



**Government of Nepal**  
**Water and Energy Commission Secretariat**  
**Singha Durbar, Kathmandu**

**Study on Identification and Development of  
Hot Water Spring Sources in Nepal**

**Contract No.: WECS/SEED/078-79/01**

**FINAL REPORT**

**Volume 3: Master Plans**

**3A: Master Plan of Paudwar and Bhurung Tatopani, Myagdi**

**July, 2024**

**Submitted By:**

---

**Global – PNet - Azad JV**

G. P. O. Box: 8975 EPC 1337, Asram Marga, Balkhu, Kathmandu, Nepal.

Phone: +977 (0)1 5187338, +977 (0)1 5424889

E-mail: [engineeringassociates@gmail.com](mailto:engineeringassociates@gmail.com), [pnet.pvt.ltd@gmail.com](mailto:pnet.pvt.ltd@gmail.com)

## **Executive Summary**

### **Introduction**

Nepal is globally renowned for its natural beauty, encompassing the majestic Himalayas, diverse topography, and rich cultural heritage. Among its natural assets are numerous hot water springs, which are manifestations of geothermal activity beneath the Earth's surface. These springs emerge along tectonic belts like the Main Central Thrust (MCT), Main Boundary Thrust (MBT), and Ramgarh Thrust (RT), making them significant from geological, cultural, and economic perspectives.

Hot water springs in Nepal serve diverse purposes, including tourism, wellness, and potential renewable energy sources. However, limited scientific exploration and unstructured development have restricted their utility and potential contributions to sustainable development. This study, commissioned by the Water and Energy Commission Secretariat (WECS), aims to identify, evaluate, and propose development strategies for these natural resources.

This volume of the report consists master plan including tourism infrastructure, cost estimates, revenue potential, and recommendations for implementation and investment structures on Paudwar and Bhurung Tatopani.

### ***Objective and Scope of Work***

The primary objective of this study is to identify hot water spring resources in Nepal and develop a comprehensive plan for their promotion as tourism destinations. The scope of the work includes identifying hot water springs, conducting site visits to collect data, and assessing various parameters such as accessibility, historical significance, and geological conditions. The study will also evaluate the tourism potential and vulnerability of these resources while preparing a detailed development plan, including cost estimation and economic analysis of selected four sources. This volume of the report focuses solely on Paudwar and Bhurung Tatopani in Myagdi District.

### ***Location and Accessibility***

Paudwar and Bhurung Tatopani Kunda are located in Myagdi District in Gandaki Province of Nepal. The location of these hot water springs lies in Annapurna Rural Municipality and on the left bank and right bank of Kaligandaki River respectively.

The location of Paudwar Tatopani Kunda lies in the Annapurna Rural Municipality ward no-5 and on the left bank of the Kaligandaki River. The hot spring's coordinates are approximately 83°39'20.47"E longitude and 28°30'00.68"N latitude.

Bhurung Tatopani Kunda is located in the Annapurna Rural Municipality ward no-2 and about 500m downstream and opposite bank of Paudwar Tatopani i.e. on the right bank of the Kaligandaki River. The hot spring's coordinates are approximately 83°39'15.40"E longitude and 28°29'46.53"N latitude.

Bhurung Tatopani in Myagdi District, particularly Tatopani bazar, is accessible via Prithvi Highway, Mid-Hill Highway and Kaligandaki Corridor. There is mainly one route leading towards the site and this is around 303 kilometres from Kathmandu to Pokhara to Bhurung Tatopani road passing through the hilly terrain.

Accessing the site involves traversing through the picturesque landscape of the Annapurna region. Visitors primarily reach Tatopani via road from Pokhara to Beni, with the journey taking approximately

5-6 hours, depending on road conditions and traffic. Bhurung Tatopani is approximately 29 kilometres from Beni, head-quarter of Myagdi district located on the Kaligandaki Corridor (NH 48). Beni itself is connected by 12km road from Maldhunga at Mid-Hill Highway (NH03). The journey involves traveling from Beni through a mix of paved and unpaved roads to Tatopani. Then further to Paudwar one can travel on foot via suspension bridge over Kaligandaki at the northern end of Tatopani bazar.

For those starting from Kushma on the Mid-Hill Highway (NH03), the distance to Paudwar is about 50 kilometres via Beni. Additionally, trekkers often incorporate Tatopani into their itineraries along the Annapurna Circuit or the Jomsom-Muktinath Trek, arriving after several days of trekking from Besisahar or Nayapul. Local buses or jeeps may be available from nearby villages like Beni or Ghasa, providing another transportation option.

### **Methodology**

After selecting this location as one of the four sites for the preparation of a site-specific master plan, a site visit by experts was conducted. Information gathered during the identification stage—including locations, discharges, temperatures, accessibility, geological conditions, historical and religious significance, and tourism potential—was verified. Additionally, the master plan concept was developed, and a list of required surveys and investigations was prepared. Following the field studies, a topographic survey was conducted. Finally, the consultant developed a master plan outlining conservation measures, tourism infrastructure such as ponds, cost estimates, revenue potential, and recommendations for implementation and investment structures.

### **Master Plan**

Site-specific master plans were prepared for four priority sites, integrating tourism, ecological conservation, and community engagement. These plans were developed based on extensive field visits conducted by a multidisciplinary team of experts, including geologists, urban planners, topographic surveyors, and hydrologists. Hydrological analyses were conducted using long-term data from rivers associated with each hot water spring source, while detailed topographic surveys were carried out using appropriate methods and advanced technology.

### ***Topographic Survey***

A detailed topographic survey was conducted using Total Station instruments (Topcon & Sokkia) to ensure precise horizontal and vertical control. Benchmark points (BM-9, BM-10, BM-3) were established based on reference points from the upstream Mistri-2 Hydropower Project. The survey provided accurate X, Y, and Z coordinates, facilitating mapping at a scale of 1:1000 with 1-meter contour intervals. Key details like roads, rivers, and landslide features were recorded for AutoCAD-based mapping.

### ***Hydrological Study***

Hydrological parameters of the Kaligandaki River were analyzed using satellite data and SRTM 30m DEM for watershed characteristics. The river's gradient near the hot springs is 2.54%, with a catchment area of 3919.01 km<sup>2</sup>. Design discharge was calculated for a 100-year return period, yielding peak discharge values of 2835.42 m<sup>3</sup>/s. High flood levels were estimated at 1234.07 m (Paudwar) and 1222.88 m (Bhurung), with average flow velocities of 7.57 m/s and 8.3 m/s, respectively. Flood

dynamics and velocity distributions were modeled and presented graphically, aiding infrastructure design.

### ***Paudwar Tatopani***

The master plan is developed in accordance with the demand for the space covers a total area of 4246.07 sqm. The functions are positioned with consideration for the environment of the site. The placement of private areas, such as shower, changing room is done far from the plaza area other public spaces like ticket counter, chautara and temple space are placed along entrance for convenience and privacy while maintaining the building's functioning and religious views.

Each building has an open area surrounding it to ensure that some structures must be isolate from one another, such as the accommodations, which needs to be secluded from other structures. To guarantee convenient access for the general public as well as for the

Administrative office building's other regulatory tasks, the administrative office building is situated close to the entrance/road. Changing room and shower area is given special consideration when creating the site plan since, it should be situated near the hot springs.

In accordance with the prepared axes, circulation pathway and the site geometry, the buildings are positioned. The vertical and horizontal axes of the site are where the structures are positioned. All of the structures are oriented toward the nearby open space because of how they are placed in relation to one another.

Right after the main entrance the Ticket Counter is placed to the East. Towards the west of the entrance is the public service building that consists of Main block and the public toilet.

The main block is along the major circulation pathway which consists of the administration space, accommodation and restaurant space. A waiting space is also provided for the convenience of those who are waiting. After passing through the main block, stairs and ramp can be seen which leads toward the hot spring. Hot spring is easily accessible by differently abled people with different facilities for them. A segregates space for relaxation is provided in the west side which will Offer wellness retreats, yoga sessions, and holistic healing experiences. This recreation area aims to create an engaging and eco-friendly destination that enhances visitor experiences, supports local communities, and preserves the region's natural and cultural legacy. The plan includes enhancing the natural hot springs with eco-friendly pools and creating a wellness zone with spas and meditation areas to promote relaxation.

Stepped seating is also provided near the hot springs. Designing stepped seating for Paudwar Tatopani involves creating a comfortable, aesthetically pleasing, and functional space that enhances the visitor experience while blending with the natural landscape. Open shower is also designed near the hot spring which makes it more easier safeguarding the privacy. There are mainly three hot springs which are used for healing and relaxation process.

The hot springs can be accessed while enjoying the beautiful river view and aesthetically pleasing pathways. Toilet and changing room block are also provided closer to the hot spring with the locker service for the security reasons. Key notes of the master plan are:

- New bridge and entrance facilities enhance accessibility.
- Structures include ticket counters, administrative buildings, wellness centers, communal hot spring pools, and eco-friendly accommodations.

- Universal design principles ensure inclusivity, while renewable energy and waste management promote sustainability.

### ***Bhurung Tatopani***

The master plan is developed in accordance with the demand for the space. The functions are positioned with consideration for the environment of the site. An entrance gate is provided straight from the parking space. A welcoming landscape with resting space leads to the hot springs and other entities. A ticket counter is placed near the entrance to maintain the public flow and provide information regarding the hot spring. The overall site is 1091 sqm in which 910 sqm is for future expansion. All the infrastructures are located in the private properties.

The master plan for hot spring surroundings integrates both practical amenities and sustainable design to create a welcoming and inclusive destination. Two separate hot spring areas are designated for male and female visitors, each featuring open shower areas and washing facilities for pre-soak preparation. To enhance the natural ambiance, existing toilet spaces are repurposed into inviting landscapes, fostering a harmonious blend with the environment which will also buffer the space from the nearest main road.

A new block is introduced to cater to the needs of visitors, including essential services and retail opportunities. Within this block, retail shops offer basic groceries and clothing items, supporting local vendors and enhancing the visitor experience. Adjacent to the shops, a restaurant or dining space provides a place for guests to enjoy authentic cuisine and socialize, complementing their hot spring visit.

The new block also incorporates modern amenities, including proper toilet and changing room facilities equipped with locker areas for secure storage. Inclusivity is prioritized with the inclusion of a toilet specifically designed for differently-abled individuals, ensuring accessibility for all visitors. Additionally, two dedicated family bathtub spaces are provided, offering privacy and comfort for families to enjoy the hot springs together.

To accommodate future growth and development, an area for expansion is designated within the master plan. This space allows for the thoughtful expansion of facilities and services in response to evolving visitor needs and preferences, ensuring the long-term sustainability of hot spring destination.

Overall, the master plan balances functionality with environmental sensitivity, creating a holistic experience that celebrates local culture, supports economic growth, and preserves the natural beauty of the surrounding landscape. Key notes of the master plan are:

- Facilities include retail shops, a canteen for 35 visitors, changing rooms, and two large gender-segregated pools.
- Accessibility features (ramps, wide paths) are incorporated, and ecological integrity is preserved by protecting the hot spring source.

### **Cost Estimate and Economic Analysis**

The total project cost, including VAT and contingencies, is estimated at NPR 128,376,778.15. Economic analysis highlights feasibility with a BCR > 2.74, an IRR of 22.41%, and a payback period of 7 years. Revenue projections suggest annual gross revenue of NPR 29.37 million, ensuring sustainability and economic viability.

## **Organization of Report**

This Final Report is presented in three volumes, Volume-1: Main Report, Volume-2: Annexes and Volume-3: Master Plans.

### **Volume 1: Main Report**

- 1 Introduction
- 2 Methodology
- 3 Data Collection
- 4 Qualitative Parameters of Hot Water
- 5 Findings
- 6 Geothermal Energy
- 7 Ranking of Hot Water Spring from Tourism Aspect
- 8 Selection of Hot Water Spring for Preparation of Master Plan
- 9 Preparation of Master Plan
- 10 Conclusions

### **Volume 2: Annexes**

- Annex-1: Response Letter from All Local levels
- Annex-2: Comparison of 162 Hot Water Springs
- Annex-3: Location map of 66 hot water springs
- Annex-4: Description of all Hot Water Springs
- Annex-5: All 66 Hot Water Springs table
- Annex-6: Table of 41 Hot Water Springs with physical and chemical parameters
- Annex-7: Ranking of 41 Hot Water Springs
- Annex-8: Ranking parameters and ranking values of 41 Hot Water Springs
- Annex-9: Lab report test analysis summary
- Annex-10: Lab Reports
- Annex-11: D-Card of Hot Water Spring Sources
- Annex-12: Correspondences with stakeholders for Master Plan
- Annex-13: Comments response sheet

### **Volume 3: Master Plans**

**3A: Master Plan of Paudwar and Bhurung Tatopani, Myagdi**

3B: Master Plan of Tapta Kunda, Dang

3C: Master Plan of Jarami Tatopani, Jumla

3D: Master Plan of Sunikot Tapoban, Bajhang

## Table of Contents

SUBMISSION INFORMATION .....	I
EXECUTIVE SUMMARY .....	II
ORGANIZATION OF REPORT.....	VI
TABLE OF CONTENTS .....	VII
LIST OF FIGURES.....	IX
LIST OF TABLES.....	X
LIST OF PHOTOGRAPHS.....	X
LIST OF ABBREVIATIONS.....	XI
<b>1 INTRODUCTION .....</b>	<b>1</b>
1.1 LOCATION AND ACCESSIBILITY .....	1
1.2 PAUDWAR TATOPANI, MYAGDI (HS/4040105-22).....	3
1.3 BHURUNG TATOPANI, MYAGDI (HS/4040102-23).....	5
<b>2 TOPOGRAPHIC SURVEY .....</b>	<b>9</b>
2.1 BACKGROUND .....	9
2.2 SCOPE OF WORKS.....	9
2.3 METHODOLOGY .....	10
2.3.1 Identification of Base Control Points.....	10
2.3.2 Reconnaissance and Monumentation.....	10
2.4 DETAILED SURVEY OF PROJECT AREA.....	11
<b>3 HYDROLOGICAL STUDY .....</b>	<b>13</b>
3.1 INTRODUCTION.....	13
3.2 CATCHMENT DESCRIPTION .....	13
3.3 DATA AVAILABILITY .....	13
3.4 DESIGN FLOOD.....	14
3.5 FLOOD MODELLING .....	14
3.6 RIVER PROTECTION REQUIREMENT.....	17
3.6.1 Paudwar Tatopani .....	17
3.6.2 Bhurung Tatopani .....	18
3.6.3 Flood Warning System.....	18
<b>4 MASTER PLAN OF HOT WATER SPRINGS .....</b>	<b>19</b>
4.1 NECESSITY OF REDEVELOPMENT.....	19
4.2 CONCEPT AND DESIGN DEVELOPMENT.....	20
4.2.1 Key Concept of Redevelopment .....	20
4.3 PAUDWAR TATOPANI KUNDA.....	22
4.3.1 Introduction to Site .....	22
4.3.2 Existing Site Condition .....	22
4.3.3 Discharge .....	23
4.3.4 The Master Plan.....	23

4.4	BHURUNG TATOPANI.....	34
4.4.1	<i>Introduction to Site</i> .....	34
4.4.2	<i>Existing Site Condition</i> .....	34
4.4.3	<i>Discharge</i> .....	35
4.4.4	<i>The Masterplan</i> .....	36
<b>5</b>	<b>COST ESTIMATE</b> .....	<b>43</b>
5.1	ESTIMATING METHODOLOGY.....	43
5.2	BASIC RATES OF MATERIAL AT SITE AND RATE ANALYSIS.....	43
5.2.1	<i>Labour Cost</i> .....	43
5.2.2	<i>Construction Equipment</i> .....	43
5.2.3	<i>Construction Material</i> .....	43
5.2.4	<i>Unit Rates</i> .....	44
5.3	CONTINGENCIES AND VAT.....	44
<b>6</b>	<b>ECONOMIC ANALYSIS</b> .....	<b>45</b>
6.1	EXPECTED SOCIAL BENEFIT.....	45
6.1.1	<i>Current Scenario</i> .....	45
6.1.2	<i>Social Benefits</i> .....	45
6.1.3	<i>Economic Benefits</i> .....	46
6.1.4	<i>Tourism Benefit</i> .....	48
6.2	REVENUE SOURCE.....	48
6.2.1	<i>Social Benefit</i> .....	48
6.2.2	<i>Economic Benefits</i> .....	48
6.2.3	<i>Entrance Fees</i> .....	49
6.2.4	<i>Activity Fees</i> .....	49
6.2.5	<i>Parking Fees</i> .....	49
6.2.6	<i>Partnership and Sponsorship</i> .....	49
6.2.7	<i>Grants and Donation</i> .....	49
6.3	BASIS OF REVENUE ESTIMATION.....	49
6.4	PARAMETERS FOR ECONOMIC ANALYSIS.....	49
<b>7</b>	<b>IMPLEMENTATION AND OPERATION MECHANISM</b> .....	<b>51</b>
7.1	FUNDING MECHANISM.....	51
7.2	OPERATION MECHANISM.....	51
<b>8</b>	<b>CONCLUSIONS AND RECOMMENDATIONS</b> .....	<b>52</b>
8.1	CONCLUSIONS.....	52
8.2	RECOMMENDATIONS.....	53
<b>9</b>	<b>ANNEXES</b> .....	<b>54</b>

## List of Figures

Figure 1.1: Location in Topographic Map published by Department of Survey, GoN.....	1
Figure 1.2: Location map of the area from Google Earth.....	2
Figure 2.1: Survey Equipment .....	9
Figure 3.1: Watershed Map of the Kaligandaki River at hot water spring on Google Earth Basemap	13
Figure 3.2: HEC-RAS Model for hot water spring at Kaligandaki River.....	15
Figure 3.3: Velocity distribution and high flood level during 100 years flood at the Paudwar hot water spring (HS/4040105-22) .....	16
Figure 3.4: Rating Curve at Paudwar hot water spring (HS/4040105-22) .....	16
Figure 3.5: Velocity distribution and high flood level during 100 years flood at Bhurung hot water spring (HS/4040105-23) .....	17
Figure 3.6: Rating Curve at Bhurung hot water spring (HS/4040105-23).....	17
Figure 4.1: Location Map.....	22
Figure 4.2: Existing Condition.....	23
Figure 4.3: Existing Accommodation .....	23
Figure 4.4: The Master Plan .....	24
Figure 4.5: Outline of the Master Plan .....	25
Figure 4.6: Plan of ticket counter .....	26
Figure 4.7: Blow-up Master Plan near entrance area .....	27
Figure 4.8: Location of Temple.....	27
Figure 4.9: Location of Toilet and Tap.....	28
Figure 4.10: Location of administrative building.....	28
Figure 4.11: Plan of Administrative Building .....	29
Figure 4.12: Toilet and Changing Room with Bath Tub.....	31
Figure 4.13: Location of Toilet and Changing Room .....	31
Figure 4.14: Landscape Plan of Healing/Recreational Space .....	32
Figure 4.15: The three kundas of Paudwar .....	33
Figure 4.16 Location Map.....	34
Figure 4.17 Night view of Bhurung Tatopani.....	35
Figure 4.18 Existing condition of Bhurung Tatopani .....	35
Figure 4.19: Master Plan of Bhurung Tatopani .....	36
Figure 4.20: Outline of the Master plan .....	37
Figure 4.21: Plan of Ticket Counter .....	39
Figure 4.22: Blow-up plan near parking area .....	39
Figure 4.23: Ground Floor Plan of Main Block.....	39
Figure 4.24: First Floor Plan of Main Block.....	40
Figure 4.25: Hot spring source in the bank of Kali Gandaki River .....	42

## List of Tables

Table 1.1: Accessibility to Bhurung and Paudwar Tatopani .....	3
Table 1.2: Discharge and Temperature of Paudwar Hot Spring.....	3
Table 1.3: Discharge and Temperature of Bhurung Hot Spring .....	6
Table 2.1: Co-ordinate of this base point.....	10
Table 2.2: List of Permanent Benchmarks.....	11
Table 3.1: Maximum Instantaneous discharge at Kaligandaki river station 410.....	14
Table 5.1: Cost Estimate for Paudwar and Bhurung Tatopani .....	44
Table 6.1: Economical travel cost and tourist destination time.....	47
Table 6.2: Adopted parameters for financial analysis.....	50
Table 6.3: Output of financial analysis .....	50

## List of Photographs

Photograph 1.1: Pond constructed and the area around Paudwar Tatopani, Myagdi .....	3
Photograph 1.2: People soaking in hot water for therapeutic purpose .....	4
Photograph 1.3: Bhurung Tatopani and Kaligandaki corridor on the right bank of Kaligandaki River....	6
Photograph 1.4: Meeting and discussion program with the local representative regarding the master plan of the Bhurung and Paudwar Tatopani .....	7

## List of Abbreviations

BCR	Benefit Cost Ratio
BM	Benchmark
CAD	Computer Aided Design
DEM	Digital Elevation Model
DGPS	Differential Global Positioning System
DTM	Digital Terrain Model
EDM	Electro-magnetic Distance Measuring
EIRR	Economic Rate of Return
EPA	Environmental Protection Act
EPR	Environmental Protection Regulation
GoN	Government of Nepal
GPS	Global Positioning System
HEC-RAS	Hydrologic Engineering Centre-River Analysis System
JV	Joint Venture
HS/HWS	Hot Water Spring
LED	Light Emitting Diode
masl	meter above sea level
MS	Microsoft
NPV	Net Present Value
NRs	Nepalese Rupees
PNet	Professional Network for Engineering Services Pvt. Ltd.
PV	Photovoltaic
SRTM	Shuttle Radar Topography Mission
SW-DTM	Softwel-Digital Terrain Model
T	Temperature
TIA	Tribhuvan International Airport
ToR	Terms of Reference
US	United States
USB	Universal Serial Bus
WECS	Water and Energy Commission Secretariat

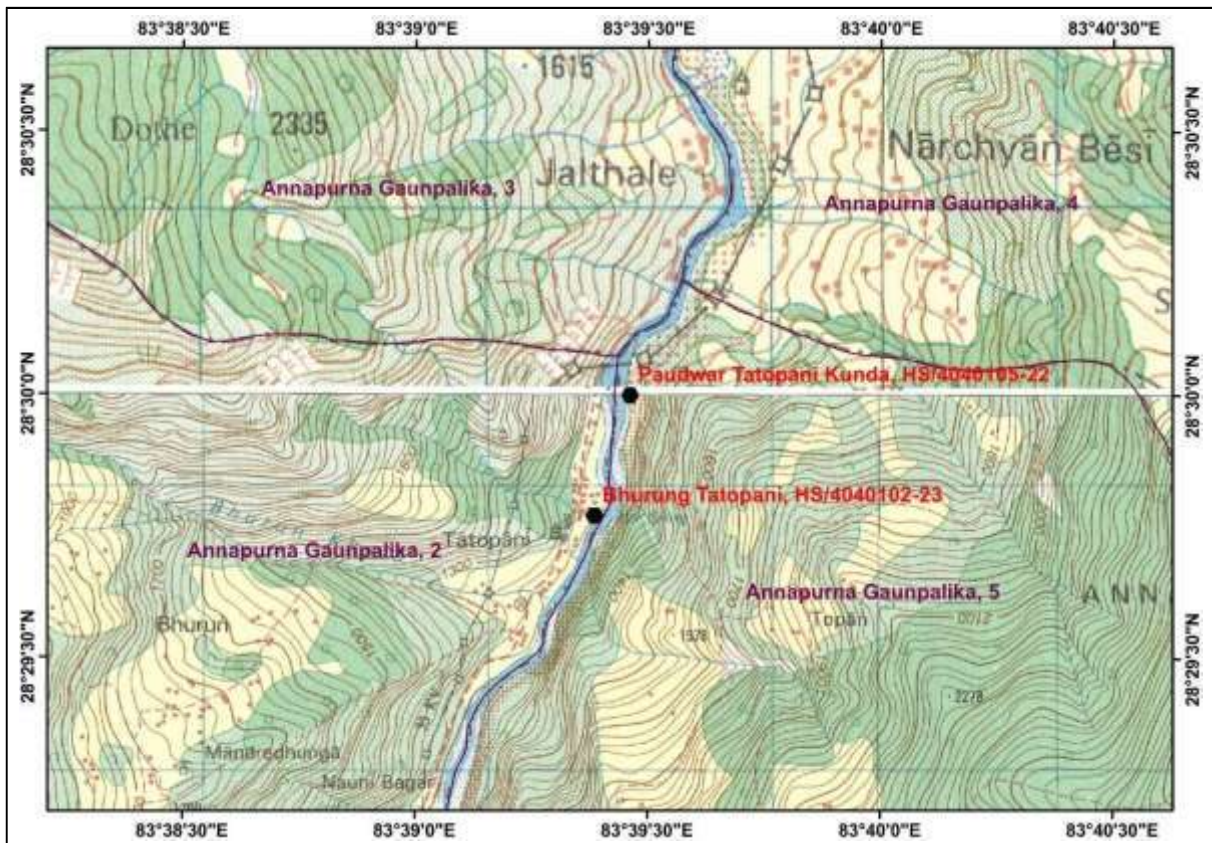
## 1 INTRODUCTION

Water and Energy Commission Secretariat (WECS) intends to study on Identification and Development of Hot Water Spring Sources in Nepal. For conducting consultant services of the same, WECS has nominated Global – PNet – Azad JV as per the governing laws.

This Final Report has been prepared in accordance with the Term of Reference (ToR) prepared by the Water and Energy Commission Secretariat (WECS), Singha Durbar, Kathmandu for the consulting services of the study on the Identification and Development of Hot Water Spring Sources in Nepal. This volume of the document, Volume-3A, consists the part of the report and deals with topographic survey, hydrological study and preparation of Master plan of Paudwar and Bhurung Tatopani Kunda, Myagdi.

### 1.1 Location and Accessibility

Paudwar and Bhurung Tatopani Kunda are located in Myagdi District in Gandaki Province of Nepal. The location of these hot water springs lies in Annapurna Rural Municipality and on the left bank and right bank of Kaligandaki River respectively (Figure 1.1 and Figure 1.2).



**Figure 1.1: Location in Topographic Map published by Department of Survey, GoN**

The location of Paudwar Tatopani Kunda lies in the Annapurna Rural Municipality ward no-5 and on the left bank of the Kaligandaki River. The hot spring's coordinates are approximately 83°39'20.47\"E longitude and 28°30'00.68\"N latitude.



**Figure 1.2: Location map of the area from Google Earth**

Bhurung Tatopani Kunda is located in the Annapurna Rural Municipality ward no-2 and about 500m downstream and opposite bank of Paudwar Tatopani i.e. on the right bank of the Kaligandaki River. The hot spring's coordinates are approximately 83°39'15.40"E longitude and 28°29'46.53"N latitude.

Bhurung Tatopani in Myagdi District, particularly Tatopani bazar, is accessible via Prithvi Highway, Mid-Hill Highway and Kaligandaki Corridor. There is mainly one route leading towards the site and this is around 303 kilometres from Kathmandu to Pokhara to Bhurung Tatopani road passing through the hilly terrain.

Accessing the site involves traversing through the picturesque landscape of the Annapurna region. Visitors primarily reach Tatopani via road from Pokhara to Beni, with the journey taking approximately 5-6 hours, depending on road conditions and traffic. Bhurung Tatopani is approximately 29 kilometres from Beni, head-quarter of Myagdi district located on the Kaligandaki Corridor (NH 48). Beni itself is connected by 12km road from Maldhunga at Mid-Hill Highway (NH03). The journey involves traveling from Beni through a mix of paved and unpaved roads to Tatopani. Then further to Paudwar one can travel on foot via suspension bridge over Kaligandaki at the northern end of Tatopani bazar.

For those starting from Kushma on the Mid-Hill Highway (NH03), the distance to Paudwar is about 50 kilometres via Beni. Additionally, trekkers often incorporate Tatopani into their itineraries along the Annapurna Circuit or the Jomsom-Muktinath Trek, arriving after several days of trekking from Besisahar or Nayapul. Local buses or jeeps may be available from nearby villages like Beni or Ghasa, providing another transportation option.

Alternatively, to reach the Bhurung Tatopani, one can take a flight from Tribhuvan International Airport (TIA) to Pokhara International Airport. The flight typically takes about 30 minutes. Once arrived at Pokhara International Airport, visitors will need to travel about 105 kilometres to reach the hot water spring.

Major alternative to reach to the hot water spring site are shown in Table 1.1.

**Table 1.1: Accessibility to Bhurung and Paudwar Tatopani**

Destination	Approx. Distance (km)	Approx. Time	Type of Road	Remarks
<b>Alternative 1</b>				
Kathmandu To Pokhara	200	5hr	Blacktopped Road	Prithvi Highway
Pokhara to Bhurung Tatopani	103	3hr 30 min.	Blacktopped Road	
<b>Alternative 2</b>				
TIA Airport to Pokhara Airport	-	30	-	
Pokhara to Bhurung Tatopani	103	3hr 30 min.	Blacktopped Road	

## 1.2 Paudwar Tatopani, Myagdi (HS/4040105-22)

The area surrounding the hot spring, Paudwar Tatopani Kunda, is hilly and mountainous, with high hills on both sides of the region. The hot water source is situated on the left bank of the Kaligandaki River and discharges around 2.55 litres of water per second. The measured temperature of the water at the source of the hot spring is 65.3 degrees Celsius. Two measurements were done during the study area and presented in Table 1.2.

**Table 1.2: Discharge and Temperature of Paudwar Hot Spring**

SN	Discharge (lps)	Temperature °C	Date Measured
1	2.55	65.3	8/9/2080
2	1.53	66.3	1/28/2081



**Photograph 1.1: Pond constructed and the area around Paudwar Tatopani, Myagdi**

The landform of the hot water spring is comprised of alluvium deposits with vegetation, however, steep rock slopes are present behind the area to the extent of river valley. The hot spring is situated close to the Kaligandaki River, surrounded by steep slopes and massive cliffs. The area features a deep valley formed by the river, which has a considerable depth. The surface near the hot water source is covered in alluvial deposits, while other parts have colluvial deposits and vegetation. The land in the area is used for forests, agriculture, paths, settlements, and the river, and the region experiences a cold climate at an elevation of around 1230 meters above sea level.

Hot spring area's climate is classified as warm and temperate. When compared with winter, the summers have much more rainfall. This location is classified as Cwb by Köppen and Geiger. The mean yearly temperature recorded in the area is 10.8 °C | 51.5 °F, as per the available data.

The area around Paudwar hot spring receives a lot of rainfall, with an average of around 1750 mm per year. It's located in the northern hemisphere, in the upper half of the planet. The summer months are June through September, with the hottest temperatures in July, averaging around 16.6°C. January is the coldest month, with an average of 3.2°C. There is a significant difference in precipitation between the wettest and driest months, with July being the wettest at 563 mm and December being the driest at 31 mm. The variation in annual temperature is around 13.4°C. The relative humidity is highest in July, at around 92.05%, and lowest in January, at 62.71%. July is the wettest month, with an average of 29 days of precipitation, while December is the driest, with only around 5.67 days of precipitation.



***Photograph 1.2: People soaking in hot water for therapeutic purpose***

The potential disaster that may pose a direct impact on the hot water source is flooding. The steep inclination of the natural hill slopes also poses a threat of landslides from the uphill sections; however, the slope seems generally stable. It is noted that structures have been constructed around the hot spring area, but these are not adequate to protect the hot spring from these hazards.

The area of Paudwar Tatopani Kunda has a community with 300 households and a population of approximately 3000 individuals. The community is composed primarily of Janjati (60%), Dalit (40%), and other ethnic groups. The people have a deep-rooted tradition of engaging in worship ceremonies at the hot spring, driven by their religious and cultural beliefs. These rituals aim to bring about improvements in the health of individuals suffering from skin allergies, joint pain, and various ailments. The hot spring has been a destination for visitors for over a century, with people flocking to its healing nature of water. The region is predominantly covered by lush forests, covering approximately 70% of the area other than coverage of structures. Agricultural activities occupy around 10% of the land, while the remaining 20% is designated as grazing land. The local economy heavily relies on the hospitality industry, with hotels serving as the primary source of income for the community. The hot spring attracts a steady influx of both domestic and international tourists, creating additional opportunities for income generation among the locals. On a daily basis, the hot spring welcomes around 25-30 visitors who come to bathe in its rejuvenating water. Monthly, this number can reach approximately 750 individuals.

Paudwar Tatopani, hot water springs are natural sources that do not have a significant impact on the environment. They are believed to have therapeutic properties, alleviating joint pain, gastric distress, and skin disorders. The area's biodiversity remains undisturbed, and there is no impact on the drinking water of wildlife or specific species. The springs have not been linked to any degradation of water quality downstream or health hazards of waterborne diseases. The springs have not triggered any socio-economic or political tensions related to water supply rights.

The 'Paudwar Tatopani Kunda' seems safe and potentially therapeutic for bathing. The temperature is quite high, so caution with exposure time is advised. The mineral content, including a higher level of silica, may be beneficial for the skin and overall health. The chloride and sodium levels are moderate, which might require caution for individuals with sodium-sensitive conditions. Regular monitoring, especially of the sulphate level, is advisable to ensure ongoing safety.

### **1.3 Bhurung Tatopani, Myagdi (HS/4040102-23)**

Bhurung Tatopani, hot water spring is located in a hilly and mountainous region, with towering hills surrounding the area. The hot water source is situated on the right bank of the Kaligandaki River, with measured discharge totalling 2.86 litres per second (Table 1.3). The water has a temperature of 58.23 degrees Celsius and is clear, without any noticeable odour. Three distinct sources were identified in the vicinity, with the water being collected in a tank and distributed to pond and taps, however, one spring lies uphill of the pond near present canteen area, which continuously feed the pond. The hot spring is situated in a deep valley carved out by the Kaligandaki River, with steep slopes and hills on either side of the river. The area is characterized by alluvial deposits along the river's course.

**Table 1.3: Discharge and Temperature of Bhurung Hot Spring**

SN	Discharge (lps)	Temperature °C	Date Measured
1	2.86	58.23	8/8/2080
2	1.71	59	1/28/2081



**Photograph 1.3: Bhurung Tatopani and Kaligandaki corridor on the right bank of Kaligandaki River**

The dominating bedrock lithology of the Bhurung Tatopani area is quartzite. The quartzite has a fine-grained texture and a medium-bedded structure, with a pale yellow to grey colour. The bedrock is oriented at 28°/020° (dip/dip direction) and has three major joint sets with measurements of 50°/205°, 77°/320°, and 26°/300°. The rock mass is in fair condition, with an estimated Unconfined Compressive Strength (UCS) of up to 200 MPa. The joints are coated or thinly filled with clay or silt particles that exhibit softening characteristics. The spacing between discontinuities varies between 5 cm and 40 cm, with rough planar or undulating surfaces. The area encompasses forests, agricultural land, roads, settlements, and the Kaligandaki River, with a cold climate at an elevation of approximately 1225 meters above sea level.

Hot spring area's climate is classified as warm and temperate. When compared with winter, the summers have much more rainfall. This location is classified as Cwb by Köppen and Geiger. The mean yearly temperature recorded in the area is 10.8 °C | 51.5 °F, as per the available data.

To protect the hot springs from potential flooding during the rainy season, a protective structure has been constructed, and the management of the hot spring is well-established. Floods are identified as the primary natural disaster that could directly impact the hot water source, while the steep

inclination of the natural hill slope and the jointed and fractured nature of the rock mass in the vicinity make in risk to landslides originating from the uphill sections.

The area of Bhurung Tatopani has an average annual precipitation of around 1735 mm. It's situated in the northern hemisphere, in the upper half of the planet. The summer months are June through September, with the hottest temperatures in July, averaging around 16.6°C (61.8°F). January is the coldest month, with an average of 3.2°C (37.7°F). The area experiences a significant difference in precipitation between the wettest and driest months, with July being the wettest at 563 mm (22.2 inches) and December being the driest at 31 mm (1.2 inches). The variation in annual temperature is around 13.4°C (24.1°F). The relative humidity is highest in July, at around 92.05%, and lowest in January, at 62.71%. July is the wettest month, with an average of 29 days of precipitation, while December is the driest, with only around 5.67 days of precipitation.



***Photograph 1.4: Meeting and discussion program with the local representative regarding the master plan of the Bhurung and Paudwar Tatopani***

The Bhurung Tatopani hot water spring is located in a region inhabited by a community of around 200 individuals, primarily belonging to the Janjati ethnic group, specifically the Thakali community. The community is deeply rooted in their cultural and religious beliefs, which play a significant role in their engagement with the hot spring. The hot spring serves as a place of worship, attracting individuals from different parts of the country who come to offer prayers and seek blessings. It also serves as a resting point and bathing spot for pilgrims traveling to the famous religious site of Muktinath. The area is home to religious sites such as the Ram Temple and Devi Temple, further adding to its spiritual significance. Festivals such as Loshar, Dashain, Tihar, and Falgu Purnima are celebrated by the

community, contributing to the cultural vibrancy of the region. The region is predominantly covered by forests, which encompass approximately 70% of the area. The diverse flora and fauna species, including Jaamun, Kafal, Chilauney, Mallata, and orange, contribute to the region's rich biodiversity. Wildlife such as Ghoral, Red Monkeys, and Bears also find their habitat in this area, further enriching the local ecosystem. The local economy heavily relies on the operation of hotels, which is the primary source of income for the community. The presence of the hot spring attracts a consistent flow of both domestic and international tourists, creating valuable opportunities for additional income generation.

The hot water spring is a natural element that do not have a significant impact on the environment. They are believed to have medicinal benefits, alleviating joint pains, gastric issues, and skin ailments. The heat they emanate has a moderate impact on the environment, but it does not have a noticeable odour. The hot water springs maintain a harmonious relationship with nature, leaving no marked impact on the drinking water supplies of wildlife or any particular species. They have not resulted in any appreciable loss of surrounding vegetation or imposed a significant threat to indigenous wildlife, even the endangered species. The springs have not engendered any notable deterioration in downstream water quality, particularly concerning aquatic life. They do not introduce any considerable risks of waterborne diseases to visitors or the water's downstream users.

The 'Bhurung Tatopani' appears to be safe and potentially beneficial for therapeutic uses such as soaking. The high temperature warrants caution to avoid burns. The mineral content, particularly silica, sulphate, and bicarbonates, may offer health benefits for the skin and muscles. The chloride level is moderately high but should not pose a significant risk for external use. Regular monitoring is recommended to ensure ongoing safety and to check for any changes in these parameters.

## 2 TOPOGRAPHIC SURVEY

### 2.1 Background

Topographical survey and mapping are an essential task in the study of any project. The survey of the project area will allow the project designer to determine the gross head, set out project components on appropriate location and prepare and prepare quantity estimation. In addition, the topographical mapping will be useful for geological mapping, geophysical investigation and social studies.

The topographical survey of Paudwar and Bhurung Tatopani Kunda, Myagdi has been carried out using Total Station. The Total Station approach of the survey has been chosen for horizontal and vertical control survey. The detail topographical survey of different components has been carried out using high precision Topcon & Sokkia Total Station.

### 2.2 Scope of Works


Topographical survey has been carried out by referring the Guidelines of (WECS) and the Survey Department, GoN. In brief, following are the specifications which have been strictly obeyed during detail survey.

- To Transfer the coordinate & elevation to the site with Total Station close traversing.
- Sufficient number of the permanent control points was monument either with concrete pillar, engraved on the rock or marked on permanent boulders with iron pin in centre within the project area as required & preparation of D-Cards of each permanent benchmark.
- Carryout the detail topographical survey of proposed project area.
- The following maps has to be prepared:
  - Maps of project area in scale 1:1000 with contour interval of 1m.
- Preparation of a complete and comprehensive survey Report.

#### Survey Equipment

The following instruments have been used during Detail Topographical Survey of Tatopani Kundas.

- Total Station (Topcon & Sokkia)
- Hand GPS (Garmin)
- Measuring Tape



**Reliable Large Volume Memory**  
Internal memory has 50,000 points to record. USB memory can be used up to 32GB.

### Newly Designed High-End Class EDM

Especially effective in surveying control points that require high-accuracy, and in cross sectional surveying in large areas with reflectorless measurement mode.

**All Features are at Top Class**

	Accuracy	Measuring Range
Prism-Mode	1.5mm+2ppm	6,000m*
Reflectorless	2.0mm+2ppm	1,000m*

\* Good atmospheric condition

**Distance Measurement Accuracy (Prism Mode)**

iM

Accuracy

1.5mm + 2ppm

Previous Model

Accuracy

2.0mm + 2ppm

**Measuring Range (Reflectorless Mode)**

iM

Measuring Range

1,000m

Previous Model

Measuring Range

500m

Figure 2.1: Survey Equipment

Detail topographical survey have been performed by Total Stations with a minimum least count resolution of 2" (second). For distance measurements, an Electro-magnetic Distance Measuring (EDM) device has been used.

## 2.3 Methodology

### 2.3.1 Identification of Base Control Points

The base control points namely BM-9 & BM-10 has been used for whole project survey works. These points have been situated at the proposed headwork's area of the Mistri-2 Hydropower Project which project is just upstream from our Project by using Total station approach then sufficient numbers of benchmarks or control points has been established at the project area in term of accuracy.

The Co-ordinates and their elevations are tabulated below.

**Table 2.1: Co-ordinate of this base point**

Station	Northing	Easting	Elevation	Remarks
BM-9	3153097.948	466411.9	1224.633	
BM-10	3152940.988	466423.9	1222.017	

### 2.3.2 Reconnaissance and Monumentation

A quick preliminary reconnaissance survey has been executed by an experienced surveyor together with the project officials. We visited and rapidly examined the whole survey area and identified suitable locations for the establishment of the control stations and benchmarks.

During the site visit, the condition and usefulness of the identified ground control stations have been established. Issues such as accessibility to the proposed survey stations, visibility, lengths of lines of sight, ground cover, need for cutting and clearing of vegetation, etc. have been studied during the visit to confirm the proposed survey plans.

After the finalization of the survey stations to be established, wooden peg, monuments, and stable boulders have been used for the fixation of survey stations and benchmarks. The monuments of the concrete pillars have been fixed on the strategic locations from where the detailed survey, longitudinal sectioning, and cross-sectioning can be carried out and the setting out of the construction can also be carried out. The benchmarks have been established on a Concrete pillar, stable boulder or on manmade permanent structures that were available in and in the vicinity of the project area. The landmarks thus fixed have been referenced with some prominent witness marks so that they will be identified easily for future use.

A clear and well descriptive Description Cards (D-Cards) of every station have been prepared and photographs of all established control points and benchmarks have been taken, showing their designations marked on the top of the concrete monuments. The design of the monuments is like 20 cm X15 cm X45 cm (Bottom X Top X Height). Altogether 2 nos. of benchmarks have been fixed on the concrete pillar or stable boulders for permanent use. Other survey points are of temporary natures which are fixed especially on wooden pegs or by enamel paint on the boulder. Benchmarks and Control Points

Altogether 2 nos. of permanent benchmarks have been established at the project area including DGPS control points where as at least 2 nos. of permanent benchmarks have been established at each option of components as per ToR. The benchmarks have established using standard practice adopted by DoS. Such as dimension of post & referencing tie up etc.

**Table 2.2: List of Permanent Benchmarks**

Station	Northing	Easting	Elevation	Remarks
BM-9	3153097.948	466411.894	1224.633	
BM-10	3152940.988	466423.896	1222.017	
BM-3	3152804.742	466210.684	1299.511	

## 2.4 Detailed Survey of Project Area

The topographical mapping was to be done of the proposed project area in 1 in 1000 scales with 1-meter contour intervals. Keeping this in view, sufficient survey control points were fixed during the stage of horizontal controlling.

For detailed topographic survey, tachometric method of survey has been introduced. The X, Y and Z co-ordinates of every detail was recorded by the Total Stations instrument in the site. The procedure for detail surveying is as follows.

After setting the instrument over a known survey station, the back sight was fixed on the prism reflector placed over a known point and then started taking details on the ground. The details include roads, footpath, houses, physical and man-made features, hydrographic features such as rivers, streams, etc. Some special landslide signs such as cracks, scarp areas, etc. have been surveyed. All information mentioned in the scope has been depicted from the ground.

The X, Y and Z Co-ordinates of every detail have been recorded and saved in the Total Stations and downloaded in the computer later. The further processing of all topographic data has been done in the computer and they have been prepared the plot file in AutoCAD format.

### Plotting and Preparation of Maps

After the completion of fieldwork, all the survey data has been downloaded to computer at Kathmandu office & processed with appropriate survey processing software like MS-Excel, Word, AutoCAD, Arc Map, SW-DTM, AutoCAD Civil-3D, Topcon link etc. After the processing that, steps have been followed as given below.

- Managing of data in proper location of the computer
- Plotting of maps
- Contour generation
- Editing of contours and other topographic details
- Symbolization of details
- Preparation of layouts and adding of marginal information
- Printing of maps
- Final printing

Digital maps have been prepared in AutoCAD format at appropriate scales as mentioned above in the ToR Showing the location of control points, BMs, topographical features, project road, Houses, foot

track, fence area, canal, Kholsi and shrub land. The contour is annotated and the symbol / database of the features are as prescribed in the Legend.

