

DANDA TOLE WATER SUPPLY PROJECT
Roshi Rural Municipality-11, Danda Tole
Kavrepalanchok District, Nepal

PROJECT REPORT
ON
DETAIL ENGINEERING SURVEY, DESIGN
AND COST ESTIMATE

Prepared and Submitted By:

Danda Tole Water Supply User's Committee
Roshi Rural Municipality-11, Danda Tole
Kavrepalanchok District, Nepal

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Background of the Project Area

1. General Introduction

The development of rural water supply project has been on the high priority of the government planning in Nepal. Although the achievement so far in providing piped drinking water supply is limited, due to the various factors, as lack of source, high cost for small project etc. Constant effort are being made by government, non-governmental organization and private sector to fulfill need of the communities and global commitment.

Following the directives of the Nepal government has adopted a community based approach in the implementation of rural water supply projects. Emphasis has also been laid on the promotion of sanitation and personal hygiene maintaining linkages of these activities with water supply. Formation of Water Users' Committee (WUC) has been made a pre-requisite condition for the communities to implement water supply scheme. High emphasis is given to schemes with hardship, committed people's participation and substantial contribution of local level inputs like local manpower and materials.

The proposed **Danda Tole** water supply project is Gravity Flow water supply system with distribution by yard connection i.e. connection of water supply line in each houses.

2. Location

The **Danda Tole** Water Supply Project covers Danda Tole and Bhanjyang communities of the Roshi Municipality ward no. 11 of Kavre district. This Rural Municipality is situated in the east of Kathmandu followed by BP Highway.



3. Accessibility

The project area lies near the main road of BP Highway. There are 90 km blacked topped road from Kathmandu and 14 km earthen road up to project site. This highway connects the community to the market place to procure pipes and other construction materials required to the water supply project.

4. Existing Situation

There are some existing system in the project area but the existing situation of water supply is poor in this area. The existing system covers big number of households of the various clusters, the old project installed before 35 years, pipeline leakage and broken etc. causes irregular water supply and sometimes water abandoned for more than a week. Moreover, the existing water source is decreased drastically after devastated earthquake in 2015, resulting more scarcity to get water. So the community proposed new water project to manage the water problem.

5. Demography of the community

The present population of the proposed project area is 226 distributed in 41 households. Major inhabitant are Tamang, Magar, Damai and Sarki. Damai and Sarki are Dalits caste and are deprived minorities. The community has less households, irregular geography and no access to the government and others to ask their water project. So they could not get support since a long year and waiting for some kind people to hear their water problem. Major spoken & written language is Tamang and Nepali. There is a Buddha Baal Primary School at the community and has 59 students and staffs.

6. Economic Characteristics

Main occupation of the people living in the area is agriculture and wage labor in the village. Some people of the community is engaged in transportation means and wage labors in town within Nepal and overseas too. Economic condition of the local people is very low as they have less land and monsoon crops only. Food sufficiency from their agriculture product is less than 6 months, so need to search labor work but it is seasonal, temporary and difficult to find as there is many unemployed youth. So the community can't contribute in cash but ready to contribute labor to build their water project.

7. Availability of Construction Materials

Non-local construction materials like cement, steel rod, pipes and pipe fittings shall be procured and transported up to the project site from nearest market as Banepa or Kathmandu. Other local materials like stone, sand, wood are available in the nearby area of the project. Sand shall be collected from Roshi River which is nearest among other quarry site.

8. Scheme Identification

Considering the topography, population, settlement pattern, source availability and ease of operation and maintenance, this gravity flow schemes has been proposed to construction for proper water supply. The system is surveyed and designed to supply water to the consumers through private tap stand connected to water collection reservoir. The purpose of this survey is to supply water and to help on the improvement of general livings of rural people and hygiene condition as well.



9. Environmental Consideration

The proposed water supply project and their routes are surveyed in such a way that the alignment does not pass through the geologically instable zones, wildlife conservation areas, dense forest. System components do not bring any remarkable environmental disruptions. Due consideration has been given while selecting the site of reservoir and other structures for safe disposal of waste water so that it does not create erosion, gulling and pollution hazards.

10. Community Contribution

In the proposed project the beneficiaries have expressed their willingness to participate their share of cost as kind contribution. They are ready to provide land needed for various structures free of cost. The earthwork in excavation and backfilling of pipeline and unskilled labor contribution for making foundations of civil structures can be contributed from the community people.

11. Sustainability of the Project

The operation of the proposed systems is fairly simple and can be managed by the beneficiaries through WUC. Operation and maintenance cost is recoverable from water tariff. Therefore, it can be safely assumed that the project is sustainable by beneficiaries themselves. Water supply commodity is regarded as the entry point for all other development goals. Hence without providing safe and reliable water supply facilities it is harder to think of development of the community. Implementation of this water supply scheme is expected to bring improvements in livelihood in this community. Community people are aware in this regard and project is highly recommendable in view of water supply need in the project area.

12. Project Cost

Rate analysis is done based on the prevailing government approved norms and the approved district rate of Kavre district. Even though some of the rates are taken from the community as they are practicing now. Total estimated cost of the project is NRs. 6,636,705. The expected donor and community contribution is Nrs. 4,977,321 (75%) and NRs. 1,659,384 (25 %) of total estimated cost respectively.

Project Design Consideration

1. Issues to be considered in the design

Data are generated from the engineering detailed survey work of the coverage area of water supply project. According to detail survey report, the water source was selected and considered for design purpose upon the discussion and finalization of the local people as far as possible. The source considered for the scheme is the spring. This scheme is designed in the basis of gravity flow system.

Different sizes of Ferro-cement are adopted for the construction. The scheme is designed by considering daily demand as 60 litre per capita per day (lpcd) and 10 litre for day students. Other components are designed by following the Drinking Water Supply Scheme (DWSS) guideline. Detail Cost & quantity estimate is prepared in accordance with approved norms, district rate, prevailing community rates and departmental standard and specifications.

2. Water Quality Management

Proposed water source is spring and the source is colorless, odorless and clear. It is observed that the water sources are natural, no access of human and animals and almost free from contamination, so except the simple physical unit process components, no water treatment units are incorporated in the design purposes. Implementing Office has to aware the people for adopting the household water treatment processes for ensuring the water quality.

3. Design Criteria

1. The basic design criteria adopted as per DWSS guideline is as follows, the population growth rate of district according to census 2016. The population growth rate is assumed as 1.0 percent for design purposes.
2. Geometrical progression method has been used to compute the design population.
3. Presuming a minimum of 2 years would be required to complete the project, base year is considered as 2022 and design period is taken as 20 years which would be 2042.
4. White Colebrook formula & the Darcy - Weisbach equation is used to calculate hydraulic head losses in the pipeline.
5. Distribution main is designed following the consumption pattern where peak factor is taken as minimum 3.
6. As far as possible minimum residual head of is maintained in the each openings and taps.
7. As far as possible velocity is maintained between 0.3 to 3 m/s.
8. Water demand is computed as follows: (as per DWSS guide line). Per capita water demand is taken 60 litres per capita per day.

Salient Features of the Project

Name of Project: Danda Tole Water Supply Project

Location: Roshi Rural Municipality-11, Kavre

A. General			
1	Name of Rural Municipality		Roshi
2	Wards Covered		11
3	Number of scheme		Scheme - 1
4	Type of scheme		New
5	Name of Community		Danda Tole, Bhanjyang
6	Name of Source		Chambote Khola Mul
7	Type of Source		Spring
8	Safe yield (L/S)		0.40
9	Water Quality of Source		Good
10	Households (Survey year:2020)	No.	41
11	Population (Survey year:2020)	No.	226
12	School (Survey year:2020)	No.	1
13	Student and Staff (Survey year:2020)	No.	100
14	Population (Design year:2042)	No.	292
15	Design Period	Yrs.	20
16	Base Period (Construction Period)	Yrs.	2
17	Annual growth rate	%	1.00
18	Per Capita Daily Demand	L/D	60.00
19	Total Water Demand (Design Year)	L/D	32,870
B. Project Components			
1	Spring intake (without VC)	No.	1
2	Ferrocement Reservoir (Nos/capacity)	No.	16 cum-1 no.
3	Nos. HH Connection + School	No.	42
4	Total Number of CC,VC & AVC	No.	8
5	Transmission Main pipe line	Km	5.412
6	Distribution Pipe Line	Km	1.859
7	Total Pipe Line	Km	7.271
8	Total HH Connection Pipe Line	Km	0.84
9	GI Crossing	No.	3
10	Cable Crossing	No.	1
C. Financial			
1	Total Estimated Project Cost (NRs)		6,636,705
2	Donor Contribution (NRs)		4,977,321
3	Donor Contribution %		75.00%
4	Community Contribution (NRs)		1,659,384
5	Community Contribution %		25.00%
6	Per Capita Cost at Present Population (NRs)		29,366

Estimated by:
Guna Bdr. Lama
Engineer

Recommended by

Project Cost Contribution

Project Name: Danda Tole Water Supply Project

SN	Items	Amount (NRs)	Donor Contribution (NRs)	Community Contribution (NRs)	Remarks
A	Water Supply				
A1	Civil Works				
1	Detailed Survey & Design Work	1 10 000.00	1 10 000.00		
2	Spring intake (without VC)	63 707.94	63 707.94		
3	Ferrocement Reservoir Tank - 16cum	4 43 683.17	4 43 683.17		
4	Air Valve Chamber	37 121.30	37 121.30		
5	Washout Valve Chamber	1 53 099.68	1 53 099.68		
6	Collection Chamber	1 33 282.48	1 33 282.48		
7	Suspended Cable	2 76 855.51	2 76 855.51		
	Sub-Total (A1)	12 17 750.08	1217750	0	
A2	Materials & Equipment				
1	Pipes	15 30 168.30	15 30 168.30		
2	Fittings	2 96 623.08	2 96 623.08		
3	Tools & Plants	77 659.25	77 659.25		
4	Transportation of Pipes, Fittings & Tools)	63 912.64	63 912.64		
	Sub-Total (A2)	1,968,363	1,968,363	0	
A3	Pipeline works (digging and back filling)				
1	Transmission	15 47 916.48	11 42 416.48	4 05 500.00	
2	Distribution	5 81 328.64		5 81 328.64	
	Sub-Total (A3)	2,129,245	1,142,416	986,829	
A4	Tap Stand (Private connection)				
1	Household connection	6 72 555.24		6 72 555.24	
	Sub-Total (A4)	672,555	0	672,555	
	Total A (A1+A2+A3+A4)	5,987,913	4,328,529	1,659,384	
B	Capacity Building Training				
1	Training to Water Users' Committee on construction, operation & Maintenance, Book Keeping and Project sustainability- 3 events	50 000.00	50 000.00		
	Total (B)	50 000.00	50 000.00	0.00	
C	Technical Cost				
1	Supervision and monitoring @ 5 % of (A) - technical	2 99 396.00	2 99 396.00		
	Total (C)	2 99 396.00	2 99 396.00	0.00	
D	Overhead Cost (Transportation, monitoring and miscellaneous)				
1	Project overhead @ 5% of (A)	299,396	299,396		
	Total (D)	299,396	299,396	0	
	Total Cost (A+B+C+D)	6,636,705	4,977,321	1,659,384	

timated by:

Recommended by:

Summary of Cost

Project Name: Danda Tole Water Supply Project

SN	Items	Unit	Unit Rate	Scheme - 1	
				Qty	Amount (Rs.)
A	Water Supply				
A1	Civil Works				
1	Detailed Survey & Design Work	no	1 10 000.00	1	1 10 000.00
2	Spring intake (without VC)	no	63 707.94	1	63 707.94
3	Ferrocement Reservoir Tank 16 cum	no	4 43 683.17	1	4 43 683.17
4	Air Valve Chamber	no	18 560.65	2	37 121.30
5	Washout Valve Chamber	no	38 274.92	4	1 53 099.68
6	Collection Chamber	no	1 33 282.48	1	1 33 282.48
7	Suspended Cable	no	2 76 855.51	1	2 76 855.51
	Sub-Total (A1)				12 17 750.08
A2	Materials & Equipment				
1	Pipes	km		7.271	15 30 168.30
2	Fittings	%		100%	2 96 623.08
3	Tools & Plants	%		100%	77 659.25
4	Transportation of Pipes, Fittings & Tools)	%		100%	63 912.64
	Sub-Total (A2)				1,968,363
A3	Pipeline works (digging and back filling)				
1	Transmission	km		4.95	15 47 916.48
2	Distribution	km		1.86	5 81 328.64
	Sub-Total (A3)				2,129,245
A4	Tap Stand (Private connection)				
1	Household connection with tap	no	16 013.22	42	6 72 555.24
	Sub-Total (A4)				672,555
	Total A (A1+A2+A3+A4)				5,987,913
B	Capacity Building Training				
1	Training to Water Users' Committee on construction, operation & Maintenance, Book Keeping and Project sustainability- 3 events		50 000.00	1	50 000.00
	Total (B)				50,000
C	Technical Cost				
1	Supervision and monitoring @ 5 % of (A) - technical			1	299,396
	Total (C)				299,396
D	Overhead Cost (Transportation, monitoring and miscellaneous)				
1	Project overhead @ 5% of (A)			1	299,396
	Total (D)				299,396
	Total Cost (A+B+C+D)				6,636,705
Total Cost of Project (NPR.):					6,636,705

Estimated by:

Recommended by:

Transportation of Pipes, Fittings and Tools

Danda Tole Water Supply Project

Sn	Items	Unit	Unit Rate	Scheme # 1	
				Qty	Amount
1	Pipes (HDPE + GI)	kg	10.72	5235	56 119.20
2	Fittings	kg	10.72	584	6 260.48
3	Tools	kg	10.72	143	1 532.96
	Total (Rs.)			5 962.00	63 912.64

Prepared By :

Checked By :

Approved By :

Cost of Tools

Project Name: Danda Tole Water Supply Project
 Rural Municipality: Roshi
 Ward no.: 11

Types of Tools	Unit	Unit wt. (kg)	Unit Price (NRs.)	8-15 KM		
				Qty	Wt.	Amount
Shovel	Pc	2.00	510	8	16.00	4080
Pick Axe	Pc	5.00	515	8	40.00	4120
Crowbar 1"x5'	Pc	5.00	850	2	10.00	1700
Sledge Hammer 10 lbs	Pc	11.00	1700	2	22.00	3400
Stone Chisel 1" * 6"	Pc	5.50	170	3	16.50	510
Stone Chisel 1" * 12"	Pc	2.00	240	2	4.00	480
Tool Box with Locking set	Pc	1.00	2000	1	1.00	2000
Heating Plate (150 mm dia)	Pc	2.50	1200	1	2.50	1200
Teflon Cover (20 cm * 20 cm) -bag	Pc		391	5	0.00	1955
Thermocrome Crayon	Pc		650	10	0.00	6500
Blow Torch	Pc	1.00	2200	1	1.00	2200
Pipe Wrench - 14"	Pc	1.50	1300	1	1.50	1300
Pipe Wrench - 18"	Pc	2.40	2000	1	2.40	2000
Hacksaw Frame	Pc	0.50	200	1	0.50	200
Hacksaw Blade	Dz	0.60	200	5	3.00	1000
Adjustable Spanner 18"	Pc	0.40	300	1	0.40	300
Iron Pan (medium size)	Pc	1.00	182	3	3.00	546
Pointing Trowel	Pc	0.10	59	3	0.30	177
Building Trowel	Pc	0.25	95	3	0.75	285
Iron Brush	Pc	0.15	66	2	0.30	132
Die - Set 1/2 " - 1" with Teeth	Set	5.00	7890	1	5.00	7890
Die - Set 1 1/2 " - 2" with Teeth	Set	8.00	12700	1	8.00	12700
Spare Die - Set 1/2 " - 2"	Set	2.50	5600	1	2.50	5600
Racet die for nut bolt	Set	1.50	7600	1	1.50	7600
Measuring Tape 30 m	Pc	0.75	850	1	0.75	850
TOTAL Rs.					142.9	68725.00
Vat 13%						8934.25
Grand Total						77659.25

Scheme No.	KM	Amount
Scheme-1	8-15 km	77659.25

Quantity and Cost of Pipes

Danda Tole Water Supply Project

Scheme:1

S.No.	Pipe size and series	Unit	Quantity	Rate	Amount	Weight	Unit wt.
1	HDPE pipes						
	20 mmØ 10 kg/cm ²	m		44.22	0.00	0.00	0.134
	25 mmØ 10 kg/cm ²	m	495	66.66	32 996.70	99.99	0.202
	32 mmØ 10 kg/cm ²	m	165	110.22	18 186.30	55.11	0.334
	40 mmØ 10 kg/cm ²	m	1980	169.62	3 35 847.60	1 017.72	0.514
	50 mmØ 10 kg/cm ²	m	561	262.68	1 47 363.48	446.56	0.796
	63 mmØ 10 kg/cm ²	m		418.77	0.00	0.00	1.269
	32 mmØ 6 kg/cm ²	m	495	74.58	36 917.10	111.87	0.226
	40 mmØ 6 kg/cm ²	m		115.50	0.00	0.00	0.35
	50 mmØ 6 kg/cm ²	m	2871	178.86	5 13 507.06	1 556.08	0.542
	63 mmØ 6 kg/cm ²	m	242	280.50	67 881.00	205.70	0.85
	75 mmØ 6 kg/cm ²	m		393.03	0.00	0.00	1.191
	Subtotal HDPE pipe				11 52 699.24		
	VAT 13%				1 49 850.90		
	Total HDPE pipe		6809		1302550.14	3493.03	
	GI Pipe						
	15 mmØ medium class	m		141.00	0.00	0.00	1.28
	20 mmØ medium class	m		192.00	0.00	0.00	1.65
	25 mmØ medium class	m		291.00	0.00	0.00	2.54
	32 mmØ medium class	m		372.00	0.00	0.00	3.27
	40 mmØ medium class	m	462	436.00	2 01 432.00	1 741.74	3.77
	50 mmØ medium class	m		600.00	0.00	0.00	5.32
	Subtotal GI pipe				2 01 432.00		
	VAT 13%				26 186.16		
	Total GI pipe		462		227618.16	1741.74	
	Total Pipes (HDPE+GI)		7271		1530168.3	5234.77	

Estimated by

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Laying & Jointing of HDPE and GI Pipes

Danda Tole Water Supply Project

Sn	Items	Unit	Unit Rate	Scheme # 1	
				Qty	Amount
A	HDPE Pipes				
1	16-20-25 mm Ø 10 kg/cm ²	m	5.75	495	2 846.25
2	32 mm Ø 6,10 kg/cm ²	m	7.04	495	3 484.80
3	40-50 mm Ø 4,6,10 kg/cm ²	m	8.52	5412	46 110.24
4	63-90 mm Ø 4,6,10 kg/cm ²	m	115.66	242.00	27 989.72
	Total A		6 644.00	6 644.00	80 431.01
B	GI Pipes				
1	15 -20 mm Ø GI (Medium Class)	m	125.06		0.00
2	25-32 mm Ø GI (Medium Class)	m	172.50	0	0.00
3	40-50 mm Ø GI (Medium Class)	m	235.03	462	1 08 583.86
	Total B				1 08 583.86
	Total (A+B)			6644.0	

Prepared By :

Checked By :

Approved By :

Earthwork In Excavation & Backfilling for Pipeline Works

Danda Tole Water Supply Project

Scheme no : 1

Sn	Description	Length	Breadth	Height	Quantity	Unit	Rate	Amount
A	<u>Transmission line</u>							
	E/W in excavation in ordinary soil	4950	0.40	0.60	1188.00	m ³	651.48	7 73 958.24
	E/W in backfilling with ordinary soil	4950	0.40	0.60	1188.00	m ³	651.48	7 73 958.24
	Sub-total				4950			15 47 916.48
B	<u>Distribution line</u>							
	E/W in excavation in ordinary soil	1859	0.40	0.60	446.16	m ³	651.48	2 90 664.32
	E/W in backfilling with ordinary soil.	1859	0.40	0.60	446.16	m ³	651.48	2 90 664.32
	Sub-total				1859		Rs.	5 81 328.64
	Total cost of pipeline works						Rs.	21 29 245.12

Estimated by

Checked by

Approved by

Cost of Fittings

Name of Project : Danda Tole Water Supply Project

S. N.	Description	Unit	Weight (kg)	Unit rate (Rs.)	Scheme-1										
					INT1	CC	AVC	WVC	RVT1	GI Crossing	Pipe Line	Total Quantity	Total Amount (Rs.)	Total Weight	
					1	1	3	4	20cum-1	3					
A	FITTINGS														
1	Brass Union with Adapter														
	25 mm Φ	pc	0.25	474.00					1			1.00	474.00	0.25	
	32 mm Φ	pc	0.35	670.00			4	2	1			7.00	4690.00	2.45	
2	GI Elbow														
	15 mm Φ	pc	0.10	46.00					6			6.00	276.00	0.60	
	25 mm Φ	pc	0.20	115.00					2			2.00	230.00	0.40	
	32 mm Φ	pc	0.30	165.00				2	3			5.00	825.00	1.50	
	40 mm Φ	pc	0.40	242.00		7		2				9.00	2178.00	3.60	
	50 mm Φ	pc	0.68	370.00	1	1			6			8.00	2960.00	5.44	
3	GI Nipple Short														
	15 mm Φ	pc	0.10	50.00			5		2			7.00	350.00	0.70	
	25 mm Φ	pc	0.20	97.00					3			3.00	291.00	0.60	
	32 mm Φ	pc	0.30	130.00			4	4				8.00	1040.00	2.40	
	40 mm Φ	pc	0.40	160.00		3		4				7.00	1120.00	2.80	
	50 mm Φ	pc	0.68	210.00	1	1			4			6.00	1260.00	4.08	
4	GI Socket														
	25 mm Φ	pc	0.25	80.00					1			1.00	80.00	0.25	
	32 mm Φ	pc	0.40	120.00					2			2.00	240.00	0.80	
	40 mm Φ	pc	0.56	170.00						20		20.00	3400.00	11.20	
	50 mm Φ	pc	0.87	268.00					4			4.00	1072.00	3.48	
5	GI Union														
	15 mm Φ	pc	0.22	115.00					2			2.00	230.00	0.44	
	25 mm Φ	pc	0.30	220.00					1			1.00	220.00	0.30	
	50 mm Φ	pc	1.13	580.00					1			1.00	580.00	1.13	
	Strainer 50	pc	3.00	1314.00	1	1						2.00	2628.00	6.00	
6	GM Gate Valve														
	25 mm Φ	pc	0.65	1744.00					1			1.00	1744.00	0.65	
	32 mm Φ	pc	1.05	2624.00				2				2.00	5248.00	2.10	
	40 mm Φ	pc	1.45	3567.00		1		2				3.00	10701.00	4.35	
	50 mm Φ	pc	1.87	5500.00	1	1			2			4.00	22000.00	7.48	
7	GM Globe Valve														
8	GI/HDP flange set														
	40 mm Φ	pc	3.75	1205.00	1	1	2	2		6		12.00	14460.00	45.00	
	50 mm Φ	pc	4.75	1500.00					1			1.00	1500.00	4.75	

