels, coverage of area and duration of the impacts. The evaluation will be used to emphasize the need to address the concerns. Magnitude, geographical extent and duration of impacts are defined below;

Magnitude: This can be low-L (minor), medium-M (moderate), and high-H (major), depending on the scale or severity of change.

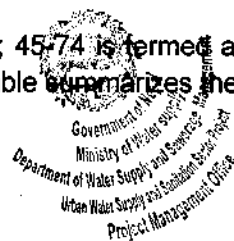
Geographical extent: If the action is confined to the sub-project area, it is referred as site specific (Ss), if it occurs outside area but close to sub-project area, the extent of impact is local (Lc), if it occurs far away from the sub-project, it is referred as regional (R).

Duration: It can be short term (St - i.e. less than 3 years), medium term (Mt - i.e. 3-20 years), and long term (Lt - i.e. more than 20 years).

For the Impact evaluation the matrix method with numerical ranking is used for the quantitative ranking of the predicted impacts. The numerical scale mentioned in the National EIA Guidelines 1993 has been adopted for this sub-project. The numerical scale is as;

Magnitude		Extent		Duration	
High	60	Regional	60	Long Term	20
Moderate	20	Local	20	Medium Term	10
Minor	10	Site Specific	10	Short Term	05

The combined score up to 44 is termed as insignificant impact; 45-74 is termed as Significant and beyond 75 is termed as very significant impact. Following table summarizes the evaluations of the impacts;



[Signature]
Engineer

Table 4.3: Evaluation of Environmental/Social Impacts

Beneficial Impacts					
Construction stage					
Employment Generation and Increase in Income	Direct	M (20)	Lc (20)	St (5)	Significant (45)
Skill Enhancement	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
Enterprise Development and Business Promotion	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
Operation Stage					
Improvement in health and saving of time	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Development of Market center	Indirect	M (20)	Lc (20)	Lt (20)	Significant (60)
Appreciation of land value	Indirect	M (20)	Lc (20)	Lt (20)	Significant (60)
Women Empowerment	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Quality of Life Values	Indirect	M (20)	Lc (20)	Lt (20)	Significant (60)
Adverse Impacts					
Construction stage					
<i>Physical Environment</i>					
Erosion and land surface disturbance	Direct	M (20)	Ss (10)	Lt (20)	Significant (50)
Underground Water Quality and State of Water table	Direct	M (20)	Ss (10)	Lt (20)	Significant (50)
Damage to existing facilities	Direct	L (10)	Ss (10)	St (5)	Insignificant (25)
Air Pollution	Direct	L (10)	Lc (20)	St (5)	Insignificant (35)
Noise nuisance	Direct	L (10)	Ss (10)	St (5)	Insignificant (25)
Impact on water bodies	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Waste disposal	Direct	M (20)	Lc (20)	Mt (10)	Significant (50)
<i>Biological Environment</i>					
Loss of vegetation cover	Direct	M (20)	Ss (10)	Mt (10)	Insignificant (40)
Impacts on fauna	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Impacts on aquatic lives	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)

Engineer



Project Management Office

IEE of Pragatinagar Urban Water Supply and Sanitation Project
November 2019

Socio-economic Environment					
Disturbance to community activities	Direct	M (20)	Ss (10)	St (5)	Insignificant (35)
Crop loss	Direct	M (20)	Ss (10)	St (5)	Insignificant (35)
Social dispute and dissatisfaction	Indirect	M (20)	Ss (10)	St (5)	Insignificant (35)
Occupational health and safety	Direct	H (60)	Ss (10)	Mt (10)	Significant (80)
Community health and safety	Direct	M (20)	Ss (10)	Mt (10)	Insignificant (40)
Operation & Maintenance Stage					
Risk from exposure to chemicals	Direct	M (20)	Lc (20)	Lt (20)	Significant (60)
Impact on water bodies and aquatic life	Direct	L (10)	Lc (20)	Mt (10)	Insignificant (40)
Impact of use of diesel generators	Direct	M (20)	Ss (10)	Mt (10)	Insignificant (40)



24/11/19
Engineer



5. ANALYSIS OF ALTERNATIVES WITH AND WITHOUT PROJECT

5.1 With- and Without-Subproject Alternatives

The project area is a major junction and booming market place. It lies in close connection to the East-West Highway. Though the trend of urbanization is increasing, the town is facing increased problems to water supply. The overall sanitary condition of the project area is reasonably satisfactory, but still improvements are required.

Doing nothing about these challenges would be allowing the project's rural municipality to further develop as "under-serviced" area, put the health of its residents and the general public at more risks, and worsen its living environment. This would impede: (i) further social and economic development of project rural municipality and (ii) Nepal's delivery of its commitment to SDG 6th to increase the proportion of population with sustainable access to safe drinking water and basic sanitation. Hence, do-nothing or without-project alternative is not chosen.

5.2 With subproject' location alternative

The project area is a very needy area in terms of safe water needs. Strategically, the investment in water and sanitation in this belt will improve the overall socio-economic aspects of the Province as it serves as a market junction to the surrounding rural municipalities and it is located around 6 kilometers from Lamahi, and about 36km away from Ghorahi, the headquarters of Dang District.

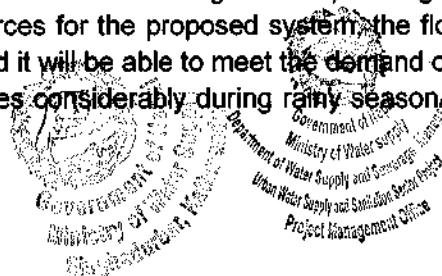
The project components are selected at technically safe site where there is no social dispute as well. Minimization of loss of vegetation cover is also considered. Avoiding tree clearance and damage to cultivated land has also been considered in site selection.

Since the settlements in Pragatinagar are separated by Dolai river into North-western and South-eastern settlements, 2 separate District Management Areas (DMAs) are established. This is based on the principle of managing a large water network into a number of areas, typically of between 500 and 3000 connections, each established area having a defined and permanent geographical and/or hydraulic boundary. With other possibilities as well, the proposed sub-systems will be a easy-to-operate and cost effective option for the scattered location of the settlements.

5.3 Alternatives Relative to Planning and Design

Regarding the source and its technology of water extraction, the proposed deep tube well as source is more sustainable. The project area has Dolai River which flows through form North to South of the project area. It has discharge of 75 lps (as measured in August 2017). Though this perennial river could have been one of the water sources for the proposed system, the flow in the river decreases considerably during dry season and it will be able to meet the demand of the service areas. Besides, the quality of water deteriorates considerably during rainy season, thus

84/93/17
- 49 -
Engineer

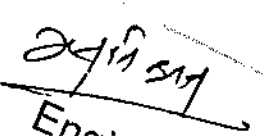


requiring extensive water treatment. Hence, deep tube wells will be relatively more reliable and sustainable source technology.

The proposed system is a small scale project. Since the yield of the proposed deep tubewells is reliable, it is expected that the water supply will be smooth. The major component of a ground water based water supply system consists typically of boreholes with pumps, treatment unit, reservoirs and distribution system. It was assessed that the proposed water supply system with adequate treatment will have very small negative impact on the environment. However, there will be substantial improvement in personal hygiene thereby increasing the quality of life and community health. All water supply components will be constructed on the land owned by WUSC.

The work involved is labor intensive and minimum use of mechanical equipment is involved. Most of the construction work will be done manually, avoiding heavy equipment which will produce minimum environmental impacts. Trained human resources will be employed.

The working procedures proposed are participatory one and the beneficiaries will be actively participating in all the phases of the project. Except from some mechanical equipment for drilling of boreholes, most of the raw materials used will be local in nature. Similarly, as far as possible, local people will be employed for the project so that the chances of conflict are minimal.


Engineer



6. MITIGATION MEASURES FOR THE POTENTIAL IMPACTS

Precautionary measures and the mitigations with respect to the project development activities have been considered, and are already mentioned in section 4.2.1 and Table 4.2. This chapter focuses on the mitigation measures for the anticipated impacts during project's Construction Phase, and project's O&M Phase.

6.1 Construction Phase

6.1.1 Physical Environment

i. Erosion and land surface disturbance

During execution of construction works, precautionary measures will be taken. Proper backfilling of excavated trenches will be done timely and the excavated soil will be stacked properly. Open land near the Pipari site is planned to be used for spoil disposal. Major construction activities will be avoided during the rainy periods.

The project area is agricultural belt, hence topsoil is very important. Efforts will be made to save the topsoil. The topsoil of about 20 cm thick will be placed at a separate place and the remaining excavation will be done. After placing the pipes in trenches and backfilling with other soil and compaction, the topsoil will be replaced to its original position and compacted.

ii. Damage to the Existing Facilities

Coordination has been done with the local authorities during the design phase in order to minimize the damage to existing facilities. However, for unavoidable cases, a repair team will be on standby for the repair of water supply pipe line for immediate repairs. To avoid any such damage, prior coordination will be established with other local authorities. Layout drawing will be at the site to avoid any kind of possible damage. Market and core settlements of Kalapani are likely to face such impacts. The premises of Shivalaya (Shiva temple) will be provided protection with provision of compound wall of around 25 m in length. This is to ensure that there is no disturbance to the visitors coming to the temple. The cost of this work has been proposed to be included in the BoQ of the contractor's contract document.

iii. Air Pollution and Noise nuisance

Use of power horns and movement of heavy vehicles can cause disturbances to the community, educational institutes, hospitals/health posts and residences. Mitigating measures to reduce air and noise pollution are:

- Providing information to the public about the work schedule,
- Allowing the use of vehicles only complying with NVMES 2069 or vehicles having green stickers meeting Vehicle Emission Standards 2057 during project construction period,
- Limiting the speed of vehicles
- The use of power horns will be prohibited,
- Equipment and vehicles will be regular maintained,
- Prohibiting the operation of plants and construction vehicles between 7 PM to 6 AM in residential areas,
- Avoiding work at culturally sensitive times (during religious festivals in the area),

24/12/21
Engineer

Government of Nepal
Ministry of Water Supply
Sanitation and Sewerage
Pragatinagar, Kathmandu

Government of Nepal
Ministry of Water Supply
Sanitation and Sewerage
Pragatinagar Urban Water Supply and Sanitation Project
Project Management Office

- Increasing the work force in sensitive areas so as to finish the work quickly,
- Burning of solid wastes, particularly in workers camp and construction sites, will be banned
- Use of firewood as fuel will be prohibited in the work-camps.

iv. Impact on water bodies

So as to mitigate this potential impact, the worker's camp will be located away from the vicinity of water bodies. Disposal of debris and waste into Doali River, Bhulke khola, and Gopi khola will be totally prohibited. Regular monitoring of the workers camp will be scheduled. In addition to this, the excavated soil will be stacked. Backfilling of trenches will be done timely, and before the rainy season. Separate areas shall be allocated for the stacking of construction materials. Public land near the rural municipality office at ward 5 is proposed as a prime campsite and stockpile area. Wastewater generated from campsite will be collected in a settling chamber and from there the effluent will be sent to a soak pit, or used for water the gardens or orchard.

v. Waste Management and Disposal

Waste generated from the workers' camps will be properly disposed off. Organic waste like food waste and others will be used for composting. Pit composting and bin composting will be promoted. Inorganic waste will be collected in a bin. Reusables will be sold to local scrap collectors. Only the residue will be disposed off to sites designated by the local government. 3R Principles will be regulated. Regular monitoring of the workers camps will be carried out. Temporary sanitary toilets for the workers will be installed before starting the work. Waste like excess grease, lubricants will be collected in plastic containers and will be sold to scrap dealers. Solid waste and other construction waste will be deposited in designated sites near by the labour camp and will be cleared after the completion of the construction works. Spoil will be disposed at designaged sites for individual sub-systems. Public land with need of leveling has been identified at open space near the Pipari sites.

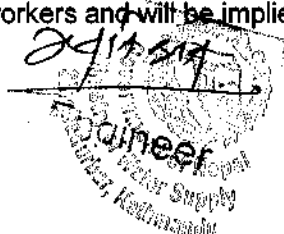
6.1.2 Biological Environment

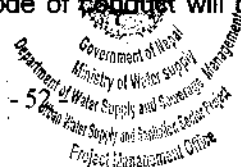
i. Loss of vegetation cover

To protect the topsoil and vegetation, the topsoil will be kept separately and replaced in its original position after laying the pipes. Greenery promotion will be carried out in the user committee building premise and around treatment units. There is no need for felling of trees. However, for any unpredicted and unavoidable felling of trees, the compensatory plantation at the ration of 1:10 per tree cut will be carried out. Species of local demand like Kapur (*Cinnamomum camphora*), Tejpatta (*Cinnamomum tamala*), etc will be planted as per need under coordination with the WUSC and local authorities. Consent letters for use of community forest land for water supply works has been provided by the concerned user groups (Annex 4).

II. Impact on Fauna

The workforce will be sensitized on importance of wildlife conservation. Horns will not be used unnecessarily in the areas close to any wildlife sensitive areas. The workers will not be allowed to conduct any kind of hunting activities. Code of conduct will be developed, explained to the workers and will be implied strictly.


Engineer
Water Supply
Prithvi, Kathmandu


Government of Nepal
Ministry of Water supply
Department of Water Supply and Sanitation
Pragatinagar Urban Water Supply and Sanitation Project
Project Management Office
- 52 -
Ward 5, Prithvi, Kathmandu

iii. Impact on aquatic life

Washing of vehicles and clothes directly on rivers will be discouraged. Disposal of waste and spoil on to water bodies will be strictly regulated. Fishing by workforce in the local rivers will be strictly restricted.

6.1.3 Socio-economic Environment

i. Disturbance to community activities

In order to minimize the disturbance to the community activities, a detailed Traffic Management Plan will be developed by Contractor during the early stage of construction phase for areas along the construction works to minimize traffic flow interference from construction activities. Local public will be notified about project construction activities in advance and schedules, routings and affected areas including road closures will be shared well ahead of time and discussed with the locals. Sign-boards in Nepali and English languages will be placed at properly visible sites. Extensive coordination will be conducted with the School Management Committee of Krishna Secondary School which is near the sub-system component site of Kalapani. Placing of safety nets, barricades, signboards, etc will be discussed and prioritized in coordination with the concerned stakeholders.

ii. Crop loss

Compensation of crops will be provided if the pipe laying works damage standing crops in significant amount. This will be processed through User's Committee and compensation provision will be based on mutual understandings between the affected land owner and the User Committee.

iii. Social Dispute and Dissatisfaction

Code of conduct will be developed and applied for the workforce. An employment policy will be prepared so that the local people may not be deprived of employment opportunities. Local people and women above the age of 16 will be given preference for employment. Wages will be settled based on DWEC (District Wage Evaluation Committee) with the list of employees.

iv. Occupational health and safety (OHS)

To mitigate or minimize the health risks for workers and to avoid any health hazards of the workers, adequate safety instructions will be provided to the contractor and monitored by the project. Following mitigation steps will be taken;

- o Health and hygiene in the camp site (against unsafe working conditions, accidents, transmission of communicable diseases etc) will be given top priority.
- o Provision of sanitary toilets at the rate of 1 toilet unit for 15 workers, and number of toilets meeting the maximum number workers accommodated in the camps during the peak construction period

Engineer

- Regular health checkups, proper sanitation and hygiene, health care will be provided. Awareness programs concerning human trafficking and the possibility of spread of STDs and HIV/AIDS will be conducted during focus group discussions.
- Personal protection equipment (PPE) viz., safety helmets, safety belt, boots, gloves will be provided to all construction workers.
- The loss of life or any type of injuries will be compensated and insurance to the workers will be provided. First aid kits, standby vehicle, and fire extinguishers will be provided in camp sites.

To avoid risks from accidents on site due to the movement of the public and workers, health and safety measures of the contract will also prohibit entry at construction sites to the public and the area will be barricaded and warning signs will be placed.

6.2 Operation & Maintenance Phase

i. Risks from exposure to chemicals

The storage procedures, in-plant handling and dosages of chlorine (bleaching powder) will be addressed. Procedures and guidelines will be developed for its handling. These procedures and guidelines will be prepared by the contractor during the last period of construction phase and will be approved by the consultant. The cost will be included in the contract document itself. First aid measures will be introduced for emergencies. Training on the handling and on dosage of the chemicals will be given to the staff.

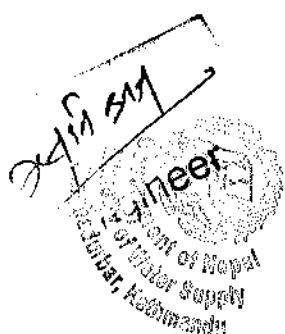
ii. Impact on water bodies and aquatic life

The measures to be taken are to mitigate the impacts are as follows;

- The effluent produced from the periodic backwashing of the filter plant, if discharged directly to the river course may cause harm to the water bodies and aquatic life especially during the dry season when the flow will be less. As the backwash water mainly contains suspended solids a small pond of 20,000 litres capacity will be constructed for decantation and will be drained off to the river/ stream course.
- To avoid the impact to aquatic life, the effluent and sludge will be disposed off only in designated areas and regular monitoring of the river or stream water quality will be done.
- Septic tanks will be built as per design of public toilets, and standard designs will also be provided to the household latrines.

iii. Impacts of operation of pumps and diesel generators

To mitigate the concern, under suitable condition governed by location of water source, the electro-mechanical components will be placed as practicably far as possible from the major settlements, say more than 200 meters far from the major settlement or market area. In addition to this, the specifications of pumps and generators have been worked out so as to meet also low noise and pollution emissions.



6.3 Mitigation measures for Cumulative Impacts

Measures to mitigate the adverse impacts during construction phase are based on source based monitoring of pollution sources, and coordination among offices while working in communities.

Mitigation measures of potential impacts of land use pattern and rapid urban growth would be rational land use planning of the municipality and the district, incorporating environmental management for sustainable growth.

6.4 Implementation of Mitigation Measures

Most of the mitigation measures specified will be incorporated as part of the contractual obligations during the project construction and therefore will be integrated into the project design and tender documents. By including mitigation measures in the contract monitoring and supervision of mitigation implementation will be covered under the normal engineering supervision provisions of the contract. The mitigation measures implementation will be monitored through direct observation, records of contractors, consultation with people etc weekly or daily as required.

a. Project Design for implementation

For most of the adverse environmental impacts likely to occur during project construction and operational phase, mitigation measures will be integrated in the design of the project itself so as to strengthen the benefits and sustainability of the project. This will enhance the mitigation measures in terms of specific mitigation design, cost estimation of the mitigation measure, and specific implementation criteria. The proponent will ensure that the mitigations measures are included in the design of the project.

b. Project Contract

The project contract will clearly specify the mitigations measures that are part of the project construction and the contractor will be bound by the parameters identified in the environmental assessment pertaining to specific mitigation measures. The proponent will ensure the compliance of the proposed measures from the contractor and the final acceptance of the completed work will not occur until the environmental clauses have been satisfactorily implemented.

c. Bill of Quantities

The tender instruction to the bidders will explicitly mention the site-specific mitigation measures to be performed, the materials to be used, labour camp arrangements and waste disposal areas, as well as other site specific environmental requirements.



The environmental impacts related to different project activities and its corresponding mitigation measures are tabulated in Table 6.2;

Table 6.1: Impacts and Mitigation Measures

Detailed Design			Included in Detailed Design cost
Selection of water supply source	Concerns over unsatisfactory raw water quality	Water quality sampling/testing, and its reconfirmation	
Design of alignment for pipe-laying	Disturbance/damage to communities structures/facilities	Place water pipes away from existing utilities during design. Under unavoidable cases, identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase Consultation with local authorities, offices like Division Road Office Provide budget for restoration/replacement of damaged utilities, and require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services	
Designing of source/tubewells & reservoirs	Risk of tapping of contaminated water, and Seismic risks like cracking of reservoirs	Choosing of treatment unit with comparative analysis of the treatment options Preparation and implementation of WSP to be planned Design all reservoirs and structures under the project as per appropriate seismic resistance	
Designing of treatment units	Health hazards arising from inadequate design of facilities for receiving, storing and handling of CI & other chemicals Delay in project due to absence of necessary statutory permits and approvals	Design has included a "housed" dosing unit. Standard operation methods has been prescribed in design	
Apply for relevant permits		Obtain Letters of Approval and agreement for: (i) temporary acquisition/easements of land and properties; (ii) disruption of water supply and other utilities; (iii) required permits from relevant authorities (e.g., Rapti Rural Municipality) prior to construction works; (iii) avoid tree cutting, and establish a requirement that if necessary, cut only trees that are marked and have been agreed from relevant authorities for removal; and compensatory tree plantation to be carried out at the rate of 25 saplings for each felled tree.	


Engineer

Construction			
Construct workforce camp establishment	Haphazard camps resulting in social stress and degradation of local environment	Establish workforce camps in designated sites only and in consultation with local community. All camps are to include sanitary facilities for men and women. Employ local people (and women in jobs and follow core labor standards) Equal pay for men and women	Civil works contract
Employment	Local people may be deprived of opportunities, minors may be employed		
Transportation of materials	Traffic congestion and public annoyance	Prepare and implement traffic plans to prevent traffic jams and annoyances to the public in coordination with relevant local authorities and communities.	Civil works contract
Dumping of waste in the river Construction of toilets in the camps	Water and land pollution; and	Provide designated areas with collection bins for wastes. Provide toilet facilities and prohibit open defecation.	Civil works contract
Storing of materials in the project area	Spillage/leakage concerns	Prohibit washing of vehicles next to rivers and streams. Proper storage of construction aggregates, hazardous and toxic materials, lubricating oils and used batteries in safe areas and the proper segregation and disposal of chemical containers, packaging materials, plastic bags etc. Fuel and lubricants will be stored in containers over well concealed surfaces which are at safe distance from any water bodies. Absorbent pads/mats will be placed at the stockpiles, workshops and campsites to control seepage during accidental spillage.	
Handling of toxic materials Dumping of excess material	OHS risks	Provide training to workforce on safe handling of toxic materials and OHS measures during construction.	Civil works contract
Movement of vehicles	Air quality deterioration and damage to existing roads	Dust suppression on roads or at open sites by sprinkling water as required at regular intervals. Routine monitoring of dust (total suspended particulates) to meet air quality standards; and limit vehicle speed. See that vehicles comply with the National Vehicle Mass Emission Standards, 2056 Maintenance works	Civil works contract 125,000
Earthworks	Engineer	Provide proper ventilation in confined working areas.	

Stockpiling of construction waste and construction materials		Covering of stacked spoil and soil Limit the time of temporary stacking of construction materials in residential and market areas Stockpiles to be maintained only at designated sites	
Movement of vehicles Operation of construction machineries and equipment Horn honking	Noise and vibration	Monitoring of noise levels regularly at site to meet the noise standards. Fit mufflers in vehicles to control noise. Limit the speed of vehicles and decreasing drop-heights Regular maintenance of equipment. Compensate and repair damages caused by vibration during construction activities.	50,000
Pipe laying	Land surface disturbance, Crop loss	Maintaining the land surface Vegetation protection, greenery promotion Pipe-laying will be conducted in coordination with Division Road Office	Included in BoQ
	Vegetation clearance	Crop compensation under avoidable critical conditions Avoid tree cutting. Obtain necessary tree cutting permits Plant tree saplings at the rate of 25 saplings for each felled tree Greenery promotion	150,000
	Disturbance to community Impacts to business activity including temporary relocation of vendors	Prior to construction, hold community meetings to inform them of construction works. Distribute project information. Advanced notice should be provided at least 1-2 weeks in advance.	225,000
			75,000

Pragatinagar
Municipality
Department of Water Supply and Sanitation
Pragatinagar, Bangalore
Karnataka
560002

Engineer

		Place WUSC phone hotline on signs in visible areas. Make community fully aware of grievance mechanism and provide contact info of PMO and ICG unit. Maintain access to avoid disturbance to residents and businesses by providing planks and leaving spaces for businesses and residents to maintain access. Manage traffic flows, conduct work at night where possible. Trenches open for only 1-3 days & works should be quickly completed. Avoid full street closure to fullest extent possible. Businesses losing income due to disturbance are compensated as per the resettlement plan. Temporary sites to be restored to natural and stable conditions as per agreement with land owner Proponent report in writing that temporary areas have been vacated and restored to pre-project conditions before acceptance of the works Provide employment opportunity to the affected people to the extent possible Assist vendors in shifting prior to construction and to return to original location when construction is complete in relevant sections Avoid disturbance to tourist areas	
Construction of project components	Reinstatement of community services and infrastructures	Compensate or reinstate/relocate community assets that are disturbed such as irrigation canals, electricity poles, telephone lines, drinking water pipes, sewerage lines, roads, etc. to the satisfaction of the people. Avoid disturbance to any historic/heritage buildings or structures by taking necessary precautions (work away from any heritage buildings, hand digging, no heavy equipment, etc.)	550,000
Influx of outside workforce, money and unwanted activities	Increase in crime and community stress	Prohibit gambling and alcohol consumption in contractors' campsites. Instruct the outside workforce to respect the local cultures, traditions, rights etc. Provide security in contractors' camps, and implement code of	

		conduct for the workforce	
Project activities relating to health and safety issues at work areas Traffic management at construction sites Employment opportunities, project activities in settlement	Health and hygiene (unsafe working conditions, accidents, fire hazard, transmission of communicable diseases etc.)	Ensure measures (fencing and/or barriers) to protect public from construction site. Provide regular health check-ups, proper sanitation and hygiene, health care, and control of epidemic diseases to the workforce.	
		Launch awareness programs concerning human trafficking and the possibility of spread of STDs and HIV/AIDS using brochures, posters, and signboards	100,000
		Make available first aid kits, and fire extinguishers in campsites Make available protection gears to all construction workers and compensate for the loss of life or any type of injuries Provide insurance to the workers and training in OHS and community health and safety. Ensure all work areas are clearly demarcated and marked and protect public from getting near to the trenches. Provide alternate potable water supply during maintenance works and notify the public in advance.	Civil works contract
	Traffic congestion (temporary disruption to local access due to open trenches, excavation across roads or road closures due to construction). Social disharmony; Sanitation issues, and gender issues	Develop and implement a traffic plan and road safety plan to minimize traffic flow interference from construction activities Coordinate with local authorities (police, municipality, local area committees, etc.) to manage traffic during construction period Provide advance public awareness and public notification of construction activities, schedule, routing, and affected areas including road closures Erect alternative routing signage in Nepali and English. Arrange for night time construction for activities in congested/heavy daytime traffic areas Arrange for onsite "grievance handling" through use of liaison officers Undertake trench closure and facilitate surface rehabilitation or paving as quickly as feasible Awareness activities for environmental conservation, WASH trainings; social safeguards meetings	50,000

and market areas				
Operational Phase				
Operation of the system; Operation of treatment units	Health and hygiene (unsafe working conditions, accidents, fire hazard, transmission of communicable diseases etc.)	Provide regular health checkups, proper sanitation and hygiene, health care, and control of epidemic diseases to the staff. Make available first aid kits in worksites Provide insurance to the workers and training in OHS and Community Health and Safety.	WUSC to manage for the provisions	
Operation of the system	Health risks due to contaminated water	Conduct regular monitoring of water quality from treatment plants to ensure water delivered to public meets national standards Conduct regular O&M of the system; provide alternate potable water supply during maintenance works and notify the public in advance Develop and Implement Water Safety Plan and promote Hygiene Behaviours, Total Sanitation	75,000 WUSC to manage for the provisions WSP cost is incorporated in the Civil Contract	

Total of NRs 1,500,000 has been provisioned for the implementation of the EMP activities.



Signature
Engineer



7. ENVIRONMENT MANAGEMENT PLAN

7.1 Objectives of Environment Management Plan

The purpose of the Environmental Management Plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assignment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with. This EMP will be included in the BoQ of the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. The contractor will be required to conduct the Prior Site Assessment in regards to the safety and actual site conditions, and need to take records of site conditions before contractors mobilized to the site and start construction work. The contractor needs to prepare a site specific EMP by its own, and as per the EMP (S-EMP) of the IEE report. The contractor will have to submit the S-EMP to the RPMO/consultant, and needs to have approval of the same. A copy of the S-EMP and EMP will be kept at the project office of the contractor at all times. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

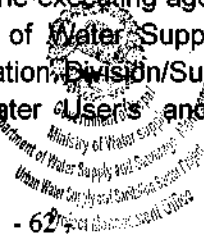
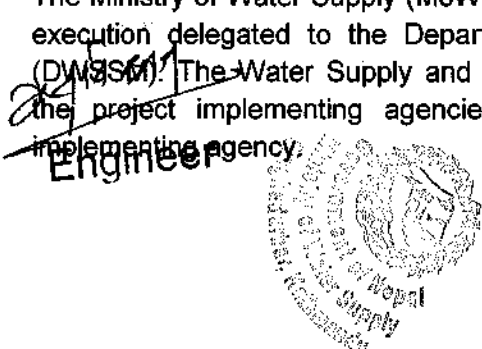
The basic objectives of the EMP are to;

- to ensure that all mitigation measures and monitoring requirements will actually be carried out at different stages of project implementation and operation - pre-construction, construction and operation and maintenance;
- to recommend a plan of action and a means of testing the plan to meet existing and projected environmental problems;
- to establish the roles and responsibilities of all parties involved in the project's environmental management;
- to describe mitigation measures that shall be implemented to avoid or mitigate adverse environmental impacts and maximizing the positive ones;
- to ensure implementation of recommended actions aimed at environmental management and its enhancement; and
- to ensure that the environment and its surrounding areas are protected and developed to meet the needs of the local people, other stakeholders and safeguard the interests of the common people.

A Safeguard Unit within the project should be established and be headed by a senior environmental expert, a sociologist and a legal expert with adequate support staff.

7.2 Institutional Arrangement

The Ministry of Water Supply (MoWS) is the executing agency with responsibility of project execution delegated to the Department of Water Supply and Sewerage Management (DWSSM). The Water Supply and Sanitation Division/Sub-division Office (WSSDOs) are the project implementing agencies. Water Users and Sanitation Committee is the implementing agency.



The key responsibilities of the executing and implementing agencies are as follows;

Prior to construction:

- The MoWS will depute a qualified staff to act as the Environmental Safeguard Officer of the Project management office (PMO).
- The MoWS will establish the grievance redress mechanism, including setting up the Grievance Redress Committee.
- The Water Supply and Environmental Division of the MoWS will be responsible for reviewing and approval of the IEE Report.
- The DWSSM will review the IEE Report prepared by the Design, Supervision and Management Consultant Team's Environmental Safeguard Expert (DSMC-ESE) prior to forwarding this to MoWS.

The DWSSM will prepare the ToRs for the Environmental Safeguard Specialist that will engage to support the PMO and for the Environmental Safeguard Specialists of the two Design, Supervision and Management Consultants that will be appointed to prepare the projects

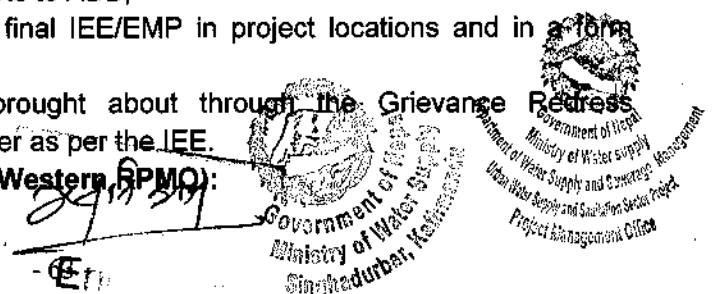
7.3 Safeguard Implementation Arrangement

Project Management Office (PMO):

The safeguard officers (environmental safeguard officer and social safeguard officer) of the PMO will receive support from safeguards experts (environmental and social) of the DRTAC as specified below;

- (i) Confirm existing IEE/EMP is updated based on detailed designs and is prepared in accordance with the EARF and government rules;
- (ii) Confirm whether EMP is included in bidding documents and civil works contracts;
- (iii) Provide oversight on environmental management aspects of projects and ensure EMP is implemented by Western RPMO and the contractor;
- (iv) Establish a system to monitor environmental safeguards of the project including monitoring the indicators set out in the monitoring plan of the EMP;
- (v) Facilitate and confirm overall compliance with all government rules and regulations regarding site and environmental clearances as well as any other environmental requirements as relevant;
- (vi) Supervise and provide guidance to the RPMO to properly carry out the environmental monitoring and assessments as per the EARF;
- (vii) Review, monitor and evaluate the effectiveness with which the EMP is implemented, and recommended necessary corrective actions to be taken as necessary;
- (viii) Consolidate monthly environmental monitoring reports from RPMO and submit semi-annual monitoring reports to ADB;
- (ix) Ensure timely disclosure of final IEE/EMP in project locations and in a form accessible to the public; and
- (x) Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEE.

Regional Project Management Office (Western RPMO):



The regional DWSSM engineer and social development officer of the RPMO will receive support from; (i) the PMO safeguards officers (environmental and social); and (ii) the safeguards specialists (environmental and social), the social mobilizer and environmental management plan (EMP) monitor of the design, supervision and management consultant (DSMC) teams as specified below;

- (i) Prepare new IEE/EMP in accordance with the EARF and government rules;
- (ii) Include EMP in bidding documents and civil works contracts;
- (iii) Comply with all government rules and regulations;
- (iv) Take necessary action for obtaining rights of way;
- (v) Oversee implementation of the EMP including environmental monitoring by contractors;
- (vi) Take corrective actions when necessary to ensure no environmental impacts;
- (vii) Submit monthly environmental monitoring reports to PMO, and;
- (viii) Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEE.

Civil Works Contract and the Contractor:

EMP is to be included in bidding and contract documents and verified by the PMO and RPMO. The contractor will be required to designate an environment supervisor to ensure implementation of EMP during civil works. Contractor needs to carry out all environmental mitigation and monitoring measures outlined in their contract. The government will ensure that bidding and contract documents include specific provision requiring contractors to comply with all; (i) applicable labor laws and core labor standards on (a) prohibition of child labor as define in national legislation for construction and maintenance activities, (b) equal pay for equal work of equal value regardless of gender, ethnicity or caste (c) elimination of forced labor; and (ii) the requirement to disseminate information on OHS to employee/s and local communities surrounding the project site.

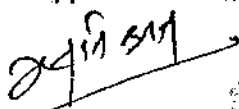
Capacity Building:

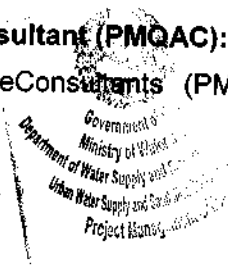
The DRTAC safeguards experts (environmental and social) will be responsible for training the; (i) PMO's safeguards officers (environmental and social); (ii) RPMO's engineers and social development officer. Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as below;

- (i) Sensitization;
- (ii) Introduction to environment and environmental consideration in water supply and wastewater projects;
- (iii) Review of IEE and integration into the project detailed design;
- (iv) Improved coordination within nodal departments; and
- (v) Monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites.