**The maps have produced as follows:**

Topographical survey Map of proposed project area in appropriate scale with contour interval 1m in a A3 sized sheets. Benchmarks and topographical maps are shown in Annex-I and Annex-II respectively.

### 3 HYDROLOGICAL STUDY

#### 3.1 Introduction

The preparation of the master plan includes the conservation plan and the tourism development plan. The development plan includes tourism development infrastructure such as recreational areas, swimming ponds, bath showers, jacuzzi, etc. The main objective of a hydrological study is to determine the hydrological parameters of the river for the design of infrastructure, ensuring that the design flood would pass without endangering the structures.

#### 3.2 Catchment Description

The river basin characteristics is determined based on satellite data. SRTM 30m DEM is used for analysis of basin characteristics and river morphometry. Kaligandaki River originates from Tibetan plateau and has a perennial flow. The highest and lowest elevation in the catchment is 8167.0 masl and 1238.9 masl respectively. Gradient of Kaligandaki River at hot water spring stretch is 2.54%. The watershed area of river at hot water spring is 3919.01 km<sup>2</sup> which is shown in Figure 3.1.



**Figure 3.1: Watershed Map of the Kaligandaki River at hot water spring on Google Earth Basemap**

#### 3.3 Data Availability

The nearest gauging station downstream of the hot water spring is located at Setibeni. The data for peak floods is available from 1964 to 1995. The maximum instantaneous discharge of hydrological station 410 of the Kaligandaki River at Setibeni is presented in Table 3.1.

**Table 3.1: Maximum Instantaneous discharge at Kaligandaki river station 410**

Year	Maximum Instantaneous Discharge (m <sup>3</sup> /s)	Year	Maximum Instantaneous Discharge (m <sup>3</sup> /s)
1964	1790	1980	2270
1965	1620	1981	2320
1966	1990	1982	1570
1967	1370	1983	1660
1968	2400	1984	1880
1969	1550	1985	1290
1970	2520	1986	1710
1971	1660	1987	1760
1972	1690	1988	1710
1973	2900	1989	2060
1974	2190	1990	1710
1975	3280	1991	1700
1976	1900	1992	1650
1977	2190	1993	2970
1978	1710	1994	1900
1979	1850	1995	2600

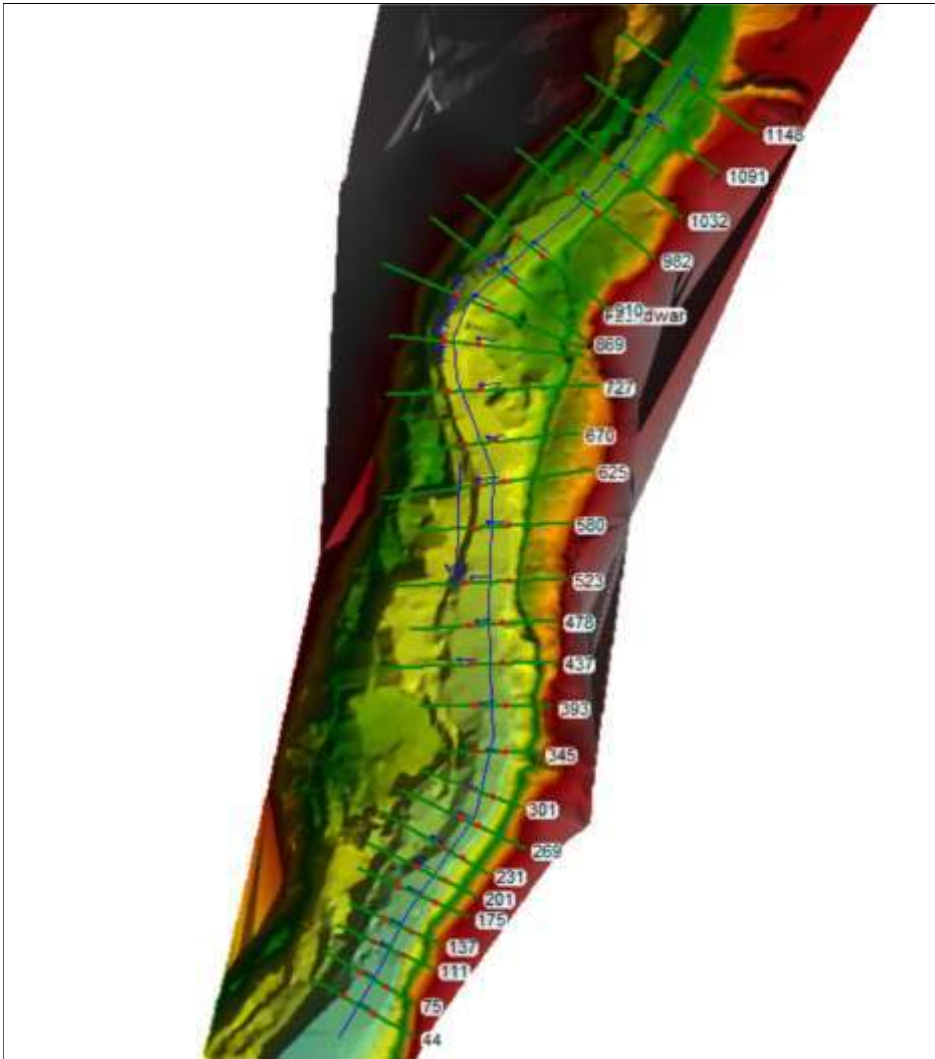
### 3.4 Design Flood

Maximum design discharge is the peak river discharge that corresponds to a certain return period, which is usually taken as 100 years for the design of the infrastructure. The Gumbel distribution was employed to compute the peak discharge using the maximum instantaneous discharges at station 410. The obtained data was used to compute the peak flood using the catchment area correlation method. The 100-year flood computed for the Kaligandaki River at the hot water spring is 2835.42 m<sup>3</sup>/s.

### 3.5 Flood Modelling

The determination of high flood level, waterway width, velocity of flow at site, and depth of flow was performed on a 1D HEC-RAS interface. HEC-RAS, a computer program developed by the US Department of Defence, Army Corps of Engineers, is used for modelling flood discharge flowing through systems of open channels and computing water surface profiles. The basic computational procedure of HEC-RAS for steady flow is based on the solution of the one-dimensional energy equation. Energy losses are evaluated by friction and contraction/expansion. The momentum equation may be used in situations where the water surface profile is rapidly varied. These situations include hydraulic jumps, hydraulics of bridges, and evaluating profiles at river confluences. A total length of 1160 m of river stretches was considered for modelling. Manning’s coefficient of 0.045 is

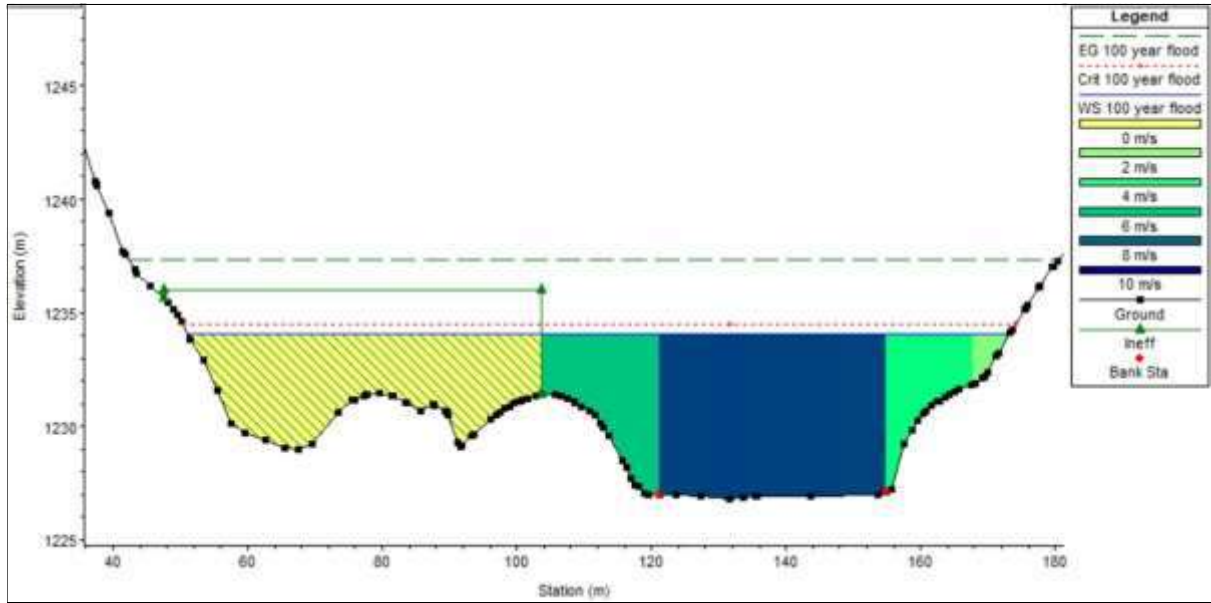
considered for both the thalweg part and overbanks. The HEC-RAS model for the hot water spring at Kaligandaki River is presented in Figure 3.2.



**Figure 3.2: HEC-RAS Model for hot water spring at Kaligandaki River**

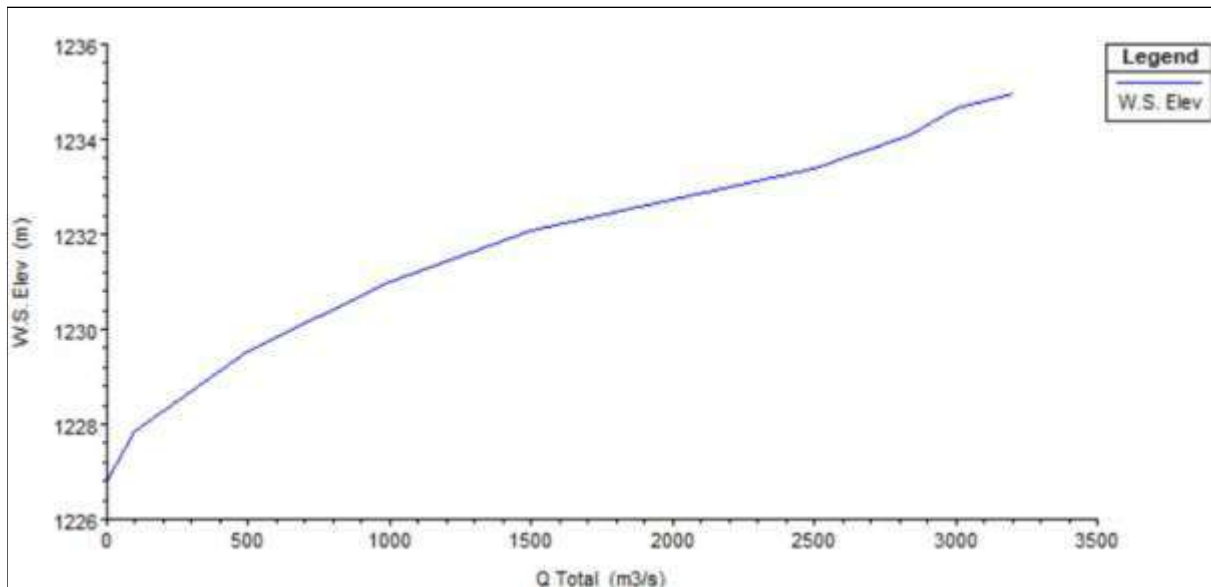
#### **Output**

The high flood level computed at Paudwar hot water spring (HS/4040105-22) is 1234.07 m with an average velocity of 7.57 m/s and flow depth of 7.26 m. The velocity distribution across the cross section and high flood level at Paudwar hot water spring is presented in Figure 3.3.



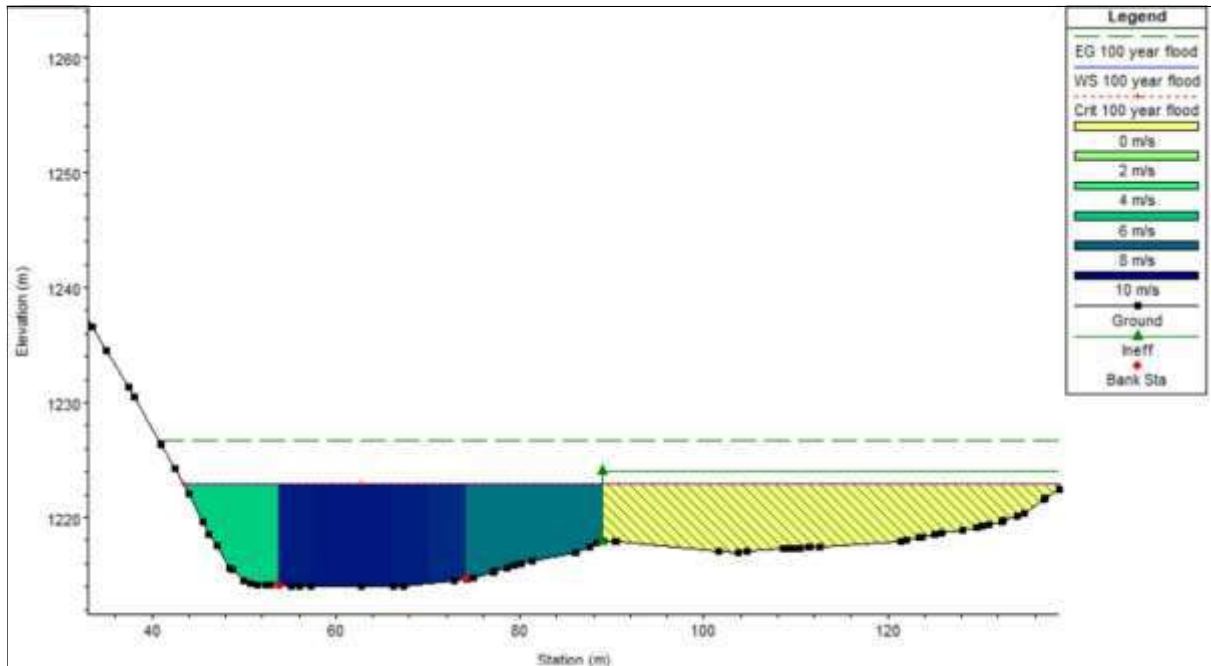
**Figure 3.3: Velocity distribution and high flood level during 100 years flood at the Paudwar hot water spring (HS/4040105-22)**

The rating curve for elevation versus discharge at the Paudwar tatopani (HS/4040105-22) is presented in Figure 3.4.



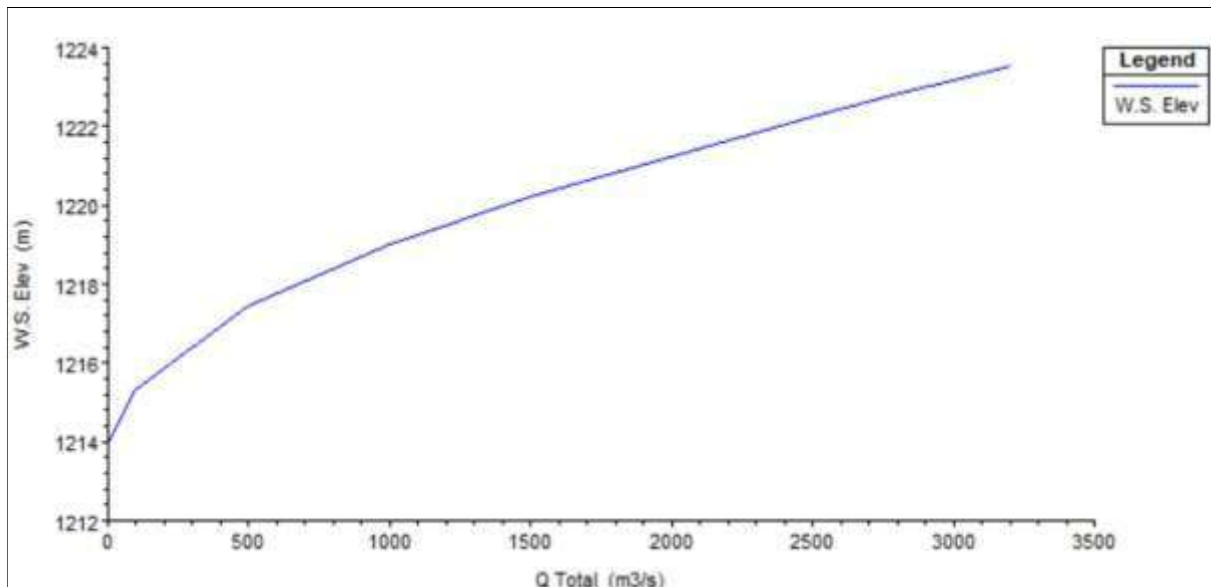
**Figure 3.4: Rating Curve at Paudwar hot water spring (HS/4040105-22)**

The high flood level computed at the Bhurung hot water spring (HS/4040105-23) is 1222.88 m with an average velocity of 8.3 m/s and flow depth of 8.89 m. The velocity distribution across the cross section and high flood level at Bhurung hot water spring (HS/4040105-23) is presented in Figure 3.5.



**Figure 3.5: Velocity distribution and high flood level during 100 years flood at Bhurung hot water spring (HS/4040105-23)**

The rating curve for elevation versus discharge at the Bhurung hot water spring is presented in Figure 3.6



**Figure 3.6: Rating Curve at Bhurung hot water spring (HS/4040105-23)**

### 3.6 River Protection Requirement

The river protection structure is proposed based on site condition, hydrological analysis and river hydraulics condition.

#### 3.6.1 Paudwar Tatopani

Paudwar Tatopani Kunda lies at left bank of Kaligandaki River. The source lies at hill slope bottom and located on the backside from current development. The location of proposed structure is safe from

flood inundation based on hydrological and hydraulic analysis. At the upstream area of Tatopani, Kaligandaki river has sharp bend. The river is striking directly to right bank and protection structure at that bank is constructed by Beni Jomsom road and hence the location of Paudwar Tatopani is safe from bank erosion and river current of Kaligandaki River at current condition. The Tatopani Kunda development be affected by river flood if the Kaligandaki River changes course and erode the bank at about 100 m upstream. Hence flood wall to guide Kaligandaki river is proposed. The flood wall will be 7 m height and material will be plum concrete. The wall will train the river course and make sure the Kunda area and proposed development will not be affected.

The infrastructure shall be constructed with plinth level greater than existing ground level.

### **3.6.2 Bhurung Tatopani**

The Bhurung Tatopani lies at right bank of Kaligandaki River. One of the sources of Tatopani lies within yearly flood plain of Kaligandaki River and the current Tatopani Kunda lies within 100-year flood plain and will be inundated by flood greater 10-year return period. However, the Kunda lies away from direct risk of river bank erosion and velocity of inundation water will be about 1m/s and average depth will be 1.5 m. Hence, there exist risk of flood inundation. The structure of Kunda cannot be planned out of inundation boundary due to space constrain and hence flood warning system shall be installed in the Bhurung Tatopani for evacuation during flood period.

The source lies at yearly flood plain and now source is enclosed by small tank. The tank is not safe against river scouring and need to be protected by direct hit by river current. Hence flood wall is required to protect the source from river scour. A flood wall is proposed with total height of 8 m. The wall will enclose the source and already constructed tank.

The structures shall be constructed at plinth level 1218 m or above to be free from the flood up to 10-year return period.

### **3.6.3 Flood Warning System**

Flood warning system with hydrological and meteorological data collection shall be develop within Kaligandaki basin upstream of Tatopani Kundas. The development of flood warning system cannot be done by Tatopani development unit due to resource constraint. Upstream of Tatopani area there are some meteorological station and one automatic hydrological stations (Jomsom) at Kaligandaki basin operated by department of Hydrology and Meteorology. Denser network of Hydrological and Meteorological station shall be planned with at least one automatic gauge station downstream of confluence of each major tributaries and warning system shall be developed such that the data from network of hydrological data is directly adopted by the flood warning model which routes the observed flow at each station and predicting the time and volume flood reaching the area. The flood warning shall be disseminated by using hooters in Kunda area and text message can be sent to phones in affected area.

## 4 MASTER PLAN OF HOT WATER SPRINGS

Nestled in the tranquil beauty of Nepal's landscape, hot springs have great potential to grow as a tourism destination. Travelers seeking physical rejuvenation and cultural immersion have taken notice of Nepal's major hot springs, among which the consultant team along with the coordination with WECS have identified and shortlisted 5 hot springs, out of which two hot water springs are recommended to develop in combination. A thorough evaluation that considered a number of variables, including accessibility, geological significance, cultural legacy, and the potential for sustainable development, led to their selection for the master plan.

Historically, hot springs have held a special place in Nepal's cultural fabric, revered for their therapeutic properties and spiritual significance. Despite their cultural and natural importance, many of these hot springs have faced neglect in terms of infrastructure and management. This neglect has not only hindered their ability to attract visitors but has also posed threats to their ecological integrity.

The initiation of the master plan marks a crucial step towards addressing these challenges. It aims to revitalize the existing infrastructure of the hot springs, including bathing facilities, accommodation options, and recreational amenities. Additionally, the plan proposes the development of new structures and services tailored to enhance the overall visitor experience, thereby unlocking the full tourism potential of these natural assets.

Moreover, the master plan is underpinned by a strong commitment to environmental conservation and sustainable practices. Efforts will be made to minimize the ecological footprint of tourism activities, with initiatives focusing on waste management, biodiversity conservation, and the promotion of eco-friendly practices among visitors and local stakeholders.

The master plan recognizes the importance of community engagement and empowerment in ensuring the long-term success of tourism initiatives. Local communities will be actively involved in the planning and implementation process, with opportunities for capacity building, entrepreneurship, and cultural preservation initiatives. By fostering a sense of ownership and stewardship among local residents, the master plan seeks to create a tourism ecosystem that is not only economically viable but also socially and environmentally sustainable.

In essence, the development of the master plan represents a holistic approach to hot springs tourism in Nepal, one that seeks to balance the economic benefits of tourism with the imperative of environmental conservation and cultural preservation. Through strategic interventions and collaborative efforts, it aims to transform these hot springs into thriving destinations that offer enriching experiences for visitors while safeguarding Nepal's natural and cultural heritage for generations to come.

### 4.1 Necessity of Redevelopment

Nepal's hot springs need to be developed again for a number of reasons that will help the local population as well as the tourism industry. The hot springs, a natural attraction, have a lot of promise for tourism as they entice people looking for rest and healing properties. However, the attractiveness of the current amenities may be limited if they don't live up to the expectations of tourists. The location can draw more people and create economic opportunities for the community by improving the amenities, bathing spaces, and changing rooms. Additionally, by addressing environmental issues

like waste management and water quality, rehabilitation projects can guarantee the site's sustainability for coming generations. Better security protocols and hygienic amenities can also improve the general guest experience while fostering health and wellbeing. In the end, redevelopment offers a chance to several issues currently plague the site of in Nepal, impacting both the local community and visitors. These problems hinder the area's potential for tourism and economic development. Here's an overview of the key challenges:

- Underdeveloped tourism infrastructure, including accommodation options, restaurants, and recreational activities.
- Insufficient facilities such as changing rooms, toilets, and bathing areas.
- Limited road access and poor transportation infrastructure.
- Seasonal fluctuation of visitors.
- Lack of sustainable management of water resources.
- Lack of Management.
- Inadequate sanitation facilities and safety measures

## **4.2 Concept and Design Development**

Redevelopment of hot springs offers an opportunity to transform the site into a sustainable and attractive destination that celebrates its natural beauty, cultural heritage, and offers enriching experiences for visitors. The main concept for the redevelopment is to create a premier eco-tourism destination that harmonizes with nature, celebrates local culture, promotes wellness, and fosters economic opportunities for the community while preserving the environment for future generations.

### **4.2.1 Key Concept of Redevelopment**

#### **4.2.1.1 *Natural Hot Springs Enhancement***

Restore and enhance the natural hot springs while preserving their ecological integrity. Develop bathing/soaking pools and relaxation areas with eco-friendly infrastructure. Integrate natural landscaping to create a tranquil and immersive experience.

#### **4.2.1.2 *Sustainable Infrastructure***

Implement sustainable design practices in all infrastructure development, focusing on energy-efficient buildings, water conservation measures, and waste management systems. Design pedestrian-friendly pathways to minimize environmental impact and promote active transportation. Introduce renewable energy sources, such as solar power, for lighting and heating.

#### **4.2.1.3 *Wellness and Eco-Tourism Offerings***

Develop eco-lodges and sustainable accommodations that blend with the natural surroundings. Offer wellness retreats, yoga sessions, and holistic healing experiences centered around the hot springs. Provide opportunities for eco-friendly adventure activities such as hiking, birdwatching, and nature walks.

#### **4.2.1.4 *Universal Design***

Universal design principles are crucial to ensuring inclusion and accessibility for all people in the redevelopment plan. Ramps facilitate easy access to pathways, entrances, and common areas by being

smoothly incorporated into the infrastructure. In order to safely and pleasantly accommodate those with mobility issues, these ramps have non-slip surfaces, large widths, and moderate slopes. Wider entrances and accessible fixtures are examples of accessibility features that prioritize the comfort of visitors with impairments in the design of accommodations and restrooms. Ramps are also thoughtfully positioned to accommodate a variety of ground levels and open areas, according to the natural curves and facilitating smooth transitions between them. The town creates a friendly atmosphere for both locals and guests by ensuring clear navigation and accessibility throughout with inclusive signage and wayfinding.

#### **4.2.1.5 Community Engagement and Empowerment:**

Involve the local community in the planning, development, and management of the site. Create opportunities for community-owned enterprises, including homestays, guided tours, and handicraft sales. Invest in training and capacity building programs to enhance the skills and entrepreneurship of local residents.

#### **4.2.1.6 Sustainable/Green features**

These features help sustain the hot spring leaving behind less carbon footprint. By prioritizing sustainability, the natural environment is preserved for future generations.

#### **4.2.1.7 Renewable resources**

Maximizing the use of daylight can reduce energy consumption by incorporating PV cells for electricity production. This approach includes utilizing direct, indirect, and isolated gain, along with proper planning of windows and sun shading devices.

#### **4.2.1.8 Water Pollution**

The hot spring should not put pressure on the nearby water body and shouldn't pollute the existing river. The activities related to hot spring should have minimal effects on the water body used for placing the remains.

#### **4.2.1.9 Solid Waste Management**

Segregation of waste should be done before disposal such that maximum organic materials are composted and recyclable materials are sent for recycling. Following the 5R principles for disposal of waste can help minimize the overall waste.

By embracing this concept for the redevelopment of hot springs, the site can emerge as a model for sustainable tourism, offering memorable experiences that enrich the lives of visitors, support the livelihoods of the local community, and safeguard the natural and cultural heritage of the region for generations to come.

## 4.3 Paudwar Tatopani Kunda

### 4.3.1 Introduction to Site

Paudwar hot spring, located on left bank of the Kaligandaki River in Paudwar of Annapurna Rural Municipality, Myagdi, is gaining prominence as a natural healing place by making this area a popular destination for those in search of geothermal water for relaxation or medicinal purposes. Locals use the gentle waters of this natural mineral spring to relax and feel better, and it also draws a steady stream of curious tourists.

The people of Nepal appreciate these springs despite their lack of complexity compared to other places. Visitors get to experience soaking in a more rustic setting while being able to socialize with others.



**Figure 4.1: Location Map**

### 4.3.2 Existing Site Condition

Paudwar Tatopani remains a perfect example of rural Nepal, balancing traditional lifestyles with emerging tourism and development. Its natural beauty, cultural heritage, and warm community provide a unique experience, though challenges related to infrastructure and accessibility persist. Efforts to improve local conditions are ongoing, aiming to enhance the quality of life for residents and the experience for visitors. Other existing features of the site are:

- Access for pedestrians
- Presence of electricity services and poles
- Existence of functioning hot springs
- Existence of other structures within the sites (chautara, temple, accommodations, etc.)
- Newly constructed bridges



**Figure 4.2: Existing Condition**



**Figure 4.3: Existing Accommodation**

### **4.3.3 Discharge**

The hot water source is situated on the left bank of the Kaligandaki River and discharges around 2.55 litres of water per second. The average temperature of the water at the source of the hot spring is 65.3 degrees Celsius. The available discharge is sufficient for current use as per Kunda Management. However, the further development has envisioned growth in visitors. The sufficiency of water and need of storage of hot water in insulated tank shall be studied based on increased visitors such that the discharge at night time can be collected and used by visitor during day time. For now, the master plan has not considered the storage of hot water.

### **4.3.4 The Master Plan**

The master plan is developed in accordance with the demand for the space covers a total area of 4246.07 sqm. The functions are positioned with consideration for the environment of the site. The placement of private areas, such as shower, changing room is done far from the plaza area other public spaces like ticket counter, chautara and temple space are placed along entrance for convenience and privacy while maintaining the building's functioning and religious views.

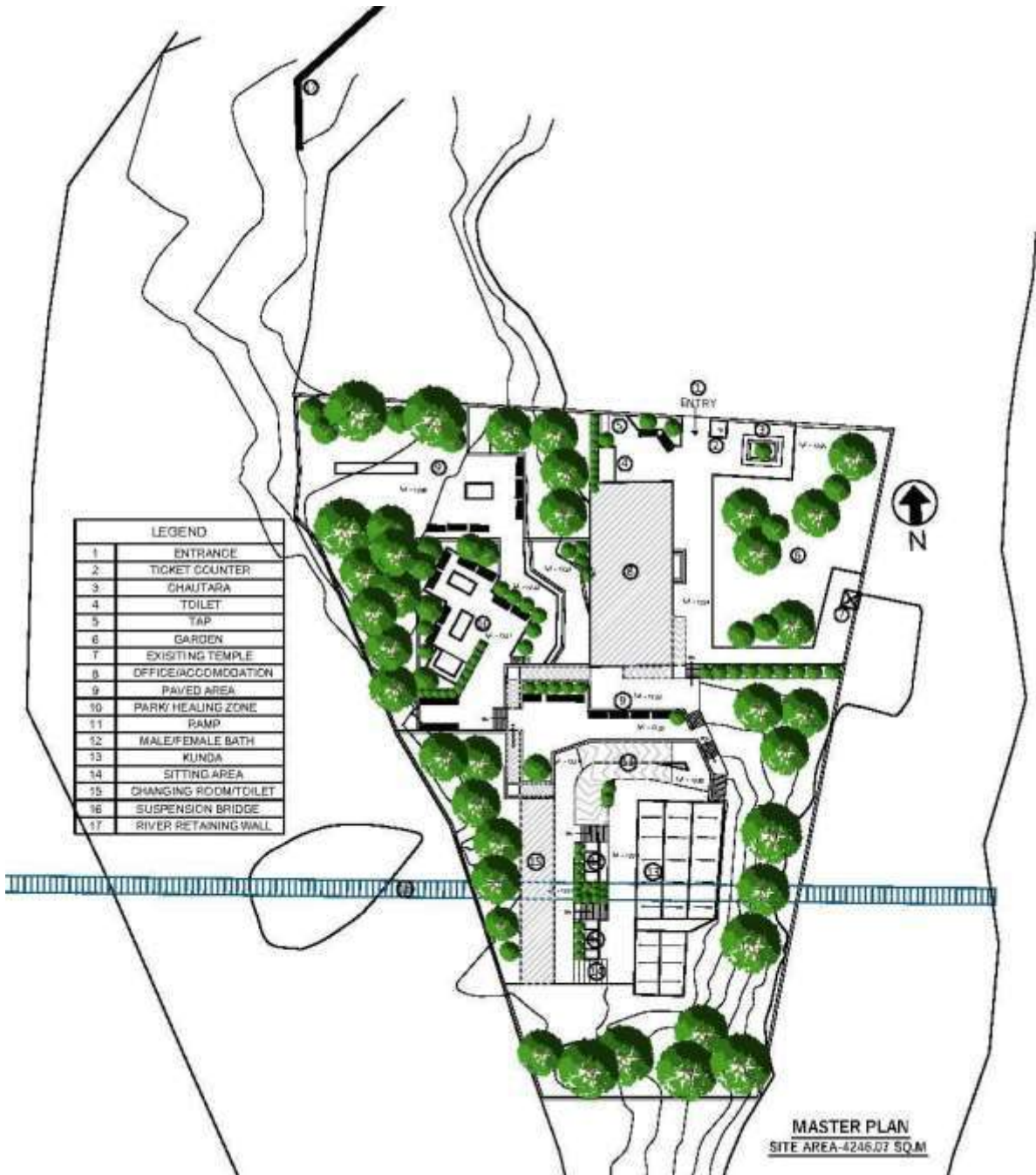


**Figure 4.4: The Master Plan**

Each building has an open area surrounding it to ensure that some structures must be isolate from one another, such as the accommodations, which needs to be secluded from other structures. To guarantee convenient access for the general public as well as for the

Administrative office building's other regulatory tasks, the administrative office building is situated close to the entrance/road. Changing room and shower area is given special consideration when creating the site plan since, it should be situated near the hot springs.

In accordance with the prepared axes, circulation pathway and the site geometry, the buildings are positioned. The vertical and horizontal axes of the site are where the structures are positioned. All of the structures are oriented toward the nearby open space because of how they are placed in relation to one another.



**Figure 4.5: Outline of the Master Plan**

Right after the main entrance the Ticket Counter is placed to the East. Towards the west of the entrance is the public service building that consists of Main block and the public toilet.

The main block is along the major circulation pathway which consists of the administration space, accommodation and restaurant space. A waiting space is also provided for the convenience of those who are waiting. After passing through the main block, stairs and ramp can be seen which leads toward the hot spring. Hot spring is easily accessible by differently abled people with different facilities for them. A segregates space for relaxation is provided in the west side which will Offer wellness retreats, yoga sessions, and holistic healing experiences. This recreation area aims to create an engaging and eco-friendly destination that enhances visitor experiences, supports local communities, and preserves

the region's natural and cultural legacy. The plan includes enhancing the natural hot springs with eco-friendly pools and creating a wellness zone with spas and meditation areas to promote relaxation.

Stepped seating is also provided near the hot springs. Designing stepped seating for Paudwar Tatopani involves creating a comfortable, aesthetically pleasing, and functional space that enhances the visitor experience while blending with the natural landscape. Open shower is also designed near the hot spring which makes it more easier safeguarding the privacy. There are mainly three hot springs which are used for healing and relaxation process.

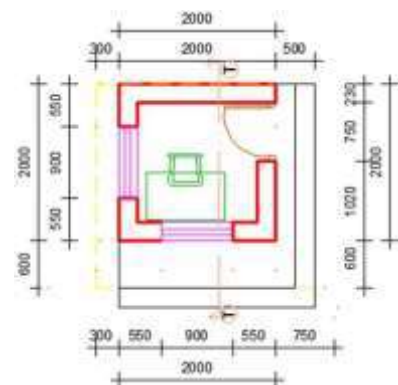
The hot springs can be accessed while enjoying the beautiful river view and aesthetically pleasing pathways. Toilet and changing room block are also provided closer to the hot spring with the locker service for the security reasons.

#### **4.3.4.1 Entrance**

The entrance (no 1 in Master Plan) location is designed taking the existing entrance way into consideration making sure it does not deviate much from the current entrance. The plaza lies immediately after the entrance along which the public service building is located. The visitors can reach to the entrance through the bridge crossing the Kaligandaki river. And the site can be reached by a 12m road which is connected to Baglung Highway.

#### **4.3.4.2 Ticket Counter**

Designing a ticket counter (no 2 in Master Plan) for Paudwar Tatopani involves creating a functional, welcoming, and aesthetically pleasing space that efficiently handles visitor flow and integrates with the natural surroundings. The area of ticket counter is 4 sq. m which can accommodate a person. It will be constructed using locally sourced materials like stone, treated timber, and bamboo, the counter features an open-air design with a thatched or pitched roof, providing shelter while maintaining a natural aesthetic. Equipped with multiple service windows and electronic ticketing systems, the counter ensures efficient handling of high visitor volumes. Nearby seating areas, constructed from natural materials, offer comfort to waiting visitors, and digital displays provide essential information.



**Figure 4.6: Plan of ticket counter**

#### **4.3.4.3 Chautara**

The existing Chautara (no 3 in Master Plan) space in Paudwar, traditionally a simple resting area under a shaded tree, will be transformed into a vibrant, multifunctional community hub that honors its cultural roots while enhancing its functionality. Currently, the Chautara serves primarily as a basic rest stop for locals and travelers, offering limited seating and a rudimentary platform. The redesign aims to elevate this space into a welcoming and dynamic gathering area. Traditional elements, such as a shaded central platform under a native tree, will be preserved to maintain the cultural essence of the Chautara.



**Figure 4.7: Blow-up Master Plan near entrance area**

#### **4.3.4.4 Temple**

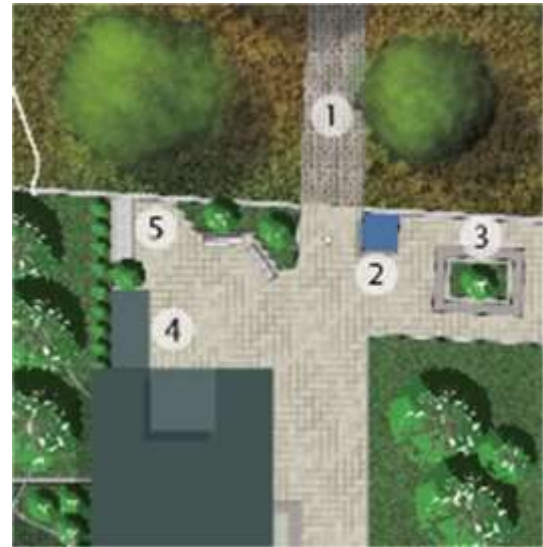
The existing temple (no 7 in Master Plan) in Paudwar, a modest yet spiritually significant structure, stands as a testament to the village's rich cultural heritage and religious traditions. This small temple, integral to the local community's daily life, is nestled within the village's serene landscape. It is revered by villagers who visit regularly for worship and communal gatherings. To enhance its accessibility and integrate it more effectively into the village's infrastructure, a network of thoughtfully designed pathways will be developed.



**Figure 4.8: Location of Temple**

#### 4.3.4.5 Toilet and Tap

Near the entrance of Paudwar, strategically positioned to cater primarily to residents of the accommodation block while also serving day visitors, are essential toilet and tap facilities designed to enhance convenience and comfort for all. The 8.80 sq. m toilet area (no 4 in Master Plan) accommodates two male and two female toilets, ensuring ample space and privacy. These facilities are equipped with modern amenities to meet hygiene standards and provide a pleasant experience. Adjacent to the toilets, the 4 sq. m tap area (no 5 in Master Plan) offers additional convenience, allowing residents and visitors alike to freshen up easily. This thoughtful placement near the entrance ensures quick accessibility, making it convenient for both long-term guests and day visitors to use these facilities upon arrival or departure, thereby enhancing the overall experience at Paudwar.



**Figure 4.9: Location of Toilet and Tap**

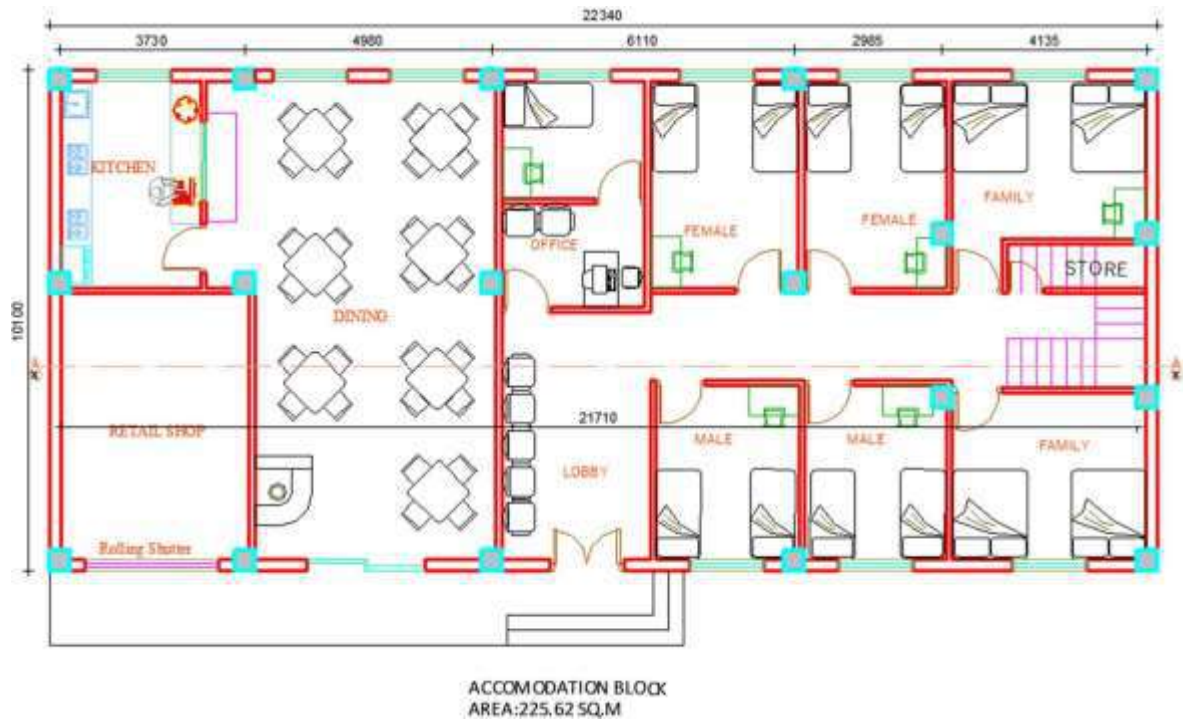
#### 4.3.4.6 Administrative Building

The administrative building (no 8 in Master Plan) which is near the entrance consists of several spaces like restaurants and accommodations. It is currently designed as a single storeyed building with a plinth area of 225.62sqm. As it is along the major circulation pathway it can be easily accessed and is disable friendly. The building is divided into three parts internally as accommodation space, restaurant space and office space. A lobby space of 14.81 sq. m connects these spaces. A large lawn area is designed in front of the building to connect people with nature. In the northern side of the building is the toilet and tap area which provide services to the people of this building.



**Figure 4.10: Location of administrative building**

The building consists of following major spaces.



**Figure 4.11: Plan of Administrative Building**

### Office Space

The office is ideally situated within the premises, close to the main entrance, to facilitate staff accessibility and efficient coordination with other facilities. made the most of natural light by making use of skylights and huge windows to reduce the need for artificial lighting and create a comfortable working environment. The office space is 6.90 square metres, and 1-2 people may work there without any problems. There is also space for cabinets to hold documents and data that are necessary.

### Restaurant Space

The southern portion of the building houses the restaurant. Paudwar Tatopani's restaurant areas are intended to provide a dining experience that is immersive and in tune with the surrounding natural surroundings. The restaurants, which are positioned to offer expansive views of the river and hot springs, are built using locally sourced materials like bamboo, stone, and wood to mix in well with the surroundings. The open-air layout keeps diners connected to nature with retractable partitions or wide glass walls that let in fresh mountain air and picturesque views. The restaurant's kitchen and dining areas are dispersed over 66 square metres. Up to 35 persons can be served at once in the eating area.

### Retail Shop

The retail shop is envisioned as a charming and inviting space that offers a curated selection of locally crafted goods, souvenirs, and essential items for visitors. The 20.23 sq. m large retail shop can provide service to all the visitors and can also promote the local craftsmanship. As it is near the pathways, people can easily get their stuffs from this shop.

## **Accommodations**

The lodging options at Paudwar Tatopani are carefully planned to meet the various demands of guests while highlighting the area's natural beauty. There are two warm and inviting rooms for male visitors, each with space for two persons. These accommodations provide a calm haven with elegant furniture and conveniences, guaranteeing a comfortable stay in the peaceful surroundings. Likewise, there are two hospitable rooms that are tailored to the comfort of female guests. After a day of exploring, these lodgings offer female tourists a tranquil sanctuary where they may rest and regenerate.

Apart from the individual rooms, there are two family rooms that can hold three people each. With lots of space, these elegantly furnished apartments are perfect for families or small gatherings.

Furthermore, to ensure the comfort and convenience of guests, there is also a dedicated staff accommodation available on-site. This accommodation serves as a comfortable and convenient lodging option for staff members, allowing them to remain onsite to attend to the needs of guests promptly. Whether it's a solo traveller, a couple, or a family, the accommodations at Paudwar Tatopani offer a welcoming and tranquil retreat for all guests to enjoy.

### **4.3.4.7 Garden/Lawn**

The garden/lawn space (no 6 in Master Plan) at Paudwar serves as a picturesque and functional area, strategically located between the main block, temple, and Chautara. Spanning an expansive 424.05 sq. m, this green oasis enriches the village's ambiance with its lush vegetation and open expanse. Positioned prominently near the entrance, it welcomes visitors with its serene atmosphere and verdant surroundings.

This well-planned garden/lawn space not only enhances the aesthetic appeal of Paudwar but also serves practical purposes. It provides a tranquil setting for relaxation and social gatherings, offering ample room for residents and visitors to unwind amidst nature's beauty. The carefully landscaped design incorporates native plants and trees, creating a harmonious blend with the surrounding cultural and architectural elements.

