PRELIMINARY DESIGN REPORT OF CHHESKAM DRINKING WATER SUPPLY
CHHESKAM, SOLUKHAMBU, PROVINENCE-1

SHS

SWISS HOPE SHERPA

NISHARGA NIRMAN SEWA PVT. LTD.
Building Future and Trust

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LIST OF ACRONYMS & ABBREVIATIONS

AIECs	Average Incremental Economic Costs
CAP	Community Awareness Plan
CBS	Central Bureau of Statistics
DAO	District Administration Office
DDC	District Development Committee
DDF	District Development Fund
DEWATS	Decentralized Wastewater Treatment
DPC	Damp Proof Course
DSMC	Design Supervision and Management Consultant
DTW	Deep Tube Well
DUDBC	Department of Urban Development & Building Construction
DWSS	Department of Water Supply & Sewerage
EA	Executing Agency
EARF	Environmental Assessment and Review Framework
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
EO	Executive Officer
EOCC	Economic Opportunity Cost of Capital
EPR	Environmental Protection Rules
ES	Environmental Safeguards
FS	Feasibility Study
FY	Fiscal Year
GESI	Gender Equality & Social Inclusion
GON	Government of Nepal
HDPE	High Density Polyethylene Pipe
IA	Implementing Agency
IEE	Initial Environmental Examination
IRR	Internal Rate of Return
LSGA	Local Self Governance Act 2056 (1999)
NDWQS	National Drinking Water Quality Standard
NLSS	Nepal Living Standards Survey
NPR /NRs	Nepalese Rupee

OHT	Over Head Tank
PAM	Project Administration Memorandum
PMC	Project Management Consultant
PMO	Project Management Office
PPTA	Project Preparation Technical Assistance
QA	Quality Assurance
RP	Resettlement Plan
RVT	Reservoir Tank
SESF	Social & Environmental Safeguards Framework
SOE	Statement of Expenditures
SSTWSSSP	Second Small Towns Water Supply and Sanitation Sector Project
STW	Shallow Tube Well
STWSSSP	Small Towns' Water Supply & Sanitation Sector Project
TDF	Town Development Fund

TL	Transmission Line
ToR/TOR	Terms of Reference
TSTWSSSP	Third Small Towns' Water Supply & Sanitation Sector Project
TW	Tube Well
UfW	Unaccounted for Water
USD	US Dollar
VDC	Village Development Committee
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WRA	Water Resources Act
WS	Water Supply
WSS	Water Supply and Sanitation
WSSDO	Water Supply and Sanitation Division/ Sub-division Office
WTP	Water Treatment Plant

SALIENT FEATURES

S. N	Items	Description
1	Name of the Project	Chheskam Water Supply Project
2	Type	Gravity Flow
3	Study Level	Preliminary
4	Location Area	
4.1	Region	Provinence-1
4.2	Zone	Sagarmatha
4.3	District	Solukhumbu
4.4	VDC/Municipality	Mahakulung Rural Municipality
4.5	Ward	3
5	Available Facilities	
5.1	Road	Gravel Hill Road
5.2	Supply Water System	Very primitive existing System
5.3	Electricity	Available
5.4	Communication	Available
5.5	Health Services	Primary
5.6	Banking Facilities	Primary
6	Social Status	
6.1	Present HHs Numbers (2021)	160
6.2	Present Population (2021)	1120
6.3	Base Year Population (2021)	1120
6.4	Design Year Population (2041)	1508
6.5	Weighted Growth Rate % (WGR)	1.5
7	Water Demand (LPD)	
7.1	Design Year (2041)	76305
8	Source Characteristics	
8.1	Source Name	Uphill Source
8.2	Source Type	Natural Stream
8.3	Source Location Coordinate	27°41'24.8"N 86°54'35.8"E
8.4	Safe Yield (lps)	31.1
9	Type of Structures	
9.1	Intake	1 New proposed Source
9.2	Storage Reservoir	12 Cu.m (4m X 2m X1.5 m)
9.3	BPT Chamber (Break pressure tank)	4 (1m X 1m)
9.4	Household Connection	160
9.5	Transmission Line (meter)	3000
9.6	Distribution Network (meter)	5000
10	Total Cost of WS Component (Inclusive of all) NRs	12,077,440

