

RULE 5

ROLES OF NATIONAL GOVERNMENT AGENCIES

Article 13. Department of the Interior and Local Government (DILG). The DILG shall have the following responsibilities in the sector:

- a. Raise awareness of LGUs on opportunities relating to the sector, within the framework of relevant government policies, such as financing schemes and available assistance from local and foreign financing institutions, technological breakthroughs, management and institutional arrangements, etc.;
- b. Facilitate transactions between LGUs and communities and lending institutions by preparing water supply investment packages, assisting in the financial, economic and institutional and environmental data collection and analysis, etc., in coordination with appropriate national government agencies;
- c. Build capacity of LGUs and BWSAs/RWSAs in the general areas of planning, implementation, management, monitoring and evaluation, and regulation, upon agreement with the LGUs, and as required by financing institutions, in coordination with national government agencies such as DPWH in the case of the engineering aspects;
- d. Develop and maintain a national data management system of LGU-managed water systems to include data on extent of service coverage, cost recovery, collection efficiency, size of water systems, nature of water resources, among others, in coordination with appropriate national government agencies;
- e. Establish a system for monitoring strategic performance of LGUs in relation to the sector, including compliance with technical standards established by LWUA and DPWH;
- f. Upon agreement with the LGU, provide technical assistance in the establishment of a system of public performance audit, in collaboration with appropriate national government agencies;
- g. Coordinate sector activities of LGUs vis-a-vis other national government documents and issue regular bulletins;

- h. Monitor the implementation of this IRR, including the formulation of monitoring and evaluation parameters and reporting requirements; and
- i. Act as the coordinator for projects funded by the National Government per NEDA Board Resolution No. 6 (series of 1996).

Article 14. Local Water Utilities Administration (LWUA). The LWUA shall have the following responsibilities in the sector:

- a. Act as a specialized lending institution for local water districts;
- b. Provide technical assistance to local water districts in the areas of operation, maintenance, personnel training and fiscal practices;
- c. Upon agreement with the LGU, provide technical and financial assistance in the conduct of engineering studies;
- d. Approve tariffs of local water districts;
- e. Establish and update, as and when necessary, the technical standards for local water utilities, including LGU-managed systems;
- f. Monitor and evaluate the performance of local water districts; and
- g. Register RWSAs and furnish all registration documents to DILG.

Article 15. Department of Public Works and Highways (DPWH). The DPWH shall have the following responsibilities in the sector:

- a. Set and/or update, as and when necessary, technical standards for engineering surveys, design, construction and operation and maintenance of Level I systems;
- b. Upon agreement with the LGUs, assist in the conduct of engineering surveys and in the preparation of plans, specifications and programs of work, through its District Offices;
- c. Upon agreement with the LGUs, assist in construction management, through its District Offices; and

- d. Conduct technical researches in coordination with the LGUs.

Article 16. Department of Health (DOH). The DOH shall have the following responsibilities in the sector:

- a. Set and/or update, as and when necessary, standards on water quality testing, treatment and surveillance, and sanitary practices;
- b. Provide technical assistance to the LGUs in the conduct of periodic water quality control and surveillance-related activities; and
- c. Monitor and evaluate, on a regular basis, health and hygiene education programs implemented by local health offices, particularly in areas where waterworks systems are expected to be constructed.

Article 17. National Water Resources Board (NWRB). The NWRB shall have the following responsibilities in the sector:

- a. Regulate the use of water resources through the issuance of water rights;
- b. Regulate tariffs of privately-run water system; and
- c. Establish and manage a user-friendly water resources data management system.

Article 18. Metropolitan Waterworks and Sewerage System (MWSS). The MWSS shall be responsible for water systems in Metro Manila and its adjacent areas.

RULE 6

RURAL/BARANGAY WATERWORKS AND SANITATION ASSOCIATIONS

Article 19. General Provision. A Rural/Barangay Waterworks and Sanitation Association shall be formed to manage public water systems and sanitation facilities: RWSAs for Level II systems and BWSAs for Level I systems. RWSAs/BWSAs shall initiate/assist in site identification, planning, implementation and evaluation of water supply projects as well as guide the construction and/or maintenance of household and community latrines (toilets).

Article 20. Organization of RWSAs/BWSAs. RWSAs and BWSAs shall be organized upon initiation of the LGU. A participatory approach shall be adopted in the formation of RWSAs/BWSAs with the LGU concerned taking the lead and non-government organizations (NGOs) providing technical assistance, as necessary. Prior to the formation of RWSAs/BWSAs, dialogues shall be conducted with and among all stakeholders such as women's groups, civic and religious organization, health practitioners, NGOs and other people's organizations.

Article 21. Registration Requirements. RWSAs/BWSAs shall register with DILG. BWSAs shall be encouraged to associate with other BWSAs or the RWSAs prior to registration. DILG shall keep a record of all registration documents.

Article 22. Powers. Every duly registered RWSAs/BWSA shall be autonomous and shall have the power and capacity to:

- a. Award and enter into a contract(s) with private contractors for the delivery of necessary services or the supply of materials, in the course of managing a public water and sanitation facility, subject to existing laws, rules and regulations;
- b. Oversee the implementation of project undertaken by private contractors;
- c. Own and manage the operation of the water facility in a sustainable manner, including providing for adequate reserves for maintenance and repair, setting appropriate levels of user fees, and implementing billing and collection schemes;
- d. Handle the activities required of any lawful business transaction entered into by the Association;
- e. Enter into agreement with other RWSAs/BWSAs for any merger or consolidation as may be proven advantageous to their operations;
- f. Convene meetings of water users for the purpose of information dissemination, consultation, public hearing on water rates and other activities deemed important;
- g. Initiate improvements in operations found to be advantageous and favorable to the communities concerned;
- h. Decide on matters found to be advantageous and favorable to the communities concerned; and

- i. Prepare an annual report on its operations.

Article 23. Capability Building of RWSAs/BWSAs. RWSAs and BWSAs may request assistance for capability building from LGUs and/or DILG, DPWH and other concerned agencies, through the LGUs.

RULE 7

PROJECT DEVELOPMENT AND IMPLEMENTATION

Article 24. Sector Planning. Planning and development of water supply investment shall be made within the framework of national policies, and shall implement specific targets in the provincial and city/municipal sector plans. These plans shall define the strategies, policies and approaches in sector development at different levels of government. A National Sector Plan for Water Supply, Sewerage and Sanitation shall be prepared, and updated, on a regular basis, by the National Economic and Development Authority (NEDA), in coordination with the concerned oversight water agencies, and shall provide the national policy framework. At the provincial level, the LGUs, through their respective Provincial Planning and Development Offices, shall prepare, and update, on an annual basis, the Provincial Water Supply, Sewerage and Sanitation Sector Plans. At the city/municipal level, a similar sector plan shall be prepared and updated, on an annual basis, by the LGUs, through their City/Municipal Planning and Development Offices. The respective Local Councils shall approve the provincial and city/municipal sector plans.

Article 25. Project Identification. On the basis of the provincial and city/municipal sector plans, water supply investments shall be identified and developed into a local investment program that includes an appropriate financing plan. The Local Council concerned shall approve the local investment program. The proposed investments shall then be developed according to a demand-driven approach that would allow beneficiaries to select from among cost-effective technical options and from among financing options. The LGUs may avail of technical assistance from the DILG in the preparation of this project package (Rule 5).

Water supply investment shall be developed to the principles of managing water services at the most appropriate level and providing services based on what local consumers want and are willing to pay for. This means that LGU systems shall be constructed on the basis of choosing among technical options that are affordable through the financial resources made available by users, communities and LGUs. The process of determining demand for a particular service delivery shall be concluded through a negotiated agreement between the LGU, water utility and the users, on how the costs will be shared at the town, barangay and household levels.

