

INTERNSHIP REPORT
ON
**RURAL WATER SUPPLY SCHEME IN VILLAGE
AROUND MORAR, GWALIOR**

UNDER

(JAL JEEVAN MISSION)

(16/1/22 to 16/5/22)

Submitted to-

MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE GWALIOR
(Agovt.AidedAutonomous Institute under RGPV, Bhopal (M.P) Established in 1957)

IN PARTIAL FULFILLMENT FOR REQUIREMENT FOR THE AWARD OF THE DEGREE OF

BACHELOR OF TECHNOLOGY
In
CIVIL ENGINEERING



MAY 2022

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Madhav Institute of Technology & Science, Gwalior
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to R.G.P.V. Bhopal)

CERTIFICATE



PUBLIC HEALTH ENGINEERING DEPARTMENT

THIRD PARTY INSPECTION AGENCY THATIPUR, DIVISION-GWALIOR (M.P)

CERTIFICATE

This is to certify that **KRISHNA YADAV** Enrollment No. **0901CE193D07** Has completed internship program in **RURAL WATER SUPPLY SCHEME (JAL JEEVAN MISSION)**

FROM-16-01-2022 TO-16-05-2022

Conducted by **PUBLIC HEALTH ENGINEERING DEPARTMENT (TPI) Thatipur division-Gwalior, (M.P)**

as a part of his institute grading, we would like to grade his excellence during the internship we wish all the best for his future.

DATE: 24-05-2022


AUTHORIZED SIGNATURE

Gwalior (M.P)

RECOMMENDATION

It is here by recommended that the internship report entitled— rural water supply scheme in village around morar, Gwalior under Jal Jeevan Mission which is being submitted by Krishna Yadav completed under the mentor of Prof. Aditya Agrawal may be accepted in the partial fulfillment of the award of the degree of Bachelor of Engineering in civil Engineering

Date : 2/6/22

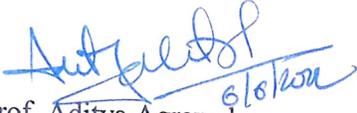
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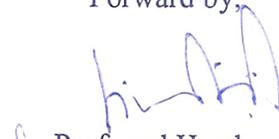
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Prof. Aditya Agrawal

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When it comes to properly acknowledging someone's support and assistance, it maybe a challenging undertaking, chiefly when the support offered is so whole hearted and unwavering.

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I take great pleasure for my institute **PUBLIC HEALTH ENGINEERING DEPARTMENT, (TPI) Gwalior (M.P)** for providing the internship opportunities.

The environment of department has been valuable experience for me. It has provided a lot of knowledge to learn at our own pace in discipline of interest. I would like to thank all those who helped me during different stages of completion of this internship.

KRISHNA YADAV

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**DEPARTMENT OF CIVIL ENGINEERING
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ABSTRACT

The Arroli village water supply scheme was started in the year 2020 and their village people in block morar, Gwalior district to requirement of drinking water. The designed project was expected to provide 70 lpcd water to a population of 2340 at atotal estimated cost of Rs.87.09 lakh.

The object of this scheme to “enable all house hold to have access to and use safe & adequate drinking water within premises to the extent possible”.

Also the scheme is provide functional house hold tap connection to every house hold with service level at the rate of 55 litres per capita per day (lpcd).

Finally I have lot of knowledge about water supply scheme inareas like GSR (ground service reservoir), OHT (over head tank), sump well and distribution system in village

ABSTRACT IN HINDI

अरोली गांव जल पूर्ति योजना वर्ष 2020 में शुरू की गई थी और उनके गांव के लोगों को पीने के पानी की आवश्यकता के लिए ब्लॉक मोरार, ग्वालियर जिले में। डिजाइन की गई परियोजना से कुल अनुमानित लागत पर 2340 की आबादी को 70 एलपीसीडी पानी उपलब्ध कराने की उम्मीद थी। 87.09 लाख।

इस योजना का उद्देश्य "सभी घरों को परिसर के भीतर सुरक्षित और पर्याप्त पेय जल तक पहुंच और उपयोग करने में सक्षम बनाना" है।

साथ ही यह योजना प्रत्येक परिवार को 55 लीटर प्रतिव्यक्ति प्रतिदिन (एलपीसीडी) की दर से सेवा स्तर के साथ कार्यात्मक घरेलू नल कनेक्शन प्रदान करती है।

अंत में मुझे जीएसआर (ग्रांड सर्विस जलाशय), ओएचटी (ओवर हेड टैंक), नाबदान कुएं और गांव में वितरण प्रणाली जैसे क्षेत्रों में जल पूर्तियों जन के बारे में बहुत जानकारी है।

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WEEKLY SCHEDULE

SR. NO.	WEEKLY WORKS	WEEK . NO.
1.	Introduction about project and surveying part	1 - 2
2.	Population and water supply system	3 - 5
3.	Operation of GSR & maintenance of damaging surface	6 - 8
4.	Estimation calculation used in civil works	9 -12
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CHAPTER – 1

INTRODUCTION

PROJECT AREA

Aroli village of Morar Block in Gwalior District of Madhya Pradesh state in India is situated at the Latitude & longitude of 26°10'7.40"N 78°22'1.34"E. The Village is situated at a distance of 38.6 Km from the District head Quarters.