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Executive Summary

This is the Preliminary Design Report (PDR) for Chheskam Town Water Supply Project has been prepared in close consultation of stakeholders and submitted to the client as per the work program proposed in consultant's Technical Proposal to meet requirement of Terms of Reference. The preliminary design assessment is based on technical, social, institutional and financial performances and data as well as on detailed desk analysis of these.
Chheskam, which was previously different Village Development Committee has been merged with other two Village Development committee namely Bung and Gudel and has form new local level body as Mahakulung Rural Municipality. Mahakulung Rural municipality is one of the 753 local levels of Nepal. This state no. 1 of Solukhumbu district. Bounded on three sides of Merapik, Silucho Danda and Kenpa Danda, it is spread over an area of 648.05 sq km and is located between 27.37 'to 27.62' north latitude and 86.50 'to 86.84' east longitude. V.S. According to the 2068 BS census, this Rural municipality with a population of 11,452 has been divided into 5 wards. It is bounded by Sankhuwasabha district on the east, Khumbu Pasanglamu and Sotang municipalities on the west, Khumbupasalhamu municipality on the north and Khotang and Bhojpur districts on the south. The center of this village municipality established on 27th February, 2073 BS is kept at the Bung VDC office of Savik. Kirats, Buddhists and Hindus live in the majority of the Kirat community here.

The service area of proposed Chheskam Village Water Supply and Sanitation Subproject comprises partial ward areas of wards-3 Mahakulung Rural municipality.

Existing Water Supply Situation

Kishodo Water Supply and Sanitation is the only existing piped water system which is nearby project area. Two former sources merged into a new source. The system serves part of ward no. 1 to 3 of the Mahakulung Rural municipality. These transmission lines are about 5 years old. The cumulative length of the transmission line is about 10.0 Km. The entire length of both the transmission line comprises of HDPE pipes.

The distribution pipeline is about 16 Km HDPE pipe networks is serving water to the town. The pipes were not properly laid and the distribution system is not properly maintained with the distribution pipelines exposed in many places. Most of these pipelines are open.

About 100 houses have been connected to the existing distribution system to serve the population. The tapped discharges of the existing system are not sufficient to meet the water demand of the of whole Chheskam area.

Proposed Water Supply System

The service area of the proposed project covers areas of Chheskam of the Mahakulung Municipality. As per social survey total HHs and population are 160 and 1120 respectively in 2021

The forecasted populations of the town are 1508 in 2041 A.D with average weighted growth rate of nearly 1.5%. The amalgamation of various demands based on accepted design criteria of TSTWSSSP has been assessed. While calculating the nodal demand domestic consumption has been considered at ultimate demand i.e.,83 lpcd.

The domestic demand of the town has been adopted in lower side of recommended value. It has been decided due to absence of reliable water sources in the vicinity, most of the HHs on hill top (ridge) with cold climate in all months all the year, a low figure of 83 lpcd from the range of 75 to 100 lpcd per capita demand has been taken from the recommended value of domestic demand.

Design Concept and Project components

The overall concept has been developed with distribution system comprising of household distribution system (DS). The service area has been divided based on elevation difference and proximity of households in a distribution system.

At the same time, it will also reduce pipe cost considerably, provides flexibility to operate the system, avoid excessive large numbers of break pressure tanks and follows principles of DMA.

This system does not have any treatment facilities, a conventional type treatment plant comprising of Settling Basin (SB) have been proposed.

