**SIDAMA ZONE WATER MINE AND ENERGY DEPARTMENT**

**HAMESHO KEBENA WATER SUPPLY PROJECT STUDY & DESIGN REPORT**

**NOV, 2018 G.C**

**HAWASSA**

TABEL OF Contents Page

[Executive summery 5](#_Toc531125355)

[1 INTRODUCTION 6](#_Toc531125356)

[1.1 General 6](#_Toc531125357)

[*1.2* *Back ground* 7](#_Toc531125358)

[1.2.1 Location and Accessibility 7](#_Toc531125359)

[1.2.2 Administration and population 7](#_Toc531125360)

[1.2.3 Socio- Economic Survey 7](#_Toc531125361)

[1.3 Goals of the project 8](#_Toc531125362)

[*1.4* *Objective of the project* 8](#_Toc531125363)

[2 Population Projection and Water Demand 8](#_Toc531125364)

[*2.1* *General* 8](#_Toc531125365)

[*2.2* *Design period* 9](#_Toc531125366)

[*2.3* *Base population and population projection* 9](#_Toc531125367)

[*2.4* *Population growth* 9](#_Toc531125368)

[*2.5* *Population projection* 9](#_Toc531125369)

[3 EXISTING WATER SUPPLIES CONDITION 10](#_Toc531125370)

[3.1 Demand Assessment 10](#_Toc531125371)

[4 DESIGN OF THE SYSTEM 11](#_Toc531125372)

[*4.1* *Water source requirement & Reservoir capacity* 11](#_Toc531125373)

[4.1.1 The Source is from Borehole at the Village 11](#_Toc531125374)

[4.1.2 11](#_Toc531125375)

[4.1.2 Reservoir capacity (R.c) 12](#_Toc531125376)

[5 PUMP 12](#_Toc531125377)

[5.1 General 12](#_Toc531125378)

[5.1.1 Pump capacity and power requirement 12](#_Toc531125379)

[5.2 Inputs and Output(Possible suggested solutions) 14](#_Toc531125380)

[5.2.1 Project Inputs 14](#_Toc531125381)

[5.2.2 Output(Possible Suggested Solutions) 14](#_Toc531125382)

[6 HYDRAULIC CALCULATION 16](#_Toc531125383)

[6.1. 16](#_Toc531125384)

[7. Drawings 20](#_Toc531125385)

LIST OF TABLES

[**Table 1 population projection (2010 - 2031)** 10](#_Toc531125386)

[Table 2 Population projection and water demand analysis in H/Kebena village 11](#_Toc531125387)

[**Table 3 water source requirement** 11](#_Toc531125388)

[Table 4 the work done by the pump and generator is calculated as follows. 13](#_Toc531125389)

[**Table 5 Hydraulic calculation of pressure main** 16](#_Toc531125390)

## Executive summery

This design report is about Hamesho Kebena kebele water supply and sanitation project, which is located in Sidama zone, Benssa woreda. consisting of distribution Line, pressure line, water points, 100m3 concrete Reservoir, Reservoir Valve chamber, electromechanical (pump & generator), generator and guard house, valve chamber for Network Road crossing and anchor blocks and trust blocks. The overall cost of this project is **8,202,460.96**Birr, including 15%VAT.

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# INTRODUCTION

## General

Water is one of the basic needs of life without it life cannot sustain. Ethiopia is endowed with good water potential and known to be the water tower of east Africa. However the need for potable water is not still scarified and the potential is not yet expected more over the sanitation any standard of the society is not developed. As result many people suffer from water born diseases.

The impact of this fact on the economic progress of the country is obvious for significant socio-economic development of the community an adequate supply of safe water is prerequisite.

A factor such as time and Energy saving in the collection of drinking water and a substation reduction in the incidence of deceases greatly contributes to development. Besides the time and energy loss by women in fetching water and be used to care for their children. Despite huge costs in incurs the development of water supply facilities is therefore of paramount importance and issue of priority to any community. Hamesho Kebena and the surounding community kebele are exposed to the problems mentioned above. To improve living standards and health condition of this town community preparing new water supply project proposal has been essential. So in this document the detailed study and design of the Hamesho Kebena kebele water supply with bill of quantities are included.

## *Back ground*

The intended drinking water source of the Hamesho Kebena kebele is from spring and river in the kebele. Previously the community has no hygienic supply of water at the nearby. They use simply seasonal springs, river water and from neighboring kebeles by traveling large distance.

### Location and Accessibility

The project area, Hamesho Kebena kebele,is located at about 20 km gravel road to Worancha Town. The geographic location of Hamesho Kebena kebele site lies in 476293 and 731322 the average Elevation of the kebele is 2263 m.a.s.l Hamesho Kebena kebele site is categories under “ Weyina dega” Climatic Zone.

### Administration and population

Hamesho Kebena kebele is established traditionally and it was not master plan based. As Hamesho Kebena kebele Administrative population and housing census currently the population of the village is 7254.

### Socio- Economic Survey

The major agricultural product of the area is coffee, Enset, maize, sugar cane and others. Hamesho Kebena kebele has 1 junior (1-8) school, Protestant churches, and there are different religions catholic, orthodox also the ethnic groups are composed of mainly Sidama.

## 

## Goals of the project

Overall objective of this project would be:

* Establishment of sustainable Environmental service for people in water supply, sanitation and hygiene’s promotion thought its design period.
* Increasing Environment impact of ruler community in village including marginalized groups in decision making and management of water supply and sanitation services.

## *Objective of the project*

The objective of this project is to supply potable water for community living in Hamesho Kebena and the surounding kebeles. This ensures a sustainable improvement in health condition.

To produce appropriate design of water supply system for the selected source & related structures.

# Population Projection and Water Demand

## *General*

A water supply scheme includes huge and costly structures which are difficult to replaced or increased in their capacities easily and conveniently. Hence all scenarios affecting the water supply system should have to thoroughly access before the system designed. One of the scenarios that have great impact on estimating the water demand of a particular project is the projection of the population sizes. Hence the planning of any water supply system has to base on forecast of population size, population growth rate and distribution.

## *Design period*

As of WHO recommendation and as large water supply projects in Ethiopia 20-25 years of a design period is provided for all design consideration. We take 20 years for design purpose.

## *Base population and population projection*

The use of reliable base population figure is very important for optimizing the project costs and sustaining the projects services. Here over and under estimation of the populations result in a higher investment cost and a lower service run period respectively. Hence it’s very important to initially get realistic base population figures not to come with the above mentioned problems.

## *Population growth*

The water supply system not has to be designed for the current resident requesting, but also for the future population, it will inevitably serve during the design period. According to CSA the rural population has an average of 3% growth rate of population increment.

## *Population projection*

For rural Keble’s like Hamesho Kebena kebele the population forecasting method selected is Geometric progration.

According to Hamesho Kebena kebele Administration the population of Hamesho Kebena kebele in 2010E.C is about 7254.

Population forecasting for the design period

P1=Po (1+r) n, Growth rate 3%

**Table 1 population projection (2010 - 2031)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Description | Growth  rate per year  (%) |  | | | | | |
|  |  | 2010 | 2011 | 2016 | 2021 | 2026 | 2031 |
| Population projection | 3 | 7254 | 7472 | 8662 | 10041 | 11641 | 13495 |

# EXISTING WATER SUPPLIES CONDITION

There is shortage of water in project site from actual production figure and the actual population figures obtained that the population provides with an average supply of less than 25 l/c/day. Hamesho Kebena kebele community gets water from shallow wells; hand dug well, Rivers and small bays in rainy season. Also mostly this water is poor quality of hygiene infected by bacteria.