Cost of Fittings

Name of Project : Danda Tole Water Supply Project

S. N.	Description	Unit	Weight (kg)	Unit rate (Rs.)	Scheme-1									
					INT1	CC	AVC	WVC	RVT1	GI Crossing	Pipe Line	Total Quantity	Total Amount (Rs.)	Total Weight
					1	1	3	4	20cum-1	3				
	40 mm Φ	pc	1.50	1670.00							80	80.00	133600.00	120.00
9	GI equal Tee													
	15 mm Φ	pc	0.13	66.00		1			2			3.00	198.00	0.39
	40 mm Φ	pc	0.56	267.00		1						1.00	267.00	0.56
10	Reducer GI													
	50 mm Φ - 40mmΦ	pc		165.00	1	1						2.00	330.00	
11	GI unequal Tee													
	25x25x15 mm Φ	pc	0.23	160.00					1			1.00	160.00	0.23
	32x32x15 mm Φ	pc	0.35	221.00			1					1.00	221.00	0.35
	40x40x15 mm Φ	pc	0.50	281.00		1	2					3.00	843.00	1.50
	50x50x15 mm Φ	pc	0.70	448.00					1			1.00	448.00	0.70
12	Air Valve													
	Air Valve 15 mm	pc	0.40	2460.00			3					3.00	7380.00	1.20
	Sub-Total (A)												223244.00	237.68
B	GI PIPES													
	15 mm Φ (mc)	mtr	1.28	125.00		0.8			8			8.80	1100.00	11.26
	25 mm Φ (mc)	mtr	2.54	258.00					6			6.00	1548.00	15.24
	32 mm Φ (mc)	mtr	3.27	330.00					4			4.00	1320.00	13.08
	40 mm Φ (mc)	mtr	3.77	386.00	0.7	2.6				54		57.30	22117.80	216.02
	50 mm Φ (mc)	mtr	5.32	531.00	0.7	0.7			9			10.40	5522.40	55.33
	Drain-HDPE-75/2.5kgf	mtr	1.19	254.87		10			20			30.00	7646.10	35.70
	Sub-Total (B)												39254.30	346.63
	Total (A+B)												262498.30	584.31
	Vat 13%												34124.78	
	Grand Total												296623.08	

Spring Intake

(Without valve chamber)

Danda Tole Water Supply Project

S.N.	Description	No.	Length	Breadth	Height	Quantity	Unit	Rate	Amount
	Total length of wing walls		2.50 m	Size of C.C			x		
	Height of structure		0.40 m						
1	Site Clearance		5.00	3.00		15.00	m ²	208.47	3 127.05
2	Earthwork in excavation in foundation								
	Wing Wall		2.21	1.30	0.50	1.44			
	Catchment portion					0.00			
	Pipe trench for washout		5.00	0.45	0.50	1.13			
	water diversion and drainage ditch		5.00	0.50	0.50	1.25			
						3.82	m ³	1,302.95	4 977.27
3	Plain Cement Concrete (1:2:4)								
	Wing Walls		2.21	1.30	0.10	0.287			
	Catchment Portion					0.000			
	At the top of Wing Wall		2.50	0.45	0.10	0.113			
	Lintel over drywall					0.000			
	for fencing iron angle pole	6.00	0.23	0.23	0.40	0.127			
	For cover slab		2.21	1.30	0.10	0.287			
	Deduct :								
	Manhole Cover					0.000			
	Total					0.814	m ³	23,313.12	18 976.88
4	Stone masonry in 1:4 c-s mortar								
	Wing Wall		2.21	0.45	0.40	0.40			
	Walls of CC					0.00			
	Deduction								
	for embeddment block	7.00	0.23	0.23	0.40	-0.15			
	for dry wall					0.00			
	Total					0.25	m ³	18,361.82	4 590.46
5	Dry stone masonry		1.52	0.9	0.4	0.55	m ³	6,527.69	3 590.23
6	Steel reinforcement								
	8mm φ bars @ 150c/c both ways								
	for cover slab	15	1.30	@ 0.395 kg/m		7.70			
		15	2.20	@ 0.395 kg/m		13.04			
	Deduction for Manhole Opening					0.00			
	Total					20.74	kg	174.01	3 608.97
7	Centering & shuttering works for RCC/PCC								
8	12.5mm thick 1:3 cement sand plaster								
	inside of wing walls		3.08	-	0.40	1.23	m ²		
	outside of wng wall		4.46		0.40	1.78			
	Floor of CC		1.52	0.90	-	1.37			
	top of wall		2.50		0.45	1.13			
	Total plastering work					5.51	m ²	654.42	3 605.85
9	3mm 1:1cement sand punnig	as plastering work				5.51			
	Deduct for outside of walls		4.46		0.40	-1.78			
						3.73	m ²	402.68	1 502.00
10	Boulder Packing								0.00
11	Standard Manhole Cover 60cm*60cm size								0.00
12	Iron angle pole for fencing					7.00	pc	800.00	5 600.00
13	Barbed wire fencing	1				15	kg	120	1 800.00
14	Entrance gate in fencing	1				1	pc	5000	5 000.00
	Subtotal								56 378.71
	Add Value Added Tax							@ 13.00%	7 329.23
	Total Amount with VAT							Rs.	63 707.94

Estimated by

Checked by

Approved by

Collection Chamber (CC)

Inner size of chamber = 1.00 x 1.00 Total height = 1.00

S.N.	Description	No.	Length	Breadth	Height	Quantity	Unit	Rate	Amount
1	Site clearance		3	2		6	m ²	208.47	1 250.82
2	Earthwork in excavation for fondation work in hard soil								
		1	1.90	1.90	1.00	3.61	m ³	2071.69	7 478.80
3	Dry stone soling	1	1.90	1.90	0.15	0.54	m ³	4502.25	2 431.22
4	Plain Cement Concrete (1:2:4)								
	in foundation	1	1.90	1.90	0.10	0.361			
	Pipe embeddment block	5	0.45	0.20	0.20	0.090			
	top of baffle wall	1	1.00	0.35	0.10	0.035			
	for fencing iron angle pole	12	0.23	0.23	0.40	0.254			
	Cover slab	1	1.90	1.90	0.10	0.361			
	Deduct:								
	-Manhole cover	2	0.60	0.60	0.05	-0.036			
	Total					1.065	m ³	23313.12	24 828.47
5	Stone masonry work in 1:4 c-s mortar								
	CC portion	1	5.80	0.45	1.00	2.61			
	baffle wall	1	1.00	0.35	0.60	0.21			
	Deduct - for PCC blocks	5	0.45	0.20	0.20	-0.09			
	Total					2.73	m ³	18361.82	50 127.77
6	Centering & shuttering work for PCC/RCC								
	Bottom of cover slab - CC portion	1	0.65	1.00		0.65			
	-Outer edge of cover slab	1	7.60	-	0.10	0.76			
	Total form work					1.41	m ²	789.94	1 113.82
7	Steel reinforcement								
	8 mm ø @ 150 mm c/c bothways	6	1.90	@ 0.395 kg/m		4.50			
		14	0.70	@ 0.395 kg/m		3.87			
	Total reinforcement					8.37	kg	174.01	1 456.46
8	12.5 mm thick 1:4 c-s plaster								
	floor of CC	1	0.65	1.00		0.65			
	Inner sides of Walls of CC	2	0.65	-	1.00	1.30			
		2	1.00	-	1.00	2.00			
	Side of baffle wall	2	1.00		0.70	1.40			
	top of baffle wall	1	1.00	0.35		0.35			
	Outer portion of all walls above GL	1	7.60	-	0.30	2.28			
	Total					7.98	m ²	637.11	5 084.14
9	3 mm thick 1:1 c-s punning								
	as per plaster					7.98			
	Deduct for outer portion					-2.28			
	Total					5.70	m ²	402.68	2 295.28
10	Supply and installation of standard man hole cover - 600×600 mm ²	2				2	set	2321.16	4 642.32
11	Iron angle pole for fencing					12.00	pc	800.00	9 600.00
12	Barbed wire fencing	1				22	kg	120	2 640.00
13	Entrance gate in fencing	1				1	pc	5000	5 000.00
	Subtotal								1 17 949.10
	Add Value Added Tax						@ 13.00%		15 333.38
	Total Amount							Rs.	1 33 282.48

Estimated by

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Ferrocement Storage Tank

16 m³ Capacity

Diameter, d = **3.5** m Tank wall height, h = **1.9** m
 Dome height, = **0.6** m

S.N.	Description	No.	Radius	Length/ Radius	Breadth	Height	Qty.	Unit	Rate	Amount
1	Site Clearance(L= d+2*2.0m,B=d+1m)			8.00	6.00		48.00	m ²	208.47	10 006.56
2	Earthwork in excavation for foundation in									
	Valve Chamber			1.70	1.50	1.30	3.32			
	Storage tank	π	2.55	2.55	-	1.80	36.77			
	(Q = π x R ² x h, R = d/2+0.05+0.75									
	Total						40.09	m ³	1302.95	52 235.27
3	Earthwork in back filling with									
	in storage tank : total trench (π*R ² *h')	π	2.55	2.55	-	1.30	26.56	m ³		
	Deduct tank portion (π*r ² *h'): r=d/2+.05	π	1.80	1.80	-	1.30	-13.23	m ³		
	Net backfilling work						13.33	m ³	651.48	8 684.23
4	Stone soling work									
	Valve Chamber			1.70	1.50	0.15	0.38			
	Storage tank	π	2.05	2.05	-	0.20	2.64			
	(Q = π x r ² x h, r = d/2+0.05+0.25									
	deduction for overlapping with VC portion			1.70	0.40	0.20	-0.14			
	Total						2.88	m ³	4502.25	12 966.48
5	Stone masonry in 1:6 c-s mortar									
	Valve Chamber			5.00	0.35	1.15	2.01	m ³	16838.99	33 846.37
6	Plain cement concrete (1:2:4)									
	Cover slab of valve chamber			1.70	1.50	0.10	0.255			
	Deduction for manhole opening	π	0.30	0.30	-	0.05	-0.014			
	(Q = p x r ² x h, r = 0.30)									
	Manhole Cover of tank	π	0.30	0.30	-	0.05	0.014			
	Angle pole base	20		0.23	0.23	0.40	0.423			
	Total						0.678	m ³	23313.12	15 806.30
7	Plain Cement Concrete (1:1.5:3)									
	for tank base(Q = π x r ² x h, r = d/2+0.05+0.10	π	1.90	1.90	-	0.125	1.418	m ³	25717.83	36 467.88
8	Steel reinforcement									
	for VC slab cover 8 mmφ bars @ 15 cm c/c both ways									
	Longer span	11	1.70		@ 0.395 kg/m		7.39			
	Shorter span	12	1.50		@ 0.395 kg/m		7.11			
	Deduction for manhole opening	8	0.60		@ 0.395 kg/m		-1.90			
	Total						12.60	kg	174.01	2 192.53
9	Shuttering works for RCC									
	- Cover slab bottom			1.00	0.80		0.80			
	Side			6.40	-	0.10	0.64			
	Deduction for manhole opening	π	0.30	0.30			-0.283			
	Total						1.16	m ²	789.94	916.33
10	HDPE formwork for ferrocement									
	- Wall portion (Q = 2 x π x r x h, r = d/2+.025)	2π	1.78		-	1.90	21.25			
	- Roof portion	2π	2.93			0.60	11.05			
	Q = 2 x π x R x h, R = ((d+.05) ² +4h ²)/8h,h=dome height									
	- Deduction for manhole opening Q=πr ² , r=0.30	π	0.30	0.30			-0.28			
	Total form work						32.02	m ²	480.78	15 394.58
11	Bar binding work including chicken wire mesh,									

Estimated by

Checked by

Approved by

Valve Chamber

(Washout/Air Valve)

Danda Tole Water Supply Project									
	Inner dimension		0.60 m x		0.6 m				
S.N.	Description	No.	Length	Breadth	Height	Quantity	Unit	Rate	Amount
1	Site Clearance		2.00	2.00		4.00		208.47	833.88
2	Earthwork in excavation for foundation								
		1	1.30	1.30	1.30	2.20	m ³	1302.95	2 866.49
3	Boulder soling with sand	1	1.30	1.30	0.15	0.25	m ³	4502.25	1 125.56
4	Stone masonry in 1:6 c-s mortar		3.80	0.35	1.00	1.33	m ³	16838.99	22 395.86
5	Plain Cement Concrete (1:2:4)								
	Cover slab	1	1.30	1.30	0.100	0.170			
	Deduction for manhole		0.60	0.60	0.100	-0.113			
	Manhole cover		0.60	0.60	0.05	0.057			
	Total					0.114	m ³	23313.12	2 657.70
6	Steel reinforcement								
	8 mm ø at 150 mm spacing bothways								
	Longer span	10	1.30	@ 0.395 kg/m		5.14			
	Shorter span	10	1.30	@ 0.395 kg/m		5.14			
	Deduction for manhole opening	12	0.45	@ 0.395 kg/m		-2.13			
	Total					8.15	kg	174.01	1 418.18
7	Centering & Shuttering work for RCC								
	Cover slab bottom	1	0.60	0.60	-	0.36			
	Sides	1	5.20	-	0.10	0.52			
	Deduction for manhole opening	1	0.75	0.75	-	-0.56			
						0.32	m ²	789.94	252.78
9	Installation of pipes & fittings								0.00
10	Standard manhole cover 60*60 cm with metal frame					1	no.	2321.16	2 321.16
	Subtotal								33 871.61
	Add Value Added Tax						@ 13.00%		4 403.31
	Total Amount with VAT							Rs.	38 274.92

Estimated by

Checked by

Approved by

Tap Stand Post (Household Connection)

Danda Tole Water Supply Project

S.N.	Description	No.	Length	Breadth	Height	Quantity	Unit	Rate	Amount
1	Site Clearance		2.00	2.00		4.00	m ²	208.47	833.88
2	Earthwork in excavation for foundation in								
	foundation	1	1.20	1.20	0.20	0.29			
	Total					0.29	m ³	1302.95	377.86
3	Boulder soling with sand								
	foundation	1	1.20	1.20	0.20	0.29			
	Total					0.29	m ³	4502.25	1 305.65
4	Plain Cement Concrete in (1:2:4)								
	Foundation	1	1.20	1.20	0.10	0.144			
	Platform border1	1	2.30	0.10	0.10	0.023			
	Platform border2	1	1.00	0.25	0.05	0.013			
	Post	1	0.65	0.25	0.25	0.041			
	Total					0.221	m ³	23313.12	5 152.20
5	Stone masonry in 1:6 c-s mortar								
	Total					0.00	m ³	16838.99	0.00
6	20 mm thick cement plaster in 1:4 c-s mortar								
	outer edge	4	1.00	0.10		0.40			
	Inner edge	2	1.45	0.10		0.29			
	Top of platform and edges	1	1.00	1.00		1.00			
	Post	4	0.65	0.25		0.65			
	Total					2.34	m ²	829.45	1 940.91
7	Centering & Shuttering work for PCC								
	Platform border	4	1.20	-	0.10	0.48			
	Platform border inside	2	1.45	-	0.10	0.29			
	Post	4	0.65	-	0.25	0.65			
	Total					1.42	m ²	789.94	1 121.71
	Subtotal								10 732.21
	Add Value Added Tax							#####	1 395.19
	Total Amount with VAT							Rs.	12 127.40

A	FITTINGS				Qty	Amount	Weight
1	Brass union 15 mm Φ	pc	0.11	230.5	2	461.04	0.22
2	GI Elbow 15 mm Φ	pc	0.1	48.59	2	97.18	0.2
3	GI Nipple Short 15 mm Φ	pc	0.1	35.03	3	105.09	0.3
4	GI Socket 15 mm Φ	pc	0.13	44.07	2	88.14	0.26
5	Brass Ferrule heavy 15 mm Φ	pc	0.45	853.2	1	853.15	0.45
6	PVC saddle Tee with washer,nut,bolt etc					0	0
	32 x32x20mm Φ	pc	0.4	246.9	1	246.9	0.4
	40 x40x20mm Φ				1		
	50 x50x20mm Φ				1		
	25 x25x20mm Φ				1		
	20 x20x20mm Φ				1		
7	Brass Tap 15 mm Φ (400 gm)	pc	0.4	500	1	500	0.4
8	GI Pipe 15 mm Φ (mc)	mtr	1.28	135.6	1.5	203.4	1.92
9	HDPE 20mm dia-10kg/cm2	mtr	0.13	39.37	20	787.4	2.6
10	HDPE 32mm dia-6kg/cm3	mtr	0.23	66.4	1	66.4	0.23
11	Globe valve 20mm Φ	pc	0.68	395	1	395	0.68
	Total					3803.7	7.66
	Transportation	kg	7.66	10.72		82.12	
	Grand Total					3885.82	

Total Amount per Tap (materials and fittings with transportation)	16013.22
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Estimated by

Checked by

Approved by

Detail Estimate of Suspended crossing (66m length)

Project Name: *Danda Tole Water Supply Project*
 District: *Kavre*
 R. Municipality: *Roshi* Ward: *11*
 Name of Village Served: *Danda Tole, Bhanjyang*

S.n.	Descripton	No.	Length	Breadth	Height	Quantity	Unit	Rate	Amount (Rs.)
1	E/W Excavation								
	R / B	1	2.0	2.0	1.0	2.00	m3		
	L /B	1	2.0	2.0	1.0	2.00	m3		
					Total	4.00	m3	1,302.95	5211.8
2	PCC(1:2:4)								
	Tower foundation	2	0.60	0.60	0.10	0.07	m3		
	Top of tower	2	0.40	0.40	0.10	0.03	m3		
	Anchor block	2	1.00	0.50	0.50	0.50	m3		
					Sub-Total	0.60	m3	20,584.66	12350.796
3	Rubble stone masonry(1:4)								
	Tower	2	0.40	0.40	0.50	0.16	m3	16,838.99	2694.2384
4	Dry stone masonry								
	Anchorage block	2	2.00	2.00	1.00	8.00			
	Additional load	2	2.00	2.00	0.50	4.00			
					Sub-Total	12.00	m3		
	Deduction								
	Anchorage block	-2	1.00	0.50	0.50	-0.50			
	Tower foundation	-2	0.60	0.60	0.10	-0.07			
					Total deduction	-0.57	m3		
					Net Total	11.43	m3	16,838.99	192469.6557
4	20mm dia.Reinforcement for anchorage block (@2.47kg/m)								
	Anchore bar	2	0.90			1.80	m		
	Hook	2	1.60			3.20	m		
					Total	5.00			
						12.35	kg	174.01	2149.0235
6	Plain wire(3.5mm)					20.00	kg	115.00	2300
7		63/6	mm HDP cover pipe			80.00	m	280.50	22440
8		13	mm dia. Bulldog grips			8	pcs.	155.00	1240
9		13	mm dia. Cable			80.00	m	450.00	36000
					Total				276855.5136

Estimated by :

Checkedd by

Design of Suspension Crossing-1

Project Name: *Danda Tole Water Supply Project*
 District: *Kavre*
 R. Municipality: *Roshi* Ward: *11*
 Name of Village Served: *Danda Tole, Bhanjyang*

For Inclined cable crossing in sloped ground.