Project Management and Quality Assurance Consultant (PMQAC):

The Project Management and Quality Assurance Consultants (PMQAC) will provide support to the PMO in the following areas:


Engineer



- ensure that the quality of the designs and construction of all water supply and sanitation components implemented under the project are to the required standards; and
- assist the PMO with the overall planning, implementation and monitoring of the project during all stages of implementation including adherence to all environmental and social safeguards' requirements.

Water Users and Sanitation Committees (WUSC):

WUSC is the eventual operator of the completed project. The key tasks and responsibilities of the WUSC are, but not limited to;

Prior to construction

- Facilitate public consultation and participation, information dissemination and social preparation.
- Provide available data to the DSMC-ESS during the conduct of the IEE
- Assist in securing the tree-cutting permit and/or registration of water source.
- Participate in the capacity development program.

During construction

- Assist in the observance of the grievance redress mechanism.
- Actively participate in the monitoring of Contractor's compliance with the IEE and its EMP and the conditions set out with Government's approval of the IEE Report.
- Facilitate public interactions, as necessary.

During operation

- Implement the EMP and the Water Safety Plan.
- If applicable, actively work with the engaged licensed and accredited laboratory in water quality monitoring.
- Prepare the environmental monitoring report as per IEE.
- Ensure observance of the grievance redress mechanism.

Licensed and accredited laboratory

It is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring in the first few years of operation and to train the WUSC on the same. The laboratory will ensure that while carrying out the water quality monitoring as prescribed in the National Drinking Water Quality Standard and its Directives, 'hands-on' training is provided to the WUSC

7.4 Environmental Management Plan

The mitigation measures for the potential impacts that are predicted in the Chapter 4 of this report need to be planned to be implemented at right time and to make it clear who does it. Its monitoring and its reporting is also very important. Thus this chapter will provide a management plan, and a monitoring plan. A total of NRs 15,00,000 has been allocated for implementation of activities under this EMP. Table 7.1 below presents the details EMP for this project;

Engineer

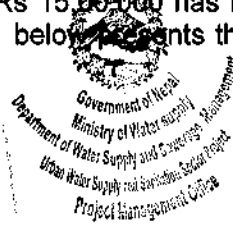


Table 7.1: Environmental Management Plan

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
1. Prior to Construction Activities					
Consents, permits, clearances, no objection certificate (NOC), etc.	Failure to obtain necessary consents, permits, NoCs, etc can result to design revisions and /or stoppage of works	- Obtain all of the necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. - Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. - Include in detailed design drawings and documents all conditions and provisions if necessary	PMO, RPMO, & DSMC	Incorporated in final design and communicated to contractors	Prior to award of contract
Existing utilities	Disruption of services	- Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction - Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. - Require contractors to prepare spoil management plan	DSMC, RPMO	List of affected utilities and operators; Bid document to include requirement for a contingency plan for service interruptions (for example provision of water if disruption is more than 24 hours).	During detailed design phase
Drinking water supply	Extraction of unsatisfactory raw water quality Delivery of unsafe water to the distribution system	- During the detailed engineering design stage, water sample from existing tube well was tested. Total hardness and total alkalinity are significant. Although the water quality is found to be suitable as per NDWQS, the deposition of calcium in the pipe may be likely to occur due to high concentration of hardness and alkalinity. - The water treatment system consisting of pressure filter, softening and disinfection is recommended. This IEE proposes "hands on" training by a licensed & accredited laboratory for the first two years of operation under the Water Safety Plan included in the project design & continuing training thereafter.	PMO, RPMO & DSMC	Incorporated in final design and communicated to contractors	Prior to award of contract
Sanitation (Toilets and septage disposal)	Contamination of drinking water source and other environmental receptors from household and community toilets Risk to public and environmental health due to	- The design of toilets includes septic tanks that are designed as per national standards and codes to allow for maximum retention of septage. This includes ensuring septic tanks are sealed and water tight. Toilets will be established at least 30m downstream of the drinking water source. - The septage disposal pit (similar to sludge drying bed technology) is to be designed and constructed in accordance to international best	PMO, RPMO, & DSMC	Incorporated in final design and communicated to contractors	Prior to award of contract

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	inappropriate siting and design of seepage disposal pit	practice and acceptable standards (e.g US EPA standards etc). This includes: (i) locating disposal pits at least 300m away from the nearest dwelling, and 30 m downstream of the drinking water source; (ii) pits are to be only established in relatively flat land with no more than 8% slope; and (iii) site selected for establishment of pits should not be where food crops are grown. The sanitation condition will be maintained to deter flies, mosquitos, and other vectors for breeding, free from odor and aesthetically pleasing. A proper seepage management shall be developed and followed.			
Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	- Determine locations prior to award of construction contracts	DSMC, RPMO	List of selected sites for construction work camps, stockpile areas, storage areas, and disposal areas. Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	During detailed design phase
Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	- Mechanism of safe disposal will be developed in the project site before the actual commencement of work	Contractor	Contractor records, visual inspection	During detailed design phase
EMP Implementation Training	Irreversible impact to the environment, workers, and community	Project manager and contractors should undergo EMP implementation including spoils management for construction works; standard operating procedures (SOP) for construction works as it is a method of identifying a work process and breaking it into the specific step by step procedure needed to successfully execute the process right from the beginning and result to greater quality via conforming to proven steps therefore, the written SOP provide instruction for less experience workers and benefits to the contractor is it serves as a benchmark for all workers on how a work process is to be completed; health & safety (H&S), Labor Act (2017), applicable environmental laws, etc.	PMO, RPMO and DSMC, Contractor's Environmental Supervisor	Record of completion (safety/sanitation Compliance Orientation)	During detailed design phase prior to mobilization of workers to site



[Signature]

Engineer

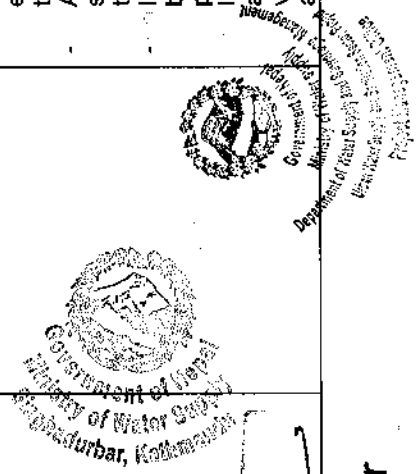
Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
2. During Construction Activities					
A. Physical Characteristics					
Topography, geology landforms, geology and soils and/or river morphology and hydrology	Excavation works may degrade surface land state. Impacts are possible in the public land at Sidhanath tole beside the open space of Thapachaur where the core construction works are planned.	Excavations works should be carried out only after approval from the Supervision Consultant and after approval from the local authorities. Soil erosion will be minimized by taking precautionary measures such as: excavated soil will be reused and proper backfilling of the trenches will be done and the excavated soil will be placed properly against erosion. Aggregates should be bought only from the authorized suppliers.	Contractor	Records of potential areas of soil erosion; transmission mains and distribution pipelines core area	Monthly by RPMO Weekly by DSMC-ESE
Community facilities	Aggregates use Damage to existing facilities (like drains, compound walls and pavements) An open shed built for selling of local agricultural products will be relocated/compensated	Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the project sites. Prior permission shall be obtained from respective local government for use of water for construction. Use of water for construction works shall not disturb local water users. If construction work is expected to disrupt, users of community shall be served 7 days in advance and again 1 day prior to start of construction. Ensure any damage to properties and utilities will be restored or compensated to pre work conditions. A new community block/unit will be built at suitable site nearby the existing location	Contractor	List of any public or private infrastructure disturbed by the proje project works Minutes with the locals	Weekly prior-inspection to know if there could be any such cases As per need, field-inspection if any such case is foreseen
Water bodies and water quality	Pollution of water bodies, contamination of water sources due to waste disposal, transport of sediments, effluent disposal, leakage/disposal of oil and grease from construction campsites	All earthworks must be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. Location for stock yards for construction materials shall be identified at least 300m away from water courses. Place storage Areas for fuels and lubricants away from any drainage leading to water bodies Take all precautions to prevent entering of waste water into streams, watercourses, or irrigation system. Install temporary silt traps or sediment basins along the drainage leading to the water bodies. While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or	Contractor	Water quality of the surface and ground water sources Areas for stockpiles of fuels and waste lubricants and materials; Number of physical measures (like silt traps installed along trenches leading to water bodies)	Visual inspection by RPMO and DSMC-ESE on weekly basis Weekly field monitoring, and quarterly water quality monitoring



[Signature]
Engineer

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Ambient air	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon, monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites.	- appendage are disposed off in a manner that may block the flow of water of any watercourse - Water sprinkling at dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. - If re-surfacing of distributed roads cannot be done immediately, spread of crushed gravel over backfilled surfaces - Require trucks delivering aggregates and cement to have tarpaulin cover and maintain a minimum of 2 feet free board - Limit speed of construction vehicles in access roads to maximum of 30kph. - Ensure use of equipment and fuel complying with applicable emission standards	Construction Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy equipment and machinery with air pollution control devices; Certification that vehicles are compliant with air quality standards.	Visual inspection by RPMO & DSMC-ESS on monthly basis Weekly field monitoring, and biannual air quality monitoring
Acoustic environment	Construction activities will be on settlements along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment materials, and people.	- Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. - Plan activities in consultation with local administration so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. - Restrict noisy activities to daytime. - Minimize drop heights when loading and unloading coarse aggregates. - Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach. - Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufactures' specifications at all times. - All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent type generators (if required) - If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. - Identify any building at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.	Contractor	Results of monitoring noise levels (Maintain maximum sound levels not exceeding 80 decibels when measured at a distance of 10m or more from the vehicle/s) Number of complaints from sensitive receptors;	Inspection by RPMO & DSMC-ESS on monthly basis, and as required additionally

[Signature]
Engineer



Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Waste disposal	Pollution of water and land resources, and cases of vector borne diseases due to haphazard waste disposal	- Waste minimization and waste segregation will be prioritized based on 3R principles - Practices of composting will be promoted - Containment of hazardous waste will be carried out - Prohibition of unwanted littering and discharge of waste. - Municipal disposal site will be used for final disposal	Contractor	On-site situation in campsites and its vicinity	Monthly monitoring by RPMO & DSMC-ESS
B. Biological Characteristics					
Vegetation	Loss of vegetation cover during construction works and laying of the pipelines	- Greenery promotion around the construction sites and road alignments where possible - Tree felling will be avoided, and if any such cases occur, prior approval from the local bodies will be received and compensatory plantation @ 1:10 will be carried out - Trees of local economic value and aesthetic significance will be planted under compensatory plantation - Locally demanded plants like <i>Camphor trees</i> will be promoted	Contractor	Area of greenery that has been cleared Number of trees cut (only if unavoidable) Complaints or grievances by the locals	Weekly monitoring by RPMO & DSMC-ESS
Impacts on Fauna	There could be some disturbances to local and migratory birds, reptiles and mammals No major impacts on animals area expected	- No heavy vehicles will be made available to run on the road that may disturb the wildlife of the area - Horn prohibited sign will be placed in nearby wildlife inhibited area - Code of conduct will be developed and implemented for the workforce to prohibit them from any wood logging, hunting - Other mitigation measures include: (i) installing clear signage to direct traffic movement in sites; (ii) designating stockpiling areas; (iii) providing alternative fuel to workers for cooking.	Contractor	Vehicles running nearby wildlife inhibited area will be monitored; Number of complaints from sensitive receptors on disturbance of poaching fishing, etc.	Visual inspection by RPMO & DSMC-ESS on monthly basis
Aquatic ecosystem	Disposal of slurry from treatment plant directly onto water bodies, disposal of water on or nearby water bodies, sediment transport and leakage/disposal of hazardous waste may harm the aquatic lives in the rivers/streams of project area	- Only sedimented back-wash will be disposed to rivers - Disposal of vehicles on local rivers (<i>Dotal river</i> and <i>surface water bodies</i>) will be restricted - Disposal of waste of any kind on water bodies will be strictly prohibited - Fishing in rivers will be prohibited for workforce	Contractor	Local streams and rivers will be monitored; Any grievances from locals regarding disposal of waste onto water bodies will be referred	Visual inspection by RPMO & DSMC-ESS on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
C. Socioeconomic Community activities	The construction related activities that generate dust, noise and impede access will disturb the local residents	- To minimize the disturbances, construction work will be conducted as quickly as possible. - The local residents will be consulted and informed about the work schedule and possible disturbances in advance. - Temporary diversions and signboards will be provided for the pedestrians.	Construction contractor	Time schedule of construction work; Information related to construction activity to local residents; Number of temporary diversions, signboards etc.	Visual inspection by RPMO & DSMC-ESS on weekly basis
	Social harmony	- A Code of Conduct will be developed for the workforce - Local people should be given priority to work (recommended that more than 60% local workers whenever available) in the project which helps to minimize the chances of cultural discrepancy and conflict due to increased labor from outside.	Construction contractor	Daily entry-sheet of the workforce in the campsites; Number of local people versus outside workers in the project area will be regularly monitored	Inspection at campsites by RPMO & DSMC-ESS on monthly basis
Occupational Health & Safety	During the construction work, the laborers involved in the construction activities may be exposed to different level of health risks and are prone to accidents	- A site Health and Safety Plan will be prepared encouraging use of safety measures (PPEs) such as mask, helmet, hand gloves and rubber boots. - The laborers will be insured for their health and safety. - Provide safe drinking water for laborers - Workers working at height above the ground especially during the construction will be provided with safety gears. - First aid box will be kept at a proper and easily accessible place. - The child labour will be totally prohibited from all the constructional activities. - There will be no discrimination in wage for male and female workers in the project	Construction contractor	Site-specific H&S Plan, Equipped first-aid stations, Medical insurance coverage for workers, Number of accidents, Campsite standards, Record of H&S orientation trainings, Availability of personal protective equipment at construction site, Signage for storage and disposal areas, Condition of sanitation facilities for workers	Visual inspection by RPMO (monthly) and DSMC-ESS on weekly basis.
	Community Health & Safety Hazards	- Contractor's will maintain adequate space and adequate lighting, temporary fence, barriers and signage at campsites; - Construct gender friendly toilet for labours - Children will be prohibited from active construction sites. - Proper fencing of stockpile and cement campsites will be done. - Awareness programs on communicable diseases and hygiene practices will be carried out and signage will be placed at project location	Construction contractor	Number of permanent signs, barricades and flagmen on worksites as per Traffic Management Plan (Annex 2-C); Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at project location	Visual inspection by RPMO & DSMC-ESS on weekly basis

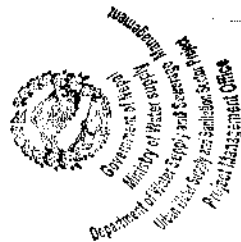
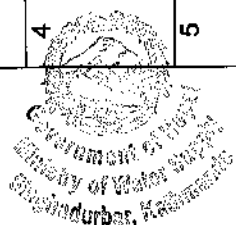
Engineer

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	construction workers Krishna Secondary School is near the site of Kalapani sub-system, and this needs to be well taken care of	GRM will be formed & implementation of the GRM will be made mandatory Coordination with School Management Committee (for placement of safety nets, safety sign-boards, barricades, etc)			
Resettlement, and relocation compensation issues	There is no any resettlement or relocation issue. Unforeseen/unavoidable small-scale cases of compensation may arise for disturbance on existing facilities	- Any disturbance or damage to local facilities or properties will be well recorded - Any relocation needed will be addressed properly and timely - Any compensation required will be paid through WSUC's coordination	Contractor/WSUC	Records of any grievance from the locals regarding any disturbance or damage on public or private properties	During O&M of the system.
D. Historical, Cultural, and Archaeological Characteristics					
Physical and cultural heritage	Project area holds no archaeological, paleontological, or architectural sites of heritage significance A temple (Shivalaya temple) is situated nearby the proposed site. Disturbances may occur during construction period	- If by chance any such findings are spotted or suspected, the contractor will immediately stop work to allow further investigation - Proper fencing will be provided to isolate the project site from the temple area, and adequate route for the visitors and local passer-bys will be maintained so as to minimize any disturbance to local cultural practices	Contractor	Records of chance finds	Visual inspection by RPMO and DSMC-ESS on quarterly basis.
During Operation and Maintenance Phase					
Exposure to chemicals	Excessive exposure to chlorine, hypochlorous acid, and hypochlorite ion generally results in irritation of the oesophagus, a burning sensation in the mouth and throat, and spontaneous vomiting The effluent produced from the periodic backwashing of the filter plant, if discharged directly to the river course may cause harm to the water bodies and aquatic life especially during the dry season when the flow will be less.	(i) All disinfection chemicals require proper storage and handling practices; (ii) providing safe storage for chemicals; (iii) ensure that the person is hired, with knowledge of chlorine use for disinfection process during operation; (iv) Ensure use of PPE while using chemicals; (v) Use of chlorine guideline as per WHO A settling tank is provided for decanting of the slurry from the effluent during backwash	WSUC	Water quality test	
Water bodies			Contractor	Effluent status	For first year, DSMC After that WSUC every six months

Department of Water Supply
Pragatinagar, Haldwani

Sink-based monitoring						
SN	Field and Source	Stages/Phases	Parameters	Location	Frequency	Standards
1	Monitoring in residential areas	Construction	Air quality; noise levels	Residential areas along pipelines	Monthly	NAAQS 2003, WHO Guideline values
2	Monitoring in religious sites/markets	Construction	Air quality; noise levels	Religious sites/markets areas along pipelines	Monthly	NAAQS 2003, WHO Guideline values
3	Monitoring in surface water sources	Construction	Water quality SW disposal	Rivers/streams within 500 m of project components/units	Six monthly	NDWQS 2005
4	Monitoring in proposed drinking water sources	Pre-construction, Construction and Post-construction	Water quality	Sources/identified for the project	Quarterly	NDWQS 2005
5	Public/Open spaces	Construction	Greenery Promotion	Open spaces within the service wards	Quarterly	Contract Specifications
						Joint Monitoring Team (Biannually by RPMO/PMO)

Monitoring of the environmental compliances during construction and operation phases will be source based monitoring, and monitoring of the environmental impacts will be sink based monitoring.



[Signature]
Engineer

7.5.1 Environmental Monitoring Cost

The cost of regular monitoring works will be inbuilt in the EMP and the civil work's contract of the contractor. Other monitoring will works will have additional costs for involvement of a authorized team. The project level monitoring team will submit its report to MoWS. Total cost of environmental monitoring (field visits, observation, review of reports and report preparation) is estimated NRs. 335,000.

Table 7.3: Environmental Monitoring Cost

Item	Quantity	Unit Price (NRs.)	Total (NRs.)
Team Leader/Environmental Specialist	1	75,000	75,000
Water Resource Engineer	½	60,000	30,000
Socio-economist	½	60,000	30,000
Cost of Monitoring by MoWSS	1	50,000	50,000
Support staff	1	25,000	25,000
Transportation cost		LS	75,000
Report preparation & sampling/lab. Test		LS	50,000
Total			335,000

7.5.2 Types of Monitoring and Monitoring Parameters

Monitoring is an ongoing component of the environmental assessment process and subsequent environmental management and mitigation activities. There are basically three types of environmental monitoring;

Baseline Monitoring - It is done if the project is not going to be implemented recently (in this project not required)

Compliance Monitoring - It verifies whether contract environmental clauses and the mitigation measures are properly implemented in the field.

Impact Monitoring - It confirms whether the environmental mitigation measures specified in the project design and contract are correctly formulated.

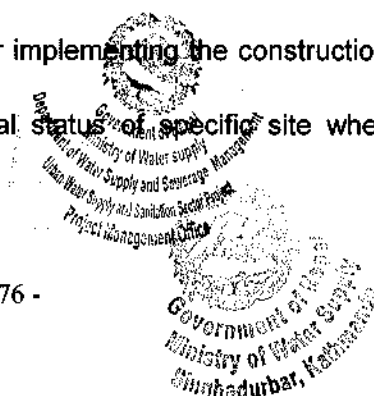
The nature and purpose of environmental monitoring will be different in the pre-construction, stage, construction stage and operation stage of the project.

Pre-construction Stage

Monitoring at this stage of project is to:

- Confirm that plan, route selection and design of the road has considered the recommendation made by IEE
- Judge the level of preparation for implementing the construction related mitigation, and
- Prepare up-to-date environmental status of specific site where the impacts are assessed to be significant

Engineer



Construction Stage

This stage of monitoring is to check compliance with the best practices, norms and standards and on implementation of the mitigation measures prescribed by IEE. The following parameters will mainly be focused on:

- i. Disposal of spoil and construction wastes and its consequences
- ii. Disruption of natural water courses, drainage work and its consequences
- iii. Slope protection measures
- iv. Loss, stratification or degradation of forest vegetation
- v. Care, sensitivity or disruption of community infrastructures
- vi. Loss or degradation or threat to private properties
- vii. Care, sensitivity or disruption to cultural sites

Operation Stage

- i. The monitoring in this stage is mainly related to road features, road induced activities and their impacts on receiving environment. The following parameters are mainly monitored during operation stage:
- ii. Drainage structures, their outfall and damage to private properties, community properties and natural resources
- iii. Effectiveness of the slope protection and soil erosion measures
- iv. Encroachment into road side, public land, forest or marginal land
- v. Status of waste disposal sites
- vi. Road accidents
- vii. Symptoms of emergence of road side settlements, changes in agricultural pattern
- viii. Activities of road neighboring communities
- ix. Illegal felling of trees and hunting of wildlife

7.6 Institutional Capacity Development Program

Considering the limited capability of the project's key players in environmental management, technical assistance from environmental specialists and capacity development during loan implementation will be needed. Capacity development will consist of hands-on training in implementing the responsibilities in EMP (as well as in EARF) implementation, complemented with a short-term series of lectures/seminars on relevant topics.

WUSC does not have the capacity to monitor the quality of supplied water as prescribed in the NDWQS and its Directives. Although monitoring kits and laboratory rooms will be provided, this would not guarantee WUSC can handle monitoring appropriately. DWSSM has five regional laboratories; however some are not functioning fully due to lack of human resources. Considering that public health is a critical concern associated with water supply, it is recommended that a licensed and accredited laboratory be engaged to conduct water quality monitoring for at least the first 2-3 years of operation with WUSC actively participating to develop its capacity. Water quality monitoring should be carried out in such a way that WUSC will be "learning by doing". After the engagement period, there should be continuing periodic training of new persons to ensure that the capacity of WUSC is sustained. The cost for monitoring during operation is based on the assumption that a licensed laboratory will be engaged for both the monitoring requirements and to train WUSC. A Water Safety Plan is included in subproject design and will oblige the operator to carry out water quality

Engineer
Government of Nepal
Ministry of Water Supply
Sanitation and Sewerage
Kathmandu

Ministry of Nepal
Ministry of Water supply
Sanitation and Sewerage Management
Water Supply and Sanitation Sector Project
Project Management Office

monitoring accordingly. There will be sufficient fund to include training by the licensed and accredited lab, while monitoring water quality.

The contractor will be required to conduct environmental awareness and orientation of workers prior to deployment to work site. The proposed training project along with the frequency of sessions is presented in Table 7.4. The Environmental Safeguard specialist & EMP Field Monitoring Staffs are responsible for organizing different training program for Environmental Management.

Table 7.4: Training Program for Environmental Management

Items	Pre-construction/prior to construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and GON and how the project will meet these requirements	To build the capacity of the staffs for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and GON	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	Module 1: Orientation • ADB Safeguards Policy Statement • Government of Nepal Environmental Laws and Regulations Module 2: Environmental Assessment Process • ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements • Review of environmental assessment report to comply with ADB requirements • Incorporation of EMP into the project design and contracts	• Roles and responsibilities of officials/contractors/consultants towards protection of the environment • Environmental issues during construction • Implementation of EMP • Monitoring of EMP implementation • Reporting requirements	Experiences on EMP implementation – issues and challenges Best practices followed
Duration	1 day	1 day	1 day on a regular period to be determined by PMO, ICGs, and (provide if DRTAC or DSMC)
Participants	Executing and implementing agencies, PMO, and PMO staff (technical and environmental) involved in the project implementation	PMO ICGs Contractors	PMO ICGs Contractors

24/11/19
Engineer



	Particulars	Stages	Unit	Total Number	Rate (NPR)	Cost (NPR)	Cost covered by
							liability period
F	Expert Monitoring Costs						
	Environmental Specialist			1 MM	100,000	100,000	PMO cost
	Sociologist			1 MM	75,000	75,000	
	Support staff			2 MM	25,000	50,000	
	Cost of monitoring visit by MoWS/DWSSM					200,000	
	Transportation and logistics					75,000	
TOTAL						3,800,000	

The EMP will be included in civil work bidding and contract documents. The cost of NRs 1,500,000 will be included in the contract document to ensure implementation of EMP works.

7.8 Implementation Schedule

Environmental management will be implemented from the detailed design phase through to procurement, construction and operation. Table 7.6 presents the indicative time frame of key EMP activities in relation to subproject implementation schedule.

Table 7.6: Environmental Management Implementation Schedule

SN	Activity	Indicative Time Frame
1	PROJECT IMPLEMENTATION	
	Detailed Design & Bidding Documents	Q2 Y0
	Procurement	Q3 Y0
	Construction	Q4 Y0 – Q4 Y2
	Contractor Operating Period	Q3 Y2 – Q4 Y3
	Handover to WUSC for Operation	Q3 Y3 – Q1 Y4
	Defects Liability Period	Q3 Y2 – Q4 Y4
2	ENVIRONMENTAL MANAGEMENT	
2.1	Overall	
i	Design Review and Technical Audit Consultant (DRTAC)-Engagement of Environmental Specialist	Starting Q4 Y0 (5 yrs of intermittent inputs)
ii	PMO's submission of Environmental Monitoring Report (EMR)	
iii	Monthly EMR for subproject's Monthly Progress Report	8 th day after effective month
iv	Semi-Annual EMR during construction for submission to ADB	8 th day after effective 6-month period
v	Annual EMR for submission to ADB	8 th day after effective year
2.2	Prior to Construction Mobilization	
i	Finalization of EMP, (if applicable) revision of IEE	Q2 Y0
ii	ADB review & approval of revised IEE & EMP.	Q 2 Y0
iii	Obtaining Government's approval of IEE Report	Q2 Y0 – Q3 Y0
iv	Community preparation (including disclosure of Final IEE & its EMP)	Q4 Y0

SN	Activity	Indicative Time Frame
V	Establishment of baseline data (as set out in the EMP)	Q4 Y0 (shall have been done prior to award of contract)
Vi	Preparation of C-EMP by selected Contractor, review of C-EMP against SPS-compliant EMP.	Q4 Y0, before Notice to Proceed is given
2.3	Construction Period	
	Mobilization to Demobilization	
i	Implementation of mitigation measures and conduct of environmental effects monitoring following the C-EMP.	Q4 Y0 – Q4 Y2
ii	Submission of Environmental Monitoring Report (EMR)	Q4 Y0 – Q4 Y2
	- Monthly, by Contractor	5 th day of the month following the effective month
	- Quarterly, by Contractor or by Licensed Laboratory	3 rd day of the month following the effective quarter
2.4	Operation Period (potentially could start even before DLP is over)	
i	Implementation of mitigation measures & monitoring activities as specified in the EMP	Starting anytime between Q3 Y3 & Q1 Y4
ii	Submission of EMR	Anytime between Q3 Y3 & Q1 Y4
	Monthly, by Operator	5 th day of the month following the effective month
	Quarterly, by Operator or (if applicable) by Licensed Laboratory	3 rd day of the month following the effective quarter

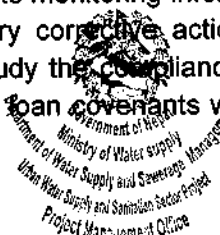
Note: Y0 = Design Year; Y1 to Y4 = Year 1 to Year 4 from start of Construction Contract

7.9 Monitoring and Reporting

RPMO will monitor and measure the progress of EMP implementation. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the IEEs for the projects. In addition to recording information on the work and deviation of work components from the original scope PMO, ICGs will undertake site inspections and document review to verify compliance with EMP and progress toward the final outcome.

RPMO will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in Annex 2-E. Subproject budgets will reflect the costs of monitoring and reporting requirements. For the projects likely to have significant adverse environmental impacts during operation phase, reporting will be continued at bio-annual & annual basis. Monitoring reports will be posted in a location accessible to the public.

For subprojects likely to have significant adverse environmental impacts, PMO will retain qualified and experienced external experts to verify its monitoring information. PMO-ESS will document monitoring results, identify the necessary corrective actions, reflect them in a corrective action plan, and for each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by the PMO-ESO, with support from the PMO-ESS



The contractor will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The contractor needs to conduct regular monitoring of environmental status, compliance and standards in its working sites and campsites. This needs to be included in monthly reporting to the Consultant in the format prescribed by the consultant. The Contractor shall facilitate for field visits in any and all monitoring activities planned by the Consultant, the Client and the ADB.

ADB will review project performance against the MoWS's 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. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

- (i) Conduct periodic site visits for projects with adverse environmental or social impacts;
- (ii) Conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
- (iii) Review the periodic monitoring reports submitted by EAs to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
- (iv) Work with EAs to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
- (v) Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

7.10 Information Disclosure, Consultation And Participation

Stakeholder consultations and local participation was an essential process in project preparation and IEE study. The process in engaging stakeholders and affected people involved key informant interviews, on-site discussions with WUSC, and random field interviews of stakeholders. Table 7.7 lists the persons consulted during the IEE Study.

Table 7.7: Lists of People and Institutions Consulted

SN	Name	Organization/Address
1	Mr Shantaram Sharma	President, Pragatinagar WUSC
2	Mrs. Bhima Acharya	Vice President, Pragatinagar WUSC
3	Mr Ohmnath Banjade	Secretary, Pragatinagar WUSC
4	Mr. Arjun Adhikari	Treasurer, Pragatinagar WUSC
5	Mr Bharat Prasad Pandey	Member, Pragatinagar WUSC
6	Mr Tuladhwoj Malla	Member, Pragatinagar WUSC
7	Mr. Thagendra Pariyar	Member, Pragatinagar WUSC)
8	Mrs Pratima Acharya	Member, Pragatinagar WUSC)
9	Mrs Nirmala Chaudhary	Member, Pragatinagar WUSC)
10	Mr Numa Nanda Subedi	Chairperson, Rapti Rural Municipality
11	Mr Lalit K Thapa	Chief Admin. Officer, Rapti Rural Municipality

Engineer

Government of Nepal
Ministry of Water Supply
Sanitation and Sewerage Management
Kathmandu

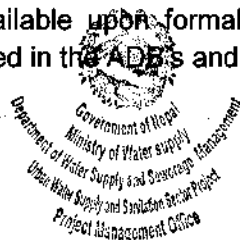
12	Mr Resham R Adhikari	Finance Section, Rapti Rural Municipality
13	Mr Damodar Pokharel	Secretary, Rapti Rural Municipality
14	Hemanta Chhetri	Assistant, Bhalubang Ddhyog Banijya Sangh
15	Mr Purna Bahadur Budhathoki	Chair, Sishaniya Udhyog Banijya Sangh

During the IEE preparation, consultations were undertaken. A formal public consultation was conducted on 22nd March 2019 at the meeting hall of the office of Rapti Rural Municipality in compliance with GoN's EPR requirements (Annex 5). Choosing of safe construction campsites and safety concerns in the proposed project sites during construction were raised as among the concerns during the public consultation. Stakeholder consultations will continue throughout the implementation of the subprojects and operation. All stakeholders must be invited and encouraged to participate in community consultations. To facilitate the engagement of stakeholders, the PMO and ICG will maintain good communication and collaboration with WUSC and the Rural Municipality. PMO, ICG, Contractors and/or WUSC will be open to the public to contact on matters concerning the progress of the subprojects, adverse impacts, mitigation measures and environmental monitoring and grievances. Future stakeholder consultations will be as follows;

- During the construction stage, if there would be a major change in design/alignment/location, the PMO and ICG will hold at least one public consultation meeting early on in the construction period to solicit perceived impacts, issues, concerns and recommendations from affected communities;
- Prior to construction, the PMO and ICG will conduct an intensive information, education and communication (IEC) campaign to ensure sufficient level of awareness/information among the affected communities regarding the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of the PMO and ICG, and status of compliance with the Government's environmental safeguard requirements, among others, are attained/provided. Billboards about the subproject, implementation schedule and contact details of the executing agency, PMO-ES, ICG-ESA and Contractors will have been set up at strategic locations within the subprojects' main areas of influence. The grievance redress procedure and details will have been posted at the offices of the ICG, WUSC and Rural Municipality;
- During construction, regular random interviews will be conducted by the ICG-ESA every month to monitor environmental concerns of subproject communities;
- During operation, periodic random interviews will be conducted by the ICG and WUSC to monitor the environmental concerns of subproject communities;

The public consultations and information disclosure will be continuous throughout the project cycle. Women participation from beneficiary community will be insured. PMO and ICG will be responsible for designing and implementing such aspects. The GoN-approved IEE Report (in English), will be available at the offices of the PMO, ICG and WUSC for the perusal of interested parties. Copies may be made available upon formal request. The IEE and environmental monitoring reports will be disclosed in the ADB's and UWSSP website.

24/11/2019
Engineer



7.11 Grievance Redress Mechanism

Purpose of the Grievance Redress Mechanism

The Grievance Redress Mechanism (GRM) is meant for persons seeking satisfactory resolution to their complaints on the social and environmental performance of the project. The mechanism, developed in consultation with key stakeholders, will ensure that: (i) the basic rights and interests of every person adversely affected by the social and environmental performance of a Project are protected; and (ii) their concerns are effectively and timely addressed.

7.11.1 Proposed Set Up

The MoWS, as the Project executing agency, will establish the GRM and its support system, including setting up the Grievance Redress Committee (GRC) at the project level. The GRC will comprise of the: (i) Chief of the WSSDO; (ii) members of the WUSC; (iii) two representatives of affected persons, a male and a female; (iv) a member of IP community, preferably female; (v) a representative of a non-government organization or community-based organization actively involved in IP development/other backward communities in the area, if any; (vi) local government representatives, i.e., Municipality and DCC; (vii) DSMC social safeguard expert; and (viii) DSMC environmental safeguard expert (ESE). The environmental safeguard assistant (ESA) of the ICG will oversee the implementation/observance of the mechanism for environmental complaints at the project level. He/she will be technically advised, supported and trained by DRTAC's environmental specialist and the DSMC ESE. PMO's Environmental Officer will oversee the implementation/observance of the GRM in all projects. Representatives of affected persons (APs), civil society and eminent citizens will be invited as observers during GRC meetings. Contractors and WUSCs (as Operators) will be required to designate their respective counterpart GRM staff.