## Demand Assessment

In the design of any water supply project it is necessary to estimate the amount of water that is required to supply.

This involves determine the number of people to serve and their percapita water consumption along with analysis of the factors that may operate to affect consumption. The total water demand of the village calculated by considering the water requirement for public and domestic usage of water expected in the village. Analysis of water demand in the studied area is 25 l/c/d water demand analysis is done, based on per capita water demand.

Table Population projection and water demand analysis in H/Kebena village

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Description** | **Growth rate per year (%)** | **Year** | | | | |  |
| **2010** | **2011** | **2016** | **2021** | **2026** | **2031** |
| Population projection | 3 | 7254 | 7472 | 8662 | 10041 | 11641 | 13495 |
| Average per capital demand(l/c/d) |  |  | 25 | 25 | 25 | 25 | 25 |
| Average daily water demand(l/d) |  |  | 186791 | 216541 | 251031 | 291014 | 337364 |
| Maximum day demand(l/s) |  |  | 2.59 | 3.01 | 3.49 | 4.04 | 4.69 |
| Peak hourly demand(l/s) |  |  | 4.67 | 5.41 | 6.28 | 7.28 | 8.43 |
| Reservior capacity(m^3) |  |  | 62 | 72 | 84 | 97 | 112 |
| Adopted reservior capacity(m^3) |  |  | 75.00 | 75.00 | 100 | 100 | 100 |

# DESIGN OF THE SYSTEM

## *Water source requirement & Reservoir capacity*

### The Source is from Borehole at the Village

The water is pumped from the Borehole to 100m3 Reservoir at elevated area of Hamesho Kebena kebele.

4.1.2Source requirement

**Table 3 water source requirement**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| year(E.C) | 2011 | 2016 | 2021 | 2026 | 2031 |
| peak hourly demand (l/s) | 4.67 | 5.41 | 6.28 | 7.28 | 8.43 |
| water production from existing source (l/s) | 4 | 4 | 4 | 4 | 4 |

The total amount of source required satisfying the demand of Hamesho Kebena kebele throughout the design period the reservoirs will be 8.43 l/s and the available source 4l/s and there should be need of extra source in the future.

### Reservoir capacity (R.c)

To equalize the pumping rate to supply and demand to allow uniform rate of pumping throughout the day the reservoir capacity of the system is estimated to be 1/3 average daily demand . We take 1/3 rule because we have no hourly consumption.

|  |
| --- |
| **R.c= 1/3\***337364.4**\*1/1000=112m3 take 100m3 fore design purpose.** |

Therefore adopt the standard 100m3 concrete reservoir.

# PUMP

## General

A pump may be defined as mechanical dives that will cause a fluid to flow or to be discharged at a higher elevation or higher or pressure pump are used in water works for the purpose of lifting raw water from surface sources and well sources.

### Pump capacity and power requirement

According to site report of Hamesho Kebena kebele, the Borehole can be pumped at discharge rate of 4 l/sec.

Table 4 the work done by the pump and generator is calculated as follows.

|  |  |  |  |
| --- | --- | --- | --- |
| **Pump capacity and Power Requirement The work done by Pump and Generator Is Calculated as follows.** | | | |
| S.NO | TDH CALCULATION STEPES | DIMENSION | unit |
| 1 | pumping distance | 2100.00 | M |
| 2 | Discharge | 4.00 | L/S |
| 3 | ALLOWANCE | 10.00 | M |
| 4 | Pump position /Rizing main/ | 130.00 | M |
| 5 | DELIVERY HEAD(Elevation difference) | 94.00 | M |
| 6 | RESERVOIR HEIGHT | 3.00 | M |
| 7 | HL (IN DELEVERY PIPE ) | 57.40 | M |
| 8 | VELOCITY IN DELEVERY PIPE | 1.28 | M/S |
| 9 | DIAMETER OF DELEVERY PIPE | 75.00 | mm |
| 10 | DISCHARGE | 4.00 | L/S |
| 11 | MINOR HL | 2.87 | M |
| 12 | TDH | 297.27 | M |
| 13 | TDH take | 315.00 | m |
|  | **POWER OF SUBMESIBLE PUMP CALCULATION** |  |  |
| 1 | TDH | 315.00 | M |
| 2 | Discharge | 4.00 | L/S |
| 3 | efficiency of pump(E) | 60.00 | % |
| 4 | POWER OF PUMP=TDH\*Q | 19.61 | Kw |
| 102\*E |
|  | Pp take | 20.00 | Kw |
|  |  | 25.00 | kVA |
|  | **power supply (power of generator)=pg** |  |  |
| 1 | power of pump(Pp) | 20.00 | kw |
| 2 | Pg = \*2\*Pp | 40.00 | KW |
| 3 | Pg take | 40.00 | KW |
| 4 | Pg take | 50.00 | KVA |

***Therefore from the above table we can conclude that:-***

* Submersible Pump capacity Pp = 20Kw/25Kva Head (H)=315m & Discharge Q= 4 l/s
* Power of generator Pg = 40Kw/50KVA with all accessories.

## Inputs and Output(Possible suggested solutions)

### Project Inputs

The project costs **8,202,460.96** Eth birr

### Output(Possible Suggested Solutions)

For the purpose of supplying potable water to the community of Hamesho Kebena kebele in the next 20 years the following suggested main points and mechanisms are indicated under. `

* Construction of higher altitude Reservoir with a capacity of 100m3.
* Pumping station should be supplied with one Generator house

(Standard hollow concert block Generator House should be

Constructed), Pump capacity Pp=20Kw/25Kva**,** Head (H) =300m,

Discharge Q=4l/s and Power of generator=Pg=40Kw/50KVA with all accessories

* Design of pressure main with length of 2100m and Diameter of63mmthat will lead up to 100m3 concrete reservoirs that will be constructed.
* A total of six, six fauceted water points are proposed to be constructed near by the settlement area and their location is indicated on the lay out drawing.
* The required distribution pipe network and water points should be constructed as per the detail design considerations specifications and drawings.
* The management of this project should be guided and administered under woreda water mine & energy supply office.

# 

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# HYDRAULIC CALCULATION

|  |
| --- |
| **The** |

6.1.Pressure Line from the Borehole to the Reservoir

**Table 5 Hydraulic calculation of pressure main**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pressure main pipe line From BH to 100m3 Reservoir | | | | | | | | | | |  | |
| **IN.pt** | **St.pt** | **Pipe  Length** | **Pipe Dia (mm)** | **Velocity (m/s)** | **Discharge (l/sec)** | **Head loss(m)** | **Cum. HL** | **rH** | **Cum. rH** | **Node  Elv.** | **Remark** |
| BH | PI | 250 | 63 | 1.283835 | 4 | 6.67 | 6.67 | -12 | -12 | 2245 |  |
| PI | P2 | 282 | 63 | 1.283835 | 4 | 7.52 | 14.19 | 16 | 4 | 2261 |  |
| P2 | P3 | 375 | 63 | 1.283835 | 4 | 10.00 | 24.19 | 0 | 4 | 2261 |  |
| P3 | P4 | 255 | 63 | 1.283835 | 4 | 6.80 | 30.99 | 2 | 6 | 2263 |  |
| P4 | P5 | 230 | 63 | 1.283835 | 4 | 6.13 | 37.12 | -2 | 4 | 2261 |  |
| P5 | P6 | 120 | 63 | 1.283835 | 4 | 3.20 | 40.32 | 10 | 14 | 2271 |  |
| P6 | P7 | 150 | 63 | 1.283835 | 4 | 4.00 | 44.32 | 66 | 80 | 2337 |  |
| P7 | p8 | 80 | 63 | 1.283835 | 4 | 2.13 | 46.46 | 8 | 88 | 2345 |  |
| p8 | Rcc | 100 | 63 | 1.283835 | 4 | 2.67 | 49.12 | 6 | 94 | 2351 |  |