Weight of Cable dia. (mm)	13 Wc	=	0.643 kg/m	
Weight of pipe mm/kg/cm ²	50/6 Wp	=	0.540 kg/m	
Wt. of cover Pipe mm/kg/cm ²	63/6 Wpc	=	0.850 kg/m	
Weight of water in pipe per metre	50/6 Ww	=	1.399 kg/m	
Weight of Plainwire		=	0.20 kg/m	
Sub Total weight per metre length of crossing	Wt	=	3.63 kg/m	
Wind force (15% of Wt)	Ww	=	0.54 kg/m	
Total weight per metre length of crossing	W	=	4.17	
Length of Span	S	=	100.00 m	
R L of Left bank	Lower side	=	1488.00 m	
R L of Right bank	Lower side	=	1488.00 m	
HFL=		=	1480.00 m	
Level defference(h)		=	0 m,	
Distance (L _n),	Higher side	=	1.8 m	
Distance (L _L),	Lower side	=	1.8 m	
Tower height(H)		=	0.65 m	RL of Higher saddle = 1488.65
Tower height(H)		=	0.65 m	RL of Lower saddle = 1488.65
Sag at mid Span(Y)	S / 22	=	4.55 m	
Lowest point from L /F(Fmin)	(4Y-h) ² /16Y	=	4.55 m	RL= 1484.10
Free board (Fb)	EL-HFL-Fmin	=	4.10 m	Hence, ok
Calculation of horizontal Tension (t)	WS ² /8Y	=	1145.60 kg	
Calculation of angle (β)				
Higher foundation	Tan β ₁ =(4Y+h)/S	=	10.31 deg.	
Lower foundation	Tan β ₂ =(4Y-h)/S	=	10.31 deg.	
Calculation of total tension in the cable with a safety factor of 4.	T= 4t/cosβ	=	4657.6 kg	Hence, Selected cable size is ok
Calculation of required cable length	L=S(1+1/2(h/S) ² +8/3(Y/ε	=	100.55 m	
Total cable length	L _{Total} =L+Back stay +3m over lapping=		107.38 m	

Estimated by :

Checkedd by

SLIDING CHECK

Right Bank

v	L	B	H	Qty
v-1	2.0	2.0	1	4.00
v-2	0.4	0.4	0.6	0.10
v-3	2.0	2.0	0.5	2.00

Weight of structure	(W)	6.1 m3	2100 Kg/m3	12810 Kg
Angle of forestay cable	(β)	10.31 Deg		
Total cable tension	(T)	4658 Kg		
Inclination of anchorage block	(α)	0 Deg		
Angle of internal friction of soil				
-Sub soil	(φ1)	32 Deg		
-Back filling	(φ2)	30 Deg		
Inclination of back fill soil	(ψ)	0 Deg		
Unit weight of moist soil	(γ)	2000 kg/m3		
Height of active earth pressure(0.5+h)	(ha)	1 m		
Length of the foundation	(L)	1 m		
Coefficient of earth pressure	(λ ah)	0.74	$(\cos^2(\phi_2)/(1+\sqrt{(\sin(\phi_2-\psi)/\cos 2/3 \phi + \cos \psi)})$	

OUTPUT

Weight of structure	(W)	12810 Kg
Tv	=	Sin β x t = 833.66
Th	=	Cos β x t = 4582.8
Eah	=	λ ah x 0.5 x γ x (ha) ² x L = 740
Eav	=	Eah x Tanδ = 269.34
Total weight(Wv)	=	W+Tv+Eav = 13913
Total weight(Wh)	=	Th+Eah = 5322.8
Angle of resultant force(δR)	=	Tan ⁻¹ (Wh/Wv)= 20.936 deg

Factor of security against sliding (Fsl)= $\tan \phi_1 / \tan(\delta R - \alpha) = 1.63$ **Hence Safe**

Left Bank

v	L	B	H	Qty
v-1	2.0	2.0	1	4.00
v-2	0.4	0.4	0.6	0.10
v-4	2.0	2.0	0.5	2

Weight of structure	(W)	6.1 m3	2100 Kg/m3	12810 Kg
Angle of forestay cable	(β)	10.31 Deg		
Total cable tension	(T)	4658 Kg		
Inclination of anchorage block	(α)	0 Deg		
Angle of internal friction of soil				
-Sub soil	(φ1)	32 Deg		
-Back filling	(φ2)	30 Deg		
Inclination of back fill soil	(ψ)	0 Deg		
Unit weight of moist soil	(γ)	2000 kg/m3		
Height of active earth pressure	(ha)	1 m		
Length of the foundation	(L)	1 m		
Coefficient of earth pressure	(λ ah)	0.74	$(\cos^2(\phi_2)/(1+\sqrt{(\sin(\phi_2-\psi)/\cos 2/3 \phi + \cos \psi)})$	

OUTPUT

Weight of structure	(W)	12810 Kg
Tv	=	Sin β x t = 833.66
Th	=	Cos β x t = 4582.8
Eah	=	λ ah x 0.5 x γ x (ha) ² x L = 740
Eav	=	Eah x Tanδ = 269.34
Total weight(Wv)	=	W+Tv+Eav = 13913
Total weight(Wh)	=	Th+Eah = 5322.8
Angle of resultant force(δR)	=	Tan ⁻¹ (Wh/Wv)= 20.94 deg

Factor of security against sliding (Fsl)= $\tan \phi_1 / \tan(\delta R - \alpha) = 1.63$ **Hence Safe**

Estimated by :

Checked by

Water Demand and Tap Flow Calculation

Project Name: Danda Tole Water Supply Project
 District: Kavrepalanchok RM: Roshi
 Ward No: 11
 Name of Village Served: Danda Tole, Bhanjyang

Peak Factor 3
 Base Year 2
 Design Year 20
 Population Increment 1.00 %

Description of Tap		Domestic Water Demand					Institutional Water Demand			Total Water Demand	Tap Flow Calculation					Remarks
		Nos of HH	Present Population (P)	Base Population (Po)	Design Population (Pn)	Total Domestic Demand (lpd)	No. of Pupil in School (Nos)	Other Institutional Demand (lpd)	Total Institutional Demand (lpd)		Average Tap Flow (lps)	Peak Factor (Factor)	Peak Flow (lps)	Design flow (lps)	Adjusted Peak factor (lps)	
[1]	[2]	[3]	[4]	[5]	[6]	[8]=[6]*[7]	[9]	[10]	1]=[9]*10+1	[12]=[8]+[11]	[13]=[12]/86400	[14]	[15]=[13]*[14]	[16]	[17]=[16]/[13]	[18]
Sub-scheme-I_RVT-I		RVT-2														
Per Capita Demand			60													
Per Capita Demand for Student			10													
1	Bhanjyang-1	2	11	12	15	900		700	700	1,600	0.02	3	0.06	0.10	5.26	
2	Bhanjyang-2	3	17	17	21	1,260		1,050	1,050	2,310	0.03	3	0.08	0.15	5.56	
3	Swara	3	17	17	21	1,260		1,050	1,050	2,310	0.03	3	0.08	0.15	5.56	
4	Danda Tole -1	2	11	12	15	900		700	700	1,600	0.02	3	0.06	0.10	5.26	
5	Danda Tole -2	6	33	34	42	2,520		2,100	2,100	4,620	0.05	3	0.16	0.30	5.56	
6	Danda Tole -3	6	33	34	42	2,520		2,100	2,100	4,620	0.05	3	0.16	0.30	5.56	
7	Danda Tole -4	4	22	23	29	1,740		1,400	1,400	3,140	0.04	3	0.11	0.20	5.41	
8	Danda Tole -5	5	28	29	36	2,160		1,750	1,750	3,910	0.05	3	0.14	0.25	5.43	
9	Danda Tole -6	3	17	17	21	1,260		1,050	1,050	2,310	0.03	3	0.08	0.15	5.56	
10	School	1	6	6	8	480	100	350	1,350	1,830	0.02	3	0.07	0.10	4.55	
11	School Tole-1	3	17	17	21	1,260		1,050	1,050	2,310	0.03	3	0.08	0.15	5.56	
12	School Tole-2	3	17	17	21	1,260		1,050	1,050	2,310	0.03	3	0.08	0.15	5.56	
13	School Tole-3	3	17	17	21	1,260		1,200	1,200	2,460	0.03	3	0.09	0.15	5.17	
TOTAL		41	226	235	292	17,520	100	14,350	15,350	32,870				2.25		

Reservoir Tank Sizing

SCHEME NAME : Danda Tole Water Supply Project

LOCATION : WARD NO : 11 RM : Roshi DISTRICT : Kavrepalanchok

a) Scheme Information

a.1 Reservoir Tank No:	1		
a.2 Served Standposts / Ferruel Regulator Chamber	1 to 12		
a.3 Average Design Demand to be Supplied through Reservoir	0.38 l/s =	32870.0 l/day	
a.4 Available Minimum flow from the Source (Safe Yield)	0.400 l/s		
<i>Is greater than demand : Flow to Reservoir is adopted same as Yield</i>			
a.5 Adjusted/Optimized supply to Reservoir from Source	0.400 l/s =	34560.0 l/day	
a.6 Total Design Flows of all Standposts :	2.250 l/s		

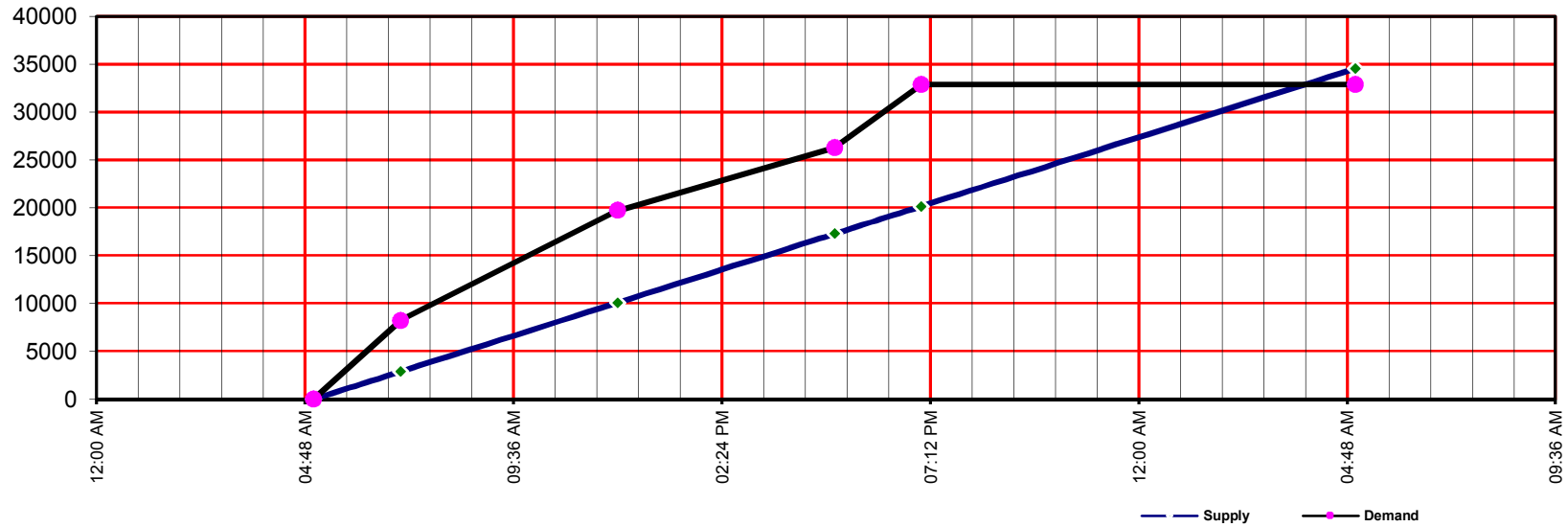
b) Reservoir sizing assuming Continuous System using Consumption Patterns

Time Period		Hours	Water Consumption (%)	Cummu. Supply (lt)	Cummu. Demand (lt)	Surplus (lt)	Deficit (lt)
From	To						
5:00 AM	7:00 AM	2	25.0%	2880	8218		5338
7:00 AM	12:00 AM	5	35.0%	10080	19722		9642
12:00 AM	5:00 PM	5	20.0%	17280	26296		9016
5:00 PM	7:00 PM	2	20.0%	20160	32870		12710
7:00 PM	5:00 AM	10	0.0%	34560	32870	1690	

Maximum Deficit 12710 lt
 Minimum required Reservoir capacity 12.71 cum
 Provide Reservoir of capacity **16.00** cum 49% of Average Demand

Check if Reservoir gets filled during night (7:00 PM - 5:00 AM)

Volume of water collected during night 14.40 cum



Max Deficit 12710 lt = 12.71 cum
 Provide Reservoir Capacity of **16.00** cum

c) Recommended Reservoir Size

Recommended Size for RVT 01 = **16.00** cum Time to Fill the RVT **11.11** Hr

HYDRAULIC CALCULATIONS

Project Name: Danda Tole Water Supply Project

District: Kavrepalanchok RM: Roshi

Ward No: 11

Name of Village Served: Danda Tole, Bhanjyang

Pipe Line Design from CW Method

S. No.	Pipe Line		Length		Design Discharge Q	Direction	Reduced Level		Level Diff.	New Static Level	Total Head Available	Max. Static Pressure	PIPE USED					Friction Factor	Head Loss	Residual Head	Flow Velocity	Hydraulic Gradient Line		Soil Type	Remarks				
													HDPE			G.I.						From	To						
	From	To	Actual	Design	O.D.	Class	I.D.	N.B.	Class																				
	[1]	[2]	(m)	(m)	(mm)	(kg/cm ²)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)

Sub-scheme-I

Intake to CC, RVT and Taps																										
1	INT	CC	11	11	0.400	D	1520.00	1517.00	3.00	1520.00	3.00	3.00	50.00	6.0	42.20			0.0348	0.04	2.96	0.29	1520.00	1519.96	OS	Intake-1	
2	CC	P4	550	550	0.400	D	1517.00	1500.00	17.00	1517.00	17.00	17.00	50.00	6.0	42.20			0.0348	1.94	15.06	0.29	1517.00	1515.06	OS	CC	
3	P4	P10	363	363	0.400	D	1500.00	1494.00	6.00	1517.00	0.87	23.00	50.00	6.0	42.20			0.0348	1.28	71.59	0.29	1515.06	1513.78	OS		
4	P10	P20	330	330	0.400	D	1494.00	1470.00	24.00	1517.00	43.78	47.00	50.00	6.0	42.20			0.0348	1.17	42.61	0.29	1513.78	1512.61	OS		
5	P20	WO1	264	264	0.400	D	1470.00	1457.00	13.00	1517.00	55.61	60.00	50.00	6.0	42.20			0.0348	0.93	54.68	0.29	1512.61	1511.68	OS		
6	WO1	AV1	330	330	0.400	D	1457.00	1485.00	-28.00	1517.00	26.68	60.00	50.00	6.0	42.20			0.0348	1.17	25.51	0.29	1511.68	1510.51	OS		
7	AV1	P47	297	297	0.400	D	1485.00	1488.00	-3.00	1517.00	22.51	32.00	50.00	6.0	42.20			0.0348	1.05	21.46	0.29	1510.51	1509.46	OS		
8	P47	P48	66	66	0.400	D	1488.00	1488.00	0.00	1517.00	21.46	29.00	50.00	6.0	42.20			0.0348	0.23	21.23	0.29	1509.46	1509.23	OS		
9	P48	P60	495	495	0.400	D	1488.00	1464.00	24.00	1517.00	45.23	53.00	50.00	6.0	42.20			0.0348	1.75	43.48	0.29	1509.23	1507.48	OS		
10	P60	WO2	330	330	0.400	D	1464.00	1435.00	29.00	1517.00	72.48	82.00	50.00	10.0	38.00			0.0345	1.87	70.61	0.35	1507.48	1505.61	OS		
11	WO2	P77	231	231	0.400	D	1435.00	1437.00	-2.00	1517.00	68.61	82.00	50.00	10.0	38.00			0.0345	1.31	67.30	0.35	1505.61	1504.30	OS		
12	P77	P91	462	462	0.400	D	1437.00	1452.00	-15.00	1517.00	52.30	80.00				40	M	0.0564	3.40	48.90	0.32	1504.30	1500.90	OS		
13	P91	AV2	132	132	0.400	D	1452.00	1457.00	-5.00	1517.00	43.90	65.00	40.00	10.0	30.30			0.0341	2.29	41.61	0.55	1500.90	1498.61	OS		
14	AV2	WO3	627	627	0.400	D	1457.00	1440.00	17.00	1517.00	58.61	77.00	40.00	10.0	30.30			0.0341	10.88	47.73	0.55	1498.61	1487.73	OS		
15	WO3	P120	198	198	0.400	D	1440.00	1448.00	-8.00	1517.00	39.73	77.00	40.00	10.0	30.30			0.0341	3.44	36.29	0.55	1487.73	1484.29	OS		
16	P120	AV3	231	231	0.400	D	1448.00	1462.00	-14.00	1517.00	22.29	69.00	40.00	10.0	30.30			0.0341	4.01	18.28	0.55	1484.29	1480.28	OS		
17	AV3	WO4	363	363	0.400	D	1462.00	1425.00	37.00	1517.00	55.28	92.00	40.00	10.0	30.30			0.0341	6.30	48.98	0.55	1480.28	1473.98	OS		
18	WO4	RVT	132	132	0.400	D	1425.00	1452.00	-27.00	1517.00	21.98	92.00	40.00	10.0	30.30			0.0341	2.29	19.69	0.55	1473.98	1471.69	OS		
RVT to Branches																										
1	RVT	B1	165	165	0.400	D	1452.00	1436.00	16.00	1452.00	16.00	16.00	32.00	6.0	26.90			0.0340	5.22	10.78	0.70	1452.00	1446.78	OS		
2	B1	B2	99	99	0.300	D	1436.00	1432.00	4.00	1452.00	14.78	20.00	32.00	6.0	26.90			0.0355	1.87	12.91	0.53	1446.78	1444.91	OS		
3	B2	B3	165	165	0.150	D	1432.00	1411.00	21.00	1452.00	33.91	41.00	25.00	10.0	18.90			0.0396	4.95	28.96	0.53	1444.91	1439.96	OS		
RVT to Branches																										
1	RVT	B4	77	77	1.850	D	1452.00	1435.00	17.00	1452.00	17.00	17.00	63.00	6.0	53.30			0.0274	1.39	15.61	0.83	1452.00	1450.61	OS		
2	B4	P62	165	165	1.750	D	1435.00	1406.00	29.00	1452.00	44.61	46.00	63.00	6.0	53.30			0.0276	2.65	41.96	0.78	1450.61	1447.96	OS		
3	P62	J1	132	132	1.750	D	1406.00	1406.00	0.00	1452.00	41.96	46.00	50.00	6.0	42.20			0.0279	6.95	35.01	1.25	1447.96	1441.01	OS		
4	J1	J2	33	33	1.450	D	1406.00	1403.00	3.00	1452.00	38.01	49.00	50.00	6.0	42.20			0.0284	1.23	36.78	1.04	1441.01	1439.78	OS		
5	J2	J3	264	264	0.950	D	1403.00	1380.00	23.00	1452.00	59.78	72.00	40.00	10.0	30.30			0.0304	23.56	36.22	1.32	1439.78	1416.22	OS		
6	J3	B11	33	33	0.500	D	1380.00	1380.00	0.00	1452.00	36.22	72.00	40.00	10.0	30.30			0.0329	0.87	35.35	0.69	1416.22	1415.35	OS		
7	B11	B12	132	132	0.400	D	1380.00	1362.00	18.00	1452.00	53.35	90.00	32.00	10.0	23.80			0.0341	7.82	45.53	0.90	1415.35	1407.53	OS		
8	B12	B13	264	264	0.150	D	1362.00	1370.00	-8.00	1452.00	37.53	90.00	25.00	10.0	18.90			0.0396	7.93	29.60	0.53	1407.53	1399.60	OS		
Junction 1 to branches																										

HYDRAULIC CALCULATIONS

Project Name: Danda Tole Water Supply Project

District: Kavrepalanchok RM: Roshi

Ward No: 11

Name of Village Served: Danda Tole, Bhanjyang

Pipe Line Design from CW Method

S. No.	Pipe Line		Length		Design Discharge Q	Direction	Reduced Level		Level Diff.	New Static Level	Total Head Available	Max. Static Pressure	PIPE USED				Friction Factor	Head Loss	Residual Head	Flow Velocity	Hydraulic Gradient Line		Soil Type	Remarks
							From	To					From	To	HDPE						G.I.			
	[0]	[1]	[2]	[3]	[4]	[5]	(L/R/U/D)	(m)	(m)	(m)	(m)	(m)	O.D.	Class	I.D.	N.B.]Class	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)

1	J1	B5	66	66	0.300	D	1406.00	1416.00	-10.00	1452.00	25.01	46.00	32.00	6.0	26.90			0.0355	1.25	23.76	0.53	1441.01	1439.76	OS																																																																																																							
Junction 2 to branches																																																																																																																															
1	J2	B6	66	66	0.500	D	1403.00	1411.00	-8.00	1452.00	28.78	49.00	32.00	6.0	26.90			0.0330	3.20	25.58	0.88	1439.78	1436.58	OS																																																																																																							
2	B6	B7	99	99	0.200	D	1411.00	1408.00	3.00	1452.00	28.58	44.00	32.00	6.0	26.90			0.0383	0.88	27.70	0.35	1436.58	1435.70	OS																																																																																																							
Junction 3 to branches																																																																																																																															
1	J3	B8	33	33	0.450	D	1380.00	1375.00	5.00	1452.00	41.22	77.00	32.00	10.0	23.80			0.0337	2.43	38.79	1.01	1416.22	1413.79	OS																																																																																																							
2	B8	B9	33	33	0.300	D	1375.00	1370.00	5.00	1452.00	43.79	82.00	25.00	10.0	18.90			0.0359	3.65	40.14	1.07	1413.79	1410.14	OS																																																																																																							
3	B9	B10	33	33	0.150	D	1370.00	1366.00	4.00	1452.00	44.14	86.00	25.00	10.0	18.90			0.0396	0.99	43.15	0.53	1410.14	1409.15	OS																																																																																																							
<table style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td colspan="5">Design pipe Line</td> <td>Existing</td> <td>New</td> <td>GI</td> <td colspan="17"></td> </tr> <tr> <td colspan="5">Transmission Line</td> <td>5,412.00</td> <td>-</td> <td>4,950.00</td> <td>462.00</td> <td colspan="17"></td> </tr> <tr> <td colspan="5">Distribution Line</td> <td>1,859.00</td> <td>-</td> <td>1,859.00</td> <td>-</td> <td colspan="17"></td> </tr> <tr> <td colspan="5">Total Pipeline</td> <td>7,271.00</td> <td>-</td> <td>6,809.00</td> <td>462.00</td> <td colspan="17"></td> </tr> </table>																									Design pipe Line					Existing	New	GI																		Transmission Line					5,412.00	-	4,950.00	462.00																		Distribution Line					1,859.00	-	1,859.00	-																		Total Pipeline					7,271.00	-	6,809.00	462.00																	
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Total Pipeline					7,271.00	-	6,809.00	462.00																																																																																																																							

Survey data Calculation

(Altimeter/Abney Level)

Project Name : Danda Tole Water Supply Project
District : Kavrepalanchok
Ward No.: 11
VDC : Roshi

Village Served : Danda Tole, Bhanjyang

Station		Inclined Length	Ground Distance (m)		Vertical Height (m)	Reduced Level	Remarks
From	To		Length	Chainage			
Scheme-1							
Intake to RVT							
INT						1520.00	Intake, Chambote Khola
INT	CC	10.00	11.00	11.00	-3.00	1517.00	Collection Chamber (CC)
CC	P1	90.00	99.00	110.00	-2.00	1515.00	
P1	P2	180.00	198.00	308.00	-3.00	1512.00	
P2	P3	140.00	154.00	462.00	-8.00	1504.00	
P3	P4	90.00	99.00	561.00	-4.00	1500.00	Jukepani khola
P4	P5	110.00	121.00	682.00	-2.00	1498.00	
P5	P6	100.00	110.00	792.00	0.00	1498.00	Mane CC
P6	P7	30.00	33.00	825.00	-1.00	1497.00	
P7	P8	30.00	33.00	858.00	0.00	1497.00	
P8	P9	30.00	33.00	891.00	0.00	1497.00	
P9	P10	30.00	33.00	924.00	-3.00	1494.00	
P10	P11	30.00	33.00	957.00	-4.00	1490.00	
P11	P12	30.00	33.00	990.00	-3.00	1487.00	
P12	P13	30.00	33.00	1023.00	-2.00	1485.00	
P13	P14	30.00	33.00	1056.00	-1.00	1484.00	kholsi, 6m GI pipe crossing
P14	P15	30.00	33.00	1089.00	0.00	1484.00	
P15	P16	30.00	33.00	1122.00	-5.00	1479.00	
P16	P17	30.00	33.00	1155.00	-4.00	1475.00	
P17	P18	30.00	33.00	1188.00	-3.00	1472.00	
P18	P19	30.00	33.00	1221.00	-2.00	1470.00	
P19	P20	30.00	33.00	1254.00	0.00	1470.00	
P20	P21	30.00	33.00	1287.00	-2.00	1468.00	
P21	P22	30.00	33.00	1320.00	0.00	1468.00	
P22	P23	30.00	33.00	1353.00	-1.00	1467.00	
P23	P24	30.00	33.00	1386.00	-2.00	1465.00	
P24	P25	30.00	33.00	1419.00	-1.00	1464.00	
P25	P26	30.00	33.00	1452.00	-2.00	1462.00	
P26	P27	30.00	33.00	1485.00	-4.00	1458.00	
P27	P28	30.00	33.00	1518.00	-1.00	1457.00	(Washout)
P28	P29	30.00	33.00	1551.00	4.00	1461.00	
P29	P30	30.00	33.00	1584.00	4.00	1465.00	
P30	P31	30.00	33.00	1617.00	6.00	1471.00	
P31	P32	30.00	33.00	1650.00	2.00	1473.00	
P32	P33	30.00	33.00	1683.00	3.00	1476.00	
P33	P34	30.00	33.00	1716.00	-1.00	1475.00	
P34	P35	30.00	33.00	1749.00	2.00	1477.00	
P35	P36	30.00	33.00	1782.00	3.00	1480.00	
P36	P37	30.00	33.00	1815.00	3.00	1483.00	
P37	P38	30.00	33.00	1848.00	2.00	1485.00	Air Valve
P38	P39	30.00	33.00	1881.00	-1.00	1484.00	12m GI crossing
P39	P40	30.00	33.00	1914.00	0.00	1484.00	
P40	P41	30.00	33.00	1947.00	1.00	1485.00	
P41	P42	30.00	33.00	1980.00	2.00	1487.00	
P42	P43	30.00	33.00	2013.00	-1.00	1486.00	
P43	P44	30.00	33.00	2046.00	-2.00	1484.00	
P44	P45	30.00	33.00	2079.00	-1.00	1483.00	
P45	P46	30.00	33.00	2112.00	3.00	1486.00	
P46	P47	30.00	33.00	2145.00	2.00	1488.00	
P47	P48	60.00	66.00	2211.00	0.00	1488.00	Cable crossing, Jogidil Khola
P48	P49	40.00	44.00	2255.00	1.00	1489.00	
P49	P50	70.00	77.00	2332.00	-1.00	1488.00	
P50	P51	50.00	55.00	2387.00	-1.00	1487.00	
P51	P52	40.00	44.00	2431.00	-7.00	1480.00	