The GRM will accommodate both informally- and formally-lodged, but Project-related, valid grievances. Informally-lodged grievances are those received by the Contractors during construction or WUSCs during operation. Formally lodged grievances are those received at the ICG office. The ICG, GRC and PMO maintain records of all grievances, informally- and formally-lodged, valid and invalid, and appealed. The ICG will immediately inform the PMO, as necessary, particularly when an appeal is made by an AP in court. PMO will in turn immediately inform the ADB of the same. The observance/implementation of the GRM will be reported by the: (i) ICG/ESA in the project's monthly progress reports, semi-annual project environmental monitoring report (EMR) during construction and annual project EMR during operation; and (ii) PMO EO in the Project's monthly progress report, semi-annual Project EMR during construction and annual Project EMR during operation.

Sufficient support system, including well GRM-oriented staff of Contractors and WUSCs, communication/documentation/recording and reporting system, funds, posters declaring contact details and displayed at strategic locations, among others, will be in place to sustain the effective implementation of the mechanism.

Engineer
Government of Nepal
Ministry of Water Supply
Sanitation and Sewerage Management
Pragatinagar Urban Water Supply and Sanitation Project
Project Management Office

7.11.2 Access to Mechanism

Any person who has environmental concerns/issues pertaining to the projects during detailed design, construction and operation phases will have access to the mechanism free of charge. The PMO EO and ICG ESA will ensure that:

- The public, especially the residents and regular passers-by, in the main areas of influence of the projects, are aware of their rights to access, and will have access to the GRM free of administrative and legal charges; and
- The GRM is fully disclosed prior to Notice to Proceed for construction is given: (a) in public consultations and social/community preparations, (b) through posters displayed in the offices of the ICG, Municipality, DCC and at strategic places within the main areas of influence of projects (posters to include names and contact details of the EO of the PMO and ESA of the ICG).

7.11.3 GRM Steps and Timeframe

Informal Approach: Informally, APs can lodge complaints directly to the Contractor during construction or Operator (WUSC) during operation. Contractor/Operator will document and screen the complaint immediately. If screening reveals the complaint as Project-related and valid, the Contractor/Operator will act on the complaint within three days from receipt of complaint. Otherwise, the Contractor/Operator will direct the AP with non-Project-related and/or invalid complaint to the ICG. The Contractor/Operator will secure a confirmation of completion of action from the AP. For at least a week after confirmation of completion, the ICG will monitor the effectiveness of the action/resolution taken. After which, ICG will secure a written confirmation of satisfaction from the AP. The Contractor/Operator shall report to the ICG all complaints received, eligible or ineligible, actions agreed on and taken and confirmation of completed action.

Formal Approach: If a complaint is eligible but is not acted on within three days from the receipt of the complaint, or if AP is not satisfied with the resolution undertaken by the Contractor/Operator, he/she can access the formal mechanism, as follows: (Figure 7.1).

i. First level of GRM

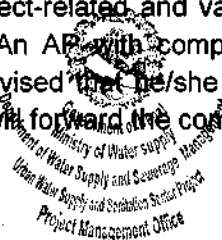
The access point will be the ICG. The steps are detailed below;

Step 1 Lodging a Complaint (Day 1)

AP lodges complaint with the ICG, verbally or in writing. ICG documents/registers lodged complaint, makes sure these are duly referenced and provides AP with a copy of the referenced complaint.

Step 2 Screening of Complaint (Day1)

ESA screens the complaint if it is Project-related and valid and informs the AP immediately of the screening results. An AP with complaint screened as non-Project-related and/or invalid will be advised that he/she may raise complaint to the second level of the GRM, and ICG will forward the complaint to the GRC.



Step 3 Investigations, Discussion and Agreement (Day 1)

ICG, together with the Contractor/Operator and AP, will investigate and discuss the complaint at the site. Agreement on actions and measures and time involved will be made with the AP. Agreement will be properly documented and filed; ICG, AP, Contractor/Operator will have copies.

Step 4 Implementing the Agreed Action

- If the required action is minor, i.e. not requiring further investigation and would be quick and easy to implement, the Contractor/Operator will immediately implement the agreed action. (Day 2/Day 3)
- If required action is major, i.e., requiring further investigation and/or procurement of supplies/parts, the Contractor/Operator will: (i) immediately provide the most suitable interim measure to reduce the magnitude of the impact (Day 2/Day 3); and (ii) start work on the major action within 5 days from discussion (or not later than Day 8 since receipt of complaint).
- AP will be advised by the ICG that his/her complaint may be raised to the second level of the GRM, if he/she so prefers when: (i) minor action is not implemented within 2 days from discussion; (ii) interim measure prior to major action is not implemented within 2 days from discussion; or (iii) major action is not started within 5 days from discussion.

Step 5 Confirmation of Completed Action

Contractor/Operator will secure a written confirmation of completed action from the AP and furnish the ICG a copy.

Step 6 Confirmation of Satisfaction (1 week after confirmation of completed action)

The ICG will monitor the effectiveness of the resolution for at least a week after receipt of confirmation of completed action from the Contractor/Operator. After which, ICG will secure a written confirmation of satisfaction from the AP.

ii. Second level of GRM

The AP will be notified by the ICG when complaint is forwarded to the GRC. The GRC will call for a hearing, if necessary, where AP can present his or her concerns or issues. The GRC will suggest corrective action/measure at the field level and assign clear responsibilities for implementing its decision within 7 days of receipt of complaint by GRC. If GRC decision is not acceptable to the AP, if the suggested corrective action/measure is not started within 7 days, the matter/AP will be referred to the third level.

iii. Third level of GRM

Third Level: The ICG will refer AP and its unresolved complaint or major issues to the PMO EO, who will act within 15 days.

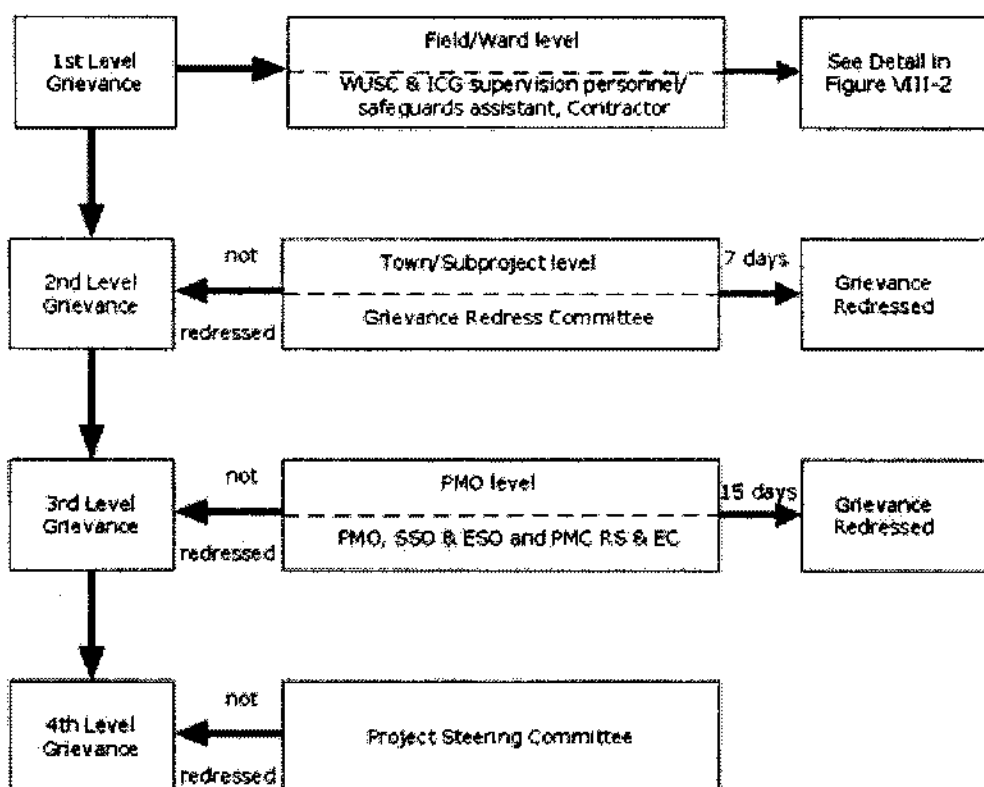
iv. Fourth level of GRM

Fourth Level: For extremely major issues that will go beyond the third level, these will be referred to the project steering committee (PSC), to be resolved within 30 days.

Environmental complaints (other than those that will involve the legal system) are expected to be mainly resolved at the second level, and to a lesser extent at the third level.

Despite the GRM, an AP will have access to the country's legal system at any stage. Accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Nepal Resident Mission. The complaint can be submitted in the country's language. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the GRM.

Figure 7.1: Grievance Redress Mechanism (Formal Approach)



ES - Environmental Specialist, ESO - Environmental Safeguards Officer, ICG - Implementation Core Group, PMC - Project Management Consultant, PMO - Project Management Office, RS - Resettlement Specialist, SSO - Social Safeguards Officer, WUSC - Water User and Sanitation Committee

7.11.4 Record Keeping and Disclosure

The PMO, GRC, ICG will keep records of all lodged and documented/referenced complaints, actions/resolutions taken, AP's written confirmations of completed action and satisfaction, complaints raised to higher levels and lessons learned. The number of grievances recorded and resolved and the outcomes will be displayed at the offices of WSSDO, ICG, PMO and WUSC and reported in the monthly progress reports, semi-annual EMR during construction and annual EMR during operation, submitted to ADB.

7.11.5 Periodic review and documentation of lesson learned

The PMO EO will do periodic review of the effectiveness 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 complaints.

7.11.6 Costs

All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) at local (field/ward/town) level will be borne by the concerned focal organisations at each level: WUSC at town level; RPMO at regional level and PMO at central level.



[Handwritten signature]
Engineer



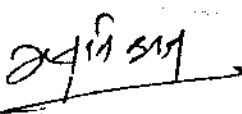
8. CONCLUSION

The water supply and sanitation project proposed under UWSSP in Pragatinagar Town is not an environmentally critical intervention. The IEE further concludes that;

- The project is not within or adjacent to any environmentally sensitive area and hence it is unlikely to cause any significant adverse impacts of flora and fauna.
- Since it is a development intervention, there will be some adverse impacts on the local environment. However, the extent of adverse impacts is expected to be local, confined within the subprojects' main areas of influence, and for short period of time.
- Controlled activities during construction of reservoirs and building, well managed activity plan for deep tube wells and treatments plants, and proper management of construction campsites and stockpile areas are seen as major areas to focus with respect to environmental safeguards.
- Mitigation measures, basically integral to socially and environmentally responsible construction practices, are commonly to be applied at construction sites. Mitigation measures would not be difficult to be implemented but timely implementation and its monitoring is required.
- There needs to be proper coordination with the local communities like Paharawa, Lathhawa, Kalabani, Thulo Sisahaniya, Pipara, Bijauri and Nayabasti to minimize disturbances to local activities and damage to public or private properties during laying of pipelines and other construction works
- During operation, the potential delivery of unsafe water can be mitigated with good operation and maintenance, prompt action on leaks, and complying with the required quality monitoring of supplied water as prescribed in the National Drinking Water Quality Standards Directives.

The proposed subproject will bring about: (i) the benefits of access to reliable supply of safe and potable water; (ii) promotion of good hygiene and sanitation practices and reduced health and safety risks as positive impacts; and (iii) enhanced community health, improved quality of life and safe communities as outcomes. This project will have positive development impact not only in the project area, but also in this belt of Province 5.

Finally, based on the above findings, the classification of Pragatinagar Urban Water Supply and Sanitation Project as Category B is confirmed. IEE is sufficient for the project, and no further special study or EIA needs to be undertaken for safeguarding the environmental aspects of the project implementation.


Engineer




REFERENCES

- ✓ ADB, 2003. *Environmental Assessment Guidelines*.
- ✓ *Constitution of Nepal (2015)*. Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- ✓ *Environment Protection Act, (1997)*. Ministry of Science, Technology and Environment Kathmandu
- ✓ *Environment Protection Rules, (1997)*, Ministry of Science, Technology and Environment, Kathmandu
- ✓ *Environment Statistics of Nepal*, CBS, 2011
- ✓ *Environmental Impact Assessment Guidelines, (1993)*. National Conservation Strategy Implementation Project, National Planning Commission, His Majesty's Government, Nepal
- ✓ *Detailed Engineering Design Report of Pragatinagar Water Supply Sub Project, 2016*
- ✓ *Labor Act (1991)*, Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- ✓ *Local Self-Governance Act, (1999)*. Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- ✓ *Ministry of Population and Environment, 1999. Environment Protection Act, 1997 and Environment Protection Rules, 1999. (Amendment, 1999)*. Ministry of Law, Justice and Parliament Affairs, Nepal
- ✓ *Rural Municipality profile and baseline information of Rapti Rural Municipality, and National Population and Housing 2011*, CBS, 2012
- ✓ *National Transport Policy, (2001)*. Ministry of Physical Infrastructure and Transport, Government of Nepal, Nepal
- ✓ *National Urban Policy (2007)*. Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu
- ✓ Shrestha K 1998. *Dictionary of Nepalese Plant names*. Mandala Book Point, Kathmandu, Nepal.
- ✓ *Solid Waste Management Act (2011)*. Ministry of Science and Technology and Environment, Kathmandu
- ✓ *The Updated Fifteen-Year Development Plan for Small Towns' Water Supply and Sanitation Sector, 2009*
- ✓ Uprety, B.K (2003). *Safeguard the Resources Environmental Impact Assessment Process and Practice*, Kathmandu
- ✓ *Water Resource Act (1992)*. Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

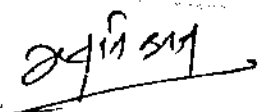


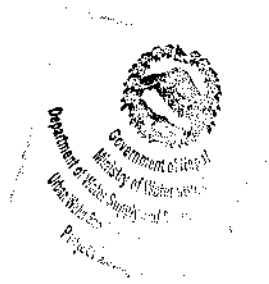
24/11/2019
Engineer



ANNEXES

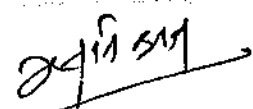
- Annex 1: Approved ToR
- Annex 2: Environmental Standards, Sample Forms, Formats and Reporting Templates
- Annex 3: Project Location and Service Area
- Annex 4: Public Notice & *Muchulka*, Public Consultation minutes, Consent Letters & Recommendation Letter
- Annex 5: Water Quality Test Report
- Annex 6: Survey Questionnaire & Checklists
- Annex 7: Photographs
- Annex 8: Comments from MoWS, and Comments Incorporation Matrix


Engineer



ANNEX 1: APPROVED TOR




Engineer







नेपाल सरकार

खानेपानी मन्त्रालय

नेपाल
संविधान
अनुसार

फोन नं.: ४२९९६९३

फ्याक्स : ९७७-१-४२९९४३३

सिंहदरबार,

काठमाडौं, नेपाल।

पत्र संख्या:- ०६४/०६६०

चलानी नं:- ९९४

श्री खानेपानी तथा ढल निकास विभाग
पानीपोखरी, काठमाण्डौ।

२६६

०६४/०६६०

मिति: २०७५/०८/०३

[Handwritten signature]
२४/११/२१

विषय: प्रारंभिक वातावरणीय परिक्षण (IEE) को कार्यसूचि(TOR) स्वीकृत गरिएको सम्बन्धमा।

उपरोक्त विषयमा तेश्रो साना सहरी खानेपानी आयोजना प्रस्तावक रहेको प्रगतिनगर, दाङ सहरी खानेपानी तथा सरसफाइ आयोजना को प्रारंभिक वातावरणीय परिक्षण (IEE) को कार्यसूचि (ToR) नेपाल सरकार (सचिवस्तर) को मिति २०७५/०७/२९ को निर्णयानुसार स्वीकृत गरिएको ब्यहोरा निर्देशानुसार अनुरोध छ।

(स्वीकृत कार्यसूचि (TOR) को १ प्रति संलग्न गरिएको)

[Handwritten signature]
मधुसुधन खनाल
(इन्जिनियर)

बोधार्थ

तेश्रो साना सहरी खानेपानी आयोजना
आयोजना व्यवस्थापन कार्यालय, पानीपोखरी।



[Handwritten signature]
२४/१०



Terms of Reference (ToR)

For

Initial Environmental Examination (IEE) study

Of

**Pragatinagar Small Town Water Supply
and Sanitation Project
(Pragatinagar, Dang)**

Submitted to

Ministry of Water Supply and Sanitation

Government of Nepal
Singhadurbar, Kathmandu

Submitted by

Project Management Office
Third Small Towns
Water Supply and Sanitation Sector
Project
Department of Water Supply and
Sewerage
Panipokhari, Kathmandu

Prepared By

Building Design Authority Pvt. Ltd. and
Plush Engineers and Architects (P) Ltd.
(BDA-PEA JV)
Kamaladi, Kathmandu



February, 2018

TABLE OF CONTENTS

1. ORGANIZATION PREPARING THE TERMS OF REFERENCE	1
2. DESCRIPTION OF THE PROJECT	2
2.1. General Description	2
2.2. Project Area Description	3
2.3. Socio-Economic Status of the Project Area	5
2.4. Objectives of the Project	5
2.5. Component of the Project	5
2.5.1. Water source	6
2.5.2. Water quality and treatment units	7
2.5.3. Treatment process	8
2.5.4. Transmission main	8
2.5.5. Service Reservoirs	8
2.5.6. Distribution Network	9
2.5.7. Electrical Facilities	9
2.5.8. House Connections	10
2.5.9. Appurtenances	10
2.5.10. Generator/Operator Room	10
2.5.11. Office Building/ Laboratory Room	10
2.5.12. Operation & Maintenance Equipment and Tools	10
2.5.13. Sanitation Improvement	11
2.5.14. Project cost estimate	12
2.5.15. Salient Features of the Project	12
2.6. Environmental Conditions of the Project	14
2.6.1. Geophysical profile	14
2.6.2. Biological Profile	14
2.6.3. Socio-Economic Profile	14
2.7. Human and Economic Development	15
2.7.1. Economic characteristics	15

2.7.2.	Infrastructural facilities.....	15
2.7.3.	Health and sanitation.....	15
2.8.	Resettlement, Relocation and Compensation Issue.....	16
2.9.	Relevancy of the Project Proposal.....	16
2.10.	Threshold Limits for Conducting IEE.....	17
2.11.	Impact Area Delineation.....	18
2.11.1.	Direct Impact Zone	18
2.11.2.	Indirect Impact Zone	18
3.	APPROACH AND METHODOLOGY.....	19
4.	POLICIES, LAWS, RULES AND GUIDELINES.....	21
5.	TIME SCHEDULE AND BUDGET FOR IEE STUDY	23
6.	ANTICIPATED IMPACT OF THE PROJECT.....	24
6.1.	Beneficial Impacts.....	24
6.1.1.	Construction Phase.....	24
6.1.2.	Operation and Maintenance Phase.....	24
6.2.	Adverse Impacts.....	25
6.2.1.	Pre-construction Phase	25
6.2.2.	Construction Phase.....	25
6.2.3.	Post-Construction and Operation Phase.....	26
6.3.	Prioritized Issues.....	27
6.4.	Mitigation Measure	28
7.	ANALYSES OF ALTERNATIVES TO THE PROPOSED PROJECT.....	29
7.1.	Design.....	29
7.2.	Project site.....	29
7.3.	Technology, Procedure of Operation, Time Schedule, and Raw Materials to be used....	29
7.3.	Other Factors	29
8.	MITIGATION MEASURES.....	30
9.	MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROJECT	31
9.1.	Environmental Management Plan.....	31
9.2.	Environmental Monitoring Plan.....	31
9.3.	Information Disclosure, Public Consultation and Participation	32



ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

9.4. Grievance Redress Mechanism.....	33
10. OTHER NECESSARY MATTERS/IEE REPORT FORMAT.....	34

LIST OF TABLES

Table 1: Number of Households and Population of the Service Area	2
Table 2: Existing Sources of Water	6
Table 3: Proposed Water Sources and Locations.....	6
Table 4: Yield of Proposed Water Source.....	7
Table 5: Water Quality Assessment	7
Table 6: Transmission/Pumping Main	8
Table 7: Requirement of Reservoir.....	9
Table 8: Distribution Pipe Network.....	9
Table 9: Transformers and Generator Set	10
Table 10: Salient Features of the Proposed Water Supply Project.....	12
Table 11: Drainage and Sewerage Facility	16
Table 12: Threshold Limits.....	17
Table 13: Proposed Schedule of work for IEE Report Preparation.....	23
Table 14: Prioritized Issues.....	237

LIST OF FIGURES

Figure 1: Map of the Proposed Water Supply Project Area of Pragatinagar	4
---	---

ANNEX

Annex I:	Reference Literatures
Annex II:	Distribution System Division Map of the Project
Annex III:	Rapid Environmental Assessment (REA) Checklist for IEE study
Annex IV:	Checklists and questionnaires





ToR - PRAGATI AGAR TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

ACRONYMS

ADB	Asian Development Bank
BS	Bikram Sambat
CI	Cast Iron
DDC	District Development Committee
DED	Detailed Engineering Design
DI	Ductile Iron
DIZ	Direct Impact Zone
DSC	Design and Supervision Consultant
DSMC	Design Supervision and Management Consultant
DTW	Deep Tube Well
DWSS	Department of Water Supply and Sewerage
EPA	Environment Protection Act
EPR	Environment Protection Rules
GI	Galvanized Iron
GoN	Government of Nepal
GR	Ground Reservoir
GoN	Government of Nepal
HDPE	High Density Polyethylene Pipe
IEE	Initial Environmental Examination
ICG	Implementation Core Group
IIZ	Indirect Impact Zone
LB	Local Bodies
LPCD	Liter Per Capita Per Day
MP	Member of Parliament
MPPW	Ministry of Physical Planning and Works
MWSS	Ministry of Water Supply and Sanitation
NGO	Non-Governmental Organization
O & M	Operation & Maintenance
OHS	Occupational Health & Safety



TOR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

OHT	Over Head Tank
PMO	Project Management Office
PPTA	Project Preparation Technical Assistance
PPM	Parts Per Million
RCC	Reinforced Cement Concrete
RoW	Right of Way
RT	Reservoir Tank
TSTWSSSP	Third Small Towns Water Supply and Sanitation Sector Project
TDF	Town Development Fund
TLO	Toll Lane Organization
TM	Transmission Main
TOR	Term of Reference
TPCC	Town Project Coordination Committee
TPO	Town Project Office
VDC	Village Development Committee
WRPMO	Western Region Project Management Office
WRDSMC	Western Region Design Supervision and Management Consultancy
WHO	World Health Organization
WSSDO	Water Supply and Sanitation Division Office
WUSC	Water Users and Sanitation Committee
WUA	Water Users Association
ZoI	Zone of Impact



1. ORGANIZATION PREPARING THE TERMS OF REFERENCE

The Environment Protection Rules 1997 (and its amendments) mentions that a Terms of Reference (TOR) for an Initial Environmental Examination (IEE) is required.

This Terms of Reference (TOR) has been prepared in order to carry out an IEE for Pragatinagar Small Town Water Supply and Sanitation Project in Pragatinagar, Dang district. The proposed proponent is the Project Management Office (PMO), Third Small Towns Water Supply and Sanitation Sector Project (TSTWSSSP) of the Department of Water Supply & Sewerage, Ministry of Water Supply and Sanitation, the Government of Nepal is responsible for the preparation of IEE report. Name and address of the proponent is given below:

Name of the Proponent:

Project Management Office

Pragatinagar Small Town Water Supply and Sanitation Project

Third Small Towns Water Supply and Sanitation Sector Project

Department of Water Supply and Sewerage

Ministry of Water Supply and Sanitation

Government of Nepal

Address of the Proponent:

Panipokhari, Kathmandu, Nepal

Phone: 4423848, 4412348

Fax: 4413280

Email: info@stwspp.gov.np

Website: www.sstwspp.gov.np



2. DESCRIPTION OF THE PROJECT

2.1. GENERAL DESCRIPTION

This Terms of Reference (ToR) for Pragatinagar Town Project of Third Small Towns Water Supply and Sanitation Sector Project (TSTWSSSP) has been prepared with the purpose of mainly ensuring the participation of the beneficiaries in the project from the beginning of the project cycle i.e. from project preparation stage to final operation and takeover of the project. The preliminary design of water supply and sanitation system, estimate and cost sharing arrangements, cost recovery and tariff collection mechanism, and implementation arrangements etc. including scenario on alternative sources are all covered in this report.

Extending the water supply and sanitation services to hardship area is still a priority development plan in Nepal. Government has prepared a fifteen-year development plan in order to implement water supply and sanitation programs in emerging towns all over the country. The plan assesses the demand for water supply and sanitation in the small towns, estimates the investment requirements and outlines a financing plan. The overall approach to meet the demand of the small towns for water supply and sanitation is in line with the policies stated in the national development plans and the National Water Supply and Sanitation Policy. The fifteen-year plan envisaged that the total investment requirements for small towns' water supply and sanitation improvement will be about \$174 million for a service area population of about 2.1 million. The small town water supply and sanitation sector project, which is under implementation with the financial assistance of Asian Development Bank, is being carried out as per the plan.

The sub-project will improve the water supply system of ward no. 5, 7 and 8 of Rapti Rural Municipality of Dang district (Table 1). The area is partly covered by piped water supply system. There are existing Water Supply Systems in the project area which were constructed under WSSDO and handed over to WUSC. The schemes cover parts of the Rapti Rural Municipality, which supplies water through community taps. However, coverage is less than 5% of the total population of the proposed project area.

Due to high in-migration ratio and increase of rented population, WUSC is unable to serve enough water supplies. The level of services in terms of quality, quantity, coverage is quite insufficient.

Table 1: Number of Households and Population of the Service Area

VDC / Municipality	Ward No	Cluster / Settlements	HHs	Population			Remarks
				Permanent	Rental (Floating)	Total	
Rapti Rural Municipality	5	4702	862	4702	103	4805	
	7	1883	326	1883	2	1885	
	8	5323	968	5323	30	5353	
Total			2,156	11,908	135	12,043	

Source: Socio-economic Survey, 2017

Overall sanitation situation of the Pragatinagar can be said to be satisfactory in terms of 95.7 percent of the household has possessed toilets. Most of the households in the market area have permanent type of private latrine and others have pit latrine. It was reported that all the colleges / schools, hospital and government offices have toilets. The sewerage system has not been developed in the service area so far.

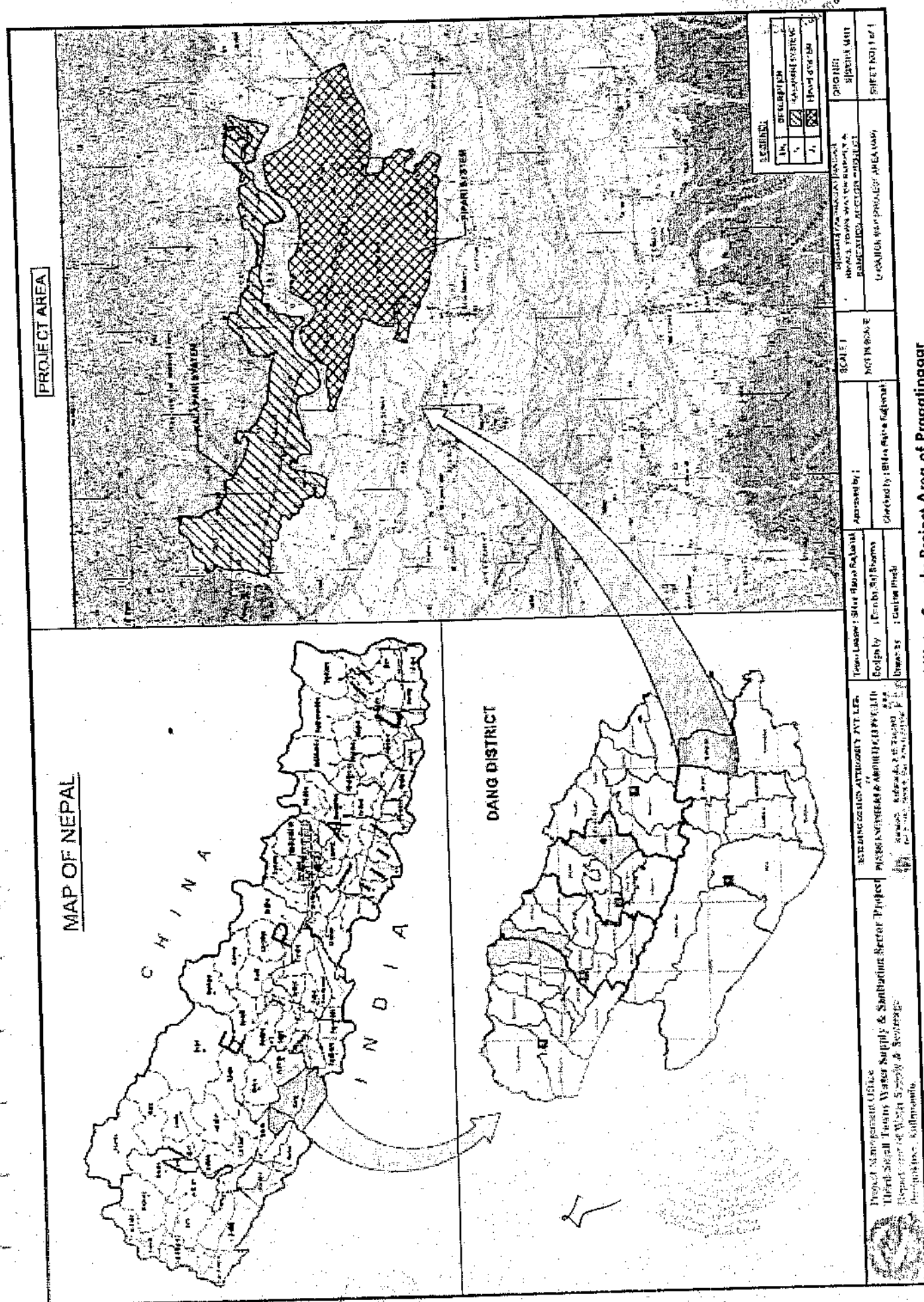
Lined drain is observed in limited part of the core bazaar area. The proper management of solid waste by the different agencies has not been developed till now in this town. People were found to manage solid waste in the pits prepared in the backyard of their house.

2.2. PROJECT AREA DESCRIPTION

The proposed Pragatinagar Town Project of Water Supply and Sanitation is located at Rapti Rural Municipality in Dang district of Rapti zone. The municipality is bounded by Arghakhanchi district in the East, Bangaduli Rural Municipality in the North, Lamahi Municipality in the West and Gadhwara Rural Municipality in the South. Pragatinagar is one of the emerging towns which lie in Deukhuri valley of Dang district. It is located at East-West Highway at around 6 kilometres east of Lamahi and 36 kilometres away from Gorahi, the headquarter of Dang district. Geographically, the project area is lies in Terai region between 27°51'54" North Latitude and 82°39'14" East Longitude.

The project area is located in relatively flat Terai plain. The altitude of the town varies from 210 m to 300m above the sea level. Since the topography of the area is almost flat, the large portion of land faces flooding problem during rainy season. The climate of the project area is Upper Tropical with temperature ranging 33.9°C in summer and 5.4°C in winter season in average.

Geologically it is situated in the foothill of Siwalik range. The underlain formation of the area consists of cobbles, gravels and sand with pockets of clay. The area is rich in groundwater potential. The shallow as well as deep aquifers are being extracted for drinking and irrigation purposes. The project area is drained by Gopi khola and Dolai khola (Figure 1).



2.3. SOCIO-ECONOMIC STATUS OF THE PROJECT AREA

There are total 2,156 households having population of 12,043 in the service area with an average household size of 5.5.

The proposed project service area comprises multi caste / ethnic groups. Each caste and ethnicity is characterized by its own customs, traditions, culture and nature of occupation with which they are associated. Janjati comprises 75.0 percent of total families, Brahmin/Chhetri are the next major group with 19.2 percent, followed by Dalit which constitutes about 4.6 percent.

Although, the economy of the area is gradually shifting from rural agricultural economy to trade/ business and service based, majority of the households are still dependent on agriculture. About 49.4 percent of the households have agriculture as main occupation in service area followed by 30 percent in service and 15 percent in wage work. Green vegetables, livestock, fishery, banana plantations are the source of income, and people earned NRs. 60,000 to 90,000 yearly by selling these products. Bhalubang, Sishaniya, and Lahamai are the market place for selling green vegetables. Similarly, people earn NRs. 20,000 to 45,000 yearly from milk production. It is a potentially growing area in all sphere of life.

2.4. OBJECTIVES OF THE PROJECT

- i. Improve water supply and sanitation facilities and provide a health and hygiene education program in each town.
- ii. Support community participation in the development of water supply and sanitation facilities, and
- iii. Facilitate Sustainable development of the facilities thereby help/ improve health and quality of life of the people living in the project area.

2.5. COMPONENT OF THE PROJECT

Pragatinagar Small Town Water Supply and Sanitation Project has been conceptualized as a piped water supply system with pumping system. The existing water supply systems serve only about 5% of the project area population. The capacity of the existing structures is too much undersized to be utilized in the proposed system. The existing structures are abandoned and new systems have been proposed extracting groundwater through deep tube wells.

Based on the topography, settlement pattern and suitable location for tube well, two water supply systems based on decentralized distribution system is adopted which are described below:

- i. **Kalapani System:** This is a pumping system. This system is proposed to serve northern part of Dolai River in Kohalwa-Jutpani, Kalapani, Singe, Paharwaha and Lathuwa areas, wards 5 and 8 of Sisahaniya VDC. This system is designed to cater 10,131 permanent and 21 rented (total 10,152) population. The groundwater will be extracted through a tube well as water source. The water is pumped from tube well to the 200 m³ overhead RCC reservoir. The water from the overhead reservoir is supplied to the service areas through gravity.
- ii. **Pipari System:** This is a pumping system. This system is proposed to serve southern part of Dolai River in Bijauri, Baraki-Sisaniya, Jitpur, Pipara, Pipari, Pragatinagar and Kamal Road areas, wards 5, 7 and 8. This system is designed to cater 28,435 permanent and 247

rented (total 28,682) population. The groundwater will be extracted through a tube well as water source. The water is pumped from tube well to the 250 m³ ground RCC reservoirs. The water from the ground reservoir is pumped to the 450 m³ overhead RCC reservoir so that sufficient head is available at the consumers' area. The water from the overhead reservoir is supplied to the service areas through gravity.