Article 26. Technical Aspects. Technically feasible options shall be developed, particularly for a Level II service level. These options may include varying levels of operation (in terms of operating hours), which may have substantial implications on capital and operating and maintenance costs. In addition, the operation and management (O&M) cost of a technical option is strongly influenced by the management mode chosen by an LGU, economies of scale factors and the size of the service area. Thus, for any Level III service, at least two technical options shall be explored; those of an inter-LGU service delivery organization involving amalgamation of service areas and of singled LGU management systems. The former option shall be explored and developed further only upon agreement with the LGU concerned.

In the conduct of the engineering work (i.e., feasibility studies and detailed design), the LGUs may tap the services of the private sector, using their internal resources or may request the DILG, DPWH and/or LWUA for financial and/or technical assistance.

Article 27. Financing and Management Options. A range of options is available to the LGUs on financing and management of Level III systems. They include, but are not limited to, the following options:

Options 1: The LGU may finance the system from its internal resources or may borrow from a financial institution. It may then create a **profit center within the LGU office** with a separate cost accounting system. Under this arrangement, the LGU may directly manage the system or may enter into a **management contract** with a private party or a **service contract** with a private party to handle billing and collection and/or repair and maintenance. In these types of management arrangements, the LGU retains the responsibility for providing the service and assumes the commercial risks. Institutions such as neighboring water districts, cooperatives and other private institutions may be tapped by the LGU for these types of contracts.

Option 2: The LGU may enter into a **lease contract** with private party to operate and manage the system. Under this arrangement, the LGU finances the capital expenditures from its internal resources or from borrowings. The LGU then leases the facility to a private party, which assumes the commercial risks and the responsibility for operation and maintenance. The private party is allowed to recover its costs from user fees, and may also collect, on behalf of the LGU, any other charges contributing to the repayment of a loan which the LGU may have taken on behalf of the users.

Option 3: The LGU may enter into **concession contract** with a private party. Under this arrangement, the private party assumes the operations and management of the assets of the LGU, and

undertakes to expand and finance the services according to the terms and conditions of the contract. The private party is then allowed to operate the system, and recover its costs and earn a reasonable return on its investment from user fees. The private party also assumes the commercial risk. After the concession contract expires, the system reverts to the LGU, or may be contracted out again by the LGU.

Option 4: The LGU may create a **local water district**, in accordance with Presidential Decree No. 198, as amended.

Option 5: The LGU may form a **water company** to handle the provision of the service.

The LGU appoints the Board of Directors to be tapped from the private sector who would manage the company along commercial principles.

Options 6: The LGU may enter into contract with a private party under the **Build-Operate-Transfer scheme or any of its variants**, per Republic Act No. 6970, as amended, for the whole water system or a component of it (i.e., source development or distribution).

Option 7: The LGU may enter into a **joint venture agreement** with a private party in providing the service. Under this arrangement, both parties share in the risks of the project, as well as operate the water supply system through a shared management and organization structure.

In the contracts of LGUs with private parties, performance standards shall be stipulated including remedies for non-performance that are consistent with national regulatory laws.

The DILG, in its role of raising awareness of LGUs on opportunities in the sector, shall be responsible for informing the LGUs of these schemes, and in facilitating the implementation of the preferred option. **Annex D** provides a matrix of these various schemes.

RULE 8

COORDINATION AND COLLABORATION MECHANISMS

Article 28. Inter-LGU Collaboration. Provinces, cities, municipalities and barangays may assist, coordinate and collaborate with each other, as far as practicable, in the effort of improving the delivery of services to the Filipino people. The DILG shall take the lead in coordinating among the LGUs.

Article 29. Coordination Between Local and National Governments. LGUs may avail of the technical, financial and institutional expertise of national agencies like LWUA, DPWH, DILG, NWRB, DOH and DENR. DILG, as appropriate, shall coordinate with other national agencies on behalf of the LGUs.

RULE 9

TRANSITION ARRANGEMENTS

Article 30. Ongoing Projects. The DPWH, DOH and DILG shall continue to implement ongoing foreign-assisted Level I projects until the completion of such projects.

Article 31. Pipeline Projects. Projects in the pipeline shall conform to the provisions of this IRR to the extent possible.

RULE 10

MISCELLANEOUS PROVISIONS

Article 32. Applicability Clause. The application of this IRR shall be without prejudice to existing and future laws, rules, regulations, and/or international agreements entered into by the Philippine Government.

Article 33. Effectivity of the IRR. These Implementing Rules and Regulations shall take effect upon its approval by the NEDA Board, on recommendation by the Infrastructure Committee. It shall then be published in at least two national newspapers of general circulation.

Annex A

NEDA Board Resolution No. 5 (series of 1998)

**APPROVING THE IRR ON THE DELINEATION OF
RESPONSIBILITIES IN THE DEVELOPMENT AND
IMPLEMENTATION OF WATER
SUPPLY PROJECTS**

On motion duly seconded,

BE IT RESOLVED, as it is hereby resolved, to approve as it is hereby approved, the Implementing Rules and Regulations (IRR) on the Delineation of Responsibilities in the Development and Implementation of Water Supply Projects.

UNANIMOUSLY APPROVED, 17 March 1998.

Annex B

NEDA Board Resolution No. 4 (series of 1994)

**APPROVING THE RECOMMENDATION OF THE
INFRASTRUCTURE
COMMITTEE (INFRACOM) ON THE REFORMS IN THE WATER
SUPPLY SECTOR**

On motion duly seconded,

BE ITS RESOLVED, as it is hereby resolved, to approve and confirm, as the same is hereby approved and confirmed the following recommendations of the INFRACOM:

- a. Registration with the National Water Resources Board (NWRB) of all drilling and the extraction of water therefrom, irrespective of the use of extracted water and ownership of the land where the well is to be drilled. Amendment to Article 6 of the Water Code (PD No. 1067) shall be initiated by NWRB to this effect. Subsequently, NWRB shall formulate rules and regulations for the effective enforcement of this requirement within sixty (60) days after approval of the proposed amendment.
- b. Strengthening of the NWRB staff in order to effectively cope with the planning, monitoring and implementation activities of the water resources sector. NWRB shall submit an action plan to this effect to INFRACOM for review and endorsement to the President of the NEDA Board.
- c. Reorientation of the Local Water Utilities Administration (LWUA) to its original corporate mission as a "specialized lending institution" financing only viable water supply projects with tariff levels formulated towards full cost recovery. LWUA shall therefore upgrade its banking and finance expertise and immediately complete its financial restructuring. Further, it should radically improve its collection efficiency as well as its database and accounting systems.
- d. Privatization of all existing Water Districts (WDs) should be vigorously pursued whenever feasible and large commercially viable water services areas like Metro Manila, Cebu, Zamboanga, Davao should be formed or converted into SEC-style private water corporations, independent of LWUA and other government funding institutions by subject to regulation by NWRB.

- e. Procurement needs of WDs should be provided based on a competitive basis and not centrally imposed.
- f. LWUA shall submit an action plan to INFRACOM to effect the recommended reforms for review and endorsement.
- g. With respect to the delineation of responsibilities in the sector, NEDA Board Resolution No. 5 (series of 1998) is proposed to be amended to allow local government units (LGUs) to implement all levels of water supply projects consistent with government's decentralization and devolution process, mandating LWUA to implement only financially viable projects and further defining the roles of the agencies in the sector. The proposed amendment is as follows:

"Level I (point source system), Level II (communal faucet) and Level III (house connections) water supply projects may be implemented by the concerned LGUs within their jurisdiction. LWUA shall implement only financially viable Level III water supply projects in areas outside the MWSS jurisdiction. DILG's participation will consist of general administration and institution building, such as assistance to the LGUs in the formation of Rural and/or Barangay Waterworks and Sanitation Associations (RWSAs/BWSAs) as well as in the identification of water supply systems. MWSS will be responsible for Level II water systems in Metro Manila and adjacent areas. DPWH, together with DILG and DOH, will provide technical assistance (within a period of about 2 years) to LGUs in the planning, implementation and operation and maintenance of water supply facilities".

UNANIMOUSLY APPROVED, 15 March 1994.

