

# Design and Estimation of Garbage Disposal Shed at Uchagaon Village, Kolhapur, Maharashtra

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## ABSTRACT

Solid waste management is a major challenge in rural and semi-urban areas due to increasing population and changing lifestyles. Uchagaon village in Kolhapur district, Maharashtra, is experiencing similar issues related to improper waste disposal and lack of organized infrastructure. This study focuses on the design and cost estimation of a garbage disposal shed to improve waste handling and sanitation conditions in the village. The proposed system includes proper segregation, storage, and protection of waste from environmental factors. Standard engineering design principles and estimation methods are used. The project supports sustainable waste management practices and aligns with the Swachh Bharat Mission initiated by the Government of India.

The rapid increase in municipal solid waste generation due to population growth, lifestyle changes, and urban influence has become a major concern for environmental sustainability and public health, particularly in rural and semi-urban areas. Improper waste disposal practices such as open dumping, roadside

accumulation, and unscientific handling result in soil contamination, water pollution, foul odors, and spread of vector-borne diseases. To address these challenges, the development of basic waste management infrastructure is essential. One such important infrastructure component is a garbage disposal shed that provides a designated space for waste collection, segregation, temporary storage, and transportation.

## KEY WORDS

Solid Waste Management, Garbage Shed, Rural Infrastructure, Cost Estimation, Uchagaon Village, Sanitation

## 1. INTRODUCTION

Solid waste generation has increased significantly due to population growth, urbanization, and lifestyle changes. Rural areas are no longer isolated from these challenges, especially villages located near urban centers like Kolhapur.

### Improper waste disposal leads to:

- Environmental pollution
- Health hazards
- Soil and water contamination

- A garbage disposal shed provides a centralized facility for:
- Collection
- Segregation
- Temporary storage of waste

## **2. LITERATURE REVIEW**

Previous studies on solid waste management indicate that:

- Proper segregation at source improves recycling efficiency
- Rural areas lack basic waste infrastructure
- Low-cost and simple designs are most effective in villages
- Government initiatives like Swachh Bharat Mission emphasize decentralized waste management
- Studies suggest that providing a dedicated garbage collection and storage unit significantly improves hygiene and reduces open dumping.

## **3. METHODOLOGY**

The methodology adopted in this study is similar to standard engineering project approaches and includes:

### **3.1 DATA COLLECTION**

- Village data from Census and Gram Panchayat
- Waste generation standards (CPHEEO guidelines)

### **3.2 SITE SELECTION**

- Accessible location within village
- Away from residential zones
- Connected to road for waste transport

### **3.3 DESIGN PLANNING**

- Structural design of shed
- Segregation compartments

### **3.4 QUANTITY TAKE-OFF**

- Calculation of materials required

### **3.5 COST Estimation**

Based on Maharashtra PWD Schedule of Rates

#### 4. STUDY AREA: UCHAGAON VILLAGE



##### 4.1 LOCATION

Uchagaon is located in Karveer Taluka of Kolhapur District, Maharashtra. It is situated near Kolhapur city and is influenced by urban development.

- District: Kolhapur
- Taluka: Karveer
- State: Maharashtra

##### 4.2 ADMINISTRATIVE DETAILS

- Governed by: Gram Panchayat Uchagaon
- Falls under Kolhapur Municipal influence region (peri-urban zone)

##### 4.3 DEMOGRAPHIC DETAILS (OFFICIAL SOURCE RECOMMENDED)

###### AS PER CENSUS OF INDIA 2011:

- Population: ~ [ 31,238 ]
- Households: (7,121)
- Literacy Rate: (86.24%)

For publication, cite:

“Census of India 2011, Village Directory – Kolhapur District”

##### 4.4 CLIMATE AND GEOGRAPHY

Climate: Tropical monsoon

Rainfall: High rainfall zone (~1000–1200 mm/year)

