

Initial Environmental Examination

March 2016

Philippines: Water District Development Sector Project

BRGY. PARAISO WATER SUPPLY SYSTEM
WATER SUPPLY SUBPROJECT FOR CITY OF KORONADAL
CITY OF KORONADAL WATER DISTRICT

Prepared by Local Water Utilities Administration for the Asian Development Bank. This is an updated version of the draft originally posted in March 2014 available on <http://www.adb.org/sites/default/files/project-document/80457/41665-013-iee-02.pdf>.

CURRENCY EQUIVALENTS

(as of 22 January 2016)

Currency unit	–	peso (Php)
Php1.00	=	\$0.02097
\$1.00	=	P47.687

ABBREVIATIONS

ADB	–	Asian Development Bank
CEMP	–	Contractor's Environmental Management Plan
CIA	–	Cumulative impact assessment
CKWD	–	City of Koronadal Water District
CNC	–	Certificate of Non-Coverage
DAO	–	Department Administrative Order
DENR	–	Department of Environment and Natural Resources
ECC	–	Environmental Compliance Certificate
EIA	–	Environmental Impact Assessment
EMB	–	Environmental Management Bureau
EMP	–	Environmental Management Plan
GHG	–	Greenhouse gas
GRM	–	Grievance Redress Mechanism
IEE	–	Initial Environmental Examination
LGU	–	Local Government Unit
LWUA	–	Local Water Utilities Administration
MC	–	Memorandum Circular
NGO	–	Non-government organization
NIA	–	National Irrigation Administration
NWRB	–	National Water Resources Board
PD	–	Presidential Decree
PEISS	–	Philippine Environmental Impact Statement System
PIU	–	Project Implementing Unit
PMU	–	Project Management Unit
PNSDW	–	Philippine National Standards for Drinking Water
RA	–	Republic Act
REA	–	Rapid Environmental Assessment
RO	–	Regional Office
SPS	–	Safeguards Policy Statement
TSP	–	Total suspended particulate
WD	–	Water District
WDDSP	–	Water District Development Sector Project
WDGRC	–	Water District Grievance Redress Committee
WHO	–	World Health Organization

WEIGHTS AND MEASURES

ha	–	Hectare
HP	–	Horsepower
km	–	Kilometer
KVA		Kilo volt ampere
lps		liter per second
m		Meter
m ²		square meter
m ³		cubic meter
mg/L		Milligrams per liter
mm		Millimeter
ug/Ncm		Microgram per normal cubic meter
MPN		most probable number
PCU		platinum cobalt unit

NOTE

In this report, "\$" refers to US dollars.

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EXECUTIVE SUMMARY

1. **Background.** The City of Koronadal Water District (CKWD) is an operational water supply utility located in the City of Koronadal, South Cotabato, Republic of the Philippines and one of the selected subprojects under project preparatory technical assistance for the PHI: Water District Development Sector Project (Project) funded by the Asian Development Bank (ADB). The Project intends to improve the livability and competitiveness in urban areas outside of Metro Manila through the provision of better water supply and sanitation infrastructure and services to a number of water districts (WDs). The Local Water Utilities Administration (LWUA) is the executing agency. The participating WDs, in this case CKWD, are the implementing agencies for water supply and sanitation subprojects.

2. **Environmental safeguard.** An environmental assessment was conducted for the proposed water supply subproject of CKWD in the City of Koronadal, South Cotabato. CKWD proposes to establish water supply systems in five barangays for financing by ADB. Relative to the significance of impacts and risks, this subproject has been determined to be Environmental Category B based on ADB's environmental categorization and the type of assessment, requiring the preparation of an Initial Environmental Examination (IEE) report. This IEE was carried out in accordance with ADB's Safeguards Policy Statement (2009) (ADB SPS 2009).

3. **Legal framework.** The assessment was also carried out within the policy, legal, and administrative frameworks relevant to the environmental assessment of water supply systems in the Republic of the Philippines. These include the following laws and regulations: (i) Presidential Decree (PD) 198 - Provincial Water Utilities Act of 1973, (ii) PD 1586 - Establishing the Philippine Environmental Impact Statement System, and (iii) Republic Act No. 9275 - Philippine Clean Water Act of 2004. The overall institutional framework is the LWUA-and-WD setup as defined by PD 198.

4. **Subproject description.** CKWD aims to expand its water supply system coverage and meet the water supply demand until 2025. The plan calls for the development of five separate water supply systems in the growth areas of Brgys. Concepcion, Paraiso, San Jose, Sarabia and Topland. At present, these five barangays are not served by CKWD and its residents depend on individual or communal shallow wells for their domestic water supply. The program includes the development of well sources, construction of pumping facilities, provisions for treatment facilities, construction of storage tanks, installation of transmission and distribution pipelines, and lot acquisition in each of the identified barangays. The sites for the wells, pumping facilities, and storage tank are all lots owned by the respective barangays. The proposed subproject will help improve the living conditions of the urban population of these barangays and enhance their competitiveness by developing water supply infrastructure.

5. Using Brgy. Paraiso as a model, the environmental assessment is applicable to all five new water supply systems proposed by CKWD. The water supply system in Brgy. Paraiso will provide 472 service connections in the first year of implementation and comprised of one deep well with expected yield of 15 liters per second (lps), pump facilities, elevated storage tank, transmission and distribution lines. The site for the deep well, pumping facilities, and storage tank is a lot located in Sitio Salkan, Brgy. Paraiso, City of Koronadal.

6. **Environmental management plan (EMP).** The environmental assessment process has not identified any significant negative environmental impacts that cannot be mitigated. The environmental assessment considered the fact that proposed site for the well, pump facilities, and elevated storage tank is only 350 square meters (m²) and will have no significant negative impact on the surrounding residential and agricultural landscape with patches of cornfields and cassava plantation. Transmission and distribution lines will be laid very close to the roads that have been in existence for a very long time already. Hence, the subproject will not encroach into an environmentally sensitive area.

7. Anticipated impacts during operation and maintenance include (i) improvement in water supply system and healthy environment; (ii) significant enhancement in quantity and quality of supplied water to water deficient areas; and (iii) proper accounting of water by metering of connections in each barangay.

8. **Public consultation.** The public participation process included (i) identifying interested and affected parties (stakeholders); (ii) informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; (iii) creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns) with regard to the proposed development; (iv) giving the stakeholders feedback on process findings and recommendations; and (v) ensuring compliance to process requirements with regards to the environmental and related legislation. A series of consultations were conducted with various stakeholders on 18 August 2009, 22 November 2012, and 14 January 2013. The IEE includes the activities that will be undertaken during project design to engage the stakeholders, and planned information disclosure measures and processes for carrying out consultations during project implementation.

9. **Grievance redress mechanism.** A common grievance redress mechanism (GRM) will be in place at the WD for social, environmental, or any other grievances related to the WD's subprojects; the resettlement plan and IEE will follow the GRM described in this report, which is developed in consultation with key stakeholders. The GRM will provide an accessible and trusted platform for receiving and facilitating resolution of affected persons' grievances related to the project. The multi-tier GRM will have time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required.

10. **Categorization.** Based on this IEE, the determination of environment category as "B" in accordance with the SPS is confirmed. With the implementation of the mitigation measures as proposed in the EMP, the subproject is not expected to cause irreversible adverse environment impacts. Also, the water supply subproject can be implemented in an environmentally acceptable manner without the need for further environmental assessment study.

LOCATION MAP



I. INTRODUCTION

1. The City of Koronadal Water District (CKWD) is an operational water supply utility located in the City of Koronadal, South Cotabato, Philippines and one of the selected subprojects under PHI: Water District Development Sector Project (WDDSP) funded by the Asian Development Bank (ADB). The expected impact of the subproject is improved health and living conditions for the communities served by the participating WDs. The expected outcome is increased access to improved water supply and sanitation services. The Local Water Utilities Administration (LWUA) is the executing agency. The participating WDs, in this case CKWD, are the implementing agencies for water supply and sanitation subprojects.

2. Preparation of this Initial Environmental Examination (IEE) is part of the activities of the WDDSP. It provides ADB with an assessment of the environmental concerns to be considered regarding the subproject location, design, construction, operation and maintenance. This report is also intended to assist LWUA and the CKWD in the preparation of the required environmental reports to meet the Department of Environment and Natural Resources (DENR) requirements for an application of the necessary Environmental Compliance Certificate (ECC) before the start of the construction activities.

3. This IEE is prepared for the proposed water supply subproject of City of Koronadal. Using as a model Brgy. Paraiso, one of the five barangays where CKWD plans to establish a water supply system, the environmental assessment is applicable to all five water supply systems proposed by CKWD. A detailed description of the proposed system is provided in **Section III**.

4. Preparation of the IEE involved field visits to the proposed subproject area; review of available information, discussions with CKWD, LWUA, DENR, and other government agencies, local government officials, and members of the community within the subproject area.

5. The environmental impacts of the proposed water supply system have been identified and assessed as part of the planning and design process, and actions will be taken to reduce negative impacts to acceptable levels. An environmental assessment using ADB's Rapid Environmental Assessment (REA) Checklist for Water Supply (**Appendix 1**) was conducted, and results of the assessment show that the project is unlikely to cause significant adverse impacts. Thus, this IEE has been prepared in accordance with ADB Safeguard Policy Statement (2009) (SPS) requirements for Environment Category B projects and to meet the following objectives:

- (i) To provide critical facts, significant findings, and recommended actions;
- (ii) To present the national and local legal and institutional framework within which the environmental assessment has been carried out;
- (iii) To provide information on the existing geographic, ecological, social, and temporal contexts, including associated facilities within the project's area of influence;

- (iv) To assess the project's likely positive and negative direct and indirect impacts on physical, biological, socioeconomic, and physical cultural resources in the project's area of influence;
- (v) To identify mitigation measures and any residual negative impacts that cannot be mitigated;
- (vi) To describe the process undertaken during project design to engage stakeholders, the planned information disclosure measures, and the process for carrying out consultation with affected people and facilitating their participation during project implementation;
- (vii) To describe the project's grievance redress mechanism for resolving complaints about environmental performance;
- (viii) To present the set of mitigation measures to be undertaken to avoid, reduce, mitigate, or compensate for adverse environmental impacts;
- (ix) To describe the monitoring measures and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures; and
- (x) To identify who is responsible for carrying out the mitigation and monitoring measures.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

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

7. **Screening and categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

- (i) **Category A.** Projects could have significant adverse environmental impacts. An environmental impact assessment (EIA) is required to address significant impacts.
- (ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in Category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
- (iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.

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

8. **Environmental management plan (EMP).** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

9. **Public disclosure.** ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

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

B. National Laws

10. The policy, legal, and administrative frameworks relevant to the environmental assessment of water supply and sanitation projects in the Philippines have long been established by the following laws and regulations: (i) Presidential Decree (PD) 198 - Provincial Water Utilities Act of 1973, (ii) PD 1586 - Establishing the Philippine Environmental Impact Statement System, (iii) Republic Act (RA) No.9275 - Philippine Clean Water Act of 2004, and (iv) PD 856 - Code on Sanitation of the Philippines. The frameworks apply to the CKWD subproject.

11. The overall institutional framework is the LWUA and WD setup as defined by PD 198 (Provincial Water Utilities Act of 1973). LWUA, as a government corporation, is mandated to promote the development of WDs in the country. It has a clear mandate to "primarily be a specialized lending institution for the promotion, development, and financing of local water utilities." To carry out this mandate LWUA has major subsidiary roles such as: (i) prescribing minimum standards and regulations in order to assure acceptable standards of construction materials and supplies, maintenance, operation, personnel training, accounting, and fiscal practices for local water utilities; (ii) providing technical assistance and personnel training programs.

12. PD 198 also mandated the formation of local WDs, which were initially formed by resolutions of the local government units (LGUs) (generally, municipalities) to serve a single LGU or a cluster of LGUs. Once formed, a WD becomes legally autonomous of the LGU and has the standing and legal character of an independent government-owned and controlled corporation. It is controlled by a board of directors, appointed by either the mayor or the governor, consisting of five members representing various sectors, who in turn appoint the WD's general manager.

13. Under the Project, LWUA is the executing agency, while the WDs, such as CKWD, are the implementing agencies for their respective subprojects. LWUA has

overall responsibility for project coordination, implementation, and liaison with ADB and other government offices. The Project can contribute to Philippines' efforts in achieving relevant targets in the Millennium Development Goals (MDGs). Most relevant to the project is Goal 7 (Ensure environmental sustainability) with its "Target 7C" for 2015 calling to reduce by half the proportion of people without sustainable access to safe drinking water and basic sanitation. Achieving the MDG7 2015 target on accessibility to safe drinking water necessitates an assurance that indeed the water is safe. WDs must have raw water sources with sustainable quantities and acceptable quality. They should be able to maintain acceptable water quality levels in the distribution systems to ensure delivery of potable water. The 7C Philippine target is 86.8% of Filipinos will have access to safe water by 2015 and 83.8% will have access to a sanitary toilet facility.

14. The environmental assessment requirement is covered by PD 1586 (establishing the Philippine Environmental Impact Statement System [PEISS]) as well as its implementing rules and regulations issued under DENR Administrative Order No. 30 series of 2003 (DAO 2003-30). The PEISS requires the project proponent to obtain an Environmental Compliance Certificate (ECC) from the Environmental Management Bureau (EMB) before an infrastructure or development project can be implemented. The Philippine environmental assessment system conforms with ADB's environmental assessment requirements under ADB's *Special Evaluation Study on Environmental Safeguards* (2006).

15. In addition to complying with the requirements of the Philippine National Standards for Drinking Water (PNSDW), water systems are also covered by Republic Act No. 9275 (The Philippine Clean Water Act of 2004). Its' implementing rules and regulations are issued under DENR Administrative Order No.10 series of 2005 (DAO 05-10). Standards for the discharge of all industrial and municipal wastewaters are defined in DENR Administrative Order No. 35 series of 1990 (The Revised Effluent Regulations of 1990) which is based on the Philippine Pollution Control Decree of 1976 issued as PD 984. Sanitation and septic tanks are also covered by PD 856 (Code on Sanitation of the Philippines). The project proponent must secure a discharge permit from the EMB-RO, to confirm the facility's compliance with the prescribed effluent standards. A Permit to Cut will also need to be secured, if trees have to be cut.

16. **Table 1** presents the summary of environmental regulations and mandatory requirements for the proposed subproject.

Table 1: Summary of Applicable Environmental Regulations

Laws, Rules and Regulations	Description/Salient Features	Permit/Clearance	Required for the Project
PD 1586 and its implementing rules and regulations	Requires project proponents to secure ECC from the DENR before an infrastructure project is constructed. DAO 03-30 provides the implementing rules and regulations for PD 1586 and the Revised Procedural Manual of DAO 03-30 integrates DENR policies to promote EIA as a planning and decision-making tool. DENR MC No. 2011-005	ECC for proposed projects under the EIS system or Certificate of Non-Coverage (CNC) for proposed projects not covered by the system.	An IEE Checklist Report is required for water supply systems with six or less wells and other systems in order to secure an ECC.

Laws, Rules and Regulations	Description/Salient Features	Permit/Clearance	Required for the Project
	further streamlined the PEISS.		
Philippine Clean Water Act of 2004 (RA 9275) and its implementing rules and regulations	Provides the policy and regulations for the prevention, control and abatement of pollution in the country's water resources for sustainable development.	Requires Wastewater Discharge Permit for facilities that discharge of regulated effluents	Not applicable
DENR Administrative Order No. 35, series of 1990	Known as Revised Effluent Regulations of 1990, the order sets the effluent standards for discharge into the receiving water bodies.	Compliance with the effluent standards is the primary basis for issuance of Wastewater Discharge Permit	Not applicable
Water Code of the Philippines (PD 1067) and its amended implementing rules and regulations	Establishes the principles for appropriation, control and conservation of water resources in the country and defines the rights and obligations of water users.	Water Permit and Permit to Drill from NWRB	Application for permit to drill shall be filed with the NWRB prior to drilling and then water permit after completion of the drilling.
Permit to Cut Trees	Required by the DENR before cutting any tree in both public and private properties.	Permit to Cut is secured from the EMB-RO where the tree/s to be cut are located	To be secured if trees would be cut in the well site or along the transmission line.

DAO=Department Administrative Order, DENR=Department of Environment and Natural Resources, ECC=Environmental Compliance Certificate, EMB-RO=Environmental Management Bureau–Regional Office, IEE=Initial Environmental Examination, MC=Memorandum Circular, NWRB = National Water Resources Board, PD=Presidential Decree, PEISS=Philippine Environmental Impact Statement System, RA=Republic Act.

III. DESCRIPTION OF THE PROJECT

A. Existing Condition and Need for the Subproject

17. The present source of water for domestic, commercial and institutional demands in Koronadal is groundwater through wells. CKWD has ten deep well sources. The wells have diameters ranging from 200 to 250 millimeters (mm), depths ranging from 85 to 120 meters (m) and discharge capacities ranging from 15 to 40 liters per second (lps). Although most of the existing wells showed high concentration of manganese, the newly drilled Sta. Cruz Well and San Isidro Well located southwest of the City of Koronadal along the limestone formation showed better water quality as compared with the wells drilled in the north and to the southeast along the alluvial formation.

B. Water Demand and Service Connections Projections

18. During the PPTA, the five barangays, including Brgy. Paraiso, were not served by CKWD and its residents depend on individual or communal shallow wells for their domestic water supply. The projected number of service connections and population served within the CKWD area are shown in **Table 2 and Table 2B**, while the water demand projections and demand variations are shown in **Table 3**.

Table 2: Projected Service Connections

Barangays	2018	2020	2025
1. Poblacion (Zone 1)	494	731	970
2. Poblacion (Zone 2)	710	744	789
3. Poblacion (Zone 3)	1,501	1,786	2,073
4. Poblacion (Zone 4)	1,455	1,555	1,655
5. Gen. P. Santos (Barrio 1)	1,741	2,473	3,207
6. Morales	795	1,091	1,388
7. Santa Cruz	1,381	1,720	2,061
8. Santo Nino (Barrio 2)	1,354	1,549	1,746
9. Carpenter Hills	304	404	505
10. San Isidro	489	670	851
11. Concepcion (Barrio 6)	339	451	563
12. Paraiso	472	675	878
13. San Jose (Barrio 5)	647	893	1,140
14. Saravia (Barrio 8)	562	724	886
15. Zulueta (Barrio 7 or Topland)	687	918	1,150
Total	12,931	16,384	19,862

Source: PPTA Consultant.

Table 2B: Projected Service Connections and Served Population (2025)

Barangay	Brgy. Pop.	Service Area Pop.	No. of Connections	Served Pop.	Percentage	
					Served/ Brgy. Pop.	Served/ Service Area
Poblacion (Zone 1)	6,456	6,134	970	5,790	89.68%	94.40%
Poblacion (Zone 2)	5,253	4,990	789	4,674	88.98%	93.66%
Poblacion (Zone 3)	13,791	13,101	2,073	12,258	88.88%	93.56%
Poblacion (Zone 4)	11,012	10,462	1,655	9,588	87.07%	91.65%
Gen. P. Santos (Bo. 1)	28,305	22,644	3,207	19,176	67.75%	84.68%
Morales	11,542	9,810	1,388	8,280	71.74%	84.40%
Santa Cruz	17,120	14,552	2,061	12,324	71.99%	84.69%
Santo Nino (Bo. 2)	13,708	12,337	1,746	10,440	76.16%	84.62%
Carpenter Hills	7,147	3,573	505	3,018	42.23%	84.46%
San Isidro	7,520	6,016	851	5,088	67.66%	84.57%
Concepcion (Bo. 6)	4,686	3,983	563	3,360	71.70%	84.35%
Paraiso	6,900	5,865	878	5,244	76.00%	89.42%
San Jose (Bo. 5)	8,946	7,604	1,140	6,810	76.12%	89.55%
Sarabia (Bo. 8)	9,505	6,653	886	5,298	55.74%	79.63%
Zulueta (Bo. 7 or Topland)	9,029	7,675	1,150	6,870	76.09%	89.51%
Total	160,920	135,400	19,862	118,218	73.46%	87.31%

Source: City of Koronadal

Table 3: Projected Water Demand Projections/Water Demand Variations

Year	Total Demand	Non-Revenue Water	Average-Day Demand		Maximum-Day Demand		Peak-Hour Demand	
	(m ³)	%	(m ³)	(lps)	(m ³)	(lps)	(m ³ /d)	(lps)
2018	9,611.3	15%	11,307.4	130.9	14,699.6	170.1	22,614.8	261.7
2020	12,049.6	15%	14,176.0	164.1	18,428.8	213.3	28,352.0	328.1
2025	14,514.1	15%	17,075.4	197.6	22,198.1	256.9	34,150.9	395.3

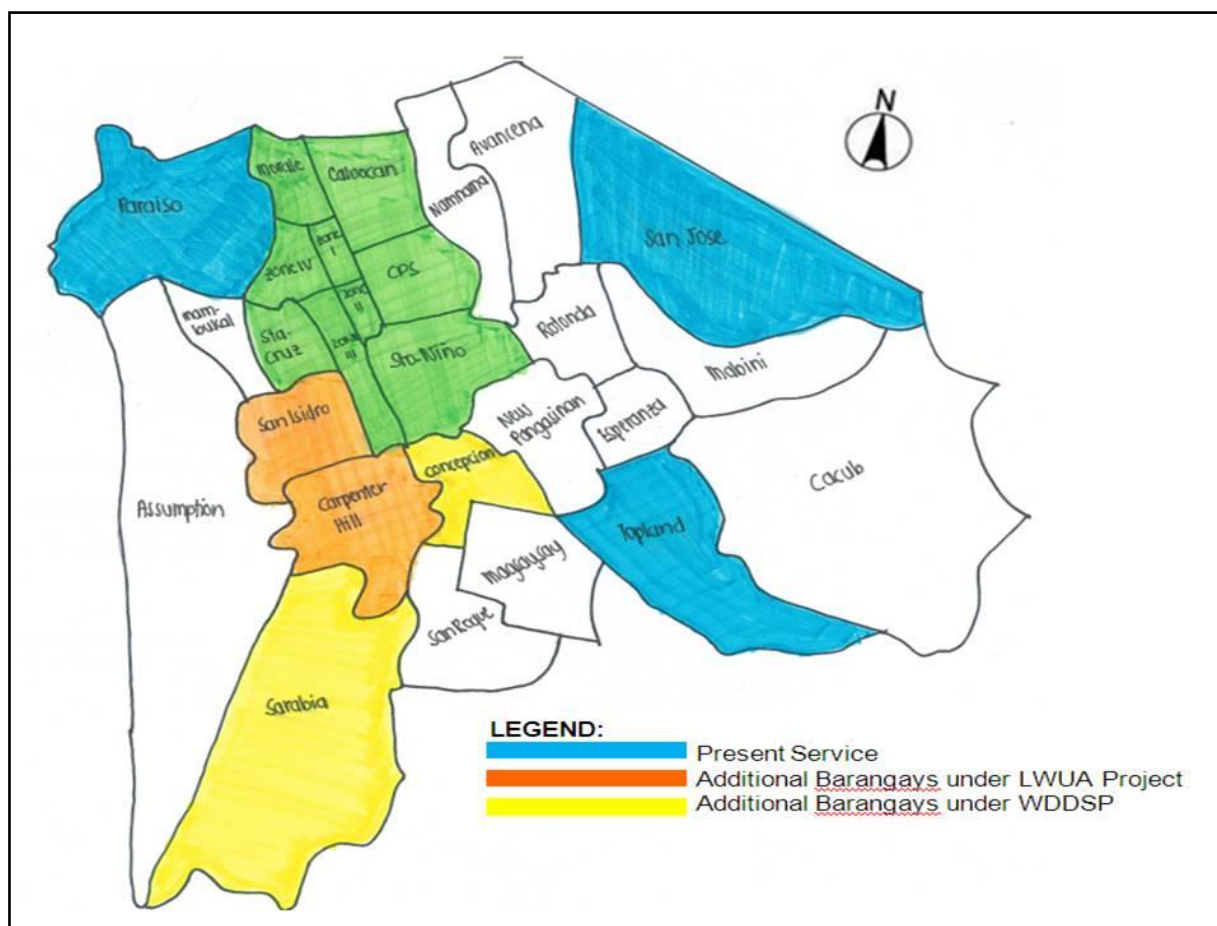
m³ = cubic meters, lps = liters per second

Source: PPTA Consultant.

