सत्यमेव जयते

Report of the Comptroller and Auditor General of India
Performance Audit on
Waste Management in Urban Local Bodies

SUPREME AUDIT INSTITUTION OF INDIA
लोकहितार्थ सत्यनिष्ठा
Dedicated to Truth in Public Interest

Government of Madhya Pradesh

Report No. 2 of 2024

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PREFACE

This Report of the Comptroller and Auditor General of India for the year ended 31st March 2022 has been prepared for submission to the Governor of Madhya Pradesh under Article 151 of the Constitution of India, for being laid before the Legislature of the State.

The Report contains significant results of Performance Audit on Waste Management in Urban Local Bodies, covering the period 2017-18 to 2021-22.

The instances mentioned in this Report are among those which came to notice in the course of test audit.

The audit has been conducted in conformity with the Auditing Standards issued by the Comptroller and Auditor General of India.

Audit wishes to acknowledge the co-operation and assistance extended by the State Government, UADD, all the audited ULBs and MPPCB in conducting the performance audit.

EXECUTIVE SUMMARY

Executive Summary

The ultimate objective of solid waste management is to reduce the quantity of solid waste disposed of on land by recovery of materials and energy from solid waste. Similarly, the objective of the sewerage system is to ensure that the sewage discharged by the community is properly collected, transported and treated to safe levels and disposed of or reused without causing any health or environmental problems. The State Government has prepared a State Level Policy in the year 2017 for Waste Water Recycle and Faecal Sludge Management (FSM) to provide sustainable sanitation services and protection of environment. Considering the importance of the issue of management of wastes in addressing the environmental and aesthetic concerns of the State, a Performance Audit (PA) on the topic 'Waste Management in Urban Local Bodies' was taken up. The audit covered a period of five years from 2017-18 to 2021-22. The performance audit was carried out during July 2022 to February 2023 in 34 ULBs out of 413 ULBs and collection of relevant information from the Urban Development and Housing Department. The objective of this performance audit was to seek assurance about effectiveness of the process of planning, collection, transportation and disposal of solid waste, sewage & special wastes and adequacy of the existing monitoring system.

Chapter 1

Local authorities were required to prepare a solid waste management plan as per the State policy after making a realistic assessment of different kinds of waste generated in the city to determine various options that could be adopted for the collection, processing and disposal of waste. However, 15 test checked ULBs had not assessed the quantity of various type of waste generated during the year 2017-22 and 15 test checked ULBs adopted per capita estimate of waste generation without conducting any survey during the audit period 2017-22. We observed that this method had low level of reliability. No study had been conducted so far to access the quantity and composition of waste generated in the ULBs. Further, underestimation of quantum of waste generated may lead to construction of facilities with inadequate capacities to meet performance standards. No gap analysis of infrastructures and financial sustainability of operation and maintenance was done by 23 ULBs. Integration of informal sector would not only help in reducing the burden on ULBs but also contribute to the social and economic upliftment of the informal sector. The PA revealed that action for integration of informal sector (i.e., rag pickers and *kabadiwalas*) for Solid Waste Management was not taken by the ULBs (except ULB Indore, where persons involved in informal sector were engaged in various stages of SWM). Eighty-eight *per cent* (30 ULBs) of the test checked ULBs had identified site for setting up solid waste processing facilities out of which 28 ULBs have acquired the site and 41 *per cent* (14 ULBs) have started enforcing the waste generators to segregate waste at source. Door-to-door collection of waste was ensured by all the 34 test-checked ULBs, 56 *per cent* of the test checked ULBs had set up waste processing facilities, only 15 *per cent* of the test checked ULBs had either bio-remediated or capped their old and abandoned dumpsites. Segregation of waste at source ensures that the waste is less contaminated and can be collected and transported for further processing. The practice of enforcing waste generators to segregate waste though followed by 15 ULBs, the purpose of segregation could not be achieved due to

dumping the mixed waste at landfill site. Physical verification of the Material Recovery Facilities revealed that most of these were not operational, leading to dumping of waste at landfill. The claim of all the test checked ULBs to have achieved 100 *per cent* collection of wastes generated under their jurisdiction was not verifiable as records to substantiate the claim were not maintained. Further, absence of realistic data of waste generated and weighbridges in the test checked ULBs, raised doubts on the veracity of the claim. In 29 ULBs sanitary landfills had not yet been constructed and 24 ULBs confirmed that they had not developed a buffer zone of no development around their solid waste processing and disposal facility. In 23 test-checked ULBs, substantial legacy waste is yet to be disposed of and only 12 ULBs out of these have prepared DPR for disposal of legacy waste.

Only three meetings of the State Level Advisory Body constituted in October 2017 had been conducted since the date of its constitution against the required nine meetings during the last five years. No action has been initiated by Madhya Pradesh Pollution Control Board against the ULBs operating their waste processing facilities without obtaining the statutory 'Authorization/ Consent to Operate'.

Some ULBs had engaged private parties for the activities under Solid Waste Management. Audit observed inadequate contract management which led to issues such as non-payment of royalty by the concessionaire amounting to ₹ 7.11 crore (ULB Indore ₹ 4.63 crore and ULB Jabalpur ₹ 2.48 crore); irregular payment of tipping fee (ULB Satna) amounting to ₹ 4.76 crore to a contractor; unfruitful expenditure (ULB Bhopal) of ₹ 1.51 crore due to termination of agreement for which exorbitant payment of ₹ 2.99 crore was made to supervising agency ; irregular payment (ULB Bhopal) of ₹ 2.64 crore (₹ 0.83 crore + ₹ 1.81 crore) without augmentation of the processing capacity of plant; and two works, already covered under the scope of existing work of contract was given to other agencies (at ULB Gwalior) for which additional payment of ₹ 5.74 crore (₹ 4.49 crore + ₹ 1.25 crore) were made to these agencies.

Chapter 2

Urban Local Bodies are also responsible for management of sewage. Government of India (GoI) had given directions to states and cities for adoption of National Urban Sanitation Policy, 2008. The Central Public Health and Environmental Engineering Organisation (CPHEEO) has published a Manual on Sewerage and Sewage Treatment Systems that was introduced in November 2013 to achieve the objectives as envisaged in the National Urban Sanitation Policy. To avoid any conflicts in developing the city in future, City Sanitation Plan is required to be prepared. Audit noted that 32 ULBs had not prepared City Sanitation Plan. City Sanitation Task Force was also not constituted in the 32 out of 34 tests checked ULBs. The planning of sewerage system was deficient as DPRs relating to sewerage systems were prepared by 11 ULBs without considering the sewage generated by the institutions like commercial/ public institutions, industries and commercial buildings. Further, works of 11 sewerage networks in nine ULBs were completed by the contractors after a delay of eight to 44 months. Sewage treatment facility was not available in 22 ULBs, partially functional or was under trial run in the six ULBs, at Operation & Maintenance stage in three ULBs and construction works were ongoing at three ULBs. Due to non-availability of sewage treatment facility, approximately 2,09,726.13 ML of sewage merged into the water bodies through various drains during the

years 2017-22. Audit observed that sewerage network and Sewerage Treatment Plants (STPs) have been constructed in nine ULBs. The ULBs had not made it mandatory for all households to obtain household sewage connections as required under CPHEEO manual. Thus, only 36.84 *per cent* (1,42,746 households out of 3,87,437) households in seven ULBs were covered by the sewage network, defeating the very purpose of constructing sewerage system. The ULBs were to frame its own policy for a sanitation service at the micro level within the framework of the guidelines established in the macro policy formulated by the State Government. However, there was lack of proper strategy for safe disposal of septage as 26 ULBs had not prepared Faecal Sludge and Sewage Management Policy (FSSM). Also, Faecal Sludge Treatment Plants (FSTP) were functional in only 10 ULBs and Faecal Sludge Treatment Plants constructed by other 14 ULBs were not functional. Further, 33 ULBs had neither imparted training for cleaning of septage nor, prepared a Manual of Practices to be followed for cleaning of septage. In six out of nine ULBs where sewerage network system was available, no complaint redressal mechanism was in place. Joint physical verification of 10 STPs of three ULBs revealed that Online Continuous Effluent Monitoring Systems to monitor the parameters like Potential of Hydrogen (pH), Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) was not installed which was against the instruction given by Madhya Pradesh Pollution Control Board. Audit observed instances of inadmissible payment of GST of ₹ 15.45 crore (ULB Morena) to contractors; excess payment of ₹ 4.88 crore (ULB Bhind ₹ 4.15 crore, ULB Gwalior ₹ 0.55 crore and ULB Morena ₹ 0.18 crore) due to short carry forward of amount paid in the previous running account bill; excess payment of ₹ 14.39 crore (in eight ULBs) due to non-deduction of the prescribed amount; excess payment of ₹ 6.35 crore (ULB Gwalior) to a contractor without executing the item as per specifications; excess payment of ₹ 5.73 crore (ULB Morena) for incidental work.

Chapter 3

Special waste requires special handling and disposal due to its quantity, concentration, physical and chemical characteristics, or biological properties *etc*., to protect human health, environment and also to exploit its potential for recycling. Audit observed that 26 ULBs had not prepared any bye-laws for plastic waste management though required under the Plastic Waste Management Rules 2016, consequently these wastes were being dumped in landfill sites along with other wastes. The joint physical verification of landfill revealed stray cattle feeding on such wastes, which could be a health hazard for them. The ULBs did not have processing and recycling facilities for disposal of plastic waste nor had agreement with the recyclers for recycling and disposal of plastic waste. Further, 29 ULBs did not implement the system for registration of the shopkeepers and street vendors using plastic carry bags. Thus, a control on use of plastic bags was absent. In 11 ULBs, instructions for prohibiting storage, distribution, sale and utilisation of plastic carry bags of less than 50 microns in thickness were not issued. Though some ULBs had completely banned single-use plastic items like plates, glass, plastic sticks used in balloons, ice-cream and candy *etc*., strict implementation of the ban was not observed as these banned items were easily available for sale in the jurisdiction of these ULBs. Moreover, only three ULBs had made some efforts to encourage the use of unrecyclable plastic waste for road construction works after complying with the stipulated standards and 28 ULBs were yet to act in this regard. This resulted in use of miniscule quantity of plastic waste,

generated during the year 2018-22, in road works. Further, 22 ULBs did not have any policy/ plan for segregation, collection and channelization of E-waste to its authorised dismantler or recycler. In its absence, ULBs could not implement the e-waste Rules in an effective manner, consequently these wastes were either dumped at landfill site or huge quantity of such wastes were occupying spaces in office buildings of ULBs.

Micro plastics can have serious threat to human, animal and environment. The study conducted by M/s AMPRI in two water bodies and two filtration plants in Bhopal and one water body and one filtration plant of Indore revealed that the water bodies are highly contaminated with micro-plastics. The treated water supplied from the water treatment plants of both these cities also contained traces of micro-plastics and could be hazardous for human health in long run. The study justifies the need for proper collection, segregation, transportation and scientific disposal of plastic waste.

Government of India has formulated Construction and Demolition (C&D) Waste Rules, 2016 for disposal of C&D wastes like building materials, debris, rubble *etc*., generated during the process of construction, re-modelling, repair and demolition of civil structures *etc*., by individuals or organisation or authorities. Audit observed that the State had not prepared any policy in this regard. Only 16 ULBs had issued notification to make waste generators responsible for collection and segregation of C&D waste generated and to ensure that other waste (such as solid waste) does not get mixed with this waste and is stored and disposed separately. Nineteen ULBs had not notified the charges for collection, transportation, processing and disposal of C&D waste under their jurisdiction, 11 ULBs though notified the C&D charges, did not provide information on the amount of such charges realised by them on this account. Further, 24 ULBs had not identified the site required for establishing collection and processing facilities for C&D waste despite elapse of the specified period for its establishment.

Chapter 4

Recommendations

I Solid Waste Management

- *The ULBs may ensure availability of baseline data of wastes generated in their jurisdiction to properly assess the quantity of waste generated and prepare action plans for its adequate management.*

  (Recommendation 1)

- *The State Government may ensure segregation of waste at source by devising a system for incentivising waste generators and collectors for segregation of waste and should prevent mixing of segregated waste during various stages of Solid Waste Management.*

  (Recommendation 2)

- *ULBs may ensure collection and segregation of wastes from all Resident Welfare Associations, Market Associations, Gated Communities, Institutions, Hotels and*

Restaurants and as far as possible process bio-degradable waste through composting or bio-methanation within the premises itself.

(Recommendation 3)

- *ULBs may put in place a robust system for monitoring of vehicles engaged in door-to-door collection and transportation of wastes to ensure that all areas under their jurisdiction are covered.*

(Recommendation 4)

- *ULBs may ensure creation of all facilities essential for effective and safe operation of the processing plants and the landfill sites.*

(Recommendation 5)

- *GoMP may strengthen monitoring of waste management activities through State level Advisory Body by ensuring its regular meetings and prescribing corrective actions in cases of irregularities noticed.*

(Recommendation 6)

- *MPPCB may put in place an adequate monitoring system to ensure compliance of provisions of Solid Waste Management Rules in all the ULBs.*

(Recommendation 7)

- *The Government may examine and fix responsibility in the cases where excess/ irregular payments were made to contractors.*

(Recommendation 8)

II Management of Sewage

- *ULBs may prepare City Sanitation Plan in line with CPHEEO manual and ensure that all Municipal Corporation areas and all households are connected to the sewerage network.*

(Recommendation 9)

- *GoMP may consider putting in place an institutional mechanism for ensuring coordination of all line departments in implementing sewage systems.*

(Recommendation 10)

- *ULBs may ensure management of sewage accordingly and optimise the reuse of treated water and converting sludge into manure.*

(Recommendation 11)

- *MPPCB may invariably ensure that OCEMS is installed at all STPs to ensure quality of sewage treatment.*

(Recommendation 12)

- *Government may examine and fix responsibility for making excess/ irregular payments in contracts for works under sewerage projects and put in place a system to ensure adherence to the conditions of Contract and as per ISSR rates, before making final payments.*

(Recommendation 13)

III Special waste

- *Department may put in place an effective mechanism to ensure prohibition on the usage of single use/ banned plastic products to prevent contamination of water bodies due to micro plastics.*

(Recommendation 14)

- *The ULBs may establish the plastic waste processing and disposal facilities as per the PWM Rules.*

(Recommendation 15)

- *The MPPCB may ensure that all plastic waste processing industries had obtained necessary authorisation for their functioning and are adhering to the prescribed standards.*

(Recommendation 16)

- *The ULBs of the state may enforce the E-Waste Rules by forming effective policy/ plan/ action plan and establish the adequate facilities for proper segregation, collection and channelization of e-waste as per E-Waste Rules.*

(Recommendation 17)

- *The MPPCB may evolve an effective monitoring mechanism to monitor the compliance of provisions of E-Waste Rules by all the industries engaged directly or indirectly in generation and disposal of e-waste.*

(Recommendation 18)

- *The State Government may enforce the PWM Rules and C&D Waste Management Rules in an efficient manner and monitor its implementation process effectively by adequately strengthening the monitoring mechanism. The Government may expedite approval of policy for management of C&D waste.*

(Recommendation 19)

CHAPTER 1

INTRODUCTION AND AUDIT FRAMEWORK

Chapter 1

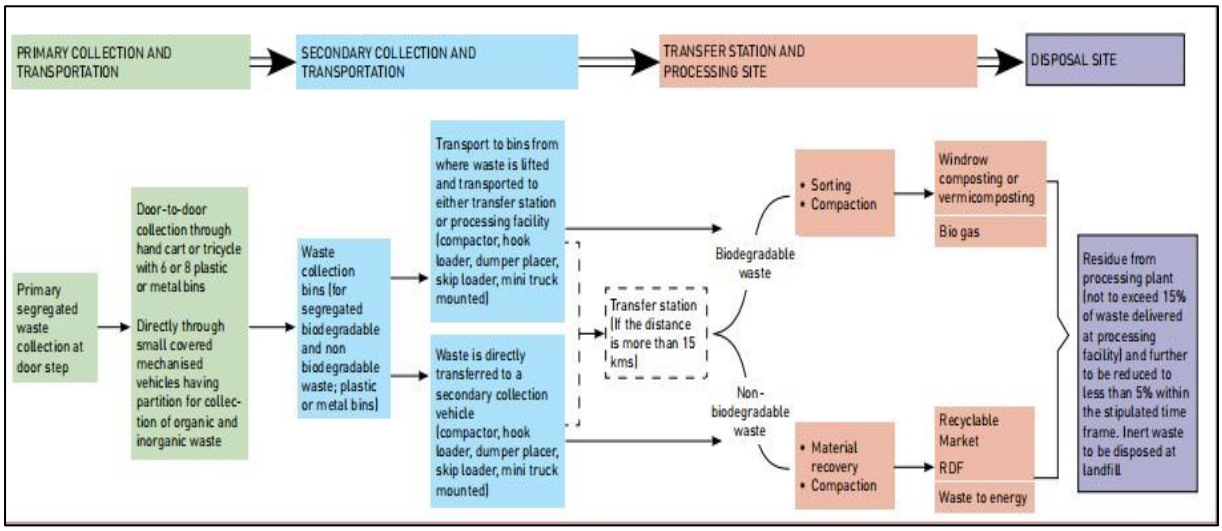
Introduction and audit framework

1.1 Solid Waste Management

As per Solid Waste Management Rules, 2016, the solid waste includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non-residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities.

The management of municipal solid waste is one of the main functions of all Urban Local Bodies (ULBs) in the country. All ULBs are required to meticulously plan, implement and monitor all systems of urban service delivery especially that of municipal solid waste. The objective of solid waste management is to reduce the quantity of solid waste disposed of on land by recovery of materials and energy from solid waste. The process of Solid Waste Management is depicted below:

Chart 1.1: Showing the process of Solid Waste Management



(Source: Manual on Municipal Solid Waste Management, 2016)

Urban India is facing an ever-increasing challenge of providing for the incremental infrastructural needs of a growing urban population. With this increasing population, municipal solid waste management in the country has emerged as a challenge not only because of the environmental and aesthetic concerns, but also because of the huge quantities of municipal solid waste (MSW) generated every day. The status of generated, collected, treated, and disposed of solid waste in India during the year 2017-18 to 2020-21 is given in **Table 1.1**:

Table 1.1: Status of generated, collected, treated, and disposed of solid waste in India during 2017-18 to 2020-21

(in Ton Per Day)

S.N.	Year	Solid waste generated	Solid waste collected	Percentage of collected waste w.r.t. waste generated	Solid waste treated	Percentage of treated waste w.r.t. waste generated	Landfilled solid waste
1	2017-18	54,417	45,082	82.85	15,387	28.28	22,905
2	2018-19	1,52,077	1,49,749	98.47	55,760	36.67	50,161
3	2019-20	1,50,847	1,46,054	96.82	70,973	47.05	40,863
4	2020-21	1,60,039	1,52,749	95.44	79,956	49.96	29,427

(Source: Reports of Central Pollution Control Board on SWM)

The percentage of waste collection, *w.r.t.* waste generation, had reduced from 98.47 to 95.44 during the year 2018-19 to 2020-21, whereas the percentage of treated waste, *w.r.t.* waste generated, had increased from 36.67 to 49.96 during the same period. Further, as per the Report of CPCB for the year 2020-21, the per capita solid waste generation in country had decreased marginally from 132.78 gm. per day (during 2016-17) to 119.07 gm. per day (during 2020-21).

To improve solid waste management in India, it is important to adopt a multi-pronged approach that includes waste segregation at the source; waste collection and transportation; waste processing and disposal; public education and awareness.

Several initiatives and programs such as the Swachh Bharat Mission (Clean India Mission) have been implemented by Government of India (GoI) to improve solid waste management in the country.

(a) Regulatory framework for governing management of solid waste

The various waste management rules which were framed during 2016 under the Environment (Protection) Act, 1986, provide a legal framework for disposal and management of waste. Guidelines for preparation of comprehensive plan for the prevention, control or abatement of pollution by using scientific waste management have been issued by GoI from time to time. The regulatory framework governing the management of different types of waste is indicated in **Appendix 1.1**.

(b) Municipal solid waste in Madhya Pradesh

The details of solid waste generated, collected, treated and dumped in landfill in the State of Madhya Pradesh during the years from 2017-18 to 2021-22 are given in the following table:

Table 1.2: Generation, collection/transportation[1], treatment and landfilling of solid waste in Madhya Pradesh during 2017-18 to 2021-22

(in Ton Per Day)

S.N.	Year	Solid waste generated	Solid waste collected/ transported	Percentage of collected waste w.r.t. waste generated	Solid waste treated	Percentage of treated waste w.r.t. waste generated	Solid waste landfilled
1	2017-18	7,212	6,537	90.64	2,272.5	31.51	4,264.5
2	2018-19	8,000	7,500	93.75	6,100	76.25	1,400
3	2019-20	7,980	7,193	90.14	6,431	80.59	762
4	2020-21	8,022	7,235.5	90.20	6,472	80.68	763.5
5	2021-22	7,115	6,132	86.18	6,059	85.16	76.10

(Source: Reports of Madhya Pradesh Pollution Control Board (MPPCB)

It is evident from the above table that during 2017-18 to 2020-21, the percentage of waste collection in the State was stagnant (between 90.14 *per cent* in 2019-20 and 93.75 *per cent* in 2018-19) but it decreased to 86.18 *per cent* in the year 2021-22. However, there was an increasing trend in the treatment of waste with respect to the total waste generated during the year 2017-18 to 2021-22. However, the target of 100 *per cent* collection and treatment of waste was still to be achieved. Further, it was also noticed that the waste collected was either not segregated or segregated but was ultimately dumped together in the same landfill site except Indore and Satna ULBs (refer Paragraph 2.11.2). This made the process of segregation a wasteful exercise. Also, there was non-availability of weighbridge at landfill site as discussed in Paragraph 2.12.2, as a result Audit cannot vouch for the accuracy of the data in **Table 1.2.**

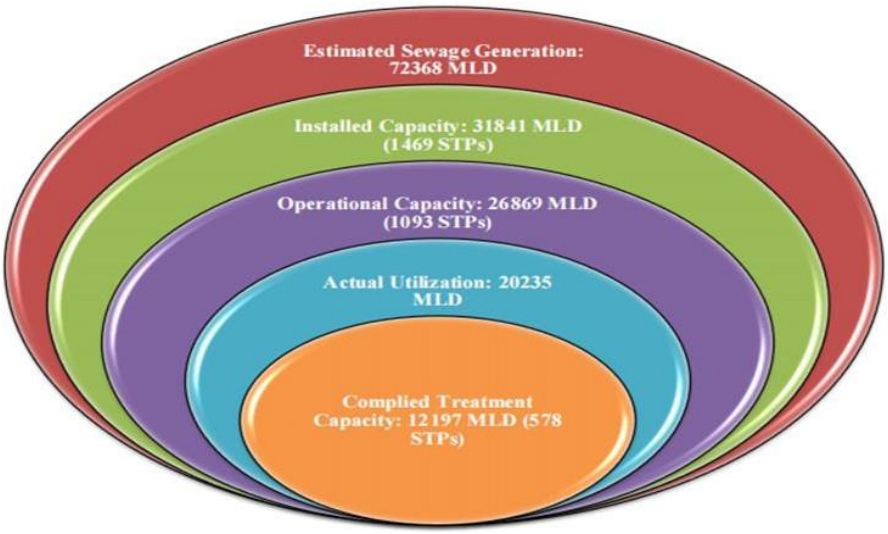
1.2 Sewerage Management

Sewerage and sewage treatment is a part of public health and sanitation and according to the Indian Constitution, the subject falls within the purview of the State List. Since this is an essential service, the responsibility for providing the services lies within the public domain.

Sewage is a type of wastewater that is produced by a community of people. It is characterized by volume or rate of flow, physical condition, chemical and toxic constituents, and its bacteriological status. The status of sewage generation, installed treatment capacity and actual treatment in India (as on 30 June 2020) is depicted in **Chart 1.2**.

[1] As per the reply of the Department (17th August 2023) the data of waste collected and transported is same. However, the figures intimated were different from data of the MPPCB. Therefore, Audit has considered the quantity of collection as shown by MPPCB as transported quantity.

Chart 1.2: The Sewage Generation, Installed Treatment Capacity and Actual Treatment in India



(Source: Report of CPCB on National Inventory of Sewerage Treatment Plant, March 2021)

The objective of the sewerage system is to ensure that the sewage discharged by the community is properly collected, transported and treated to safe levels, and disposed of or reused without causing any health or environmental problems. Insufficient infrastructure leads to discharge of partially treated and untreated sewage into nearby water bodies of cities and towns.

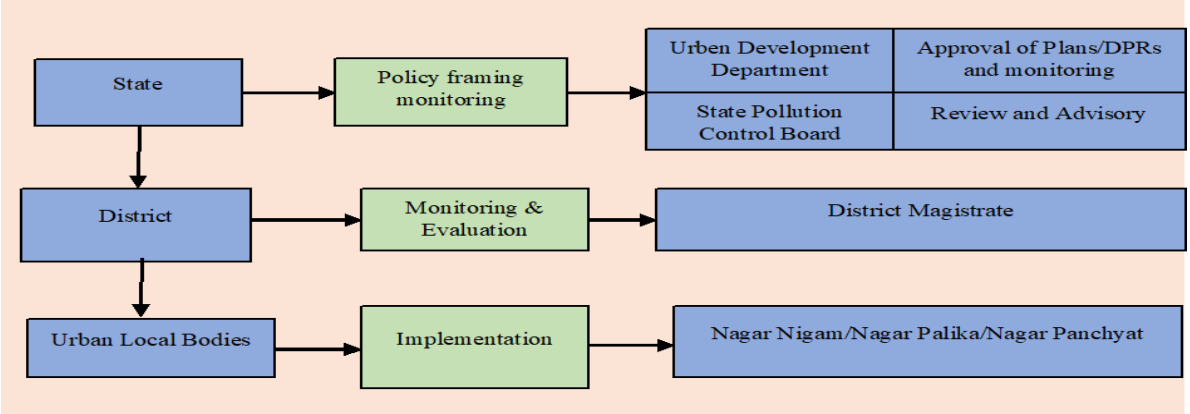
For this purpose, GoMP prepared a State Level Policy (2017) for Waste Water Recycle and Faecal Sludge Management (FSM) to ensure improved health status of urban population, especially the poor and under privileged, through the provision of sustainable sanitation services and protection of environment.

1.3 Organisational set-up

The Urban Development and Housing Department (UDHD), headed by the Principal Secretary, is the nodal department for the governance of all ULBs. The Urban Administration and Development Directorate (UADD) functions as an interface between the State Government and ULBs, which functions directly under UDHD. The UADD is headed by a Commissioner, who is assisted by nine Joint Directors at division level. Commissioner of each Municipal Corporation and Chief Municipal Officer of each Municipal Council/ Nagar Parishad are the administrative heads of the ULBs and are responsible for solid waste and sewage management.

The MPPCB is engaged in implementation of the various rules under Environment (Protection) Act, 1986, in the State. The MPPCB is the principal agency for monitoring and controlling waste management. **Chart 1.3** depicts the role of various authorities at all levels in planning, execution and monitoring of MSW management.

Chart 1.3: Role of authorities in planning, execution and monitoring at various levels



The three-tier administrative set up of ULBs is given in **Appendix 1.2** and the organisational structure of the ULBs pertinent to SWM and Sewerage Management is given in **Appendix 1.3.**

1.4 Audit Objective

The objectives of the performance audit were to ascertain whether:

- The management of solid waste was effective with respect to its planning, collection, segregation, storage, transportation, disposal and social inclusion of informal waste workers, solid waste management projects established for disposal of solid waste were effective and economic and an adequate monitoring system existed for monitoring of solid waste activities and other social and environmental aspects;
- The management of sewerage was effective and adequate with respect to its planning, collection, transportation and treatment and a suitable monitoring mechanism existed for monitoring the sewerage system;
- The management of special waste *viz*. plastic waste, e-waste and construction and demolition waste was proper and effective with respect to their planning, collection, transportation and their disposal as per the regulatory framework and various environmental norms/ parameters.

1.5 Audit Criteria

The criteria for evaluating performance of SWM were derived mainly from:

- Manual of Municipal Solid Waste Management, 2016 issued by GoI in April 2016 and The Solid Waste (Management and Handling) Rules, 2016;
- Madhya Pradesh Municipal Corporation Act, 1956; and Madhya Pradesh Municipalities Act, 1961;
- Madhya Pradesh Financial Rules, Madhya Pradesh Works Department (WD) Manual;
- Central Public Health and Environmental Engineering Organisation (CPHEEO) Manual, Guidelines of AMRUT Mission;
- GoMP State Level Policy, 2017 for waste water recycle and reuse and Faecal Sludge

and Septage Management (FSSM) Policy;

- Budget and Administrative Report of UADD;
- Survey Reports and DPRs, Integrated Standard Schedule of Rates (ISSR);
- Construction and Demolition Waste Management Rules, 2016;
- Plastic Waste (Management and Handling) Rules, 2016;
- Performance parameters set out in Service Level Benchmarking (SLB) Guidelines;
- The Environment (Protection) Act and Rules, 1986;
- Water (Prevention and Control of Pollution) Act, 1974;
- National Urban Sanitation Policy, 2008; and
- Instructions, guidelines, policies issued by Central Pollution Control Board, State Pollution Control Board, Government of India/ State Government on waste management (Solid and Sewage wastes) from time to time.

1.6 Scope of Audit

The Performance Audit of "Waste Management in Urban Local Bodies" was carried out during July 2022 to February 2023 covering a period of five years from 2017-18 to 2021-22. It involved examination of the records relating to Solid Waste, Plastic Waste, Construction and Demolition Waste (C&D Waste), e-waste and Sewerage in the 34 selected ULBs **(Table 1.3).**

The records related to the above were also examined in offices of Urban Administration and Development Directorate (UADD), Madhya Pradesh Pollution Control Board (MPPCB). The list of selected ULBs is given in **Appendix 1.4.**

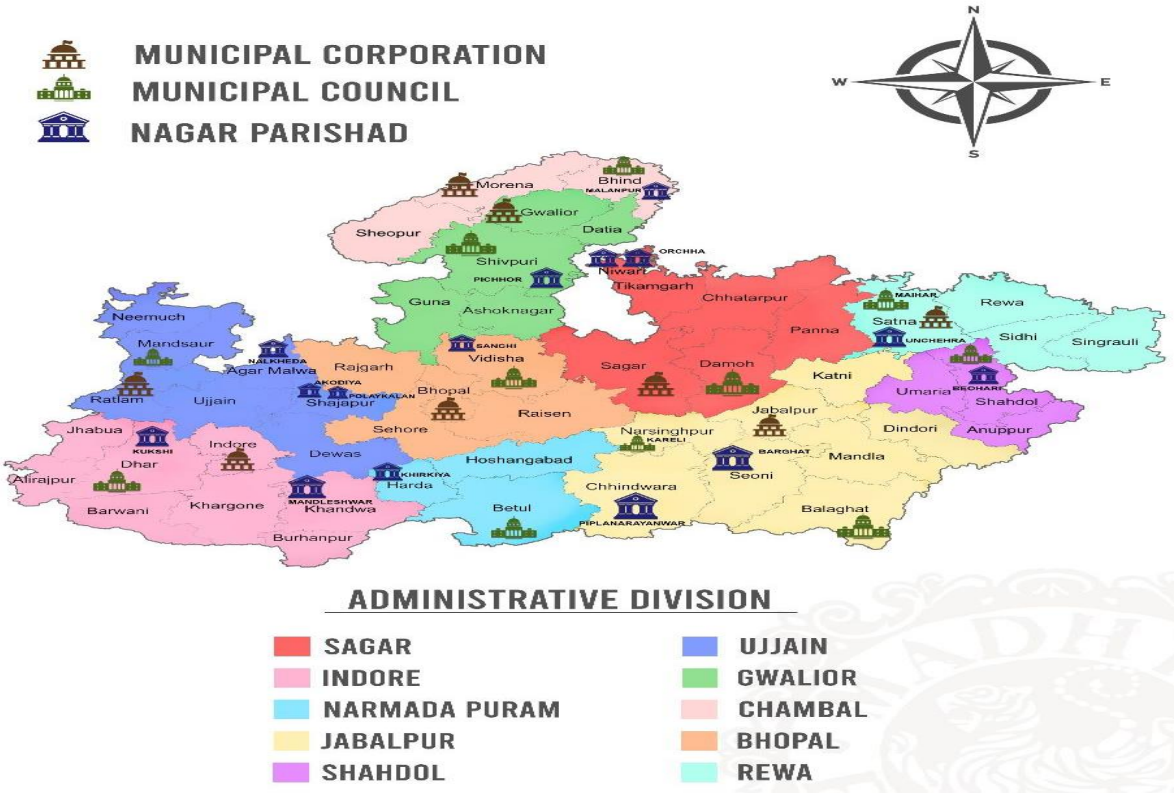
Table 1.3: Number of ULBs selected for test-check

S.N.	Category of ULBs	Number of ULBs in the state	Number of ULBs test checked
1	Municipal Corporation	16	8
2	Municipal Council	99	11
3	Nagar Parishad	298	15
Total		**413**	**34**

(Source: UADD Administrative Report for the year 2021-22)

The ULBs selected for audit have been depicted in **Map 1.1**:-

Map 1.1: Showing selection of ULBs for Test-Check



The ULBs were selected for test-check through simple random sampling method (Division-wise[2]) using IDEA application software.

1.7 Audit Methodology

An Entry Conference was held on 3 October 2022 with the Principal Secretary, Urban Development and Housing Department (UDHD) to explain the audit methodology, scope, objectives and criteria. The audit methodology involved document analysis, responses to audit queries, joint physical verifications (JPV) with municipal staff and collection of photographic evidence. Testing of water bodies in two ULBs Bhopal and Indore was also done to observe the presence of micro plastics in them. The Exit Conference with the concerned Department was held in May 2023, wherein the major Audit findings and other issues were discussed. The views of the Departments are suitably incorporated in the Report.

1.8 Best Practices

The Madhya Pradesh state was awarded with the title of India's Cleanest State under the Swachh Survekshan 2022, and 30 cities of the State have found place in the list of top 100 cleanest cities in the country, under the category of cities having more than one lakh population.

[2] From each tier of ULBs (Municipal Corporation, Municipal Council and Nagar Parishad) available in each Division, samples are drawn in such a manner that equal representation to each Division is ensured. One Municipal Corporation, 10 *per cent* (approx.) of its Municipal Councils and five *per cent* (approx.) of its Nagar Parishads from each Division, were selected in such a manner that the coverage of population of sampled units is not less than 25 *per cent* of entire urban population. Total urban population of ULBs covered under audit was 85.01 lakh whereas the total urban population of the State was 1.92 crore as per the Census, 2011.

Indore city of the State has bagged six consecutive Cleanest City titles, under this category for the years 2017 to 2022.

Further, the Indore Municipal Corporation (IMC), is serving as an inspiration for other cities in the country, after establishment (February 2022) of the Asia's first Bio-CNG plant of 550 TPD capacity at Indore on public private partnership (PPP) model, under the Centre's 'waste-to-wealth' concept and generating 17,500 kg bio-CNG gas per day.

1.9 Acknowledgement

Audit acknowledges the cooperation and assistance extended by the State Government, UADD, all the audited ULBs and MPPCB in conducting the performance audit.

1.10 Constraints in Audit

Absence of complete set of records and non-providing of information called for in Audit in the offices of the UADD, Bhopal and ULBs of Bhopal, Gwalior, Vidisha and Bhind (commented at various places in the report) hampered audit analysis. Hence, the findings of the joint physical inspections documented in the form of photographs formed the basis for highlighting the impact of insufficient solid waste management. The findings have also been substantiated with references to study conducted by Barkatullah University, Bhopal, and Media Reports.

CHAPTER 2

SOLID WASTE MANAGEMENT

Chapter 2

Solid Waste Management

2.1 Introduction

Improper management of solid waste could have harmful effects on both life and ecosystems. Therefore, it is important that solid wastes are properly managed and disposed.

The framework for administration and management of Solid Waste Management (SWM) in India is broadly divided into three tiers - Central, State and Local Bodies. Other stakeholders that play a crucial role are households, businesses, industries, informal sector, non-governmental organizations (NGOs), community-based organizations (CBOs), self-help groups (SHGs), *etc*. Involvement of all these stakeholders is necessary at several stages of SWM, as shown under **Appendix 2.1.**

Audit observed deficiencies in planning, policy making and other issues like assessment, collection, segregation, disposal, monitoring and contract management as discussed in paragraphs below.

2.2 State policy and strategy of SWM

Rule 11 of SWM Rules, 2016 stipulated that Secretary-in-charge, Urban Development Department shall prepare a State policy and SWM strategy for the state in consultation with stakeholders including representatives of waste pickers, self-help and similar groups working in the field of waste management consistent with these rules, National Policy on SWM and National Urban Sanitation Policy of the Ministry of Urban Development, in a period not later than one year from the date of notification of these Rules *i.e.* 08 April 2016.

The Urban Development and Housing Department of the State Government has notified "Solid Waste Management Policy-2018" on 05 September 2018 under Rule 11(1)(a) of SWM Rules, 2016. Thus, there was a delay of one year in notifying the State Policy, indicating laxity on the issue of solid waste management in the State and risk of unsystematic solid waste management during the time.

Urban Development and Housing Department, Government of Madhya Pradesh (Government) accepted (August 2023) the fact and stated that the delay was attributable mainly to the time consumed in preparing the State SWM policy and its approval by the State Cabinet.

2.3 Absence of SWM plan at ULB level

Rule 15(a) of SWM Rules, 2016 stipulates that the local authorities shall prepare a SWM plan as per state policy and strategy on SWM within six months from the date of notification of State Policy and strategy and submit a copy to respective departments of State Government or agency authorised by the State Government. Section 1.3 of Municipal Solid Waste Management (MSWM) Manual 2016 stipulated that planning for the MSW management services should

follow a seven-step process **(Appendix 2.2)**, to ensure compliance with SWM Rules, 2016 and other guidelines issued by the Government of India and respective state governments.

The MSWM plan is a long-term strategy spanning 20-25 years, with multiple short-term plans (five years) incorporated into it. These short-term plans will be assessed every 2-3 years to ensure their effectiveness. The National Green Tribunal (NGT) had also reiterated (orders in case number 606/2018), that action plan for solid waste management should be prepared by each ULB till 31 October 2018 and implement it by 31 December 2019.

State Government had notified the SWM policy in September 2018, thus, the ULBs had to prepare and submit their SWM plan, within six months (up to March 2019). Audit observed that 25[1] out of 34 ULBs had not prepared any long term and short term MSWM Plan up to July 2022 to deal with the MSW issues even after elapse of more than three years from the date of notification of the State Policy.

Further, three ULBs[2] had intimated that SWM plan had been prepared by them. However, copy of the plan prepared by them was not provided, so the date of its preparation and the period of delay if any in preparing the plan could not be ascertained. Five ULBs[3] had not provided any reply to the audit enquiry. Only one ULB, Piplanarayanwar indicated that they had prepared the SWM plan in the year 2012-13 much before the implementation of the SWM Rules, 2016.

Non preparation of SWM Plan resulted in ineffective implementation of SWM Rules in these ULBs.

Government stated (August 2023) in reply that SWM action plan of 378 ULBs has been published in August 2017 which was further revised in October 2020.

However, no documents were furnished in support of the reply. Further, the Department had sought the stated action plan from all the heads of ULBs by March 2023.

2.4 Not framing bye-laws

Rule 15 (e) of SWM Rules, 2016 stipulated that ULBs shall frame bye-laws incorporating the provisions of these Rules within one year from the date of notification of these Rules (i.e. by April 2017) and ensuring timely implementation.

Audit noticed that 23[4] out of 34 ULBs had not framed any bye-laws incorporating the provisions of these Rules. Further, seven ULBs[5] intimated that they had prepared the SWM bye-laws, however, except ULB Indore, no other ULB could provide copy of the bye-laws or the date of its preparation, for verification. Four ULBs[6] have not provided any reply to the audit enquiry.

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1 Akodia, Balaghat, Beohari, Betul, Damoh, Gwalior, Indore, Jabalpur, Kareli, Khirkiya, Maihar, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Polaykalan, Ratlam, Sagar, Sanchi, Shahdol, and Uchehara.

2 Dhar, Shivpuri and Vidisha.

3 Barghat, Bhind, Bhopal, Kukshi and Satna.

4 Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Gwalior, Jabalpur, Kareli, Khirkiya, Malanpur, Mandleshwar, Morena, Nalkheda, Niwari, Orchha, Piplanaraynwar, Polaykalan, Ratlam, Sagar, Sanchi, Shahdol and Uchehara.

5 Dhar, Indore, Maihar, Mandsaur, Pichhore, Shivpuri and Vidisha.

6 Bhind, Bhopal, Kukshi and Satna.

Non-framing of bye-laws can lead to improper disposal of waste and inadequate management of waste, leading to the accumulation of waste in public spaces, creating unsanitary conditions and aesthetic problems. Waste management could also become a haphazard and disorganized process, leading to inefficiencies and waste of resources.

The Government replied (August 2023) that as per data submitted by the ULBs on the Swachhatam portal of MoHUA all test checked 34 ULBs have prepared bye-laws related to provisions of SWM rules and furnished documents in support of the reply.

The reply is not acceptable as the bye laws have not been adopted by the ULBs (except ULB Indore) and the supporting document provided to Audit pertains to collection of user charges for waste management and notification for levy of penalty /spot fines for non-compliance of SWM Rules 2016. Further, the reply did not indicate Government approval/ gazette publication of the Byelaws.

2.5 Non-assessment of waste generated

A reliable assessment of different kinds of waste generated in the city limit is essential for planning and effective implementation of SWM. The quantity and composition of MSW generated in the ULB determines the collection, processing, and disposal options that could be adopted. They are dependent on the population, demographic details, principal activities in the city or town, income levels, and lifestyle of the community.

Para 1.4.3.3 of MSWM Manual 2016 stipulated that as an essential requirement, each ULB should assess the quantity and composition of waste generated to plan for and design MSWM systems effectively. Thus, the quantity of waste generated in the city needs to be assessed realistically to establish adequacy of existing systems and to plan for augmentation of treatment and disposal facilities.

Para 1.4.3.3.2 of MSWM, Manual stipulated that multiple samples at multiple locations need to be taken to determine waste composition as daily, seasonal and temporal fluctuations are usually observed within a ULB. Further, para 1.4.5.1 states that estimating future waste generation quantities and composition is also critical for developing MSWM plan. Thus, factors like (1) Future population forecasts; (2) anticipated lifestyle changes and (3) changes in socio-economic profile of the ULB were also to be considered.

Audit noticed that 15[7] out of 34 ULBs had not assessed the quantity of various type of waste generated during the years 2017-18 to 2021-22, and 15 ULBs[8] had assessed the quantity of waste. Four ULBs[9] have not provided reply to the audit enquiry. However, almost all of these ULBs (except ULB Indore) were making the assessment on per capita waste generation basis[10], instead of making a realistic assessment based on actual weighment. The estimate of waste

[7] Akodia, Balaghat, Beohari, Betul, Jabalpur, Kareli, Malanpur, Mandleshwar, Morena, Nalkheda, Niwari, Orchha, Pichhore, Sagar, and Shahdol.