The total capacity of the service reservoir provided in the Chheskam Town water supply project is about 35 CUM. The distribution system comprises of a pipe network, which are branched. The network has been analyzed using EPAnet, a design analytical software tool. The entire system has been designed using HDPE pipes. The size of HDPE pipes is 50 mm and above. In order to have proper saddle arrangement at household connection in distribution pipe, minimum diameter of distribution pipe has been adopted as 50mm.

The total pipe length of the proposed distribution system works out to 6,018m.

INTRODUCTION

Background of the Project

The Water Supply and Sanitation Project (WSSP or the project) will build upon the on-going efforts of the Swiss Hopes Sherpa in providing water supply and sanitation (WSS) services in Chheskam.

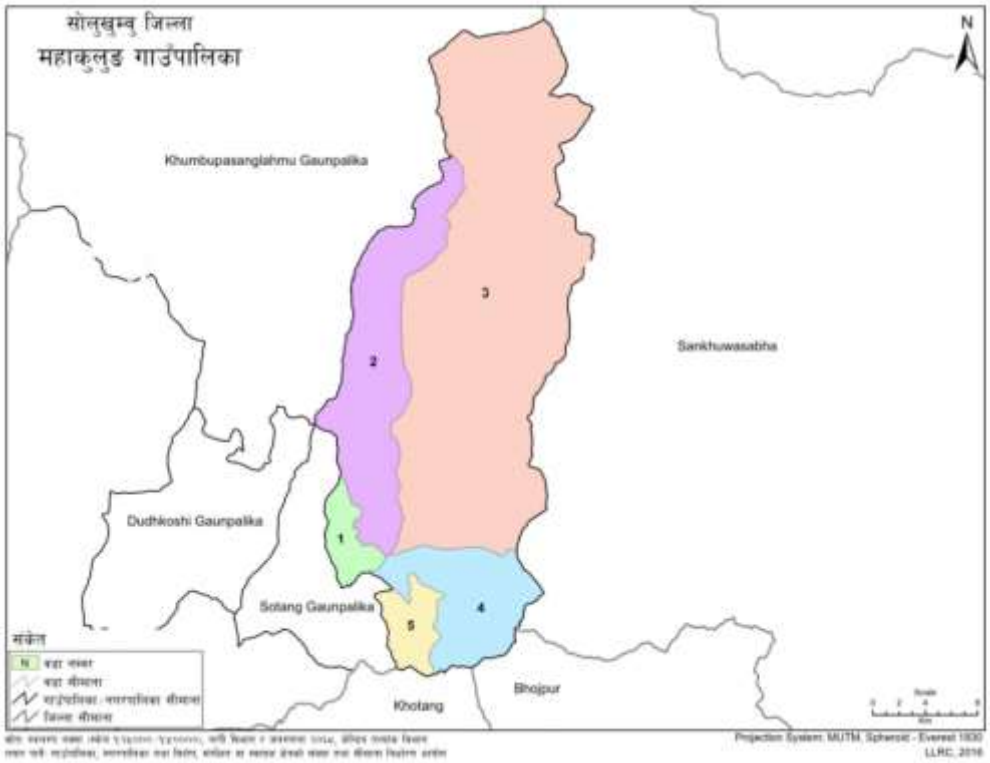
This is the Preliminary Design Report (PDR) for Chheskam Town Water Supply Project prepared in close consultation of Design Team and submitted to the client as per the work program proposed in consultant's Technical Proposal to meet requirement of Terms of Reference (TOR). The overall project strategy is to implement the project in people centered manner by application of participatory approach. This project seems to be effective, reliable, achievable and affordable. The project cost has been evaluated based on the principles of allocable, allowable and reasonable.

Location and accessibility of the Project area

The Project area of Chheskam Water Supply and Sanitation lies in Mahakulung Rural Municipality, Solukhambu District, is a hilly/mountainous district in Sagarmatha Zone in the Eastern Development Region of Nepal. The municipality lies between 27.37 'to 27.62' north latitude and 86.50 'to 86.84' east longitude.