NEDA Board Resolution No. 6 (series of 1996)

**APPROVING THE RECOMMENDATIONS OF THE
INFRASTRUCTURE COMMITTEE (INFRACOM) ON THE
EXECUTING AGENCY ARRANGEMENT FOR THE DEVOLVED
INFRASTRUCTURE ACTIVITIES/FACILITIES**

On motion duly seconded,

BE IT RESOLVED as it is hereby resolved, to approve and confirm as the same is hereby approved and confirmed, the following recommendations of INFRACOM on national government (NG) assistance to Local Government Units (LGUs) in the implementation of devolved infrastructure activities/facilities under the Local Government Code in support of national priority programs in order to ensure efficiency, effectivity and more focused implementation consistent with the Government's decentralization and devolution objectives:

- a. DILG, which has administrative supervision over LGUs, shall be the lead national government agency (NGA) to oversee/administer NG assistance to LGUs in the implementation of devolved infrastructure programs/projects with the collaboration/participation of other concerned agencies. The identification and formulation of infrastructure programs/projects devolved to LGUs proposed for NG assistance shall therefore be coordinated with DILG to rationalize their development;
- b. The implementation of identified devolved infrastructure programs/projects shall be undertaken by the LGUs with DILG providing assistance in institution, capacity and capability building of the LGUs and with DPWH and other technical agencies providing and transferring technical expertise to the LGUs as necessary. The levels of capacities and capabilities of LGUs shall be determined by the DILG in coordination and collaboration with DPWH and other concerned agencies to determine, among others, the extent of support and assistance that these national agencies should provide in order to effect the successful implementation of devolved NG-assisted infrastructure programs/projects;
- c. DILG, as the lead agency, shall include in its annual budget the financial requirements necessary for the implementation of the identified and approved devolved infrastructure programs/projects. This shall be without prejudice to any future funds arrangement that the national government may

adopt with regard to NG assistance to LGUs for devolved projects particularly funds source from foreign loans and grants;

- d. For on-going and already committed devolved infrastructure programs/projects with NG assistance, the same shall be implemented with the previously identified NGA as lead in order not to disrupt is prosecution. However, there shall be phasing in at DILG and LGUs in the implementation arrangements for these devolved infrastructure projects in accordance with the provisions of this Resolution for purposes of policy and operational consistency and thus, effect a smooth transition;
- e. To efficiency and effectively implement the provisions of this Resolution, the INFRACOM shall formulate and periodically review the guidelines, rules and regulations that will already define the specific roles of the various concerned agencies in the implementation of NG assistance to LGUs for devolved infrastructure activities/utilities as well as the appropriate implementing mechanisms. In addition, INFRACOM shall likewise formulate the criteria and program for phasing out NG assistance to LGUs for devolved infrastructure activities/facilities;
- f. To carry out its tasks, the INFRACOM may request for financial and technical assistance form participating government agencies as well as from multilateral and bilateral sources; and
- g. The provisions of this Resolution shall apply to all NG assistance for devolved infrastructure activities/utilities unless otherwise explicitly provided for under the existing and future laws, such as the General Appropriations Act (GAA).

UNANIMOUSLY APPROVED, 12 March 1996.

MATRIX OF FINANCING AND MANAGEMENT OPTIONS

<u>Option</u>	<u>Description</u>
LGU-Financed and Managed	The LGU finances the investment from its income and other resources available to it (e.g., URA, locally-generated taxes, grants) or borrows from a financial institution. It then establishes a profit center within the LGU office with a separate cost accounting system. Under this arrangement, the LGU directly manages the operations of the system. The LGU assumes the commercial risk.
Service Contract	The LGU finances the investment and directly operates and manages the system. It enters into contract with a private party to undertake billing and collection and/or repair and maintenance activities for a fee. The LGU maintains a profit center within the LGU office and assumes the commercial risk.
Management Contract	The LGU finances the investment and enters into contract with a private party to manage the system. The private party collects the water tariffs set by the LGU, operates and manages the system and in turn, is paid a management fee by the LGU. The LGU maintains a profit center within the LGU office and assumes the commercial risk.
Lease Contract	The LGU finances the capital expenditures and leases the facility to the private sector. The private sector assumes the commercial risks and the responsibility for operation and maintenance. To recover its costs, the private party is allowed to collect user fees as well as any other charges on behalf of the LGU.
Concession Contract	The LGU enters into contract with a private party to undertake the investment. The private party assumes the assets of the LGU and undertakes to expand the services according to the terms and conditions of the contract. The private party is allowed to operate the system and to collect user fees to recover its costs and earn a reasonable return on its investment. After the contract expires, the system reverts to the LGU or may be contracted out again by the LGU.
Creation of a Local Water District	The LGU may create a local water district. The local water district finances the investment from a loan from the Local Water Utilities Administration (LWUA) and operates and manages the system. The local water district is then supervised by LWUA.
LGU Company	The LGU may form a water company to handle the provision of the service. The water company shall be duly

registered with the Securities and Exchange Commission (SEC) and shall have share holdings which, can be sold to the private sector in the future. The LGU appoints the board members to be selected from the private sector who would then manage the company along commercial principles.

Build-Operate-Transfer or any of its variants (per RA 6970 as amended)

Under the BOT scheme, the private sector finances the investment, operates it for a certain period of time after which the asset is transferred to the LGU. The private party is allowed to collect user fees to recover its costs and earn a reasonable rate of return on its investment. The LGU and the BOT proponent negotiate on the risk sharing.

Joint Venture Agreement

Under a joint venture agreement, the LGU and the private party share in the risks of the project and operate the system through a shared management and organizational structure.

NEDA BORD RESOLUTION No. 5 (s. 1994)

NEDA BOARD RESOLUTION

No. 5 (s. 1994)

**APPROVING THE RECOMMENDATION
OF THE INFRASTRUCTURE COMMITTEE
(INFRACOM) ON THE NATIONAL POLICY,
STRATEGY AND ACTION PLAN FOR
URBAN SEWERAGE (LIQUID WASTE)
AND SANITATION**

On motion duly seconded,

BE IT RESOLVED, as it hereby resolved to approve as the same is hereby approved and confirmed the following recommendations of the INFRACOM:

A. NATIONAL POLICY

1. Provision of improved sewerage/sanitation services in urban areas shall be considered a high priority.
2. On-site sanitation facilities for all urban households/establishments readily adaptable to further sewerage systems shall be required.
3. All new subdivisions/housing developments shall provide simplified or conventional sewerage system/sanitation facilities.
4. Conventional or low-cost sewerage for central business districts and for potentially high-income residential areas where economically and financially viable shall be provided.
5. Treatment of industrial as well as collected city/municipality wastewater to established standards set forth by the DENR prior to disposal into the drainage system shall be required.
6. Provision of services shall be based on consumer demand and willingness to pay.

B. NATIONAL STRATEGY

1. A sanitation/sewerage program and a Central Sanitation/Sewerage program Support Office (CPSO) to coordinate subsector activities at the national level and to assist LGUs to plan and manage sanitation/sewerage programs at the community level shall be established.

2. External sources of assistance shall be explored provided as may be appropriate to enable Municipal Development Fund (MDF) facility or other financing sources to extend loans to LGUs for sanitation and sewerage projects.
3. LGUs shall primarily be the implementors of the sanitation/sewerage programs with the national government providing assistance to develop their capacities in the following areas: community participation, sub-sector planning, program management, regulation of development, selection of technologies, financial management, construction supervision, O&M, monitoring and reporting.

C. ACTION PLAN

1. A CPSO shall be created and housed at LWUA with the LWUA Board exercising over-all jurisdiction over its operations. An Inter-departmental Advisory Committee (IAC) composed of representatives from DPWH, DOH, DILG, DOF, DBM, LWUA, DENR, MWSS and NEDA shall likewise be created and act as the coordination body in the implementation and monitoring of urban sewerage and sanitation programs particularly the five (5) pilot areas (Davao City, Calamba, Dagupan City, Roxas City and Cotabato City). The representatives to the IAC shall preferably be Asst. Sec. or Dir. level. The Chairman of the IAC and the Dir. of the CPSO shall be appointed by the LWUA Board.
2. LWUA shall fully staff the CPSO from within its existing manpower as soon as possible. An international institutional development consultant shall be engaged to assist the CPSO to design and implement the activities. The CPSO shall exist for a period of about 3 to 5 years or until after its functions have been fully devolved to the LGUs.