C. Proposed Water Supply System

19. The proposed water supply subproject aims to expand CKWD's water supply system coverage and meet the water supply demand until 2025. The plan calls for the development of five separate water supply systems in the growth areas of Brgys. Concepcion, Paraiso, San Jose, Sarabia, and Topland. **Figure 1** shows the map of the City of Koronadal showing the barangays targeted.

20. The program includes the development of well sources, construction of pumping facilities, provisions for treatment facilities, and construction of storage tanks, installation of transmission and distribution pipelines, and lot acquisition in each of the identified barangays.

Figure 1: Present and Future Service Area of the City of Koronadal Water District**D. Description of the Proposed Subproject**

21. **Source facilities.** For an efficient water supply system, a minimum supply rate equivalent to the maximum day demand, with corresponding storage tank, is generally sufficient. Each well to be drilled in the five barangays should yield a supply rate equivalent to the maximum day demand. The well parameters in each of the barangay are tabulated below.

	Concepcion	Paraiso	San Jose	Sarabia	Topland
Well Depth, m	100	100	100	100	100
Well Diameter, mm	200	250x200	250x00	250x200	250x200
Expected Yield, lps	10	15	20	15	20
No. of Wells	1	1	1	1	1

m = meter, mm = millimeter

22. **Pumping facilities.** Five units of submersible pumps and motors complete with

the necessary controls and fittings will be purchased and installed in each of the proposed well sources. Five pump houses will likewise be constructed to shelter the electro-mechanical equipment as well as the proposed well sources. Three-phase power lines, 15 units of distribution transformers and five units demand meters will also need to be installed in order to operate the electromechanical equipment. Further, five diesel generating sets are proposed to be acquired as standby power in order to ensure continuity of power in case of blackouts. The description of each major component is tabulated below.

	Concepcion	Paraiso	San Jose	Sarabia	Topland
Electro-mechanical equipment	20 Hp	25 Hp	30 Hp	25 Hp	30 Hp
3-phase Power line extension	1,000 m	1,000 m	1,350 m		1,350 m
Distribution transformers	3-10 Kva	3-10 Kva	3-15 Kva	3-10 Kva	3-15 Kva
Generating set	40 Kva	50 Kva	60 Kva	50 Kva	60 Kva
No. of demand meter	1	1	1	1	1

Hp = horse power, Kva = kilovolt ampere, m = meter

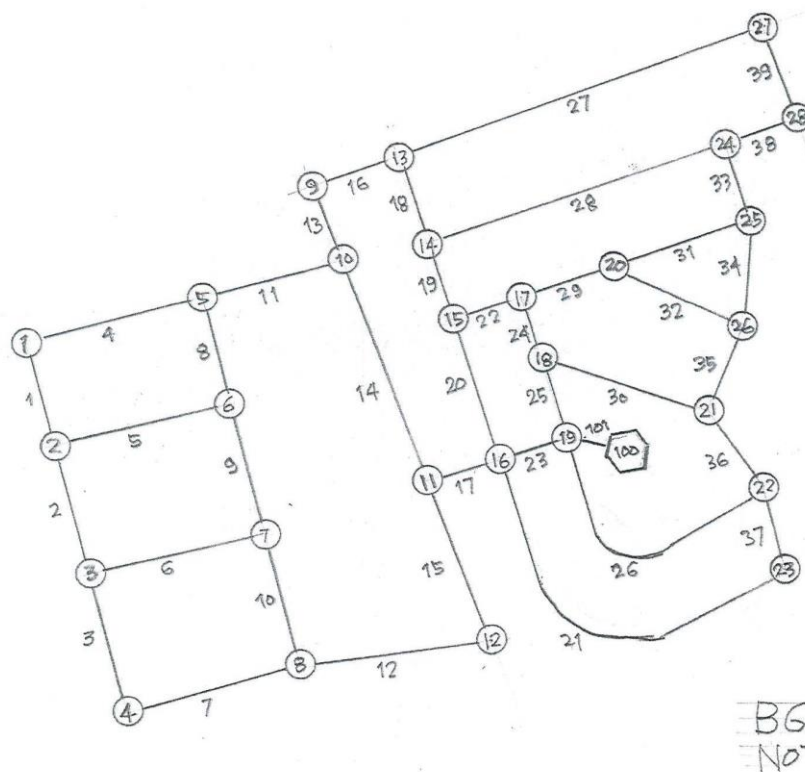
23. **Treatment facilities.** Five units of hypochlorinator will be provided for the necessary treatment prior to distribution.

24. **Storage facilities.** Five units of elevated steel tank will also be provided for each barangay to meet the projected peak hour demand and ensure sufficient pressure in the distribution network. In order to minimize capital cost, only the operational volume has been considered. As such, a 100-m³ elevated steel tank is recommended for each barangay.

25. **Transmission and distribution pipelines.** For Brgy. Paraiso, the following breakdown of pipelines in various sizes will be laid out to serve an initial 472 service connections in the first year of the subproject implementation:

- 150 mm pipe, 115 m
- 100 mm pipe, 465 m
- 75 mm pipe, 1,963 m
- 50 mm pipe, 1,111 m

26. For Brgy. Paraiso water system, the nodal diagram of the water supply system is presented in **Figure 2**.

Figure 2: Nodal Diagram of the Paraiso Water Supply System

27. **Cost estimates.** The estimated cost of the proposed Brgy. Paraiso water supply system at 2012 prices is presented **Table 4**.

Table 4: Estimated Cost of the Brgy. Paraiso Water Supply System

No.	Item	Cost (PhP)
1	Well development	22,000

2	Submersible pump	573,844
3	Discharge line, valves, civil works, pump house	310,120
4	Stand-by genset	903,859
5	Electrical	1,079,679
6	Treatment facility	68,876
7	Storage facility	30,000
8	Transmission/distribution pipes	1,935,147
9	Service connections	811,840
Subtotal		5,735,365
10	Physical contingencies (10%)	573,536
11	Engineering study (6%)	344,122
12	Construction supervision (4%)	229,415
Total		6,882,438
13	Lot	350,000
14	Contingencies (5%)	17,500
Total Cost		7,249,938

Source: PPTA Consultant.

E. Implementation Schedule

28. The implementation schedule of the entire CKWD water improvement program covering five barangays of the city is shown in **Figure 3**. For the water supply system in Brgy. Paraiso, the following construction timeline would be adopted:

- (i) Well drilling – 3 months
- (ii) Construction of pumphouse – 1 month
- (iii) Powerline installation – 1 month
- (iv) Installation of electromechanical components – 1 week
- (v) Laying of transmission line – 2 weeks per kilometer

Figure 3: Implementation Schedule of City of Koronadal Water District

Item No.	DESCRIPTION	PHASE I															
		Year 2016				Year 2017				Year 2018				Year 2019			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	Detailed Design and Tendering																
2	Lot Acquisition																
3	Well Drilling																
4	Laying of Transmission Distribution Lines, installation of Valves and Hydrants																
5	Bridge/River/Culvert Crossings																
6	Pavement Cutting, Breaking and Restoration																
7	Electro-mechanical Treatment Facilities																
8	Purchase of Generator Set																
9	Construction of Reservoir/Storage Facilities																
10	Installation of Service Connections																

IV. DESCRIPTION OF THE ENVIRONMENT

A. Methodology Used for the Baseline Study

29. **Data collection and stakeholder consultations.** Data for this study has been primarily collected through literature review, discussions with the CKWD officials and staff, stakeholder agencies like the EMB-Region XII and LGUs, and field visits to the proposed subproject site.

30. The literature review broadly covered the following:

- (i) Project details, reports, maps, and other documents on WDDSP available at the CKWD office;
- (ii) EMB-DENR, NWRB and their respective rules and regulations as well as ADB SPS relevant to the proposed subproject;
- (iii) Barangay Development Plan of Brgy. Paraiso.

31. Several visits to the subproject sites were made in November 2012 and January 2013 to assess the existing environment (physical, biological, and socioeconomic) and gather information with regard to the proposed sites and scale of the proposed project. A separate socioeconomic study was conducted to determine the demographic information, and settlements.

32. **Data analysis and interpretation.** The data collected was analyzed and interpretations made to assess the physical, biological, and socioeconomic features of the project area. The relevant information is presented in the succeeding paragraphs.

B. Physical Resources

33. **Location.** The proposed site for the deepwell and the pumping facilities is a privately owned lot located at Sitio Salkan, about 2 km southeast of the Paraiso Barangay Hall. It has an approximate coordinates of 6° 28' 18.6" north and 124° 48' 49.1" east with elevation of approximately 126 m. The site is part of a 2.6-hectare. property of Bonet Morales, a resident of Brgy. Paraiso. (Mr. Morales expressed his willingness to part with a portion of his property for the proposed subproject during the site visit conducted with the General Manager of CKWD in January 2013).

34. The proposed site is a vacant lot covered with grasses. It used to be a cornfield but presently uncultivated. The boundaries of the proposed site are as follows: barangay road in the west; cassava plantation in the northwest; cornfield in the northeast; and residential units in the southeast. **Appendix 2** shows the photographs of the surrounding areas, as well as the roadsides where the transmission and distribution lines will be laid.

35. Brgy. Paraiso is located at the northwestern tip of the City of Koronadal. It has a total land area of 2,334 hectares. It is bounded on the southwest by the Municipality of Banga, by the Municipality of Tantangan in the north, Brgys. Morales and Zone IV and

Sta. Cruz in the east and Brgys. Mambucal and Assumption in the south. The map of Brgy. Paraiso showing the indicative location of the proposed location of deep well, pumping facilities and elevated storage tank is presented in **Figure 4**.

36. **Topography.** The City of Koronadal is approximately 50% (13,900 of 27,700 hectares), is predominantly flat with slopes between 0 to 3%. Its mountain ranges have peaks reaching as high as 700 to 800 meters above sea level (masl) and gradually dropping towards the center of the City.

37. **Geology and soils.** The city is underlain with alluvial deposits and sedimentary rocks mostly limestone and sandstone of Miocene and Pleistocene Age, which overly the Basement Complex of plutonic origin. It is located east of a structural complex characterized by the Roxas and Matulas Anticlines. It has four types of soils, namely: San Manuel fine sandy loam (Koronadal fine sandy loam), New Iloilo sandy loam (Bulol sandy loam), Nupol sandy loam and Faraon clay loam. The identified San Manuel fine sandy loam locally known as koronadal fine sandy loam type of soil with alluvials deposits from mixed origin is found at the low land areas. A large portion of Koronadal's land area (62.7% of total) consists of San Manuel fine sandy loam.

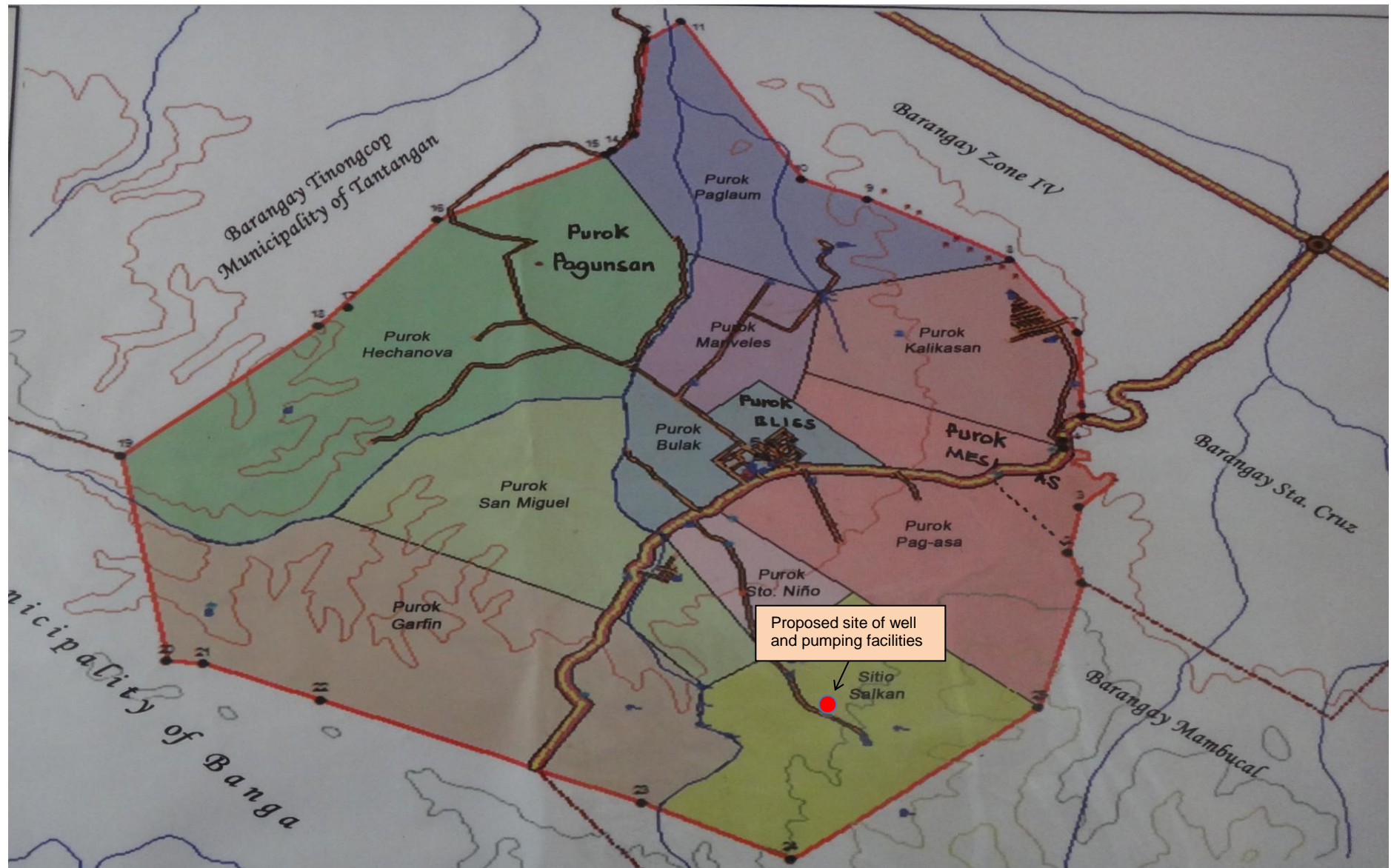
38. **Water resources.** Two major rivers identified in the City of Koronadal, the Marbel River and the Taplan River, originate from the Roxas and Quezon mountain ranges and flow through the Koronadal valley. Marbel River originates from the eastern flanks of the Roxas mountains about 15 km south of the city proper. It flows in a north-northwesterly direction and drains into the Buluan Lake and is currently being used by the National Irrigation Administration (NIA) to irrigate a big portion of the Koronadal lowlands. Throughout the length of the river, several intake structures have been built also for irrigation purposes.

39. Extensive allocation of the waters from the Marbel and Taplan Rivers for agricultural projects substantially reduces the water supply potential of both rivers for domestic purposes. Moreover, surface water is generally more prone to pollution and contamination and will require high costs for physical and chemical treatment.

40. Springs of small to medium capacities also exist in the limestone formation along the slopes of the Roxas and Quezon mountain ranges. The largest of the springs inventoried, the Morales Spring with an estimated discharge of 35 lps, is being used for irrigation purposes, while the other small capacity springs are being used as water sources of the barangays outside the CKWD's service area. Utilization of these springs is not recommended due to the limiting factors of elevation, discharge capacity and distance to the proposed service areas.

41. The present source of water for domestic, commercial and institutional demands in City of Koronadal is groundwater through wells. CKWD has already six deep well sources, five of which are operational while the other one is about to be commissioned. The wells have diameters ranging from 200 to 250 mm, depths ranging from 85 to 120 m and discharge capacities ranging from 15 to 40 lps. Although most of the existing wells showed high concentration of manganese, the newly drilled Sta. Cruz Well and San Isidro Well located southwest of the City of Koronadal along the limestone formation showed better water quality as compared with the wells drilled in the north and to the southeast along the alluvial formation. **Table 5** presents a sample of water quality from a deepwell in the neighboring barangay of Sta. Cruz.

Figure 4: Map of Brgy. Paraiso, City of Koronadal Showing Proposed Site of Well



Source: Brgy. Paraiso, City of Koronadal. 2012.

Table 5: Water Quality of Water from a Deep Well

Parameter	Test Results	2007 PNSDW Limit
odor	Not objectionable	Not objectionable
pH, unit	7.5	6.5 – 8.5
Total Dissolved Solids, mg/L	461	500
Acidity, mg/L	19.82	none
Alkalinity, mg/L	399.2	none
Calcium, mg/L	46.3	none
Chloride, mg/L	107.6	250
Hardness as CaCO ₃ , mg/L	237.8	300
Iron, mg/L	0.3	1.0
Manganese, mg/L	0.1	0.4

CaCO₃ = calcium carbonate, mg/L = milligrams per liter, pH = power of hydrogen, PNSDW = Philippines National Standard for Drinking Water

Source: City of Koronadal Water District. Sta. Cruz Pumping Station. 2009.

42. Groundwater flows from the recharge areas in the Roxas Mountain Range and the Quezon Mountain Range towards the flat areas of the Koronadal Valley in a north-northwest trend. The piezometric gradient appears to be relatively gentle with slopes that vary from 0.010 to 0.025.

43. Geo-resistivity surveys were carried out by LWUA in March and August 2008 and October 2009 along the expanse of the alluvial and the limestone formation in the area. The 2008 and 2009 surveys covered Bgys. Concepcion, Carpenter Hills, Morales, Paraiso, San Isidro, Sta. Cruz, Sarabia and Bgys. San Jose and Topland.

44. The survey identified three electrostratigraphic layers in the study area: the conductive layer with resistivity less than 20 ohm-meters; the resistive layer with resistivity ranging from 25 to around 150 ohm-meters; and the highly resistive layer with resistivity greater than 200 ohm-meters. The conductive layer is associated with formation consisting predominantly of fine-grained sediments such as clay and silt and limestone formation with significant amount of clayey and marlyfacies. The resistive layer is associated with formation consisting of coarse-grained sediments such as sand and gravel and limestone formation containing significant amount of coarse sediments and clasticfacies. This layer represents the aquifer in the study area and could be intersected down to depths ranging from 50 to 120 m below ground level (mbgl). In some sounding points, this layer extends down to undetermined depth but is believed to reach depths greater than 120 mbgl. The highly resistive layer is associated with the massive sandstone and limestone formation.

45. The geological and geophysical investigation as well as the lithostratigraphic well logs suggests that an aquifer exists both in the limestone formation and the alluvial deposits. These aquifers are believed to have sufficient recharge and have substantial groundwater storage that could be exploited to support the water requirement of the existing and proposed service areas. Based on the results of the previous well drilling projects in Koronadal, the aquifer in the study area exhibits transmissivity ranging from 1.85×10^{-3} to $5.36 \times 10^{-3} \text{ m}^2/\text{s}$ and could support wells with capacities ranging from 30 to 50 lps.

46. **Climate.** The City of Koronadal has a mild and sub-tropical climate and typhoon free. Rainy months are from June to October. Based on the climatic data of the

Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) the highest rainfall is 225.60 mm in August 2003, and the lowest rainfall is 3.0 mm in April 2003. Its highest relative humidity ranged from 82% to 84% in the months of June to October during 2001 to 2006. The month of April 2006 has the lowest relative humidity of 74%. Warmest temperatures occur during the month of April. Maximum temperature was observed at 35.20°C in March 2004, while the coolest was observed at 22.10°C in November 2003.

47. Analysis made by PAGASA of the trends of increases or decreases in extreme daily rainfall are not statistically significant; although, there have been changes in extreme rain events in certain areas in the Philippines. For instance, intensity of extreme daily rainfall is already being experienced in most parts of the country, but not statistically significant. Likewise, the frequency has exhibited an increasing trend, also, not statistically significant. On the other hand, analysis of extreme daily maximum and minimum temperatures (hot-days index and cold-nights index, respectively) show there are statistically significant increasing number of hot days but decreasing number of cool nights.¹

48. PAGASA predicted that the mean temperature in South Cotabato would increase by an average of 1.1°C in 2020 and by an average of 2.15°C in 2050. On the other hand, rainfall would increase by 10.1% during the months of December to March and decrease by an average of 9.2% from April to November in 2020, increase by 8.6% in December to March and decrease by an average of 14.4% in 2050.² These predictions point to the need for serious consideration of climate change adaptation in the long-term planning of the WD since higher temperature and lower precipitation levels would have impacts on the availability of surface water and groundwater.

49. **Air quality and noise.** There are no available air quality data specific to the areas where the subproject components will be constructed. However, based on the consultant's experience on air quality measurements of similar rural setting in the Philippines, the expected average ground level concentrations of total suspended particulates (TSP) would be close to the indicative value of 65 ug/Ncm. Similarly, there are no actual data on the present noise levels of this area. Again, based on the consultant's experience on noise measurements of similar rural setting in the Philippines, the expected noise levels along the inhabited areas would be between 42 to 48 decibel [dB(A)] for the daytime, while those in the farm areas would be less than 40 dB(A). In areas where there is higher vehicular traffic volume noise levels could reach as high as 54 dB(A).

C. Economic Development in the City of Koronadal

50. **City Income and Expenditures.** The City of Koronadal is a third class component city with a total income of Php 546,163,411.08 and expenditure of Php 447,810,779.74 in 2011.³ Its income is derived from tax revenue, non-tax revenue, service income, business income and other income.

¹ *Current Climate and Observed Trends.* kidlat.pagasa.dost.gov.ph. Accessed on May 1, 2013.

² *Climate Projections.* kidlat.pagasa.dost.gov.ph. Accessed on May 1, 2013

³ State of Local Governance Report (2011). City of Koronadal

51. **Land Use.** The existing total urban land area of the city is 2,912 hectares or 10.51% of 27,700 hectares of Koronadal's land area.⁴ The urban center of the city includes the four Zones, Brgys. Morales, General P. Santos, Sta. Cruz, and a portion of Brgy. Sto. Nino, Conception and Paraiso.