As for Mahakulung (Chheskam), there is approximately Seventeen hours bus drive to Chheskam from Kathmandu by bus. Optionally, a thirty-five minutes flight from Kathmandu to Phaplu is required and road drive from Phaplu to Chheskam would take around Seven hours using local Jeeps.

Mahakulung is the visiting destination for many trekkers. The trek route in Mahakulung has ups and downs in small hills. Trekkers have to go through jungles, cross rivers. A chance to explore flora and fauna. Also, Mahakulung has three beautiful villages with cultures of local inhabitants. The major ethnic group of Mahakulung is Kulung where Sherpa and other lie in the minority. Mahakulung is regarded as one of favourable trip locations because of its heavenly atmosphere. The surrounding area is one of the best scenic locations. Also, it is also a trek route to Silicho peak which is 4150m high above the sea level.



Objectives and Main Approach of the study

The objectives of the feasibility/detailed engineering study include technical, social, environmental, economic and financial analysis of various options and develop the details for project implementation. Therefore, it includes detailed engineering design, cost- estimates, social dimensions, economic and financial analysis

and environmental assessment. The following main considerations were undertaken in order to prepare this engineering design report.

- Existing system has been utilized as far as possible
- Interaction with village representative and consumers has been empathized from the outset of the study

EXISTING SITUATION

Socio-economic Profile

The socio-economic profile has been prepared in detail in wide consultations with different stakeholders and submitted separately

Project Area

The service area of proposed Chheskam Water Supply project comprises ward number 3 of Mahakulung Municipality. As the social surveys have been done before the formation of Chheskam of Mahakulung Municipality, all the social information has been presented in terms of former ward. The service area of the proposed Chheskam Water Supply project comprises ward area of 1. The consultants conducted a socio-economic survey of the proposed service area.

Settlement pattern

The town is located in a hilly area with a heterogeneous ethnic composition. Most of the government and non-governmental offices are located in ward nos. 1 of municipality, which have the thin population.

Ethnicity and caste

The survey revealed that Rai's are the main group of the project area comprising of 100% (160 of total household.

Education and Health

Education

Few public and private institutions such as school and college, bank and financial institution and health post exist within the service area. Most of the educational institutions depend on springs for the water supply. The Education condition of this service area is very primitive.

Health

Medical facilities as small health post are available in this area. The health facilities of this service area is very primitive.

Economic Activities

The economy of the municipality is extensively agrarian although most of the households in the project area depend on more than one occupation as during trekking season most of work as potter and off season as Farmer. During the course of the household survey of the project area, detailed data has been collected about the major occupation and economic activities of all the households. The survey shows that the highest number of the population (about 51%) are engaged in the agriculture sector, whereas the lowest (2.11%) of the households are engaged in industrial work, 6.88% in business,0.6% in service. Similarly, about 4 and 7.51% of household heads are dependent upon remittance and labor, respectively.

Willingness to Tap Connection

According to the study, all 100 % of households are interested to having private tap connection in service area.

Existing Water Supply

Kishodo Water Supply and Sanitation is the only existing piped water system which is nearby project area. Two former sources merged into a new source. The system serves part of ward no. 1 to 3 of the Mahakulung Rural municipality.

Existing Sanitation Situation

Sanitary Facilities

The survey shows that about 91.5% household have ventilated pit latrines. Similarly, 9.5% have pit latrine which seems to be temporary and need to be replaced.

Existing Institutional Situation

Existing Institutions involved in Water Supply and Sanitation Field

The no other institutions are involved in water supply and sanitation sector in the projected area of Chheskam is only to the other parts of the village Ward-3 as the project area is not by any other water supply system.

SURVEY, INVESTIGATIONS AND CONSULTATIONS

As part of this engineering design, all available relevant documents and reports prepared by different agencies have been collected and reviewed to identify requirements of necessary surveys, studies and investigations for the study.

Topographic Survey

The distribution network and transmission line survey of existing system of the project was conducted by a survey team of the consultants during NOV 2021.