2.5.1. WATER SOURCE

A. SOURCE LOCATION, TYPE AND REQUIRED YIELD

According to the socio-economic census survey 2017, the existing water resources in the project area are as given in Table 2. It indicates that a significant number of households (93 percent) in the service area have Tube well and 5 percent of them are getting water from Public Taps. Less than 1 percent households have private tap connection and nearly 1 percent is using other sources such as spring, river or pond as main sources of water. The existing piped water supply scheme is not sufficient to serve the growing population.

Table 2: Existing Sources of Water

SN	Water Source	Ward Number			Total	Percent
		5	7	8		
1	Private Tap	15	4	89	108	5
2	Public Tap	5	5	8	18	0.8
3	Tube well	834	313	863	2010	93.2
4	Others (Mul/River/Pond)	8	4	8	20	0.9
Total		862	326	968	2156	100

Source: Socio-economic Survey, August 2017

All the proposed water sources of the project are tube-wells. The proposed tube well site for Kalapani system is located in the forest area at Kalapani village, ward 5 of Rapti Rural Municipality. The proposed tube well site for Pipari system is south of Dolai River at Pipari village, ward 8 of Rapti Rural Municipality. The water from tube wells will be pumped to overhead reservoir tank after proper treatment. The proposed water sources and their location are shown in Table 3.

Table 3: Proposed Water Sources and Locations

SN	System	Source Type	Well Number			Source Location	Remarks
			Working	Standby	Total		
1	Kalapani	Tube-well	1	1	2	Kalapani, Ward 5, Rapti Rural Municipality	
2	Pipari	Tube-well	2	1	3	Pipari, Ward 8, Rapti Rural Municipality	

The yield of all the proposed sources was measured in June 2017 by WRDSMC team during the detailed survey. The yield in the dry season was arrived using the engineering judgment such as location, topography, soil type and vegetation of the area in consultation with the local inhabitants. The safe yield of the source is taken as 90% of the yield in the dry season. The tapped discharge from the source depended on the water demand of the system and is equal or less than safe yield of the source. Table 4 presents the measured discharge, yield in the dry season, safe yield and tapped discharge of the proposed sources.

Table 4: Yield of Proposed Water Source

SN	System	Source Type	Expected Safe Yield per well (lps)	Well Number			Tapped Discharge (lps)
				Working	Standby	Total	
1	Kalapani	Tube Well	35	1	1	2	17.67
2	Pipari	Tube Well Maibela Mul-2	35	2	1	3	52.84

2.5.2. WATER QUALITY AND TREATMENT UNITS

The water sample from the existing tube well located at Sisahaniya was collected on August 31, 2017 in order to assess the raw water quality of the groundwater in the project area. The water quality of the existing tube well in the project area along with National Drinking Water Quality Standards is presented in Table 5.

Table 5: Water Quality Assessment

SN	Parameters	Units	Test methods	Observed Values	NDWQS Nepal
1	pH at 27°C		Electromeric, 4500 – H ⁺ B, : APHA	7.1	6.5 – 8.5
2	Electrical Conductivity	µS/cm	Conductivity Meter, 2510 B, APHA	510	1500
3	Turbidity	NTU	Nephelometric, 2130 B, APHA	<1	5
4	Total Hardness as CaCO ₃	mg/l	EDTA Titrimetric, 2340 C, APHA	271	500
5	Total Alkalinity as CaCO ₃	mg/l	Titrimetric, 2320 B, APHA	295	-
6	Chloride	mg/l	Argentometric Titration, 4500 – Cl ⁻ B, APHA	2.98	250
7	Ammonia	mg/l	Direct Nesslerization, 4500 – NH ₃ C APHA	0.17	1.5
8	Nitrate	mg/l	UV Spectrophotometric Screening, 4500 –NO ₃ B, APHA	4.58	50

SN	Parameters	Units	Test methods	Observed Values	NDWQS, Nepal
9	Nitrate	mg/l	NEDA, Colorimetric, 4500 – NO ₂ ⁻ B, APHA	<0.02	-
10	Calcium	mg/l	EDTA Titrimetric, 3500 –Ca B & 3500 –Mg B APHA	85.77	200
11	Magnesium	mg/l		14.1	-
12	Arsenic	mg/l	SDDC, 3500 - As, C: APHA	N.D. (<0.01)	0.05
13	Iron	mg/l	Direct Air – Acetylene AAS, 3111 B, APHA	0.07	0.3
14	Manganese	mg/l		N.D. (<0.02)	0.2

2.5.3. TREATMENT PROCESS

The water treatment process will be selected based on the raw water quality. The proposed treatment process aims to remove the high concentrations of iron and turbidity present in the raw water. It also kills pathogenic organisms present in raw water and ensures the presence of residual chlorine to kill the pathogenic organisms during the conveyance of treated water in pipelines. The treatment process will consist of lime dosing, aeration towers, pressure filters and disinfection with associated accessories like air blowers/compressors, valves and pipes.

2.5.4. TRANSMISSION MAIN

The transmission main are estimated to distribute water from the tube well to overhead service reservoirs. The distribution system will comprise pipes that will be selected ensuring that the velocity of water within the pipes remain within the range of 0.5 m/s to 1.5 m/s. DI pipes are proposed to use in both the systems. The total transmission main pipe length of the proposed systems is 0.717 km. Thrust blocks are also provided to restrain the pumping mains in both the systems (Table 6).

Table 6: Transmission/Pumping Main

SN	Systems	Length of Pipes (m)
1	Kalapani	135
2	Pipari	582
Total		717

2.5.5. SERVICE RESERVOIRS

The total storage requirement for the system at the end of design period i.e. 2039 is calculated as 900m³. Existing reservoirs made of ferro-cement are very small in capacity and have not been utilized in the proposed system. The reservoirs will be constructed of RCC and is designed as overhead tank as the terrain suggests. However, a ground based reservoir of 250 m³ capacity

has provided prior to the overhead reservoir in Pipari system so that the capacity of the overhead reservoir can be optimized.

The following table summarizes the requirement of reservoir tanks for the various systems (Table 7).

Table 7: Requirement of Reservoir

SN	Systems	Reservoir Size (m ³)	Type	Remarks
1	Kalapani	200	RCC – OHT	Proposed
2	Pipari	450	RCC – OHT	Proposed
		250	RCC – Ground	Proposed
Total		900		

2.5.6. DISTRIBUTION NETWORK

The distribution system comprises of pipe network, which consists of mainly loops and branch. The water is supplied from the service reservoir to the consumers by the distribution pipe network. Distribution pipes are laid both sides of the all metalled and major roads. Single line pipes are proposed in earthen and other roads. HDPE pipes are predominantly used. Pipe of class and size lesser than 6 kgf and 50 mm is not proposed. Existing pipes will not be used as these are leaking and found substandard (class of 4 kgf). The length of the distribution network pipes proposed for various systems is shown in Table 8. The total distribution pipe length of the proposed systems is 66.446 km.

Table 8: Distribution Pipe Network

SN	Systems	Length of Pipes (m)
1	Kalapani	30009
2	Pipari	36437
Total		66446

2.5.7. ELECTRICAL FACILITIES

Power for the operation of pumps shall be obtained from nearby 11 KVA line locating about 1500 m away from the boring station for Kalapani system. In case of Pipari system, the power is proposed to be tapped from nearby 11 KVA line locating about 50 m away from the boring station for both proposed tube wells of this system. The total 11 KV power distribution lines required is about 1600 m. As the voltage of the electricity line of Nepal Electricity Authority is found fluctuating, stabilizers have also been proposed. Similarly standby diesel generators are also proposed to be used in case of electricity power failure and load shedding. A three-phase power line shall connect the control panel, which will distribute power to different power load points. Table 9 summarizes the proposed electrical equipment.

Table 9: Transformers and Generator Set

SN	System	Power of Pump (KW)		Building and Peripheral Lighting (KW)	Total Power		Transformer (KVA)	Stabilizer (KVA)	DG Set (KVA)
		DTW - SW/GR	SW/GR - OHT		(KW)	(KVA)			
1	Kalapani	40	12	3	55	68.75	100	100	125
2	Pipari	60	30	3	93	116.25	200	200	250

2.5.8. HOUSE CONNECTIONS

The system has been designed, predominantly as house to house connections. The system has been analyzed for a design capacity of providing a total of 6981 house connections at the end of design period. However, initially during construction phase, only 2,406 house connections are provided to satisfy the need for the base year population.

2.5.9. APPURTENANCES

These will primarily comprise of valve chambers in flow control valves for controlling flow in the pipeline. Altogether 125 valve chambers and 25 pipe valve boxes are expected in the system. Other appurtenances as air valves, scour valves, fire hydrants will be provided at suitable locations. Some road crossings have been initially provided. This will also facilitate for less road cuttings during the operational phase.

2.5.10. GENERATOR/OPERATOR ROOM

Two permanent generator operator houses to accommodate the generators shall be constructed. In case of failure of power supply the generator shall be used to supply power to the pumps to deliver water. A permanent area to accommodate the pump / plant operator will be provided in this generator house. Accordingly a guard room is proposed.

2.5.11. OFFICE BUILDING/ LABORATORY ROOM

There is no office building in the existing system. Thus new one is proposed to accommodate the required facilities Laboratory room, counters, managers room cannot be accommodated in the present office building. The new will consist of manager's room, cash counters, meeting hall etc. Lab room, store will be placed in the office building.

2.5.12. OPERATION & MAINTENANCE EQUIPMENT AND TOOLS

Beside all other required tools, O & M equipment and tool will also be considered in the project so that project works during construction period and for operational activities will be effectively carried out.

- i. Leakage detecting equipment- 1 set
- ii. Submersible sludge pump- 1 no
- iii. Electro-fusion machine for joining the HDPE pipes including portable Generator - 1 set

- iv. Water quality testing laboratory equipment – 1 set
- v. Other Tools and Plants like: electric pipe cutters, pipe wrenches etc.

2.5.13. SANITATION IMPROVEMENT

This component comprises waste water management, solid waste management, etc and is described below:

A. INDIVIDUAL HOUSEHOLD TOILET IMPROVEMENT

It was learnt, some of the households have prepared pit latrines with bamboo, shrubs cover. The wall of pits is not found properly protected. Similarly toilets as such were also found made temporarily e.g. from bamboo, wooden post etc. Thus training programme in association with LB will be carried out for the proper construction of local material e.g., cement plaster in bamboo woven to make wall, strengthening pit wall by locally available stone, use of RCC rings and cover and its molding methods etc. Accordingly awareness campaign is also carried out regarding public sanitation and health.

B. DESIGN OF LOW COST LATRINE FOR LOW INCOME HOUSEHOLD

There are a few types of latrines that may be adopted for low income household and range from pit latrines to septic tank latrines. The type of latrines the people will construct depends largely on the financial capacity of the consumers. The other factors as culture, tradition of the people, ground condition, climate and availability of space also play a vital role. There are three distinct income groups in the project area. People with higher income tend to build better sanitation facilities with more contribution, people with medium income like to improve but with little contribution while low income people want to have latrines constructed but do not want to contribute.

C. WASTE WATER MANAGEMENT

Pragatinagar, Dang does not have a water-borne sewerage system. The current practice of human excreta management and disposal is on-site sanitation consisting of individual household or institutional septic tanks often without a proper effluent disposal system. The septic sludge is often discharged, though illegally, in to surface water. The existing practice is unhygienic and unaesthetic for the population.

Thus a trailer mounted suction tank with a capacity of 4,000 liter is proposed. A sludge drying bed constructed from masonry structure with sand and gravel packing is proposed. Gravel packing will enhance to percolate moisture and dry sludge faster. Dried sludge can be sold to the farmers for composting.

D. SOLID WASTE MANAGEMENT

While discussing with the officials of municipality they have requested for a tractor with trailer for prompt service. Similarly few hand carts (wheel barrows) and collection bins (115 ltrs capacity) are proposed.

Besides training program shall be conducted regarding the solid waste management to concerned municipality officials, users and WUSC members and other members of Tole Lane

ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

Organizations (TLO). These software programs will help to reduce, reuse and recycle the waste from the households.

2.5.14. PROJECT COST ESTIMATE

The total capital cost of proposed water supply project is NRs. 520.299 million where the project cost of water supply component only has been estimated as NRs. 506.115 million. Whereas, the total project cost of sanitation component has been estimated as NRs. 144.184 million. Contingency @15% and VAT @13% are all included. The cost has been based on district rate of Dang (FY 074/75).

2.5.15. SALIENT FEATURES OF THE PROJECT

Table 10: Salient Features of the Proposed Water Supply Project

SN	Items	Description
1	Name of the Project	Third Small Towns Water Supply and Sanitation Sector Project
		Pragatinagar Small Town Water Supply & Sanitation Project, Dang
2	Type	Ground (Pumping) scheme
3	Study Level	Detailed Engineering Design Report
4	Location Area	
	Province	Number 5
	Zone	Rapti
	District	Dang
	VDC/Municipality	Rapti Rural Municipality
	Wards	Parts of Ward No. 5, 7 and 8
5	Available Facilities	
	Road	East-West Highway
	Nearest Airport	Nepalgunj
	Existing Water Supply System	Partially covered by piped water supply system. Spring sources are used
	Electricity	Available
	Communication	Available
	Health Services	Available
	Banking Facilities	Available
	Ghorahi- Pragatinagar distance	36 km
6	Source Characteristics	
	Source Name	Deep Tube Well
	Source Type	Groundwater
	Source Location	Kalapani in Ward # 5 and Pipari in Ward # 8, Rapti Rural Municipality
	Proposed Tapping yield (lps)	Kalapani DTW :17,67lps (Pumping) Pipari DTW:2 x 26,42lps (Pumping)
7	Project Components	
	Storage Tank	RCC Overhead Tank 200 Cum : 1 # (Proposed) RCC Overhead Tank 450 Cum : 1 # (Proposed) RCC Ground Tank 250 Cum : 1 # (Proposed) Total 900 cum

	Valve Chamber (Nos.)	Type 1 (1500x900x1000) : 6 # Type 2 (900 x900x1000) : 119 # Pipe Valves (125mm dia) : 25 #
	Community Stand Posts	Nil
	Household Connection (Nos.)	2406 for base year
	Total Length of pipe (Km)	Transmission : 0.717 Km Distribution : 66.446 Km
	Treatment Unit	Lime dosing unit, Aerator, Pressure filter and Disinfection – 17.67lps and 52.84 lps capacity
	Fire Hydrants	28 numbers
8	Social Status	
	Survey Year Population (2017)	11,908 (permanent) 135 (floating) [Total 12,043]
	Base Year Population (2019)	13,293 (permanent) 134 (floating) [Total 13,427]
	Design Year Population (2039)	38,566 (permanent) 268 (floating) [Total 38,834]
	Adopted Annual Growth Rate %	5.42 (Average)
	Household Numbers (2017, 2039)	6,981 in 2017, 6,987 in 2039
	Average Family Sizes	5.52
9	Total Water Demand	
	Base year 2019 (m ³ /day)	Total 1,420.27
	Design year 2039 (m ³ /day)	Total 4,567.87
10	Total Cost of the Project (NRs.)	520.299 million with 15% contingencies & 13% VAT
	Water Supply Sector	NRs. 506.115 million
	Sanitation Sector	NRs. 14.184 million
11	Cost Sharing Arrangement for water supply component (NRs)	506.115 million
	1) GoN Grant @ 70%	NRs. 354.281 million
	2) WUSC Contribution	
	a) Upfront cash contribution @ 5%	NRs. 25.306 million
	b) Loan through TDF @ 25%	NRs. 126.529 million
12	Cost Sharing Arrangement for Sanitation Component (NRs)	14.184 million
	1) GoN Grant @ 85%	NRs. 12.056 million
	2) Local Body (WUSC, VDC & others) 15%	NRs. 2.128 million
13	Per capita Investment (for water supply sector)	Base Year : NRs. 38,750.22 (considering permanent and floating population both) Design Year : NRs. 13,398.03 (considering permanent and floating population both)
14	Project Status	
	Started	October, 2017

2.6. ENVIRONMENTAL CONDITIONS OF THE PROJECT

2.6.1. GEOPHYSICAL PROFILE

Pragatinagar town located in Rapti Rural Municipality of Dang district has fervent hot and temperate type of climate. The temperature rises to about 33.9°C in summer while in winter it drops to about 5.4°C. About eighty percent of the total annual rainfall occurs during the monsoon season (June to September).

The project is located in relatively flat Terai plain. The altitude of the town varies from 210 to 300m above the sea level. Since the topography of the area is almost flat, the large portion of land faces flooding problem during rainy season.

Geologically it is situated in the foothill of Siwalik range. The underlain formation of the area consists of cobbles, gravels and sand with pockets of clay. The area is rich in groundwater potential. The shallow as well as deep aquifers are being extracted for drinking and irrigation purposes.

2.6.2. BIOLOGICAL PROFILE

The major vegetation in the project area comprises mainly of tropical type that includes: *Shorea robusta*, *Terminalia bellirica*, *T. chebula*, and *Adina cardifolia*, *Aegle marmelos*, *Albizia spp*, *Bauhinia variegata*, *Dalbergia latifolia*, *parvifolia*, *Toona serrata*, *Justicia adhatoda*, *Hypericum cordifolium*, *Clerodendron viscosum* and *Bauhinia vahlii*, *Bombax ceiba*, *Zizyphus auritiana*. In poorly drained areas of the project area, vegetation such as *Saccharum bengalense*, *Saccharum spontaneum* are predominantly found studded with clumps of *Acacia catechu* and *Dalbergia sissoo*.

Furthermore, the major mammal species found in the area are: tiger (*Panthera tigris*), common leopard (*Panthera pardus*), barking deer (*Muntiacus muntjac*), wild boar (*Sus scrofa*), spotted deer (*Axis axis*), four horned antelope (*Tetracerus quadricornis*), sambar deer (*Cervus unicolor*), leopard cat (*Felis bengalensis*), jungle cat (*Felis chaus*), sloth bear (*Melursus ursinus*), striped hyaena (*Hyena hyaena*), jackal (*Canis aureus*), hare (*Lepus nigricollis*), flying squirrel (*Petaurista petaurista*), palm squirrel (*Funambulus pennati*) and porcupine (*Hystrix indica*).

2.6.3. SOCIO-ECONOMIC PROFILE

There are total 2, 156 households having population of 12, 043 in the service area with an average household size of 5.5.

The proposed project service area comprises multi caste / ethnic groups. Each caste and ethnicity is characterized by its own customs, traditions, culture and nature of occupation with which they are associated. Janjati comprises 75.0 percent of total families, Brahmin/Chhetri are the next major group with 19.2 percent, followed by Dalit which constitutes about 4.6 percent.

Although, the economy of the area is gradually shifting from rural agricultural economy to trade/business and service based, majority of the households are still dependent on agriculture. About 49.4 percent of the households have agriculture as main occupation in service area followed by 30 percent in service and 15 percent in wage work. Green vegetables, livestock, fishery, banana



plantations are the source of income, and people earned NRs. 60,000 to 90,000 yearly by selling these products. Bhalubang, Sishaniya, and Lahamai are the market place for selling green vegetables. Similarly, people earn NRs. 20,000 to 45,000 yearly from milk production. It is a potentially growing area in all sphere of life.

2.7. HUMAN AND ECONOMIC DEVELOPMENT

2.7.1. ECONOMIC CHARACTERISTICS

Agriculture is the main occupation of the people located in the project area. The soil condition of the project area is very good, large amount of rice and daal (masuro, maas and adahar) are produced in the area. Green vegetables, livestock, fishery, banana plantations are the source of income, and people earned NRs. 60,000 to 90,000 yearly by selling these products. Bhalubang, Sishaniya, and Lahamai are the market place for selling green vegetables. Similarly, people earn 20,000 to 45,000 Rs. Yearly from milk production. It is a potentially growing area in all sphere of life.

Furthermore, economic condition of the families in service area is satisfactory in terms of their monthly income level. About 51.3 percent of households have income range NRs. 2001-50000 per month. Likewise, 26.1 percent of households fall under the income range NRs. 7501-20000 categories. About 20.8 percent of households have highest income level (more than NRs.50,000 per month), whereas 0.2 percent of the households have lowest income level i.e. less than NRs. 5,000 per month.

2.7.2. INFRASTRUCTURAL FACILITIES

The project area is well connected with East-West Highway. Community settlements are well connected with earthen roads. Electricity facility and telephone facilities are also available. Institutions are equipped with toilet facilities. However, sewerage system has not been developed in the service area so far.

District level government offices and other institutions have been established in the project area. There are total 6 government offices including office of Rural Municipality. Besides these, a significant number of government and private institutions / organizations are in the town. Among them 11 are financial institutions, 10 educational institutions i.e. college / schools, 8 health intuitions (hospital / health centre) and 1 I/NGOs (International / National Nongovernmental Organizations).

2.7.3. HEALTH AND SANITATION

In general the overall sanitation condition of the project area is satisfactory. Most of the households in the market area have permanent type of private latrine and others have temporary type of private latrine. It was reported that all the colleges / schools, hospital and government offices have toilets.

Lined drains are in limited part of the core bazaar area. Only about 2.8 percent of the households of core area have access to drainage and sewerage facility (Table 11). No water



logged area is found as sufficient natural slope exists. The proper management of solid waste by the different agencies has not been developed till now in this town. People were found to manage solid waste in the pits prepared in the backyard of their house.

Regarding the drainage facility, 97.2 percent of the respondents reported that they do not have access to drainage, whereas nearly 2.8 percent of them have access to it. The sewerage system has not been developed in the service area so far.

Table 11: Drainage and Sewerage Facility

Facility Type	Drainage	Ward Number			Total	Percent
		5	7	8		
Drainage and Sewerage	Yes	46	4	10	60	2.8
	No	816	322	958	2096	97.2
	Total	862	326	968	2156	100

Source: Socio-economic Survey, 2017

2.8. RESETTLEMENT, RELOCATION AND COMPENSATION ISSUE

The major project structures and transmission main and distribution networks are proposed on public land and existing public road RoVVs as far as possible. Therefore, no settlements are expected to be adversely affected due to acquisition of small size of public vacant lands at different sites. The public land can be used after getting consent from municipality.

No involuntary resettlement and indigenous peoples impacts are anticipated due to execution to the town as there will be no physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) as a result of land acquisition. There is no any designated park and protected area within the project. Hence there will be no impacts on indigenous people due to vegetation loss or restriction on access to natural resources such as forest product.

The impact on indigenous people will be more positive increasing the access to drinking water rather than adverse impact. Some low magnitude site specific impacts caused by construction activities can be expected. Such impacts will be locally dealt and be mitigated on time.

2.9. RELEVANCY OF THE PROJECT PROPOSAL

Any development project has some environmental implication, whether beneficial or adverse. Therefore, it is pertinent to identify the complications/changes apparent in the environmental condition along with the favorable or adverse impacts resulting from the activities associated with the project over the physical, biological, socio-economic and cultural environment of the project area. Similarly the assessment of the magnitude of the impacts is also equally important. The assessment techniques and methods to be adopted may however vary depending upon the nature of the project.

In recent years, environmentally sustainable development has become one of the major challenges faced by different development institutions. Accordingly, the Ministry of Environment, Science and



TOR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

Technology, GoN has introduced a variety of instruments into the country's development activities. IEE is one of the tools for the environmentally sustainable development.

Taking in view of the statutory requirement of GoN, adhered to for the environmental assessment of any development projects under EPA-2053 & EPR-2054, an IEE study is necessary and thus TOR is prepared. The Schedule - 1 of EPR states to conduct IEE Study.

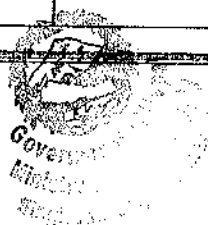
All projects funded by the ADB must comply with the Safeguard Policy Statement (SPS) 2009 to ensure that projects funded under ADB loan are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. With respect to the environment, the SPS 2009 is underpinned by the ADB Operations Manual, Bank Policy (OM Section F1/OP, 2010).

2.10. THRESHOLD LIMITS FOR CONDUCTING IEE

For Drinking Water Supply Project, according to Environment Protection Rules, 2054 BS, First Revised (2055 BS) Schedule -1 (Clause G. Drinking Water), IEE is required for following conditions:

Table 12: Threshold Limits

SN	Particulars	Status for proposed Pragatinagar Small Town Water Supply & Sanitation Project
1	Collection of rain- water in not more than 200 hectares, and use of water sources (springs and wetlands) located within the same area.	Not applicable
2	Surface water sources with not more than 1 cubic ft. safe yield and supply of not more than 50 percent of the water during the dry season.	Not applicable
3	Processing of water at the rate of 10 to 25 liters per second.	Within limits
4	Recharging up to 50 percent of the total aquifer for the development of underground water source.	Not applicable
5	Construction of not more than one kilometer long tunnels for carrying water	Not applicable
6	Displacement of not more than 100 persons for operating a water supply scheme.	Not applicable
7	Settlement of not more than 500 persons on the upper reaches of water sources.	Not applicable
8	Supply of drinking water to population ranging between 5,000 and 50,000	Within limits
9	Supply of drinking water to a population ranging between 10,000 and 100,000 upon connecting new sources.	Design population 38,834 (within limits)
10	Installation of more than 20 kilometers long electricity transmission lines for pumping or	Not applicable



ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

	processing water and consumption of more than one MW of electricity.	
11	River training and diversion activities over an area of more than one kilometer.	Not applicable
12	Operation of a drinking water supply system with inclusion of sewage disposal system with sewage treatment system	Not applicable
13	Extraction of ground water from sources which are located at point and non-point sources of biological and chemical pollution and/or their influenced areas	No non point and point sources of pollution is present in the vicinity of the water source
14	Operation of water supply project included in a multipurpose project utilizing a source of 25 liter per sec water. (Construction of Multiple Purpose Reservoir Required)	This is not a multipurpose project and is solely for water supply.

For Drinking Water Supply Project, IEE is required for the water supply scheme having population between 10,000 –100,000. Population of the project falls in the strata. Further this is an upgrading of existing system. Service areas have been added and new sources are to be tapped. Further no people will be displaced with the construction / operation of the project. Thus the IEE study has to be carried out.

2.11. IMPACT AREA DELINEATION

2.11.1. DIRECT IMPACT ZONE

The IEE study area covers the environment that will potentially be affected by the installation of the transmission mains and distribution pipes and construction/installation of collector well, main sump well, pumps, treatment units, ground reservoir tanks (RVT) and appurtenances such as office building, laboratory unit, guard house and generator house. As the high impact area includes the area from 50m radius from the sub-project site where direct activity during construction occurs, all the project components are located in the Direct Impact Zone (DIZ). The covered area for this project are ward no. 5, 7 and 8.

2.11.2. INDIRECT IMPACT ZONE

The area around the DIZ that could be indirectly affected due to project construction and implementation activities such as mobility of people, equipment, vehicles, noise, dust, vibration are demarcated as the Indirect Impact Zone (IIZ). Such area generally within 200m from the edges of the component sites where environmental and socio-economic impacts will be less.



3. APPROACH AND METHODOLOGY

Initial Environment Examination report will be based on this Terms of Reference to be approved by the Ministry of Water Supply and Sanitation, GON. The general methodology to be used in the preparation of IEE report will be as follows:

A. DESK STUDY AND LITERATURE REVIEW

A desk review will be carried out with the following steps:

- i. Collection and review of secondary information from various sources
- ii. Initial interaction and consultation with the local community and district level stakeholders
- iii. Delineation of geographical boundary of the influence area on the topographical map
- iv. Preparation of sub-project specific checklist
- v. Collection and review of secondary sources of information from various sources

Secondary information will be collected through published and unpublished reports and interpretation of maps and photographs.

B. CONSULTATIONS

Initial interaction and consultation with the local community and district level stakeholders. During the IEE report preparation, Consultancy's Environmental team meet, discuss and interact with concern staff of the Government of Nepal, DDC, and VDCs in the district head quarter and teachers, community based organization members and knowledgeable key persons of the surrounding areas within the Zone of Influence (Zol).

Accordingly, delineation of the geographical boundary of the Zone of Influence area on the topographic map will be done.

C. PREPARATION OF A PROJECT SPECIFIC CHECKLIST

A checklist is prepared to collect physical, biological, socio-economic and cultural environment-related information in the field. In addition, a Zol household survey questionnaire will be used to collect socio-economic information of the households. Data of following components will also be collected.

Physical- Topography, land use, air noise and water quality, geology, hydrology soil type, etc.

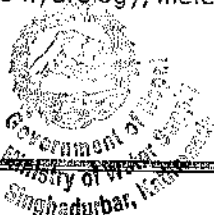
Biological- Flora/Fauna, endangered species, NTFPs, etc

Socio-Economic- Population, ethnicity, existing infrastructure, health facility, public utilities, economic status, etc.

D. IMPACT IDENTIFICATION

In order to identify the impact a preliminary exercise to solicit information from planners, policy makers, project components, concerned authorities and the user community will be conducted.

Similarly, the reports on hydrology and geo-hydrology, meteorology, geology and others related to the environment will also be reviewed.



E. IMPACT PREDICTION

The consultant shall address the impact details by furnishing information on environmental Physical, Biological, Socio-economic and Cultural Environments. A description of relevant parts of the project, using maps with appropriate scale and photographs and aerial photographs, where necessary, including the following information: location, alignment, alternatives, design, standards, pre-construction, construction and post-construction activities, work schedule, staffing and support facilities and services shall be determined.

F. IMPACT EVALUATION

To evaluate the occurrence of the impact, information on mitigation; costs associated with construction activities (during design, construction and operation and maintenance activities) shall be included.

G. PUBLIC CONSULTATION PROGRAM AND PUBLIC NOTICE:

Public consultation program in the project area will be organized to inform the broader communities and to collect the feedbacks and suggestions regarding the issues. This program mainly focus on the awareness about the project plans and programs, building of mutual consensus about the implementation of the project, identification of the key issues to be considered during IEE study and project design.

The proponent will affix a notice in the office of Rapti Rural Municipality and concerned ward offices, Office of the DDC, schools at project area, hospitals, health post requesting the concerned authorities and individuals to offer their written opinion and suggestions within fifteen days with regard to the possible impact of the implementation of the proposal on the environment. The notice will also be published in the national daily newspaper. Deeds of the fixing of notice from the concerned offices will be collected and included within the report.

H. DATA ANALYSIS AND REPORT PREPARATION:

The data collected shall be analyzed to identify both the negative and positive impacts of the project on the existing environment. During this stage, the socio-economic profile prepared by the NGO shall also be considered for further verification before finalization and identifying and predicting the possible impacts both the adverse and beneficial. The consultant will submit the IEE Draft report within 45 days after approval of TOR. The draft IEE report will be presented to WUSC, local body representative etc. The consultant will incorporate the comments and suggestion made by PMO and WUSC. The consultant will submit the final IEE report within 7 days after receiving comments from PMO.

The proponent shall submit fifteen copies of the proposal to the concerned Ministry (MWSS) in accordance with Rule 10 of the EPR, 1997 for the approval of the proposal. Requirements as per ADB's SPS 2009 will be complied during the study and while preparation of the report.

2

4. POLICIES, LAWS, RULES AND GUIDELINES

The IEE should also be conducted in compliance with the following Policies, laws, Acts, Regulations, Standards and Guidelines:

CONSTITUTION

The Constitution of Nepal, 2072

ACTS

National Park and Wild Life Conservation Act, 2030 BS (1974 AD)
Child Labour prohibition and Regulation Act, 2056 BS (2001 AD)
Soil and Watershed Area Conservation Act, 2039 BS (1983 AD)
Labour Act, 2048 BS (1992 AD)
Water Resources Act, 2049 BS (1992 AD)
Forest Act, 2049 BS (1992 AD)
Environment Protection Act, 2053 BS (1996 AD)
Local Self Governance Act, 2055 BS (1999 AD)
Aquatic Animals Protection Act, 1961 and First Amendment, 2055 BS (1999 AD)
Land Acquisition Act, 2034 BS (1978 AD)
Solid Waste Management Act, 2011 AD
Industrial Enterprise Act, 1992 AD
Town Development Act, 1998 AD

RULES AND REGULATION

Forest Regulations, 2050 BS (1993 AD)
Environment Protection Rules, 2054 BS (with Amendments)
Local Self Governance Regulations, 2056 BS (2000 AD)
Water Supply and Sanitation Regulation, 2062 BS (2005 AD)
Solid Waste Management Rules, 2070 BS
Drinking Water Regulation, 1998 AD



PLAN AND POLICIES

National Urban Policy, 2007 AD

Urban Environment Management Directives, 2011 AD

Rural Water Supply and Sanitation National Policy, Strategy and Action Plan, 2060 B.S. (2004 AD)

Water Supply and Sanitation National Policy and Strategy, 2060 B.S. (2004 AD)

Urban Water Supply and Sanitation Policy, 2066 B.S. (2009 AD)

ADB's "Safeguard Policy Statement (SPS)", 2066 BS (2009 AD)

National Wetland Policy, 2003 AD

STANDARDS, GUIDELINES AND STRATEGIES

National EIA Guidelines, 2050 B.S. (1993 AD)

National Drinking Water Quality Standards, 2062 B.S. (2005 AD)

Water Resources Strategy, 2055 B.S. (2002 AD)

National Ambient air Quality Standards, 2012 AD

Nepal Environmental Policy and Action Plan (NEPAP I and II), 1993/1998

National Healthcare Waste Management Guideline, 2002 AD

Nepal's National Drinking Water Quality Standards, 2006 AD

2 ✓





ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

5. TIME SCHEDULE AND BUDGET FOR IEE STUDY

Time schedule envisaged for the IEE study is as follows:

Duration: Within Two months of the approval of TOR.

Table 13: Proposed Schedule of work for IEE Report Preparation

SN	ACTIVITIES	1 WK	2 WK	3 WK	4 WK	5 WK	6 WK	7 WK	8 WK
1	TOR Approval								
2	Public Notification								
3	Field investigation, experts view / focus group session and collection of public opinion								
4	Preparation and submission of Draft Report								
5	Collection of comments and suggestions								
6	Preparation and submission of Final Report								

The estimated budget for the IEE study is NRs 500,000.



✓



6. ANTICIPATED IMPACT OF THE PROJECT

A distinction shall be made between the potentially significant positive and adverse impacts and immediate and long term impacts. Impacts that are unavoidable or irreversible shall be identified. Where ever possible, the significant impacts shall be quantified in terms of environment costs and benefits. The impacts shall be identified mainly for the activities pre-construction and post construction (O&M) phase on the existing physical, biological and socio-economic resources.

As a part of the study, enhancement of the positive impacts shall also be carried out. The potential impacts that shall be assessed are grouped into three major impacts as follows:

6.1. BENEFICIAL IMPACTS

6.1.1. CONSTRUCTION PHASE

A. EMPLOYMENT GENERATION AND INCREASE IN INCOME

One of the major direct beneficial impacts of the water supply and sanitation project at construction stage is the creation of employment opportunity to the local community.