52. **Commerce and Trade.** As the administrative center of Region XII, Koronadal has become important hub of commercial, industrial and other socio-economic activities. The City enjoys the distinction of being identified as the Agri-Industrial Center of the province of South Cotabato which made it as a lead center for industrialization acting as catalyst for development particularly in the second district of South Cotabato. Koronadal, primarily an agri-production area, boasts of an agri-based resources. Stable peace and order condition provides a favorable climate for more investments.⁵

53. **Agriculture.** Agricultural land accounts for about 55% (15,225 hectares) of the total land area. Major crops include rice, corn, and high value commercial crops such as fruit crops, root crops, vegetable, legumes, and cutflowers are being cultivated. Rice and corn crops are in both irrigated and non-irrigated areas. Other agricultural endeavors include aqua culture/farming, livestock and poultry. The City is also extending agricultural facilities and other related services.

54. **Tourism.** Tourist attractions are either natural or man-made. Potential natural tourist destinations are the Millenium Falls in Barangay Cacub, the Cadidang Cave, and the Cabillion and Supon Falls in Barangay San Jose, and the Siok Falls in Bgy. Mabini. There are five resorts. Tourist accommodations are available in the City such as economical dormitories, pension houses, and hotels. Koronodal City is a gateway to Lake Sebu - a place far from the city and inhabited by indigenous people.

55. **Existing Water Supply System.** Present water sources of CKWD are eight deepwells: Barangays Sto. Niño, GPS, Morales, San Antonio (Phase 1), San Isidro, Paraiso, and two in Sta. Cruz with discharges ranging from 2.5 lps to 26.10 lps. Water from the seven deepwells are pumped directly to the distribution system, while that of the San Antonio Well is transmitted to the existing elevated steel tank before releasing to the distribution network. Except for the newly constructed Sta. Cruz Well, water from all wells has manganese content exceeding the 2007 PNSDW limit of 0.4 mg/l. Iron and manganese removal facilities of the Sto. Niño, GPS and Morales pump stations are unable to reduce the manganese concentrations to acceptable levels. A 24-hour water service is not available in some areas.

56. CKWD has a total length of 81,045 linear meters (lm) of PVC transmission and distribution mains with pipe diameters ranging from 50 mm to 250 mm. Storage facilities are one concrete ground reservoir and one elevated steel tank. The concrete ground reservoir constructed in 1998 and is located at Barangay Zone IV has a capacity of 800 cubic meters (m³) and elevation of 84 masl. The elevated steel tank is located at Barangay Sta. Cruz and operates on a fill and draw scheme with water coming from the San Antonio Well. The San Antonio Well and the elevated steel tank are used exclusively for the residents of San Antonio Village.

⁴ <http://koronadal.gov.ph>. Accessed February 2014

⁵ http://www.nscb.gov.ph/ru12/Municipal_Profile/Koronadal. Accessed February 2014

57. **Existing Water Supply Service.** CKWD operates a water supply system serving an estimated 37,382 people with a total of 5,751 active connections as of May 2009 in the City of Koronadal covering 9 barangays, namely: Caloocan, General Paulino Santos, Morales, Sta. Cruz, Santo Nino, Zone I, Zone II, Zone III and Zone IV.

58. Data on present water service situation in the City of Koronadal were generated by a WDDSP household survey using stratified random sampling with 384 respondents. Survey was conducted on groups with pipe water connection and those without. For those with pipe water connection, the survey indicated low service coverage even in urban barangays. About 18.3% of respondents had piped water with the CKWD. Water supply service is intermittent in certain areas. Average monthly water consumption was 26.7 m³. About 13.9% provided water to neighbors or relatives.

59. Issues on sufficiency and perceived quality of water were indicated for certain areas; additional sources were cited as private deep wells for other domestic uses (with an average volume of 1.2 gallons per day); purified water refilling stations were the source of drinking water for 2.4% with an average volume of 2.4 gallons per day and at an average cost of Php 16 per day; though not allowed, 1.4% used pump to increase water pressure. Overall, 81.9% assessed that water received from piped connection was sufficient for their needs.

60. When asked to rate water service, water pressure was considered poor by only 1.4% of respondents. All WD-connected respondents cited that water was available everyday during the rainy season. Performance rating on continuity of water supply was considered poor by 1.4%; on reliability of water – very poor by 1.4%; regularity of billing and collection was satisfactory with none giving a rating of “poor”, while response to customer complaints was rated poor by 5.6% and very poor by 2.8%.

61. There was positive net satisfaction of overall water service with 42% that reported some area of dissatisfaction. Aspects of water service that bothered households most were price and water quality. Areas for improvement were: water pressure (2.8%), reduction of water rates (20.8%), complaints handling (11.1%), quality of water (15.9%) and billing and maintenance at less than 5%. Aspects of water quality that were at issue were taste (21.7%), color (24.6%) and smell (8.7%).

62. For those without pipe water connection, 18.4% got water from water vendors and peddlers, while 3.4% reported paying for supply of piped water from those with water service connection. Most common water source was private shallow wells at 40.6% and private deep wells at 30.9%; less common were public faucets at 3.8%, while 0.3% got water from open dug wells.

63. Shallow wells led as a source for bathing (82.2%) and for gardening (83.4%) but only 45.7% used water from these for drinking. The main reason for not being connected as cited by 67.1% was unavailability of water connection; smaller percentages of 9% considered the application fee of Php1,800 to be too high or that their present water source was satisfactory (11.2%). About 71.4% of non-connected households assessed overall quality of water from current source as extremely or moderately satisfactory all year round.

64. **Transportation and Communication.** The city can be reached by land, sea and air. Sea and air transportations are through General Santos City where the port and

airport are located. Land transportation has several routes plying to and from the city daily. Land transportation can be availed of through passenger buses, jeepneys, and vans. Within the city, one can take tricycles, jeepneys, multicabs and motorcycle (locally called habal-habal or skylabs) for remote barangays. Available communication facilities include broadcast media (radio), television networks, telephone system, cell phone communications, internets, and publications (local and national dailies).

65. **Power Supply.** Electricity comes from the Mindanao Grid of the Maria Cristina Hydro Electric Plant in Lanao del Norte. It is distributed in the city by the South Cotabato I Electric Cooperative, Inc. (SOCOTECO-1). All 27 barangays are energized.

D. Socio and Cultural Resources

66. **Population and CKWD Service Area.** Based on 2010 Census of Population and Housing (National Statistics Office [NSO]), City of Koronadal 2010 population was 158,273. Population density was 5.7 persons per hectare. Rural population was 99,330 representing 62.76% of the total population, while urban population was 58,943 equivalent to 37.24% of the total population. The existing service area of CKWD covers 9 barangays namely Caloocan, General Paulino Santos, Morales, Sta. Cruz, Sto. Nino, Zone I, Zone II, Zone III and Zone IV. The existing service area will eventually be expanded to include two more barangays under the LWUA-funded project. Three more barangays will also be included under a WDDSP and these are Concepcion, Namnama, and Sarabia. By design year 2025, the service area would cover 15 barangays out of the 27 barangays of the city.

67. **Public Health and Sanitation.** The City of Koronadal plays an active role in the creation of the Local Area Health Development Zone (LAHDZ), a district or a catchment area composed of a number of neighboring municipalities which main function is to improve networking and strengthen cooperation among themselves with regards to health matters. Its mission is to provide quality, efficient and effective healthcare through: (i) provision of entire package of services for its entire populace, (ii) intensification of information, education activities on the basic health services, (iii) provision of adequate health facilities, and (iv) strengthening of personnel/ community involvement. The available data on morbidity from the City Health Office ranked diarrhea as second in the 2006 ten leading causes of morbidity.

68. City of Koronadal has five hospitals of which one is a tertiary hospital. There are 28 private medical clinics, 8 dental clinics, and 38 health centers. The NSO 2000 sanitation data revealed that only 45.2% of total households had septic tanks. Presently, the city has no sanitary sewer system.

69. **Education.** Six private institutions provide tertiary level education, while technical/vocational education is available from 11 private schools. High school education is offered by 15 government and privately operated schools. Based on the 2006 data of the Department of Education, the city had a literacy rate of 95.44%.

70. **Socioeconomic Survey.** WDDSP conducted a household survey to get a good insight into the socioeconomic situation specific to the project area. Using stratified random sampling, 384 respondents were interviewed for a 95% level of confidence and standard deviation of 0.1. Based on this survey, average household size is 5.34 with 36.1% having 3-4 members and another 33.6 having 5 members. Women-headed

household is 18.6%. Highest grade of household heads was college and over with a significant difference of 65.7% for WD connected households as against 34.5% for non-connected households. Other respondents reached or finished high school. Respondents were distributed under a wide occupational range including farming, business, street vending, and government and private employment; 4.3% of non-connected households were unemployed. Ilonggo (68%) was the most spoken language in the area followed by Cebuano (10.5%) and Ilocano (9.5%). Sole occupancy of dwelling was most common at 85.5% with 58.8% owning the house they occupied.

71. Average monthly income was Php 10,762, though 22.9% had incomes of less than Php 5,000 and another 35.2% had an income range of Php 5,000-9,999. The official annual per capita poverty threshold for South Cotabato for 2012 was pegged at PhpP 19,847.⁶ About 22% spent less than Php5,000 per month while a sizable percentage (42.4%) spent about Php5,000-9,999. Over 58% were unable to save while many of those who could (28.1%) had less than Php1,000 in savings per month. Television (88.5%), cellular phones (88%) and refrigerators (61%) were the most common valuable items of the household.

**Table 6: Annual Income - City of Koronadal
(thousand pesos)**

2010	2011	2012	2013	2014	Average
594,231	632,934	598,440	593,614	620,922	608,028

Source: Commission on Audit

72. Out of the 393 households in the City of Koronadal, 79.6% had water-sealed toilet (flush or pour flush) connected to a septic tank. The next most common type of toilet system representing 9.2% of the households was water-sealed toilet (flush or pour flush) connected to a pit; 8.9% shared toilets. All households in the survey sample had toilets though 0.5% admitted using water-sealed flush or pour flush toilets that connected to the drainage system. All of 80% were satisfied with their current toilet system; the main reason for dissatisfaction was due to a combination of backflow resulting to foul odor and inconvenience (61.8%). Some 27.7% of Koronadal households felt a need to improve their septic system; 43.1% of these preferred to improve their existing septic tanks.

73. All survey respondents reported washing hands before cooking, before eating, after using the toilet, before feeding children, and after washing the children after toilet. There was less awareness about washing hands before breastfeeding (51.9%). Non-connected households transported water from source using open (53.3%) and closed containers (19%) or a combination of both open and closed containers (17.1%). Some also used pipe or water hose to connect to a neighbor as reported by 5.7% of 315 cases; 4.1% of 319 cases had at least one member who suffered from a water-related disease during the past year while 0.6% of households had at least one child who suffered from diarrhea. About 6.9% of non-connected households treated water from the faucet before drinking. Respondents sought medical services primarily from public facilities such as medical centers (55%), government hospitals (16.8%), private hospitals (7.4%) and private clinics (15.3%). The majority (91.3%) of respondents was satisfied with available health services in their locality, with men slightly more satisfied than women; 73.3% of

⁶ <http://www.nscb.gov.ph/poverty>. Accessed February 2014

both female and male-headed households had access to Philhealth or had assistance on health expenses; 2.5% relied on self-medication.

E. Socioeconomic Conditions in Brgy. Paraiso

74. **Demography.** Brgy. Paraiso has a population of 5,642 comprising of 1,240 households with 1,514 families. It has a total land area of 2,334 hectares subdivided into 10 puroks and one sitio. Sitio Salkan, the biggest sub-village, is a community of indigenous people; mostly B'laans comprises 19% of the barangay population, while Purok Paglaum is the smallest in terms of population contributing about 6% to the population.⁷

75. The dominant tribes found in the barangay are Ilonggo (76%), B'laan (13.9%), Tagalog (3.9), and Bisaya/Cebuano, (1.2%). Ilonggo has the highest number because the founder of the barangay came from Iloilo.

76. **Social and cultural characteristics.** There are various religious denominations in the barangay with the Roman Catholic being the biggest group followed by the Baptist and Iglesia ni Cristo as the third in rank. Any archeological, historical, or cultural chance finds will be reported to the National Museum of the Philippines.

77. There are five day care centers operating in the barangay jointly funded by the city and the barangay, and two elementary schools operated by the Department of Education.

78. There is no known historical or archeological site of significance in the barangay.

79. **Agricultural crops.** Brgy. Paraiso is basically an agricultural area. Majority of the people depend on farming as source of income to provide for the basic needs of the family. Tilling of lands for crops and vegetable plantation are commonly practiced. Major crops raised by farmers are corn, rice, and minor crops are vegetables and fruit trees, such as mangoes and bananas.

80. **Livestock.** Livestock raising on small scale is also practiced in the barangay to augment family income. Normally, raising of livestock is on backyard level, usually chicken.

F. Commerce and Trade

81. **Commercial establishments.** The most common business establishments in the barangay are sari-sari stores and carenderia or small restaurants.

82. **Employment.** Sari-sari stores are the most common economic activity to augment family income. Employment in public or private establishment remains slim within the barangay because of very limited employment opportunities.

G. Infrastructure Facilities and Utilities

83. Due to the close proximity of Brgy. Paraiso to the city proper, provision of infrastructure facilities and utilities like communication, electricity, and road networks is

⁷ Barangay Profile. Brgy. Paraiso, City of Koronadal. 2012.

assured but on a limited scale. As of 2002, not all barangays were served by the electric cooperative.

84. **Water.** Limited supply of potable water is a concern on Brgy. Paraiso. Domestic water supply is usually provided by either shallow wells in individual residential units or by communal shallow wells. The prevalent rate of water borne diseases would continuously affect the health of the residents. Some households have their own shallow wells but the majority depends on communal system which is also limited.

85. **Electricity.** Electricity is supplied by the electric cooperative, SOCOTECO 1, which operates four substations (Matulas, Koronadal; Morales Koronadal; Dajay Surallah; and Poblacion Norala). Not all barangays are served and expansion of the electrification program is needed.

86. **Transportation.** The concrete national highway connects the barangay with the rest of the city and the nearby municipalities. The barangay is accessible to all forms of land transportation facilities, such as buses, jeepneys, vans, multi-cabs, motorcycles (skylab), and private vehicles.

87. **Communication.** The major form of communication is via mobile and landline telephone system provided by the major telecommunication companies.

IV. ANTICIPATED IMPACTS AND MITIGATION MEASURES

88. The present report assesses the impacts of the proposed activities on various environmental attributes of the subproject site.

89. **Methodology.** Issues for consideration have been raised by the following means: (i) input from interested and affected parties; (ii) desktop research of information relevant to the proposed project; (iii) site visit and professional assessment by the environment specialist; and (iv) evaluation of proposed design and potential impacts based on the environment specialist's past experiences. Categorization of the project and formulation of mitigation measures have been guided by ADB's REA Checklist for Water Supply (**Appendix 1**) and SPS.

90. A comprehensive assessment of environmental impacts is made through a review of the parameters associated with water supply projects against the components of the proposed CKWD subproject and the environment where the facilities will be located. A screening checklist was developed from various sources such as DENR checklists, ADB's REA Checklist, and World Bank Environmental Source Book. Some items of the checklist may not be applicable to this particular subproject. However, they are included in the discussions to indicate that their applicability was reviewed in the environmental impact screening process. This will help identify which topics do not require further attention.

A. Anticipated Impacts of the Subproject

91. The assessment is made on the following phases of the subproject: (i) pre-construction, (ii) construction, and (iii) operation and maintenance. Results of the environmental impacts screening are summarized in **Table 6**, covering the three phases of project development.

92. **Pre-construction.** Planning principles and design considerations will be incorporated in the site planning process whenever possible. The concepts considered in the design of water supply project are; (i) sustainability of groundwater source, (ii) adequacy of groundwater source confirmed by geo-resistivity studies, (iii) source protection, (iv) source abstraction, (v) no involuntary land acquisition, (vi) materials for water abstraction, (vii) materials for water storage, (viii) materials for transmission and service connections, and (ix) intended service areas.

93. While the Project is intended to improve climate change resilience by upgrading and/or expansion of the existing current water system, the system itself may be vulnerable to the effects of climate change. In particular, sources of raw water (i.e., groundwater) may be depleted and/or ground heave (and other phenomena) may affect structural integrity of the distribution system. This can be mitigated with the conduct of appropriate study to ascertain availability (or abundance) of raw water especially under extremely dry conditions/weather. Likewise, the detailed engineering design (DED) should ensure the selection of appropriate materials for piping distribution to mitigate potential effects of ground heave (and other similar phenomena).

94. Likewise, relevant engineering standards shall be applied to account for other natural hazards (e.g., flood, earthquake). All civil works will take into consideration construction criteria applicable to the observed level of risk. Disaster risk mitigation measures will include, among others, sufficient elevation for structural foundation to account for projected or estimated flood depths; avoiding areas of known seismic risks (e.g., fault lines) as component locations; and ensuring structural design are in accordance with applicable standards/codes. These measures will be considered in detail during the DED stage.

95. Using the AWARE climate sensitivity software and the scenario of “*without-mitigation*”, the project has been rated as “MEDIUM” risk with flood and landslide as major risk contributors. With all the identified mitigation and adaptation measures for both climate change and natural hazards, the resulting residual risk significance may be considered as “LOW”.

96. It is expected that some problems may be encountered because many of narrow streets with no sidewalks. Careful planning and extensive coordination with barangay officials must be established. Information campaign must precede any construction activity in order to make the public aware of the extent of the problem that might be present during the period of construction.

97. **Construction.** As practiced by the WD, well drilling and construction of pump house are contracted to qualified contractors who provide the equipment and manpower. The equipment supplier will supply materials and labor for electro-mechanical works. Laying of pipes of transmission lines and distribution pipes will be undertaken by CKWD workers and contractors. Bid documents will include the requirements for incorporating pertinent provisions of the environmental management plan to be carried out by the contractors during construction.

98. Well drilling will be undertaken by a contractor under the supervision of CKWD engineers to ensure that the terms and conditions of the contract are followed. During test pumping water quality analysis will be conducted and water from test pumping will be drained into the nearby creek.

99. The pipes will be buried in trenches immediately adjacent to roads. Trenches will be dug by backhoe digger, supplemented by manual digging where necessary. Excavated soil will be placed nearby, and the pipes (brought to site on trucks and stored on unused land nearby) will be placed in the trench manually. After the pipes are joined, loose soil will be shoveled back into the trench, and the surface layer will be compacted by hand-operated compressor. Any excavated or damaged road will be reinstated.

100. Under the Cultural Properties Preservation Act (Presidential Decree No. 374) when excavators shall strike upon any buried cultural property, the excavation shall be suspended and the matter reported immediately to the Director of the National Museum who shall take the appropriate steps to have the discovery investigated and to insure the proper and safe removal thereof, with the knowledge and consent of the owner. The suspension can only be lifted by the Director of the National Museum. Accordingly, in case of archeological, historical, cultural chance finds, the following procedure would be observed to avoid damage to cultural properties: (i) detailed design of all civil works will be located away from all cultural/ archeological/historical properties; (ii) procedures for chance finds of valued relics and cultural values will be stipulated in the contract with contractors in order to avoid damaging such valuable properties; (iii) site supervisors will be on the watch for chance finds; (iii) upon a chance find, all work will be stopped immediately, find will be left untouched, and notify CKWD who in turn will notify the National Museum; (iv) work at the find site will remain suspended until the National Museum allows work to resume.

101. **Operation and maintenance (O&M).** CKWD workers will undertake operation and maintenance of the pump facilities and distribution system. These include monitoring and maintenance of all the electro-mechanical equipment, hypochlorination, transmission and service connections to ensure continuous supply of water at the acceptable quantity and quality to the various customers of the WD.

102. The main O&M activities of the water system will be detection and repair of leaks and pipe bursts. These are, however, likely to be minimal as proper design and selection of good quality pipe material shall mean that leaks are minimal. Leak repair work will be similar to the pipe-laying work as earlier explained. Trenches will be dug to reveal the leaking area and the faulty connection will be refitted, or the pipe will be removed and replaced if necessary.

103. Delivery of potable water that consistently meets the PNSDW will be maintained during the O&M phase of the project. To achieve this, implementation of the water safety plan with regular water quality monitoring will be undertaken.

104. Climate change adaptation needs to be seriously considered in the long-term planning of the WD in view of the predictions of PAGASA about changes in weather pattern. These changes would impact on the sources of water supply (whether surface water and/or groundwater) and the concurrent issue on potential conflict of water uses in the future.

105. Water supply can be protected against increasing variability of seasonal and annual precipitation and runoff and thereby simultaneously address conflict of use by (i) building additional water storage infrastructure, such as reservoirs or storage tanks, to provide buffers; (ii) adjusting infrastructure designs and introducing flexibility in water systems operations can build resilience to changing climatic conditions such as changes

in the seasonality of precipitation; (iii) diversifying water supply sources—including conjunctive use of surface and groundwater, reuse and recycling, and use of household-level water sources such as roof water harvesting—can mitigate the impacts of weather-related disruptions on any given component of the water supply system.

106. Potential conflict on water uses in the future can also be mitigated through integrated water resources management within river basins to improve the allocation and management of scarce water resources in the context of climate change.

107. Depending on their magnitude, earthquakes can produce faults in rocks, in the subsoil, settlement of the ground surface, cave-ins, landslides, and mudslides. Vibration can also soften saturated soils (known as liquefaction), reducing the capacity of structural resistance. Expected effects of earthquakes on water supply system can be (i) total or partial destruction of wells, transmission and distribution pipes, (ii) loss of water due to breaks in pipes, (iii) damage to pumping facility, (iv) damage to water tank, (v) water contamination when cracks or faults connect surface water or water from latrines with ground water.

108. Physical damages caused by floods include (i) damage to pipes and appurtenances, (ii) soil erosion leading to sections of pipe being uncovered, displaced, or washed away, (iii) damage to pumping facility.

109. **Decommissioning.** Due to the relatively long operational life of the subproject, decommissioning or closure is not envisioned in the near or medium term (e.g., 25 – 50 years). In case decommissioning become an option, the appropriate action plan will be prepared in compliance with Government of the Philippines (GOP) regulatory requirements.

