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WATER SUPPLY SYSTEM AND SOLID WASTE MANAGEMENT FOR LASONA VILLAGE

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ABSTRACT
This paper includes water supply scheme and SWM for Lasona village. Water supplied to the peoples is impure in nature and without any treatment in Lasona village. Water distribution system is not provided, villagers have to collect water from various water tanks this is waste of man hours and increases conflict related to water. In present work an effective pattern for rural water supply has been designed and elaborated.SWM in village is another environmental problem faced by rural population. This paper gives a composting as a treatment method for the solid waste generated. A composting yard has been designed and its estimates have been prepared. Total cost required for water supply and SWM is calculated be4041.62 rs and 468.40 rs as per existing SSR and market rates.

KEYWORDS: Water supply system, Solid waste (SW), compostingyard. Water treatment

INTRODUCTION

Lasona is a village in Osmanabad taluka of Osmanabad district. It is at distance of 30km from osmanabad. S.T. Bus service is available in all season. Village is situated on Osmanabad-Kond road. Nearest Rail station in Murud which is 20 km away from the village. Main profession of the peoples of village is agriculture and main crops grown are Jawar, Wheat, etc.The village Panchayat perform all the civil affairs of the village, like cleaning roads or gutters, lightening, maintenance of street light, and maintenance of basic record of the village and also maintain the all civil affairs etc.

In village present water supply arrangement was executed by Zilla Parishad. In this scheme source is percolation well situated at local nalla near village which becomes dry in summer season. In this scheme existing E.S.R. capacity 0.4 Lac with 9.0 M staging height But the ESR is not in use. In village existing distribution system 75mm dia 4kg/ sqcm. it is completely damaged and not in use. There are two numbers of hand pumps and two power pumps for water supply purpose of village, but these sources goes dry in summer season.

Fig 1:- Present water supply arrangement

To overcome this problem necessary is that water available at the time and water is of good quality

1.1Configuration: General slope is from North to South in gaothan area. Difference between high & low level is about 5.63 m

A.Highest ground level: - 102.85 m

B.Lowest ground level: - 97.22m

1.2 Rainfall: Nearest rainguage station is at Osmanabad. Maximum, minimum and average rainfall figures are as follows:

a.Maximum in year 1148mm

b.Minimum in year 358 mm

Average rainfall 705mm

1.3 Population: Population of the village as per 2011 census is 1903 souls. This is as per actual census record. The population figure of village is taken from grampanchayat

a. Population in year 2011 as per census:-1903 souls

b. Population in year 2028 as per design: - 2335 souls

2) SOLID WASTE MANAGEMENT:

Inconsiderate littering causes poor environmental sanitation resulting in unhealthy quality of living. Therefore, domestic-refuse should be handled responsibly.

2.1Present scenario of SW:-

In a present scenario it has been observed that peoples are educated to keep domestic, trade and individual bins for storage waste and hence no bins are placed. Domestic waste from shop, schools, hospitals, hotel etc. is disposed of an open plot and drain which results pipes are chocked and pollution of water. At some site, waste is directly burnt on the site storage facility not provided for storage of solid waste at source.

Fig 2:- solid waste dumping site

2.2 Importance of solid waste collection:-

For environment clean and healthy solid waste is to be collect as early as possible. The frequency of solid waste collection mainly depends upon the solid waste quantity generated.

METHODOLOGY:

1) WATER SUPPLY SYSTEM

It is proposed to supply water of 40 LPCD for design stage only. Accordingly daily demand figure would be as follows:

Daily demand (Design stage 2034) = 0.350 ML

Hours of pumping (Design stage 2034) = 8 Hr.

Table 1:-Population Forecasting

Year	Population	Increase InDecade	Incremental Increase In Decade	Rate Of Growth Per Decade
1971	980	-	-	-
1981	1289	309	-	0.3153
1991	1617	328	19	0.2544
2001	2084	467	139	0.2888
2011	1903	-181	-648	-0.0868
Total	**= 7873**	**= 923**	**= 490**	**= 0.7717**
Average	**1575**	**231**	**-163**	0.1929
Year	Arithmetical Method	Incremental increase method	Geometric progression method	Average of I.I. & G.P.
2014	1972	1940	2006	1973
2024	2203	1959	2394	2176
2034	2434	1814	2855	2335

Incremental increase method is used for design of population forecasting.