B. SKILL ENHANCEMENT

Although many people in the project area are found unskilled at present, the construction of the water supply system and the distribution network is likely to enhance their skills in plumbing, fittings and other construction works.

C. ENTERPRISE DEVELOPMENT AND BUSINESS PROMOTION

During construction period, different types of commercial activities will come into operation in order to cater the demand and requirement of workers. As money flow begins, they will regularly demand different food items, beverages and other daily needs.

6.1.2. OPERATION AND MAINTENANCE PHASE

A. IMPROVEMENT IN HEALTH AND SAVING OF TIME

After the water supply and sanitation project is complete, the people living within the project area will benefit from the supply of sufficient quantity and good quality water and improved sanitary conditions.

B. DEVELOPMENT OF MARKET CENTER

The availability of good supply of drinking water will accelerate development of market centers.

C. APPRECIATION OF LAND VALUE

One of the major benefits of the project is that the land price will increase due to the availability of reliable safe drinking water and sanitation system.



ToR - PRAGATI SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

D. WOMEN EMPOWERMENT

Women and girls in particular will largely benefit from this project, as they are the ones who spend a great deal of time in fetching water. With the operation of the water supply scheme, this time will be saved.

E. QUALITY OF LIFE VALUES

The project may help to enhance the life quality of people by many ways, like by providing opportunities for jobs, providing good quality water, improved sanitation etc.

6.2. ADVERSE IMPACTS

6.2.1. PRE-CONSTRUCTION PHASE

The pre-construction works involved field survey and investigation, development of design & detailed drawings, carrying out cost estimate etc. This also includes discussion with WUSC and revision of design if necessary. Then bidding processes commence and finally the construction contract is awarded to the contractor.

6.2.2. CONSTRUCTION PHASE

A. PHYSICAL ENVIRONMENT

Erosion and land surface disturbance

Construction activities may lead to erosion and caving thereby causing soil erosion, silt runoff, and unsettling of street surfaces. The activity as such will be a nuisance and discomfort to the road users and inhabitants.

Damage to the Existing Facilities

During the construction time, while excavating the earth, existing water supply distribution pipe lines and telecommunication cable may get damaged in few places particularly in core areas in spite of great care.

Air and Noise pollution

The construction activity will comprise of construction, laying of transmission and distribution pipelines, construction of storage reservoirs, transport and installation of pumps. This may increase air pollution and noise nuisance.

Impact on water bodies

There will be some impacts on water bodies located within project area during construction phase.

Waste Management and Disposal

Lack of Proper waste management and disposal system may arise during construction period.



B. BIOLOGICAL ENVIRONMENT

The project area falls under built up area with agricultural land and no forest area is covered. Only scattered plants of local species and fruit plants are available within the sub-project area and thus slight impact to these is anticipated only during construction period.

Loss of vegetation cover

The loss of vegetation cover and species diversity due to earthwork primarily at direct impact area of deep well site will be minimum as these are located in open grass land within OHT premises. During the construction, there will be loss of shrubs cover rather than trees.

Impact on Fauna

The project site is mainly within the built up area. Population dynamics of resident and migratory birds and reptiles at the project site may be affected during construction period due to various construction activities.

Impact on aquatic life

Some of the construction activities works are proposed at the bank of river. These construction activities will physically disturb the water quality for certain period of time and may cause impact on aquatic life.

C. SOCIO-ECONOMIC ENVIRONMENT

Disturbance to the community activities

Construction activities particularly construction works in the roads may cause disturbances to the community activities, festivals and social events.

Social Dispute and Dissatisfaction

There is possibility of influx of outside workforce. Their activities and consumption of local resources may cause conflicts with the local people. Use of public land for project infrastructures may also bring some remarks from the locals.

Occupational health and safety (OHS)

Safety and health of workers particularly of those involved in concreting, trench cutting, formwork and other construction activities is of prime concern.

6.2.3. POST-CONSTRUCTION AND OPERATION PHASE

i. Impacts on land resource and landscape aesthetics if decommissioning of construction facilities is not conducted in proper manner

ii. Risk of health hazard if water supply system is not well maintained during leakages, and if disinfection is not well carried out

6.3. PRIORITIZED ISSUES

Issues that are likely to occur during different phases of the construction have been prioritized as follows;

Table 14: Prioritized Issues

Project Phases and Environmental Issues	Physical	Biological	Socio-economic and Cultural
Pre-Construction Phase	Degradation of source areas through repeated access	Access and site clearance can affect the vegetation, especially at source and reservoir sites	Concerns of water rights
	Concerns during taking of test borings	Disturbance to wildlife	Issues of land requirement for project structures
Construction Phase	Disturbance to land-surface during construction of project components	Vegetation may be lost during construction of project components and during pipe laying works	Local festive and cultural activities, and social events may be disturbed due to construction activities
	Loss of top-soil	Disposal of spoil and waste onto water bodies may impact the aquatic lives	Social disharmony due to influx of outside workforce could be an issue
	In-use roads, electrical poles, etc may be disturbed due to laying of transmission and distribution pipelines	Illegal hunting by workforce, encroachment of wild habitats could take place	Competitive sense of employment opportunities among the locals and outside workforce could bring conflicts
	Drying of water sources could be an issue		Elderly and young ones, and the people travelling to work and market may face health and safety challenges, especially if quarries and ditches are not well

			managed
	Ambient air pollution due to use of vehicles and equipment, its associate noise and vibration effects		Health and safety of the workers, e.g. workers involved in construction of water tanks, pipe-laying may have injuries, etc
Post Construction and Operation Phase	If campsites and temporary facilities are not well decommissioned after the completion of construction works, this may impact on local land aesthetics	Discharge of slurry from treatment plants onto water bodies may negatively affect the aquatic lives	If the water supply system is not well operated and maintained, there may be chances of supply of polluted water to its users
	Issues of ground water level		

6.4. MITIGATION MEASURE

Suitable, cost effective and environment friendly mitigation measures shall be recommended during the preparation of IEE report for all the perceived impacts in order to minimize the environmental impacts of project implementation. In general the following area shall be covered while preparing mitigation measures:

- Project design and preparation phase
- Project construction phase
- Project operation and maintenance phase

Concerned agencies; TSTWSSSP, DWSS, WSSDO and local agencies, local administration office shall be consulted during the implementation of mitigation measures. National EIA Guidelines 1993 will be used for significance analysis of impacts.

2

7. ANALYSES OF ALTERNATIVES TO THE PROPOSED PROJECT

The study will consider different project alternatives for selection of the best option to achieve the sustainability of the proposed development works. Following are the significant alternatives to be considered during the study;

7.1. DESIGN

Alternative designs of project will be examined and analyzed to select most appropriate design of the proposed project so that the project caters best of its services to the project area. In doing so, environmental consideration and safety point of view will be given due considerations and will be analyzed accordingly.

7.2. PROJECT SITE

Alternative sites will be considered and studied in the process so as to avoid significant environmental impacts. The options will primarily focus on reducing the felling of trees, avoiding disturbance on the wildlife habitats, avoiding the damage to public/private infrastructures and avoiding disturbances to local services, etc.

7.3 TECHNOLOGY, PROCEDURE OF OPERATION, TIME SCHEDULE, AND RAW MATERIALS TO BE USED

The study will analyze different technology, procedures of operation, time - schedule and raw materials to be used to select the best alternative among them. The technological alternatives will include fully-mechanized, semi-mechanized, labor-intensive, labor-based etc options of proposal implementation. Similarly methods of operation whether contractor based, community based, labor base or a mix of them will also be assessed.

Procedures of operation will be assessed in terms of round the year operation and peak-time operation services; types and specifications of equipments to be used, etc will also be assessed in terms of needs as well as demand in the area. Schedule of implementation of the proposal works including agricultural off-season, monsoon season, day and night time working etc will be assessed.

Alternative resources required for the proposed works, including cement, steel, gabion boulders, gravel, earth, sand, bioengineering sapling, etc will be assessed.

7.3. OTHER FACTORS

The study will also consider different options of project implementation. The IEE study will examine different alternatives for the environmental management system. The options will be assessed based on the institutional structures of the project implementation, monitoring options, extent of participation of the stakeholders, role of local bodies, including NGOs/CBOs etc.

8. MITIGATION MEASURES

Suitable, cost effective and environmentally friendly mitigation measures shall be recommended during the preparation of IEE report for all the perceived impacts to minimize the environmental impacts of project implementation. In general the following area shall be covered while preparing mitigation measures:

- i. Project design and preparation Phase
- ii. Project construction phase
- iii. Project operation and maintenance phase

The IEE team will study the mitigation measures for all the identified significant impacts and incorporate them in the report. The proponent will identify the most suitable of measures to prevent or to reduce significant adverse impacts. Measures to enhance beneficial project impacts will also be presented. The mitigation measures will deal separately for physical, biological, socio-economic and cultural environments in both the construction and operation phases. The proponent will be responsible for the implementation of environmental mitigation and enhancement program mentioned in IEE report.

The mitigation measures shall be specific and developed by applying a pragmatic approach that is technically and economically feasible, socially acceptable, and preferably of proven effectiveness. The cost required for each and every mitigation measure and enhancement measures will be estimated and incorporated in IEE report. Cost of mitigation and enhancement measures will be categorized in terms of construction and operation phases.

The enhancement and mitigation measures will be categorized in terms of the physical, biological, socio-economic and cultural environment for the construction and operation phases. A matrix of impact and mitigation measures shall also be included in the IEE report.



9. MATTERS TO BE MONITORED WHILE IMPLEMENTING THE PROJECT

9.1. ENVIRONMENTAL MANAGEMENT PLAN

The project proponent has to develop an Environmental Management Plan (EMP) to systematically manage all the perceived environmental impacts of the project. It shall be therefore based on the mitigation measures for the project induced impacts. An Environmental Management Plan (EMP) has a dual purpose. It is designed to monitor the contractor's work during project implementation. It helps to check contractual compliance with specified mitigation measures. It also helps in making periodic checks on the actual environmental impacts of the Project over the years following completion of the works, and compares these with those impacts anticipated at the time of Project appraisal. The EMP therefore provides the necessary feedback required for correcting potentially serious Project deficiencies, and for planning of other projects.

The EMP shall include the responsibilities of different stakeholders based on preliminary plans and schedules. This program shall include measures required during the project design, construction and operational phases and shall include recommendations on allocation of components of the EMP to the various parties involved. Feasible and cost-effective measures to prevent/mitigate/reduce significant negative impacts should be recommended in an Environmental Management Plan. The impacts and costs associated with implementing the measures will have to be detailed. The EMP will include proposed work programs, budget estimates, schedules, staffing and training requirements, and other support services to implement the mitigating measures.

9.2. ENVIRONMENTAL MONITORING PLAN

The project will develop Environmental Monitoring Program for the pre-construction, construction and post construction activities of the project. The program will evaluate:

- i. The extent and severity of the adverse environmental impacts as compared to what was predicted,
- ii. How effective the mitigating measures were and compliance with the regulations and
- iii. Overall effectiveness of the EMP.

The environmental monitoring of the project includes field supervision and reporting of project activities prior to and during the project construction and operation in order to ensure that the works are being carried out in accordance to the approved design and that the environmental mitigation measures are fully implemented in accordance with the EMP.

The WRDSMC will prepare progress reports on EMP implementation and submits to relevant agencies on regular basis. The RPMO Nepalgunj will supervise the environmental monitoring activities undertaken by WRDSMC.

Monitoring of the mitigation measures during the construction and operation phase will be mainly considered the impacts of followings:

Construction Phase: Soil erosion, sedimentation and slope stabilization; spoil-tip protection and management; stock taking of species of urban vegetation during vegetation clearance along pipeline alignments and re-plantation; change in hydrology and morphology of streams



and rivers; water, air and noise (vibration) pollution; solid waste; land intake and compensation; reinstatement of damaged structures and services; crime and community stress; health, safety and sanitation of the work force and camps; archaeological and cultural sites and chance finds; and traffic management.

Operation Phase: Discharge of water during plant maintenance, leakage, backwash, treatment operations; silt disposal; quality of drinking water supplies; pipe flushing.

Monitoring mechanism: The monitoring mechanism during construction will be of regular type whereas baseline monitoring, compliance monitoring and process monitoring shall have to be done during the operation and maintenance phase. The monitoring team shall visit the project site and monitor the effectiveness of the implementation of mitigation measures.

9.3. INFORMATION DISCLOSURE, PUBLIC CONSULTATION AND PARTICIPATION

Public consultation is the process of exchanging information with those persons and organizations with a legitimate interest in a project and/or who are likely to be affected by the project (stakeholders). It is a two-way process that informs and involves the community in developing a project, and informs the proponent about issues and concerns, which can then be addressed in project design. Information disclosure involves stakeholders in monitoring the development and implementation of a project and fosters openness in decision-making by presenting documents and other project materials for public scrutiny.

The consultation and disclosure involves consultation with stakeholders at an early stage of project preparation, and throughout project implementation. As a minimum, stakeholders will be consulted regarding the scope of the environmental study before work has commenced in earnest, and should then be informed about the likely impacts of the project and proposed mitigation once the draft IEE report is under preparation. The report should record the views of stakeholders and indicate how these have been taken into account in project development.

Information is disclosed through public consultation and more formally by making documents and other materials available in a form and at a location in which they can be easily accessed by stakeholders. This normally involves making draft reports available (in the local language) at public locations in the community and providing a mechanism for the receipt of comments and making documents available more widely.

Public consultation and involvement should be given highest priority in the implementation of mitigation measures. Public consultation should take place and on the basis of decision of the consultation meeting, implementation of mitigation measures should be prioritized and should be carried out with the involvement of the local people.

Monitoring is one of the components of EMP. The results of monitoring should also be disclosed in the form of demonstration, charts, figures, graphs, and samples, etc. to the local people, school students and other interested stakeholders. In the process of compliance monitoring of the project construction, local people and construction workers should be consulted.



ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

9.4. GRIEVANCE REDRESS MECHANISM

The Town Project Coordination Committee (TPCC), Pragatinagar will be responsible to address the issues and problems raised by the local communities regarding the loss of assets, water and sanitation etc. during the implementation of the project. The TPCC, Pragatinagar shall ask the Environment Specialist of the DSMC to assist in the handling of grievances and the community level stakeholders should be encouraged to help in the handling of grievances at the project sites.

The affected person / community will submit grievances / complaints to the TPCC. The TPCC will try to solve the grievance at the project level. If the grievance cannot be solved at the project level, TPCC will forward it to Director General (DG)'s Office at Kathmandu through TSTWSSSP.



✓

ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

10. OTHER NECESSARY MATTERS/IEE REPORT FORMAT

The report shall include all cited information, reference lists, maps, graphs, photographs, tables and charts, graphs, and questionnaires used during the IEE study as per the ERR 1997. The IEE Report will be prepared based on Schedule-5 (pertaining to Rule 7) of the EPR 1997.

IEE report shall be prepared as per this TOR and shall be submitted to MWSS through TSTWSSSP. The basic format of the report will be in accordance with the EPR, 1997 and National EIA Guidelines, 1993. Land use map of location sites, letters obtained from the stakeholders in response to public notification, and the newspaper cut piece of public notification and no objection letter from local authorities will be included in the IEE report. Similarly, wherever applicable maps, photographs, tables and matrix shall be presented. The format for the IEE report should include, but not be limited to the following:

1. **NAME AND ADDRESS OF THE INSTITUTION PREPARING THE REPORT**
2. **SUMMARY OF THE PROPOSAL**
 - 2.1. BACKGROUND
 - 2.2. NEED OF THE SUB-PROJECT
 - 2.3. OBJECTIVES OF THE ENVIRONMENTAL STUDY
 - 2.4. SCOPE OF IEE
 - 2.5. RELEVANCY OF IEE
3. **THE PROPOSAL**
 - 3.1. THE STUDY AREA
 - 3.2. THE SUB-PROJECT
 - 3.3. EXISTING SITUATIONS
 - 3.4. SIZE AND MAGNITUDE OF OPERATION
 - 3.5. PROPOSED SCHEDULE OF IMPLEMENTATION
 - 3.6. COMPONENTS OF THE PROJECT
 - 3.7. LAND REQUIREMENTS AND COMPENSATION
 - 3.8. CONSTRUCTION AND OPERATION ACTIVITIES OF THE PROJECT
4. **REVIEW OF ACTS/RULES, PLANS/POLICIES, GUIDELINES AND STANDARDS**
 - 4.1. POLICY AND LEGAL FRAMEWORKS
 - 4.2. CONVENTIONS
 - 4.3. OTHER DOCUMENTS
 - 4.4. RELEVANT STANDARDS
5. **IEE STUDY METHODOLOGY**
 - 5.1. DESK STUDY AND IMPACT AREA DELINEATION
 - 5.2. FIELD WORK
 - 5.3. DATA PROCESSING
 - 5.4. CONSULTATION AND INFORMATION DISCLOSURE
6. **DESCRIPTION OF THE ENVIRONMENT**
 - 6.1. PHYSICAL RESOURCES
 - Topography, Geology and Soils
 - Land Use
 - Climate
 - Water Resources
 - Air quality
 - Noise levels

ANNEXES

- Annex I: Reference literature
- Annex II: Distribution System Division Map of the Project
- Annex III: Rapid Environmental Assessment (REA) Checklists for IEE study
- Annex IV: General Socio Economic and Environmental Checklists for IEE study



Annex I: Reference Literatures

ADB, 2003. *Environmental Assessment Guidelines*.

Constitution of Nepal (2015). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

District Development profile of Nepal 2010/11 with VDC Profile.

Environment Protection Act, (1997). Ministry of Science, Technology and Environment Kathmandu

Environment Protection Rules, (1997), Ministry of Science, Technology and Environment, Kathmandu (and amendments)

Environment Statistics of Nepal, CBS, 2011

Environmental Impact Assessment Guidelines, (1993). National Conservation Strategy Implementation Project, National Planning Commission, His Majesty's Government, Nepal

Feasibility Study of Pragatinagar Water Supply and Sanitation Project, 2017

Geology of Nepal, Dahal R.K., 2006, Department of Geology, Tribhuvan University, Ghantaghar, Kathmandu, Nepal.

National Urban Policy (2007). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu

Shrestha K 1998. Dictionary of Nepalese Plant names. Mandala Book Point, Kathmandu, Nepal.

Solid Waste Management Act (2011). Government of Nepal, Kathmandu

The Updated Fifteen-Year Development Plan for Small Towns' Water Supply and Sanitation Sector, 2009

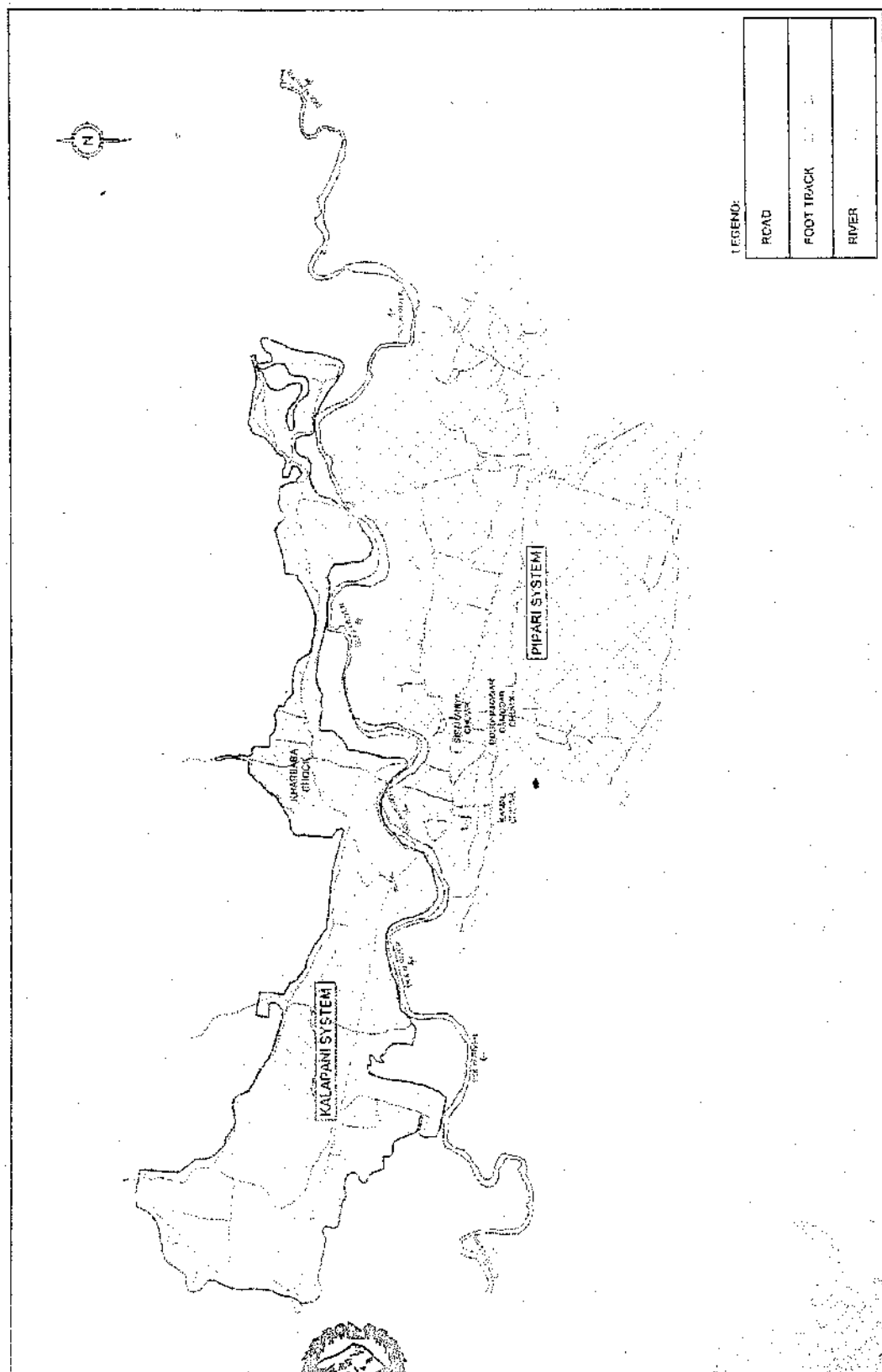
Upreti, B.K (2003). Safeguard the Resources Environmental Impact Assessment Process and Practice, Kathmandu

Water Resource Act (1992). Ministry of Law, Justice and Parliamentary Affairs, Law Books Management Board, Kathmandu.

✓



Annex 1: Distribution System Division Map of the Project



Government of Nepal
Ministry of Water Supply
Singhadurbar, Kathmandu

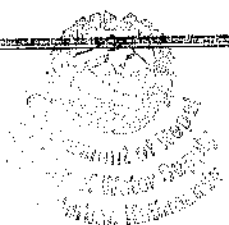
Government of Nepal
Ministry of Water Supply
Singhadurbar, Kathmandu



Annex III:

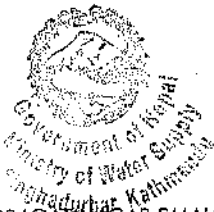
**ADB's RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST FOR IEE
STUDY OF PRATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION
PROJECT**

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area...			
☐ Densely populate		No	
☐ Heavy with development activities?		No	
☐ Adjacent to or within any environmentally sensitive areas?		No	
☐ Cultural heritage site		No	
☐ Protected Area		No	
☐ Wetland		No	
☐ Mangrove		No	
☐ Estuarine		No	
☐ Buffer zone of protected area		No	
☐ Special area for protecting biodiversity		No	
☐ Bay		No	
B. Potential Environmental Impacts Will the Project cause...			
☐ pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		No	
☐ impairment of historical/cultural monuments/areas and loss/damage to these sites?		No	
☐ hazard of land subsidence caused by excessive ground water pumping?		No	
☐ social conflicts arising from displacement of communities ?		No	
☐ conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		No	
☐ unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		No	Lab tests will be the basis
☐ delivery of unsafe water to distribution system?		No	



TOR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

☐ inadequate protection of intake works or wells, leading to pollution of water supply?		No	
☐ over pumping of ground water, leading to salinization and ground subsidence?		No	
☐ excessive algal growth in storage reservoir?		No	
☐ increase in production of sewage beyond capabilities of community facilities?		No	
☐ inadequate disposal of sludge from water treatment plants?		No	
☐ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		No	
☐ impairments associated with transmission lines and access roads?	Yes		Options for minimum disturbance will be taken into account
☐ health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		No	Standard procedures, precautions and provisions will be adopted
☐ health and safety hazards to workers from handling and management of chlorine used for disinfection, other contaminants, and biological and physical hazards during project construction and operation?		No	
☐ dislocation or involuntary resettlement of people?		No	
☐ disproportionate impacts on the poor, women and children, indigenous Peoples or other vulnerable groups?		No	
☐ noise and dust from construction activities?	Yes		Minimal
☐ increased road traffic due to interference of construction activities?		No	
☐ continuing soil erosion/silt runoff from construction operations?		No	
☐ 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?		No	
☐ delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		No	
☐ accidental leakage of chlorine gas?		No	
☐ excessive abstraction of water affecting downstream water users?		No	
☐ competing uses of water?		No	
☐ increased sewage flow due to increased water supply	Yes		
☐ increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	Yes		



ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

☐ 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	
☐ social conflicts if workers from other regions or countries are hired?	Yes		Concerns of social disharmony
☐ 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	
☐ 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	
C. Potential Environmental Impacts			
Will the Project cause...			
☐ impairment of historical/cultural monuments/areas and loss/damage to these sites?		No	
☐ interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?	Yes		Minimal effects
☐ dislocation or involuntary resettlement of people?		No	
☐ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		No	
☐ impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?		No	
☐ overflows and flooding of neighboring properties with raw sewage?		No	
☐ environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?		No	
☐ noise and vibration due to blasting and other civil works?	Yes		Minimal level
☐ risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?	Yes		
☐ discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		No	
☐ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		No	
☐ road blocking and temporary flooding due to land excavation during the rainy season?		No	
☐ noise and dust from construction activities?	Yes		

ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

☐ traffic disturbances due to construction material transport and wastes?		No	
☐ temporary silt runoff due to construction?		No	
☐ hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		No	
☐ deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		No	
☐ contamination of surface and ground waters due to sludge disposal on land?		No	
☐ health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unstabilized sludge?		No	
☐ large population increase during project construction and operation that causes increased burden on social infrastructure (such as sanitation system)?		No	
☐ social conflicts between construction workers from other areas and community workers?	Yes		Slight possibility during construction phase
☐ 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 construction and operation?		No	
☐ 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?	Yes		Concerns of accidental possibilities during construction phase

R

ANNEX IV:

General Socioeconomic and Environmental Checklists/Questionnaires

Checklist for Physical Environment

ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017.

A. Topography/Physiography

1. Study of Topographic maps/ other available maps and identify the ground topographic characteristics of land covered by the proposed project
2. Verify the topographic characteristics of the land in the field
3. Soil Type

B. Climate and Meteorology

1. Study of published data of regarding temperature, rainfall, humidity, wind speed and direction, solar radiation
2. If possible classify the climatic zone and its verification
3. Visit the meteorological office of the district and get latest information

C. Air Quality

1. Collect any data on air quality of the area from previous literature
2. Investigate on the air polluting activities of the area (traffic, biomass burning, industries, other anthropogenic activities)

D. Erosion and land Stability

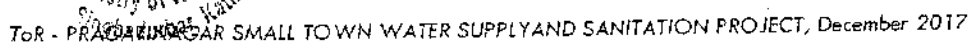
1. Identification of erosion prone area along the pipeline alignment
2. Investigate the erosion features and potentials of the local streams and gullies

E. Land Use

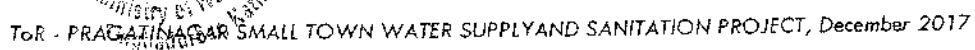
1. Investigate on the land use of the Project Blocks from the topo-maps, and other available land use maps
2. Investigate the land use affected by the project structures and subsidiary facilities
3. Investigate on the land use potentials of the area

Checklist for Plant Resources

Date:



Note:.....



Date:

[illegible]

Note:



ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

१. खाद्यान्न बाली			
	धान		
	गहु		
	मकै		
	कोदो		
	दाल ग्रेडागुडी		
	अन्य		
२. नगदे बाली			
	आलु		
	तोरी		
	तरकारी		
	अन्य		

(ख) उक्त जग्गामा लगाएको फलफूल र अन्य बोट विरुवाको विवरण दिनुहोस्

क्र.सं.	बोटविरुवा	विरुवा संख्या		जम्मा
		फल लागेको	फल नलाएको	
१	फलफूल			
२	कागती			
३	सुन्तला			
४	आँप			
५	मेवा			
७	अम्वो			
८	लिच्छी			
९	कटहर			
१०	केरा			
११	आरु			
१२	नास्पाती			
१३	आरुबखडा			
१४	अन्य			
१५	डाले घाँस			
१६	पाखुरी			
१७	काभ्रो			
१८	वडहर			
१९	खनायो			
२०	टाकी			
२१	गिदरी			
२२	अन्य			
२३	इन्धनको लागि प्रयोग गर्ने बोट विरुवा			
२४	काठमा प्रयोग हुने बोटविरुवा			
२५	बाँस निगालो			

३.६ के तपाईंको जग्गामा भएको गत वर्षको उत्पादनले तपाईंको परिवारलाई खान पर्याप्त भयो र

भयो

भएन

३.७ यदि अप्रत्याप्त भयो भने कति महिनाको लागि पुगेन रु महिना

- (क) तिन महिना (ख) छ महिना
(ग) नौ महिना (घ) बाह्र महिना

३.८ आफ्नो उत्पादित खाद्यान्न अप्रत्याप्त भएको बेला आफ्नो परिवारलाई कसरी खुवाउनु हुन्छ ?

- क. ऋण गरेर ख. नोकरीबाट भएको आम्दानीबाट
ग. व्यापारीको आम्दानीबाट घ. भारी बोकेर भएको आम्दानीबाट
ड. दैनिक मजदुरबाट भएको च. अन्य

३.९ पशुपालन सम्बन्धी :

तपाईंको घरमा कति / कस्ता पशु पक्षीहरू पाल्नु भएको छ रु

क्र.सं.	पशुपक्षी	संख्या
१	गाई	
२	गोरु	
३	भैँसी	
४	वाछा	
५	बाछी	
६	पाडा	
७	पाँडि	
८	राँगो	
९	घोडा	
१०	बाख्रा	
११	बोका	
१२	खसी	
१३	पाठा/पाठी	
१४	सुँगुर/बंगुर	
१५	हाँस	
१६	कखरा	
१७	अन्य (खुलाउने)	

४. घर परिवारको वार्षिक औषत आम्दानी :

श्रोत	वार्षिक आम्दानी (रु.)	श्रोत	वार्षिक आम्दानी (रु.)
कृषिबाट		अन्य श्रोतहरू	
खाद्यान्न		नोकरी, सेवा	
नगदेवाली		ज्याला मजदुरी र भरीया	
फलफूल		निवृत्तिभरण	
जम्मा (१)		व्यापार	
पशुपालनबाट		घरेलु उद्योग	
दुग्ध उत्पादन		पेशागत सेवा	
अण्डा कखरा हाँस विक्री		माछा विक्री	
वाछा/वाछी/गोरु/विक्री		अन्य	
भैँसि/राँगो विक्री		जम्मा (३)	

ToR - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

बोका/खर्सी/भेडा/वाखा विक्रि			
सगर/बगर विक्रि			
कचुरा/होस विक्रि			
जम्मा (रु.)			
जम्मा आय (रु.)			

५. घर परिवारको वार्षिक औषत खर्च :

विवरण	जम्मा रकम (रु.)	विवरण	जम्मा रकम (रु.)
चामल		चिया	
घाल		दाउरा	
मकै		बिजुली	
तरकारी		मट्टितेल	
दूध/दही		औषधि	
माछा/मास		शिक्षा	
तेल/धुने		कपडा	
भर-मसला		चाडपर्व	
नून		अन्य	
चिनी			
		जम्मा खर्च	

६. पानीको आपूर्ति

(क) तपाईंले यस खोलाको पानी उपयोग गर्नु हुन्छ कि हुदैन रु
 गर्नु ☐ गर्दैन ☐

(ख) यदि खोलाको पानी प्रयोग गर्नु हुन्छ भने कुन प्रयोजनको लागि प्रयोग गर्नुहुन्छ रु
 सिंचाई ☐ नुहाउने, कपडा धुने ☐
 पिउने ☐ अन्य ☐

७. स्वास्थ्य सम्बन्धि:

(क) तपाईंको परिवारमा कुनै सदस्य विगत वर्षमा विरामी भएका थिए रु

थिए ☐ थिएनन् ☐

(ख) यदि थिए भने निम्न विवरण दिनुहोस् रु

क्र.सं.	नाता	पुरुष	महिला	उमेर	रोग
१					
२					
३					
४					



TOB - PRAGATINAGAR SMALL TOWN WATER SUPPLY AND SANITATION PROJECT, December 2017

(रोगको प्रकार:- दिवापखाला, आउं, टाइफाइड, हैजा, मलेरिया, टीबी, जन्डीस, छाला सम्बन्धी, निमोनिया, दम, रक्तचाप, एड्स र यौन रोग, अन्य)

(ग) विरामी पर्दा सर्वप्रथम कहाँ जानुहुन्छ रु

(घ) त्यहाँ निको नभए कहाँ जानुहुन्छ रु कमश उल्लेख गर्नुहोस ।

क.सं	जाने ठाउँ	रहेको स्थान	दूरी (कि.मी.)
१	अस्पताल		
२	हेल्थपोस्ट		
३	हेल्थ सेन्टर		
४	आयुर्वेदिक औषधालय		
५	निर्जि क्लिनिकर औषधी पसल		
६	धामी भाकी		
७	अन्य		

घ. महिलाको अवस्था:

(क) श्रमको वर्गिकरण

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	खनजोत		
२	मल राख्ने		
३	जमिन तयारी		
४	रोप्ने		
५	गोडमेल		
७	सिंचाई		
८	काट्ने		
९	बोक्ने र थन्काउने		
१०	अन्न प्रसोधन (कुटाई पिसाई)		
११	घाँस दाउरा		
१२	गोठालो		
१३	मैलापात		
१४	खाना पकाउने		
१५	पानी पखेरो		
१६	बच्चावच्ची र बूढाबूढी हेरविचार		

(ख) सम्पत्तिमा अधिकार

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	घर		
२	जग्गा		
३	पशु		
४	गरगहना		

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
६	उद्योग धन्दा		
७	अन्य		

(ग) निर्णय प्रक्रियामा अधिकार

क.सं	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	वाली रोज्ने		
२	पशु खरीदविक्री		
३	गरगहना खरीदविक्री		
४	थुल खरीदविक्री		
५	फलफूल खरीदविक्री		
६	पशुजन्य पदार्थ खरीदविक्री		
७	काठ दाउरा खरीदविक्री		
८	विहावारी		
९	परिवार नियोजन		
१०	छोराछोरी पढाई लेखाई		
११	अन्य		

९. मुआब्जा सम्बन्धी: (आवश्यक परेको अवस्थामा मात्रै)

(क) तपाईंको घर र जग्गाको मुआब्जा के मा चाहनु हुन्छ रु

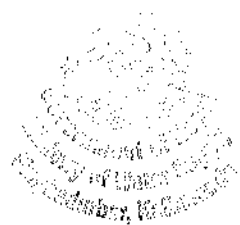
नगद ☐ जग्गाको सट्टा जग्गा ☐ अन्य ☐

(ख) यदि तपाईंले मुआब्जा नगदमा पाउनु भयो भने उक्त मुआब्जा रकम के मा प्रयोग गर्नु हुन्छ रु

जग्गा किल्ले ☐ घर बनाउने ☐ ऋण तिर्ने ☐
 व्यापार गर्ने ☐ अन्य ☐

१०. प्रस्ताव कार्यान्वयन गर्दा के कस्तो प्रभाव पर्न सक्दछ सो सम्बन्धी राय सुभाब छ रु
 सकारात्मक: नकारात्मक:





**ANNEX 2: ENIRONMENTAL STANDARDS,
SAMPLE FORMS, FORMATS AND REPORTING TEMPLATE**

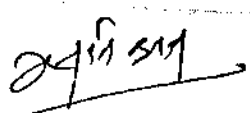


24/11/19
Engineer



IEE of Pragatinagar Urban Water Supply and Sanitation Project
November 2019




Engineer



ANNEX 2-A: RELEVANT ENVIRONMENTAL QUALITY STANDARDS

Ambient Air Quality Standards

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard ($\mu\text{g}/\text{m}^3$) *	WHO Air Quality Guidelines ($\mu\text{g}/\text{m}^3$) **	
			Global Update 2005	Second Edition * 2000
TSP	Annual	-	-	-
	24-hour	230	-	-
PM ₁₀	Annual	-	20	-
	24-hour	120	50	-
PM _{2.5}	1-year	-	10	-
	24-hour	-	25	-
SO ₂	Annual	50	-	-
	24-hour	70	20	-
	10-minute	-	500	-
NO ₂	1-year	40	40	-
	24-hour	80	-	-
	1-hour	-	200	-
CO	8-hour	10,000	-	10,000
	15-minute	100,000	-	100,000
Pb	1-year	0.5	-	0.5
Benzene	1-year	20	-	-

* National Ambient Air Quality Standards for Nepal, 2003. Obtained from Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.