Table 7: Anticipated Impacts of the Subproject

Impact Field	Anticipated Impact on the Environment
Design Phase	
Geo-resistivity studies	Results of the study will be the basis of the design. The procedure is not expected to cause any environmental impact.
Watershed Protection	Groundwater recharge may be impaired due to watershed deterioration and loss of aquifer recharge capability.
Source Protection	Insufficient protection measures and provision of devices at intake works, leading to pollution or contamination of raw water supply.
Source Abstraction	Unregulated groundwater mining will result to groundwater depletion and water use conflict.
Utilities	Electric poles and wires, within right-of-way (ROW) require shifting without disruption to services.
Water supply	Health risk due to closure of existing water supply such as community tanks, water stations, and privately-owned small water pipes.
Social and cultural resources	Ground disturbance can uncover and damage archaeological and historical remains. Impact on sites of cultural/religious importance during pipe laying.
Temporary construction facilities, stockpile areas, storage areas, and disposal areas	Locations may cause encroachment/impact either directly or indirectly on adjacent environments.
Traffic	Traffic flow will be disrupted if routes for delivery of construction materials and temporary blockages during construction activities are not planned and coordinated with the local barangay.
Construction Phase	

Impact Field	Anticipated Impact on the Environment
Sources of materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.
Air quality	Emissions from construction vehicles, equipment, and machinery used for excavation and construction resulting to dust and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons.
Surface water quality	Mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works can contaminate downstream surface water quality.
Noise levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people. Operation of heavy equipment and machines in the night time can cause nuisance to the surrounding environment/ people
Ecological resources	Cutting of trees would affect terrestrial ecological balance and affect terrestrial and aquatic fauna/wildlife.
Existing infrastructure and facilities	Disruption of service and damage to existing infrastructure located alongside roads, in particular electric poles and community-scheme water supply pipes.
Landscape and aesthetics	Solid wastes as well as excess construction materials may create unacceptable aesthetic condition.
Accessibility	Traffic problems and conflicts in ROW. Roads, people, businesses may be disturbed by trenching.
Socioeconomic– Income	Impede the access of residents and customers to nearby shops along the transmission line. Shops may lose business temporarily.
Occupational health and safety	Occupational hazards which can arise during construction (e.g., trenching, falling objects, etc.).
Community health and safety	Community hazards which can arise during construction (e.g., open trenches, air quality, noise, falling objects, etc.). Trenching on concrete roads using pneumatic drills will cause noise and air pollution. Traffic accidents and vehicle collision with pedestrians during material and waste transportation.
Construction waste	Trenching will produce additional amounts of waste soil. And also accumulation of debris waste materials and stockpiling can cause environmental visual pollution.
Temporary construction facilities	Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. This may cause conflict with residents and problem of waste disposal and disruptions to residents.
Social and cultural resources	Risk of archaeological chance finds. Sites of social/cultural importance (schools, hospitals, religious place, tourism sites) may be disturbed by noise, dust, vibration, and impeded access.
Clean-up operations, restoration and rehabilitation	Impacts on social or sensitive receptors when post construction requirements are not undertaken, e.g. proper closure of temporary facilities, disposal of solid waste, and restoration of land after project construction.
Operation and Maintenance Phase	
General maintenance	Maintenance activities may cause disturbance to sensitive receptors, dusts, and increase in noise level.
Health of the served population	Public health is expected to improve with the available source of potable water.
Competition with other wells	Nearby wells may be adversely affected by the additional water abstraction.
Economic development	Impediments to residents and businesses during routine maintenance.
Climate change	Impacts on the availability of both surface water and groundwater due to variability of seasonal and annual precipitation and runoff.
Natural risks such as earthquake and flood	Damage to deepwells, pumping facilities, water tanks, and contamination of water supply

Source: PPTA Consultant.

B. Mitigation Measures

110. The subproject is unlikely to cause significant adverse impacts. There are no impacts that are significant or complex in nature, or that needs an in-depth study to assess the impact. The potential adverse impacts that are associated with design, construction, and O&M can be mitigated to acceptable levels with the mitigation measures presented in **Table 8**.

Table 8: Recommended Mitigation Measures

Parameter	Mitigation Measures
Planning Phase	
Watershed protection	<ul style="list-style-type: none"> City of Koronadal Water District (CKWD) shall request the Department of Environment and Natural Resources (DENR) and the city government for the assignment of a watershed area to the water district (WD) and prepare a watershed management plan in the near future with active participation of the city and watershed barangays. A Memorandum of Agreement (MOA) to that effect shall be initiated by CKWD with the proposal that environmental charge be incorporated in future revision of water tariff for watershed protection. Meanwhile, tree planting program shall be undertaken by the WD in coordination with Brgy. Paraiso.
Source protection	<ul style="list-style-type: none"> Source protection may be incorporated in watershed management plan as part of the responsibilities of upstream dwellers and resource users. It will prevent the contamination of the groundwater source from unregulated activities upstream of the water source. Provide a fenced buffer zone of at least 50 meters surrounding wells. Undertake baseline water quality tests to ensure good quality of water source to minimize cost of treatment and future water quality related operational problems.
Source abstraction	<ul style="list-style-type: none"> Over abstraction may result in competitive use of groundwater with other users and or depletion of the water resource. Full compliance with the prescribed rate of abstraction granted by Natural Water Resources Board (NWRB) in its water permit will prevent over abstraction.
Work schedule and closure of areas	<ul style="list-style-type: none"> Ensure careful planning and scheduling of the activities. To minimize impact on traffic flow, businesses, and road users, as much as possible schedule trenching works during nighttime. Consider low-traffic and non-sensitive areas (other than schools, religious places, and commercial/business) for daytime trenching works. Increase workforce in areas to be excavated during daytime. Prepare a traffic management plan and road safety plan.
Barricades and warning signs	<ul style="list-style-type: none"> Use easily transportable barricades and warning signs such as those made of high reflector plastic materials. Also use aluminized rolled warning signs to warn the public.
Reuse of excavated materials	<ul style="list-style-type: none"> If readily available, mix local sand with the backfill material to ensure pipe integrity. Ensure backfill materials do not contain pointed broken stones, since these might affect the plastic pipe and cause breakage.
Road crossings	<ul style="list-style-type: none"> Manual borings are recommended for road crossings in narrow streets to minimize traffic. Apply local technology, knowledge, and minor equipment such as augers, galvanized iron pipes, and high-pressure water pumps to deliver the water to the tip of the auger.
Equipment	<ul style="list-style-type: none"> In areas where there are few utilities buried under the ground as verified from the results of the surveys, trial pits, the contractor shall use small mechanical excavators to attain faster trenching progress.
Workers	<ul style="list-style-type: none"> Employ workers with adequate experience, training, and know-how. It is always advantageous for the contractor to employ workers with adequate experience, training, and know-how in the line of work that they are doing.

Parameter	Mitigation Measures
	These people are usually reliable and can be counted upon to exercise good judgment in the field.
Community and public awareness	<ul style="list-style-type: none"> Establish extensive coordination with the barangay and other government agencies, as may be needed. An information campaign must precede any construction activity in order to make the public aware of the extent of the problem that might be present during the period of construction. The road closure, together with the proposed detour, needs to be communicated via road signage, pamphlets, radio broadcasts, etc. Open liaison channels shall be established between the barangay, the contractors, and interested and affected parties such that any queries, complaints, or suggestions can be dealt with quickly and by the appropriate persons.
Surveys	<ul style="list-style-type: none"> Connection survey to obtain service connection requirements, and benefits from the project. Road survey to collect information on the traffic condition of the roads during daytime and nighttime, road width, surface condition, existing structures along the roads, road users and their usage pattern, parking areas, and open spaces. Land survey with objective to conduct control level survey, control traverse survey, conduct trace survey of longitudinal section along pipeline, and detailed road surveying and plotting.
Legislation, permits, and agreements	<ul style="list-style-type: none"> In all instances, CKWD and contractors must remain in compliance with relevant local and national legislations.
Access to site	<ul style="list-style-type: none"> Access to site will be via existing roads. The contractor will need to ascertain the existing condition of the roads and repair damage due to construction. The local traffic police shall be involved in the planning stages of the road closure and detour and shall be available on-site for the monitoring of traffic in the early stages of the operations during road closure. The local traffic police must be informed at least a week in advance if the traffic in the area will be affected. No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of the Environmental Management Board (EMB)-Regional Office.
Setting up of temporary construction facilities	<ul style="list-style-type: none"> Choice of site for the facilities must take into account location of local residents, businesses, and existing land uses, including flood zones and slip/unstable zones. If the contractor chooses to locate the camp site on private land, he must get prior permission from the landowner. Use portable toilet facilities (PORTALETS). Under no circumstances may open areas or surrounding bushes be used as toilet facility. Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged.
Establishing equipment lay-down and storage area	<ul style="list-style-type: none"> Storage areas shall be secure so as to minimize the risk of crime. They shall also be safe from access by children, animals, etc.
Materials management – sourcing	<ul style="list-style-type: none"> The contractor shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, etc), and submit these to CKWD for approval prior to commencement of any work.
Education of site staff on general and environmental conduct	<ul style="list-style-type: none"> Ensure that all site personnel have a basic level of environmental awareness. Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task.
Construction phase	
Trench width excavation	<ul style="list-style-type: none"> During the preparation of the trenches, allowance of 150 mm shall be made on each side of the pipe.

Parameter	Mitigation Measures
	<ul style="list-style-type: none"> The excavated earth shall always be dumped on the side opposite the carriageway as this will not restrict the vehicular movement on the carriageway and not create bottlenecks on the roadway. In the event that excavated trenches are to be kept open overnight, lights, high visibility warning signs, and barricades shall be provided.
Hauling of excavated materials	<ul style="list-style-type: none"> The contractor shall haul away all excavated materials from the excavation site and deposit these in an area designated by CKWD. The stockpile shall be processed where it is deposited so that it can be brought back to the trenches as selected filling material. Hauling vehicles must always be present at the excavation site.
Reuse of excavated materials	<ul style="list-style-type: none"> The contractor can process the excavated materials at the disposal site and use these as selected backfill materials. If excavated materials are not suitable for reuse, the contractor shall deposit these in an area designated by CKWD.
Equipment	<ul style="list-style-type: none"> The contractor shall use small mechanical excavators in appropriate areas to fast tract the construction. The excavator shall be immediately followed by skilled workers who will trim and clean the trenches to proper size and depth as required in the plan. They shall see to it that the trenches are ready for pipe installation as soon as they move away from them.
Access	<ul style="list-style-type: none"> The contractor shall make available in his stock steel plates and wooden planks which will be deployed on top of trench excavation to provide temporary access to building carport and garages, street crossings, and other areas where these will be necessary. Advance road signage must indicate the road detour and alternative routes. Provide sign boards for pedestrians to inform them of nature and duration of construction works and contact numbers for concerns/ complaints.
Occupational health and safety	<ul style="list-style-type: none"> Employ workers with adequate experience, training, and know-how. These workers shall be led by an experienced supervisor or engineer, who will provide the leadership in daily activities. A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. The contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed.
Community health and safety	<ul style="list-style-type: none"> Contractor's activities and movement of staff will be restricted to designated construction areas. The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site. Disruption of access for local residents, commercial establishments, institutions, etc. must be minimized. Provide walkways and metal sheets where required to maintain access for people and vehicles. Consult businesses and institutions regarding operating hours, and factor this in work schedules. The contractor is to inform neighbors by provide sign boards for pedestrians to inform them of nature and duration of construction works and contact numbers for concerns/complaints.

Parameter	Mitigation Measures
	<ul style="list-style-type: none"> • The contractor will ensure that there is provision of alternate access to business establishments during the construction, so that there is no closure of these shops or any loss of clientage. • The contractor will ensure that any damage to properties and utilities will be restored or compensated to pre-work conditions. • Lighting on the construction site shall be pointed downwards and away from oncoming traffic and nearby houses. • The site must be kept clean. • Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors. • Notice of particularly noisy activities must be given to residents/businesses adjacent to the construction site. Examples of these include: noise generated by jackhammers, diesel generator sets, excavators, etc. • Noisy activities must be restricted to the times given in the project specification or general conditions of contract. • A complaints register (refer to the grievance redressal mechanism) shall be housed at the site. This register is to be tabled during monthly site meetings. • Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. • The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the concerned personnel attention immediately; and (iv) taking remedial action. • The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken within 48 hours of receipt of such complaint/grievance.
Community and public awareness	<ul style="list-style-type: none"> • Storage facilities and other temporary structures on-site shall be located such that they have as little visual impact on local residents as possible.
Temporary construction facilities and storage areas	<ul style="list-style-type: none"> • The contractor is to ensure that open areas or the surrounding bushes are not being used as toilet facility. • The contractor shall ensure that all litter is collected from the work areas daily. • Bins shall be emptied regularly and waste shall be disposed of at the pre-approved site. • The contractor shall ensure that his camp and working areas are kept clean and tidy at all times. • After construction work, all structures comprising the construction camp should be removed from site or handed over to the property owner/community as per mutual agreement (if established on private/community land). • The area that previously housed the temporary construction facilities is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. • The contractor must arrange the cancellation of all temporary services.
Dust and air pollution	<ul style="list-style-type: none"> • Vehicles travelling to and from the construction site must adhere to speed limits to avoid producing excessive dust. • Access and other cleared surfaces, including backfilled trenches, must be dampened whenever possible and especially in dry and windy conditions to avoid excessive dust. • Vehicles and machinery are to be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption, etc.
Noise levels	<ul style="list-style-type: none"> • Noise-generating equipment must be fitted with silencers. • If a worker is exposed to noise above a noise exposure limit, the contractor must investigate options for engineered noise control such as using low-noise excavators, jackhammers, drills, and power generators. • 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. Workers in a posted noise hazard area must wear hearing protection.

Parameter	Mitigation Measures
Utilities	<ul style="list-style-type: none"> • Prepare a list of affected utilities and operators • Prepare a contingency plan to include actions to be done in case of unintentional interruption of services.
Water quality	<ul style="list-style-type: none"> • Every effort shall be made to ensure that any chemicals or hazardous substances do not contaminate the soil or water on-site. • Care must be taken to ensure that runoff from vehicle or washing does not enter the surface/ground water. • Site staff shall not be permitted to use any stream, river, other open water body, or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing, or for any construction or related activities. Municipal water shall instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting etc. • All concrete mixing must take place on a designated, impermeable surface. • No vehicles transporting concrete to the site may be washed on-site. • No vehicles transporting, placing, or compacting asphalt or any other bituminous product may be washed on-site. • All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed or removed from the site. • Hazardous substance/ materials are to be transported in sealed containers or bags.
Waste management	<ul style="list-style-type: none"> • Wastes must be placed in the designated bins which must be regularly emptied. These shall remain within demarcated areas and shall be designed to prevent wastes from being blown out by wind. • Littering on-site is forbidden and the site shall be cleared of litter at the end of each working day/night period. • Recycling is to be encouraged by providing separate receptacles for different types of wastes and making sure that staff is aware of their uses. • All waste must be removed from the site and transported to a disposal site. • Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the environment management specialist, or at disposal sites.
Conservation of natural environment	<ul style="list-style-type: none"> • Only trees that are covered by Permit to Cut can be removed, if cutting of trees is required.
Cultural and historical environment	<ul style="list-style-type: none"> • If something of archeological importance is uncovered, the National Museum or the DENR shall be contacted and work shall be stopped immediately.
Safeguards supervisor or pollution control officer	<ul style="list-style-type: none"> • The contractor shall appoint one environment safeguard supervisor or pollution control officer who will be responsible for assisting the contractor in implementation of EMP, coordinating with the EMB-RO, community liaison, consultations with interested/affected parties, reporting, and grievance redressal on a day-to-day basis.
Operation and Maintenance Phase	
Detection and repair of leaks and pipe bursts	<ul style="list-style-type: none"> • Leak repair work will be similar to the pipe-laying work as earlier explained. Trenches will be dug to reveal the leaking area and the faulty connection will be refitted, or the pipe will be removed and replaced if necessary. • Although impact is likely to be minimal due to new and well-designed efficient system, it must be ensured that leak detection and restoration time are minimized to the extent possible.
Delivery of water with poor water quality	<ul style="list-style-type: none"> • Delivery to customers of poor water quality from the deepwell and storage tank can be prevented by implementing a water safety plan as advocated by the World Health Organization (WHO). The 2007 Philippine National Standards for Drinking Water (PNSDW) also advocates preparation of a water safety plan.
Pollution from increased generation of sewage	<ul style="list-style-type: none"> • Wastewater from the toilets, kitchens, and laundry areas will normally be handled by the individual septic tanks system of the water consumers. • CKWD and the city government will implement a septage management program jointly.
Variability in the	<ul style="list-style-type: none"> • Building additional water storage infrastructure to provide buffers.

Parameter	Mitigation Measures
availability of water resource due to climate change	<ul style="list-style-type: none"> Adjusting infrastructure designs and introducing flexibility in water systems operations. Diversifying water supply sources, including conjunctive use of surface and groundwater, roof water harvesting, reuse and recycling.
Potential conflict on water uses in the future	<ul style="list-style-type: none"> Integrated water resources management within river basins to improve the allocation and management of scarce water resources in the context of climate change.
Damage due to natural risks, such as earthquake and flood	<ul style="list-style-type: none"> Design and construction of the subproject shall conform to the criteria mandated by the Philippine Building Code and DPWH guidelines to ensure structural integrity.

Source: PPTA Consultant.

C. Cumulative Impact Assessment

111. The cumulative impact assessment (CIA) examined the interaction between the project's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing, and reasonably foreseeable future projects or activities. The interaction of residual effects associated with multiple projects and/or activities can result in cumulative impacts, both positive and negative. The project's potential cumulative effects were considered with respect to valued components (VCs) in environmental and socioeconomic categories, in four areas:

- (i) of any potential residual project effects that may occur incrementally over time;
- (ii) consideration of other known relevant projects or activities within the specified study area boundaries, even if not directly related to the project;
- (iii) potential overlapping impacts that may occur due to other developments, even if not directly related to the proposed project; and
- (iv) future developments that are reasonably foreseeable and sufficiently certain to proceed.

112. The project has identified the VCs as water quality, noise, traffic management, socioeconomic and socio-community components, and human health. There are no foreseeable projects that will overlap with the project. The spatial boundary of the project is the area along the pipe alignment, existing right of ways, and pump sites. The temporal boundary can be considered as the whole Brgy. Paraiso.

113. Given the water supply requirement in Brgy. Paraiso will be met and the sources considered adequate, there are no significant cumulative impacts expected on the future water supply.

114. Air quality effects will occur during construction. Consequently, although emissions of common air contaminants and fugitive dust may be elevated in proximity to active work sites, this impact will be short-term and localized to the immediate vicinity of the alignment. Greenhouse gas (GHG) emissions may increase as a result of project activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, landfilling of residual wastes). Given the project's relatively minor contribution to common air contaminants and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible.

115. Noise levels during construction in the immediate proximity of most work sites are expected to increase. The duration of this exposure will be relatively brief. This exposure represents a temporary, localized, adverse residual effect of low to moderate significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction. Noise levels associated with the project O&M will be largely imperceptible, as the pump is submersible and located in relatively small sites within the barangay.

116. Land use/traffic management concerns will occur spatially during construction. Site-specific mitigation measures will be implemented to address temporary disruptions to land use and access, traffic delays and detours, and increased volumes of construction-related traffic. Traffic movement along the alignment will be improved once construction is completed. Since the project will occupy on 350 square meters (m²) of area plus the pipelines that will also be buried, it will not conflict with existing or planned land use. However, following improvement in infrastructures and services, added residential developments, commercial, and business facilities and increased densities are expected to develop and enhance the project area. This can be considered a long-term cumulative benefit of the subproject.

117. Upon completion of the subproject, the socio-community will benefit from improved water supply system. This is considered a long-term cumulative benefit.

118. No adverse residual effects to human health will occur as a result of subproject construction or operation. While exposure to elevated noise levels and fugitive dust and common air pollutants will occur in proximity to project work sites during construction, due to their short-term, localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health.

119. The subproject will benefit the general public by contributing to the long-term improvement of water supply system and community livability in Brgy. Paraiso in particular and in the City of Koronadal in general.

V. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Public Consultations Conducted

120. The public participation process included (i) identifying interested and affected parties (stakeholders); (ii) informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; (iii) creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns) with regard to the proposed development; (iv) giving the stakeholders feedback on process findings and recommendations; and (v) ensuring compliance to process requirements with regards to the environmental and related legislation.

121. The following methodologies have been used for carrying out public consultation:

- (i) Public forums thorough organized public consultations with residents of the barangays where the subproject will be established.
- (ii) Walk-through informal group consultations were held in the Brgy. Hall of Brgy. Paraiso.

- (iii) The environmental concerns and suggestions made by the participants were listed, and discussed, and suggestions accordingly incorporated in the EMP.

122. CKWD has undertaken various activities concerning information disclosure, public consultation, and public participation for the proposed CKWD's subprojects. These were done to achieve a meaningful stakeholders' consultation and ensure success. During the planning phase, information regarding the proposed subprojects was disclosed to the public such as in the conduct of a socioeconomic survey between April to May 2009. Some 384 households in CKWD's area were informed about the proposed subproject and interviewed for socioeconomic data. Survey respondents also included those households without water service connection with CKWD.

123. **Key informant interviews.** Key informant interviews and focus group discussions (FGDs) with barangay and city officials were conducted to get their cooperation and gather information relative to poverty incidence and concentration, and identify needs and recommendations on water. Participants in the key informant and FGDs included the (i) WD staff and management, (ii) local health officials, (iii) gender focal persons of LGU, (iv) city and barangay officials, (v) LGU planning offices, (vi) local environment offices, and (vii) urban poor NGOs.

124. **Public consultations.** On 18 August 2009, CKWD conducted an initial public consultation and formally discussed the proposed water supply subproject with the stakeholders and requested their views. A total of 9 stakeholders' representatives participated. Stakeholders were encouraged to raise their social and environmental issues. Participants included: (i) concerned individuals, (ii) barangay officials, (iii) NGOs, (iv) LGU planning officials, (v) City Environment and Natural Resources Officer, and (vi) WD staff and management. Stakeholders expressed support for the CKWD subprojects. Summary of the consultation outcomes is presented in **Table 9**, while the documentation is presented at the **Annex A**. Septage management was part of the consultation topics since it was a subproject component during the initial stage of the study.

Table 9: Summary of Comments and Responses in the Public Consultation Held on 18 August 2009

Group Represented / Representative	Issues/ Concerns Raised	Project's Response
City Health Office; 1 attendee	Incidence of waterborne diseases usually increased during rainy season.	Proposed septage management program will greatly help the city in controlling the spread of septic tank effluents.
City Planning Office; 1 attendee	Reservations on the positive impact of the proposed septage management program since only 10% of the households have functioning septic tanks as estimated.	The project has a revolving fund for septic tanks repair and also studying the possibility of involving women's organizations in implementing the financing of septic tanks repair using the revolving fund. The projects suggested a joint City of Koronadal Water District-City Health Office information campaign to increase 'buy-in' to the septage management program and possible increase in the number of water service connections.
City Engineers Office; 2	Reservations on the viability of	Financing concerns are being analyzed

Group Represented / Representative	Issues/ Concerns Raised	Project's Response
attendee	the septage management program if only 10% of the households can participate since it might result to a significant increase in water tariff to recover the cost for operation and maintenance.	under the project preparatory technical assistance and data on septic tanks will be validated during detailed engineering design phase.
Local Government Unit (LGU) Representative; 1 attendee	The city will study CKWD's suggestion for the LGU to manage the proposed septage management system and requested detailed cost estimates of the proposed system to be used for City Council presentation.	Detailed cost estimates are not yet finalized.
Barangay Chairman of Concepcion; 1 attendee	Barangay Concepcion has poor quality groundwater and people are buying drinking water from water stations.	The project will definitely serve Barangay Concepcion since the pipeline will pass through this area.
Barangay Chairman of Concepcion	Ensure that public safety and convenience shall be addressed properly during pipe laying activities particularly near schools.	Civil works contracts will include provisions requiring the contractors to properly address public safety and convenience.
Barangay Chairmen of Saravia and Concepcion; 2 attendees	They expressed full support to the proposed water supply and sanitation subproject.	CKWD welcomed the expression of support.