UNANIMOUSLY APPROVED, 15 March 1994.

Certified true copy:

FORTUNATO R. ABRENILLA
Acting Board Secretary
and Director, Legal Staff



7. WATER SOURCE DEVELOPMENT

7.1 General

Table 7.1.1 Well Sources Information

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)					Page: 1 of 7
Content: Water Source - General Information				Date:	
Data Collection Level: Provincial		Province No.: 1163		Filename: Water Source.xls	
Region Number: XI		Province Name: South Cotabato			Form Number: P.4.1
	Type of Water Source		Shallow Well	Deep Well	Spring
Imple- mentor	Total number of water sources	Number	35,116	894	100
	Government Agency	Number	591	329	45
	Private	Number	34,525	565	55
Level	Level I	Number	35,116	867	45
	Level II	Number		14	52
	Level III	Number		13	3
Ownership	Water District	Number		9	0
	MEO/CEO	Number			
	RWSA	Number		9	14
	BWSA	Number		1	
	Institution	Number		8	41
	Commercial Establishment	Number			
	Industrial/Agricultural Undertaking	Number			
	Public (Domestic)	Number	591	329	45
	Private (Domestic)	Number	34,525	538	
Abstraction	Submersible/Turbine	Number		27	
	Centrifugal	Number			
	Handpump	Number	35,116	867	
	Bucket & Rope	Number			
	Free Flowing	Number			
Usage	Drinking	Number	17,558	894	100
	Washing/Bathing	Number			
	Gardening/Irrigation	Number			
	Big-Scale Irrigation	Number			
	Production	Number			
Water Quality	No Quality Problem	Number			
	High Iron/Mag. Content	Number			
	High Chloride Content	Number			
	Turbidity/Colored/Smell	Number			
	Polluted/Contaminated	Number			
	Chlorinated	Number			
	Treated	Number			
Production	Seasonal Production	Number			
	Average Capacity < 100 m ³ /day	Number	35,116	871	56
	Average Capacity >= 100 m ³ /day	Number		23	44
	Number of Household < 5	Number			
	Number of Household >= 5	Number			

Table 7.1.1 Water Sources Information

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)						Page: 2 of 7		
Content: Water Source - General Information						Date:		
Data Collection Level: Provincial			Province No.: 1163			Filename: Water Source.xls		
Region Number: X			Province Name: South Cotabato			Form Number: P.4.1		
	Name of Municipalities	Character	Banga			Koronadal		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	5,528	15	1	14,197	521	
Imple- mentor	Government Agency	Number		5		115	57	
	Private	Number	5,528	10	1	14,082	464	
Level	Level I	Number	5,528	15		14,197	517	
	Level II	Number			1			
	Level III	Number					4	
Ownership	Water District	Number					3	
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number			1		1	
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number		5		115	57	
	Private (Domestic)	Number	5,528	10		14,082	460	
Abstraction	Submersible/Turbine	Number					4	
	Centrifugal	Number						
	Handpump	Number	5,528	15		14,197	517	
	Bucket & Rope	Number						
	Free Flowing	Number						
Usage	Drinking	Number	2,764	15	1	7,099	521	
	Washing/Bathing	Number						
	Gardening/Irrigation	Number						
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number						
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m ³ /day	Number	5,528	15		14,197	518	
	Average Capacity >= 100 m ³ /day	Number			1		3	
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Table 7.1.1 Water Sources Information

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)						Page: 3 of 7		
Content: Water Source - General Information						Date:		
Data Collection Level: Provincial			Province No.: 1163			Filename: Water Source.xls		
Region Number: X			Province Name: South Cotabato			Form Number: P.4.1		
	Name of Municipalities	Character	Lake Sebu			Norala		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	61	5	22	4,408	9	7
Implementor	Government Agency	Number	32	5	10	30	2	7
	Private	Number	29		12	4,378	7	
Level	Level I	Number	61	5	10	4,408	8	7
	Level II	Number			12		1	
	Level III	Number						
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number					1	
	BWSA	Number						
	Institution	Number			12			
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number	32	5	10	30	2	7
	Private (Domestic)	Number	29			4,378	6	
Abstraction	Submersible/Turbine	Number					1	
	Centrifugal	Number						
	Handpump	Number	61	5		4,408	8	
	Bucket & Rope	Number						
	Free Flowing	Number						
Usage	Drinking	Number	31	5	22	2,204	9	7
	Washing/Bathing	Number						
	Gardening/Irrigation	Number						
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number						
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m ³ /day	Number	61	5	12	4,408	8	7
	Average Capacity >= 100 m ³ /day	Number			10		1	
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Table 7.1.1 Water Sources Information

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)							Page: 4 of 7	
Content: Water Source - General Information							Date:	
Data Collection Level: Provincial			Province No.: 1163			Filename: Water Source.xls		
Region Number: X			Province Name: South Cotabato			Form Number: P.4.1		
	Name of Municipalities	Character	Polomolok			Santo Nino		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	560	81	5	581	43	
Implementor	Government Agency	Number	90	30		47	30	
	Private	Number	470	51	5	534	13	
Level	Level I	Number	560	68		581	41	
	Level II	Number		5	4		2	
	Level III	Number		8	1			
Ownership	Water District	Number		6				
	MEO/CEO	Number						
	RWSA	Number		5	4		2	
	BWSA	Number						
	Institution	Number		2	1			
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number	90	30		47	30	
	Private (Domestic)	Number	470	38		534	11	
Abstraction	Submersible/Turbine	Number		13			2	
	Centrifugal	Number						
	Handpump	Number	560	68		581	41	
	Bucket & Rope	Number						
	Free Flowing	Number						
Usage	Drinking	Number	280	81	5	291	43	
	Washing/Bathing	Number						
	Gardening/Irrigation	Number						
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number						
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m ³ /day	Number	560	70	3	581	41	
	Average Capacity ≥ 100 m ³ /day	Number		11	2		2	
	Number of Household < 5	Number						
	Number of Household ≥ 5	Number						

Table 7.1.1 Water Sources Information

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)						Page: 5 of 7		
Content: Water Source - General Information						Date:		
Data Collection Level: Provincial			Province No.: 1163			Filename: Water Source.xls		
Region Number: X			Province Name: South Cotabato			Form Number: P.4.1		
	Name of Municipalities	Character	Surallah			Tboli		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	5,328	108	6		5	17
Imple- mentor	Government Agency	Number	141	92	1		4	9
	Private	Number	5,187	16	5		1	8
Level	Level I	Number	5,328	103	1		4	9
	Level II	Number		5	5			7
	Level III	Number					1	1
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number		1				
	BWSA	Number		1				
	Institution	Number		3	5		1	8
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number	141	92	1		4	9
Private (Domestic)	Number	5,187	11					
Abstraction	Submersible/Turbine	Number		5			1	
	Centrifugal	Number						
	Handpump	Number	5,328	103			4	
	Bucket & Rope	Number						
	Free Flowing	Number						
Usage	Drinking	Number	2,664	108	6		5	17
	Washing/Bathing	Number						
	Gardening/Irrigation	Number						
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number						
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m ³ /day	Number	5,328	104	4		4	9
	Average Capacity >= 100 m ³ /day	Number		4	2		1	8
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Table 7.1.1 Water Sources Information