Soil: Black cotton soil

##### 4.5 EXISTING WASTE MANAGEMENT CONDITION

- No structured waste collection system

- Open dumping observed
- Lack of segregation practices
- Increasing waste due to urban proximity

## 5. WASTE GENERATION ANALYSIS

According to CPHEEO standards:

ग्रामीण waste generation: **0.3–0.5 kg/person/day**

Total Waste = Population x per Capita Waste

Estimated Population (2026): 11,200

Per Capita Waste: 0.4 kg/day

Total Waste = 11,200 X 0.4 = 4,480 kg/day

**Total Waste Generated = 4.48 tonnes/day**

This calculation helps determine required shed capacity.

## 6. DESIGN OF GARBAGE DISPOSAL SHED

### 6.1 Design Considerations

- Easy accessibility
- Ventilation
- Rain protection
- Segregation facility
- Low maintenance

### 6.2 Structural Components

- Foundation (PCC + RCC)
- Columns (RCC)
- Roof (GI sheet / RCC slab)
- Brick masonry walls
- Cement concrete flooring

### 6.3 Proposed Dimensions

- Length: 6 m
- Width: 4 m

- Height: 3 m

### 6.4 Segregation System

- Wet waste compartment
- Dry waste compartment
- Recyclable waste section

## 7. ESTIMATION OF QUANTITIES

### 7.1 Earthwork

- Excavation for foundation

### 7.2 Concrete Work

- PCC (1:4:8)
- RCC (1:2:4)

### 7.3 Masonry

Brickwork in cement mortar

### 7.4 Roofing

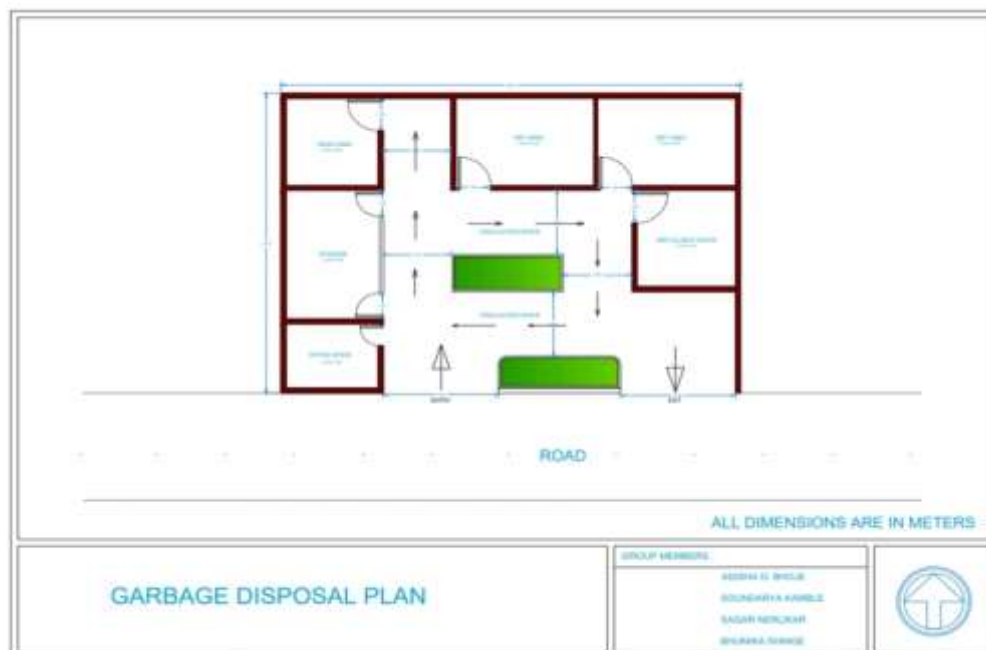
GI sheet roofing with steel frame

### 7.5 Finishing

Plastering

Flooring

Painting



**Detailed Estimate: Garbage Disposal Shed (3000 sq.ft)**

Sr No	Item	Qty	Unit	Rate (₹)	Amount (₹)
1	Site Clearance	3000	sqft	10	30000
2	Excavation	150	cum	250	37500
3	PCC	30	cum	4000	120000
4	RCC Work	50	cum	7000	350000
5	Brickwork	200	cum	5000	1000000
6	Plastering	6000	sqft	25	150000
7	Flooring	3000	sqft	80	240000
8	Roofing Sheet	3000	sqft	150	450000
9	Doors & Windows	1	LS	100000	100000
10	Painting	6000	sqft	20	120000