Survey data Calculation

(Altimeter/Abney Level)

Project Name : Danda Tole Water Supply Project
District : Kavrepalanchok
Ward No.: 11
VDC : Roshi

Village Served : Danda Tole, Bhanjyang

Station		Inclined Length	Ground Distance (m)		Vertical Height (m)	Reduced Level	Remarks
From	To		Length	Chainage			
P52	P53	30.00	33.00	2464.00	-15.00	1465.00	Kholsi, 12 m GI pipe crossing
P53	P54	40.00	44.00	2508.00	5.00	1470.00	
P54	P55	30.00	33.00	2541.00	-1.00	1469.00	
P55	P56	30.00	33.00	2574.00	6.00	1475.00	
P56	P57	30.00	33.00	2607.00	-2.00	1473.00	
P57	P58	30.00	33.00	2640.00	2.00	1475.00	
P58	P59	30.00	33.00	2673.00	-3.00	1472.00	
P59	P60	30.00	33.00	2706.00	-8.00	1464.00	
P60	P61	30.00	33.00	2739.00	-7.00	1457.00	
P61	P62	30.00	33.00	2772.00	-12.00	1445.00	
P62	P63	30.00	33.00	2805.00	0.00	1445.00	
P63	P64	30.00	33.00	2838.00	-5.00	1440.00	
P64	P65	30.00	33.00	2871.00	-2.00	1438.00	
P65	P66	30.00	33.00	2904.00	-1.00	1437.00	
P66	P67	30.00	33.00	2937.00	-1.00	1436.00	
P67	P68	30.00	33.00	2970.00	-1.00	1435.00	
P68	P69	30.00	33.00	3003.00	0.00	1435.00	
P69	P70	30.00	33.00	3036.00	0.00	1435.00	(Washout)
P70	P71	30.00	33.00	3069.00	2.00	1437.00	Left road
P71	P72	30.00	33.00	3102.00	0.00	1437.00	
P72	P73	30.00	33.00	3135.00	1.00	1438.00	
P73	P74	30.00	33.00	3168.00	1.00	1439.00	
P74	P75	30.00	33.00	3201.00	-1.00	1438.00	
P75	P76	30.00	33.00	3234.00	-2.00	1436.00	
P76	P77	30.00	33.00	3267.00	1.00	1437.00	
P77	P78	30.00	33.00	3300.00	2.00	1439.00	Magar Fundi - rock area
P78	P79	30.00	33.00	3333.00	1.00	1440.00	Magar Fundi - rock area
P79	P80	30.00	33.00	3366.00	1.00	1441.00	Magar Fundi - rock area
P80	P81	30.00	33.00	3399.00	1.00	1442.00	Magar Fundi - rock area
P81	P82	30.00	33.00	3432.00	0.00	1442.00	Magar Fundi - rock area
P82	P83	30.00	33.00	3465.00	1.00	1443.00	Magar Fundi - rock area
P83	P84	30.00	33.00	3498.00	2.00	1445.00	Magar Fundi - rock area
P84	P85	30.00	33.00	3531.00	2.00	1447.00	Magar Fundi - rock area
P85	P86	30.00	33.00	3564.00	1.00	1448.00	Magar Fundi - rock area
P86	P87	30.00	33.00	3597.00	-3.00	1445.00	Magar Fundi - rock area
P87	P88	30.00	33.00	3630.00	2.00	1447.00	Magar Fundi - rock area
P88	P89	30.00	33.00	3663.00	2.00	1449.00	Magar Fundi - rock area
P89	P90	30.00	33.00	3696.00	2.00	1451.00	Magar Fundi - rock area
P90	P91	30.00	33.00	3729.00	1.00	1452.00	Magar Fundi - rock area
P91	P92	30.00	33.00	3762.00	0.00	1452.00	
P92	P93	30.00	33.00	3795.00	2.00	1454.00	
P93	P94	30.00	33.00	3828.00	1.00	1455.00	
P94	P95	30.00	33.00	3861.00	2.00	1457.00	Airvalve
P95	P96	30.00	33.00	3894.00	-2.00	1455.00	
P96	P97	30.00	33.00	3927.00	-7.00	1448.00	
P97	P98	30.00	33.00	3960.00	-4.00	1444.00	
P98	P99	30.00	33.00	3993.00	-4.00	1440.00	
P99	P100	30.00	33.00	4026.00	1.00	1441.00	
P100	P101	30.00	33.00	4059.00	7.00	1448.00	
P101	P102	30.00	33.00	4092.00	0.00	1448.00	
P102	P103	30.00	33.00	4125.00	-2.00	1446.00	
P103	P104	30.00	33.00	4158.00	2.00	1448.00	
P104	P105	30.00	33.00	4191.00	3.00	1451.00	
P105	P106	30.00	33.00	4224.00	-3.00	1448.00	
P106	P107	30.00	33.00	4257.00	3.00	1451.00	
P107	P108	30.00	33.00	4290.00	-3.00	1448.00	
P108	P109	30.00	33.00	4323.00	-3.00	1445.00	

Survey data Calculation

(Altimeter/Abney Level)

Project Name : Danda Tole Water Supply Project
District : Kavrepalanchok
Ward No.: 11
VDC : Roshi

Village Served : Danda Tole, Bhanjyang

Station		Inclined Length	Ground Distance (m)		Vertical Height (m)	Reduced Level	Remarks
From	To		Length	Chainage			
P109	P110	30.00	33.00	4356.00	-3.00	1442.00	
P110	P111	30.00	33.00	4389.00	-2.00	1440.00	
P111	P112	30.00	33.00	4422.00	-3.00	1437.00	
P112	P113	30.00	33.00	4455.00	3.00	1440.00	
P113	P114	30.00	33.00	4488.00	0.00	1440.00	Raksi Rock (Washout)
P114	P115	30.00	33.00	4521.00	2.00	1442.00	
P115	P116	30.00	33.00	4554.00	-1.00	1441.00	
P116	P117	30.00	33.00	4587.00	0.00	1441.00	
P117	P118	30.00	33.00	4620.00	0.00	1441.00	
P118	P119	30.00	33.00	4653.00	5.00	1446.00	
P119	P120	30.00	33.00	4686.00	2.00	1448.00	
P120	P121	30.00	33.00	4719.00	0.00	1448.00	
P121	P122	30.00	33.00	4752.00	2.00	1450.00	
P122	P123	30.00	33.00	4785.00	3.00	1453.00	
P123	P124	30.00	33.00	4818.00	2.00	1455.00	
P124	P125	30.00	33.00	4851.00	3.00	1458.00	
P125	P126	30.00	33.00	4884.00	1.00	1459.00	
P126	P127	30.00	33.00	4917.00	3.00	1462.00	Giddhe Danda, Airvalve
P127	P128	30.00	33.00	4950.00	0.00	1462.00	
P128	P129	30.00	33.00	4983.00	-3.00	1459.00	
P129	P130	30.00	33.00	5016.00	-2.00	1457.00	
P130	P131	30.00	33.00	5049.00	-8.00	1449.00	
P131	P132	30.00	33.00	5082.00	-7.00	1442.00	
P132	P133	30.00	33.00	5115.00	-6.00	1436.00	
P133	P134	30.00	33.00	5148.00	-2.00	1434.00	
P134	P135	30.00	33.00	5181.00	0.00	1434.00	
P135	P136	30.00	33.00	5214.00	-3.00	1431.00	
P136	P137	30.00	33.00	5247.00	-4.00	1427.00	
P137	P138	30.00	33.00	5280.00	-2.00	1425.00	Washout, 12m crossing
P138	P139	30.00	33.00	5313.00	4.00	1429.00	Road
P139	P140	30.00	33.00	5346.00	2.00	1431.00	
P140	P141	30.00	33.00	5379.00	15.00	1446.00	
P141	P142	30.00	33.00	5412.00	6.00	1452.00	RVT, Congress Danda
RVT						1452.00	RVT
RVT	P143	30.00	33.00	33.00	-6.00	1446.00	
P143	P144	30.00	33.00	66.00	-4.00	1442.00	
P144	P145	30.00	33.00	99.00	-8.00	1434.00	
P145	P146	30.00	33.00	132.00	-1.00	1433.00	
P146	P147	30.00	33.00	165.00	3.00	1436.00	B-1, 2HH, Bhanjyang-1
P147	P148	30.00	33.00	198.00	1.00	1437.00	
P148	P149	30.00	33.00	231.00	0.00	1437.00	
P149	P150	30.00	33.00	264.00	-5.00	1432.00	B-2, 3HH, Bhanjyang-2
P150	P151	30.00	33.00	297.00	-4.00	1428.00	
P151	P152	30.00	33.00	330.00	-9.00	1419.00	
P152	P153	30.00	33.00	363.00	-2.00	1417.00	
P153	P154	30.00	33.00	396.00	-2.00	1415.00	
P154	P155	30.00	33.00	429.00	-4.00	1411.00	B-3, 3HH, Swara
RVT						1452.00	RVT, Congress Danda
RVT	P56	40.00	44.00	44.00	-13.00	1439.00	
P56	P57	30.00	33.00	77.00	-4.00	1435.00	B-4, 2HH, Danda Tole-1
P57	P58	30.00	33.00	110.00	-9.00	1426.00	
P58	P59	30.00	33.00	143.00	-10.00	1416.00	
P59	P60	30.00	33.00	176.00	-6.00	1410.00	
P60	P61	30.00	33.00	209.00	-1.00	1409.00	
P61	P62	30.00	33.00	242.00	-3.00	1406.00	

Survey data Calculation

(Altimeter/Abney Level)

Project Name : Danda Tole Water Supply Project
District : Kavrepalanchok
Ward No.: 11
VDC : Roshi

Village Served : Danda Tole, Bhanjyang

Station		Inclined Length	Ground Distance (m)		Vertical Height (m)	Reduced Level	Remarks
From	To		Length	Chainage			
P62	P63	30.00	33.00	275.00	-1.00	1405.00	
P63	P64	30.00	33.00	308.00	1.00	1406.00	
P64	P65	30.00	33.00	341.00	0.00	1406.00	
P65	P66	30.00	33.00	374.00	0.00	1406.00	Junction-1
P66	P67	30.00	33.00	407.00	-3.00	1403.00	Junction-2
P67	P68	30.00	33.00	440.00	-3.00	1400.00	
P68	P69	30.00	33.00	473.00	-2.00	1398.00	
P69	P70	30.00	33.00	506.00	-3.00	1395.00	
P70	P71	30.00	33.00	539.00	-2.00	1393.00	
P71	P72	30.00	33.00	572.00	-3.00	1390.00	
P72	P73	30.00	33.00	605.00	-1.00	1389.00	
P73	P74	30.00	33.00	638.00	-2.00	1387.00	
P74	P75	30.00	33.00	671.00	-7.00	1380.00	Junction-3

Household Details of Danda Tole

1. Bhoj Kumar Lama
2. **Gobinda Ruchal**
3. Rajan Ruchal
4. Tek Bahadur Ruchal
5. Dil Bahadur Ruchal
6. Saroj Sijali
7. Rak Kumar Lama
8. Raj Kumar Lama
9. Kul Bahadur Sijali
10. Aaslal Balampakhi
11. Dhawa Sang Lama
12. Dhawa Dorji Lama
13. Nir Bahadur Pulami
14. Khadka Bahadur Nepali
15. Kalpana Nepali
16. Amrit Bisungkhe
17. Hari Bahadur Bisungkhe
18. Subba Bisungkhe
19. Lila Bahadur Syangtan
20. Ram Sharan Nepali
21. Sanu Bhim Bahadur Tamang
22. Takhta Man Tamang
23. Kanchha Man Tamang
24. Aasha bapu Nepali
25. Man Bahadur Nepali
26. Durga Bahadur Nepali

27. Dipak Nepali
28. Rak Kumar Nepali
29. Bhim Narayan Lama
30. Singh Bahadur Nepali
31. Anita Thokar
32. Muluk Singh Nepali
33. Jagat Narayan Nepali
34. Ramhari Nepali
35. Rajkumar Nepali
36. Bhoj Kumar Nepali
37. Keshab Nepali
38. Fursang Syangtan
39. Dirgha Raj Syangtan
40. Khel Bahadur Nepali
41. Uddhab Nepali
42. School – Buddha Bal Basic School

Annex-1

Rate Analysis

**Danda Tole Water Supply Project
Item Rates for Estimating**

Sn.	Norms no	Items	Unit	Rate Per Unit (without VAT)	Reference No.
Earth Works					
1	1-8	Site clearance	m ²	208.47	F4
2	2-9	Earthwork in Excavation in ordinary soil	m ³	1,302.95	F5
4	2-14	Earthwork in Excavation in boulder mixed soil	m ³	2,071.69	F7
5	2-25a	Earthwork in backfilling in ordinary soil	m ³	651.48	F11
Stone Works					
11	6-5	Stone soling work	m ³	4,502.25	F16
6	6-2.1	Dry stone masonry work	m ³	6,527.69	F18
7	6-2.2	Stone masonry in mud mortar	m ³	7,640.89	F19
8	6-3.2	R.R. masonry in 1:4cement mortar	m ³	18,361.82	F21
9	6-3.3	R.R. masonry in 1:6cement mortar	m ³	16,838.99	F22
Concrete Works					
10	7-2c	Plain cement concrete (1:3:6) in sub Structure	m ³	20,584.66	F24
11	7-2d	Plain cement concrete (1:2:4) sub Structure	m ³	23,313.12	F25
12	7-4 b	Plain cement concrete (1:1.5:3) sub Structure	m ³	25,717.83	F26
13	7-2 d	Plain cement concrete (1:2:4) in super structure	m ³	26,786.12	F27
14	7-4 b	Plain cement concrete (1:1.5:3) in super structure	m ³	29,190.83	F28
15	7-2d	Plain cement concrete (1:2:4) substructure with 2% WPC	m ³	24,469.38	F29
16	7-4 b	Plain cement concrete (1:1.5:3) substructure with 2% WPC	m ³	27,163.15	F30
Miscellaneous Works					
17	7-5	Mild steel reinforcement	kg	174.01	F32
18	8-2a	Form work for concrete work in simple slab and structure (Assuming form work canbe used 4 times)	m ²	789.94	F33
19	DWSS	HDPE pipe formwork for ferro-cement works	m ²	480.78	F35
20	DWSS	Bar binding works including chicken wire, MS rods, GI plain wires etc	m ²	1,687.94	F36
21	24-6	Barbed wire fencing	m	116.67	F37
22	24-7	Barbed wire fencing on wooden posts (2 diagonals & 5 horizontals) @ 3m c\c	m	476.16	F38
Plastering, Punning and Pointing works					
23	12-1a	12.5 mm thick 1:2 c-s plaster	m ²	735.71	F48
24	12-1b	12.5 mm thick 1:3 c-s plaster	m ²	654.42	F49
25	12-1c	12.5 mm thick 1:4 c-s plaster	m ²	637.11	F50
26	12-4a	20 mm thick 1:3 c-s plaster	m ²	862.44	F51
27	12-4b	20 mm thick 1:4 c-s plaster	m ²	829.45	F52
28	12-4c	20 mm thick 1:6 c-s plaster	m ²	763.60	F53
29	13-10	3 mm thick 1:1 c-s punning	m ²	402.68	F57
30	14-2c	1:3 c-s Flush ruled pointing work	m ²	464.98	F58
Painting Works					
31	13-5	Two coats of enamel painting with one coat of primer	m ²	432.96	F60
32	13-12b	Two coats snowcem painting	m ²	231.21	F61
33	13-10	Two coats of bitumen painting	m ²	124.66	F62
Transportation work					
34	Convenient load from store to site		kg	8.17	F80
35	Inconvenient load from store to site		kg	10.72	F81

Analysis of Rates

Name of Project : Danda Tole Water Supply Project

Assumptions

Density of sand	=	1450.00 kg/m ³
Density of rubble stone	=	2000.00 kg/m ³
Density of aggregate	=	1600.00 kg/m ³
Name of market :	Banepa	
Name of roadhead :	Bhanjyang	
Distance of project site from market on :		
- Foot	=	2.00 kosh
-Earthen road	=	12.00 km
- Gravel road	=	0.00 km
-Metalled road	=	65.00 km
Sand is available in	Roshi Khola	
Distance of river from project site for sand collection for head load	=	0.00 km
If there is tractor/ truck road distance of haulage for sand transportation on :		
-Earthen road	=	0.00 km
- Gravel road	=	0.00 km
-Metalled road	=	0.00 km
Distance of quarry from project site for stone / aggregate	=	0.50 km
Cost of sand per m ³ for purchase		4545.00 Rs.

District Rates :

District rate of transportation by head load for :		
-convenient load	=	2.20 Rs./kg.kosh
-inconvenient load as HDPE pipes, etc.	=	3.20 Rs./kg.kosh
District rate of transportation by truck for convenient load on :	Truck analysis	
-Earthen road	=	4.80 Rs./km.quintal
- Gravel road	=	2.80 Rs./km.quintal
-Metalled road	=	2.30 Rs./km.quintal
District rate of transportation by truck for inconvenient load on :	Truck analysis	
-Earthen road	=	5.10 Rs./km.quintal
- Gravel road	=	3.10 Rs./km.quintal
-Metalled road	=	2.60 Rs./km.quintal
Rate of load / unload	=	30.80 Rs./quintal
District rate of Skilled labour	=	1400.00 Rs./d
District rate of unskilled labour	=	1100.00 Rs./d
District rate of plumber	=	1400.00 Rs./d

Rate of some local materials

1 Sand for 1 m³

Distance from site to	Roshi Khola	=	0.00 km
Labour required for collection, screening and stacking of river sand			0.00 nos
Labour required for transportation upto 13 km by headload			36.25 nos
Hence, Labour required for transportation upto site	0.00 km	=	0.00 nos
Total labour required to collect and transport 1 m ³ of sand upto site		=	0.00 nos
Cost of labour for collection and transportation			0.00
Cost of transportation by truck	-Earthen road	0.00 km =	0.00
	- Gravel road	0.00 km =	0.00
	-Metalled road	0.00 km =	0.00
Rate 1 m³ of sand at site (transportation cost +collection or purchase cost) =			4 545.00 Rs.