[8] Barghat, Damoh, Dhar, Gwalior, Indore, Khirkiya, Maihar, Mandsaur, Piplanarayanwar, Polaykalan Ratlam, Sanchi, Shivpuri, Uchehara and Vidisha.

[9] Bhind, Bhopal, Kukshi and Satna.

[10] The Handbook on Service Level Benchmarks issued by Ministry of Urban Development Government of India gave the highest level of priority for waste generation estimates based on quarterly surveys/samples of statistically significant and representative number of households and establishments and gave lowest level of reliability on waste generation estimates based on empirical standards of per capita waste generation based on the size of the city.

generation on the basis of per capita assessment may lead to overestimation or underestimation of the actual amount of waste generated, resulting in inappropriate planning like selection of landfill site and inadequate allocation of resources for waste management. Thus, there was no baseline data available in the ULBs to properly assess the quantity of waste generated.

Government stated (August 2023) that all the ULBs follow SBM guidelines for assessment of per capita waste generation and are regularly or fortnightly doing the weighing of all their door-to-door collection vehicles at weighbridge either owned by them or privately owned and are maintaining the weighing receipts properly. Weighing receipts of ULBs Jabalpur, Damoh, Ratlam and Satna were attached as evidence.

The reply is not acceptable as the ULBs had not followed a systematic procedure of estimation of average amount of waste generated based on the provisions as stated in the para 1.4.3.3.2 of MSWM Manual. Further, under estimation of quantum of waste generated may lead to construction of facilities with inadequate capacity to meet performance standards.

2.6 Gap Analysis not done

Para 1.3 of MSWM 2016 provides that the municipal authority should carry out a critical assessment of the current status of SWM in the city as per the SWM Rules, 2016. The assessment should clearly identify deficiencies or gaps that need to be bridged to meet legal obligations.

To carry out gap analysis of equipment, vehicles, manpower and the operation and maintenance requirements for putting in place a proper solid waste management system the Government of India, Ministry of Housing and Urban Affairs (MoHUA) issued (November 2017) a template for Gap Analysis of Municipal Solid Waste Management Infrastructure and Services in ULBs. The template included gap analysis of infrastructures related to door-to-door garbage collection, storage and transportation, processing and disposal, manpower, IEC strategy and financial sustainability of operation and maintenance.

Only four ULBs (Dhar, Gwalior, Mandsaur and Ratlam) had intimated that they have conducted the required gap analysis, but no documents were submitted for verification of their claim. On the other hand, 23 ULBs[11] had intimated that they have not conducted gap analysis of infrastructures and financial sustainability of operation and maintenance. Additionally, seven ULBs (Bhind, Bhopal, Indore, Kukshi, Sagar, Satna and Shivpuri) had not provided any reply to the audit enquiry. Thus, conducting the gap analysis by the ULBs could not be ascertained.

Conducting gap analysis is crucial for ULBs to identify the gaps in their infrastructure and financial sustainability. This would enable ULBs to identify the gaps and take appropriate measures to address them. It would also help in improving the overall service delivery and operational efficiency of ULBs.

Government intimated that the State has conducted a gap analysis of the availability of basic infrastructures like vehicles, processing plants, machineries, *etc*. in the ULBs with the help of

[11] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Jabalpur, Kareli, Khirkiya, Maihar, Malanpur, Mandleshwar, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Sanchi, Shahdol, Uchehara and Vidisha.

the administrative set up of the Department and provided the necessary design, drawings, specifications, and funds for the procurement of the same.

However, no records pertaining to the conduct of gap analysis were furnished to Audit. Further, the test-checked 23 ULBs replied to Audit that no gap analysis of infrastructures and financial sustainability of operation and maintenance were conducted by them so far.

Audit also observed the following:

2.6.1 Levy and collection of user fee for solid waste management

Rule 15(f) of SWM Rules, 2016 provides that ULB shall prescribe a user fee as deemed appropriate to cover the cost of providing solid waste services like collection, transportation, processing and disposal. The fee could be collected from the waste generators by ULBs on their own or through any authorised agency.

The test checked ULBs could not provide the information as required regarding levy of user fee, due to which an analysis of the demand and revenue realised on this account could not be ascertained. However, the status of levy of user fee for SWM services as provided by the test checked ULBs were as given below:

- Out of 15 test checked Nagar Parishads (NPs) only NP Niwari collected user fee for SWM during the years 2017-22. Seven NPs[12] had not levied any user fee for SWM till March 2022. Three NPs (Khirkiya, Piplanarayanwar and Sanchi) were collecting it from the years 2018-19, 2019-20 and 2020-21 respectively. Further three NPs (Barghat, Mandleshwar and Uchehara) have started collecting user fee from the year 2021-22. One NP (Kukshi) did not provide reply to the audit enquiry.
- Out of 11 test checked Municipal Councils (MCls) only four MCls[13] collected user fee for SWM during the years 2017-22. MC Shivpuri intimated that no separate user fee for SWM was being collected, it is included in *Samekit Kar*. Two MCls (Balaghat and Vidisha) had not levied any user fee for SWM till March 2022. Two MCls (Maihar and Shahdol) were collecting user fee from 2020-21 and MC Damoh from 2021-22. MCl Bhind did not provide reply to audit enquiry.
- All the test checked Municipal Corporations (MCs) except Gwalior collected user fee for SWM during the years 2017-22. While MC, Gwalior was collecting it from the year 2019-20.

2.6.2 Non-receipt of Performance Grant under 14th Finance Commission

The 14th Finance Commission recommended the Basic Grant and Performance Grant to ULBs as a percentage of divisible pool[14] account. On the recommendation of 14th Finance

[12] Akodia, Beohari, Malanpur, Nalkheda, Orchha, Pichhore and Polaykalan.
[13] Betul, Dhar, Kareli and Mandsour.
[14] The net tax revenue of the State is known as divisible fund. The net tax revenue is arrived at after deducting the share of State Government in Central taxes, 10 *per cent* amount as a collection charge and assigned revenue.

Commission, the state Government fixed the following conditions for distribution of Performance Grant among ULBs:

1. The Municipality will have to submit audited accounts that relates to the year, not earlier than two years preceding the year, in which the Municipality seeks to claim the Performance Grant.
2. The Municipality will have to show an increase in its own revenue over the preceding year as reflected in the audited accounts.
3. The Municipality must ensure and publish the Service Level Benchmarks to basic urban services each year for the period of the award and make it publicly available.

Audit noticed that 298 out of 378 ULBs and 329 out of 378 ULBs had qualified for receiving Performance Grant respectively in the year 2018-19 and 2019-20 but the eligible amount of grant ₹ 602.55 crores[15] was not received till the year 2021-22 and the ULBs were deprived of availing the said grant.

The above para was also included in the Performance Audit of Comptroller and Auditor General of India's report, for the year 2022, on the subject "Implementation of 74th Constitutional Amendment Act in Madhya Pradesh" and the said grant had still not been released by the Government of India.

2.7 Non-integration of the Informal Sector

As per Rule 11(c) and 11(m) of SWM Rules, 2016 the State Government had to prepare the State policies and strategies duly acknowledging the role of the informal sector (includes *kabadiwalas* or scrap dealers/ rag pickers/ waste pickers) in SWM activities and start a scheme for registration of these waste pickers and waste dealers. Further, Rule 15 (c) of the SWM Rules, 2016 stipulated that the ULBs shall establish a system to recognise organisations of waste pickers or informal waste collectors and establish a system for their integration to facilitate their participation in solid waste management including door-to-door collection of waste.

State Government in its State Policy for Solid Waste Management 2018 also mandated for starting a scheme of registration of rag pickers in the State and ensuring livelihood of the workers engaged in formal and informal sectors and facilitate their working in good environment.

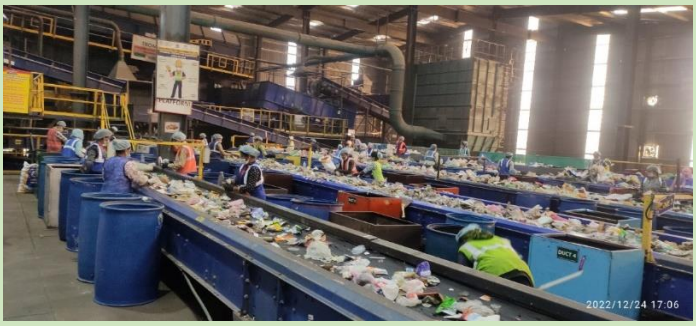
Information regarding initiation of any scheme for registration of rag pickers in the State, was called for from UADD, however reply to the same has not been provided. In its absence, Audit could not conclude whether the State Government had made any scheme for ensuring livelihood of the workers engaged in informal sectors and facilitate their working in good environment.

During physical inspection of Material Recovery Facility (MRF) operated by Indore Municipal Corporation (IMC), Audit noticed that waste pickers were deployed by the firm for sorting of reusable materials from dry wastes brought to site. Further, as per information provided by MPPCB approximately 443 waste pickers had been involved in the MRF

[15] ₹ 602.55 crore (₹ 260.91 crore for 2018-19 and ₹ 341.64 crore for 2019-20).

operated by M/s NEPRA under Public-Private Partnership model. These rag pickers were working as contractual workers with M/s NEPRA and were getting benefits of government schemes. A large chunk of other rag pickers was also deployed for the work of garden composting for treating garden waste or household waste into compost, or working as *Safai Mitra* for sweeping roads/ pavements, collecting garbage and also at transfer stations. They are employed with a fixed term contract and getting salary into their account.

Image 2.1: Waste pickers engaged in automated MRF of IMC



(Photo: Audit Team)

This is a positive step towards empowering the informal sector and integrating them into the formal waste management system.

However, 20 ULBs[16] (except nine ULBs Betul, Dhar, Indore, Maihar, Mandsaur, Ratlam, Sagar, Shivpuri and Vidisha) stated that they did not have any scheme of registration of rag pickers. Five ULBs (Bhind, Bhopal, Gwalior, Kukshi and Satna) were yet to provide related information.

Non-involvement of rag pickers/ informal waste collectors (informal sector) in the primary (door-to-door) collection of waste by these ULBs resulted in non-compliance of provisions of the SWM Rules, 2016 and the solid waste management process could not be optimised.

It is recommended that these ULBs also take similar steps as taken by IMC to engage waste pickers in solid waste management and provide them with better working conditions and fair wages. This will not only help in reducing the burden on ULBs but also contribute to the social and economic upliftment of the informal sector.

Government stated (August 2023) that the State had prepared *Jyotirmay* Scheme in 2018 with the aim to identify the unauthorised rag pickers available in the survey and engage them in further segregation of waste in different categories at material recovery facilities by forming SHGs and providing them with PPE kits and identity cards. This scheme is implemented by all the ULBs of the State.

The reply is not acceptable as except the nine ULBs stated above, none of the ULBs had any scheme of registration of rag pickers, and only ULB Indore had actually engaged these rag pickers for activities under solid waste management.

[16] Akodia, Balaghat, Barghat, Beohari, Damoh, Jabalpur, Kareli, Khirkiya, Malanpur, Mandleshwar, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Sanchi, Shahdol, and Uchehara.

2.8 Framing of Bye-laws prescribing criteria for levy of spot fine for littering

Rule 15 (zf) of SWM Rules, 2016 provides that it is the duty of the local body to frame bye-laws and prescribe criteria for levying of spot fine for persons who litters or fails to comply with the provisions of these Rules and delegate powers to officers or local bodies to levy spot fines as per the bye laws framed.

It was noticed that GoMP had issued gazette notification (28 September 2020) prescribing various fines to be levied on spot for violation of the SWM Rules, 2016, after a lapse of more than four years from the date of issue of SWM Rules, 2016.

The test checked ULBs had not framed bye-laws of criteria for levy of spot fine for littering in accordance to Rule 15 (zf) of SWM Rules 2016. However, 25 test-checked ULBs[17] had intimated that they have issued notification for levy of spot fines in newspapers, however bye-laws has not been framed by the test checked ULBs. Only seven of the 25 ULBs as detailed in **Table 2.1** intimated that they had recovered an amount of ₹ 2.16 crore as spot fine, during last five year, *i.e.*, 2017-18 to 2021-22.

Table 2.1: Showing details of amount recovered as spot fine by the test checked ULBs

S.N.	Name of ULB	Amount recovered during five years (in ₹)
1	Niwari	200
2	Betul	89,050
3	Damoh	64,900
4	Ratlam	39,38,321
5	Jabalpur	1,60,04,927
6	Sagar	14,57,650
7	Shivpuri	90,000
Total		**2,16,45,048**

(Source: Information provided by respective ULBs)

Out of 25 ULBs where notification was stated to have been issued, 18 ULBs[18] could not intimate the amount of spot fines recovered by them, despite publication of notification in this regard.

Five test-checked ULBs[19] have intimated that they had not framed any bye-laws for levying of spot fines for littering or failure to abide by the SWM Rules, 2016. Four ULBs (Bhind, Bhopal, Kukshi and Satna) did not provide any reply to the audit enquiry. Non-issue of notification or inaction of the ULBs in levy of spot fines despite publication of notification, failed to curb the citizens from littering and abiding with the SWM Rules, 2016.

Government replied (August 2023) that ULBs had already initiated the process of notifying charges for spot fines and indicated its intent to issue directives to those ULBs that had not yet

[17] Akodia, Balaghat, Barghat, Betul, Damoh, Dhar, Gwalior, Indore, Jabalpur, Khirkiya, Maihar, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Ratlam, Sagar, Sanchi, Shahdol, Shivpuri and Vidisha.

[18] Akodia, Balaghat, Barghat, Dhar, Gwalior, Indore, Khirkiya, Maihar, Mandleshwar, Mandsaur, Morena, Nalkheda, Orchha, Pichhore, Piplanarayanwar, Sanchi, Shahdol and Vidisha.

[19] Beohari, Kareli, Malanpur, Polaykalan and Uchehara.

provided data on the spot fines collected by them over the past five years, to provide the same. It was also mentioned that four[20] ULBs have collected spot fines.

2.9 Preparation of Environment Impact Assessment (EIA) Report

Guidelines issued by Ministry of Environment and Forests (MoEF) in December 2013 (Notified again by MoEF in March 2020) has classified all MSW projects under B1 category and had to obtain prior Environment Clearance from State Environment Impact Assessment Authority (SEIAA).

Five ULBs (Dhar, Pichhore, Sagar, Sanchi and Shivpuri) intimated that they have prepared EIA report, without providing evidence for verifying the same. Further, 24 ULBs[21] intimated that they have neither prepared EIA Report nor obtained any EIA Clearance from SEIAA for the land fill site and the facilities created at landfill site. ULB Indore intimated that preparation of EIA was not required as the sites of MSW projects are 60 years old. Four ULBs (Bhind, Bhopal, Kukshi and Satna) did not offer any reply to the audit observation.

Non preparation of EIA reports by these 24 ULBs indicate that these ULBs had not made any effort for assessing the risks from Municipal Solid Waste to human health and environment in their jurisdiction, prior to the commencement of the MSWM activities. The reply of ULB Indore is not acceptable as all MSWM projects were classified under B1 category and thus had to obtain prior environment clearance from SEIAA before setting it up. Thus, the environmental impact of the MSWM projects was not rolled out by most of the ULBs.

Government stated (August 2023) that a plan to construct 45 clustered landfills and appointing a consultant at State level is under consideration. This consultant would assist ULBs in the preparation of EIA reports for these 45 clustered landfill sites. Consequently, individual ULBs would not be required to prepare their own EIA reports. Additionally, it was mentioned that instructions would be issued to ULB Indore to expedite the process of obtaining the environment clearance for SEIAA.

2.10 Progress of ULBs in developing infrastructure for effective SWM

Rule 22 of the SWM Rules, 2016 stipulated that necessary infrastructure for implementation of these Rules shall be created by the local bodies and other concerned authorities, as the case may be, on their own directly or by engaging agencies within the specified timeframe. Hence, the ULBs were required to identify the infrastructures required for implementation of Solid Waste Management, and also prepare an action plan for timely completion of necessary infrastructure as per the requirement of the SWM Rules, 2016.

The progress made by the test-checked ULBs in creation of infrastructures for SWM has been shown in **Table 2.2**.

[20] ULBs- Bhopal ₹ 235.38 lakh, Polaykalan ₹ 0.23 lakh, Satna ₹ 15.15 lakh and Uchehara ₹ 3,300.

[21] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Gwalior, Jabalpur, Kareli, Khirkiya, Maihar, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Ratlam, Shahdol, Uchehara and Vidisha.

Table 2.2: Showing the progress made by test-checked ULBs in creation of SWM infrastructures

S. N.	Activity	Time limit from the date of notification of rules	ULBs achieving the requirement	ULBs yet to achieve the requirement
1	Identification of site for setting up solid waste processing facilities	1 year	30	3 ULB[22] (reply of ULB Bhopal awaited)
2	Procurement of site	2 years	28	5 (reply of ULB Bhopal awaited)
3	Enforcing segregation of waste at source	2 years	14	12 (reply of 8 ULBs awaited)
4	Ensuring door-to-door collection	2 years	34	0
5	Ensuring separate storage, collection and transportation of Construction and Demolition waste	2 years	19	11 (reply of 4 ULBs awaited)
6	Setting up solid waste processing facilities for ULBs having population 1,00,000 or more/ below 1,00,000	2/3 years	19	12 (reply of 3 ULBs awaited)
7	Setting up common or standalone sanitary landfill by ULBs having five lakh or more population (four ULBs – Bhopal, Indore, Gwalior and Jabalpur, under the criteria)	3 years	1	2 (reply of ULB Bhopal awaited)
8	Setting up common or regional sanitary landfill by ULBs having population below five lakh (remaining 30 ULBs under the criteria)	3 years	4	21 (reply of 5 ULBs awaited)
9	Bioremediation or capping of old and abandoned dump sites	5 years	5	23 (reply of 6 ULBs awaited)

The **Table 2.2** above provides information on the progress made by ULBs in various activities related to solid waste management. Thirty (88 *per cent*) of the test checked ULBs had identified site for setting up solid waste processing facilities. Out of these 30 ULBs, 28 had acquired the site. Thus, the Audit could ascertain about availability of landfill site in 28 out of the selected 34 ULBs. Fourteen (41 *per cent*) of the test-checked ULBs had started enforcing the waste generators to segregate waste at source. All the test-checked ULBs had ensured door-to-door collection of waste. Fifty-Six *per cent* of the test-checked 34 ULBs had set up waste processing facilities. Only 15 *per cent* of the test checked 34 ULBs had stated that they had set up common or standalone sanitary landfill. Similarly, only 15 *per cent* of the test checked ULBs had stated that old and abandoned dumpsites under them had been either bio-remediated or capped.

Thus, it is evident that while progress had been made in some areas of solid waste management, there is still significant work to be done in others. The ULBs that had not yet achieved the requirements for each activity need to take necessary steps to ensure proper solid waste management in their respective areas.

Government in its reply stated (August 2023) that as per the Swachhatam portal's data all the test checked ULBs have achieved the activities listed under serial numbers 1 to 5 in the table 2.2. It was also stated that the variation against the activity under serial number 2 of table may be attributed to delays in transfer of land ownership title to some ULBs. Against activity under

[22] The ULB Pichhore was yet to identify the site for setting of solid waste processing facilities. The ULB Satna was part of Rewa MSW cluster and the ULB Jabalpur had set up waste to energy plant, due to which requirement of site did not exist.

serial number 3 it was clarified that all ULBs had enforced segregation of waste at source and acknowledged that the percentage of waste segregation at source may be lower in some ULBs. In case of activity number 8, the Government stated that, as per the State strategy of preparing clustered landfills, these 30 ULBs are planned to be covered under 13 proposed clustered landfills.

Audit is of the view that delays in transfer of land ownership title to ULBs to establish landfills would contribute to unscientific and non-sustainable disposal of waste. Additionally, the proposed State strategy of preparing clustered landfills needs to be closely monitored for its successful execution.

2.11 Segregation of Waste

The SWM Rules, 2016 defines segregation as sorting and separate storage of various components of solid waste namely biodegradable wastes including agriculture and dairy waste, non-biodegradable wastes including recyclable waste, non-recyclable combustible waste, sanitary waste and non-recyclable inert waste, domestic hazardous wastes, and construction and demolition wastes.

Segregating waste at source ensures that waste is less contaminated and can be collected and transported for further processing. Segregation of waste also optimises waste processing and treatment technologies. It results in high proportion of segregated material that could be reused and recycled, leading to less consumption of virgin material.

The SWM Rules, 2016 mandated the implementation of waste segregation within two years of their introduction.

The deficiencies observed in the process of segregation are discussed in paragraphs below.

2.11.1 Guidelines/ instructions for source segregation

Rule 4 (a) of the SWM Rules, 2016 stipulated that every waste generator shall segregate and store the waste generated by them in three separate streams namely bio-degradable, non-biodegradable and domestic hazardous wastes in suitable bins and handover these to authorised waste pickers or waste collectors as per the direction or notification by the local authorities from time to time. Waste collectors were entrusted with the responsibility of not only collecting waste, but also ensuring that the waste they collect is segregated properly. According to Section 2.2.1 of MSWM Manual 2016, ULBs are required to give the highest priority to waste segregation at source.

Thirteen test checked ULBs[23] stated that they had neither provided guidelines nor made arrangement for waste segregation at source by waste generators or waste collectors during the collection of waste. Eighteen test checked ULBs[24] intimated that instructions regarding waste segregation had been issued to waste generators.

[23] Akodia, Barghat Beohari, Damoh, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Niwari, Orchha, Polaykalan and Sagar.

[24] Balaghat, Betul, Dhar, Gwalior, Indore, Maihar, Mandleshwar, Mandsaur, Morena, Nalkheda, Pichhore, Piplanarayanwar, Ratlam, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

Government stated that the State has been sharing guidelines, instructions, and IEC materials like street play scripts, mike announcement scripts, banner/ poster designs, slogans, *etc.* to ULBs during the last five years. Government admitted that the level of source segregation is not that high in all the ULBs and stated that the State is taking steps to increase the level of segregation in the ULBs.

Audit is of the view that the level of source segregation needs to be improved in a time bound manner at ground level, for facilitating proper segregation at source.

2.11.2 Failure of ULBs to enforce segregation of wastes by waste generators

Rule 22 of SWM rules, 2016 provides a time limit of two years from the date of notification of the rules, to ULBs for enforcing waste generators to practice segregation of biodegradable, recyclable, combustible, sanitary waste, domestic hazardous and inert solid wastes at source.

- Thirteen[25] out of 34 test checked ULBs intimated that they have not enforced waste generators to practice segregation of waste at source. All these ULBs (except ULB, Sagar and ULB, Jabalpur where unsegregated wastes were being taken directly to waste processing facilities) were dumping wastes in their landfill site.
- Fifteen[26] ULBs had intimated that they are enforcing waste generators to practice segregation of wastes at source. Audit, however, observed that in nine[27] out of these 15 ULBs segregated wastes were being dumped together in the landfill sites of these ULBs, defeating the very purpose of segregation. Of the remaining six ULBs, ULB Dhar intimated that they are following the concept of zero landfill, however dumping of wastes was also observed in this ULB. In three ULBs Khirkiya, Mandleshwar and Mandsaur, wastes were also found dumped. ULB Satna was a part of Rewa cluster as such wastes were being transported to the project site at Rewa. Proper segregation of wastes and its processing was observed in ULB Indore only. **Images 2.2 to 2.9** depicts dumping of wastes by the ULBs.
- The remaining six[28] ULBs did not offer any information on the issue.

[25] Akodia, Damoh, Jabalpur, Malanpur, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Sagar, Sanchi, and Vidisha.
[26] Balaghat, Barghat, Beohari, Betul, Dhar, Gwalior, Indore, Khirkiya, Maihar, Mandleshwar, Mandsaur, Ratlam, Satna, Shahdol and Uchehara.
[27] Balaghat, Barghat, Beohari, Betul, Gwalior, Maihar, Ratlam, Shahdol and Uchehara.
[28] Bhind, Bhopal, Kareli, Kukshi, Pichhore and Shivpuri.

Images 2.2 to 2.9: Wastes found dumped at landfill sites

Image 2.2: Waste dumped at ULB, Ratlam

Image 2.3:Waste dumped at landfill site at ULB, Dhar

Image 2.4: Unsegregated waste dumped at landfill site at ULB, Betul

Image 2.5: Unsegregated waste being dumped at landfill site at ULB, Balaghat

Image 2.6: Waste found dumped at landfill site at ULB, Mandleshwar

Image 2.7: Waste found dumped at landfill site at ULB, Khirkiya

Image 2.8: Waste found dumped at landfill site at ULB, Mandsaur

Image 2.9: Waste found dumped at landfill site at ULB, Uchehara

(Photo: Audit Team)

Government stated that penalties were being levied and given wide publicity through newspapers, social media and other means of communication, to enforce waste generators to practice segregation of waste at source.

Audit is of the view that the segregation at source needs to be enforced at ground level, for effective waste management.

2.11.3 Operational challenges in Material Recovery Facilities (MRFs) created for waste segregation

Material recovery begins at the household level where recyclable materials such as newspapers, cardboard, plastics, bottles, *etc*. are separated from waste and sold to the *kabadi* system (scrap dealers or haulers) or local recyclers. Any items that cannot be sold to the *kabadi* system are discarded and becomes part of MSWM. In cases where source segregation is absent or deficient, it is essential to ensure segregation of waste before it reaches the processing / landfill site.

As per clause 15(h) of the SWM Rules, 2016, it is the duty and responsibility of local authorities to set up MRFs with sufficient space for sorting of recyclable materials, to enable informal or authorised waste pickers and waste collectors to separate recyclables from the waste and provide easy access to waste pickers and recyclers for collection of segregated recyclable waste such as paper, plastic, metal, glass, textile from the source of generation or Material Recovery Facilities (MRFs).

Audit observed that 20 ULBs had constructed MRFs, but physical verification revealed that these were not in operation **(Images 2.10 to 2.13)**. Eleven ULBs[29] out of these intimated that expenditure of ₹ 96.65 lakh was incurred on construction of these MRFs, and remaining ULBs could not provide the expenditure incurred on its construction. In nine ULBs[30], MRFs were in operation. ULB Morena did not have MRF, and three ULBs (Sagar, Satna and Jabalpur) had adopted other methods of disposal. ULB Bhopal did not provide reply to the audit enquiry.

Images 2.10 to 2.13: MRFs lying un-operated

Image 2.10: Unoperated MRF at ULB Orchha

Image 2.11: Unoperated MRF at ULB Betul

[29] Akodia, Barghat, Betul, Bhind, Kareli, Kukshi, Malanpur, Orchha, Polaykalan, Sanchi and Shahdol.
[30] Damoh, Dhar, Indore, Khirkiya, Mandleshwar, Mandsaur, Nalkheda, Ratlam and Shivpuri.

Image 2.12: Unoperated MRF at ULB Polaykalan

Image 2.13: Unoperated MRF at ULB Akodia

(Photo: Audit Team)

Due to non-operation of MRFs, the wastes collected were being dumped at landfill sites as indicated in Paragraph 2.11.2.

Government replied (August 2023) that in most of the ULBs, MRFs are not maintained properly due to lack of manpower and space availability to store the segregated waste properly, and due to this reason, these MRFs are non-operational or un-operated. Government also stated that MRF at Betul is fully operational and an agency has been engaged to run it.

The reply does not provide any assurance regarding the scope of utilisation of the MRF for the purpose envisaged. Further, during physical verification (September 2022), MRF at Betul was found un-operational.

2.11.4 Lack of community participation in waste segregation due to non-conduct of meetings

As per Para 2.2.2 of CPHEEO MSW Manual, 2016, it is recommended that ULB staff hold regular meetings with representatives of Resident Welfare Associations (RWAs), market associations, NGOs, SHGs, and other stakeholders until the community fully adopts the practice of segregation of wastes.

However, during audit, it was found that out of the 34 test checked ULBs, 19 ULBs[31] did not hold such meetings with stakeholders, and four ULBs (Bhind, Bhopal, Indore and Satna) did not provide the required information. 11 ULBs[32] intimated that the meetings had been organised during the five years, but details thereof were not provided for verification. The failure to conduct meetings resulted in lack of community participation in waste segregation by the ULBs.

Government stated (August 2023) that Department is putting its best effort for community participation and supporting ULBs to hold meetings with representatives of RWAs, market associations, *etc*. for community participation in waste segregation. It further stated that campaigns like Swa-Sahayta Samuh Swachhta Abhiyan (Door-to-door segregation campaign), Swachh toilet campaign, Swachhata Sewa Pakhwada were organised for this purpose. Online

[31] Balaghat, Beohari, Betul, Damoh, Gwalior, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Sanchi and Shahdol.

[32] Akodia, Barghat, Dhar, Maihar, Mandleshwar, Mandsaur, Ratlam, Sagar, Shivpuri, Uchehara and Vidisha.

meetings were conducted at ULB level with NGOs, RWAs and SHGs from time to time for best practices of segregation of waste.

The reply is not convincing as 19 test checked ULBs replied to Audit that no such meetings with stakeholders were held.

2.11.5 Lack of monitoring for waste segregation at unlicensed places

According to Rule 4(4) of the SWM Rules, 2016 any event or gathering of more than one hundred persons at an unlicensed place must be intimated to the local body.

However, during audit it was found that out of the 34 test checked ULBs, 27 ULBs[33] did not receive any application from organisers of such events. Further, three ULBs (Damoh, Mandleshwar and Ratlam) had received applications for such events but monitoring of segregation of wastes was being done by two ULBs (Damoh and Mandleshwar). Four ULBs (Bhind, Bhopal, Indore and Satna) did not provide the required information. Additionally, the ULBs did not have information about events organised at unlicensed places within their jurisdictional area. This lack of information prevented the ULBs from properly monitoring whether organisers were segregating and handing over the wastes generated at these events to waste collectors.

The SWM Rules, 2016 defines segregation as sorting and separate storage of various components of solid waste namely biodegradable wastes including agriculture and dairy waste, non-biodegradable wastes including recyclable waste, non-recyclable combustible waste, sanitary waste and non-recyclable inert waste, domestic hazardous wastes, and construction and demolition wastes. Segregation of wastes was to be done within two years of the introduction of SWM rules.

Audit noticed instances of non-compliance with various provisions of SWM rules relating to segregation of waste such as non-framing of guidelines, non-issue of instructions for segregation of waste at source, failure of ULBs to enforce segregation of waste-by-waste generators, operational challenges in MRFs set up for segregation of waste, lack of community participation in waste segregation and lack of monitoring for waste segregation at unlicensed events.

Due to these reasons 100 *per cent* segregation of waste was not ensured by the test-checked ULBs (except ULB Indore), even after elapse of almost six years of introduction of the SWM Rules. Consequently, the ULBs were dumping unsegregated waste at landfill sites as shown in **Images 2.2 to 2.9 and 4.1 to 4.4.**

2.12 Collection of Wastes

Para 2.3.2 of MSWM Manual, 2016 stipulated that collection of segregated municipal waste is an essential step in MSWM. Inefficient waste collection services have an impact on public health and aesthetics of towns and cities. Collection of wet, dry and domestic hazardous waste

[33] Akodia, Balaghat, Barghat, Beohari, Betul, Dhar, Gwalior, Jabalpur, Kareli, Khirkiya, Kukshi, Maihar, Malanpur, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Sagar, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

separately ensures maximum recovery of recyclables. It also enhances the potential of cost-effective treatment of such wastes which can then easily meet the minimum quality criteria defined for different products, *e.g.*, production of compost from pure organic waste.

Waste collection service is divided into primary and secondary collection. Primary collection refers to the process of collecting, lifting and removal of segregated solid waste from source of its generation like households, shops, offices, markets, hotels, institutions and other residential or non-residential premises and taking the waste to a storage depot or transfer station or directly to the disposal site. Secondary collection includes picking up waste from community bins, waste storage depots, or transfer stations and transporting it to waste processing sites or to the final disposal site.

Audit scrutinised the efficacy of ULBs in waste collection and found out deficiencies like absence of weighbridges, inadequate collection of waste from households and resident welfare associations, non-issue of instructions to sweepers not to burn leaves, lack of personal protection equipment kits for workers, *etc*, as discussed below:

2.12.1 Status of waste collection in the state

The Handbook of Service Level Benchmarks (SLBs) issued by GoI gave least level of priority to waste generation estimates based on per capita waste generation based on the population of the ULB. The quantum of waste generated and collected in the State during the period 2017-18 to 2021-22 is shown in **Table 2.3**.

Table 2.3: The quantity of waste generated and collected in the State (in tons per day)

S.N.	Period	Waste Generated	Wastes Collected	Collection *Percentage*
1	2017-18	7,212	6,537	90.64
2	2018-19	8,000	7,500	93.75
3	2019-20	7,980	7,193	90.14
4	2020-21	8,022	7,235.50	90.20
5	2021-22	7,115	6,132	86.18
Total		**38,329**	**34,597.5**	**90.26**

(Source: Reports of MPPCB)

From **Table 2.3**, it can be seen that the percentage of waste collected in the State, ranges from 86.18 *per cent* to 93.75 *per cent* over the five-year period. The highest percentage was in 2018-19 when 93.75 *per cent* of waste generated was collected, while the lowest percentage was in 2021-22 when only 86.18 *per cent* of waste generated was collected. Although all the test checked ULBs claimed to have collected 100 *per cent* of wastes generated, this statement cannot be verified as the ULBs did not have any records to substantiate the claim. Additionally, as mentioned in the following paragraph, the ULBs did not have a weighbridge to measure the quantity of waste generated and collected, further casting doubt on the veracity of the claim.

2.12.2 Absence of weighbridge

According to Para 1.4.3.3.1 of the MSWM Manual, 2016, it is necessary to quantify the waste generated from households, markets, and other commercial establishments and institutions. Furthermore, all waste collected from the city should be weighed at weighbridges located at transfer stations or en-route to processing and disposal facilities.

However, during the audit, it was found that weighbridges were not installed in 23[34] out of 34 test-checked ULBs. The weighbridge installed at ULB Betul was found un-operational during physical verification of site. Only seven ULBs[35] had weighbridges in operation. Information about availability of weighbridges from three ULBs (Bhopal, Gwalior and Satna) was awaited. On physical verification of transfer station (Govindpura Transfer Station, Bhopal), and MRFs at Bhanpur and Adampur at Bhopal, Audit observed that facilities for weighing the capsules used for transporting wastes from transfer stations to trenching ground was not available. Further, the data of weighbridge installed at Adampur Chawni MRF, Bhopal was being deleted after recording the entries in an excel sheet. Weighment entries were also found made manually at the MRF site and sample check of manual entries with the data in the excel sheet revealed differences in the quantity of wastes. Thus, the reliability on the data entered in the excel sheet could not be ensured. Since, payment to the contractor for processing of wastes is made on the basis of quantity of waste received/recorded at MRF, preserving of weighbridge data is mandatory.

The absence of weighbridges for weighing of wastes collected in a majority of the test checked ULBs is a matter of concern. Without proper quantification, it is difficult to assess the efficiency and effectiveness of waste management practices in these ULBs. This also raises questions about the accuracy of the ULBs' claims of collecting hundred *per cent* of the waste generated. It is imperative that ULBs prioritize the installation of weighbridges at transfer stations or en-route to processing and disposal facilities to ensure accurate measurement and monitoring of the waste collected.

Government stated that most of the test checked ULBs do not have weighbridges; installation and maintenance of weighbridge is very costly since these ULBs have less population and quantity of waste generation is less. It was also stated that the Department has appointed division wise consultants for the preparation of Solid Waste Management DPRs (Detailed Project Report) for each ULB and the work is in progress.

Audit while agreeing with the statement of the Government with respect to the ULBs having less population, is of the opinion that a foolproof system for ascertaining and recording the data of waste particularly where it forms basis for payment needs to be strictly ensured.

2.12.3 Door-to-Door Collection (DTDC) of waste

Rule 15 (b) of SWM Rules, 2016 stipulated that ULBs were required to make arrangement for DTDC of segregated solid waste from all households including slums and informal settlements, commercial, institutional and other non-residential premises.

Status of DTDC facility in the ULBs of the state during the period from 2017-18 to 2021-22 is shown in **Table 2.4.**

[34] Akodia, Balaghat, Barghat, Beohari, Bhind, Damoh, Jabalpur, Kareli, Kukshi, Maihar, Malanpur, Mandleshwar, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Sanchi, Shahdol, Shivpuri and Vidisha.

[35] Dhar, Indore, Khirkiya, Mandsaur, Ratlam, Sagar and Uchehara.

Table 2.4: Statement showing the status of DTDC facility in the ULBs in the State

S.N.	Year	Total no. of ULBs	No. of ULBs covered under DTDC	Percentage of ULBs covered under DTDC
1	2017-18	378	274	72.49
2	2018-19	378	364	96.30
3	2019-20	378	372	98.41
4	2020-21	378	372	98.41
5	2021-22	406	406	100.00

(Source: Reports of MPPCB)

The above **Table 2.4** shows the percentage of ULBs in the State that are covered under door-to-door Collection (DTDC) of waste for the years 2017-18 to 2021-22. The data reveals that the percentage of ULBs covered under DTDC has been steadily increasing over the years. In the year 2017-18, only 72.49 *per cent* of ULBs had DTDC, whereas in the year 2021-22, all 406 ULBs have implemented DTDC. This indicates a positive trend towards better waste management practices in the State as DTDC is an effective way to ensure proper waste collection from households and commercial establishments.

2.12.4 Collection of wastes from Resident Welfare Associations

According to Rule 4 (6,7 and 8) of the SWM Rules 2016, Resident Welfare Associations, Market Associations, Gated Communities, Institutions, Hotels and Restaurants are required to ensure segregation of waste at source within a year of notification of this Rule. This should be done in partnership with the local body and should include facilitating the collection of segregated waste in separate streams. Bio-degradable waste shall be processed, treated and disposed of through composting or bio-methanation within the premises as far as possible. The residual waste should be given to the waste collectors.

However, test check revealed that compliance with Rule 4 was not ensured by 14 test checked ULBs[36] out of 34 ULBs. Three ULBs (Bhind, Bhopal and Satna) were yet to furnish a reply to the audit enquiry.

Government stated (August 2023) that in most of the test checked ULBs, Resident Welfare Associations are not available as population of these ULBs are very less and there are not much gated society in these ULBs. Hence the provision of RWA need not be complied.

Audit is of the view that, absence of RWAs under jurisdiction of ULBs does not exempt other entities like hotels, and restaurants from their obligations of segregation of waste as provided in the SWM Rules.

2.12.5 Issue of Personal Protection Equipment kits to workers handling solid

According to Rule 15 (zd) of SWM Rules, 2016, it is the duty of local authorities or facility operators to ensure that Personal Protection Equipment (PPE), including uniform fluorescent jacket, hand gloves, raincoats, appropriate foot wear and masks are provided to all workers

[36] Akodia, Barghat, Kareli, Khirkiya, Kukshi, Maihar, Malanpur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Polaykalan and Uchehara.

handling solid waste. Moreover, it is imperative that these PPEs are used by the workforce to protect their health and safety.

However, out of 34 test-checked ULBs, four ULBs (Akodia, Balaghat, Khirkiya and Ratlam) did not provide personal protection equipment to their workforce handling solid waste, and three ULBs (Bhind, Bhopal and Satna) did not respond to the audit enquiry. Moreover, even in ULBs where PPE kits were issued to the workforce handling solid waste, the workers in some ULBs were observed working without the necessary PPE kits, as shown in **Images 2.14 and 2.15**. This is a severe risk to their health and safety, and it is crucial to take appropriate measures to rectify this issue. It is imperative that the local authorities and facility operators enforce strict guidelines to ensure that workers handling solid waste wear their PPE kits at all times. This will not only ensure their safety but also prevent any hazardous waste from contaminating the environment.

Images 2.14 and 2.15: Workers found working without safety equipment

Image 2.14: Workers found on duty without safety equipment at ULB, Gwalior

Image 2.15: Worker without safety equipment at waste plant at ULB, Beohari

(Photo: Audit Team)

Non-provision or non-use of PPE by workers handling solid waste can have adverse effects on their health. Appropriate measures need to be taken to ensure that workers handling solid waste are provided with the necessary PPE kits and also ensure its use by the workforce.

Government replied (August 2023) that the department has issued directions to all the ULBs to provide personal protective equipment.

2.12.6 Idling of bins due to improper assessment of requirement

As per the gap analysis template issued by the Ministry of Housing and Urban Affairs in November 2017, ULBs were required to assess the number of bins needed for placing along the main roads based on the population density in the area and the availability of space.

Audit however, noticed that in five test-checked ULBs (Akodia, Orchha, Piplanarayanwar Ratlam and Satna), the bins procured for community places on public roads were lying idle in store rooms or other places and getting damaged/ rusted without use as shown in **Images 2.16 to 2.19**.

Images 2.16 to 2.19: Dustbins lying idle in various ULBs

Image 2.16:Dustbins lying in store of ULB Ratlam

Image 2.17: Steel dustbins lying idle in ULB Piplanarayanwar

Image 2.18: Dustbins dumped at Pushkarni Park Satna

Image 2.19: Dustbins lying idle in Akodia

(Photo: Audit Team)

The ULB, Akodia intimated that these dust bins were installed, but removed later on as pedestrians were littering wastes around these dust bins. The ULB Orchha intimated that the dustbins would be installed when required.

Lack of utilisation of resources not only results in wastage of funds but also hampers the proper functioning of waste collection services. It is essential that ULBs assess their requirements carefully and procure them only as per their need. Additionally, these ULBs must ensure that these bins are put to use promptly and maintained regularly to avoid damage or rusting. This will help in improving waste collection services and maintaining a clean and healthy environment for all.

Government replied (August 2023) that additional 20 *per cent* of equipment for any infrastructure is generally procured and stored in store rooms as a common practice, and they may not have been used due to lack of requirement. In respect of ULBs Akodia and Orchha, it was stated that they are small ULBs and installation of bins on the roadside leads to easy theft and misuse of facilities therefore it is installed as and when required.

2.13 Transportation

As per Para 2.3.3 of SWM Manual 2016, primary collection of segregated MSW from individual households and establishments (door-to-door collection) is accomplished through the use of containerised pushcarts, tricycles or small mechanised vehicles, compactors, or tipping vehicles depending on the terrain of the locality, width of streets, and building density. In cramped neighbourhoods, handcarts or pushcarts, or tricycles or small mechanised vehicles may be used for door-to-door collection of waste, which may then be transferred to a larger

vehicle in the vicinity. Where access to individual houses or establishments is difficult, handcarts or rickshaws could be made to stand at designated spots.

Audit scrutinised the efficacy of ULBs in transportation of wastes and found issues like absence of separate compartment for collection of special wastes, and lack of monitoring mechanism in vehicles used for transportation as discussed in paragraphs below:

2.13.1 Use of vehicles without separate space/compartment for collection of different wastes

As per the SWM Rules, 2016, it is mandatory to collect different types of waste such as sanitary, plastic, and domestic hazardous waste separately to prevent their mixing with other waste streams.

Audit noticed that all ULBs had transportation vehicles with partitions for wet and dry waste. However, in 14 ULBs[37] the vehicles were not found equipped with separate compartments for carrying special wastes like e-waste, bio-medical waste, domestic hazardous and plastic wastes. This was evident from **Images 2.20 and 2.21**.