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)							Page: 6 of 7	
Content: Water Source - General Information						Date:		
Data Collection Level: Provincial			Province No.: 1163		Filename: Water Source.xls			
Region Number: X			Province Name: South Cotabato			Form Number: P.4.1		
	Name of Municipalities	Character	Tampakan			Tantangan		
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	575	46	21	2,694	20	6
Imple- mentor	Government Agency	Number		46	11	136	17	3
	Private	Number	575		10	2,558	3	3
Level	Level I	Number	575	46	11	2,694	19	3
	Level II	Number			10		1	3
	Level III	Number						
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number			10			
	BWSA	Number						
	Institution	Number					1	3
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number		46	11	136	17	3
Private (Domestic)	Number	575			2,558	2		
Abstraction	Submersible/Turbine	Number					1	
	Centrifugal	Number						
	Handpump	Number	575	46		2,694	19	
	Bucket & Rope	Number						
	Free Flowing	Number						
Usage	Drinking	Number	288	46	21	1,347	20	6
	Washing/Bathing	Number						
	Gardening/Irrigation	Number						
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number						
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m ³ /day	Number	575	46	13	2,694	19	3
	Average Capacity ≥ 100 m ³ /day	Number			8		1	3
	Number of Household < 5	Number						
	Number of Household ≥ 5	Number						

Table 7.1.1 Water Sources Information

Provincial Water Supply, Sewerage And Sanitation Sector Plan (PW4SP)						Page: 7 of 7		
Content: Water Source - General Information						Date:		
Data Collection Level: Provincial			Province No.: 1163			Filename: Water Source.xls		
Region Number: X			Province Name: South Cotabato			Form Number: P.4.1		
	Name of Municipalities	Character	Tupi					
	Type of Water Source	Number	Shallow Well	Deep Well	Spring	Shallow Well	Deep Well	Spring
	Total number of water sources	Number	1,184	41	15			
Implementor	Government Agency	Number		41	4			
	Private	Number	1,184		11			
Level	Level I	Number	1,184	41	4			
	Level II	Number			10			
	Level III	Number			1			
Ownership	Water District	Number						
	MEO/CEO	Number						
	RWSA	Number						
	BWSA	Number						
	Institution	Number			11			
	Commercial Establishment	Number						
	Industrial/Agricultural Undertaking	Number						
	Public (Domestic)	Number		41	4			
Private (Domestic)	Number	1,184						
Abstraction	Submersible/Turbine	Number						
	Centrifugal	Number						
	Handpump	Number	1,184	41				
	Bucket & Rope	Number						
	Free Flowing	Number						
Usage	Drinking	Number	592	41	15			
	Washing/Bathing	Number						
	Gardening/Irrigation	Number						
	Big-Scale Irrigation	Number						
	Production	Number						
Water Quality	No Quality Problem	Number						
	High Iron/Manganese Content	Number						
	High Chloride Content	Number						
	Turbidity/Colored/Smell	Number						
	Polluted/Contaminated	Number						
	Chlorinated	Number						
	Treated	Number						
Production	Seasonal Production	Number						
	Average Capacity < 100 m ³ /day	Number	1,184	41	5			
	Average Capacity >= 100 m ³ /day	Number			10			
	Number of Household < 5	Number						
	Number of Household >= 5	Number						

Table 7.1.2 Major References

Report/Information	Agency/Author	Contents	Reference Data/Description	Output
1. Topographic Map (1:250,000)	NAMRIA	political boundary, topographic contour, river, road, etc.	major river basins & road	Location Map (Base Map of the Province)
2. Rapid Assessment of Water Supply Sources	NWRB	groundwater availability, well inventory	well depth, static water level, specific capacity, etc.	Groundwater Availability Map
3. Individual Well Information Database	NWRB	location & well inventory	location with well depths & water levels	Individual Well Location Map
4. Groundwater Resources Investigation	NWRB	groundwater potential	high yielding and water quality problem areas	Groundwater Availability Map
5. Geological Map of the Philippines	BMGS	lithologic distribution and structures	aquifers distribution	Groundwater Availability Map
6. Philippine Water Resources Summary Data	NWRB	location map & runoff records	runoff record & statistical data	River Flow Duration Curve & Probability of Surface Water
7. Road Network Map of the Province	PPDC	major road & municipality boundaries	municipal boundaries	Distribution Map of Urban & Rural Areas
8. Feasibility Study Reports of the Water Districts	LWUA	well field information	groundwater potential & quality	Groundwater Availability Map
9. Water Quality Analysis Result	Water Districts	water quality results	water sources quality	Groundwater Availability Map & Groundwater Quality
10. Water Quality Analysis Result	PHO, PSPT	water quality results	water sources quality	Groundwater Availability Map & Water Sources Quality
11. Assessment of the Mineral Production	DENR	location, activity of the mining sites	location & activity of the mining sites	River Network Map
12. General Information of Groundwater	DEO, PSPT	groundwater availability	low yielding and water quality problem area	Groundwater Availability Map
13. Well Inventory	DEO, PSPT	location and well information	well depth, static water level, specific capacity, etc.	Existing Well Inventory
14. Spring Inventory	DEO, PSPT	location and spring information	discharge, distance & elevation	Water Sources Information
15. Pumping Test Data	DEO	pumping test results	well capacity	Groundwater Availability Map

7.3 Groundwater Sources

7.3.1 Classification of Groundwater Availability

Table 7.3.1 Well Inventory by Municipality

Municipality	Barangay	Utilization	Type	Depth (m)	SWL (mbgs)	Spe. Cap. (lpsm)
BANGA	Cabudian	Level-I	DW	32.1	5.0	0.0
BANGA	Cabudian	Level-I	SW	18.7	3.0	0.0
BANGA	Cabuling	Level-I	DW	25.2	3.0	0.0
BANGA	Cabuling	Level-I	SW	13.1	3.0	0.0
BANGA	Cinco	Level-I	DW	31.2	5.0	0.0
BANGA	Cinco	Level-I	SW	18.3	3.0	0.0
BANGA	El Nonok	Level-I	DW	21.2	3.0	0.0
BANGA	El Nonok	Level-I	SW	15.0	3.0	0.0
BANGA	Kusan	Level-I	DW	24.4	3.0	0.0
BANGA	Kusan	Level-I	SW	15.3	3.0	0.0
BANGA	Lam-Apos	Level-I	DW	23.4	5.0	0.0
BANGA	Lam-Apos	Level-I	SW	18.2	3.0	0.0
BANGA	Lambingi	Level-I	DW	27.4	5.0	0.0
BANGA	Lambingi	Level-I	SW	17.4	3.0	0.0
BANGA	Lampari	Level-I	DW	23.2	3.0	0.0
BANGA	Lampari	Level-I	SW	15.4	3.0	0.0
BANGA	Liwanay	Level-I	DW	32.7	5.0	0.0
BANGA	Liwanay	Level-I	SW	12.7	3.0	0.0
BANGA	Malaya	Level-I	DW	24.4	3.0	0.0
BANGA	Malaya	Level-I	SW	12.6	3.0	0.0
BANGA	Pob. Benitez	Level-I	DW	30.4	5.0	0.0
BANGA	Pob. Benitez	Level-I	SW	18.2	3.0	0.0
BANGA	Pob. Improgo Village	Level-I	DW	32.6	5.0	0.0
BANGA	Pob. Improgo Village	Level-I	SW	17.6	3.0	0.0
BANGA	Pob. Reyes	Level-I	DW	30.5	5.0	0.0
BANGA	Pob. Reyes	Level-I	SW	16.5	3.0	0.0
BANGA	Pob. Rizal	Level-I	DW	28.3	3.0	0.0
BANGA	Pob. Rizal	Level-I	SW	16.7	3.0	0.0
BANGA	Punong Grande	Level-I	DW	31.3	5.0	0.0
BANGA	Punong Grande	Level-I	SW	16.2	3.0	0.0
BANGA	Rang-ay	Level-I	DW	36.6	5.0	0.0
BANGA	Rang-ay	Level-I	SW	18.6	3.0	0.0
BANGA	Rizal	Level-I	DW	30.5	5.0	0.0
BANGA	Rizal	Level-I	SW	17.3	3.0	0.0
BANGA	San Jose	Level-I	DW	35.3	5.0	0.0
BANGA	San Jose	Level-I	SW	19.6	3.0	0.0
BANGA	San Vicente	Level-I	DW	37.7	5.0	0.0
BANGA	San Vicente	Level-I	SW	13.5	3.0	0.0
KORONADAL	Cacub	Level-I	DW	28.0	3.0	0.0
KORONADAL	Cacub	Level-I	SW	15.3	3.0	0.0
KORONADAL	Caloocan	Level-I	DW	34.0	3.0	0.0
KORONADAL	Caloocan	Level-I	SW	13.5	3.0	0.0
KORONADAL	Carpenter Hill	Level-I	DW	28.0	3.0	0.0
KORONADAL	Carpenter Hill	Level-I	SW	17.8	3.0	0.0
KORONADAL	Concepcion	Level-I	DW	32.0	3.0	0.0
KORONADAL	Concepcion	Level-I	SW	16.3	3.0	0.0