### **4.3.4.8 Pathways**

The paved pathways (no 9 in Master Plan) at Paudwar serve as crucial connectors, linking various spaces throughout the village with practicality and aesthetic appeal. Ranging in size from 1500 mm to 3500 mm, these pathways are tailored to fit the specific needs and dimensions of each area they traverse. Crafted from durable interlocking blocks, these materials ensure longevity and ease of maintenance while complementing the natural surroundings.

These pathways not only facilitate smooth movement between different zones within Paudwar but also enhance accessibility for residents and visitors alike. Designed with careful consideration of usability and safety, they feature even surfaces and non-slip textures to accommodate pedestrians of all ages and abilities.

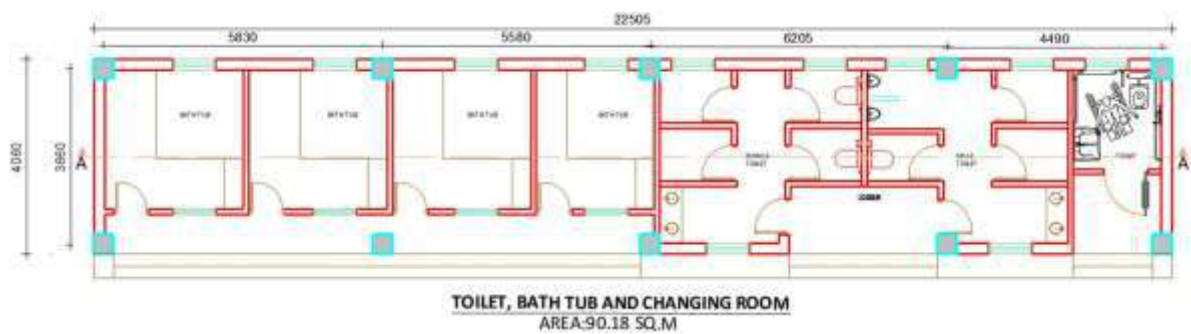
### **4.3.4.9 Ramps**

Ramps (no 11 in Master Plan) at Paudwar are meticulously integrated to ensure universal accessibility throughout the village, adhering to a 1:12 ratio to accommodate people of all mobility levels

comfortably. These ramps are strategically placed to provide seamless access to every significant space within the village, including buildings and various contour levels. By incorporating ramps into the village's design at key junctions and pathways, Paudwar promotes inclusivity and ensures that its natural beauty and cultural heritage are accessible to everyone. These thoughtful accessibility features not only enhance the overall visitor experience but also underscore Paudwar's commitment to creating a welcoming environment where everyone can participate fully in community life.

#### 4.3.4.10 Toilet and Changing Room

At Paudwar Tatopani, we value our guests' comfort above all else, which is demonstrated by the well-thought-out lavatory and changing area amenities that we offer along with locker services. A large bathroom area (no 15 in Master Plan) with two urinals for enhanced convenience is provided for male visitors. Accessibility for people with disabilities is ensured with a separate loo.



**Figure 4.12: Toilet and Changing Room with Bath Tub**

Two distinct, luxurious bathrooms are provided for female visitors, giving privacy and comfort top priority. In addition, there are two changing rooms available for male and female visitors, providing ample space for tourists to change and freshen up. These rooms also feature lockers for safekeeping personal goods.

To elevate the relaxation experience, four hot bathtubs are available for families and couples. These secluded spots offer a serene retreat amidst nature's beauty, inviting guests to unwind and rejuvenate together. Whether it's enjoying a soak as a family or indulging in a romantic getaway, our hot bathtubs provide an idyllic escape for all guests to cherish. With ample space for families or couples to enjoy, the hot bathtub provides a tranquil escape where guests can immerse themselves in the soothing waters and create cherished memories together.



**Figure 4.13: Location of Toilet and Changing Room**

#### 4.3.4.11 Shower Area

The open shower area (no 12 in Master Plan) at Paudwar Tatopani is cleverly constructed to offer a rejuvenating and immersive bathing experience while blending in with the surrounding natural scenery. The layout of the four separate bathing areas respects privacy while enabling visitors to fully

enjoy the tranquil surroundings. With four separate bathing facilities for each gender, the male and female shower areas are strategically separated. It is located near to the pond and changing room for easy access.

Natural landscaping and steps are included into the design to establish separate areas for male and female visitors, guaranteeing seclusion and calm. The bathing areas are naturally divided by lush vegetation and well-placed rocks, which increases solitude without obstructing the breath-taking views of the surrounding mountains and hot springs.

Guests can ascend gentle steps adorned with native plants and flowers to access their designated shower area, further enhancing the immersive experience. Each shower space features a simple yet elegant design, with natural materials such as stone and wood complementing the rustic charm of the surroundings.

#### **4.3.4.12 Healing Area/ Recreational Space**

The healing/recreational area (no 10 in Master Plan) at Paudwar Tatopani has been thoughtfully designed to showcase the compelling natural beauty of the surrounding landscapes and the river. This area, which is surrounded by thick vegetation and provides guests with sweeping views of the river, is a peaceful haven where they can relax and get in touch with nature and covers an area of 1018.26 sq. m.

The dining areas are positioned to take full advantage of the picturesque views; cosy chairs and benches are situated along the riverbank, while raised platforms provide unhindered views. The canopy trees shade the seating areas, shielding guests from the sun and letting them enjoy the rustic atmosphere.

Dedicated areas for yoga and meditation are included into the design to promote calm and awareness. A level surface with soft, grassy mats spread out makes for a cosy and welcoming yoga practice place. In order to



*Figure 4.14: Landscape Plan of Healing/Recreational Space*

revitalize their mind, body, and soul, guests can practice yoga and meditation while taking in the calming sounds of nature and the soft rustle of leaves.

Native plants, bushes, and blooming trees are incorporated into the landscape design to create a lively and peaceful setting that melds in well with the surrounding natural surroundings. Maintaining the natural flow of the nature, stone pathways lead visitors to various seating areas and yoga spaces throughout the refreshment area.

With its serene ambiance, breath-taking views, and thoughtfully designed spaces for relaxation and contemplation, the refreshment area at Paudwar Tatopani offers a sanctuary where guests can escape the hustle and bustle of everyday life and immerse themselves in the tranquility of nature.

#### **4.3.4.13 Stepped Seating**

Stepped seating areas (no 14 in Master Plan) at Paudwar are designed with 600mm wide seats, ingeniously utilizing natural terrain contours to offer scenic views of the kundas and nearby shower area. These spaces not only provide comfortable outdoor seating but also serve as versatile spots for visitors to relax, wait, or enjoy the serene surroundings. By integrating seamlessly into the landscape, these stepped seats enhance the village's aesthetic appeal while offering practical and enjoyable spaces for guests to unwind and appreciate the natural beauty of Paudwar.

#### **4.3.4.14 Hot springs**

The kundas (no 13 in Master Plan), or naturally occurring hot water ponds, are essential to Paudwar Tatopani's community and tourism industry. It is currently a semi-covered space with 3 ponds separated to each other by walls. The center attraction is the Main Kunda, which offers healing hot springs rich in minerals like sulphur that both residents and visitors use to treat conditions like arthritis and muscle soreness. The Women's Kunda offers female bathers a private space that promotes social interaction while honoring local customs. For those looking for peace and quiet away from the major bathing sites, scattered private kundas offer more private settings suitable for individuals or small groups. In addition, bathers may pleasantly acclimatize after soaking in the hotter pools thanks to the Cooling Kunda's cooler water option. When taken as a whole, these kundas improve social cohesiveness, boost the local economy, and offer health advantages by attracting wellness tourism, making Paudwar Tatopani a unique destination for relaxation and cultural experience. The three kundas are proposed for male, female and the southernmost pond shall be divided into 4 small ponds so that people with skin diseases can take treatment separately for health concern.



**Figure 4.15: The three kundas of Paudwar**

## 4.4 Bhurung Tatopani

### 4.4.1 Introduction to Site

Just a few meters to the south of Paudwar hot pools is the Bhurung Hot Springs, located on the bank of Kaligandaki River, Myagdi. Tatopani Hot Spring, located in Nepal's Myagdi District, is a well-known tourist attraction known for its breathtaking Himalayan settings and naturally occurring geothermal springs. Tatopani, which translates to "hot water" in Nepali, is a popular destination for tourists looking to unwind and recuperate from its curative waters. It is situated along the Kali Gandaki River amid the magnificent Annapurna and Dhaulagiri mountain ranges. Trekkers, visitors, and residents all go to the hot springs because they provide a restorative experience and are thought to have therapeutic qualities.



**Figure 4.16 Location Map**

### 4.4.2 Existing Site Condition

Basic facilities such as changing rooms, bathing areas, and seating facilities are available near the hot springs to accommodate visitors. These facilities may vary in terms of cleanliness and maintenance, depending on local management and resources.

Efforts to improve local conditions are ongoing, aiming to enhance the quality of life for residents and the experience for visitors. Other existing features of the site are:

- Access for vehicles and pedestrians
- Presence of electricity services and poles
- Existence of functioning hot springs

- Existence of other structures within the sites (temple, restaurant space, etc.)
- Area for future expansion
- Accommodation facilities nearby



*Figure 4.17 Night view of Bhurung Tatopani*



*Figure 4.18 Existing condition of Bhurung Tatopani*

#### **4.4.3 Discharge**

The hot water source is situated on the right bank of the Kaligandaki River, discharging approximately 2.86 litres per second. The water has an average temperature of 58.23 degrees Celsius and is clear, without any noticeable odour. The available discharge is sufficient for current use as per Kunda Management. However, the further development has envisioned growth in visitors. The sufficiency of

water and need of storage of hot water in insulated tank shall be studied based on increased visitors such that the discharge at night time can be collected and used by visitor during day time. For now, the master plan has not considered the storage of hot water.

#### 4.4.4 The Masterplan

The master plan is developed in accordance with the demand for the space. The functions are positioned with consideration for the environment of the site. An entrance gate is provided straight from the parking space. A welcoming landscape with resting space leads to the hot springs and other entities. A ticket counter is placed near the entrance to maintain the public flow and provide information regarding the hot spring. The overall site is 1091 sqm in which 910 sqm is for future expansion. All the infrastructures are located in the private properties.



Figure 4.19: Master Plan of Bhurung Tatopani

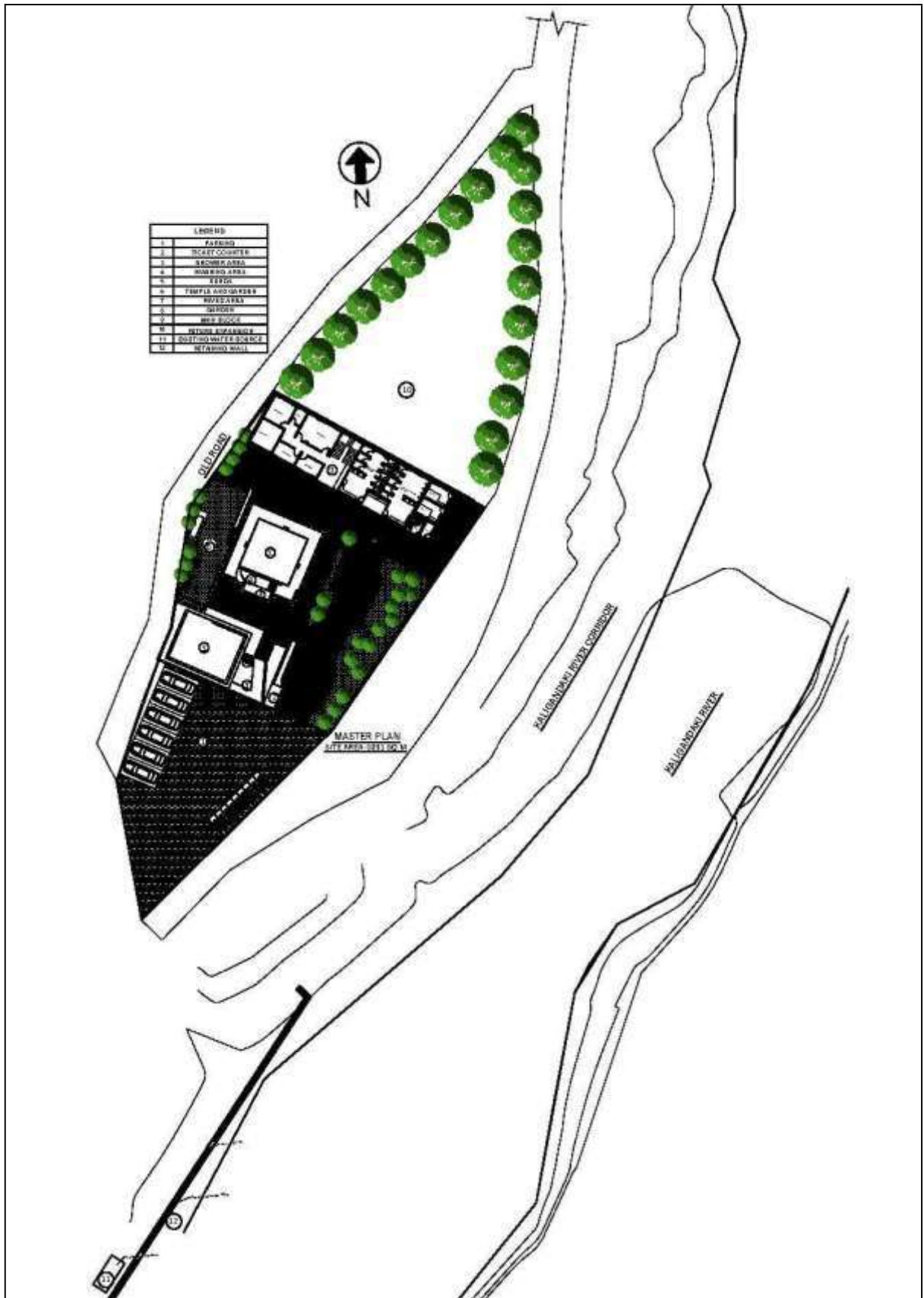


Figure 4.20: Outline of the Master plan

The master plan for hot spring surroundings integrates both practical amenities and sustainable design to create a welcoming and inclusive destination. Two separate hot spring areas are designated for male and female visitors, each featuring open shower areas and washing facilities for pre-soak preparation. To enhance the natural ambiance, existing toilet spaces are repurposed into inviting landscapes, fostering a harmonious blend with the environment which will also buffer the space from the nearest main road.

A new block is introduced to cater to the needs of visitors, including essential services and retail opportunities. Within this block, retail shops offer basic groceries and clothing items, supporting local vendors and enhancing the visitor experience. Adjacent to the shops, a restaurant or dining space provides a place for guests to enjoy authentic cuisine and socialize, complementing their hot spring visit.

The new block also incorporates modern amenities, including proper toilet and changing room facilities equipped with locker areas for secure storage. Inclusivity is prioritized with the inclusion of a toilet specifically designed for differently-abled individuals, ensuring accessibility for all visitors. Additionally, two dedicated family bathtub spaces are provided, offering privacy and comfort for families to enjoy the hot springs together.

To accommodate future growth and development, an area for expansion is designated within the master plan. This space allows for the thoughtful expansion of facilities and services in response to evolving visitor needs and preferences, ensuring the long-term sustainability of hot spring destination.

Overall, the master plan balances functionality with environmental sensitivity, creating a holistic experience that celebrates local culture, supports economic growth, and preserves the natural beauty of the surrounding landscape.

#### **4.4.4.1 Entrance and Parking**

Near the parking area (no 1 in Master Plan), there will be an entrance gate. This gate will serve as the entry point for visitors arriving by car or motorcycle. The parking area will have space for approximately 6-7 cars and 25-30 bikes. Adjacent to the entrance gate, there will be hoarding boards providing information about the pricing, operating hours, and other important details for visitors to know before entering. These hoarding boards will serve as a helpful guide for visitors, ensuring they have all the necessary information for their visit to the destination.

#### 4.4.4.2 Ticket Counter

The task of designing a ticket counter (no 2 in Master Plan) for Bhurung Tatopani is making a place that is both aesthetically pleasing and functional, able to manage visitor traffic with efficiency and blend in with the surrounding environment. The ticket counter has a 4 square metre footprint and can

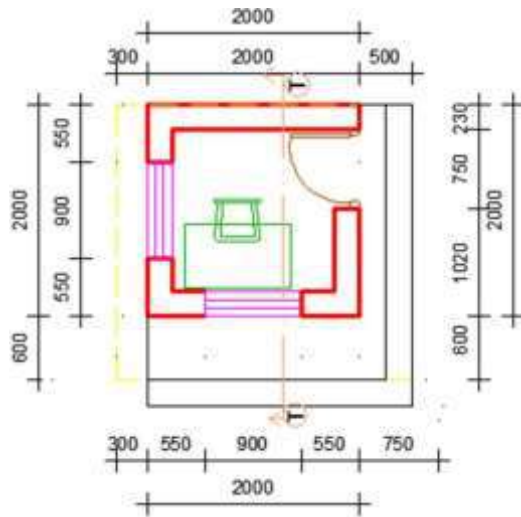


Figure 4.21: Plan of Ticket Counter



Figure 4.22: Blow-up plan near parking area

hold single person. The counter will be built of locally sourced materials including bamboo, treated wood, and stone. It will have an open-air design with a pitched or thatched roof that will provide shelter without sacrificing the natural look.

#### 4.4.4.3 Main Block

To improve the visiting experience, a number of amenities are planned for the new block (no 9 in Master Plan). There will be retail stores there where guests can buy necessities, trinkets, and other things. To further enhance guests' comfort and convenience, the block will have lavatory and changing room amenities. There will be designated bathtub areas for guests to unwind in and enjoy a calming dip.

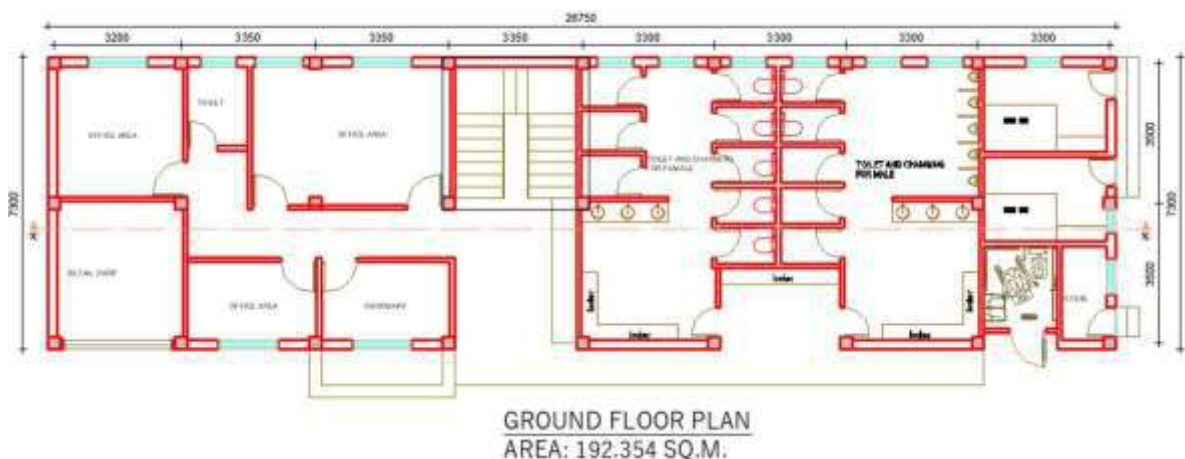


Figure 4.23: Ground Floor Plan of Main Block



**Figure 4.24: First Floor Plan of Main Block**

Additionally, there will be a canteen area where guests may get food and drinks, providing a handy on-site dining choice. In general, the new block seeks to meet the various demands of guests by offering facilities and services that are necessary for a pleasurable and unforgettable stay at the location. It is a two-storied building with a plinth area of 192.35 sqm and a total built-up area of 398.56 sqm.

### **Canteen/Restaurant Space**

There will be a canteen area on the first floor with a functional kitchen on the west side of the planned block. About thirty to thirty-five persons can have their needs met in this kitchen at once. Visitors can enjoy a convenient dining experience while visiting the attraction with a range of food and beverage options available at the canteen. The canteen will provide guests with a warm and inviting environment to meet their needs for food and drink, whether they are in the mood for a little snack or a substantial dinner.

### **Retail Shop**

The retail store is intended to be a quaint and welcoming location that provides a carefully chosen assortment of handcrafted goods, mementos, and necessities for guests. The spacious retail store, spanning 20.23 sqm, has the capacity to serve all customers and showcase regional handicrafts. People may get their belongings from this shop conveniently because it is close to the routes.

### **Toilet and Changing Room**

The toilet and changing room facilities in the proposed block will be designed to accommodate the needs of visitors comfortably and efficiently. For male visitors, there will be four toilets, four changing rooms, and two urinals, along with basins located outdoors. Female visitors will have access to four toilets and four changing rooms, with two basins conveniently situated indoors. Additionally, two family bathtubs will be accessible from the eastern side, providing families with a private space to enjoy the hot springs together.

To ensure accessibility for all visitors, including differently-abled individuals, there will be a designated toilet specifically designed for their needs. Additionally, locker spaces will be provided near the stairs, offering a secure area for visitors to store their belongings while they enjoy the facilities. Overall, these facilities aim to provide visitors with a comfortable and inclusive experience, enhancing their enjoyment of the destination.

#### **4.4.4.4 Shower Area**

For guests' convenience and privacy, there are separate bathing rooms for men and women outside the hot springs. Every shower area has a space set up for washing garments, which adds convenience for guests who might want to clean or freshen up their swimsuits after experiencing the hot springs. Surrounded by the natural beauty of the terrain, guests can rinse off both before and after their bath in the hot springs at these outdoor shower places, which will provide a revitalizing and rejuvenating experience. Furthermore, the gender-segregated bathing spaces will guarantee that every guest at the hot springs feels respected and at ease.

#### **4.4.4.5 Hot Springs**

A number of important elements are incorporated into the hot springs area's design to improve visitors' experiences. First, there are two distinct rectangular pools: one on the southern side is for male tourists, while the other is for female visitors. Every guest is guaranteed comfort and privacy thanks to this segregation.

Every pool can accommodate 20–30 people at a time, which is a significant quantity for any given pool. There is room for everyone to have a comfortable and pleasurable time without feeling crowded. Stone walks encircle the pools; it's a hardy, organic material that fits in perfectly with the surroundings. These walkways give guests room to stroll about the hot spring region, giving them the chance to take in the picturesque surroundings and access seating.

The walkways' thoughtful construction guarantees that they are not overly deep, enabling guests to relax inside the pools and take use of the healing properties of the hot spring water. Furthermore, steps are thoughtfully positioned at the pools' entry locations to make it simple for guests of all ages and abilities to reach the areas. A large platform is added between the two hot springs to improve the experience even more. It serves as a primary meeting place and separates the regions for men and women. This platform lets guests unwind and mingle while taking in the calming atmosphere of the hot springs.

The overall goal of the hot springs area's design is to provide a serene and welcoming environment where guests may relax, commune with nature, and enjoy the restorative

#### **4.4.4.6 Source**

One of the sources lies near the temple behind the pool. Another source lies about 81 metres from the pool and is protected by metal rails. Visitors are protected from harm while still being able to view and enjoy the hot springs' source thanks to this barrier. The source is situated close to the Kaligandaki River and enjoys the tranquil atmosphere that the natural surroundings and riverfront provide. The source's inherent integrity is preserved by the metal rails acting as a barrier to stop unintentional access. All things considered, the source improves the experience of visitors to the location by offering an intriguing window into the geological processes that give rise to the hot springs.



**Figure 4.25: Hot spring source in the bank of Kali Gandaki River**

## 5 COST ESTIMATE

Preliminary quantity estimates are based on the measurements of the structures and the section in the drawings. The architectural drawing of main civil works was created and quantity were derived. The cost for other works is estimated on lump sum basis. Rate for items were derived from GoN norms.

### 5.1 Estimating Methodology

The project cost estimate is carried out in parallel with the quantities of various items taken from the feasibility level of drawings and quantities derived from empirical relations.

The cost estimation is divided into following subheadings.

- Civil works
  - Major civil works are estimated based on architectural drawing
  - River protection works is estimated based on prepared protection plan
  - For minor civil works quantity is directly extracted from master plan
  - Physical and price contingency is considered
- Electrical works
  - Sufficient provision for indoor and outdoor lights is made
  - The outdoor light will be pole mounted LED light with pole height 5 m and spacing 10 m considering 25 watt led light which will provide around 2200 lumens
  - The wiring and accessories are adopted on lumpsum basis from previous experience
- Water supply and sanitary works
  - The number of faucets, bathtubs, showers, commodes and pans is counted based on architectural drawing.
  - The piping cost is adopted on lumpsum basis from previous experience

### 5.2 Basic Rates of Material at Site and Rate Analysis

#### 5.2.1 Labour Cost

For estimating purpose, the labour force has been subdivided into three categories of workers, namely unskilled, semi-skilled and skilled. It is also assumed that the work force required for the project will be from the local market, and only specific skilled labour will be brought from outside.

Considering the overall construction requirements for the project, 6 days x 8 hours work a week was selected as the basis for planning and estimating the major construction activities.

#### 5.2.2 Construction Equipment

The access road is proposed to be constructed first to transport the heavy machineries and equipment to the project site. For the purpose of rate analysis, equipment rates were derived from DOR published hire rates and adjusted to cope with the project site condition.

#### 5.2.3 Construction Material

It has been assumed that most of the construction materials like cement and reinforcement steel will be supplied from the nearest local market.

#### 5.2.4 Unit Rates

Unit rates have been derived for the major construction activities. GoN norms of practice and consultant's in-house experience have been utilized in the derivation of the unit rates. The prices of materials and labours were obtained from the Approved District Rates.

### 5.3 Contingencies and VAT

#### Physical Contingencies

The estimated costs include physical contingencies, which allow for unforeseen cost increases that may become necessary as more information is obtained and evaluated. In view of the extent of study carried out to date, the present stage of feasibility designs and the cost analysis performed, 10 % physical contingency has been added to cost additionally 10 % price contingency is added.

#### Value Added Tax - VAT

It is additional cost on the construction material, labour cost and other equipment. In general, the amount of VAT is considered as 13 %.

**Table 5.1: Cost Estimate for Paudwar and Bhurung Tatopani**

S. N.	Particulars	Amount (NRs.)	Remarks
A	Civil works		
1	All building, landscaping, protection	83,227,140.23	
	Total of Civil works	83,227,140.23	
B	Electrical and Allied Installations		
1	Indoor and outdoor	6,226,000.00	
	Total of Electrical and Allied Installations	6,226,000.00	
C	Sanitary, Plumbing & Water Supply Works		
1	Indoor and outdoor	5,220,000.00	
	Total of Sanitary, Plumbing & Water Supply Works	5,220,000.00	
<b>D</b>	<b>Total Cost of Building (A+B+C):</b>	<b>94,673,140.23</b>	
E	Physical Contingency @ 10% of Sub-Total D	9,467,314.02	
F	Price Contingency @ 10% of Sub-Total D	9,467,314.02	
<b>G</b>	<b>Subtotal (D+E+F)</b>	<b>113,607,768.28</b>	
H	VAT @ 13% of Sub-Total G	14,769,009.88	
<b>I</b>	<b>Total Cost with VAT and Contingency (G+H)</b>	<b>128,376,778.15</b>	

Total cost summing up for master plan of both the hot water spring is NRs. 128,376,778.15 inclusive of VAT. This cost only covers the cost required within the proposed boundary of Hot Water Spring and include other facilities, recreational structures and river protection works. Details of rate analysis and estimates are presented in Annex-IV.

## 6 ECONOMIC ANALYSIS

Economic analysis is carried out to assess economic viability of the project. Various indicative parameter including Economic Rate of Return (EIRR), Net Present Value (NPV), Benefit cost ration (BCR) and payback period has been evaluated considering the project cost and direct benefit resulted from tangible income as revenue generated from hot water spring.

### 6.1 Expected Social Benefit

#### 6.1.1 Current Scenario

As per social analysis, at Paudwar Tatopani the local economy heavily relies on the hospitality industry, with hotels serving as the primary source of income for the community. The presence of the hot spring attracts a steady influx of both domestic and international tourists, creating additional opportunities for income generation among the locals. On a daily basis, the hot spring welcomes around 25-30 visitors who come to bathe in its rejuvenating waters. Monthly, this number can reach approximately 750 individuals. The winter season, spanning from Magh to Chaitra, marks the peak period of the hot spring's popularity, although visitors also come during the summer months. During the peak season, an estimated 500 individuals visit the hot spring daily for bathing and engaging in religious rituals.

Similarly, at the Bhurung Tatopani, the local economy heavily relies on the operation of hotels, which serve as the primary source of income for the community. The presence of the hot spring attracts a consistent flow of both domestic and international tourists, creating valuable opportunities for additional income generation. The management of the hot spring is well-organized, with facilities such as changing rooms and a well-maintained pool to accommodate visitors. Several bathing taps have been installed to cater to the needs of the influx of tourists. On a daily basis, an average of 200 visitors come to the hot spring to experience its rejuvenating waters. This number can increase to approximately 6,000 visitors on a monthly basis, highlighting the popularity of the hot spring among tourists. While the rainy season is the peak period of the hot spring's popularity, visitors also frequent the area during the winter and spring months, seeking relaxation and healing in the therapeutic waters.

#### 6.1.2 Social Benefits

The development of hot water spring generates significant indirect revenue for the community through various economic, social, and environmental mechanisms. These benefits, while not always directly measurable, contribute to the overall economic health and quality of life in the community.

##### 6.1.2.1 Increase Local Business

The development of new tourism facility will increase the flow of visitor and subsequently promotes local business.

##### 6.1.2.2 Creates Job

The influx of tourists supports jobs in the hospitality, retail, and service sectors, contributing to local employment and economic stability.

### **6.1.2.3 Increase in Property Value**

Proximity to tourism can increase property values in the surrounding area, benefiting homeowners and increasing property tax revenues for local governments.

### **6.1.2.4 Cultural Expansion**

The local culture can be shared and presented with tourist increasing cultural expansion. Cultural expansion through tourism refers to the process by which local traditions, customs, and arts are shared and promoted beyond their native contexts. As tourists visit a region, they experience and often take-home elements of its culture, such as cuisine, music, and crafts. This exchange fosters a broader appreciation and understanding of the local culture, leading to its wider recognition and sometimes adoption. Additionally, increased tourism can encourage the preservation and revitalization of cultural practices, enriching the cultural fabric and helping sustain local identity.

### **6.1.2.5 Economic Development**

The increased economic activity around the hot water spring area will subsequently play role in economic development of surrounding. Increased economic activity around a hot water spring can drive economic development in surrounding areas by attracting tourism, which boosts local businesses such as hotels, restaurants, and shops. This growth in tourism infrastructure and spending creates jobs, enhances local services, and stimulates further investment in the region.

## **6.1.3 Economic Benefits**

The development can attract businesses and tourism, leading to economic growth and job creation. This contributes to overall social stability by providing employment opportunities and improving the standard of living.

### **6.1.3.1 Economic Benefit in Travel Route**

Businesses along travel routes, such as hotels, restaurants, and roadside attractions, benefit from increased tourist traffic and spending. This influx of travellers boosts local revenue and supports the growth of these enterprises, leading to a more vibrant and prosperous economy in the area.

To experience the health benefit of Bhurung and Paudwar Tatopani, Individuals can go either on public transport or by to Pokhara from Kathmandu. It takes minimum 7 hrs. by road and 30 minutes by flight costing NRs. 631.00 and NRs. 4500.00 respectively. From Pokhara to Tatopani there is double lane blacktopped road of 130 km which takes 3.5 hrs. to drive and costs NRs. 640.00 on Public Transport. In addition, individuals need to cross the Kaligandaki River and walk about 600m from the Highway to reach the Paudwar Tatopani. There are Markets and Hotels with decent facilities on the right bank of the Kaligandaki named as Tatopani. In general, price for one-night stay cost NRs. 2500 per room and one-time meal cost NRs. 500 per person in this route. On the left bank limited number of hotels are available. Estimated Travel cost and time for a person to reach Paudwar Tatopani is presented on following table.

**Table 6.1: Economical travel cost and tourist destination time**

SN	Itinerary	Distance (km)	Approx. Time	Expenses (NRs)	Remarks
1	Kathmandu To Pokhara	202	5 Hrs	631	By Bus
2	Pokhara to Tatopani	103	3.5 Hrs	640	By bus/ Bolero
Flying to Pokhara					
1	Kathmandu to Pokhara		0.5 Hrs	4500	By Flight
2	Pokhara to Tatopani	103	3.5 Hrs	640	By bus/ Bolero
Vehicle from nearest border					
1	Sunauli-Waling-Kushma- Tatopani	226	7 hrs.	2500	Private vehicle

### **6.1.3.2 Infrastructure Development**

Increased tourism can lead to improvements in local infrastructure, such as better roads and public transportation, which can benefit both tourists and local residents. Increased tourism often drives the development of local infrastructure, including enhancements to roads, public transportation, and utilities. These improvements facilitate easier and more efficient travel for tourists, attracting more visitors and boosting the local economy. Additionally, enhanced infrastructure benefits residents by providing better connectivity, reducing travel times, and improving overall quality of life.

### **6.1.3.3 Growth in Existing Business**

The growth in local businesses is driven by the increased demand for hospitality, food and beverage, retail, transportation, and recreational services. This growth not only boosts the local economy but also enhances the overall quality of life for residents by providing more job opportunities, better services, and improved infrastructure.

### **6.1.3.4 Attraction of New Business**

The growth in existing business also attracts new business of similar nature and also increases new type of business opportunity. This influx of new enterprises can lead to economic diversification, job creation, and a more dynamic local economy.

### **6.1.3.5 Enhanced Commercial Activities**

The development activities stimulate local economies by increasing foot traffic and attracting tourists, which boosts sales for nearby retail, food, and beverage businesses. Proximity to spring source raises property values, encouraging real estate development and higher investments. The growth of businesses creates jobs and enhances visitor services such as guided tours, equipment rentals, and accommodations. Improved infrastructure and transport services also support increased commercial activities, while cultural and educational programs foster community engagement and promote a vibrant local culture, leading to sustained economic growth and diversification.

#### **6.1.4 Tourism Benefit**

Tourism sector can be benefitted by several ways, enhancing their economic and social impact. Tourist attraction contribute directly to revenue through entrance fees and other facility charges. Tourism also stimulates local businesses, including hotels, restaurants, and retail stores, boosting employment and generating tax revenue. Beyond economic impacts, tourism supports cultural exchange, environmental awareness, and conservation efforts, fostering community pride and engagement. Additionally, the activity attract investment in infrastructure and amenities, improving accessibility and enhancing visitor experiences. Overall, tourism promotes sustainable development while preserving natural resources, making it vital contributors to regional economies and community well-being.

##### **6.1.4.1 Increased Tourism Mobility**

The new development creates area of public attraction resulting increased tourism mobility. The development of an area can attracts businesses and tourism, which in turn stimulates economic growth and generates job opportunities. This influx of economic activity enhances the local economy, leading to better infrastructure and services. By providing stable employment and improving the standard of living, such development contributes to social stability and reduces economic disparities.

##### **6.1.4.2 Tourism Connection**

The tourism connection can be created with nearby places of tourist attraction such that defined tourism circuit is promoted. The new development attracts the tourist visiting the surrounding location to hot water location for recreation and also tourist visiting hot water location will visit nearby location. The Tatopani of Myagdi is already connected to several tourism destination including Pokhara, Kushma, Baglung, Annapurna circuit, Ghorepani, Poon Hill, Marpha, Jomsom, Muktinath and Upper Mustang. The traveller up to Pokhara, Kushma, Baglung and treks around Annapurna circuit can extend their visit up to Tatopani, if properly promoted and the travellers visiting different place in Mustang can make it stopover destination. The tourism connection with popular designation will increase tourist influx.

### **6.2 Revenue Source**

#### **6.2.1 Social Benefit**

The social benefit acts as indirect source of revenue. The project with social benefit has to be launched even if the direct revenue of the project does not payback the initial investment. In the long run after project launching the cumulative effect of its social benefit will make project viable.

#### **6.2.2 Economic Benefits**

The economic benefits such as increased tourist mobility, benefit of travel route, infrastructure development, growth in existing business and attracting new business will increase the value of the area and creates job opportunity. The indirect economic benefit also serves as booster of economic viability of project even if the project is not directly financially viable. The project with economic benefit will attract funding from government agencies on construction and development cost making the project financially viable.

### **6.2.3 Entrance Fees**

The entry fee in hot water spring area can be a source of direct revenue. The entry fee of NRs 100 per person shall be charged with the visitor with free access to hot water shower area and additional charge should be enforced for facility such as jacuzzi/ bathtubs and hot water pools.

### **6.2.4 Activity Fees**

The activity fees include the charges taken for use of hot water pools and bathtubs. Also, the use of cafeteria and accommodation shall be charged separately.

### **6.2.5 Parking Fees**

The provision of pay parking on hourly basis also help in increase in revenue.

### **6.2.6 Partnership and Sponsorship**

With increase in tourist flow the hot water spring public private partnership can be effective way to increase the required further investment for its enhancement. Also, sponsorship agreement with various local companies with advertisement at various location of park will increase the revenue.

### **6.2.7 Grants and Donation**

Grants from different level of government including local, provincial and federal to enhance the existing facility and develop the hot water spring area will increase the socio-economic activities in vicinity and tourist route to reach the spring area. The increase economic activity will enhance economy of the local area around the spring area.

## **6.3 Basis of Revenue Estimation**

The revenue was estimated on the basis of following assumption

- The average number of visitors adopted based on data provided by current operation management committee. The current number of visitors is adopted as based data and increase rate of average annual number of visitors is taken as 2%.
- Ticket fees per person NRs. 100.
- The average rate of escalation in ticket fee is adopted as 5%.
- Among the total visitor 25 % will use pools and jacuzzi and fees to use those facility is adopted as NRs. 200 per person.
- The accommodation facilities will have average occupancy of 30%
- The net revenue generated from cafeteria will be about 50% of total revenue generated from ticket sale
- The revenue generated from sponsorship will be 10% of all other revenue combined.

## **6.4 Parameters for Economic Analysis**

The economic parameters including BCR, NPV and payback period were estimated based on following parameters.

**Table 6.2: Adopted parameters for financial analysis**

Parameter	Value	Remarks
Total Project cost	NRs. 128,376,778.15	
Annual O&M	5.0%	
Escalation rate	5.0%	
Discount rate	10.0%	
Annual Gross revenue	29,372,200.00	
Annual Net Revenue	23,497,760.00	
Annual benefit increment	2.0%	
Operation duration	20 years	
Construction duration	2 years	(40% cashflow on first and 60 % on second year)

From the economic analysis following output is obtained

**Table 6.3: Output of financial analysis**

Parameter	Value	
IRR	22.41%	
NPV	NRs. 390,417,400.71	
Payback period	7	years
BCR	> 2.74	

The analysis carried out in terms of economic rate of return shows the development of hot water spring source seems to be feasible. Details of the economic analysis is presented in Annex-V.

## **7 IMPLEMENTATION AND OPERATION MECHANISM**

### **7.1 Funding Mechanism**

Tourism infrastructure has become a crucial sub-sector within Nepal's broader infrastructure development efforts. Recognizing its potential to drive economic growth and improve living standards, local governments have prioritized its expansion and enhancement. They view tourism infrastructure as a key element in regional development and management strategies. One specific area of interest is the development of hot springs as tourist attractions. Hot springs have the potential to draw significant numbers of visitors, both domestic and international, thus becoming an important infrastructure focus at both regional and national levels. To support these projects, local governments may seek financial assistance from provincial and federal levels.

Special grants and complementary funding from higher levels of government can significantly bolster these initiatives. Additionally, the federal government may provide viability gap funding to bridge any financial shortfalls, ensuring that projects are feasible and sustainable. This collaborative approach can help maximize the benefits of tourism infrastructure projects, fostering economic growth, creating jobs, and enhancing the overall tourism experience in Nepal. The local government then implement the project through local management committee.

### **7.2 Operation Mechanism**

Local governments, with support from higher levels of government, will take a central role in the development, operation, and management of tourism infrastructure projects, such as hot spring areas. The responsibility for the day-to-day operations and management of these hot springs will fall to a local management committee. This committee will oversee all operational aspects, ensuring that the hot springs are well-maintained and efficiently run. In addition to covering operational and management costs, the local management committee will also be tasked with generating sufficient revenue to repay the initial investment made by the local government. This repayment will be made from the revenue generated by the hot springs, ensuring that the project is financially sustainable and beneficial for the local economy. Through this model, the local community gains a significant role in managing and benefiting from the tourism infrastructure, while higher levels of government provide the necessary support and oversight to ensure the project's success.

The federal and provincial governments can play a crucial role in promoting and supporting the development of tourism infrastructure, such as hot springs. By sharing information about these developed sites, they can ensure these attractions are included in broader tourism plans and strategies. This collaborative effort can help maximize the visibility and appeal of these destinations, attracting more visitors both domestically and internationally.

To further enhance the promotion of these tourism infrastructures, they can be incorporated into national and international publications. This might include travel guides, brochures, websites, and social media platforms dedicated to tourism. Additionally, showcasing these attractions in embassies and consulates around the world can help raise awareness and interest among potential international visitors. By leveraging these promotional channels, the federal and provincial governments can help drive tourism growth, contributing to the economic development of the regions where these infrastructures are located.

## 8 CONCLUSIONS AND RECOMMENDATIONS

### 8.1 Conclusions

The masterplan for the redesign of Paudwar seamlessly integrates modern amenities with sustainable practices, ensuring that the site remains a harmonious blend of natural beauty, cultural heritage, and functional spaces. The entrance design respects the existing pathways and enhances accessibility through a new bridge over the Kaligandaki River, maintaining a connection to the Baglung Highway. The ticket counter, constructed with locally sourced materials like stone, timber, and bamboo, provides a functional and aesthetically pleasing gateway that blends with the environment while offering efficient visitor services.

The administrative building, strategically located near the entrance, combines office space, a restaurant, retail shop, and accommodations, creating a multifunctional hub that prioritizes accessibility and visitor comfort. Its design incorporates natural light and a large lawn area, fostering a seamless connection between indoor spaces and the surrounding landscape. Complementing this, well-designed sanitation facilities, including accessible toilets and changing rooms, enhance visitor convenience, while hot bathtubs and dedicated shower areas provide immersive, nature-integrated experiences.

The redesign of the hot springs into communal, private, and cooling kundas enriches Paudwar's appeal, offering diverse bathing options that cater to varying visitor preferences and promote wellness tourism. Universal design principles are embedded throughout the site, ensuring accessibility for all visitors through ramps, wide entrances, and thoughtful spatial planning. Sustainable features, such as the use of renewable energy, effective waste management, and measures to protect the nearby water body, highlight the project's commitment to environmental stewardship.

Finally, the plan emphasizes community development by supporting local crafts, sustainable agriculture, and vocational training, thereby enhancing the local economy and fostering community engagement in the planning process. Overall, the masterplan for Paudwar Tatopani exemplifies a holistic approach to development, balancing modern functionality with ecological sensitivity and cultural respect, ultimately revitalizing the area as a sustainable, inclusive, and welcoming destination for all.

The masterplan for Bhurung thoughtfully integrates functional facilities with sustainable design principles to enhance visitor experiences while preserving the site's natural and cultural heritage. The entrance gate, strategically placed near the parking area, accommodates 6-7 cars and 25-30 bikes, providing a clear and organized entry point for visitors. Adjacent hoarding boards supply essential information, ensuring that visitors are well-informed from the moment they arrive.

Central to the plan is the new block, which houses retail shops, a canteen, toilets, and changing rooms, catering to the diverse needs of visitors. The retail shops offer local crafts and essentials, while the canteen provides a range of food and beverage options in a space that can serve up to 35 people, enhancing both convenience and the local economy. The thoughtfully designed toilet and changing room facilities, which include separate amenities for male and female visitors as well as accessible options for differently-abled individuals, ensure comfort and privacy, contributing to a welcoming atmosphere for all guests.

The outdoor shower area, with separate facilities for men and women, offers privacy and convenience, incorporating spaces for washing garments amidst the natural surroundings. This design provides a refreshing prelude or conclusion to the hot springs experience, enhancing overall visitor satisfaction. The hot springs themselves, featuring two large pools segregated for male and female visitors and surrounded by stone walkways, offer a serene and spacious environment for relaxation. A central platform serves as a communal area, fostering social interaction and enjoyment of the natural setting.

Universal design principles are embedded throughout the site, ensuring accessibility with smooth pathways, ramps, and inclusive fixtures, allowing all visitors, regardless of mobility, to comfortably enjoy the facilities. The protection of the hot spring source by metal rails, located near the tranquil Kaligandaki River, allows safe visitor access and appreciation while preserving its natural integrity. Overall, the Bhurung masterplan effectively balances modern functionality with ecological sensitivity, creating a sustainable, inclusive, and enriching destination for all visitors.

The analysis carried out in terms of economic rate of return shows the development of hot water spring source seems to be feasible.

