

Urban Development- Study on implementing under Ground Sewerage Scheme (UGSS) in Pollachi and its Environmental Impact Assessment

M.Sandhiya¹, C. Vinayagamoorthy², V. Balaji Prabhu³, S. Divlin Gracia Josephine⁴, P.S.Sathish Kumar⁵

B.E, Department of Civil Engineering, Dr.Mahalingam College of Engineering and Technology, Pollachi, India^{12 3 4}

Assistant Professor, Dr.Mahalingam College of Engineering and Technology, Pollachi, India⁵

ABSTRACT: Improving the infrastructure facility in the developing country like India is always very challenging. Enhancing the infrastructure facility such as water supply and sewerage system in urban regions is more critical with the increasing population. The wastewater generated if not properly collected, treated and disposed, the related effects pose serious threat to the environment. Drainage and sewerage system in urban areas is having more priority in all developing countries because of rapid urbanization, industrialization and population growth along with increase in slum population and migration.

As per the census 2011, at nation level, there is no drainage facility in 48.9% households, while 33% households have only open drainage system. Many developing cities do not have proper drainage system, Pollachi is one such.

Pollachi which is located in Coimbatore district is a developing town with open drainage system in practice. In open drainage system, during the flow stagnation of the sewage may occur due to the dumping of garbage into it which in turn creates odour nuisance, causes disease to humans and other animals. Due to these impacts on the environment the idea of laying Under Ground Sewerage System (UGSS) becomes essential. In this study the process involved in converting the existing open drainage system into Under Ground Sewerage System (UGSS) in Pollachi has been done. This paper predominantly deals with the Environmental Impact Assessment (EIA) done in relation to the conversion of existing open drainage system into Under Ground Sewerage System (UGSS) and about the results of the assessment carried out.

KEYWORDS: Waste water, Under Ground Sewerage Scheme (UGSS), Environmental Impact Assessment (EIA)

I. INTRODUCTION

1.1 ENVIRONMENTAL IMPACT ASSESSMENT: An Environmental Impact Assessment (EIA) is an assessment of the possible impacts that a proposed project may have on the environment, consisting of the environmental, social and economic aspects. The purpose of the assessment is to ensure that decision makers consider the environmental impacts when deciding whether to proceed or not with a project. The International Association for Impact Assessment (IAIA) defines an environmental impact assessment as "**the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.**" EIAs are unique that they do not require adherence to a predetermined environmental outcome, but rather they require decision makers to account for environmental values in their decisions and to justify those decisions in light of detailed environmental studies and public comments on the potential environmental impacts.

The environment impact assessment process was introduced with the purpose of identifying/evaluating the potential beneficial and adverse impacts of development projects on the environment, taking in to account environmental, social, cultural and aesthetic considerations. All of these considerations are critical to determine the

viability of a project and to decide if a project should be granted with environmental clearance. An EIA concentrate on problems, conflicts and natural resource constraints which might affect the viability of a project. It also predicts how the project could harm to people, their homeland, their livelihoods, and the other nearby developmental activities. After predicting potential impacts, the EIA identify measures to minimize the impacts and suggests ways to improve the project viability.

The main advantages and benefits of EIA are:

1. Improved project design.
2. More informed decision-making with improved opportunities for public involvement in decision-making.
3. More environmentally sensitive decisions.
4. Increased accountability and transparency during the development process.
5. Improved integration of projects into their environmental and social setting;
6. Reduced environmental damage.
7. More effective projects in terms of meeting their financial and/or socio-economic objectives.
8. A positive contribution towards achieving sustainability.

II. UNDER GROUND SEWERAGE SCHEME (UGSS)

1.2.1 What is UGSS?

Under Ground Sewerage Scheme is the laying of pipelines below ground level in order to minimise the effects caused due to disease causing pathogens and to reduce maintenance cost and so on.



Figure 1.1 Underground Sewerage System –Laying pipes

Ref - (<http://www.ugss.in/process.html>-)

III. NEED FOR PROPOSING UNDER GROUND SEWERAGE SCHEME (UGSS) IN POLLACHI (ZONE -2)

1. The existing open drain system is not functioning satisfactorily.
 2. There is no proper drainage system in zone-2 the water is stagnating in many places and due to that mosquitoes and flies are developed, which cause many diseases.
 3. In Zone-2 we have dense population and the quantity of sewage generated will also be high and also there is an increased consumption of water due to the presence of railway station markets , recreational areas and so on.
- Therefore, underground sewerage system is a must for Pollachi town.



Figure 1.2 Stagnating Sewage in Pollachi (ZONE-2)

1.3.1 GENERAL AND ENVIRONMENTAL PROFILE OF POLLACHI

Importance of Town :

Around Pollachi Municipality, a famous temple namely Masani Amman kovil in Anamalai, Monkey Falls, Aliyar dam and ArivuThirukovil within the Town limit are available.