Socio-economic Survey

The socioeconomic survey for the project area was conducted by a team in November 2021. The survey included census survey of all area. The survey focused on collection of data on various social and economic conditions relating to water supply and sanitation activities in the area.

Study Assumptions And /Or Limitations

The limitations and/or assumptions built into the study, which has bearings on the project, have been mentioned below.

- Time constraints of the study and their implications on findings as presented in this report.
- Limitations on availability of some information in feasibility report and their impact on evaluations as presented in this report.
- Assumption or hypothesis made on demand/population/development etc. forecasting or anticipating future characteristics.

PROJECT ASSESSMENT AND DESIGN PARAMETERS

Service Area

The delineation of service area of the proposed project has been adopted as per the discussions and decisions. The service area for detail engineering design of Chheskam has been delineated as ward 3 area Water Supply Project.

Assessment of Water Resources

Natural stream found on the top of the hill is purpose as the source and its discharge capacities is found to be adequate for the design population.

Population Growth

The projection of population of project area is based on above assumptions/data has been presented in the Table below.

Ward No.	Growth Rate	Survey Year (2021)		Population Projection		Water Demand Analysis					Avg. Flow	Peak Factor	Design Flow	Remarks
		Total HHs	Population	Base Year (2021)	Design Year (2041)	Domestic Demand	Non Domestic	Total Demand	Leakage & Wastage	Total Demand				
	(%)						10%	(LPD)	15%	(LPD)	(lps)		(lps)	
3	1.5	160	1120	1120	1508	60320	6032	66352	9952.8	76304.8	0.883	2.4	2.119	

The population of service area is expected to be 1,120 in the base year 2021 and is expected to rise to 1,508 by the end of design period in 2041 at average weighted population growth rate of about 1.5%.

Engineering Design and Approach

The broad objectives of the consulting services include detail-engineering design, which includes detailed engineering survey, design, preparation of detailed working drawings, cost- estimates, economic and financial analysis, level of water tariff, bid documents related to water supply and sanitation services for entire households in the service area of Sub-project Town.

While reviewing report of the town and other relevant documents, the following main considerations were undertaken in order to prepare this report.

- Existing system has been utilized as far as possible.
- Interaction with WUSC and consumers has been empathized from the outset of the study.
- Regular co-ordination has been maintained with all concerned stakeholders.

- Orientation and review of other Town Project have become the basis for the preparation of the feasibility/detailed design report.
- Design criteria and parameters developed by the Project Management Office has been utilized as a guideline while preparing the feasibility report/detailed design report.

Water Demand

The water demand of the project town comprises domestic demand, institutional demand and commercial/ industrial demand (constituting non-domestic demand) and fire demand. The respective demands are described below.

Domestic Demand

Primarily it comprises of daily household needs. The domestic demand of the town has been adopted in lower prescribed rate. It has been decided due to almost HHs on hill top (ridge) with cold climate all the year in service area and absence of reliable water sources in the vicinity a low figure from the range of 75 to 100 lpcd per capita demand has been taken from the recommended value of domestic demand.

Non-Domestic Demand

This consists of water demand pertaining to institutions (schools). About 10% of the water demand is taken for the non-domestic demand for these institutions. These institutions have been included in nodal demand calculation.

Leakage/Wastage and others

System leakage, wastage and losses are items, which occur in any water supply system. Based on the quality of work done during the construction of the project and the effectiveness of operation and maintenance of the system, the quantity varies greatly. As the system will be mostly a new system with use of new pipes, it can be expected that the leakage, wastage, theft, unauthorized connection and total unaccounted for water would be at a minimum level. A total of 15% of the total demand has been provided for the leakage and wastage.

Total Water Demand

The amalgamation of various demands described earlier forms the basis for establishing the total water demand of the project. The total daily water demand for Chheskam water supply project has been estimated to be 0.63756 MLD in the base year 2021 and this demand is projected to increase to 0.85842 MLD by the end of design period in 2041.