## 8.2 Recommendations

Based on the masterplan level of study and analysis following recommendation for implementation and operation phase are made:

- The location of both Tatopani are vulnerable to extreme events at Kaligandaki River, hence details of early warning system shall be studied separately and proper disaster management method should be formulated.
- The availability of hot water is sufficient for current tourist flow however with proper development and marketing the tourist flow may be increased and causing increase in water demand. Hence temporal variation demand and supply shall be studied and water storage facility shall be planned.
- Smooth and easy road network will increase people's temptation to visit the place and hence the local government shall request provincial and federal government to improve and maintain road access.
- The Bhurung Tatopani lies directly in the flood plain of Kalingandaki river. To make the development area safe from Kalingandaki river, a large investment is required. The National highway passes between Tatopani Kunda and the river and hence the area is recommended to be protected by the highway which will minimize financial burden to development of Tatopani.
- The tourist facilities like restaurants, hotels, and resorts nearby will be monitored to ensure proper hospitality for visitors. This will enhance tourists' overall satisfaction. In the long run, it will increase the area's popularity among tourists and hence increased tourist flow.
- The health and wellness benefits of hot water spring shall be well disseminated and marketed.
- Safety measure shall be implemented with proper signage, lifeguards and first aid station. The visitors should be advised about the safety regulation before entering the area.
- Phased implementation is recommended for facilities planned in master plan. Detailing of each facility shall be carried out during detail project report preparation.
- The overall planning system and management committee of hot water spring shall be monitored and evaluated by local government and with some inputs from experts from relevant fields. Based on the outcome of evaluation the management system shall be improved.
- Detailed environmental study as per EPA 2075 and EPR 2077 shall be carried out.

## **9 ANNEXES**

Annex-I: D-Cards of Bench Marks

Annex-II: Topographic Survey Maps

Annex-III: Drawings

Annex-IV: Rate Analysis and Estimate

Annex-V: Economic analysis and revenue estimate

**Annex-I: D-Cards of Bench Marks**

# MASTERPLAN OF PAUDWAR AND BHURUNG TATOPANI KUNDA, MYAGDI

## DESCRIPTION CARD OF GROUND CONTROL POINT

Station No.: BM-9  
 Location: Project Area  
 Date: June 2024  
 District: Myagdi

Province No: 4 (Gandaki)  
 Ward No./ Municipality: 04, Annapurna  
 Type of Land: Jungle  
 Land Owner: Private

### Description:

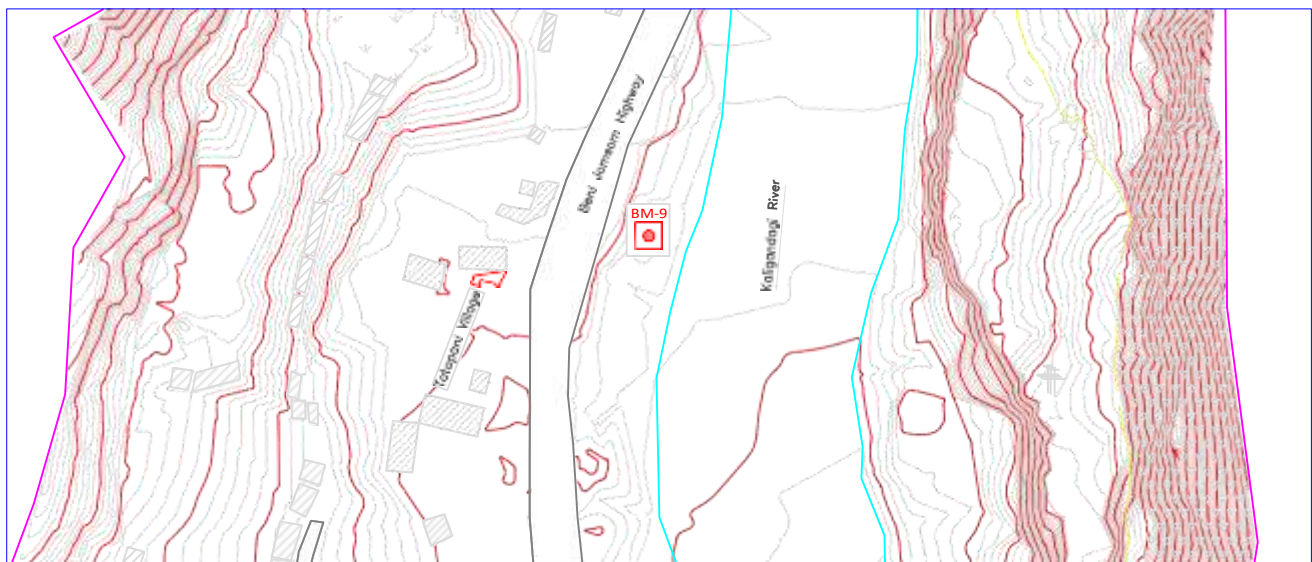
This Point has been situated at proposed Project Area, Right bank of Kaligandi River. It takes 15min to reach this point from Tatopani Village. The point has established in Permanent Boulder engraved on it and marked by red enamel paint with three reference points. The points BM-9 and BM-10 are intervisible each others. The name of the known person is Sher Bahadur Rawat.

### Coordinates and Elevation(m)

Northing	3153097.948
Easting	466411.894
Elevation	1224.633



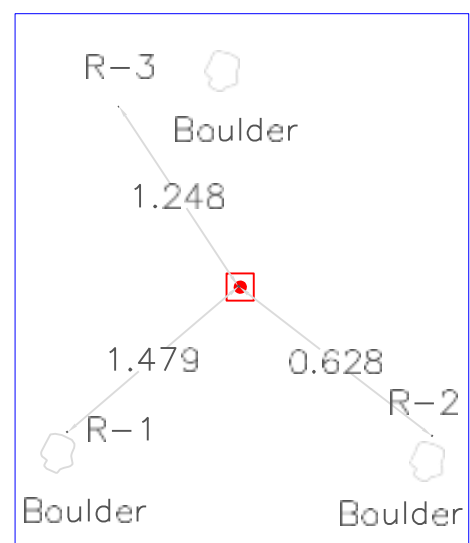
### SCHEMATIC DIAGRAM



### PHOTOGRAPH



### DIMENSIONAL DESCRIPTION



# MASTERPLAN OF PAUDWAR AND BHURUNG TATOPANI KUNDA, MYAGDI

## DESCRIPTION CARD OF GROUND CONTROL POINT

Station No.: BM-10  
 Location: Project Area  
 Date: June 2024  
 District: Myagdi

Province No: 4 (Gandaki)  
 Ward No./ Municipality: 04, Annapurna  
 Type of Land: Jungle  
 Land Owner: Private

**Description:**

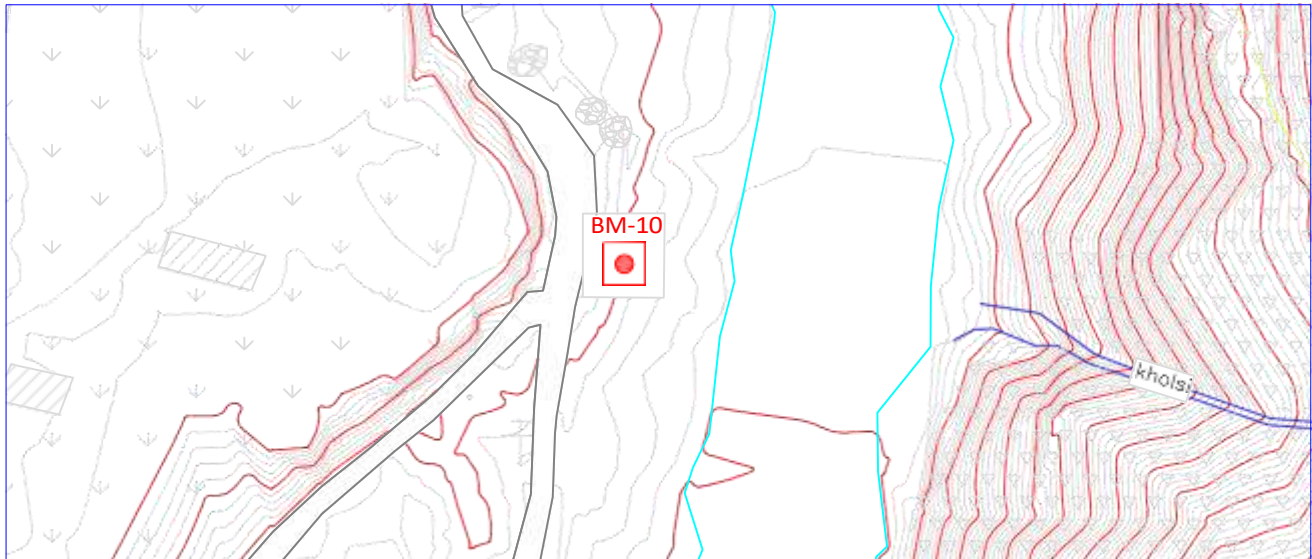
This Point has been situated at proposed Project Area, Right bank of Kaligandi River. It takes 20min to reach this point from Tatopani Village. The point has established in Concrete pillar and marked by red enamel point with three reference points. The points BM-9 and BM-10 are intervisible each others. The name of the known person is Sher Bahadur Rawat.

**Coordinates and Elevation(m)**

Northing	3152940.988
Easting	466423.896
Elevation	1222.017



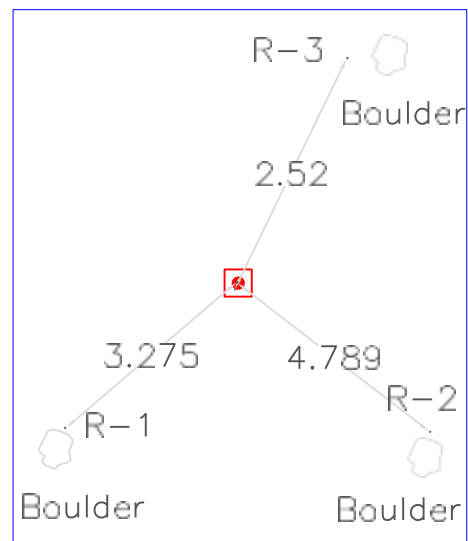
**SCHEMATIC DIAGRAM**



**PHOTOGRAPH**



**DIMENSIONAL DESCRIPTION**



# MASTERPLAN OF PAUDWAR AND BHURUNG TATOPANI KUNDA, MYAGDI

## DESCRIPTION CARD OF GROUND CONTROL POINT

Station No.: BM-3  
 Location: Project Area  
 Date: June 2024  
 District: Myagdi

Province No: 4 (Gandaki)  
 Ward No./ Municipality: 04, Annapurna  
 Type of Land: Jungle  
 Land Owner: Private

**Description:**

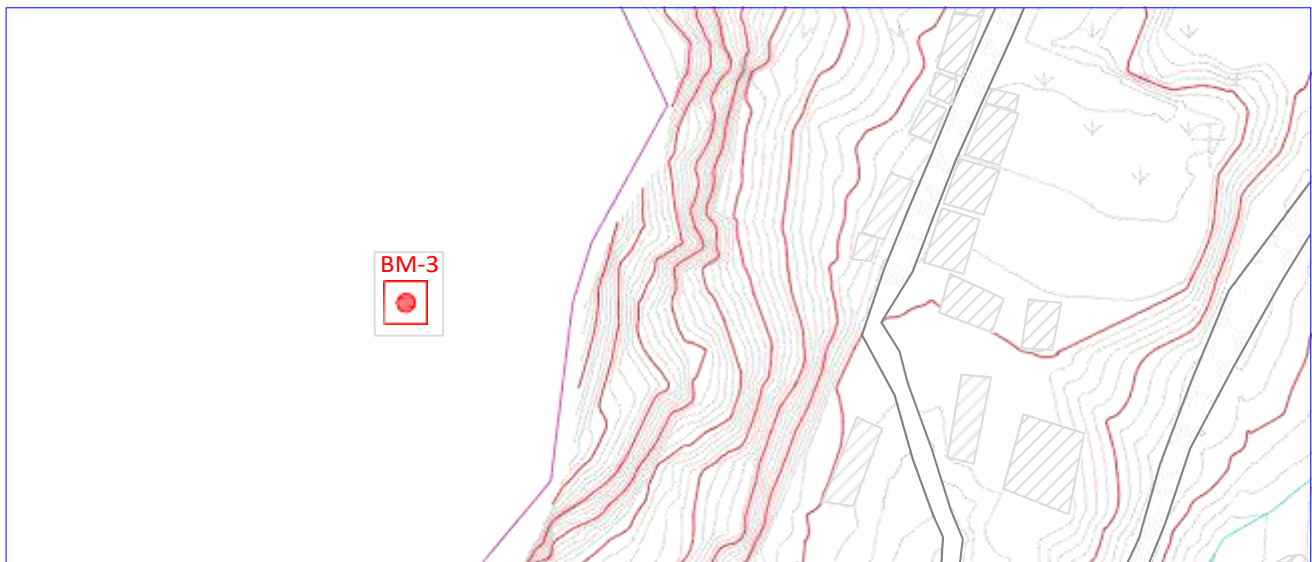
This Point has been situated at proposed Project Area, Right bank of Kaligandi River. It takes 25 min to reach this point from Tatopani Village. The point has established in Concrete pillar and marked by red enamel paint with three reference points. The points BM-10 and BM-3 are intervisible each others. The name of the known person is Sher Bahadur Rawat.

**Coordinates and Elevation(m)**

Northing	3152804.742
Easting	466210.684
Elevation	1299.511



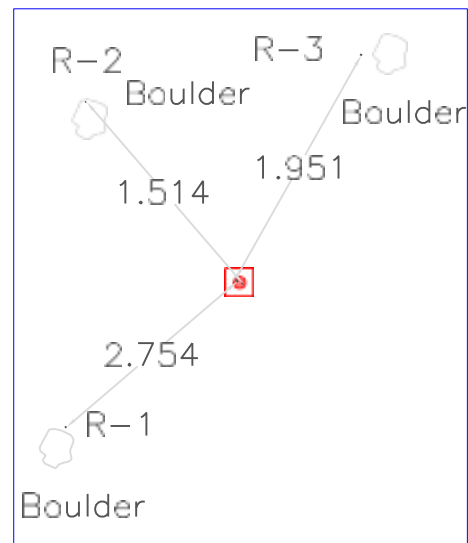
**SCHEMATIC DIAGRAM**



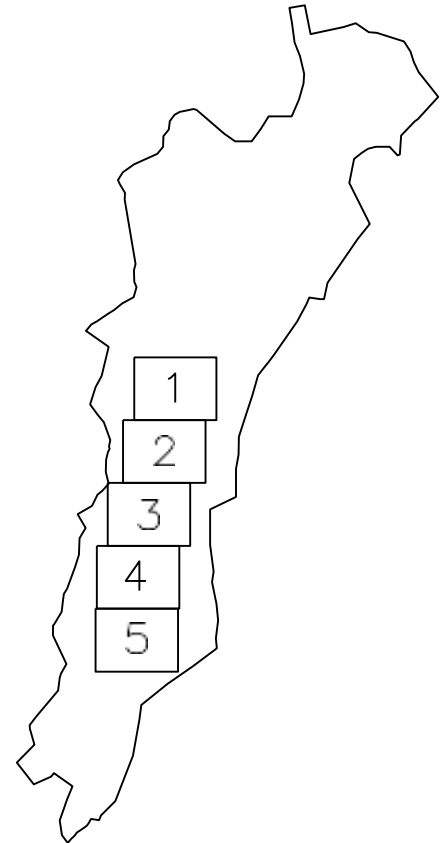
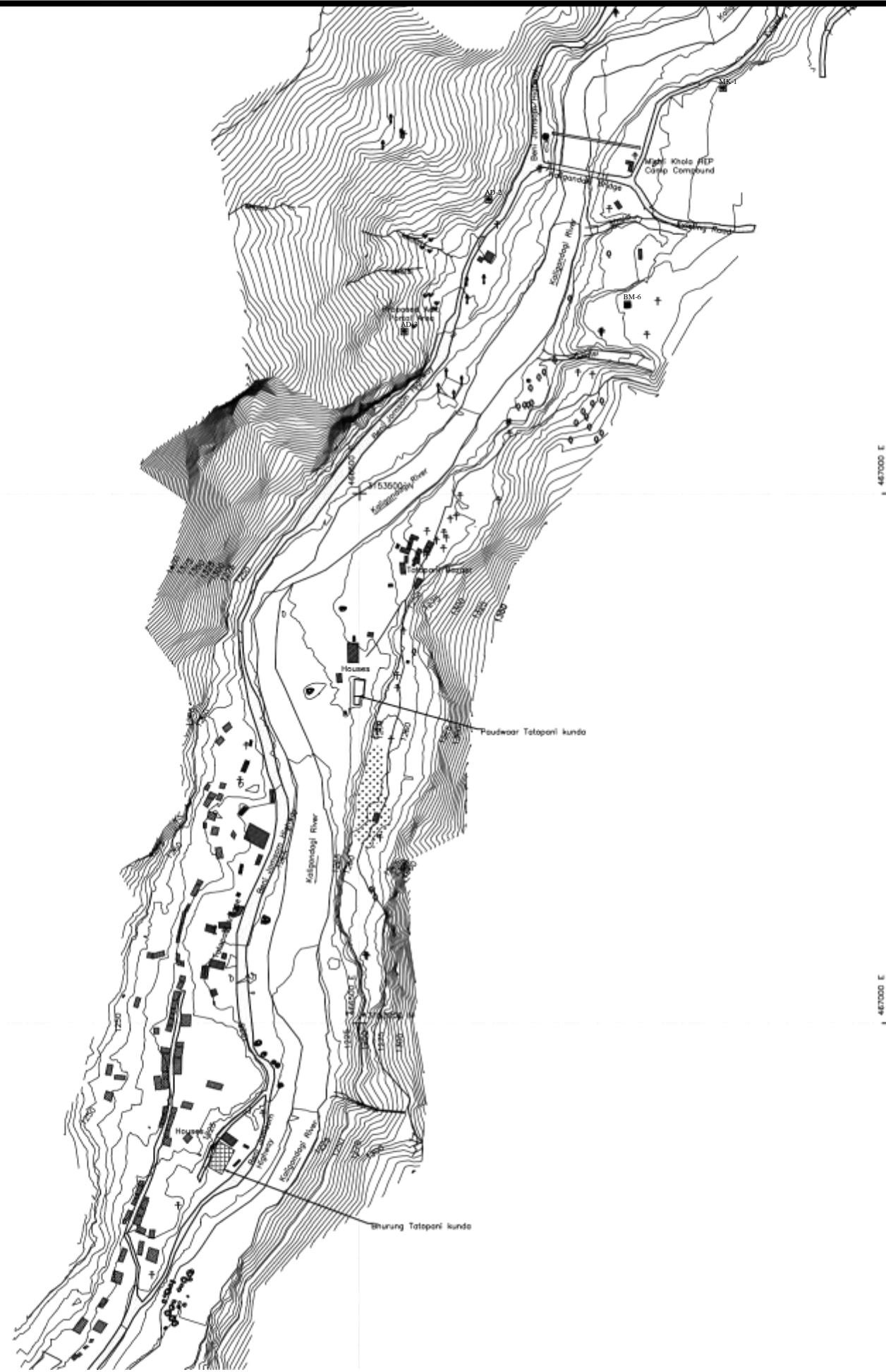
**PHOTOGRAPH**



**DIMENSIONAL DESCRIPTION**



**Annex-II: Topographic Survey Maps**



LEGEND	
	HOUSE/HUT/TOILET/SHED
	ROAD EDGE/TRACK
	SURVEY POINTS (BM/ST/PT/B.L.)
	TREE
	KHOLDHI/KHOLA
	SUSPENSION BRIDGE
	FOOT TRAIL
	BOULDER
	BAGAR
	BARİ
	ROCK

**CLIENT:**  
 Government of Nepal  
 Water and Energy Commission Secretariat  
 Singhdurbar Kathmandu

**PROJECT:**  
 MASTERPLAN OF HURUNG AND PAUDWAAR TATOPANI,  
 ANNAPURNA RURAL MUNICIPALITY-5, MYAGDI  
 HS/4040102-22 & HS/4040102-23

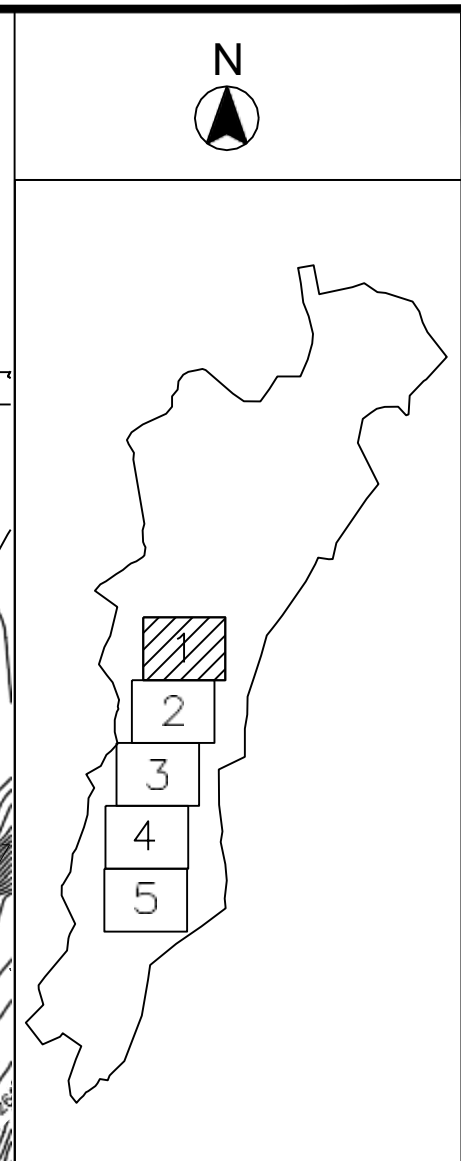
**PREPARED BY:**  
 Global-PNet-Azad JV  
 Kathmandu, Nepal

<b>DATE:</b>	July 2024	<b>SIGNATURE</b>
<b>SURVEYED BY:</b>		
<b>DRAWN BY:</b>		
<b>CHECKED BY:</b>		

**DRAWING TITLE**  
 Topographic Survey maps

**SCALE**  
 1:5000

**Sht No.**  
 1/17  
 Org. Size A3



LEGEND	
	HOUSE/HUT/TOILET/SHED
	ROAD EDGE/TRACK
	SURVEY POINTS (BM/ST/PT/BL)
	TREE
	KHOLCHI/KHOLA
	SUSPENSION BRIDGE
	FOOT TRAIL
	BOULDER
	BAGAR
	BAR
	ROCK

CLIENT:  
 Government of Nepal  
 Water and Energy Commission Secretariat  
 Singhdurbar Kathmandu

PROJECT  
 MASTERPLAN OF PAUDWAAR TATOPANI,  
 ANNAPURNA RURAL MUNICIPALITY-5, MYAGDI  
 HS/4040102-22

preparEd by:  
 Global-PNet-Azad JV  
 Kathmandu, Nepal

DATE :	July 2024	SIGNATURE
SurveyED by :		
Drawn by :		
Checked by :		

DRAWING TITLE  
 Topographic Survey maps

SCALE  
 1:500

SHT No.  
 2/17  
 Org. Size A3



CLIENT:  
 Government of Nepal  
 Water and Energy Commission Secretariat  
 Singhdurbar Kathmandu

PROJECT  
 MASTERPLAN OF PAUDWAAR TATOPANI,  
 ANNAPURNA RURAL MUNICIPALITY-5, MYAGDI  
 HS/4040102-22

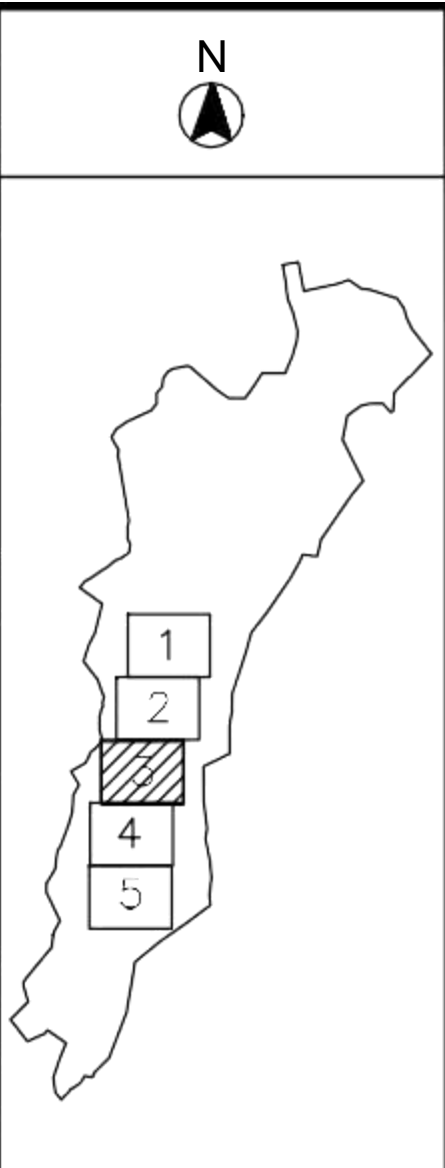
PREPARED BY:  
 Global-PNet-Azad JV  
 Kathmandu, Nepal

DATE:	July 2024	SIGNATURE
SURVEYED BY:		
DRAWN BY:		
CHECKED BY:		

DRAWING TITLE  
 Topographic Survey maps

SCALE  
 1:500

SHT No.  
 3/17  
 Org. Size A3



LEGEND	
	HOUSE/HUT/TOILET/SHED
	ROAD EDGE/TRACK
	SURVEY POINTS (BM/ST/PI/BL)
	TREE
	KHOLU/KHOLA
	SUSPENSION BRIDGE
	FOOT TRAIL
	BOULDER
	BAGAR
	BAR
	ROCK

CLIENT: Government of Nepal  
Water and Energy Commission Secretariat  
Singhdurbar Kathmandu

PROJECT: MASTERPLAN OF BHURUNG TATOPANI,  
ANNAPURNA RURAL MUNICIPALITY-2, MYAGDI  
HS/4040102-23

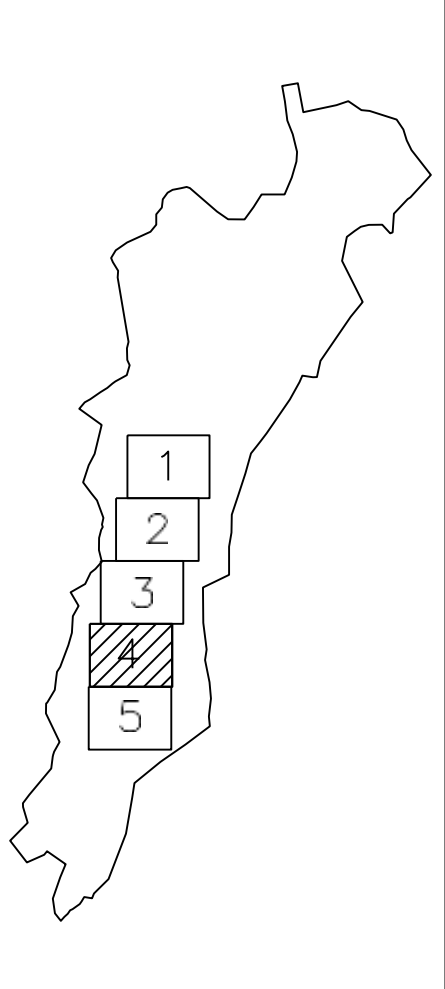
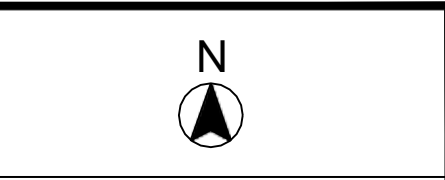
prePared by: Global-PNet-Azad JV  
Kathmandu, Nepal

DATE:	July 2024	SIGNATURE
SURVEYED BY:		
DRAWN BY:		
CHECKED BY:		

DRAWING TITLE  
Topographic Survey maps

SCALE  
1:500

SHT No.  
4/17  
Org. Size A3



LEGEND	
	HOUSE/HUT/TOILET/SHED
	ROAD EDGE/TRACK
	SURVEY POINTS (BM/ST/PT/BL)
	TREE
	KHOLCHI/KHOLA
	SUSPENSION BRIDGE
	FOOT TRAIL
	BOULDER
	BAGAR
	BARRI
	ROCK

CLIENT: Government of Nepal  
Water and Energy Commission Secretariat  
Singhdurbar Kathmandu

PROJECT: MASTERPLAN OF BHURUNG TATOPANI,  
ANNAPURNA RURAL MUNICIPALITY-2, MYAGDI  
HS/4040102-23

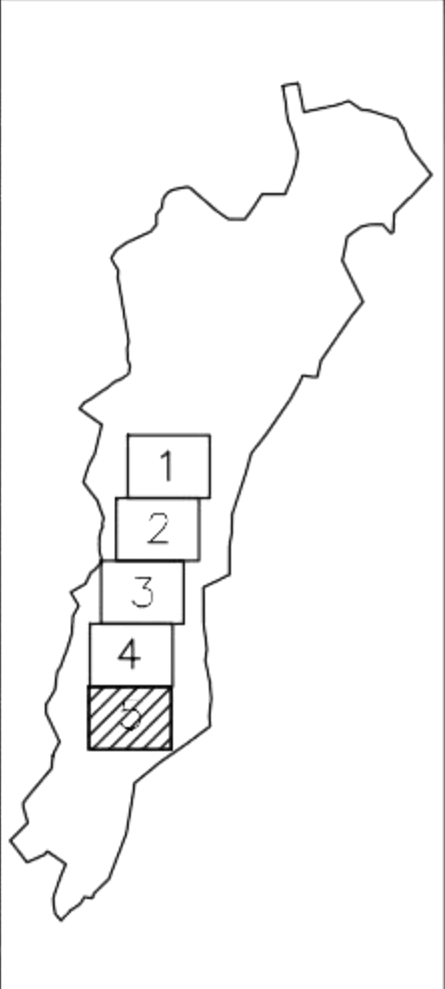
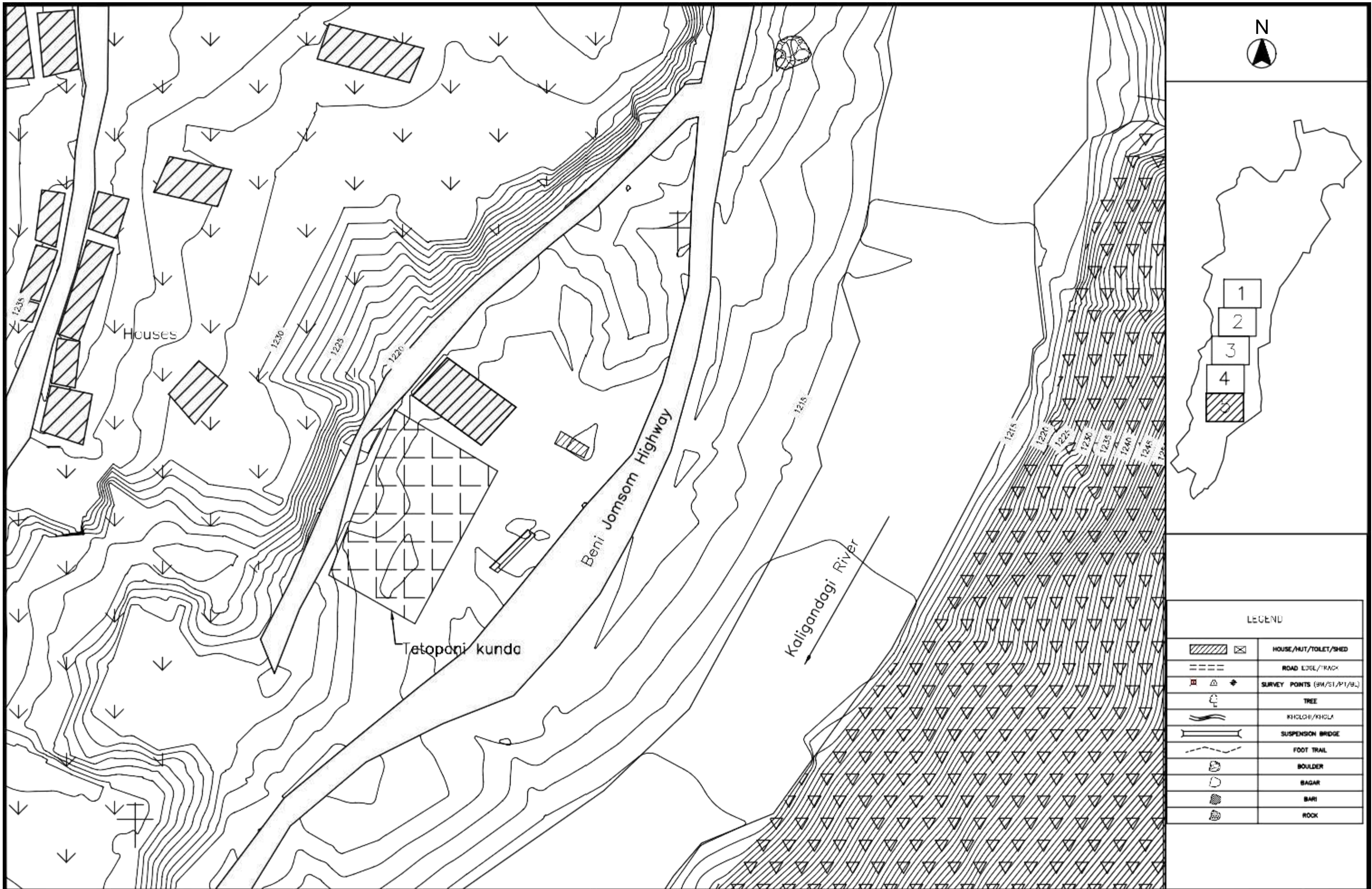
preparEd by: Global-PNet-Azad JV  
Kathmandu, Nepal

Date :	July 2024	Signature
Surveyed by :		
Drawn by :		
Checked by :		

DRAWING TITLE  
Topographic Survey maps

SCALE  
1:500

Sht No.  
5/17  
Org. Size A3



LEGEND	
	HOUSE/HUT/TOILET/SHED
	ROAD EDGE/RACK
	SURVEY POINTS (BM/SI/P1/P2)
	TREE
	KHULOI/KHOLA
	SUSPENSION BRIDGE
	FOOT TRAIL
	BOULDER
	BAGAR
	BARİ
	ROCK

CLIENT: Government of Nepal  
Water and Energy Commission Secretariat  
Singhdurbar Kathmandu

PROJECT: MASTERPLAN OF BHURUNG TATOPANI,  
ANNAPURNA RURAL MUNICIPALITY-2, MYAGDI  
HS/4040102-23

prePared by: Global-PNet-Azad JV  
Kathmandu, Nepal

DATE:	July 2024	SIGNATURE
SURVEYED BY:		
DRAWN BY:		
CHECKED BY:		

DRAWING TITLE  
Topographic Survey maps

SCALE  
1:500

SHT No.  
6/17  
Org. Size A3

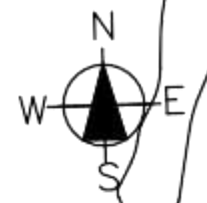
**Annex-III: Drawings**

LEGEND	
1	ENTRANCE
2	TICKET COUNTER
3	CHAUTARA
4	TOILET
5	TAP
6	GARDEN
7	EXISTING TEMPLE
8	OFFICE/ACCOMODATION
9	PAVED AREA
10	PARK/HEALING ZONE
11	RAMP
12	MALE/FEMALE BATH
13	KUNDA
14	SITTING SPACE
15	CHANGING ROOM/TOILET
16	SUSPENSION BRIDGE





CLIENT:	PROJECT:	prepared by:	DATE:	DRAWING TITLE	SCALE	Sht No.				
Government of Nepal Water and Energy Commission Secretariat Singhdurbar Kathmandu	MASTER PLAN OF PAUDWALAR TATOPANI, ANNAPURNA RURAL MUNICIPALITY-5, MYAGDI HS/4040102-22	Global-PNet-Azad JV Kathmandu, Nepal	<table border="1"> <tr> <td>Drawn by :</td> <td></td> </tr> <tr> <td>Checked by :</td> <td></td> </tr> </table>	Drawn by :		Checked by :		Master Plan Layout	1:1000	7/17 Org. Size A3
Drawn by :										
Checked by :										



LEGEND	
1	PARKING
2	TICKET COUNTER
3	CHAUTARA
4	TOILET
5	TAP
6	GARDEN
7	OFFICE/ACCOMODATION
8	PAVED AREA
9	PARK/ HEALING ZONE
10	RAMP
11	MALE/FEMALE BATH
12	KUNDA
13	CHANGING ROOM/ TOILET
14	SUSPENSION BRIDGE



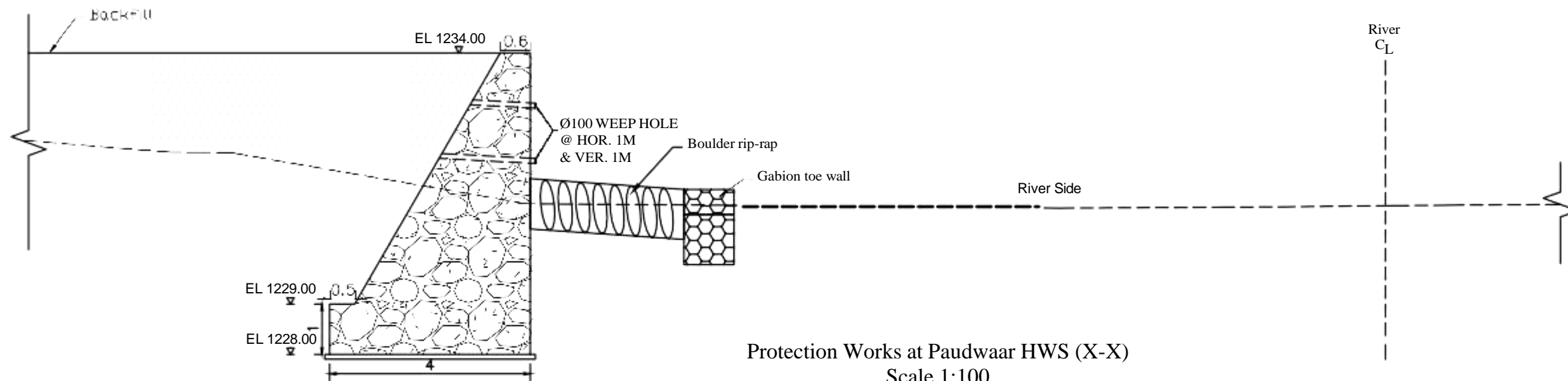
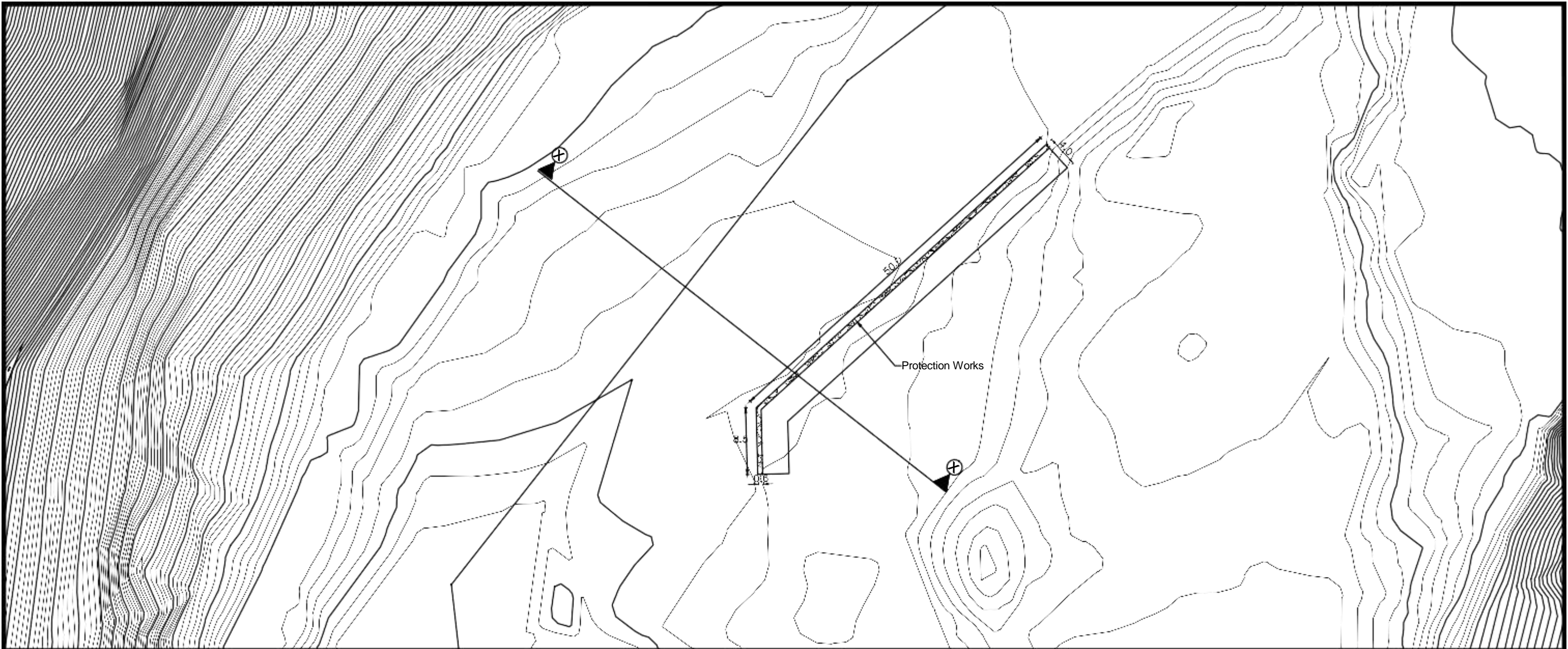
**MASTER PLAN**  
**SITE AREA-4246.07 SQ.M**

CLIENT: Government of Nepal Water and Energy Commission Secretariat Singhdurbar Kathmandu	PROJECT: MASTERPLAN OF PAUDWAAR TATOPANI, ANNAPURNA RURAL MUNICIPALITY-5, MYAGDI HS/4040102-22	PREPARED BY: Global-PNet-Azad JV Kathmandu, Nepal	DATE: July, 2021	SIGNATURE:	DRAWING TITLE: Master Plan	SCALE: 1:400	SHT No.:
			SURVEYED BY:				8/17
			DRAWN BY:				Org. Size A3
			CHECKED BY:				









Protection Works at Paudwaar HWS (X-X)  
Scale 1:100

CLIENT: Government of Nepal Water and Energy Commission Secretariat Singhdurbar Kathmandu	PROJECT MASTERPLAN OF PAUDWAAR TATOPANI, ANNAPURNA RURAL MUNICIPALITY-5, MYAGDI HS/4040102-22	PREPARED BY: Global-PNet-Azad JV Kathmandu, Nepal	DATE:	July 2024	SIGNATURE	DRAWING TITLE Protection Works	SCALE	1:300	Sht No. 12/17
			SURVEYED BY:				1:100		
			DRAWN BY:					Drg Size A3	
			CHECKED BY:						

# LEGEND

- 1. ENTRY
- 2. TICKET COUNTER
- 3. SHOWER AREA
- 4. WASHING AREA
- 5. KUNDA
- 6. TEMPLE AND GARDEN
- 7. PAVED AREA
- 8. GARDEN
- 9. MAIN BLOCK
- 10. FUTURE EXPANSION
- 11. EXISTING WATER SOURCE
- 12. RETAINING WALL