Altitude of reservoir 100m3 site above mean sea level= 2351m+3

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **IN.pt** | **St.pt** | **Pipe  L.th** | **P.Dia (mm)** | **V.cy (m/s)** | **D.g (l/sec)** | **H. loss (m)** | **Cum. HL** | **rh** | **Cum. rH** | **Free  Head** | **Node  Elv.** | **Location** |
| R | p1 | 80 | 75 | 1.11 | 4.91 | 1.34 | 1.34 | -6 | -6 | 4.66 | 2345 |  |
| p1 | wp1 | 50 | 38 | 0.72 | 0.82 | 0.70 | 2.04 | -6 | -12 | 9.96 | 2339 | Adula Anewo |
| p1 | p2 | 185 | 75 | 0.93 | 4.1 | 2.16 | 3.50 | -46 | -52 | 48.50 | 2299 |  |
| p2 | p3 | 185 | 75 | 0.93 | 4.1 | 2.17 | 5.67 | -14 | -66 | 60.33 | 2285 |  |
| p3 | p4 | 165 | 75 | 0.93 | 4.1 | 1.93 | 7.60 | -20 | -86 | 78.40 | 2265 |  |
| p4 | p5 | 170 | 75 | 0.93 | 4.1 | 1.99 | 9.60 | -2 | -88 | 78.40 | 2263 |  |
| p5 | p6 | 175 | 75 | 0.93 | 4.1 | 2.05 | 11.65 | 0 | -88 | 76.35 | 2263 |  |
| p6 | wp2 | 20 | 38 | 0.72 | 0.82 | 0.28 | 11.93 | -2 | -90 | 78.07 | 2261 | Argeta Becci |
| p6 | p7 | 255 | 63 | 1.08 | 3.38 | 4.85 | 16.50 | -2 | -92 | 75.50 | 2261 |  |
| p7 | p8 | 375 | 63 | 1.08 | 3.38 | 7.13 | 19.06 | 4 | -86 | 66.94 | 2265 |  |
| p8 | p9 | 282 | 63 | 1.08 | 3.38 | 5.36 | 24.42 | -8 | -94 | 69.58 | 2257 |  |
| p9 | wp3 | 20 | 38 | 0.72 | 0.82 | 0.28 | 24.70 | -4 | -98 | 73.30 | 2253 | Adamo Gobaro |
| p9 | p10 | 255 | 63 | 0.82 | 2.56 | 2.79 | 27.21 | -11 | -105 | 77.79 | 2246 |  |
| p10 | school tap | 100 | 38 | 0.72 | 0.82 | 1.40 | 28.61 | -5 | -110 | 81.39 | 2241 | school |
| p10 | p11 | 280 | 50 | 0.89 | 1.74 | 4.49 | 31.70 | -9 | -114 | 82.30 | 2237 |  |
| p11 | p12 | 400 | 50 | 0.89 | 1.74 | 6.41 | 38.11 | -11 | -125 | 86.89 | 2226 |  |
| p12 | p13 | 475 | 50 | 0.89 | 1.74 | 7.61 | 45.72 | -13 | -138 | 92.28 | 2213 |  |
| p13 | wp4 | 20 | 38 | 0.72 | 0.82 | 0.28 | 46.00 | 2 | -136 | 90.00 | 2215 | Alemayo Adiso |
| p13 | p14 | 542 | 38 | 0.72 | 0.82 | 7.61 | 53.33 | -10 | -148 | 94.67 | 2205 |  |
| p14 | wp5 | 290 | 38 | 0.72 | 0.82 | 4.07 | 57.40 | -8 | -156 | 98.60 | 2197 | Legese Gobaro |