PROJECT STRATEGY

Community participation is at the core for success and sustainability of rural drinking water supply schemes. Towards achieving this, Ministry of Drinking Water and sanitation (MDWS,GOI) launched "Jal Jeevan Mission(JJM)" in 2019 with a goal of a every rural house hold has a functional house hold tap connection (FHTC). JJM is to be implemented as a community demand-driven, single village preferably solar powered mini PWS programme for increasing the PWS coverage in rural areas across the district. Community and Gram Panchayat would be fully responsible for operation and maintenance of JJM scheme

TARGET YEAR

The PR has been prepared taking into account for 20 years projection from present day, taking the horizon .

PROJECT AREA & TOPOGRAPHICAL PLANNING

The project area is limited to Aroli village comprising approximately of 1278.8 Hectares area. the topography of village is almost flat with a variation of about 5 meters in ground elevation having a general slope towards North Direction.

BASIC PLANNING STRATEGY

The following points have been taken into consideration for the proposed water supply scheme so as to meet the water demand of present and future population.

1. Topographic Survey has to be done for the Village including assessment of existing infrastructure for present and future water demand.
2. The scope is limited to augmentation of water supply based on ground water with house hold tap connections and identified sustainability structure for GW source for the village
3. Preparation of conceptual designed report, based on guidelines.
4. Planning in a Phased manner and implementation there of
5. Preparation of detailed cost estimates and BOQ including O&M.

CHAPTER – 2. POPULATION

PRESENT POPULATION

The population of the village as per census 2011 and the habitation wise estimated present population(year 2020) is as follows:

S No.	Name of Habitation	Population 2011	House Hold 2011	Population 2020	House Hold 2020
1	Aroli	1917	196	2340	231

TABLE NO. 1

POPULATION FORECAST

. Therefore, for the district Gwalior rural declare growth rate 24.5 % (year 2001 to 2011) has been adopted for population projection and accordingly population projection has been worked out as follows

Year	Projected Population	Population of Main Village	Population of Sub Village for stand alone scheme
2020	2340	2340	0
2030	2810	2810	0
2040	3280	3280	0

TABLE NO. 2

WATER DEMAND

As per capita water supply for designing water supply scheme is considered

WATER DEMAND ASSESSMENT

TABLE NO. 3

Year	Population	Water Demand Per capita	Water Demand in Kilo Lit
		LPCD	KL

2020	2340	70	164
2030	2810	70	197
2040	3280	70	230

As mentioned above, the calculations for water demand for different year is as follows -

PRESENT STATUS OF WATER SUPPLY

Details of Existing Arrangement

At present, water supply to the village completely dependent on ground water from hand pumps, hence a sustainable arrangement is required with pipe water supply system including house hole tap connection. Details of all present sources are as follows:

TABLE. NO.4

no.	source name	Quantity in nos.	water level Mt/yard (LPM)	water Quality for drinking (acceptable/not accept able)	water availability during summer
1	Hand Pump	6	60/110	Acceptable	yes

PROPOSED WATER SUPPLY SYSTEM

SOURCE

The two numbers sources to be identified for water supply. Following Tube wells are proposed for water supply to village.

TABLE. NO-5

S. No.	Source	Numbers	Dia & depth of source
1	Proposed Tube well - Main Village	2+1	200mm/180 m
2	Proposed Tube well- Sub Village	0	200mm/180 m

FIGURE -1



THREE PHASE ELECTRIC CONNECTION

The provision of three phase power connection made for the source site from the nearest tapping point will have to be done accordingly 0.2 km extension of electric line is proposed. Minimum 16 Hour Pumping is considered.

PUMP HOUSE AT SOURCE

It is proposed to install readymade mini pump house (control Panel Box) With G.I.sheet of 18 gauge of size 90 cmx90cmx60cm with 40x40x5 mm angle iron frame to fix it 200 mm below ground level



FIGURE -2

MOTOR PUMP

Submersible motor pumps for each tube wells is proposed as per required head and discharge.

FIGURE -3



CLEAR WATER PUMPING/GRAVITY MAIN
 Following details are given for clear water pumping main

TABLE .NO-6

S. No.	Pipe Diameter	Length in Meters
1	110 mm HDPE Pipe (10 Kg/sqcm)	1100

Under Ground Sump and Over Head Tank

The UGR/Sump well to be considered for present population 300-1000 sump well along with OHT will considered for population more than 1000.

This is proposed for main village so population of Tola / Phaliya / Sub village has been deducted

TABLE .NO -7

Only GSR required	11	No
GSR + OHT required		Yes

	Nos	Capacity
Capacity of GSR	1	20
Capacity of OHT	1	125



FIGURE NO. -3

Pump House above under ground Sump

The Pump house is proposed above under ground sump and pumping arrangement is proposed (1 working + 1 Standby Pump) for water supply or filling of Over Head Tank

Scheme for Phaliya / tola Situated 500 meter away from main village

In case any habitation is located beyond 500 meters from the end of main village or habitation can not be covered due to any techno- economical reasons, for such distant small habitations, stand alone scheme may be designed and this scheme may be treated as sub-scheme of the main village scheme.

In sub schemes if distance between the settlement is more, two polyethylene tank are considered which will be filled by same tube well. For sub schemes 65 mm GI pipe is considered as rising main.