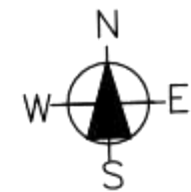
# BHURUNG TATOPANI



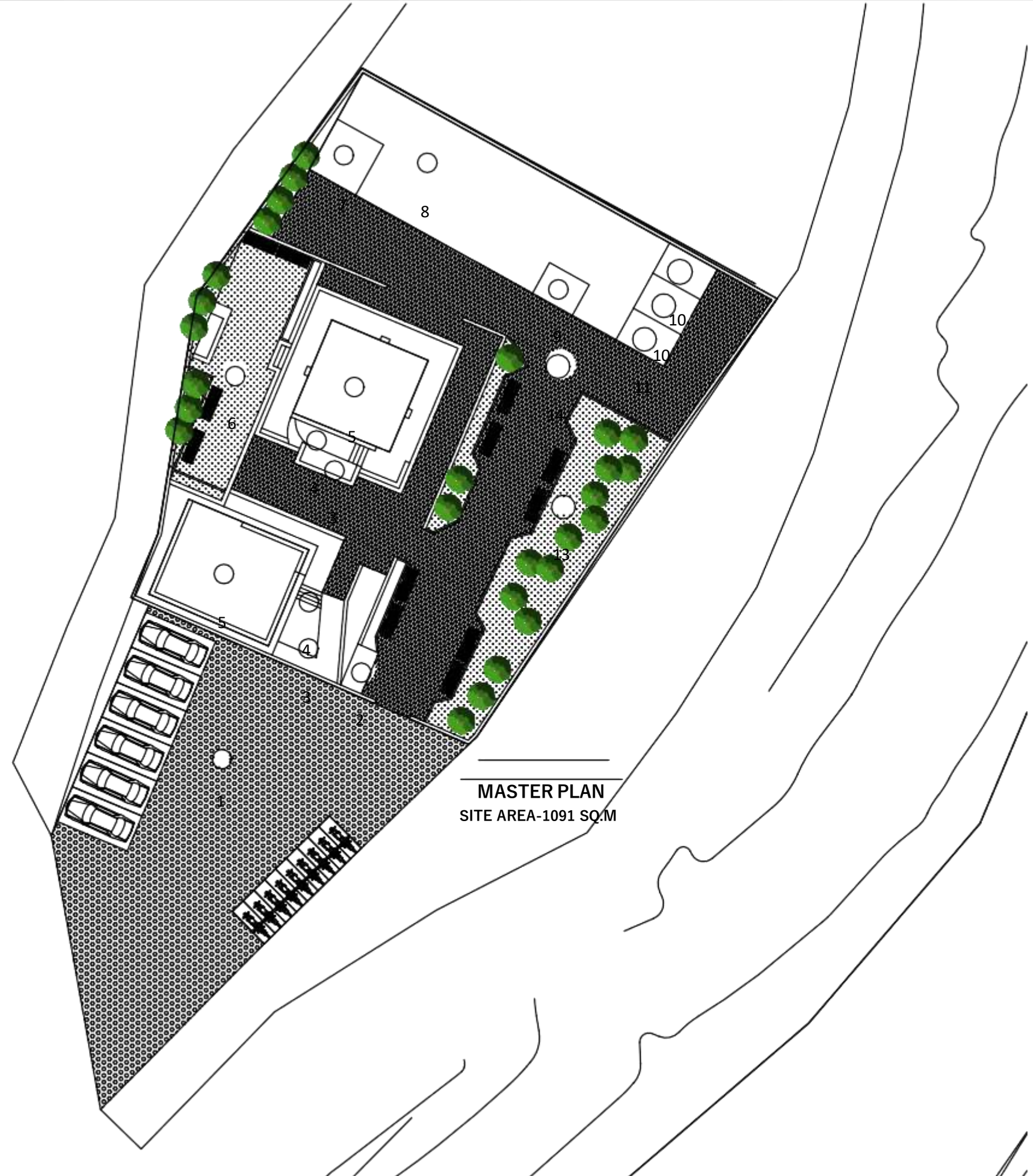
Government of Nepal  
Water and Energy Commission Secretariat  
Singha Durbar, Kathmandu  
Study on Identification and Development of  
Hot Water Spring Sources in Nepal  
Master Plan of Bhurung Tatopani, Myagdi  
Consultant  
Global – PNet - Azad JV



<b>CLIENT:</b> Government of Nepal Water and Energy Commission Secretariat Singhdurbar Kathmandu	<b>PROJECT:</b> MASTERPLAN OF BHURUNG TATOPANI, ANNAPURNA RURAL MUNICIPALITY-2, MYAGDI HS/4040102-23	<b>prePared by:</b> Global-PNet-Azad JV Kathmandu, Nepal	<b>DATE :</b> July 2024	<b>SIGNATURE</b>	<b>DRAWING TITLE</b> Master Plan Layout	<b>SCALE</b> 1:1000	<b>SHT No.</b>
			<b>SurVEYED by :</b>				13/17
			<b>Drawn by :</b>				Org. Size A3
			<b>Checked by :</b>				

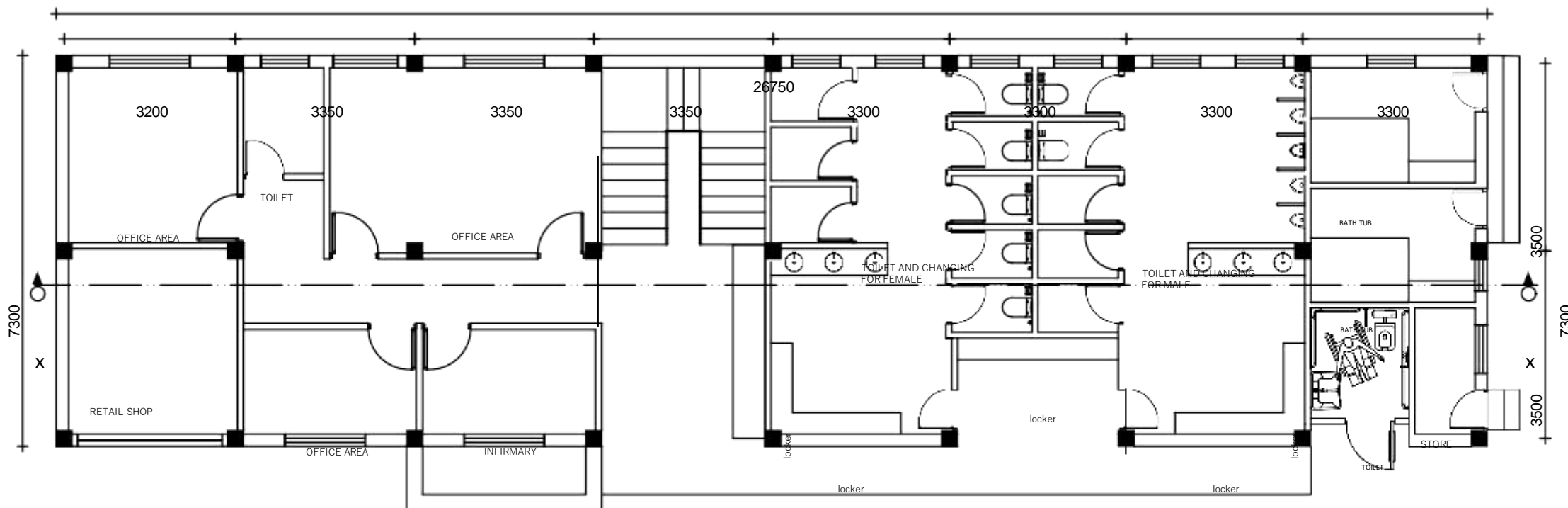
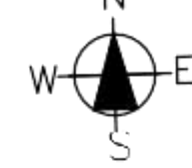


LEGEND	
1	PARKING
2	TICKET COUNTER
3	SHOWER AREA
4	WASHING AREA
5	KUNDA
6	TEMPLE AND GARDEN
7	RETAIL SHOP
8	RESTAURANT
9	TOILET AND CHANGING ROOM
10	BATH TUB
11	TOILET FOR DIFFERENTLY ABLED
12	FUTURE EXPANSION
13	GARDEN
14	PAVED AREA
15	EXISTING WATER SOURCE

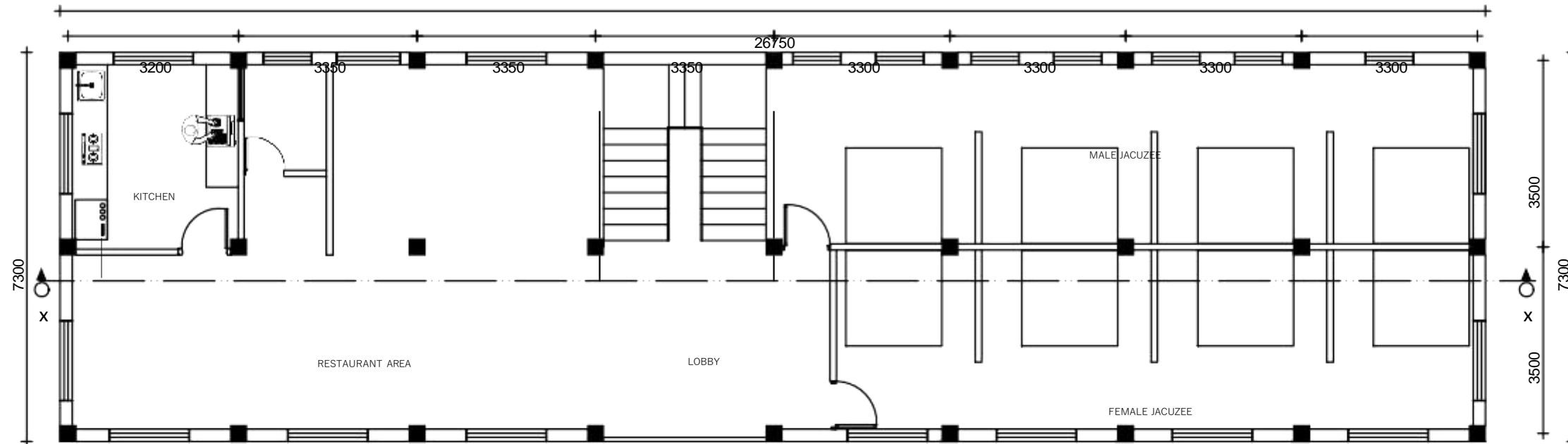


**MASTER PLAN**  
SITE AREA-1091 SQ.M

<b>CLIENT:</b> Government of Nepal Water and Energy Commission Secretariat Singhdurbar Kathmandu	<b>PROJECT:</b> MASTERPLAN OF BHURUNG TATOPANI, ANNAPURNA RURAL MUNICIPALITY-2, MYAGDI HS/4040102-23	<b>prePared by:</b> Global-PNet-Azad JV Kathmandu, Nepal	<b>DATE :</b> July 2024	<b>Signature</b>	<b>DRAWING TITLE</b> Master Plan	<b>SCALE</b> 1:300	<b>Sht No.</b> 14/17 Org. Size A3
			<b>SurVEYEd BY :</b>				
			<b>Drawn by :</b>				
			<b>ChECKEd BY :</b>				



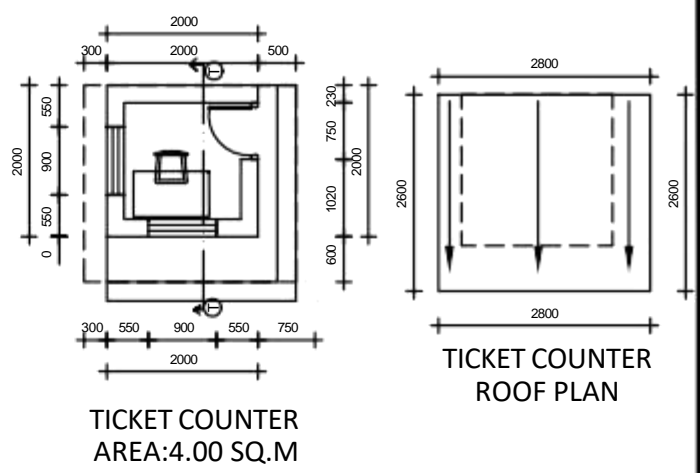
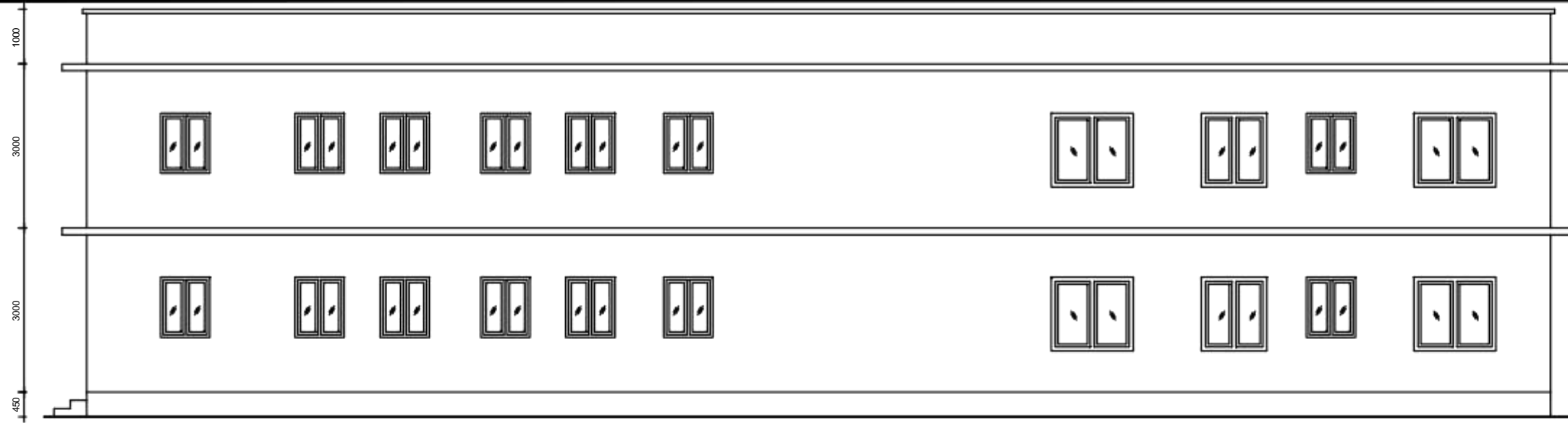
**GROUND FLOOR PLAN**  
AREA: 192.354 SQ.M.



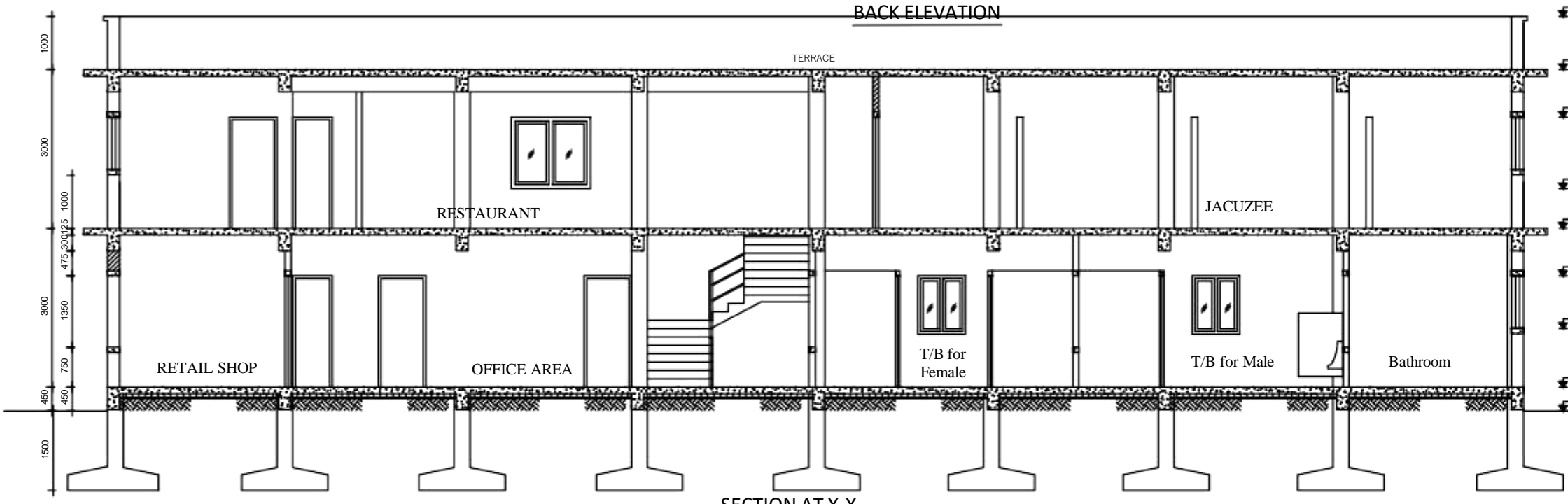
**FIRST FLOOR PLAN**  
AREA: 192.354 SQ.M.

**MAIN BUILDING**

<b>CLIENT:</b> Government of Nepal Water and Energy Commission Secretariat Singhdurbar Kathmandu	<b>PROJECT</b> MASTERPLAN OF BHURUNG TATOPANI, ANNAPURNA RURAL MUNICIPALITY-2, MYAGDI HS/4040102-23	<b>prePared by:</b> Global-PNet-Azad JV Kathmandu, Nepal	<b>DATE :</b> July 2024	<b>Signature</b>	<b>DRAWING TITLE</b> Master Plan	<b>SCALE</b> 1:100	<b>Sht No.</b>
			<b>SurVEYED by :</b>				15/17
			<b>Drawn by :</b>				Org. Size A3
			<b>Checked by :</b>				



**BACK ELEVATION**

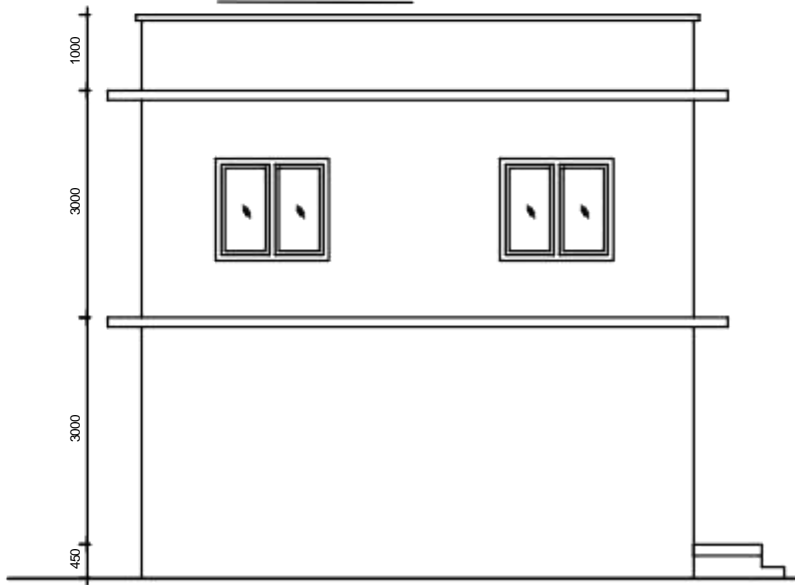


- + 7000mm Parapet Lvl.
- + 6000mm Staircase Cover
- + 5100 mm Lintel Lvl.
- + 3750mm Sill Lvl.
- + 3000mm First Floor Lvl.
- + 2100mm Lintel Lvl.
- + 1050mm Sill Lvl.
- ± 0.00mm Plinth Lvl.
- 450mm Ground Lvl.

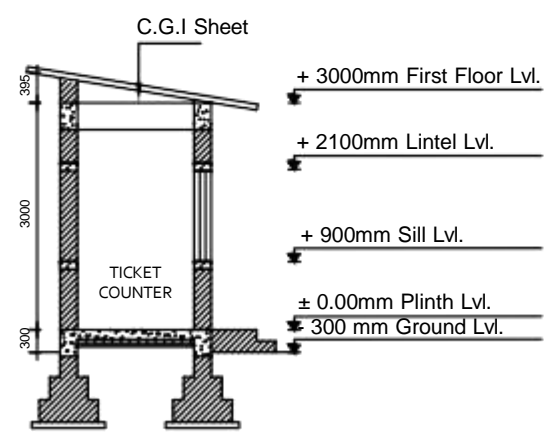
**SECTION AT X-X**



**SIDE ELEVATION-1**

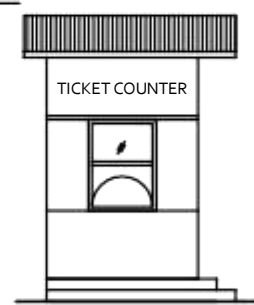


**SIDE ELEVATION-2**

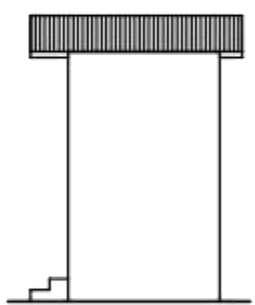


**SECTION AT T-T**

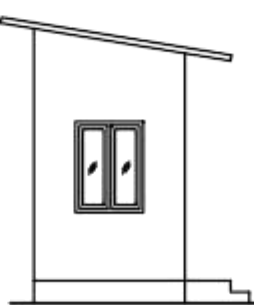
- + 3000mm First Floor Lvl.
- + 2100mm Lintel Lvl.
- + 900mm Sill Lvl.
- ± 0.00mm Plinth Lvl.
- 300 mm Ground Lvl.



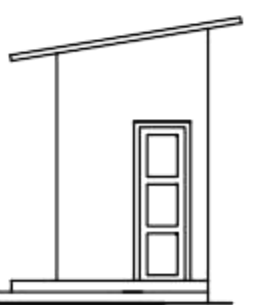
**FRONT ELEVATION**



**BACK ELEVATION**



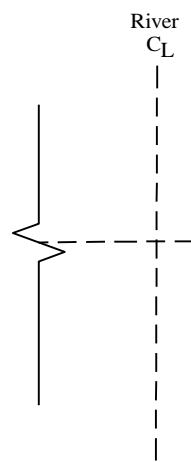
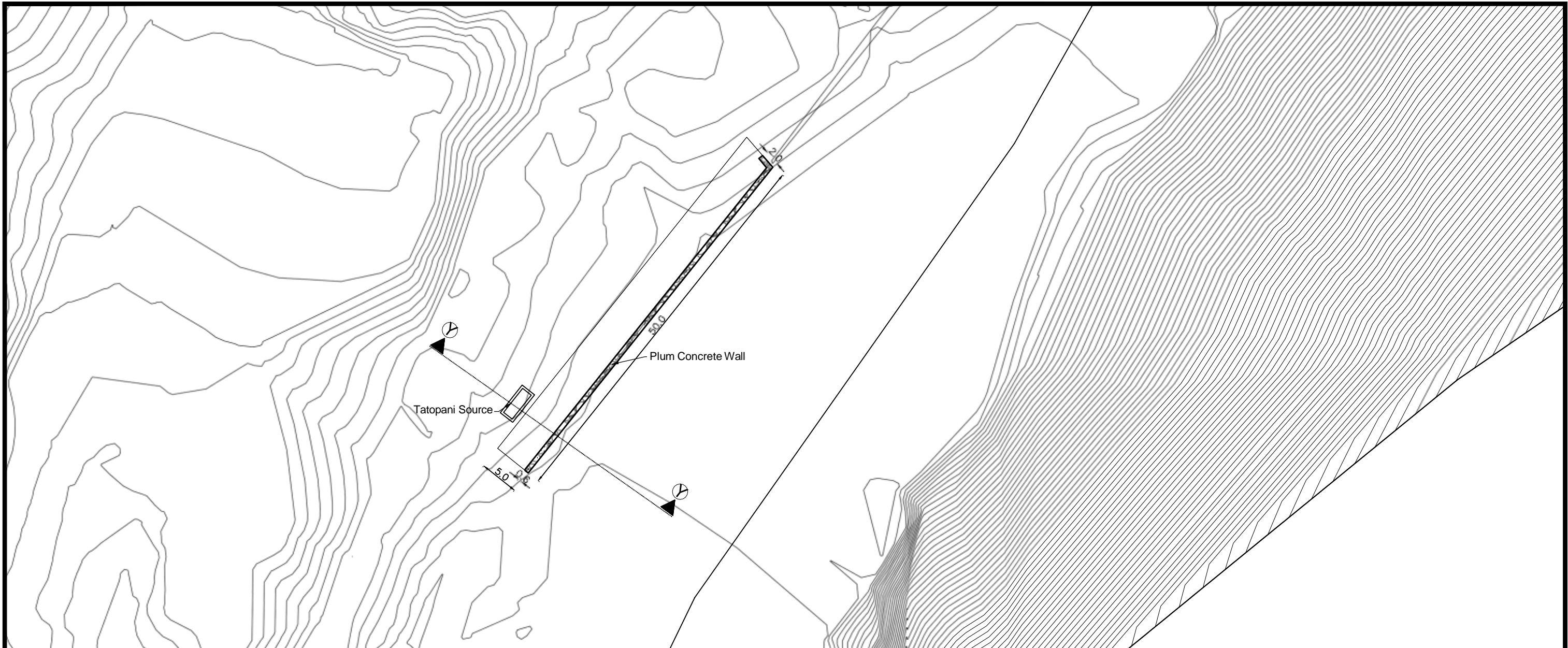
**SIDE ELEVATION-1**



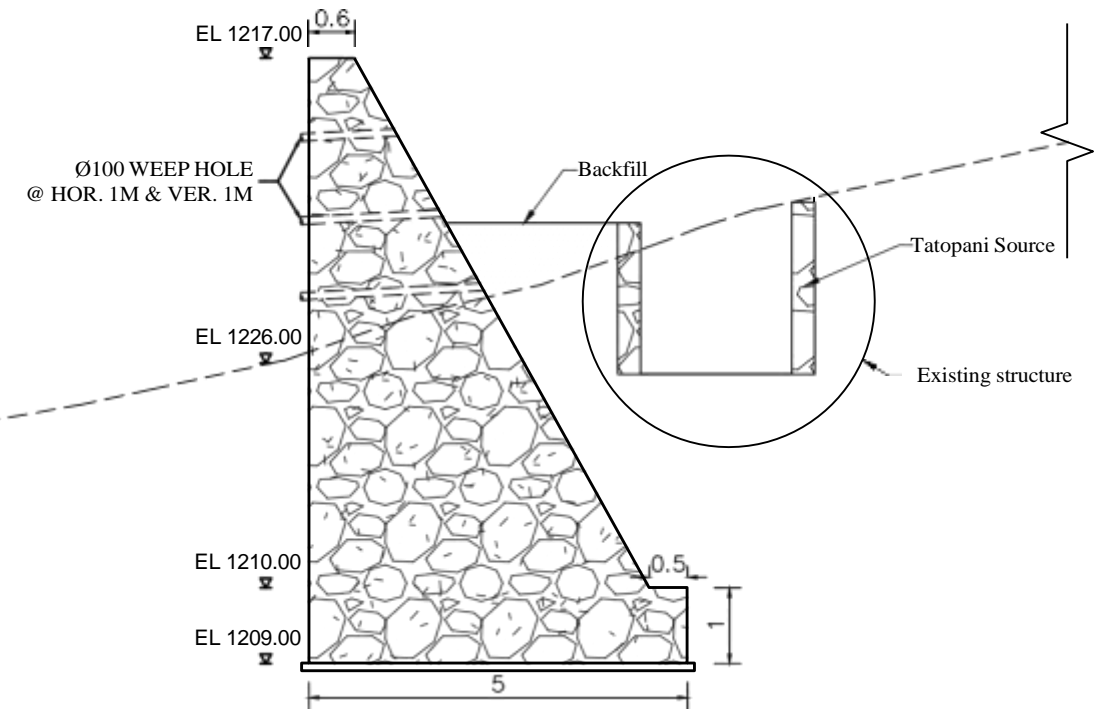
**SIDE ELEVATION-2**

**MAIN BUILDING & OFFICE**

CLIENT: Government of Nepal Water and Energy Commission Secretariat Singhdurbar Kathmandu	PROJECT: MASTERPLAN OF BHURUNG TATOPANI, ANNAPURNA RURAL MUNICIPALITY-2, MYAGDI HS/4040102-23	prEparEd by: Global-PNet-Azad JV Kathmandu, Nepal	DATE: July 2024	SIGNATURE	DRAWING TITLE	SCALE	Sht No.				
			SURVEYED by:					Master Plan	1:100	16/17	
			Drawn by:								Org. Size A3
			Checked by:								



Protection Works at Bhurung HWS (Y-Y)  
Scale 1:100



CLIENT: Government of Nepal Water and Energy Commission Secretariat Singhdurbar Kathmandu	PROJECT MASTERPLAN OF BHURUNG TATOPANI, ANNAPURNA RURAL MUNICIPALITY-2, MYAGDI HS/4040102-23	PREPARED BY: Global-PNet-Azad JV Kathmandu, Nepal	DATE:	July 2024	SIGNATURE	DRAWING TITLE Protection Works	SCALE	1:500	SHIT No. 17/17
			SURVEYED BY:				SCALE	1:100	
			DRAWN BY:						
			CHECKED BY:					Drg. Size A3	

**Annex-IV: Rate Analysis and Estimate**

# **RATE ANALYSIS**

**Government of Nepal**  
**Water and Energy Commission Secretariat**  
**Singhdurbar Kathmandu**

**Project: Study on Identification and Development of Hot Water Spring Sources in Nepal**

**Site: Annapurna Rural Municipality-2, Myagdi, Bhurung**

**Material Rate(Myagdi district rate 2080/81)**

S.No.	Description	District			Remarks
		Unit	Rate	Rate with Vat(Material)	
<b>A. APPROVED LABOUR RATE</b>					
1	Skilled (carpenter, mason)	m.d.	1140.00	1140.00	Myagdi DR
2	Unskilled	m.d.	880.00	880.00	Myagdi DR
3	Plumber	m.d.	1140.00	1140.00	Myagdi DR
4	" helper	m.d.	780.00	780.00	Myagdi DR
5	Electrician	m.d.	1140.00	1140.00	Myagdi DR
6	" helper	m.d.	780.00	780.00	Myagdi DR
<b>B. GENERAL CONS.MATERIAL</b>					
1	Excavator(1 nos)	1 hr	1800	1800.00	
2	Bricks 1st class	no.	19.00	19.00	Myagdi DR
3	" Machine made (Chinese)	no.	21.00	21.00	Myagdi DR
4	Blockstone/ Bond stone	cu.m.	1400.00	1400.00	Myagdi DR
5	Boulder stone	cu.m.	1070.00	1070.00	Myagdi DR
6	Gravel of river	cu.m.	1150.00	1150.00	Myagdi DR
7	(Chips agg.) of 10 mm	cu.m.	3600.00	3600.00	Myagdi DR
8	River agg. Average 10-40 mm	cu.m.	1966.67	1966.67	Myagdi DR
9	Crushed or broken agg.for RCC 5-10, 10-20, 20-50 mm	cu.m.	2110.00	2110.00	Myagdi DR
10	Crushed or broken agg.for RCC 10-40 mm	cu.m.	2110.00	2110.00	Myagdi DR
11	Sand (Coarse & fine)	cu.m.	2100.00	2100.00	Myagdi DR
12	Soil for mud mortar	cu.m.	310.00	310.00	Myagdi DR
13	Soil for earth filling	cu.m.	105.00	105.00	Myagdi DR
14	Sal wood	cu.m.	220000.00	220000.00	Myagdi DR
15	Sisamwood	cu.m.	64979.09	64979.09	
16	Other Ku kath (local wood)	cu.m.	34100.00	34100.00	Myagdi DR
17	Cement NS Nepali PPC(50 kg)	Bag	640.00	640.00	Myagdi DR
18	Cement NS Nepali OPC (50 kg)	Bag	740.00	740.00	Myagdi DR
19	Water Proofing Compound	Kg	65.00	65.00	Myagdi DR
20	Cement white ( 50 kg)	Kg	36.00	36.00	Myagdi DR
21	Ropes - Nylon	Kg	270.00	270.00	Myagdi DR
22	- Coconut	Kg	80.00	80.00	Myagdi DR
23	Bamboo 20' long	no	310.00	310.00	Myagdi DR
24	Jute ( hemp )	kg	85.00	85.00	Myagdi DR
25	Fire wood (a) Kukath	kg	10.00	10.00	Myagdi DR
26	cement Concrete tile 25 mm	sqm	664	664.00	Kathmandu DR
27	Flag stone 32.5mm	sqm	1291.01	1291.01	Myagdi DR
28	Fuel	Lit	170.00	170.00	NOC
29	Elstrometric water profing all work complete	sqm	643.45	643.45	Kathmandu DR
<b>C. IRON / GLASS / HARDWARE</b>					
1	Tor-Steel rod avg.	kg	95.00	95.00	Ktm DR
2	T.M.T. Rod Avg	kg	100.75	100.75	Myagdi DR
3	Binding wire	kg	130.00	130.00	Myagdi DR

S.No.	Description	District			Remarks
		Unit	Rate	Rate with Vat(Material)	
4	Barbed wire 12 guage	kg	120.00	120.00	Myagdi DR
5	Hinges heavy - 3"	no.	19.00	19.00	Myagdi DR
6	" - 4" NS	no.	23.00	23.00	Myagdi DR
7	" - 6"	no.	40.00	40.00	Myagdi DR
8	Bolts - Aluminium	no.	20.00	20.00	Myagdi DR
9	" - G.I.	no.	20.00	20.00	
10	Holdfast	kg	100.00	100.00	Myagdi DR
11	Mortise lock steel	no	520.00	520.00	Myagdi DR
12	Handle aluminium	no	55.00	55.00	Myagdi DR
13	Handle Iron	no	35.00	35.00	Myagdi DR
14	Door spring 6"	no	130.00	130.00	Myagdi DR
15	Handle lock small	no	155.00	155.00	Myagdi DR
16	Handle lock large (Aldrop 10" long)	no	135.00	135.00	Myagdi DR
17	Mortice Lock (a) Bronze	no	680.00	680.00	Myagdi DR
18	(b) Steel	no	680.00	680.00	Myagdi DR
19	Nails ½" to 4"/Screws	kg	130.00	130.00	
20	Wirenail	kg	860.00	860.00	
21	Mosquito proof wiremesh	sqm	143.00	143.00	Myagdi DR
22	Expanded metal wiremesh 4 feet wide	sqm	198.00	198.00	Myagdi DR
23	" " " 3 feet wide	sqm	165.00	165.00	
24	½"Listi of wood	R.ft.	3.66	3.66	Myagdi DR
25	1" " "	R.ft.	4.57	4.57	Myagdi DR
26	Glass - 4mm	Sq.ft	84.00	84.00	Myagdi DR
27	" - 5mm	Sq.ft	92.00	92.00	Myagdi DR
28	CGI sheet (a)24 medium(0.5mm)	Bndle	10600.00	10600.00	Myagdi DR
29	(b) 26medium(0.38mm)	Bndle	9240.00	9240.00	Myagdi DR
30	(c) 26 medium colour(0.38mm)	Bndle	12870.00	12870.00	Myagdi DR
31	0.5mm coloured plane sheet	Mtr	840.00	840.00	Myagdi DR
32	Sky light sheet (pepsi glass)	Sq ft	120.00	120.00	Kathmandu DR
33	J or U hook	kg	150.00	150.00	Myagdi DR
34	Bitumen Washer	pack	40.00	40.00	Myagdi DR
35	Nut & Bolt	kg	297.00	297.00	Myagdi DR
36	Plywood - 4 mm	sqm	236.68	236.68	Myagdi DR
37	" - 6 mm	sqm	322.75	322.75	Myagdi DR
38	" - 9 mm	sqm	473.37	473.37	Myagdi DR
39	" - 12 mm	sqm	408.82	408.82	Myagdi DR
40	" - 4 mm teak	sqm	763.85	763.85	Myagdi DR
41	Gabion wire Medium zinc coated				
42	12 guage comercial	kg	119.00	119.00	Myagdi DR
43	10 guage comercial	kg	118.00	118.00	Myagdi DR
44	8 guage comercial	kg	118.00	118.00	Myagdi DR
45	MS Black pipe	kg	93.00	93.00	Kathmandu DR
46	MS Grill Work with red oxide paint	kg	154.00	154.00	Kathmandu DR
47	16 Gauge MS metal Gate with fixing	sqm	8912.52	8912.52	
48	38 mm thick steel pipe	Rm	367.00	367.00	Kathmandu DR
49	25 mm thick steel pipe	Rm	288.00	288.00	Kathmandu DR

S.No.	Description	District			Remarks
		Unit	Rate	Rate with Vat(Material)	
50	Bracket	pc	81.54	81.54	Kathmandu DR
51	Kazzaria, Simany or equivalent tile	sqm	1721.34	1721.34	Market rate
52	clay tile	pc	34.00	34.00	Kathmandu DR
	<b>D.PAINTING MATERIALS</b>				
1	Lime	Bag	1400.00	1400.00	Myagdi DR
2	White putty	Kg	65.00	65.00	Myagdi DR
3	Snowcem (cem. paint)	kg	106.00	106.00	Myagdi DR
4	Gum	kg	375.00	375.00	Myagdi DR
5	Enamel paint	litre	487.00	487.00	Myagdi DR
6	Aluminium paint	litre	525.00	525.00	Myagdi DR
7	Tarpentine	litre	143.00	143.00	Myagdi DR
8	Varnish (a) General	litre	456.00	456.00	Myagdi DR
9	Primer (a) Wood	litre	350.00	350.00	Myagdi DR
10	(b) Metal	litre	330.00	330.00	
11	( C ) Cement	litre	280.00	280.00	
12	Thinner T101	litre	220.00	220.00	Myagdi DR
13	Distemper	kg	293.00	293.00	Myagdi DR
14	Sand paper iron	Mtr	30.00	30.00	Kathmandu DR
15	" general	PC	6.00	6.00	Kathmandu DR
16	Plastic emulsion paint ( Interior )	litre	787.00	787.00	Myagdi DR
17	Exterior Wether Coat paint	litre	652.00	652.00	Kathmandu DR
18	Bitumen paint	litre	231.00	231.00	Myagdi DR
19	Painting brush	Inch	71.75	71.75	Myagdi DR
20	Road marking paint	Ltr	599.00	599.00	Kathmandu DR

Government of Nepal  
Water and Energy Commission Secretariat  
Singhadarbar Kathmandu

Project: Study on Identification and Development of Hot Water Spring Sources in Nepal  
Site: Annapurna Rural Municipality-2, Myagdi, Bhurung

**Transportation Cost**

S.No.	Description	District		Norms		Source	Lead from market/Source (km)			Transportation Cost			Site Rate	Remarks	
		Unit	Rate	Unit	Rate		Metalled	Earthen	Manual	Metalled	Earthen	Manual			
							From Source	Km.	m.						Load/ unload
<b>A. APPROVED LABOUR RATE</b>															
1	Skilled (carpenter, mason)	m.d.	1140.00	m.d.	1140.00	Myagdi DR								1140.00	
2	Unskilled	m.d.	880.00	"	880.00	Myagdi DR								880.00	
3	Plumber	m.d.	1140.00	"	1140.00	Myagdi DR								1140.00	
4	" helper	m.d.	780.00	"	780.00	Myagdi DR								780.00	
5	Electrician	m.d.	1140.00	"	1140.00	Myagdi DR								1140.00	
6	" helper	m.d.	780.00	"	780.00	Myagdi DR								780.00	
<b>B) Vehicle Transportation</b>															
<b>By vehicle</b>															
For> 50 Km Transportation															
				unit	Easy goods	Difficult goods									
				KG/km	0.032	0.043									
				KG/km	0.052	0.050									
For<50 Km Transportation															
				KG/km	0.032	0.043									
				KG/km	0.052	0.050									
<b>Loading Unloading</b>															
				KG	0.2	0.30									
				unit per	Easy goods	Difficult goods									
				per Kg/km	1.25	1.56									
<b>By portar</b>															
<b>C) Machine analysis</b>															
		Source	Destination	Roadtype	Price/hr										
		Kathmandu	Sukute	Metalled	2700.00	36720.00									
		Sukute	Site	Earten	1800.00	15000.00									
		Site	Kathmandu			51720.00									
<b>D. GENERAL CONS.MATERIAL</b>															
2	Bricks 1st class	no.	19.00	no	19.00	Beni	3.00	18.60	0.00	0.24	2.42	0.0000	0.5000	22.16	
3	" Machine made (Chinese)	no.	21.00	no	21.00	Beni	3.00	18.60	0.00	0.24	2.42	0.0000	0.5000	24.16	
4	Blockstone/ Bond stone	cu.m.	1400.00	cu.m.	1400.00	Local	0.00	10.00	0.00	0.00	560.00	0.0000	350.0000	2310.00	
5	Boulder stone	cu.m.	1070.00	cu.m.	1070.00	Local	0.00	10.00	0.00	0.00	560.00	0.0000	350.0000	1980.00	
6	Gravel of river	cu.m.	1150.00	cu.m.	1150.00	Beni	3.00	18.60	0.00	168.00	1041.60	0.0000	350.0000	2709.60	
7	(Chips agg.) of 10 mm	cu.m.	3600.00	cu.m.	3600.00	Beni	3.00	18.60	0.00	168.00	1041.60	0.0000	350.0000	5159.60	
8	River agg. Average 10-40 mm	cu.m.	1966.67	cu.m.	1966.67	Beni	3.00	18.60	0.00	168.00	1041.60	0.0000	350.0000	3526.27	
9	Crushed or brocken agg.for RCC 5-10, 10-20, 20-50 mm	cu.m.	2110.00	cu.m.	2110.00	Beni	3.00	18.60	0.00	168.00	1041.60	0.0000	350.0000	3669.60	
10	Crushed or brocken agg.for RCC 10-40 mm	cu.m.	2110.00	cu.m.	2110.00	Beni	3.00	18.60	0.00	168.00	1041.60	0.0000	350.0000	3669.60	
11	Sand (Coarse & fine)	cu.m.	2100.00	cu.m.	2100.00	Beni	3.00	18.60	0.00	147.84	916.61	0.0000	308.0000	3472.45	
12	Soil for mud mortar	cu.m.	310.00	cu.m.	310.00	Local	0.00	1.00	0.00	0.00	595.40	0.0000	290.0000	1195.40	
13	Soil for earth filling	cu.m.	105.00	cu.m.	105.00	Local	0.00	1.00	0.00	0.00	595.40	0.0000	290.0000	990.40	

S.No.	Description	District		Norms		Source	Lead from market/Source (km )			Transportation Cost			Site Rate	Remarks	
		Unit	Rate	Unit	Rate		Metalled	Earthen	Manual	Metalled	Earthen	Manual			
							From Source	Km.	m.						Load/ unload
14	Sal wood	cu.m.	220000.00	cu.m.	220000.00	Beni	3.00	18.60	0.00	95.04	957.53	0.0000	198.0000	221250.57	
15	Sisamwood	cu.m.	64979.09	cu.m.	64979.09	Beni	3.00	18.60	0.00	95.04	957.53	0.0000	198.0000	66229.66	
16	Other Ku kath (local wood)	cu.m.	34100.00	cu.m.	34100.00	Beni	3.00	18.60	0.00	95.04	957.53	0.0000	198.0000	35350.57	
17	Cement NS Nepali PPC(50 kg)	Bag	640.00	mt	12800.00	Beni	3.00	18.60	0.00	96.00	967.20	0.0000	200.0000	14063.20	
18	Cement NS Nepali OPC (50 kg)	Bag	740.00	mt	14800.00	Beni	3.00	18.60	0.00	96.00	967.20	0.0000	200.0000	16063.20	
19	Water Proofing Compound	Kg	65.00	Kg	65.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.2000	66.26	
20	Cement white ( 50 kg)	Kg	36.00	Kg	36.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.2000	37.26	
21	Ropes - Nylon	Kg	270.00	Kg	270.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	271.06	
22	- Coconut	Kg	80.00	Kg	80.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	81.06	
23	Bamboo 20' long	no	310.00	no	310.00	Beni	3.00	18.60	0.00	0.96	9.67	0.0000	0.0000	320.63	
24	Jute ( hemp )	kg	85.00	kg	85.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	86.06	
25	Fire wood (a) Kukath	kg	10.00	kg	10.00	local	0.00	0.50	0.00	0.00	0.16	0.0000	0.0000	10.16	
26	cement Concrete tile 25 mm	sqm	664.00	sqm	664.00	Kathmandu	224.40	18.60	0.00	35.90	4.84	0.0000	1.0000	705.74	5kg/nc
27	Flag stone 32.5mm	sqm	1291.01	sqm	1291.01	Beni	3.00	18.60	0.00	4.13	41.59	0.0000	8.6000	1345.33	43KG/SQM
28	Fuel	Lit	170.00	Lit	170.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	171.06	
29	Elstrometric water profing all work complete	sqm	643.45	sqm	643.45	Kathmandu	224.40	18.60	0.00	12.85	1.73	0.0000	0.0000	658.03	1.79 kg/sqm
	<b>D. IRON / GLASS / HARDWARE</b>														
1	Tor-Steel rod avg.	kg	95.00	mt	95000.00	Beni	3.00	18.60	0.00	129.00	930.00	0.0000	300.0000	96359.00	
2	T.M.T. Rod Avg	kg	100.75	mt	100750.00	Beni	3.00	18.60	0.00	129.00	930.00	0.0000	300.0000	102109.00	
3	Binding wire	kg	130.00	kg	130.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.2000	131.26	
4	Barbed wire 12 guage	kg	120.00	rm	15.00	Beni	3.00	18.60	0.00	1.03	7.44	0.0000	1.6000	25.07	
5	Hinges heavy - 3"	no.	19.00	no	19.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	19.11	
6	" - 4" NS	no.	23.00	no	23.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	23.11	
7	" - 6"	no.	40.00	no	40.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	40.11	
8	Bolts - Aluminium	no.	20.00	no	20.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	20.11	
9	" - G.I.	no.	20.00	no	20.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	20.11	
10	Holdfast	kg	100.00	no	14.29	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	14.39	7 pc/kg
11	Mortise lock steel	no	520.00	no	520.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	520.11	
12	Handle aluminium	no	55.00	no	55.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	55.11	
13	Handle Iron	no	35.00	no	35.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	35.11	
14	Door spring 6"	no	130.00	no	130.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	130.11	
15	Handle lock small	no	155.00	no	155.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	155.11	
16	Handle lock large (Aldrop 10" long)	no	135.00	no	135.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	135.11	
17	Mortice Lock (a) Bronze	no	680.00	no	680.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	680.11	
18	(b) Steel	no	680.00	no	680.00	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	680.11	
19	Nails ½" to 4"/Screws	kg	130.00	no	1.30	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	1.41	
20	Wirenail	kg	860.00	no	8.60	Beni	3.00	18.60	0.00	0.01	0.10	0.0000	0.0000	8.71	
21	Mosquito proof wiremesh	sqm	143.00	sqm	143.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.2000	144.26	
22	Expanded metal wiremesh 4 feet wide	sqm	198.00	sqm	198.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.2000	199.26	
23	" " " 3 feet wide	sqm	165.00	sqm	165.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.2000	166.26	
24	½" Listi of wood	R.ft.	3.66	R.ft.	3.66	Beni	3.00	18.60	0.00	0.04	0.44	0.0000	0.0000	4.14	
25	1" " "	R.ft.	4.57	R.ft.	4.57	Beni	3.00	18.60	0.00	0.04	0.44	0.0000	0.0000	5.05	