Images 2.20 and 2.21: Vehicles without compartments for collection of special wastes

Image 2.20: Vehicles without separate boxes for collecting domestic hazardous waste in ULB, Shivpuri

Image 2.21: Collection vehicle without separate boxes for special wastes ULB, Gwalior

(Photo: Audit Team)

Lack of separate compartments for special wastes increases the risk of cross-contamination and can compromise the safety and health of the workers involved in waste management. Therefore, it is recommended that the concerned authorities equip the transportation vehicles with separate compartments for special wastes to ensure proper segregation and safe transportation.

Government stated that through rigorous monitoring the State has tried to ensure that four compartments are available in the vehicles and stated that some ULBs use sack bags for collection of domestic hazardous and sanitary waste.

Audit is of the view that proper labelling of bags and handling procedures by ULBs may be implemented for appropriate management of waste.

2.13.2 Monitoring of transportation vehicles

According to para 6.1.3 of CPHEEO MSW Manual, all cities are required to establish a basic Management Information System (MIS), either manually or electronically. However, using

[37] Balaghat, Beohari, Bhind, Damoh, Gwalior, Khirkiya, Malanpur, Mandsaur, Morena, Nalkheda, Orchha, Piplanarayanwar, Ratlam and Shivpuri.

advanced technologies such as Geographic Information Systems (GIS), Global Positioning System (GPS), *etc*. could result in the development of integrated and comprehensive solutions for MSWM.

Audit observed that the vehicles used for waste transportation in 14 ULBs[38] did not have GPS technology integrated with the GIS system. Twelve ULBs[39] did not provide the required information. Two ULBs, Sagar and Jabalpur were operating under the PPP mode, hence, monitoring of vehicles were being done by the concessionaire. Six ULBs[40] had GPS in transportation vehicles; however, out of these, only ULB Indore had an integrated command and control centre (ICCC) to monitor vehicles engaged in transportation of wastes, as shown in **Image 2.22**.

Image 2.22: Showing the ICCC set up by ULB Indore

(Source: Website of Smart City Indore)

In absence of GPS integrated with the GIS system, real-time monitoring of vehicles' movement was not possible.

Government stated (August 2023) that State had issued instructions to ULBs to install GPS in all vehicles of the ULB that is engaged in waste management service and monitor them regularly. It was also stated that the State would ensure that GPS remains active in all the vehicles on all days and in all the ULBs.

2.14 Processing and treatment of MSW

As per Para 4.1 of MSWM Manual, 2016 (Volume I), the selection and adoption of MSW processing technologies should be based on defined selection criteria and subject to a detailed due diligence study. The technology selected should be appropriate to the prevailing conditions of the respective ULB. Treatment and processing of segregated waste streams not only reduces operational costs but also increases the efficiency of the process.

[38] Akodia, Bhind, Damoh, Kareli, Khirkiya, Kukshi, Malanpur, Mandsaur, Nalkheda, Orchha, Piplanarayanwar, Polaykalan, Sanchi and Shivpuri.
[39] Balaghat, Barghat, Beohari, Bhopal, Dhar, Gwalior, Maihar, Mandleshwar, Morena, Shahdol, Vidisha and Uchehara.
[40] Betul, Indore, Niwari, Pichhore, Ratlam and Satna.

The processing and treatment facilities of municipal solid waste typically consist of four components: recycling, composting, disposal, and waste-to-energy via incineration. Section 4.3 of the manual further provides that the integrated solid waste management (ISWM) framework should be used as a guide for selecting the most appropriate technologies for managing MSW.

Organic waste is typically composted aerobically to produce manure or processed anaerobically (in the absence of air) to produce energy. Recyclables are separated and sent to wholesalers for further supply to recycle facilities. High calorific wastes are baled or processed and can be used as fuel or co-processed in cement plants.

Adopting appropriate MSW processing technologies and incorporating them into the integrated solid waste management framework can help minimise waste and environmental pollution while also generating revenue streams. Implementation of Solid waste management plan includes identification of land for SWM processing, treatment and disposal, obtaining statutory clearances, requirement of EIA for SWM facilities, preparation of action plans and DPRs for major infrastructure, tendering and contract management for construction and operation of SWM processing and treatment facilities.

Audit found out inadequacies like action plan not prepared by ULBs, lack of recycling facilities, non-adopting process of composting or bio-methanation for disposal of bio-degradable waste and not testing compost produced from solid waste. These have been discussed in detail in paragraphs below.

2.14.1 Non-Preparation of Action Plan and Detailed Project Reports for creation of infrastructure for SWM

As per Para 5.2 of Part-2 of the SWM Manual 2016, the short-term five-year plan should be detailed into task specific actions plans (e.g., road sweeping and transportation for service provision) or DPRs for major infrastructure-related services such as transfer stations, processing or treatment facilities, and scientific waste disposal facilities.

24 ULBs[41], out of total 34 test checked ULBs, neither had any action plan for creating infrastructure nor prepared DPRs for major infrastructure related services. Only seven ULBs[42] intimated that they had prepared DPR and action plan for SWM. However, in all these cases (except ULB Indore) the DPR and action plan were not provided for verification. No reply was offered by three ULBs (Bhind, Bhopal and Kukshi).

Non preparation of action plan and DPR for creation of infrastructures required for SWM indicates lack of preparedness, focus and prioritization among a majority of the ULBs. It also suggests that there may be challenges in ensuring effective and sustainable infrastructure development and management in these ULBs. The reasons for this lack of preparedness need

[41] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Jabalpur, Kareli, Khirkiya, Maihar, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi and Shahdol.

[42] Dhar, Gwalior, Indore, Satna, Shivpuri, Uchehara and Vidisha.

to be assessed and steps be taken to address any institutional or capacity gaps that may be hindering progress in this area.

Government stated (August 2023) that the State had empanelled division-wise consultants for the preparation of DPRs for solid waste, legacy waste and landfills for all the ULBs. The work of solid waste and landfill DPRs is in progress and legacy waste DPRs are complete.

2.14.2 Compliance with Recycling requirements under SWM Rules, 2016 not made

The Solid Waste Management (SWM) Rules, 2016 define recycling as "the process of transforming segregated solid waste into a new product or a raw material for producing new products". The Rule further state that arrangements must be made to provide segregated recyclable material to the recycling industry through waste pickers or any other agency engaged or authorised by the urban local body for the purpose.

Twenty-three[43] out of 34 test-checked ULBs intimated that they do not have any agreements with the recyclers for recyclable waste. Eight ULBs[44] either intimated that they have agreement with the recyclers or were part of SWM cluster and wastes were being sent for processing there. Two ULBs (Damoh and Ratlam) stated that they have the facility but details thereof were not provided. The ULB, Bhopal did not offer any reply to the audit enquiry.

As majority of the ULBs (23 out of 34) did not have any agreements with recyclers for the management of recyclable waste, it indicates that there is a significant gap in the waste management practices of these ULBs, which could lead to increased environmental degradation and health hazards. However, it is encouraging to note that eight ULBs have agreements with recyclers or are part of a Solid Waste Management (SWM) cluster and are sending their waste for processing. This indicates that some ULBs are taking steps towards more sustainable waste management practices.

Thus, there is a need of improving waste management practices across all ULBs to promote a cleaner and healthier environment.

Government replied (August 2023) that ULBs have been instructed to make contracts with locally available "kabadi wallas" for purchase of segregated waste of different categories from them.

2.14.3 Non adoption of composting or bio-methanation process by Bulk Waste Generators

Para 1.4.5.8.1 of MSWM Manual, 2016 states that decentralised waste management systems can reduce the burden of handling large volumes of MSW at a centralised location. The SWM Rules, 2016 (Rule 4 and 15) provides that bulk waste generators such as resident welfare and market associations, gated communities and institutions, hotels and restaurants must ensure that bio-degradable waste is processed, treated and disposed of through composting or bio

[43] Akodia, Balaghat, Barghat, Beohari, Betul, Bhind, Dhar, Kareli, Khirkiya, Kukshi, Malanpur, Mandleshwar, Morena, Nalkheda, Niwari, Orchha, Pichhore Piplanarayanwar, Polaykalan, Sanchi, Shahdol, Shivpuri, and Vidisha.

[44] Gwalior, Indore, Jabalpur, Maihar, Mandsaur, Sagar, Satna and Uchehara.

methanation, within their premises in partnership with the local body within one year from the date of notification of these Rules.

Audit observed that:

- Seven ULBs[45] had large residential complexes, out of which only ULB, Indore intimated that they have established decentralised processing plants at 77 complexes. Three ULBs (Balaghat, Gwalior and Morena) intimated that they have not promoted establishment of decentralised processing plants in large residential complexes under their jurisdiction. Further due to establishment of waste to energy plant in ULB, Jabalpur, integrated regional solid waste management project in ULB, Sagar and ULB, Satna being part of Integrated solid waste management project of Rewa cluster, no action for establishment of decentralised processing plants was taken by these ULBs. Four ULBs (Bhind, Bhopal, Kukshi and Maihar) did not offer any reply. Twenty three[46] ULBs intimated that there were no large residential complexes in their jurisdictional area.
- Five ULBs[47] intimated that they have established decentralised compost plants in the vicinity of markets. Out of these ULBs- Betul and Indore have intimated that they have established two and 206 decentralised compost plants respectively at the premises of bulk waste generators (BWGs), and remaining three ULBs (Damoh, Mandsaur and Shivpuri) did not intimate the number of such plants established by them. 25 ULBs[48] intimated that they have not set up decentralised compost plants in the vicinity of markets, and replies of four ULBs (Bhopal, Bhind, Kukshi and Satna) were awaited.

2.14.4 Non-testing of compost produced from organic waste

According to Schedule-I (h) and (i) of the SWM Rules, 2016 compost produced from solid waste management should meet the standards prescribed under Fertilizer Control Order including requirements for arsenic, copper, lead, mercury, nickel, zinc, pH, moisture, *etc*. among others. This is essential to ensure safe application of compost.

Eleven[49] out of test checked 34 ULBs intimated that they have established NADEP[50] or compost pit to manage organic waste at home or on a larger scale, such as in agricultural fields or community gardens. Only six ULBs[51] out of these were actually utilising these for producing compost. ULB Indore had established Bio-CNG plant (compressed natural gas) which is used to produce biogas and organic compost from organic waste. However, ULB Indore did not intimate whether testing of composts were being done by them. While ULB Sagar intimated that they were testing the quality of composts. ULB Gwalior intimated that they have

[45] Balaghat, Gwalior, Indore, Jabalpur, Morena, Sagar and Satna.
[46] Akodia, Barghat, Beohari, Betul, Damoh, Dhar, Kareli, Khirkiya, Malanpur, Mandleshwar, Mandsaur, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.
[47] Betul, Damoh, Indore, Mandsaur and Shivpuri.
[48] Akodia, Barghat, Balaghat, Beohari, Dhar, Gwalior, Jabalpur, Kareli, Khirkiya, Maihar, Malanpur, Mandleshwar, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Shahdol, Uchehara and Vidisha.
[49] Betul, Damoh, Dhar, Gwalior, Indore, Kareli, Mandsaur, Niwari, Ratlam, Sagar and Shivpuri.
[50] Narayan Deorao Pandharipande (NADEP) is a method of organic composting.
[51] Damoh, Gwalior, Indore, Mandsaur, Ratlam, and Sagar.

established composting plant for disposal of legacy waste, however, only negligible quantity of compost is generated due to which they are not accounting it. Remaining three ULBs were not testing the quality of composts.

Absence of testing of compost could lead to its unsafe application, with potential health and environmental risks. It is recommended that ULBs ensure compliance with the quality standards specified under the SWM Rules, 2016 and take necessary steps to ensure safe application of compost.

Initiatives taken by ULBs for disposal of various types of wastes as observed during audit are indicated below:

(1) ULB Indore has established a 550 TPD capacity of Bio-CNG Plant at Devguradia, on PPP mode, to use bio-degradable waste for generating Bio-CNG gas. The plant was operational from 27 May 2022. **Image 2.23** depicts the picture of the plant.

Image 2.23: Bio-CNG Plant of IMC for processing of Bio-degradable Waste

(Photo: Audit Team)

(2) ULB Gwalior had established Waste to Compost plant of 390 TPD capacity at landfill site in village Kedarpur for disposal of its legacy waste, by making compost. The plant was operational from April 2022. **Image 2.24** depicts the W to C plant established by ULB Gwalior.

Image 2.24: Waste to Compost plant of GMC for processing Legacy Waste

(Photo: Audit Team)

Government replied (August 2023) that some ULBs might not have agreement with Lab or agriculture colleges to check the quality of compost produced and its further usage.

2.15 Disposal of Waste

According to Rule 15 (zh) of SWM Rules, 2016, it is the responsibility of local bodies to cease land filling or dumping of mixed waste soon after the timeline as specified in Rule 23 for the establishment and operation of sanitary landfills (*i.e.*, two years from the notification of Rules). Additionally, according to Rule 15 (zi), only non-usable, non-recyclable, non-biodegradable, non-combustible and non-reactive inert waste and pre-processing rejects and residues from waste processing facilities should be sent to sanitary landfills. These sanitary landfill sites must meet the specifications outlined in Schedule–I, but every effort must be made to recycle or reuse the rejects to achieve the goal of zero waste going to landfills.

Furthermore, Rule 15(w) of the SWM Rules, 2016 mandates that ULBs should construct, operate, and maintain sanitary landfills and associated infrastructure within three years of notification of these Rules. It is the responsibility of the local bodies to undertake this task themselves or through another agency.

Twenty-nine ULBs[52] out of 34 test-checked ULBs, failed to construct a sanitary landfill despite the passage of more than three years since the notification of the SWM Rules, 2016. Only three ULBs (Indore, Sagar and Khirkiya) intimated that sanitary landfill had been constructed by them. No reply was provided by the ULB, Bhopal. The ULB, Satna intimated that sanitary landfill was not required as they were part of Rewa SWM cluster.

Government replied (August 2023) that State has decided to construct Sanitary Landfill (SLF) at district headquarters on a regional landfill concept in all remaining ULBs by forming clusters. DPRs are under preparation for construction of 45 such SLFs and would be operational by the end of March 2024.

It is crucial that all ULBs take concrete steps towards improving their solid waste management infrastructure to ensure a clean and healthy environment for their residents.

Audit further noticed deficiencies in issues such as availability of land for landfill, establishment of buffer zone around solid waste processing and disposal facilities, selection of landfill site and absence of basic facilities in landfills. These have been discussed below:

2.15.1 Availability of land for setting up landfills

As per Rule 22 of the SWM Rules, 2016, local authorities with a population of 0.5 million or more are required to set up common regional sanitary landfill facilities or standalone sanitary landfill facilities within three years of the Rules' notification. Additionally, local authorities with a population under 0.5 million must identify suitable sites for setting up common regional sanitary landfill facilities for suitable clusters of local authorities within a year.

Moreover, according to Rule 11 (f) and 12 (a) of SWM Rules 2016, state and District authorities

[52] Akodia, Barghat, Balaghat, Beohari, Betul, Bhind, Damoh, Dhar, Gwalior, Jabalpur, Kareli, Kukshi, Maihar, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore Piplanarayanwar, Polaykalan, Ratlam, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

must assist local authorities in identifying and allocating suitable land for solid waste processing and disposal facilities within one year of the Rules' notification.

Twenty-eight[53] out of 34 test-checked ULBs intimated that district authorities have allotted separate land for solid waste activities. Two ULBs (Malanpur and Mandleshwar) had identified the land but the land has not been transferred to these ULBs by the district administration so far, while ULB Pichhore was yet to identify the land required for the purpose, thus these ULBs did not have the required land. The ULB, Satna were part of Rewa MSW cluster, and the ULB Jabalpur had set up waste to energy plant due to which requirement of landfill did not exist. The ULB, Bhopal did not provide any information regarding allotment of land for SWM.

Thus, majority of the ULBs (28 out of 34) have been allotted separate land for solid waste activities by the district authorities. This is a positive development as having a dedicated landfill site is crucial for proper solid waste management.

Government replied (August 2023) that based on land availability and distance between the ULBs, a total of forty-five number of lands have been identified for setting up of Sanitary Landfill on a regional landfill concept at District Headquarters under SBM (U) 2.0. Three ULBs (Pichhore, Malanpur and Mandleshwar) have been considered under SBM 2.0.

The reply is in line with audit observation.

2.15.2 Absence of basic facilities in landfills site

According to Schedule I of SWM Rules 2016, landfill sites and processing plants must have the following facilities available:

- Fencing or hedging with proper gate to monitor incoming vehicles and prevent the entry of unauthorised persons and stray animals.
- A concrete or paved approach and internal road to avoid generation of dust particles due to vehicular movement. It should be designed to ensure free movement of vehicles and other machinery.
- A waste inspection facility to monitor waste brought in for landfilling, an office facility for record keeping, and shelter for keeping equipment and machinery, including pollution monitoring equipment. The operator is responsible for maintaining a record of waste received, processed and disposed of.
- Provisions of weighbridge to measure quantity of waste brought to the landfill site, fire protection equipment, and other facilities required.
- Drinking water and other sanitary facilities, including lighting arrangements for easy landfill operations during night hours.
- Provisions for parking, cleaning, washing of transport vehicles carrying solid waste should be provided.

[53] Akodia, Balaghat, Barghat, Beohari, Betul, Bhind, Damoh, Dhar, Gwalior, Indore, Kareli, Khirkiya Kukshi, Maihar, Mandsaur Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

These facilities are essential to ensure that landfill sites and processing plants operate effectively, safely and efficiently.

As discussed in Paragraph 2.10, only 28 out of 34 ULBs had procured landfill site, and in respect of two ULBs (Mandleshwar and Malanpur), though land has been identified, transfer of land is yet to be made. In the remaining four ULBs, one ULB (Pichhore) has not identified the site, one ULB (Satna) was part of Rewa MSW cluster, one ULB (Jabalpur) had set up waste to energy plant (due to which there is no requirement for landfill) and one ULB (Bhopal) did not furnish any information. Physical verification of landfill sites in 28 test checked ULBs revealed that 23 ULBs[54] were utilising the land for dumping waste as shown in **Images 2.2 to 2.9** under paragraph 2.11.2. Audit also observed that the concessionaire of Rewa cluster was utilising the landfill sites of ULBs Maihar and Uchehara for dumping wastes as pointed out in paragraph 2.20.1.2. The ULBs Piplanarayanwar and Khirkiya received land in February 2022 and March 2022 respectively, due to which wastes were being dumped at a temporary landfill. Dumping of wastes on daily basis was not observed in ULBs Indore, Mandsaur and Sagar.

Following basic facilities were also not available at the landfill sites of these 28 ULBs.

- **Fencing or hedging with proper gate:** Eighteen ULBs[55] did not have fencing and 2 ULBs (Orchha and Niwari) had fencing but were found broken at various places. Fencing work was in progress in ULB Piplanarayanwar. ULB Balaghat had fencing but out of two gates only one gate was in place. Only six ULBs (Betul, Gwalior, Mandsaur, Nalkheda, Sagar and Shivpuri) had proper fencing.
- **Concrete or paved approach and internal road:** Twenty four ULBs[56] did not have concrete or paved approach and internal road at the landfill site. Only three ULBs (Beohari, Indore and Ratlam) had concrete road within the premises of landfill site. One ULB (Mandsaur) had concrete road at some patches.
- **Waste Inspection facility:** Twenty-two ULBs[57] did not have facility for inspection of waste. This facility was available only with six ULBs (Barghat, Gwalior, Khirkiya, Mandsaur, Ratlam, and Sagar).
- **Availability of weighbridge:** Twenty-three ULBs[58] did not have weighbridge facility for weighing wastes brought to landfill site. Four ULBs (Gwalior, Indore, Mandsaur and Ratlam) had facility of weighbridge. The ULB, Betul had weighbridge but was not in working condition.

[54] Akodia, Balaghat, Barghat, Beohari, Betul, Bhind, Damoh, Dhar, Gwalior, Kareli, Kukshi, Maihar, Morena, Nalkheda, Niwari, Orchha, Polaykalan, Ratlam, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

[55] Akodia, Barghat, Beohari, Bhind, Damoh, Dhar, Indore, Kareli, Khirkiya, Kukshi, Maihar, Morena, Polaykalan, Ratlam, Sanchi, Shahdol, Uchehara and Vidisha.

[56] Akodia, Balaghat, Barghat, Betul, Bhind, Damoh, Dhar, Gwalior, Kareli, Khirkiya, Kukshi, Maihar, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Sagar, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

[57] Akodia, Balaghat, Beohari, Betul, Bhind, Damoh, Dhar, Indore, Kareli, Kukshi, Maihar, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

[58] Akodia, Balaghat, Barghat, Beohari, Bhind, Damoh, Dhar, Kareli, Khirkiya, Kukshi, Maihar, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Sagar, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

- **Drinking water facility:** Eighteen ULBs[59] did not have drinking water facility at landfill site. This facility was available only with ten ULBs (Balaghat, Betul, Dhar, Gwalior, Indore, Mandsaur, Ratlam, Sagar, Shivpuri and Vidisha).
- **Sanitary facility:** Twenty-one ULBs[60] did not have sanitary facilities at the landfill site. This facility was available only with seven ULBs (Betul, Dhar, Indore, Ratlam, Sagar, Shivpuri and Vidisha).
- **Lighting arrangement:** Sixteen ULBs[61] did not have lighting arrangement at the landfill site. This facility was available only with 12 ULBs (Balaghat, Damoh, Dhar, Gwalior, Indore, Khirkiya, Mandsaur, Morena, Ratlam, Sagar, Shivpuri and Vidisha).
- **Parking, Cleaning and washing facility for vehicles:** Twenty-four ULBs[62] did not have parking, cleaning and washing facility for vehicles entering the landfill site. This facility was available only with four ULBs (Betul, Gwalior, Mandsaur and Sagar).

As a result of these shortcomings, stray cattle were observed inside the landfill (**Images 2.25 to 2.28**) which can be a health hazard to the cattle due to consumption of plastic waste as stated in paragraph 4.1.1. These stray cattle could also become carriers of pathogens and cause of release of harmful gases or other pollutants due to digging of the waste materials in the landfill. Further, absence of inspection facility and weighbridge facility at landfills, also led to non-compliance by ULBs in maintaining records of waste brought to the site and keeping track of vehicles entering the site.

Images 2.25 to 2.28: Stray animals found inside landfill site in various ULBs

Image 2.25: Stray animals inside landfill site at ULB, Balaghat

Image 2.26: Stray animals inside landfill site at ULB, Betul

[59] Akodia, Barghat, Beohari, Bhind, Damoh, Kareli, Khirkiya, Kukshi, Maihar, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Sanchi, Shahdol, and Uchehara.

[60] Akodia, Balaghat, Barghat, Beohari, Bhind, Damoh, Gwalior, Kareli, Khirkiya, Kukshi, Maihar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Sanchi, Shahdol and Uchehara.

[61] Akodia, Barghat, Beohari, Betul, Bhind, Kareli, Kukshi, Maihar, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Sanchi, Shahdol and Uchehara.

[62] Akodia, Balaghat, Barghat, Beohari, Bhind, Damoh, Dhar, Indore, Kareli, Khirkiya, Kukshi, Maihar, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Ratlam, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

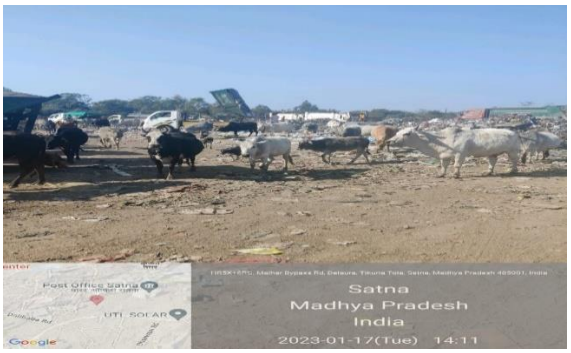


Image 2.27: Stray animals inside landfill site at ULB, Satna

Image 2.28: Stray animals inside landfill site at ULB, Shivpuri

(Photo: Audit Team)

It is important to ensure that the required facilities are in place to ensure proper management of solid waste and prevent any adverse impacts on the environment and public health.

Government replied (August 2023) that the State has empanelled consultants for preparation of DPRs, transaction advisory and Project Management Consultancy services at the division level to undertake projects under SBM 2.0 and it will be ensured that all the ULBs have basic facilities required for the proper operation of plants.

2.15.3 Non-establishment of buffer zone

Waste management sites encompass waste processing/disposal facilities, which become sources of pollution in terms of air, water, land and noise besides emitting foul smell. Therefore, provision of buffer zone around these facilities is essentially required to protect people living in the surroundings from exposure/impacts of such pollutants but also to ensure continued safe operations in the waste management facility. According to Schedule-I A (IX) of the SWM Rules, 2016, a buffer zone of no development was required to be maintained around solid waste processing and disposal facilities exceeding five tonnes per day of installed capacity. This buffer zone would be established within the total area of the facility and would be determined on case-to-case basis by the local body in consultation with concerned State Pollution Control Board.

Schedule I (A) of SWM Rules, 2016 also specified the criteria for selection of sites for landfills. According to which, a landfill site should be at least 100 meters away from a river, 200 meters away from a pond, highway, habitation, public parks, and water supply wells and 20 km away from Airports or Airbase.

Only ULB, Shivpuri had intimated about establishment of a buffer zone, though documents to support the claim were not provided. Meanwhile, 24 ULBs[63] confirmed that they had not developed a buffer zone of no development around their solid waste processing and disposal facility. Two ULBs, Bhopal and Indore did not provide any reply. ULBs Maihar and Satna intimated that they were part of Rewa cluster, and ULBs Sagar and Jabalpur intimated that their projects are working on PPP mode as such they did not have landfill consequently the necessity

[63] Akodia, Balaghat, Barghat, Beohari, Betul, Bhind, Damoh, Dhar, Gwalior, Kareli, Khirkiya Kukshi, Mandsaur Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Ratlam, Sanchi, Shahdol, Uchehara and Vidisha.

of buffer zone did not exist. Three ULBs (Mandleshwar, Malanpur and Pichhore) were yet to receive land for solid waste processing facilities.

Physical verification of sites of two ULBs (Betul and Morena) revealed habitations near the landfill of ULB Betul, and at the banks of river (Quanri river) at Morena.

It is imperative that all ULBs adhere to the buffer zone mandate outlined in the SWM Rules. Failure to do so not only pose a significant threat to the environment but also jeopardizes the health and well-being of the public. To mitigate these risks, ULBs must prioritise establishing a no-development buffer zone surrounding their solid waste processing and disposal facility, thereby preventing any adverse impacts on the environment and the health of the community.

Government replied (August 2023) that landfill sites are selected as per the distance limits prescribed from the airport, river, pond highways, habitats public parks and water supply wells. It was further stated that DPRs for setting up fresh waste processing plants for 22 ULBs is under consideration under SBM 2.0, where DPR is under finalisation and while site selection a buffer zone around these solid waste processing and disposal facilities will be considered.

2.16 Disposal of Legacy Waste

The most prevalent method to dispose of waste in ULBs has been open dumping. These dumpsites were the major source of air and ground water pollution. As per clause 'J' of schedule I of the SWM Rules, 2016, solid waste dumps which have reached their full capacity or those which will not receive additional waste after setting up of new and properly designed landfills should be closed and rehabilitated by bio mining, waste processing or other methods suitable for reducing environmental impact to acceptable level.

CPCB Guidelines for disposal of legacy waste provides that for disposal of legacy waste the ULBs conduct contour survey and drone mapping to determine the volume of waste before starting the process of disposal of legacy waste.

UADD intimated that out of 34 test checked ULBs, 23 ULBs had 22.77 lakh tons of legacy waste which were awaiting disposal. UADD also intimated that 12 ULBs out these 23 ULBs have prepared DPR for clearance of legacy waste and the implementation timeline is in the year 2023. However, copies of the DPRs were not made available to audit, due to which Audit could not confirm whether the work of clearance of legacy waste was a part of the DPR. Remaining 11 ULBs were yet to prepare DPR for disposal of the legacy waste.

Harmful effects on Human health and environment due to dumping of wastes at landfill site of ULB Bhopal as revealed in a case study published in International Journal and media reports

SWM Rules, 2016 mandates that urban local bodies (ULBs) stop dumping mixed waste in landfills after two years from the date of notification of rules (i.e., by April 2018) and to recycle or reuse as much waste as possible and only wastes that cannot be used, recycled, should go to landfills. ULBs should also investigate old and existing dumpsites to see if they could be "biomined" or "bio-remediated" (cleaned up using biological methods), and if the dumpsite couldn't be cleaned up that way, then as it should be capped to prevent further damage to the environment.

However, Audit found that many ULBs were still dumping mixed waste in landfills, even though they weren't supposed to. The reason could be assigned to non-preparation of plans to create the necessary infrastructures required for waste processing and recycling, and non-availability of facilities to handle the waste properly as discussed in paragraphs 2.14.1 to 2.14.3. This went against the goal of zero waste going to landfills. I**mages 2.29 and 2.30** show the status of landfills in test checked ULBs.

Images 2.29 and 2.30: Dumping of wastes at landfills

Image 2.29: Dumping of wastes by ULB Balaghat

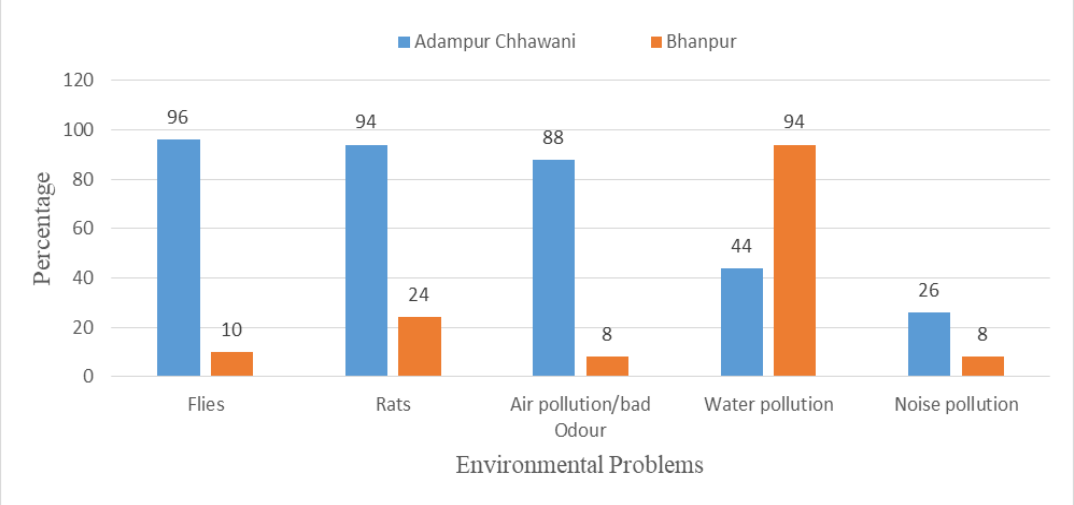
Image 2.30: Dumping of wastes by ULB Betul

(Photo: Audit Team)

According to a study published in the International Journal of Geography, Geology and Environment in December 2021, the environmental and community health impacts of municipal solid waste at two dumpsites Bhanpur and Adampur Chhawani, Bhopal, Madhya Pradesh were assessed by Barkatullah University, Bhopal. The study revealed that residents surrounding the operational dumpsite of Adampur Chhawni experienced more health problems {like typhoid (58 *per cent*), chest related illness (24 *per cent*), cholera and diarrhea (34 *per cent*), malaria (22 *per cent*), and skin infections (16 *per cent*)} compared to residents residing around the capped Bhanpur dumpsite.

The study concluded that dumpsites should be properly managed and cared for to minimize their effects on the environment. In addition to the health problems, other problems such as flies, rats, bad odour, and contamination of groundwater due to high bacteria content in leachates, which percolate into groundwater through cracks in membranes, were also observed as shown in **Chart 2.1.**

Chart 2.1: Various environmental problems observed at landfill site



MSWM Manual states that under natural conditions, the organic fraction of waste continually decomposes, accompanied by a strong foul odour and production of gases, which are predominantly methane. Methane is highly inflammable and can cause landfill fires, which can also release harmful chemicals and gases into the air, which can be a health hazard for nearby communities. During the field visit of landfill sites of test checked ULBs instances of fumes emerging from landfill sites were observed as shown in **Images 2.31 and 2.32**.

Image 2.31 and 2.32: Fumes at landfill site

Image 2.31: Fumes emerging at landfill site of ULB, Gwalior

Image 2.32:Fumes emerging at landfill site of ULB, Shahdol

(Photo: Audit Team)

Adampur landfill site of ULB Bhopal had recently caught fire which had also gained media attention as shown in **Image 2.33.**

Image 2.33: Newspaper report on fire at Adampur landfill, Bhopal

Fire erupts at Adampur landfill, may reduce 5L tonne of waste to ashes

RAISING A STINK: ₹2.62Cr 'Spent' On Waste Disposal, Project Deadline Missed

Pic: A Moeed Faruqui

Jamal.Ayub@timesgroup.com

Bhopal: Fire in estimated five lakh tonnes of waste at Bhopal Municipal Corporation (BMC) is smelling of a scam. The fire in waste on Adampur Chhawani landfill site broke in the last 72-hours and has spread to 7 acre so far. Smoke is seen from two kilometers away, threat of methane gas has increased apprehension of the villages nearby.

The timeline for solid waste disposal was 18 months. It ended in September 2022. A private firm was entrusted with the task. BMC claims 400 metres of the landfill was processed.

The landfill site does not have a hydrant. Water has to be sourced from 2 km away. It is not the first fire in the landfill. Around six such major and small incidents have been cited in the last few months.

Eyebrows are being raised over Rs 2.62 crore that was paid for disposal of the waste. Scientific closure was for waste disposal of an estimated five lakh ton. Old waste was brought from old waste dump of the BMC. Contract was till in May 2022, but later extended till September.

According to reports, an audit has objected to the process and payments made to the private firm. The contract was extended due to the pandemic. As things stand, the MoU timeline has expired. Reports points out that work order was released on 27 September 2018. In a short time, processing in full capacity was claimed by the BMC. It is alleged that machines were in place not before November. The timeline of has raised questions, if machines were placed in November how was the processing taking place before that. Electricity connection was sought in October from the Discom, while November was the aforesaid installation of the processing machines. BMC fire wing said on Monday evening that the fire began on Saturday. Since then, the fire brigade personnel have been trying to extinguish the fire. According to fire officer Rameshwar Neel, flammable gas is leaking in the garbage. After extinguishing the fire at one place, suddenly the fire is burning like a furnace at another place.

An estimated six million tonnes of waste has been deposited at the dump yard which began in 2017. Adampur Chhwani, some 12 km outside Bhopal. Around 800 MT of waste collected in Bhopal each day. Land measuring 44 acres was selected for new MSW Management and Disposal site at Aadampur village.

THE NEW LANDFILL

The Adampur Chhavni landfill started operations on December 11, 2019, after a delay of more than two years. The site was started after the orders of NGT to close down the landfill at Bhanpur. It started off with a capacity of 1200 tonne waste processing. However, fire cases have been reported frequently from the site one of them a major fire only in February. Villagers in the vicinity have been objecting to the setting up of the landfill site at Adampuir Chhavani

FIRES

Feb 24, 2023 | Fire spreads to two acre of landfill area

March 8, 2023 | NGT forms a panel to probe Adampur landfill fire

April 22, 2019 | Fire breaks out at Adampur dumpyard. Toxic fumes engulfed surrounding villages as fire rages for over 24 hours

Fire brigade officials say that flammable gas is leaking from the garbage due to fire

6 YRS OF ENVIRONMENT IMPACT ON VILLAGE: BU STUDY

A study by the BU department of environmental sciences and limnology states that self-reported health problems of residents surrounding Adampur Chhawani dumpsite were typhoid (58%), chest related illness (24%), cholera and diarrhea (34%), malaria (22%) and skin infections (16%). But when compared to the residents residing around Bhanpur dumpsite (now closed), the number of respondents who had typhoid, chest-related illness, cholera and diarrhea, malaria and skin infections, stood at 52%, 8%, 22%, 12% and 4% respectively. It was found that residents living nearby the Adampur Chhawani dumpsite are most affected by the dumpsite, finds an environmental assessment of impact of landfill on local population. The study was published in the International Journal of Geography, Geology and Environment last year and was done by Waheed Ahmad Hurra and Abhilasha Bhawsar of the department.

Incidences of fire in waste in open dumpsite could result in air pollution and increase greenhouse gas emission which has been known to contribute to climate change. Therefore, dumpsites should be properly managed and cared to minimize its effects on the environment.

Government intimated that 16 ULBs have prepared DPR and floated tender for legacy waste remediation. Remaining ULBs are having less quantity of waste which will be processed from the proposed fresh waste processing facilities.

2.17 Information, Education and Communication activities

The SWM Rules, 2016 mandates ULBs to create public awareness through IEC campaigns and educate the waste generators to minimise waste and prohibit littering. ULBs were also responsible for sensitising citizens to the associated environmental and health hazards of improper waste management. Citizens should be made aware of the need to pay user fees or charges to ensure sustainability of the MSWM services.

The IEC campaign should target all stakeholders, including households, shops, commercial and institutional premises, municipal officials, elected representatives, schools, non-government organisations (NGOs), the informal sector and the media. The MSWM Manual, 2016 (Para 1.4.5.13.1) specifies the target audience and the type of awareness required as shown in **Appendix 2.3**. The active participation of all stakeholders is essential to effectively manage city waste and discharge their role effectively.

The SBM Guidelines (2017) mandates that at least 50 *per cent* of the IEC fund in each annual plan as approved by State HPC, must go to the ULB's for IEC activities at the grass root level. Status of funds provided for IEC activities and funds transferred to ULBs for IEC activities is shown in **Table 2.5.**

Table 2.5: Status of funds earmarked for IEC activities and the funds transferred to ULBs for IEC activities

(₹ in crore)

S.N.	Budget Year	Provision of funds for IEC	Funds to be transferred to ULBs for IEC (50 *per cent* of IEC funds)	Funds actually transferred to ULBs	Shortfall in funds transferred
1	2017-18	15.73	7.87	15.15	(-) 7.28
2	2018-19	9.83	4.92	8.63	(-) 3.71
3	2019-20	15.90	7.95	14.64	(-) 6.69
4	2020-21	9.07	4.54	0.32	4.22
5	2021-22	25.85	12.92	10.58	2.34
	Total	**76.38**	**38.20**	**49.32**	**(-) 11.12**

The Table above indicates that during the years 2017-18 to 2019-20, UADD has transferred more than 50 *per cent* of amount provided for IEC to ULBs. However, the amount transferred to ULBs during the years 2020-21 to 2021-22 was found below the required 50 *per cent*. UADD intimated that less amount has been transferred to ULBs during these years as excess amount was provided in the years 2017-18 to 2019-20.

Audit observed that:

- **Conduct of IEC activities for all SWM issues not ascertainable**

Twenty-four[64] ULBs had intimated that awareness campaigns such as *Anand Utsav* (two ULBs), *Nukkad Natak* (12 ULBs), *Swatchta Pakhwada* (two ULBs), Amrit Mahotsav (two ULBs), Jan jagrukta (12 ULBs), Jingle bell (one ULB), wall painting (four ULBs), rally (three ULBs), waste segregation (three ULBs), display of hoarding (two ULBs) has been conducted by them. However, in absence of documentation, Audit could not ascertain whether all the activities shown in **Appendix 2.3** (referred above) has been carried out by the ULBs.

Remaining 10 ULBs (Indore, Bhopal, Jabalpur, Bhind, Mandsaur, Niwari, Barghat, Piplanarayanwar, Malanpur and Nalkheda) did not provide information regarding IEC activities conducted by them during the last five years.

There is a lack of comprehensive documentation of IEC activities conducted by the ULBs, due to which assessment of efforts made by ULBs towards IEC programs was not possible. It is therefore recommended that ULBs adopt a more holistic and comprehensive approach towards IEC programs, and maintain proper documentation of the activities conducted.

Government stated (August 2023) that under the *Swachh Bharat* Mission and *Swachhta Survekshan*, various IEC campaigns were launched on themes like source segregation, home composting, 3R concept, littering, single use plastic and plastic ban, open defecation, *etc*. With the rigorous and continuous efforts of these campaigns the percentage of segregated waste is increasing every year in ULBs.

Audit is of the opinion that proper documentation of IEC activities is crucial for transparency, accountability, evaluation, and continuous improvement and it would provide a solid foundation for evidence-based decision-making for achieving the goals of cleanliness, waste

[64] Akodia, Balaghat, Beohari, Betul, Damoh, Dhar, Gwalior, Kareli, Khirkiya, Kukshi, Maihar, Mandleshwar, Morena, Orchha, Pichhore, Polaykalan, Ratlam, Sagar, Sanchi , Satna, Shahdol, Shivpuri, Uchehara and Vidisha.

management, and environmental sustainability in ULBs.

2.18 Capacity Building

Para 1.4.5.5 of MSWM Manual, 2016 provides that there is an urgent need to train and enhance the capacities of staff in MSWM activities. Professionalising the MSW sector will not only build the capacities of workers to perform more effectively and efficiently in the existing conditions but will also inculcate a sense of responsibility and pride towards their profession. Various capacity building approaches and training programmes, which could be adopted for different stakeholders are given in **Appendix 2.4.**

Rule 11(k) and 15 (zc) of SWM Rules, 2016, required UADD and ULBs to arrange training and capacity building of staff (including contract workers) engaged in managing solid waste, segregation and transportation or processing of such waste at source.

Observations noticed in respect of capacity building programs are as under:

2.18.1 Failure in ensuring training to the Officers and staff of ULBs under Integrated Capacity Building Program (ICBP)

Government of India issued (December 2017) instructions[65] for implementation the Integrated Capacity Building Program (ICBP). The ICBP was to be organized by merging various training programmes/workshops provided under different urban schemes run by the GOI such as AMRUT, SBM, Smart City Mission, NULM, Housing for All, *Pradhan Mantri Awas Yojana* and *HRIDAY.*

UADD intimated that eight training programmes / workshops had been arranged under ICBP in the year 2021-22 as shown in **Table 2.6**.

Table 2.6: Details of training programmes conducted under ICBP by UADD

S.N.	No. of training programmes/ workshops conducted	Name of programme	Targeted group
1	5	Swachhta ki Pathshala	Master trainers, administrative officers, SBM nodal, Sanitary inspector, computer operator and technical staff
2	2	Social Media	All ULB staff
3	1	3R workshop	All ULB staff

No training under ICBP was conducted during the years 2019-21.

2.18.2 Prescribed training program for all stakeholders not conducted by ULBs

Para 9.6 of the SBM guidelines stipulated that States and ULBs should identify relevant officials (both senior level officials and field-level functionaries) for training and draw up a calendar of training for them (as shown in **Appendix 2.4**). It will be the responsibility of the State Mission Director to ensure that identified officials undergo adequate capacity building / training to ensure the success of SBM (Urban) in the state.

Audit observed from the information provided by test checked ULBs that training to senior officials has been given by 19 ULBs, to collection staff by 21 ULBs, to transportation staff by

[65] Letter No. K-14012/101(25)/2017-CBUD dated 29 December 2017.