2 Stone for 1 m³		
If it is to be purchased, cost/m ³	=	1200.00
Distance of quarry from site	=	0.50 km
Labour required for collection and stacking of 1 m ³ of stone	=	1.40 nos
Cost of labour for collection and stacking of 1 m ³ of stone	=	0.00 Rs.
Cost of transportation of 1 m ³ of stone up to site	=	<u>687.50 Rs.</u>
Rate of 1 m³ of Stone at site	=	1887.50 Rs.
3 Aggregates (20-40 mm size) for 1m³		
If it is to be purchased, cost/m ³	=	4545.00
Labour required for breaking and stacking of 1 m ³ of aggregate(15 nos)	=	15.00 nos.
Cost of labour for breaking and stacking of 1 m ³ of aggregate	=	0.00 Rs.
Cost of transportation of 1 m ³ of aggregate up to site	=	<u>50.00</u>
Rate of 1 m³ aggregate	=	4595.00 Rs.
4 Aggregates (10-20 mm size) for 1m³		
If it is to be purchased, cost/m ³	=	4545.00
Labour required for breaking and stacking of 1 m ³ of aggregate(21.5 nos)	=	21.50 nos.
Cost of labour for breaking and stacking of 1 m ³ of aggregate	=	0.00 Rs.
Cost of transportation of 1 m ³ of aggregate up to site	=	<u>50.00</u>
Rate of 1 m³ aggregate	=	4595.00 Rs.
5 Rate of Transportation :		
	For convenient load	For inconvenient load
-Earthen road	0.58 Rs/kg	0.61 Rs/kg
- Gravel road	0.00 Rs/kg	0.00 Rs/kg
-Metalled road	1.50 Rs/kg	1.69 Rs/kg
-For head load	4.40 Rs/kg	6.40 Rs/kg
Loading - unloading	<u>0.62 Rs/kg</u>	<u>0.62 Rs/kg</u>
Rate of transportation per kg :	7.10 Rs/kg	9.32 Rs/kg
Rate of transportation of inconvenient load with CO (Without VAT)		10.72 Rs/kg
Rate of transportation of convenient load with CO (Without VAT)		8.17 Rs/kg
6 Local Wood per 1 m³		
If it is to be purchased, cost/m ³	=	15000.00 Rs.
District rate of sawing per cft.	=	0.00 Rs/cft.
Royalty per cft	=	0.00 Rs/cft.
Value Added Tax @ 10 % of royalty	=	0.00 Rs/cft.
Sub total		0.00 Rs/cft.
Asuming that prepared wood is 70% of trunk wood ,		
Total rate	=	0.00 Rs/cft.
Transportation cost, per cft.	=	49.84 Rs/cft.
Sub total	=	49.84 Rs/cft.
Miscelleneous expenses @ 5% of subtotal	=	4.98 Rs/cft.
Total cost of local wood for 1 cft	=	<u>54.82 Rs.</u>
Rate of local wood per 1 m³	=	16 935.69 Rs/m³
7 Salwood per 1 m³		
District rate of salwood, per m ³		1 30 000.00 Rs/m³
8 Mud [per m³]		
District rate of mud	=	1650.00 Rs/m³
[If ther is no specific district rate of mud, it will be obtained as "1.5×labour cost]		

Unit Rate of Non-local Materials at Site

Danda Tole Water Supply Project

Sn	Item	Unit	Maket rate of material With VAT Rs./unit	Unit weight kg	Transportation cost		Rate of material at site With VAT (Rs)
					Rate Rs.	Amount Rs.	
1	2	3	4	6	7	(6 x 7) =8	5+8
1	Cement	Bag	980.00	50	7.10	355.00	1,335.00
2	M.S. Bar	kg	105.00	1	9.32	9.32	114.32
3	Binding Wire	kg	120.00	1	7.10	7.10	127.10
4	GI Plain Wire	kg	115.00	1	7.10	7.10	122.10
5	Nails	kg	112.00	1	7.10	7.10	119.10
6	Chicken wire mesh	m	250.00	0.60	9.32	5.59	255.59
7	M.S. Angle, kg	kg	95.00	1.00	9.32	9.32	104.32
8	Barbed wire 12 SWG	kg	123.00	1.00	9.32	9.32	132.32
9	GI plain sheet (26 SWG)	m ²	386.67	4.5	9.32	41.94	428.61
10	CGI sheet (26 SWG)	m ²	400.00	5.1	9.32	47.53	447.53
11	Primer	L	370.00	1	7.10	7.10	377.10
12	Enamel Paint	L	555.00	1	7.10	7.10	562.10
13	Bitumen Paint	L	95.00	1	7.10	7.10	102.10
14	Snowcem paint	kg	70.00	1	7.10	7.10	77.10
15	Polythene Sheet	m ²	50.00		7.10	-	50.00
16	Water proofing compound	kg	150.00	1	7.10	7.10	157.10
17	Fuel (Petrol)	L	113.00	1	9.32	9.32	122.32
18	MS angle grill gate, of 15 kg	No	1 500.00	15	9.32	139.80	1,639.80
19	MS angle manhole cover 60×60cm	set	2 200.00	13	9.32	121.16	2,321.16
20	MS angle manhole cover 60 cmØ	set	2 200.00	11	9.32	102.52	2,302.52
21	MS angle manhole cover 45×45cm	set	0.00	9	9.32	83.88	83.88
22	8 mm Suspender Cable	m	190.00	0.62	9.32	5.78	195.78
23	13 mm Suspender Cable	m	317.00	1.21	9.32	11.28	329.00

Estimated by

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For Analysis of Rates

Name of Project : Danda Tole Water Supply Project

1 For distance for transportation of non local materials

Name of market Banepa
 Name of roadhead: Bhanjyang
 Distance of projectsite from market on :
 -Earthen road = 12.00 km
 - Gravel road = 0.00 km
 -Metalled road = 65.00 km
 - Foot = 2.00 kosh

2 For sand collection

Sand is available in Roshi Khola

Mode of transportation of sand

2.1 If head load is there specify haul distance = km
2.2 If there is tractor/ truck road specify distance
 -Earthen road = km
 - Gravel road = km
 -Metalled road = km
iii If sand is to be purchased, specify cost/m³ 4545.00 Rs/m³

3 Collection of stone

Distance of quarry from site 0.50 km
 If stone is to be purchased, specify cost/m³ 1200.00 Rs/m³

4 Aggregates

If aggregate is to be purchased, specify cost/m³ 4545.00 Rs/m³

5 Local wood

5.1 If it is obtained from sawing,
 specify distance of its availability 1.00 kosh
5.2 If it is to be purchased, specify cost/m³ 15000.00 Rs/m³

6 Salwood

6.1 If it is obtained from sawing,
 specify distance of its availability 0.00 kosh
6.2 If it is to be purchased, specify cost/m³ 130000.00 Rs/m³

6 Approved District Rates for transportation and labours:

6.1 District rate of transportation by head load for :

-convenient load 2.20 Rs./kg.kosh
 -inconvenient load as HDPE pipes, etc. 3.20 Rs./kg.kosh

6.2 If there no approved district rate for transportation by truck, and it is to be analyse

6.3 District rate of transportation by truck for convenient load on :

For Analysis of Rates

Name of Project : Danda Tole Water Supply Project

-Earthen road	=	4.80	Rs./km.quintal
- Gravel road	=	2.80	Rs./km.quintal
-Metalled road	=	2.30	Rs./km.quintal

6.4 District rate of transportation by truck for inconvenient load on :

-Earthen road	=	5.10	Rs./km.quintal
- Gravel road	=	3.10	Rs./km.quintal
-Metalled road	=	2.60	Rs./km.quintal

6.5 Rate of load / unload = 15.00 Rs./quintal

6.6 District / Local rates of labours

Rate of skilled labour		1400.00	Rs./day
Rate of unskilled labour		1100.00	Rs./day
Rate of plumber		1400.00	Rs./day
Helper		1000.00	Rs./day
Driver			Rs./day
Asistant to driver			Rs./day

7 Rate of nonlocal materials

		Rate/ unit	
7.1	Cement, bag	980.00	Rs.
7.2	Tor steel bars, kg	105.00	Rs.
7.3	Binding wire, kg	120.00	Rs.
7.4	Comercial GI plain wire, kg	115.00	Rs.
7.5	Nails, kg	112.00	Rs.
7.6	Chicken wire, m ²	250.00	Rs.
7.7	M.S. Angle, kg	95.00	Rs.
7.8	Barbed wire (12 SWG), kg	123.00	Rs.
7.9	GI Plain Sheet (26 SWG), m ²	386.67	Rs.
7.10	CGI Sheet (26 SWG), m ²	400.00	Rs.
7.11	GI Plain Sheet for ridge cover, m	386.67	
7.12	Primer, L	370.00	Rs.
7.13	Enamel paint, L	555.00	Rs.
7.14	Bitumen paint, kg	95.00	Rs.
7.15	Snowcem paint, kg	70.00	Rs.
7.16	Polythene sheet, m ²	50.00	Rs.
7.17	Water proofing compound, kg	150.00	Rs.
7.18	Fuel (Petrol), L	113.00	Rs.
7.30	MS angle grill gate, of 15 kg	1500.00	Rs.
7.31	MS angle manhole cover 60×60cm, set	2200.00	Rs.
7.34	Suspender cable, 13 mmφ, kg	325.00	Rs.
	Bulldog Grip, 13 mmφ, kg	155.00	
7.35	Bamboo, no	150.00	Rs.

Analysis of Item Rates

This rate analysis is based on the HMG/N approved **Norms 2041** (Including second revision)

Name of Project : Danda Tole Water Supply Project

A. Earthworks (for 1 m³) and Site clearance (for 1 m²)

Earthwork in excavation with 10m lead and 1.5 m lift in pipeline trench in :

Materials and labours	Unit	Rate Rs/unit	Hard soil (Norms No 2-12)		Boulder/Gravel mixed soil (Norms No 2-14)		Ordinary Soil (Norms No 2-9)		Soft rock (Norms No 2-15a)		Medium rock (Norms No 2-15b)	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Coolie	Rs/day	1100.00	1.25	1375.00	1.59	1749.00	1.00	1100.00	3.00	3300.00	4.50	4950.00
Tools and plants	%		3.00%	41.25	3.00%	52.47	3.00%	33.00	3.00%	99.00	3.00%	148.50
Subtotal				1416.25		1801.47		1133.00		3399.00		5098.50
Contractor's Overhead	%	15.00%		212.44		270.22		169.95		509.85		764.78
Rate/m³ (Without VAT)				1628.69		2071.69		1302.95		3908.85		5863.28

Earthwork in excavation with 10m lead and 1.5 m lift in pipeline trench in :

Materials and labours	Unit	Rate Rs/unit	Hard rock (Norms No. 2-16b)	
			Quantity	Cost Rs.
Coolie	Rs/day	1100.00	25.20	27 720.00
Tools and plants	%		3.00%	831.60
Subtotal				28 551.60
Contractor's Overhead	%	15.00%		4 282.74
Rate/m³ (Without VAT)				32 834.34

Earthwork in back filling for pipe line trench with compaction in layers of 20cm with water sprinkling and site clearance

Materials and labours	Unit	Rate Rs/unit	Hard soil (Norms No 2-39c)		Boulder/Gravel mixed soil (Norms No 2-39d)		Ordinary Soil (Norms No)		Soft rock (Norms No 2-39e)		Site clearance per m ² N(1-8)	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Coolie	Rs/day	1100.00	0.63	693.00	0.6	660.00	0.5	550.00	1.1	1210.00	0.16	176.00
Tools and plants	%		3.00%	20.79	3.00%	19.80	3.00%	16.50	3.00%	36.30	3%	5.28
Subtotal				713.79		679.80		566.50		1246.30		181.28
Contractor's Overhead	%	15.00%		107.07		101.97		84.98		186.95		27.19
Rate/m³ (Without VAT)				820.86		781.77		651.48		1433.25		208.47

Estimated by

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B. Stone Works (for 1m³) : With a lead of 30 m and upto height 5 m.

Materials and labours	Unit	Rate Rs/unit	Dry stone soling in foundation (N 6-5)		Dry stone masonry (N6-2a)		Stone masonry in mud mortar (N6- 2b)		RR Stone masonry in 1:4 cs mortar (N6-1b)		RR stone masonry in 1:6 cs mortar (N6-1c)	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Cement	kg	26.70	-		-		-		159	4245.30	106	2830.20
Sand	m ³	4545.00	-		-				0.45	2045.25	0.47	2136.15
Block Stone	m ³	1887.50	1.20	2265.00	1.10	2076.25	1.10	2076.25	1.10	2076.25	1.10	2076.25
Mud	m ³	1650.00	-		-		0.42	693.00	-		-	
Mason	no	1400.00	-		1.00	1400.00	1.00	1400.00	1.50	2100.00	1.50	2100.00
Coolie	no	1100.00	1.50	1650.00	2.00	2200.00	2.25	2475.00	5.00	5500.00	5.00	5500.00
Subtotal				3 915.00		5 676.25		6 644.25		15 966.80		14 642.60
Contractor's Overhead	%	15.00%		587.25		851.44		996.64		2 395.02		2 196.39
Rate/m³ (Without VAT)				4 502.25		6 527.69		7 640.89		18 361.82		16 838.99

C. Concrete work in substructure and super structure (for 1m³)

(With a lead of 30 m and all materials supplied)

Materials and labours	Unit	Rate Rs/unit	P.C.C (1:3:6) work in sub structure (N 7-2c)		P.C.C (1:2:4) work in sub structure (N 7-2d)		P.C.C(1:1.5:3) work in sub structure (N7-2d +N7-4b)		P.C.C1:2:4) work In superstructure (N 7-4a)		P.C.C(1:1.5:3) work In superstructure (N 7-4b)	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Cement	kg	26.70	220	5874.00	320	8544	400	10680.00	320	8544.00	400	10680
Sand	m ³	4545.00	0.47	2136.15	0.445	2022.53	0.425	1931.63	0.445	2022.53	0.425	1931.63
Aggregate-10-20mm	m ³	4595.00			0.33	1516.35	0.86	3951.70	0.33	1516.35	0.86	3951.70
Aggregate-20-40mm	m ³	4595.00	0.89	4089.55	0.52	2389.40			0.52	2389.40		
W.P.C @2%	kg	157.10										
Skiled Labour	no	1400.00	1	1400.00	1.00	1400.00	1.00	1400.00	0.80	1120.00	0.80	1120.00
Coolie	no	1100.00	4.00	4400.00	4.00	4400.00	4.00	4400.00	7.00	7700.00	7.00	7700.00
Subtotal				17 899.70		20 272.28		22 363.33		23 292.28		25 383.33
Contractor's Overhead	%	15.00%		2 684.96		3 040.84		3 354.50		3 493.84		3 807.50
Rate/m³ (Without VAT)				20 584.66		23 313.12		25 717.83		26 786.12		29 190.83

Estimated by

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D. Steel reinforcement (kg), form work (m²), Ferrocement work(per m²), and wood work(per m³) for door-window frame etc.

Materials and labours	Unit	Rate Rs/unit	Steel rein for cement cutting,bending &placing in place,etc,per kg (N7-5)		Shuttering work for slabs,etc(per m ²) N8-2a		HDPE Formwork for ferrocement works per m ² (DWSS-Standard)		Barbinding work for fe-c,including chicken wire,plain GI wire,M.S.bars etc. per m ² (DWSS)		Wood work for door/ window frame per m ³ N10-I7	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Steel bar	kg	114.32	1.05	120.04	-				2.593	296.43		
Binding wire	kg	127.10	0.01	1.27	-		0.083	10.55	0.111	14.11		
GI Plain wire	kg	122.10	-		-				2.083	254.33		
Chicken wire	m	255.59	-		-				1.806	461.6		
Nail	kg	119.10	-		0.25	29.78	0.014	1.67				
Hold fast	no	29.10									92	2677.2
Screw	no	0.50									184	92
Wood	m ³	16935.69	-		0.0526/4x0.75	133.62					1.1	18629.26
Bamboo	no	150.00	-		-		0.333	49.95				
32mmφ HDP pipe	m	-					40.00					
Skiled labour	no	1400.00	0.012	16.8	0.172	240.8	0.167	233.8	0.25	350	34	47600
coolie	no	1100.00	0.012	13.2	0.257	282.7	0.111	122.1	0.083	91.3	3.4	3740
Subtotal				151.31		686.9		418.07		1467.77		72738.46
Contracror's Overhead	%	15.00%		22.70		103.04		62.71		220.17		10910.77
Rate / Unit (Without VAT)				174.01		789.94		480.78		1687.94		83649.23

E. Plastering Work (for 1m²)

Materials and labours	Unit	Rate Rs/unit	12.5mm thick 1:2 c-s plaster(N12-1a)		12.5mm thick 1:3 c-s plaster (N12-1b)		12.5mm thick 1:4 c-s plaster (N12-1c)		20mm 1:3 c-s plaster (N12-4a)		20mm 1:4 c-s plaster (N12-4b)	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Cement	kg	26.70	9.00	240.30	6.25	166.88	5.38	143.65	9.60	256.32	8.10	216.27
Sand	m ³	4545.00	0.0122	55.45	0.0128	58.18	0.0146	66.36	0.0195	88.63	0.022	99.99
W.P.C.	kg	157.10										
Skilled labour	no	1400.00	0.12	168.00	0.12	168.00	0.12	168.00	0.14	196.00	0.14	196.00
Coolie	no	1100.00	0.16	176.00	0.16	176.00	0.16	176.00	0.19	209.00	0.19	209.00
Subtotal				639.75		569.06		554.01		749.95		721.26
Contracror's Overhead	%	15.00%		95.96		85.36		83.10		112.49		108.19
Rate/m² (Without VAT)				735.71		654.42		637.11		862.44		829.45

Estimated by

Checked by

Approved by

F . Pointing ,Punning ,Barbed wire fencing, C.G.I. sheet roofing

Materials and labours	Unit	Rate Rs/unit	3mm 1:1 c-s Punning (for 1m ²) (N14 -6)		1:3 c-s Flush ruled Pointing (m ²) (N14 -26)		G.I barbed wire fencing (1m) N24 -6		G.I barbed wire fencing on wooden posts (5 horz.,2 diagonals)@3mc/c for 1m		C.G.Isheet roofing (1m ²) N -9 -1	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Cement	kg	26.70	3.36	89.71	3.06	81.70						
Sand	m ³	4545.00	0.0023	10.45	0.0063	28.63						
GI Barbed wire	m	22.49	-				1.1	24.74	8.333	187.41		
Local wood	m ³	16935.69							0.006	101.61		
CGI sheet-26G	m ²	447.53	-								1.20	537.04
Nuts & bolts	no	10.71	-								3.00	32.13
J - hook	no	15.07	-								2.50	37.68
U - hook	no	2.00				LS	2.47	2.567	5.13			
Skilled labours	no	1400.00	0.10	140.00	0.1	140.00	0.01076	15.06	0.033	46.20	0.11	154.00
Collies	no	1100.00	0.10	110.00	0.14	154.00	0.0538	59.18	0.067	73.70	0.125	137.50
Subtotal				350.16		404.33		101.45		414.05		898.35
Contractor's Overhead	%	15.00%		52.52		60.65		15.22		62.11		134.75
Rate / Unit (Without VAT)				402.68		464.98		116.67		476.16		1 033.10

G. Enamel & Bitumen Paints and white washing (For 1m²)

Materials and labours	Unit	Rate Rs/unit	Two coats of enamel paint N-13-5		Two coats of Bitumen paint N-13-10		Two coats of Snowcem paint N-13-12		Gabion supply, preparation (size 2x1x1m) for 1 no		Filling of Gabion crate with block stone for 1 m ³	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Primer	L	377.10	0.081	30.55								
Enamel	L	562.10	0.16	89.94								
Bitumen	L	102.10	-		0.19	19.40						
Snowcem	L	77.10	-				0.5	38.55				
GI Plain wire (10 SWG)	kg	122.10							22.4	2735.04		
Block Stone	m ³	1887.50									1.1	2076.25
Skilled labours	no	1400.00	0.12	168.00	0.04	56.00	0.065	91.00	0.5	700.00		
Collies	no	1100.00	0.08	88.00	0.03	33.00	0.065	71.50	0.2	220.00	0.5	550.00
Subtotal				376.49		108.4		201.05		3655.04		2626.25
Contractor's Overhead	%	15.00%		56.47		16.26		30.16		548.26		393.94
Rate/m² (Without VAT)				432.96		124.66		231.21		4203.3		3020.19

Estimated by

Checked by

Approved by

H. HDPE Pipe Jointing (For 1m) Norms No 17 - 2

Materials and labours	Unit	Rate Rs/unit	20,25mm dia HDPE For (1000m)		32 mm dia HDPE For (1000m)		40,50mm dia HDPE For (1000m)		63,75,90 mm dia HDPE For (50m)		110,125 mm dia HDPE For (50m)	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Plumber	no.	1400.00	1.00	1400.00	1.00	1400.00	1.50	2100.00	1.00	1400.00	1.50	2100.00
Helper	no.	1100.00	1.00	1100.00	1.00	1100.00	1.50	1650.00	1.00	1100.00	1.50	1650.00
Coolis	no.	1100.00	2.00	2200.00	3.00	3300.00	3.00	3300.00	2.00	2200.00	3.00	3300.00
Sub total			-	4700.00		5800.00		7050.00		4700.00		7050.00
Contingencies		2.50%		117.50		145.00		176.25		117.50		176.25
Tools & plants	day	150.00	1	150.00	1	150.00	1	150.00	1	150.00	1	150.00
Petrol	L	122.32	0.25	30.58	0.25	30.58	0.25	30.58	0.5	61.16	0.5	61.16
Subtotal				4998.08		6125.58		7406.83		5028.66		7437.41
Contractor's Overhead	%	15.00%		749.71		918.84		1111.02		754.30		1115.61
Grand Total				5747.79		7044.42		8517.85		5782.96		8553.02
Rate /m				5.75		7.04		8.52		115.66		171.06

I. GI Pipe jointing work (For 1m) N - 17- 4 a

Materials and labours	Unit	Rate Rs/unit	15,20 mm dia GI For (30m)		25,32 mm dia GI For (30m)		40,50mm dia GI For (30m)		65,80 mm dia GI For (30m)		100 mm dia GI For (30m)	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Plumber	no.	1400.00	0.50	700.00	0.50	700.00	0.75	1050.00	1.25	1750.00	1.75	2450.00
Helper	no.	1100.00	1	1100.00	1.5	1650.00	2	2200.00	2	2200.00	2	2200.00
Coolis	no.	1100.00	1	1100.00	1.5	1650.00	2	2200.00	3	3300.00	4	4400.00
Sub total				2900.00		4000.00		5450.00		7250.00		9050.00
Red lead , Hemp etc.		10%		290.00		400.00		545.00		725.00		905.00
Contingencies		2.50%		72.50		100.00		136.25		181.25		226.25
Subtotal				3262.50		4500.00		6131.25		8156.25		10181.25
Contractor's Overhead	%	15.00%		489.38		675.00		919.69		1223.44		1527.19
Grand Total				3751.88		5175.00		7050.94		9379.69		11708.44
Rate /m				125.06		172.50		235.03		312.66		390.28

Estimated by

Checked by

Approved by

J. Gravel Packing and door shutter

Materials and labours	Unit	Rate Rs/unit	Gravel packing for 1 m ³		38 mm thick wooden shutter with GI plain sheet for 1 m ² [Norms no 10-9)		38 mm thick panelled wooden shutter for 1 m ² [Norms no 10-2)	
			Quantity	Cost Rs.	Quantity	Cost Rs.	Quantity	Cost Rs.
Aggregate - 40mm	m ³	4595.00	1.05	4824.75	-		-	
Local wood	m ³	16,935.69			0.017	287.91	0.040	677.43
Nails	kg	119.1	-		LS	5.00	LS	5.00
Hinges	no	41.07	-		1.34	55.03	2.84	116.64
Locking set	no	302.13	-		0.45	135.96	0.47	142.00
Tower bolt 150mm	no	241.07	-		0.89	214.55	0.95	229.02
Handle	no	37.42	-		0.45	16.84	0.95	35.55
GI plain sheet	no	428.61			2.07	887.22		0.00
Skilled labour	no	1400.00	1	1400.00	3.12	4368.00	4.73	6622.00
Collies	no	1100.00	3.5	3850.00	0.31	341.00	0.47	517.00
Total				10074.75		6311.51		8344.64
C.P&VAT		26.50%		2669.81		1672.55		2211.33
Rate /Unit				16594.56		8325.06		11072.97

Estimated by

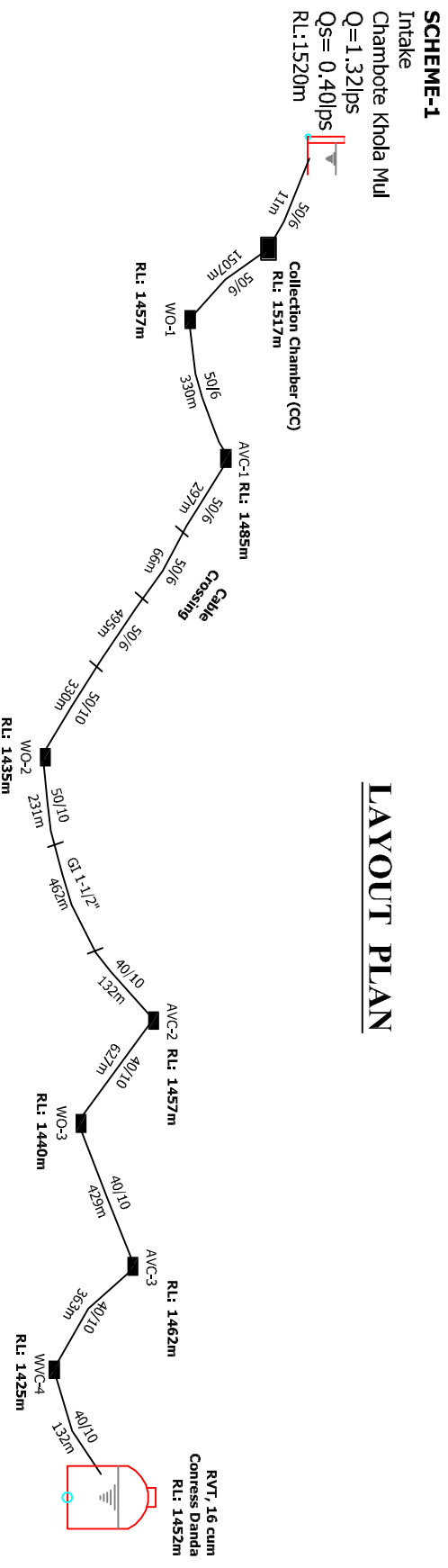
Checked by

Approved by

Annex-2

Pipeline Profile, Flow Diagram and Layout Plan

LAYOUT PLAN



PROJECT NAME : DANDA TOLE WATER SUPPLY PROJECT

Designed and Drawn by: Guna Bahadur Lama
 (Engineer)