Water Distribution Network

Considered design norms for water distribution network

- a. Peak factor-03
- b. Minimum residual pressure (head at consumer end) - 07 m
- c. Minimum Pipe size - 90 mm dia

TABLE.NO-8

S. No.	Pipe Details	Length (Meters)
1	90 mm dia. HDPE pipe 6 Kg	3000 Mtr
2	110 mm Dia.HDPE pipe 6 kg	600 Mtr
3	140 mm Dia.HDPE pipe 6 kg	300 Mtr
4	160 mm Dia.HDPE pipe 6 kg	400 Mtr
3	180 mm Dia.HDPE pipe 6 kg	0 Mtr
4	200 mm Dia.HDPE pipe 6 kg	0 Mtr



FIGURE -5

DESIGN OF DISTRIBUTION NETWORK

The design of distribution network has been carried out using latest software considering the average per capita supply at 70 LPCD. Modeling scenarios such as peak hour demand and extended period simulation have been simulated for each zone by ensuring a minimum residual pressure of 7 m at every junction node and desired velocity in the pipeline. The zone wise outcome of the network design in terms of pipe size and the network length is presented in the following tables.

Details Summary of Pipelines for the proposed Distribution Network is attached on Design

FUNCTIONAL HOUSE TAP CONNECTIONS (FHTC)

THROUGHFERRULE ON WATER NETWORK

As per the Guidelines of "JJM " functional households tap connections within the village are the mandatory component of the scheme. House connections for all present houses of village including school, anganwadi, panchayat building community hall is considered

CHAPTER -3

OPERATION & MAINTENANCE AND CONVERGENANCE

A Project to be sustainable requires a very long term O & M and planned in terms of institution framing which includes the revenue generated by the added infrastructure which includes the raising of bills and collection of the revenue and what strategy is adopted for the same. The tariff and the recovery in terms of financial strategy is the most important aspect of the project being sustainable for a number of years.

INSTITUTION FRAME WORK STRATEGY (ORGANIZATION & OPERATIONS)

The institution to be engaged in the 09 month O&M after successfully completion of trial & run of 90 days of the created infrastructure is assumed to be the PHED, with its contractor and technical staff consisting of the supervisory field staff. After 09 month O&M after successfully completion of trial & run of 90 days by PHED, concerning Gram Panchayat or its Sub Committee i.e. VWSC will maintain.

PROPOSED O&M PERSONNEL

In assessing the O&M staff for the proposed water supply scheme it has been considered that the existing set up of the Gram Panchayat or its Sub Committee i.e. VWSC will have to be recognized and further strengthened by inducting more technical staff

ENERGY CHARGES

The Major cost of O & M is incurred in the form of energy charges that is used for pumping of the water from the source to the OHSR's. Also energy charges will be incurred for various installations like electric rooms, facilities in the Pump chambers, area lighting for various sites. Such energy charges have been estimated with a unit energy cost of Rs 6 /- per unit at present

O&M OF WATER SUPPLY SYSTEM

The Water Supply System with its refurbished components properly designed and installed will be handed over to the governing body i.e. Gram Panchayat or its Sub Committee i.e. VWSC in charge of maintenance who will assume full responsibility to make the system functional satisfactorily, for the benefits of the habitants after 09 month O&M after successfully completion of trial & run of 90

days by the PHED. The primary effort of the maintenance staff is to maintain a free flow of the water supply without any obstruction, to maintain and to keep the infrastructure in a health condition and to attend to any bottlenecks accruing day to day and to keep a proper watch and ward of the complete components and to regulate the water supply in such a manner so as to serve the complete village.

Proper maintenance of a water supply system is very essential to accomplish effective functioning of the same and fulfillment of its intended purpose of collection and distribution of water. Preventive and routine maintenance by periodic inspection of the newly commissioned system shall be planned to avoid any bottle necks.

The primary essential step towards such maintenance is availability of proper as built drawing of the system, which shall include essential details like all appurtenances S.V., air valve butterfly valves etc., size of the rising main, length of the rising main, that is all the details are which is detailed in completion plan of the water supply scheme.

ANNUAL EXPENDITURE

The total annual expenditure of village on maintenance of system, electricity, staff salary is estimated to Rs. 8.93 Lakhs which is presented in sheet attached

SOURCE SUSTAINABILITY STRUCTURE

Water has a fixed quantity in universe, as such it is necessary to make judicious use of water by way of conservation. The amount of rainfall per precipitation at a place is not utilized or conserved with the area. It moves out along the slopes and joins drains, streams, rivers & ultimately in to ocean. Large quantity evaporates out. As such to conserve the rainfall at a place and quantity of run off needs conservation 100% check within the area. To conserve the runoff the best practices are :

- | | |
|---|------------------------------|
| | Roof Top rain water |
| | Rainwater |
| | Based on satellite |
| a | Hydromorphological |
| b | Hydrogeological |
| c | Drainage Maps based on above |
| | |
| a | Check dams - |
| b | Percolation Tanks |

c	Silt Traps	12
d	Recharge Channels	
e	Recharge shaft pits	
f	Gulley Traps	
g	Roof Top Recharge	

To ensure the sustainability of the source of this scheme, suitable recharging structure are being proposed after consultation of departmental hydro geologist

Grey Water Management

Grey water management is included in the PR, and the rate is based on the Swachh Bharat Mission (Grameen) Phase II Operational Guidelines, which are due in May 2020.

Greywater management interventions will be carried out in accordance with the Village Action Plan for the Jal Jeevan Mission, which outlines how the Jal Jeevan Mission will be implemented in communities. When planning greywater management interventions, the volume of greywater, the flow of greywater, the discharge arrangements, and so on must all be taken into account.