S.No.	Description	District		Norms		Source	Lead from market/Source (km )			Transportation Cost			Site Rate	Remarks	
		Unit	Rate	Unit	Rate		Metalled	Earthen	Manual	Metalled	Earthen	Manual			
							From Source	Km.	m.						Load/ unload
26	Glass - 4mm	Sq.ft	84.00	sqm	903.84	Beni	3.00	18.60	0.00	1.29	9.30	0.0000	3.0000	917.43	
27	" - 5mm	Sq.ft	92.00	sqm	989.92	Beni	3.00	18.60	0.00	1.29	9.30	0.0000	3.0000	1003.51	
28	CGI sheet (a)24 medium(0.5mm)	Bndle	10600.00	sqm	633.21	Beni	3.00	18.60	0.00	0.52	3.72	0.0000	0.0120	637.46	
29	(b) 26medium(0.38mm)	Bndle	9240.00	sqm	551.97	Beni	3.00	18.60	0.00	0.52	3.72	0.0000	0.0120	556.22	
30	(c) 26 medium colour(0.38mm)	Bndle	12870.00	sqm	768.82	Beni	3.00	18.60	0.00	0.52	3.72	0.0000	0.0120	773.07	
31	0.5mm coloured plane sheet	Mtr	840.00	Rm	233.33	Beni	3.00	18.60	0.00	0.26	1.86	0.0000	0.0060	235.46	
32	Sky light sheet (pepsi glass)	Sq ft	120.00	Sq.m	1291.20	Kathmandu	224.40	18.60	0.00	19.30	1.86	0.0000	0.0040	1312.36	
33	J or U hook	kg	150.00	no	21.43	Beni	3.00	18.60	0.00	0.01	0.13	0.0000	0.0000	21.57	7 pc/kg
34	Bitumen Washer	pack	40.00	no	2.67	Beni	3.00	18.60	0.00	0.01	0.13	0.0000	0.0000	2.80	
35	Nut & Bolt	kg	297.00	No	19.80	Beni	3.00	18.60	0.00	0.01	0.06	0.0000	0.0000	19.86	15pc/kg
36	Plywood - 4 mm	sqm	236.68	sqm	236.68	Beni	3.00	18.60	0.00	0.96	9.67	0.0000	2.0000	249.32	
37	" - 6 mm	sqm	322.75	sqm	322.75	Beni	3.00	18.60	0.00	0.96	9.67	0.0000	2.0000	335.38	
38	" - 9 mm	sqm	473.37	sqm	473.37	Beni	3.00	18.60	0.00	0.96	9.67	0.0000	2.0000	486.00	
39	" - 12 mm	sqm	408.82	sqm	408.82	Beni	3.00	18.60	0.00	0.96	9.67	0.0000	2.0000	421.45	
40	" - 4 mm teak	sqm	763.85	sqm	763.85	Beni	3.00	18.60	0.00	0.96	9.67	0.0000	2.0000	776.48	
41	Gabion wire Medium zinc coated					Beni	3.00	18.60							
42	12 guage comercial	kg	119.00	KG	119.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.2000	120.26	
43	10 guage comercial	kg	118.00	KG	118.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.2000	119.26	
44	8 guage comercial	kg	118.00	KG	118.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.2000	119.26	
45	MS Black pipe	kg	93.00	KG	93.00	Kathmandu	224.40	18.60	0.00	7.18	0.97	0.0000	0.2000	101.35	
46	MS Grill Work with red oxide paint	kg	154.00	KG	154.00	Kathmandu	224.40	18.60	0.00	7.18	0.97	0.0000	0.2000	162.35	
47	16 Gauge MS metal Gate with fixing	sqm	8912.52	Sqm	8912.52	Beni	3.00	18.60	0.00	0.96	9.67	0.0000	2.0000	8925.15	10 kg/sqm
48	38 mm thick steel pipe	Rm	367.00	Rm	367.00	Kathmandu	224.40	18.60	0.00	11.85	1.60	0.0000	0.3300	380.77	1.65 kg/m
49	25 mm thick steel pipe	Rm	288.00	Rm	288.00	Kathmandu	224.40	18.60	0.00	11.85	1.60	0.0000	0.3300	301.77	1.65 kg/m
50	Bracket	pc	81.54	pc	81.54	Kathmandu	224.40	18.60	0.00	1.44	0.19	0.0000	0.0400	83.21	
51	Kazzaria, Simany or equivalent tile	sqm	1721.34	sqm	1721.34	Kathmandu	224.40	18.60	0.00	287.23	38.69	0.0000	8.0000	2055.26	40 kg/sqm
52	clay tile	pc	34.00	pc	34.00	Kathmandu	224.40	18.60	0.00	8.26	1.11	0.0000	0.2300	43.60	1.15 kg/nos
<b>E.PAINTING MATERIALS</b>															
1	Lime	Bag	1400.00	kg	35.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	36.06	
2	White putty	Kg	65.00	kg	65.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	66.06	
3	Snowcem (cem. paint)	kg	106.00	kg	106.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	107.06	
4	Gum	kg	375.00	kg	375.00	Kathmandu	224.40	18.60	0.00	7.18	0.97	0.0000	0.0000	383.15	
5	Enamel paint	litre	487.00	ltr	487.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	488.06	
6	Aluminium paint	litre	525.00	ltr	525.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	526.06	
7	Tarpentine	litre	143.00	ltr	143.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	144.06	
8	Varnish (a) General	litre	456.00	ltr	456.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	457.06	
9	Primer (a) Wood	litre	350.00	ltr	350.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	351.06	
10	(b) Metal	litre	330.00	ltr	330.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	331.06	
11	( C ) Cement	litre	280.00	ltr	280.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	281.06	
12	Thinner T101	litre	220.00	ltr	220.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	221.06	
13	Distemper	kg	293.00	kg	293.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	294.06	

S.No.	Description	District		Norms		Source	Lead from market/Source (km)			Transportation Cost			Site Rate	Remarks	
		Unit	Rate	Unit	Rate		Metalled	Earthen	Manual	Metalled	Earthen	Manual			
							From Source	Km.	m.						Load/ unload
14	Sand paper iron	Mtr	30.00	Mtr	30.00	Kathmandu	224.40	18.60	0.00	1.00	0.10	0.0000	0.0000	31.10	
15	" general	PC	6.00	PC	6.00	Kathmandu	224.40	18.60	0.00	0.72	0.10	0.0000	0.0000	6.81	
16	Plastic emulsion paint ( Interior )	litre	787.00	litre	787.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	788.06	
17	Exterior Wether Coat paint	litre	652.00	litre	652.00	Beni	3.00	18.60	0.00	0.10	0.97	0.0000	0.0000	653.06	
18	Bitumen paint	litre	231.00	litre	231.00	Kathmandu	224.40	18.60	0.00	7.18	0.97	0.0000	0.0000	239.15	
19	Painting brush	Inch	71.75	Inch	71.75	Beni	3.00	18.60	0.00	0.00	0.01	0.0000	0.0000	71.76	
20	Road marking paint	Ltr	599.00	Ltr	599.00	Kathmandu	224.40	18.60	0.10	7.18	0.97	0.1250	0.0000	607.27	

**Government of Nepal**  
**Water and Energy Commission Secretariat**  
**Singhadarbar Kathmandu**

**Project: Study on Identification and Development of Hot Water Spring Sources in Nepal**

**Site: Annapurna Rural Municipality-2, Myagdi, Bhurung**

**Summary of Rates at site**

S.No.	Description	District		Site Rate		Source
		Unit	Rate	Unit	Rate	
<b>A. APPROVED LABOUR RATE</b>						
1	Skilled (carpenter, mason)	m.d.	1140.00	m.d.	1140.00	
2	Unskilled	m.d.	880.00	"	880.00	
3	Plumber	m.d.	1140.00	"	1140.00	
4	" helper	m.d.	780.00	"	780.00	
5	Electrician	m.d.	1140.00	"	1140.00	
6	" helper	m.d.	780.00	"	780.00	
<b>B. GENERAL CONS.MATERIAL</b>						
1	Excavator(1 nos)	hr	1800.00	hr	1800.00	Kathmandu
2	Bricks 1st class	no.	19.00	no	22.16	Beni
3	" Machine made (Chinese)	no.	21.00	no	24.16	Beni
4	Blockstone/ Bond stone	cu.m.	1400.00	cu.m.	2310.00	Local
5	Boulder stone	cu.m.	1070.00	cu.m.	1980.00	Local
6	Gravel of river	cu.m.	1150.00	cu.m.	2709.60	Beni
7	(Chips agg.) of 10 mm	cu.m.	3600.00	cu.m.	5159.60	Beni
8	River agg. Average 10-40 mm	cu.m.	1966.67	cu.m.	3526.27	Beni
9	Crushed or brocken agg.for RCC 5-10, 10-20, 20-50	cu.m.	2110.00	cu.m.	3669.60	Beni
10	Crushed or brocken agg.for RCC 10-40 mm	cu.m.	2110.00	cu.m.	3669.60	Beni
11	Sand (Coarse & fine)	cu.m.	2100.00	cu.m.	3472.45	Beni
12	Soil for mud mortar	cu.m.	310.00	cu.m.	1195.40	Local
13	Soil for earth filling	cu.m.	105.00	cu.m.	990.40	Local
14	Sal wood	cu.m.	220000.00	cu.m.	221250.57	Beni
15	Sisamwood	cu.m.	64979.09	cu.m.	66229.66	Beni
16	Other Ku kath (local wood)	cu.m.	34100.00	cu.m.	35350.57	Beni
17	Cement NS Nepali PPC(50 kg)	Bag	640.00	mt	14063.20	Beni
18	Cement NS Nepali OPC (50 kg)	Bag	740.00	mt	16063.20	Beni
19	Water Proofing Compound	Kg	65.00	Kg	66.26	Beni
20	Cement white ( 50 kg)	Kg	36.00	Kg	37.26	Beni
21	Ropes - Nylon	Kg	270.00	Kg	271.06	Beni
22	- Coconut	Kg	80.00	Kg	81.06	Beni
23	Bamboo 20' long	no	310.00	no	320.63	Beni
24	Jute ( hemp )	kg	85.00	kg	86.06	Beni
25	Fire wood (a) Kukath	kg	10.00	kg	10.16	local
26	cement Concrete tile 25 mm	sqm	664.00	sqm	705.74	Kathhmandu
27	Flag stone 32.5mm	sqm	1291.01	sqm	1345.33	Beni
28	Fuel	Lit	170.00	Lit	171.06	Beni
29	Elstrometric water profing all work complete	sqm	643.45	sqm	658.03	Kathmandu
<b>C. IRON / GLASS / HARDWARE</b>						
1	Tor-Steel rod avg.	kg	95.00	mt	96359.00	Beni
2	T.M.T. Rod Avg	kg	100.75	mt	102109.00	Beni
3	Binding wire	kg	130.00	kg	131.26	Beni

S.No.	Description	District		Site Rate		Source
		Unit	Rate	Unit	Rate	
4	Barbed wire 12 guage	kg	120.00	rm	25.07	Beni
5	Hinges heavy - 3"	no.	19.00	no	19.11	Beni
6	" - 4" NS	no.	23.00	no	23.11	Beni
7	" - 6"	no.	40.00	no	40.11	Beni
8	Bolts - Aluminium	no.	20.00	no	20.11	Beni
9	" - G.I.	no.	20.00	no	20.11	Beni
10	Holdfast	kg	100.00	no	14.39	Beni
11	Mortise lock steel	no	520.00	no	520.11	Beni
12	Handle aluminium	no	55.00	no	55.11	Beni
13	Handle Iron	no	35.00	no	35.11	Beni
14	Door spring 6"	no	130.00	no	130.11	Beni
15	Handle lock small	no	155.00	no	155.11	Beni
16	Handle lock large (Aldrop 10" long)	no	135.00	no	135.11	Beni
17	Mortice Lock (a) Bronze	no	680.00	no	680.11	Beni
18	(b) Steel	no	680.00	no	680.11	Beni
19	Nails ½" to 4"/Screws	kg	130.00	no	1.41	Beni
20	Wirenail	kg	860.00	no	8.71	Beni
21	Mosquito proof wiremesh	sqm	143.00	sqm	144.26	Beni
22	Expanded metal wiremesh 4 feet wide	sqm	198.00	sqm	199.26	Beni
23	" " " 3 feet wide	sqm	165.00	sqm	166.26	Beni
24	½"Listi of wood	R.ft.	3.66	R.ft.	4.14	Beni
25	1" " "	R.ft.	4.57	R.ft.	5.05	Beni
26	Glass - 4mm	Sq.ft	84.00	sqm	917.43	Beni
27	" - 5mm	Sq.ft	92.00	sqm	1003.51	Beni
28	CGI sheet (a)24 medium(0.5mm)	Bndle	10600.00	sqm	637.46	Beni
29	(b) 26medium(0.38mm)	Bndle	9240.00	sqm	556.22	Beni
30	(c) 26 medium colour(0.38mm)	Bndle	12870.00	sqm	773.07	Beni
31	0.5mm coloured plane sheet	Mtr	840.00	Rm	235.46	Beni
32	Sky light sheet (pepsi glass)	Sq ft	120.00	Sq.m	1312.36	Kathmandu
33	J or U hook	kg	150.00	no	21.57	Beni
34	Bitumen Washer	pack	40.00	no	2.80	Beni
35	Nut & Bolt	kg	297.00	No	19.86	Beni
36	Plywood - 4 mm	sqm	236.68	sqm	249.32	Beni
37	" - 6 mm	sqm	322.75	sqm	335.38	Beni
38	" - 9 mm	sqm	473.37	sqm	486.00	Beni
39	" - 12 mm	sqm	408.82	sqm	421.45	Beni
40	" - 4 mm teak	sqm	763.85	sqm	776.48	Beni
41	Gabion wire Medium zinc coated					
42	12 guage comercial	kg	119.00	KG	120.26	Beni
43	10 guage comercial	kg	118.00	KG	119.26	Beni
44	8 guage comercial	kg	118.00	KG	119.26	Beni
45	MS Black pipe	kg	93.00	KG	101.35	Kathmandu
46	MS Grill Work with red oxide paint	kg	154.00	KG	162.35	Kathmandu
47	16 Gauge MS metal Gate with fixing	sqm	8912.52	Sqm	8925.15	Beni
48	38 mm thick steel pipe	Rm	367.00	Rm	380.77	Kathmandu
49	25 mm thick steel pipe	Rm	288.00	Rm	301.77	Kathmandu
50	Bracket	pc	81.54	pc	83.21	Kathmandu

S.No.	Description	District		Site Rate		Source
		Unit	Rate	Unit	Rate	
51	Kazzaria, Simany or equivalent tile	sqm	1721.34	sqm	2055.26	Kathmandu
52	clay tile	pc	34.00	pc	43.60	Kathmandu
	<b>D.PAINTING MATERIALS</b>					
1	Lime	Bag	1400.00	kg	36.06	Beni
2	White putty	Kg	65.00	kg	66.06	Beni
3	Snowcem (cem. paint)	kg	106.00	kg	107.06	Beni
4	Gum	kg	375.00	kg	383.15	Kathmandu
5	Enamel paint	litre	487.00	ltr	488.06	Beni
6	Aluminium paint	litre	525.00	ltr	526.06	Beni
7	Tarpentine	litre	143.00	ltr	144.06	Beni
8	Varnish (a) General	litre	456.00	ltr	457.06	Beni
9	Primer (a) Wood	litre	350.00	ltr	351.06	Beni
10	(b) Metal	litre	330.00	ltr	331.06	Beni
11	( C ) Cement	litre	280.00	ltr	281.06	Beni
12	Thinner T101	litre	220.00	ltr	221.06	Beni
13	Distemper	kg	293.00	kg	294.06	Beni
14	Sand paper iron	Mtr	30.00	Mtr	31.10	Kathmandu
15	" general	PC	6.00	PC	6.81	Kathmandu
16	Plastic emulsion paint ( Interior )	litre	787.00	litre	788.06	Beni
17	Exterior Wether Coat paint	litre	652.00	litre	653.06	Beni
18	Bitumen paint	litre	231.00	litre	239.15	Kathmandu
19	Painting brush	Inch	71.75	Inch	71.76	Beni
20	Road marking paint	Ltr	599.00	Ltr	607.27	Kathmandu

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount	
<b>1. EARTHWORK</b>						
Excavation of soft clay & silty soils including disposal upto 10m lead including disposal upto 10m lead and 1.5m lift	Unskilled	m.d.	0.70	880.00	616.00	
	Equipment					
	3%of labour				18.48	
	<b>Item No. 1.1</b>	Sub-Total			634.48	
Norms - 2(1) page 5	including@15% overhead		cu.m.		729.65	
<b>E/W in excav. in soft soil .</b>			<b>material vat @ 13 %</b>		<b>2.40</b>	
Excavation of hard clay and soils mixed with soft moorum stones (upto 30mm size) including disposal upto 10m lead and 1.5m lift	Unskilled	m.d.	0.80	880.00	704.00	
	Equipment					
	3%of labour				21.12	
	<b>Item No. 1.2</b>	Sub-Total			725.12	
Norms - 2(2) page 5	including@15% overhead		cu.m.		833.89	
<b>E/W in excav. in B.M.Soil</b>			<b>material vat @ 13 %</b>		<b>2.75</b>	
Excavation of soft soil, disposal upto 10m lead and 1.5m lift	Unskilled	m.d.	1.00	880.00	880.00	
	Equipment					
	3%of labour				26.40	
	<b>Item No. 1.3</b>	Sub-Total			906.40	
Norms - 2(9) page 8	including@15% overhead		cu.m.		1042.36	
<b>E/W excav.in found.- soft soil</b>			<b>material vat @ 13 %</b>		<b>3.43</b>	
Excavation for foundation drain, pipe line etc.in boulder mixed soil, disposal (upto 10m lead and 1.5m lift)	Unskilled	m.d.	1.59	880.00	1399.20	
	Equipment					
	3%of labour				41.98	
	<b>Item No. 1.4</b>	Sub-Total			1441.18	
Norms - 2(14) page 9	including@15% overhead		cu.m.		1657.35	
<b>E/W in found. of drain pipe line B.M.Soil</b>			<b>material vat @ 13 %</b>		<b>5.46</b>	
excavation using hydraulic excavator) including disposal upto 10m and lift upto 1.5 m etc. , trimming bottom and side slopes in accordance with requirements of lines, grades and cross sections all complete as per specification.	Unskilled	m.d.	0.06	880.00	52.80	
	Equipment					
	Excavator	Hr	0.02	1800.00	30.60	
	Fuel	Lit	0.34	171.06	58.16	
	for lead upto 1 Km	Tipper	Hr	0.04	700.00	30.80
	Fuel	Lit	0.13	171.06	22.58	
	<b>Item No. 1.5</b>	Sub-Total			194.94	
	Norms - 2(1) page 5	including@15% overhead		cu.m.		224.18
<b>E/W in excav. in soft soil using excavator .</b>			<b>material vat @ 13 %</b>		<b>18.48</b>	
<b>2. EARTH FILLING</b>						
Filling with ordinary soil in 15 cm thick layer and hand compaction (haulage distance 10m) with sprinkling water	Unskilled	m.d.	0.50	880.00	440.00	
	Sub-Total				440.00	
<b>Item No. 2.1</b>						
Norms - 2(25a) page 15	including@15% overhead		cu.m.		506.00	
<b>Earth filling - compaction work with watering</b>			<b>material vat @ 13 %</b>		<b>0.00</b>	

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Filling with ordinary soil in 15 cm thick layer and hand compaction (haulage distance 10m) without water	Unskilled	m.d.	0.25	880.00	220.00
<b>Item No. 2.2</b>	Sub-Total				220.00
Norms - 2(25a) page 15	including@15% overhead				253.00
<b>Earth filling-compaction work without watering</b>				<b>material vat @ 13 %</b>	<b>0.00</b>

Filling with ordinary soil in 15 cm thick layer and hand compaction (haulage distance 10m) with sprinkling water Soil from outer place	Unskilled	m.d.	0.50	880.00	440.00
	soil	cu.m	1.20	990.40	1188.48
<b>Item No. 2.3</b>	Sub-Total				1628.48
Norms - 2(25a) page 15			<b>cu.m.</b>		1872.75
<b>Earth filling lead upto 2 km</b>				<b>material vat @ 13 %</b>	<b>0.00</b>

Filling with gravel mix soil in 15 cm thick layer and hand compaction (haulage distance 10m) with sprinkling water,soil from outer place	Unskilled	m.d.	0.50	880.00	440.00
	Gravel	cu.m	1.20	2709.60	3251.52
<b>Item No. 2.4</b>	Sub-Total				3691.52
Norms - 2(25a) page 15	including@15% overhead			<b>cu.m.</b>	4245.25
<b>Gravel filling with manual- compaction</b>				<b>material vat @ 13 %</b>	<b>422.70</b>

Filling by sand and hand compaction (haulage distance 10m) with sprinkling water	Unskilled	m.d.	0.70	880.00	616.00
	Sand	cu.m.	1.10	3472.45	3819.69
<b>Item No. 2.5</b>	Sub-Total				4435.69
Norms - 2(42) page 21	including@15% overhead			<b>cu.m.</b>	5101.05
<b>Sand Filling Works</b>				<b>material vat @ 13 %</b>	<b>496.56</b>

### 3. SITE CLEARENCE

Site Clearence	Unskilled	m.d.	0.04	880.00	35.20
Cutting thick vegetation, grubbing their roots and disposing them 25m from the construction site( dia <=30cm and density <15 nos. per 100m2)	Equipment				
	3%of labour				1.06
<b>Item No. 3.1</b>	Sub-Total				36.26
Norms - 1(1.3)	including@15% overhead			<b>sq.m.</b>	41.69
				<b>material vat @ 13 %</b>	<b>0.14</b>

Uprooting trees & disposal 15 far from the construction site (12 to 30) cm dia	Unskilled	m.d.	0.40	880.00	352.00
	Equipment				
	3%of labour				10.56
<b>Item No. 3.2</b>	Sub-Total				362.56
Norms - 2(2) page 5	including@15% overhead			<b>per nos</b>	416.94
				<b>material vat @ 13 %</b>	<b>1.37</b>

### 4. BRICK WORK

Chimney (bhatta) brick masonry works along with supplying bricks making	skilled	m.d.	1.50	1140.00	1710.00
	unskilled	m.d.	2.20	880.00	1936.00
cement sand mortar and construction of brick wall including haulage distance upto 30m	Brick	nos.	560.00	22.16	12408.48
	Cement	m.t.	0.13	16063.20	2088.22
	Sand	cu.m	0.27	3472.45	937.56
<b>a) 1:3</b>	Add.unskilled	m.d.	0.20	880.00	176.00
<b>Item No. 4.1</b>	Equipment	3%			5.28
	Sub-Total				19261.54
Norms - 5(1-b-1) page 31	including@15% overhead			<b>cu.m.</b>	22150.77
<b>B/W in c.m.1:3 in G. floor</b>				<b>material vat @ 13 %</b>	<b>2007.14</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Chimney (bhatta) brick masonry works	skilled	m.d.	1.50	1140.00	1710.00
along with supplying bricks making	unskilled	m.d.	2.20	880.00	1936.00
cement sand mortar and construction	Brick	nos.	560.00	22.16	12408.48
of brick wall including haulage distance	Cement	m.t.	0.10	16063.20	1606.32
upto 30m	Sand	cu.m	0.28	3472.45	972.29
a) 1:4	Add.unkill	m.d.	0.20	880.00	176.00
	Equipmen.	3%			5.28
<b>Item No. 4.2</b>	Sub-Total				18814.37
Norms - 5(1b2) page 32	including@15% overhead		<b>cu.m.</b>		21636.52
<b>B/W in c.m.1:4 in G.floor</b>				<b>material vat @ 13 %</b>	<b>1949.01</b>
Chimney (bhatta) brick masonry works	skilled	m.d.	1.50	1140.00	1710.00
along with supplying bricks making	unskilled	m.d.	2.20	880.00	1936.00
cement sand mortar and construction	Brick	nos.	560.00	22.16	12408.48
of brick wall including haulage distance	Cement	m.t.	0.07	16063.20	1124.42
upto 30m	Sand	cu.m	0.30	3472.45	1041.73
a) 1:6	Add.unkill	m.d.	0.20	880.00	176.00
	Equipmen.	3%			5.28
<b>Item No.4.3</b>	Sub-Total				18401.92
Norms - 5(1b3) page 32	including@15% overhead		<b>cu.m.</b>		21162.21
<b>B/W in c.m. 1:6 in G. floor</b>				<b>material vat @ 13 %</b>	<b>1895.39</b>
Chimney (bhatta) brick masonry works	skilled	m.d.	1.00	1140.00	1140.00
along with supplying bricks making	unskilled	m.d.	1.70	880.00	1496.00
mud mortar and construction of brick	Brick	nos.	560.00	22.16	12408.48
wall including haulage distance upto	mud	cu.m	0.42	1195.40	502.07
30m	Add.unkill	m.d.	0.20	880.00	176.00
a) mud mortar	Equipmen.	3%			5.28
<b>Item No. 4.4</b>	Sub-Total				15727.83
Norms - 5(1-b-6) page 32	including@15% overhead		<b>cu.m.</b>		18087.00
<b>B/W in mud mortar in G. floor</b>				<b>material vat @ 13 %</b>	<b>1679.06</b>
Chimney (bhatta) brick masonry works	skilled	m.d.	1.50	1140.00	1710.00
along with supplying bricks making	unskilled	m.d.	2.20	880.00	1936.00
cement sand mortar and construction	Brick	nos.	560.00	22.16	12408.48
of brick wall including haulage distance	Cement	m.t.	0.10	16063.20	1606.32
upto 30m (First floor)	Sand	cu.m	0.28	3472.45	972.29
a) 1:4	Add.unkill	m.d.	0.70	880.00	616.00
	Equipmen.	3%			18.48
<b>Item No. 4.5</b>	Sub-Total				19267.57
Norms - 5(1-b-2) page 32	including@15% overhead		<b>cu.m.</b>		22157.70
<b>B/W in c.m. 1:4 in first floor</b>				<b>material vat @ 13 %</b>	<b>1950.72</b>
Chimney (bhatta) brick masonry works	skilled	m.d.	1.50	1140.00	1710.00
along with supplying bricks making	unskilled	m.d.	2.20	880.00	1936.00
cement sand mortar and construction	Brick	nos.	560.00	22.16	12408.48
of brick wall including haulage distance	Cement	m.t.	0.07	16063.20	1124.42
upto 30m (First floor)	Sand	cu.m	0.30	3472.45	1041.73
a) 1:6	Add.unkill	m.d.	0.70	880.00	616.00
	Equipmen.	3%			18.48
<b>Item No. 4.6</b>	Sub-Total				18855.12
Norms - 5(1b3) page 32	including@15% overhead		<b>cu.m.</b>		21683.39
<b>B/W in c.m. 1:6 in first floor</b>				<b>material vat @ 13 %</b>	<b>1897.11</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Machine made brick masonry works	skilled	m.d.	1.50	1140.00	1710.00
along with supplying bricks making	unskilled	m.d.	2.20	880.00	1936.00
cement sand mortar and construction	Brick	nos.	530.00	24.16	12803.74
of brick wall including haulage distance	Cement	m.t.	0.07	16063.20	1124.42
upto 30m	Sand	cu.m	0.30	3472.45	1041.73
a) 1:6	Add.unskill	m.d.	0.20	880.00	176.00
<b>Item No. 4.7</b>	Equipmen.	3%			5.28
	Sub-Total				18797.18
Norms - 5(1a4) page 32	including@15% overhead		<b>cu.m.</b>		<b>21616.76</b>
<b>B/W in c.m. 1:6 in G. floor (machine made)</b>			<b>material vat @ 13 %</b>		<b>1946.77</b>

Machine made brick masonry works	skilled	m.d.	1.50	1140.00	1710.00
along with supplying bricks making	unskilled	m.d.	2.20	880.00	1936.00
cement sand mortar and construction	Brick	nos.	530.00	24.16	12803.74
of brick wall including haulage distance	Cement	m.t.	0.10	16063.20	1606.32
upto 30m	Sand	cu.m	0.27	3472.45	937.56
a) 1:4	Add.unskill	m.d.	0.20	880.00	176.00
<b>Item No. 4.8</b>	Equipmen.	3%			5.28
<b>2.5</b>	Sub-Total				19174.90
Norms - 5(1a2) page 32	including@15% overhead		<b>cu.m.</b>		<b>22051.14</b>
<b>B/W in c.m. 1:4 in G. floor (machine made)</b>			<b>material vat @ 13 %</b>		<b>1995.88</b>

Machine made brick masonry works	skilled	m.d.	1.50	1140.00	1710.00
along with supplying bricks making	unskilled	m.d.	2.20	880.00	1936.00
cement sand mortar and construction	Brick	nos.	530.00	24.16	12803.74
of brick wall including haulage distance	Cement	m.t.	0.07	16063.20	1124.42
upto 30m	Sand	cu.m	0.30	3472.45	1041.73
a) 1:6	Add.unskill	m.d.	0.70	880.00	616.00
<b>Item No. 4.9</b>	Equipmen.	3%			18.48
<b>2.5</b>	Sub-Total				19250.38
Norms - 5(1a4) page 32	including@15% overhead		<b>cu.m.</b>		<b>22137.94</b>
<b>B/W in c.m. 1:6 in First floor (machine made)</b>			<b>material vat @ 13 %</b>		<b>1948.49</b>

Machine made brick masonry works	skilled	m.d.	1.50	1140.00	1710.00
along with supplying bricks making	unskilled	m.d.	2.20	880.00	1936.00
cement sand mortar and construction	Brick	nos.	530.00	24.16	12803.74
of brick wall including haulage distance	Cement	m.t.	0.10	16063.20	1606.32
upto 30m	Sand	cu.m	0.27	3472.45	937.56
a) 1:4	Add.unskill	m.d.	0.70	880.00	616.00
<b>Item No. 4.10</b>	Equipmen.	3%			18.48
<b>2.5</b>	Sub-Total				19628.10
Norms - 5(1a2) page 32	including@15% overhead		<b>cu.m.</b>		<b>22572.32</b>
<b>B/W in c.m. 1:4 in first floor (machine made)</b>			<b>material vat @ 13 %</b>		<b>1997.59</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
<b>5. STONE WORKS</b>					
Filling by stones in the foundation and levelling including haulage distance upto 30m	Unskilled	m.d.	1.50	880.00	1320.00
	Block stone	cu.m.	1.00	2310.00	2310.00
	Bond stone	cu.m.	0.20	2310.00	462.00
<b>Item No. 5.1</b>	Sub Total				4092.00
Norms - 6(5) page 39	including@15% overhead		cu.m.		4705.80
<b>Stone filling in foundation trench</b>				<b>material vat @ 13 %</b>	<b>360.36</b>
Rubble masonry work including supply of hard stone blocks preparing cement sand mortar and construction of the wall upto 5m high haulage distance upto 10m	skilled	m.d.	1.50	1140.00	1710.00
	unskilled	m.d.	5.00	880.00	4400.00
	cement	m.t.	0.159	16063.20	2554.05
	Sand	cu.m	0.45	3472.45	1562.60
	bl.stone	"	1.00	2310.00	2310.00
a) cement sand mortar 1:4	bond st.	"	0.10	2310.00	231.00
<b>Item No. 5.2</b>	Sub-Total				12767.65
Norms - 6(1-2) page 35	including@15% overhead		cu.m.		14682.80
<b>Stone work(RM) in c.m. - 1:4</b>				<b>material vat @ 13 %</b>	<b>865.49</b>
Rubble masonry work including supply of hard stone blocks preparing cement sand mortar and construction of the wall upto 5m high haulage distance upto 10m	skilled	m.d.	1.50	1140.00	1710.00
	unskilled	m.d.	5.00	880.00	4400.00
	cement	m.t.	0.106	16063.20	1702.70
	Sand	cu.m	0.47	3472.45	1632.05
	bl.stone	"	1.00	2310.00	2310.00
a) cement sand mortar 1:6	bond st.	"	0.10	2310.00	231.00
<b>Item No. 5.3</b>	Sub-Total				11985.75
Norms - 6(1-3) page 35	including@15% overhead		cu.m.		13783.61
<b>Stone work(RM) in c.m. - 1:6</b>				<b>material vat @ 13 %</b>	<b>763.85</b>
Rubble masonry work including supply of hard stone blocks preparing mud mortar and construction of the wall upto 5m high haulage distance upto 30m	skilled	m.d.	1.00	1140.00	1140.00
	unskilled	m.d.	2.25	880.00	1980.00
	bl.stone	cu.m	1.00	2310.00	2310.00
	bond st.	"	0.10	2310.00	231.00
a) in mud mortar	mud	"	0.42	1195.40	502.07
<b>Item No. 5.4</b>	Sub-Total				6163.07
Norms - 6(2-2) page 36	including@15% overhead		cu.m.		7087.53
<b>Stone work(RM) in mud mortar</b>				<b>material vat @ 13 %</b>	<b>395.60</b>
Boulder Pitching on slope and bed including haulage upto 100 m and of hard stone blocks and construction of the wall upto 5m high haulage distance upto 30 m	skilled	m.d.	1.00	1140.00	1140.00
	unskilled	m.d.	2.00	880.00	1760.00
	bl.stone	cu.m	1.00	2310.00	2310.00
a) dry wall	bond st.	"	0.10	2310.00	231.00
<b>Item No. 5.5</b>	Sub-Total				5441.00
Norms - 6(2-1) page 36	including@15% overhead		cu.m.		6257.15
<b>Dry stone masonry work</b>				<b>material vat @ 13 %</b>	<b>330.33</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Boulder Pitching on slope and bed including haulage upto 100 m and lift 1.5 m	skilled	m.d.	0.71	1140.00	809.40
	unskilled	m.d.	2.12	880.00	1865.60
	bl.stone	cu.m	1.00	2310.00	2310.00
<b>Item No. 5.6</b>	Sub-Total				4985.00
Norms - 6(2-1) page 36	including@15% overhead		cu.m.		5732.75
<b>Boulder pitching</b>				<b>material vat @ 13 %</b>	<b>300.30</b>

## 6. CONCRETE WORKS

Concreting of foundation, vertical faces	skilled	m.d.	1.00	1140.00	1140.00
walls (cement concrete) including supply	unskilled	m.d.	4.00	880.00	3520.00
of materials and haulage distance upto	cement	m.t.	0.22	16063.20	3533.90
30 m a) P.C.C.(1:3:6)	Aggregate1	cu.m.	0.65	3669.60	2385.24
aggregate 1 = 40 mm	" 2	cu.m.	0.24	3669.60	880.70
aggregate 2 = 20 mm	sand	cu.m.	0.47	3472.45	1632.05
<b>Item No.6.1</b>	Sub-Total				13091.90
Norms-7 -2-(c) page 44	including@15% overhead		cu.m.		15055.68
<b>P.C.C. - 1:3:6 in foundation,walls etc.</b>				<b>material vat @ 13 %</b>	<b>1096.15</b>

Concreting of foundation, vertical faces	skilled	m.d.	1.00	1140.00	1140.00
walls (cement concrete) including supply	unskilled	m.d.	4.00	880.00	3520.00
materials and haulage distance upto 30m	cement	m.t.	0.32	16063.20	5140.22
a) P.C.C.(1:2:4)	aggregate 1	cu.m.	0.52	3669.60	1908.19
aggregate 1 = 40 mm	aggregate 2	cu.m.	0.22	3669.60	807.31
aggregate 2 = 20 mm	aggregate 3	cu.m.	0.11	3669.60	403.66
aggregate 3 = 10 mm	sand	cu.m.	0.4450	3472.45	1545.24
<b>Item No. 6.2</b>	Sub-Total				14464.62
Norms-7- 2(d) page 44	including@15% overhead		cu.m.		16634.32
<b>P.C.C. - 1:2:4 in foundation,walls etc.</b>				<b>material vat @ 13 %</b>	<b>1274.60</b>

Concreting works of super structure, deck slabs, beams including supply	skilled	m.d.	0.80	1140.00	912.00
of materials and haulage distance upto	unskilled	m.d.	7.00	880.00	6160.00
30 m	cement	m.t.	0.32	16063.20	5140.22
Aggregate1 = 40 mm	Aggregate 1	cu.m.	0.52	3669.60	1908.19
Aggregate2 = 20 mm crushed	Aggregate 2	cu.m.	0.22	3669.60	807.31
Aggregate3 = 10 mm crushed	" 3	cu.m.	0.11	3669.60	403.66
	sand	cu.m.	0.445	3472.45	1545.24
<b>Item No. 6.3</b>	Sub-Total				16876.62
Norms-7(4)a page 46	including@15% overhead		cu.m.		19408.12
<b>1:2:4 PCC for RCC</b>				<b>material vat @ 13 %</b>	<b>1274.60</b>

Concreting works of super structure, deck slabs, beams including supply	skilled	m.d.	0.80	1140.00	912.00
of materials and haulage distance upto	unskilled	m.d.	7.00	880.00	6160.00
30 m	cement	m.t.	0.40	16063.20	6425.28
Aggregate1 = 40 mm	Aggregate 1	cu.m.	0.00	3669.60	0.00
Aggregate2 = 20 "	Aggregate 2	cu.m.	0.57	3669.60	2091.67
Aggregate3 =10 "	" 3	cu.m.	0.29	3669.60	1064.18
	sand	cu.m.	0.425	3472.45	1475.79
<b>Item No.6.4</b>	Sub-Total				18128.93
Norms-7(4)b page 46	including@15% overhead		cu.m.		20848.27
<b>1:1.5:3 PCC for RCC</b>				<b>material vat @ 13 %</b>	<b>1437.40</b>

Concreting works of super structure, deck slabs, beams including supply	skilled	m.d.	0.70	1140.00	798.00
of materials and haulage distance upto	unskilled	m.d.	7.00	880.00	6160.00
30 m	cement	m.t.	0.61	16063.20	9798.55
Aggregate1 = 40 mm	Aggregate 1	cu.m.	0.00	3669.60	0.00
Aggregate2 = 20 "	Aggregate 2	cu.m.	0.21	3669.60	770.62
Aggregate3 =10 "	" 3	cu.m.	0.43	3669.60	1559.58
	sand	cu.m.	0.425	3472.45	1475.79
<b>Item No.6.5</b>	Sub-Total				20562.54
Norms-7(4)b page 46	including@15% overhead		cu.m.		23646.92
<b>1:1:2 PCC for RCC</b>				<b>material vat @ 13 %</b>	<b>1768.59</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Concreting work for Precast slab, beam etc.haulage distance upto 30 m.	skilled	m.d.	1.20	1140.00	1368.00
a) P.C.C.(1:2:4)	unskilled	m.d.	6.80	880.00	5984.00
	cement	m.t.	0.32	16063.20	5140.22
	river aggre.40mm	cu.m.	0.52	3669.60	1908.19
	aggregate20mm	cu.m.	0.22	3669.60	807.31
<b>Item No. 6.6</b>	aggregate10mm	cu.m.	0.11	3669.60	403.66
	sand	cu.m.	0.445	3472.45	1545.24
	Sub-Total				17156.62
Norms-7-9 page 52	including@15% overhead		cu.m.		19730.12
<b>P.C.C. 1:2:4 work for precast slab</b>				<b>material vat @ 13 %</b>	<b>1274.60</b>

Providing and laying Plum concrete (Boulder mixed concrete) as per Drawing and Specifications. [60% M15 concrete and 40% boulders/stones / Manual Means]	skilled	m.d.	1.00	1140.00	1140.00
	unskilled	m.d.	4.00	880.00	3520.00
	cement	m.t.	0.19	16063.20	2971.69
	river aggre.40mm	cu.m.	0.16	3669.60	572.46
	aggregate20mm	cu.m.	0.07	3669.60	264.21
<b>Item No. 6.6</b>	aggregate10mm	cu.m.	0.30	3669.60	1097.21
	sand	cu.m.	0.30	3472.45	1038.26
	stone	cu.m.	0.44	1980.00	871.20
	Sub-Total				11475.03
Norms-7-9 page 52	including@15% overhead		cu.m.		13196.29
<b>Plum Concrete(M15)</b>				<b>material vat @ 13 %</b>	<b>772.70</b>

## 7. REINFORCEMENT

Cutting, bending, placing in position as shown in the drawing & binding by GI	skilled	m.d.	12.00	1140.00	13680.00
wire of reinforcement steel bar for RCC	unskilled	m.d.	12.00	880.00	10560.00
works incl. haulage dist. upto 30m	iron rod	m.t.	1.05	102109.00	107214.45
	bind.wire	kg	10.00	131.26	1312.63
<b>Item No.7.1</b>	Sub-Total				132767.08
			mt		132767.08
Norms-7-5 page 47	including@15% overhead		kg		152.68
<b>Reinforcement work</b>				<b>material vat @ 13 %</b>	<b>14.11</b>

## 8. FORMWORK

Making wooden form work including supply and selection of materials fixing, nailing	skilled	m.d.	1.72	1140.00	1960.80
according to drawings, placing separa- tors, dismantling forms and hauling	unskilled	m.d.	2.57	880.00	2261.60
upto 30 m distance <b>for slab</b>	wood	cu.m.	0.06575	35350.57	2324.30
	killa	kg	2.50	100.00	250.00
<b>Item No. 8.1</b>	Sub-Total				6796.70
Norms-8(2a) page 55	including@15% overhead		sq.m.		781.62
<b>Form work for slab</b>				<b>material vat @ 13 %</b>	<b>33.47</b>

Making wooden form work including supply and selection of materials fixing, nailing	skilled	m.d.	3.748	1140.00	4272.72
according to drawings, placing separa- tors, dismantling forms and hauling	unskilled	m.d.	5.622	880.00	4947.36
upto 30 m distance <b>for columns 2 m.girth</b>	wood	cu.m.	0.06575	35350.57	2324.30
	killa	kg	2.50	100.00	250.00
<b>Item No. 8.2</b>	Sub-Total				11794.38
Norms-8(3a) page 56	including@15% overhead		sq.m.		1356.35
<b>Form work for coloums</b>				<b>material vat @ 13 %</b>	<b>33.47</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Making wooden form work including supply	skilled	m.d.	4.00	1140.00	4560.00
and selection of materials fixing, nailing	unskilled	m.d.	6.00	880.00	5280.00
according to drawings, placing separa-	wood	cu.m.	0.06575	35350.57	2324.30
tors, dismantling forms and hauling	killa	kg	2.50	100.00	250.00
upto 30 m distance <i>for beams ht. Up to 0.3 m</i>	Sub-Total				12414.30
<b>Item No. 8.3</b>					
Norms-8(4a) page 57	including@15% overhead		sq.m.		1427.64
<b>Form work for beam</b>				<b>material vat @ 13 %</b>	<b>33.47</b>

### 9. ROOFING WORK:-

26 gauge C.G.I. sheet roofing works	skilled	m.d.	1.10	1140.00	1254.00
with supply of materials using J or L hooks	unskilled	m.d.	1.25	880.00	1100.00
all complete	CGIsheet	sq.m.	12.00	556.22	6674.63
<b>Item No.</b>	nutbolt	nos.	30.00	19.86	595.91
<b>9.1</b>	J-hook	nos.	25.00	21.57	539.17
	bit.washer	nos.	55.00	2.80	154.27
	Sub-Total				10317.98
Norms-9(1) page 69	including@15% overhead		sq.m.		1186.57
<b>CGI sheet roofing - 26 # M.C.</b>				<b>material vat @ 13 %</b>	<b>103.53</b>

26 gauge coloured C.G.I. sheet roofing works	skilled	m.d.	1.10	1140.00	1254.00
with supply of materials with all complete	unskilled	m.d.	1.25	880.00	1100.00
	CGIsheet	sq.m.	12.00	773.07	9276.78
	nutbolt	nos.	30.00	19.86	595.91
<b>Item No. 9.3</b>	J-hook	nos.	25.00	21.57	539.17
<b>7.1</b>	bit.washer	nos.	55.00	2.80	154.27
	Sub-Total				12920.13
Norms-9(1) page 69	including@15% overhead		sq.m.		1485.82
<b>Coloured CGI sheet roofing - 26 #</b>				<b>material vat @ 13 %</b>	<b>137.36</b>