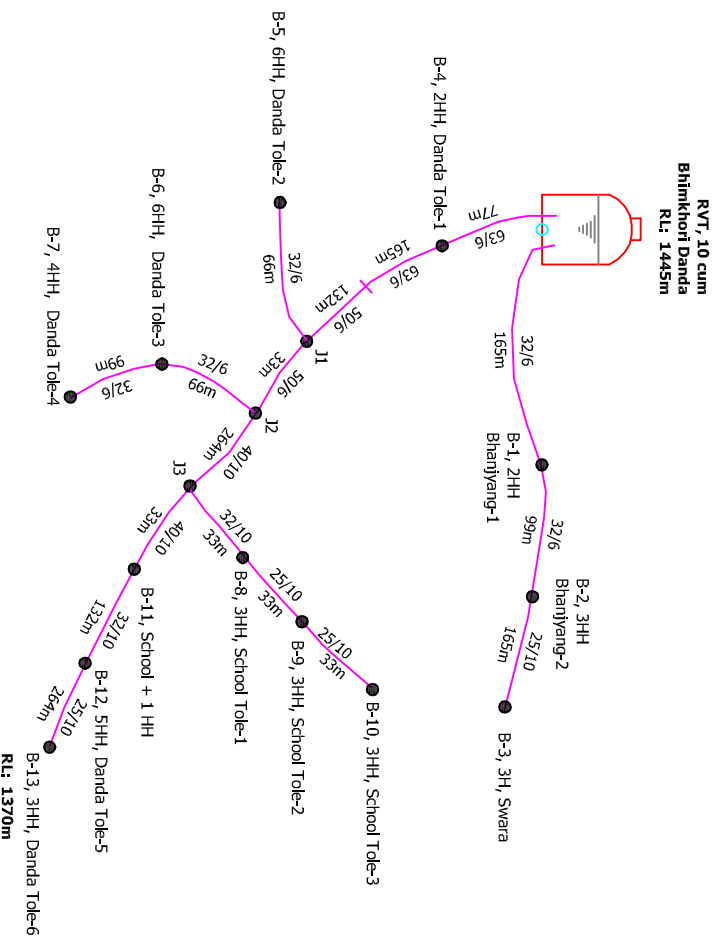
PIPE LINE DESIGN PROFILE

PROJECT LOCATION : Roshni Rural Municipality - 11, Kavrepalanchok

Approved by:

FISCAL YEAR: 2020

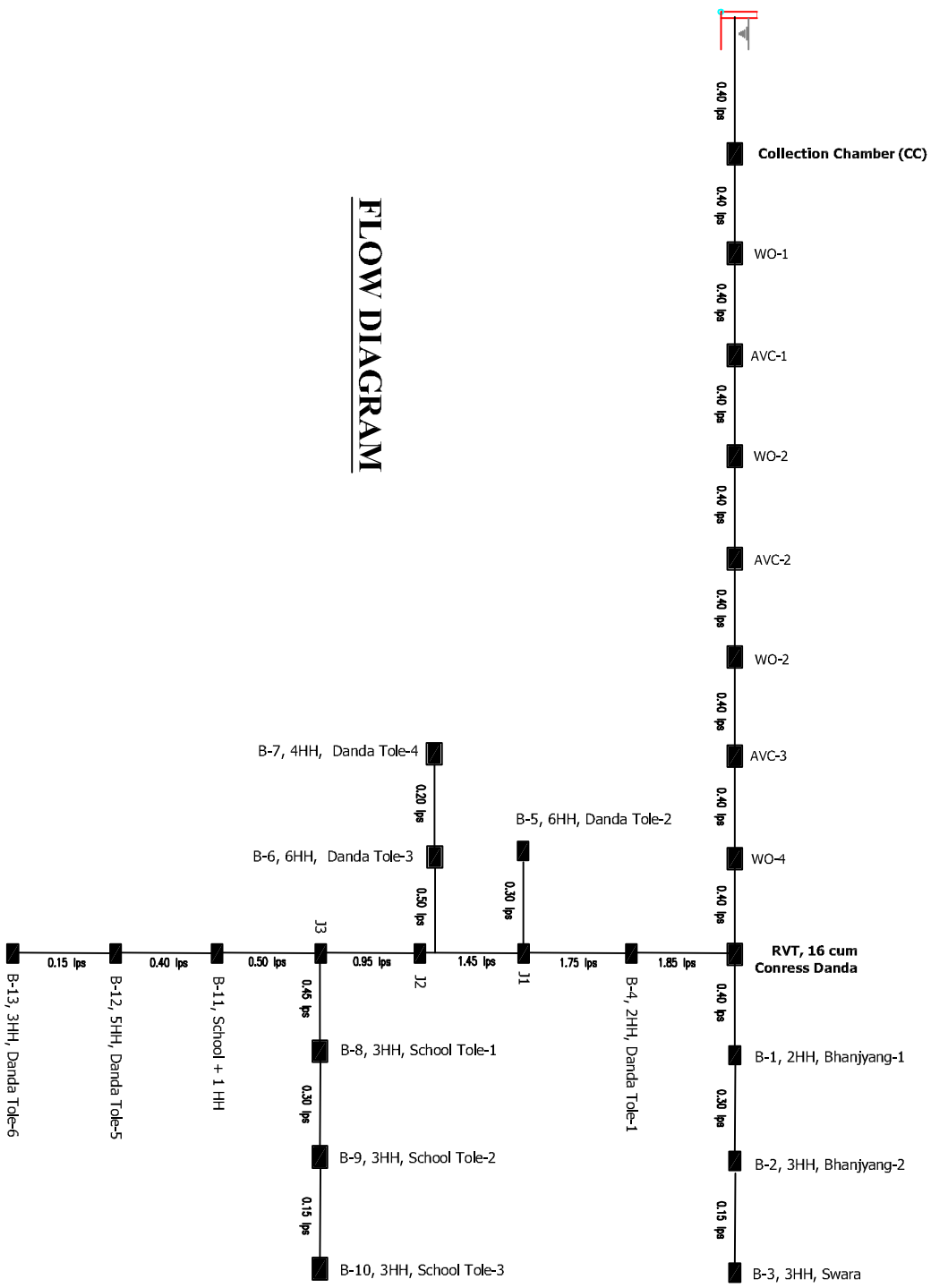
LAYOUT PLAN



Scale: Not to Scale

PROJECT NAME : DANDA TOLE WATER SUPPLY PROJECT	Designed and Drawn by: Guna Bhodur Loma (Engineer)
PROJECT LOCATION : Roshi Rural Municipality – 11, Kavrepalanchok	Approved by:
PIPE LINE DESIGN PROFILE	
FISCAL YEAR: 2020	

Intake
Chambote Khola Mul



FLOW DIAGRAM

PROJECT NAME : DANDA TOLE WATER SUPPLY PROJECT

PROJECT LOCATION : Roshi Rural Municipality - 11, Kavrepalanchok

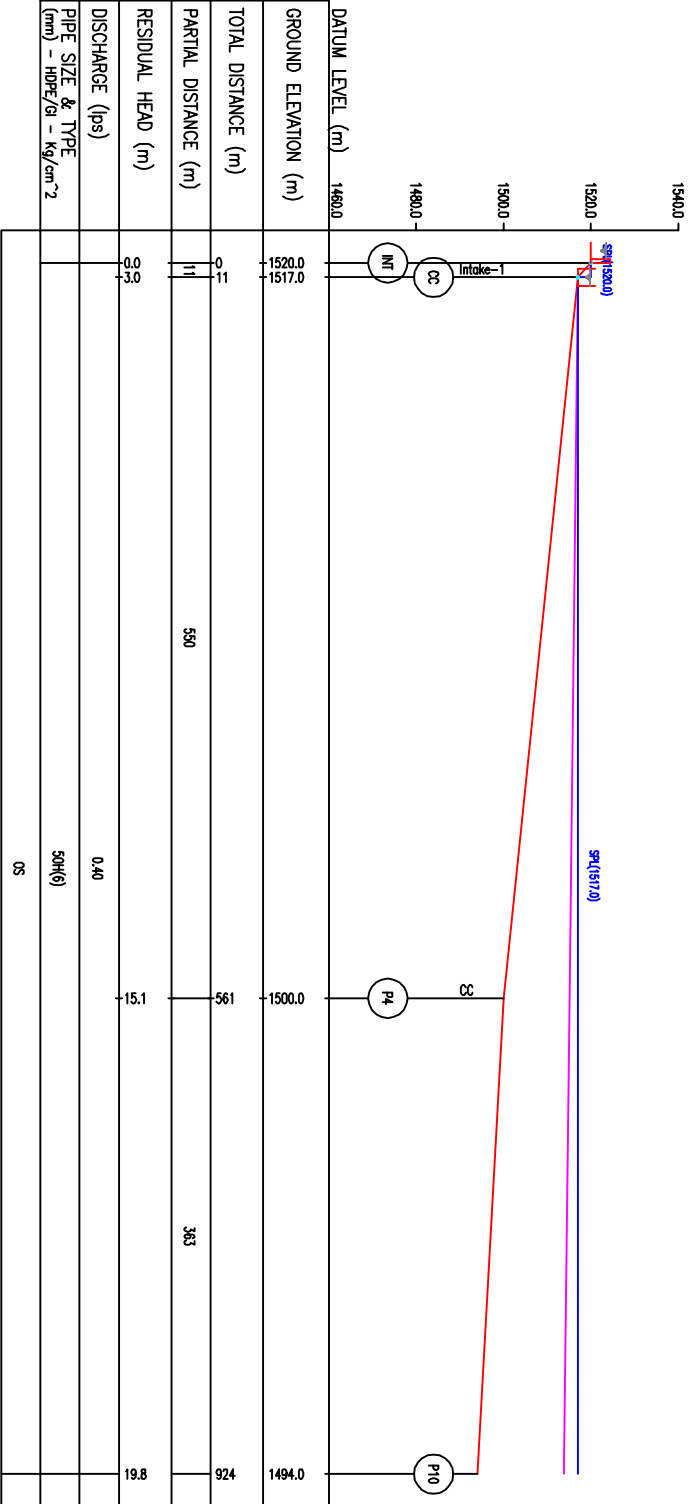
Designed and Drawn by: **Guna Bahodur Lama**
(Engineer)

Approved by:

FLOW DIAGRAM

FISCAL YEAR: 2018

Scale: Not to Scale



Intake to CC, RVT and Taps
(Sheet No: 1/6) of

PROJECT NAME : Danda Tole Water Supply Project

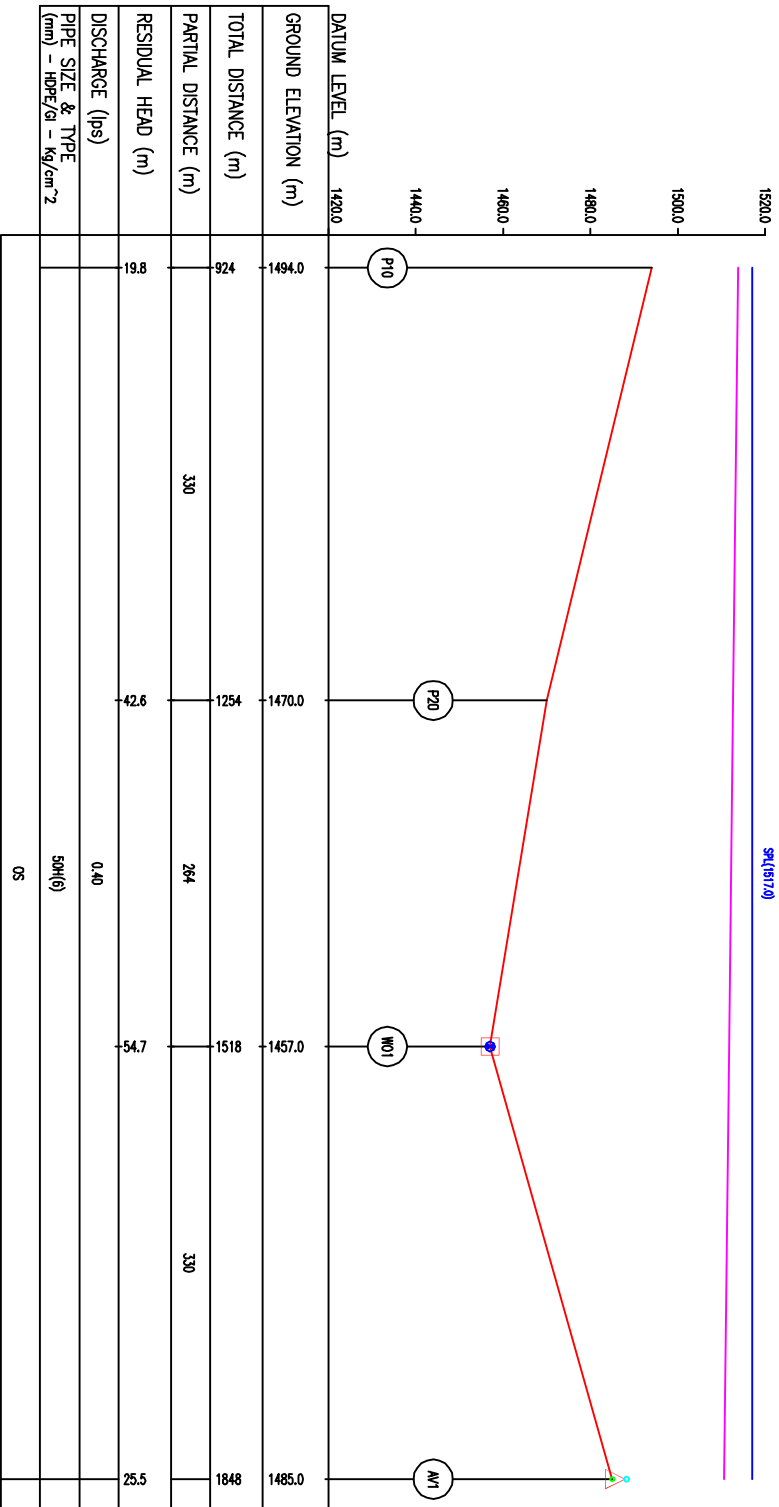
PROJECT LOCATION : Roshi-11, Kabhre District

Scale: [H : 5000, V : 1500]

PIPE LINE DESIGN PROFILE

FISCAL YEAR: 2077/78

Surveyed By :
Designed By :
Recommended By :
Approved By :



Intake to CC, RVT and Taps
(Sheet No: 2/6) of

PROJECT NAME : Danda Tole Water Supply Project

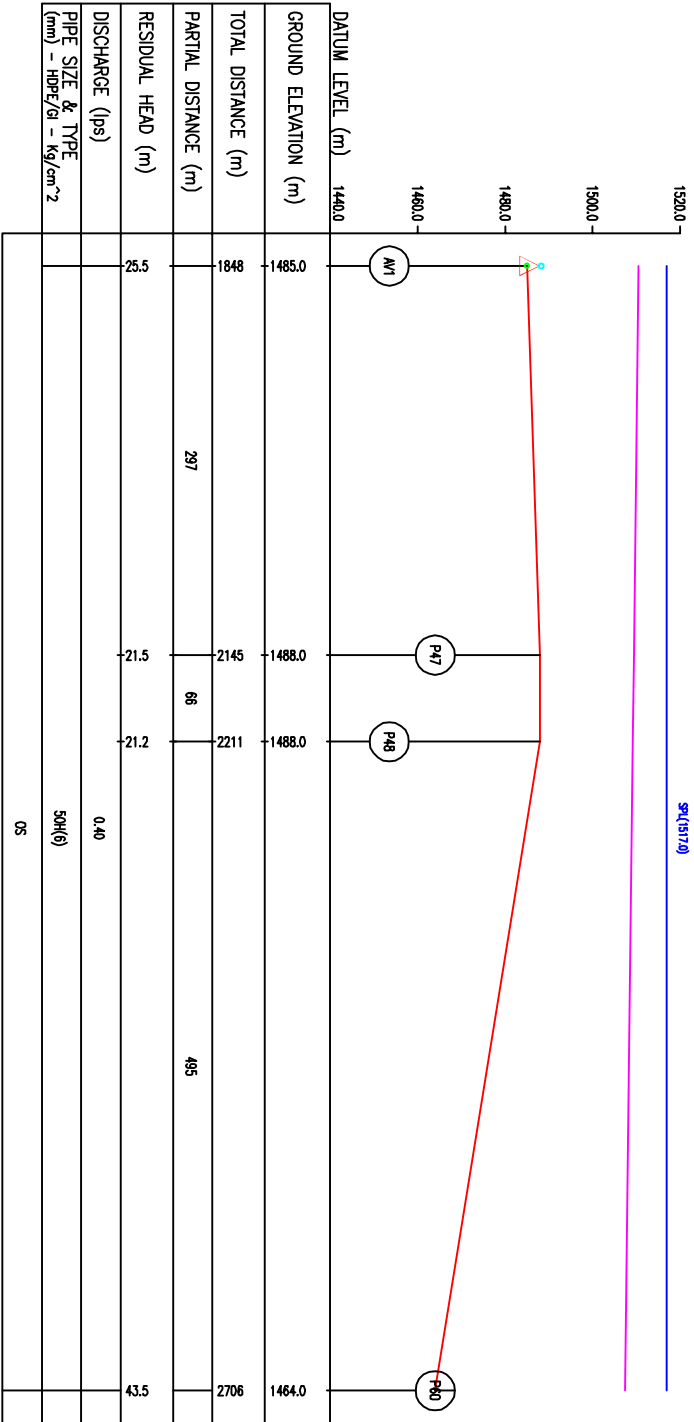
PROJECT LOCATION : Roshi-11, Kabhre District

Scale: [H : 1: 5000, V : 1: 1500]

PIPE LINE DESIGN PROFILE

FISCAL YEAR: 2077/78

Surveyed by :
Designed by :
Recommended by :
Approved by :



Intake to CC, RVT and Taps
(Sheet No: 3/6) of

PROJECT NAME : Danda Tole Water Supply Project

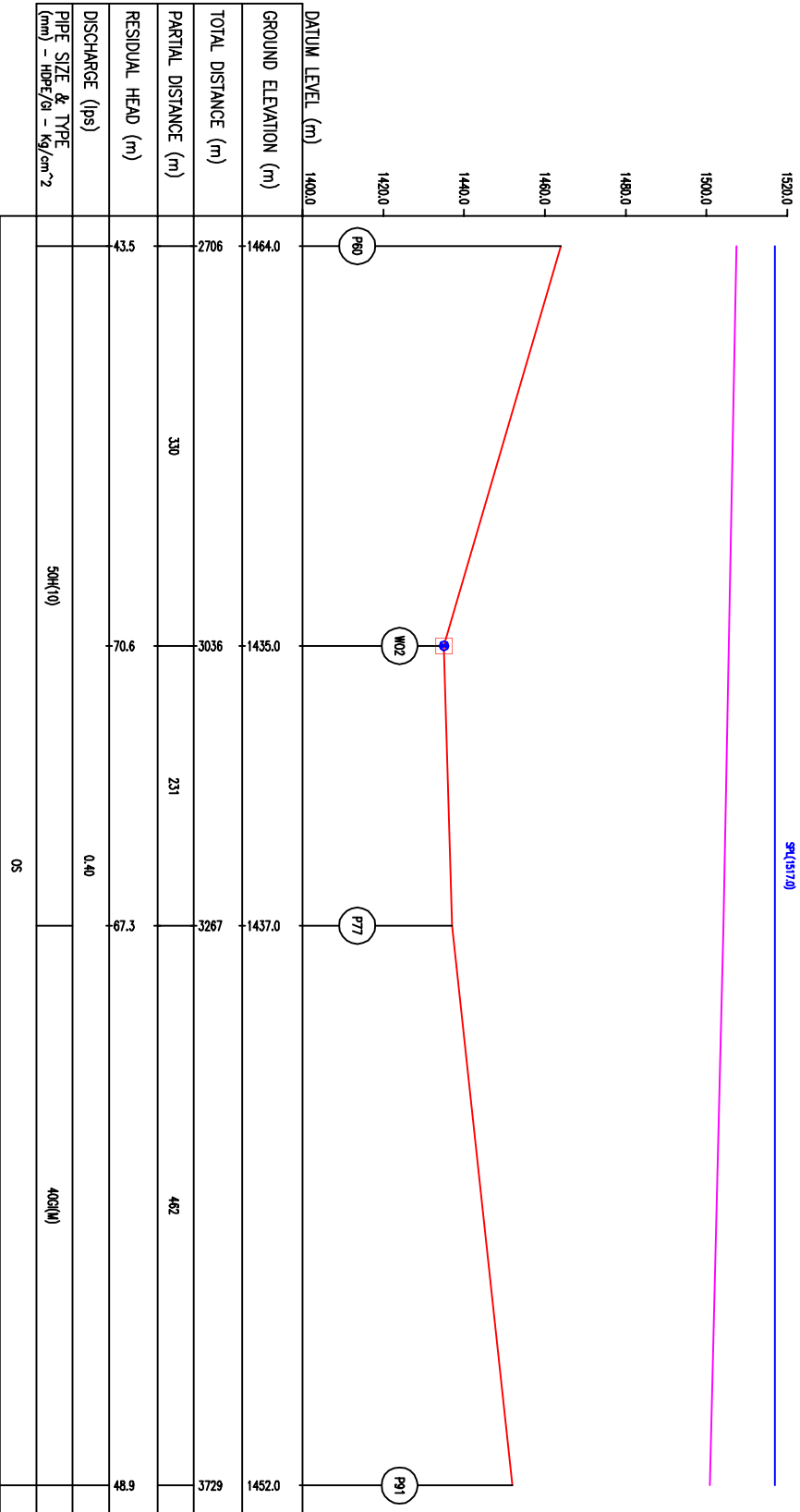
PROJECT LOCATION : Roshni-1, Kohhre District

Surveyed by :
Designed by :
Recommended by :
Approved by :