**BILL OF QUANTITY**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | **Sidama Zone Water Mine & Energy Department** | | | | | | | | | | | | | | | | | | | | |
| **Project Name:Hamasho kebenaWater Supply Project** | | | | | | | | | | |  | | | | | | | |  |
| **It. No** | **Description** | | | **Unit** | | | **Quantity** | | | | **Unit Price** | | | | | | | | **Total price** |
| A | Supply and Installation of Pipes and Fittings | | | Ls | | | 1 | | | | 4,619,882.00 | | | | | | | | 4,619,882.00 |
| B | Construction of 100m3 Concrete Reservoir | | | No. | | | 1 | | | | 688,349.47 | | | | | | | | 688,349.47 |
| C | Construction of Water Points with Six Faucet | | | No. | | | 6 | | | | 39,425.00 | | | | | | | | 236,550.00 |
| D | Construction of Valve Chambers In Net - Work | | | No. | | | 6 | | | | 4,940.08 | | | | | | | | 29,640.48 |
| E | Construction of valve Chambers In Reservior | | | No. | | | 1 | | | | 11,489.25 | | | | | | | | 11,489.25 |
| F | Supply and Installation of Electro-Mechanical Work for Borata woyo | | | No. | | | 1 | | | | 1,366,480.00 | | | | | | | | 1,366,480.00 |
| G | Construction of Guard and Generator house | | | No. | | | 1 | | | | 157,083.2 | | | | | | | | 157,083.2 |
| H | Construction of Anchor Blocks for Pipe Support | | | No. | | | 6 | | | | 3,850.1 | | | | | | | | 23,100.3 |
| I | Road Crossing Structure | | | No. | | | 2 | | | | 43,355.0 | | | | | | | | 86,710.0 |
|  | **Total** | | |  | | |  | | | |  | | | | | | | | **7,132,574.75** |
|  | **VAT (15%)** | | |  | | |  | | | |  | | | | | | | | **1069886.212** |
|  | **Total including VAT (15%)** | | |  | | |  | | | |  | | | | | | | | **8,202,460.96** |
| **Sidama Zone Water Mine & Energy Department** | | | | | | | | | | | | | | | | | | | |
| **Project Name:Hamasho kebena kebele Water Supply Project** | | | | | | | | | | | | | | | | | | | |
| **Bill No : B Supply & installation of Pipe & fittings** | | | | | | | | | | | | | | | | | | | |
| **It. No** | **Description** | | | **Unit** | | | **Quantity** | | | | | **Unit Price** | | | | | | **Total price** | |
| **1** | **Earth Works** | | |  | | |  | | | | |  | | | | | |  | |
| 1.1 | Trench excavation for pipe laying (0.6\* 0.8) \* ………..m | | | m3 | | | 9,192.96 | | | | | 45.00 | | | | | | 413,683.20 | |
| 1.3 | Back fill over the pipe with selected soil type inspected by site Engineer | | | m3 | | | 9,192.96 | | | | | 30.00 | | | | | | 275,788.80 | |
| **2** | **Supply and laying of different size of GI medium class-B pipe (Technical spesfication fulfilling IS1239 (part 1)or BS1387 or equvalent weight and wall thickness** | | |  | | | - | | | | |  | | | | | | - | |
| 2.2 | 3" | | | m | | | 1,749.00 | | | | | 700.00 | | | | | | 1,224,300.00 | |
| 2.3 | 21/2" | | | m | | | 2,612.00 | | | | | 580.00 | | | | | | 1,514,960.00 | |
| 2.4 | 2" | | | m | | | 1,271.00 | | | | | 520.00 | | | | | | 660,920.00 | |
| 2.5 | 1 ½” | | | m | | | 1,147.00 | | | | | 370.00 | | | | | | 424,390.00 | |
| **3** | **Supply and Install different size fittings European standard/Class-B/** | | |  | | |  | | | | |  | | | | | | - | |
|  | a)    Union | | |  | | |  | | | | |  | | | | | | - | |
|  | 3" | | | No | | | 16.00 | | | | | 400.00 | | | | | | 6,400.00 | |
|  | 21/2" | | | No | | | 24.00 | | | | | 350.00 | | | | | | 8,400.00 | |
|  | 2" | | | No | | | 12.00 | | | | | 260.00 | | | | | | 3,120.00 | |
|  | 1 ½” | | | No | | | 12.00 | | | | | 200.00 | | | | | | 2,400.00 | |
|  | b) Nipples | | |  | | | - | | | | |  | | | | | | - | |
|  | 3" | | | No | | | 32.00 | | | | | 500.00 | | | | | | 16,000.00 | |
|  | 21/2" | | | No | | | 48.00 | | | | | 400.00 | | | | | | 19,200.00 | |
|  | 2" | | | No | | | 24.00 | | | | | 350.00 | | | | | | 8,400.00 | |
|  | 1 ½” | | | No | | | 24.00 | | | | | 200.00 | | | | | | 4,800.00 | |
|  | c)    Reducer | | |  | | | - | | | | |  | | | | | | - | |
|  | 3”-1 1/2” | | | No | | | 2.00 | | | | | 400.00 | | | | | | 800.00 | |
|  | 3”-2 1/2” | | | No | | | 2.00 | | | | | 350.00 | | | | | | 700.00 | |
|  | 21/2”-2 ” | | | No | | | 4.00 | | | | | 350.00 | | | | | | 1,400.00 | |
|  | 21/2”-11/2 ” | | | No | | | 4.00 | | | | | 350.00 | | | | | | 1,400.00 | |
|  | 2”-1 1/2” | | | No | | | 4.00 | | | | | 350.00 | | | | | | 1,400.00 | |
|  | d)    Tee | | |  | | | - | | | | |  | | | | | | - | |
|  | 3" | | | No | | | 2.00 | | | | | 350.00 | | | | | | 700.00 | |
|  | 21/2" | | | No | | | 2.00 | | | | | 300.00 | | | | | | 600.00 | |
|  | 2" | | | No | | | 2.00 | | | | | 260.00 | | | | | | 520.00 | |
|  | e) Gate Valve | | |  | | | - | | | | |  | | | | | | - | |
|  | 3" flanged | | | No | | | 2.00 | | | | | 3,500.00 | | | | | | 7,000.00 | |
|  | 21/2" | | | No | | | 2.00 | | | | | 400.00 | | | | | | 800.00 | |
|  | 2" | | | No | | | 2.00 | | | | | 350.00 | | | | | | 700.00 | |
|  | 1 ½” | | | No | | | 7.00 | | | | | 300.00 | | | | | | 2,100.00 | |
|  | g) Elbow 90 | | |  | | | - | | | | |  | | | | | | - | |
|  | 3" | | | No | | | 12.00 | | | | | 450.00 | | | | | | 5,400.00 | |
|  | 21/2" | | | No | | | 10.00 | | | | | 350.00 | | | | | | 3,500.00 | |
|  | 2" | | | No | | | 6.00 | | | | | 350.00 | | | | | | 2,100.00 | |
| **4** | 1 ½” | | | No | | | 20.00 | | | | | 250.00 | | | | | | 5,000.00 | |
| **5** | Synthetic Paint | | | Kg | | | 20.00 | | | | | 100.00 | | | | | | 2,000.00 | |
|  | Synthetic Fiber | | | Kg | | | 20.00 | | | | | 50.00 | | | | | | 1,000.00 | |
|  | **Total cost** | | |  | | |  | | | | |  | | | | | | **4,619,882.00** | |
| |  | | --- | | **Sidama Zone Water Mine & Energy Department** | | | | | | | | | | | | | | | | | | | | |
| **Project Name:Hamasho kebenakebele Water Supply Project** | | | | | | | | | | | | | | | | | | | |
| **Bill No : A Construction of 100m3 concrete Reservoir** | | | | | | | | | | | | | | | | | | | |
| **It. No** | **Description** | **Unit** | | | **Quantity** | | | | **Unit Price** | | | | | | **Total price** | | | | |
| **1** | **Earth Work** |  | | |  | | | |  | | | | | |  | | | | |
| 1.1 | Site clearing & grubbing up to a average depth of 20 cm to remove top vegetated soil | M3 | | | 113.04 | | | | 25 | | | | | | 2,826.00 | | | | |
| 1.2 | Foundation excavation to a depth of 100 cm below ground level | m3 | | | 30.00 | | | | 40 | | | | | | 1,200.00 | | | | |
| 1.3 | Trench excavation for rock formation | m3 | | | 10.17 | | | | 45 | | | | | | 457.65 | | | | |
| 1.4 | 130cm wideTrench excavation for pavement and Drainage ditch around reservoir | m3 | | | 7.72 | | | | 50 | | | | | | 386.00 | | | | |
| 1.5 | Filling and compacting foundation base with selected materials for 20 cm | m3 | | | 8.14 | | | | 120 | | | | | | 976.8 | | | | |
| 1.6 | Placing 40 cm thick basaltic stone or equivalent hard core well-rolled consolidated and blinded with gravel | m3 | | | 16.28 | | | | 850 | | | | | | 13838 | | | | |
| 1.7 | Back filling around a foundation with approved selected materials from site well rammed in layer of 15 cm | m3 | | | 6.10 | | | | 65 | | | | | | 396.5 | | | | |
| 1.8 | Cart away surplus excavated materials from the site to a distance of 200 m | m3 | | | 40.69 | | | | 35 | | | | | | 1424.15 | | | | |
| **2** | **concrete work** |  | | |  | | | |  | | | | | | 0 | | | | |
| 2.1 | Casting 10cm thick Lean concrete blinding over hard-core with Grade C-15 concrete with minimum cement 150kg/m3 | M3 | | | 4.07 | | | | 2500 | | | | | | 10175 | | | | |
| 2.2 | Casting 30cm thick Base slab in Grade C-25 reinforced concrete with minimum cement 360kg/m3 mix 1:2:3 | m3 | | | 12.21 | | | | 3200 | | | | | | 39072 | | | | |
| 2.3 | Casting 25cm thick Roof cover slab with Grade C-25 reinforced concrete of minimum cement 360kg/m3 | m3 | | | 9.07 | | | | 3200 | | | | | | 29024 | | | | |
| 2.4 | 25cm thick R.C. wall concrete as per the drawing | m3 | | | 23.00 | | | | 3200 | | | | | | 73600 | | | | |
| 2.5 | supply, cut, bend and fix in position reinforcement bars |  | | |  | | | |  | | | | | | 0 | | | | |
|  | c/ Ф 10mm | kg | | | 848.86 | | | | 65 | | | | | | 55175.83067 | | | | |
|  | d/ Ф 12mm | kg | | | 4,404.95 | | | | 65 | | | | | | 286321.7101 | | | | |
|  | e/ diameter ( Ф)14mm | kg | | | - | | | |  | | | | | | 0 | | | | |
| 2.6 | Black wire | kg | | | 100.00 | | | | 40 | | | | | | 4000 | | | | |
| **2.7** | **Formwork** |  | | |  | | | |  | | | | | | 0 | | | | |
| **2.7.1** | **Sheet metal Panels** |  | | |  | | | |  | | | | | | 0 | | | | |
|  | For floor concrete slab | m2 | | | 22.61 | | | | 200 | | | | | | 4521.6 | | | | |
|  | For top Concrete slab | m2 | | | 76.68 | | | | 200 | | | | | | 15335.76 | | | | |
|  | For Internal and External wall | m2 | | | 153.36 | | | | 200 | | | | | | 30671.52 | | | | |
|  | Galvanized iron sheet metal water stop | m2 | | | 73.19 | | | | 200 | | | | | | 14638.68 | | | | |
| **3** | **Masonry work** |  | | |  | | | |  | | | | | | 0 | | | | |
| 3.1 | Floor finish 30 mm thick trawl and smooth finish with 1:3 cement Sand mortar screed | m2 | | | 34.19 | | | | 200 | | | | | | 6838.92 | | | | |
| 3.2 | 100cm wide stone pavement around reservoir with cement Sand mortar of mix 1 : 3 | m2 | | | 40.82 | | | | 200 | | | | | | 8164 | | | | |
| 3.3 | Construction of Semi-Circular 30 cm diameter Drainage Ditch as per drawing | m2 | | | 8.67 | | | | 200 | | | | | | 1733.28 | | | | |
| **4** | **Miscellaneous & Finishing** |  | | |  | | | |  | | | | | | 0 | | | | |
| 4.1 | Supply & Install all necessary B-class (medium) pipes & fittings |  | | |  | | | |  | | | | | | 0 | | | | |
|  | Ø 4" pipe for outlet | m | | | 6.00 | | | | 450 | | | | | | 2700 | | | | |
|  | Ø 4 " pipe for inlet | m | | | 6.00 | | | | 450 | | | | | | 2700 | | | | |
|  | Ø 4" pipe for drainage | m | | | 6.00 | | | | 450 | | | | | | 2700 | | | | |
|  | Ø 4" pipe for over flow | m | | | 6.00 | | | | 450 | | | | | | 2700 | | | | |
|  | Ø 4" pipe for aire Ventilation | m | | | 6.00 | | | | 450 | | | | | | 2700 | | | | |
|  | **Fitting** |  | | |  | | | |  | | | | | | 0 | | | | |
|  | Elbow Ø 4" | pcs | | | 4.00 | | | | 450 | | | | | | 1800 | | | | |
|  | Union Ø 4" | pcs | | | 2.00 | | | | 450 | | | | | | 900 | | | | |
|  | Nipples Ø 4" | pcs | | | 4.00 | | | | 450 | | | | | | 1800 | | | | |
|  | Water meter Ø 4"(Flanged Water meter) | pcs | | | 1.00 | | | | 5600 | | | | | | 5600 | | | | |
|  | Gate valve Ø 4" flanged | pcs | | | 1.00 | | | | 5600 | | | | | | 5600 | | | | |
|  | Tee Ø 4" | pcs | | | 2.00 | | | | 450 | | | | | | 900 | | | | |
|  | Bolts and nuts | No | | | 32.00 | | | | 20 | | | | | | 640 | | | | |
| 4.2 | Supply & Install lockable Steel Man-Hole cover with all fixing hinges & Accessories with lock gate (Design) | No | | | 1.00 | | | | 2000 | | | | | | 2000 | | | | |
| 4.3 | Supply and install both External & Internal Ladder made of Class B, G I Pipe of DN 25 mm Length 3.0 m having extra 1.0 m high handle at the top for External Ladder | No | | | 2.00 | | | | 3000 | | | | | | 6000 | | | | |
| 4.4 | Supply and fix 25 mm thick quality expansion Joint made of Bitumen asphalt applied when necessary | m2 | | | 0.64 | | | | 400 | | | | | | 257.48 | | | | |
| 4.5 | Chiselling and Plastering the whole inner wall face and exposed faces of concrete works with three coats of cement sand mortar of mix 1 : 3 | m2 | | | 167.30 | | | | 150 | | | | | | 25094.88 | | | | |
| 4.6 | Supplying & placing tarred paper b/n lean concrete& floor slab | m2 | | | 40.69 | | | | 130 | | | | | | 5290.272 | | | | |
| 4.7 | Supplying & painting tarred paper with bituminous mastic | m2 | | | 40.69 | | | | 100 | | | | | | 4069.44 | | | | |
| **5** | **Fence work** |  | | |  | | | |  | | | | | | 0 | | | | |
| 5.1 | Fencing with barbed wire around the compound with 10cm well seasoned wooden post stand to the height of 2m above ground level with 0.5m deep concrete foundation & bracing diagonals. The fence shall be constructed with 3mm barbed wire horizontally every 0. | m2 | | | 144.00 | | | | 80 | | | | | | 11520 | | | | |
| 5.2 | Construct & fix corrugated iron sheet door of size 2m\*1m with wooden post fitted with lock | pcs | | | 1.00 | | | | 2000 | | | | | | 2000 | | | | |
| 5.3 | disnifecting and cleaning internal part of the reservoir | Ls | | | 2.00 | | | | 300 | | | | | | 600 | | | | |
| |  | | --- | |  | | **Total** | **Birr** | | |  | | | |  | | | | | | **688,349.47** | | | | |