18 ULBs, to NGOs/CBOs by 11 ULBs, to elected representatives by eight ULBs and training to staff at processing site has been given by 12 ULBs. However, the number of persons nominated for these training has only been provided by 10 ULBs[66]. Nine ULBs (Gwalior, Morena, Malanpur, Kareli, Sagar, Piplanarayanwar, Khirkiya and Pichhore) had not imparted training to any officials, while two ULBs Bhind and Bhopal did not provide reply to the audit enquiry.

It is essential to prioritize training for officials engaged in SWM activities, and ULBs should ensure that adequate and regular training is provided to all personnel. Regular monitoring and evaluation of the training program should also be carried out to ensure its effectiveness.

2.19 Monitoring of Solid Waste activities

Para 6.1 of the MSWM Manual, 2016 stipulates that a comprehensive monitoring and evaluation (M&E) system should be adopted for proper implementation of the MSWM plan and for assessing progress toward meeting the targets of the plan. As per SWM Rules and Manual, the monitoring of SWM activities is required to be done at various level. The performance of local bodies with respect to implementation of SWM Rules, 2016, State Policy and Strategy on SWM are to be monitored and reviewed at district level and state level whereas the responsibility of environmental monitoring lies with the State Pollution Control Board.
Observations on monitoring of SWM activities in the State, District and ULB level are discussed in paragraphs below:

2.19.1 Monitoring at State level

The SWM Rules, 2016 specifies the monitoring and review of SWM activities performed by the ULBs through State Level Advisory Body and monitoring of long-term progress of MSWM service provision in ULBs through reporting of achievements of Service Level Benchmarking[67] (SLBs). The deficiencies in monitoring of SWM activities at State level are discussed in the succeeding paragraphs:

2.19.1.1 Irregular and inadequate monitoring by State Level Advisory Body

Para 23 of the SWM Rules, 2016 specify that every Department in-charge of local bodies of the concerned State Government or Union Territory administration shall constitute a State Level Advisory Body within six months from the date of notification (*i.e.*, 08 April 2016) of SWM Rules, 2016. The State Level Advisory Body was required to meet at least once in every six months to review the matters related to implementation of these Rules, state policy and strategy on solid waste management and give advice to State Government for taking measures that are necessary for expeditious and appropriate implementation of these Rules.

Audit noticed that the Urban Development and Housing Department, GoMP had constituted the State Level Advisory Body on 13 October 2017 with a delay of almost one year. It was further noticed that State Level Advisory Body had held only three meetings from the date of constitution (13 October 2017) to 31 March 2022 to review the matters related to

[66] Balaghat, Betul, Dhar, Kukshi, Mandleshwar, Mandsaur, Pichhore, Satna, Shahdol, and Shivpuri.
[67] Indicators stipulated by the Ministry of Urban Development (MoUD) for benchmarking MSWM service provision.

implementation of the SWM Rules, 2016 as against the total nine meetings required to be conducted as per the provisions of the SWM Rules, 2016.

Thus, the delay in constitution of State Level Advisory Body and holding of inadequate meeting shows the inadequate monitoring and review of the matters related to implementation of SWM Rules, 2016 along with the violation the provisions contained in the SWM Rules, 2016 in this regard. Reasons for delay in constitution of this body and holding of inadequate meeting were not found on records.

Government stated (August 2023) that the reasons for inadequate meetings during the tenure was the State elections in 2019 and security and health risk related reasons during the two waves of Covid-19.

2.19.2 Monitoring at District level

As per Rule 12 (b) of SWM Rules, 2016, the District Magistrate / Deputy Commissioner will review the performance of local bodies at least once in a quarter on waste segregation, processing, treatment and disposal.

20 Test checked ULBs did not have any information of such reviews conducted by the District Magistrate. Four ULBs[68] were yet to provide information regarding conduct of review meetings by District Magistrate. Whereas only 10 ULBs[69] have intimated that DM had conducted the review meetings. However, it cannot be ascertained that the review was done quarterly.
Though Government stated (August 2023) that District Magistrate is conducting regular meetings with their ULBs to check and monitor the performance of waste segregation, processing, treatment and disposal, no documentary evidence for the same was furnished to Audit.

2.19.3 Monitoring of MSW at ULB level

As per the Para 6.1 of the SWM Manual, 2016, the monitoring system adopted should facilitate or include the following:

- Regular collection of data by the identified staff, e.g., ward-wise collection of waste;
- Analysis of collected information to assess the efficacy of the overall system, e.g., reasons for not reaching 100 *per cent* collection in an area;
- Reporting of data and its analysis to senior officials; and
- Mechanisms for proposing corrective action as needed, e.g., contingency plan for extra efforts wherein lagging, rerouting or changing the timings for collection in a particular ward so that 100 *per cent* collection can be achieved.

The deficiencies observed in monitoring of SWM activities at ULB level are discussed in the succeeding paragraphs.

2.19.3.1 Delayed/ non submission of Annual Reports

Rule 15 (za) and (zb) of SWM, Rules 2016 specifies that the local body shall prepare and submit annual report in Form IV on or before the 30th April of the succeeding year to the Commissioner

[68] Bhopal, Indore, Maihar, and Uchehara.
[69] Akodia, Balaghat, Barghat, Dhar, Ratlam, Satna, Mandsaur, Mandleshwar, Shivpuri and Vidisha.

or Director, Municipal Administration or designated Officer. The annual report shall then be sent to the Secretary-in-Charge of the State Urban Development Department or village panchayat or rural development department and to the respective State Pollution Control Board or Pollution Control Committee by the 31st May every year.

Audit noticed that 15 ULBs[70] had not submitted the annual reports required to be submitted as per the Rules. Only 15 ULBs[71] were regular in submitting the required report. Information from four ULBs were awaited.

As the report contains information regarding various activities of solid waste management such as quantity of waste generated, collected, transported, processed and other facilities available in the ULB, due to non-submission of the same the UADD and MPPCB were deprived of information required for monitoring the activities for solid waste management by the ULB.

2.19.4 Monitoring of Municipal Solid Waste by State Pollution Control Board

As per Rule 16 of SWM Rules, 2016, the State Pollution Control Board of the concerned state was responsible to enforce the SWM Rules, 2016 in their State through local bodies, monitor environmental standards and adherence to conditions as specified under the Schedule I and Schedule II for waste processing and disposal sites, issue authorisation to the local body or an operator of a facility, suspend or cancel the authorization and renew the authorisation issued. The deficiencies/ shortcomings noticed in monitoring of SWM activities by SPCB are discussed in the succeeding paragraphs:

- **Shortfall in monitoring of air quality at waste processing / landfill site at ULBs**

Rule 16.1.b of SWM Rules, 2016 provides it is the duty of State Pollution Control Board (SPCB), to monitor the standards and adherence to conditions as specified under the Schedule I and Schedule II of the Rule for waste processing and disposal sites. Rule 16.4 further provides that monitoring of ambient air quality around the waste processing and disposal sites of ULBs should be done at least once in a year.

Scrutiny of the details of monitoring of ambient air quality at waste processing/landfill sites of ULB as provided in the Annual Report of Solid Waste Management submitted to Central Pollution Control Board by SPCB during 2017-18 to 2021-22, revealed that air quality monitoring in 34 test-checked ULBs were not carried out as per frequency prescribed in Rules. The ULB wise summary of monitoring is given in **Appendix 2.5.**

Audit noticed that the SPCB had conducted 95 tests against the required 170 tests for measuring the air quality at waste processing/landfill sites, during the last five years (2017-18 to 2021-22) in test checked 34 ULBs. It was also observed that the SPCB had conducted air quality testing every year at ten[72] test checked ULBs during the last five years. Further, no air quality tests were conducted at waste processing/landfill sites of ten[73] test checked ULBs during the last five

[70] Akodia, Barghat, Betul, Beohari, Dhar, Khirkiya, Mandleshwar, Malanpur, Morena, Maihar, Niwari, Orchha, Polaykalan, Uchehara and Vidisha.
[71] Balaghat, Damoh, Gwalior, Jabalpur, Kareli, Kukshi, Mandsaur, Nalkheda, Pichhore, Piplanarayanwar, Ratlam, Sagar, Sanchi, Shahdol and Shivpuri.
[72] Damoh, Indore, Maihar, Mandsaur, Morena, Piplanarayanwar, Sagar, Satna, Shahdol and Vidisha.
[73] Akodia, Beohari, Gwalior, Kukshi, Malanpur, Mandleshwar, Nalkheda, Niwari, Orchha and Polaykalan.

years from 2017-18 to 2021-22. SPCB intimated that nine of these ULBs did not have identified landfill site and SPCB also intimated that regular testing at five ULBs (Gwalior, Bhind, Shivpuri, Balaghat and Kareli) could not be done in absence of permanent electricity connection. As a result, there was a shortfall of 44.12 *per cent* in conducting the testing of air quality in test checked ULBs.

The MPPCB replied (May 2023) that the provision of air quality monitoring as per SWM Rules 2016, were applicable to sanitary landfill sites only. There were only five sanitary landfills sites in these 34 ULBs and the monitoring (minimum once in a year) of air quality in these landfill sites was being done regularly during last five years except in sanitary landfill at Jabalpur during the year 2017-18. Further, the monitoring of air quality at dump sites of other ULBs was being done regularly twice in a year.

The reply of the MPPCB is factually incorrect as the monitoring of air quality on these sanitary landfills was 84 *per cent* during the last five years as per the annual report submitted by MPPCB to CPCB.

- **Shortfall in monitoring of water quality at waste processing/ landfill site at ULBs**

Schedule-I (E) of Solid Waste Management Rules, 2016 provides the criteria for water quality monitoring by SPCB. According to these criteria, the ground water quality within 50 meters of the periphery of landfill site shall be periodically monitored covering different seasons in a year that is summer, monsoon and post-monsoon period to ensure that the ground water is not contaminated.

Scrutiny of the details of monitoring of Water Quality at waste processing/landfill site of test checked ULBs as provided in the Annual Report of Solid Waste Management submitted to CPCB by SPCB during 2017-18 to 2021-22 revealed that the Water Quality monitoring in test checked ULBs were not carried out as per frequency prescribed in Rules, details have been shown in **Appendix 2.6.**

Audit noticed that the SPCB had conducted total 202 testing against the required 510 tests (frequency of three tests in a year as per the SWM Rules, 2016) for measuring the water quality at waste processing/landfill sites in 34 test-checked ULBs during 2017-18 to 2021-22. Further, the MPPCB had not conducted testing of water quality in a systematic manner as it had not conducted any testing of water quality at waste processing/landfill sites at nine[74] test checked ULBs during the year 2017-18 to 2021-22. As a result, there was a shortfall of 60.39 *per cent* in conducting the testing of water quality, which showed an inadequate and unsystematic monitoring of water quality by MPPCB.

The MPPCB replied (May 2023) that the provision of water quality monitoring as per SWM Rules 2016, were applicable to sanitary landfill sites only. There were only five sanitary landfills sites in these 34 ULBs and the monitoring (minimum three times in a year) of water quality in these landfill sites was being done regularly during last five years except in sanitary landfill at Jabalpur during the year 2018-19. Further, the monitoring of air/ water quality at dump sites of other ULBs was being done regularly twice in a year.

[74] Akodia, Beohari, Kukshi, Malanpur, Mandleshwar, Nalkheda, Niwari, Orchha and Polaykalan.

The reply of the MPPCB is factually incorrect as the monitoring of water quality on these sanitary landfills was 60 *per cent* during the last five years as per the annual report submitted by MPPCB to CPCB. Further, the monitoring of water quality at dump sites of other ULBs was also not being done regularly.

Government intimated (August 2023) that instructions will be issued to ULBs so that compliance with monitoring of water quality at waste processing site is ensured.

- **Non-initiation of penal action by MPPCB against the ULBs operating the waste processing facilities without obtaining the 'Authorisation/Consent to Operate'**

The SWM Rules, 2016 specify environmental monitoring requirements for designing, disposal, treatment and processing facilities, to ensure pollution prevention and environmentally sound operation of these facilities. These specifications are detailed out in Para 3.2.1, 3.2.12, 3.3.13, 3.5.9, 3.6 and 4.1 of Part II of MSWM Manual. As per requirement of the SWM Rules, 2016, the operator of solid waste processing and disposal facilities was required to obtain the "Consent to Establish and Operate" these facilities before establishing and starting of operation.

MPPCB provided view authorisation access to XGN (Extended Green Node) data. Verification of the data available on the website as on 28 January 2023, revealed that out of 34 sampled ULBs only four ULBs (Bhopal, Jabalpur, Indore and Sagar) have applied for or got the Combined Consent Authorisation (CCA)/ Consent to Establish (CTE) the waste processing operating facilities. SW processing facilities at Jabalpur (Jabalpur MSW Pvt Ltd. Kathonda) and Sagar (Sagar MSW solutions Pvt. Ltd, Maswasi) were having valid CCA. Out of four processing facilities at Indore, only two (Indo-Enviro Integrated Solutions Ltd. for Bio-CNG plant and Nepra Resource Management Pvt. Ltd. for MRF) had valid CCA.

The CCA of one processing facility (Trenching Ground at Devguradia, Indore) was not renewed after its expiry and another processing facility (Bio methanation plant, Kabitkhedi) had obtained CTE but did not have CCA, but both these processing facilities were being shown as operational in XGN. Out of seven processing facilities in Bhopal, one (Saurashtra Enviro Projects Pvt. Ltd., Bhanpur) had valid CCA. Further, CCA of two processing facilities (Garbage Transfer Stations at Arif Nagar and Danapani), were not found renewed after its expiry in December 2022. Three processing facilities (Dead Animal Crematorium at Adampur Chhawani, Bhopal, Green Gas Pvt Ltd Adampur Chhawani and NVVN Ltd. Adampur Chhawani) were being operated without CCA.

Further, CTE of one Processing facility (M/s Green Resources Solid Waste Management Pvt. Ltd. Adampur Chhawni) was rejected due to non-obtaining of Environment Clearance, but the XGN data shows the facility was under operation.

The XGN data, however, did not have any information regarding the CTE/CCA obtained for the processing facilities set up in the remaining 30 test checked ULBs.

The MPPCB, while accepting the audit observation, replied (May 2023) that it had already initiated necessary action on all the defaulting ULBs and also filed court cases against 13 ULBs out of sampled 34 ULBs, which were under process.

- **Non submission of online monthly testing report by Industries under Municipal Solid Waste**

MPPCB grants Consent to Operate (CTO) under section 25 of the Water (Prevention and Control of Pollution) Act, 1974, under Section 21 of the Air (Prevention and Control of Pollution) Act, 1981 and Registration as Manufacturer/Producer and Brand Owner under Rule 13 of Plastic Waste Management Rules, 2016. As per the conditions of consent, the applicant had to take samples and measurements for analysis of pollutants, to meet the monthly requirement specified in the consent order and report the results online through XGN software.

Audit generated the report from the Module which generates the report for grant of Consent/Renewal of Consent in respect of Industries under Solid Waste Management Sector for the period from 1 April 2017 to 24 January 2023.

From the view authorisation for 'CCA module for SWM (Solid Waste Management)' of XGN software provided by MPPCB to Audit. Audit observed that 17 industries were classified under the solid waste sector, out of which 15 industries were falling under the red category. Review of these 15 red category units revealed that 14 out of these were not uploading monthly test reports and one industry was found irregular in complying with the requirement. The 14 industries, which were not submitting the monthly returns included Indo-Enviro Integrated Solutions (operator of Bio-CNG plant) and Hoswin Incinerator Pvt. Ltd. (firm engaged for incineration of Sanitary Waste) at Indore and Sagar MSW solutions Pvt. Ltd., Sagar (Implementing ISWM project) at Sagar, and two Garbage Transfer Stations of Arif Nagar and Danapani, Bhopal and Saurashtra Enviro Projects Private Ltd. (engaged in bioremediation of legacy waste) at Bhopal, and Jabalpur MSW Pvt. Ltd. (engaged in Waste to Energy plant).

Further, CPCB had directed (December 2019) all SPCBs to inspect all red category industries, preferably at the frequency of 6 months for environmental surveillance. Audit observed that inspections of these industries were not carried out as per the prescribed frequency.

In 15 industries, 39 instances were observed where inspections were done after a gap of more than six months as detailed in **Table 2.7**.

Table 2.7: Showing number of instances, where inspections of industries under Solid Waste Sector were done after a gap of more than six months in sampled industries

S. N.	Sector	PCB ID	Name of Industry	District	No. of instances of monitoring frequency not adhered
1	SWM	137331	Indo Enviro Integrated Solutions Limited	Indore	1
2	SWM	111895	Katni MSW Management Pvt.Ltd	Katni	3
3	SWM	114800	Sagar MSW Solutions Pvt. Ltd.	Sagar	3
4	SWM	145908	Citadel Iswm Project Singrauli Pvt Ltd	Singrauli	1
5	SWM	19526	Sun Pharmaceutical Industries Limited (Bulk Drug Unit)	Dewas	5
6	SWM	86511	Ujjain Waste Management Private Limited	Ujjain	5
7	SWM	136464	Habibganj Railway Station	Bhopal	2
8	SWM	142991	Municipal Corporation Bhopal, Danapani Garbage Transfer Station	Bhopal	1
9	SWM	142876	Municipal Corporation Bhopal, Arif Nagar Garbage Transfer Station	Bhopal	1

S. N.	Sector	PCB ID	Name of Industry	District	No. of instances of monitoring frequency not adhered
10	SWM	120695	Saurashtra Enviro Projects Pvt. Ltd.	Bhopal	1
11	SWM	112196	Hoswin Incinerator PVT. Ltd. Indore	Indore	3
12	SWM	128753	Rewa Waste 2 Energy Project Limited (A Subsidiary Company of Rewa MSW Holding Li	Rewa	2
13	SWM	118133	Nagar Palika Parisad Chhatarpur	Chhatarpur	1
14	SWM	32483	Mangla Enterprises Pvt. Ltd.	Dewas	6
15	SWM	28396	Jabalpur MSW Pvt. Ltd., Jabalpur	Jabalpur	4
Total					39

(Source: XGN data of Madhya Pradesh Pollution Control Board)

Thus, compliance to the orders of CPCB was not made by these processing units and also by MPPCB. MPPCB intimated that industries/facilities are instructed to maintain necessary records for the same for acting as a guide/aid during inspection. MPPCB also intimated that as per office order no. 867 dated 20 April 2015 routine inspection practice has been eliminated and practice of random inspection has been adopted. Adoption of the practice of random inspection approach, may result in the key areas of non-compliance remaining unnoticed, and thereby increasing the likelihood of environmental damage and posing a risk to public health.

The MPPCB replied (May 2023) that initially the consent was granted to industries to discharge the effluent at the outfall of the industry premises, but at present practice the water consent has mandatory condition to implement zero discharge outside the premises, hence, the condition of monthly testing reports for discharge of effluent has become an advisory condition and not mandatory. Further, the red and highly polluting industries were also being inspected by Regional Officer and his team for regular compliances and inspection reports were being processed in hardcopy in office files and not processed in XGN software.

Reply is not acceptable as the red and highly polluting industries are still required to submit the monthly testing reports for discharge of effluent. Further, no evidence in support of submission of inspection report in hard copy was provided by the MPPCB.

2.20 Contract Management of SWM activities by ULBs

Management of contracts related to municipal solid waste should be guided by transparency, accountability, and a commitment to ensuring that the waste is collected, transported, and disposed of in an environmentally sound and cost-effective manner. Observations noticed in management of SWM contracts are discussed in succeeding paragraphs.

2.20.1 Contracts for Waste to Energy

Waste to Energy (WtE) refers to the process of generating energy in the form of heat or electricity from MSW. As per the CPCB letter dated 30 July 2020, the cluster based Integrated Solid Waste Management model based on waste to energy concept is under various stages of implementation in three clusters (Jabalpur, Rewa, and Gwalior), and it is currently operational in one cluster (Jabalpur).

A review of the compliance to the contractual provisions of Waste to Energy plants revealed the following deficiencies:

2.20.1.1 Waste to Energy production in ULB, Jabalpur

An agreement between Jabalpur Municipal Corporation (JMC) and Essel Jabalpur MSW Private Limited was executed on 5th February 2013 for establishment of processing plant for conversion of Municipal Solid Waste (MSW) into energy at Kathonda, Jabalpur, for a concession period of 20 years.

- As per article 5.1 of concession agreement, the project was designed to receive unsegregated Municipal Solid Waste (MSW) generated by households, public services, agricultural activities, commercial establishments and industries located within the jurisdiction of JMC excluding biomedical waste, C&D waste, dead remains and hazardous wastes. It was however noticed that neither at the primary nor at the secondary stage, segregation of bio medical waste and hazardous waste from MSW was being done (**Image 2.34 and 2.35**), which was in violation of the terms of the contract.

Image 2.34 and 2.35: Mixed waste being collected and transported

Image2.34: Mixed waste collection

Image2.35: Mixed waste collection

(Photo: Audit Team)

- **Non deposit of royalty by concessionaire**

Article 5.3 of the concession agreement provides that JMC shall provide 450 TPD as assured waste quantity for processing to the concessionaire. Further, Article 8 of the contract, provides that the concessionaire was to pay royalty to JMC at the rate of ₹ 20.70 per ton of MSW supplied by JMC to the Developer. In case JMC fails to deliver the requisite quantity of MSW, then the concessionaire shall be entitled to get the operating and maintenance cost incurred on the project facilities for non-treatment of MSW, the amount of which was to be determined mutually. The price schedule of the agreement further specifies that the concessionaire has to deposit the revenue share to JMC at the start of every year, which shall be deposited or adjusted on the basis of actual waste supplied in the respective years.

It was noticed that JMC has been demanding royalty from 2014-15 onwards, but the concessionaire was not depositing the amount. Audit observed that till April 2021 total amount of royalty demanded by JMC had accumulated to ₹ 2.20 crore. Further JMC had not demanded

royalty after April 2021. Audit worked out the total outstanding amount of royalty as ₹ 2.48 crore from 2014-15 to 2021-22, as detailed in **Table 2.8**.

Table 2.8: Details of Year wise royalty to be deposited by concessionaire

(₹ in crore)

S.N.	Year	Quantity of MSW supplied to project site (in MT)	Rate per MT (in ₹)	Revenue share (Royalty) raised	Revenue share (Royalty) deposited by concessionaire	Differences if any
1	2014-15	1,43,446.365	20.70	0.30	Nil	0.30
2	2015-16	1,45,803.531	20.70	0.30	Nil	0.30
3	2016-17	98,548.616	20.70	0.20	Nil	0.20
4	2017-18	1,04,467.815	20.70	0.22	Nil	0.22
5	2018-19	1,61,921.174	20.70	0.34	Nil	0.34
6	2019-20	1,91,273.004	20.70	0.40	Nil	0.40
7	2020-21	1,51,589.645	20.70	0.31	Nil	0.31
8	2021-22	1,51,317.000*	20.70	0.31*	Nil	0.31*
	Total			**2.48**		**2.48**

Amount calculated by audit on the basis of Quantity of MSW provided by JMC and at the determined rate

On being pointed out, JMC stated that notice for depositing royalty has been issued to the concessionaire. The reply was not acceptable as Article 9 of the agreement stipulates that action for declaring the concessionaire as defaulter and terminating the agreement was to be taken by JMC.

Government replied (August 2023) that the Department would seek information from the ULB regarding non-deposit of royalty by the concessionaire, and will ensure that all the terms and conditions of contract are met by both ULB and concessionaire.

2.20.1.2 Waste to Energy production in ULB, Rewa

Agreement for setting up ISWM- Waste to Energy project on PPP mode was executed in February 2017 between Rewa MSW Holding and Commissioner, NN Rewa. The concession agreement was for a period of 21 years, of which 19 years was for operation and maintenance of ISWM project. The project included 28 ULBs coming under three districts of Rewa, Sidhi and Satna. These 28 ULBs included three test checked ULBs *i.e*. Satna, Maihar and Uchehara. Article 7 of the agreement provided that concessionaire would be paid monthly tipping fees of ₹ 1,746 per MT. Forty *per cent* of the tipping fee was payable for the collection, transportation, and disposal of existing waste and freshly generated waste that has not been processed and disposed of as per the MSWM Rules. The remaining sixty *per cent* of the fee was payable only when the waste is processed and disposed of as per the MSWM rules after the commissioning of the Integrated Solid Waste Management (ISWM) facility. The work of construction of ISWM project at Rewa was still in progress.

Audit observed that:

- ULB Satna made payment of ₹ 5.97 crore for 85,496.55 MT waste pertaining to the period February 2018 to February 2021 to the contractor @ ₹ 698.40 per MT. For the period from March 2021 to September 2022, an amount of ₹ 7.93 crore was paid for 45,409.71 MT waste @ ₹ 1,746/- per MT. Payment of tipping fees, for the period March 2021 to Dec 2022 during which the ISWM facility was not commissioned; for the quantity of 45,409.71

MT waste at full rate of ₹ 1,746/- per MT in place of ₹ 698.40 per MT resulted in irregular payment of ₹ 4.76 crore (45,409.71 MT x 1,047.6) to the concessioner,.

Government stated that presently waste is being collected by concessionaire and processed at processing facility and after processing compost is sold to farmers or fertilizer companies and RDF is stored in plant area which will be disposed in waste to energy plant after it becomes operational.

The reply of the Government, however, does not address on payment of the full tipping fee for the period from March 2021 to December 2022.

- ULB, Maihar made payment of ₹ 65.35 lakh as tipping fee for door-to-door collection and transportation of waste for the period June 2019 to January 2021(₹ 9.19 lakh for the period June 2019 to September 2019, ₹ 11.91 lakh for the period October 2019 to February 2020, and ₹ 44.26 lakh for the period March 2020 to January 2021). No further payment was made to the concessionaire. Audit observed that the concessionaire instead of transporting the collected waste to the project site, was actually dumping them at the trenching ground at Maihar and was also irregular in collection of wastes from all the wards under the ULB.
- ULB, Uchehara also paid ₹ 23.93 lakh as tipping fee for door-to-door collection and transportation of waste for the period May 2019 to November 2021(₹ 1.28 lakh for the period May 2019 to June 2019, ₹ 9.41 lakh for the period July 2019 to March 2020, and ₹ 13.24 lakh for the period January 2021 to November 2021). Payment made by the ULB for the intervening period April 2020 to December 2020 was not available on records maintained by the ULB. No further payment was made to the concessionaire after November 2021. Audit observed that the concessionaire instead of transporting the collected waste to the project site, was actually dumping them at the trenching ground at Uchehara.

  Government stated (August 2023) that the Department would seek information from both the ULBs and would direct them to ensure that concessionaire collect, process and dispose waste at processing facility in a scientific manner.

2.20.2 Collection and Transportation of MSW under Design, Build, Finance, Operate and Transfer Model

Jabalpur Municipal Corporation (JMC) issued LOA to M/s Essel Infra Projects Ltd. on 11 August 2016 for the work of Collection and Transportation of Municipal Solid Waste, under Design, Build, Finance, Operate and Transfer Model. The concessionaire was asked to sign the agreement within 15 days and submit the required amount of performance guarantee. Audit observed that the firm formed a Special Purpose Vehicle (SPV), named Jabalpur Waste Collection and Transportation Management Private Limited (on 29 August 2016) to implement the project. The agreement was signed in November 2016 between JMC and Jabalpur Waste Collection & Transportation Management Private Ltd. and M/s Essel Infra Projects Ltd. for a period of 10 years.

Audit observed that:

- The newly formed SPV did not fulfill the criteria given in para 3 (c) of instructions to the bidders, which requires that the selected firm should have three years' experience in the field of MSW sector. On being pointed out, it was stated that the tender was issued to

M/s Essel Infra Projects Ltd. which had the required experience. The reply was not acceptable as the actual execution was being done by a firm which had no experience in the MSW sector.

- The concession agreement provides that fully covered vehicles were to be used for transportation of waste collected from secondary transfer points to eliminate spillage and minimize the foul odour. It was noticed that transportation of MSW was being done in open dumpers by concessionaire (**Image 2.36 and 2.37**), which was against the contractual conditions.

Image 2.36 and 2.37: Uncovered vehicles used for transportation in ULB, Jabalpur

Image2.36: Transportation of waste in uncovered vehicle

Image2.37: Transportation of waste in uncovered vehicle

(Photo: Audit Team)

- The waste collected from the streets was being dumped in the city drain by the concessionaire, in spite of several warnings issued by JMC directing him to improve the work. Media has also been publishing the plight of solid waste management in Jabalpur as shown in **Image 2.38 and 2.39**.

Image 2.38 and 2.39: Dumping of street waste in drains and media report thereon in JMC

Image 2.38: Media Report

Image 2.39: Dumping of waste in drains

(Photo: Audit Team)

While accepting the observation, JMC, stated that a proposal to terminate the contract was under consideration in the Member in Council. The fact remains that due to lack of experience of the SPV in MSW work, the cleaning work was not being done properly.

- As per Schedule-2 of concession agreement, the concessionaire had to submit a Detailed Project Report for approval to JMC. It was however noticed that the DPR had not been approved by JMC. JMC agreed to the audit observation.

- The concessionaire had to submit Performance Bank Guarantee (BG) of ₹ 238.14 lakh at the time of agreement for due performance of its obligations under the contract (Article 5.1a of agreement). The BG was to be kept valid throughout the term of the agreement. The Contractor submitted two BGs for the same at the time of agreement – one BG of ₹ 100.00 lakh valid upto 28 October 2020; and the other BG of ₹ 138.14 lakh valid up to 27 March 2021. Validity period of both these BGs has expired, due to its non-renewal before expiry.

  As per the terms of agreement, the BG if not renewed within one month prior to its validity period, the BG was to be invoked in its favour by the ULB, which was not done. JMC replied that the amount would be recovered from the bills of concessionaire. The fact remains that both the BGs had expired and JMC had not taken action as per agreement clause.

- As per the scope of work (Article 2.1) of agreement the concessionaire had to install semi-underground waste collection bins at 200 identified locations. It was noticed that the concessionaire had not executed this component. JMC later got this work done at 50 locations under the Jabalpur Smart City Project, by incurring an expenditure of ₹ 1.99 crore. JMC confirmed the facts and stated that the proposal to terminate the contract with the concessionaire was under consideration in MIC.
- As per Part (c) of Appendices of Volume 1 of RFP documents, the bidder was responsible for conducting a campaign for disseminating the best practices in waste collection and disposal activities amongst the residents, the cost of which was to be borne by concessionaire. It was however noticed that JMC hired a separate agency (M/s Human Matrix Security) for conducting IEC activity and paid an amount of ₹ 75.60 lakh to the firm. As IEC was already included in the scope of work of the concessionaire, award of same work to another agency and incurring expenditure on it was irregular.

  Government replied (August 2023) that the Department would seek information from the ULB regarding the work of waste collection awarded to the firm and ensure that the ULB will properly manage the contract and its terms and conditions through transparency, accountability and commitment to ensure waste is collected and transported to processing facility.

2.20.3 Undisposed legacy waste at temporary site allotted for Sagar Cluster Project Site

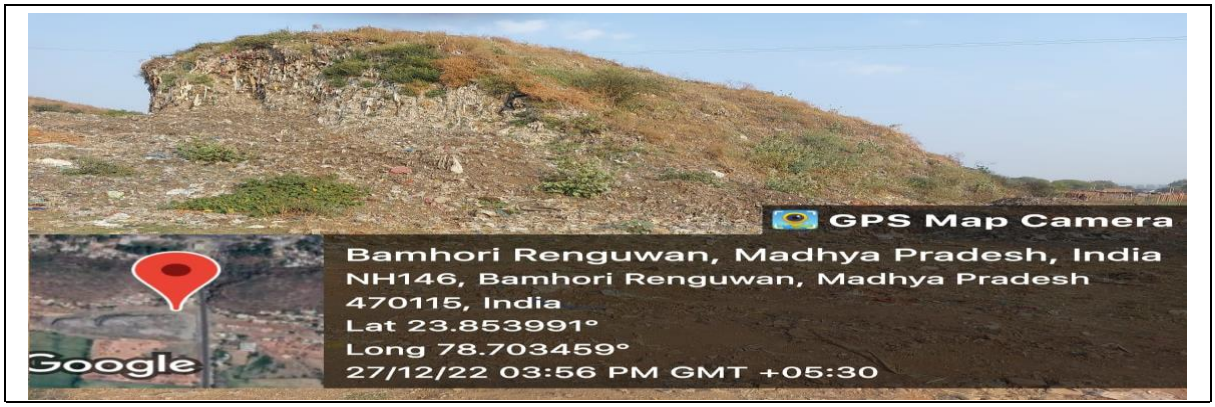
The work of setting up the Integrated Regional Solid Waste Management Project for Sagar Cluster was awarded to M/S Ramky Enviro Engineers Limited for tipping fee @ ₹1,692/MT vide agreement dated 27 March 2015. The concession period was 19 years after Commercial Operation Date. The project was to be executed under PPP model.

- As per RFP document, the ISWM project of Sagar Cluster was to be established in village Hafsili. The collection and transportation of MSW was started by concessionaire from April 2016 and collected wastes were being dumped in village Hafsili. Amid protests from villagers of village Hafsili, the ULB asked the concessionaire to use land at Amaouni

village temporarily, till a separate land is made available for the project. Separate land for the project was allotted on 30 November 2016 at village Maswasi. During the intervening period large quantity of wastes got accumulated at the temporary land at Amaouni village. As per terms of the agreement the concessionaire was required to process the wastes collected by him. However, the concessionaire did not take any step for processing of accumulated wastes at the temporary site, despite several reminders from the ULB Sagar.

During joint physical verification, it was found that the wastes dumped in Amaouni village had taken a shape of a mountain (**Image 2.40)**. Further, some habitations were also found near the dumping place, hence the possibility of it posing health problems to the people residing nearby areas could not be ruled out.

Image 2.40: The wastes dumped in Amaouni village took a shape of a mountain



(Photo: Audit Team)

In reply, ULB Sagar stated that the concessionaire has not taken any action to dispose of the waste dumped at Amaouni village despite several correspondences, oral instructions and monitoring committee meetings with the concessionaire. The fact remains that huge quantity of waste was lying undisposed at the temporary site.

- As per the scope of work, the concessionaire was responsible for primary collection of MSW in a segregated manner in compliance with MSWM Rules. During joint physical verification of project site at Sagar, audit noticed unsegregated wastes at transfer station as well as project site, indicating that segregated waste was not being collected by the concessionaire **(Image 2.41 and 2.42)** during primary collection, which was in violation of the conditions of the contract.

Image 2.41 and 2.42: Unsegregated wastes at transfer station as well as project site in ULB, Sagar

Image 2.41: Unsegregated waste

Image 2.42: Unsegregated waste

(Photo: Audit Team)

In reply, the ULB, Sagar confirmed the fact that segregation of waste was not being done by concessionaire.

- **Non-disposal of combustible waste by concessionaire**

According to Schedule 2A(d) of SWM Rule, 2016, pre-process and post-process rejects was to be removed from the processing facility on regular basis and should not be allowed to pile at the site. Recyclables shall be routed through appropriate vendors. The non-recyclable high calorific fractions having minimum calorific value exceeding 1500 kcal/ kg to be segregated and sent to waste to energy or for RDF production, co-processing in cement plants or to thermal power plants. Only rejects from all processes shall be sent for sanitary landfill site. From the test reports of the lab, it was noticed in audit that combustible wastes having calorific value more than 1500 kcal/ kg, was available at site and piles of these waste were lying undisposed as shown in **Image. 2.43**.

Image 2.43: Combustible waste found lying undisposed in ULB, Sagar

(Photo: Audit Team)

2.20.4 Unfruitful expenditure on "Regional Integrated Solid Waste Management Project Bhopal Cluster involving eight ULBs

The ULB, Bhopal awarded work order to a concessionaire (M/s Essel Group) for implementing ISWM Project in Bhopal at a tipping fee of ₹ 1,260 per ton. As per provision in Clause 2.2(b)(vi) of the Concession Agreement (16 November 2016), the ULB, Bhopal had committed to purchase the electricity generated from waste to energy plant at a levelized tariff of ₹ 6.39 per unit. As per the electricity regulations, the tariff rate was required to be adopted by Madhya Pradesh Electricity Regulatory Commission (MPERC). The petition for adoption of tariff rate

was rejected by MPERC with the reason that the rate of ₹ 6.39 is applicable for projects which does not involve government grants. Due to rejection of the petition the concession agreement was terminated. Audit observed that:

- During the intervening period, the ULB, Bhopal had paid an amount of ₹ 1.51 crore to the concessionaire for construction of waste to energy plant. Due to termination of the agreement the payment made to M/s Essel Group remained unfruitful.
- Further, up to the date of foreclosure of the work, the ULB, Bhopal had paid ₹ 1.51 crore to the concessionaire for work done up to that date. However, the payment made to the Independent Engineer engaged for supervision of work done by the concessionaire was ₹ 2.99 crore as detailed in **Table 2.9**.

Table 2.9: Showing amount paid to Independent Engineer for supervision of work done by concessionaire

S.N.	Invoice Number	Amount (*in* ₹)
1	RA01	25,67,500
2	RA02	30,39,783
3	RA03	30,39,783
4	RA04	30,39,783
5	RA05	30,39,783
6	RA06	30,39,783
7	RA07	30,39,783
8	RA08	30,39,783
9	RA09	30,39,783
10	RA10	30,39,783
	Total	**2,99,25,547**

This exorbitant payment for supervision of work done by the concessionaire *i.e.,* 198 *per cent* of the value of work done by him was doubtful as value of work done by concessionaire was only ₹ 1.51 crore. Further, details of engineers deployed by the Independent Engineer (M/s M.V.S. International) and supporting documents to justify the payment for supervision work were not made available to audit.

Government replied (August 2023) that since the project work was in continuation, payment was made to the independent engineer.

The reply is not acceptable because till the termination of agreement the concessionaire had executed works valuing ₹ 1.51 crore, and the independent engineer engaged for supervising the work done by concessionaire was paid an exorbitant amount of ₹ 2.99 crore. Justification for the same was not provided.

2.20.5 Irregular payment for processing of wastes during the period of establishment of project

The work of preparation of compost/ manure by organic method from wet waste at transfer stations/ garbage stations of the city and Adampur Chhawani for Urban Solid Waste Management at Bhopal, was allotted to M/s National Federation of Farmers Procurement Processing and Retailing Cooperative of India (NACOF) for processing of 400 ton of waste per

day @ ₹ 786 per tonne (September 2018), for a period of one year. According to Clause 12.14 the duration of contract was one year and three months (three months for establishing the project and one year for regular operation) from the date of signing of the agreement.

- Audit observed that though work order was issued on 27 September 2018, payment of ₹ 82.68 lakh for processing of waste for the period October 2018 to November 2018, was made to the contractor. This payment is doubtful as records (note sheet dated 25 May 2019) reveal that the concessionaire had not initiated the civil works for establishing the four transfer stations at site. It was further noticed that the work was terminated on 15 December 2020 due to an increase in the quantity of wastes from 400 tonnes to 800 tonnes.
- The work was meanwhile awarded to the same contractor for processing of 800 tonnes of waste per day vide work order number 312, dated 23 November 2020 @ ₹ 333 per ton. Audit observed that the contractor was paid an amount of ₹ 1.81 crore for processing of 800 tons of wastes from the second day of agreement *i.e.*, 24 November 2020 to 24 January 2021. This payment also seems doubtful as the existing capacity of old plant was 400 MT/ per day and processing of extra quantity (double capacity) just a day after the date of issue of work order was not possible. Further, records to prove that the contractor had enhanced the processing capacity by purchasing and installation of new plant was also not there.
- The scope of work included disposal of five lakh MT legacy waste along with, processing of new waste and complete management of landfill site. Audit however noticed that an amount of ₹ 58.08 lakh was paid to another firm (M/s Odedra Construction Co.) for hiring of nine Pokelen machine for the site (Adampur) for the period from 5 November 2020 to 30 November 2020. This payment was irregular as tender for complete management (disposal of legacy waste and processing of new waste) of Adampur land fill site was accepted before the hiring of these machines *i.e.*, on 29 October 2020.
- As per the DPR, contractor had to develop the Green Belt at Adampur landfill site at a cost of ₹ 87.50 lakh but specific area and number of plants were not mentioned. Audit observed that payment of ₹ 52.50 lakh was made to the contractor towards development of Green Belt but during the field visit, very few number of plants alongside road to landfill site were observed as shown in **Image 2.44 and 2.45**.

Image 2.44 and 2.45: Landfill site where green belt was to be developed

Image 2.44: Negligible plantation at landfill site

Image 2.45: Negligible plantation at landfill site

(Photo: Audit Team)

Government intimated (August 2023) that BMC floated tender for processing fresh daily MSW of 800 TPD capacity in which M/s NACOF offered L1 rate i.e. ₹ 333/MT and work order was issued. Since the existing capacity of old plant was 400 MT/day working at eight hours shift.

After the work was awarded to concessionaire, the processing work of MSW was carried out in two shifts (i.e. eight hours each) for the daily MSW coming at site. Thus, the contractor was paid for daily processing of MSW.

Reply is not acceptable as the capacity of old plant was 400 TPD and to process 800 TPD the firm had to augment its existing capacity and develop other infrastructures for which four months' time was provided to the concessionaire in the Pre-bid meeting. The condition of eight hours per shift which was stated in reply was not supported by any documents. Thus, claim of the concessionaire and payment for 800 TPD immediately from the second day of agreement *i.e.,* 24 November 2020 is not justified.

Government needs to examine the matter and fix responsibility for making payment to contractor for processing higher quantity of wastes from the second day of the agreement and negligible survival of plantations alongside road to landfill site.

2.20.6 Avoidable expenditure due to non-performing the duties by the concessionaire

Clause 2.1(a) of the concession agreement (04 December 2017) with M/s Ecogreen (Gwalior) envisaged that the concessionaire shall be responsible for complete management of MSW generated in the whole project area, including residential, commercial, institutional, hotels, restaurants, markets, marriage garden, parks, dead animals, non-hazardous industrial waste, treated biomedical waste, *etc*.

- Audit observed that the ULB, Gwalior had paid an amount of ₹ 4.49 crore to other agency (Sh. Rakesh Singh Jadon) for collection and transportation of dead animals from different locations of Gwalior Municipal Corporation and dispose it off by burying it in land near Kedarpur landfill site, during the period from 29 December 2017 to 09 June 2020 as shown in **Table 2.10**.

Table 2.10: Amount paid to separate agency for collection, transportation and disposal of dead animals

S.N.	Payment Period	Amount (in lakh)
1	29/12/2017 to 28/02/2018	24.33
2	01/03/2018 to 30/04/2018	27.46
3	01/05/2018 to 30/06/2018	28.78
4	01/07/2018 to 30/08/2018	32.52
5	01/09/2018 to 30/11/2018	50.86
6	01/12/2018 to 31/01/2019	35.69
7	01/02/2019 to 31/03/2019	31.52
8	01/04/2019 to 31/08/2019	82.86
9	01/09/2019 to 09/06/2020	135.40
Total		**449.42**

Payment made for the work of disposal of bodies of dead animals to a separate agency was irregular, as the concessionaire was responsible for its execution as well as installation of incinerator (Estimated cost ₹ 3.00 crore) as per scope of work.