Greywater management activities will be undertaken as under:

Villages with less than 5000 residents should consider community-level soak pits based on terrain, groundwater levels, and population density. Depending on the ground level situation, states will have the flexibility to implement a conveyance system such as underground / small bore sewers / closed drainages, as well as activities suggested for larger villages such as WSP / DEWATS / constructed wetlands and other treatment systems, with additional funds from the 15th Finance Commission and convergence from other State funds.

Villages with a population of more than 5000 people should plan for a conveyance system, such as underground / small bore sewers / closed drainages, as well as treatment systems, such as WSP / DEWATS / constructed wetlands and other treatment systems, based on terrain, groundwater level, and climatic conditions.

Villages with a population of more than 5000 people should plan beforehand.

Community Sanitary Complex (CSC)

At least one CSC in ODF-plus settlements must be able to meet the sanitary demands of the floating population. The GP will select an appropriate location for the CSC's construction that is easily accessible to all, has adequate water supply, and can provide long-term O&M. Priority will be given to places with a high concentration of SC/ST habitations, the poorest of the poor in the community, and/or those frequented by migratory laborers/floating population, among other things.

Funding for the programme SBMG Phase II Provisions

The following are the various components of SBMG Phase-II, as well as the approved financial aid for each component:

TABLE NO. 9

Programme funding provisions in SBMG Phase II

Component		Financial Assistance	
SLWM activities	Village level SLWM activities	Village Size	Financial Support
		Upto 5000 Population	Grey Water Management : Upto Rs.280 per capita
		Above 5000 Population	Grey Water Management : Upto Rs.660 per capita
Community Sanitary Complex		Rs.3.00 Lakh	

Note-

1. The GPs will cover 30% of this cost out of their 15th Finance Commission funding.
2. Based on their needs for both solid waste and greywater management, each community can use a minimum of Rs. 1 lakh.

PHASING & IMPLEMENTATION SCHEDULE

The phasing of the project for implementation of the project has been done on the basis of cost and Panchayat area covered. While considering the above factor the project shall be proposed in a single phase. The CPM/PERT CHART is prepared to calculate the completion period and the critical activities.

PROJECT BENEFITS ASSESMENT

ADVANTAGES OF IMPLEMENTATION OF PROJECT

The scheme so formulated provides following benefits to the habitants of the project area, in a manner that the water supply will be made available to the users at their door step, and they will have easy access to the service

The scheme will cover total population in the area. At present a large population is deprived of the availability of potable water through tap connections.

The economical weaker sections of society will benefit in terms of employment which will be generated by the implementation of the project, since the service will be a continuous service in term of annual operation and maintenance even after completion of the project.

The scheme envisages safe and potable drinking water to the whole population there is likelihood of drastic decrease of water borne diseases, thereby improving the health of the habitants as a whole.

Since the scheme provides a regular water supply at fixed hours every day it will result in the saving of labor and time of specially the economical weaker sections of society, who were otherwise spending a lot of the time in fetching un safe water from different sources, thereby improving their economic Looking into the above beneficial aspects of the project the implementation of the project, will result in improved quality of life of the habitants in terms of better health and improvement in their financialstatus.

CHAPTER – 4

COST ESTIMATE

The following consideration have been taken for preparation of detailed cost estimates for providing comprehensive water supply scheme.

1. The land shall be allocated by Gram Panchayat /Government.
2. The proposed physical infrastructure cost (Capital Cost) has been detailed mandatory components wise. The components from source development to the distribution system have been enumerated and based as per guide lines given in the "JJM" Guidelines issued by MDWS, Gol.
3. The project cost is estimated to be about Rs 87.09 Lakh.

The abstract estimate is as follows:

**Cost Abstract - Water Supply works under JJM Village -AroliPART - A -
CIVIL WORK / CAPITAL COST**

TABLE NO- 10

S. No.	Sub Head of Work	Quantity / Unit	Amount In Rs.
1	Construction & Provision for drilling of tube well with casing pipe & all work pertaining to drilling of tube etc. Sub Estimate – 1	3 Nos for Main Village	510,000
2	Procurement & installation of Submersible pumps of suitable discharge and head i/c pannel board etc. including electrical Connection complete. Sub Estimate - 2	4 Nos for Main Village	522,391
3	Supply & erection of mini pump house as required at each tube well locations as per approved specifications Sub Estimate – 3	3 Nos for Main Village	40,500
4	Provision for Supply & Errection of Transformer and laying of 11 KV Three Phase Electric line & LT Line including all ancillary work upto tube well & sump well. Sub Estimate – 4	As per MPVVCLSOR Estimate	440,948
5	Providing laying and jointing of Rising Main (HDPE 10Kg & GI) and jointing arrangements etc. all complete. Sub Estimate – 5	HDPE Pipe= 1100 m	864,454
6	Construction of Ground Water Sump, Pump House, Pumps installation all complete. Sub Estimate – 6	Sump -20 KL	436,504
7	Construction of Over Head Tanks & Polyethylene Tanksall complete. Sub Estimate – 7	OHT -125KL	1,701,000
8	Provision for construction of RCC framed brick masonry 57 m length, 1.75 m high boundary wall with MS Gate of Size 3mx1.5m. & GI fencing Sub Estimate - 8	Boundary wall 1 No.	365,509
9	Bulk Flow meter and Supply delivery and erection of ONLINE Silver ionization water disinfection equipmentusing oilgodinamic disinfection as per standrad specification product feasibility study carried out by NEERI for the following capacities. The life of the inbultelectrode in these equipments will last for the maentioned life in lakh liters. - Sub Estimate – 9	1 No Capacity 15000 LPH	122,501