** Environmental, Health and Safety General Guidelines, 2007. International Finance Corporation, World Bank Group.

* Air Quality Guidelines for Europe, Second Edition, 2000. WHO Regional Office for Europe, Copenhagen.

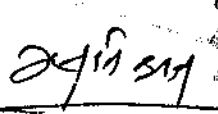
Parameter that either has no national standard value for 24-hour observation or with WHO guideline value for 24-hour observation as more stringent than that specified in the national standards.

Noise Level Standards

Receptor / Source	National Noise Standard Guidelines, 2012 (dB)		WHO Guideline Values for Noise Levels Measured Out of Doors * (One Hour L _{max} in dBA)	
	Day	Night	07:00 - 22:00	22:00 - 07:00
Industrial area	75	70	70	70
Commercial area	65	55		
Rural residential area	45	40	55	45
Urban residential area	55	50		
Mixed residential area	63	55		
Quiet area	50	40	-	-
Water pump	65		-	-
Diesel generator	90		-	-

* Guidelines for Community Noise, WHO, 1999.

Source: Environmental, Health and Safety General Guidelines, 2007.
International Finance Corporation, World Bank Group.


Engineer


Government of Nepal
Ministry of Water Supply
Kathmandu


Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage
Urban Water Supply and Sanitation Sector Project
Project Management Unit

29/11/19

Engineer



National Drinking Water Quality Standards, 2006

Group	National Drinking Water Quality Standards, 2006			WHO Guidelines for Drinking-water Quality, 4th Edition, 2011*
	Parameter	Unit	Max. Concentration Limits	
Physical	Turbidity	NTU	5 (10) **	-
	pH		8.5 - 8.5	none
	Color	TCU	5 (15)	none
	Taste & Odor		Would not be objectionable	-
	TDS	mg/l	1000	-
	Electrical Conductivity	µS/cm	1500	-
	Iron	mg/l	0.3 (3)	-
	Manganese	mg/l	0.2	-
	Arsenic	mg/l	0.05	0.01
	Cadmium	mg/l	0.003	0.003
	Chromium	mg/l	0.05	0.05
	Cyanide	mg/l	0.07	none
	Fluoride	mg/l	0.5 - 1.5 *	1.5
	Lead	mg/l	0.01	0.01
	Ammonia	mg/l	1.5	none established
Chemical	Chloride	mg/l	250	none established
	Sulphate	mg/l	250	none
	Nitrate	mg/l	50	50
	Copper	mg/l	1	2
	Total Hardness	mg/l	500	-
	Calcium	mg/l	200	-
	Zinc	mg/l	3	none established
	Mercury	mg/l	0.001	0.006
	Aluminum	mg/l	0.2	none established
	Residual Chlorine	mg/l	0.1 - 0.2	5 **
Micro Germs	E-coli	MPN/100ml	0	must not be detectable in any 100 ml sample
	Total Coliform	MPN/100ml	0 in 95% of samples taken	

* Health-based guideline values

** Figures in parenthesis are upper range of the standards recommended.

* These standards indicate the maximum and minimum limits.

** From WHO (2003) Chlorine in Drinking-water, which states that this value is conservative.

** Parameter with WHO guideline value as more stringent than national standard value.

National Drinking Water Quality Standards was obtained from the Environment Statistics of Nepal 2011, Government of Nepal, National Planning Commission Secretariat, Central Bureau of Statistics, Kathmandu, Nepal.



Signature
Engineer



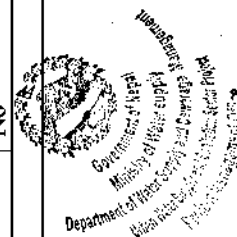
ANNEX 2-B:
SAMPLE GRIEVANCE REDRESS FORM
(To be available in Nepalese and English)

The _____ Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enables us to get in touch with you for clarification and feedback. Should you choose to include your personal details but want that information remain confidential, please inform us by writing/typing* (CONFIDENTIAL)* above your name. Thank you.

Date: _____		Place of registration	
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 includes 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: (Names of official registering grievance)	
Mode of communication: Note/Letter E-mail Verbal/Telephonic	
Reviewed by: (Names/positions of official(s) reviewing grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Mean of Disclosure	



Engineer

**ANNEX C:
SAMPLE TRAFFIC MANAGEMENT PLAN**

SAMPLE: TRAFFIC MANAGEMENT PLAN (TMP)

A. Principles

One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone, and to address the following issues:

- the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
- protection of work crews from hazards associated with moving traffic;
- mitigation of the adverse impact on road capacity and delays to the road users;
- maintenance of access to adjoining properties
- Avoid hazards in addressing issues that may delay the project.

B. Operating Policies for TMP

The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

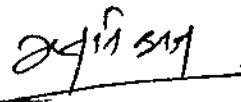
- Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
- Inhibit traffic movement as little as possible.
- Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
- Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
- Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
- Train all persons that select, place, and maintain temporary traffic control devices.
- Keep the public well informed.
- Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

C. Analyze the impact due to street closure

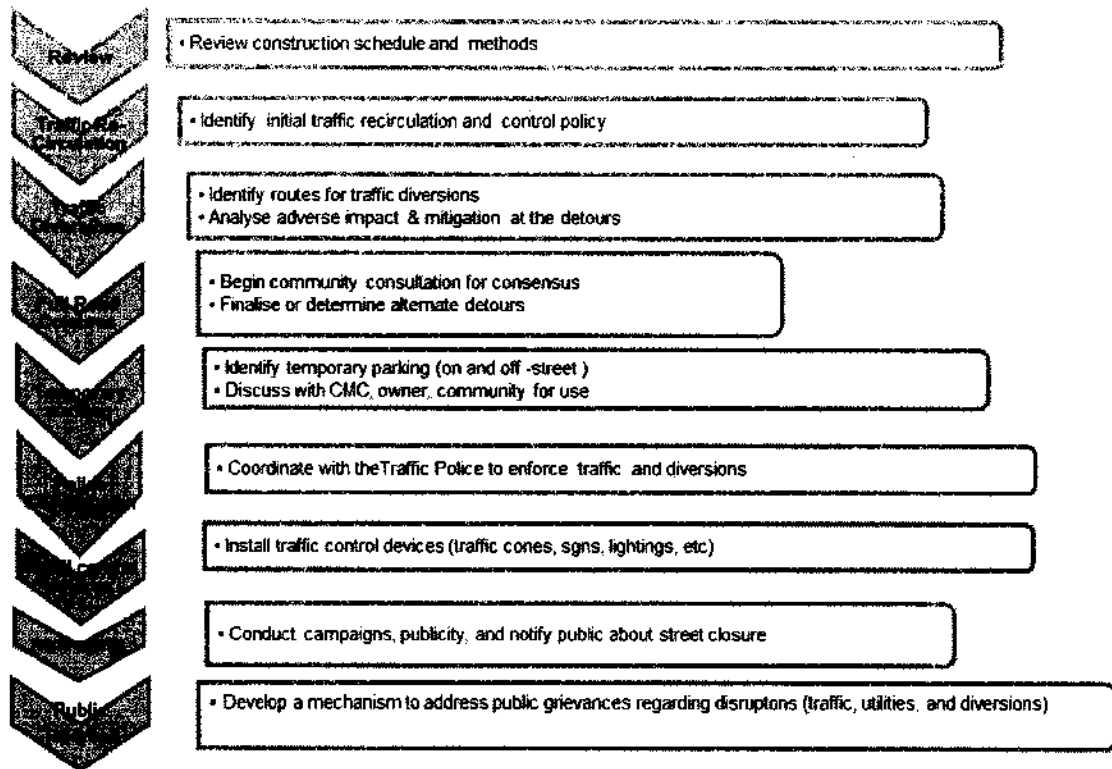
Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

- approval from the ICG, local administration to use the local streets as detours;
- consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- determining if additional traffic control or temporary improvements are needed along the detour route;
- considering how access will be provided to the worksite;
- contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
- developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the Detour Street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.


Engineer





Policy Steps for the TMP

D. Public awareness and notifications

As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

The ICG will also conduct an awareness campaign to educate the public about the following issues:

- traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- defensive driving behavior along the work zones; and
- reduced speeds enforced at the work zones and traffic diversions.

It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the ICG, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

- Explain why the brochure was prepared, along with a brief description of the project.

24/11/2019
Engineer
Pragatinagar Urban Water Supply and Sanitation Project
Pragatinagar, Karnataka

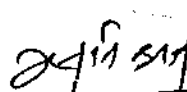
Pragatinagar Urban Water Supply and Sanitation Project
Pragatinagar, Karnataka
Project Management Office

- Advise the public to expect the unexpected;
- Educate the public about the various traffic control devices and safety measures adopted at the work zones;
- Educate the public about the safe road user behavior to emulate at the work zones;
- Tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
- Indicate the office hours of relevant offices.

E. Vehicle Maintenance and Safety

A vehicle maintenance and safety program shall be implemented by the construction contractor. The contractor should ensure that all the vehicles are in proper running condition and it comply with roadworthy and meet certification standards of GoN. All vehicles to be used at STWSSP shall be in perfect condition meeting pollution standards of GoN. The vehicle operator requires a pre state of shift checklist. Additional safety precautions will include the requirement for:

- Driver will follow the special code of conduct and road safety rules of Government of Nepal.
- Drivers to ensure that all loads are covered and secured drivers to ensure operation equipment can't leak materials hauled
- Vehicles will be cleaned and maintained in designed places.


Engineer




Government of Nepal
Ministry of Water supply
Department of Water Supply and Sanitation
Urban Water Supply and Sanitation Sector Project
Project Management Office

F. Install traffic control devices at the work zones and traffic diversion routes

The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

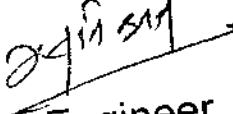
Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary "STOP" and "GO").

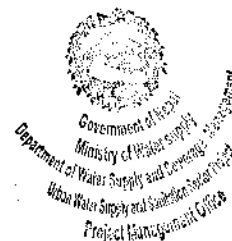
The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

The ICG and contractor will coordinate with the local administration and traffic police regarding the traffic signs, detour, and any other matters related to traffic. The contractor will prepare the traffic management plan in detail and submit it along with the EMP for the final approval.


Engineer



ANNEX D: SPOIL MANAGEMENT PLAN

Spoil Management Plan (SMP)

Purpose and application: SMP is to describe how STWSSP will manage the spoil generated and reuse related to design and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works in accordance with the spoil management hierarchy outlined in this document.

Objectives of SMP: The objectives of SMP are:

- To minimize spoil generation where possible
- Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
- Manage onsite spoil handling to minimize environmental impacts on resident and other receivers
- Minimize any further site contamination of land, water, soil
- Manage the transportation of spoil with consideration of traffic impacts and transport related emissions

Structure of SMP:

Section 1: Introduction of SMP

Section 2: Legal and other requirements

Section 3: Roles and responsibilities

Section 4: Identification and assessment of spoil aspects and impacts

Section 5: Spoil volumes, characteristics and minimization

Section 6: Spoil reuses opportunities, identification and assessment

Section 7: On site spoil management approach

Section 8: Spoil transportation methodology

Section 9: Monitoring, Reporting, Review, and Improvements

Aspects and Potential Impacts

The key aspects of potential impacts in relation to SMP are listed in table below

Aspects	Potential Impacts
Air Quality	Potential for high winds generating airborne dust from the stock piles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and Groundwater	Contamination of water (surface and ground water)
Noise	Associated with spoil handling and haulage and storage
Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a receivable site that doesn't have permission for storage/disposal
Design specifications	Limitations on opportunities to minimize spoil generation
Sustainability	Limited sites for storage, reuse opportunities

Spoil volumes, Characteristics and Minimization

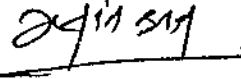
Spoil volume calculations: Estimate the volumes of spoils produced from each of the construction sites.

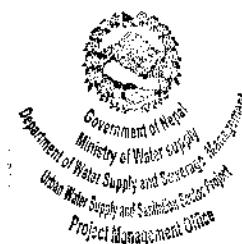
Characterization of spoil: Based on the type of spoil; characterization is done (sand stone, MWSS mix materials, reusable materials)

Adopt Spoil Reduce, Reuse Opportunities

An overview of the assessment methodology to be used is mentioned below.

- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities


Engineer



Identification of possible safe disposal sites for spoil: Those spoils which can't be reuse shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior cliental approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

Storage and stock piling

Transportation and haulage route

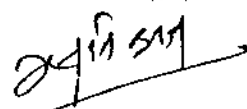
Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the DSMC for their review and approval.

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

Appendixes

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection Report
- Others


Engineer



**ANNEX E:
SAMPLE SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE**

This template must be included as an appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

INTRODUCTION

- Overall project description and objectives
- Description of sub-projects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

N o.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre- Construction	Construction	Operational		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

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

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

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

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

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

[Signature]
Engineer



Summary Monitoring Table

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



[Signature]
Engineer



Overall Compliance with CEMP/EMP

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

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

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

MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (AMBIENT AIR, WATER QUALITY AND NOISE LEVELS)

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

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

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 (µg/m3)	SO2 (µg/m3)	NO2 (µg/m3)



Signature
Engineer



Water Quality Results

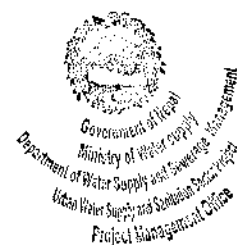
Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity (µS/cm)	BOD (mg/L)	TSS (mg/L)	TN (mg/L)	TP (mg/L)

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

Noise Quality Results

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

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



29/11/2019
Engineer



ANNEX F:
SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT

Project Name
Contract Number

NAME: _____ DATE: _____
TITLE: _____ DMA: _____
LOCATION: _____ GROUP: _____

WEATHER CONDITION: _____

INITIAL SITE CONDITION: _____

CONCLUDING SITE CONDITION:

Satisfactory _____ Unsatisfactory _____ Incident _____ Resolved _____ Unresolved _____

INCIDENT:
Nature of incident: _____

Intervention Steps: _____

Incident Issues

Resolution

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

Inspection

Emissions	Waste Minimization
Air Quality	Reuse and Recycling
Noise pollution	Dust and Litter Control
Hazardous Substances	Trees and Vegetation
Site Restored to Original Condition Yes No	

Signature _____

Sign off

Name _____

Position _____

Name _____

Position _____

Engineer



ANNEX 3:
PROJECT LOCATION AND SERVICE AREA



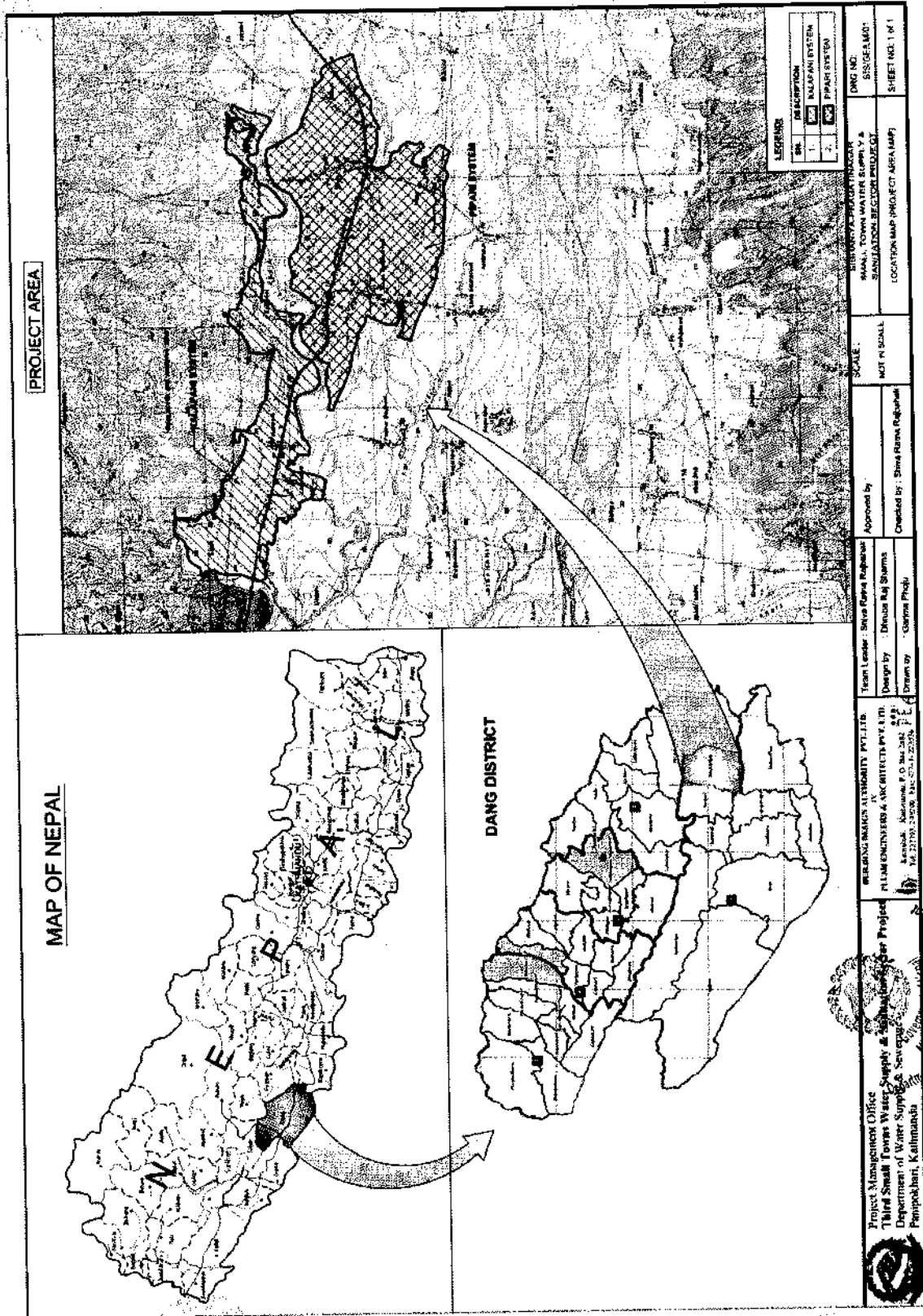
[Handwritten signature]
Engineer





[Signature]
Engineer





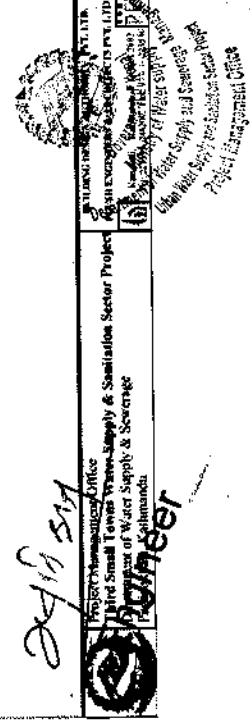
Engineer



24/11/19

Engineer



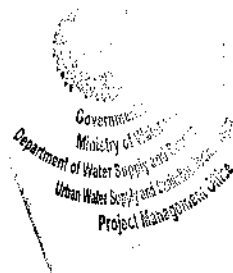


ANNEX 4:
Public Notice, Muchulka, Public Consultations, Consent Letters, Recommendation Letter



24/11/2019
Engineer





24/11/19
Engineer



आर्थिक अभियान

शहरी खानेपानी तथा सरसफाई क्षेत्रगत आयोजना
प्रगतिनगर खानेपानी तथा सरसफाई आयोजना
राष्ट्रिय गाउँपालिका, दाङ
प्रारम्भिक वातावरणीय परिक्षणको लागि राख सुझाव पेश गर्ने सम्बन्धी
सार्वजनिक सूचना
प्रकाशित मिति: २०७४/०८/०३

नेपाल सरकार र एशियाली विकास बैंकको आर्थिक सहयोगमा प्रदेश नं. ५ को दाङ जिल्ला स्थित राष्ट्रिय गाउँपालिका वडा नं. ५, ७ र ८ मा संचालन हुन गइरहेको प्रगतिनगर शहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणीय परिक्षण (Initial Environmental Examination) प्रतिवेदन तयार गर्नु पर्ने भएकाले सो आयोजनाबाट भौतिक, जैविक सामाजिक आर्थिक एवं सांस्कृतिक पक्ष तथा प्रणालीहरूमा के कस्ता असरहरू पर्दछन् वा पर्ने सक्दछन् सो बारे लिखित राय सुझाव सहित १५ (पन्ध्र) दिवसभित्र आईपुग्ने गरी निम्न ठेगानामा पठाई दिनु हुन वातावरण संरक्षण नियमावली २०५४ को नियम ७ (२) अनुसार यो सूचना प्रकाशित गरिएको छ। साथै लिखित राय सुझावको प्रतिलिपी सम्बन्धित मन्त्रालय तथा विभागमा समेत दिन सकिनेछ।

राख सुझाव पठाउने ठेगाना

तेश्रो साना शहरी खानेपानी तथा
सरसफाई क्षेत्रगत आयोजना
आयोजना व्यवस्थापन कार्यालय
पानीपोखरी, काठमाण्डौ
फोन: ०१-४४१२३४८
फ्याक्स: ०१-४४१३२८०

खानेपानी तथा सरसफाई उपमोक्ता
कार्यालय, प्रगतिनगर
राष्ट्रिय गाउँपालिका, दाङ
फोन: ९८४७८४८२५७

बि.डि.ए.-पि.इ.ए. जे.भी.
कमलादी, काठमाण्डौ
पो.ब.नं.: ३८८२
फोन नं.: ०१-४२४८२००
फ्याक्स: ०१-४२२३४३६

ई-मेल: bdapvttd@gmail.com



अभिमान
Engineer





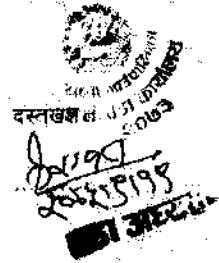

Engineer

सूचना टाँसको सुचुल्का

आज मिति २०७५/०९/१६ गतेका दिन यस राप्ति गाउँपालिका, दाङ जिल्लामा शहरी खानेपानी तथा सरसफाई आयोजना अन्तर्गत यस नगरपालिकामा संचालन हुन गर्दैरहेको "प्रगतिनगर खानेपानी तथा सरसफाई आयोजना" को प्रारम्भिक वातावरणीय परिक्षण (IEE) का लागि वातावरण संरक्षण नियमावली २०५४ अनुसार मिति २०७५/०९/०३ मा प्रकाशित सार्वजनिक सूचना यस कार्यालयमा टाँस भई सो सम्बन्धी जानकारी प्राप्त भएको छः

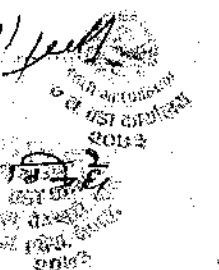
१. राप्ति गाउँपालिका, दाङ - वडा नं. ५

सूचना पाटिमा टाँस गरेको छिने।



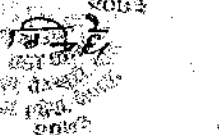
२. राप्ति गाउँपालिका, दाङ - वडा नं. ७

सूचना पाटिमा टाँस गरेको छिने।



३. राप्ति गाउँपालिका, दाङ - वडा नं. ८

सूचना पाटिमा टाँस गरेको छिने।



४. राप्ति गाउँपालिका, दाङ - वडा नं. ९

सूचना पाटिमा टाँस गरेको छिने।



५. राप्ति गाउँपालिका, दाङ - वडा नं. १०

सूचना पाटिमा टाँस गरेको छिने।



अभिमान
Engineer



प्रजमिति 2002 साल चैत्र १ गते यसमगतिनगर साना सही -
खानेपानी तथा सरसफाई आयोजना को बैंक संस्थाको अध्यक्ष श्री
शान्तराज शर्मा को अध्यक्षतामा बसि निर्माणकारको उपस्थिति
मा तपतिल बमोजिमको निर्णय हु गरियो।

उपस्थिति

१. अध्यक्ष- श्री शान्तराज शर्मा
२. उपाध्यक्ष- श्री भिमा आचार्य
३. सचिव- श्री ओम नाथ वज्राडे
४. कौषाध्यक्ष- श्री अर्जुन कु. अधिकारी
५. सदस्य- श्री भरत प्रसाद पाके
- ६- " श्री तुलाधर मल्ल
- ७- " श्री विरबहादुर चौधरी
- ८- " श्री नारायण प्रसाद "
- ९- " श्री हरेन्द्र परिया
- १०- " श्री प्रतिमा आचार्य
- ११- " श्री निर्मला चौधरी
- १२- " श्री शिवधाम मल्ल
- १३- " श्री मिश्रराज भट्टराई
- १४- " श्री मोखुरा चौधरी
- १५- " श्री सुरामणि पोखरेल
- १६- " श्री दलिलाल चौधरी
- १७- " श्री देव प्रसाद "
- १८- " श्री देविराम शर्मा
- १९- " श्री सुन्दर साही
- २०- " श्री राम बहादुर साही
- २१- " श्री तुलसी प्रसाद गौतम
- २२- " श्री पुरन प्रसाद चौधरी
- २३- " श्री श्यामा रावत
- २४- " श्री विष्णु रावत
- २५- " श्री प्रकाश पौडेल
- २६- " श्री सोमप्रकाश आचार्य
- २७- " श्री राम प्रसाद चौधरी
- २८- " श्री रत्न के.सी.

श्री शर्मा
श्री भिमा
श्री ओम
श्री अर्जुन
श्री भरत
श्री तुलाधर
श्री विरबहादुर
श्री नारायण
श्री हरेन्द्र
श्री प्रतिमा
श्री निर्मला
श्री शिवधाम
श्री मिश्रराज
श्री मोखुरा
श्री सुरामणि
श्री दलिलाल
श्री देव प्रसाद
श्री देविराम
श्री सुन्दर
श्री राम बहादुर
श्री तुलसी
श्री पुरन
श्री श्यामा
श्री विष्णु
श्री प्रकाश
श्री सोमप्रकाश
श्री राम प्रसाद
श्री रत्न के.सी.

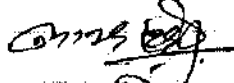
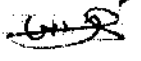
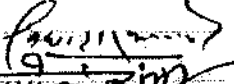
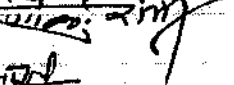
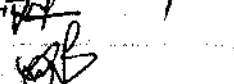
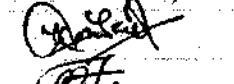
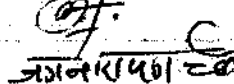
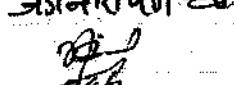
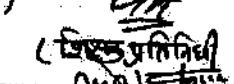
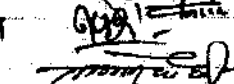
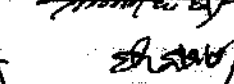
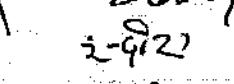
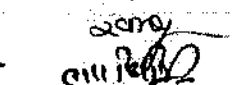
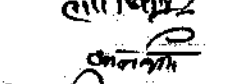
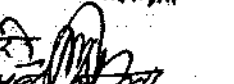
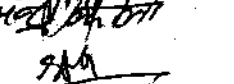
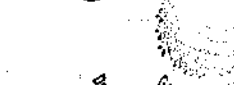
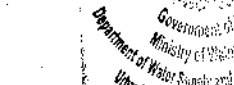
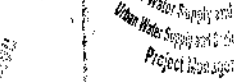
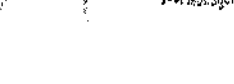


अभिमान
Engineer

30. सदस्य श्री गोविन्द कुवसेत्री

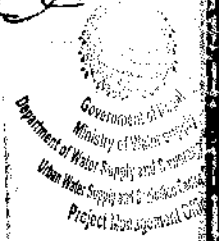
गोविन्द

आमन्त्रित

31. रा.गा.पा. अध्यक्ष श्री नृमानन्द सुवेदी 
32. " उपाध्यक्ष श्री जगदम्मा कु. चौधरी 
33. " वडा अध्यक्ष श्री गोबिन्दन रावत 
34. " " " श्री विद्या सरण चौधरी 
35. " " " श्री जीरु वहादुर शर्मा 
36. " " सदस्य श्री भानु चौधरी 
37. 60. A/P.E.A.U. श्री योगेश साव्य 
38. सदस्य श्री मोहन प्रसाद चौधरी 
39. " श्री पुरन प्रसाद " 
40. " श्री लहान " 
41. " श्री जगनारायण " 
42. " श्री तिलकपुर धापा " 
43. " श्री मधु प्रसाद सुवेदी " 
44. " श्री भगवता अधिकारी " 
45. श्री सर्वोदय मा. वि. सहयोगी हेमराज अधिकारी (विद्युत्प्रतिनिधी) 
46. संस्था सदस्य श्री जगेश कुमार चौधरी 
47. श्री हरम मा. वि. विष्णु श्री ओमिन्द प्रसाद " 
48. श्री हरि प्रसाद कुवाली 
49. श्री इन्दोरा पोखरेल 
50. श्री संगिता वेल्वासे 
51. संस्था सदस्य श्री तारा विभीरे 
52. श्री कमला शर्मा 
53. श्री स्वर्णेश्वर अधिकारी 
54. श्री चन्द्र कला " 
55. श्री साता सुवेदी 
56. श्री गंगा कुसी 

24/11/19

Engineer



प्रस्ताव

१- प्रारम्भिक वातावरणिय परिक्षण (IEE) सम्बन्धी सार्वजनिक
अन्तरक्रिया कार्यक्रम सम्बन्धमा :-

निर्णय

प्रस्ताव नं. १ माथि छलफल गर्दा यस प्रगतिनगर तेस्रो स्थाना सहरी -
स्थानेपाती तथा सरसफाई आयोजना को मिति २०७५ साल पौष
शुक्ले प्रकाशित प्रारम्भिक वातावरणिय परिक्षण (I-E-E)
को सुचना अनुसार यस रा.गा.पा. वडा नं. ५ को लभोकट्टा
मा यस आयोजनाको कार्यान्वयन वाट वातावरणमा पर्ने
सम्बन्धी असरहरू र सम्भाव्य न्युनिकरण रोक धामको ठुण्डा
रुट वाट विस्तारमा आयुक्त सार्वजनिक छलफल गरियो।
जसमा निम्नानुसार बुझाईएको छ ।

- १- यस आयोजना को संरचना र स्मातहरू वारे विस्तीर्ण रुपमा
छलफल भयो ।
- २- यस आयोजना को निर्माण कार्य गर्दा वातावरण का नैतिक,
सांसाजिक आर्थिक पक्षहरूमा पर्ने सम्बन्धी असरहरू
कोरु जानकारी र छलफल भयो ।
- ३- निर्माण कार्य क्रममा शिव मैदिर वडा नं. ८ पारिसर सजिकता
२५ मिटर देखि ४५ मिटर सम्म width बन्नु पर्ने सुझाव
प्राप्त भयो ।
- ४- शिवालयमा वडा नं. ८ कमसेकम डिकरन हुने गरि जाले -
वाट काट गरि सुरक्षित तवरले आम गर्नु पर्ने सुझाव प्राप्त
भयो ।
- ५- निर्माण कार्य का लागि construction camp पिपरी
चोक को वन कार्यालय को परिसर सजिक को जग्गा
प्रयोग गर्ने सम्बन्धी सुझाव प्राप्त भयो ।

६- आयोजना को अवधारणा का वारेमा गाडुपलिका
का अवस्था रूट वाट रोला रेलगाडी जस्तै समुदाय

को लैग समन्वय गरि आम गर्नु पर्ने सुझाव प्राप्त
भयो ।

अभिमान
Engineer



Public Consultation

प्रजमिति २०१२ साल चैत्र ८ गते यसप्रगतिनगर साना सस्ती -
रुनेपानी तथा सरसफाई आयोजना को बैंक संस्थाको अध्यक्ष श्री
शान्तराज शर्मा को अध्यक्षतामा बस्ने निर्माणकारको उपस्थिति
मा तपस्विल बमोजिमको निर्णय हुन गरीयो।

उपस्थिति

१. अध्यक्ष श्री शान्तराज शर्मा
२. उपाध्यक्ष श्री मिना कान्छा
३. सचिव श्री ओम नाथ बज्राडे
४. कोषाध्यक्ष श्री अर्जुन कु. अधिकारी
५. सदस्य श्री भरत प्रसाद पाख्रे
६. " श्री तुलाधर मल्ल
७. " श्री विरबहादुर चौधरी
८. " श्री नारायण प्रसाद "
९. " श्री सोनू परिवार
१०. " श्री प्रतिमा आचार्य
११. " श्री निर्मला चौधरी
१२. " श्री शिवधन मल्ल
१३. " श्री निरञ्जन भट्टराई
१४. " श्री जोगुराज चौधरी
१५. " श्री सुरामणि पौडेल
१६. " श्री दलिलाल चौधरी
१७. " श्री देव प्रसाद "
१८. " श्री देविकाम शर्मा
१९. " श्री सुन्दर राही
२०. " श्री राम बहादुर राही
२१. " श्री तुल्सी प्रसाद जोत्त
२२. " श्री पुरन प्रसाद चौधरी
२३. " श्री प्रणाम रावल
२४. " श्री विष्णु रावल
२५. " श्री प्रकाश पौडेल
२६. " श्री सोभान आचार्य
२७. " श्री राम प्रसाद चौधरी
२८. " श्री रत्न के.सी.