| **Sidama Zone Water Mine & Energy Department** | | | | | | | | | | | | | | | | | | | |
| **Project Name:Hamasho kebena kebele Water Supply Project** | | | | | | | | | | | | | | | | | | | |
| **Title: - Bills of Quantities for water point construction with six faucted** | | | | | | | | | | | | | | | | | | | |
| **It. No** | **Description** | | | **Unit** | | | **Quantity** | | | | | | **Unit Price** | | | **Total price** | | | |
| D | CONSTRUCTION OF WATER POINTS | | |  | | |  | | | | | |  | | |  | | | |
|  | WITH SIX FAUCETS | | |  | | |  | | | | | |  | | |  | | | |
| 1 | Earth work | | |  | | |  | | | | | |  | | |  | | | |
| 1.1 | Site clearing to an average depth of 20cm to remove the top vegetated soil | | | m2 | | | 30.00 | | | | | | 40 | | | 1,200.00 | | | |
| 1.2 | Excavation for foundation to a depth of 40 cm | | | m3 | | | 6.40 | | | | | | 55 | | | 352.00 | | | |
| 1.3 | Cart away the excavated surplus material to a distance not less than 100m | | | m3 | | | 6.40 | | | | | | 30 | | | 192.00 | | | |
| 1.4 | placing 25cm thick hardcore of basaltic or equivalent material well rolled, compacted and blinded with crushed stone | | | m3 | | | 4.00 | | | | | | 200 | | | 800.00 | | | |
| **2** | **Masonry work** | | |  | | |  | | | | | |  | | | - | | | |
| 2.1 | Construction of masonry wall for six faucet water point embedded in 1:3 cement sand mortar mix | | | m3 | | | 1.40 | | | | | | 800 | | | 1,120.00 | | | |
| **3** | **Concrete work** | | |  | | |  | | | | | |  | | | - | | | |
| 3.1 | Casting 50mm thick lean concrete of 1:3:6 mix ratio(minimum cement content of 150kg/m3) | | | m2 | | | 18.00 | | | | | | 200 | | | 3,600.00 | | | |
| 3.2 | Mass concrete (1:3:6) mix below foundation wall | | | m3 | | | 3.06 | | | | | | 850 | | | 2,601.00 | | | |
| 3.3 | Construction of water point cap with concrete of 1:2:3 mix ratio as per the design drawing | | | m3 | | | 0.90 | | | | | | 950 | | | 855.00 | | | |
| 3.4 | Smooth and well strutted zigba form work | | | m2 | | | 19.40 | | | | | | 75 | | | 1,455.00 | | | |
| **4** | **Plumbing Works** | | |  | | |  | | | | | |  | | | - | | | |
| 4.1 | Pipe supply and connecting work | | |  | | |  | | | | | |  | | | - | | | |
| 4.1.1 | GS pipe Ø= 11/2" | | | m | | | 6.00 | | | | | | 284 | | | 1,704.00 | | | |
| 4.1.2 | GS pipe Ø= 1" | | | m | | | 6.00 | | | | | | 220 | | | 1,320.00 | | | |
| 4.1.3 | GS pipe Ø= 3/4" | | | m | | | 3.00 | | | | | | 200 | | | 600.00 | | | |
| **4.2** | **Fitting supply and connecting work** | | |  | | |  | | | | | |  | | | - | | | |
| 4.2.1 | 900 elbow Ø=11/2" | | | Pcs | | | 6.00 | | | | | | 300 | | | 1,800.00 | | | |
| 4.2.2 | Gate valve Ø=11/2" | | | Pcs | | | 1.00 | | | | | | 1250 | | | 1,250.00 | | | |
| 4.2.3 | Water meter Ø=11/2" | | | Pcs | | | 1.00 | | | | | | 1200 | | | 1,200.00 | | | |
| 4.2.4 | Union Ø=11/2" | | | Pcs | | | 1.00 | | | | | | 310 | | | 310.00 | | | |
| 4.2.5 | Union Ø=1" | | | Pcs | | | 2.00 | | | | | | 310 | | | 620.00 | | | |
| 4.2.6 | Nipples Ø=11/2" | | | Pcs | | | 6.00 | | | | | | 250 | | | 1,500.00 | | | |
| 4.2.7 | Nipples Ø=1" | | | Pcs | | | 4.00 | | | | | | 200 | | | 800.00 | | | |
| 4.2.8 | Tee Ø=11/2" | | | Pcs | | | 1.00 | | | | | | 230 | | | 230.00 | | | |
| 4.2.9 | Cross tee Ø=1" | | | Pcs | | | 2.00 | | | | | | 150 | | | 300.00 | | | |
| 4.2.10 | Reducer Ø= 11/2" - Ø=1" | | | Pcs | | | 2.00 | | | | | | 250 | | | 500.00 | | | |
| 4.2.11 | Reducer Ø= 1" - Ø=3/4" | | | Pcs | | | 6.00 | | | | | | 180 | | | 1,080.00 | | | |
| 4.2.12 | Coupling Ø= 3/4" | | | Pcs | | | 6.00 | | | | | | 150 | | | 900.00 | | | |
| 4.2.13 | Faucet Ø=3/4" | | | Pcs | | | 6.00 | | | | | | 200 | | | 1,200.00 | | | |
| **5** | **Micellnious and Finishing works** | | |  | | |  | | | | | |  | | | - | | | |
| 5.1 | Construction of HCB common walled valve chamber for gate valve and water meter. Price includes supply and fixing anit rust painted and lockable metal valve chamber size 1m\*1m with angle iron frame and proper installation of fittings and pointing of HCB | | | no. | | | 1.00 | | | | | | 1200 | | | 1,200.00 | | | |
| 5.2 | 12mm thick plastering of all exposed surface of concrete and masonry wall with cement mortar mix of 1:3 | | | m2 | | | 20 | | | | | | 200 | | | 4,000.00 | | | |
| 5.3 | 5mm pouring of cement screed placing for floor finish of water points | | | m2 | | | 11.18 | | | | | | 200 | | | 2,236.00 | | | |
| 6 | Fencing work | | |  | | |  | | | | | |  | | | - | | | |
| 6.1 | Fencing around the compound (6\*6m) with 10cm well seasoned Tid post stand to the height of 2m above ground level with 0.5m deep concrete foundation and bracing diagonals at the corner. The fence shall be constructed with 3mm barbed wire horizontally every 0.1m bellow 1m and 0.2m above 1m with two ways diagonal bracings | | | m2 | | | 36 | | | | | | 100 | | | 3,600.00 | | | |
| 6.2 | Supply and fix corrugated iron sheet door of size 2m\*1m with tabular post including pad lock | | | ls | | | 1 | | | | | | 900 | | | 900.00 | | | |
|  | **Total for one water point** | | |  | | |  | | | | | |  | | | **39,425.00** | | | |
|  | **Total for 6(Six) water points** | | |  | | |  | | | | | |  | | | **236,550.00** | | | |
| **Sidama Zone Water Mine & Energy Department** | | | | | | | | | | | | | | | | | | | |
| **Project Name:Hamasho kebena kebele Water Supply Project** | | | | | | | | | | | | | | | | | | | |
| **Title: - Bills of Quantities for Valve Chambers Construction In Net - Work** | | | | | | | | | | | | | | | | | | | |
| **It. No** | **Description** | | | **Unit** | | | **Quantity** | | | | | | **Unit Price** | | | | | | **Total price** |
| **1** | **Earth work** | | |  | | |  | | | | | |  | | | | | |  |
| 1.1 | Site clearing to remove the top soil to a depth of 20cm | | | m2 | | | 4 | | | | | | 25 | | | | | | 100.00 |
| 1.2 | Excavation for foundation to a depth of 30cm | | | m3 | | | 0.588 | | | | | | 35 | | | | | | 20.58 |
| 1.3 | Cart away the excavated surplus material for a distance of 100m | | | m3 | | | 2 | | | | | | 30 | | | | | | 60.00 |
| 1.4 | 25cm thick hard core filling under the floor slab | | | m3 | | | 0.49 | | | | | | 300 | | | | | | 147.00 |
| **2** | **Masonry work** | | |  | | |  | | | | | |  | | | | | | - |
| 2.1 | Construction of 30 cm thick masonry wall embedded with 1:3 mortar | | | m3 | | | 1.5 | | | | | | 700 | | | | | | 1,050.00 |
| 2.2 | Plastering the internal masonry wall | | | m2 | | | 6 | | | | | | 120 | | | | | | 720.00 |
| 2.3 | Pointing out the exposed part of the masonry wall | | | m2 | | | 8 | | | | | | 120 | | | | | | 960.00 |
| **3** | **Concrete work** | | |  | | |  | | | | | |  | | | | | | - |
| 3.1 | Mass concrete for floor slab | | | m3 | | | 0.45 | | | | | | 850 | | | | | | 382.50 |
| 3.2 | Supply & Install 700mm\*700mm\* 3mm thick lockable steel man-hole cover with all fixing hinges & and angle iron frame and all accessories with lockable gate including anti- rust painted | | | ls | | | 1 | | | | | | 1200 | | | | | | 1,200.00 |
| **4** | **Form work** | | |  | | |  | | | | | |  | | | | | | - |
| 4.1 | Smooth and well strutted zigba form work | | | m2 | | | 1.5 | | | | | | 200 | | | | | | 300.00 |
|  | **Total for one valve chamber** | | |  | | |  | | | | | |  | | | | | | **4,940.08** |
|  | **Total for 6(six) valve chambers** | | |  | | |  | | | | | |  | | | | | | **29,640.4** |
|  |  | | | | | | | | | | | | | | | | | | |
| **Sidama Zone Water Mine & Energy Department** | | | | | | | | | | | | | | | | | | | |
| **Project Name:Hamasho kebena kebele Water Supply Project** | | | | | | | | | | | | | | | | | | | |
| **Title:-Constraction of Valve Chamber for Reservoir** | | | | | | | | | | | | | | | | | | | |
| **It. No** | **Description** | | **Unit** | | | **Quantity** | | **Unit Price** | | | | | | **Total price** | | | | | |
| **1.1** | **Earth work** | |  | | |  | |  | | | | | |  | | | | | |
| 1.2 | Site clearing to remove top soil to a depth of 20cm | | M3 | | | 0.8 | | 25.00 | | | | | | 20.00 | | | | | |
| 1.3 | Excavation for base foundation | | m3 | | | 3.25 | | 35.00 | | | | | | 113.75 | | | | | |
| 1.4 | 25cm thick hardcore filling | | m2 | | | 3.25 | | 700.00 | | | | | | 2,275.00 | | | | | |
| 1.5 | Cart away excavated materials | | m3 | | | 3.25 | | 30.00 | | | | | | 97.50 | | | | | |
| **2** | **Masonry Work** | |  | | |  | |  | | | | | | - | | | | | |
| 2.1 | Stone masonry wall | | m3 | | | 3.25 | | 700.00 | | | | | | 2,275.00 | | | | | |
| **3** | **Concrete work** | |  | | |  | |  | | | | | | - | | | | | |
| 3.1 | 10cm thick mass concrete above hardcore | | m3 | | | 1 | | 900.00 | | | | | | 900.00 | | | | | |
| 3.2 | 10cm thick RC concrete for roof slab | | m3 | | | 1 | | 900.00 | | | | | | 900.00 | | | | | |
| 3.3 | RC bar Ø 10mm | | kg | | | 14 | | 65.00 | | | | | | 910.00 | | | | | |
| 3.4 | Black wire Ø 1.5mm | | kg | | | 1 | | 35.00 | | | | | | 35.00 | | | | | |
| **4** | **Form work** | |  | | |  | |  | | | | | | - | | | | | |
| 4.1 | Form work for roof slab | | m2 | | | 3.9 | | 120.00 | | | | | | 468.00 | | | | | |
| 4.2 | Plastering & other finishing work | |  | | |  | |  | | | | | | - | | | | | |
| 4.3 | Plastering internal wall | | m2 | | | 6.8 | | 150.00 | | | | | | 1,020.00 | | | | | |
| 4.4 | Pointing of external masonry wall | | m2 | | | 8.5 | | 150.00 | | | | | | 1,275.00 | | | | | |
| 4.5 | Mane hole cover with angle iron frame and sheet metal including pad lock (70cm\*70) | | ls | | | 1 | | 1,200.00 | | | | | | 1,200.00 | | | | | |
|  | **Total cost for reservoir VC** | |  | | |  | |  | | | | | | **11,489.25** | | | | | |
| **Project Name:Hamasho Kebena kebele Water Supply Project** | | | | | | | | | | | | | | | | | | | |
| **Title: - Bills of Quantities for Supply and Installation of Electro Mechanical Equipments for Borata woyo** | | | | | | | | | | | | | | | | | | | |
| **It. No** | **Description** | | | **Unit** | | | **Quantity** | | | **Unit Price** | | | | | | | **Total price** | | |
| **G** | **SUPPLY AND INSTALLATION OF ELECTRO** | | |  | | |  | | |  | | | | | | |  | | |
|  | **MECHANICAL EQUIPMENT** | | |  | | |  | | |  | | | | | | |  | | |
| **1** | **Supply and Installation of Submersible Pump** | | |  | | |  | | |  | | | | | | |  | | |
| 1.1 | Supply and install submersible pump with capacity of:- | | |  | | |  | | |  | | | | | | |  | | |
|  | Head, H= 300m | | |  | | |  | | |  | | | | | | |  | | |
|  | Discharge, Q=4 lit/sec | | |  | | |  | | |  | | | | | | |  | | |
|  | with its full autotransformer switch board | | |  | | |  | | |  | | | | | | |  | | |
|  | including the following accessories and specification:- | | |  | | |  | | |  | | | | | | |  | | |
|  | Cable length =120m | | |  | | |  | | |  | | | | | | |  | | |
|  | Cable size= 3\*50mm2 | | |  | | |  | | |  | | | | | | |  | | |
|  | Electrode cable length = 120m | | |  | | |  | | |  | | | | | | |  | | |
|  | Electrode cable size=2\*1.5mm2 with two electrodes | | | set | | | 1 | | | 850000 | | | | | | | 850,000.00 | | |
| **2** | **Supply and Install Diesel Generator** | | |  | | |  | | |  | | | | | | | - | | |
| 2.1 | Supply and install diesel generator set having engine power capacity, P=50kva | | | set | | | 1 | | | 500000 | | | | | | | 500,000.00 | | |
| **3.2** | **Supply and install fittings** | | |  | | |  | | |  | | | | | | | - | | |
| **3.2.1** | **Elbow** | | |  | | |  | | |  | | | | | | | - | | |
|  | ɸ=3" | | | pcs | | | 4 | | | 450 | | | | | | | 1,800.00 | | |
| **3.2.2** | **Union** | | |  | | |  | | |  | | | | | | | - | | |
|  | ɸ=3" | | | pcs | | | 2 | | | 500 | | | | | | | 1,000.00 | | |
| **3.2.3** | **Water meter flanged** | | |  | | |  | | |  | | | | | | | - | | |
|  | ɸ=3" | | | pcs | | | 1 | | | 4500 | | | | | | | 4,500.00 | | |
| **3.2.4** | **Gate valve flanged** | | |  | | |  | | |  | | | | | | | - | | |
|  | ɸ=3" | | | pcs | | | 1 | | | 4500 | | | | | | | 4,500.00 | | |
| **3.2.5** | **Check valve** | | |  | | |  | | |  | | | | | | | - | | |
|  | ɸ=3" | | | pcs | | | 1 | | | 3000 | | | | | | | 3,000.00 | | |
| **3.2.6** | **Nipples** | | |  | | |  | | |  | | | | | | | - | | |
|  | ɸ=3" | | | pcs | | | 4 | | | 300 | | | | | | | 1,200.00 | | |
| **3.2.8** | **Bolts and nuts** | | | no. | | | 8 | | | 60 | | | | | | | 480.00 | | |
|  | **Total sum** | | |  | | |  | | |  | | | | | | | **1,366,480.00** | | |