10	Renovation of existing Over Head Tank like plastering, painting work etc		0.00
11	Providing and Fixing of Typical Information Board. SubEstimate – 10	1 No.	27,000
12	Providing laying and jointing / Retrofitting of Distribution system and jointing arrangements etc. all complete. Sub Estimate – 11	HDPE Pipe =4300 m	2,126,104
13	Provision of Functional House Tap Connection (FHTC) as per approved specification all complete. Sub Estimate - 12	231 Nos	541,280
	Part A - Total Rs.		7,698,192
	Add Contingencies @ 1%		76982
	Add GST @ 12% (on Total + Contingencies)		933021
	Grand Total (Rs.)		8708195
	Grand Total (Rs. Lakh)		87.09

PART B - OPERATION & MAINTENANCE

S. No.	Sub Head of Work	Quantity / Unit	Amount In Rs.
1	Provision for Operation & maintenance of scheme after Sucessfully completion of trial & run	12 Months at Rs. 12500 Per Month	150,000
	Part - B Total Rs.		150000
	Add Contingencies @ 1%		1500
	Add GST @ 12% (on Total + Contingencies)		18180
	Grand Total (Rs.)		169680
	Grand Total (Rs. Lakh)		1.70

PART C - CONVERGENCE WORK
Source Sustainability and Grey Water Management

S No.	Item	Quantity	RATE	AMOUNT IN RS.
1	Construction of Recharge Shaft near Tube well - Sub Estimate 1C	3	85000	255000
2	Community Sokage pit outside village - Sub Estimate 2C	1	19000	19000
3	Construction of sokage pit of 70 cm dia. and 1.0 m deep all complete.	231	949	219219
4	Construction of Cattle Trough - Sub Estimate 3C	1	27000	27000
5	Construction of washing platform.- Sub Estimate 4C	1	10000	10000
	Total			530219
	Add Contingencies @ 1%			5302
	Add GST @ 12% (on Total + Contingencies)			64263
	Total			599784
	Grand Total (Rs. Lakh)			6.00

CHAPTER – 5

CALCULATION OF SOURCE OF WATER SUPPLY

Water Supply works under JJM Village -Aroli

TABLE NO- 11

Water Demand Calculation			
Designed Water Demand	Basic Year	Prospective Year	Ultimate Year
Demand	Year 2020	Year 2030	Year 2040
Projected Population	2340	2810	3280
a. Domestic(@ 55+15 lpcd) In liters per day	163800	196700	229600
b. Say	0.170	0.200	0.230
	MLD	MLD	MLD