Pepsi glass sheet roofing works	skilled	m.d.	1.10	1140.00	1254.00
with supply of materials with all complete	unskilled	m.d.	1.25	880.00	1100.00
	pepsi sheet	sq.m.	12.00	1312.36	15748.35
	nutbolt	nos.	30.00	19.86	595.91
<b>Item No. 9.5</b>	J-hook	nos.	25.00	21.57	539.17
	bit.washer	nos.	55.00	2.80	154.27
	Sub-Total				19391.70
Norms-9(1) page 69	including@15% overhead		sq.m.		2230.05
<b>pepsi glass sheet roofing work</b>				<b>material vat @ 13 %</b>	<b>221.49</b>

0.5mm coloured .G.I. sheet 150mm width works ,450mm gutter	skilled	m.d.	1.75	1140.00	1995.00
works with all work complete	unskilled	m.d.	2.00	880.00	1760.00
	CGIsheet 0.5mm	sq.m.	13.50	235.46	3178.67
	nutbolt	nos.	48.00	19.86	953.46
<b>Item No. 9.6</b>	Bracket	nos.	32.00	83.21	2662.71
	bit.washer	nos.	48.00	2.80	134.63
	Sub-Total				10684.48
	including@15% overhead		sq.m.		1228.71
<b>Gutter works</b>				<b>material vat @ 13 %</b>	<b>90.08</b>

### 10. WOODEN WORKS

Making and fixing seasoned sal wood	skilled	m.d.	34.00	1140.00	38760.00
chauhkat	unskilled	m.d.	3.40	880.00	2992.00
Suppose 1 Kg holdfast = 5 nos.	wood	cu.m	1.10	221250.57	243375.62
	holdfast	nos.	92.00	14.39	1324.07
<b>Item No. 10.1</b>	killa	"	184.00	1.41	258.76
	Sub-Total				286710.45
Norms - 10(1-b) page 75	including@15% overhead		cu.m.		329717.02
<b>Sal wood work - chauhkat</b>				<b>material vat @ 13 %</b>	<b>31844.60</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Making and fixing sal wood 38 mm thick panelled shutters using 38x75 mm frame	skilled	m.d.	10.00	1140.00	11400.00
	unskilled	m.d.	1.00	880.00	880.00
<b>Shutter size:</b>	wood	cu.m	0.084	221250.57	18585.05
1.07m * 1.982 m=2.114 sq.m.	hinges	nos.	6.00	23.11	138.64
Hinges (Kabja) - 100 mm	bolt_1	nos.	1.00	20.11	20.11
bolt_1(Chheskini) - 150 mm	bolt_2	nos.	1.00	20.11	20.11
bolt_2(Chheskini) - 300 mm	lock	nos.	1.00	135.11	135.11
lock - Aldrop set - 250 mm	handle	nos.	2.00	55.11	110.21
<b>Item No. 10.2</b>	nails	L.S.	48.00	1.41	67.50
	Sub-Total				31356.72
Norms - 10(2) page 76	including@15% overhead		sq.m.		17057.82
<b>38 mm thick salwood panelled shutters</b>			<b>material vat @ 13 %</b>		<b>1173.12</b>
Making and fixing sal wood and 9 mm ply shutters using 38 mm x 100mm sal wood frame (without listi)	skilled	m.d.	10.00	1140.00	11400.00
	unskilled	m.d.	1.00	880.00	880.00
	wood	cu.m	0.049	221250.57	10841.28
	9mm ply	sq.m	1.688	486.00	820.37
<b>Shutter size:</b>	hinges	nos.	6.00	23.11	138.64
1.07m * 1.982 m=2.114 sq.m.	bolt_1	nos.	1.00	20.11	20.11
Hinges (Kabja) - 100 mm	bolt_2	nos.	1.00	20.11	20.11
bolt_1(Chheskini) - 150 mm	lock	nos.	1.00	520.11	520.11
bolt_2(Chheskini) - 300 mm	handle	nos.	2.00	55.11	110.21
lock - Mortice lock 250 mm	nails	L.S.			24.00
<b>Item No. 10.3</b>	Sub-Total				24774.82
Norms - 10(2) page 76	including@15% overhead		sq.m.		13477.31
<b>In 1.5" sal frame -9 mm ply shutters</b>			<b>material vat @ 13 %</b>		<b>768.37</b>
Making and fixing sal wood and 6mm ply shutters using 38 mm* 100mm sal wood frame	skilled	m.d.	10.00	1140.00	11400.00
	unskilled	m.d.	1.00	880.00	880.00
<b>Shutter size:</b>	wood	cu.m	0.049	221250.57	10841.28
1.07m * 1.982 m=2.114 sq.m.	6mm ply	sq.m	1.688	335.38	566.13
Hinges (Kabja) - 100 mm	hinges	nos.	6.00	23.11	138.64
bolt_1(Chheskini) - 150 mm	bolt_1	nos.	1.00	20.11	20.11
	bolt_2	nos.	1.00	20.11	20.11
bolt_2(Chheskini) - 300 mm	lock	nos.	1.00	520.11	520.11
lock - Mortise lock 250 mm	handle	nos.	2.00	55.11	110.21
	nails	L.S.			24.00
<b>Item No. 10.4</b>	Sub-Total				24520.58
Norms - 10(2) page 76	including@15% overhead		sq.m.		13339.01
<b>In 1.5" sal frame 6mm ply shutters with listi</b>			<b>material vat @ 13 %</b>		<b>752.73</b>
Making and fixing 4 mm thick glazed shutter using sal wood shutter of size : 38 mm x 75 mm	skilled	m.d.	9.00	1140.00	10260.00
	unskilled	m.d.	0.90	880.00	792.00
	wood	cu.m	0.049	221250.57	10841.28
hinges (Kabja) - 75 mm	glass	sq.m.	1.085	917.43	995.41
bolts (Chheskini) - 100 mm	hinges	nos.	8.00	19.11	152.85
	bolts	nos.	4.00	20.11	80.43
<b>Item No. 10.5</b>	handle 4"	nos.	2.00	55.11	110.21
	screws	nos.	48.00	1.41	67.50
	Sub-Total				23299.68
Norms - 10(4) page 78	including@15% overhead		sq.m.		12015.53
<b>38 mm thick glazed shutter with 4 mm glass</b>			<b>material vat @ 13 %</b>		<b>713.99</b>
Making and fixing 4 mm commercial plywood flush shutter ( plywood both sides ) in 38 mm sal wood frame.	skilled	m.d.	7.00	1140.00	7980.00
	unskilled	m.d.	0.70	880.00	616.00
	wood	cu.m	0.0346	221250.57	7655.27
<b>Shutter size : 1.092*2.058 = 2.245</b>	Plywood	sq.m.	4.65	249.32	1159.32
lock - Mortise lock	hinges	nos	3.00	23.11	69.32
hinges - 100 mm	bolts	nos	2.00	20.11	40.21
bolts - 150 mm	lock	nos	1.00	520.11	520.11
<b>Item No. 10.6</b>	screws	L.S.			24.00
	Sub-Total				18064.23
Norms - 10(7) page 80	including@15% overhead		sq.m.		9253.39
<b>38mm thick flush shutter with 4mm plywood</b>			<b>material vat @ 13 %</b>		<b>548.27</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Making and fixing 38 mm thick Mosquito proof	skilled	m.d.	5.00	1140.00	5700.00
wire mesh net shutter with expanded metal net	unskilled	m.d.	0.50	880.00	440.00
flush shutter on salwood frames	wood	cu.m.	0.026	221250.57	5752.51
<b>Shutter size:</b>	Mosq. net	sq.m.	2.13	144.26	307.28
1.092*2.058 = 2.245 sq.m.	exp. net	sq.m.	2.13	199.26	424.43
hinges - 100 mm	hinges	nos	3.00	23.11	69.32
bolts - 150 mm	bolt	nos	2.00	20.11	40.21
<b>Item No. 10.9</b>	spring	nos	1.00	130.11	130.11
	handle	nos	2.00	55.11	110.21
	screws	L.S.			50.00
	Sub-Total				13024.08
Norms-10(10) page 83	including@15% overhead		sq.m.		6671.58
<b>38mm thick shutter with M.net+Expen.net</b>				<b>material vat @ 13 %</b>	<b>398.63</b>

Making and fixing 38 mm thick Mosquito proof	skilled	m.d.	5.00	1140.00	5700.00
wire mesh net flush shutter on salwood frames	unskilled	m.d.	0.50	880.00	440.00
<b>Shutter size:</b>	wood	cu.m.	0.026	221250.57	5752.51
1.092*2.058 = 2.245 sq.m.	Mosq. net	sq.m.	2.13	144.26	307.28
hinges - 100 mm	hinges	nos	3.00	23.11	69.32
bolts - 150 mm	bolt	nos	2.00	20.11	40.21
<b>Item No. 10.10</b>	spring	nos	1.00	130.11	130.11
	handle	nos	2.00	55.11	110.21
	screws	L.S.			50.00
	Sub-Total				12599.65
Norms-10(10) page 83	including@15% overhead		sq.m.		6454.16
<b>38mm thick shutter with M.net</b>				<b>material vat @ 13 %</b>	<b>374.06</b>

Fixing 4 mm thick comercial plywood	skilled	m.d.	0.06	1140.00	68.40
using necessary nails.	unskilled	m.d.	0.006	880.00	5.28
	4mm plywood	sq.m.	1.05	249.32	261.78
<b>Item No. 10.11</b>	nails	L.S.			15.00
	Sub-Total				350.46
Norms-10(11)b page 84	including@15% overhead		sq.m.		403.03
<b>Fixing of 4 mm thick plywood with nails</b>				<b>material vat @ 13 %</b>	<b>35.98</b>

Making and fixing 4 mm thick glass	skilled	m.d.	0.06	1140.00	68.40
using necessary listi.	unskilled	m.d.	0.006	880.00	5.28
<b>Item No. 10.12</b>	glass	sq.m.	1.00	917.43	917.43
	½" listi	r.m.	4.05	4.14	16.75
	nails	L.S.			15.00
	Sub-Total				1022.86
Norms-10(11)b page 84	including@15% overhead		sq.m.		1176.29
<b>Fixing of 4 mm thick Glass with nails</b>				<b>material vat @ 13 %</b>	<b>123.39</b>

Fixing mosquito proof mesh net	skilled	m.d.	0.06	1140.00	68.40
using listi.	unskilled	m.d.	0.006	880.00	5.28
<b>Item No. 10.13</b>	net	sq.m.	1.05	144.26	151.48
	1"listi	r.m.	4.05	5.05	20.46
	nails	L.S.			35.00
	Sub-Total				280.62
Norms - similar to 10(12) page 85	including@15% overhead		sq.m.		322.71
<b>Fixing of M.P.net with listi</b>				<b>material vat @ 13 %</b>	<b>26.90</b>

Fixing mosquito proof mesh net	skilled	m.d.	0.06	1140.00	68.40
with expanded metal net using listi	unskilled	m.d.	0.006	880.00	5.28
	M.P. net	sq.m.	1.05	144.26	151.48
<b>Item No. 10.14</b>	exp.net	sq.m.	1.05	166.26	174.58
<b>4.8</b>	1" listi	r.m.	4.05	5.05	20.46
	nails	L.S.			35.00
	Sub-Total				455.19
Norms - similar to 10(12) page 85	including@15% overhead		sq.m.		523.47
<b>Fixing of M.P.net &amp;Exp.net with listi</b>				<b>material vat @ 13 %</b>	<b>49.60</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Fixing expaded metal wire mesh net with listi.	skilled	m.d.	0.06	1140.00	68.40
	unskilled	m.d.	0.006	880.00	5.28
<b>Item No. 10.15</b>	Exp.net	sq.m.	1.05	166.26	174.58
	1" listi	r.m.	4.05	5.05	20.46
	nails	L.S.			35.00
	Sub-Total				303.72
Norms - similar to 10(12) page 85	including@15% overhead		sq.m.		349.27
<b>Fixing of expanded metal net with listi</b>			<b>material vat @ 13 %</b>		<b>29.90</b>
Making ceiling with 50*75 mm sal wood frames, 0.6*0.6 m box size and fixing 25mm thick	skilled	m.d.	6.50	1140.00	7410.00
	unskilled	m.d.	0.65	880.00	572.00
planks with all complete 10.00sq.m	wood	cu.m	0.421	221250.57	93146.49
	Listi	L.S.			150.00
<b>Item No. 10.16</b>	killa	L.S.			100.00
	Sub-Total				101378.49
Norms no 11-21 p 109	including@15% overhead		sq.m.		11658.53
<b>25mm Sal wood planking with wooden frames</b>			<b>material vat @ 13 %</b>		<b>1214.15</b>
Making ceiling with 50*75 mm size local wood 0.6*0.9m segment and fixing 4mm ply	skilled	m.d.	23.00	1140.00	26220.00
	unskilled	m.d.	2.30	880.00	2024.00
35.68 sq.m	Local wood	cu.m	0.45	35350.57	15907.76
	4 mm plywood	sq.m	37.50	249.32	9349.38
<b>Item No. 10.17</b>	Listi	L.S.			125.00
	killa	L.S.			75.00
	Sub-Total				53701.14
Norms no 10(16-a) p 89	including@15% overhead		sq m		1730.84
<b>False ceiling of 4 mm ply with local wood</b>			<b>material vat @ 13 %</b>		<b>92.75</b>
Making variou types of flush ceiling in sal wood frame of size 50mm*75mm	skilled	m.d.	23.00	1140.00	26220.00
	unskilled	m.d.	2.30	880.00	2024.00
using 4 mm commercial plywood Ceiling size	Salwood	cu.m.	0.45	221250.57	99562.76
	plywood	sq.m.	37.50	249.32	9349.38
9.75 x 3.65 = 35.68 sq.m.	Listi	L.S.			125.00
	killa	L.S.			75.00
<b>Item No.10.18</b>	Sub-Total				137356.14
	Norms-10(16-a) page 89	including@15% overhead		sq m	4427.12
<b>False ceiling of 4 mm ply with Salwood</b>			<b>material vat @ 13 %</b>		<b>397.55</b>
Making beams, rafter, purlin cross beams from seasoned local wood with	skilled	m.d.	17.65	1140.00	20121.00
	unskilled	m.d.	1.76	880.00	1548.80
fitting and fixing <b>Item No. 10.19</b>	wood	cu.m	1.05	35350.57	37118.10
	killa	L.S.		500.00	125.00
	Sub-Total				58912.90
Norms - 10(17) page 90	including@15% overhead		cu.m.		67749.83
<b>Local wood work - beam, rafter etc.</b>			<b>material vat @ 13 %</b>		<b>4841.60</b>
Making beams, rafter, purlin cross beams from seasoned sal wood with	skilled	m.d.	17.65	1140.00	20121.00
	unskilled	m.d.	1.76	880.00	1548.80
fitting and fixing <b>Item No. 10.20</b>	wood	cu.m	1.05	221250.57	232313.10
	killa	L.S.		500.00	125.00
	Sub-Total				254107.90
Norms - 10(17) page 90	including@15% overhead		cu.m.		292224.08
<b>Sal wood work - beam, rafter etc.</b>			<b>material vat @ 13 %</b>		<b>30216.95</b>
Making & fixing 25mm thick sal wood eaves board	skilled	m.d.	1.43	1140.00	1630.20
	unskilled	m.d.	0.143	880.00	125.84
<b>Item No. 10.21</b>	salwood	cu.m.	0.275	221250.57	60843.91
	killa	L.S.			100.00
	Sub-Total				62699.95
Norms-10(19) page 91	including@15% overhead		sq m		7210.49
<b>25mm thick salwood eaves board</b>			<b>material vat @ 13 %</b>		<b>792.27</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Making false ceiling of sal wood frame of size 50mm*75mm in 600 * 900 mm boxes with 12mm planks.	skilled	m.d.	23.00	1140.00	26220.00
	unskilled	m.d.	2.30	880.00	2024.00
	wood	cu.m.	0.45	221250.57	99562.76
<b>Ceiling size</b>	12 mm Ply	sq.m.	37.50	421.45	15804.42
9.75 x 3.65 = 35.68 sq.m.	1" Listi	R.m	61.00	5.05	308.15
<b>Item No. 10.22</b>	killa	L.S.			150.00
	Sub-Total				144069.32
Norms-10(16a) page 89	including@15% overhead		<b>sq m</b>		<b>4643.49</b>
<b>False ceiling of salwood with 12 mm Plywood</b>				<b>material vat @ 13 %</b>	<b>422.01</b>
Making and fixing seasoned sal wood chaukhat (excluding salwood )	skilled	m.d.	34.00	1140.00	38760.00
	unskilled	m.d.	3.40	880.00	2992.00
	wood	cu.m	1.10	0.00	0.00
<b>Item No. 10.23</b>	holdfast	nos.	92.00	14.39	1324.07
	killa	"	184.00	1.41	258.76
	Sub-Total				43334.83
Norms - 10(1-b) page 75	including@15% overhead		<b>cu.m.</b>		<b>49835.05</b>
<b>Sal wood work - chaukhat excluding salwood</b>				<b>material vat @ 13 %</b>	<b>205.77</b>
Making and fixing sal wood 38 mm th. panelled shutters using 38x75 mm frame(exclu. Salwood)	skilled	m.d.	10.00	1140.00	11400.00
	unskilled	m.d.	1.00	880.00	880.00
<b>Shutter size:</b>	wood	cu.m	0.084	0.00	0.00
1.07m * 1.982 m=2.114 sq.m.	hinges	nos.	6.00	23.11	138.64
Hinges (Kabja) - 100 mm	bolt_1	nos.	1.00	20.11	20.11
bolt_1(Chheskini) - 150 mm	bolt_2	nos.	1.00	20.11	20.11
bolt_2(Chheskini) - 300 mm	lock	nos.	1.00	680.11	680.11
lock - Aldrop set - 250 mm	handle	nos.	2.00	55.11	110.21
<b>Item No. 10.24</b>	nails	nos.	48.00	1.41	67.50
	Sub-Total				13316.67
Norms - 10(2) page 76	including@15% overhead		<b>sq m</b>		<b>7244.17</b>
<b>38 mm thick p. shutters(excluding wood)</b>				<b>material vat @ 13 %</b>	<b>63.75</b>
Making and fixing 4 mm thick glazed shutter using sal wood shutter of size : 38 mm x 75 mm( excluding salwood )	skilled	m.d.	9.00	1140.00	10260.00
	unskilled	m.d.	0.90	880.00	792.00
	glass	sq.m.	1.085	917.43	995.41
hinges (Kabja) - 75 mm	hinges	nos.	8.00	19.11	152.85
bolts (Chheskini) - 100 mm	bolts	nos.	4.00	20.11	80.43
handle 4" aluminium	handle 4"	nos.	2.00	55.11	110.21
<b>Item No. 10.25</b>	screws	nos.	48.00	1.41	67.50
	Sub-Total				12458.40
Norms - 10(4) page 78	including@15% overhead		<b>sq m</b>		<b>6424.74</b>
<b>38 mm th. G. S. with 4 mm glass(excl.wood)</b>				<b>material vat @ 13 %</b>	<b>81.99</b>
Fixing 4 mm thick teak plywood using necessary nails.	skilled	m.d.	0.06	1140.00	68.40
	unskilled	m.d.	0.006	880.00	5.28
<b>Item No. 10.26</b>	4mm plywood	sq.m.	1.05	776.48	815.30
<b>10.26</b>	nails	L.S.			15.00
	Sub-Total				903.98
Norms-10(11)b page 84	including@15% overhead		<b>sq m</b>		<b>1039.58</b>
<b>Fixing of 4 mm thick teak plywood</b>				<b>material vat @ 13 %</b>	<b>107.94</b>
Making beams, rafter, purlin cross beams from seasoned sal wood with fitting and fixing (excluding salwood )	skilled	m.d.	17.65	1140.00	20121.00
	unskilled	m.d.	1.76	880.00	1548.80
	killa	L.S.			125.00
<b>Item No. 10.27</b>	Sub-Total				21794.80
Norms - 10(17) page 90	including@15% overhead		<b>cu.m.</b>		<b>25064.02</b>
<b>Fixing of beam, rafter etc (exclu. Salwood)</b>				<b>material vat @ 13 %</b>	<b>16.25</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Partitioning the room with 38*75 mm sal wood	skill	m.d.	23.00	1140.00	26220.00
and making frame 0.61*0.915 m size 4mm	Unskill	m.d.	2.30	880.00	2024.00
commercial ply wood fixing both side	sal wood	Cu.m	0.34	221250.57	75225.19
frame 9.75*3.65=35.68	Ply wood	Sq.m	75.00	249.32	18698.76
<b>Item No. 10.28</b>	miscellane.	LS			50.00
	Sub-Total				122217.95
	including@15% overhead		sq m		3939.20
<b>Partion with sal wood &amp; 4mm ply b/s</b>				<b>material vat @ 13 %</b>	<b>346.28</b>

**11. FLOORING WORKS :**

1" thick 1:2:4 cement concrete work with	skilled	m.d.	1.10	1140.00	1254.00
finishing by rubbing	unskilled	m.d.	1.50	880.00	1320.00
	cement	m.t.	0.09	14063.20	1265.69
<b>Item No.</b>	sand	cu.m.	0.12	3472.45	416.69
<b>11.1</b>	aggregate12mm	cu.m.	0.23	3669.60	844.01
Norms-11(1)a page 96	Sub-Total				5100.39
	including@15% overhead		sq m		586.54
<b>25mm thick PCC( 1:2:4)</b>				<b>material vat @ 13 %</b>	<b>32.84</b>

1.5" thick 1:2:4 cement concrete work with	skilled	m.d.	1.25	1140.00	1425.00
finishing by rubbing	unskilled	m.d.	2.00	880.00	1760.00
	cement	m.t.	0.13	14063.20	1828.22
<b>Item No.</b>	sand	cu.m.	0.18	3472.45	625.04
<b>11.2</b>	aggreg.12mm	cu.m.	0.36	3669.60	1321.06
Norms-11(1)b page 96	Sub-Total				6959.31
	including@15% overhead		sq m		800.32
<b>37.5 mm thick PCC(1:2:4) work</b>				<b>material vat @ 13 %</b>	<b>49.07</b>

2" thick 1:2:4 cement concrete work with	skilled	m.d.	1.25	1140.00	1425.00
finishing by rubbing	unskilled	m.d.	2.50	880.00	2200.00
	cement	m.t.	0.17	14063.20	2390.74
<b>Item No.</b>	sand	cu.m.	0.23	3472.45	798.66
<b>11.3</b>	aggreg.20mm	cu.m.	0.46	3669.60	1688.02
Norms-11(1)c page 96	Sub-Total				8502.42
	including@15% overhead		sq m		977.78
<b>50 mm thick PCC(1:2:4) work</b>				<b>material vat @ 13 %</b>	<b>63.41</b>

3" thick 1:2:4 cement concrete work with	skilled	m.d.	1.25	1140.00	1425.00
finishing by rubbing	unskilled	m.d.	3.00	880.00	2640.00
	cement	m.t.	0.26	14063.20	3656.43
<b>Item No.</b>	sand	cu.m.	0.34	3472.45	1180.63
<b>11.4</b>	aggreg.20mm	cu.m.	0.68	3669.60	2495.33
Norms-11(1)d page 97	Sub-Total				11397.39
	including@15% overhead		sq m		1310.70
<b>75mm thick PCC (1:2:4) work</b>				<b>material vat @ 13 %</b>	<b>95.32</b>

Flat brick laying (soling) in cement sand (1:6)	skilled	m.d.	2.25	1140.00	2565.00
with pointing in joints with (1:2) cement sand	unskilled	m.d.	3.25	880.00	2860.00
mortar.	Brick	nos.	430.00	22.16	9527.94
<b>Item No.</b>	cement	m.t.	0.078	14063.20	1096.93
<b>11.5</b>	Sand	cu.m.	0.229	3472.45	795.19
Norms - 11(12) page 105	Sub-Total				16845.06
	including@15% overhead		sq m		1937.18
<b>Flat Brick soling in cement mortar (1:6)</b>				<b>material vat @ 13 %</b>	<b>148.46</b>

On edge brick laying (soling) in cement sand (1:6)	skilled	m.d.	1.10	1140.00	1254.00
with pointing in joints with (1:2) cement sand	unskilled	m.d.	1.80	880.00	1584.00
mortar.	Brick	nos.	750.00	22.16	16618.50
<b>Item No.</b>	cement	m.t.	0.121	14063.20	1701.65
<b>11.6</b>	Sand	cu.m	0.431	3472.45	1496.63
Norms - 11(13) page 106	Sub-Total				22654.77
	including@15% overhead		sq m		2605.30
<b>Edge Brick soling in cement mortar(1:6)</b>				<b>material vat @ 13 %</b>	<b>257.62</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Dry brick laying (soling) in sand	skilled	m.d.	0.50	1140.00	570.00
a) flat	unskilled	m.d.	1.00	880.00	880.00
<b>Item No.</b>	Brick	nos.	420.00	22.16	9306.36
<b>11.7</b>	Sand	cu.m.	0.71	3472.45	2465.44
Norms - 11(15-a) page 107	Sub-Total				13221.80
	including@15% overhead		<b>sq m</b>		<b>1520.51</b>
<b>Dry flat Brick soling -</b>				<b>material vat @ 13 %</b>	<b>153.03</b>
Dry brick laying (soling) in sand	skilled	m.d.	1.00	1140.00	1140.00
a) on edge (vertical)	unskilled	m.d.	3.25	880.00	2860.00
<b>Item No.</b>	Brick	nos.	750.00	22.16	16618.50
<b>11.8</b>	Sand	cu.m	0.71	3472.45	2465.44
Norms - 11(15-b) page 107	Sub-Total				23083.94
	including@15% overhead		<b>sq m</b>		<b>2654.65</b>
<b>Dry on edge Brick soling</b>				<b>material vat @ 13 %</b>	<b>248.09</b>
Dry stone laying (soling) in sand	skilled	m.d.	1.00	1140.00	1140.00
	unskilled	m.d.	3.50	880.00	3080.00
<b>Item No.</b>	stone	cu.m	1.10	1980.00	2178.00
<b>11.9</b>	Sand	cu.m	0.71	3472.45	2465.44
Norms - 11(16) page 107	Sub-Total				8863.44
	including@15% overhead		<b>cum</b>		<b>10192.95</b>
<b>Dry stone soling in sand</b>				<b>material vat @ 13 %</b>	<b>603.65</b>
Sand filling	skilled	m.d.	6.50	1140.00	7410.00
	unskilled	m.d.	0.00	880.00	0.00
<b>Item No.</b>	sand	cum	11.00	3472.45	38196.93
<b>11.10</b>					45606.93
Norms-11(19-a) page 108	Sub-Total				45606.93
	including@15% overhead		<b>cum</b>		<b>5244.80</b>
<b>Sand filling</b>				<b>material vat @ 13 %</b>	<b>496.56</b>
Brick bats filling up to 15 cm. Size.	skilled	m.d.	10.00	1140.00	11400.00
	unskilled	m.d.	0.00	880.00	0.00
<b>Item No.</b>	brick bats	cum	11.00	800.00	8800.00
<b>11.11</b>					20200.00
Norms-11(19-b) page 108	Sub-Total				20200.00
	including@15% overhead		<b>cum</b>		<b>2323.00</b>
<b>Brick bats filling work.</b>				<b>material vat @ 13 %</b>	<b>114.40</b>
3 mm thick fine cement punning works	skilled	m.d.	1.00	1140.00	1140.00
	unskilled	m.d.	1.00	880.00	880.00
<b>Item No.</b>	cement	m.t.	0.0532	14063.20	748.16
<b>11.12</b>					2768.16
Norms-11(20) page 109	Sub-Total				2768.16
	including@15% overhead		<b>sq m</b>		<b>318.34</b>
<b>3mm cement punning</b>				<b>material vat @ 13 %</b>	<b>9.73</b>
25mmmm flat stone flooring)	skilled	m.d.	2.00	1140.00	2280.00
	unskilled	m.d.	4.50	880.00	3960.00
<b>Item No.</b>	Stone	sqm	11.00	1345.33	14798.58
<b>11.13</b>	cement	m.t.	0.060	14063.20	843.79
	Sand	cu.m	0.165	3472.45	572.95
Norms - 11(13) page 106	Sub-Total				22455.33
	including@15% overhead		<b>sq m</b>		<b>2582.36</b>
<b>flat stone flooring in cement mortar(1:6)</b>				<b>material vat @ 13 %</b>	<b>210.80</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
porcelian Glazed/unglazed Tile in 1:4 C/s Mortar	skilled	m.d.	13.00	1140.00	14820.00
all work Complete	unskilled	m.d.	4.50	880.00	3960.00
	cement	m.t.	0.06	14063.20	787.54
	sand	cu.m.	0.15	3472.45	527.81
	white cement	kg	3.23	36.06	116.41
<b>Item No.</b>	Kazzaria, Simany or equivalent	sqm	11.00	2055.26	22607.90
<b>11.14</b>	tile				
	Sub-Total				42819.67
	including@15% overhead			<b>sq m</b>	<b>4924.26</b>
<b>porcelian Glazed/unglazed Tile</b>				<b>material vat @ 13 %</b>	<b>312.52</b>

clay tile works	skilled	m.d.	0.50	1140.00	570.00
(Size in cm=0.19*0.3 for .22*.35)	unskilled	m.d.	1.50	880.00	1320.00
<b>Item No.</b>	machine tile	pcs	184.0000	43.60	8022.44
<b>11.15</b>	Sub-Total				9912.44
	including@15% overhead			<b>sq m</b>	<b>1139.93</b>
<b>clay tile</b>				<b>material vat @ 13 %</b>	<b>104.29</b>

25 mm cement concrete tiles of Grey colour in 1:4 c/s	skilled	m.d.	13.00	1140.00	14820.00
	unskilled	m.d.	4.50	880.00	3960.00
	cement	m.t.	0.06	14063.20	843.79
	sand	cu.m.	0.15	3472.45	527.81
	CC tile	sqm	11.00	705.74	7763.14
<b>Item No.</b>					
<b>11.16</b>	Sub-Total				27914.74
	including@15% overhead			<b>sq m</b>	<b>3210.20</b>
<b>25 mm cement concrete tiles</b>				<b>material vat @ 13 %</b>	<b>118.75</b>

## 12. PLASTERING WORKS

12.5 mm thick cement sand plastering work on walls .	skilled	m.d.	12.00	1140.00	13680.00
a) Cement sand ratio - 1:3	unskilled	m.d.	16.00	880.00	14080.00
	cement	m.t.	0.625	14063.20	8789.50
	sand	cu.m	1.28	3472.45	4444.73
<b>Item No. 12.1</b>	Sub-Total				40994.23
Norms-12(1b) page 110	including@15% overhead			<b>sq m</b>	<b>471.43</b>
<b>12.5mm C. P. on walls in c.m. - 1:3</b>				<b>material vat @ 13 %</b>	<b>17.20</b>

12.5 mm thick cement sand plastering work on walls.	skilled	m.d.	12.00	1140.00	13680.00
a) Cement sand ratio - 1:4	unskilled	m.d.	16.00	880.00	14080.00
	cement	m.t.	0.538	14063.20	7566.00
	sand	cu.m	1.46	3472.45	5069.77
<b>Item No. 12.2</b>	Sub-Total				40395.78
Norms-12(1c) page 110	including@15% overhead			<b>sq m</b>	<b>464.55</b>
<b>12.5mm th. C.P. on walls in c.m. - 1:4</b>				<b>material vat @ 13 %</b>	<b>16.43</b>

12.5 mm thick cement sand plastering work on walls.	skilled	m.d.	12.00	1140.00	13680.00
a) Cement sand ratio - 1:6	unskilled	m.d.	16.00	880.00	14080.00
	cement	m.t.	0.382	14063.20	5372.14
	sand	cu.m	1.57	3472.45	5451.74
<b>Item No. 12.3</b>	Sub-Total				38583.89
Norms-12(1d) page 110	including@15% overhead			<b>sq m</b>	<b>443.71</b>
<b>12.5 mm th.C.P. on walls in c.m. - 1:6</b>				<b>material vat @ 13 %</b>	<b>14.07</b>

20mm (3/4") thick cement sand plastering works	skilled	m.d.	14.00	1140.00	15960.00
a) Cement sand ratio - 1:4	unskilled	m.d.	19.00	880.00	16720.00
	cement	m.t.	0.810	14063.20	11391.19
	sand	cu.m	2.20	3472.45	7639.39
<b>Item No. 12.4</b>	Sub-Total				51710.58
Norms-12(4-b) page 112	including@15% overhead			<b>sq.m.</b>	<b>594.67</b>
<b>20mm th. C.P. on walls in c.m. - 1:4</b>				<b>material vat @ 13 %</b>	<b>24.74</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
20mm (3/4") thick cement sand plastering works	skilled	m.d.	14.00	1140.00	15960.00
	unskilled	m.d.	19.00	880.00	16720.00
a) Cement sand ratio - 1:6	cement	m.t.	0.570	14063.20	8016.02
	sand	cu.m	2.35	3472.45	8160.25
<b>Item No. 12.5</b>	Sub-Total				48856.28
Norms-12(4-c) page 112	including@15% overhead		sq m		561.85
<b>20mm th.C.P. on walls in c.m. - 1:6</b>				material vat @ 13 %	21.03

12.5 mm thick cement sand plastering work on ceiling.	skilled	m.d.	15.00	1140.00	17100.00
	unskilled	m.d.	20.00	880.00	17600.00
a) Cement sand ratio - 1:3	cement	m.t.	0.625	14063.20	8789.50
	sand	cu.m	1.28	3472.45	4444.73
<b>Item No. 12.6</b>	Sub-Total				47934.23
Norms-12(1b) page 110	including@15% overhead		sq m		551.24
<b>12.5 mm th.C.P. on ceiling in c.m. - 1:3</b>				material vat @ 13 %	17.20

12.5 mm thick cement sand plastering work on ceiling.	skilled	m.d.	15.00	1140.00	17100.00
	unskilled	m.d.	20.00	880.00	17600.00
a) Cement sand ratio - 1:4	cement	m.t.	0.538	14063.20	7566.00
	sand	cu.m	1.46	3472.45	5069.77
<b>Item No. 12.7</b>	Sub-Total				47335.78
Norms-12(1c) page 110	including@15% overhead		sq m		544.36
<b>12.5 mm th. on ceiling in c.m. - 1:4</b>				material vat @ 13 %	16.43

20 mm thick cement sand plastering work on ceiling.	skilled	m.d.	17.50	1140.00	19950.00
	unskilled	m.d.	23.75	880.00	20900.00
a) Cement sand ratio - 1:3	cement	m.t.	0.96	14063.20	13500.67
	sand	cu.m	1.95	3472.45	6771.27
<b>Item No. 12.8</b>	Sub-Total				61121.95
Norms-12(4-a) page 112	including@15% overhead		sq m		702.90
<b>20 mmth. C.P. on ceiling in c.m. - 1:3</b>				material vat @ 13 %	26.35

20 mm thick cement sand plastering work on ceiling.	skilled	m.d.	17.50	1140.00	19950.00
	unskilled	m.d.	23.75	880.00	20900.00
a) Cement sand ratio - 1:4	cement	m.t.	0.81	14063.20	11391.19
	sand	cu.m	2.20	3472.45	7639.39
<b>Item No. 12.9</b>	Sub-Total				59880.58
Norms-12(4-b) page 112	including@15% overhead		sq m		688.63
<b>20 mm C.P. on ceiling in c.m. - 1:4</b>				material vat @ 13 %	24.74

### 13. POINTING WORKS

Flush pointing work on brick masonry walls	skilled	m.d.	10.50	1140.00	11970.00
a) Cement sand ratio - 1:2	unskilled	m.d.	12.00	880.00	10560.00
	cement	m.t.	0.21	14063.20	2953.27
	sand	cu.m	0.29	3472.45	1007.01
<b>Item No. 13.1</b>	Sub-Total				26490.28
Norms-14(1-b) page 121	including@15% overhead		sq m		304.64
<b>Flush pointing work on Brick M. walls</b>				material vat @ 13 %	5.15

Flush pointing work on stone masonry walls	skilled	m.d.	10.00	1140.00	11400.00
a) Cement sand ratio - 1:2	unskilled	m.d.	14.00	880.00	12320.00
	cement	m.t.	0.408	14063.20	5737.79
	sand	cu.m	0.57	3472.45	1979.30
<b>Item No. 13.2</b>	Sub-Total				31437.08
Norms-14(2-b) page 122	including@15% overhead		sq m		361.53
<b>Flush pointing work on stone masonry walls</b>				material vat @ 13 %	10.03

Ruled pointing work on brick masonry walls	skilled	m.d.	15.75	1140.00	17955.00
a) Cement sand ratio - 1:2	unskilled	m.d.	18.00	880.00	15840.00
	cement	m.t.	0.21	14063.20	2953.27
	sand	cu.m	0.29	3472.45	1007.01
<b>Item No. 13.3</b>	Sub-Total				37755.28
Norms-14(1-b) page 121	including@15% overhead		sq m		434.19
<b>Ruled pointing work on brick masonry walls</b>				material vat @ 13 %	5.15

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Ruled pointing work on stone masonry walls	skilled	m.d.	15.00	1140.00	17100.00
a) Cement sand ratio - 1:2	unskilled	m.d.	21.00	880.00	18480.00
<b>Item No.</b>	cement	m.t.	0.408	14063.20	5737.79
<b>13.4</b>	sand	cu.m	0.57	3472.45	1979.30
Norms-14(2-b) page 122	Sub-Total				43297.08
	including@15% overhead		<b>sq m</b>		<b>497.92</b>
<b>Ruled pointing work on stone masonry walls</b>				<b>material vat @ 13 %</b>	<b>10.03</b>

3 mm thick flushing plaster of cement sand	skilled	m.d.	10.00	1140.00	11400.00
a) Cement sand ratio - 1:1	unskilled	m.d.	10.00	880.00	8800.00
<b>Item No.</b>	cement	m.t.	0.336	14063.20	4725.24
<b>13.5</b>	sand	cu.m	0.23	3472.45	798.66
Norms-14(6) page 123	Sub-Total				25723.90
	including@15% overhead		<b>sq m</b>		<b>295.82</b>
<b>3 mm thick flushing plaster of cement sand</b>				<b>material vat @ 13 %</b>	<b>7.18</b>

3 mm thick flushing plaster of cement	skilled	m.d.	10.00	1140.00	11400.00
<b>Item No.</b>	unskilled	m.d.	10.00	880.00	8800.00
<b>13.6</b>	cement	m.t.	0.518	14063.20	7284.74
Norms-14(8) page 124	Sub-Total				27484.74
	including@15% overhead		<b>sq m</b>		<b>316.07</b>
<b>3 mm thick flushing plaster of cement</b>				<b>material vat @ 13 %</b>	<b>9.47</b>

#### 14. PAINTING WORKS

Water proof Cement Paint (White Cement) painting application a) in 1 coats	skilled	m.d.	1.70	1140.00	1938.00
<b>Item No.</b>	unskilled	m.d.	1.70	880.00	1496.00
<b>14.1</b>	White cement	kg	30.00	37.26	1117.90
Norms-13(4-a) page 116	Sub-Total				4551.90
	including@15% overhead		<b>sq m</b>		<b>52.35</b>
<b>1 coat White cement painting works</b>				<b>material vat @ 13 %</b>	<b>1.45</b>

cement paint (Snowcem) application a) in 1 coats	skilled	m.d.	3.50	1140.00	3990.00
<b>Item No. 14.2</b>	unskilled	m.d.	3.50	880.00	3080.00
	Snowcem	kg	30.00	107.06	3211.90
Norms-13(12-a) page 120	Sub-Total				10281.90
	including@15% overhead		<b>sq m</b>		<b>118.24</b>
<b>1 coat Snowcem painting</b>				<b>material vat @ 13 %</b>	<b>4.18</b>

cement paint (Snowcem) application a) in 2 coats	skilled	m.d.	6.50	1140.00	7410.00
<b>Item No. 14.3</b>	unskilled	m.d.	6.50	880.00	5720.00
	Snowcem	kg	50.00	107.06	5353.16
Norms-13(12-b) page 120	Sub-Total				18483.16
	including@15% overhead		<b>sq m</b>		<b>212.56</b>
<b>2 coats Snowcem painting</b>				<b>material vat @ 13 %</b>	<b>6.96</b>

Readymade enamel paint application in addition to one base or lining coat (primer) a) in 1 coats	skilled	m.d.	8.00	1140.00	9120.00
<b>Item No. 14.5</b>	unskilled	m.d.	5.00	880.00	4400.00
	primer	litre	8.10	351.06	2843.61
Norms-13(5-a&b) page 117	Sub-Total				4392.57
	including@15% overhead		<b>sq m</b>		<b>20756.18</b>
<b>1 coats enamel painting with primer</b>				<b>material vat @ 13 %</b>	<b>9.41</b>