Government stated (August 2023) that the concessionaire of ISWM project Gwalior was not performing its duties, eventually the contract was terminated and there is no duplicity of expenditure.

The reply is not acceptable as the expenditure of ₹ 4.49 crore (besides cost of incinerator) shown in the **Table 2.10** above pertains to the period of currency of agreement of M/s Ecogreen and no details of recovery made on this account has been produced to verify the claim of non-duplicity in payment. Further, the dead animals were buried instead of being incinerated.

2.20.7 Avoidable expenditure on conduct of IEC activities through agencies other than the concessionaire

According to Clause 2.1 (P) and schedule-7 of the Concession Agreement for Integrated Solid Waste Management (ISWM) Project Gwalior Cluster (consisting 16 ULBs) the concessionaire (M/s Ecogreen Energy Gwalior Private Limited) was responsible for carrying out IEC campaign to sensitize citizens about their role in achieving the objectives of the Project. However, during scrutiny of records, Audit observed that the ULB, Gwalior had spent an amount of ₹ 1.25 crore during the year 2018-19 for conducting various IEC activities through other agencies, during Swachh Bharat Mission Survey 2019 as detailed in **Table 2.11**.

Table 2.11: Expenditure for conducting various IEC activities in 2018-19

(₹ in lakh)

S.N.	Name of the Firm	Activity	Bill Amount
1	M/s Om Sai Vision Bhopal	Production of TV/ theatre spots, video documentary films, *etc*.	11.04
2	M/s Ascent Brand Communication Pvt. Ltd. Indore	Video, documentary films under IEC activities	10.03
3	M/s Ascent Brand Communication Pvt. Ltd. Indore	Wall writing	42.20
4	M/s Ascent Brand Communication Pvt. Ltd. Indore	Promotion through different types of hoarding, bus panels LED displays and various medium at IEC activities under SBM	61.27
Total			**124.54**

As per the agreement, all the activities mentioned above were to be carried out by the concessionaire. The reasons for conducting IEC activities through other agencies, and action taken against the concessionaire for not conducting above activities was not made available to Audit. Further, information pertaining to the years 2017-18, 2019-20 and 2020-21 were also not made available to audit by the ULB, Gwalior despite repeated pursuance by the audit party.

Government stated (August 2023) that the concessionaire of ISWM project Gwalior was not performing its duties, eventually the contract was terminated and there is no duplicity of expenditure.

The reply is not acceptable as the expenditure of ₹ 1.25 crore shown in the **Table 2.11** pertains to the year 2018-19 and the agreement was terminated in November 2020 and no details of recovery made from the concessionaire has been provided to verify non-duplicity in payment.

2.20.8 Unwarranted payment of GST to the private party

Department of Revenue, Ministry of Finance, GoI, vide notification dated 28th June 2017 (No. 12/2017-Central Tax (Rate)), had exempted pure services provided to a municipality in respect of functions entrusted to it under article 243W of the Constitution from the purview of GST.

Thus, services of outsourced labours provided to the municipalities was exempted from the purview of GST. Audit observed that:

- Contrary to the above order, Nagar Palika Parishad Betul, irregularly made unwarranted payment of GST amounting to ₹ 25.84 lakh to the contractor for the work of supply of 50 labours for Daily sweeping of roads, footpaths, public places, *etc*.

  ULB, Betul intimated that payment of GST on labour contract was made as per provisions of GST Act, 2017.

- Similarly, Nagar Palika Parishad, Damoh irregularly made unwarranted payment of GST amounting to ₹ 19.56 lakh to four agencies for the work of supply of 143 outsourced skilled/semi-skilled /unskilled workers for SWM activities.

Government stated (August 2023) in reply that the department has no information about the terms of contract as the contract was executed at ULB level.

2.20.9 Contract for collection, transportation and IEC awareness activities

NPP Betul awarded the work of "collection, transportation and IEC awareness activities for Municipal Solid Waste and Biomedical Waste" to a private firm in July 2019 (25 July 2019) Audit observed that:

- As per condition no. 5.1 of the contract the contractor had to maintain regular record of wastes collected and transported and submit the same to ULB, Betul officials. However, these records were neither available in file nor was it produced to audit. ULB, Betul replied that the contracted agency provided geo-tagged photo booklet along with their monthly bills as evidence. The reply is not acceptable as compliance to the contractual condition was not made.

- Payment of ₹ 6.49 crore has been made to the contractor for this work since the date of award of work, on the basis of monthly salary of the employees deployed for the work. This system was not in accordance with the provisions of the Guidebook on Swachh Bharat which stated that payment for collection and transportation of MSW should have been on the basis of maximum allowed weight per vehicle volume. The system of payment of remuneration to the contractor was not proper as it did not encourage the contractor to collect and transport waste in large quantities. NPP Betul, while accepting the audit observation, assured to take corrective measures in future.

On being pointed out, no reply was offered by the Government (February 2024).

2.20.10 Non-payment of royalty by concessionaire of the work of installation and commissioning

The ULB, Indore awarded (October 2018) the work of supply, installation and commissioning of 300 TPD capacity of Automated Material Recovery Facility for Dry Municipal Waste processing on PPP model to a firm.

As per the Article 5 "Annual Operating Fee" of the agreement, for the first contract year and each subsequent contract year, concessionaire had to pay to employer an annual fee of

₹ 1.41 crore payable on quarterly basis (₹ 35.25 lakh per quarter) for intake of 300 MT/ Day dry waste after commencement of commercial operations. The annual fee in the second year and subsequent years thereafter was subject to escalation at the rate of 5 *per cent* per annum on previous year amounts. Further, as per section 3.1(b), till the start of commercial operation of 300 TPD, the existing MRF (MRF-1) of the ULB, Indore was handed over to concessionaire on as is where is basis, from the date of work order, and the contractor had to pay for this facility on pro-rata basis of amount approved for 300 TPD plant (MRF-2). Section 5.2 "Payments by the contractor" of the agreement further provides that delay in the payment of royalty by the concessionaire shall attract an interest of 12 *per cent* per annum.

Audit noticed that the concessionaire started its commercial operations from 14 November 2019. Therefore, for the period starting from 1 October 2018 to 13 November 2019, the Contractor had to pay for operation of manual MRF-1 facility at ₹ 6.08 lakh for each quarter and after 13 November 2019 at the rate quoted by contractor on quarterly basis. But the contractor has deposited only of ₹ 67.09 lakh till September 2022 against the required amount of ₹ 4.63 crore (as detailed in the **Table 2.12**).

Table 2.12: Detail showing royalty payable by the Contractor

(₹ in crore)

S.N.	Period	Royalty to be paid by Contractor
1	01/10/18 to 30/09/19 (04 Qtrs.)	0.24
2	01/10/19 to 13/11/19 (44 days)	0.03
3	14/11/19 to 31/12/19 (48 days)	0.19
4	01/01/20 to 24/03/20 (84 days)	0.32
5	01/04/20 to 31/03/21 (04 Qtrs.)	1.48
6	01/04/21 to 31/03/22 (04 Qtrs.)	1.55
7	01/04/22 to 30/09/22 (02 Qtrs.)	0.82
Total		**4.63**

The ULB, Indore had issued several notices to the contractor for depositing the amount of outstanding royalty. Audit further noticed that the ULB, Indore had not demanded the interest component for delay in payment of royalty. Thus, an amount of ₹ 3.96 crore (4.63 crore - 67.09 lakh) excluding interest was pending for recovery against the royalty charges from the concessionaire. The ULB, Indore intimated that the issue related to outstanding amount of royalty will be resolved soon.

On being pointed out, no reply was offered by the Government (February 2024).

2.21 Recommendations

Audit recommends that:

1. The ULBs may ensure availability of baseline data of wastes generated in their jurisdiction to properly assess the quantity of waste generated and prepare action plans for its adequate management.
2. The State Government may ensure segregation of waste at source by devising a system for incentivising waste generators and collectors for segregation of waste and should prevent mixing of segregated waste during various stages of Solid Waste Management.

3. ULBs may ensure collection and segregation of wastes from all Resident Welfare Associations, Market Associations, Gated Communities, Institutions, Hotels and Restaurants and as far as possible process bio-degradable waste through composting or bio-methanation within the premises itself.
4. ULBs may put in place a robust system for monitoring of vehicles engaged in door-to-door collection and transportation of wastes to ensure that all areas under their jurisdiction is covered.
5. ULBs may ensure creation of all facilities essential for effective and safe operation of the processing plants and the landfill sites.
6. GoMP may strengthen monitoring of waste management activities through State level Advisory Body by ensuring its regular meetings and prescribing corrective actions in cases of irregularities noticed.
7. MPPCB may put in place an adequate monitoring system to ensure compliance of provisions of Solid Waste Management Rules in all the ULBs.
8. The Government may examine and fix responsibility in the cases where excess/ irregular payments were made to contractors.

CHAPTER 3

MANAGEMENT OF SEWAGE

Chapter 3

Management of Sewage

3.1 Introduction

Management of sewage undertake the task of sewerage and sewage treatment service delivery, with its own staff, equipment, and funds, or in some cases by engaging private enterprises. Being of a local nature, it has been entrusted to the ULBs. The main cause of water pollution is the unintended disposal of untreated, partly treated and non-point sources of sewage and more important is its effect on human health and environment. To tackle this problem, the Government of India (GoI) had given policy directions to states and cities by adoption of National Urban Sanitation Policy, 2008. Central Public Health and Environmental Engineering Organisation[1] Manual on Sewerage and Sewage Treatment Systems (CPHEEO Manual on SSTS) was introduced (November 2013) to achieve the objectives as envisaged in the National Urban Sanitation Policy.

Audit test checked the record of 34 Urban Local Bodies (ULBs) in respect of aspects related to sewage management. Observations on the sewage management issues like, planning, collection and treatment of sewage, monitoring and quality control as well as programme implementation observed in the audited ULBs are discussed in the succeeding paragraphs.

3.2 Planning of Sewerage Network

Proper planning for the collection, treatment and disposal is necessary for the functioning of an effective sewerage system. It is most essential to collect, treat and dispose of all the waste products of the city in such a way that it may not cause any hazardous effects on people residing in town as well as the environment.

Planning aspects related to sewage management i.e., existence of City Sanitation Plan, planning of sewerage network with respect of sewage generation were checked during the audit. Findings based on the test checks are discussed in the subsequent paragraphs.

3.2.1 Non preparation of City Sanitation Plan

A City Master Plan (CMP) guides development, conservation and capital improvement projects to improve the quality of life in the community. The CMP includes the City's goals and objectives, land use plan, urban design, housing, infrastructure, parks, open space, transportation, economic development and preservation of historical monuments.

The City Sanitation Plan (CSP) shall also mandatorily form part of the CMP. As per Paragraph 2.4.10 of the CPHEEO Manual on SSTS, 2013, all local bodies are required to prepare CSP

[1] Involved in preparation of Technical Guidelines in the form of Manuals in the field of Public Health & Environmental Engineering which are used as basic documents by the State PHEDs / State Water Boards / UTs/ Urban Local Bodies in their functions of planning, designing, construction and O&M of water supply and sanitation schemes in the above sectors.

for a period of 30 years considering future development and city development in line with CMP to avoid any conflicts in developing the city in future.

The CSP involves close collaboration with other planning agencies at local, State and National levels to ensure better coordination in allocation of priorities and resources. The collection, transportation, treatment and disposal aspects, facilities, augmentation and replacement of the equipment and sites, allocation of priorities and resources should invariably be decided keeping in view the design period of the CSP.

Audit noticed that out of the audited 34 ULBs, only Indore ULB had prepared the CSP, 32 ULBs had not prepared CSP while ULB, Bhopal did not furnish information in this regard. Although construction of sewerage system is already in progress in 11[2] out of 34 ULBs. In absence of such Plan, overall sewage management of these 32 ULBs for identification, collection, treatment and disposal in systematic and planned manner had remained incomplete.

Government stated (August 2023) that 13[3] out of 34 audited ULBs are under AMRUT 2.0 and have prepared and uploaded their City Water Balance Plan (CWBAP) to Government of India, Ministry of Housing and Urban Affairs (MoHUA) Portal.

While considering the reply of Government, the fact remains that the majority of ULBs have not yet prepared CSP.

3.2.2 City Sanitation Task Force not constituted

Paragraph 10.5.2.2.1 of CPHEEO Manual on SSTS, 2013 envisages constitution of a multi-stakeholder City Sanitation Task Force (CSTF) comprising representatives from Agencies directly responsible for sanitation, including the different Divisions and Departments of the ULBs, Public Health Engineering Department (PHED), *etc*. for (a) Launching the City 100 *per cent* Sanitation Campaign (b) Generating awareness amongst the Citizens and stakeholders (c) Approving materials and progress reports provided by the implementing agency, other public agencies, NGOs or private parties contracted for different aspects of implementation (d) Approving the CSP for the City prepared by the Sanitation Implementation Agency after consultations with Citizens (e) Undertaking field visits from time to time to supervise progress (f) Issue briefings to the press/ media and State Government about progress (g) Providing overall guidance to the Implementation Agency (h) Recommend to the ULB fixing of responsibilities for city-wide sanitation on a permanent basis.

Audit noticed that CSTF was not constituted in the 32[4] out of audited 34 ULBs while ULBs, Bhopal and Satna did not furnish information in this regard. Thus, in its absence the aforesaid activities as envisaged in CPHEEO Manual for the CSTF could not be accomplished which raised doubts about successful implementation of the CSP in these 32 ULBs.

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2 Bhind, Bhopal, Gwalior, Indore, Jabalpur, Mandleshwar, Morena, Ratlam, Sagar, Shahdol, and Vidisha.

3 Betul, Bhind, Bhopal, Damoh, Gwalior, Indore, Jabalpur, Morena, Ratlam, Satna, Sagar, Shivpuri and Vidisha.

4 Akodia, Balaghat, Barghat, Beohari, Betul, Bhind, Damoh, Dhar, Gwalior, Indore, Jabalpur, Kareli, Khirkiya, Kukshi, Maihar, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

Government stated (August 2023) that CSTF had been constituted in ULB Bhopal, Indore, Ratlam and Satna only and remaining ULBs are in process of setting up their CSTF.

Audit is of the opinion that CSTF may be constituted in a time bound manner in all the ULBs.

3.2.3 Non-inclusion of Institutes/ Public Toilets in the sewerage system

According to paragraph 3.7 of the CPHEEO Manual, sewage from commercial public institutions, industries and commercial buildings often use water other than the municipal supply and may discharge their liquid waste into the sewers. Thus, estimates of such flows should be made separately considering the needs of their potable water as indicated in **Table 3.1.**

Table 3.1: Showing the type of Institutions and their needs of potable

S.N.	Types of institutions	Water Supply (in liters)
1	Hospitals including laundry and beds not exceeding 100	340 per bed
2	Hostels/ boarding schools & colleges, nursing homes and medical quarters	135 lpcd
3	Restaurants per seat	70 per seat
4	Day Schools/ colleges, offices, factories, duty staffs	45 lpcd
5	Cinema, concerts and theaters	15 lpcd
6	Train and bus stations, alighting and boarding person	15 lpcd

(Source: CPHEEO Manual on SSTS, 2013)

During scrutiny of Feasibility Report/ Detailed Project Reports (DPRs) relating to sewerage systems, Audit observed that no provision was made in 11[5] ULBs for the treatment of sewage generated by these institutions. Preparation of DPR without considering the sewage generated by these institutions, possibility of improper collection, treatment and disposal of sewage cannot be ruled out.

In reply, the ULBs stated that DPR of the sewerage system was prepared by consultants keeping in mind the household sewerage system only. Replies indicate deficient planning process for Institutional sewage discharge.

Government stated (August 2023) that at the time of preparation of DPR, the assessment of sewage flow is made @ 80 *per cent* of total waste supply (@ 70 -135 lpcd) along with 10 *per cent* additional water infiltration. Also, the quantity of sewerage during initial year is far less than design capacity therefore any additional flow from commercial public institutions, industries and commercial building upto 5 to 10 *per cent* is easily accommodated.

The Reply substantiates the fact that the provisions of manual was not followed during planning and may adversely impact the bearing capacity of the system.

3.2.4 Non-completion of projects in scheduled time period

The sewerage project is envisioned with a view to dispose of the sewer water after its treatment so that this water may not pollute the soil and water bodies of the State. As this task was of prime importance, its timely execution was equally important so that the intended purpose be achieved at the earliest.

[5] Bhind, Bhopal, Gwalior, Indore, Jabalpur, Morena, Ratlam, Sagar, Satna, Shahdol and Vidisha.

In 11 works of nine ULBs, the contractor had failed to complete the work within stipulated time period as detailed in **Table 3.2.**

Table 3.2: Details of delayed project

S. N.	ULB	Project name	Date of Work order	Period	Scheduled date of completion	Actual Date of completion	Delay period (up to 3/2023)
1	Gwalior	Gwalior-Morar Sewerage	25/09/17	24 months	24/09/19	31/03/22	30 months
2	Gwalior	Gwalior-Laskar Sewerage	04/10/17	24 months	03/10/19	02/02/22	31 months
3	Morena	Morena Sewerage	12/07/16	24 months	11/07/19	30/12/21	32 months
4	Bhind	Bhind Sewerage	08/12/17	24 months	07/12/19	not completed	33 months
5	Satna	Satna Sewerage	05/12/16	36 months	04/12/19	Foreclosed on 28/05/21	34 months
6	Vidisha	Vidisha Sewerage	20/04/17	24 months	19/04/19	not completed	44 months
7	Indore	Nalla tapping of city	24/01/18	24 months	23/01/20	not completed	36 months
8	Indore	Indore Sewerage	28/12/17	24 months	27/12/19	not completed	37 months
9	Sagar	Sagar Sewerage	08/07/16	36 months	06/07/19	not completed	36 months
10	Mandleshwar	Mandleshwar Sewerage	06/01/18	24 months	05/01/20	not completed	39 months
11	Jabalpur	Jabalpur Sewerage	23/07/21	12 months	22/07/22	not completed	8 months

Thus, due to delay of projects the generated sewage is merging in nearby water bodies. Some **Images 3.1 to 3.3** of merging of untreated water in nearby water bodies are as under:

Image 3.1 to 3.3: Untreated sewage merging in water bodies due to delay of projects

Untreated sewage water merging in River Satna at Satna

Untreated sewage water merging in River Narmada through Kandhari Nalla at Jabalpur

(Photo: Audit Team)

Government stated (August 2023) that the sewage treatment facility was under trial in six ULBs (ULBs Bhind, Bhopal, Jabalpur, Ratlam, Sagar and Vidisha), at O&M stage in three ULBs (ULBs Gwalior, Indore and Morena) and under construction stage in three ULBs (ULBs Mandleshwar, Satna and Shahdol).

Audit is of the opinion that the department needs to strengthen the monitoring mechanism for timely completion of projects to avoid further pollution of water bodies.

3.2.5 Non-Development of infrastructure for sewage management

According to section 2.2.2 to 2.2.4 of handbook of service level benchmarking issued by ministry of urban development of GOI, 100 *per cent* of the households, commercial, industrial and other institutions of the service area of body shall be covered by underground sewage network and 100 *per cent* sewage emitted under the service area of the local body shall be collected and treated.

Audit noticed that during the period 2017-22, sewage treatment facility was partially functional and was under trial run in the six ULBs[6], O&M stage in three ULBs[7] and construction was ongoing at three ULBs[8]. Sewage treatment facility was not available in remaining 22 ULBs (March 2023) and the generated sewage was merging eventually into the local water bodies

[6] Bhind, Bhopal, Jabalpur, Ratlam, Sagar and Vidisha.
[7] Gwalior, Indore and Morena.
[8] Mandleshwar, Satna and Shahdol.

through different open nalas. Thus, due to non-availability of sewage treatment facilities in ULBs, approximately total 2,09,726.13 ML **(Appendix 3.1)** of sewage had merged into water bodies through various nalas during 2017-22. Five such instances of sewage flowing through open nalas have been depicted in **Images 3.4 to 3.8.**

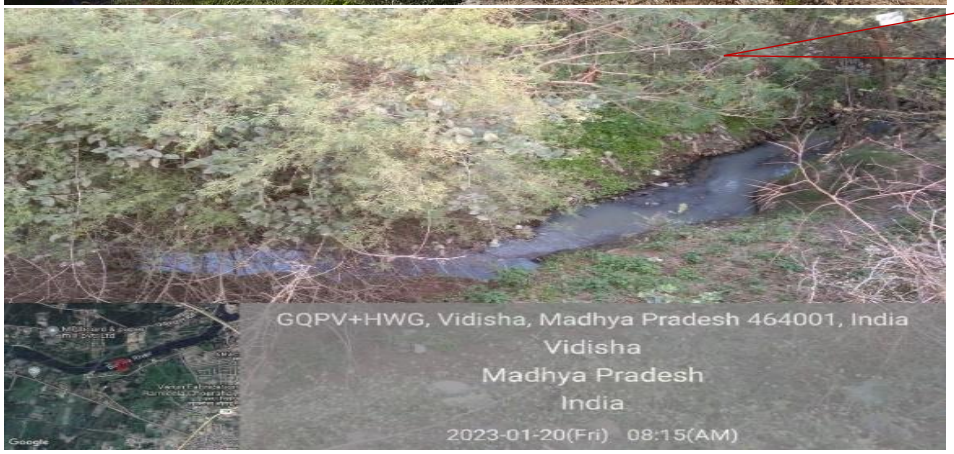
Image 3.4 to 3.8: Sewage flowing through open nalas

Umriha Taalab, Ward No. 10, Beohari

Sewerage flowing into Budi Talab, Balaghat

Shankar talkies nala merging in River Murna at Railway crossing Shahdol

Nala merging in Shivna River at Mandsaur



Chorghat nala merging in Betwa River at Vidisha

(Photo: Audit Team)

Government stated (August 2023) that in 22 ULBs, one STP is under trial in Shivpuri (PHE), LOA has been issued for sewerage project in Maihar and Sanchi under ADB scheme. In Betul, Damoh and Mandsaur ULBs sewerage projects have been proposed under AMRUT 2.0 and for remaining ULBs, projects have been proposed under SBM 2.0. In Vidisha, 22.25 MLD STP is operational since 2021. It was further stated that water quality testing report of river Betwa at Vidisha shows satisfactory results.

Reply is not convincing as it lacks timeline to prevent merging of untreated sewerage in water bodies. Further, in Vidisha due to non-connection of 100 *per cent* households and nallas with sewerage network, untreated water is merging in the river Betwa, which shows deficient planning.

3.2.6 Absence of mandatory provision for obtaining sewerage connection

Paragraph 2.11 of CPHEEO Manual, regarding Guidelines on house sewer connections envisages to:

- Amend the Municipal Byelaws to make it compulsory for the population to avail house service connection wherever public sewer is provided, otherwise, the local authority shall affect the house sewer connection and initiate revenue recovery proceedings.
- Include house-service sewer connections as part of the sewerage project itself.

ULBs had not made it mandatory for the households to take sewerage connection. Sewerage network and STPs have been constructed in nine out of total 34 ULBs. Out of these nine ULBs, household connections were not given adequate importance and number of connected households was very low in seven ULBs. At Mandleshwar, Satna and Shahdol sewage projects are under construction stage, while ULB Gwalior did not provide any information in this regard. Total households and connected households with sewerage line are detailed in **Table 3.3.**

Table 3.3: Details of connections obtained by households

S.N.	Name of ULBs	Date of completion of project	Total number of households as per DPR	Number of households connected to sewerage connection	Percentage of connection
1	Bhind	07/12/19	13,585	7,735	56.94
2	Bhopal (ADB Project)	04/05/20	60,921	8,798	14.44
3	Jabalpur	27/06/20	1,46,900	58,244	39.65
4	Morena	28/07/18	26,585	20,100	75.61
5	Ratlam	27/12/19	53,273	29,103	54.63
6	Sagar	06/07/19	60,173	4,738	7.87
7	Vidisha	19/04/19	26,000	14,028	53.95
	Total		**3,87,437**	**1,42,746**	**36.84**

(Source: Information provided by ULBs)

It would be seen from **Table 3.3** above that only 1,42,746 out of 3,87,437 households i.e. 36.84 *per cent* in these ULBs had taken sewerage connections. Thus, purpose of laying of sewerage line i.e. treatment and disposal of sewer water to save the water bodies and soil from pollution, was not achieved due to the failure of the ULBs to connect the residential sewer waste with the sewer network. Therefore, this may result in unabated flow of the pollutant in the soil and water bodies, defeating the very purpose for which this scheme was envisaged.

Government stated (August 2023) that it is mandatory for the contractor to do House Service Connection (HSC) wherever the sewer network is laid. ULBs Vidisha, Morena, Bhind and Bhopal (where sewerage projects has been completed) the revised HSC target given under AMRUT 1.0 has been fully achieved.

The reply is not convincing as even after stated completion of projects, all households as shown in the DPR have not been connected in ULBs Vidisha, Morena, Bhind and Bhopal, defeating the very purpose of the project.

3.2.7 Non-levy of user charges for sewerage service connection

Paragraph 2.2.8 of GoI's Handbook of Service Level Benchmarking (SLB) envisages that all operating costs should be recovered through a combination of user charges, fees and taxes, *etc*. Further, Urban Development and Housing Department (UDHD), GoMP had amended (September 2020) the Madhya Pradesh Municipality (User charges for Water supply, Sewerage and Solid Waste Management Services) Rules, 2020. Accordingly, fixation of user charges for Water Supply, Sewage and Solid Waste management services shall be done in such a manner so that annual expenditure incurred on the services can be recovered fully.

Audit, however, observed that nine ULBs[9] (where sewerage system is completed) did not implement orders for levy of user charges, fees, taxes, due to which the ULBs have to separately provide for the funds for maintenance of the existing sewage system, from their own limited resources.

The ULBs are already working with scare resources. Hence, non-levy of user charges will further impact development and maintenance of various other schemes.

Government stated (August 2023) that Government of Madhya Pradesh has issued Gazette no. 360 dated 28 September 2020 for the collection of user charges. It was further stated that adoption of this Gazette notification and implementation of user charges by ULBs is being pursued.

3.2.8 Lack of planning for use of treated wastewater

Method of treatment or disposal of sewage should be decided at the stage of preparing the detailed project report.

Audit scrutinized the DPR and noticed in ULBs, Bhopal, Indore, Morena and Vidisha that the sewerage schemes were prepared to protect the water bodies of ULBs and use of treated water for the purpose of agriculture, gardening, washing of roads, *etc*. Further, the treated and untreated sewage of these ULBs were being discharged into the local drains by the ULB itself as shown in Images **3. 9 to 3.14**.

Image 3.9 and 3.10: Treated water of Char Imli STP discharged in *Panchsheel Nala* by ULB, Bhopal

(Photo: Audit Team)

[9] Bhind, Bhopal, Gwalior, Indore, Jabalpur, Morena, Ratlam, Sagar and Vidisha.

Image 3.11 and 3.12: Treated water of Shirin River STP discharged in Upper Lake by ULB, Bhopal

(Photo: Audit Team)

Image 3.13 and 3.14: Treated water of STP discharged in Sarswati River, Indore and Nala No.1, Morena which finally merges into the Quwanri River at Morena

(Photo: Audit Team)

Government stated (August 2023) that treated effulent from STP is reused in Agriculture and Horticulture if they are in closed proximity to parks and fields. STP at Char Imli and Shirin in Bhopal are located within the city and due to lack of reuse possibilities most of treated effulent is discharged in water bodies. But planning for their potential reuse is in process.

Reply is not tenable as all these schemes were prepared with the view to protect the nearby water bodies of the ULBs.

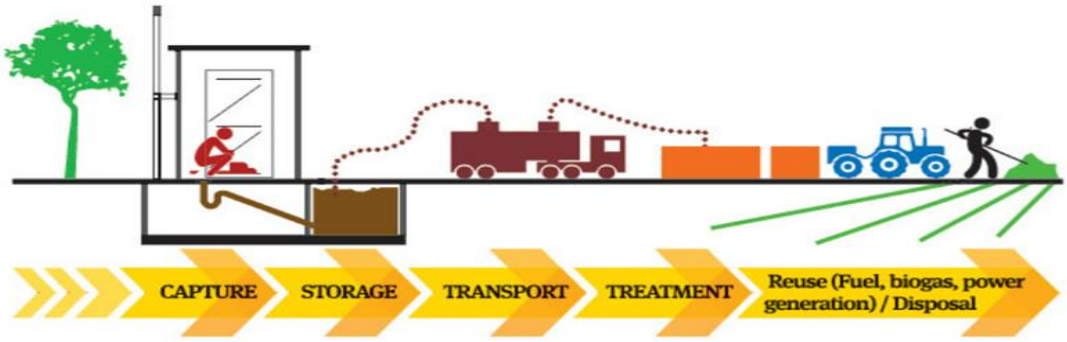
3.3 Faecal Sludge Management

Collection and treatment of sewage is the most integral part of sewage management. Audit scrutinised the issues relating to this aspect and found many deficiencies such as lack of training on cleaning of septage, preparation of manual of practice on septage management as well as proper strategy for faecal sludge and septage management, inadequate de-sludging of septic tanks/ collection of septage and non-functional Faecal Sludge Treatment Plant. These have been discussed below:

Faecal Sludge is raw or partially digested, in slurry or semisolid form, the collection, storage or treatment of combinations of excreta and black water, with or without grey water. It is the solid or settled contents of pit latrines and septic tanks. The effluents from the septic tank can be collected in a network of drains and/ or sewers and treated in a treatment plant designed appropriately. The accumulating sludge at the bottom of the septic tanks, however, must be removed also and treated once it has reached the designed depth or at the end of the designed

de-sludging frequency whichever occurs earlier. However, such a removal is possible only by vacuum emptier trucks. Procedure of collection and treatment of faecal sludge is depicted in the following **Image 3.15**:

Image 3.15: The procedure of collection, transportation and treatment



(Source: Ministry of Urban Development, GoI)

The issue was checked at ULB level through various aspects, i.e., strategy for Faecal Sludge and Septage Management (FSSM), collection, transport, treatment, monitoring of faecal sludge generation and disposal, *etc*.

Findings on above are discussed in detail in succeeding Paragraphs:

(a) Lack of proper strategy for Faecal Sludge and Septage Management in ULBs

GoMP State Level Policy (2017) for Wastewater Recycle and Reuse and FSSM states that prime responsibility for installing and operating a sanitation service lies with the individual Municipal Bodies. Each Municipal Government should determine its own policy for a sanitation service at the micro level within the framework of the guidelines established in the macro policy formulated by the State Government.

Audit observed that out of selected 34 ULBs, only Indore had prepared FSSM Policy, 26 ULBs[10] had not prepared any FSSM Policy. ULBs, Maihar, Nalkheda, Pichhore, Shivpuri, Uchehara did not offer any specific reply while ULBs, Bhopal and Satna did not provide any information in this regard. Thus there is lack of proper strategy for safe disposal of septage under jurisdiction of these ULBs.

The ULBs had accepted the facts of non-preparation of FSSM policy, however, the replies of ULBs do not account for not formulating the Policy for a sanitation service at the micro level. Further, no strategy for safe disposal was formulated in the ULBs.

Government stated (August 2023) that the State has drafted an FSSM policy which is in process of approval and will be launched soon.

(b) Non-functional Faecal Sludge Treatment Plant

Faecal Sludge Management (FSM) is the collection, transport and treatment of faecal sludge from pit latrines, septic tanks or other sanitation system. FSM is necessary in densely populated

[10] Akodia, Balaghat, Barghat, Betul, Beohari, Bhind, Damoh, Dhar, Gwalior, Jabalpur, Kareli, Khirkiya, Kukshi, Morena, Mandsaur, Malanpur, Mandleshwar, Niwari, Orchha, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Shahdol and Vidisha.

area where a part of the population is not connected to a sewerage network, and covering and rebuilding of pit latrines is not possible.

Faecal Sludge Treatment Plant (FSTP) is a vermi filtration based comprehensive and sustainable technological solution developed to manage faecal sludge effectively. FSTP can separate solid and liquid wastes to convert them into vermi compost and water for non-potable uses such as gardening, flushing and farming with appropriate treatment.

Audit had test checked the records of 34 ULBs, out of these, FSTPs were functional in 10 ULBs[11] and in 14 ULBs[12] FSTP were not functional though an expenditure of ₹ 1.06 crore **(Appendix 3.2)** had been incurred during 2017-22 on construction of these FSTPs, while FSTPs were under construction stage at Barghat, Niwari and Pichhore and FSTPs are not required at Indore, Bhopal and Vidisha, while Gwalior, Jabalpur, Ratlam and Sagar did not provided any information. Hence, expenditure incurred on these FSTPs could not be utilised for converting sludge into useful products such as vermi-compost and non-potable water. Two examples of non-functional FSTPs are depicted in Images below:

Image 3.16 and 3.17: Non-functional FSTPs

Non-functional FSTP at Dhar ULB

Non-functional FSTP at Akodia ULB

(Photo: Audit Team)

Government stated (August 2023) that as per the guidelines issued by MoHUA under SBM for ODF+/ODF++ certification for any ULB to be certified as ODF++, functional treatment plant are mandatory. On the same line, out of these 34 ULBs inspected, 31 ULBs have been certified as ODF++ or higher by the MoHUA vide third party based validation and field inspection.

[11] Balaghat, Betul, Damoh, Khirkiya, Mandleshwar, Morena, Nalkheda, Piplanarayanwar, Satna and Shivpuri.

[12] Akodia, Beohari, Bhind, Dhar, Kareli, Kukshi, Maihar, Malanpur, Mandsaur, Orchha, Polaykalan, Sanchi, Shahdol, and Uchehara.

However, the reply does not address the audit observation on the functionality of FSTPs.

(c) Training on cleaning of septage and preparation of manual of practice on septage management

Paragraph 9.2 of advisory note on Septage Management in Urban India, issued (January 2013) by Ministry of Urban Development, GoI, states that it is obligatory on the part of every local body to collect, transport and properly dispose of septage as well as sewage generated in the area under their respective jurisdictions. This required training on matters like technical, financial, regulatory, field visit, monitoring and evaluation, *etc*. to achieve this objective. Further, paragraph 5.3 of this advisory note states that it is best that a Manual of Practices for septage be prepared by the septage program managers by reviewing the operating procedures for specific equipment and then documenting all aspects of the day-to-day procedures like (a) scheduling and routing for trucks (b) locating tanks and cleanouts (c) proper pumping equipment operation and worker safety (d) site control, including post-pumping clean-up (e) disposal procedures at the treatment facility (h) recordkeeping for all tanks pumped and wastes discharged at the disposal facility. Manual of Practices was an important document to provide guidance for the equipment operators and for new employees.

Audit noticed that during the last five years neither training programmes for cleaning of septage was arranged nor a Manual of Practices on septage management was prepared by the 33 out of 34 test checked units while ULB, Bhopal did not furnish any information in this regard.

In reply, 33 ULBs admitted that no training programme for labourers engaged in septage management was imparted/ or, organized during last five years and, Manual of Practices was also not prepared.

3.4 Monitoring and Quality Control

Audit scrutinised monitoring and quality control under the sewerage management and found out that SLB cell not constituted, absence of mechanism for complaint redressal, non-testing of major parameters at STPs, *etc*, were observed inadequacies in issues, these have been discussed below:

3.4.1 Absence of Complaint Redressal mechanism for complaints relating to sewage

Section 2.2.7 of the Handbook on Service Level Benchmark issued by Ministry of Urban Development, GoI states that, systems for receiving and logging in-complaints should be effective and easily accessible to the citizens. Points of customer contact should include common phone numbers, written complaints at ward offices, collection centres, drop boxes, online complaints on the website, *etc*. Further, in cases of satisfactory resolution of sewage related complaints, a satisfactory resolution of the compliant duly endorsed by the person making the compliant in a format or proforma should be used to track complaints.

Audit noticed that no complaint redressal mechanism was been established in six ULBs[13] out of nine ULBs having a sewerage system.

On being pointed out no specific reply was provided to audit.

3.4.2 Exaggeration of SLB (Service Level Benchmark) targets to show better performance

- **Coverage of sewage network**

As per paragraph 2.2.2 of SLB Handbook, this indicator denotes the extent to which the underground sewerage network has reached out to individual properties across the service area. The benchmark value for this indicator was 100 *per cent*.

Audit noticed that in two out of nine ULBs (where sewerage network completed) the 100 *per cent* households were not connected with sewer network, but they have shown 95 to 100 *per cent* achievement against this indicator (as of March 2022).

Table 3.4: Details of connections obtained by households

S.N.	Name of ULBs	Total number of households as per DPR	Number of households connected to sewerage connection	Percentage of connection	Percentage of achievement as per SLB
1	Vidisha	26,000	14,028	53.95	95
2	Indore	4,77,421	4,74,826	99.56	100

Thus, the achievement of performance indicator as shown by the above ULBs were incorrect and the exaggerated achievement was shown to show the better performance.

Government stated (August 2023) that comprehensive DPRs were made for covering 100 *per cent* HSC within the city under its sewerage project. But due to fund constraints, phase wise implementation was done under AMRUT 1.0. Leftover network will be taken up under AMRUT 2.0 to achieve 100 *per cent* coverage.

- **Efficiency in collection of sewage charges**

Paragraph 2.2.9 of SLB handbook indicates the efficiency in collection is defined as current year revenues collected, expressed as a percentage of the total operating revenues, for the corresponding time period. The benchmark value for this indicator was 50 *per cent*.

Audit noticed that two ULBs had not levied sewerage charges yet, but achievement in this regard was shown ranging 20 to 50 *per cent* **(Table 3.5)**. Thus, the reported efficiency in collection as detailed below, was not only incorrect but also misleading. :

Table 3.5: Details of connections obtained by households

S.N.	Name of ULBs	Total number of households as per DPR	Number of households connected to sewerage connection	Percentage of achievement for user charges
1	Indore	4,77,421	4,74,826	50
2	Vidisha	26,000	14,028	20

(Source: ULBs)

[13] Gwalior, Jabalpur, Morena, Ratlam, Sagar and Vidisha.

Government stated (August 2023) that Government of Madhya Pradesh has issued Gazette no. 360 dated 28 September 2020 for the collection of user charges. Adoption of this Gazette notification and implementation of user charges by ULBs is being pursued.

However, the reply of the Government is silent about the incorrect data of achievement shown.

3.4.3 Online Continuous Effluent Monitoring Systems was not installed at STPs

As per Section 33 A of the Water (Prevention & Control of Pollution) Act, 1974, MPPCB had issued following directions for strengthening the monitoring mechanism for effective compliance through self-regulatory mechanism:

- All the STPs being operated in Million Plus Cities and remaining cities/ towns by Indore Nagar Nigam, Municipalities or the concerned body in the State shall install Online Continuous Effluent Monitoring Systems (OCEMS) for the parameters namely pH, TSS, BOD, COD before 31 January 2021 and for remaining Cities it was to be installed before 31 July 2021.
- The STP operating authority shall connect and upload the online effluent monitoring data with the servers of the MPPCB at Environment Surveillance Centre (ESC) at Bhopal in a time bound manner but not later than timelines as mentioned above and shall ensure regular maintenance and operation of the OCEMS with temper proof mechanism with facilities for calibration.

On the basis of above-mentioned direction issued by the MPPCB, the eligible ULBs were required to install OCEMS at STPs coming under their jurisdiction before 31 January 2021. During the Joint Physical Verification of STPs in three ULBs[14], the OCEMS were not found installed at 10 STPs which was in violation of MPPCB directions.

Government stated (August 2023) that installation is complete for 19 out of 39 STPs and work awarded for 15 STPs in ULBs Indore, Gwalior and Morena.

3.4.4 Non-use of Sulphur resistant pipes sewage

Note 10 of Chapter-12 of the Integrated Standard Schedule of Rate (ISSR) of UADD provides that, sulphur resistant cement should be used for manufacture of RCC Pipes used in sewerage works. Chapter 3 of CPHEEO Manual for Sewerage Engineering also provides for use of Sulphate resistant pipes in sewage network.

Audit noticed that, in five ULBs[15], sulphur resistant RCC pipes (NP-2, NP-3 and NP-4) were not found used. Non-use of sulphur resistance pipes could result in depletion of pipes at a higher pace, thereby shortening the life of entire project.

Government stated (August 2023) that use of Sulphide-resistant pipes will be mandatory in upcoming AMRUT 2.0 projects.

[14] Gwalior (4), Indore (5), and Morena (1).
[15] Bhopal, Jabalpur, Morena, Ratlam, and Vidisha.

3.5 Programme Implementation

Audit scrutinised records relating to various Sewerage Projects and found instances of excess payments, extra cost, irregularities in execution of works and other deficiencies in maintaining records. A few such instances are highlighted in **Table 3.6.**

Table 3.6: Irregularities in implementation of Sewerage Projects

S.N.	Brief of Observation	Amount (₹ in crore)	Audit Comments
1	Excess/ inadmissible payment of GST	15.45	Clause 25.1 of section 3, Part-1 - conditions of contract under General conditions of contract (GCC) provides that 'the rate quoted by the contractor shall be deemed to be inclusive of the sales and other levies, duties, cess, toll, taxes of central and State government, local bodies and authorities. Further, the clause 25.3 provides that 'Any changes in the taxes due to change in legislation or for any other reason shall not be payable to the contractor'. Therefore, no additional payment on account of taxes including GST was to be paid to the contractor. Audit, however, observed that in Nagar Nigam Morena, an amount of ₹ 15.45 crore was additionally paid against above contractual provisions to the contractor towards GST component @12 *per cent* on the value of work done[16] after 1 July 2017 (effective date of GST). This additional payment of GST was over and above the payment due for the work as per agreement. This has resulted in excess payment of ₹ 15.45 crore to the contractor. Government stated (August 2023) that through letter no. F1-22/2015/18-3 dated 05 April 2015 it has authorised Mayor-in-Council (MIC) to take decision regarding AMRUT scheme. Hence MIC of ULB Morena authorised ULB through Resolution no. 77 dated 15 November 2019 to pay 12 *per cent* GST from Municipal Fund. Reply is not acceptable as no explanation was provided w.r.t the audit observation on account of admissibility of separate payment towards GST for works taken prior to the implementation of GST. Further, the resolution No. 77 dated 15 November 2019 of MIC Morena has not explicitly approved for such a payment, which was in fact not due to the contractor.
2	Excess payment due to short accounting of previous payment in Running Bill	4.88	To calculate the actual value of work done in current running bill, value of previous bill should be mentioned correctly on the bill. Audit noticed that in three works the value of work done of previous work was incorrectly carried forward in next bill, which has resulted in excess payment of ₹ 4.88 crore[17] to the contractors. The ULB, Bhind stated that the said amount has been removed from the 17th RA Bill. ULB Gwalior had not submitted any reply and the ULB,

[16] The estimated value of work considered for computation was based on the rate of ISSR, 2012 i.e. prior to implementation of GST.