श्री

श्री

श्री

श्री

श्री

श्री

श्री

श्री

श्री

श्री

श्री

श्री

श्री

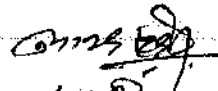
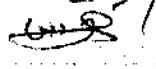
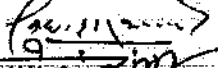
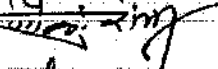
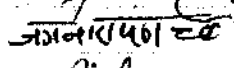
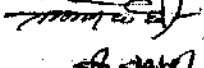
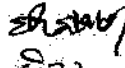
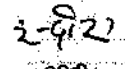
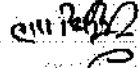
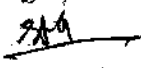
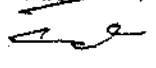
श्री
Engineer



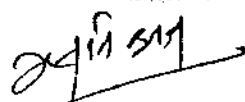
३०- सदस्य श्री गोविंद कुवसेत्री

गोविंद

आमन्त्रीत

- ३१- रा.गा.पा. अध्यक्ष श्री नृपानन्द सुवेदी 
- ३२- " उपाध्यक्ष श्री जगदम्माकु. चौधरी 
- ३३- " वडा अध्यक्ष श्री गोदाधन रावत
- ३४- " " श्री विद्या हरण चौधरी 
- ३५- " " श्री गीर्ण वहापुर दाता 
- ३६- " " सदस्य श्री भानु चौधरी 
- ३७- B.O. A/P.E.A.J. श्री योगेश सावय 
- ३८- सदस्य श्री रोहन प्रसाद चौधरी 
- ३९- " श्री पुरन प्रसाद " 
- ४०- " श्री लहजु " " 
- ४१- " श्री जगनारायण " 
- ४२- " श्री तिलाकपुर धापा 
- ४३- " श्री मधु प्रसाद सुवेदी 
- ४४- " श्री भगवता अधिकारी 
- ४५- श्री सर्वोदय मा. वि. सहितियों हेमराज अधिकारी 
- ४६- संस्था सदस्य श्री जगेश कुमार चौधरी 
- ४७- श्री सूरमा. वि. विष्णु/श्री ओमिन प्रसाद " 
- ४८- श्री हरि प्रसाद खाली 
- ४९- श्री इन्दिरा पौमेल 
- ५०- श्री संगिता वेल्वासे 
- ५१- संस्था सदस्य श्री तारा धिमरि 
- ५२- श्री कमला शर्मा 
- ५३- श्री स्वामीवर अधिकारी 
- ५४- श्री चंद्र कला " 
- ५५- श्री साता सुवेदी 
- ५६- श्री रीता कुशी 




Engineer

Government
Ministry of
Department of Water Supply
Urban Water Supply
Project Division

प्रस्ताव

१- प्रारम्भिक वातावरणिय परिक्षण (IEE) सम्बन्धी सार्वजनिक
अन्तरक्रिया कार्यक्रम सम्बन्धमा:-

निर्णय

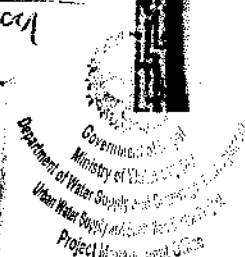
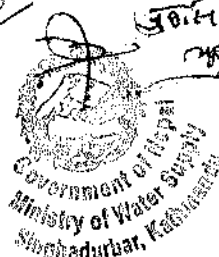
प्रस्ताव नं. १ माथि छलफल गर्दा यस प्रगतिनगर तेस्रो खाना सहरी -
स्थानेपाती तथा सरसफाई आयोजना को मिति २०७५ साल वैशाख
३ गते प्रकाशित प्रारम्भिक वातावरणिय परिक्षण (I-E-E)
को सूचना अनुसार यस रा.गा.पा. वडा नं. ५ को सभाकक्ष
मा यस आयोजनाको कार्यान्वयन तार वातावरणमा पर्ने
सम्बन्धी असरहरू र सम्भाव्य न्युनिकरण रोकथामको रूपमा
रुख तोरे विस्तारमा व्यापक सार्वजनिक छलफल गरियो।
सबमा निर्माण हुने ढुङ्गाहरू छन्।

- १- यस आयोजना को संरचना र स्थापना गर्ने विस्तारित रूपमा
छलफल भयो।
- २- यस आयोजना को निर्माण कार्य गर्दा वातावरण का भौतिक,
नैतिक, सामाजिक, आर्थिक पक्षहरूमा पर्ने असरहरू
को बारे जानकारी र छलफल भयो।
- ३- निर्माण कार्य क्रममा शिव मन्दिर वडा नं. ८ परिसर मजिफ्ता
२५ मिटर देखि ४५ मिटर सम्म wall बनाउनु पर्ने सुझाव
प्राप्त भयो।
- ४- शिवालयमा वडा नं. ८ कमसेकम डिस्कभ हुने गरि जालो -
तार काटि गरि सुरक्षित तबली काम गर्नु पर्ने सुझाव प्राप्त
भयो।
- ५- निर्माण कार्यको लागि construction camp सिपरी
चोक को वन कार्यालय को परिसर नजिकैको जग्गा
प्रयोग गर्ने सम्बन्धी सुझाव प्राप्त भयो।

६- आयोजना को अवधारणा का बारेमा गाउँपालिका
का अध्यक्ष रूख बाट होला रेलमा जन समुदाय
को समन्वय गरि काम गर्ने पर्ने सुझाव प्राप्त
भयो।

अध्यक्ष/ वडा समन्वय गरि काम गर्ने पर्ने सुझाव प्राप्त
भयो।

अध्यक्ष
Engineer



राप्ती गाउँपालिका

८ नं. वडा कार्यालय

पिपरी देउखरी दाई

५ नं. प्रदेश नेपाल



मिति २०७६/०२/१९

विषय - जग्गा उपलब्ध गराइएको बारे ।

सम्बन्धित तथ्याङ्क सङ्ग्रहण आयोजना

सम्बन्धित तथ्याङ्क सङ्ग्रहण विभाग वि.सं.देउखरी, दाई

यस आयोजना माफत राप्ती गाउँपालिका वडा नं. ५, ७ र ८ मा संचालन
माथि आवश्यक पर्ने कार्यालय भवन बोर्डिङ जडान र शौचालय लगायत
निम्नानुसारको जग्गा उपलब्ध गराउने भएकोले सो स्थानमा आवश्यक
जग्गा उपलब्ध गराइएको व्यहोरा सादर अनुरोध गरिन्छ ।

समाधान
समाधानको कार्यालय संचालन गर्न भवन तथा टुकी निर्माण गर्न
समाधान गर्नुपर्ने भएमा पिपरी दाई जाने पक्की बाटो, पश्चिममा टेक
समाधान गर्ने भएमा रामबाल चौधरी तथा गोविन्द के.सी.को जग्गा यी

समाधान गर्न तथा बोर्डिङ जडानको लागि राप्ती
गाउँपालिका वडा नं. ५, ७ र ८ मा उपलब्ध गराइने भएमा यी जग्गा
समाधान गर्ने भएमा यी जग्गा नं. १ कट्टा रैलानी जग्गा ।

समाधान गर्न तथा बोर्डिङ जडानको लागि राप्ती गाउँपालिका वडा नं. ८
मा उपलब्ध गराइने भएमा यी जग्गा नं. १ कट्टा रैलानी जग्गा ।

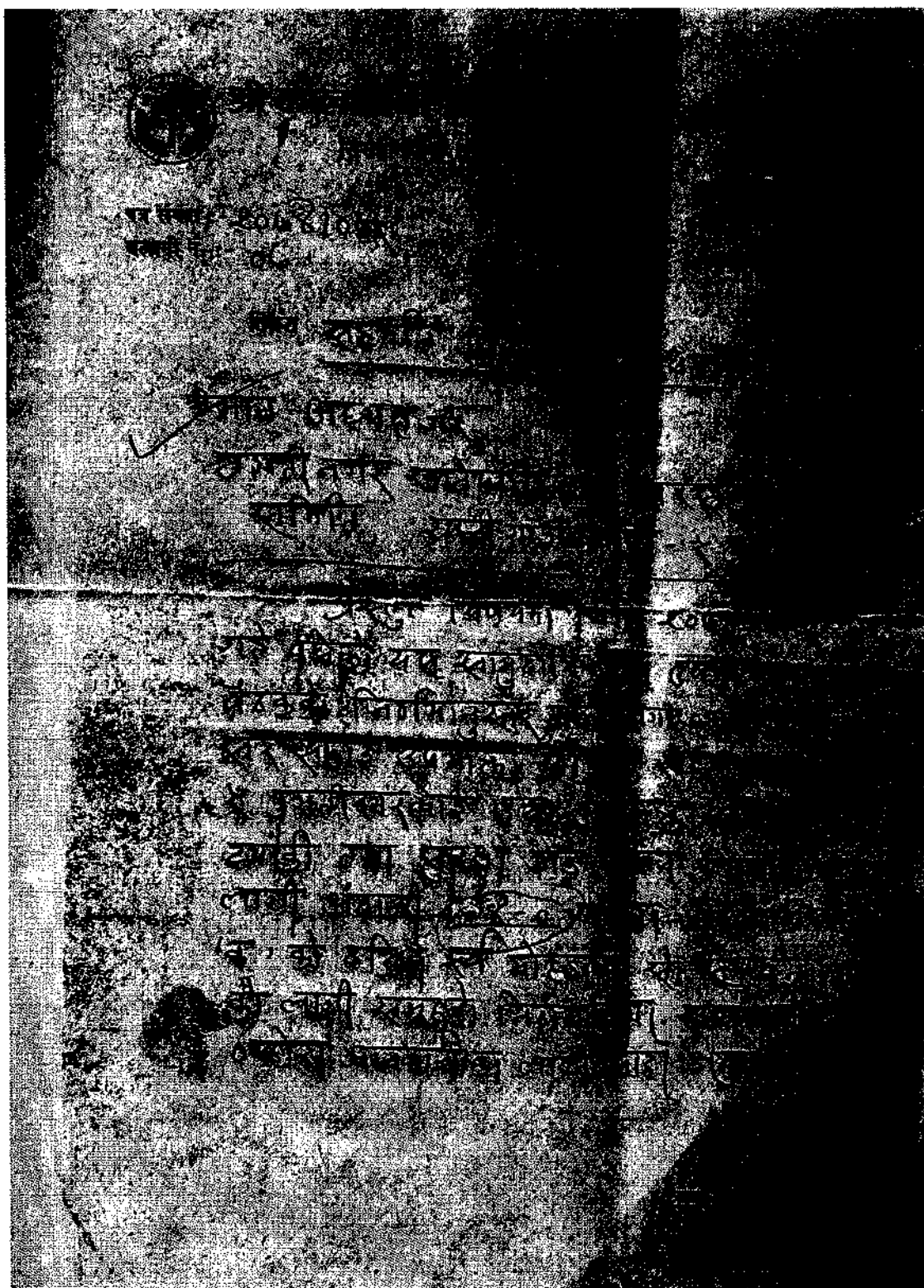
समाधान गर्न तथा बोर्डिङ जडानको लागि राप्ती गाउँपालिका वडा नं. ८
मा उपलब्ध गराइने भएमा यी जग्गा नं. १ कट्टा रैलानी जग्गा ।

समाधान गर्न तथा बोर्डिङ जडानको लागि राप्ती गाउँपालिका वडा नं. ८
मा उपलब्ध गराइने भएमा यी जग्गा नं. १ कट्टा रैलानी जग्गा ।



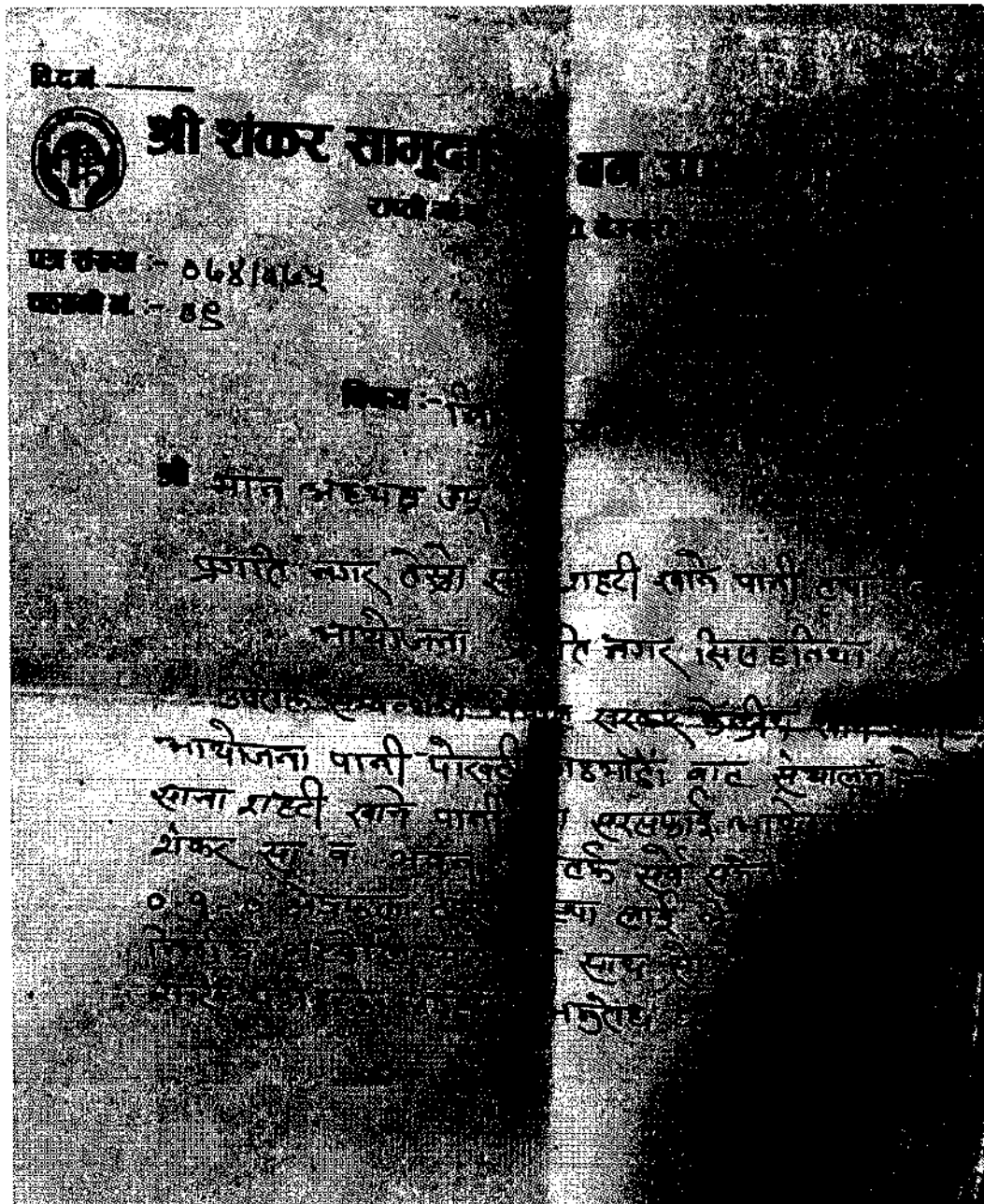
अनुमति





अभि सय
Engineer





Signature
Engineer





राष्ट्रिय गाउँपालिका गाउँ कार्यपालिकाको कार्यालय

मसुरीया, दाङ

५९ नं. प्रदेश, नेपाल

प.सं. :- २०७५/०७६

च.नं. :- १३४४



मिति: २०७५/१२/२९

विषय : सिफारिस सम्बन्धमा ।

श्री खानेपानी मन्त्रालय,
सिंहदरबार, काठमाडौं ।

उपरोक्त सम्बन्धमा त्यस मन्त्रालय अन्तर्गत प्रदेश नं. ५ को दाङ जिल्ला स्थित राष्ट्रीय गाउँपालिकामा संचालन हुने प्रगतिनगर खानेपानी तथा सरसफाई आयोजना (बडा नं. ५, ७ र ८) को प्रारम्भिक वातावरणीय परिक्षण (Initial Environmental Examination) प्रतिवेदन तयार गर्ने क्रममा सो आयोजनाबाट भौतिक, जैविक, सामाजिक, आर्थिक एवं सांस्कृतिक पक्ष तथा प्रभावहरूमा के कस्ता असरहरू पर्दछन् वा पर्ने सम्बन्धमा सो बारे लिखित राय सुझाव का लागि मिति २०७५/०९/०३ मा प्रकाशित १५(पन्ध्र) दिने सूचना यस गाउँपालिकामा र सार्वजनिक स्थानहरूमा टाँस गरिएको र सो अवधि भित्र यो कार्यालयमा कुनै विरोध पर्न नआएको कारण र यसका साथै यस अध्ययनका क्षेत्रमा कुनै प्रतिकूल प्रभाव नपर्ने देखिएको व्यहोरा समेत सिफारिस गरिन्छ ।

२०७५/१२/२९
मुमानन्द सुवेदी
अध्यक्ष

मुमानन्द सुवेदी
अध्यक्ष



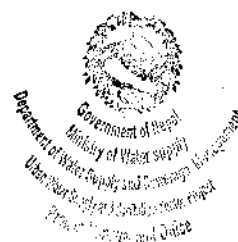
२५/१२/१९
Engineer





**ANNEX 5:
WATER QUALITY TEST REPORTS**

24/11/2019
Enc.





[Handwritten signature]
Engineer





Nepal Environmental & Scientific Services (P) Ltd.

G.P.O. Box: 7351, Thapalhari, Kathmandu, Nepal
Phone: +977-1-4244688, 4241000; Fax No: +977-1-4226028, Email: ness@nesspvt.com.np
http://www.nesspvt.com

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL-71(W) (I) - 09 - 2017 Date Received : 03 - 09 - 2017

Sample : Boring Water Date Completed : 06 - 09 - 2017

Client : BDA PEA JV Sampling Date : 31 - 08 - 2017

Sampled By : Client Location : Sishaniya-

Pragatinagar, Dang

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1.	pH at 23°C	Electrometric, 4500 - H ⁺ B, APHA	7.1	6.5 - 8.5
2.	Electrical Conductivity, (µS/cm)	Conductivity Meter, 2510 B, APHA	510	1500
3.	Turbidity (NTU)	Nephelometric, 2130 B, APHA	<1	5
4.	Total Hardness as CaCO ₃ (mg/L)	EDTA Titrimetric, 2340 C, APHA	272	500
5.	Total Alkalinity as CaCO ₃ (mg/L)	Titrimetric, 2320 B, APHA	295	-
6.	Chloride (mg/L)	Argentometric Titration, 4500 - Cl ⁻ B, APHA	2.08	250
7.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH ₃ C, APHA	0.17	1.5
8.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ B, APHA	4.58	50
9.	Nitrite, (mg/L)	NEDA, Colorimetric, 4500 - NO ₂ B, APHA	<0.02	-
10.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	85.77	200
11.	Magnesium, (mg/L)		14.10	-
12.	Arsenic, (mg/L)	SDSC, 3500 - As, C, APHA	N.D. (<0.01)	0.05
13.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	0.07	0.3
14.	Manganese, (mg/L)		N.D. (<0.02)	0.2

N.D. - Not Detected

Note:

NDWQS: National drinking Water Quality Standard - 2063; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthylethylenediamine dihydrochloride; APHA: American Public Health Association.

Remarks: All observed values complied the prescribed NDWQS for drinking water.

(Analyzed By)

(Checked By)

(Authorized Signature)

- Note:
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (012), section OFT.
 2. The result listed refer only to the tested samples & applicable parameters. Endorsement of products is neither inferred nor implied.
 3. Liability of our institute is limited to the invoiced test parameters & amount only.
 4. Samples will be destroyed after one month from the date of issue of test certificate unless otherwise specified.
 5. This report is not to be reproduced wholly / partially & cannot be used as an evidence in the Court of Law & should not be used in any advertising media without our permission in writing.
 6. The clients are requested to take back their hazardous samples along with the report/certificate

Government of Nepal
Ministry of Water Supply
Singhadurbar, Kathmandu

Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sanitation Development
Urban Water Supply and Sanitation Development
Project Management Office



Nepal Environmental & Scientific Services (P) Ltd.

G.P.O. Box: 7301, Thapathali, Kathmandu, Nepal

Phone : +977-1-4244989, 4241001, Fax No. : +977-1-4226028, Email: ness@mos.com.np

http://www.nesspltd.com

Page 1 of 1

NESS/Lab, M-03/R1.1

QS Test Report / Certificate

NS Accreditation No. Pra. 01/053-54

Entry No. : NCL - 362(W) (1) - 02 - 2018 Date Received : 28 - 02 - 2018

Sample : Ground Water Date Completed : 15 - 03 - 2018

Client : BDA PEA JV Sampled By : Client

Project : Pragatinagar Third Small Town Water Supply Project

Location : Latmatiya, Masuriya

S. N.	Parameters	Test Methods	Observed Values	NDWQS, Nepal
1.	pH at 20°C	Electrometric, 4500 - H ⁺ B, APHA	7.8	6.5 - 8.5
2.	Electrical Conductivity, (μS/cm)	Conductivity Meter, 2510 B, APHA	357	1500
3.	Turbidity, (NTU)	Nephelometric, 2130 B, APHA	2	5
4.	Color, (Chromaticity Unit)	Spectrophotometric, 2120 C, APHA	N. D. (<0.05)	5
5.	Total Hardness as CaCO ₃ , (mg/L)	EDTA Titrimetric, 2340 C, APHA	212	500
6.	Total Alkalinity as CaCO ₃ , (mg/L)	Titrimetric, 2320 B, APHA	223	-
7.	Bicarbonate Alkalinity, (mg/L)		223	-
8.	Chloride, (mg/L)	Argentometric Titration, 4500 - Cl ⁻ B, APHA	4.93	250
9.	Ammonia, (mg/L)	Direct Nesslerization, 4500 - NH ₃ C, APHA	0.05	1.5
10.	Nitrate, (mg/L)	UV Spectrophotometric Screening, 4500 - NO ₃ ⁻ B, APHA	6.57	50
11.	Nitrite, (mg/L)	NEDA, Colorimetric, 4500 - NO ₂ ⁻ B, APHA	N. D. (<0.02)	-
12.	Fluoride, (mg/L)	SPANDS, 4500 - F ⁻ D, APHA	<0.05	0.5-1.5
13.	Sulphate, (mg/L)	Gravimetric Method with Ignition of Residue, 4500 - SO ₄ ²⁻ C, APHA	<1	250
14.	Calcium, (mg/L)	EDTA Titrimetric, 3500 - Ca B & 3500 - Mg B, APHA	60.92	200
15.	Magnesium, (mg/L)	SDDC, 3500 - As, C, APHA	14.58	-
16.	Arsenic, (mg/L)		N. D. (<0.01)	0.05
17.	Iron, (mg/L)	Direct Air - Acetylene AAS, 3111 B, APHA	N. D. (<0.05)	0.3
18.	Manganese, (mg/L)	APHA	N. D. (<0.02)	0.2

N. D.: Not Detected

Note:

NDWQS: National Drinking Water Quality Standard - 2063; AAS: Atomic Absorption Spectrophotometer; UV: Ultraviolet; EDTA: Ethylenediaminetetraacetic acid; NTU: Nephelometric turbidity unit; NEDA: N-1-Naphthylethylenediamine dihydrochloride; APHA: American Public Health Association.

Remarks: All observed values complied the prescribed NDWQS for drinking water.

(Analyzed By)

(Checked By)

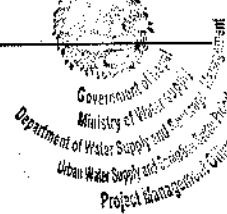
(Authorized Signature)

Note:

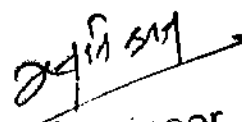
1. This report/certificate is in reference to Laboratory Quality Control Manual, QS (917).
2. The result of parameters refers only to the tested samples. Endorsement of products is neither inferred nor implied.
3. Liability of our institute is limited to the invoiced test parameters & amount only.
4. Samples will be destroyed after three months from the date of issue of test certificate unless otherwise specified.
5. This report is not to be reproduced wholly / partially & cannot be used as an evidence in the Court of Law & should not be used in any advertising media without our permission in writing.
6. The clients are requested to take back their hazardous samples along with the report/certificate.



Engineer



**ANNEX 6:
SURVEY QUESTIONNAIRE
&
CHECKLISTS**


Engineer





[Signature]
Engineer



Household Survey

१. परिचय

१.१ अन्तर्वाता दिने व्यक्तिको नाम ठेगाना:

(क) जिल्ला:

(ख) गा.वि.स.:

(ग) टोल रस्थान:

(घ) बाई नं.:

१.२ पारिवारिक विवरण

(क) घरमुलिको नाम: श्रीमान् र श्रीमती

(ख) जाती: (ग) उमेर: (घ) लिंग: ☐ पुरुष ☐ महिला ☐

(ड) वैवाहिक स्थिति: (च) धर्म: (छ) व्यवसाय (घरमुलीको):

(ज) बसेको वर्ष: (झ) शिक्षा :

(ञ) कुल परिवार संख्या

उमेर समूह	पुरुष	पेशा	महिला	पेशा	जम्मा
०-५ वर्ष					
६-१० वर्ष					
११-१५ वर्ष					
१६-४५ वर्ष					
४५-६० वर्ष					
६० भन्दा माथि					
जम्मा					

१.३ विद्यालय जाने उमेरका बाल बालिका (६-१५ वर्ष)

जम्मा	विद्यालय गएका		विद्यालय नगएका	
	पुरुष	महिला	पुरुष	महिला

२. साक्षरता : (तपाईंको परिवारमा)

	लेखपढ गर्न सक्ने	एस.एल.सी. उत्तिर्ण	स्नातक	स्नातकोत्तर	जम्मा
महिला					
पुरुष					
जम्मा					

३. कृषि (भु-उपयोग)

३.१ तपाईं वा परिवार सदस्यको नाममा गा.वि.स.र वडा भित्र जग्गा छ रु

छ ☐ छैन ☐

३.२ यदि छ भने कति छ ? रोपनीमा भन्नुहोस :

क्र.सं.	स्वामित्व	खेत	झाडी	खारदारी	वन	कैफियत
१	आफ्नै					
२	सगोलको					
३	कमाई आएको					

Engineer
Pragatinagar
Singhadurbar, Kathmandu

Government of Nepal
Ministry of Water Supply and Sanitation
Department of Water Supply and Sanitation
Pragatinagar Urban Water Supply and Sanitation Project
Project Management Office

क्र.सं.	स्वामित्व	खेत	बारी	खरवारी	वन	कैफियत
४	कमाउन दिएको					
५	जम्मा					

३.३ गा.वि.स. वा वडा बाहिर कुन ठाउँमा जग्गा छ र

क्र.सं.	ठाउँको नाम	खेत	बारी	खरवारी	वन	कैफियत

३.४ तपाईंको जग्गा आयोजना भित्र पर्छ र ९९भिन्नकभ नभलतप्यल तजभ अकउयलभलत या उचयवभअत धजभचभ जज।बकि०

- | | |
|---|---|
| <u>घर</u> | <u>खेत</u> |
| ☐ लम्बाई (फिटमा) | ☐ पाखो बारी |
| ☐ चौडाई (फिटमा) | ☐ जंगल |
| ☐ छाना | ☐ अन्य |
| ☐ तल्ला | |
| ☐ कोष | ☐ अन्दाजी मूल्य (चलनचल्तीमा) नेरु. |

(क) आयोजना क्षेत्र भित्र तपाईंको कतिवटा घर र गोठ छन्।

घर गोठ

क्र.सं.	किसिम	क्षेत्रफल
घर १		
घर २		
घर ३		

(१) कच्ची-खरले छाएको (२) पक्की ढुङ्गा, ईटाको पर्खाल र ढलान भिगटी वा टिनको छानो)

	संख्या	क्षेत्रफल
गोठ		
अन्य (खुलाउने)		

३.५ (क) तपाईंको आयोजना क्षेत्र भित्र पर्ने जमिनमा कुन कुन फसल लगाउनु हुन्छ र

क्र.सं.	खाद्यान्न वाली	वाली लगाएको क्षेत्रफल	उत्पादन प्रतिवर्ष
१. खाद्यान्न वाली			
	धान		
	गहु		
	मकै		
	फोदो		

Engineer

Government of Nepal
Ministry of Water Supply and Sanitation
Urban Water Supply and Sanitation Project
Project Management Office

	दाल गेडागुडी		
	अन्य		
२. नगदे वाली			
	आलु		
	तोरी		
	तरकारी		
	अन्य		

(ख) उक्त जग्गामा लगाएको फलफूल र अन्य बोट विरुवाको विवरण दिनुहोस र

क्र.सं.	बोटविरुवा	विरुवा संख्या		जम्मा
		फल लागेको	फल नलाएको	
१	फलफूल			
२	कागती			
३	सुन्तला			
४	आँप			
५	मेवा			
६	अम्बा			
७	लिच्ची			
८	कटहर			
९	केरा			
१०	आरु			
११	नास्पाती			
१२	आरुखडा			
१३	अन्य			
१४	डाले घाँस			
१५	पाखुरी			
१६	काभ्रो			
१७	बडहर			
१८	खनायो			
१९	टाकी			
२०	गिदरी			
२१	अन्य			
२२	इन्धनको लागि प्रयोग गर्ने बोट विरुवा			
२३	काठमा प्रयोग हुने बोटविरुवा			
२४	बाँस निगालो			

३.६ के तपाईंको जग्गामा भएको गत वर्षको उत्पादनले तपाईंको परिवारलाई खान पर्याप्त भयो र

भयो

भएन

३.७ यदि अपर्याप्त भयो भने कति महिनाको लागि पुगेन र महिना

(क) तिन महिना

(ख) छ महिना

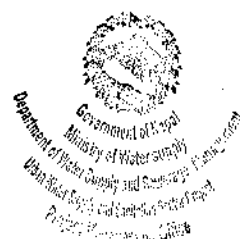
(ग) नौ महिना

(घ) बाह्र महिना

३.८ आफ्नो उत्पादित खाद्यान्न अपर्याप्त भएको बेला आफ्नो परिवारलाई कसरी खुवाउनु हुन्छ ?