125. Another public consultation on the proposed water supply systems in the selected five barangays and on the proposed septage treatment facilities was conducted in the conference room of CKWD on 22 November 2012. Twenty-seven attended the consultation, including barangay officials and residents of Brgys. Topland, Concepcion, Carpenter Hills, Saravia, GPS, Paraiso, Tampakan, and San Jose. Also present were a representative of the Unified Tricycle and Operators and Drivers Association and officials and staff of CKWD.

11. Participants in the public consultation held on 22 November 2012 were asked pre-formulated questions to solicit their perception about the proposed subproject. All the participants expressed general acceptance of the proposed water supply subproject. **Annex B** presents the documentation of the public consultation.

Table 10: Summary of Comments and Responses in the Public Consultation Held on 22 November 2012

Name / Organization	Question	Response
Hon. Samuel B. Velarde - Brgy. Captain, Brgy. Paraiso	When did you first learn about the proposed project and what were your initial reactions to it?	Brgy. Chairman Velarde said that it is his first time to learn about sanitation development and is glad that he was invited by CKWD for today's project proposal presentation.
Hon. David V. Mangisel - Brgy. Kagawad, Brgy. Concepcion	When did you first learn about the proposed project and what were your initial reactions to it?	<p>Brgy. Kagawad Mangisel said that when he heard about the project what comes to his mind is the cost, because in reality, particularly in some remote barangays don't even have a septic tank although he himself acknowledges the importance of proper collection and disposal of waste from households. Mr. Nyrh Cabance commented that such cost is part of the cost of building a house because it is required by law (Phil. Building Code). You cannot secure a building permit if you do not have a building plan that includes a septic tank. Mr. Mangisel pointed out that his concern was about the indigents or those who cannot afford, what are the alternatives.</p> <p>Mr. Cabance said that the government is considering alternatives such as public or "communal" toilet. Another alternative is for a group of 10-15 households to pool their resources together for construction of septic tank. Another alternative is to use cheaper materials such as steel drums for septic tank. The proposed sanitation ordinance would provide alternative means to comply with its requirements.</p>
Participant	Does the local people support the proposed project?	All participants pledged to give their full support for the said project for everybody's welfare.
Hon. Samuel B. Velarde - Brgy. Captain, Brgy. Paraiso	Any critical issue or concern by the local people regarding the project?	Brgy. Chairman Velarde said that his only concern is about the cost of treatment. Mr. Nyrh Cabance said that the cost is not much. In Dumaguete, water consumers added Php2.00/cubic meter (m ³). as cost for the septage treatment. It started sometime in 2008. In Manila, every household adds 20% of water bill for septage collection and treatment. He added that the Asian Development Bank (ADB) encourages water districts (WDs) to combine water supply and sanitation for financing program.
Hon. Rogelio B. Joquino - Brgy. Captain, Brgy. Concepcion	Any critical issue or concern by the local people regarding the project?	Brgy. Chairman Joquino commented that just like in the case of SOCOTECO, we are paying for their system loss. What we need is information campaign or let the public realize the importance of this project and how will it benefit them in the long run.
None	Are there employment opportunities in the project?	No queries/Response
None	Any loss of residential or commercial structures due to the project	No queries/Response
None	Any loss of Community life (like market place, public playground) or Community Activities that will be affected?	No queries/Response

Name / Organization	Question	Response
None	Would there be land acquisition that would result in resettlement, or would affect parks, forest, etc.?	No queries/Response
None	Will the project location adversely affect water resources?	No queries/comments
Ruben L. Valderama - Unified Toda, Secretary	Any other issues you want to share (security, cooperation from local communities)?	Mr. Valderama asked if there is a law prohibiting the use of a domestic pump or a pitcher pump? Mr. Nyrh Cabance said that it is not prohibited. However, the public is warned of the risk of contaminating drinking water if domestic pump is located near septic tank (should not be less than 25 meters apart), which is not regularly maintained. Valderama also queried how deep should the domestic pump be for it to be free from any contaminations. Mr. Cabance replied that it depends upon the area/location but a deepwell (80-100 meters deep) is safer because sewage undergoes treatment as it percolates through the ground. Lastly, Mr. Valderama asked if it is possible that the cost for the septage treatment facilities may be donated by ADB to CKWD? Mr. Cabance said that the LGU and the WD are both mandated to provide sanitation facilities, That's why the project is a joint undertaking of CKWD and the LGU. The city government may provide subsidies or incentives as part of its ordinance requiring regular desludging of septic tanks. He was informed by the mayor that the city has already acquired a 13.9 hectares land in Brgy. Paraiso for the city sanitary landfill and has allotted 1hectare. for CKWD.
Hon. Rogelio B. Joquino -Brgy. Captain, Brgy Concepcion	Any other issues you want to share (security, cooperation from local communities)?	Brgy. Chairman Joquino said that one of his concerns is the proper place to dispose all those wastes because he had already witnessed some unscrupulous people disposing their wastes in rivers. Mr. Cabance said that the reason why he is encouraging the people to support the sanitation project is because it will reduce sickness in the community when wastes are treated properly before discharge.

Source: City of Koronadal Water District.

126. A briefing of the City Council of Koronadal was conducted on 14 January. The CKWD general manager and the PPTA's environmental specialist presented the proposed water supply and the septage management projects to the council. The water supply component o the subproject was very much welcomed by the city council. It was also suggested that more service connections be installed. Issues on the health effects of septic tank overflow if the tanks are made watertight were raised by one of the councilors. In response, it was pointed out that the proposed city ordinance on septage management should make it mandatory for households to desludge their septic tanks every 3-5 years. A copy of the septage management ordinance of Dumaguete City was requested. A soft copy of the ordinance was furnished to the secretary of the City Council, together with a copy of the memorandum of agreement between Dumaguete City Water District and the LGU of Dumaguete City.

127. The presentation materials used in the briefing of the City Council of Koronadal is attached as **Annex C**.

B. Future Consultation and Disclosure

128. The Initial Environment Examination (IEE) and other relevant documents will be made available at public locations in the city and posted on the ADB website. The consultation process will be continued during the subproject implementation to ensure stakeholders participation in project execution, as well as to implement a comprehensive information, education, and communication plan.

129. During detailed design, LWUA and CKWD will again conduct public consultations and information disclosure. Large group of stakeholders are expected to attend to this proposed consultations since proposed water tariffs will also be discussed. Views of the stakeholders will be considered in the overall design process. Stakeholders' consultations shall be continued throughout the duration of the construction phase. CKWD shall keep records of environmental and social complaints, received during consultations, field visits, informal discussions, and/or formal letters, together with the subsequent follow-up and resolutions of issues.

VI. GRIEVANCE REDRESS MECHANISM

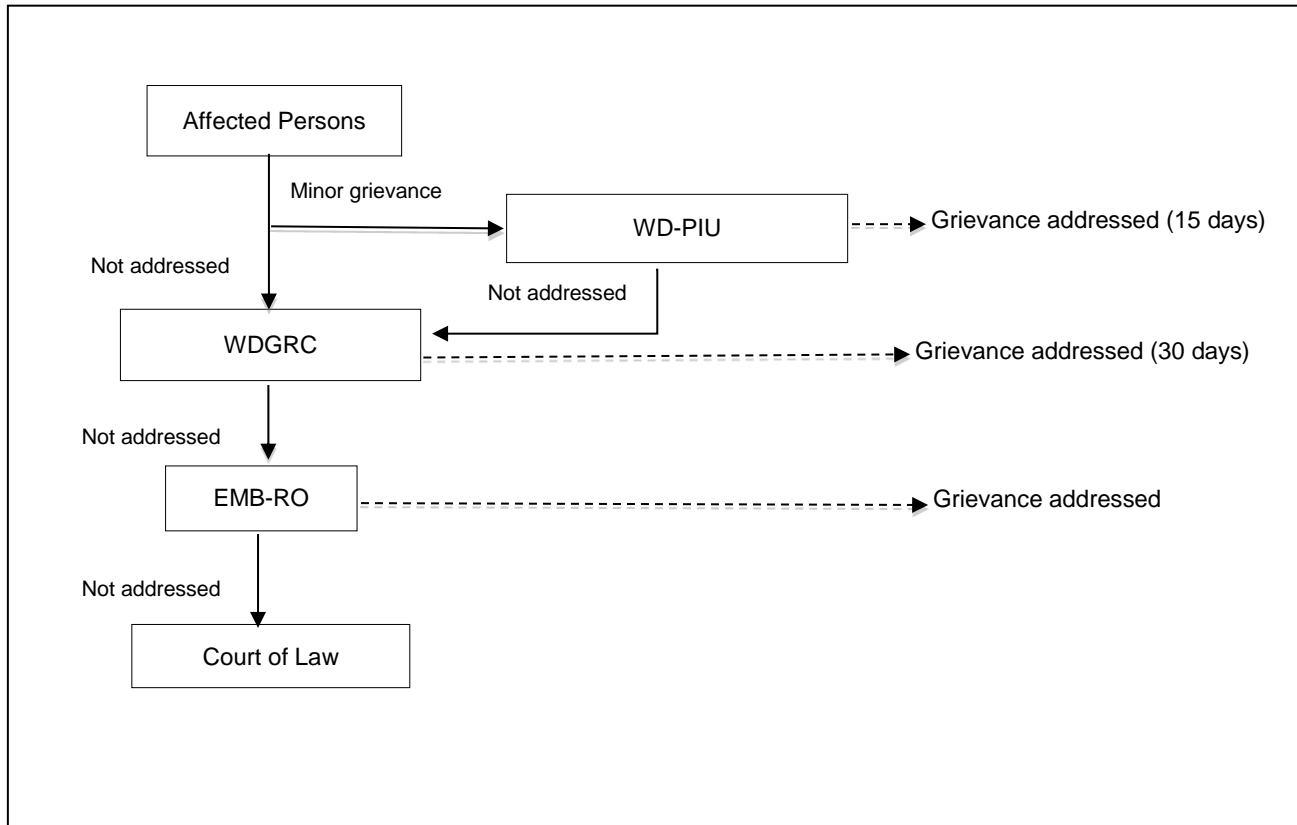
130. A common grievance redress mechanism (GRM) will be established at the WD to receive, evaluate, and facilitate the resolution of affected persons (APs) concerns, complaints, and grievances about the social and environmental performance related to the various subprojects. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the subproject. This mechanism shall be disclosed in public consultations during detailed design and in meetings during the construction phase.

131. CKWD shall appoint a Social Development and Safeguards Officer (Safeguards Officer) in the PIU, and will form the Water District Grievance Redress Committee (WDGRC) to be chaired by the Water District-General Manager. Members shall include the following: (i) the contractor's highest official at the site such as the Construction Manager or the Construction Superintendent, (ii) barangay officials, (iii) concerned NGOs, and (iv) women's organizations. Creation of the WDGRC and its operation shall be included in appropriate sections of the civil works contract. Expeditious resolution of complaints during construction is important since activities are sometimes continuous and can easily change the landscapes within a week. For the quick filing of complaints, the WDGRC shall prepare a form to be used for the filing of grievances/complaints. The use of form will also facilitate the filing of complaints by illiterate persons. A sample grievance registration form is in **Appendix 3**.

132. The steps to be followed in filing complaints and the procedures for redress are the following: (i) complainant shall provide the background and file the complaint verbally or in writing to WDGRC, and the Safeguards Officers or other WD personnel on site shall assist the complainant in filling-up the complaint form; (ii) within 2 working days, the WD-PIU head, contractor's representative, and complainant shall discuss if the complaint can be resolved without calling for a WDGRC meeting; (iii) if the complaint cannot be resolved by the WD-PIU head and contractor's representative, a WDGRC meeting shall be called within 5 working days with the complainant to resolve the complaint; (iv) if the complaint cannot be resolved by the WDGRC within 30 days, the complainant shall raise the issue to the EMB-Region XII; and (v) if the complaint cannot be resolve at the EMB level, the complainant shall seek recourse with the courts. If the

complaints are based on violations of the ECC terms and conditions, the complainant has an option to also bring the issue to EMB-Regional Office. **Figure 5** shows the grievance redress process.

Figure 5: Grievance Redress Process



133. **Recordkeeping.** Records will be kept by the CKWD-PIU of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome.

134. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication, and information dissemination) will be borne by CKWD.

135. **Complaints to the Department of Environment and Natural Resources.** Complaints about environmental performance of projects issued an Environmental Certificate of Compliance (ECC) can also be brought to the attention of DENR-EMB. The process of handling such complaints is described in the *Revised Procedural Manual (2007)* for the IRR of PD 1586. The steps that DENR-EMB may follow in handling complaints are: (i) DENR-EMB shall verify if the complaint is actionable under PD.1586, (ii) within 72 hours from receipt of a complaint DENR-EMB will send the proponent a Notice of Alleged Violation (NAV) and requests for an official reply as to why the proponent should not be penalized, (iii) DENR-EMB may conduct field validation, site inspection and verification or other activities to assess or validate the complaint. The proponent is allowed to respond within seven days. Proponent's failure to respond to the NAV and further notices will force DENR-EMB to take legal actions. DENR may issue a Cease and Desist Order (CDO) to project proponents which shall be effective immediately based on: (i) violations under the PEISS, and (ii) situations that present grave or irreparable damage to the environment. PD 1586 also allows DENR to suspend or cancel the proponent's ECC if the terms and conditions have been violated.

VII. ENVIRONMENTAL MANAGEMENT PLAN

136. 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 assessment 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.

137. The EMP will be updated by CKWD during the detailed design stage. Upon clearance/approval by ADB, the updated EMP shall form part of the bidding document and/or contracts. The EMP will continually be updated as need arises.

138. A copy of the EMP must be kept on work sites at all times. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

A. Environmental Management Action Plan

139. The EMP will guide the environmentally sound construction of the project and ensure efficient lines of communication between the WD-PIU, and the contractors. The EMP identifies activities for the three phases: (i) site establishment and preliminary

activities, including updating and/or finalizing the IEE/EMP; (ii) the construction stage; and (iii) the post-construction/operational stage. **Table 11** outlines the mitigation measures and persons responsible for implementation and monitoring.

Table 11: Environmental Mitigation Measures Action Plan

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Planning Phase						
Watershed protection	<ul style="list-style-type: none"> City of Koronadal Water District (CKWD) shall request the Department of Environment and Natural Resources (DENR) and the city government for the assignment of a watershed area to the water district (WD) and prepare a watershed management plan in the near future with active participation of the city and watershed barangays. A Memorandum of Agreement (MOA) to that effect shall be initiated by CKWD with the proposal that environmental charge be incorporated in future revision of water tariff for watershed protection. Meanwhile, tree planting program shall be undertaken by the WD in coordination with Brgy. Paraiso. 	CKWD management	Local Water Utilities Administration (LWUA) – Project Management Unit (PMU)	Deed of Assignment or MOA with the Local Government Unit (LGU)/DENR for a watershed.	Annually	Watershed management plan
Source protection	<ul style="list-style-type: none"> Source protection may be incorporated in watershed management plan as part of the responsibilities of upstream dwellers and resource users. It will prevent the contamination of the groundwater source from unregulated activities upstream of the water source. Provide a fenced buffer zone of at least 50m surrounding wells. Undertake baseline water quality tests to ensure good quality of water source to minimize cost of treatment and future water quality related operational problems. 	CKWD management	LWUA PMU	Water quality monitoring reports	Annually	Philippine National Standards for Drinking Water (PNSDW)
Source abstraction	<ul style="list-style-type: none"> Over abstraction may result in competitive use of groundwater with other users and or depletion of the water resource. Full compliance with the prescribed rate of abstraction granted by National Water Resources Board (NWRB) in its water 	CKWD management	(NWRB)	Rate of abstraction	Annually	NWRB rules and regulations

	permit will prevent over abstraction.					
Work schedule and closure of areas	<ul style="list-style-type: none"> Ensure careful planning and scheduling of the activities. To minimize impact on traffic flow, businesses, and road users, as much as possible schedule trenching works during nighttime. Consider low-traffic and non-sensitive areas (other than schools, religious places, and commercial/business) for daytime trenching works. Increase workforce in areas to be excavated during daytime. Prepare a traffic management plan and road safety plan. 	CKWD – Project Implementation Unit (PIU) to coordinate with contractor	CKWD safeguards officer/pollution control officer (SO/PCO) to approve schedule and areas	Plan and schedule for road closures	Prior to start of civil works	Detailed design documents
Barricades and warning signs	<ul style="list-style-type: none"> Use easily transportable barricades and warning signs, such as those made of high reflector plastic materials. Also use aluminized rolled warning signs to warn the public. 	Contractor to submit information to CKWD as part of compliance report and construction method statement	CKWD SO/PCO	Lists and samples of warning signs and barricades	Prior to start of civil works	Detailed design documents
Reuse of excavated materials	<ul style="list-style-type: none"> If readily available, mix local sand with the backfill material to ensure pipe integrity. Ensure backfill materials do not contain pointed broken stones since these might affect the plastic pipe and cause breakage. 	Contractor to submit sources of materials to CKWD	CKWD SO/PCO	Lists of construction materials	Prior to start of civil works	Detailed design documents
Road crossings	<ul style="list-style-type: none"> Manual borings are recommended for road crossings in narrow streets to minimize traffic. Apply local technology, knowledge, and minor equipment such as augers. 	Contractor to submit information to CKWD	CKWD SO/PCO	Construction method statement	Prior to start of civil works	Detailed design documents
Workers	<ul style="list-style-type: none"> Employ workers with adequate experience, training, and know-how. It is always advantageous for the contractor to employ workers with adequate experience, training, and know-how in the line of work that they 	Contractor	Contractor's SO/PCO	Workers list	Prior to start of civil works	Detailed design documents

	are doing. These people are usually reliable and can be counted upon to exercise good judgment in the field.					
Community and public awareness	<ul style="list-style-type: none"> Careful planning and coordination with the local barangay officials must be established. Information campaign must precede any construction activity in order to make the public aware of the extent of the problem that might be present during the period of construction. The road closure, together with the proposed detour, needs to be communicated via road signage, etc. Open liaison channels shall be established between CKWD, the contractors, and interested and affected parties such that any queries, complaints, or suggestions can be dealt with quickly and by the appropriate persons. 	Contractor in coordination with barangay officials	CKWD SO/PCO	Communication and participation strategy	Prior to start of civil works	No complaints received
Surveys	<ul style="list-style-type: none"> Connection survey to obtain service connection requirements, and benefits from the project. Road survey to collect information on the traffic condition of the roads during daytime and nighttime, road width, surface condition, existing structures along the roads, road users and their usage pattern, parking areas, and open spaces. Land survey with objective to conduct control level survey, control traverse survey, conduct trace survey of longitudinal section along pipeline, and detailed road surveying and plotting. 	Contractors	CKWD SO/PCO	(i) Existing service connection survey (ii) Road surveys (iii) Land surveys	Prior to start of civil works and as necessary	Detailed design documents
Legislation, permits, and agreements	<ul style="list-style-type: none"> In all instances, CKWD and contractors must remain in compliance with relevant local and national legislations. 	Contractor	CKWD SO/PCO	All applicable permits and approvals	Prior to award of contract and as necessary	Permit for excavation, Environment Compliance Certificate (ECC), Permit to Cut, Barangay Permit

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Access to site	<ul style="list-style-type: none"> Access to site will be via existing roads. The contractor will need to ascertain the existing condition of the roads and repair damage due to construction. The local traffic police shall be involved in the planning stages of the road closure and detour and shall be available on-site for the monitoring of traffic in the early stages of the operations during road closure. The local traffic police must be informed at least a week in advance if the traffic in the area will be affected. No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of the Environmental Management Bureau-Regional Office (EMB-RO). 	Contractor	CKWD SO/PCO	Traffic management plan	Prior to start of civil works	No complaints received Minimal traffic disturbance
Setting up of construction camp	<ul style="list-style-type: none"> Choice of site for the facilities must take into account location of local residents, businesses, and existing land uses, including flood zones and slip/unstable zones. If the contractor chooses to locate the camp site on private land, he must get prior permission from the landowner. Use portable toilet facilities (PORTALETS). Under no circumstances may open areas or surrounding bushes be used as toilet facility. Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged. 	Contractor	CKWD SO/PCO	Location plan	Prior to start of civil works	Approved location plan Construction method No complaints received
Establishing equipment lay-down and storage area	<ul style="list-style-type: none"> Storage areas shall be secure so as to minimize the risk of crime. They shall also be safe from access by children, animals, etc. 	Contractor	CKWD SO/PCO	Location plan		Approved location plan Construction method complaints

						received
Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Materials management – sourcing ⁸	<ul style="list-style-type: none"> The contractor shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, etc), and submit these to CKWD for approval prior to commencement of any work. 	Contractor to submit sources of materials to CKWD	CKWD SO/PCO	Lists of sources	Prior to start of civil works	Standards prescribed by CKWD
Education of site staff on general and environmental conduct	<ul style="list-style-type: none"> Ensure that all site personnel have a basic level of environmental awareness. Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their task. 	Contractor	CKWD SO/PCO	Records of orientation	Prior to start of civil works and every new employee	Environmental management plan (capacity building)
Construction phase						
Trench width excavation	<ul style="list-style-type: none"> During the preparation of the trenches, allowance of 150 millimeter (mm) shall be made on each side of the pipe. The excavated earth shall always be dumped on the side opposite the carriageway as this will not restrict the vehicular movement on the carriageway and not create bottlenecks on the roadway. In the event that excavated trenches are to be kept open overnight, lights, high visibility warning signs, and barricades shall be provided. 	Contractor	CKWD SO/PCO	Construction method statement	As work progresses	Construction method Detailed design documents
Hauling of excavated materials	<ul style="list-style-type: none"> The contractor shall haul away all excavated materials from the excavation site and deposit these in an area designated by CKWD. The stockpile shall be processed where it is deposited so that it can be brought back to the trenches as selected filling material. 	Contractor	CKWD SO/PCO	Construction method statement	As work progresses	Construction method Detailed design documents

⁸ Materials must be sourced in a legal and sustainable way to prevent offsite environmental degradation.