Demand Allocation

Demand allocation to the nodes has been done using area basis. Nodal areas have been computed based on the half pipe distances on each side making a closed polygon. Depending on the model application scenario as discussed in the sub-sequent sub-sections, the various magnitudes of demands are computed and model is run for that scenario.

Nodal Demand

Water demand at the nodes of the pipeline network is calculated based on the design population to be served at that node. While calculating the nodal demand domestic consumption has been considered at ultimate demand i.e., 83 lpcd. Nodal demand also includes the institutional, wastage and leakage.

Consumption Pattern

The consumption pattern is essential for determining storage requirements. There has been no separate study of water consumption pattern in the project town. So, the consumption pattern of a typical Hilly town in Nepal recommended by PMO has been used for calculating storage capacity. The consumption pattern is as presented in the table below.

Table 4-4: Consumption Pattern

Hours	% Of Total Daily Demand
05:00-07:00	25
07:00-12:00	30
12:00-17:00	15

17:00-19:00	15
19:00-05:00	15

Pipe and Pipe Materials

HDPE pipes are used in the transmission and distribution system in the service area. Pipes with different pressure rating (PN6 and PN10) has been used in the transmission line. The maximum outer diameter of 75 mm has been adopted in the design.

Pressure and Velocity

There must be some residual head or pressure at all the service nodes of a water supply system for the proper functioning during operation. As per DWSS/PMO guideline, a minimum residual head of 7 meters has been maintained at all service nodes. However, in most service nodes an attempt has been made to have 6-10 m residual head. Attempt has been made to have preferably 10m of residual head.

Reservoir Sizing

In order to increase reliability of the system reservoir sizing has been carried out to store minimum of 25-40% of total daily system demand. Incorporation of existing storage tank in proposed system is high priority of the study. A nominal size of 12 cu. M reservoir has been proposed in the design.

Technical Design

Transmission mains, the flow and direction has been designed as loop system. The network has been analyzed using EPAnet, a design analytical software tool.

Scope of the project

The proposed Chheskam Town sub-project has been formulated to provide reliable and continuous drinking water supply in adequate quantity and quality to the consumers of the service area at the desired service level. The project aims to meet the service demand.

WATER SUPPLY SYSTEM

Concept of Project

The Proposed Chheskam Town project is the new water supply project. The proposed components comprise of a new intake from new source transmission lines, additional storage reservoirs, new households' connection and allied structures.

The Chheskam Town project has been conceptualized as a totally gravity surface water system. The overall concept has been developed with distribution system comprising of bulk water system (BDS) and household distribution system (DS).

The transmission components of the system; intake, transmission line, WTP and allied structures, have been designed with a slightly higher capacity (10 %). This has been done to accommodate the additional discharge in transmission systems during wet seasons.

Service Reservoir

The total capacity of the service reservoir provided in the Chheskam Town water supply sub-project is about 12 cubic meters.