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| **Sidama Zone Water Mine & Energy Department** | | | | | |
| |  | | --- | | **Project Name:Hamasho kebena kebele Water Supply Project** | | | | | | |
| **Title:-Bills of Quantities for Construction of Generator and Guard House in HCB** | | | | | |
| **It. No** | **Description** | **Unit** | **Quantity** | **Unit Price** | **Total price** |
| **1** | **Earth work** |  |  |  |  |
| 1.1 | Site clearing to an averaged depth 0f 20cm to remove top soil and grubbing | m2 | 63.0 | 45.0 | 2,835.0 |
| 1.2 | Excavation for foundation trench to a depth of notexceeding 100cm below stripped ground level | m3 | 43.9 | 50.0 | 2,194.5 |
| 1.3 | Excavation for hard formation | m3 | 7.8 | 70.0 | 546.8 |
| 1.4 | Back filling around a foundation with good dry filling material from the site | m3 | 13.0 | 55.0 | 716.1 |
| 1.5 | Back filling under a hard core with good and approved selected materials a round the site well rammed and compacted in layers not exceeding 20cm | m3 | 13.0 | 40.0 | 520.8 |
| 1.6 | Cart away surplus excavated matrial to a distance of 100m | m3 | 43.9 | 40.0 | 1,755.6 |
| 1.7 | Placing 25 cm thick basaltic or equvialent stone hard core well rolled andconsolidated and blinded with crushed stone | m2 | 10.4 | 700.0 | 7,291.2 |
| **2** | **Masonry work** |  |  |  | - |
| 2.1 | Construction of 50cm thick basaltic or equivalent masonry foundation wall to a depth of 70cm below stripped ground level blended and joined in cementmortar of mix (1:30 | m3 | 15.6 | 900.0 | 14,040.0 |
| 2.2 | Construction of 50cm thick basaltic or equivalent masonry foundation wall to a height of 35cm above ground level blended and joined in cementmortar of mix (1:3) | m3 | 11.0 | 900.0 | 9,900.0 |
| 2.3 | Pointing the exposed external wall surface of the foundation wall with cement mortar 1:3 | m2 | 16.0 | 500.0 | 8,000.0 |