	<ul style="list-style-type: none"> Hauling vehicles must always be present at the excavation site. 					
Reuse of excavated materials	<ul style="list-style-type: none"> The contractor can process the excavated materials at the disposal site and use these as selected backfill materials. If excavated materials are not suitable for reuse, the contractor shall deposit these in an area designated by CKWD. 	Contractor	CKWD SO/PCO	Construction method statement and inventory	As work progresses	Construction method Detailed design documents Zero complaints from community
Equipment	<ul style="list-style-type: none"> The contractor shall use small mechanical excavators in appropriate areas to fast tract the construction. The excavator shall be immediately followed by skilled workers who will trim and clean the trenches to proper size and depth as required in the plan. They shall see to it that the trenches are ready for pipe installation as soon as they move away from them. 	Contractor	CKWD SO/PCO	Construction method statement	As work progresses	Construction method Detailed design documents
Hauling of excavated materials	<ul style="list-style-type: none"> The contractor shall haul away all excavated materials from the excavation site and deposit these in an area designated by CKWD. The stockpile shall be processed where it is deposited so that it can be brought back to the trenches as selected filling material. Hauling vehicles must always be present at the excavation site. 	Contractor	CKWD SO/PCO	Construction method statement	As work progresses	Construction method Detailed design documents
Access	<ul style="list-style-type: none"> The contractor shall make available in his stock steel plates and wooden planks which will be deployed on top of trench excavation to provide temporary access to building carport and garages, street crossings, and other areas where these will be necessary. Advance road signage must indicate the road detour and alternative routes. Provide sign boards for pedestrians to inform them of nature and duration of construction works and contact numbers for 	Contractor	CKWD SO/PCO	Construction method statement and inventory number of warning signs and barricades	As work progresses	Construction method Detailed design documents Zero complaints from community

	concerns/ complaints.					
Occupational health and safety	<ul style="list-style-type: none"> Employ workers with adequate experience, training, and know-how. These workers shall be led by an experienced supervisor or engineer, who will provide the leadership in daily activities. A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. The contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. 	Contractor	CKWD SO/PCO	<p>Occupational health and safety plan</p> <p>Number of accidents and work-related injuries</p> <p>Complaints from community</p>	As work progresses	<p>Construction method</p> <p>Detailed design documents</p> <p>Zero accident and work-related injuries</p> <p>Zero complaints from community and workers</p>
Community health and safety	<ul style="list-style-type: none"> Contractor's activities and movement of staff will be restricted to designated construction areas. The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal 	Contractor in coordination with the local barangay	CKWD SO/PCO	<p>Complaints from community</p> <p>Activities based on the communication and participation strategy</p>	As work progresses	Zero complaints from community and workers

	of staff from the site.					
Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
	<ul style="list-style-type: none"> • Disruption of access for local residents, commercial establishments, institutions, etc. must be minimized. • Provide walkways and metal sheets where required to maintain access for people and vehicles. • Consult businesses and institutions regarding operating hours, and factor this in work schedules. • The contractor is to inform neighbors by provide sign boards for pedestrians to inform them of nature and duration of construction works and contact numbers for concerns/complaints. • The contractor will ensure that there is provision of alternate access to business establishments during the construction, so that there is no closure of these shops or any loss of clientage. • The contractor will ensure that any damage to properties and utilities will be restored or compensated to pre-work conditions. • Lighting on the construction site shall be pointed downwards and away from oncoming traffic and nearby houses. • The site must be kept clean to minimize the visual impact of the site. • Machinery and vehicles are to be kept in good working order for the duration of the project to minimize noise nuisance to neighbors. • Notice of particularly noisy activities must be given to residents/businesses adjacent to the construction site. Examples of these include: noise generated by jackhammers, diesel generator sets, excavators, etc. 					

	<ul style="list-style-type: none"> Noisy activities must be restricted to the times given in the project specification or general conditions of contract. 					
	<ul style="list-style-type: none"> A complaints register (refer to the grievance redressal mechanism) shall be housed at the site. This register is to be tabled during monthly site meetings. Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the concerned personnel attention immediately; and (iv) taking remedial action. The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken within 48 hours of receipt of such complaint/grievance. 					
Community and public awareness	<ul style="list-style-type: none"> Storage facilities and other temporary structures on-site shall be located such that they have as little visual impact on local residents as possible. 	Contractor	CKWD SO/PCO	Approved location plan Complaints from community	Monthly	Approved location plan Zero complaints from community and workers
Temporary construction facilities and storage areas	<ul style="list-style-type: none"> The contractor is to ensure that open areas or the surrounding bushes are not being used as toilet facility. The contractor shall ensure that all litter is collected from the work areas daily. Bins shall be emptied regularly and waste shall be disposed of at the pre-approved site. 	Contractor	CKWD SO/PCO	Vehicle emission testing records Complaints from community	As work progresses	No visible increase in dust and particulate matters Zero complaints from community

	<ul style="list-style-type: none"> The contractor shall ensure that his camp and working areas are kept clean and tidy at all times. 					
	<ul style="list-style-type: none"> After construction work, all structures comprising the construction camp are to be removed from site or handed over to the property owner/community as per mutual agreement (if established on private/community land). The area that previously housed the temporary construction facilities is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. <p>The contractor must arrange the cancellation of all temporary services.</p>					
Dust and air pollution	<ul style="list-style-type: none"> Vehicles travelling to and from the construction site must adhere to speed limits so as to avoid producing excessive dust. Access and other cleared surfaces, including backfilled trenches, must be dampened whenever possible and especially in dry and windy conditions to avoid excessive dust. Vehicles and machinery are to be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption, etc. 	Contractor	CKWD SO/PCO	Complaints from community Waste disposal record	As work progresses	No visible increase in water pollution due to the project Zero complaints from community
Noise levels	<ul style="list-style-type: none"> Noise-generating equipment must be fitted with silencers. If a worker is exposed to noise above a noise exposure limit, the contractor must investigate options for engineered noise control such as using low-noise excavators, jackhammers, drills, and power generators. If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the 	Contractor	CKWD SO/PCO	Complaints from community Noise level monitoring record	As work progresses	EMB-Region XII Noise Regulations

	noise hazard areas. Workers in a posted noise hazard area must wear hearing protection.					
Utilities	<ul style="list-style-type: none"> • Prepare a list of affected utilities and operators • Prepare a contingency plan to include actions to be done in case of unintentional interruption of services. 	Contractor	CKWD SO/PCO	Number of affected utilities Length of time to restore disrupted services	As work progresses	No disrupted service
Water quality	<ul style="list-style-type: none"> • Every effort shall be made to ensure that any chemicals or hazardous substances do not contaminate the soil or water on-site. • Care must be taken to ensure that runoff from vehicle or plant washing does not enter the surface/ground water. • Site staff shall not be permitted to use any stream, river, other open water body, or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing, or for any construction or related activities. Municipal water shall instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting etc. • All concrete mixing must take place on a designated, impermeable surface. • No vehicles transporting concrete to the site may be washed on-site. • No vehicles transporting, placing, or compacting asphalt or any other bituminous product may be washed on-site. • All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of removed from the site. • Hazardous substance/ materials are to be transported in sealed containers or bags. 	Contractor	CKWD SO/PCO	Complaints from community Waste disposal manifest/record	As work progresses	No dumped wastes and litter at work sites at all times Zero complaints from community

Parameter	Mitigation Measures	Responsible for Implementation	Responsible for Monitoring	Parameter to Monitor	Frequency of Monitoring	Guidelines/ Standards
Waste management	<ul style="list-style-type: none"> Wastes must be placed in the designated bins which must be regularly emptied. These shall remain within demarcated areas and shall be designed to prevent wastes from being blown out by wind. Littering on-site is forbidden and the site shall be cleared of litter at the end of each working day/night period. Recycling is to be encouraged by providing separate receptacles for different types of wastes and making sure that staff is aware of their uses. All waste must be removed from the site and transported to a disposal site. Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the environment management specialist, or at disposal sites. 	Contractor	CKWD SO/PCO	Permit to Cut	As required	Only allowed trees to be cleared
Conservation of natural environment	<ul style="list-style-type: none"> Only trees that are covered by Permit to Cut are to be removed, if cutting of trees is required. 	Contractor	CKWD SO/PCO	Complaints from community	As work progresses	Zero complaint from community
Cultural and historical environment	<ul style="list-style-type: none"> If something of archeological importance is uncovered, the National Museum or the DENR shall be contacted and work shall be stopped immediately. 	Contractor	CKWD SO/PCO	Chance finds	As necessary	All chance finds shall be reported and turned over to the National Museum.
Safeguards supervisor or pollution control officer	<ul style="list-style-type: none"> The contractor shall appoint one environment safeguard supervisor or pollution control officer who will be responsible for assisting the contractor in implementation of EMP, coordinating with the EMB-RO, community liaison, consultations with interested/affected parties, reporting, and grievance redressal on a day-to-day basis. 	Contractor	CKWD SO/PCO	Hiring and actual work	As work progresses	Continuous work output and reporting records

Post-construction phase (prior to turnover to CKWD)						
Access	<ul style="list-style-type: none"> All excavated roads shall be reinstated to original or better condition. 	Contractor	CKWD SO/PCO	Road conditions	Prior to turn-over	Pre-existing conditions
Utilities and other existing infrastructure	<ul style="list-style-type: none"> All disrupted utilities restored All affected structures rehabilitated/compensated 	Contractor	CKWD SO/PCO	All affected utilities	Immediately after civil works	All disrupted services restored
Temporary construction facilities and storage areas	<ul style="list-style-type: none"> After construction work, all structures comprising the temporary facilities are to be removed from site or handed over to the property owner/community as per mutual agreement (if established on private/community land). The area that previously housed the temporary facilities is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be topsoiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. The contractor must arrange the cancellation of all temporary services 	Contractor	CKWD SO/PCO	General condition of the areas	Prior to end of construction period/demobilization	Pre-existing condition
Waste management	<ul style="list-style-type: none"> All wastes shall be removed from the site and transported to a disposal site or as directed by the PCO. 	Contractor	CKWD SO/PCO	General condition of the areas	Prior to end of construction period/demobilization	Pre-existing condition
Detection and repair of leaks and pipe bursts	<ul style="list-style-type: none"> Leak repair work will be similar to the pipe-laying work as earlier explained. Trenches will be dug to reveal the leaking area and the faulty connection will be refitted, or the pipe will be removed and replaced if necessary. Although impact is likely to be minimal due to new and well-designed, efficient system, it must be ensured that leak detection and restoration time is minimized to the extent 	CKWD	CKWD	Number of reported leaks	As part of operations and maintenance of the improved system	Standards set by LWUA

	possible.					
Operation and maintenance phase						
Delivery of water with poor water quality	<ul style="list-style-type: none"> Delivery to customers of poor water quality from the deepwell and storage tank can be prevented by implementing a water safety plan as advocated by the World Health Organization (WHO). The 2007 Philippine Standards for Drinking Water (PSDW) also advocates preparation of a water safety plan. 	CKWD	CKWD	Number of complaints from customers	As part of operations and maintenance of the improved system	Philippine National Drinking Water Standards
Pollution from increased generation of sewage	<ul style="list-style-type: none"> Wastewater from the toilets, kitchens, and laundry areas will normally be handled by the individual septic tanks system of the water consumers. CKWD and the city government will implement a septage management program jointly. 	Department of Health of the City government	EMB-RO XII	Water quality criteria	Annually	Septage management ordinance Effluent Standards
Variability in the availability of water resource due to climate change	<ul style="list-style-type: none"> Building additional water storage infrastructure to provide buffers. Adjusting infrastructure designs and introducing flexibility in water systems operations. Diversifying water supply sources, including conjunctive use of surface and groundwater, roof water harvesting, reuse and recycling. 	CKWD	LWUA	Rate of production	Quarterly	Production record
Potential conflict on water uses in the future	<ul style="list-style-type: none"> Integrated water resources management within river basins to improve the allocation and management of scarce water resources in the context of climate change. 	CKWD and DENR	LWUA	Water uses	Annually	Record of water use
Damage due to natural risks, such as earthquake and flood	<ul style="list-style-type: none"> Design and construction of the subproject shall conform to the criteria mandated by the Philippine Building Code and Department of Public Works and Highways (DPWH) guidelines to ensure structural integrity. 	CKWD	LWUA	Integrity of structure	After occurrence of event	Record of events

140. Although details of the required mitigating measures are already discussed in **Table 9**, the following items are discussed further to highlight their importance: (i) tender documents and construction contracts, (ii) contractor's environmental management plan, (iii) construction site management plan, (iv) water safety plan, (v) source protection study and wellhead protection plan, and (vi) unanticipated environmental impacts.

141. **Environmental Compliance Certificate (ECC).** In accordance with the DENR Memorandum Circular No. 2010-14, ECC based on the submission of an IEE report shall be issued within 20 working days while CNC applications shall be processed within the same day of receipt at the designated DENR-EMB office.

142. In compliance with the requirements of ADB SPS 2009, the ECC shall be secured by CKWD prior to any awarding of contract. The Discharge Permit shall be secured prior to any commissioning activities.

143. **Tender documents and construction contracts.** Environmentally responsible procurement advocates the inclusion in construction contract documents the provisions addressing the management of environmental impacts and risk during construction. This includes the contractor's submittal of a Contractor's Environmental Management Plan (CEMP). Tender documents and construction contracts shall therefore include environmental management provisions on the following issues: (i) erosion and sediment runoff, (ii) noise and dust, (iii) vehicular traffic, (iv) construction wastes, (v) oil and fuel spillages, (vi) temporary construction facilities, and (vii) public safety and convenience.

144. The updated EMP, upon clearance by ADB, shall form part of the tender documents and construction contracts. The contractor shall revise and prepare a detailed CEMP, based on the updated EMP, that will also be in compliance with the contractor's internal HSE standards and requirements. No funds shall be released to the contractor without the submission of the CEMP.

145. **Contractor's environmental management plan.** During construction, each contractor will be guided by its detailed CEMP. The ADB-approved EMP shall be the minimum requirement in the preparation of the CEMP.

146. The CEMP shall be prepared by all contractors, endorsed by CKWD's PIU and approved/cleared by ADB prior to the commencement of any work on site. This requirement shall be included in the construction contracts. It shall provide details on specific items related to the environmental aspects during construction. It shall include specifications on requirements for dust control, erosion and sediment control, avoidance of casual standing water, management of solid wastes, workers' camp sanitation, pollution from oil, grease, fuel spills, and other materials due to the operation of construction machineries, safety and traffic management, avoidance of inconveniences to the public, air and noise pollution control. It shall also include guidance on the proper design of the construction zone, careful management of stockpiles, vegetation, topsoil, and vehicles and machinery.

147. **Water safety plan.** CKWD shall manage the environmental risk to its water supply system in a broader scale. As previously pointed out, the role of a water safety plan in addressing the risk cannot be overemphasized. This is an approach advocated by the World Health Organization (WHO) to ensure the delivery of safe drinking water to the consumers. Its need is also reflected in the 2007 PNSDW. The water safety plan

shall enable the CKWD to (i) prevent contamination of its water sources water, (ii) treat the water to reduce or remove contamination that could be present to the extent necessary to meet the water quality targets, and (iii) prevent re-contamination during storage, distribution and handling of drinking water. It is an approach that will clearly show the desire of the CKWD in applying best practices in ensuring delivery of potable water to its consumers.

148. **Source protection study and wellhead protection plan.** An input to the preparation of the water safety plan is the source protection study. This includes preparation of a source water assessment and wellhead protection plan. The study will help identify risk to the water supply system. A source water assessment is an evaluation of how susceptible a source may be to potential sources of contamination. Potential contaminant sources that could adversely affect the quality of water supply source are identified. Output of assessments will be used to prepare the wellhead protection plan. Wellhead Protection is a way to prevent drinking water from becoming polluted by managing potential sources of contamination in the area with influence to the groundwater supplies to the well. The wellhead protection plan includes designating the protection area or capture zone. A wellhead protection plan is particularly important for CKWD since its groundwater sources are within or near built-up areas and the risk of contamination to these sources is high.

149. **Unanticipated environmental impacts.** Where unanticipated environmental impacts become apparent during project implementation, CKWD shall prepare a supplementary environmental assessment and EMP to assess the potential impacts and outline mitigation measures and resources to address those impacts.

B. Reporting

150. During the construction period, the contractor shall submit to the PIU a monthly environmental monitoring report (to be appended to its monthly progress report). The reports shall be consolidated by the construction supervision consultant for submission to CKWD on a quarterly basis. After review, the quarterly environmental monitoring report shall be submitted by CKWD to LWUA. The LWUA shall review the reports and submit a consolidated report for all subprojects covered under the sector loan to ADB on a semi-annual basis.

151. During operation, CKWD shall comply with the quarterly submission of self-monitoring report to EMB-RO. These reports can be compiled and shall form part of the annual report to LWUA and ADB.

C. Implementation Arrangement

152. **Institutional Setup.** LWUA is the executing agency, while CKWD is the implementing agency. LWUA has overall responsibility for project coordination, implementation, and liaison with ADB and other government offices. LWUA will establish a Project Management Unit (PMU) to coordinate implementation at the national level, including procurement of goods, works, and services. A PMU staff shall be designated as the Social Development and Safeguards Officer for the project. At the subproject level, CKWD will be responsible during construction and operation phase of the subproject. During the construction phase, CKWD shall establish a Project Implementation Unit (PIU) to work closely with the PMU. A team of consultants will

assist the PMU and CKWD during pre-construction and construction phases. The role of the WDGRC during the construction phase is highlighted since it is an important aspect of the grievance redress mechanism in promptly addressing the public's complaints about environmental performance of the subproject during execution of the construction activities.

153. CKWD will provide all the necessary logistic support (vehicle, computers, support staff, etc.) to the PIU for carrying out the related activities for environmental and social safeguard implementation and monitoring. CKWD will ensure that bidding and contract documents include specific provisions requiring contractors to comply with all applicable labor laws and core labor standards on (i) prohibition of child labor as defined in national legislation for construction and maintenance activities; (ii) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; (iii) elimination of forced labor; and (iv) the requirement to disseminate information on health to employees and local communities surrounding the project sites.

154. The PIU will also be responsible for implementing and monitoring safeguards compliance activities, public relations activities, gender mainstreaming activities, and community participation activities. The PIU will have a Safeguards Officer who will be responsible for safeguards functions. The responsibilities of the Safeguards Officer are to: (i) ensure that the Environmental Assessment and Review Framework (EARF) provisions are observed, such as ensuring that works are selected according to the environmental criteria for project selection; (ii) review and approve subproject IEEs and EMPs; (iii) confirm existing IEEs and EMPs are updated based on detailed designs; (iv) confirm whether the EMPs are included in bidding documents and civil works contracts; (v) provide oversight on environmental management aspects of the subprojects and ensure EMPs are implemented by contractors; (vi) establish a system to monitor environmental safeguards of the subprojects including monitoring the indicators set out in the monitoring plan of the EMPs; (vii) 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; (viii) review, monitor and evaluate the effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken as necessary; (ix) consolidate environmental monitoring reports and submit quarterly or semi-annual monitoring reports to EMB-RO-XII, LWUA, and ADB; (x) ensure timely disclosure of final IEE/EMP in locations and form accessible to the public, and (xi) address any grievances brought about through the GRM in a timely manner. The monitoring report will focus on the progress of implementation of the IEE and RP, issues encountered and measures adopted, follow-up actions required, if any, as well as status of compliance with relevant loan covenants.

155. **Contractor.** The contractor will have an environment supervisor or pollution control officer to (i) coordinate with CKWD on updating the IEE/EMP based on detailed designs, and (ii) ensure implementation of EMP during civil works.

156. **Implementation Schedule.** As presented in the project description, the CKWD subproject is scheduled to start in 2014 and will take about more than a year to complete in the selected five barangays.

157. **Clearances and permits.** Under PEISS, CKWD shall apply for an ECC by submitting an EIS to EMB-RO XII for the proposed water supply system, and for Water

Permit from the NWRB. If trees have to be cut, the necessary Permits to Cut will be secured by the contractor.

158. **Permits of existing wells.** Of the eight existing wells operated by CKWD, three are covered with Water Permits issued by the NWRB, two applications are under process and the applications of the remaining three are being prepared. Three have ECCs issued by EMB-RO XII, while the required documents are being prepared for the remaining five wells. CKWD is committed to comply with the requirements of the said regulatory agencies of the government.

D. Capacity Building

159. CKWD will organize orientation workshop for PIU officials and staff involved in the project implementation on: (i) ADB SPS 2009, applicable laws, rules and regulations on environment; (ii) induction course for the training of contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures, and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing. The contractor will also be required to conduct environmental awareness and orientation of workers prior to deployment to work sites.

E. Environmental Costs

160. The main environmental costs to be borne by CKWD are the costs for securing the ECC from EMB-RO XII (Php5,000) and Water Permit from NWRB (Php5,130). Both permits will be secured prior to implementation of the subproject. Also, the periodic environmental monitoring during the operation phase will be an annual recurring expense of CKWD.

161. The costs for public consultations and information disclosure, and capacity building are major costs that are covered under the subproject.

162. The contractor's cost for site establishment, preliminary activities, construction, defect liability activities, and environmental mitigation measures related to EMP implementation during planning, design, and construction will be incorporated into the contractual agreements and engineers costs, which will be binding on him for implementation. The survey will be conducted by the contractor.

163. The operation phase mitigation measures are again good operating practices, which will be the responsibility of CKWD. All monitoring during the O&M phase will be conducted by CKWD; therefore, there are no additional costs.

164. The activities identified in the EMP mainly include site inspections and informal discussions with workers and local community, and this will be the responsibility of PIU, costs of which are part of project management.

165. **Table 12** presents the estimated cost to implement EMP.

Table 12: Cost for Implementing the EMP

Component	Description	Number	Cost per Unit (Php)	Cost (Php)	Source of Funds
Legislation, permits, and agreements	Securing ECC from EMB-RO and Water Permit from NWRB	Once	Not Applicable	5,000 for ECC and 5,130 for the Water Permit	CKWD expense
Public consultations and information disclosure	Information disclosure and consultations during preconstruction and construction phase, including public awareness campaign through media	As per requirement	Lump sum	1,832,000 for the five water supply subprojects	Part of the loan package
Capacity building	(i) Orientation workshop CKWD officials and staff involved in the project implementation on ADB SPS (2009), applicable laws, rules and regulations on environment; (ii) induction course for the training of contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing.	Three modules, one day per module	30,000 per module	90,000. Cost is integrated in the public consultation and information disclosure for five subprojects	Part of the loan package
Dust suppression at work sites	Application of dust suppression measures during construction phase	As required	Contractor's liability	10,000. Covered in the contract	Covered under construction contract
Traffic management	Safety signboards, temporary diversions,	Wherever required throughout	Contractor's liability	Not applicable	Covered under construction

Component	Description	Number	Cost per Unit (Php)	Cost (Php)	Source of Funds
	barricades, etc.	the project corridor			contract
Baseline water quality monitoring	Water quality characterization of receiving water body, groundwater	One sample each	15,000/set of samples	30,000	Covered under engineering design contractor
Surveys	Part of the design preparation	Lump sum	Contractor's liability	30,000	Covered under engineering design contractor
Periodic environmental monitoring	Groundwater monitoring	Quarterly, one set sample per station	5,000/set of samples	20,000 annually	Under CKWD's operating expense
Water quality from storage tank	Monthly sampling of water going into the transmission line and randomly from a tap	One from the storage tank outlet and from a tap	2,000/set of sample	24,000 annually	CKWD operating expense
Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period	Lump sum	Contractor's liability	As per insurance requirement	Covered under engineering design and construction cost – contractor's insurance

ECC=Environmental Compliance Certificate, EMB-RO=Environmental Management Bureau=Regional Office, NWRB=National Water Resources Board, CKWD=City of Koronadal Water District, EMP=Environmental Management Plan.

Source: PPTA Consultant.

VIII. CONCLUSION AND RECOMMENDATIONS

166. The proposed water supply subproject will provide safe drinking water to residents and commercial establishments in Brgy. Paraiso, City of Koronadal.