[17]

S.N.	Name of ULB	PAC (₹ in crore)	Actual value of work done as per previous bill		Upto date value of work done taken in next bill		Excess payment (in ₹)
			Bill No.	Value (in ₹)	Bill No.	Value (in ₹)	
1	Bhind	70.80	17th	80,63,25,009	18th	76,48,72,900	4,14,52,109
2	Gwalior (Murar)	204.90	18th	1,53,43,65,383	19th	1,52,88,74,851	54,90,532
3	Morena	125	7th	22,48,11,109	8th	22,30,03,253	18,07,856
							4,87,50,497

S.N.	Brief of Observation	Amount (₹ in crore)	Audit Comments
			Morena stated that after verification of records excess will be recovered/ adjusted. Government stated (August 2023) that short accounting of previous payment in running bill will be corrected after reconciliation.
3	Irregularities in road restoration work	14.39	As per section 2 of Instructions to bidders contained in the Agreement for the work of laying of sewerage network, the contractor was required to reconstruct roads to its original conditions. Audit had noticed the following irregularities in road restoration work: **(a)** According to item 6.2 (Dry Lean Concrete -DLC) of Integrated Standard Schedule of Rate (ISSR) (Vol-III 2012) for Roads and Bridges published by UADD, an amount of ₹ 319 per cum, ₹ 329 per cum and ₹ 335 per cum in execution of M: 20, M: 30 and M:40 pavement quality concrete respectively and ₹ 190 per cum in DLC were recoverable if electronic sensor paver is not used during laying and compaction. Further, for execution of item 4.1 Granular Sub Base (GSB), 4.2 and 4.3 Water Bound Macadam (WBM) of ISSR, if motor grader and vibratory roller is not used in the work, deduction at the rate of ₹ 51 per cum shall be made. In 12 sewerage projects of eight ULBs, contractors had executed DLC, M:20, M:30, M40 Pavement Quality Concrete (PQC), GSB and WBM without using required electric sensor paver/ vibratory roller/ motor grader in road restoration works but full amount were released. This not only resulted in poor restoration works but also resulted in excess payment of ₹ 14.39 crore to the contractors, as detailed in **Appendix 3.3.** ULB Morena stated that all the necessary machinery were used in the project hence no recovery is required. The ULB, Indore stated that non-use of specific machinery will be scrutinized and deduction will be made in final bills. The ULB, Bhind accepted the audit observation and replied that necessary recovery will be made in final bill of contractor. The ULB, Bhopal stated that the use of machinery had been done with the approval of competent authorities. Reply of ULB Bhopal and Morena is not convincing as operation of required essential machinery was not possible in the narrow width of pipe trenches.
		6.35	**(b)** In ULB Gwalior, the work of construction of comprehensive Sewerage Project System in Lashkar was awarded to M/s Envirad Projects Pvt. Ltd. for ₹ 173.32 crore against the estimated cost of ₹ 195.11 crore The work order to commence the work was issued on 04 October 2017 to complete the work within stipulated period of 24 months i.e. 03 October 2019. Work is incomplete and payment of ₹ 177.84 crore was made to the contractor. Similarly, the Sewerage Project work of Morar was awarded to M/s Jyanti Super Construction Pvt. Ltd. for ₹ 207.96 crore against the estimated cost of ₹ 204.90 crore The work order to commence the work was issued on 25 September 2017 to complete the work within stipulated period of 24 months i.e. 24 September 2019. Work was completed on 31 March 2022 and payment of ₹ 177.87 crore was made to the contractor. Audit noticed that in both the projects, the items of road restoration were derived in per Sqm. At the time of execution of work, the contractor had executed these items in lesser thickness, in compared to estimates, but payment at full rate was made to the contractor. Thus, execution of work in lesser thickness had resulted in excess payment of ₹ 6.35 crore, as detailed in **Appendix 3.4.**

S.N.	Brief of Observation	Amount (₹ in crore)	Audit Comments
			Government stated (August 2023) that payment of road restoration items will be reconciled after final measurement.
		1.03	**(c)** In ULB Sagar, the work of construction of Sewerage Project System was awarded to M/s Lakshmi Civil and Khilari Infrastructure, Kolhapur for ₹ 299.10 crore against the estimated cost of ₹ 282.61 crore. The work order to commence the work was issued on 08 July 2016 to complete the work within stipulated period of 36 months i.e. 06 July 2019. Work was in progress and payment of ₹ 247.22 crore was made to the contractor. Audit noticed that in above project the road restoration works was initially proposed with items of Chapter-6 of ISSR 2012 for Road and Bridge work. In DPR item No. 6.3 of M-40 Cement Concrete at the rate of ₹ 4,792 per cum was proposed, but road restoration work was executed with M-20 concrete for which payment under item 15.18a (iii) (item for bridge work) at the rate of ₹ 4,778 in place of item no. 6.11 of ISSR at the rate of ₹ 4,557 cum was made. Thus, incorrect application of item resulted in excess payment of ₹ 1.03 crore[18]. Government stated (August 2023) that payments of road restoration are done after approval of competent authority. Reply is not acceptable as incorrect item was paid to the contractor.
		0.67	**(d)** In road restoration work of sewerage network of Lashkar area in the ULB Gwalior, the items for road restoration work was proposed as a clubbed item by including the works of Bituminous Macadam (BM), Bituminous Concrete and Seal Coat @ ₹ 1,487 per sqm. Audit noticed that the Contractor did not execute the item 'Seal Coat', despite that full payment was made to the contractor by the ULB, Gwalior. Thus, payment of ₹ 0.42 crore {(81,116.05x58) less 11.165 *per cent*} was made for the work not done by him. Similarly, in road restoration work of sewerage network of Morar (Gwalior), the item of seal coat was not executed by the contractor, but payment at full rate was made by the ULB, Gwalior. This resulted in excess payment of ₹ 0.25 crore {(42,681.84x58) plus 1.50 *per cent*} on account of work not done. Government stated (August 2023) that payment of road restoration items will be reconciled after final measurement.
		7.34	**(e)** In ULB Vidisha, the work of construction of Sewerage Project System was awarded to M/s Ankita Construction for ₹ 91.00 crore. against the estimated cost of ₹ 85.20 crore The work order to commence the work was issued on 20 April 2017 to complete the work within stipulated period of 24 months i.e. 19 April 2019. Work was in progress and payment of ₹ 89.03 crore was made to the contractor up to 27th R.Bill. Audit noticed that, an amount of ₹ 2.27 crore was paid to the contractor for transportation of 3,35,753.55 cum earth (from working area to dump site and back) as an extra item to ensure public convenience during execution of work. However, the payment for this item was not in accordance with Clause 17.2 of contract, which provided that the Contractor was responsible for all the arrangements to carry out the work with minimum possible public inconvenience. Further, as per Notice Inviting Tender (NIT) the Contractor had to visit the site before

[18] Executed quantity 41,490 cum, excess payment = 1,02,69,605{41,490 x221(4,778-4557)}+12%(GST)

S.N.	Brief of Observation	Amount (₹ in crore)	Audit Comments
			quoting his offer, so that he gets aware with the site condition. Thus, the payment of ₹ 2.27 crore to the contractor was for item already covered under contractual obligations, resulting in excess payment. Similarly, in three projects of ULB, Bhopal, an amount of ₹ 5.07 crore (**Appendix 3.5**) was paid to the contractors for transportation of 4,37,458.60 cum earth to ensure public convenience during the work. Government stated (August 2023) that due to densely populated area, excavated earth was transported and brought back to avoid public inconvenience. Reply was not acceptable as contractor was required to be aware of the working condition and was to quote the rate accordingly.
		5.52	**(f)** Department of Mining vide its order dated 04 March 2016 has issued direction for deduction of royalty, for the materials consumed in the works, from the bills of contractors and to deposit the same to the treasury on quarterly basis. In three contracts (**Appendix 3.6**) in ULBs - Indore, Gwalior and Morena, no deduction on account of royalty charges towards utilisation of sand and metal was made from contractor's running bills. This had resulted in undue financial advantage of ₹ 5.52 crore to the Contractors. Government stated (August 2023) that in ULB Indore royalty charges will be deducted in the final bill of the contractor and in ULB Gwalior and Morena royalty charges will be deducted after final measurement.
		134.98	**(g)** As per Clause 15.1 of the GCC, the time allowed for carrying out the work shall be strictly observed by the contractor. Failure of the contractor to adhere to the timelines and/ or milestones shall also attract such liquidated damage (LD) at the rate of 0.5 *per cent* per day. In nine works of seven ULBs, the Contractors had failed to achieve milestones within the scheduled period. Due to the delay in completion of the works, the sewage treatment was consequentially delayed. Further, against the leviable maximum penalty of ₹ 134.98 crore (**Appendix 3.7**) for such abnormal delay, no action was initiated by ULBs. Government stated (August 2023) that LD is levied for completed projects (Gwalior, Indore and Morena) as per contract agreement and LD on ongoing projects will be imposed at the time of finalisation of work. Satna sewerage project is terminated and Bank Guarantee (BG) of contractor was forfeited. However audit observed that order regarding imposition of penalty in terms of contract (for completed projects) was not produced to audit.
		4.15	**(h)** According to Clause 9 of Section 3 - Special Condition of Contract - all useful materials like hard rock excavated by the contractor at site shall be the property of employer and shall be issued to the contractor at the issue rate of ₹ 200/cum. It shall be binding on the contractor to use it as rubble, metal aggregate, *etc.* after breaking into the required size for concrete work and as directed by the engineer. In four works of two ULBs, though the Contractor had excavated 2,29,296.33 cum of hard rock, but recovery as per terms of contract was not made. This had resulted in undue financial aid of ₹ 4.15 crore (**Appendix 3.8**) to the Contractors. Government stated (August 2023) that applicable amount will be deducted in the succeeding/ final bills of contractor.

S.N.	Brief of Observation	Amount (₹ in crore)	Audit Comments
		Nil	**(i)** The work of Sewerage Project of the ULB, Satna was awarded to a firm (M/s KK Span Pvt. Ltd.) at a cost of ₹ 191.56 crore. The work order was issued (05 December 2016) to complete the work within 36 months including rainy season *i.e.*, up to 04 December 2019. However, due to slow progress and execution of substandard work, the Contract was foreclosed on 06 April 2021. Up to the date of termination of the Contract the contractor was already paid an amount of ₹ 39.36 crore upto his 22nd RA Bill paid on 28 May 2021. Out of ₹ 39.36 crore, ₹ 11.52 crore was made for road restoration works. Audit noticed that while finalising the incomplete final bill of the contractor 50 *per cent* of the amount already paid to the contractor for road restoration works amounting to ₹ 5.76 crore was proposed to be deducted due to execution of substandard work. This deduction on account of sub-standard work at the time of finalising the incomplete final bill, shows laxity on the part of the departmental officials who failed to notice the sub-standard work till the payment of 22nd RA bill to the contractor. Government stated (August 2023) that since contract is terminated, the works executed by the contractor was re-measured during preparation of final bill with deduction of ₹ 5.76 crore. Reply is not acceptable as the quality of work was to be ensured by the departmental officials before making payments and in this case the substandard work was noticed after payment of 22nd RA Bill.
4	Excess payment on account of barricading in pipeline work	5.73	According to Clause 1.7 of Chapter-2 of Contract- During the progress of work, till filling of the trenches after pipes are laid and jointed, the lighting, barricading, guarding of the trenches and the maintenance of watchman shall be done by the contractor at his own cost. In ULB Morena, the work of construction of Sewerage Project System was awarded to M/s Standard Infratech India Pvt. Ltd. Hyderabad for ₹ 128.07 crore against the estimated cost of ₹ 125 crore. The work order to commence the work was issued on 12 July 2016 to complete the work within stipulated period of 24 months i.e. 11 July 2018. Work was completed and payment of ₹ 154.96 crore was made to the contractor vide 28th and pre-final bill. Audit noticed that an amount of ₹ 5.73 crore was paid for barricading 1,57,985 running meters of sewer lines (at the rate of ₹ 363.30 per running meter including tender percentage i.e., 2.456 per cent above), as an extra item which was not payable being incidental to work. This has resulted in excess payment of ₹ 5.73 crore. Government stated (August 2023) that final bill of contractor is pending. The case will be re-examined and in case of excess payment, amount will be recovered.
5	Excess payment to contractor in construction of STP resulted in locking of fund	2.78	In Vidisha ULB, the scope of work of sewerage project included construction of three STPs of 6.75 MLD (Near *Haripura Peria nala*), 7.75 MLD (Near Arihant Colony) and 7.75 MLD (Near Gaushala) at a total cost of ₹ 17.81 crore (as per price breakup schedule). Audit noticed that the scope of work was changed during execution, and one STP of 22.25 MLD was constructed in place of the proposed three STPs. Although, Department was aware of the fact of one STP in lieu of three STPs, cost difference in construction was not calculated/ adjusted (₹ 2.78 crore). The contractor was paid ₹ 18.07 crore (March 2021) on account construction of one STP and only ₹ 46.27 lakh was recovered instead of ₹ 3.24 crore. The ULB stated (March 2023) that the entire cost difference would be recovered in the final bill. Thus, the lack of prudence by the ULB resulted in excess payment of ₹ 2.78 crore to the contractor and locking of funds for more than two years. Hence, responsibility is to be fixed against the erring officials.

S.N.	Brief of Observation	Amount (₹ in crore)	Audit Comments
			Government stated (August 2023) that there is no provision for deduction of interest in contract agreement. Reply is not tenable as excess payment to the contractor had provided liquidity to the contractor to that extent. Hence interest on objected amount should be recovered and suitable action should be taken against the responsible officials.
6	Excess payment due to transportation of excess quantity of excavated material	0.82	Audit noticed that in Sewage Project of the ULB, Morena, the contractor had dismantled 1,50,847 cum quantity of existing flexible pavement, structure and concrete pavement for laying of sewerage pipeline. However, payment for transportation was made for 2,29,616 cum for a lead up to 5 km. Thus, payment for transportation in excess of quantity actually dismantled had resulted in excess payment of ₹ 0.82 crore (78,769 x 104.51) to the contractor. Government stated (August 2023) that the work was executed as per site requirement. Reply is not tenable as quantity of transported material was in excess of the quantity of dismantled material.
7	Excess payment on account of filling	0.36	In Sewage Project of the ULB, Morena, the contractor had excavated the 4,96,817.43 cum quantity of earth for trenches required for laying of pipes, which was refilled using 5,56,330 cum of earth (item 2.25 of Building ISSR). Thus, quantity refilled was in excess by 59,512.57 cum. Payment for filling quantity more than the quantity excavated had resulted in excess payment of ₹ 0.36 crore (59512.562x60.45) to the contractor. Government stated (August 2023) that the work was executed as per site requirement. Reply is not tenable as the quantity of refilling was in excess of the quantity excavated from trenches.
8	Irregular inclusion of maintenance cost in the operation and maintenance (O&M) for Defect Liability Period	-----	According to the provisions of the contract for sewerage works after successful completion of the project the contractor had to do O&M for a period of 10 years. Out of these 10 years the period first five years was the defect liability period, wherein the entire responsibility of all repair and maintenance was of the contractor. Audit noticed that, the ULB, Sagar had awarded the work of construction of sewage network to a firm (M/s Laxmi Civil and Khilari Infrastructure, Kolhapur) and provision for maintenance for civil works at the rate of ₹ 33.28 lakh per year, maintenance of pipelines at the rate of ₹ 74.73 lakh per year and maintenance of pumping stations of STP at the rate of ₹ 193.90 lakh per year for initial five years was also made in Agreement, which was irregular as first five years was defect liability period and all the repair and maintenance was to be carried out by contractor at his cost. This could lead to undue financial aid of ₹ 15.09 crore (33.28 lakh*5+74.73 lakh*5+193.90 lakh*5) to the Contractor if paid in future according to the provisions of DPR. Government stated (August 2023) that the construction work is not completed. Therefore, the work of O&M not started yet. Reply is not tenable as suitable amendments should be made by the Department in payment schedule of the contractor.
9	Irregular payment on account of filling foundation	0.94	Work of Sewage project of Kolar area under the jurisdiction of the ULB, Bhopal was awarded to M/s Ankita Construction Co. Audit noticed that the contractor had claimed an extra item (item no. 2.27.3 of ISSR) for filling foundation work in construction of Sewerage network and STP in South Zone-3 of above project. Further, the PDMC, WAPCOS Ltd. (firm responsible for ensuring quality of work and endorsing the bills of the Contractor) had conducted the test of filling

S.N.	Brief of Observation	Amount (₹ in crore)	Audit Comments
			material and raised the objection regarding the rates (item no. 2.27.3 of ISSR @570-10% = 513) for the filling work because material used in filling work was sand mix soil instead of Moorum/ Hard Copra. WAPCOS also recorded that it appears that the material obtained from the excavation of the pipeline trenches had been used in the filling work. Despite the above objection by the PDMC, an amount of ₹ 1.14 crore (22,160.062 cum @ ₹ 513 = ₹ 1,13,68,399) was paid to the contractor towards filling-up the foundation. Thus in reference to the PDMC letter this payment is quite irregular as only carriage charges @ 87.70 per cum was only payable to the contractor. This has resulted in irregular payment of ₹ 94,24,246{22160 X(513-87.70)}to the contractor. Government stated (August 2023) that payment was done as per on site filling material. The reply is not acceptable as payment for ordinary excavated soil (and not moorum) was to be made as recommended by the consultant of the ULB.
10	Avoidable expenditure due to incorrect application of unit rate for the item "filling"	1.71	UADD had separate ISSR for Building works and Water supply, Sewerage and tube well works. Both ISSR has separate rates for works of 'Excavation of earth in all kinds of soil', and 'Filling by available excavated earth (excluding rock) in trenches'. The rate of the second item i.e., 'Filling available excavated earth in trenches…' is higher by ₹ 30 in the ISSR for building works, as detailed in **Appendix 3.9.** In the agreement of sewerage system of Morena Town, the rate of excavation was adopted from the ISSR of Water Supply and Sewerage and Tube Well works but item of filling was adopted from the ISSR of Building works (which is more by ₹ 30). Thus, adopting of higher rate item resulted in avoidable expenditure of ₹ 1.71 crore[19]. Government stated (August 2023) that refilling rate was taken from section-4 (Bill Of Quantity) of contract agreement. Reply is not acceptable as rate of the item of filling with excavated material as available in ISSR of Sewerage works of UADD was to be applied in the Agreement. Such provision of rates of other ISSR in the Agreement/ BOQ resulted in avoidable expenditure of ₹ 1.71 crore.
11	Not recording the detailed measurement of STP	537.17	According to paragraph 4.017 of MPWD Manual- the measurement Book is a most important record. It is the basis of all accounts of quantities of work done, purchase made and it must contain such a complete record of facts as to be conclusive evidence in court of law. The description of the work/ materials must be lucid, and such as to admit of easy identification and check. Scrutiny of the records revealed that in 11 works of seven ULBs, lump sum payment of ₹ 537.17 crore (**Appendix 3.10)** was made to the contractors for the work of construction of STPs for which detailed measurement as stated above was not maintained and cannot be vouchsafed by audit. Further, royalty chargeable on materials like metal, sand, *etc*. consumed on the work also could not to be ascertained. Government stated (August 2023) that measurement of STPs are recorded in register. Works are recorded in Measurement Book (MB) as per approved payment schedule.

19

Executed Quantity till 28th RA Bill (in cum)	Rate Payable rate as per ISSR of Sewerage i/c tender *per cent* (in cum)	Rate as per ISSR of Building i/c tender *per cent* (in cum)	Rate difference (in cum) (C-B)	Total excess payment (₹) (AxD)
A	B	C	D	E
5,56,330	29.71 (29+.71)	60.45 (59+1.45)	30.74	1,71,01,584

S.N.	Brief of Observation	Amount (₹ in crore)	Audit Comments
			Reply is not acceptable as during field audit no MB/Register of detailed measurement of STPs were produced to audit.
12	Improper adoption of rates for construction of STPs		Audit noticed that the rate of items for construction of STP was not provided in the ISSR of the UADD. In its absence, the ULBs or the PDMC arbitrarily adopted the rates available in SORs of different States/ Institutions for estimation of the cost of construction of STPs. Non-adoption of a uniform rate resulted in cost variation ranging from ₹ 0.73 crore to ₹ 2 crore per MLD in the various STP works as shown in **Appendix 3.10.** Government stated (August 2023) that estimates were prepared as per the prevailing ISSR and guidelines and tenders were floated. Reply is not tenable as there was no uniformity in rates adopted for the said work and for such similar works, rates of different SORs were adopted from other state arbitrarily.

3.6 Recommendations

Audit recommends that:

9. ULBs may prepare City Sanitation Plan in line with CPHEEO manual and ensure that all Municipal Corporation areas and all households are connected to the sewerage network.
10. GoMP may consider putting in place an institutional mechanism for ensuring coordination of all line departments in implementing sewage systems.
11. ULBs may ensure management of sewage accordingly and optimise the reuse of treated water and converting sludge into manure.
12. MPPCB may invariably ensure that OCEMS is installed at all STPs to ensure quality of sewage treatment.
13. Government may examine and fix responsibility for making excess/ irregular payments in contracts for works under sewerage projects and put in place a system to ensure adherence to the conditions of Contract and as per ISSR rates, before making final payments.

CHAPTER 4
SPECIAL WASTE

Chapter 4

Special waste

Special waste comprises of any solid waste or a combination of solid wastes that requires special handling and disposal because of its quantity, concentration, physical and chemical characteristics, or biological properties, to protect human health, as well as the environment and to exploit its potential for recycling.

Special waste mainly consists of plastic waste, e-waste, construction and demolition (C&D) waste, and bio-waste. Under special waste, three wastes i.e. plastic waste, e-waste, C&D waste have been selected for audit. The shortcomings in management of these three wastes are discussed in the succeeding paragraphs-

4.1 Plastic Waste

Today, plastic is present in almost everything, from our money to electronic appliances, and it is used across multiple sectors, including packaging, building, construction, transportation, industrial machinery and health among others. Plastic waste has numerous implications on the environment and health. Hence, the lack of sustainable plastic waste management (PWM) poses a serious threat to our environment and natural ecosystem globally.

As per the annual report of Central Pollution Control Board (CPCB) for the year 2019-20, estimated plastic waste generation in India (all 35 States/UTs), during the year 2019-20, was 34,69,780 MTPA[1] approximately. Further, the per capita plastic waste generation was almost doubled over the last five years (from 2015-16 to 2019-20). Percentage wise distribution of plastic waste generation in different States/UTs and per capita plastic waste generation during the year 2015-16 to 2019-20 is illustrated in **Charts 4.1 and 4.2**.

Chart 4.1: Percentage of plastic waste generated by States/ UTs of India

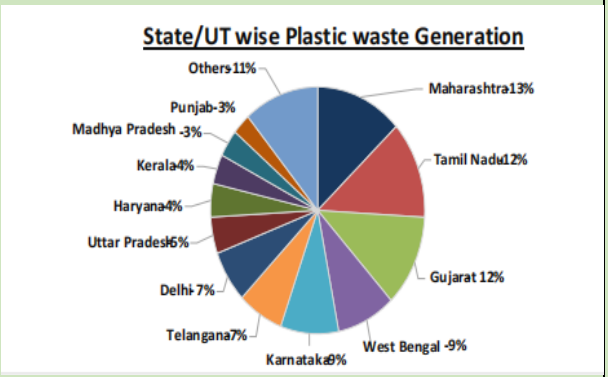
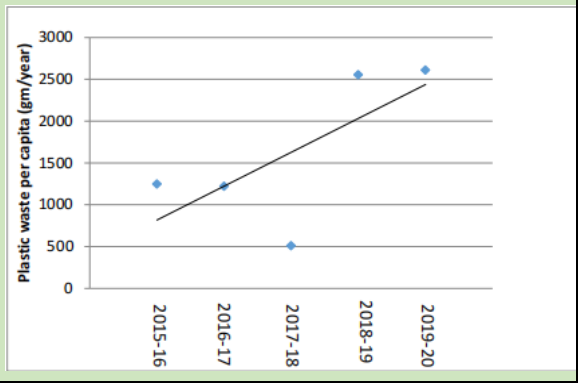


Chart 4.2: Per capita plastic waste generation during the year 2015-16 to 2019-20



(Source: Annual Report of CPCB on Plastic Waste Management for the year 2019-20)

The contribution of Madhya Pradesh in plastic generation, was only three *per cent* during the year 2019-20. The status of plastic waste generated and recycled in the Madhya Pradesh during the year 2017-22 is given in **Table 4.1**.

[1] Metric Tonnes Per Annum.

Table 4.1: Status of plastic waste generated and disposed in the Madhya Pradesh during the year 2017-22

(Qty. in MTPA)

S.N.	Year	Plastic waste generated	Plastic waste disposal (through recycling, co-processing, road construction, *etc*.)	Percentage of plastic waste recycled w.r.t plastic waste generated (in Percentage)	Plastic waste remained unrecycled
1	2017-18	61,037.00	48,155.26	78.89	12,881.74
2	2018-19	72,327.39	72,065.35	99.64	262.04
3	2019-20	1,21,079.00	1,16,898.00	96.55	4,181.00
4	2020-21	1,38,483.58	1,18,988.62	85.92	19,494.96
5	2021-22	1,32,955.40	2,85,902.10[2]	215.04	NIL

(Source: Reports of MPPCB submitted to CPCB)

From **Table 4.1**, it can be seen that generation of plastic waste has increased from 61,037 MTPA to 1,38,483.58 MTPA during the period from 2017-21 registering an increase of 226.88 *per cent* even after the introduction of Plastic Waste Management Rules, 2016. The generation of plastic waste, however, has slightly decreased during the year 2021-22 but still it was 217.83 *per cent* of the waste generated during the year 2017-18. Further, the percentage of plastic waste recycled was ranged between 78.89 to 99.64 *per cent* during the year 2017-18 to 2020-21.

Regulatory Framework for Management of Plastic Waste

Ministry of Environment, Forest and Climate Change (MoEFCC), GoI, notified (February 2011) the Plastic Waste (Management and Handling) Rules, 2011 (PW Rules, 2011). It was amended by the Plastic Waste Management Rules, 2016 (PWM Rules, 2016), as notified (18 March 2016) by Government of India. These rules were applicable to every waste generator, local body, manufacturer, importer and producer.

During the course of audit, Audit noticed deficiencies on various issues including non-compliances of PWM Rules, 2016 by the sampled ULBs on framing bye-laws, establishing plastic waste processing and disposal facilities, seeking assistance of producers in setting up of PWM system, prohibiting the usage of banned plastic, using plastic in construction of roads/ energy recovery and constitution of SLAC for PWM and working out of modalities for waste collection based on Extended Producer Responsibility. Audit also noticed some deficiencies in monitoring, required as per the PWM Rules, 2016. The shortcomings noticed by the Audit are discussed in the succeeding Paragraphs.

4.1.1 Preparation of bye-laws for management of plastic wastes, their waste processing and disposal facilities

As per rule 6 (4) of the PWM Rules, 2016, each Local Body (LB) was required to frame bye-laws for management of plastic waste incorporating the provisions of these Rules. Further, Rule 6 (1) of PWM Rules, 2016 stipulates that every LB shall be responsible for development and

[2] The data of plastic generation and disposal has been taken from the annual reports of MPPCB for the year 2016-17 to 2021-22, submitted to CPCB. In the Annual Report of MPPCB for the year 2021-22, the disposal of plastic waste (2,85,902.10 MTPA) was shown over and above the waste generation (1,32,955.40 MTPA) due to recycling of plastic waste collected by the local kabadies from the legacy waste sites.

setting up of infrastructure for segregation, collection, storage, transportation, processing and disposal of the plastic waste either on its own or by engaging agencies or producers.

Audit noticed that only three[3] out of total 34 test checked ULBs had prepared the bye-laws for management of plastic waste, however, no evidence had been produced by Dhar and Pichhore ULBs in this regard. Audit noticed that 26[4] ULBs had not prepared any bye-laws for the same whereas the remaining five[5] ULBs had not furnished any information with regard to framing of bye-laws. As a result-

- The ULBs could not implement the rules in efficient manner and the plastic waste generated in the ULBs was lying mixed with the municipal solid waste at landfill sites as shown in **Images 4.1 and 4.2**.

Images 4.1 and 4.2: Plastic waste found mixed with the municipal solid waste

Image 4.1: Plastic waste found mixed with other Municipal waste at landfill Site in Morena

Image 4.2: Plastic waste found mixed with other Municipal waste at landfill Site in Nalkheda

(Photo: Audit Team)

- The plastic waste was lying mixed with the other municipal waste at the landfill site. The animals were found consuming the waste that include the plastic waste as shown in **Images 4.3 to 4.6**.

Image 4.3 to 4.6: Plastic waste being consumed by animals

Image 4.3: Plastic waste was being consumed by animals at Shivpuri Landfill Site

Image 4.4: Plastic waste was being consumed by animals at Bhind Landfill Site

[3] Dhar, Indore and Pichhore.

[4] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Gwalior, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Shahdol, Uchehara and Vidisha.

[5] Bhind, Bhopal, Maihar, Shivpuri and Satna.

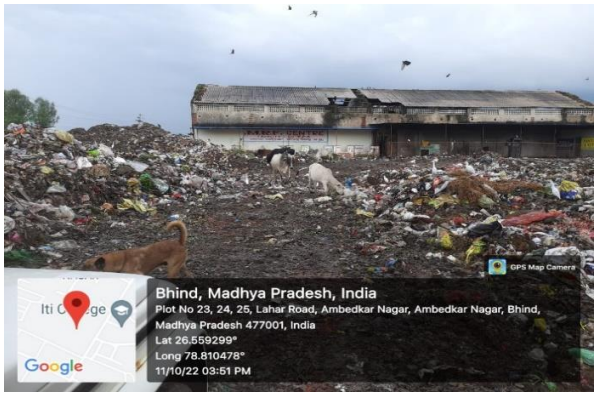


Image 4.5: Plastic waste was being consumed by animals at Bhind Landfill Site

Image 4.6: Plastic waste was being consumed by animals at Kukshi Landfill Site

(Photo: Audit Team)

- Audit further noticed that 26[6] ULBs had neither any processing and recycling/ disposal facilities for safe recycling/ disposal of plastic waste nor any agreement with the waste recycling agencies/ producers for recycling or disposal of plastic waste. Only five[7] ULBs had the recycling facilities but these ULBs had not provided any evidence with this regard and remaining three[8] ULBs had not furnished any reply in this regard. As a result, the huge quantity of un-recycled plastic waste was lying at waste processing site/ landfill site and near water bodies (**Images 4.7 to 4.12**) causing harms to human health and ecosystems.

Images 4.7 to 4.12: Unrecycled plastic waste found lying at processing /landfill sites and near water bodies

Image 4.7: Plastic Waste found lying dumped/unprocessed at Kareli landfill site

Image 4.8:Plastic Waste found lying dumped/unprocessed at Ratlam landfill site

[6] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Gwalior, Jabalpur, Kareli, Khirkiya, Kukshi, Mandsaur, Malanpur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Sagar, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

[7] Dhar, Indore, Mandleshwar, Ratlam and Satna.

[8] Bhind, Bhopal and Maihar.

Image 4.9 :Plastic waste lying dumped/unprocessed near water bodies at Damoh

Image 4.10: Plastic waste lying dumped/ unprocessed near water bodies at Shivpuri.

Image 4.11: Plastic waste lying dumped/unprocessed near water bodies at Ratlam

Image 4.12: Plastic waste lying dumped/ unprocessed near water bodies at Khirkiya (Harda)

(Photo: Audit Team)

The Government stated (August 2023) that all 34 ULBs had prepared their Municipal bye-laws on Municipal Solid Waste as per the Gazette Notification (No.05-F 1-02/2021/18-3) of Government of Madhya Pradesh, which also covered the provisions of plastic waste management. It was further stated that all 34 ULBs had Material Recovery Facilities (MRF) for segregation, collection and processing of dry waste in different compartments.

Reply is not acceptable as each ULB was required to frame bye-laws for management of plastic waste incorporating the provisions of PWM Rules. The Gazette Notification dated 22 March 2021 as referred in the reply, is of the plastic waste bye-laws of ULB Indore only while no evidence with regards to the bye-laws prepared by other 33 ULBs was furnished to substantiate the reply. Further, the reply is also not supported by any evidence on the existence of facilities for processing and recycling/ disposal or any agreement with the waste recycling agencies/ producers.

4.1.2 Non-registration of shopkeepers and street vendors willing to provide plastic carry bags

Rule 15 of PWM Rules, 2016 stipulates that:

- The shopkeepers and street vendors willing to provide plastic carry bags to customers for dispensing any commodity shall register with local body. The local body shall, within a period of six months from the date of final publication of the PWM Rules, 2016 shall make provisions for such registration on payment of plastic waste management fee determined by the concerned ULB;
- Only the registered shopkeepers or street vendors shall be eligible to provide plastic carry bags for dispensing the commodities; and
- The local body shall utilize the amount paid by the customers for the carry bags exclusively for the sustainability of the waste management system within their jurisdictions.

Audit noticed that the 29[9] ULBs did not have any system for registration of the shopkeepers and street vendors who were willing to provide plastic carry bags to the costumers to carry the commodities. This system was implemented only in Dhar ULB but no evidence was provided to audit whereas four[10] ULBs had not furnished any reply in this regard.

Thus, in the absence of such system, the ULBs not only lost their control over the shopkeepers and street vendors providing plastic carry bags to carry the commodities but also deprived themselves in recovery of plastic waste management fee from such shopkeepers and street vendors for utilising that for the sustainability of the waste management system within their jurisdictions.

The Government replied (August 2023) that all 34 ULBs were registered and created an account in Central Pollution Control Board (CPCB) Monitoring Module for compliance of Single Use Plastic (SUP). The entities of plastic waste are being added on the portal by the ULBs and over 1000 entities are already registered across the State and is a continuous process. The registered entities are allotted to the field Inspection Officer appointed by the ULB and the entity is being inspected as per latest norms of PWM.

Reply is not acceptable as all the shopkeepers and street vendors willing to provide plastic carry bags to customers for dispensing any commodity, were to be registered with ULBs as per rule 15 of PWM Rules 2016, within a period of six months from the date of final publication of the Rules. Further, the stated registration of entities is being done only after operationalisation (February 2022) of CPCB portal.

4.1.3 Not seeking assistance of producers in setting up of system for PWM

Rule 6 (3) of PWM Rules, 2016, stipulates that the local body shall seek assistance of producers for setting up of system for plastic waste management and such system shall be set up within one year from the date of final publication of these Rules in the Official Gazette of India.

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[9] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Gwalior, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Satna, Shahdol, Shivpuri, Uchehara and Vidisha.

[10] Bhind, Bhopal, Indore and Maihar.

Audit noticed that the 29[11] ULBs had neither sought any assistance of producers for setting up of system for PWM nor made any such system for PWM. Only ULB, Dhar had sought assistance of producers in setting up of system for plastic waste management, however, no evidence with regard to seeking assistance had been produced to audit. Further, four[12] ULBs had not furnished any information in this regard. Thus, it is evident that no plan had been prepared by these ULBs with the assistance of producers for management of plastic generated by them. This indicated negligence on the part of ULBs on proper management of plastic waste.

The Government replied (August 2023) that the assistance/ suggestions were taken from producers at State level Meetings. Apart from producers, there were members of the Plastic Waste Producer's Association, NGOs and experts in the matter.

However, no documentary evidence was produced by the Government in this regard.

4.1.4 Prohibition on the usage of banned plastic not implemented

As per Rule 4 (1) (c) of PWM Rules, 2016, the manufacture, importer stocking, distribution, sale and use of carry bags, plastic sheets or like, or cover made of plastic sheet and multi layered packaging, shall be made of virgin or recycled plastic which is not less than 50 microns in thickness.

During the audit of sampled ULBs, it was observed that the 11[13] ULBs had not issued any directions prohibiting the storage, distribution, sale and utilisation of carry bag made of virgin or recycled plastic, less than 50 microns in thickness to restrict the usage of the same. Further, 19[14] ULBs had issued such directions and four[15] ULBs had not furnished any information in this regard. Thus, the deterrent to reduce use of plastic less than 50 microns was not applied by majority of test checked ULBs.

It was further noticed that GoMP imposed complete ban only on production, storage and use of plastic carry bag vide Gazette Notification (May 2017). During the audit, it was noticed in selected 34 ULBs that 4.74 lakh kg plastic carry bags were seized and ₹ 1.81 crore was recovered as penalty. However, Audit noticed that the complete ban on SUP was imposed in the State from July 2022 only. Evidently, the production, sale and use of other plastic items such as plastic sheets, plates, sticks of less than 50 microns were not completely prohibited in the State up to July 2022.

The Government replied (August 2023) that it had made its best efforts to comply with the PWM Rules and also done significant work to control the uses of SUP.

[11] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Gwalior, Indore, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Satna, Shahdol, Uchehara and Vidisha.

[12] Bhind, Bhopal, Maihar and Shivpuri.

[13] Akodia, Beohari, Damoh, Gwalior, Kareli, Khirkiya, Morena, Piplanarayanwar, Polaykalan, Sagar and Uchehara.

[14] Balaghat, Barghat, Betul, Dhar, Jabalpur, Kukshi, Malanpur, Mandleshwar, Mandsaur, Nalkheda, Niwari, Orchha, Pichhore, Ratlam, Sanchi, Satna, Shahdol, Shivpuri and Vidisha.

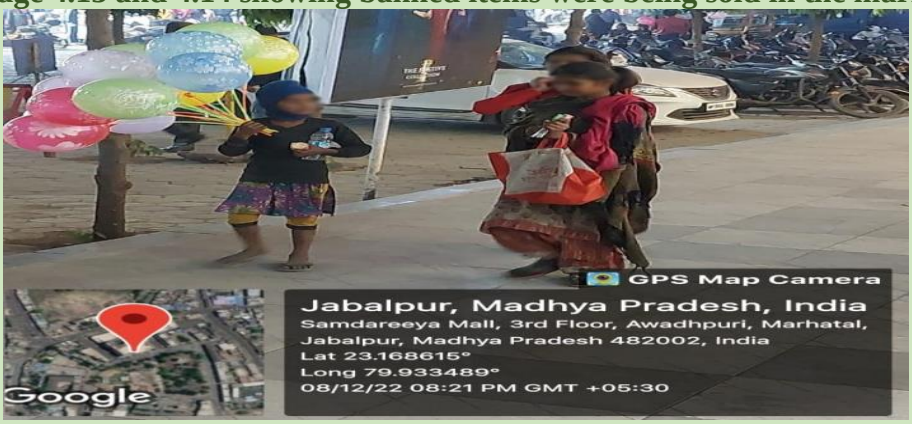
[15] Bhind, Bhopal, Indore and Maihar.

The fact remains that out of 34 ULBs selected for audit, 11 ULBs have not issued any order restricting the uses of SUP. Moreover, the items made of prohibited SUP were openly traded in the market under Municipal Corporation, Jabalpur as shown below-

Sale of SUP despite being banned

As per Rule 4 (1) (c) of the PWM Rule, 2016, carry bags made of virgin or recycled plastic were not to be less than fifty microns in thickness. The Municipal Corporation, Jabalpur completely banned (November 2021) the use of single-use plastic including items like plates, glass, plastic sticks used in balloons, ice-cream and candy from July 2022. During the visit in Jabalpur city, it was found that these banned items were being sold in the market as shown in images:

Image 4.13 and 4.14 showing banned items were being sold in the market



(Photo: Audit Team)

It was clear from above that the order regarding prohibition of single use plastic was not being followed in ULB, Jabalpur and no action was being taken by the corporation.

4.1.5 Use of Plastic Waste in construction of roads

Rule 5(1)(b) of PWM Rules, 2016 stipulates that local bodies shall encourage the use of plastic waste (preferably the plastic waste which cannot be further recycled) for road construction as per Indian Road Congress Guidelines or energy recovery or waste to oil, *etc*. complying the

standards and pollution control norms specified by the prescribed authority for these technologies.

Audit noticed that 28[16] ULBs had not initiated any action to encourage the use of plastic waste (plastic waste which cannot be further recycled) for road construction except three[17] ULBs which had made efforts in this regard. The Bhind, Maihar and Bhopal ULBs had not furnished any reply in this regard.

As a result, the usage of plastic in construction of roads remained extremely low ranging between 0.29 *per cent* and 1.72 *per cent* of total plastic waste generated during the year 2018-19 to 2021-22 whereas, it was 14.45 *per cent* during the year 2017-18. Also, the recycling process of the hazardous plastic could not be optimised for better and safer ecosystems.

The Government replied (August 2023) that the ULBs of Madhya Pradesh had made a significant stride in re-using, co-processing, recycling and utilisation of plastic in road construction.

The fact remains that the utilisation of plastic in road construction has been 0.61 *per cent* of the Plastic Waste Generated during the audit period, as per the data provided by the Government.

4.1.6 Delay in constitution of State Level Advisory Committee for PWM and holding of its inadequate meetings

As per Rule 16 of PWM Rules 2016, state should constitute a State Level Advisory Committee (SLAC), comprising total ten members from different Departments of State Government, a Chairman[18] and Convener[19] for the purpose of effective monitoring of implementation of PWM Rules. The SLAC shall meet at least once in six months and may invite experts, if it considers necessary.

Audit noticed that the State Government had constituted the SLAC in November 2016 for the purpose of effective monitoring of implementation of PWM Rules with a delay of two months. It was further noticed that SLAC had held its three meetings only during the years 2017-18 to 2021-22 as against total 10 meetings required to be held as per the PWM Rules from the date of constitution (November 2016) of SLAC.

The Government, while accepting the audit observation, replied (August 2023) that adequate meetings of SLAC could not be held due to some unforeseen events such as legislative assembly election in the State, Covid-19 situation, change in administrative setup, *etc*.

The fact remains that conducting of inadequate meetings of SLAC, defeated the very purpose of formation of such Committee.

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[16] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Gwalior, Indore, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Sagar, Sanchi, Shahdol, Shivpuri, Uchehara and Vidisha.

[17] Dhar, Ratlam and Satna.

[18] The Secretary, Department of Urban Development.

[19] Director, Municipal Administration.

4.1.7 Extended Producer's Responsibility

Extended producer's responsibility (EPR) means the responsibility of a producer for the environmentally sound management of the product until the end of its life.

As per Rule 9 (1) and 9 (2) of PWM, Rules 2016, the producers, importers and brand owners (PIBOs), within a period of six months from the date of publication of these Rules, were required to work out modalities for waste collection system based on EPR and involving Urban Development Departments, either individually or collectively and to submit the same to the State Pollution Control Boards while applying for consent to establish or operate or renewal.

Audit noticed that waste producers, importers and brand owners had not worked out the modalities for waste collection system based on EPR with the involvement of State Urban Development Departments as the UADD, GoMP had not furnished any modalities worked out by the waste generators stating that monitoring and supervision of EPR was being done by the CPCB through Centralised EPR Portal for plastic packaging.

In the absence of such working plan/ modalities for waste collection system, it would not be possible to have an effective control over the producers, importers and brand owners of plastic waste in making them responsible to meet their EPR obligations and thereby mitigating the plastic waste and its scientific disposal in the State.

The Government replied (August 2023) that the modalities for plastic waste collection system, on the basis of EPR, had already been worked out by the PIBOs and plastic waste producers identified by the MPPCB in the state through EPR portal developed by CPCB.

However, CPCB has developed the EPR portal after the amendment in PWM Rules in February 2022 only and the ULBs as well as State Government have not worked out the modalities for waste collection system based on EPR with the involvement of waste producers, importers and brand owners as per the PWM Rules, 2016, for the audit period.