Table 2:-Design of Pumping Machinery P.W. To E.S.R.Design for 10 Years

1.	Daily Water Demand	87053 Lit/Day
2.	Daily Water Demand Considering 20% Losses In Distribution System	108816 Lit/Day
3.	Daily Water Demand Considering 0% Losses In Transmission	108816 Lit/Day
4.	Hours Of Pumping	8 Hours
5.	Hourly Discharge	13602 LPH
6.	Dia And Type Of Rising Main	90 MM PVC
7.	Length Of Rising Main	1890 Meters
8.	Rate Of Frictional Losses	9.819 Meter/1000 Meter
9.	Total Losses With 10% Other Losses	20.41 Meters
10.	L.S.L. Of Pump	78.8 Meters
11.	F.S.L. Of E.S.R.	129.17 Meters
12.	Static Head On Pump	50.36 Meters
13.	Velocity /Residual Head	4.00 Meters
14.	Total Head On Pump	74.77 Meters
15.	B.H.P. Required	6.46 BHP
16.	B.H.P. Required Say	7.50 BHP

Table 3:- Statement Showing Capacity of E.S.R.

1.	Daily water requirement	93400 Lit/Day
2.	Water demand at ESR considering losses in distribution system is 15%	109882 Lit/Day
3.	Water requirement in transmission considering 5% lossess	115666 Lit/Day
4.	Capacity of ESR required at 12 Hours capacity	57833 Lit
5.	Capacity of ESR required	57833 Lit
6.	Deduct Existing Capacity Of E.S.R.	0 Lit

2) SOLID WASTE MANAGEMENT

SWM for Lasona village Storage, collection and transportation of solid waste steps are used.

a) Solid waste storage: - Grampanchayat gives storagefacilities in such a manner to keep the environment clean. Storage facilities should be set up by grampanchayat .Two dust bin are provided by grampanchayat in each house for storage of different waste separately.

b) Solid waste collection: -Solid waste is to be collected from collection source or point (house) through vehicle that is ghantagadi.

c) Transportation of solid waste:- solid waste is transporated to site which is decided for disposal of solid wsate through ghantagadi. For this village transfer station not required because of disposal site is near to the village.

2.1 Disposal method of solid waste: - After storage, collection and transportation the next step in SWM is solid waste disposal. For solid waste disposal composting method is used for solid waste disposal. Composting uses aerobic method of digestion.

2.2 Calculation Of Quantity of SW:- From collection point SW is to be trasportated to disposal site through the transportation vehicles. Generally solid waste generated from domestic is to be 100 gram per person per day. Total solid waste collected daily from collection point is calculated as –

Domestic waste-

100 gram waste / capita /per day
Lasona village population in 2035 is 2335 peoples
2335x 100 gram = 233500 gram waste /day
= 233.5 kg/ day
Daily solid waste generated = 0.2335 tonnes/day
Monthly solid waste generated= 30x0.2335
= 7.005 tonnes
Total quantity of waste generated in 6 months =7.005x6= 42.03 tonnes of waste