Table 7.3.1 Well Inventory by Municipality

Municipality	Barangay	Utilization	Type	Depth (m)	SWL (mbgs)	Spe. Cap. (lpsm)
KORONADAL	Esperanza	Level-III	DW	51.8	13.7	0.0
KORONADAL	Esperanza	Level-I	SW	13.2	3.0	0.0
KORONADAL	Gen. Paulino Santos	Level-I	DW	32.0	5.0	0.0
KORONADAL	Gen. Paulino Santos	Level-I	SW	15.8	3.0	0.0
KORONADAL	Mabini	Level-I	DW	22.0	3.0	0.0
KORONADAL	Mabini	Level-I	SW	15.7	3.0	0.0
KORONADAL	Magsaysay	Level-I	DW	36.0	3.0	0.0
KORONADAL	Magsaysay	Level-I	SW	19.8	3.0	0.0
KORONADAL	Mambucal	Level-I	DW	50.0	5.0	0.0
KORONADAL	Mambucal	Level-I	SW	19.3	3.0	0.0
KORONADAL	Morales	Level-I	DW	27.0	3.0	0.0
KORONADAL	Morales	Level-I	SW	12.8	3.0	0.0
KORONADAL	Namnama	Level-I	DW	34.0	3.0	0.0
KORONADAL	Namnama	Level-I	SW	18.7	3.0	0.0
KORONADAL	New Pangasinan	Level-I	DW	36.0	3.0	0.0
KORONADAL	New Pangasinan	Level-I	SW	15.8	3.0	0.0
KORONADAL	Paraiso	Level-I	DW	78.0	5.0	0.0
KORONADAL	Paraiso	Level-I	SW	19.8	5.0	0.0
KORONADAL	Pob. Zone I	Level-I	DW	30.0	3.0	0.0
KORONADAL	Pob. Zone I	Level-I	SW	14.8	3.0	0.0
KORONADAL	Pob. Zone II	Level-I	DW	32.0	3.0	0.0
KORONADAL	Pob. Zone II	Level-I	SW	15.7	3.0	0.0
KORONADAL	Pob. Zone III	Level-I	DW	34.0	3.0	0.0
KORONADAL	Pob. Zone III	Level-I	SW	15.2	3.0	0.0
KORONADAL	Pob. Zone IV	Level-I	DW	33.0	3.0	0.0
KORONADAL	Pob. Zone IV	Level-I	SW	14.6	3.0	0.0
KORONADAL	Rotonda	Level-I	DW	32.0	3.0	0.0
KORONADAL	Rotonda	Level-I	SW	14.5	3.0	0.0
KORONADAL	San Isidro	Level-I	DW	36.0	5.0	0.0
KORONADAL	San Isidro	Level-I	SW	15.2	3.0	0.0
KORONADAL	San Jose	Level-I	DW	26.0	3.0	0.0
KORONADAL	San Jose	Level-I	SW	10.3	3.0	0.0
KORONADAL	San Roque	Level-I	DW	32.0	3.0	0.0
KORONADAL	San Roque	Level-I	SW	12.6	3.0	0.0
KORONADAL	Santa Cruz	Level-I	DW	34.0	5.0	0.0
KORONADAL	Santa Cruz	Level-I	SW	14.3	3.0	0.0
KORONADAL	Santo Niño	Level-I	DW	30.0	3.0	0.0
KORONADAL	Santo Niño	Level-I	SW	12.2	3.0	0.0
KORONADAL	Sarabia	Level-I	DW	33.0	3.0	0.0
KORONADAL	Sarabia	Level-I	SW	16.9	3.0	0.0
KORONADAL	Zulueta	Level-I	DW	62.0	6.1	0.0
KORONADAL	Zulueta	Level-I	SW	18.3	3.0	0.0
LAKE SEBU	Poblacion	Level-III	DW	62.0	0.0	0.0
NORALA	Benigno Aquino, Jr.	Level-I	SW	14.4	3.0	0.0
NORALA	Dumaguil	Level-I	SW	15.7	3.0	0.0
NORALA	Esperanza	Level-I	SW	18.7	3.0	0.0

Table 7.3.1 Well Inventory by Municipality

Municipality	Barangay	Utilization	Type	Depth (m)	SWL (mbgs)	Spe. Cap. (lpsm)
NORALA	Kibid	Level-I	SW	17.3	3.0	0.0
NORALA	Lapuz	Level-I	SW	15.2	3.0	0.0
NORALA	Liberty	Level-I	SW	15.0	3.0	0.0
NORALA	Lopez Jaena	Level-I	DW	55.0	10.0	0.0
NORALA	Lopez Jaena	Level-I	SW	13.0	3.0	0.0
NORALA	Matapol	Level-I	SW	12.3	3.0	0.0
NORALA	Poblacion	Level-III	DW	36.3	5.0	0.0
NORALA	Poblacion	Level-I	SW	12.5	3.0	0.0
NORALA	Puti	Level-II	DW	55.0	5.0	0.0
NORALA	Puti	Level-I	SW	15.2	3.0	0.0
NORALA	San Jose	Level-I	DW	67.0	10.0	0.0
NORALA	San Jose	Level-I	SW	14.2	3.0	0.0
NORALA	San Miguel	Level-I	SW	12.7	3.0	0.0
NORALA	Simsiman	Level-I	DW	55.0	10.0	0.0
NORALA	Simsiman	Level-I	SW	12.2	3.0	0.0
NORALA	Tinago	Level-I	DW	67.0	15.0	0.0
NORALA	Tinago	Level-I	SW	14.6	3.0	0.0
POLOMOLOK	Bentung	Level-II	DW	58.7	38.6	0.0
POLOMOLOK	Glamang	Level-III	DW	150.0	114.6	0.0
POLOMOLOK	Klinan 6	Level-III	DW	67.1	54.9	0.0
POLOMOLOK	Koronadal Proper	Level-II	DW	60.9	41.5	0.0
POLOMOLOK	Lumakil	Level-I	DW	67.0	0.0	0.0
POLOMOLOK	Pagalungan*	Level-I	DW	55.0	10.0	0.0
POLOMOLOK	Palkan	Level-III	DW	67.1	54.9	0.0
POLOMOLOK	Poblacion	Level-I	DW	45.3	5.0	0.0
POLOMOLOK	Polo	Level-III	DW	149.0	77.4	0.0
POLOMOLOK	Silway 7	Level-II	DW	54.9	37.6	0.0
POLOMOLOK	Silway 8	Level-I	DW	48.8	2.5	0.0
POLOMOLOK	Sulit	Level-I	DW	48.8	2.0	0.0
SANTO NIÑO	Ambalgan	Level-I	SW	10.2	3.0	0.0
SANTO NIÑO	Guinsang-an	Level-I	SW	8.3	3.0	0.0
SANTO NIÑO	Katipunan	Level-I	DW	79.0	10.0	0.0
SANTO NIÑO	Manuel Roxas	Level-II	DW	48.4	2.6	0.0
SANTO NIÑO	Manuel Roxas	Level-I	SW	12.3	3.0	0.0
SANTO NIÑO	Panay	Level-II	DW	48.8	2.5	0.0
SANTO NIÑO	Panay	Level-I	SW	14.3	3.0	0.0
SANTO NIÑO	Poblacion	Level-II	DW	36.6	9.1	0.0
SANTO NIÑO	Poblacion	Level-I	SW	8.1	3.0	0.0
SANTO NIÑO	Sajaneba	Level-I	SW	9.8	3.0	0.0
SANTO NIÑO	San Isidro	Level-I	SW	12.0	3.0	0.0
SANTO NIÑO	San Vicente	Level-I	DW	85.0	15.0	0.0
SANTO NIÑO	San Vicente	Level-I	SW	10.2	3.0	0.0
SANTO NIÑO	Teresita	Level-I	DW	67.0	8.0	0.0
SANTO NIÑO	Teresita	Level-I	SW	10.2	3.0	0.0
SURALLAH	Buenavista	Level-II	DW	50.9	31.0	0.0
SURALLAH	Canahay	Level-I	DW	36.0	5.0	0.0