Readymade enamel paint application in addition to one base or lining coat (primer) a) in 2 coats	skilled	m.d.	12.00	1140.00	13680.00
<b>Item No. 14.6</b>	unskilled	m.d.	8.00	880.00	7040.00
	primer	litre	8.10	351.06	2843.61
Norms-13(5a,b&c) page 117	Sub-Total				7809.01
	including@15% overhead		<b>sq m</b>		<b>31372.62</b>
<b>2 coats enamel painting with primer</b>				<b>material vat @ 13 %</b>	<b>13.85</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Readymade enamel paint application	skilled	m.d.	5.00	1140.00	5700.00
work one coat (excluding primer)	unkilled	m.d.	2.00	880.00	1760.00
	enamel	litre	9.00	488.06	4392.57
<b>Item No.14.7</b>	Sub-Total				<b>11852.57</b>
Norms-13(5 - b) page 117	including@15% overhead		<b>sq m</b>		<b>136.30</b>
<b>1 coat enamel painting excluding primer</b>				<b>material vat @ 13 %</b>	<b>5.71</b>
Readymade enamel paint application without priming coat.	skilled	m.d.	9.00	1140.00	10260.00
	unkilled	m.d.	5.00	880.00	4400.00
a) in 2 coats	primer	litre	0.00	351.06	0.00
<b>Item No. 14.8</b>	enamel syn.	litre	16.00	488.06	7809.01
	Sub-Total				22469.01
Norms-13(5-b&c) page 117	including@15% overhead		<b>sq m</b>		<b>258.39</b>
<b>2 coats enamel painting excluding primer</b>				<b>material vat @ 13 %</b>	<b>10.15</b>
Readymade aluminium paint application with primer.	skilled	m.d.	10.75	1140.00	12255.00
	unkilled	m.d.	10.75	880.00	9460.00
a) in 2 coats	primer	litre	8.10	331.06	2681.61
<b>Item No. 14.9</b>	alumin.pnt	litre	10.76	526.06	5660.44
	sand paper	nos.	4.00	31.10	124.39
Norms-13(6) page 117	Sub-Total				30181.44
<b>2 coats aluminium painting with primer</b>	including@15% overhead		<b>sq m</b>		<b>347.09</b>
				<b>material vat @ 13 %</b>	<b>11.01</b>
Readymade bitumen paint application work	skilled	m.d.	4.00	1140.00	4560.00
a) in 2 coats	unkilled	m.d.	3.00	880.00	2640.00
<b>Item No. 14.10</b>	bitumen paint	litre	19.00	239.15	4543.81
	Sub-Total				11743.81
Norms-13(10-a&b) page 119	including@15% overhead		<b>sq m</b>		<b>135.05</b>
<b>2 coats bitumen painting</b>				<b>material vat @ 13 %</b>	<b>5.91</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Readymade distemper application in addition to one base or lining coat (primer)	skilled	m.d.	4.00	1140.00	4560.00
	unkilled	m.d.	4.00	880.00	3520.00
a) in 1 coats	Cement Primer	litre/Kg	8.00	281.06	2248.51
<b>Item No. 14.11</b>	distemper	kg	6.50	294.06	1911.41
	Sub-Total				12239.92
Norms-13(3-a,b page 115)	including@15% overhead		sq m		140.76
<b>1 coat Distemper painting work With Primer</b>				<b>material vat @ 13 %</b>	<b>5.41</b>
Readymade distemper application in addition to one base or lining coat (primer)	skilled	m.d.	5.80	1140.00	6612.00
	unkilled	m.d.	5.80	880.00	5104.00
a) in 2 coats	Cement Primer	litre/Kg	8.00	281.06	2248.51
<b>Item No. 14.12</b>	distemper	kg	11.50	294.06	3381.73
	Sub-Total				17346.23
Norms-13(3-a,b&c) page 115	including@15% overhead		sq m		199.48
<b>2 coat Distemper painting work With Primer</b>				<b>material vat @ 13 %</b>	<b>7.32</b>
Readymade weather coat paint application in addition to one base or lining coat (primer)	skilled	m.d.	4.00	1140.00	4560.00
	unkilled	m.d.	4.00	880.00	3520.00
a) in 1 coats	Cement Primer	kg	8.00	281.06	2248.51
	Weather Coat	litre	9.00	653.06	5877.57
<b>Item No. 114.13</b>	Sub-Total				16206.07
<b>Norms-13(5 -a&amp;b) page 117</b>	including@15% overhead		sq m		186.37
<b>1 Coat Exterior Weather Coat painting with primer</b>				<b>material vat @ 13 %</b>	<b>10.56</b>
Readymade weather coat paint application in addition to one base or lining coat (primer)	skilled	m.d.	5.80	1140.00	6612.00
	unkilled	m.d.	5.80	880.00	5104.00
a) in 2 coats	Cement Primer	kg	8.00	281.06	2248.51
	Weather Coat	litre	16.00	653.06	10449.01
<b>Item No. 14.14</b>	Sub-Total				24413.52
<b>Norms-13(5a,b&amp;c) page 117</b>	including@15% overhead		sq m		280.76
<b>2Coat Exterior Weather Coat painting with primer</b>				<b>material vat @ 13 %</b>	<b>16.51</b>
Readymade interior Emulsion paint application in addition to one base or lining coat (primer)	skilled	m.d.	8.00	1140.00	9120.00
	unkilled	m.d.	5.00	880.00	4400.00
a) in 1 coats	Cement Primer	kg	8.10	281.06	2276.61
	plastic emulsion	litre	9.00	788.06	7092.57
<b>Item No. 14.15</b>	Sub-Total				22889.18
<b>Norms-13(5 -a&amp;b) page 117</b>	including@15% overhead		sq m		263.23
<b>1 Coat interior plastic emulsion painting with primer</b>				<b>material vat @ 13 %</b>	<b>12.18</b>
Readymade interior Emulsion paint application in addition to one base or lining coat (primer)	skilled	m.d.	12.00	1140.00	13680.00
	unkilled	m.d.	8.00	880.00	7040.00
a) in 2 coats	Cement Primer	kg	8.10	281.06	2276.61
	plastic emulsion	litre	16.00	788.06	12609.01
<b>Item No. 14.16</b>	Sub-Total				35605.62
<b>Norms-13(5a,b&amp;c) page 117</b>	including@15% overhead		sq m		409.46
<b>2Coat interior plastic emulsion painting with primer</b>				<b>material vat @ 13 %</b>	<b>19.35</b>
2mm Wall or ceiling putty	skilled	m.d.	1.00	1140.00	1140.00
	unkilled	m.d.	1.00	880.00	880.00
<b>Item No. 14.17</b>	white putty	kg	10.64	65.00	691.60
	Sub-Total				2711.60
	including@15% overhead		sq m		311.83
<b>2mm Wall or ceiling putty</b>				<b>material vat @ 13 %</b>	<b>8.99</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
<b>15. Water Proofing works</b>					
38 mm thick Damp Proof Course of cement concrete of the ratio 1:2:4	skilled	m.d.	1.00	1140.00	1140.00
	unskilled	m.d.	2.00	880.00	1760.00
<b>Note :-</b>	cement	m.t.	0.12	14063.20	1687.58
<b>Item No</b>	sand	cum	0.17	3472.45	590.32
<b>Item No. 15.1</b>	aggregates12mm	cum	0.34	3669.60	1247.66
	w p c	kg	2.88	66.26	190.84
	Sub- Total				6616.40
Norms-18(9) page 188	including@15% overhead			sq m	760.89
<b>38 mm th. D.P.C. IN (1:2:4) with w.p.c.</b>				<b>material vat @ 13 %</b>	<b>48.31</b>
25 mm thick Damp Proof Course of cement concrete of the ratio 1:1.5:3	skilled	m.d.	1.00	1140.00	1140.00
	unskilled	m.d.	1.25	880.00	1100.00
<b>Note :-</b>	cement	m.t.	0.1125	14063.20	1582.11
Sieved gravel from river	sand	cu.m.	0.113	3472.45	392.39
<b>Item No 15.2</b>	12 mm aggreg	cum	0.250	3669.60	917.40
	w p c	kg	2.25	66.26	149.09
Norms-18(8) page 188	Sub-Total				5280.99
<b>25 mm th. D.P.C. IN (1:1.5:3) with w.p.c.</b>	including@15% overhead			sq m	607.31
<b>25 mm th. D.P.C. IN (1:1.5:3) withOut w.p.c.</b>				<b>material vat @ 13 %</b>	<b>39.53</b>
38 mm thick Damp Proof Course of cement concrete of the ratio 1:2:4	skilled	m.d.	1.00	1140.00	1140.00
	unskilled	m.d.	2.00	880.00	1760.00
<b>Note :-</b>	cement	m.t.	0.12	14063.20	1687.58
<b>Item No 15.3</b>	sand	cum	0.17	3472.45	590.32
	aggregates12mm	cum	0.34	3669.60	1247.66
Norms-18(9) page 188	recron	kg	2.88		0.00
	Sub- Total				6425.56
				sq m	738.94
<b>38 mm th. D.P.C. IN (1:2:4)</b>				<b>material vat @ 13 %</b>	<b>45.83</b>
<b>16. DISMANTLING &amp; REPAIRING WORKS</b>					
Dismantalling of mud masonry wall &removing upto 10 m lead	skilled	m.d.	0.00	1140.00	0.00
	Unskilled	m.d.	1.06	880.00	932.80
<b>Item No. 16.1</b>	Sub-Total				932.80
Norms 19-1	including@15% overhead			cum	1072.72
<b>Dismantaling mud masonry wall</b>				<b>material vat @ 13 %</b>	<b>0.00</b>
Dismantalling of cement masonry wall &removing upto 10 m lead	skilled	m.d.	0.00	1140.00	0.00
	Unskilled	m.d.	2.12	880.00	1865.60
<b>Item No. 16.2</b>	Sub-Total				1865.60
Norms 19-2 ,page no 191	including@15% overhead			cum	2145.44
<b>Dismantaling cement masonry wall</b>				<b>material vat @ 13 %</b>	<b>0.00</b>
Dismantalling of R.C.C./R.B.Cl & removing them upto 10 m lead	skilled	m.d.	0.00	1140.00	0.00
	Unskilled	m.d.	11.00	880.00	9680.00
<b>Item No. 16.3</b>	Sub-Total				9680.00
Norms 19-3 page no 191	including@15% overhead			cum	11132.00
<b>Dismantalling of R.C.C./R.B.Cl wall</b>				<b>material vat @ 13 %</b>	<b>0.00</b>
Dismantalling of P.C.C./L.C.C. & removing them upto 10 m lead	skilled	m.d.	0.00	1140.00	0.00
	Unskilled	m.d.	4.00	880.00	3520.00
<b>Item No. 16.4</b>	Sub-Total				3520.00
Norms 19-4 ,page no 191				cum	4048.00
<b>Dismantaling of P.C.C./L.C.C.</b>				<b>material vat @ 13 %</b>	<b>0.00</b>
Dismantaling of Cement/Lime.plastering & removing them upto 10m lead	skilled	m.d.	0.00	1140.00	0.00
	Unskilled	m.d.	0.108	880.00	95.04
<b>Item No. 16.5</b>	Sub-Total				95.04
page no 191	including@15% overhead			sq m	109.30
<b>Dismantaling of cement /lime plastering</b>				<b>material vat @ 13 %</b>	<b>0.00</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
Dismantling of tile roofing & removing the materials including stacking upto 10 m lead	skilled	m.d.	0.054	1140.00	61.56
	Unskilled	m.d.	0.081	880.00	71.28
<b>Item No. 16.6</b>	Sub-Total				132.84
Norms 19-6 ,page no 191	including@15% overhead		sq m		152.77
<b>Dismantling of tile roofing</b>				<b>material vat @ 13 %</b>	<b>0.00</b>

### 17. IRON WORKS

G.I barbed wire (12 Gauge) fencing with supply of materials and fitting all complete	Skilled	m.d.	1.076	1140.00	1226.64
	unskilled	m.d.	5.38	880.00	4734.40
1kg=8m.	barb.wire	Rm	110.00	25.07	2757.92
<b>Item No. 17.1</b>	killa	L.S.			60.00
Norms-24(6) page 240	Sub-Total				8778.96
	including@15% overhead			Rm	100.96
<b>Barbed wire fencing</b>				<b>material vat @ 13 %</b>	<b>3.66</b>

Fixing of 5 line hor.&2 lines diag.barbed wire with Concret poles@3m distance	Skilled	m.d.	1.00	1140.00	1140.00
	unskilled	m.d.	2.00	880.00	1760.00
Concret poles of size(100x100x2.1)m	Concret pole 7 ' long	No	11.00	171.06	1881.70
<b>Item No. 17.2</b>	barb.wire	Rm	250.00	25.07	6268.00
	U-Hook or GI Wire	L.S.	77.00	2.50	192.50
Norms-24(7) page 240	Sub-Total				11242.20
per m. labour rate only	including@15% overhead			Rm	430.95
<b>Barbed wire fencing with Concret poles</b>				<b>material vat @ 13 %</b>	<b>28.00</b>

### 18. River Training and Gabion Work

3 x 1.5 x 0.75 m box of (100mm *100mm) square mesh size.Supplying, weaving, work complete	skilled	m.d.	0.70	1140.00	798.00
	Unskilled	m.d.	0.440	880.00	387.20
Mesh wire10SWG; Selwage wire 8 SWG	Unskilled	m.d.	0.600	880.00	528.00
<b>Item No. 18.1</b>	C.coated10	kg	33.30	119.26	3971.46
<b>16-8kh&amp;9ka</b>	including@15% overhead				6537.36
<b>3 *1.5 *.75 m box of (100 *100)mm square</b>				<b>material vat @ 13 %</b>	<b>516.29</b>

3 *1.5 *0.75 m box of (150mm *150mm) square mesh size.Supplying, weaving, work complete	skilled	m.d.	0.50	1140.00	570.00
	Unskilled	m.d.	0.20	880.00	176.00
Mesh wire10SWG; Selwage wire 8 SWG	Unskilled	m.d.	0.60	880.00	528.00
<b>Item No. 18.2</b>	C.coated 10	kg	20.00	119.26	2385.26
<b>16-8kh&amp;9kha</b>	including@15% overhead				4208.15
<b>3 *1.5 *0.75 m box of (150 *150)mm square</b>				<b>material vat @ 13 %</b>	<b>310.08</b>

2*1 *1 m box of (100mm *120mm)hexagonal mesh size.Supplying, weaving, Laying and binding work complete	skilled	m.d.	0.45	1140.00	513.00
	Unskilled	m.d.	0.20	880.00	176.00
Mesh wire10SWG; Selwage wire 8 SWG, binding wire 12SWG	Unskilled	m.d.	0.40	880.00	352.00
<b>Item No. 18.3</b>	C.coated 10	kg	24.15	119.26	2880.21
<b>16-5ka&amp;7 ka</b>	C.coated 8	kg	2.65	119.26	316.05
page	C.coated 12	kg	0.95	120.26	114.25
	including@15% overhead				5004.23
<b>2 *1 *1 m box of (100 *120)mm hexagonal</b>				<b>material vat @ 13 %</b>	<b>430.37</b>

3*1 *1 m box of (100mm *120mm)hexagonal mesh size.Supplying, weaving, Laying and binding work complete	skilled	m.d.	0.63	1140.00	718.20
	Unskilled	m.d.	0.28	880.00	246.40
Mesh wire10SWG; Selwage wire 8 SWG, binding wire 12SWG	Unskilled	m.d.	0.60	880.00	528.00
<b>Item No. 18.4</b>	C.coated 10	kg	35.10	119.26	4186.14
<b>16-5kha&amp;-7 kha</b>	C.coated 8	kg	3.40	119.26	405.49
page	C.coated 12	kg	1.30	120.26	156.34
	including@15% overhead				7176.66
<b>3 *1 *1 m box of (100 *120)mm hexagonal</b>				<b>material vat @ 13 %</b>	<b>617.24</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
<b>Launching Apron work</b>					
2 *1 *.50m box of (100mm *120mm)hexagonal	skilled	m.d.	0.32	1140.00	364.80
mesh size.Supplying, weaving, Laying and binding work complete	Unskilled	m.d.	0.14	880.00	123.20
Mesh wire10SWG; Selwage wire 8 SWG, binding wire 12SWG	Unskilled	m.d.	0.20	880.00	176.00
medium coated	G.I.wire10swg	kg	16.45	119.26	1961.88
<b>Item No. 18.5</b>	selwage wire8swg	kg	2.10	119.26	250.45
<b>16-5 ga&amp;7-ga</b>	C.coated 12	kg	0.70	120.26	84.18
	including@15% overhead				3404.59
<b>2 *1 *.5m box of (100 *120)mm hexagonal</b>				<b>material vat @ 13 %</b>	<b>298.55</b>

3 *1 *.50m box of (100mm *120mm)hexagonal	skilled	m.d.	0.45	1140.00	513.00
mesh size.Supplying, weaving, Laying and binding work complete	Unskilled	m.d.	0.20	880.00	176.00
Mesh wire10SWG; Selwage wire 8 SWG, binding wire 12SWG	Unskilled	m.d.	0.30	880.00	264.00
medium coated	G.I.wire10swg	kg	24.15	119.26	2880.21
<b>Item No. 18.6</b>	selwage wire8swg	kg	2.75	119.26	327.97
<b>16-5 gha&amp;7-gha</b>	C.coated 12	kg	0.95	120.26	114.25
	including@15% overhead				4916.74
<b>3 *1 *.5 box of (100mm *120mm) hexagonal</b>				<b>material vat @ 13 %</b>	<b>431.92</b>

Boulder filling in crates upto 30mlead	skilled	m.d.	0.00	1140.00	0.00
<b>Item No. 18.7</b>	Unskilled	m.d.	0.50	880.00	440.00
	Boulder	Cu.m	1.10	1980.00	2178.00
page	Sub-Total				2618.00
	including@15% overhead			<b>Cum</b>	3010.70
<b>Boulder filling upto 30 m lead</b>				<b>material vat @ 13 %</b>	<b>283.14</b>

Boulder filling ( for launching)150m. Haulage	skilled	m.d.	0.26	1140.00	296.40
<b>Item No. 18.8</b>	Unskilled	m.d.	3.50	880.00	3080.00
	Boulder	Cu.m	1.10	1980.00	2178.00
page	Sub-Total				5554.40
	including@15% overhead			<b>Cum</b>	6387.56
<b>Boulder filling upto 150m lead</b>				<b>material vat @ 13 %</b>	<b>283.14</b>

**19 Railing work**

Providing and fixing stainless steel railing of 38 mm dia vertical post and hand rail, 25mm dia three layer horizontal pipe with painting on both side all complete as per specification, drawing and instruction of Site Engineer.	skilled	m.d.	7.78	1140.00	8869.20
	unskilled	m.d.	11.35	880.00	9988.00
<b>Note :-</b>	38mm steel pipe	m	15.49	380.77	5898.19
<b>Item No 19.1</b>	25mm steel pipe	m	20.00	301.77	6035.48
	Welding+painting	LS	1.00	500.00	500.00
	Sub- Total				31290.88
	including@15% overhead			<b>sq m</b>	3932.73
<b>Railing work</b>				<b>material vat @ 13 %</b>	<b>176.65</b>

**20 Truss work**

Providing, fabricating and erecting at site steel members with mild steel section of minimum yield strength of 18.94kg/sq.m. for truss, including application of primer paint, all complete, as per specification, drawing and instruction of Site Engineer.	skilled	m.d.	0.69	1140.00	783.18
	unskilled	m.d.	0.78	880.00	687.28
<b>Note :-</b>	MS black pipe fabricating and erecting	KG	18.94	101.35	1919.53
<b>Item No 20.1</b>	primer	LS			110.00
	Sub- Total				4024.99
	including@15% overhead			<b>Kg</b>	212.51
<b>Truss work</b>				<b>material vat @ 13 %</b>	<b>13.93</b>

Analysis of Rates  
**FY:2080/81**

Detail of item	Description	Unit	Quantity	Unit Rate	Amount
----------------	-------------	------	----------	-----------	--------

**21 Greenary work**

laying Dubo grass with watering with Chemical Fertilizer	unskilled	no	5.04	880.00	4435.20
Material rate					
<b>Note :- for material , rate from kathmandu is taken with 5% transpotation charge</b>	Dubo Grass	sqm	100.00	355.08	35508.00
<b>Item No 21.1</b>	Fertilizer	Kg	7.00	28.00	196.00
	5% Transportation for material				1785.20
	Sub- Total				41924.40
	including@15% overhead		sq m		482.13
<b>Greenary Work</b>				<b>material vat @ 13 %</b>	<b>48.74</b>

**22 Aluminium Doors**

Single/Double panel swing door of section 101*45*1.5 with 5mm glass	Kathmandu Rate				7789.08
	5% Transportation				389.45
	Sub- Total				8178.54
			sq m		8178.54
<b>Aluminium Doors work</b>				<b>material vat @ 13 %</b>	<b>0.51</b>

**23 Aluminium Window**

Sliding cum fix window of section 101*45*1.5 with 5mm glass with net shutter	Kathmandu Rate				9913.87
	5% Transportation				495.69
	Sub- Total				10409.56
			sq m		10409.56
<b>Aluminium Window work</b>				<b>material vat @ 13 %</b>	<b>0.64</b>

**Name Project : Masterplan, Myagdi Tatopani**

**Location : Myadgi District, Nepal.**

**Client : WECS**

**SUMMARY OF COST ESTIMATE**

S. No.	Particulars	Amount (NRs.)	Remarks
<b>A</b>	<b>Civil works</b>		
1	All building, landscaping, protection	83,227,140.23	
	<b>Total of Civil works</b>	<b>83,227,140.23</b>	
<b>B</b>	<b>Electrical and Allied Installations</b>		
1	Indoor and outdoor	6,226,000.00	
	<b>Total of Electrical and Allied Installations</b>	<b>65,188.71</b>	
<b>C</b>	<b>Sanitary ,Plumbing &amp; Water Supply Works</b>		
1	Indoor and outdoor	5,220,000.00	
	<b>Total of Sanitary ,Plumbing &amp; Water Supply Works</b>	<b>5,220,000.00</b>	
	<b>Total Cost of Building (A+B+C):</b>	<b>88,512,328.94</b>	
	<b>Physical Contingency @ 10% of Sub-Total (D):</b>	<b>8,851,232.89</b>	
	<b>Price Contingency @ 10% of Sub-Total (E):</b>	<b>8,851,232.89</b>	
	<b>Subtotal (F)</b>	<b>106,214,794.73</b>	
	<b>VAT @ 13% of Sub-Total (F):</b>	<b>13,807,923.31</b>	
	<b>Total Cost With VAT and Contingency</b>	<b>120,022,718.04</b>	

**Name Project : Masterplan, Myagdi Tatopani**

**Location : Myadgi District, Nepal.**

**Client : WECS**

**Detail Quantity Calculation Sheet**

S.N.	DESCRIPTION	NO.	LENGTH	BREADTH	HEIGHT	TOTAL	UNIT	
1	Site clearance							
1.1	Site clearance							
	Bhurung	1	Area=		4300.00	4,300.00		
	Paudwar	1	Area=		1600.00	1,600.00		
		<b>Total of Site clearance</b>				<b>5,900.00</b>	<b>sq.m</b>	
2	EARTH WORKS							
2.1	Earth Work Excavation in BMS							
	General excavation for site levelling in Paudwar	1		750.00	1.00	750.00		
	Earth Work Excavation for foundations							
	Bhurung							
	Main Block							
	Column foundations	27	2.20	2.20	1.80	235.22		
	Tie beam	3	26.75	0.50	1.00	40.13		
		9	7.30	0.50	1.00	32.85		
	Ticket Counters							
	Tie beam	2	2.00	0.50	1.00	2.00		
		2	2.00	0.50	1.00	2.00		
	Paudwar							
	Main Building							
	Column foundations	18	2.00	2.00	1.80	129.60		
	Tie beam	3	22.40	0.50	1.00	33.60		
		6	9.70	0.50	1.00	29.10		
	Toilet and Changing Block							
	Column foundations	8	2.00	2.00	1.80	57.60		
	Tie beam	2	10.40	0.50	1.00	10.40		
		5	3.30	0.50	1.00	8.25		
	Ticket Counters							
	Tie beam	2	2.00	0.50	1.00	2.00		
		2	2.00	0.50	1.00	2.00		
		<b>Total of Earth Work Excavation in BMS</b>				<b>1,334.75</b>	<b>cu.m</b>	
2.2	Earth Back Filling							
	Backfilling in foundation and plinths	1				292.37		
		<b>Total</b>				<b>292.37</b>	<b>cu.m</b>	

S.N.	DESCRIPTION	NO.	LENGTH	BREADTH	HEIGHT	TOTAL	UNIT
3	Stone works						
3.1	Stone soling						
	<b>Bhurung</b>						
	<b>Main Block</b>						
	Column foundations	27	2.00	2.00	0.20	21.60	
	Tie beam	3	26.75	0.50	0.20	8.03	
		9	7.30	0.50	0.20	6.57	
	<b>Ticket Counters</b>						
	Tie beam	2	2.00	0.50	0.20	0.40	
		2	2.00	0.50	0.20	0.40	
	<b>Paudwar</b>						
	<b>Main Building</b>						
	Column foundations	18	2.00	2.00	0.20	14.40	
	Tie beam	3	22.40	0.50	0.20	6.72	
		6	9.70	0.50	0.20	5.82	
	<b>Toilet and Changing Block</b>						
	Column foundations	8	2.00	2.00	0.20	6.40	
	Tie beam	2	10.40	0.50	0.20	2.08	
		5	3.30	0.50	0.20	1.65	
	<b>Ticket Counters</b>						
	Tie beam	2	2.00	0.50	0.20	0.40	
		2	2.00	0.50	0.20	0.40	
	For flooring for all blocks		Area=	517.00	0.20	103.40	
					<b>Total</b>	<b>178.27</b>	
4	Concrete works						
4.1	75 mm thk. PCC work (M10)				<b>Total</b>	<b>66.85</b>	
	RCC work						
	<b>Bhurung</b>						
	<b>Main Block</b>						
	Column foundations	27	1.70	1.70	0.45	35.11	
	column	27	0.40	0.40	8.00	34.56	
	beam	12	26.75	0.30	0.40	38.52	
		36	7.30	0.30	0.40	31.54	
	Slab	2	8.20	27.65	0.13	58.95	
	<b>Ticket Counters</b>						
	beam	4	2.00	0.25	0.25	0.50	
		4	2.00	0.25	0.25	0.50	
	<b>Paudwar</b>						
	<b>Main Building</b>						
	Column foundations	18	1.70	1.70	0.45	23.41	
	column	18	0.40	0.40	8.00	23.04	
	beam	12	22.40	0.30	0.40	32.26	
		24	9.70	0.30	0.40	27.94	
	slab	2	23.20	11.00	0.13	66.35	

S.N.	DESCRIPTION	NO.	LENGTH	BREADTH	HEIGHT	TOTAL	UNIT
	<b>Toilet and Changing Block</b>						
	Column foundations	8	1.50	1.50	0.35	6.30	
	column	8	0.30	0.30	4.50	3.24	
	beam	6	10.40	0.25	0.35	5.46	
		15	3.30	0.25	0.35	4.33	
	slab	1	23.40	5.00	0.13	15.21	
	<b>Ticket Counters</b>						
	Tie beam	4	2.00	0.25	0.25	0.50	
		4	2.00	0.25	0.25	0.50	
					sum	408.21	142.039
	Sill and lintel bands	1				40.58	
					<b>Total concrete</b>	<b>448.80</b>	<b>cu.m.</b>
4.2	Reinforcement					70.46	<b>Ton</b>
4.3	Formwork						
	Columns	27	1.60		8.00	36.60	
	Columns	18	1.60		8.00	27.60	
	Columns	8	1.20		4.50	13.70	
	Beams	2	583.80		0.40	586.20	
	Beams	2	501.60		0.40	504.00	
	Beams	2	111.90		0.35	114.25	
	Beams	4	16.00		0.25	20.25	
	slab	2	27.65	8.20		453.46	
	slab	2	24.00	11.00		528.00	
	slab	1	23.00	5.00		115.00	
				<b>Total Formwork</b>		<b>2,399.06</b>	
<b>5</b>	<b>BRICK WORKS</b>						
5.1	<b>Full Brick (250 mm) Works (1:4c/s) With One Side Fair Face</b>						
	<b>Bhurung</b>						
	<b>Main Block</b>						
	Wall	2	26.75	0.25	7.00	93.63	
		2	7.30	0.25	7.00	25.55	
	<b>Ticket Counters</b>						
	beam	2	2.00	0.25	3.00	3.00	
		2	2.00	0.25	3.00	3.00	
	<b>Paudwar</b>						
	<b>Main Building</b>						
	beam	2	22.40	0.25	7.00	78.40	
		2	9.70	0.25	7.00	33.95	
	<b>Toilet and Changing Block</b>						
	beam	2	10.40	0.25	3.50	18.20	
		2	3.30	0.25	3.50	5.78	
	<b>Ticket Counters</b>						
	Tie beam	2	2.00	0.25	3.00	3.00	
		2	2.00	0.25	3.00	3.00	
					<b>Total of 250 thk BK wall</b>	<b>267.50</b>	<b>cu.m</b>

S.N.	DESCRIPTION	NO.	LENGTH	BREADTH	HEIGHT	TOTAL	UNIT
5.2	<b>Half Brick (125 mm) Works (1:4c/s)</b>						
	<b>Bhurung</b>						
	<b>Main Block</b>						
	Wall	2	26.75		6.00	321.00	
		9	7.30		6.00	394.20	
	<b>Paudwar</b>						
	<b>Main Building</b>						
	beam	5	10.10		6.00	303.00	
		2	22.23		6.00	266.76	
	<b>Toilet and Changing Block</b>						
	beam	8	4.00		3.00	96.00	
		2	10.47		3.00	62.82	
						<b>Total of 250 thk BK wall</b>	<b>1,443.78 sq. m.</b>
6	<b>Flooring and Finishing</b>						
6.1	<b>Plastering</b>						
	Plastering On 250 bk wall	2	1070			2,140.00	
	Plastering On 120 bk wall	2	1,443.78			2,887.56	
	ticket counter plaster	8	8.00		3	192.00	
						<b>Total of 12.5 thk Plaster</b>	<b>5,219.56 sq.m</b>
6.2	<b>Painting</b>					<b>5,219.56</b>	<b>sq.m</b>
6.4	<b>Floor tiling</b>						
	<b>Bhurung</b>						
	<b>Main Block</b>	2	<b>192.34</b>			384.68	
	<b>Ticket Counters</b>	1	4.00			4.00	
	<b>Paudwar</b>						
	<b>Main Building</b>	2	225.62			451.24	
	<b>Toilet and Changing Block</b>	1	90.18			90.18	
	<b>Ticket Counters</b>	1	4.00			4.00	
						<b>Total area of floor tiles</b>	<b>934.10 sq.m</b>
7	<b>Roofing</b>						
7.1	<b>Color CGI Roofing</b>						
	ticket counter	2	3	2.8		16.80	
7.2	<b>False Ceiling</b>					<b>16.80</b>	
7.3	<b>Metal works for Roofing</b>					<b>252.00</b>	

S.N.	DESCRIPTION	NO.	LENGTH	BREADTH	HEIGHT	TOTAL	UNIT
<b>8</b>	<b>Openings</b>						
	Door/Windows/ Ventilations						
	<b>Bhurung</b>						
	Main Block						
	W1	19		1.5	1.35	38.48	
	W2	18		0.9	1.2	19.44	
	D1	1		1.5	2.1	3.15	
	D2	1		2.4	2.1	5.04	
	D3	20		0.9	2.1	37.80	
	D4	2		0.75	2.1	3.15	
	Ticket Counters						
	W1	4		1.5	1.35	8.10	
	W2	2		1.5	1.2	3.60	
	V1	2		3.45	0.425	2.93	
						<b>121.69</b>	
	<b>Paudwar</b>						
	Main Block						
	W1	28		1.5	1.35	56.70	
	D1	1		1.5	2.1	3.15	
	D2	1		2.4	2.1	5.04	
	D3	20		0.9	2.1	37.80	
	D4	2		0.75	2.1	3.15	
	Ticket Counters						
	W1	2		0.9	1.35	2.43	
	D1	1		0.9	2.1	1.89	
	Toilet and Changing Block						
	D1	7		0.9	2.1	13.23	
	D2	7		0.75	2.1	11.03	
						<b>134.42</b>	
<b>9</b>	<b>Landscaping works</b>						
9.1	Concrete Interlocking Block						
9.2	Brick on edge Pavement						
9.3	Flagstone pavement					1,564.00	sqm
9.4	Steps/ramp						
9.5	Railings					300.00	m
9.6	Chain link Fencing					600.00	m
9.7	Carpet grass					2,252.00	
<b>10</b>	<b>Protection Works</b>						
10.1	Gabion Rivetment						
10.2	Gabion works	1	15	4.5	1	67.50	
10.3	Masonry work						
10.4	Plum Concrete	1	50	Area=	14.25	712.50	
	Plum Concrete	1	52	Area=	22.25	1,157.00	
10.5	RCC wall						
10.6	Boulder Rip-Rap	1	50	3	1.2	180.00	
<b>13</b>	<b>Furnishing works</b>	1					<b>LS</b>

**Name Project : Masterplan, Myagdi Tatopani**

**Location : Myadgi District, Nepal.**

**Client : WECS**

**Abstract of Cost - Civil Works**

Item No.	Description of Works	Unit	Quantity	Rate	Amount
				(NRs.)	(NRs.)
<b>1</b>	<b>EARTH WORKS</b>				
1.1	<b>SITE CLEARANCE &amp; MOBILIZATION :</b>				
	Clearing and grubbing the site for construction by removing 150mm thick top soil including bushes, small trees, leveling of undulated ground, shorting and stacking/storing selected top soil for reuse in landscaping works, disposing unsuitable materials from site, etc., all complete as per drawings, specifications and instructions of the Engineer.	sq.m	5,900.00	41.69	245,996.96
1.2	<b>EARTHWORK IN EXCAVATION :</b>				
	Excavation in foundations in all type of soils for foundation, trenches, footing, pits etc. to the required depth including dewatering by manual or mechanical means etc. as per specifications with all contractor's own machinery and equipment's, providing crossing of track, shoring, strutting, timbering and buttressing with appropriate materials and all such measures necessary to retain in position the sides of the foundation pit and including refilling the excavated material with watering, ramming, leveling the site and disposing off the surplus/unusable earth to outside the construction premises, etc. all complete as per drawings, specifications and instructions of the	cu.m	1,334.75	833.89	1,113,031.17
1.3	<b>EARTH BACK FILLING :</b>				
	Back filling in foundation and sides of foundation with approved soil obtained from the excavation at site and stacked at site or brought from outside in layer not exceeding 15 cm thick (compacted thickness) including transportation of soil, spreading in required line and level, sprinkling water, ramming, compacting with mechanical rammers, testing, etc., all complete as per drawing, specification and instructions of the Engineer.	cu.m	333.69	506.00	168,845.75
1.4	<b>BOULDER SOLING</b>				
	Providing and laying uncoursed hand packed Dry Rubble Stone soling in foundation, under floor plinth with out any special dressing of stone including filling interstices with suitable quarry waste or stone chips or quarry sand, watering, compacting using appropriate mechanical compaction means with all contractors materials, handling, placing etc. all complete as per drawings, specifications and instruction of the Engineer. The complete item including all lead & lift.	cu.m	178.27	10,192.95	1,817,046.91
<b>2</b>	<b>CONCRETE WORKS</b>				
2.1	<b>P.C.C</b>				

Item No.	Description of Works	Unit	Quantity	Rate	Amount
				(NRs.)	(NRs.)
2.1.1	<b>P.C.C (1:3:6) Works</b>				
	Providing and laying machine mixed Plain Cement Concrete of nominal mix 1:3:6 (1 cement : 3 sand : 6 coarse aggregate ) for leveling course in foundations and under floor of building, etc. in all level with broken stone aggregate of size not more than 25 mm of approved quality including formwork wherever necessary, dewatering, batching, mixing, transporting, placing, compacting, curing, including all lead and lift, etc. all complete as per drawings, specifications and the instructions of the Engineer.	cu.m	66.85	15,055.68	1,006,463.02
2.2	<b>P.C.C. FOR R.C.C. WORKS</b>				
	Providing and laying in position machine mixed and machine vibrated cement concrete of mix 1:1.5:3 (1 cement:1.5 sand: 3 coarse aggregate) M20 grade for reinforced cement concrete work using approved cement with 20 mm graded machine crushed stone aggregate of approved quality in various locations and heights including transportation of concrete to site of placing, compaction, finished to required line and level, protection and curing, etc. all complete as per drawings, specifications and the instructions of the Engineer, but excluding the cost of centering, shuttering, and reinforcement, all complete as per drawings, specifications and instructions of the Engineer.	cu.m	448.80	20,848.27	9,356,622.12
2.3	<b>STEEL REINFORCEMENT</b>				
	Providing and fixing in position Fe 500 steel reinforcement of various diameter confirming to relevant IS code in R.C.C. works including straightening, cutting, bending, binding with 20 SWG annealed wire for tying the reinforcement bars at each junctions (binding wire shall not be measured separately) including all waste and cut pieces, provision for adequate numbers of spacers, chairs, providing and placing cement mortar (1:1) cover blocks to keep the bars in intended position at all levels all complete as per drawings, specifications and instructions of the Engineer. (Authorized lap length and for the bar length exceeding 10 meter in length shall be measured for the payment, except to column).	Mt.	70.46	152,682.14	10,758,136.92
2.4	<b>FORM WORKS</b>				
	Supplying and laying centering, shuttering of various pattern formworks with 19/12 mm thick water proof ply wood & steel adjustable props for all kinds of RCC works for foundations, columns, shear walls, beams, slab, staircase, lintel, sill, pergola, including nails, propping scaffolding, staging, supporting and bracing in proper lines and level, sealing the joints with heavy duty brown self adhesive tape, aligning to line and levels including Ties, PVC Spacer, Providing openings/ cutouts/ pockets, applying De-shuttering chemical, De-shuttering as approved by the Engineer etc., complete at all levels as per drawing, specifications and instructions of the Engineer.	sq.m	2,399.06	781.62	1,875,154.43

Item No.	Description of Works	Unit	Quantity	Rate	Amount
				(NRs.)	(NRs.)
<b>3</b>	<b>BRICK/ STONE MASONRY WORKS</b>				
3.1	<b>BRICK MASONRY WORKS ( 1 : 4 c/s ) ONE SIDE FAIRFACE</b>				
	Providing and laying first class selected factory pressed wire cut Fair Face brick (machine made brick) one or more brick thick wall in cement mortar 1:4 (1 cement : 4coarse sand) in ,superstructure and other specified places in all heights and level including the cost of single or multi stage self standing scaffolding, soaking bricks, curing, raking joints, provision for recesses, openings, toothing etc., all complete as per drawing, specifications and instructions of the Engineer.	cu.m	267.50	21,636.52	5,787,769.17
3.2	<b>HALF BRICK WORKS ( 1 : 4 c/s )</b>				
	Providing and laying non-fairfaced half brick work masonry in cement mortar 1:4 (1 cement:4 sand) in superstructure with approved first class fired bricks in perfect line & level, required size and shape at any height and level, including the cost of single or multi stage scaffolding, cleaning, soaking of the bricks, packing of the joints, raking joints, provision for recesses, openings, curing, providing 25x3mm GI Straps Fixed to columns at every 5th course of brick and 60mm width 14 gauge welded GI mesh anchored to GI strap, all complete as per design, drawing, specifications instructions of the Engineer.	cu.m	158.82	21,636.52	3,436,221.27
<b>4</b>	<b>Roofing</b>				
4.1	<b>Color CGI Roofing</b>	sq m	16.80	1,485.82	24,961.70
	False Ceiling	sq m	16.80	1,630.00	27,384.00
4.1.1.	Metal works for Roofing	kg	252.00	212.51	53,553.19
4.2	<b>DOOR AND WINDOW SHUTTER</b>				
4.2.1	<b>Almunium Door</b>				
	Single/Double panel swing door of section 101*45*1.5 with 5mm gl	sq.m	121.69	8,178.54	995,225.56
4.2.2	<b>Almunium Window</b>				
	Sliding cum fix window of section 101*45*1.5 with 5mm glass with n	sq.m	134.42	10,409.56	1,399,200.86
<b>5</b>	<b>FLOORING WORKS</b>				
5.1	<b>Tiling works</b>				
	Providing and laying 10 mm thick non-skidding vitrified tiles for floor of approved standard quality, pattern, standard make and of size 300mmx300mm in floor over 40 mm thick cement sand mortar in ratio (1:4) and maintaining proper slope including filling joints with cement etc all complete as per drawings, specifications and instructions.	sq.m	934.10	4,924.26	4,599,752.89
5.2	<b>Flag stone flooring</b>				
	Providing and laying flagstone in outdoor pathways with 1:4 cement and sand ratio as per design and instruction by engineer	sq.m	1,564.00	2,500.00	3,910,000.00
5.3	<b>Grass</b>				
	Providing and laying grass slumps as per design and specification	sq.m	2,252.00	450.00	1,013,400.00
<b>6</b>	<b>PLASTERING/ WALL FINISHING WORKS</b>				

Item No.	Description of Works	Unit	Quantity	Rate	Amount
				(NRs.)	(NRs.)
6.1	<b>CEMENT PLASTER WORKS</b>				
6.1.1	<b>Cement plaster (1:6)</b>				
	Providing and applying at all levels and shape 20 mm thick cement plaster in building inside in specified cement mortar in two layers as 6 to 8 mm thick final coat with 1:6 (1 cement :6 fine sand) cement mortar over the 12 to 14 mm thick 1:6 (1 cement : 6 coarse sand) under coat in all surface at all height including mixing mortar, laying in perfect line, level and plumb and finishing in regular and even surface including all necessary single or multi-stage scaffolding, making grooves and recesses, throating, dusting, dripping, wetting, curing, protection, providing chicken wire mesh at the junction of concrete and masonry etc., all complete as per drawing , specification and instruction of the Engineer. [Rate shall also include for providing drips band, moulds, groove, chicken wire mesh at junction of RCC and masonry, etc., to complete the works at any heights].	sq.m	5,219.56	443.71	2,315,995.43
6.2	<b>DISTEMPER PAINT</b>				
	Providing and applying two or more coats of washable distemper paint of approved manufacturer and shade over a coat of alkali resistant cement primer of approved manufacturer as per manufacturer's specifications to the surface of wall, ceiling, beams columns, canopies, staircase, lobbies etc., all complete as per drawings, specifications and instruction. The rates shall include for scraping, washing the surface with water, surface preparation, scaffolding etc., all complete as per the manufacturer's recommendations and as approved by the Engineer.	sq.m	5,219.56	199.48	1,041,206.56
<b>7</b>	<b>MISCELLANEOUS</b>				
7.1	<b>Protection works</b>				
7.1.2	<b>Gabion protection works</b>	cum	67.50	7,176.66	484,424.66
7.2	<b>Plum concrete works</b>	cum	1,869.50	13,196.29	24,670,460.65
	Boulder riprap	cum	180.00	6257.15	1,126,287.00
<b>8</b>	<b>Dismateling existing structure</b>	LS	1.00	1,000,000.00	1,000,000.00
<b>9</b>	<b>Furnishing works</b>	LS	1.00	5,000,000.00	5,000,000.00
<b>Total Cost of Civil Works for Tc(M), Carried Over to Summary(Without VAT) :</b>					<b>83,227,140.23</b>

Name Project : Masterplan, Myagdi Tatopani

Location : Myadgi District, Nepal.

Client : WECS

**Abstract of Cost - Sanitary and Electrical Works**

Item No.	Description of Works	Quantity	units	Rate	Amount
				(NRs.)	(NRs.)
<b>10</b>	<b>Sanitary and water supply</b>	<b>QTY</b>	<b>units</b>	<b>Rate</b>	<b>Amount</b>
10.1	Commode or Pan incl. spray and TPH	18	nos	20000	360,000.00
10.2	Wash Basin incl Tap	19	nos	8000	152,000.00
10.3	Urinals with flush	16	nos	7000	112,000.00
10.4	Showers incl mixer	8	nos	12000	96,000.00
10.5	Bathtubs/ jacuzzi	10	nos	300000	3,000,000.00
10.6	Pipes and fittings	1	LS	1500000	1,500,000.00
					<b>5,220,000.00</b>
<b>11</b>	<b>Eletrical Installation</b>				
11.1	Outdoor Lighting	60	nos	50000	3,000,000.00
11.2	Indoor/ Normal	180	nos	2200	396,000.00
11.3	electrification and wiring	1	LS	2500000	2,500,000.00
11.4	Pumps	2	nos	40000	80,000.00
11.5	Safety hooters	2	nos	125000	250,000.00
					<b>6,226,000.00</b>

## **Annex-V: Economic analysis and revenue estimate**

### Economic Analysis of Hot Water Spring, Myagdi

Project cost	120,022,718.04			<b>Cash Flow</b>		<b>Returns</b>				
Annual O&M	10.0%			Year 1	48,009,087.22	IRR	25.37%			
Escalation rate	5%			Year 2	72,013,630.83	NPV	511,039,508.16			
Discount rate	10%					Payback period	4 years			
Annual Gross revenue	29,372,200.00					BCR	> 3.83			
Annual Net Revenue	23,497,760.00	80%								
Annual benefit increment	2%									
Duration	20									
Year	Description	Cashflow		O & M	Revenue	Total cash outflow	Total cash inflow	Net cash flow	Cumulative Net cash flow	Current value
		Construction								
1	Construction	48,009,087.22			23,497,760.00	-48009087.22	23,497,760.00	-24511327.22	(24,511,327.22)	(24,511,327.22)
2	Construction	72,013,630.83		4,800,908.72	25,166,100.96	(76,814,539.55)	25166100.96	-51648438.59	(76,159,765.81)	(62,941,955.21)
3	Operation			12,002,271.80	26,952,894.13	(12,002,271.80)	26952894.13	14950622.32	(61,209,143.48)	(45,987,335.45)
4	Operation			12,602,385.39	28,866,549.61	-12602385.39	28866549.61	16264164.22	(44,944,979.27)	(30,698,025.59)
5	Operation			13,232,504.66	30,916,074.63	-13232504.66	30916074.63	17683569.97	(27,261,409.30)	(16,927,190.33)
6	Operation			13,894,129.90	33,111,115.93	-13894129.9	33111115.93	19216986.04	(8,044,423.26)	(4,540,867.21)
7	Operation			14,588,836.39	35,462,005.16	-14588836.39	35462005.16	20873168.77	12,828,745.51	6,583,174.91
8	Operation			15,318,278.21	37,979,807.53	-15318278.21	37979807.53	22661529.32	35,490,274.83	16,556,475.13
9	Operation			16,084,192.12	40,676,373.87	(16,084,192.12)	40,676,373.87	24592181.74	60,082,456.57	25,480,826.74
10	Operation			16,888,401.73	43,564,396.41	-16888401.73	43564396.41	26675994.68	86,758,451.25	33,449,138.68
11	Operation			17,732,821.82	46,657,468.55	-17732821.82	46657468.55	28924646.74	115,683,097.99	40546220.12
12	Operation			18,619,462.91	49,970,148.82	-18619462.91	49970148.82	31350685.92	147,033,783.91	46849494.8
13	Operation			19,550,436.05	53,518,029.39	-19550436.05	53518029.39	33967593.34	181,001,377.25	52429651.67
14	Operation			20,527,957.85	57,317,809.48	-20527957.85	57317809.48	36789851.62	217,791,228.87	57351237.47
15	Operation			21,554,355.75	61,387,373.95	-21554355.75	61387373.95	39833018.2	257,624,247.07	61673196.47
16	Operation			22,632,073.53	65,745,877.50	-22632073.53	65745877.5	43113803.96	300,738,051.03	65449362.15
17	Operation			23,763,677.21	70,413,834.80	-23763677.21	70413834.8	46650157.59	347,388,208.62	68728905.11
18	Operation			24,951,861.07	75,413,217.07	-24951861.07	75413217.07	50461356	397,849,564.62	71556741.26
19	Operation			26,199,454.12	80,767,555.48	-26199454.12	80767555.48	54568101.36	452,417,665.98	73973903.58
20	Operation			27,509,426.83	86,502,051.92	-27509426.83	86502051.92	58992625.09	511,410,291.07	76017881.07
							<b>IRR</b>	<b>25.37%</b>	<b>Total</b>	<b>511,039,508.16</b>

### Revenue Estimate of Myagdi

SN	Description of item	No.	Amount(NRs.)	Remarks
1	Paudwar Tatopani			
	Monthly visitors	750		Visitors for 9 months
		500		Visitors daily for three months
	Yearly Visitors	51,750.00	5,175,000.00	Revenue from ticket sales
	Bhurung Tatopani			
	Yearly Visitors	73,000.00	7,300,000.00	Revenue from Ticket sales
		<b>Subtotal</b>	<b>12,475,000.00</b>	
2	Pool and jacuzzi	31187.5	6,237,500.00	Revenue from pool
3	Accomodation	1752	1,752,000.00	
4	Cafeteria		6,237,500.00	Revenue from cafeteria
		<b>Subtotal</b>	<b>26,702,000.00</b>	
5	sponsorship		2,670,200.00	Revenue from sponsorship
		<b>Total revenue</b>	<b>29,372,200.00</b>	