PIPE LINE DESIGN PROFILE

FISCAL YEAR: 2077/78

Scale: [H : 5000, V : 1500]



Intake to CC, RVT and Taps
(Sheet No: 4/6) of

PROJECT NAME : Danda Tole Water Supply Project

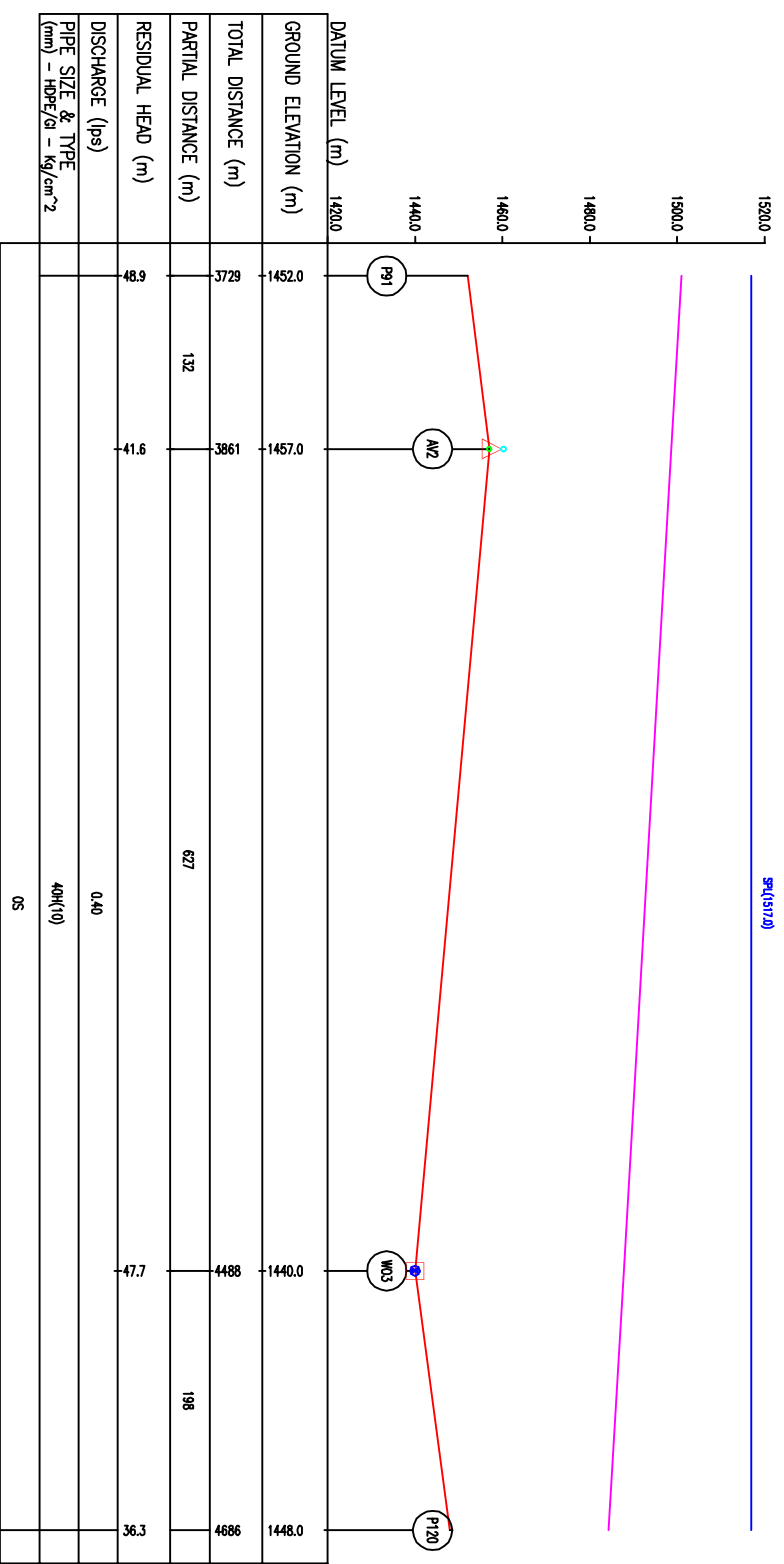
PROJECT LOCATION : Roshi-11, Kothare District

Surveyed by :
Designed by :
Recommended by :
Approved by :

PIPE LINE DESIGN PROFILE

FISCAL YEAR: 2077/78

Scale: [H : 5000, V : 1500]



Intake to CC, RVT and Taps
(Sheet No: 5/6) of

PROJECT NAME : Danda Tole Water Supply Project

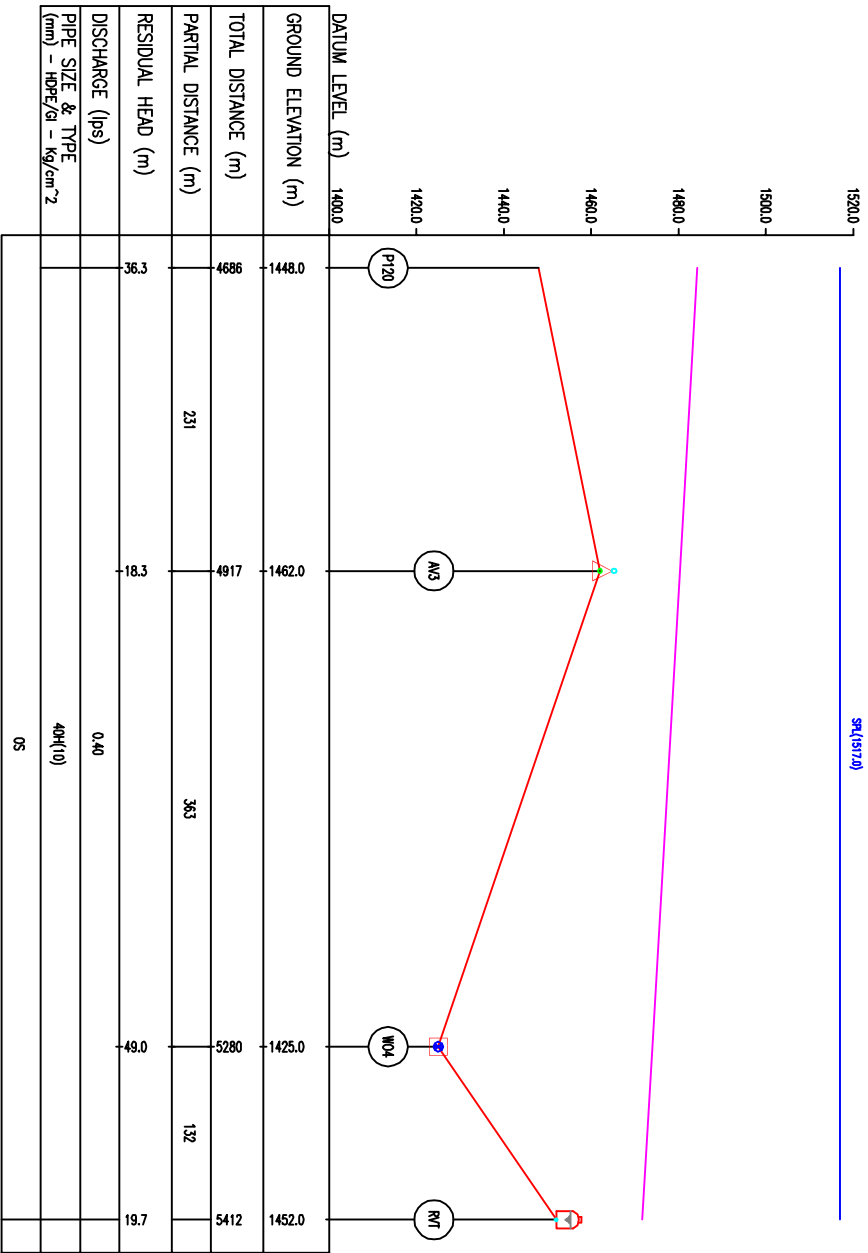
PROJECT LOCATION : Reshi-11, Kabhire District

PIPE LINE DESIGN PROFILE

FISCAL YEAR: 2077/79

Scale: [H : 5000, V : 1500]

Surveyed by :	
Designed by :	
Recommended by :	
Approved by :	



Intake to CC, RVT and Taps
(Sheet No: 6/6) of

PROJECT NAME : Danda Tole Water Supply Project

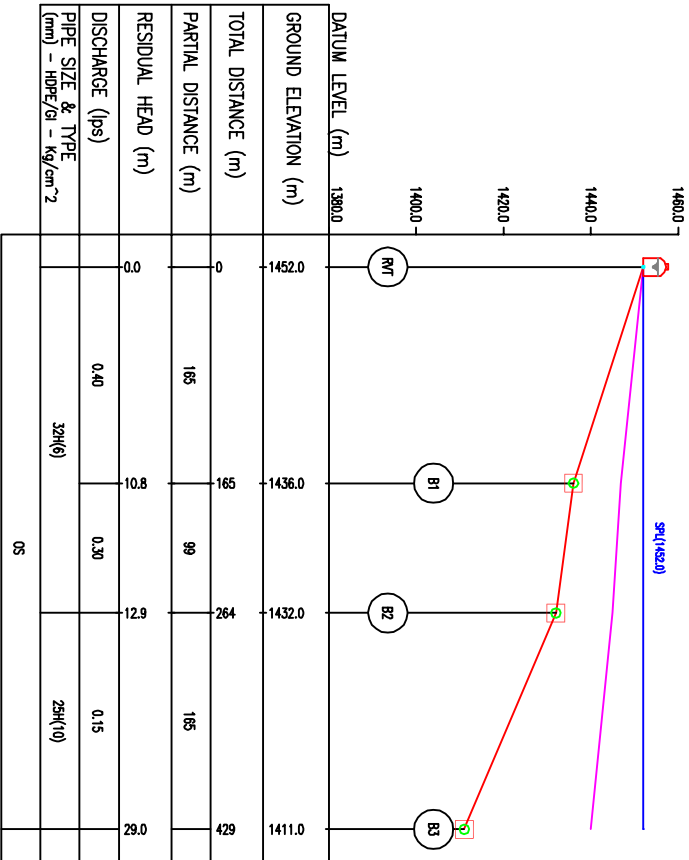
PROJECT LOCATION : Roshni-11, Kabhre District

Scale: [H : 1 : 5000, V : 1 : 1500]

PIPE LINE DESIGN PROFILE

FISCAL YEAR: 2077/78

Surveyed by :
Designed by :
Recommended by :
Approved by :



RVT to Branches
(Sheet No: 1/1) of

PROJECT NAME : Danda Tole Water Supply Project

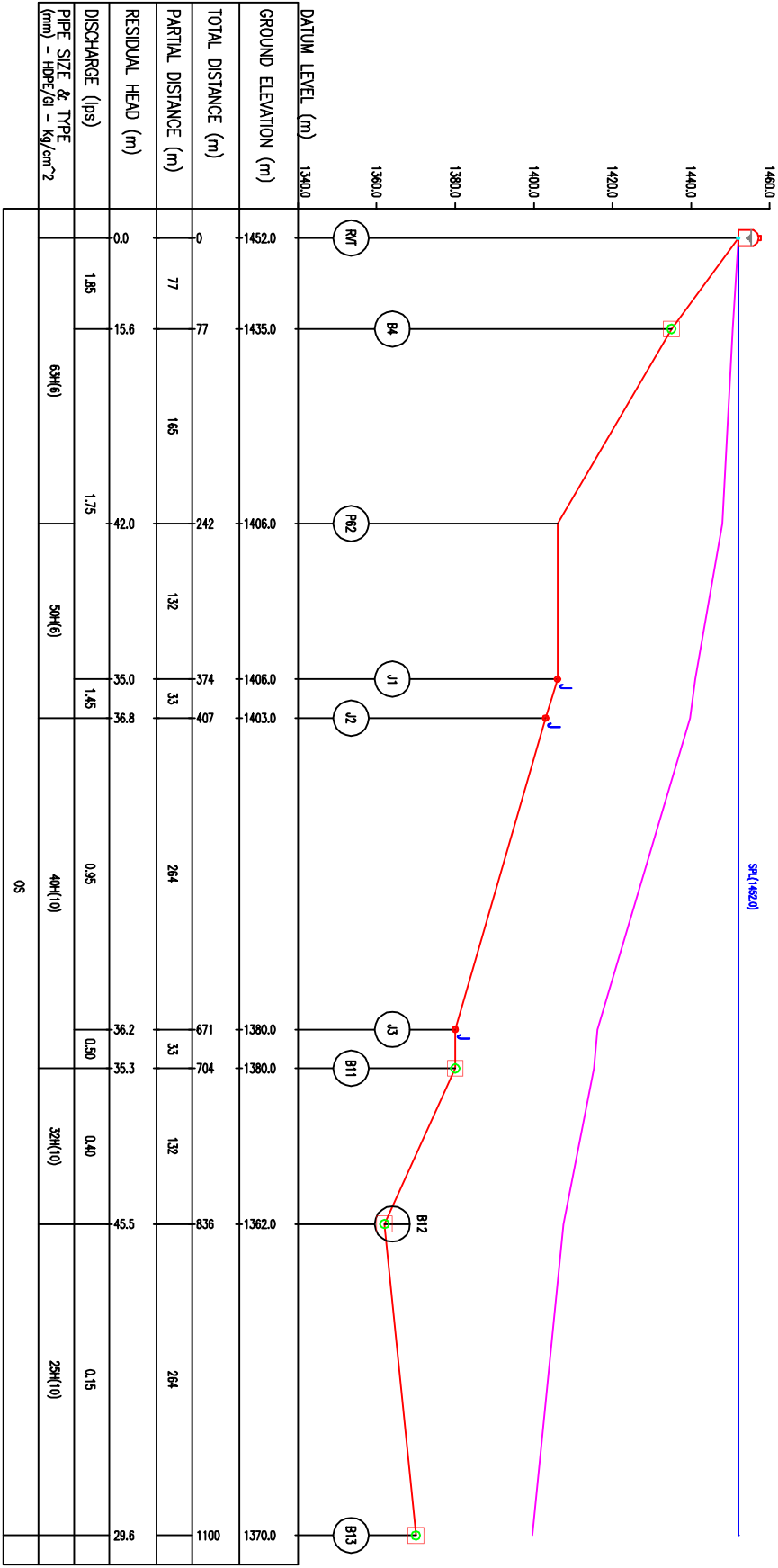
PROJECT LOCATION : Roshni-11, Kabbhe District

Surveyed by :
Designed by :
Recommended by :
Approved by :

PIPE LINE DESIGN PROFILE

FISCAL YEAR: 2077/78

Scale [H : 500, V : 1500]



RVT to Branches
(Sheet No: 1/1) of

PROJECT NAME : Danda Tole Water Supply Project

PROJECT LOCATION : Roshni-11, Kabhre District

Scale: [H : 1: 5000, V : 1: 1500]

Surveyed by :
Designed by :
Recommended by :

PIPE LINE DESIGN PROFILE

FISCAL YEAR: 2077/78

Approved by :

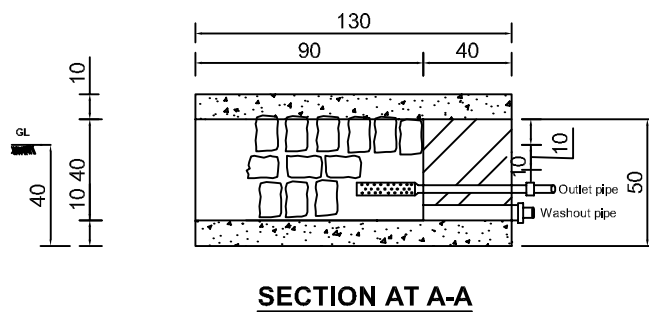
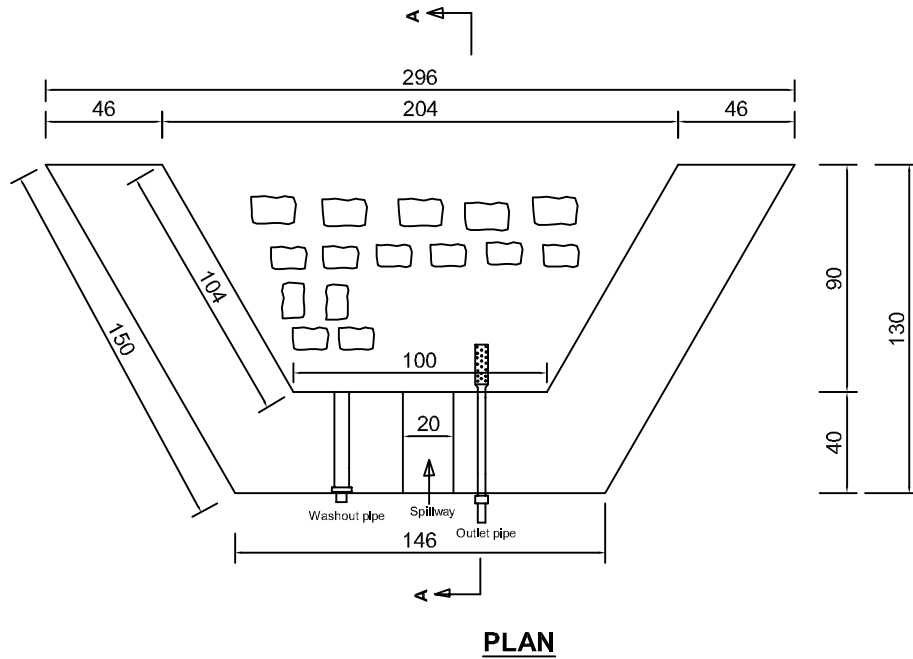
Annex-3

Drawings of Structure

Intake (Chambote Khola Mul)

Project name: Danda Tole WSP

Location: Roshi-11, Kavre



Designed and Drawn by:

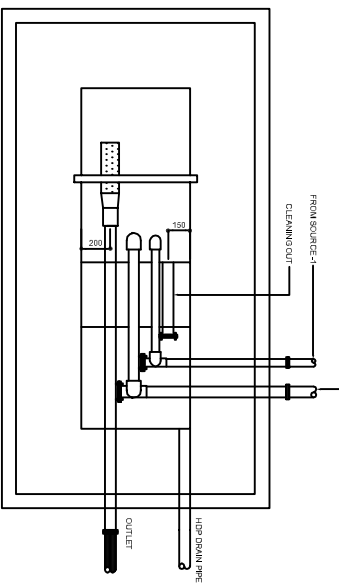
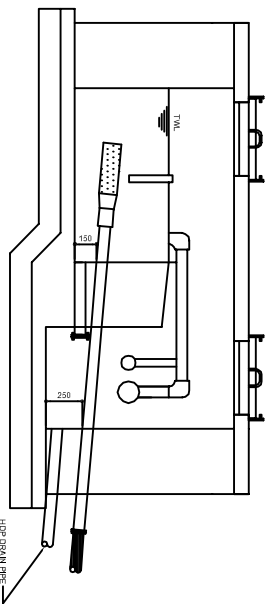
Checked by:

Approved by:

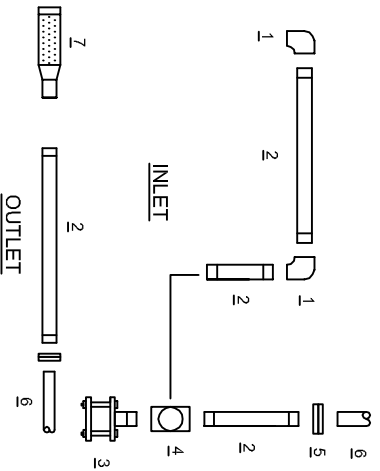
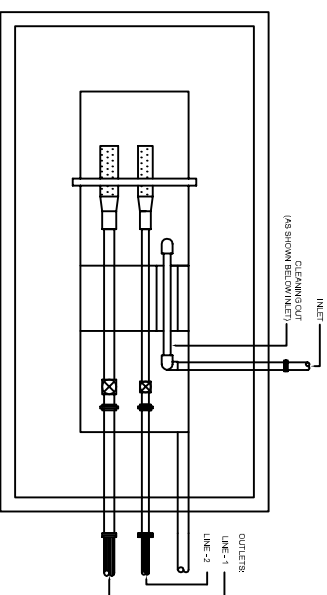
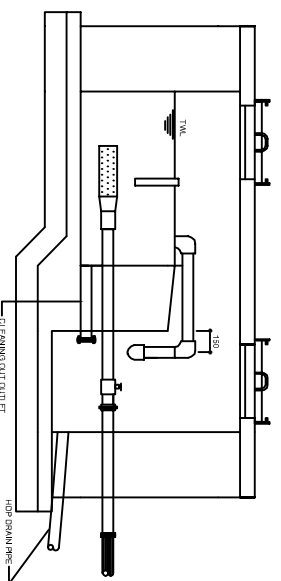
Scale: 1:25

Note: All the dimensions are in CM.

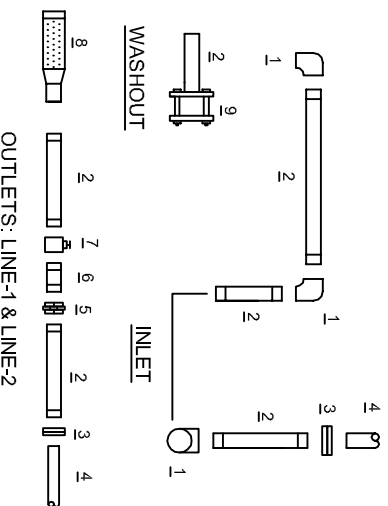
COLLECTION CHAMBER



DISTRIBUTION CHAMBER



- 1- G.I. ELBOW
- 1- G.I. PIPE
- 2- BLIND FLANGE
- 4- G.I. TEE
- 1- FLANGE SET/ BRASS UNION
- 2- HDP STRAINER



- 1- G.I. ELBOW
- 1- G.I. PIPE
- 2- FLANGE SET/ BRASS UNION
- 4- HDP PIPE
- 1- G.I. UNION
- 1- G.I. NIPPLE
- 7- GLOVE VALVE
- 2- HDP STRAINER
- 2- BLIND FLANGE

TYPE DESIGN

PIPE INSTALLATION DETAILS FOR COLLECTION CHAMBER AND DISTRIBUTION CHAMBER

APPROVED BY :

DESIGNED BY :

DRAWN BY :

CHECKED BY :

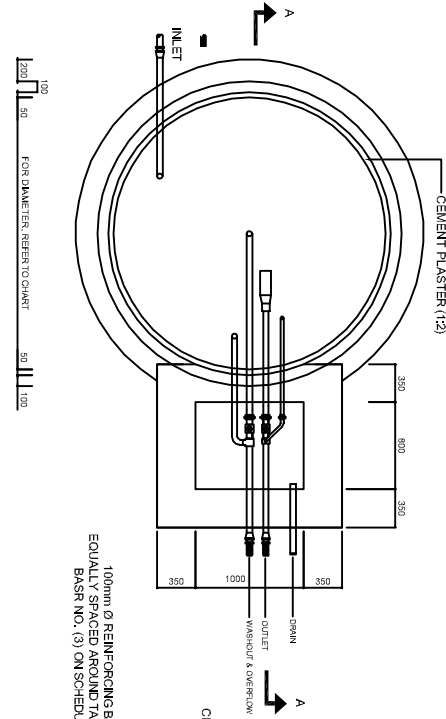
DATE :

Project: Danda Tole Water Supply Project

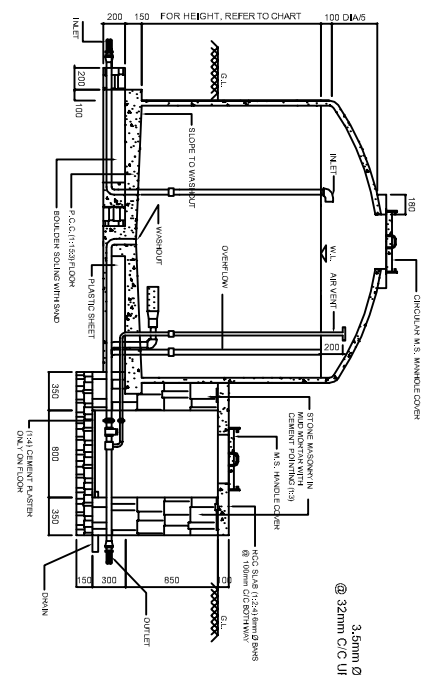
PROJECT LOCATION : Roshi-11, Kabhre District

DRG. NO.