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| 2.4 | 100cm wide semi - dressed stone pavement around generator house | m2 | 24.0 | 200.0 | 4,800.0 |
| 2.5 | Ponting of stone pavement | m2 | 25.2 | 40.0 | 1,008.0 |
| 2.6 | Construction of semi- circular 30cm diameter drainage ditch as per drawing | ls | 1.0 | 700.0 | 700.0 |
| 2.7 | Plastering all exposed surfacs of cloumn, ground and upper tie beam , window and door lintel | m2 | 25.1 | 60.0 | 1,503.4 |
| **3** | **Concrete work** |  |  |  | - |
| 3.1 | Placing 50mm thick lean concrete of Grade C-10 with minimum cement content of 150kg/m3 of concrete over the hard core | m3 | 3.91 | 700.0 | 2,734.2 |
| 3.2 | Casting 15cm thick reinforced concrete for Generator seat (Basement) with Grade C-20 Concrete with minimum cement content of 320kg/m3cost includes supply and installation of Re-bar anda pproved anchor bolts and form work fixing | m3 | 1.88 | 1,500.0 | 2,812.5 |
| 3.3 | Placing 15cm thick mass concrete of Grade C-20 with minimum cement content of 320kg/m3 of concrete over the lean concrete | m3 | 6.96 | 1,500.0 | 10,440.0 |
| 3.4 | C-20 reinforced concrete for ground tie beam and machine foundation | m3 | 2.6 | 1,500.0 | 3,912.0 |
| 3.5 | C-20 reinforced concrete for upper tie beam and lintel | m3 | 2.7 | 1,250.0 | 3,356.3 |
| 3.6 | C-20 reinforced concrete for column | m3 | 1.1 | 1,250.0 | 1,350.0 |
| 3.7 | Reinforcment bar as per construction drawing | kg | 291.5 | 65.0 | 18,950.4 |
| 3.8 | Supply, cut, bend and fixing in position sawn wooden form works of equivalent properly erected and strutted with posts and clings having tight joint notto bleed | m2 | 49.9 | 45.0 | 2,246.4 |
| **4** | **Wall and roofing** |  |  |  | - |
| **4.1** | **Wall work** |  |  |  | - |
| 4.1.1 | 20cm thick hollow concrete block wall | m2 | 48.8 | 150.0 | 7,327.2 |
| 4.1.2 | 15cm hollow concrete block wall | m2 | 3.4 | 150.0 | 504.0 |
| 4.1.3 | Pointing of internal and external wall surface | m2 | 90.0 | 100.0 | 9,000.0 |
| **4.2** | **Roofing work** |  |  |  | - |
| 4.2.1 | Supply and fix a G-32 G.1 corrugated iron sheets with roof nail having washer fixed to purling of smooth round DN 60mm eucalyptus tree fixed on trusses members made of DN 150mm round eucalyptus tree spaced @ 125cm | m2 | 49.5 | 150.0 | 7,423.9 |
| 4.2.2 | Supply and fix 25\*250mm fascial board to purlins | m | 6.5 | 70.0 | 455.0 |
| **5** | **Doors and windows** |  |  |  | - |
| 5.1 | Supply and fix metal frame door double leaf type with cylinderical lock door size 2.0\*2.10m | pcs | 1.0 | 3,000.0 | 3,000.0 |
| 5.2 | Supply and fix metal door size 0.8\*2.10m | pcs | 1.0 | 2,000.0 | 2,000.0 |
| 5.3 | Supply and fix metal window size (1.20\*1.00m) | pcs | 2.0 | 2,500.0 | 5,000.0 |
| 5.4 | Supply and fix metal window size 1.00\*1.00m | pcs | 1.0 | 2,500.0 | 2,500.0 |
| 5.5 | Supply and fix mesh wire for insect netting and ventilation as design 75cm high | m2 | 6.0 | 70.0 | 420.0 |
| **6** | **Fencing work** |  |  |  | - |
| 6.1 | Fencing around the compound (10\*10m) with 10cm well seasond Tid post stand to the height of 2m above ground level with 0.5m deep concrete foundation and bracing diagonals at the corner.The fence shall be constructed with 3mm barbed wire horizontally ever | m2 | 132.0 | 120.0 | 15,840.0 |
| 6.2 | The door shall be corrugated iron sheet 2m\*1m including tabular post and pad lock with all accesseries | ls | 1.0 | 2,000.0 | 2,000.0 |
|  | Total sum |  |  |  | 157,083.2 |