Location and Topography :

Pollachi Municipality is a selection grade municipality in Coimbatore District of Tamil Nadu State. It lies at a latitude of 10° 30' North and Longitude of 77° East. It is situated at 40 Km from Coimbatore. The Pollachi Municipality is surrounded with Chinnampalayam Panchayat in the East, Zamin Uthukkuli town panchayat West, Achippatti Panchayat in the North and Suleeswaranpatti Town panchayat in the South. This town is located along Dindigul Bengaluru Road NH 209.

Soil Condition:

Being in continuation of Western Ghats, the town under- lays red loamy and red sandy soils. Gypsum in the nearby places is mined for industrial uses. The sub soil is hard enough to support fairly heavy structures.

Water Supply Status:

At present, the requirement of the water supply to Pollachi Municipality is fulfilled by the standalone schemes implemented during 1948, 1992 and 2009 from Aliyar River and is being maintained by the local body.

Sanitation Status:

Pollachi town is not provided with underground sewerage system. The town is provided with open drains in the main area of the town. The open drains are constructed on the sides of the roads / streets. The waste water generated from the town is collected through the main drain along the road/ street.

Present Disposal of Waste Water from Town:

All the open drains join a major open channel. Through the channel, the waste water is discharged into Krishnankulam Tank near Zamin Uthukuli.

Project Description:

1. Laying new sewer lines for about 117.069Km
2. Construction of 8 Lift stations,
3. Construction of 2 Pumping stations
4. Construction of a sewage treatment plant of 12.40mldcapacity .

1.3.3 Environmental Impacts of Proposed Under Ground Sewerage Scheme

GENERAL

Urban Infrastructure projects such as underground sewerage schemes are generally expected to bring in positive impacts on health and hygienic conditions of the project towns. However, these projects are expected to induce negative impacts especially during the construction phase and operations of pumping stations, if due care is not taken during design and operation.

Prediction of Impacts

The environmental impacts caused due to the urban development projects can be categorized either as primary (direct) or secondary (indirect) impacts, Primary impacts are those which are induced directly by the project whereas secondary impacts are those which are indirectly induced and typically included the associated investment and changing patterns of social and economic activities due to the proposed action. Typically, the potential direct and indirect impacts of sewerage projects are summarized in Table 1.1

The positive impacts of underground sewerage system will be:

1. Improvement of sanitation conditions of the town

2. Improvement of health conditions due to better sanitation facilities and
3. Improved environmental aesthetics of the town.

Table 1.1 Potential Environmental impacts of Sewerage Projects.

Action / Activity	Associated issues / impacts
1. Problems Related to Siting of Facilities	a.Interference with other utilities/street traffic /access to building. b.Nuisance hazards to neighboring areas and workmen c.Inadequate resettlement provisions leading to social inequities
2. Problems in Design	a.Overflow/by passing hazards leading to contamination of environment and flooding b.Inadequate methods for sludge disposal causing environmental pollution c.Presence of hazardous materials and sulfide corrosion in sewers, causing damages to sewers .
3. Problems During Construction	a. Silt runoff from construction operations leading to soil erosion. b.Disturbance to traffic and general public
4. Problems During Operation	a.Hazards to health and safety of workmen due to toxic passes and hazardous materials, trench cave-in b.Hazards of communicable disease.

The project involves providing new pump stations, lift stations and laying of new sewer lines. These activities are expected to cause minor environmental problems during construction phase of the project. These are discussed in the following sections, in detail.

1.3.4 POTENTIAL ENVIRONMENTAL IMPACTS

The activities during laying of sewer lines involves excavation of trenches for laying the pipes, transportation and laying of the pipe of designed size and reinstating the excavated road sections. The impacts on the environment from these activities can be categorized as given below.

Impacts on Physical Resources:

Topography:

For the purposes of laying the pipelines, trenches up to a maximum depth of about 4m and in some places 5 to 6 m will be excavated. Since the terrain of the town is generally flat, these activities are not expected to cause major changes in the topography of the town. However, these excavation activities will necessitate appropriate plans for traffic diversion and safety measures for the workers involved in the excavation works.

Climate:

As the present project is to improve sanitation facilities no changes in climatic conditions are anticipated.

International Journal of Innovative Research in Science, Engineering and Technology

An ISO 3297: 2007 Certified Organization

Volume 6, Special Issue 8, May 2017

International Conference on Advances in Biotechnology, Civil & Mechanical Science (ICABCMS-17)

17th & 18th March 2017

Organized by

Selvam College of Technology, Namakkal, Tamilnadu, India

Impact on Environmental Resources

Air Quality

Construction Phase:

Suspended particulate matter and dust are the major sources of air quality impacts during implementation of the sewerage projects. As the project envisages laying the sewerage network in various developed parts of Pollachi Municipality, these impacts are expected to be more significant. However, when viewed with respect to the existing ambient air quality or with respect to compliance of ambient air quality standards, the impact on air quality due to the project is likely to be lower and adequate dust suppression measures during construction will significantly reduce the impacts.