4.1.8 Deficiencies in monitoring by MPPCB

The MPPCB monitors various stakeholders involved in the management of plastic waste, e-waste and municipal solid waste in the State through its Extended Green Node (XGN) software. The Consolidated Consent and Authorisation (CCA) module for plastic waste, e-waste and solid waste of the XGN Software generates the report for grant of consent/ renewal of consent during the defined period in respect of industries under plastic waste, e-waste and solid waste management.

Audit extracted the data relating to plastic sector industries by generating reports from CCA module of XGN software and found that total 543 plastic sector industries had granted consent/ renewed consent during the period from April 2017 to January 2023. Out of these 543 plastic sector industries, audit selected total 66 red category plastic sector industries having investment above ₹ 0.45 crore as sampled industries for audit. In respect of plastic industries, Audit observed the following deficiencies-

- **Functioning of plastic waste processing industries without CCA Validity**

As per Rule 13 of PWM Rules, 2016, each producer, recycler and manufacturer should obtain registration from the State Pollution Control Board (SPCB) prior to the commencement of production. The registration so obtained is to be got renewed after its expiry.

From the data extracted from the XGN software, Audit noticed that seven plastic waste processing industries had obtained consent to establish (CTE), out of which only four had obtained CCA whereas rest three[20] plastic waste processing industries had not obtained CCA. Audit further noticed that out of the aforesaid four industries which had obtained CCA earlier, the CCA of three[21] industries had expired between March 2019 and June 2021.

Hence, total six plastic waste processing industries (i.e., three industries had not obtained CCA and three industries did not renew their CCA) were functioning without having CCA/ valid CCA as all the six industries were shown as 'in operation' in XGN. However, initiation of any action by MPPCB against these industries was not found on record. This shows an inadequate monitoring by MPPCB which is a hinderance in management of plastic wastes in the State.

- **Inadequate inspections of industries**

The CPCB directed (December 2019) the SPCBs, that the other red category[22] industries should be inspected preferably at the frequency of six months for environmental surveillance.

The audit has reviewed the 66 red category plastic sector industries, having capital investment of ₹ 0.45 crore and noticed that the MPPCB had conducted the inspection in all 66 industries after a gap of more than six months at 219 occasions and failed in adhering with the directions of CPCB. This indicated deficient monitoring leading to inadequate control over the activities of red category industries.

- **Non submission of online monthly testing report by industries**

MPPCB accords consent to operate (CTO) under Section 25 of the Water (Prevention and Control of Pollution) Act, 1974, under section 21 of the Air (Prevention and Control of Pollution) Act, 1981 and register them as manufacturer/ producer and brand owner under Rule-13 of PWM Rules, 2016.

As per the conditions of consent, compilation of monitoring data includes samples and measurements taken to meet the monitoring requirements, promulgation of guidelines, establishing test procedures for the analysis of pollutants. Accordingly, the applicant shall take samples and measurements to meet the monthly requirements specified above and report these online through XGN to the MPPCB and maintain online records of all information resulting from monitoring activities.

[20] Chitrakoot Cement Pvt. Ltd., Satna, Karan Stampings Private Limited, Gwalior and Sarthak Samudayik Vikas Evam Jankalyan Sanstha, Berasiya Road, Bhopal.

[21] Arihant Industries, Ujjain. Environment Care Solution, Satna and Sarthak Samudayik Vikas Evam Jankalyan Sanstha, Vidisha Road, Bhopal.

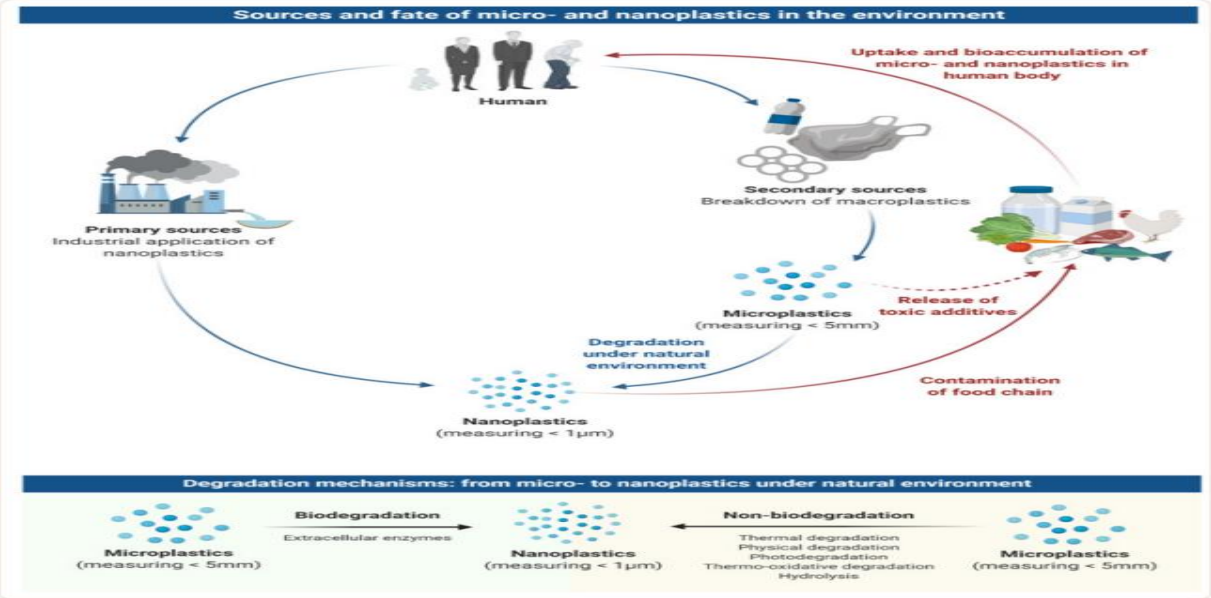
[22] As per the directions issued by CPCB on 7 March 2016, the Red Category Industries are those industries which have the pollution index score of 60 and above.

Audit noticed that only three[23], out of 66 red category Industries were regular in submission of monthly returns, whereas 22[24] industries were irregular in submission of monthly returns and 41 industries had not furnished any monthly testing report to the MPPCB violating with the condition of consent. Despite this, the MPPCB had not taken any action on the defaulting industries. Such minuscule compliance indicated poor control by the MPPCB over adherence to the conditions of consent by the industries leading to inadequate waste management.

4.1.9 Micro Plastics contamination in water bodies

Microplastics are very small pieces of plastic that pollute the environment by entering the natural eco-system from a variety of sources, including cosmetics, clothing and industrial processes. Microplastics are not a specific kind of plastic, but rather any type of plastic fragment that is less than five millimetre in length according to the United States National Oceanic and Atmospheric Administration (NOAA). The source and impact of microplastic is depicted in **Chart 4.3.**

Chart 4.3: Chart depicting the source and impact of microplastic on human health and environment



(Source: Report of National Centre for Biotechnology Information)

The toxicity assessments of microplastics on human are mainly focusing on gastrointestinal and pulmonary toxicity, which involve oxidative stress, inflammatory reactions, and metabolism disorders.

Due to inadequate facilities for proper collection, segregation, transportation and scientific disposal of plastic waste and inadequate facilities for treatment of sewerage in most of the cities

[23] Jay Pee Rewa Plant, Panasonic Energy India Co. Ltd. and Trident Corporation Ltd.

[24] Delite Dairy Ltd., Gulshan Polyols Ltd., Hindustan Coca-Cola Beverage Pvt. Ltd., KJS Cement (1) Ltd., Living Foods India Pvt. Ltd., Nagori Cement Ltd., Oasis Distilleries Ltd., Shivpuri, Oasis Distilleries Ltd., Dhar, Oyster Exim Pvt. Ltd., Parle Agro Pvt. Ltd., Pavan Shree Food International Pvt. Ltd., M/s Prism Jonson Ltd. (Cement Div.-I), M/s Prism Jonson Ltd. (Cement Div.-II), Satguru Industries, Shakti Sugar Mill Pvt. Ltd., Som Distilleries and Breweries Ltd., Sterling Agro Industries Ltd., The Panch Mahal District Cooperative Milk Product, Udaipur Beverage Ltd., Ultratech Cement Ltd., Vacmet India Ltd. and VRS Foods Ltd.

and towns of Madhya Pradesh a large part of the plastic waste goes in to water bodies (rivers, ponds, reservoirs, *etc*.) situated near these cities and towns through drainage networks, rain water or winds which further generates and release the micro particles in the water bodies and cause a possible serious threat to human, animal and environment.

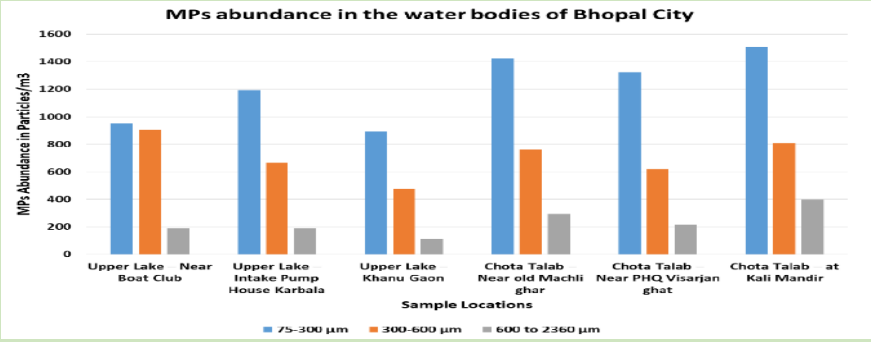
This office engaged the 'Advanced Materials and Processes Research Institute (AMPRI)', a constituent laboratory of Council of Scientific and Industrial Research (CSIR), New Delhi to detect, study and analyse the presence of microplastic particles in the water supply sources of Bhopal and Indore cities at different locations. The AMPRI collected samples from six locations of two[25] water bodies and two[26] filtration plants in Bhopal whereas in Indore, it collected samples from one[27] water body and one[28] filtration plant.

The results of testing of raw water and treated water, conducted by the agency revealed the presence of micro-plastic particles in all the samples collected from all the different locations as detailed below-

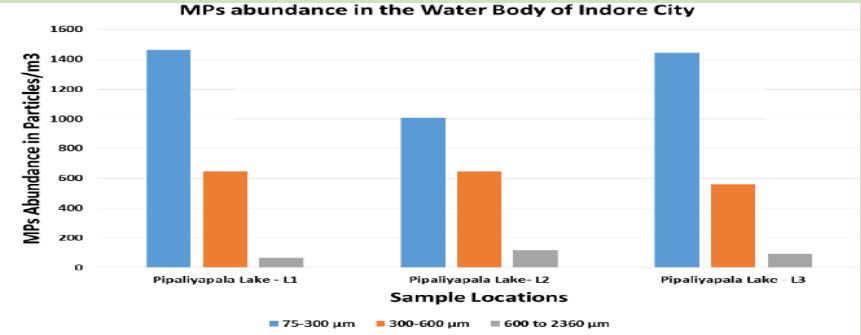
Results of water samples taken from water bodies

The results of testing revealed the presence of micro-plastic particles in all the samples collected from all the different locations. The average micro-plastic abundance in the Upper Lake of Bhopal varied from 1,480 to 2,050 particles/ cum and in the Lower Lake (Chhota Talab), Bhopal, it varied from 2,160 to 2,710 particles/ cum. In Pipaliyapala lake, Indore, the level of micro plastic varied from 1,765 to 2,175 particles/ cum. In Bhopal the highest quantity of micro plastics was observed in the Lower Lake and lowest quantity of micro plastics was observed in the treated water sample of Kerwa Dam treatment plant having abundance of 330 particles/ cum. The abundance of micro plastics in water bodies of Bhopal and Indore districts were as depicted in **Charts 4.4 and 4.5**:

Charts 4.4 and 4.5: Micro plastic in water bodies of Bhopal and Indore ULBs



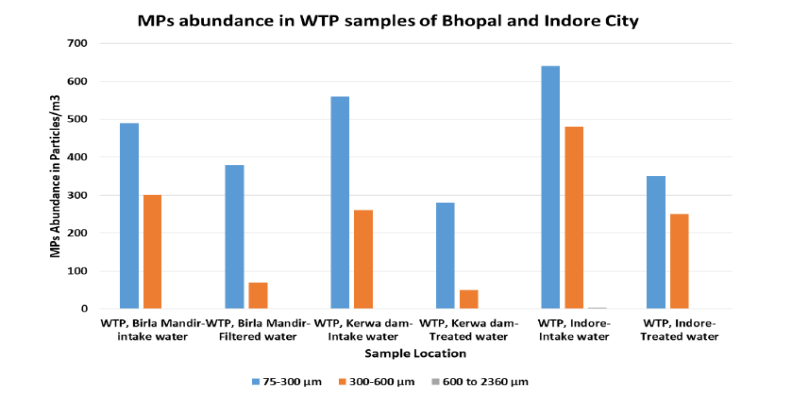
[25] Bhoj Tal (Upper Lake) and Chhota Talab (Lower Lake).
[26] Water Treatment Plant, Birla Mandir and Water Treatment Plant, Kerwa Dam.
[27] Pipaliyapala Lake.
[28] Water Treatment Plant, Dev Dharam Jal Shodhan Sayantra.



Results of Water samples taken from Water Treatment Plants

The results of testing of intake and filtered water samples of two Water Treatment Plants (WTPs, Birla Mandir and Kerwa Dam) of Bhopal revealed the presence of micro-plastic particles ranging from 790 particles/ cum (Birla Mandir) and 820 particles/ cum (Kerwa Dam) in intake samples and between 330 particles/ cum (Kerwa Dam) to 450 particles/ cum (Birla Mandir) in treated water. Similarly, in intake and filtered water sample of WTP, Dev Dhara, Indore also revealed presence of micro plastics was 1,150 particles/ cum (intake) and 600 particles/ cum (filtered water). The presence of micro plastics in the samples of water taken from water treatment plants of Indore and Bhopal were as shown in **Chart 4.6**:

Chart 4.6: Presence of micro plastics (MPs) in water treatment plants in Bhopal and Indore



Most of the particles observed are in the shape of fibres. Some other types of particles observed are fragment, films and pellets. The final results have been depicted in **Chart 4.7**:

Chart 4.7: Various types of micro plastics particles present in water

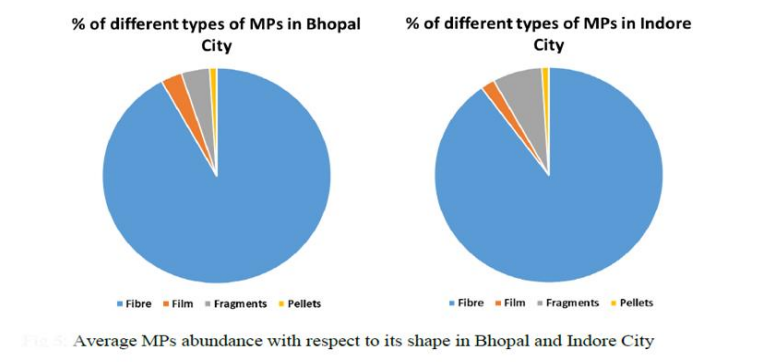


Fig 5: Average MPs abundance with respect to its shape in Bhopal and Indore City

Conclusion

The agency, i.e., CSIR-AMPRI in its study report concluded that the water bodies of Bhopal and Indore city are highly contaminated with micro-plastics. Further, the study based on the analysis of water sample of water treatment plants concluded that the raw as well as treated water contains traces of micro-plastics. Thus, the treated water being supplied to the city may be very hazardous for human health in long run.

As the water bodies have also been found contaminated, there are very high chances that the micro-plastic may have been ingested by almost every living organism (like fish, snails, worms, turtles, frogs, marsh birds, molluscs, *etc*.) in the water bodies.

Recommendations

The agency i.e. CSIR-AMPRI, in its study report, recommended for reducing the demand of plastic by the consumers, replacing the single used products with reusable products, promoting reusable products, replacing the existing plastic products with the bio plastic products and recovering the already leaked Micro-plastics in to the system.

The Indore and Bhopal ULBs had facilities for proper collection, segregation, transportation and scientific disposal of plastic waste and ahead in plastic waste management than the other cities of the State. Despite the fact, the presence of micro-plastic particles in all the samples collected, is a matter of concern and raises serious doubts about situation of water bodies in other Local Bodies where the management of plastic waste has not been started so far.

Further, due to presence of micro plastic particles in the water bodies, as mentioned in the above test report, it can be concluded that the water bodies of Bhopal and Indore cities are highly contaminated with micro plastic and the possibilities of causing its impact on human health and resultant water born deceases such as gastrointestinal, pulmonary toxicity and metabolism disorders may not be ruled out.

On being pointed out, the Government replied (August 2023) that the matter would be discussed with AMPRI.

It is recommended that the State Government may enforce the PWM Rules in the state within the time frame prescribed in the PWM rules and develop adequate mechanism to monitor the implementation of the Rules ibid. The ULBs of the State may establish the plastic waste processing and disposal facilities as per the PWM Rules and put in place an effective mechanism to ensure prohibition on the usage of banned plastics. The MPPCB may ensure that all plastic waste processing industries obtain necessary authorisation for their functioning and adhere to the prescribed standards.

4.2 E-Waste

E-waste is a popular, informal name for electronic products nearing the end of their ‘useful life’. Computers, televisions, stereos, copiers, and fax machines are common electronic products. Many of these products can be reused, refurbished, or recycled. When electronics end up in landfills, toxins like lead, mercury and cadmium, *etc.*, used in parts of the electronic products leach into the soil and water causing harm to life and ecosystems.

The e-waste is one of the fastest growing waste streams in the world. It is estimated that in the developed countries, the e-waste generation is about one *per cent* of total solid waste generation.

Regulatory Framework for e-waste management

MoEFCC, GoI notified (23rd March 2016) E-waste (Management) Rules, 2016 which came in to force from 1 October 2016. These Rules apply to every manufacturer, producer, consumer, bulk consumer, collection centres, dealers, e-retailer, refurbisher**,** dismantler and recycler involved in manufacture, sale, transfer, purchase, collection, storage and processing of e-waste or electrical and electronic equipment listed in Schedule-I, including their components, consumables, parts and spares which make the product operational.

During the course of audit, Audit noticed various issues of non-compliances of E-Waste Rules, 2016, by the sampled ULBs on formation of policy/ plan/action plan for collection of segregated e-waste and segregation, collection and channelization of e-waste, *etc.* Audit also noticed some deficiencies in monitoring, required as per the E-Waste Rules. The above shortcomings noticed in implementation of these Rules by sampled ULB and MPPCB are discussed in succeeding paragraphs:

4.2.1 Non-formation of policy/ plan/action plan for collection of segregated e-waste

Schedule-IV under section of E-waste (Management) Rules, 2016, stipulated that each ULB would ensure that e-waste if found to be mixed with Municipal Solid Waste was properly segregated, collected and was channelized to authorised dismantler or recycler. In order to ensure the above, each ULB was required to prepare a policy/ plan/ action plan.

Audit noticed that 22[29] ULBs have not prepared any such policy/ plan/ action plan in this regard. Audit further noticed that two ULBs i.e. Mandleshwar and Indore, in their reply stated that they had prepared the policy/ plan/ action plan for management of e-waste, however, ULB, Mandleshwar had not furnished any evidence with regard to such policy/ plan. Further, 10[30] ULBs had not furnished any reply in this regard.

In the absence of such policy/ plan/ action plan, these ULBs could not implement the E-Waste Rules in an effective manner resulting in non-segregation, collection and channelisation of e-waste in these ULBs as discussed below.

4.2.2 Collection and channelization of segregated e-waste not ensured

As per Schedule-IV *ibid* Rule-17 of E-waste (Management) Rules, 2016, each ULB has to ensure that e-waste if found to be mixed with Municipal Solid Waste is properly segregated, collected and is channelized to authorised dismantler or recycler.

[29] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Dhar, Jabalpur, Kareli, Kukshi, Maihar, Malanpur, Mandsaur, Morena, Niwari, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Shahdol, Shivpuri and Vidisha.

[30] Bhind, Bhopal, Gwalior, Khirkiya, Nalkheda, Orchha, Sagar, Sanchi, Satna and Uchehara.

Audit noticed that 24[31] ULBs were not collecting the segregated e-waste whereas three[32] ULBs were collecting the segregated e-waste and seven [33] ULBs had not furnished any reply in this regard. Further, in some test checked ULBs, no separate box was found fixed in the waste collection vehicle for collection of e-waste separately as shown in images:

Images 4.15 and 4.16: Collection vehicles without having separate box for e-waste

Image 4.15:Collection vehicles without having separate box for e-waste at Nagar Parishad, Piplanarayanwar, Distt.-Chhindwara

Image 4.16:Collection vehicles without having separate box for e-waste at Nagar Palika, Mandsaur

(Photo: Audit Team)

Thus, due to non-provision of separate box in collection vehicles for putting e-waste, the same was found mixed with the municipal solid waste at landfill site in some ULBs as shown in **Images 4.17 to 4.20**:

Images 4.17 to 4.20: e-waste found mixed with other wastes

Image 4.17: e-waste mixed with other Municipal waste at Damoh Landfill Site

Image 4.18:e-waste mixed with other Municipal waste at Ratlam Landfill Site

[31] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Jabalpur, Kareli, Kukshi, Maihar, Malanpur, Mandsaur, Morena, Nalkheda, Niwari, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Shahdol, Shivpuri, Uchehara and Vidisha.

[32] Dhar, Indore and Mandleshwar.

[33] Bhind, Bhopal, Gwalior, Khirkiya, Orchha, Sanchi and Satna.

Image 4.19: e-waste found dumped within the premises of ULB, Bhopal

Image 4.20: e-waste found dumped within the premises of ULB, Kareli

(Photo: Audit Team)

Thus, due to lack of proper disposal of e-waste such as lead, mercury, and cadmium, the ecosystems such as land and water bodies continued to have a hazardous impact of these materials.

4.2.3 Deficiencies in monitoring by MPPCB

The MPPCB, through its XGN software, monitors various stakeholders involved in the management of plastic waste, e-waste and municipal solid waste in the state. The CCA module for plastic, e-waste and SWM of the XGN Software generates the report for grant of consent/ renewal of consent during the defined period in respect of industries under plastic, e-waste and solid waste management.

Audit extracted the data relating to e-waste sector industries by generating reports from CCA module of XGN software and found that total 18 e-waste sector industries were granted consent/ renewed consent during the period from April 2017 to January 2023. Out of these 18 e-waste sector industries, audit checked total 16 red category e-waste sector industries in audit.

Audit scrutinised various reports of sampled industries involved in e-waste for the period from for the period from April 2017 to January 2023 from CCA module of XGN software of MPPCB and observed the following deficiencies.

- **Functioning of e-waste processing industries without CCA Validity**

Rule 13 of E-Waste (Management) Rules, 2016 stipulates that every manufacturer, consumer, bulk consumer, collection centres, dealers, e-retailers, refurbisher, dismantler, and recycler involved in manufacture, sale, transfer, purchase, collection, storage and processing of e-waste or electrical and electronic equipment listed in Schedule-1 of E-Waste (Management) Rules, 2016, including their components, consumables, parts and spares which make the product operational should obtained authorisation from the concerned State Pollution Control Board within the period specified in the Rules.

Audit noticed from the data relating to e-waste, extracted from XGN software of MPPCB that out of total 21 e-waste processing industries, seven[34] industries had not obtained CCA, however, these industries were shown as 'in operation' in XGN. Thus, the seven e-waste

[34] Arihant Marketing, Shivpuri, Asar Green Kabadi Pvt. Ltd., Bhopal, Jabalpur E-Waste Cleaners, Jabalpur, Sehore and JS Care, Ujjain, Shradha Sales, Bhopal, Techno craft, Bhopal and Taruna E-Waste Industries.

processing industries were functioning without obtaining CCA. However, initiation of any action by MPPCB against these industries was not found on record. This showed an inadequate monitoring on the part of MPPCB and the industries were continuously operating without regulations.

- **Non-adherence to directions of CPCB in respect of inspections of Industries**

The CPCB directed (December 2019) the SPCBs, to carry out inspections of the other red category industries preferably at the frequency of six months for environmental surveillance.

Audit reviewed the 16[35] red category industries under e-waste sector and noticed that the MPPCB had conducted the inspection in five industries after a gap of more than six months at 14 occasions and failed in adhering with the directions of CPCB.

- **Non submission of online monthly testing report by Industries**

MPPCB grants Consent to Operate (CTO) under section 25 of the Water (Prevention and Control of Pollution) Act, 1974, under section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Registration as Manufacturer/Producer and Brand Owner under Rule-13 of E-Waste (Management) Rules, 2016.

As per the condition of consent, compilation of monitoring data includes samples and measurements taken to meet the monitoring requirements, promulgation of guidelines, establishing test procedures for the analysis of pollutants. Accordingly, the applicant shall take samples and measurements to meet the monthly requirements specified above and report these online through XGN to the MPPCB and maintain online records of all information resulting from monitoring activities.

Audit reviewed 16[36] sampled red category industries (including one hospital) under e-waste sector and noticed that two[37] out of above 16 red category Industries, were regular in submission of monthly return, whereas five[38] industries had not furnished any monthly returns to the MPPCB violating the conditions of consent. Despite this, the MPPCB had not taken any action on the defaulting industries.

4.3 Construction and Demolition Waste

In India, the average generation of Construction and Demolition (C&D) waste is about 12 million tonnes per year, *i.e.,* 20-25 *per cent* of total MSW generation in country. Large scale construction projects of housing, industry and infrastructure development are under implementation across the country. Development of economic zones, industrial corridors,

[35] Civil Hospital, DK Electronics, Excellent Services, Gayatri Incorporation, Moon Star Enterprises Ltd., M/s Arihant Marketing, Pooja Mobile and Electronics, Smart Services, Muskan Customer Care, Prometheus Recycling Pvt. Ltd., Satguru system, Star Mobile Service Centre, Surya Roshni Ltd., Techno Minds, Unique Eco-recycle and Yash Enterprises.

[36] Civil Hospital, DK Electronics, Excellent Services, Gayatri Incorporation, Moon Star Enterprises Ltd., M/s Arihant Marketing, Pooja Mobile and Electronics, Smart Services, Muskan Customer Care, Prometheus Recycling Pvt. Ltd., Satguru system, Star Mobile Service Centre, Surya Roshni Ltd., Techno Minds, Unique Eco-recycle and Yash Enterprises.

[37] Civil Hospital, Gwalior and Surya Roshni Ltd., Malanpur.

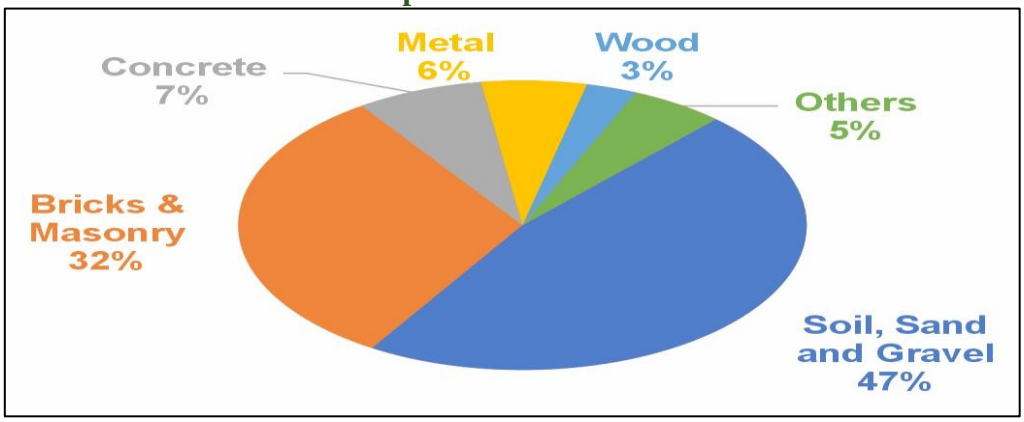
[38] Moon Star Enterprise Pvt. Ltd., Indore, M/s Arihant Marketing, Prometheus Recycling Pvt. Ltd., Satguru System and Unique Echo recycle.

redevelopment & rehabilitation works, besides repairs & renovation contributes to the magnitude of C&D waste.

With the growing importance of C&D waste, Government of India has deemed it appropriate to formulate a separate regulation for construction and demolition waste namely Construction and Demolition (C&D) Waste Rules, 2016 describing the roles and responsibilities of the different stakeholders as well as the compliance criteria for the management of the construction and demolition waste.

C&D waste includes bricks, tiles, stone, soil, rubble, plaster, drywall or gypsum board, wood, plumbing fixtures, non-hazardous insulating material, plastics, wallpaper, glass, metal (e.g., steel, aluminium), asphalt, *etc*. The composition of C&D waste in India is depicted in **Chart 4.8:**

Chart 4.8: Composition of C&D Waste in India



(Source: Report of Ministry of Housing and Urban Affairs, GoI published in June 2021)

The Rules apply to every waste resulting from construction, re-modelling, repair and demolition of any civil structure of individual or organisation or authority who generates construction and demolition waste such as building materials, debris, rubble.

Benefits of C&D waste management

Through the scientific management of C&D waste, the following (**Table 4.2**) economic & social benefits and environmental benefits can be achieved-

Table 4.2: Benefits of C&D Waste Management

Economic and Social Benefits	• Scientific C&D waste management prevents mixing of C&D waste into MSW stream. This reduces processing cost and increases efficiency of MSW. • C&D waste management prevents clogging of drains and water bodies therefore avert flooding in urban areas. • Proper management and recycling of C&D waste leads to saving of precious land by reduction in volume of inert going to landfill. • C&D waste processing and recycling generates employment through new enterprises. • Use of C&D recycled products help in reducing the demand and requirement of virgin material and natural resources.
Environmental Benefits	• Scientific C&D waste management supresses dust generation. This significantly reduces air pollution. • Prevention of unauthorized dumping of C&D waste in drains and hydrological channels reduces chances of flooding. • Utilization of recycled products from processed C&D waste helps in reducing environmental impacts of mining.

(Source: Report of Ministry of Housing and Urban Affairs, GoI published in June 2021)

During the course of audit, Audit noticed various issues of non-compliances of C&D rules, 2016, by UADD, GoMP and the sampled ULBs on framing of policy for management of C&D waste, issue of notification for the waste generators, submission of waste management plan by the waste generators, fixation/notifying and realisation of charges for C&D waste, issue of detailed directions for proper management of C&D waste, identification of site required for establishing collection and processing facility for C&D waste and commissioning and implementation of facilities for C&D waste.

The above shortcoming noticed by audit are discussed in the succeeding paragraphs.

4.3.1 Non-framing of policy by State Government for management of C&D waste

Rule 9 (1) and schedule-III under Rule 13 of the C&D Waste Management Rules, 2016, stipulate the Secretary in-charge of development in the State Government or Union territory administration shall prepare their policy document within one year from date of final notification of these rules.

Audit noticed that UDHD had not prepared any policy for management of C&D waste in the state till March 2023 even after elapse of six years from the schedule date for preparation of policy i.e. one year from the date of publication of C&D waste rules.

Thus, due to non- preparation of policy by the State Government in this regard, the State Government could not enforce rules regarding management of C&D waste with full intensity and also violated with the subject rules. Further, the non/ partial implementation of management of C&D rules, also deprived in availing the benefits of scientific management of C&D waste as discussed in **Table 4.2** above.

The Government, while accepting the audit observation, replied (August 2023) that the UDHD had recently prepared the draft policy for management of C&D waste in the state which was under review and would be published after approval from the Department.

The fact remains that the Government is yet to have an approved policy for management of C&D waste.

4.3.2 Non-issue of notification for the waste generators

As per Rule 4 (1) of the C&D Waste Management Rules, 2016, Every waste generator shall prima-facie be responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated, as directed or notified by the concerned local authority in consonance with these Rules. Further, as per Rule 4(2) of these Rules, every generator has to ensure that other waste (such as solid waste) does not get mixed with this waste and is stored and disposed separately.

Audit noticed that 14[39] ULBs had not issued any notification making responsible to generator for collection, segregation of concrete, soil and others and separate storage of construction and

[39] Akodia, Beohari, Damoh, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Nalkheda, Orchha, Piplanarayanwar, Polaykalan, Sagar and Sanchi.

demolition waste generated by them, however, 16[40] ULBs stated to have issued notification in this regard whereas four[41] ULBs had not furnished any reply.

As a result, the C&D waste generated in these ULBs was not being segregated, collected, stored properly and disposed scientifically as shown in **Images 4.21 and 4.22**:

Images 4.21 and 4.22: C&D waste lying mixed with other waste

Image 4.21:C&D Waste found on the roadside in the ULB, Jabalpur

Image 4.22:C&D Waste found on the roadside in ULB, Nalkheda

(Photo: Audit Team)

The Government replied (August 2023) that there was no bulk generators of C&D waste in the State and the ULBs had issued notifications of differential user charges in the cases of non-bulk C&D waste generators which involved open dumping of unprocessed C&D waste.

Reply is not acceptable as 14 test checked ULBs had not issued any notification for collection, segregation of concrete, soil and others and for separate storage of construction and demolition waste generated by non-bulk C&D waste generators.

4.3.3 Non-submission of waste management plan by the waste generators.

Rule 4 (3) of the C&D Waste Management Rules, 2016, stipulates that waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall segregate the waste into four streams such as concrete, soil, steel, wood and plastics, bricks and mortar and shall submit waste management plan and get appropriate approvals from the local authority before starting construction or demolition or remodelling work and keep the concerned authorities informed regarding the relevant activities from the planning stage to the implementation stage and this should be on project to project basis.

Audit noticed that 24[42] ULBs had not identified the waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month, however, ULB, Satna had

[40] Balaghat, Barghat, Betul, Dhar, Indore, Mandleshwar, Mandsaur, Morena, Niwari, Pichhore, Ratlam, Satna, Shahdol, Shivpuri, Vidisha and Uchehara.

[41] Bhind, Bhopal, Gwalior and Maihar.

[42] Akodia, Barghat, Betul, Damoh, Dhar, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Mandleshwar, Mandsaur, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Shivpuri, Uchehara and Vidisha.

identified the waste generator. Further, five[43] ULBs had not furnished any information in this regard and the provision was not applicable on four[44] ULBs.

As a result, no plan was submitted by the waste generators of these ULBs and the ULBs could not implement the C&D Waste Management Rules, 2016 effectively, thus, deprived in availing the possible benefits of scientific management of C&D waste as discussed in **Table 4.2.**

The Government in its reply stated (August 2023) that there was no bulk generator of C&D waste in all 24 ULBs identified by the audit except ULB Jabalpur. Hence, it was not applicable to submit the waste management plan by waste generators.

Reply is not acceptable as the 24 test checked ULBs have replied to Audit that they have not initiated any process for identification of bulk generators.

4.3.4 Non-fixation/notifying and realisation of charges for collection, transportation, processing and disposal of C&D waste

As per Rule 4 (5) of C&D Waste Management Rules, 2016, every waste generator shall pay relevant charges for collection, transportation, processing and disposal as notified by the concerned authorities; Waste generators who generate more than 20 tons or more in one day or 300 tons per project in a month shall have to pay for the processing and disposal of construction and demolition waste generated by them, apart from the payment for storage, collection and transportation. The rate shall be fixed by the concerned local authority, or any other authority designated by the State Government.

Audit noticed that 19[45] ULBs had not notified the charges for collection, transportation, processing and disposal of C&D waste under their jurisdiction and four[46] ULBs had not submitted any information regarding notifying the charges for waste generators. However, 11[47] ULBs had notified the C&D charges but no evidence with regard to realisation of such charges had been produced by these ULBs.

As a result, any of the test checked ULBs could not realise any C&D charges from the consumers defeating the 100 *per cent* cost recovery on management of C&D waste as per the provisions of C&D Waste Management Rules, 2016.

The Government replied (August 2023) that all the 34 ULBs had notified the charges for collection, transportation, processing and disposal of C&D waste. However, no documentary evidence with respect to the notification for levy of the charges for collection, transportation, processing and disposal of C&D waste, was furnished to audit.

[43] Bhind, Bhopal, Gwalior, Indore and Maihar.
[44] Balaghat, Beohari, Morena and Shahdol.
[45] Akodia, Balaghat, Barghat, Beohari, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Mandleshwar, Nalkheda, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Sagar, Sanchi, Uchehara and Vidisha.
[46] Bhind, Bhopal, Gwalior and Maihar.
[47] Betul, Damoh, Dhar, Indore, Mandsaur, Morena, Niwari, Ratlam, Satna, Shahdol and Shivpuri.

4.3.5 Non-issue of detailed directions for proper management of C&D waste

As per rule 6 (1) of the C&D Waste Management Rules, 2016, each ULB has to issue detailed directions with regard to proper management of construction and demolition waste within its jurisdiction in accordance with the provisions of these rules and the local authority shall seek detailed plan or undertaking as applicable, from generator of construction and demolition waste.

Audit noticed that 20[48] ULBs had neither issued any directions with regard to proper management of C&D waste within its jurisdiction in accordance with the above rules nor sought detailed plan or undertaking as applicable, from generator of construction and demolition waste. Further, nine[49] ULBs had issued such directions whereas five[50] ULBs had not furnished any information in this regard.

In the absence of detailed directions for proper management of C&D waste, these ULBs could not implement the C&D Waste Management Rules, 2016 effectively under their jurisdiction.

The Government replied (August 2023) that all 34 ULBs had proper management of C&D waste with dedicated plant in the ULBs.

The reply is not relevant as the audit observation relates to the directions to be issued by the ULBs with regard to proper management of C&D waste. Further, the Government did not furnish any documentary evidence on dedicated plant for management of C&D waste in 34 ULBs.

4.3.6 Non-identification/ delay in identification of site required for establishing collection and processing facility for C&D waste

As per schedule-III under rule 13 of C&D Waste Management Rules, 2016, each ULB has to identify the site for establishing collection and processing facilities for collection and processing of C&D waste within a period of 18 months, *i.e.*, up to September 2017 from the date of publication, *i.e.*, March 2016 of these rules.

Audit noticed that 24[51] ULBs had not identified the site for establishing the collection and processing facilities for C&D waste till March 2022 even after elapse of 54 months after notification of these Rules. No ULB could identify the site for C&D waste within the timeline. However, six[52] ULBs had identified the site after the specified timeline. Further, four[53] ULBs had not furnished any information regarding identification of such site.

[48] Akodia, Balaghat, Barghat, Beohari, Betul, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Piplanarayanwar, Polaykalan, Ratlam, Sagar and Sanchi.
[49] Damoh, Dhar, Indore, Mandleshwar, Pichhore, Satna, Shahdol, Shivpuri and Vidisha.
[50] Bhind, Bhopal, Gwalior, Maihar and Uchehara.
[51] Akodia, Balaghat, Barghat, Beohari, Betul, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Mandleshwar, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Shahdol and Vidisha.
[52] Damoh, Dhar, Indore, Satna, Shivpuri and Uchehara.
[53] Bhind, Bhopal, Gwalior and Maihar.

Thus, due to non-identification of site, 24 ULBs could not establish the facilities for collection and processing of C&D waste. As a result, these ULBs were unable to effectively manage the C&D waste to eliminate its hazards as per the C&D Waste Management Rules, 2016.

The Government replied (August 2023) that all ULBs had identified the sites for establishing collection and processing facilities for C&D waste.

The reply is not acceptable as the same is not supported by relevant documents or facts.

4.3.7 Non-commissioning/ delay in commissioning and implementation of facilities for C&D waste

As per schedule-III under Rule 13 of C&D Waste Management Rules, 2016, the ULBs with population of one million and above, population between 0.5-01 million and population less than 0.5 million have to commission and implement the facilities required for processing of C&D waste within a period of 18 months, 24 months and 36 months respectively from the date of publication of these rules.

Audit noticed that 24[54] ULBs could not commission and implement the facilities for processing of C&D waste and five[55] ULBs had not submitted any information regarding commissioning and implementation of C&D waste. Further, five[56] ULBs stated to have commissioned and implemented these facilities. However, no evidence in this regard were furnished to audit by these ULBs.

Thus, due to non- commissioning and provision of the facilities for processing of C&D waste, these ULBs were unable to adequately manage the C&D waste as observed in paragraph 4.3.2. This consequently impacted management of C&D wastes.

The Government replied (August 2023) that all ULBs had commissioned and implemented the facilities for C&D waste for collection and processing of C&D waste.

Reply is not acceptable as no documentary evidence was produced either by ULBs or Government in this regard.

4.4 Recommendations

Audit recommends that:

14. Department may put in place an effective mechanism to ensure prohibition on the usage of single use/ banned plastic products to prevent contamination of water bodies due to micro plastics.
15. The ULBs may establish the plastic waste processing and disposal facilities as per the PWM Rules.
16. The MPPCB may ensure that all plastic waste processing industries had obtained necessary authorisation for their functioning and are adhering to the prescribed standards.

[54] Akodia, Balaghat, Barghat, Beohari, Betul, Damoh, Jabalpur, Kareli, Khirkiya, Kukshi, Malanpur, Mandsaur, Morena, Nalkheda, Niwari, Orchha, Pichhore, Piplanarayanwar, Polaykalan, Ratlam, Sagar, Sanchi, Shahdol and Vidisha.
[55] Bhind, Bhopal, Gwalior, Maihar and Mandleshwar.
[56] Dhar, Indore, Satna, Shivpuri and Uchehara.

17. The ULBs of the state may enforce the E-Waste Rules by forming effective policy/ plan/action plan and establish the adequate facilities for proper segregation, collection and channelization of e-waste as per E-Waste Rules.
18. The MPPCB may evolve an effective monitoring mechanism to monitor the compliance of provisions of E-Waste Rules by all the industries engaged directly or indirectly in generation and disposal of e-waste.
19. The State Government may enforce the PWM Rules and C&D Waste Management Rules in an efficient manner and monitor its implementation process effectively by adequately strengthening the monitoring mechanism. The Government may expedite approval of policy for management of C&D waste.