Capacity of Sump-GSR

KL

20

Capacity of OHT

KL

125

DESIGN OF DISTRIBUTION SYSTEM OF WATER FOR RURAL AREA

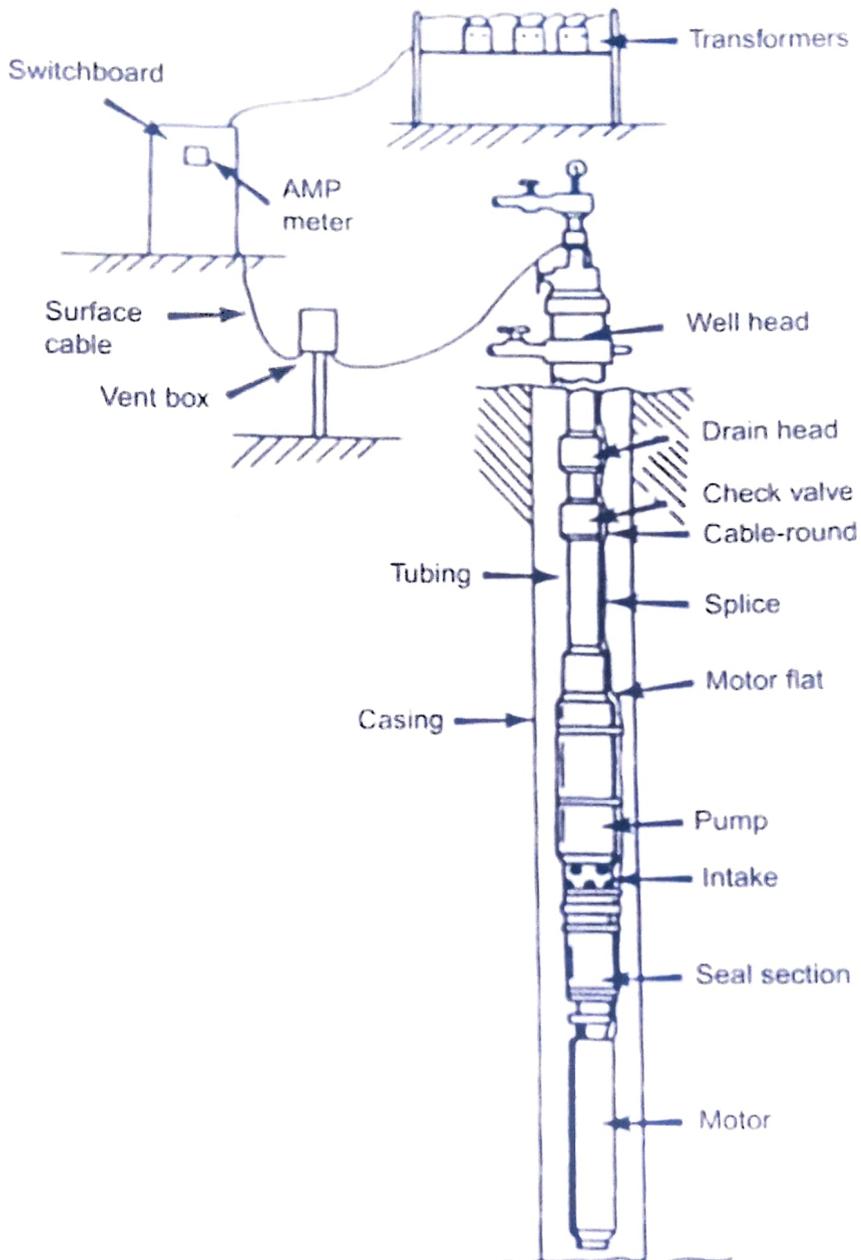


FIGURE -6

Design of Source of Water

TABLE NO-12
Supply

1	Design Demand for Main Village	2040	229600	lpd
2	Yield of DW(Main Village)			Nos.
	Existing TW	Yield (I)		lph
		Yield (II)		0 lph
	Existing DW	Yield (I)		0 lph
	Proposed TW	Yield (I)	5500	lph
		Yield (II)	5500	lph
		Yield (III)	5500	lph
		Yield (IV)		lph
		Total	16500	lph
3	Hours of Pumping		16	Hrs
4	Available water through existing/proposed sources		264000	Liter.
	I.e Required Lpd =	229600	Available Lpd =	264000
Hence ok				
Hence available sources are sufficient to fulfill the demand of village.				

DESIGN OF SUBMERSIBLE MOTOR PUMP AT TUBEWELL
AT MAIN VILLAGE

Daily Demand for 2030	=	229600	lit/day
No. of Tube Well Proposed	=	2	no.
Pumping Hours	=	16	hrs.
Discharge of Pump	=	1.99	LPS
Discharge of Pump	=	120.00	LPM

Static Head

Lifting head (Depth of Tubewell)	=	170	mtr.
Head above ground for Sump Considered	=	5	mtr.
Total Head		=	175 mtr.
Say		=	175 mtr.
Add 5% losses extra for friction and special		=	8.75 mtr.
Total		=	183.75 mtr.
Say		=	184.00 mtr.

H.P. of Pump	7.00	H.P.	(70%Efficiency)	
Provided 2 No. working submersible pump 7 HP Head 184 Mtr.				

DESIGN OF MOTOR PUMP AT SUMP

Daily Demand for 2030	=	229600	lit/day
No. of Tube Well Proposed	=	1	no.
Pumping Hours	=	16	hrs.
Discharge of Pump	=	3.99	LPS
Discharge of Pump	=	239.00	LPM

Head Required

Lifting head (Sump to Distribution / OHT) as per design	20	mtr.
---	----	------

H.P. of Pump	2.00	H.P.	(70%Efficiency)	
Provided 1 No. submersible pump (1W+1S) 2 HP Head 20 Mtr.				

CHAPTER -6 Distribution System Aroli

TABLE NO -13

Pipe Details

ID	Pipe Label	Start Node	Stop Node	Length (Scaled) (m)	Internal Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
32	P-1	R-1	J-1	37	144	HDPE	145	6.08	0.37	1.049
34	P-2	J-1	J-2	150	81	HDPE	145	0.69	0.13	0.309
36	P-3	J-2	J-3	11	81	HDPE	145	0.35	0.07	0.089
38	P-4	J-3	J-4	30	81	HDPE	145	0.41	0.08	0.119
40	P-5	J-4	J-5	37	81	HDPE	145	0.17	0.03	0.023
42	P-6	J-5	J-6	31	81	HDPE	145	0.01	0	0
44	P-7	J-1	J-7	32	144	HDPE	145	5.36	0.33	0.83
46	P-8	J-7	J-8	71	81	HDPE	145	0.55	0.11	0.2
47	P-9	J-8	J-3	181	81	HDPE	145	0.22	0.04	0.037
49	P-10	J-8	J-9	135	81	HDPE	145	0.27	0.05	0.053
51	P-11	J-9	J-10	171	81	HDPE	145	0.16	0.03	0.02
52	P-12	J-10	J-6	89	81	HDPE	145	0.09	0.02	0.007
53	P-13	J-10	J-4	57	81	HDPE	145	-0.07	0.01	0.005
55	P-14	J-4	J-11	111	81	HDPE	145	0.11	0.02	0.01
57	P-15	J-11	J-12	58	81	HDPE	145	0.09	0.02	0.006
59	P-16	J-12	J-13	43	81	HDPE	145	0.01	0	0
61	P-17	J-13	J-14	54	81	HDPE	145	0.04	0.01	0.001
62	P-18	J-5	J-13	47	81	HDPE	145	0.12	0.02	0.013