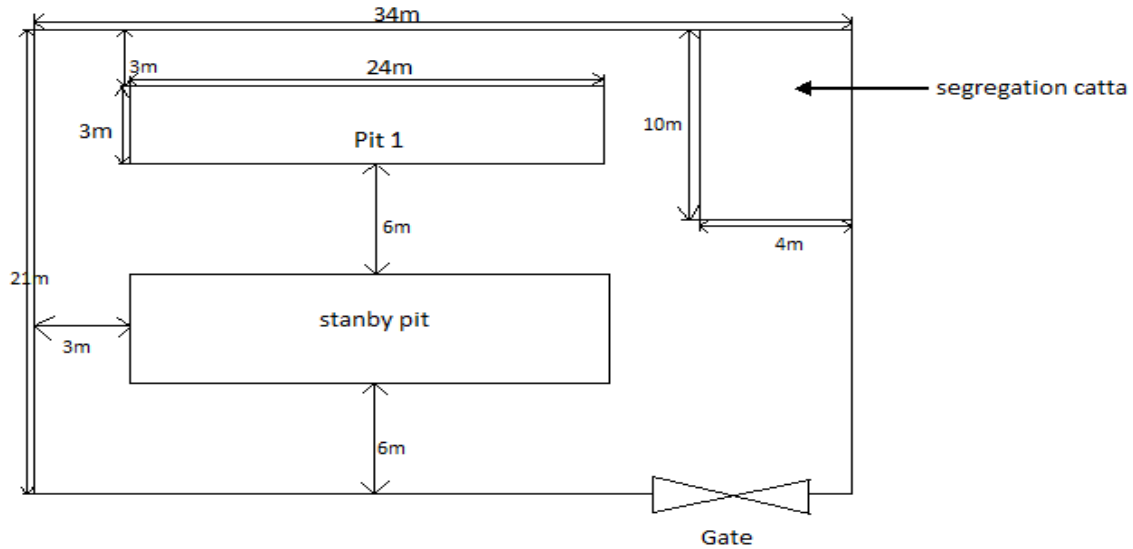

Fig 3:-Proposed Drawing of Composting Plant

2.3 Cost of SWM:-

a) cost of SW storage =Lasona village population in 2035 is 2335 people
= No of houses = 300
= Two dust bin are provided by grampanchayat in eachhouse for dry & wet waste separately
= 100 rs for pair of dust bin
= 100 x 300 = 30000rs
Therefore total cost for storage of SW is **30000rs**.

b) Cost of solid waste Collection &transportation =Solid waste is to be transportated from collection source or point (house) through vehicle that is ghantagadi. 2 labours are required for transportation of SW. One for driving vehicle and one for collecting waste from householder who store solid waste in dust bin in house which is given by grampanchyayat. Ghantagadi cost is 3 lakh (300000). Petrol and diesel require for ghantagadi is 10 lit / day. Daily payment for 2 labors is 500 rs.
Therefore total cost for solid waste collection & transportation is **570000 rs**.
c) Cost of Composting plant**= 1093707 Rs.**
Quantity rates are taken from SSR 2017-2018

RESULT AND DISCUSSION:

A.Water supply scheme: - The results of the study indicated that safe and protected water is supplied to villagers. Reduction of Water loss is to minimize during distribution.
B. Solid waste management: - open dumping of waste is avoided because of this littering of waste on road is also totally minimized. Manure is available in composting plant to villagers which can used for agriculture purpose which is at low cost.

CONCLUSION:

In the present work a water distribution network for Lasona village have been developed. Its cost is finalized.
In part storage, collection, transportation, disposal of SW have been finalized. The necessary drawing and estimate have been prepared.
The initial cost per head for improvement of safe water supply system is 4041.62 rs. Solid waste treatment amenity expenditure per head is found to be 468.40 rs. Per head.

REFERENCES:

A) Water Supply Scheme

a) Paper 1- Dani Cohen, Uri Shamir & Gideon Sinai (2009) Optimization of complex water supply systems with water quality, hydraulic and treatment plant aspects, Civil Engineering and Environmental Systems, 26:4, 295-321, 27 Oct 2009.
b) Paper 2- Sam Moon Private Operation In The Rural Water Supply In Central Tanzania: Quick Fixes And Slow Transitions August 2006
c) Paper 3- domestic water consumption under intermittent and continuous modes of water supply, Liangxin fan, Guobin Liu. Ferwang, coenJRistma. VioletterGeissen
d) Paper 4- Araujo, L.S. Ramos, H.M. and Coelho, S.T. 2002 an 'optimization of valves location in network distribution system for leaks minimization (in Portuguese's: optimizacao da localizacao de valvulasnumaRede de fugas), 10 ENGSB/SILUBESA. 16/19 September 2002 a, Braga, Portugal.

B) Solid Waste Management

a) Status and challenges of municipal solid waste management in India: Rajkumar Joshi1 and Sirajuddin Ahmed, 17 February 2016
b) Yongfeng Nie , Dongjie Niu & Qingzhong Bai (2000) The management of municipal solid waste in China, Journal of Environmental Science & Health Part A, 35:10, 1973-1980, 15 Dec 2008.
c) Logistic and Solid Waste Management in Ambajogai City. Miss. Sinare M.R. IJARIIE-ISSN (O)-2395-4396 3703 Vol-3 Issue-1 2017.
d) Prathibha Ganesan (2017) Landfill sites, solid waste management and people's resistance: a study of two municipal corporations in Kerala, International Journal of Environmental Studies, 74:6, 958-978.