- क. ऋण गरेर
ग. व्यापारीको आम्दानीबाट
ड. दैनिक मजदुरबाट भएको

ख. नोकरीबाट भएको आम्दानीबाट
घ. भारी बोकर भएको आम्दानीबाट
च. अन्य
Engineer



३.९ पशुपालन सम्बन्धी

तपाईंको घरमा कति / कस्ता पशु पक्षीहरू पाल्नु भएको छ/रु

क्र.सं.	पशुपक्षी	संख्या
१	गाई	
२	गोरु	
३	भैसी	
४	बाछा	
५	बाछी	
६	पाडा	
७	पाडि	
८	राँगो	
९	घोडा	
१०	बाखा	
११	बोका	
१२	खसी	
१३	पाठा/पाठी	
१४	सुँगुर/बुँगुर	
१५	हाँस	
१६	कुखुरा	
१७	अन्य (खुलाउने)	

४. घर परिवारको वार्षिक औषत आम्दानी :

श्रोत	वार्षिक आम्दानी (रु.)	श्रोत	वार्षिक आम्दानी (रु.)
कृषिबाट		अन्य श्रोतहरू	
खाद्यान्न		नोकरी, सेवा	
नगदेवाली		ज्याला मजदुरी र भरीया	
फलफूल		निवृत्तिभरण	
जम्मा (१)		व्यापार	
पशुपालनबाट		घरेलु उद्योग	
दुग्ध उत्पादन		पेशागत सेवा	
अण्डा कुखुरा हाँस बिक्री		माछा बिक्री	
बाछा/बाछी/गोरु/बिक्री		अन्य	
भैस/राँगो बिक्री		जम्मा (३)	
बोका/खसी/भेडा/बाखा बिक्री			
सुँगुर/बुँगुर बिक्री			
कुखुरा/हाँस बिक्री			
जम्मा (२)			
जम्मा आय (१+३):			

५. घर परिवारको वार्षिक औषत खर्च :

विवरण	जम्मा रकम (रु.)	विवरण	जम्मा रकम (रु.)
चामल		चिया	
द्याल		दाउरा	
मकै		बिजुली	
तरकारी		मट्टितेल	
दुध/दही		औषधि	
माछा/मासु		शिक्षा	
तेल/धुँ		कपडा	
मर-मसला		अन्य	

Ministry of Water Supply
Department of Water Supply and Sanitation
Pragatinagar, Kathmandu

Engin

Ministry of Water Supply
Department of Water Supply and Sanitation
Urban Water Supply and Sanitation Section
Project Management Office

विवरण	जम्मा रकम (रु.)	विवरण	जम्मा रकम (रु.)
नून		अन्य	
चिनी			
		जम्मा खर्च	

६. पानीको आपूर्ति

- (क) तपाईले यस खोलाको पानी उपयोग गर्नु हुन्छ कि हुदैन रु
गर्छु ☐ गर्दिन ☐
- (ख) यदि खोलाको पानी प्रयोग गर्नु हुन्छ भने कुन प्रयोजनको लागि प्रयोग गर्नुहुन्छ रु
सिंचाई ☐ नुहाउने, कपडा धुने ☐
पिउने ☐ अन्य ☐

७. स्वास्थ्य सम्बन्धि:

- (क) तपाईको परिवारमा कुनै सदस्य विगत वर्षमा विरामी भएका थिए रु
थिए ☐ थिएनन् ☐

(ख) यदि थिए भने निम्न विवरण दिनुहोस् रु

क्र.सं.	नाता	पुरुष	महिला	उमेर	रोग
१					
२					
३					
४					

(रोगको प्रकार:- दिसापखाला, आउं, टाइफाईड, हैजा, मलेरिया, टीबी, जन्डीस, छाला सम्बन्धी, निमोनिया, दम, रक्तचाप, एड्स र यौन रोग, अन्य)

- (ग) विरामी पर्दा सर्वप्रथम कहाँ जानुहुन्छ
- (घ) त्यहाँ निको नभए कहाँ जानुहुन्छ रु कमश उल्लेख गर्नुहोस ।

क्र.सं.	जाने ठाउँ	रहेको स्थान	दूरी (कि.मी.)
१	अस्पताल		
२	हेल्थपोस्ट		
३	हेल्थ सेन्टर		
४	आयुर्वेदिक औषधालय		
५	निजी क्लिनिकर औषधी पसल		
६	धामी भाकी		
७	अन्य		

अभिमान
Engineer
Government of Nepal
Ministry of Water Supply
Singhadurbar, Kathmandu


Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage Management
Urban Water Supply and Sanitation Sector Project
Project Management Office

द. महिलाको अवस्था:

(क) धर्मको वर्गिकरण

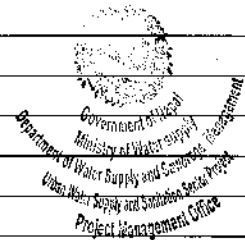
क्र.सं.	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	खनजोत		
२	मल राख्ने		
३	जमिन तयारी		
५	रोप्ने		
६	गोडमेल		
७	सिंचाई		
८	काट्ने		
९	बोक्ने र थन्काउने		
१०	अन्न प्रसोधन (कुटाई पिसाई)		
११	घाँस दाउरा		
१२	गोठालो		
१३	मेलापात		
१४	खाना पकाउने		
१५	पानी पधेरो		
१६	बच्चाबच्ची र बुढाबुढी हेरविचार		

(ख) सम्पत्तिमा अधिकार

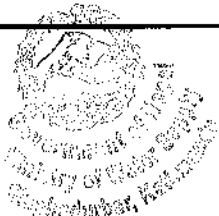
क्र.सं.	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	घर		
२	जग्गा		
३	पशु		
५	गरगहना		
६	उद्योग धन्दा		
७	अन्य		

(ग) निर्णय प्रक्रियामा अधिकार

क्र.सं.	कामको विवरण	हिस्सा प्रतिशतमा	
		पुरुष	महिला
१	वाली रोप्ने		
२	पशु खरीदविक्री		
३	गरगहना खरीदविक्री		
५	अन्न खरीदविक्री		
६	फलफूल खरीदविक्री		
७	पशुजन्य पदार्थ खरीदविक्री		
८	काठ दाउरा खरीदविक्री		
९	विहावारी		
१०	परिवार नियोजन		
११	छोराछोरी पढाई लेखाई		
१२	अन्य		



[Signature]
Engineer



९. मुआब्जा सम्बन्धी:

(क) तपाईंको घर र जग्गाको मुआब्जा के मा चाहनु हुन्छ

नगद ☐

जग्गाको सट्टा जग्गा ☐

अन्य ☐

(ख) यदि तपाईंले मुआब्जा नगदमा पाउनु भयो भने उक्त मुआब्जा रकम के मा प्रयोग गर्नु हुन्छ

जग्गा किल्ले ☐

घर बनाउने ☐

ऋण तिर्ने ☐

ब्यापार गर्ने ☐

अन्य ☐

१०. प्रस्ताव कार्यान्वयन गर्दा के कस्तो प्रभाव पर्न सक्दछ सो सम्बन्धी राय सुझाव छ
सकारात्मक: नकारात्मक:



अमर शर्मा
Engineer



CHECKLISTS

Simple Checklists for Baseline Information Collection

A. Physical Environment

Parameter	Description
Topography	
Geology (Rock and Soil Types)	
Erosion and Sedimentation	
Quarry Sites	
Sites for Labour Camp	
Site for Storage and Stockpiling	
Access and Diversion if necessary	
River Training Works	
Land Use	
Air Quality	
Water Quality	
Noise Level	
Spoil disposal sites	
Drainage Network and Ground Water	
Status of Channel Shifting	



[Signature]
Engineer



B. Vegetation and Wildlife

Vegetation in the project area

SN	Local Name	Botanical Name	Location	Vegetation Type	Local Status	Local Use	Protection Status		
							GoN	IUCN	CITES

Mammals in the project area

SN	Common Name	Scientific Name	Habitat	Local Status	Crop/Livestock Raider	Local Use	Protection Status		
							GoN	IUCN	CITES



[Signature]
Engineer



Birds Sighted in the project area

SN	Common Name	Scientific Name	Type	Habitat	Local Status	Protection Status		
						IUCN	CITES	GoN

Herpeto-fauna in the Project Area

SN	Local Name	Scientific Name	Habitat	Local Status	Status Code			Local Use
					CITES	IUCN	GoN	

Fish in the Project Area

SN	Local Name	Scientific Name	Status of Occurrence	Migratory Status/Season	Observed Location

C. Socio-Economic and Cultural Environment

Parameter	Description
Demography a) Population (Male, Female) b) Caste Ethnicity c) Language d) Religion and Culture e) Literacy	 Government of Nepal Ministry of Water Supply Department of Water Supply and Sanitation Management Urban Water Supply and Sanitation Sector Project Project Management Unit
Occupation	
Migration Pattern	
Public Health and Sanitation	
Drinking Water Supply	

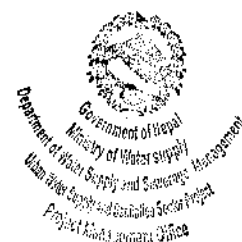
Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sanitation Management
Urban Water Supply and Sanitation Sector Project
Project Management Unit

Er

Education Facilities	
Communication	
Fuel and Energy	
Road and Transportation	
Land Holding	
Food Sufficiency	
Irrigation	
Health Care System	
Market	
Business and Industries	
Religious and Cultural Sites	
Non governmental activities	
Development Potential	
Detail of Project Affected Structures	



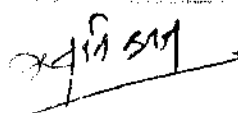
24/11/19
Engineer



Settlements and Population

SN	Settlement	Municipality & Ward	HH	Population			Caste/Ethnicity
				Male	Female	Total	




Engineer



**ANNEX 7:
PHOTOGRAPHS**


24/11/19
Engineer


Government of Nepal
Ministry of Water Supply and Sewerage Management
Urban Water Supply and Sanitation Sector Project
Project Management Office



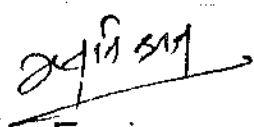

Engineer





Photo 1: Public Consultation to discuss environmental concerns

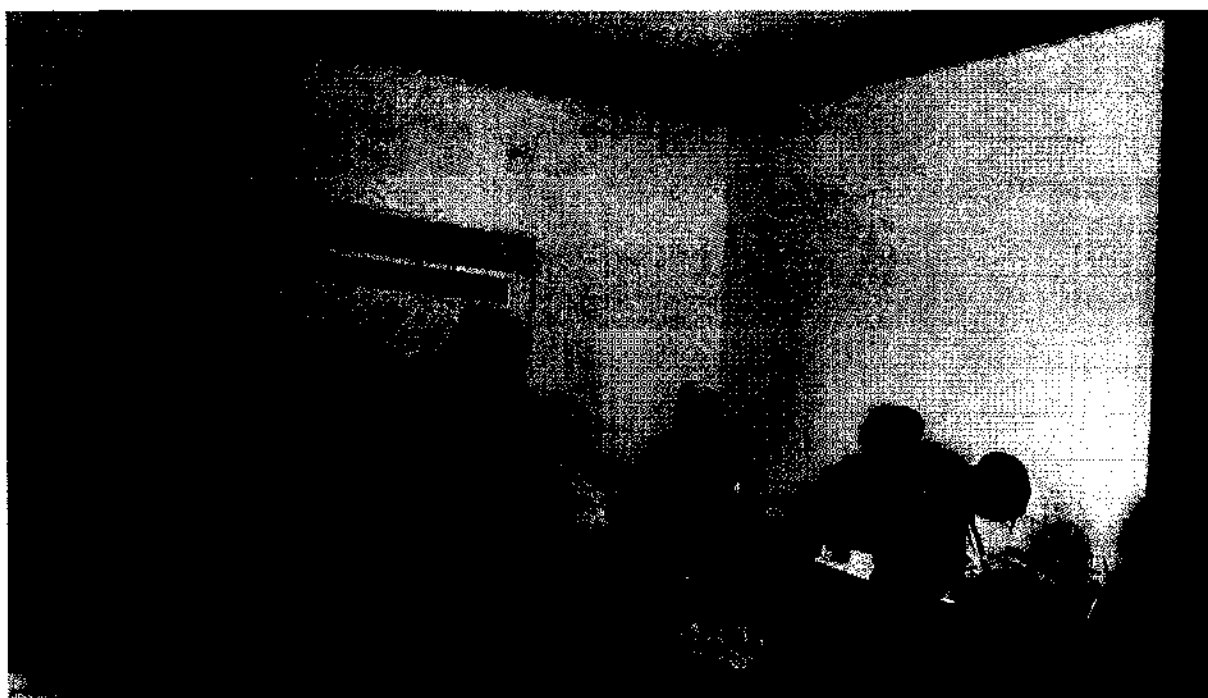


Photo 2: Feedback from the local representatives in Public Consultation


Engineer


Government of Maharashtra
Ministry of Water Supply
Singhadurbar, Kothrudurbar


Government of Maharashtra
Ministry of Water Supply
Department of Water Supply and Sewerage
Urban Water Supply and Sanitation Sector Project
Project Management Office



Photo 3: Tube Well Boring and Reservoir Sites of Kalapani System



Photo 4: Proposed site for reservoir and treatment unit in WN 8



अभिमान
Engineer



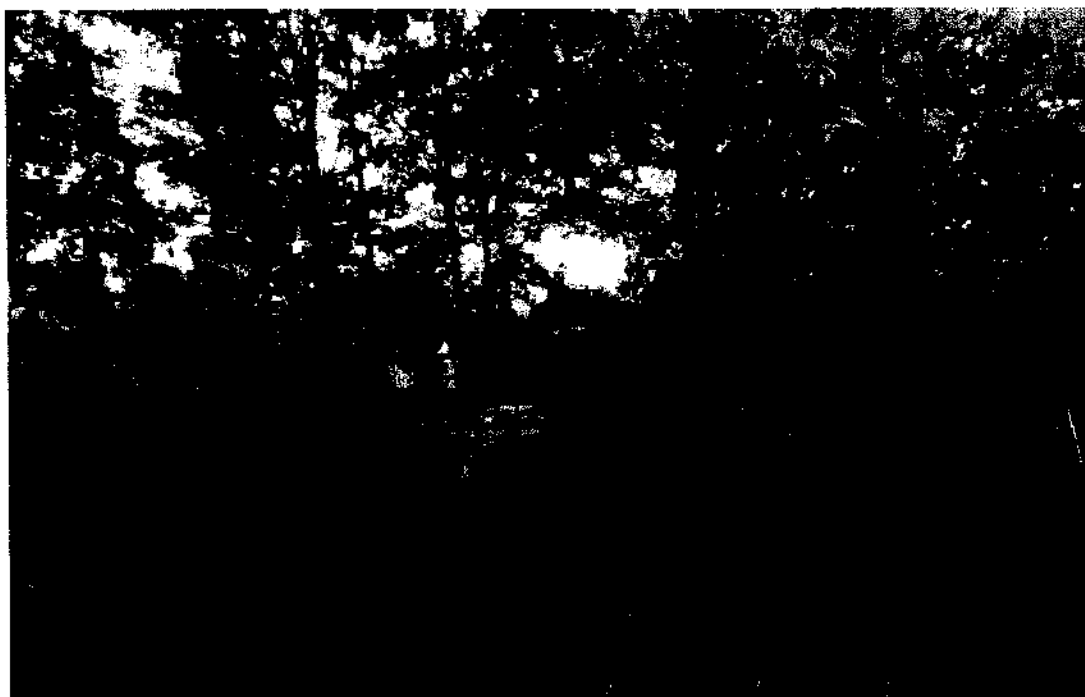
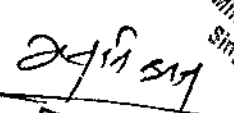


Photo 5: Reservoir of Existing Singhe System



Photo 6: Existing shallow tubewell in project area


Government of Nepal
Ministry of Water Supply
Singhadurbar, Kathmandu

Engineer


Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage Management
Urban Water Supply and Sanitation Sector Project
Project Management Office

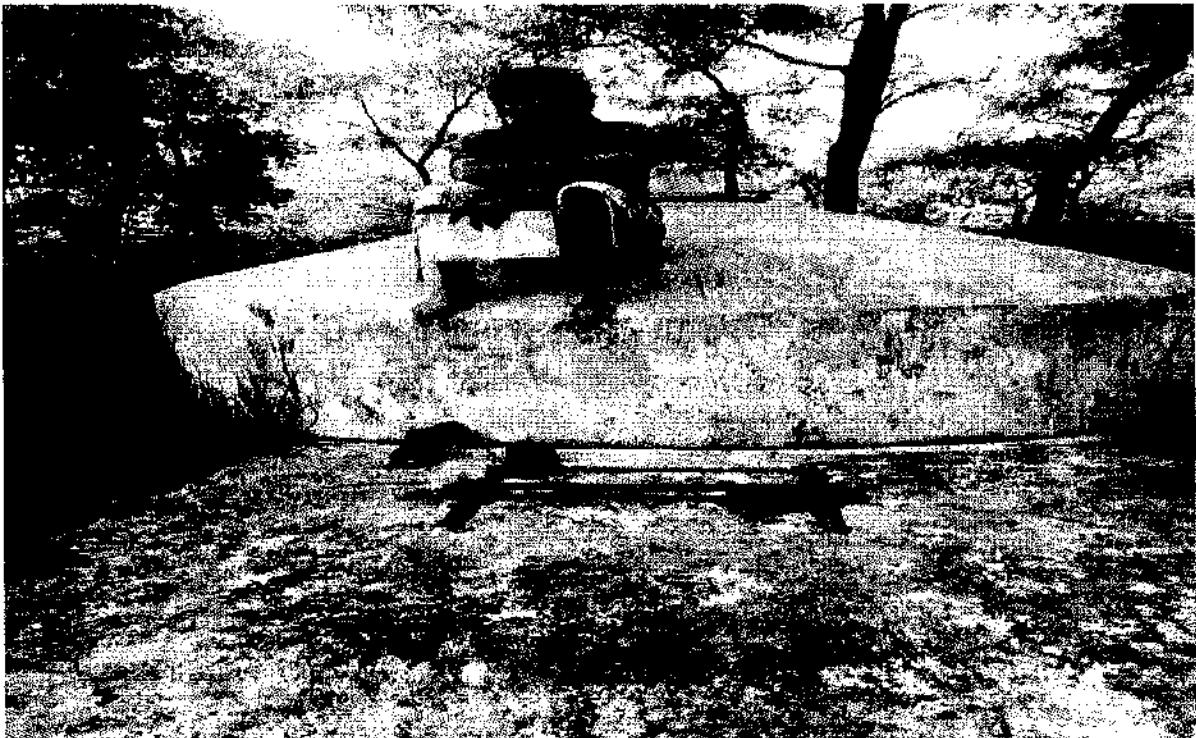


Photo 7: Reservoir of Existing Dhaberi System



Photo 8: Public Tap Stand on Existing Singhe System

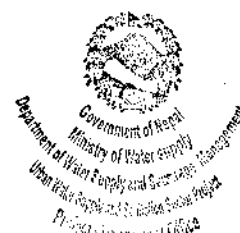
Government of Nepal
Ministry of Water Supply
Department of Water Supply
Pragatinagar, Kathmandu

24/11/19
T. Beer

Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sewerage
Urban Water Supply and Sanitation Sub-project
Project Management Office

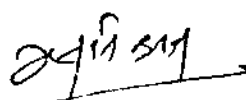
**ANNEX 8:
COMMENTS FROM MoWS, AND COMMENTS INCORPORATION MATRIX**

24/11/19
Engineer



Annex 8: Comments from MoWS, and Comments Incorporation Matrix




Engineer





खानेपानी मन्त्रालय

संघीय सरकार

पानी, सरसफाई
विभाग, सिङ्गादुर्बार

फोन नं. २२२२२२

फ्याक्स नं. २२२२२२

सिङ्गादुर्बार

काठमाडौं, नेपाल

संख्या: ०६६/६६

क्रमांक नं. २४८

मिति २०७३/०८/२२

श्री खानेपानी तथा ढल व्यवस्थापन विभाग,
पानीपोखरी, काठमाडौं।

२९८

विषय : IEE प्रतिवेदन Revise गरी पुनः पेश गर्ने सम्बन्धमा ।

प्रस्तुत विषयमा तहको पत्र साथ पेश भएको सहरी खानेपानी तथा सरसफाई (क्षेत्रगत) आयोजना, प्रस्तावक रहेको दाङ्ग जिल्लामा सञ्चालन हुने प्रगतिगार, दाङ्ग सहरी खानेपानी तथा सरसफाई आयोजनाको प्रारम्भिक वातावरणीय परीक्षण प्रतिवेदन (IEE) का सम्बन्धमा मिति २०७३/०८/१३ मा यस मन्त्रालयमा यसैको वातावरण प्रतिवेदन सुझाव समितिको बैठकमा प्राप्त यसै पत्रसाथ संलग्न निम्नित राय सुझावहरू अनुरूप प्रतिवेदन परिमार्जन गरी ती सबै Comments को Comments Incorporation Matrix सहित पुनः पेश गर्नुहुन निर्देशानुसार अनुरोध छ ।

अञ्जना महर्जन

(इन्जिनियर)

बोधार्थ :

श्री आयोजना व्यवस्थापन कार्यालय,

सहरी खानेपानी तथा सरसफाई (क्षेत्रगत) आयोजना, पानीपोखरी,



इन्जिनियर

Engineer

डा. ड. म. अधिकारी

सचिव

२०७३/०८/२२



Comments on IEE of Pragatinagar Urban Water Supply and Sanitation Project, Rapti Rural Municipality, Dang:

1. Approved ToR letter is missing.
2. Include a copy of 15 day notice showing the name of a newspaper in which it was published.
3. In background section of both executive summary mention the name of the projects district.
4. Correct the name वातावरण व्यवस्थापन ऐन, वातावरण व्यवस्थापन नियमावली as वातावरण संरक्षण ऐन and वातावरण संरक्षण नियमावली.
5. Mention a gist of mitigation measures of main report in executive summary.
6. Follow a format of schedule 5 of EPR, 1997.
7. Remove 'rapti zone' from 1, name and address of the proponent section.
8. In 2.4 section, mention 'section' instead of 'rule'.
9. In salient features table, instead of 'VDC' mention 'RM'.
10. Most of the features are different in salient features table than that of approved ToR (total length of pipe, fire hydrants, base year population, design year population, annual growth rate, household number). Better to justify the changes.
11. In salient features table mention about the depth of trench, volume of muck generation, construction period.
12. Mention about duration of water supply whether it is for 24 hrs?
13. Mention clearly about date, place of public consultation and field work as well.
14. In baseline, correct the topic by replacing 'resources' with 'environment'. Instead of ecological resources, mention biological environment.
15. Clarify whether proposed project lies in chure region or not?
16. In physical environment section, add about land use pattern, landslide prone area (if any), include date of ground water table, water recharge capacity.
17. Correct ward no. in table 3.5. Keep the data of ward no. 5 instead of ward no. 6.
18. It seems like 633 out of 2156 are literate then how it becomes 92.3%, better to clarify (in 3.9.3.3. and table 3.5)
19. In 'access to household latrine section' mention clearly whether there is a provision of septic tank or not? Or the locals directly dispose it in river?


Engineer



Government of Nepal
Ministry of Water Supply
Department of Water Supply and Sanitation
Urban Water Supply and Sanitation Sector Project
Project Management Office



20. In 'waterborne disease' section, mention clearly about existing water quality, if there is any test report mention its result in gist in main report.
21. In 3.9.3.11, cultural aspects, mention in detail about temples whether these are of archaeological importance or not. In public consultation issues related to conservation of Shivalaya temple, wall construction has been raised, better to mention about it in detail.
22. Include a table of land requirement for the proposed project showing clearly about area, type and ownership, if possible mention component wise.
23. Mention clearly about the public, private, community infrastructures that lies in the alignment of proposed project.
24. Mention about in-migration in detail.
25. Mention clearly about the amount of construction material, location and number of camp site, facilities to the workers location of stockpiling site.
26. 3.9.3.7, tells about satisfactory sanitary condition, whereas 3.11.1 (2nd paragraph 2nd line) contradicts with 3.9.3.7.
27. Information in 3.9.3.7 and 3.11.2 is same. Revisit it.
28. Include source in table.
29. Replace 'stories' with 'storeys'.
30. Add existing road damage due to heavy vehicle as an impact.

.....
Jwala Shrestha
Undersecretary
Ministry of Forests and Environment



[Handwritten signature]
Engineer





Comments on the IEE Report of Pragatinagar UWSS Project

1. Chapter 2 seems unnecessary. However, part of its content can make up a chapter on Introduction.
2. Linkage of core area and surrounding area with direct impact and indirect impact respectively is technically wrong and hence the concerned section i. e. section 3.4 (a) & (b) needs to be revised accordingly.
3. Besides service area, core area should include all construction hotspots/pipe laying works as well.
4. In Figure 3.2, the description of legends should match with the caption of the Figure.
5. Designated sites for disposal of sludge/solid waste/demolition waste need to be indicated as well in Figure 3.2.
6. Sub-chapter 3.8 on IEE Methodology needs to be presented in a separate chapter.
7. In-situ measurements and sampling seem to have been overlooked as methods of field assessment of physical environment. Besides, methods used for quantification of adverse impacts on physical environment, if any, need to be mentioned as well under Methodology.
8. Sub-chapter 3.9 on Environmental Baseline Information should be presented as a separate chapter.
9. In sub-section 3.9.1.2, it'd be highly preferable to give percentage distribution of various land-uses existing within the core area as well.
10. In sub-section 3.9.1.5, any surface water bodies within the core area, which would potentially be polluted due to project construction/operation activities, should have been specified as well.
11. In sub-section 3.9.1.6, it'd be better to present the existing practice of final disposal of solid waste within the core and surrounding areas.
12. A brief description of temporary construction facilities required is missing under project description.
13. The following could be considered as some additional construction activities.
 - a) Drilling?
 - b) Stockpiling of construction materials/fuel
 - c) Storage/disposal of extra spoil/solid waste
 - d) Operation of DG sets during construction/operation phases
14. It'd be highly desirable to present an estimation of land-use change due to placement of project structures/components with regard to adverse impact on land-use existing within the core area.
15. The mitigation measures proposed with respect to damage to existing facilities would be those that should be undertaken during pre-construction phase rather than construction phase.
16. Proposed proper disposal of the inorganic fraction of solid waste generated from workers' camps and construction waste needs to be further elaborated to ensure that the disposal is environmentally safe.
17. It's not clear how wastewater generated from workers' camps will be finally disposed of in an environmentally safe manner.


Government of Nepal
Ministry of Water Supply
Singhadurbar, Kathmandu

Signature
Engineer


Government of Nepal
Ministry of Water Supply
Urban Water Supply and Sanitation Sector Project
Project Management Office



18. It needs to be ensured that the proposed sanitary toilets for the workers need to be in adequate number with respect to the maximum number workers accommodated in the camps during the peak construction period.
19. Mitigation measures for addressing impacts of operation of pumps and DG sets during operation phase seem to be missing.
20. Monitoring parameters selected for compliance monitoring both during construction and operation phases should be source oriented rather than sink oriented.

(B. R. Manandhar)

Environmental Engineer & Freelancer

Expert on physical environment, EIA/IEE Report Suggestion Committee, MoWS, GoN



24/11/2017
Engineer



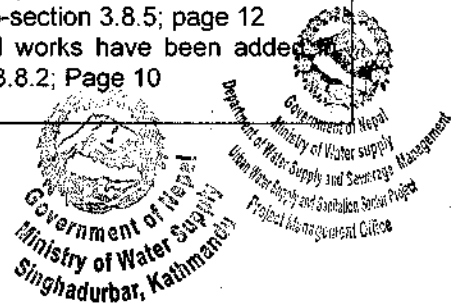


Annex 8: Comments Incorporation Matrix

(Based on comments on IEE Report provided during presentation in MoWS)

SN	Comments by MoFE (Jwala Shrestha, Head - EA Section)	Response/Updates
1	Approved ToR letter is missing	The ToR approval letter from PMO has been replaced by approval letter from MoWS (Annex 1)
2	Include a copy of 15 days notice showing the name of a newspaper in which it was published	The Public Notice showing the name of the newspaper has been provided (Annex 4)
3	In background section of both executive summary, mention the name of the project's district	This has been incorporated (Page vii - paragraph 1; and was already mentioned in Page xi - paragraph 1)
4	Correct the name वातावरण व्यवस्थापन ऐन, वातावरण व्यवस्थापन नियमावली as वातावरण संरक्षण ऐन, and वातावरण संरक्षण नियमावली	The corrections have been made in the last paragraph of Page vii
5	Mention a gist of mitigation measures of main report in executive summary	The gist of mitigation measures have been added in both the executive summaries (Page x: Nepali Executive Summary; & Page xiii: English Executive Summary)
6	Follow a format of schedule 5 of EPR, 1997	The report was submitted in the format as per Schedule 5 of EPR 1997
7	Remove 'rapti zone' from 1, name and address of the proponent section	This has been corrected; Page 1
8	In 2.4 section, mention 'section' instead of 'rule'	The correction has been made in section 2.4; Page 3
9	In salient features table, instead of 'VDC' mention 'RM'	The correction has been made in table 3.1; Page 5
10	Most of the features are different in salient features table than that of approved ToR (total length of pipe, fire hydrants, base year population, design year population, annual growth rate, household number). Better to justify the changes	The justification has been given in first paragraph of sub-section 3.2; page 5
11	In salient features table, mention about the depth of trench, volume of muck generation, construction period	All these information are not relevant to salient features of the project. Construction period has been added in 14 th heading of table 3.1; Page 6 Depth of trench and muck volume have been added in sub-section 3.15; page 36
12	Mention about duration of water supply whether it is for 24 hours?	This has been mentioned in sub-section 3.12 (Page 27), and also in the salient features table (7 th heading number of Table 3.1, Page 6)
13	Mention clearly about date, place of public consultation and field works as well.	It was already mentioned in sub-section 7.10 (Page 83). The information has been added in sub-section 3.8.5; page 12 Time of field works have been added in sub-section 3.8.2; Page 10

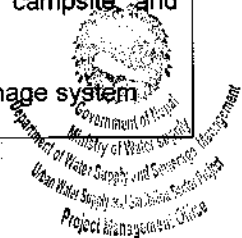
Jwala Shrestha
Engineer



14	In baseline, correct the topic by replacing 'resources' with 'environment'. Instead of ecological resources, mention biological environment	The corrections have been made (Sub-headings 3.9.1., 3.9.2 and 3.9.3)
15	Clarify whether proposed project lies in chure region or not?	This has been clearly mentioned in last paragraphs of sub-section 3.9.2; Page 15
16	In physical environment section, add about land use pattern, landslide prone area (if any), include date of ground water table, water recharge capacity	Landuse pattern is discussed in sub-section 3.9.1.2; Page 13 There are no landslide prone areas in the project area. Ground water table was referred on the basis of water table of nearby deep tubewells as mentioned in sub-section 3.13.2; page 29 Studies on deep water recharge has not been conducted
17	Correct ward no. in table 3.5. Keep the data of ward no. 5 instead of ward no. 6	The correction has been made in the table heading as/and the data is of ward number 5; Page 16
18	It seems like 633 out of 2156 are literate then how it becomes 92.3%, better to clarify (in 3.9.3.3 and table 3.5)	The percentage has been corrected as 91.9% in sub-section 3.9.3.3; Page 16
19	In 'access to household latrine' section mention clearly whether there is a provision of septic tank or not? Or the locals directly dispose it in river?	This has been discussed under the section 'Access to household latrine'; Page 18
20	In 'waterborne disease' section, mention clearly about existing water quality, if there is any test report mention its result in gist in main report.	The test reports are given in Annex 5; but there is no bacteriological test report of existing drinking water quality.
21	In 3.9.3.11, cultural aspects, mention in detail about temples whether these are of archaeological importance or not. In public consultation issues related to conservation of Shivalaya temple, wall construction has been raised, better to mention about it in detail	The details have been provided in sub-section 3.9.3.11; page 20 Additional details of the works has been provided in sub-section 6.1.1 - ii; page 50
22	Include a table of land requirement for the proposed project showing clearly about area, type and ownership	The has been tabulated in table 3.21 (page 35)
23	Mention clearly about the public, private, community infrastructures that lies in the alignment of proposed project	This details is not required for laying of water supply pipelines
24	As in-migration plays a vital role in increasing population, mention about it in detail	This has been clarified under sub-heading 'Household and Population' in sub-section 3.9.3.1; page 15
25	Mention clearly about the amount of construction material, location and number of campsite, facilities to the workers, location of stockpiling sites, drainage condition in proposed area, distance between pipe laying area and municipal drainage	The details of construction materials are estimated in sub-section 3.5, page 9 There will be only one campsite and stockpiling site There is no municipal drainage system



29/11/17
Ineer



26	3.9.3.7, tells about satisfactory sanitary condition, whereas 3.11.1 (2 nd paragraph 2 nd line) contradicts with 3.9.3.7	Correction has been made; page 27 (water supply situation is not satisfactory, but the sanitation situation is satisfactory)
27	Information in 3.9.3.7 and 3.11.2 is same. Revisit it.	The information in the sub-section 3.11.2 has been updated; page 27
28	Include source in table.	Sources have been added in tables
29	Replace 'stories' with 'storeys'	The correction has been made; Page 34
30	Add existing road damage in movement of vehicle section.	This has been added under sub-section 'Construction' of table 6.1; Page 57

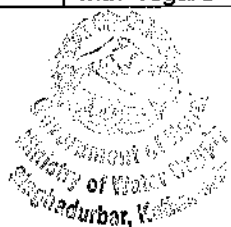


24/11/17

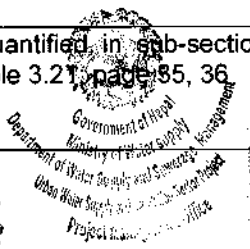
 Engineer



SN	Comments by Expert (Environmental Engineer, BhaiRaja Manandhar)	Response/Updates
1	Chapter 2 seems unnecessary. However, part of its content can make up a chapter on Introduction	The report is prepared based on Schedule 5 of EPR 2054
2	Linkage of core area and surrounding area with direct impact area and indirect impact area respectively is technically wrong and hence the concerned section i.e. section 3.4 (a) & (b) needs to be revised accordingly	This sub-section 3.4 has been updated; page 9
3	Besides service area, core area should include all construction hotspots/pipe laying works as well	In this project, core area and service area are the same
4	In Figure 3.2, the description of legends should match with the caption of the Figure	The correction has been made, Figure 3.2; page 8
5	Designated sites for disposal of sludge/solid waste/demolition waste need to be indicated as well in Figure 3.2	The sites for disposal of sludge/slurry has not yet been finalized Demolition waste will be disposed either at municipality's disposal site (not yet finalized) or at the spoil disposal site (already shown in Fig 3.2)
6	Sub-chapter 3.8 on IEE Methodology needs to be presented in a separate chapter	The report is prepared based on Schedule 5 of EPR 2054
7	In-situ measurements and sampling seem to have been overlooked as methods of field assessment of physical environment	This has been added under sub-section 3.8.3; page 10
8	Sub-chapter 3.9 needs to be presented in a separate chapter	The report is prepared based on Schedule 5 of EPR 2054
9	In sub-section 3.9.1.2, it'd be highly preferable to give percentage distribution of various land-uses existing within the core area as well.	The land use situation has been added in sub-section 3.9.1.2; page 13
10	In sub-section 3.9.1.5, any surface water bodies within the core area, which would potentially be polluted due to project construction/operation activities, should have been specified as well	The surface water bodies of the project area have been mentioned in sub-section 3.9.1.5; page 14
11	In sub-section 3.9.1.6, it'd be better to present the existing practices of final disposal of solid waste within the core and surrounding area	The situation of waste disposal has been added in sub-section 3.9.1.6; page 14
12	A brief description of temporary construction facilities required is missing under project description	This description has been added in sub-section 3.15; page 37
13	The following could be considered as some additional construction activities; a) Drilling? b) Stockpiling of construction materials/fuel c) Storage/disposal of extra spoil/solid waste d) Operation of DG sets during operation phase during electric power failure	Relevant activities have been added in sub-section 3.15, page 37 & 38
14	It'd be highly desirable to present an estimation of land-use change due to placement of project structures/components with regard to adverse impact on land-use	This has been quantified in sub-section 3.13.2.2 (xi) in Table 3.21, page 55, 36



Signature
Engineer



	existing within the core area	
15	The mitigation measures proposed with respect to damage to existing facilities would be those that should be undertaken during pre-construction phase rather than construction phase	This has been discussed under sub-section 6.1.1 - ii; Page 51
16	Proposed proper disposal of the inorganic fraction of solid waste generated from workers' camps need to be further elaborated to ensure that the disposal is environmentally safe.	The elaborations have been provided in sub-section 6.1.1 - v; Page 52
17	It's not clear how wastewater generated from workers' camps will be finally disposed of in an environmentally safe manner.	This has been discussed in sub-section 6.1.1 (iv), page 52
18	In needs to be ensured that the proposed sanitary toilets for the workers need to be in adequate number with respect to the maximum number workers accommodated in the camps during the peak construction period	This has been specified in sub-section 6.1.3 - iv; Page 53
19	Mitigation measures for addressing impacts of operation of pumps and DG sets during operation phase seems to be missing	This has been discussed in sub-section 6.2 (iii); page 54
20	Monitoring parameters selected for compliance monitoring both during construction and operation phases should be source oriented rather than sink oriented.	It has been mentioned that the monitoring of compliance will be source based, and monitoring of impacts will be sink based; sub-section 7.5; page 74-75



Signature
Engineer