Table 7.3.1 Well Inventory by Municipality

Municipality	Barangay	Utilization	Type	Depth (m)	SWL (mbgs)	Spe. Cap. (lpsm)
SURALLAH	Centrala	Level-I	DW	30.5	5.0	0.0
SURALLAH	Colongulo	Level-I	DW	36.0	5.0	0.0
SURALLAH	Dajay	Level-I	DW	24.4	5.0	0.0
SURALLAH	Dajay	Level-I	SW	19.2	0.0	0.0
SURALLAH	Duengas	Level-I	DW	54.0	5.0	0.0
SURALLAH	Lambontong	Level-III	DW	78.4	57.4	0.0
SURALLAH	Lamian	Level-I	DW	54.7	5.0	0.0
SURALLAH	Lamsugod	Level-II	DW	61.0	5.0	0.0
SURALLAH	Little Baguio	Level-I	DW	54.7	5.0	0.0
SURALLAH	Naci	Level-I	DW	72.6	5.0	0.0
SURALLAH	Pob. Libertad	Level-III	DW	45.7	4.6	0.0
SURALLAH	Talahik	Level-I	DW	24.4	5.0	0.0
SURALLAH	Tubiala	Level-II	DW	75.4	45.6	0.0
SURALLAH	Veterans	Level-II	DW	73.0	54.9	0.0
SURALLAH	Veterans	Level-I	SW	18.5	0.0	0.0
TAMPAKAN	Buto	Level-I	DW	38.7	5.0	0.0
TAMPAKAN	Buto	Level-I	SW	17.3	3.0	0.0
TAMPAKAN	Kipalbig	Level-I	DW	37.3	5.0	0.0
TAMPAKAN	Kipalbig	Level-I	SW	19.2	3.0	0.0
TAMPAKAN	Lambayong	Level-I	DW	51.8	5.0	0.0
TAMPAKAN	Maltana	Level-I	DW	35.6	5.0	0.0
TAMPAKAN	Maltana	Level-I	SW	18.2	3.0	0.0
TAMPAKAN	Poblacion	Level-II	DW	53.3	32.5	0.0
TAMPAKAN	San Isidro	Level-II	DW	51.8	41.5	0.0
TAMPAKAN	San Isidro	Level-I	SW	19.8	3.0	0.0
TANTANGAN	Bukay Pait	Level-I	DW	26.1	3.0	0.0
TANTANGAN	Bukay Pait	Level-I	SW	14.7	3.0	0.0
TANTANGAN	Cabuling	Level-I	DW	28.6	3.0	0.0
TANTANGAN	Cabuling	Level-I	SW	13.8	3.0	0.0
TANTANGAN	Dumadalig	Level-I	DW	48.2	5.0	0.0
TANTANGAN	Dumadalig	Level-I	SW	18.2	3.0	0.0
TANTANGAN	Libas	Level-I	DW	30.3	5.0	0.0
TANTANGAN	Libas	Level-I	SW	12.2	3.0	0.0
TANTANGAN	Magon	Level-I	DW	35.2	5.0	0.0
TANTANGAN	Magon	Level-I	SW	18.2	3.0	0.0
TANTANGAN	Mangilala	Level-I	DW	26.3	3.0	0.0
TANTANGAN	Mangilala	Level-I	SW	15.9	3.0	0.0
TANTANGAN	New Cuyapo	Level-III	DW	62.0	10.7	0.0
TANTANGAN	New Cuyapo	Level-I	SW	19.7	3.0	0.0
TANTANGAN	New Iloilo	Level-I	DW	34.7	5.0	0.0
TANTANGAN	New Iloilo	Level-I	SW	19.2	3.0	0.0
TANTANGAN	New Lambunao	Level-I	DW	36.2	5.0	0.0
TANTANGAN	New Lambunao	Level-I	SW	15.7	3.0	0.0
TANTANGAN	Poblacion	Level-I	DW	54.6	5.0	0.0
TANTANGAN	Poblacion	Level-I	SW	15.2	3.0	0.0
TANTANGAN	San Felipe	Level-I	DW	36.3	5.0	0.0

Table 7.3.1 Well Inventory by Municipality

Municipality	Barangay	Utilization	Type	Depth (m)	SWL (mbgs)	Spe. Cap. (lpsm)
TANTANGAN	San Felipe	Level-I	SW	14.5	3.0	0.0
TANTANGAN	Tinongcop	Level-I	SW	18.2	3.0	0.0
T'BOLI	New Dumangas	Level-I	DW	75.3	5.0	0.0
T'BOLI	Pob. Edwards	Level-III	DW	61.0	45.6	0.0
TUPI	Acmonan	Level-I	DW	84.7	5.0	0.0
TUPI	Acmonan	Level-I	SW	18.7	3.0	0.0
TUPI	Bololmala	Level-I	DW	82.7	5.0	0.0
TUPI	Bololmala	Level-I	SW	18.7	3.0	0.0
TUPI	Bunao	Level-I	DW	80.2	5.0	0.0
TUPI	Bunao	Level-I	SW	18.2	3.0	0.0
TUPI	Cebuano	Level-II	DW	65.7	0.0	0.0
TUPI	Crossing Rubber	Level-I	DW	91.4	5.0	0.0
TUPI	Crossing Rubber	Level-I	SW	19.8	3.0	0.0
TUPI	Kablon	Level-III	DW	82.3	51.8	0.0
TUPI	Kablon	Level-I	SW	19.1	3.0	0.0
TUPI	Kalkam	Level-I	DW	75.7	5.0	0.0
TUPI	Kalkam	Level-I	SW	18.3	3.0	0.0
TUPI	Linan	Level-I	DW	80.2	5.0	0.0
TUPI	Linan	Level-I	SW	19.9	3.0	0.0
TUPI	Lunen	Level-I	SW	18.8	3.0	0.0
TUPI	Palian	Level-I	DW	60.3	5.0	0.0
TUPI	Palian	Level-I	SW	17.5	3.0	0.0
TUPI	Polonuling	Level-I	DW	56.2	5.0	0.0
TUPI	Polonuling	Level-I	SW	19.0	3.0	0.0