64	P-19	J-12	J-15	57	81	HDPE	145	0.05	0.01	0.003
66	P-20	J-11	J-16	29	81	HDPE	145	-0.07	0.01	0.004
67	P-21	J-2	J-16	150	81	HDPE	145	0.22	0.04	0.037
69	P-22	J-7	J-17	114	144	HDPE	145	4.78	0.29	0.672
71	P-23	J-17	J-18	176	81	HDPE	145	0.14	0.03	0.016
73	P-24	J-17	J-19	1,453	144	HDPE	145	4.55	0.28	0.613
75	P-25	J-19	J-20	1,340	144	HDPE	145	4.35	0.27	0.564
77	P-26	J-20	J-21	455	99	HDPE	145	1.52	0.2	0.499
79	P-27	J-21	J-22	5	81	HDPE	145	1.02	0.2	0.636
81	P-28	J-22	J-23	753	81	HDPE	145	0.61	0.12	0.245
83	P-29	J-22	J-24	27	81	HDPE	145	0.41	0.08	0.117
85	P-30	J-24	J-25	213	81	HDPE	145	0.17	0.03	0.023
87	P-31	J-24	J-26	144	81	HDPE	145	0.22	0.04	0.037
89	P-32	J-26	J-27	128	81	HDPE	145	0.1	0.02	0.009
91	P-33	J-21	J-28	119	81	HDPE	145	0.13	0.03	0.014
93	P-34	J-28	J-29	39	81	HDPE	145	0.03	0.01	0
95	P-35	J-20	J-30	288	144	HDPE	145	2.68	0.16	0.23
97	P-36	J-30	J-31	69	81	HDPE	145	0.53	0.1	0.189
99	P-37	J-31	J-32	62	81	HDPE	145	0.25	0.05	0.047
101	P-38	J-32	J-33	144	81	HDPE	145	0.08	0.02	0.006
103	P-39	J-33	J-34	148	81	HDPE	145	-0.04	0.01	0.001
105	P-40	J-34	J-35	46	81	HDPE	145	0.09	0.02	0.007
107	P-41	J-35	J-36	22	81	HDPE	145	0.02	0	0
108	P-42	J-32	J-34	61	81	HDPE	145	0.12	0.02	0.011
109	P-43	J-31	J-35	86	81	HDPE	145	0.22	0.04	0.037
111	P-44	J-30	J-37	11	144	HDPE	145	1.92	0.12	0.124
113	P-45	J-37	J-38	684	81	HDPE	145	0.62	0.12	0.252
115	P-46	J-38	J-39	68	81	HDPE	145	0.06	0.01	0.003
117	P-47	J-37	J-40	10	99	HDPE	145	1.29	0.17	0.368
119	P-48	J-40	J-41	110	99	HDPE	145	0.73	0.09	0.128
121	P-49	J-41	J-42	78	81	HDPE	145	-0.16	0.03	0.021
122	P-50	J-40	J-42	62	81	HDPE	145	0.55	0.11	0.202
124	P-51	J-42	J-43	78	81	HDPE	145	0.28	0.05	0.058

ID	Pipe Label	Start Node	Stop Node	Length (Scaled) (m)	Internal Diameter (mm)	Material	Hazen-Williams	Flow (L/s)	Velocity (m/s)	Headloss Gradient (m/km)
126	P-52	J-43	J-44	76	81	HDPE	145	0.22	0.04	0.037
128	P-53	J-44	J-45	46	81	HDPE	145	0.28	0.05	0.057
130	P-54	J-45	J-46	282	81	HDPE	145	0.65	0.13	0.275
132	P-55	J-46	J-47	72	81	HDPE	145	0.06	0.01	0.003
134	P-56	J-46	J-48	342	81	HDPE	145	0.36	0.07	0.092
136	P-57	J-48	J-49	41	81	HDPE	145	0.03	0.01	0.001
138	-58	-48	-50	61	81	HDPE	145	0.05	0.01	0.002
140	-59	-41	-51	22	99	HDPE	145	0.8	0.1	0.152
141	-60	-51	-44	85	81	HDPE	145	0.19	0.04	0.028
143	P-61	J-51	J-52	45	99	HDPE	145	0.59	0.08	0.087
144	P-62	J-52	J-45	23	99	HDPE	145	0.43	0.06	0.048
146	P-63	J-52	J-53	145	81	HDPE	145	0.12	0.02	0.012

CONCLUSION

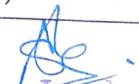
1. Water supply scheme is covering a large number of village to distribute water equally in village
2. Internship in PHE is very helpful to increase our knowledge of various steps covered in water supply in village like survey , population forecast , water demand and distribution system.
3. This Project is done for the rural area which are suffer from problem like water unavailable for particular region which is solved by yojana of Jal Jeevan mission in which the rural area gets water to there home by there tap on particular house.
4. The Jal Jeevan mission will be a major steps toward improving our people's ease of living and meeting their aspiration of a New India.

References

- [1.] S.K. GARG , KHANA PUBLISER
- [2.] B.N DUTTA , UBS PUBLISERS DISTRIBUTORS Ltd
- [3.]MANUAL FOR DEPARTMENT OF DRINKING WATER &SANITATION
W-11042/52/2020-JJM.II-DDW
- (4.) TECHNICAL MANUAL, PUBLISER "DEPARTMENT OF THE ARMY NOVEMBER 1986

FORMAT

FORTNIGHTLY PROGRESS REPORT (FPR) FROM INDUSTRY MENTOR

Name of student	Koushna Yadav		Department	PHED, Gwalior	
Industry/Organization	Govt.		Date/Duration	16/1/22 - 1/2/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation			✓		
Performance/Quality of work			✓		
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work				✓	
Comment on nature of work done/Area/Topic	Excavation, and foundation of GRS.				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	SATYAM CHATURVEDI, TEAM LEADER TPI(PHED), Gwalior				
<u>Signature of Industry Mentor</u>	 Team Leader (TPI) Fortress Infracon Ltd.				