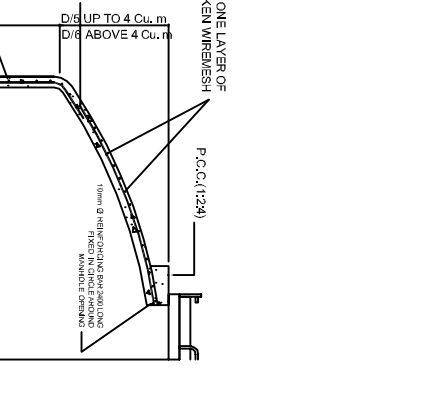
G-17



PLAN
SCALE 1:60



SECTION A-A
SCALE 1:60

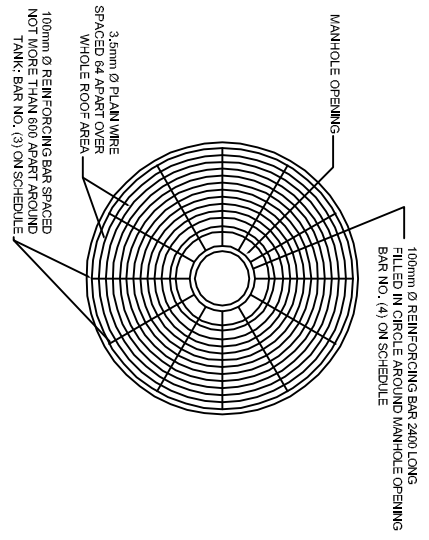


SECTION SHOWING REINFORCEMENT
SCALE 1:30

CHART FOR STORAGE TANK DIMENSIONS

TANK CAPACITY (m ³)	DIAMETER (m)	CROSS WATER DEPTH (m)	TANK WALL HEIGHT (m)	DOME HEIGHT (m)	TOTAL HEIGHT (m)
1	1.50	0.80	0.90	0.30	1.20
2	1.50	1.30	1.40	0.30	1.70
3	2.00	1.10	1.20	0.40	1.60
4	2.00	1.40	1.50	0.40	1.90
6	2.50	1.20	1.30	0.40	1.70
7	2.50	1.40	1.30	0.40	1.90
8	2.50	1.55	1.35	0.40	2.05
9	3.00	1.75	1.50	0.40	2.25
10	3.00	1.40	1.40	0.50	2.00
12	3.00	1.55	1.65	0.50	2.15
14	3.50	1.80	1.90	0.60	2.40
16	3.50	1.80	1.90	0.60	2.30
18	4.00	1.55	1.65	0.70	2.50
20	4.00	1.70	1.80	0.70	2.50

PLAN OF M.S. MANHOLE COVER



PLAN OF ROOF SHOWING REINFORCEMENT
SCALE 1:60

NOTE:
1. ALL PIPE FITTINGS ARE NOT TO SCALE
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED

STANDARD DRAWING

DESIGNED BY :

Ferrocement Storage Tank-I

DRG. NO. G-10

CHECKED BY :

APPROVED BY :

Project: Danda Tole Water Supply Project
PROJECT LOCATION : Roshi-11, Kabra District

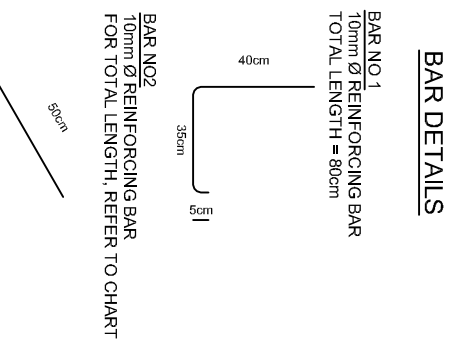
REINFORCEMENT SCHEDULE FOR FERROCEMENT STORAGE TANK

CAPACITY (m ³)	BAR NO. 1		BAR NO. 2		BAR NO. 3		BAR NO. 4		TOTAL LENGTH (m)
	QUANTITY (NO)	LENGTH (m)	QUANTITY (NO)	LENGTH (m)	QUANTITY (NO)	LENGTH (m)	QUANTITY (NO)	LENGTH (m)	
1	10	0.80	10	1.40	10	0.40	1	2.40	28.40
2	10	0.80	10	1.90	10	0.40	1	2.40	33.40
3	14	0.80	14	1.70	14	0.65	1	2.40	46.50
4	14	0.80	14	2.00	14	0.85	1	2.40	50.70
5	16	0.80	16	1.80	16	0.90	1	2.40	58.40
6	16	0.80	16	2.00	16	0.90	1	2.40	61.60
7	16	0.80	16	2.15	16	0.90	1	2.40	64.00
8	16	0.80	16	2.35	16	0.90	1	2.40	67.20
9	20	0.80	20	2.00	20	1.15	1	2.40	81.40
10	20	0.80	20	2.15	20	1.15	1	2.40	84.40
12	20	0.80	20	2.40	20	1.15	1	2.40	89.40
14	25	0.80	25	2.20	25	1.40	1	2.40	112.40
16	25	0.80	25	2.40	25	1.40	1	2.40	117.40
18	25	0.80	25	2.15	25	1.65	1	2.40	117.40
20	25	0.80	25	2.30	25	1.65	1	2.40	121.15

NECESSARY FITTINGS FOR FERROCEMENT STORAGE TANK

ITEMS:	SIZE OF MAINLINE (HDP)	
	75mm	63mm
1. BRASS UNION/FLANGE SET	50mm	32.25mm
2. G.I. PIPE (0.5m)	50mm	20*15mm
3. G.I. ELBOW	50mm	20*15mm
4. G.I. PIPE (0.5m)	50mm	20*15mm
5. G.I. SOCKET	50mm	20*15mm
6. G.I. FLANGE (ACCORDING TO CHART)	50mm	20*15mm
7. G.I. ELBOW	50mm	20*15mm

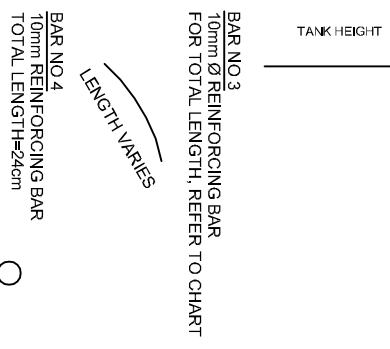
ITEMS:	SIZE OF MAINLINE (HDP)	
	75mm	63mm
1. HDPE STAINER	90mm	50mm
2. G.I. PIPE (0.5m)	65mm	40mm
3. G.I. ELBOW	65mm	40mm
4. G.I. PIPE (0.5m)	65mm	40mm
5. G.I. UNION	65mm	40mm
6. G.I. UNION	65mm	40mm
7. G.I. VALVE	65mm	40mm
8. G.I. NIPPLE	65mm	40mm
9. G.I. NIPPLE	65mm	40mm
10. G.I. NIPPLE	65mm	40mm
11. BRASS UNION/FLANGE SET	65mm	40mm
12. G.I. NIPPLE	65mm	40mm
13. G.I. ELBOW	65mm	40mm
14. G.I. PIPE (0.3m)	65mm	40mm
15. G.I. UNION	65mm	40mm
16. G.I. PIPE (0.5m)	65mm	40mm
17. G.I. ELBOW	65mm	40mm
18. G.I. PIPE (0.2m)	65mm	40mm
19. G.I. SOCKET	65mm	40mm
20. G.I. PIPE (ACCORDING TO CHART)	65mm	40mm
21. G.I. TEE	65mm	40mm



PIPE LENGTHS FOR FERROCEMENT STORAGE TANK

CAPACITY (m ³)	DIAMETER (m ³)	HEIGHT (m)	LENGTH OF PIPE (m)			
			INLET PIPE NO.6	INLET PIPE NO.20	INLET PIPE NO.3	INLET PIPE NO.15
1	1.50	0.80	0.61	0.66	1.10	0.46
2	1.50	1.30	1.11	1.16	1.10	0.96
3	2.00	1.10	0.91	0.96	1.35	0.76
4	2.00	1.40	1.21	1.26	1.35	1.06
5	2.50	1.20	1.01	1.06	1.60	0.96
6	2.50	1.40	1.21	1.26	1.60	1.06
7	2.50	1.55	1.36	1.41	1.60	1.21
8	2.50	1.75	1.56	1.61	1.60	1.41
9	3.00	1.41	1.21	1.26	1.85	1.06
10	3.00	1.55	1.36	1.41	1.85	1.21
12	3.00	1.80	1.61	1.66	1.85	1.46
14	3.50	1.60	1.41	1.46	2.10	1.26
16	3.50	1.80	1.61	1.66	2.10	1.46
18	4.00	1.55	1.36	1.41	2.35	1.21
20	4.00	1.70	1.51	1.56	2.35	1.36

ITEMS:	SIZE OF MAINLINE (HDP)	
	75mm	63mm
1. HDPE STAINER	90mm	50mm
2. G.I. PIPE (0.5m)	65mm	40mm
3. G.I. ELBOW	65mm	40mm
4. G.I. PIPE (0.5m)	65mm	40mm
5. G.I. UNION	65mm	40mm
6. G.I. UNION	65mm	40mm
7. G.I. VALVE	65mm	40mm
8. G.I. NIPPLE	65mm	40mm
9. G.I. NIPPLE	65mm	40mm
10. G.I. NIPPLE	65mm	40mm
11. BRASS UNION/FLANGE SET	65mm	40mm
12. G.I. NIPPLE	65mm	40mm
13. G.I. ELBOW	65mm	40mm
14. G.I. PIPE (0.3m)	65mm	40mm
15. G.I. UNION	65mm	40mm
16. G.I. PIPE (0.5m)	65mm	40mm
17. G.I. ELBOW	65mm	40mm
18. G.I. PIPE (0.2m)	65mm	40mm
19. G.I. SOCKET	65mm	40mm
20. G.I. PIPE (ACCORDING TO CHART)	65mm	40mm
21. G.I. TEE	65mm	40mm



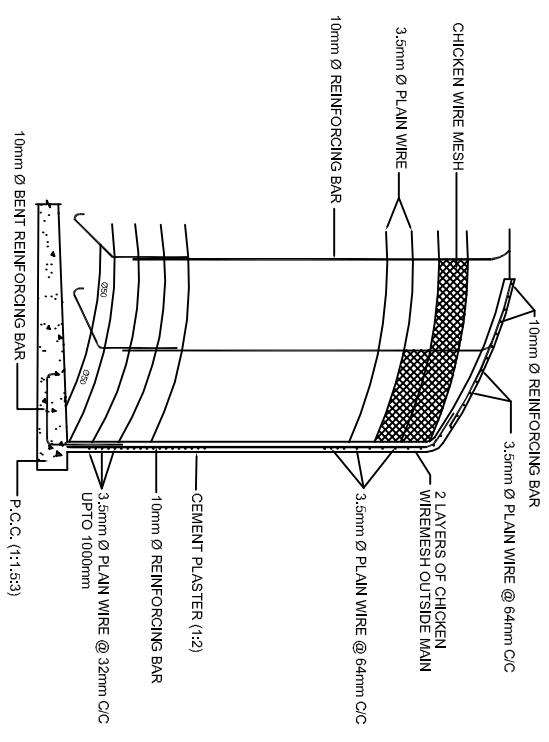
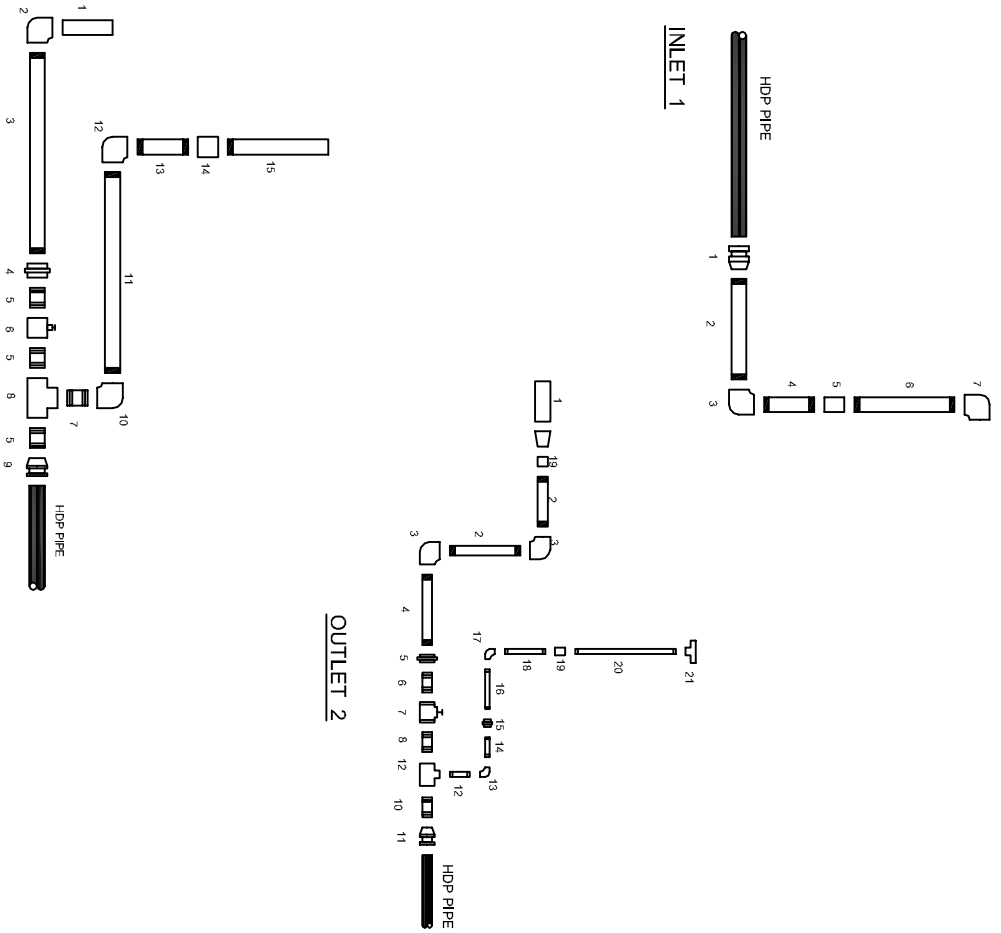
STANDARD DRAWING

Project: Danda Tole Water Supply Project
PROJECT LOCATION : Roshni-1, Kabhre District

Ferrocement Storage Tank-1

DRG. NO. G-11
DESIGNED BY :
CHECKED BY :
APPROVED BY :





STANDARD DRAWING

Ferrocement Storage Tank-1

DRG. NO.

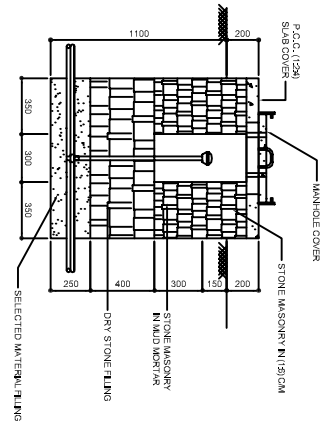
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DESIGNED BY :

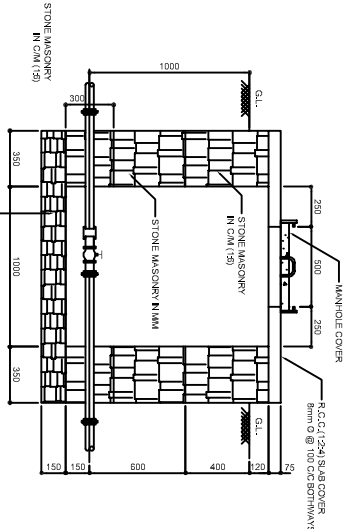
CHECKED BY :

APPROVED BY :

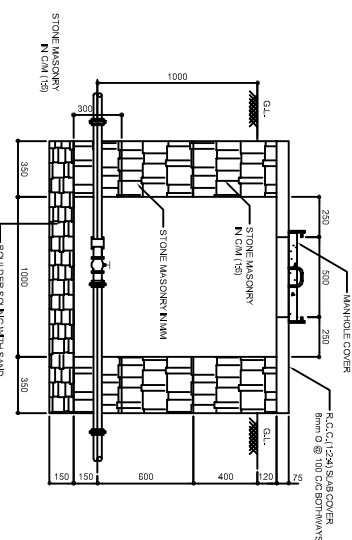
Project: Danda Tole Water Supply Project
 PROJECT LOCATION : Roshni-11, Kabhree District



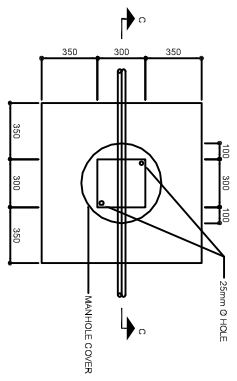
SECTION
AIR VALVE CHAMBER



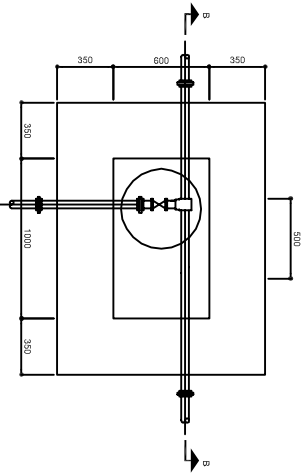
SECTION
WASHOUT VALVE CHAMBER



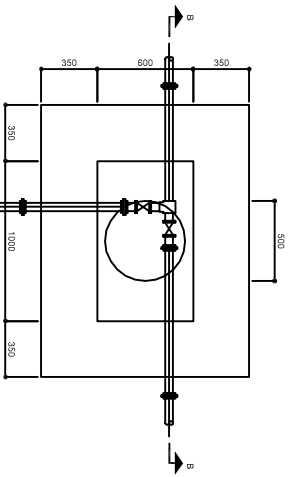
SECTION
SECTIONAL VALVE CHAMBER



PLAN
AIR VALVE CHAMBER



PLAN
WASHOUT VALVE CHAMBER



PLAN
SECTIONAL VALVE CHAMBER

SCALE 1:40

Project: Danda Tole Water Supply Project
PROJECT LOCATION : Roshi-11, Kabhre District

STANDARD DRAWING

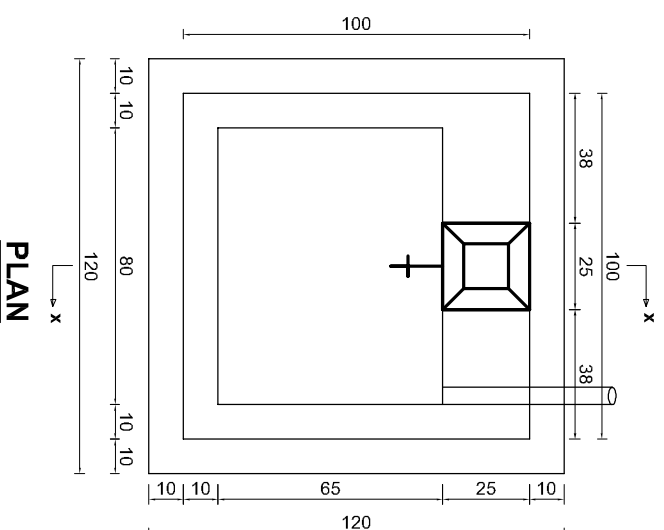
Washout, Air Valve and Sectional Valve Chamber

DRG. NO. :
DESIGNED BY :
DRAWN BY :
CHECKED BY :
DATE :

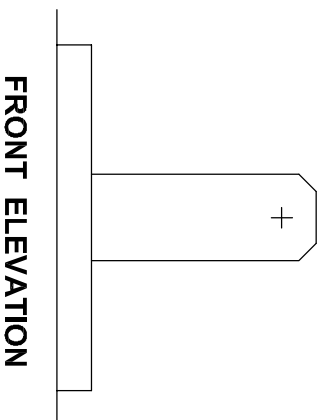
G-25

APPROVED BY :

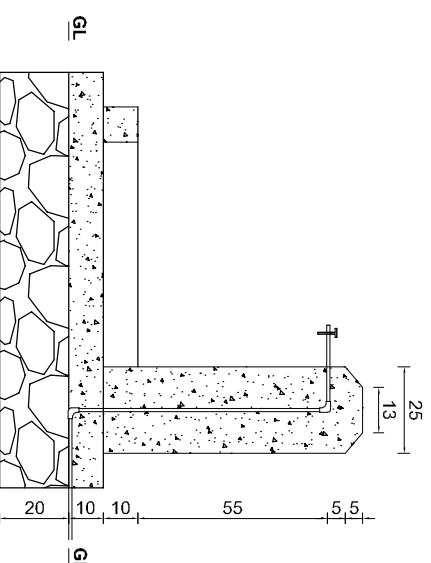
TYPICAL TAP STAND POST



PLAN



FRONT ELEVATION



SECTION AT X-X

Scale: Not to Scale

PROJECT NAME : DANDA TOLE WATER SUPPLY PROJECT

Designed and Drawn by: Guna Behodur Lamma
(Engineer)

Tap Stand Post

PROJECT LOCATION : Rashi Rural Municipality - 11, Kavrepalanchok

Approved by:

FISCAL YEAR: 2020