167. The environmental assessment process has highlighted the environmental issues and concerns of the proposed subproject. It has not identified any significant negative environmental impacts that cannot be mitigated. The environmental assessment considered the fact that proposed site for the well, pump facilities, and elevated storage tank is only 350 m² and will have no significant negative impact on the surrounding residential and agricultural landscape with patches of cornfields and cassava plantation. Transmission and distribution lines will be laid very close to the roads that have been in existence for a very long time already. Hence, the subproject is essentially not a new incursion to an ecologically untouched zone.

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

169. The subproject will benefit the general public by contributing to the long-term improvement of water supply system and community livability in Brgy. Paraiso. The potential adverse environmental impacts are mainly related to the construction period, which can be minimized by the mitigating measures and environmentally sound engineering and construction practices.

170. Based on this IEE, the determination of environment category as “B” in accordance with ADB’s SPS (2009) is confirmed. With the implementation of the mitigation measures as proposed in the EMP, the subproject is not expected to cause irreversible adverse environment impacts. Also, the water supply subproject can be implemented in an environmentally acceptable manner without the need for further environmental assessment study. As per Philippine laws, the proposed subproject will require an environmental compliance certificate by submitting an IEE checklist to the regional office of the Environmental Management Bureau (EMB).

IX. REFERENCES

Asian Development Bank (ADB). 1993. *Environmental Guidelines for Selected Infrastructure Projects*. Office of the Environment, Asian Development Bank.

_____. 1998. *Environmental Assessment Requirements of the Asian Development Bank*. Environment Division Office of the Environment and Social Development, Asian Development Bank.

_____. 2003. *Rapid Environmental Assessment (REA) Checklist for Water Supply*. ADB Online.

_____. 2003. *Rapid Environmental Assessment (REA) Checklist for Sewage Treatment*. ADB Online.

_____. 2009. *Safeguards Policy*. ADB Online.

Barangay Paraiso. 2003. Barangay Development Plan for Calendar Year 2003-2007. Barangay Paraiso, City of Koronadal, Province of South Cotabato.

Department of Environment and Natural Resources (DENR). 1990. Revised Effluent Regulations of 1990. DENR Administrative Order No. 35. Manila.

Department of Health (DOH). 2007. Philippine National Standards for Drinking Water. Manila.

Environmental Management Bureau. 2008. Revised Procedural Manual for DENR Administrative Order No. 30, series of 2003. Manila.

National Water Resources Board. 2011. Water Code of the Philippines and the Amended Implementing Rules and Regulations. Manila.

Poyry-IDP Consult. 2009. *Subproject Appraisal Report: City of Koronadal Water District*. ADB TA7122-PHI. Manila.

World Bank (WB). 1991. *Environmental Assessment Sourcebook Volume II – Sectoral Guidelines*.

____ (WB). 2006. *Philippine Sanitation Sourcebook and Decision Aid*.

World Health Organization. 2005. *Water Safety Plans*. Geneva.

APPENDIX 1: ADB REA CHECKLIST

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Rapid Environmental Assessment (REA) Checklist

Instructions:

- (I) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES) for endorsement by the Director, RSES and for approval by the Chief Compliance Officer.
- (II) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
- (III) Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: TA 7122-PHI. Water District Development Sector Project (WDDSP) based on Water Supply Subproject for Brgy. Paraiso, City of Koronadal

Sector Division: SEUW/SERD

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area...			See below
▪ Densely populated?		✓	Low density population. The proposed site (Brgy. Paraiso) is a rural/agricultural area that is sparsely populated (2.4 person/ ha).
▪ Heavy with development activities?		✓	The proposed site is mainly agricultural with some micro-scale commercial activities (i.e., sari-sari stores).
▪ Adjacent to or within any environmentally sensitive areas?			See below
▪ Cultural heritage site		✓	There is no known site of archeological or cultural significance in the area.
▪ Protected Area		✓	The project site is not within protected area.
▪ Wetland		✓	There is no wetland in the area.
▪ Mangrove		✓	There is no mangrove in the area.
▪ Estuarine		✓	There is no estuarine in the area.
▪ Buffer zone of protected area		✓	The project site is not near any protected area.
▪ Special area for protecting biodiversity		✓	The project site is not within protected/biodiversity area.
▪ Bay		✓	There is no bay in the area.
B. Potential Environmental Impacts Will the Project cause...			See below

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Screening Questions	Yes	No	Remarks
▪ pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?		✓	Proposed source is groundwater. No industrial establishment in the area.
▪ Impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	There is no known site of archeological or cultural significance in the area.
▪ hazard of land subsidence caused by excessive ground water pumping?		✓	Allowable rate of water abstraction is regulated by the National Water Resources Board (NWRB) through the issuance of Water Permit. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ social conflicts arising from displacement of communities?		✓	The project site is non-residential. No displacement of communities is projected.
▪ conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?		✓	The designed depth of well is not projected to conflict with current users of shallow wells. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?		✓	Conduct of regular (raw/treated) water quality monitoring and other appropriate measures will be included in the EMP and/or operational plans.
▪ delivery of unsafe water to distribution system?		✓	Proposed project include chlorination process. Also, conduct of regular (raw/treated) water quality monitoring and other appropriate measures will be included in the EMP and/or operational plans.
▪ inadequate protection of intake works or wells, leading to pollution of water supply?		✓	The project site, provided with perimeter fencing, is a non-residential area. Other appropriate measures will be included in the EMP and/or operational plans.
▪ over pumping of ground water, leading to salinization and ground subsidence?		✓	Allowable rate of water abstraction is regulated by the National Water Resources Board (NWRB) through the issuance of Water Permit. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ excessive algal growth in storage reservoir?		✓	Elevated tank is fully enclosed. Also, appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ increase in production of sewage beyond capabilities of community facilities?		✓	As a complementary activity, septage management will be undertaken jointly by the local (city) government and the water district.
▪ inadequate disposal of sludge from water treatment plants?		✓	Not applicable.
▪ inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?		✓	The project site, provided with perimeter fencing, is a non-residential area. Submersible pump will be used. Also, other appropriate measures will be included in the EMP and/or operational plans.
▪ impairments associated with transmission lines and access roads?	✓		Impacts are anticipated during constructions only. These impacts are deemed temporary and short in duration. Appropriate mitigating measures will be included in the EMP.

WATER SUPPLY
page 3 of 4

Screening Questions	Yes	No	Remarks
▪ health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous chemicals.		✓	Chlorine gas will not be used. Use of PPEs (e.g., gloves, masks, protective clothing) will be required and occupational/health/safety standards (e.g., storage in secure area) will be enforced. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ 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?		✓	Chlorine gas will not be used. Use of PPEs (e.g., gloves, masks, protective clothing) will be required and occupational/health/safety standards (e.g., storage in secure area) will be enforced. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ dislocation or involuntary resettlement of people?		✓	The project site is non-residential. No anticipated displacement and/or resettlement.
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		✓	Not applicable.
▪ noise and dust from construction activities?	✓		Impacts are anticipated during constructions only. These impacts are deemed temporary and short in duration. Appropriate mitigating measures will be included in the EMP.
▪ increased road traffic due to interference of construction activities?	✓		Impacts are anticipated during constructions only. These impacts are deemed temporary and short in duration. Appropriate mitigating measures will be included in the EMP. Contractor will be required to coordinate with local traffic police.
▪ continuing soil erosion/silt runoff from construction operations?		✓	Not anticipated. Topography of City of Koronadal is relatively flat. Appropriate mitigating measures will be included in the EMP.
▪ 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?		✓	Not anticipated. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?		✓	Not anticipated. Conduct of regular (raw/treated) water quality monitoring and other appropriate measures will be included in the EMP and/or operational plans.
▪ accidental leakage of chlorine gas?		✓	Not applicable (chlorine gas will not be used)
▪ excessive abstraction of water affecting downstream water users?		✓	Allowable rate of water abstraction is regulated by the National Water Resources Board (NWRB) through the issuance of Water Permit. Appropriate mitigating measures will be included in the EMP and/or operational plans.
▪ competing uses of water?		✓	Allowable rate of water abstraction is regulated by the National Water Resources Board (NWRB) through the issuance of Water Permit. Appropriate mitigating measures will be included in the EMP and/or operational plans.

WATER SUPPLY
page 4 of 4

Screening Questions	Yes	No	Remarks
• increased sewage flow due to increased water supply	✓		As a complementary activity, septage management will be undertaken jointly by the local (city) government and the water district.
• increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant		✓	As a complementary activity, septage management will be undertaken jointly by the local (city) government and the water district.
• large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Manpower requirement during construction and operation are small (maximum of 50 at any given time). Priority will be accorded to the host community. Appropriate social measures will be included in the EMP as may be specified in IR/IP/Social safeguards documents.
• social conflicts if workers from other regions or countries are hired?		✓	Manpower requirement during construction and operation are small. Priority will be accorded to the host community. Appropriate social measures will be included in the EMP as may be specified in IR/IP/Social safeguards documents.
• 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?		✓	Not applicable. Construction will not involve blasting (manual trenching only).
• 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?		✓	The project site, provided with perimeter fencing, is far from residential areas. Also, operational (trenching) area will be clearly demarcated and access will be controlled. Other appropriate mitigating measures will be included in the EMP and/or operational plans.

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	Yes	No	Remarks
• Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)?	✓		Earthquake and flood are natural risks that can be mitigated by designing civil works consistent with the Philippine Building Code.
• Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (e.g., changes in rainfall patterns disrupt reliability of water supply; sea level rise creates salinity intrusion into proposed water supply source)?	✓		Climate change adaptation strategies and measures need to be integrated into long-term plan/s in view of PAGASA's climate projections.
• Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		✓	Proposed project will not impact any marginalized population, rural-urban migrants, illegal settlement, etc.
• Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by using water from a vulnerable source that is relied upon by many user groups, or encouraging settlement in earthquake zones)?		✓	Proposed project is not expected to increase population/housing in the area.

* Hazards are potentially damaging physical events.

Appendix 2

PHOTOGRAPHS OF THE SUBPROJECT SITE



Photo 1. The proposed subproject site at Sitio Salkan, Brgy. Paraiso, City of Koronadal. Note that the site is presently uncultivated.



Photo 2. The barangay road at left is on the western side of the site.



Photo 3. The residential units at the southeastern boundary of the proposed site.



Photo 4. The barangay road where the transmission pipeline will be laid.



Photo 5. The national highway where part of the transmission pipeline will be laid immediately on the side of the road.

Appendix 3 SAMPLE GRIEVANCE REDRESS FORM

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

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

Date		Place of Registration			
Contact Information/Personal Details					
Name		Gender	* Male * Female	Age	
Home Address					
Place					
Phone no.					
E-mail					
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where, and how) of your grievance below:					
If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)	
Mode of communication: Note/Letter E-mail Verbal/Telephonic	
Reviewed by: (Names/Positions of Officials Reviewing Grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	

Annex A
DOCUMENTATION OF PUBLIC CONSULTATION HELD ON 18 AUGUST 2009

Annex A1: List of Participants

Stakeholders/Participants:

- Raoul Galia – Engineer I, City Engineers Office
- Antonia C. Cordova – Engineer I, City Engineers Office
- Elvira D. Magbanua – Pollution Engineer, City ENRO
- Augustos Bretana – City Enro, City ENRO
- Agnes D. Daguro – CPDC, LGU-Koronadal
- Lorna J. Montequi – SI-CHO, LGU-Koronadal
- Ramon L. Saguta-on – PROTECH, Prov of South Cotabatao

At CKWD Office Meeting

- Rogelio B. Joaquin – Brgy. Chairman, LGU-Concepcion
- Roger S. Mangubat – Brgy. Chairman, LGU-Saravia

City of Koronadal Water District (CKWD) and WDDSP Team

- Fred Fabellon – Interim General Manager (IGM), CKWD
- Rey Sanlap – CSO-B, CKWD
- Aser Sadana – OSA, CKWD
- Josephine Cosep – CAA, CKWD
- Ma. Lourdes Salutorio – ASO-B, CKWD
- Reyes Callao – WMM-B, CKWD
- Corazon Sagutaon – J.O, CKWD
- Jonathan Gadayan – J.O, CKWD
- D. Dagoso, Jr – J.O., CKWD
- Juliet Villegas – consultant, Poyry-IDP
- Ruel Janolino – consultant, Poyry-IDP
- Bonifacio Magtibay – consultant, Poyry-IDP

Annex A2: Minutes of the Public Consultation Held at Ramona Hotel and at the CKWD Office, City of Koronadal

Opening/ Presentations of 1st Meeting:

The public consultation/meeting started at 1:30 P.M. with CKWD's Interim GM, Mr. Fred Fabellon, welcoming the participants and thanked them for positively responding to CKWD's invitation.

CKWD's Interim GM presented the detailed aspects of the proposed water supply system and septage management program.

Mr. Bonifacion Magtibay, WDDSP's Sanitation Specialist, gave a brief presentation of the proposed septage management program as a component of the proposed ADB-funded project.

Comments, Views, Issues and Concerns of 1st Meeting

Ms. Lorna J. Montequi, Koronadal City Health Office (CHO), expressed appreciation of the proposed septage management program since incidence of waterborne diseases usually increased during rainy season. WDDSP's Sanitation Specialist explained that the proposed septage management program will greatly help the city in controlling the spread of septic tank effluents. Rainwater can easily spread the effluents.

Ms. Agnes Daguro, Koronadal City Planning Office, expressed her reservations on the positive impact of the proposed septage management program since only 10% of the households have functioning septic tanks as estimated. WDDSP's Sanitation Specialist explained that the project has a revolving fund for septic tanks repair. This can be implemented in phases, while continuously doing aggressive information campaign. WDDSP's Resettlement Specialist explained that the project is studying the possibility of involving women's organizations in implementing the financing of septic tanks repair using the revolving fund.

WDDSP's Sanitation Specialist suggested a joint WD-CHO information campaign to increase "buy-in" to the septage management program and possible increase in the number of water service connections.

Mr. Raoul Galia, City Engineers Office, have reservations on the viability of the septage management program if only 10% of the households can participate since it might result to a significant increase in water tariff to recover the cost for operation and maintenance. WDDSP's Sanitation Specialist explained that financing concerns are being analyzed under the PPTA and data on septic tanks will be validated during detailed engineering design phase.

CKWD's Interim GM suggested that the LGU may manage the septage management system and the WD will provide assistance if needed. The LGU representatives said they would still study their readiness to accept this task and it would also require City Council approval. They requested detailed cost estimates of the proposed system to be used for City Council presentation. WDDSP's Sanitation Specialist explained that detailed cost estimates are not yet finalized.

Juliet Villegas of WDDSP asked if the participants have additional issues to raise. After confirming that there were no more issues, CKWD's Interim GM closed the meeting by thanking everyone for participating in the public consultation.

1st Meeting Closed at 2:30 P.M.

Discussions of 2nd Meeting

A 2nd meeting was held at CKWD's Office immediately after the 1st meeting at Ramona Hotel. Aside from the WDDSP Team, stakeholders of this 2nd meeting were only the Barangay Chairmen of Saravia and Concepcion.

Mr. Rogelio Joaquin, Barangay Chairman of Concepcion expressed appreciation of the proposed water supply system since people of his area are buying drinking water from water stations. Barangay Concepcion has poor quality groundwater. The WDDSP Team explained that the project will definitely serve Barangay Concepcion since the pipeline will pass through the area.

Mr. Joaquin requested CKWD to ensure that public safety and convenience shall be addressed properly during pipelaying activities particularly near schools. WDDSP's Environmental Specialist explained that civil works contracts will include provisions requiring the contractors to properly address public safety and convenience during construction.

Both Barangay Chairmen said they have no problem in participating with the septage management program since they believed there is need for regular desludging of septic tanks. They expressed full support to the proposed water supply and sanitation project. CKWD's Interim GM welcomed the expression of support from the Barangay Chairmen.

2nd Meeting Closed at 4:00 P.M.

Annex A3: Attendance Sheet of the Participants

TA 7122-PHI: WATER DISTRICT DEVELOPMENT SECTOR PROJECT
LIST OF PUBLIC CONSULTATION PARTICIPANTS
PROPOSED WATER SUPPLY AND SANITATION PROJECT OF KORONADAL CITY WATER DISTRICT

CONSULTATION DATE: 18 AUGUST 2009

No.	Name	Designation	Organization	Signature
	RAMIL G. CALIA	ENGINEER I	CITY ENGINEERING OFFICE	
	ANTONIA C. CALDOVA	ENGR. NORA	CITY ENGINEERING OFFICE	
	AERIE SANDAYA	CSA	CKWD	
	DEY J. VANCELO	CSO-B	CKWD	
	JOSEPHINE J. CONOP	CSA	CKWD	
	Fred F. Fobellon	LG M	CKWD	
	Ma. Lourdes G. Santana	ASO-B	CKWD	
	Elvira P. Manabana	Waterworks Pol. Eng.	City ENPD	
	ANGELUS PATELTON	City Council	LG SANIT	
	Agnes D. Paguio	OPB-C	LGW/Cor.	
	Dorcas S. Calum	STANDARDS	CKWD	
	Donna J. Manayao	SI - CHD	LGW/KM	
	MARINA B. AGUIRRE	ASAPRA - J.O	CKWD	
	WILBERT R. GADHAY	J.O - CE	CKWD	
	D. DINGLOS JR.	J.O - AMCO	CKWD	
	FRANCIS MONTAÑON	J.O - AMCO	PROTECH, PROJ. OF SO. COF.	
	Roselee B. Torcino	Pure Bransay	LGU - CONCESSION	
	PROF. S. MANTONBAT	P. Bransay	LGU - SANIT	
	JOEL VILLAGE	Bransay	Bransay - IDP	
	RUEL JARDELINO	ENR Consultant	POKEM - IDP	
	BONIFACIO MONTAÑON	Sanitation Specialist	POKEM - IDP	

Annex A3: Attendance Sheet of the Participants (Continuation)

No.	Name	Designation	Organization	Signature
22.	NELSON T. PALAYAN, MD	Municipal Health Officer Psychiatry, Quezon City	Taychoon Social Groundsmount Unit	[Signature]
23	ALVAREZ A. DEL ROS	Finance Manager	QMWCO	[Signature]
24	Angela Pardo Lopez	Records Keeping	QMWCO	[Signature]
25	Christian Alinday	Uniting	QMWCO	[Signature]
26	JOY GARCIA	Suburban	QMWCO	[Signature]
27	Cervilla Sison	Staff	QMWCO	[Signature]
28	Aloy T.	QMWCO	QMWCO	[Signature]
29	Kathy A.	QMWCO	QMWCO	[Signature]
30.	Kubert Magroo	QMWCO	QMWCO	[Signature]
31.	Nini Francis	QMWCO	QMWCO	[Signature]

Annex A4: Photographs of the Public Consultation



Photo No.1– CKWD Interim GM explaining some points at public consultation meeting [18 August 2009]



Photo No.2 – City Planning Office representative raising a point at public consultation meeting [18 August 2009]

Annex B**DOCUMENTATION OF PUBLIC CONSULTATION HELD ON NOVEMBER 22, 2012****Annex B1: Consultation Program**

ADB TA 7122-PHI: WATER DISTRICT DEVELOPMENT SECTOR PROJECT (EXTENSION)
Public Consultation for the Validation of Social and Environment Safeguards Data for WDDSP(Ext)
City of Koronadal Water District
1st Blk., casa Subd., Barangay Zone 3, City of Koronadal
November 22, 2012

Programme

9:00 - 9:15	Registration	Secretariat
9:15 - 9:20	Invocation	Dinah B. Songcog
9:20 - 9:25	Philippine National Anthem	Sound System
9:25 - 9:45	Introduction of Participants/ Welcome Address	GM Rey J Vargas
9:45 - 10:00	Presentation of Proposed Water Supply Project in City of Koronadal	Genelyn E. Caballo
10:00 - 10:30	Open Forum	Genelyn E. Caballo
10:30 - 10:45	Presentation of Proposed Sanitation Development Plan	Nyrh Cabance
10:45 - 11:15	Open Forum	Genelyn E. Caballo
11:15 - 11:45	Break	Snacks
11:45	Closing Remarks	Genelyn E. Caballo

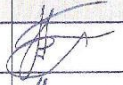








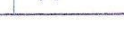
Annex B2: Attendance Sheet

ADB TA 7122-PHI: WATER DISTRICT DEVELOPMENT SECTOR PROJECT (EXTENSION)


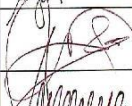

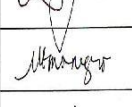
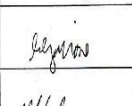


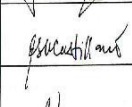

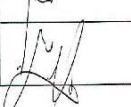



Public Consultation for the Validation of Social and Environment Safeguards Data for WDDSP (Extension)

ATTENDANCE SHEET

City of Koronadal, 22 November 2012

	PRINTED NAME	ORGANIZATION/FIRM & DESIGNATION	CONTACT NUMBERS & EMAIL ADDRESS	SIGNATURE
1	Ruben L. Valdevama	Unifed Toda Secretary	09196606666	
2	GOSSELIO D. KEE	BRGY. TOPLAND	09069188140	
3	Myrna S. Abonito	Conservation Women's Development	09285962443	
4	FRANCIS M. BALATE JR	PURAK MEZALAND	09057621883	
5	TRIEL L. PRIJES	PURAK Mezatand Carpenter Bldg Kor City	09058785995	
6	RUER LI. ARTIL	PROV. SORAVIA	09095515012	
7	EDWIN B. TIONGCO	PURAK MEZALAND	288-10-32	
8	MILBORN N. NOMERE	PPK. BAKING STATION GPS	09926493931	
9	Amyl Nicole B. Roque	PPK. Baking Station, City of Koronadal / Student	09927404409	
10	Wile S. Delfy	Benigno Y. Nido, Corporal Mezatand	0944939848	

Page 1 of 4

	PRINTED NAME	ORGANIZATION/FIRM & DESIGNATION	CONTACT NUMBER/S & EMAIL ADDRESS	SIGNATURE
11	EUFEMIA P. ARGAL	Barangay Carpenter Hill PUECO MEGA LAND - mobile		
12	NOLAN H. de DIAS	PRC MEGALAND SUB (MEMBER) BAYAN CARPENTER HILL VOLUNTEER BRGY. CAPPANAN		
13	CAMARIEL B. VELARDE	" PARAISSO		
14	RODRIGO B. LOPEZ	Purok Brgy. Brgy. CAPPANAN	09108631377	
15	Nenita B. Monesgu	WPA - Secretary	09168948608	
16	Edw. Gordinos	Mega Carpenter Hill - C.A. Inc.	09089222481	
17	Linda Hakawara	Brgy Carpenter Hill	09286498000	
18	Mary Jean F. Tanora	Ptk. Sluag, Brgy. Carpenter Hill, C.A.	99999923635	
19	BARTOLOMEU M. ESTERILLO	Megaland Sub Carpenter Hill	09378088777	
20	ELIZABETH CASTILLANO	Megaland Sub Carpenter Hill	09122744336	
21	Jaime S. de DIOS	Megaland, Sub Carpenter Hill	09208383741	
22	RODRIGO F. ANTON JR	Megaland, Sub Carpenter Hill	0032732278	
23	DAVID V. MANCIBEL	BARTOLOMEU M. ESTERILLO	09371796448	

	PRINTED NAME	ORGANIZATION/FIRM & DESIGNATION	CONTACT NUMBER/S & EMAIL ADDRESS	SIGNATURE
24	GREGORIO O. PRESA	BRGY. PARAISSO	0989962793	
25	DINAH B. SONGOG	CKND	09155276208	
26	MARIL F. MONKOE	PROY. TAMPARAN	09207490424	
27	IVAN N. PADILLA	PROY. GPS	09651081938	
28	JACQUILINE J. CARP	CKND - GAD	09238763142	
29	ANGELIE GUADALUPE	CKND	09085214904	
30	MARY ANN M. SANTOS	CKND - GAD	09295754299	
31	GENELYN E. CABALLO	CKND -	09226998639	
32	REY U. VARGAS	CKND - GM		
33	REYES CALAN	CKND		
34	Louise Myrae R. Suardo	Brgy. San Jose		
35	R. B. B. B.	PARAISSO		
36	Randy L. Buncab	Mega Land Subd.	09128696743	

37. Nym Cabane

Annex B3: Questions and Responses**Public Consultation for the Validation of Social and Environment
Safeguards Data for WDDSP (Extension)**

City of Koronadal Water District
1st Block, Casa Subdivision, Barangay Zone 3, City of Koronadal
November 22, 2012

WATER SUPPLY DEVELOPMENT PLAN

Name / Organization	Question	Response
Hon. Rogelio B. Joquino - Brgy. Captain, Brgy. Concepcion	When did you first learn about the proposed project and what were your initial reactions to it?	Brgy. Chairman Joquino replied that they were already aware of the proposed project and they had been expecting its implementation since then. He clarified that their barangay has recorded 954 households and out of that, more or less 60% expressed their intention to avail of the water service connections.
Hon. Samuel B. Velarde - Brgy. Captain, Brgy. Paraiso	When did you first learn about the proposed project and what were your initial reactions to it?	Brgy. Chairman Velarde said that when he learned about the proposed project he was so glad and thankful especially that the proposed (1) one ha. sanitary landfill is located in their area. As of this consultation date, he has already expressed his full support to the project.
Megaland Home Owner's Association - Brgy. Carpenter Hill	When did you first learn about the proposed project and what were your initial reactions to it?	One of the members of Megaland Home Owner's Association commented that the proposed project is only intended for five barangays and they are not part of it. GM Rey J. Vargas said that actually there is an on-going expansion in their area and probably they can avail ahead than the proposed benefactors.
Hon. Gregorio O. Presga - Brgy. Captain, Brgy. Saravia	Does the local people support the proposed project?	Brgy. Chairman Presga said that for him, he can always give his full support to the project and although they have springs in their area, his constituents still need the services of CKWD.
Joselito D. Kee - Brgy. Topland	Does the local people support the proposed project?	Mr. Joselito Kee of Brgy. Topland said that the constituents will surely support the proposed project. Out of 2,651 recorded households in his barangay, 30% is expected to avail of the new service connections of CKWD.