**Total Estimated Cost: ₹26,97,500****9. ADVANTAGES****1. Improved Sanitation and Hygiene**

The shed prevents open dumping of waste, thereby maintaining cleanliness in the village and reducing foul odor.

**2. Proper Waste Segregation**

It allows separation of wet, dry, and recyclable waste, which improves recycling efficiency and waste management.

**3. Environmental Protection**

Controlled waste storage reduces soil, air, and water pollution caused by unmanaged garbage disposal.

**4. Public Health Benefits**

Minimizes the spread of diseases by preventing breeding of insects, rodents, and harmful microorganisms.

**5. Support to Swachh Bharat Mission**

The project aligns with government initiatives promoting cleanliness and sustainable waste management in rural areas.

## 6. Cost-Effective Solution

The design is simple and economical, making it suitable for rural and semi-urban areas with limited budgets.

## 7. Ease of Collection and Transportation

Centralized storage helps municipal or पंचायत authorities in efficient waste collection and disposal.

## 8. Protection from Animals and Weather

The shed protects garbage from rainwater and prevents scattering by animals.

## 9. Encourages Community Awareness

Promotes responsible waste disposal habits among villagers.

## 10. Low Maintenance Requirement

The structure is durable and requires minimal maintenance over time.

## OBJECTIVES

1. To design a suitable garbage disposal shed for Uchagaon village considering local conditions and requirements.
2. To provide a systematic waste management solution for collection, segregation, and temporary storage of solid waste.
3. To promote segregation of waste at source into wet, dry, and recyclable categories.
4. To estimate the total cost of construction using standard methods and Maharashtra PWD Schedule of Rates.
5. To improve sanitation and hygiene conditions in Uchagaon village.
6. To reduce environmental pollution caused by improper waste disposal practices.
7. To develop a low-cost and sustainable infrastructure model suitable for rural and semi-urban areas.
8. To support government initiatives such as Swachh Bharat Mission for rural cleanliness.

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## CONCLUSION

The present study focuses on the design and cost estimation of a garbage disposal shed for Uchagaon village in Kolhapur district, Maharashtra. With increasing population and changing consumption patterns, the generation of solid waste in rural and peri-urban areas has increased significantly. However, the absence of proper waste management infrastructure has led to issues such as open dumping, environmental pollution, and health hazards.

The proposed garbage disposal shed provides a practical, economical, and sustainable solution to these problems. The design incorporates essential features such as waste segregation compartments, proper ventilation, protection from environmental conditions, and ease of accessibility for waste collection. The structural components are selected based on locally available materials and standard construction practices, ensuring durability and low maintenance.

The estimation of the project demonstrates that the construction of such a facility is cost-effective and feasible for implementation at the village level using available government schemes or local body funding. The adoption of this system will significantly improve the overall sanitation condition of Uchagaon village.

### **Furthermore, the implementation of the proposed design will:**

- Promote scientific waste management practices
- Encourage segregation at source
- Reduce environmental degradation
- Improve public health and hygiene

This project also supports national initiatives such as the Swachh Bharat Mission, which aims to achieve clean and healthy living conditions across rural and urban India.

In conclusion, the development of a garbage disposal shed in Uchagaon village is a necessary step toward sustainable rural infrastructure development. With proper execution, community participation, and regular maintenance, this model can be replicated in other villages facing similar waste management challenges, thereby contributing to long-term environmental sustainability and improved quality of life.

## REFERENCES

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