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1.1 **Introduction**

Our Lady of Lourdes Secondary School is a Catholic Mission Secondary School found in Bamenda Town. The present student population of 576 are boarders and girls only.

The school run its own independent water supply scheme. The school has been suffering from water shortages during the dry season. Attempts to have the school connected to the network of the national water corporation have not been technically successful. A pumping system failed shortly after it was connected.

The Principal of the school therefore mandated Integrated Engineering Associates to study the possibility of overcoming this water problem.

1.2 Description of Present System

The present system is made up of one spring catchment, 1 collection chamber, 2 circular tanks, 1 well with an automatic electric pump, 1 water point and an old rectangular tank. The rectangular tank is earmarked for demolition.

The spring catchment is the principal source for water, but the yield reduces drastically during the dry season. Water from the well is pumped up into the tanks to supplement the yield of the spring source. Water is still, however rationed as the supply does not meet with the normal demand.

The spring catchment is unprotected and human activities have dangerously encroached into the immediate (50m radius) and extended (1900m radius) catchment areas. This explains the diminishing yield of the spring source.

The system is managed by the school authority, and specifically the school technician is in charge of all technical matters.

1.3 Reasons for the project

Supply is less than demand for the present student population during the dry season

The school has requested for a study that will meet the water needs of a population of 1000.

The national water corporation has not been able to connect the school to its network.

The cost of water from the national water corporation is much.

1.4 Expected benefits

The school will have sufficient water for its present and future needs

The school will have safe water.

The school will enjoy long term cost benefits.

There will be a further improvement in hygiene and sanitation.

1.5 Management of the water supply.

The school authority is responsible for the management of the system. Operation and routine maintenance is done by the school technician.

CHAPTER 2

2.1 Field Operations

Following the request made to IEA and after discussions with the principal, a technical team was dispatched to the field to assess the present system and to collect data for the compilation of the feasibility study. During the months of march and April 2004 six potential sources were visited, i.e., four springs and two streams.

During the visit informal interviews were held with individuals acquainted to the different sources.

Layout data was collected with a GPS instrument and a line diagram of the situation plotted.

The two streams inspected are flowing well but turned out to be tributaries of the stream leading to the Mbatu dam, where the national water corporation is harnessing water for the town of Bamenda. They can therefore not be tampered with.

Yields at the spring sources measured in March 2004 were as follows

Ntahgana (water point adjacent to present spring sources	0.2l/s
Abangoh	0.3l/s
Mile 1 Upstation (Adjacent Symbol of Unity Express)	0.3l/s
Water point below well	0.2l/s

2.2 Technical Assessment of Springs

Ntahgang

Spring is surrounded by houses. Sanitary conditions are very poor. Yield may be influenced by intensive and continuing human activities. It is the

source for the totally dilapidated water point used by the surrounding population.

Abangoh

The catchment area is used as a source for the Abangoh Community Water Supply Project. The project has never really functioned properly ever since it was constructed. The New Apostolic Missionaries have also done some construction work to collect water from the catchment, which is also not functioning. The water of this catchment therefore has to be shared with the interest groups already active within this catchment area.

Most of the catchment area is covered with raffia though farming is already encroaching and there are some eucalyptus in the vicinity. Because of its isolated nature the catchment can potentially be well protected. Acquiring the catchment and implementing catchment protection measures is highly recommended.

Mile 1 Upstation

Good yielding spring. Sanitary conditions have deteriorated due to human activities resulting from the presence of the motor park. Catchment needs to be protected and water treated before use. Negotiations should be carried out with the land owners.

Water point below school well.

The yield is encouraging. The catchment however needs to be rehabilitated. The eucalyptus trees have to be replaced with traditional water bearing plants and the catchment area well protected. This will result in an increase of the yield which can be pumped up to the treatment station.

2.3 WATER NEEDS OF THE SCHOOL

Present population	576	
Daily consumption per boarding student	50	L/day
Designed population	1000	
Present demand	28800	L/day
Future Demand	50000	L/day
SPECIAL DEMAND NEEDS		
Present (Other school needs) – 576	5000	L
Future (other school needs) – 1000	10000	L
Total present daily demand	33800	L
Total future daily demand	60000	L

Present water needs 0.4L/s
Future water needs 0.7L/s

2.4 Proposed Structures

Item	Description	Quantity
1	Treatment station	1
2	Catchments	3
3	Collection chambers	2
4	Collection Tank with Pumping Station	1
5	Low points	2
6	High point	1
7	Break Pressure Tank	1
8	Stream crossings	4
9	Pipe line	4000m

2.5. Recommendations

The sources at Abangoh, Mile 1 upstation and the water point below the school well have the potentials to be harnessed.

The water has to be treated before consumption.

A detailed study has to be carried out to determine the exact technical specification of all the structures required.

Chapter 3

The project shall be implemented with the active involvement of the school authority which is the project initiator and owner.

3.2 Implementing Agency

the implement agency shall execute the works as shall be described in the project in strict respect of technical norms and any other terms of reference specified by the contracting authority. Technical details shall be spelt out in a detailed study.

3.3 Water Quality

The quality of water meant for human consumption has to be verified for the presence of harmful microbes and chemicals. This is usually done in an approved laboratory. The physical, biological and chemical analysis on raw water from the catchment shall determine the kind of treatment needed. Test to be carried out include:

Fecal coliform
Total Bacterial count

Turbidity
PH
Hardness
Conductivity and
Particulate analysis

Test samples shall also carried out at the following points: inlets of treatment station, outlet of treatment station, tank and consumption point.

3.4 Environment

It shall be ensured that environmental protection constitutes a factor for consideration during the implementation of the project. Execution shall be guided in such a way that no harm is done to the environment. Catchment protection measures shall constitute useful contribution to environmental protection and an enhancement of the yield.

3.5 Sanitation

Increasing human activities close to the catchments results in a deterioration of the sanitary conditions. Consequently the water must be treated before consumption. Catchment protection measures shall result in an improvement of the sanitary conditions.

3.6 Supervision.

The technical implementation of the project shall be supervised by a competent and experienced technical service of the eater sector selected by the contracting authority.

Bill of quantities Our Lady of Lourdes Secondary School water supply rehabilitation project

No	Description of water	Unit	Quantity	Unit cost	Total cost
1	Const. of Spring catchment with Sed. Tank	U	3	2,000,000	6,000,000
2	Site installation	LS	1	500,000	500,000
3	Construction of treatment station	U	1	6,500,000	6,500,000
4	Construction of valve chambers	U	2	200,000	400,000
5	Construction of collection chambers	U	2	500,000	1,000,000
6	Stream crossings	U	4	65,000	260,000

7	Washout valves with chambers	U	2	200,000	400,000
8	Constr. of air valves with chambers	U	1	200,000	200,000
9	Break Pressure Tank	U	1	550,000	550,000
10	Collection tank and pumping station for collection point below well	Ls	1	2,500,000	2,500,000
11	Laying of pipes and fittings	M	4,000	125	500,000
12	Purchase of pipes and fittings	Ls	1	4,800,000	4,800,000
13	Excavation and backfill of pipeline	M	4,000	400	1,600,000
14	Acquisition and Protection of catchment	Ls	1	5,000,000	5,000,000
	Sub – Total				30,210,000
15	Transportation % Cash 5				1,510,000
16	Studies and Supervision % Cash 10				3,021,000
	Total Amount				34,741,500