Name / Organization	Question	Response
Rogelio B. Joquino - Brgy. Captain, Brgy., Concepcion	Does the local people support the proposed project?	Brgy. Chairman Joquino commented that they will always support the proposed project because it is for the good of his constituents. He then asks GM Vargas if it is possible to go down to their area and conduct a public consultation so that all issues and concerns will be settled before its implementation. GM Vargas acknowledged and noted the above suggestion.
Participants	Any critical issue or concern by the local people regarding the project?	Majority of the participants said that as of date they have no critical issue yet, instead they are asking for a public consultation in their respective barangays though they knew that water will be chlorinated, still they had expressed their interests.
None	Are there employment opportunities in the project?	No Queries/Response
Joselito D. Kee - Brgy. Topland	Any loss of residential or commercial structures due to the project?	Mr. Joselito Kee of Brgy. Topland expressed his concern about the area for pump stations. Will CKWD purchase a land or will ask donations from the barangays. GM Rey Vargas answered the query, he said that in his discussion with the ADB consultants there was no budget for land acquisition that's why CKWD would like to ask at least 350sq. m from the barangay and if possible it is within the barangay hall compound for safety reasons. But in the event that the barangay cannot provide, CKWD will find ways to purchase its own land for pump stations. GM Vargas also added that once the project is installed it will remain forever. Ms. Caballo also added that as much as possible CKWD would like to utilize public property or public road only.
Hon. Rogelio B. Joquino -Brgy. Captain, Brgy Concepcion	Any loss of residential or commercial structures due to the project?	Brgy. Captain Joquino query on the preferred location for pump stations, is it along the road or could be anywhere? GM Vargas said that it could be anywhere as long as there's an access to road so that repairs and maintenance of equipments will be easy.
Participants	Any loss of Community life (like market place, public playground) or	The participants commented that if ever there will have such instances, they will find ways to settle it.

Name / Organization	Question	Response
	community activities that will be affected?	
Hon. Samuel B. Velarde -Brgy., Chairman, Barangay Paraiso	Would there be land acquisition that would result in resettlement, or would affect parks, forest, etc.?	Brgy. Chairman Velarde query if we already have an exact location of deepwells. Ms. Genelyn E. Caballo said that there's no specific area yet but a deepwell will be installed in each of the 5 barangays. He also queried on the distance where a deepwell should be positioned so that a domestic pump or pitcher pump will not be affected during the operation of the project. GM Vargas said that usually a domestic pump is positioned at 12m deep while a deepwell reaches at about 70-120m deep. This means that the shallow well would not be affected when the deepwell is operated. He also added that the upper portion of the water level is already contaminated or polluted.
Ruben L. Valderama - Unified Toda Operator's & Driver's Association	Would there be land acquisition that would result in resettlement, or would affect parks, forest, etc.?	Mr. Valderama query, what if a pipeline going to households passes thru their area and caused some damaged in their properties, will they be compensated? GM Vargas said that if ever such instance happens, CKWD will facilitate for the resettlement or relocation if necessary but rest assured that any destruction done will be rehabilitated and compensated.
None	Will the project location adversely affect water resources?	No queries/comments
Participants	Any other issues you want to share (security, cooperation from local communities)	Majority of the participants assured peace and order in their respective barangays


 Prepared by: DINAH B. SONGCOG
 Documenter

Annex B4: Photographs of the Consultation



Photo 1. The General Manager of the City of Koronadal Water District (CKWD), Rey Vargas, making the presentation on the proposed water supply subproject during a public consultation held on Nov. 22, 2012.

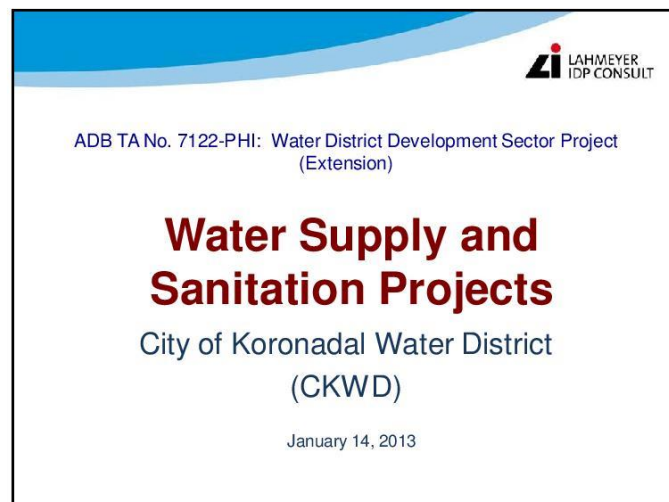
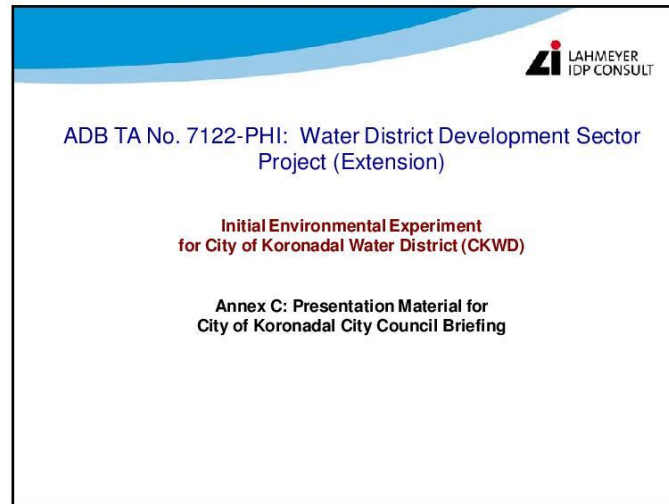


Photo 2. Representatives of various barangays of the City of Koronadal listen to the CKWD GM as he presents the water supply subproject.

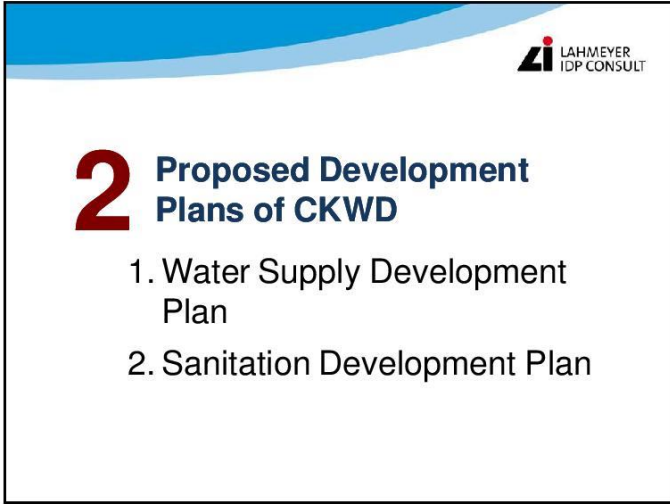


Photo 3. Joselito Kee of Brgy. Topland makes a comment on the proposed water supply project of CKWD.

2/28/2013



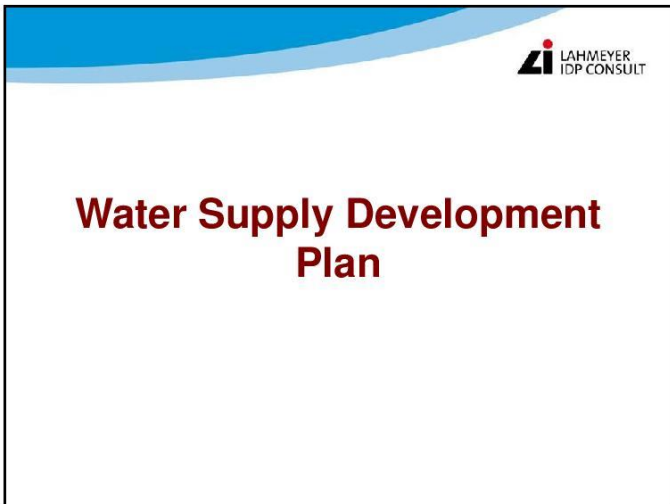
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2 Proposed Development Plans of CKWD

1. Water Supply Development Plan
2. Sanitation Development Plan



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Water Supply Development Plan

2/28/2013




Objective of water supply development plan

- Expand CKWD's service by developing separate water supply system in each of the 5 barangays not yet included in CKWD's service area.

Implementation

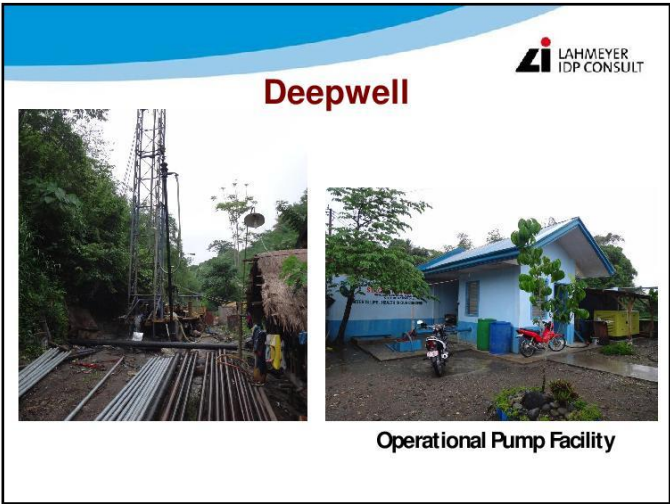
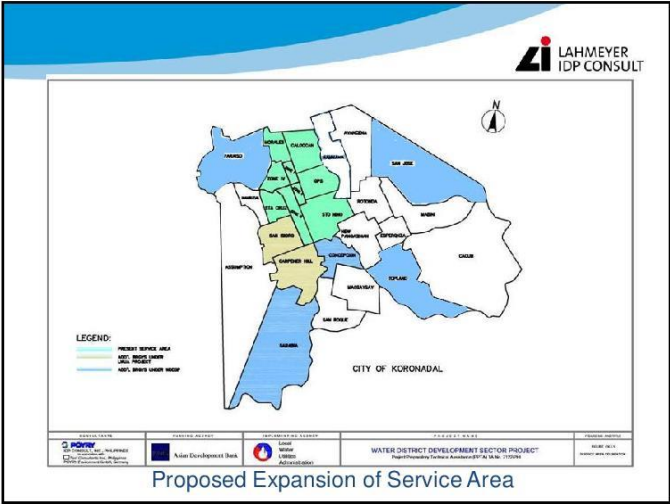
1. The recommended plan will be implemented independent of the on-going projects of CKWD.
2. The recommended plan is expected to be completed by Year 2014.




Major Project Components

1. Deepwells in Brgys. Concepcion, Paraiso, San Jose, Sarabia, and Topland each with pump facilities, hypochlorinator and stand-by generator set;
2. 100 cu. m. elevated steel storage tank for each pump station;
3. 29.15 km of pipelines for 2,707 new service connections;
4. 350 sq. m. lot for each tank and pump station.
5. Total development cost is P86.11 million

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Additional Service Connections in One Year

Barangay	No. of Service Connections
Concepcion	339
Paraiso	472
San Jose	647
Sarabia	562
Topland	687
Total	2,707



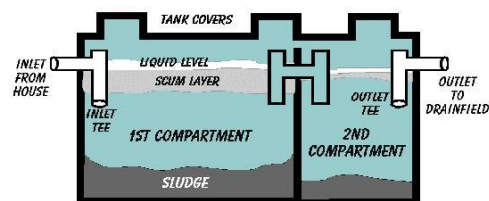
Sanitation Development Plan

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Definitions



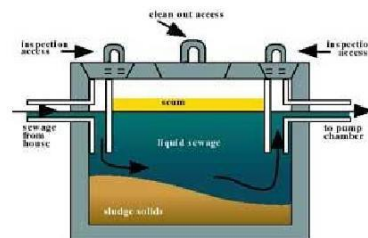
- Septic Tank – a watertight, multi-chambered tank where sewage is partially decomposed by anaerobic bacteria. Solids settle to the bottom allowing the clarified effluent to flow out of the tank for further treatment.



Definitions

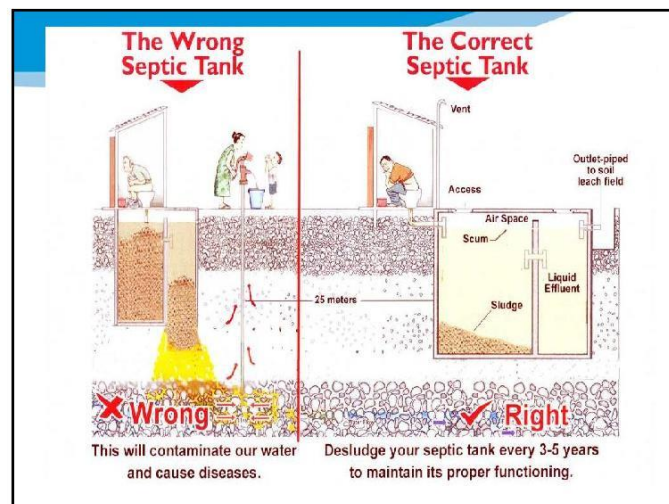
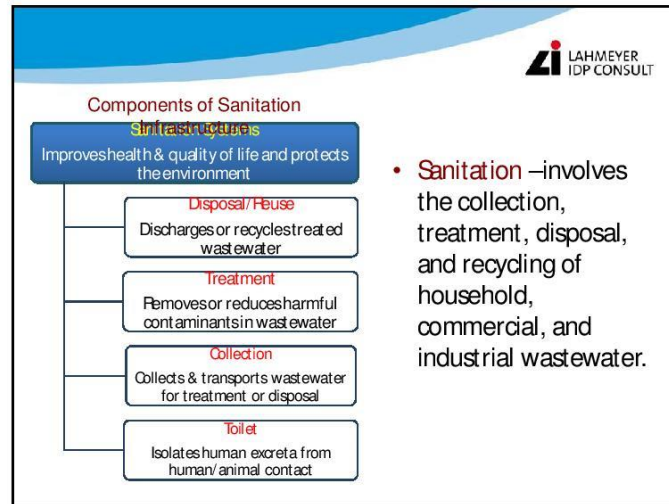


- Sewage – wastewater, particularly from toilets, but also from kitchens, laundry areas and sinks.




- Septage – combination of scum, sludge and liquid that accumulates in septic tanks.

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Cases of Diarrhea

Year	Ave 2005-2009	2010	2011
Cases	1,356	1,596	1,844
Approx. Rate	8.4 cases/1,000	9.6 cases/1,000	10.8 cases/1,000

Source: Koronadal City Health Office, 2012

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Objectives of sanitation development plan

1. Provide an appropriate collection, treatment and disposal system for domestic wastewater.
2. The recommended program is designed to meet the treatment requirements for Year 2025.
3. The program will be implemented in two phases.

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Implementation Program

Phase I (2013-2015)

1. Issuance and enforcement of city ordinance on proper design of septic tank and requiring regular desludging of septic tanks.
2. Conducting information drive on proper sanitation.
3. Inspection and repair of septic tanks.

Phase II (2016-2018)

1. Construction of septage treatment facility (SpTF).
2. Procurement of vacuum trucks, and desludging of septic tanks.
3. Operation and maintenance of the SpTF.



Sanitation Ordinance

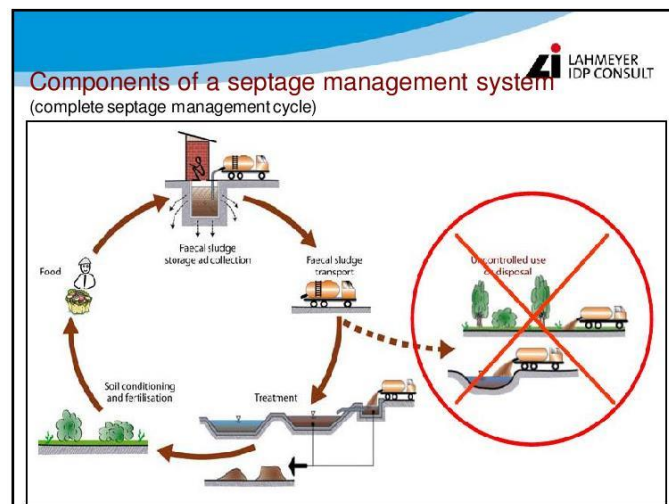
- A sanitation ordinance provides the framework on how to manage wastewater generated by public and private sources. It also provides the guidelines to private operators who would like to engage in the business of wastewater collection, treatment and disposal.

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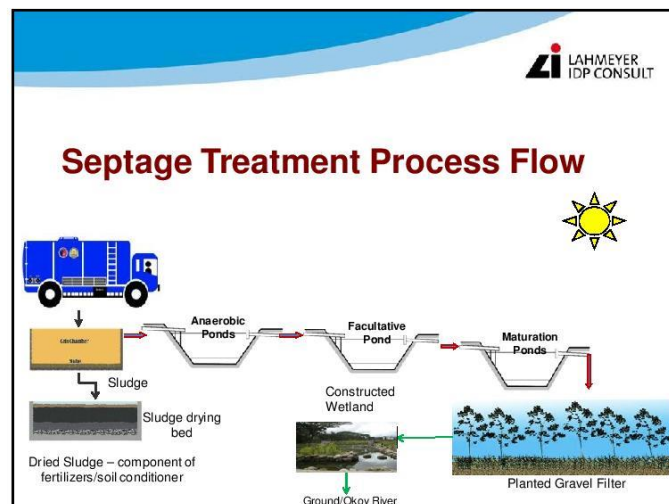
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Requirements and Contents of a Sanitation Ordinance

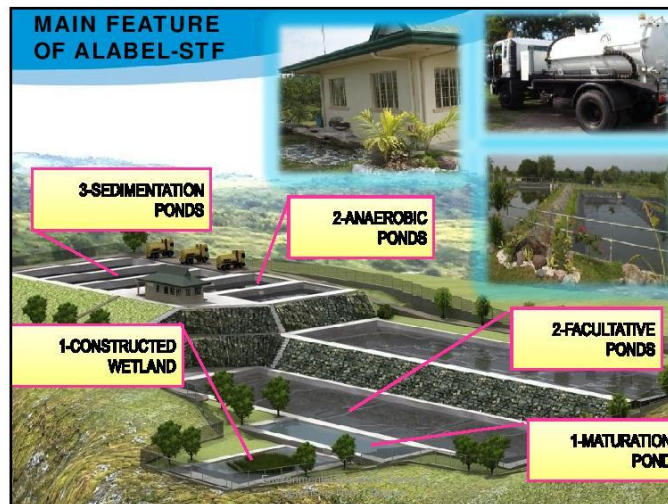
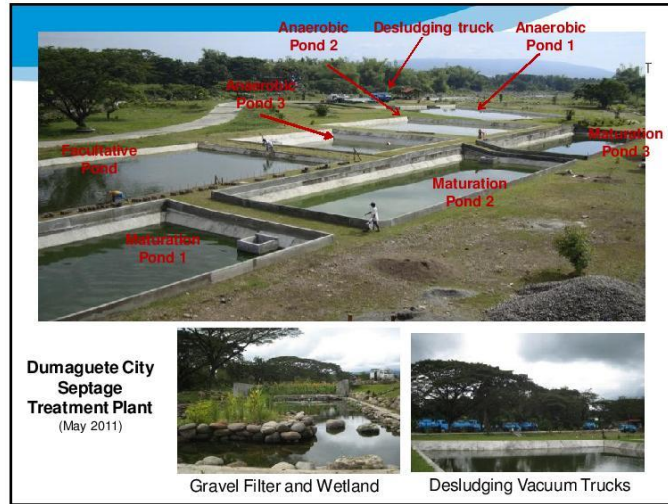
- Legal Basis, Scope, and Authority
- Definition of Terms
- Technical Provisions (Description of the Septage Management System)
- Design, Operation, and Maintenance, Septic Tanks – design and construction
- Requirements, Desludging Procedures, Septage Treatment Facility
- Administration and Enforcement (Institutional Arrangements, Monitoring and Evaluation, Finances and User Fees, Administrative Procedures)




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Total Development Cost

Components	Amount (PhP)
Basic construction cost	27.50M
Capacity building cost	1.72M
Land acquisition	2.55M
Detailed engineering design	2.94M
Vacuum trucks	9.00M
Physical contingency	9.85M
Price contingency	11.06M
Supervision	1.96M
Total	66.58M

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Financing Plan for the Sanitation Project & Fund Source

• ADB Loan	: PhP58.49 million
• WD Equity	: <u>8.09 million</u>
Total	: PhP66.58 million