RESERVOIR SIZING
For Year 2041 AD

Reservoir 'D' Near Mandir

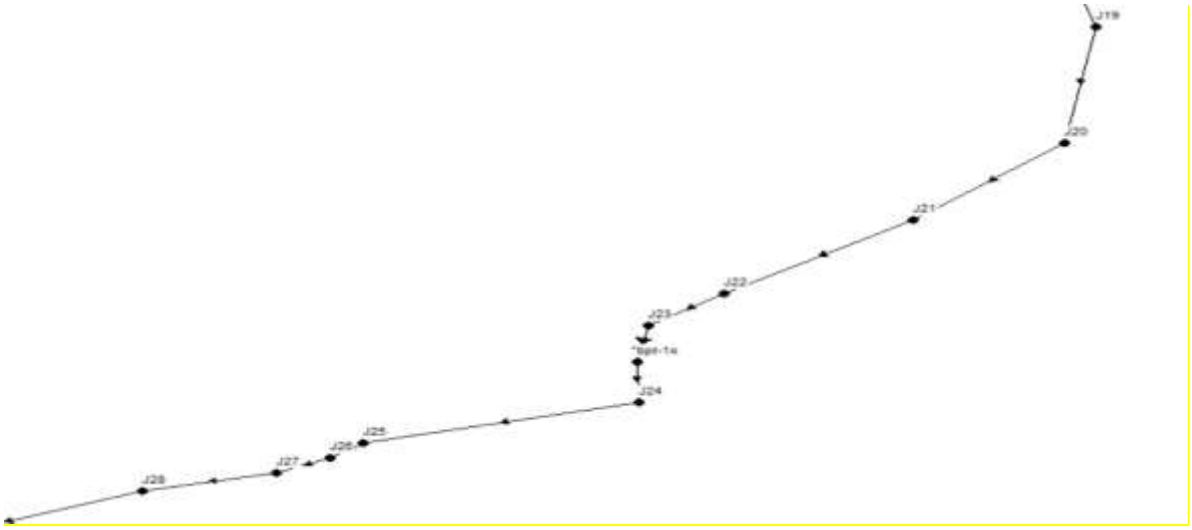
Total Daily Demand (lpd)= 83,000 Litres/day
Required Discharge from Parent RVT 1.50 lps
Proposed Tank Size (litres) = **12000** Litres

Time (Hrs) From	Time (Hrs) To	Demand Pattern (%)	Demand (Lits)	Supply (Lits)	Cummu. Demand (Lits)	Cummu. Supply (Lits)	Surplus/ Deficit (±Lits)	(±) Volumes in Rvt. (Lits)	Cumul. Vol (Lits)
5	7	25.0%	20750	10800	20750	10800	9950	-9950	2050
7	12	35.0%	29050	27000	49800	37800	12000	-2050	0
12	17	20.0%	16600	27000	66400	64800	1600	10400	10400
17	19	20.0%	16600	10800	83000	75600	7400	-5800	4600
19	5	0.0%	0	54000	83000	129600	-46600	54000	12000
Total		100.0%	83000	129600	**Required Tank Size**		**12**	**CUM**	29050

CHECK	Filled during Night	**OK**
	Deficit at any Period	**OK**
	Proposed Capacity (CUM) =	**12**

Break Pressure Tank

Total Four numbers of Break pressure Tank has been purposed in order to maintain the pressure of below 10 so that the purposed HDPE can withstand the pressure and avoid bursting of the pipes. Here in the figure (bpt-1x) shows the position of break pressure tank.



Distribution Main

The distribution system comprises of a pipe network, which are looped in certain cases and branched in other. The network has been analyzed using EPAnet, a design analytical software tool. The entire system has been designed using HDPE pipes. For proper saddle arrangements at household connections in the distribution pipe, minimum diameter of distribution pipe has been adopted as 50mm.

The total pipe length of the proposed distribution system works out to 6,018m.

PIPE SUMMARY

PIPE RATING	Pipe Diameter	TOTAL DISTRIBUTION
6 KG HDPE	50	3460
	63	567
	75	225
	Sub-Total	***4,252***
10 KG HDPE	50	936
	63	830
	75	-
	Sub-Total	***1,766***
TOTAL		***6,018***

House Connection

The system has been designed for private house connections. All the connections are new HHs connections.

Unit Rate Analysis

Unit rate of most of the work items for the project has been established by utilizing Construction Norms of GON (Second Revised Edition, 1993). Reasonable interpolation or extrapolations in inputs of material and labor have been done for few items, which are not mentioned in the GON Norms. This has been done based on past experience and inputs used by recently implemented projects of similar nature.

Rates of construction materials, transportation and that of skilled and unskilled manpower have been taken from approved district rates of Solukhamnbu District for the current fiscal year (2077/78 BS). The market price of commonly used items (other than DI Pipe, DI Fittings and its appurtenances) are used from the approved district rate. Unit price of some of the common items, which are not available in the district rate, especially electrical, plumbing items, has been used from Kathmandu district rate.