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| **Sidama Zone Water Mine & Energy Department** | | | | | |
| **Project Name:Hamasho kebena kebele Water Supply Project** | | | | | |
| **TITLE: Bill of Quantities and specification of Anchor blocks** | | | | | |
| **It. No** | **Description** | **Unit** | **Quantity** | **Unit Price** | **Total price** |
| **1** | **Earth works** |  |  |  |  |
| 1.1 | 20cm thick site clearing (2m\*1.5m) | m3 | 3 | 45.0 | 135.0 |
| 1.2 | Foundation excavation depth of  100cm (0.4m\*0.5) | m3 | 0.4 | 50.0 | 20.0 |
| 1.3 | cart away the excavated material | m3 | 0.384 | 40.0 | 15.4 |
| 1.4 | 20 cm hard core filling | m2 | 0.08 | 200.0 | 16.0 |
| 1.5 | Filling back the area around the mat foundation after construction | m3 | 0.016 | 250.0 | 4.0 |
| **2** | **concrete work** |  |  |  | - |
| 2.1 | Construct anchor block with 1:2:4 concrete the height of anchor blocks depends on the site condition. | m3 | 1.8 | 1,250.0 | 2,250.0 |
| 2.2 | reinforcement for concrete |  |  |  | - |
|  | 10 mm dia at 20 cm c/c for mat foundation | kg | 1.105 | 70.0 | 77.4 |
|  | 10mm for column of the Anchor 2 in number | kg | 2.652 | 70.0 | 185.6 |
|  | 6mm stirrup | kg | 0.5958 | 70.0 | 41.7 |
|  | black/tie wire 1.5mm thick | kg | 1.5 | 50.0 | 75.0 |
| **3** | **form work** |  |  |  | - |
|  | fix zigba form work to place concrete | m2 | 4.2 | 150.0 | 630.0 |
| **4** | Galvanized metal clamp with necessary fixtures used to hold pipes on head of anchor blocks | pcs | 1 | 400.0 | 400.0 |
|  | **Total cost for one Anchor block** |  |  |  | **3,850.1** |

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| **Sidama Zone Water Mine & Energy Department** | | | | | |
| **Project Name:Hamasho kebena kebele Water Supply Project** | | | | | |
| **TITLE: Bill of Quantities and specification of Road crossing** | | | | | |
| |  | | --- | | **S.NO** | | **Description** | **Unit** | **Qty** | **Unit Price** | **Total Price** |
| 1 | Earth Work |  |  |  |  |
| 1.1 | Trench excavation for rooad crossing pipes (0.6\*1.5)\*12m | m3 | 10.8 | 75 | 810.00 |
| 1.3 | Back fill over the selected soil type inspected by site Engineer | m3 | 10.8 | 40 | 432.00 |
| 2.2 | supply and laying of diameter 6" medium class-B cassing pipee for sliveeing 4"and 3" medium class water supply pressure and distribution | m | 12 | 1520 | 18,240.00 |
|  | Total sum for one Gravel road crossing |  |  |  | **43,355.00** |

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# 7. Drawings