Receiving Date	7/2/22	Name of Faculty Mentor	Gwalior (M.P.)	Sign	 Satyam Chaturvedi
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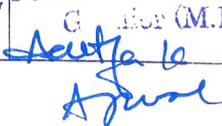
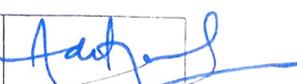
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Name of student	KRISHNA YADAV		Department	PHED, GWALIOR	
Industry/Organization	Govt.		Date/Duration	1/2/22 - 16/2/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation				✓	
Performance/Quality of work			✓		
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work			✓		
Comment on nature of work done/Area/Topic	Components of GRS,				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	SATYAM CHATURVEDI, TEAM LEADER TPI (PHED) Gwalior				
<u>Signature of Industry Mentor</u>					

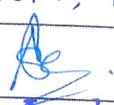
Team Leader (TPI)

Fortracon Infracon Ltd.

Receiving Date	21/2/22	Name of Faculty Mentor	 Gwalior (M.P.) Fortracon	Sign	
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FORTNIGHTLY PROGRESS REPORT (FPR) FROM INDUSTRY MENTOR

Name of student	KRISHNA YADAV		Department	PHED, GWALIOR	
Industry/Organization	Govt.		Date/Duration	36/2/22 - 3/3/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation			✓		
Performance/Quality of work				✓	
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work				✓	
Comment on nature of work done/Area/Topic	Basics of OHT, and Sump well				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	SATYAM CHATURVEDI, TEAM LEADER TPI (PHED), Gwalior				
<u>Signature of Industry Mentor</u>					

Team Leader (TPI)

Fortress Infracon Ltd.

Gwalior (M.P)

Receiving Date	7/3/22	Name of Faculty Mentor	Aditya Agpal	Sign	
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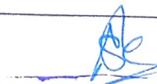
Name of student	KRISHNA YADAV		Department	PHED, GWALIOR	
Industry/Organization	Govt.		Date/Duration	3/3/22 - 18/3/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work				✓	
Behaviour/Discipline/Team work			✓		
Sincerity/Hard work				✓	
Comment on nature of work done/Area/Topic	OHT and Sump well				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	SATYAM CHATURVEDI, TEAM LEADER, TPI (PHED), GWALIOR				
<u>Signature of Industry Mentor</u>					

Team Leader (TPI,
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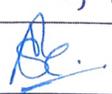
FORTNIGHTLY PROGRESS REPORT (FPR) FROM INDUSTRY MENTOR

Name of student	KRISHNA YADAV		Department	PHED, GWALIOR	
Industry/Organization	Govt.		Date/Duration	18/3/22 - 2/4/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work			✓		
Learning capacity/Knowledge up gradation				✓	
Performance/Quality of work				✓	
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work				✓	
Comment on nature of work done/Area/Topic	Materials knowledge used in OHT				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	SATYAM CHATURVEDI, TEAM LEADER, TPI (PHED) GWALIOR				
<u>Signature of Industry Mentor</u>	 Team Leader (TPI) Fortress Infracon Ltd.				

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Name of student	KRISHNA YADAV		Department	PHED GWALIOR	
Industry/Organization	Govt.		Date/Duration	2/4/22 - 17/4/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work			✓		
Learning capacity/Knowledge up gradation				✓	
Performance/Quality of work			✓	✓	
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work				✓	
Comment on nature of work done/Area/Topic	Estimate knowledge and some Estimate done in civil works like R.C.C.; Materials etc.				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	SATYAM CHATURVEDI, TEAM LEADER TPI (PHED) Gwalior				
<u>Signature of Industry Mentor</u>					

Team Leader (TPI)

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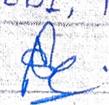
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Industry/Organization	Govt.		Date/Duration	17/4/22-1/5/22	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation			✓		
Performance/Quality of work				✓	
Behaviour/Discipline/Team work				✓	
Sincerity/Hard work			✓		
Comment on nature of work done/Area/Topic	Distribution system of water supply in village.				
<u>OVERALL GRADE (Any one)</u>	<u>POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT</u>				
<u>Name of Industry Mentor</u>	SATYAM CHATURVEDI, TEAM LEADER, TPI (PHED) Gwalior				
<u>Signature of Industry Mentor</u>					

Team Leader (I)
Fortress Infracon Ltd.

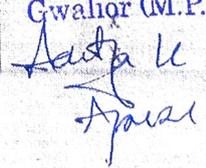
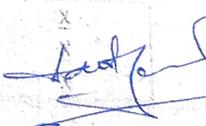
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Name of student	KRISHNA YADAV		Department	PHED GWALIOR		
Industry/Organization	Govt		Date/Duration	1/5/22 - 16/5/22		
Criterion	Poor	Average	Good	Very Good	Excellent	
Punctuality/Timely completion of assigned work				✓		
Learning capacity/ Knowledge up gradation				✓		
Performance/Quality of work				✓		
Behaviour/Discipline/ Team work				✓		
Sincerity/Hard work				✓		
Comment on nature of work done/Area/ Topic	Pipe and joint in distribution system in village.					
OVERALL GRADE (Any one)	POOR/AVERAGE/GOOD/VERY GOOD/EXCELLENT					
Name of Industry Mentor	SATYAM CHATURVEDI, TEAM LEADER, PFI (PHED) Gwalior					
Signature of Industry Mentor						

Team Leader (PFI)

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Civil Engineering Department

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CHAPTER - 9

APPENDIX



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