Operation Phase:

After implementing the sewer lines for the town, the sanitation facilities of Pollachi Municipality will be improved and will not have any air quality impacts.

Noise Levels

Construction Phase:

During the construction phase of the project, the major sources of noise pollution are movement of vehicles transporting the construction material and the noise generating activities at the construction site itself. Mixing and material movement are primary noise generating activities in the yard and will be distributed over the entire construction period. Construction activities are expected to produce noise levels in the range of 80 – 95 dB (A) and can affect the personnel working at the site and the residents in neighborhood area of the construction site.

Hence the use of proper personal protective equipment (PPE) such as earmuffs is recommended to mitigate any adverse impact of the noise generated by such equipment. The equipment should be maintained properly to minimize the intensity of the noise level.

Operation Phase:

The operation and maintenance of pumping stations is expected to increase the ambient noise levels in the neighborhood. In the present project- sewage pumping stations - lift stations are proposed at the following locations for the efficient operation of the sewerage network.

All the Lift Station sites are proposed in the Municipal owned lands and the site are in a lower level and hence there will be no disturbance.

In view of the adequate noise mitigation measures by way of vegetative cover shall be developed in and around the areas of pumping / lift stations.

Ecological Resources:

Project activities do not involve encroachment of sensitive environmental features or cutting of trees / vegetation and hence no impacts are predicted on the ecological resources of the project area.

Soil:

The impact on soil due to the project will be in terms of topsoil erosion due to construction activities. No new borrow pits and quarries are envisaged in the project. Hence, the impact on soil will be insignificant.

Other Issues:

Impact on religious and archeological monuments is one of the important aspects to be considered for any development activity. Since the proposed project components do not encroach or damage such structures, no impacts to such structures are anticipated.

International Journal of Innovative Research in Science, Engineering and Technology

An ISO 3297: 2007 Certified Organization

Volume 6, Special Issue 8, May 2017

International Conference on Advances in Biotechnology, Civil & Mechanical Science (ICABCMS-17)

17th & 18th March 2017

Organized by

Selvam College of Technology, Namakkal, Tamilnadu, India

IV. SUMMARY AND CONCLUSION

Annexure 1- Activity Impact identification Matrix provides the over view of the Environmental Impact Assessment undertaken for the project.

REFERENCES

- [1] P Sundarakumar, T Santhi, P Manoj et.al. " Storm Water Drainage Design (Case Study Vijayawada)", Andhra Pradesh, India, Visakhapatnam, A.P, ISSN 0974-5904, Volume 08, No. 02.
- [2] ABC Techno Labs India Private Limited "Environmental Impact Assessment for Proposed Construction Of Sewage system & Sewage Treatment Plant in Nagerkovil", Chennai.
- [3] Scripture Mission East Africa (SMEA) "Environmental Impact Assessment Project Report For Proposed Construction Of Water And Sanitation Structures In Bangale, Tana North Sub-County, Tana River County"

International Journal of Innovative Research in Science, Engineering and Technology

An ISO 3297: 2007 Certified Organization

Volume 6, Special Issue 8, May 2017

International Conference on Advances in Biotechnology, Civil & Mechanical Science (ICABCMS-17)

17th & 18th March 2017

Organized by

Selvam College of Technology, Namakkal, Tamilnadu, India

ANNEXURE 1

S l. No	Environment al Attributes	Physical Environment			Geology		Topograph y	SocioEconomicEnvironment						
		Air	Water	Noise	Natural Drainage	Soil		Demo graphy	Econom y	Emplo y ment	Land Use	Industr y	Infra structure	Healt h & Safety
	Construction Phase													
1	Earth Work Excavation	- ve/t			- ve/t	- ve/t	- ve/t			- ve/t				- ve/t
2	Laying of Sewer lines			-ve/t										- ve/t
3	Laying of Pumping Mains			-ve/t										- ve/t
4	Construction of Pumping Stations													
5	Construction of lift Stations		- ve/t	-ve/t										- ve/t
6	Construction of Treatment Plant	- ve/t	- ve/t								- ve/p			- ve/t
7	Land Acquisition													
8	Setting of Labour Camps		- ve/t					- ve/t	- ve/t	- ve/t				
9	Employment to Labour							+ve/t	- ve/t	- ve/t				
10	Material Treatment	- ve/t		-ve/t					+ ve/t			+ ve/t		
11	Use of Construction Equipment	- ve/t	- ve/t	-ve/t								+ve/t		
	Operation Phase													
1	Maintenance of Sewer Lines							+ve/p	- ve/t	+ve/t		+ve/t	+ve/t	+ve/t
2	Maintenance of Lift Stations		- ve/t	+ve/ t										

Note: -ve/t : Negative impact ; temporarily during construction

-ve/p : Negative impact ; permanent basis even during Operation & Maintenance

+ve/t : Positive impact ; temporarily during construction

+ve/p : Positive impact; permanent basis even during Operation & Maintenance