7.3.3 Groundwater Quality

Table 7.3.2 Groundwater Quality

No.	Municipality	Type	Bacterio.		Physical Analysis				Chemical Analysis				Major Cations				Major Anions				Trace Ele.			
			Coli. Cnt.	Bact. Cnt.	T	NTU	TCU	Odor	TDS mg/l	EC mmhc	pH	TH mg/l	Alka. mg/l	Acid. mg/l	Na mg/l	K mg/l	Ca mg/l	Mg mg/l	CO3 mg/l	HCO3 mg/l	Cl mg/l	SO4 mg/l	Fe mg/l	Mn mg/l
Philippine National Standard for Drinking Water -1994-																								
1	Banga	DW	-	-	-	26	92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.2
2	Banga	SW	300	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.2
3	Koronadal	DW	-	-	-	0	7	-	-	-	7.4	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
4	Koronadal	SW	30	-	-	12	100	-	-	-	7.0	-	-	-	-	-	-	-	-	-	-	-	0.4	0.3
5	Lake Sebu	DW	-	-	-	1	17	-	-	-	7.4	-	-	-	-	-	-	-	-	-	-	-	0.1	0.3
6	Lake Sebu	SP	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	Lake Sebu	SW	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.2
8	Norala	DW	-	-	-	39	357	-	-	-	7.2	-	-	-	-	-	-	-	-	-	-	-	0.4	0.3
9	Norala	SW	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Polomolok	DW	-	-	-	1	24	-	-	-	6.7	-	-	-	-	-	-	-	-	-	-	-	0.4	0.3
11	Polomolok	SP	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
12	Polomolok	SW	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Santo Nino	DW	-	-	-	39	0	-	-	-	7.2	-	-	-	-	-	-	-	-	-	-	-	0.4	0.3
14	Santo Nino	SW	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.3
15	Suralla	DW	-	-	-	6	90	-	-	-	7.3	-	-	-	-	-	-	-	-	-	-	-	0.4	0.1
16	Suralla	SW	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.2
17	Tampakan	DW	-	-	-	3	40	-	-	-	7.2	-	-	-	-	-	-	-	-	-	-	-	0.4	0.3
18	Tampakan	SW	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.3
19	Tantangan	DW	30	-	-	4	26	-	-	-	6.2	-	-	-	-	-	-	-	-	-	-	-	0.4	0.3
20	Tantangan	SP	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	Tantangan	SW	30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3
22	Tboli	DW	-	-	-	0	36	-	-	-	7.2	-	-	-	-	-	-	-	-	-	-	-	0.3	0.1
23	Tboli	SW	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.1
24	Tupi	DW	-	-	-	1	23	-	-	-	6.6	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1
25	Tupi	SP	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	Tupi	SW	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.1

Source; Water quality results were collected from respective Water Districts or analyzed by PSPT on site in the field survey using procured instruments.

Notes; Sampling point is located at handpump (L-I) or submersible pump (L-II/III).

7.5 Surface Water Sources

Table 7.5.1 Surface Water Quality

Surface Water Information				Parameter												PNSDW 1994				Surface Water Pollutants
Major Surface Water	Systems & Main	Location	Sampling Date (m/d/y)	Color TCU	pH	DO _{xy} mg/l	BOD mg/l	SS mg/l	TDS mg/l	MBAS mg/l	O/G mg/l	N mg/l	P mg/l	Coli. MPN/100ml	Cl mg/l	Cu mg/l	Tur. NTU	Fe mg/l	Mn mg/l	
DENR Water Quality Criteria for Fresh Water				15	6.5-8.5	70	1	25	500	nil	nil	1	nil	50	250	1	5	1	0.5	in upstream
Silway				50	6.5-8.5	70	5	50	1,000	0.2	1	10	0.1	1,000	250	1				
Mindanao	Allah	Tboli																		
		Polomolok		307	8.3									TNTC			35.4	0.4	0.2	
		General Santos																		
		Lake Sebu												30						
		Surallah		377	8.2									TNTC			38.0	0.4	0.3	
	Banaga	Santo Nino																		
		Norala																		
		Lake Sebu																		Mining
		Tboli																		
		(Lake Maughan)																		Crater Lake
Palanan	Bulan	Surallah		400	8.4												37.3	0.4	0.3	
		Banga																		
		Santo Nino																		
		Norala																		
		Tboli																		
	Tantangan	Polomolok																		
		Tupi		237	8.5												37.0	0.4	0.2	
		Koronadal																		
		Tupi																		
		Tampakan		236	7.8												34.7	0.4	0.3	Mining

Source: Water quality results were collected from respective Water Districts or analyzed by PSPT on site in the field survey using procured instruments.

Notes: Sampling point is located at upstream boundary of each river in respective municipalities.

If several streams are present in an area, the stream nearest from populated area was selected.

If there is no upstream, sampling point was selected near populated area.

Sampling point at Lake Maughan is located at drainage point to Banga River.

Remarks: Class AA - Public Water Supply Class-I.

Intended for waters having watersheds which are uninhabited and otherwise protected and which require only approved disinfection in order to meet the PNSDW.

Class A - Public Water Supply Class-II.

Sources of water supply that will require complete treatment (coagulation, sedimentation, filtration & disinfection) in order to meet the PNSDW.

7.6 Future Development Potential of Water Sources

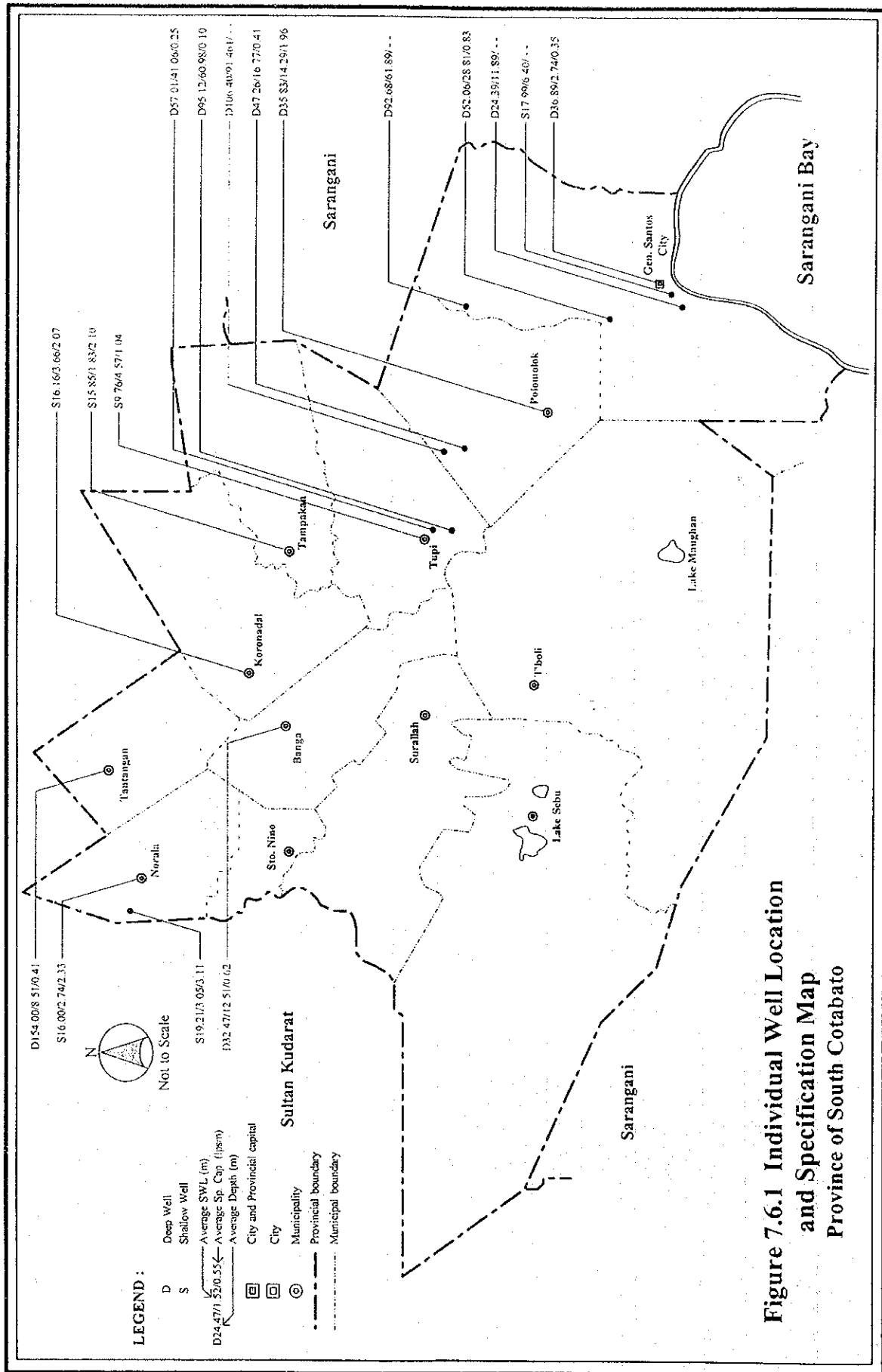


Figure 7.6.1 Individual Well Location and Specification Map Province of South Cotabato





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