However, market price of items such as Ductile Iron Pipes, Ductile Iron Fittings, bigger diameter Valves, etc (selective items) are neither available in local market of Nepal nor mentioned in approved district rates. Most of such rates have to be obtained from manufactures. As there are various types of items, the market prices are not available from a single manufacturer or agent. Therefore, in order to establish market prices of those items within relatively short period of time, unit prices used or established by Kathmandu Valley Water Supply and Sanitation Improvement Project have been used. Additional 20% of unit cost for transportation (Kathmandu-Chheskam) has been added to corresponding unit rate of DI pipes and Fitting of Kathmandu.

Quantity and Cost Estimations

Quantities of all construction works including general items have been performed using standard engineering practices. Based on the unit rates derived in the rate analysis and the unit quantity, unit cost estimates have been prepared. The total cost estimate of the system has been estimated based on unit cost estimates. The abstract of the cost has been prepared by identifying the quantity of work and unit rate analysis. The relevant details of cost estimates are given in the Appendices.

An additional 10% of the cost is provided for physical and price contingencies plus 13% VAT in order to estimate final cost of the system.

Capital Cost of Water Supply System

The capital cost for the proposed system, as described above, is summarized in the table below. Details of the capital cost breakdown are presented in Appendix A to this report.

Table 5-5: Capital Cost of Water Supply System (in NRs)

ABSTRACT OF COST
WATER SUPPLY COMPONENT

S.No	Description of Items	Qty	Unit	Rate	Amount
Civil and Pipe Works					
1	Preparation of New Source.	1	Nos	300,000	300,000
2	Construction of Break Pressure Tank.	4	Nos	275,000	1,100,000
3	Construction of Water Reservoir Tank.	1	Nos	1,800,000	1,800,000
4	Supplying of pipes as per the design.	1	Set	2,950,000	2,950,000
5	Laying of different size of pipes as per the design.	1	Set	2,750,000	2,750,000
6	Fitting of different size of pipes as per the design.	1	Set	1,500,000	1,500,000
7	Providing Tap Connections to the individual houses.	160	Nos	1800	288,000
		Sub Total			**10,688,000**
		13% VAT			**1,389,440**
		TOTAL			**12,077,440**

Benefits

Chheskam Town project has been designed to improve the quality of life of the people in the project area by facilitating water supply and sanitation facilities. It consists of extraction of water and supplying this to the consumers. The project will supply quality water, make it easily available round the clock water supply service. The main benefits of the subproject are listed below:

- The project will supply water to all households of the project area, which will provide water for 24-hours at sufficient quality and quantity.
- Availability of sufficient water improves sanitary conditions.
- The water supply project will help develop hotels and resorts in the project area and in this way promote tourism.
- Some other potential benefits of the project could be increase in the role of women in decision-making processes; time savings and the impact on the domestic life of the women; generation of more of employment opportunities; increased level of economic activities and the positive impact on the overall socio-economic status of the people; and further growth in institutional capability of the units in the area.

IMPLEMENTATION ARRANGEMENTS

Implementation Schedule

The proposed Chheskam Town Water Supply and Sanitation project comprises of single lot. A project implementation schedule reflecting the nature and size of the project has been developed. A total of 6 months construction period is allocated.

Procurement and Contract Packaging

All procurement to be made using Swiss Hope Sherpa Fund loan proceeds will be carried out in accordance. The work will mainly be all civil works. However, it includes the pipes within the civil works' contract. This not only simplifies management, but also ensures that only one contractor is responsible for the whole system. There will be very little equipment procurement. Hence, only civil works contracts will be procured.

CONCLUSION & RECOMMENDATION

In the true spirit of demand driven approach, the community has been in the fore front with respect to making informed decision-making and contributing towards the cost of the proposed system for the desired service level. The proposed system has been found to be socially, environmentally, technically and financially viable, which gives clear indication of the future sustainability of the system.