Bhopal
The 24 June 2024

(PRIYA PARIKH)
Accountant General (Audit-II)
Madhya Pradesh

Countersigned

New Delhi
The 27 June 2024

(GIRISH CHANDRA MURMU)
Comptroller and Auditor General of India

APPENDICES

Appendices

Appendix 1.1

(Reference: Paragraph 1.1 (a))

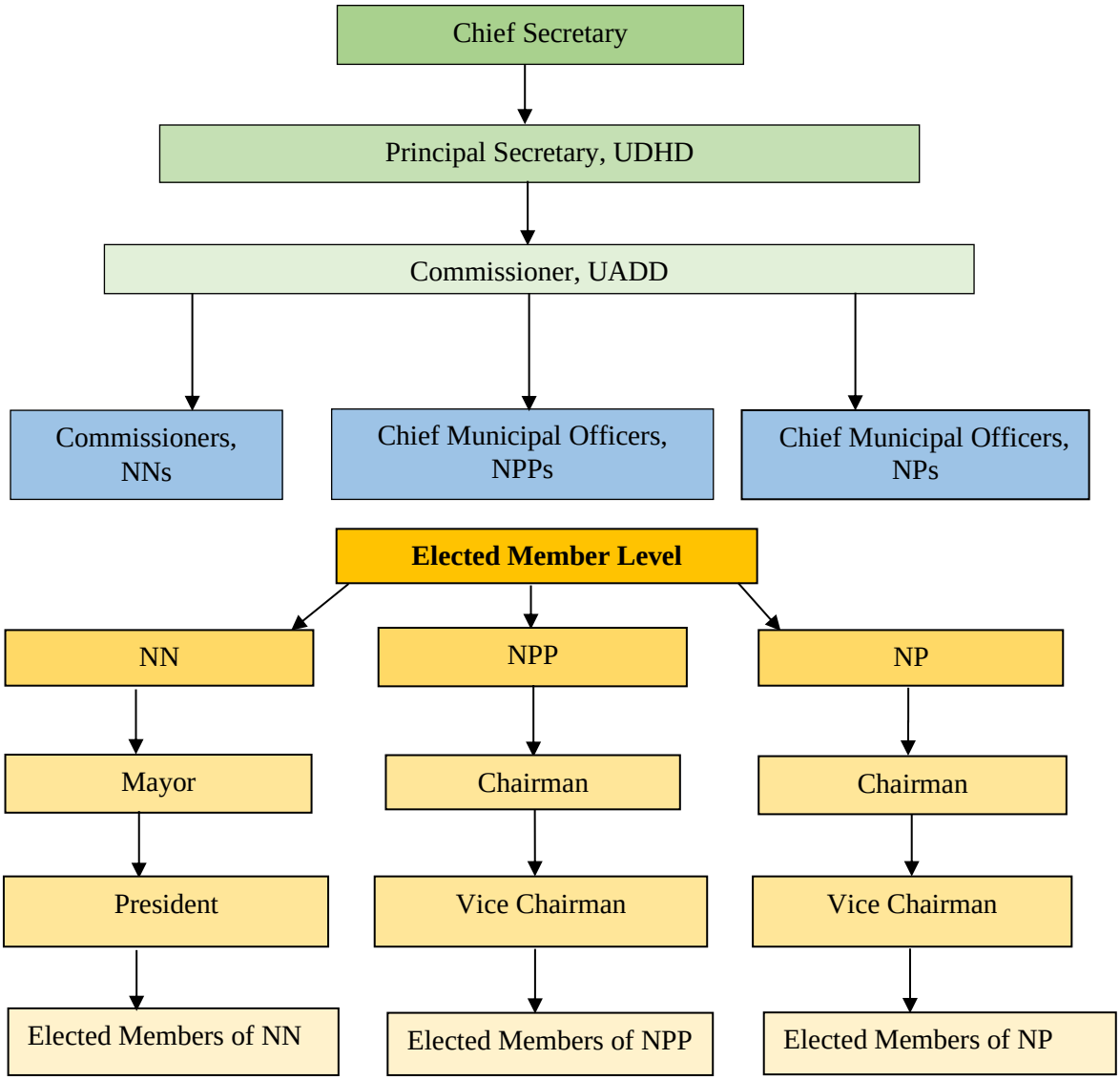
Statement showing the Regulatory framework governing the management of solid waste

S.N.	Type of Waste	Regulatory framework
1	Solid Waste	(1) Solid Waste Management Rules, 2016 (2) Manual of Municipal Solid Waste Management, 2016 issued by GoI in April 2016.
2	Plastic Waste	Plastic Waste Management Rules, 2016
3	E-Waste	E-Waste (Management) Rules, 2016
4	Bio-Medical Waste	Bio-Medical Waste Management Rules 2016
5	Construction and Demolition Waste	Construction and Demolition Waste Management Rules, 2016
6	Hazardous Waste	Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

Appendix 1.2

(Reference: Paragraph 1.3)

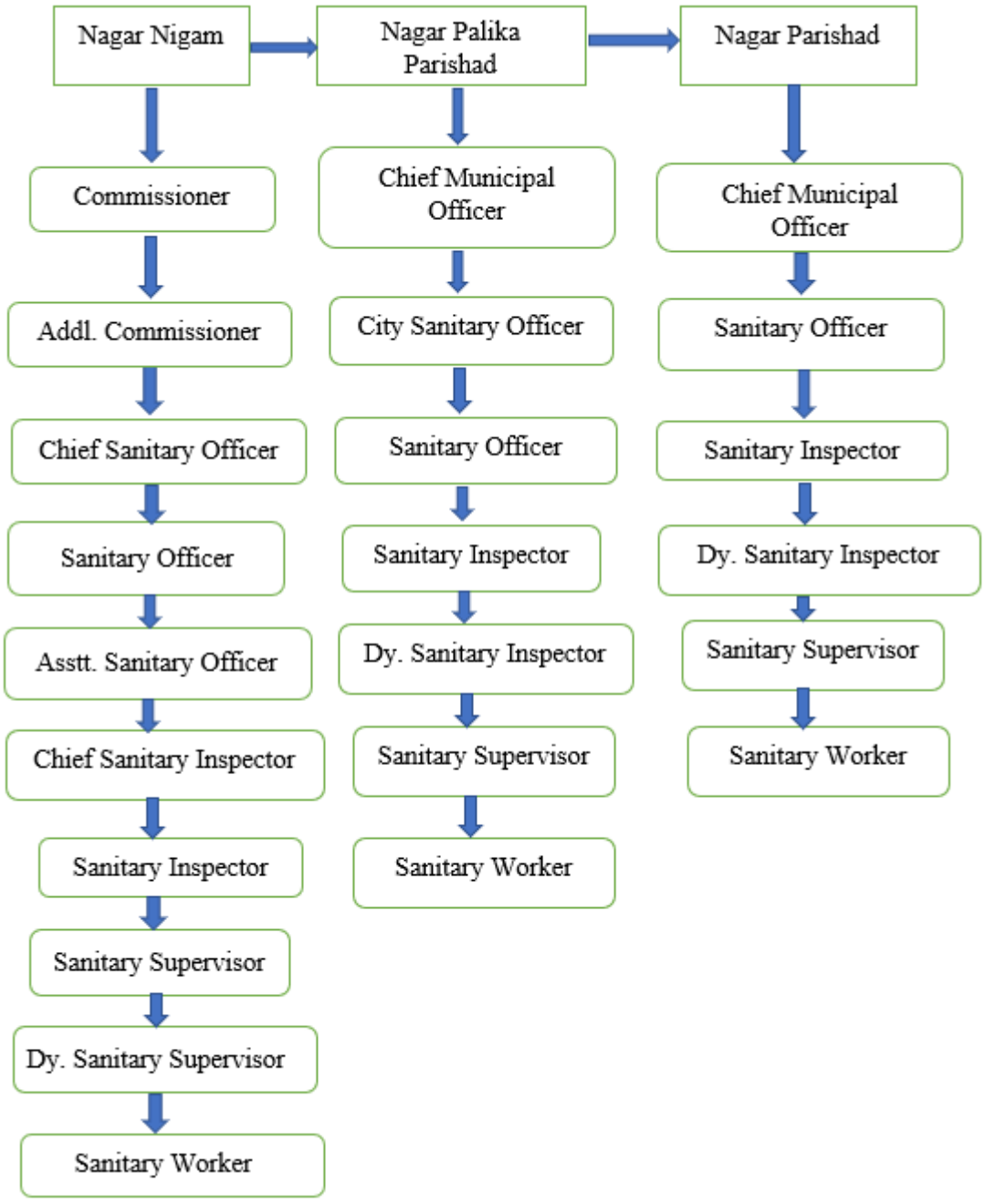
Three-tier administrative set up of ULBs



Appendix 1.3

(Reference: Paragraph 1.3)

Organisational structure of the ULBs pertinent to SWM and Sewerage Management



Appendix 1.4

(Reference: Paragraph 1.6)

List of selected ULBs

S.N.	Division	District	Name of ULBs	Category of the ULB
1	Bhopal	Bhopal	Bhopal	Municipal Corporation
		Vidisha	Vidisha	Municipal Council
		Raisen	Sanchi	Nagar Parishad
2	Chambal	Morena	Morena	Municipal Corporation
		Bhind	Bhind	Municipal Council
		Bhind	Malanpur	Nagar Parishad
3	Gwalior	Gwalior	Gwalior	Municipal Corporation
		Shivpuri	Shivpuri	Municipal Council
		Gwalior	Pichhore	Nagar Parishad
4	Indore	Indore	Indore	Municipal Corporation
		Dhar	Dhar	Municipal Council
		Dhar	Kukshi	Nagar Parishad
		Khargone	Mandleshwar	Nagar Parishad
5	Jabalpur	Jabalpur	Jabalpur	Municipal Corporation
		Balaghat	Balaghat	Municipal Council
		Narsinghpur	Kareli	Municipal Council
		Chhindwara	Piplanarayanwar	Nagar Parishad
		Seoni	Barghat	Nagar Parishad
6	Narmadapuram	Betul	Betul	Municipal Council
		Harda	Khirkiya	Nagar Parishad
7	Rewa	Satna	Satna	Municipal Corporation
		Satna	Maihar	Municipal Council
		Satna	Uchehara	Nagar Parishad
8	Sagar	Sagar	Sagar	Municipal Corporation
		Damoh	Damoh	Municipal Council
		Niwari	Niwari	Nagar Parishad
		Niwari	Orchha	Nagar Parishad
9	Shahdol	Shahdol	Shahdol	Municipal Council
		Shahdol	Beohari	Nagar Parishad
10	Ujjain	Ratlam	Ratlam	Municipal Corporation
		Mandsaur	Mandsaur	Municipal Council
		Agar Malwa	Nalkheda	Nagar Parishad
		Shajapur	Akodia	Nagar Parishad
		Shajapur	Polaykalan	Nagar Parishad

Appendix 2.1

(Reference: Paragraph 2.1)

Statement showing necessary involvement of stakeholders at several stages of SWM

Central Government (MoEFCC, MoUD and CPCB)	Laws and Rules; Policies and Norms; Guidelines, Manuals, and Technical Assistance; Financial Support; Monitoring implementation of laws and rules.
State Government (UADD headed by ACS and MPPCB headed by Chairman)	Monitoring implementation of laws and rules in metropolitan cities; State Policy and SWM Strategy; Guidelines, Manuals, and Technical Assistance; Financial Support; Reporting on Service Level Benchmarks to the MoUD; Capacity Building of local bodies; Granting consent to set up treatment and disposal activities.
District (District Collector)	Review the performance of ULBs on waste management process; Facilitate identification and allotment of suitable land for solid waste processing and disposal facilities.
ULBs (headed by Commissioner, Chief Municipal Officer)	Providing MSWM services; Preparation of SWM plan; Framing byelaws; Levy and collection of fees; Financing SWM system; Creating public awareness; Involvement of informal sector in SWM.
Informal Sector (waste recyclers, NGOs, CBOs and private partners)	Resource recovery and recycling at different stages; Providing support to the local recycling industry; Involvement of community; Creating awareness; Collection and transportation of waste; Technology providers.

(Source: Municipal Solid Waste Management Manual 2016)

Appendix 2.2

(Reference: paragraph 2.3)

Seven-step process of MSW management services

Serial of Step	Main step	Sub steps
Step 1	***Policies, programmes and legal framework***	Identify National and State Strategies/Policies
		Policies/Strategies and their Goals
		State Level/Regional/District SWM
		Identify Overall Goals for ULBs
		Role of Central/State and Local Government
		Institutions and Stakeholders Involved in MSWM Planning
Step 2	***Assessment of current situation and gap analysis***	Legal & Policy Framework,
		Institutional and Financial Set Up
		Technical Aspects
		Community Participation
		MSW Generation, Collection and Transportation
		Availability & Suitability of Land for Processing & Disposal
		MSW Processing, Treatment and Disposal
		Current Status of Dump Sites and Environmental Concerns
Step 3	***Stakeholder consultation for MSWM planning***	
Step 4	***Preparation of draft MSWM plan***	Future Projections
		Population Forecast
		Anticipated Lifestyle Changes
		Change in Socio-economic Status
		Rules, Regulations and Municipal Byelaws
		Community Participation/IEC
		Institutional and Financial Structuring
		Storage, Collection (Door-to-Door and Street Sweeping), Transportation
		Identification of Land and Inclusion in City Master Plan/City Development Plan
		Selection of Process and Best Available Technology for Processing and Disposal
Step 5	***Schedule for implementation***	Timeline
		Manpower Requirement
		Financial Viability
Step 6	***Stakeholder consultation for MSWM plan validation***	
Step 7	***Municipal council approval for MSWM plan and plan implementation including PPP***	

(Source: Municipal Solid Waste Management Manual 2016)

Appendix 2.3

(Reference: Paragraph 2.17)

Target audience and the type of awareness required as per MSWM Manual, 2016

MSWM issue	Targeted audience	Awareness to be generated
Generation	All waste generators in the city including informal settlements and floating population	• Reduce amount of waste generated • Promote reuse and recycling
Littering	Community	• Prevent open littering by communicating penalties for littering
Burning of waste	ULB staff, community, floating population (focus on informal workers, low-income group localities)	• Prevent burning of waste as a disposal option • Dissuade and prevent open burning of waste for heating (in cities with harsh winters)
Waste segregation	All waste generators: households, commercial establishments, institutions, ULB staff	• Communicate importance of waste segregation in ensuring sustainable management of waste, performance of processing and treatment systems, and health and environmental aspects
Door-to-door collection	• Waste generators serviced by door-to-door collection (e.g., households, commercial establishments, markets, institutions, etc.) • ULB staff, NGOs, RWAs, etc. responsible for door-to-door collection	• Provide information on level of segregation required • Provide information on waste collection schedule for different waste fractions (where applicable) • Provide information on timings of collection
Secondary collection	• Agencies involved in transportation of waste • Sanitary inspectors and other MSWM department staff	• Ensure segregated transportation of waste as per MSWM plan • Ensure adoption of best practices, efficient transportation of waste to avoid illegal dumping and malpractices
Transportation	• Agencies involved in transport of waste, sanitary inspectors and other solid waste management department staff involved in providing or monitoring these services	• Ensuring segregated transportation of waste as per MSWM Plan • Ensuring adoption of best practices to ensure efficient transportation of waste, avoiding illegal dumping and malpractices in waste transportation
Waste treatment or processing	• Community • MSWM department staff • Agencies, NGOs, and formal and informal recyclers • involved in solid waste processing of treatment	• Dissemination the following: • Information on need for segregation for improved efficiency of waste treatment and processing • Information on planned treatment and processing facilities • Information on environmental safeguards in MSWM treatment and processing • Information on monitoring requirements

MSWM issue	Targeted audience	Awareness to be generated
		• Periodic information on analysis of monitoring data
Waste disposal	• Community • MSWM department staff • Agencies, NGOs, and formal and informal recyclers involved in solid waste disposal	Disseminate the following: • Information on waste disposal plans of the ULB • Information on environmental safeguards in MSWM disposal facilities • Information on monitoring requirements • Periodic information on analysis of monitoring data

(Source: Municipal Solid Waste Management Manual 2016)

Appendix 2.4

(Reference: Paragraph 2.18)

Various capacity building approaches and training programmes, which could be adopted for different stakeholders

S.N.	Post of trainees	Role in SWM
1	Senior Officers	1. Field level implementation 2. Monitoring field Activities 3. Onsite supervision 4. Welfare of field Staff 5. Feedback or reporting innovations 6. Capacity building of field and administrative staff
2	Collection Staff	1. Door to door collection 2. Collection of segregated waste separately 3. Regular and timely collection 4. Use of pipes 5. Co-operation to ULBs
3	Transportation Staff	1. Transportation of segregated waste 2. Synchronization between secondary collection and transportation 3. Vehicle routing 4. Preventive maintenance 5. Safe and hygienic waste
4	NGOs / CBOs	1. Community mobilization 2. Community capacity building through IEC. 3. Capacity building of collection crew and waste generators
5	Elected Representatives	1. Policy formation, plan preparation and legislation 2. Infrastructure development 3. Supervision and monitoring 4. Continuous improvement 5. Human resource development 6. Budgeting and finance 7. Ensure co-operation of citizens
6	Staff at Processing Plant	1. Quantification of waste received at plant 2. Analysis of waste received 3. Process design 4. O&M of plant machinery 5. Disposal of waste that is not being proceed 6. Fire, health, safety and environment

Detail of training programmes

S.N.	Training programmes	Details of training program
1	Special training	The following should be trained: (i) Unqualified staff and sanitation workers; (ii) Ground level staff like sanitary supervisors (or equivalent); and (iii) Sanitary inspectors, junior engineers, and senior officers. All officers and supervisors must be trained in skills required for an effective and efficient MSWM sector including instructing the sanitation workers. Best practices adopted by different cities in the state, country, and internationally should be made known to senior staff.
2	Refresher courses for supervisory staff	Refresher courses should be conducted for officers and supervisors at least once every 5 years.
3	Study visits	Learnings can be enhanced by visiting institutions or places where good practices have already been well established
4	Professional growth opportunities	Adequate professional growth opportunities should be built into the MSWM hierarchy to encourage supervisory staff members to remain in the department and hence avoid attrition.

(Source: Municipal Solid Waste Management Manual 2016)

Appendix 2.5

(Reference: Paragraph 2.19.4)

ULB wise summary of air quality monitoring by SPCB

S.N.	Name of ULBs	Number of samples taken for air quality monitoring					Number of instances where atleast one test done during last 5 years
		2017-18	2018-19	2019-20	2020-21	2021-22	
1	Akodia	0	0	0	0	0	0
2	Balaghat	5	0	4	4	1	4
3	Barghat	0	0	2	1	1	3
4	Beohari	0	0	0	0	0	0
5	Betul	1	2	0	2	4	4
6	Bhind	2	0	5	2	1	4
7	Bhopal	0	2	0	1	1	3
8	Damoh	2	8	4	2	3	5
9	Dhar	2	1	2	8	0	4
10	Gwalior	0	0	0	0	0	0
11	Indore	2	6	4	22	20	5
12	Jabalpur	0	2	6	1	2	4
13	Kareli	1	0	2	0	1	3
14	Khirkiya	0	0	3	0	0	1
15	Kukshi	0	0	0	0	0	0
16	Maihar	1	1	1	1	2	5
17	Malanpur	0	0	0	0	0	0
18	Mandleshwar	0	0	0	0	0	0
19	Mandsaur	1	4	21	2	2	5
20	Morena	3	2	3	3	3	5
21	Nalkheda	0	0	0	0	0	0
22	Niwari	0	0	0	0	0	0
23	Orchha	0	0	0	0	0	0
24	Pichhore	3	1	0	0	0	2
25	Piplanarayanwar	1	2	2	4	4	5
26	Polaykalan	0	0	0	0	0	0
27	Ratlam	2	5	12	0	4	4
28	Sagar	3	2	2	2	6	5
29	Sanchi	0	2	2	0	0	2
30	Satna	1	1	1	1	2	5
31	Shahdol	3	4	4	3	1	5
32	Shivpuri	0	2	0	1	1	3
33	Uchehara	0	1	1	1	2	4
34	Vidisha	1	2	1	1	1	5
No. of ULBs where Monitoring was done at least once in a year		17	19	20	19	20	95
Total number of tests to be done in 34 ULBs during 5 years (1*34*5)							170
Shortfall in testing (in No.)							75
Shortfall in testing (in %)							44.12

(Source: Annual Reports on SWM Rule 2016 submitted to CPCB by MPPCB)

Appendix 2.6

(Reference: Paragraph 2.19.4)

ULB wise summary of water quality monitoring by SPCB

S.N.	Name of ULBs	Number of samples taken for water quality monitoring					Number of instances of Monitoring @ three times during the last 5 years (three or more considered as three)
		2017-18	2018-19	2019-20	2020-21	2021-22	
1	Akodia	0	0	0	0	0	0
2	Balaghat	4	2	2	0	1	8
3	Barghat	3	2	2	2	1	10
4	Beohari	0	0	0	0	0	0
5	Betul	3	0	0	6	3	9
6	Bhind	1	1	4	3	3	11
7	Bhopal	0	0	1	1	1	3
8	Damoh	4	2	4	4	2	13
9	Dhar	0	0	2	6	0	5
10	Gwalior	3	1	1	0	0	5
11	Indore	36	36	39	41	17	15
12	Jabalpur	4	2	9	2	4	13
13	Kareli	4	1	2	0	2	8
14	Khirkiya	2	0	4	0	0	5
15	Kukshi	0	0	0	0	0	0
16	Maihar	1	1	1	1	1	5
17	Malanpur	0	0	0	0	0	0
18	Mandleshwar	0	0	0	0	0	0
19	Mandsaur	0	3	2	0	1	6
20	Morena	3	1	5	2	2	11
21	Nalkheda	0	0	0	0	0	0
22	Niwari	0	0	0	0	0	0
23	Orchha	0	0	0	0	0	0
24	Pichhore	2	1	2	1	1	7
25	Piplanarayanwar	1	2	2	2	4	10
26	Polaykalan	0	0	0	0	0	0
27	Ratlam	1	1	1	1	1	5
28	Sagar	4	2	4	4	4	14
29	Sanchi	0	1	3	0	0	4
30	Satna	4	1	1	1	1	7
31	Shahdol	3	2	3	5	1	12
32	Shivpuri	1	2	1	2	1	7
33	Uchehara	0	1	1	1	1	4
34	Vidisha	1	1	0	2	1	5
Number of instances of tests done in 34 ULBs @ 3 test per year							202
No. of tests at each selected ULBs @ 3 test per year (5 year x 34 ULB x 3 samples)							510
Shortages where 3 water tests were not carried out							308
Shortage (in %)							60.39

(Source: Annual Reports on SWM Rule 2016 submitted to CPCB by MPPCB)

Appendix 3.1

(Reference: Para 3.2.5)

Statement showing untreated urban sewage merged into the local water bodies

S.N.	Particulars	Years				
		2017-18	2018-19	2019-20	2020-21	2021-22
1	**ULB, Balaghat**					
	Projected population	91,645	92,758	93,886	95,026	96,181
	Sewage generation per year	2,073.93	2,099.11	2,124.64	2,150.44	2,176.58
	Treatment of sewage through Sewerage Treatment Plants (STPs)	0.00	0.00	0.00	0.00	0.00
2	**ULB, Shahdol**					
	Projected population	98,143	99,900	1,01,688	1,03,508	1,05,361
	Sewage generation per year	2,220.98	2,260.74	2,301.20	2,342.39	2,384.32
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
3	**ULB, Beohari**					
	Projected population	28,701	29,350	30,013	30,692	31,385
	Sewage generation per year	649.50	664.19	679.19	694.56	710.24
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
4	**ULB, Mandleswar**					
	Projected population	14,823	15,215	15,619	16,033	16,457
	Sewage generation per year	335.44	344.32	353.46	362.83	372.42
	Treatment of sewage through Sewerage Treatment Plants (STPs)	0.00	0.00	0.00	0.00	0.00
5	**ULB, Barghat**					
	Projected population of ULBs	14,531	14,916	15,311	15,717	16,134
	Sewage generation per year	328.84	337.55	347.45	355.68	365.11
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
6	**ULB, Dhar**					
	Projected population of ULBs	1,12,883	1,15,874	1,18,945	1,22,097	1,25,332
	Sewage generation per year	2,554.53	2,622.23	2,699.09	2,763.05	2,836.27
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
7	**ULB, Vidisha**					
	Projected population of ULBs	1,87,284	1,92,247	1,97,342	2,02,571	2,07,939
	Sewage generation per year	4,238.24	4,350.55	4,478.08	4,584.19	4,705.67
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
8	**ULB, Niwari**					
	Projected population of ULBs	28,491	29,246	30,021	30,816	31,633
	Sewage generation per year	644.74	661.83	681.23	697.37	715.85

S.N.	Particulars	Years				
		2017-18	**2018-19**	**2019-20**	**2020-21**	**2021-22**
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
9	**ULB, Orchha**					
	Projected population of ULBs	13,824	14,190	14,566	14,952	15,348
	Sewage generation per year	312.83	321.12	330.53	338.37	347.33
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
10	**ULB, Betul**					
	Projected population of ULBs	1,24,091	1,27,379	1,30,755	1,34,220	1,37,776
	Sewage generation per year	2,073.93	2,099.11	2,130.46	2,150.44	2,176.58
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
11	**ULB, Khirkiya**					
	Projected population of ULBs	27,305	28,029	28,772	29,534	30,317
	Sewage generation per year	617.92	634.29	652.88	668.36	686.07
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
12	**ULB, Piplanarayanwar**					
	Projected population of ULBs	10,322	10,595	10,876	11,164	11,460
	Sewage generation per year	233.58	239.77	246.80	252.65	259.35
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
13	**ULB, Damoh**					
	Projected population of ULBs	1,67,601	1,72,042	1,76,602	1,81,282	1,86,086
	Sewage generation per year	3,792.81	3,893.32	4,007.44	4,102.40	4,211.12
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
14	**ULB, Sanchi**					
	Projected population of ULBs	10,089	10,356	10,631	10,912	11,202
	Sewage generation per year	228.31	234.36	241.23	246.95	253.49
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
15	**ULB, Malanpur**					
	Projected population of ULBs	15,674	16,090	16,516	16,954	17,403

S.N.	Particulars	Years				
		2017-18	**2018-19**	**2019-20**	**2020-21**	**2021-22**
	Sewage generation per year	354.71	364.11	374.78	383.66	393.83
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
16	**ULB, Kukshi**					
	Projected population of ULBs	52,636	54,031	55,463	56,933	58,441
	Sewage generation per year	1,191.16	1,222.72	1,258.56	1,288.38	1,322.53
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
17	**ULB, Mandsaur**					
	Projected population of ULBs	75,795	77,803	79,865	81,981	84,154
	Sewage generation per year	1,715.23	1,760.69	1,812.30	1,855.24	1,904.40
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
18	**ULB, Akodia**					
	Projected population of ULBs	13,993	14,364	14,745	15,135	15,536
	Sewage generation per year	316.66	325.05	334.58	342.51	351.59
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
19	**ULB, Polaykalan**					
	Projected population of ULBs	14,733	15,123	15,524	15,935	16,358
	Sewage generation per year	333.40	342.24	352.27	360.62	370.17
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
20	**ULB, Kareli**					
	Projected population of ULBs	35,942	36,895	37,872	38,876	39,906
	Sewage generation per year	813.37	834.93	859.40	879.76	903.08
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
21	**ULB, Nalkheda**					
	Projected population of ULBs	20,043	20,574	21,120	21,679	22,254
	Sewage generation per year	453.58	465.60	479.25	490.60	503.60
	Treatment of sewage through STPs	0	0	0	0	0
22	**ULB, Pichhore**					

S.N.	Particulars	Years				
		2017-18	**2018-19**	**2019-20**	**2020-21**	**2021-22**
	Projected population of ULBs	14,921	15,317	15,723	16,139	16,567
	Sewage generation per year	337.67	346.62	356.78	365.23	374.91
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
23	**ULB, Shivpuri**					
	Projected population of ULBs	2,16,137	2,21,865	2,27,744	2,33,780	2,39,975
	Sewage generation per year	4,891.19	5,020.80	5,167.97	5,290.43	5,430.63
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
24	**ULB, Satna**					
	Projected population of ULBs	3,36,523	3,45,441	3,54,595	3,63,992	3,73,638
	Sewage generation per year	7,615.52	7,817.33	8,046.47	8,237.14	8,455.42
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
25	**ULB, Uchehara**					
	Projected population of ULBs	22,147	22,734	23,337	23,955	24,590
	Sewage generation per year	501.19	514.47	529.56	542.10	556.47
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
26	**ULB, Maihar**					
	Projected population of ULBs	48,267	49,546	50,859	52,207	53,591
	Sewage generation per year	1,092.29	1,121.23	1,154.10	1,181.45	1,212.75
	Treatment of sewage through STPs	0.00	0.00	0.00	0.00	0.00
Total Sewage generation		**39,921.56**	**40,898.30**	**41,999.71**	**42,926.79**	**43,979.77**
Total sewage treated		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Total of Urban sewage merged into the local water bodies		**39,921.56**	**40,898.30**	**41,999.71**	**42,926.79**	**43,979.77**

(Source: Information provided by the ULBs, and projected population data taken from the United Nations World Population Prospects)

1	Sewage generation at the rate of 114 litres per capita per day (80% of 135 lpcd water supply + six lpcd for fire *etc*.) x 365days.
2	Sewage generation at the rate of 62 litres per capita per day (80% of 70 lpcd water supply + six lpcd for fire *etc*.) x 365days.

Appendix 3.2

(Reference: Paragraph 3.3 (b))

Non-functional Faecal Sludge Treatment Plant

S.N.	Name of ULB	PAC (in ₹)	Work order No. and date	Stipulated Period (in month)	Scheduled date of completion	Date of Completion	Payment made to contractor	FSTP Working or not (Yes/No)	Quantity of sludge brought at FSTP	Quantity of treated faecal sludge (in KLD)
1	Bhind	2,43,393.86	975, 22/02/21	3	21/05/21	During Joint physical inspection it was found completed, final bill not paid	97,211	No	Nil	Nil
2	Dhar	27,43,390	5866, 19/11/18	4	18/03/19	01/02/2021	21,55,850	No	Nil	Nil
3	Kareli	27,76,897	2582, 06/10/20	5	05/03/21	05/03/21	21,12,000	No	170 KLD	
4	Mandsaur	10,30,708	23, 05/09/19	1	04/10/19	21/12/2020	8,48,544	No		
5	Shahdol	22,77,016	4220, 22/11/21	3	21/02/22	Not complete till April 22, (sludge bed only)	8,39,336	No	-	0
6	Akodia	7,33,000	895, 29/01/19	3	28/04/19	29/12/2020	8,91,663	No	1,07,450 L	
7	Beohari	7,33,688	931, 29/09/20	1	28/10/20	Work is completed but final bill not prepared	4,54,682	No	-	0

S.N.	Name of ULB	PAC (in ₹)	Work order No. and date	Stipulated Period (in month)	Scheduled date of completion	Date of Completion	Payment made to contractor	FSTP Working or not (Yes/No)	Quantity of sludge brought at FSTP	Quantity of treated faecal sludge (in KLD)
8	Kukshi	6,63,000	2860, 10/09/2020	1	09/10/20	10/10/2020,	7,99,936	No	Nil	
9	Maihar	5,70,513	1739, 06/12/19	2	05/02/20	16/11/2021,	1,80,528	No	Nil	Nil
10	Malanpur	7,10,571	180, 28/01/22	20 days	15/02/22	15/02/2022	3,07,678	No		
11	Polaykalan	7,33,636	177, 29/01/2019	1	28/02/19	03/2020 ,	2,52,714	No	36,000 L	
12	Sanchi	6,02,734	750, 20/11/2020	6	19/05/21	01/02/2022	4,94,687	No	Nil	
13	Orchha	8,30,000	699, 02/12/2019	3	01/03/20	24/12/19	7,19,748	No	Nil	Nil
14	Uchehara	6,98,487	1528, 17/11/21	2	16/01/22	04/01.2022,	4,87,023	No	Nil	Nil
Total							**1,06,41,598**			

Appendix 3.3

(Reference: Para 3.5(3)(a))

Excess payment to contractor due to non-deployment of specific machinery

S.N.	Name of ULB	Project name/area	PAC	Item No.	Particular	Quantity executed (in cum)	Recovery rate for the respective items per cum	Contractor Percentage	Amount (in ₹)
1	Bhind	Sewage		6.1	Construction of DLC	7,342.85	190	12.29%	15,66,604
				6.5	Construction of PQC M-30 grade	14,274.69	329	12.29%	52,73,557
				4.1	GSB	1,842	51	12.29%	1,05,487
				4.3	WBM GR-III	1,557	51	12.29%	89,166
2	Gwalior	Sewage network of Lashkar		4.3	WBM GR-III	32,446.46 (81,116.15*0.4)	51	(-)11.165%	14,70,014
				6.1	Construction of DLC	12,022.90 (60,114.54x0.2)	190	(-)11.165%	20,29,303
				6.5	Construction of PQC M-30 grade	12,022.90 (60,114.54x0.2)	329	(-)11.165%	35,13,899
		Sewage network of Morar		4.3	WBM GR-III	17,072.73	51	1.50%	8,83,770
				6.1	Construction of DLC	6,675.754	190	1.50%	12,87,419
				6.5	Construction of PQC M-30 grade	6,675.754 (33,378.77x0.2)	329	1.50%	22,29,268
3	Indore	Sewage (M/s N.P. Patel)	96.21	4.1	GSB	34,144.67	51	(-)6.71%	16,24,532
				6.3	Construction of PQC M-40 grade	558.49	335	(-)6.71%	1,74,540
				6.11	Construction of PQC M-20 grade	2,864.59	319	(-)6.71%	8,52,249

S.N.	Name of ULB	Project name/area	PAC	Item No.	Particular	Quantity executed (in cum)	Recovery rate for the respective items per cum	Contractor Percentage	Amount (in ₹)
			96.21	4.1	GSB	8,305.93	51	(-)6.71%	3,95,178
				6.3	Construction of PQC M-40 grade	873.39	335	(-)6.71%	2,72,952
		Sewage (M/s Laxmi constructions)	183.6	4.1	GSB	42,150.37	51	11.84%	24,04,190
				6.3	Construction of PQC M-40 grade	2,437.91	335	11.84%	9,13,397
				6.11	Construction of PQC M-20 grade	14,727.88	319	11.84%	52,54,460
			183.6	4.1	GSB	3,062.03	51	11.84%	1,74,660
				6.11	Construction of PQC M-20 grade	875.97	319	11.84%	3,12,533
4	Vidisha	Vidisha Sewage	89.61	4.1	GSB	31,760.96	51	6.79%	17,29,794
				4.3(i)(b)	WBM	4,391.56	51	6.79%	2,39,177
				4.3(ii)(b)	WBM	14,032.9	51	6.79%	7,64,272
				4.3(iii)(b)	WBM	2,063.98	51	6.79%	1,12,410
				6.1	DLC	17,049.63	190	6.79%	34,59,387
				6.5	PQC M-30	16,042.32	329	6.79%	56,36,294
5	Bhopal	Bhoj Wetland and ADB	145	4.1	GSB	15,913.07	51-10%=45.9	38.97% (+12%GST)	11,36,857
				6.1	DLC	9,863.01	190-10%=171	38.97% (+12%GST)	26,25,093
				6.3	PQC M-40	254.67	335-10%=301.5	38.97% (+12%GST)	1,19,510
				6.5	PQC M-30	616.17	329-10%=296.10	38.97% (+12%GST)	2,83,974

S.N.	Name of ULB	Project name/area	PAC	Item No.	Particular	Quantity executed (in cum)	Recovery rate for the respective items per cum	Contractor Percentage	Amount (in ₹)
				6.11	PQC M-20	14,973.19	319-10%=287.10	38.97% (+12%GST)	66,90,932
		Kolar Sewage	135.14	4.1	GSB	22,200.01	51-10%=45.9	19.87%(+12%GST)	13,68,026
				6.1	DLC	18,838.8	190-10%=171	19.87%(+12%GST)	43,24,918
				6.3	PQC M-40	309.64	335-10%=301.5	19.87%(+12%GST)	1,23,109
				6.11	PQC M-20	29,377.9	319-10%=287.10	19.87%(+12%GST)	1,13,23,547
		Shapura Sewage	105.35	4.1	GSB	31,205.12	102-10%=91.8	31.93%(+12%GST)	42,32,823
				6.1	DLC	13197	190-10%=171	31.93%(+12%GST)	29,77,247
				6.5	PQC M-30	202.32	329-10%=296.10	31.93%(+12%GST)	88,519
				6.11	PQC M-20	19,877.33	319-10%=287.10	31.93%(+12%GST)	84,32,432
6	Morena	Sewage		4.3(ii)(a)	WBM	49,968	102	2.45%	52,21,606
				4.3(iii)(a)	WBM	22,411	102	2.45%	23,41,927
				6.1	DLC	32,886.01	190	2.45%	64,01,426
				6.11	PQC M-20	64,139.66	319	2.45%	2,09,61,835
7	Sagar	Sewage	282.61	6.1	DLC	30,365.94	190	5.83% above	61,05,892
			282.61	6.3	PQC-M40	7,736.61	335	5.83% above	27,42,864
8	Ratlam	Sewage	120.54	4.1	GSB	17,419.23	51	13.38%	10,07,246.07

S.N.	Name of ULB	Project name/area	PAC	Item No.	Particular	Quantity executed (in cum)	Recovery rate for the respective items per cum	Contractor Percentage	Amount (in ₹)
				4.3(i)(b)	WBM	13,506.58	51	13.38%	7,81,001.78
				4.3(ii)(b)	WBM	13,452.33	51	13.38%	7,77,864.84
				4.3(iii)(b)	WBM	4,762.36	51	13.38%	2,75,377.75
				6.1	DLC	12,608.79	190	13.38%	27,16,210.76
				6.5	PQC M-20	21,644.41	329	13.38%	80,73,802.15
Total									**14,39,02,552**

Appendix 3.4

(Reference: Para 3.5(3)(b))

Excess payment due to execution of lesser thickness

S.N.	Name of Project	Name of items	Thickness as per DPR	Thickness/item executed	Length (in M)	Width (in M)	Depth (in M)	Qty (in Cum)	SOR rate (in ₹)	Amount (in ₹)	Amount per Sqm (in ₹)	Add/Deduct tender %	Amount in Sqm.	Qty (in Cum)	Amount (in ₹)
1	2	3	4	5	6	7	8 (5-4)	9 (6*7*8)	10	11 (9*10)	12 (11/6)	13	14	15	16
1	Gwalior Lashkar	BM	75 mm	50 mm	15	1	0.025	0.375	5,565	2,087	2,086.87/15=139.125	(-)11.165%	123.6	81,116.15	1,00,25,956
2		BC	75 mm	SDBC 25mm	15	1	0.05	0.75	8,223	6,167.25	6,167.25/15=411.15	(-)11.165%	365.25	81,116.15	2,96,27,674
3	Gwalior Murar	BM	75 mm	50 mm	15	1	0.025	0.375	5,565	2,087	2,086.87/15=139.125	1.50%	141.21	42,681.84	60,27,103
4		BC	75 mm	SDBC 25mm	15	1	0.05	0.75	8,223	6,167.25	6,167.25/15=411.15	1.50%	417.31	42,681.84	1,78,11,559
Total									27,576						**6,34,92,291**

Appendix 3.5

(Reference: Para 3.5(3)(e))

Statement showing payment on account of excavated earth

S.N.	Name of Project	Lead	Qty of transported earth	rate	Tender %	Amount (in ₹)
1	Kolar Project	Upto 5 Km	1,55,993.9	87.70	19.87	1,63,99,013
		Upto 1 km	92,254.71	54.90	19.87	60,71,156
2	Shahpura Project	Upto 5 Km	72,546.42	87.7	31.93	83,93,810
3	Bhoj wetland /ADB	Upto 5 Km	1,10,951.1	87.3	38.97	1,34,60,672
		Upto 10 km	5,712.51	123	38.97	9,78,839
			4,37,458.6			4,53,03,491
					12% GST	54,36,419
Total						**5,07,39,909**

Appendix 3.6

(Reference: Para 3.5(3)(f))

Non-deduction of royalty charges

S.N.	Name of ULB	Project	PAC (in crore)	Work Order date	Period of Contract (In months)	Item					
						ITEM	Ex. Qty	Sand	Metal	Royalty rate	Amount (in ₹)
1	Gwalior	Lashkar Sewage	195.11	28/09/2017	24	BM	4,055.8	0	3,853.01	120	4,62,361
						SDBC	1,622.32	0	1,541.2	120	1,84,944
						WBM	32,446.46	0	32,446.46	120	38,93,575
		Morar Sewage	204.90	25/09/2017	36	BM	2,134.09	0	2,027.38	120	2,43,286
						SDBC	853.63	0	810.94	120	97,313
						WBM	17,072.73	0	17,072.73	120	20,48,728
2	Morena	Morena Sewage	125.00	12/07/2016	24	Construction of DLC (Metal 0.725/cum and Sand 0.363/cum)	32,886	11,938	23,842	100	35,78,000
						CC M-20 (Metal 0.856/cum and Sand 0).471/cum)	64,243	30,258	54,992	100	85,25,000
						WBM Gr-II (Metal 0.67/cum)	49,968	0	33,479	100	33,47,900
						WBM Gr-III (Meatal .67/cum)	22,411	0	15,015	100	15,01,500
3	Indore	Sewage	96.21	24/01/2018	24	GSB	46,223.69	7,412.73	6,964.83	120/125	82,73,068
			183.60	28/12/2017	24	GSB	42,980.14	33,210.78	58,156.76	120/125	1,52,07,427
			230.50	25/07/2018	36	Stone dust	56,245.98	2,079.16	4,000.99	120/125	78,46,824
Total											**5,52,09,926**

Appendix 3.7
(Reference: Para 3.5(3)(g))
Non-levy of penalty for delay

S.N.	Name of ULB	Project name	Contract value	Date of Work order	Period (in months)	Scheduled date of completion	Actual Date of completion	Delay period (in months)	Penalty to be levied (in ₹)
1	Gwalior	Gwalior-Morar	2,07,96,79,485	25/09/2017	24	24/09/2019	31/03/2022	30	20,79,67,948
2	Gwalior	Gwalior-Laskar	1,73,32,61,508	04/10/2017	24	03/10/2019	02/02/2022	31	17,33,26,150
3	Morena	Morena	1,25,00,00,000	12/07/2016	24	11/07/2019	30/12/2021	32	12,50,00,000
4	Bhind	Bhind	79,50,00,000	08/12/2017	24	07/12/2019	not completed	33	7,95,00,000
5	Satna	Satna	1,91,56,81,218	05/12/2016	36	04/12/2019	Foreclosed on 28/05/2021	34	19,15,68,122
6	Indore	Nalla tapping	89,75,00,000	24/01/2018	24	23/01/2020	not completed	36	8,97,50,000
		Sewage	1,83,60,00,000	28/12/2017	24	27/12/2019	not completed	37	18,36,00,000
7	Sagar	Sewage	2,99,10,56,000	08/07/2016	36	06/07/2019	not completed	36	29,91,05,600
Total									**134,98,17,820**

Appendix 3.8
(Reference: Para 3.5(3)(h))
Statement showing non-recovery of cost of Hard rock

S.N.	Name of ULB	Qty. of excavated hard rock (in cum) (A)	Qty. of Hard rock for which recovery has been done (B)	Balance quantity of Hard rock (A-B)	Recovery rate/cum (in ₹)	Amount (in ₹)
1	Sagar	1,31,366.82	0	1,31,366.82	200	2,62,73,364
2	Bhopal (Kolar Project)	28,473.33	0	28,473.33	200	56,94,666
3	Bhopal (ADB Project)	10,715.89	0	17,890.89	200	35,78,178
4	Bhopal (Shahpura Project)	29,548.31	0	29,548.31	200	59,09,662
Total						**4,14,55,870**

Appendix 3.9

(Reference: Para 3.5(10))

Statement showing incorrect adoption of rate for filling

As per ISSR of Water Supply, Sewerage and Tube well works		As per ISSR of building works	
Particular of item	**Item No/Rate**	**Particular of item**	**Item No/Rate**
Earth work in excavation for pipe trenches in all kinds of soil	15.1/129.10	Earth work in excavation by mechanical/manual means in foundation trenches or drain	2.8/129.00
Filling available excavated earth in trenches, plinth side of foundation in layer not exceeding 20cm in depth i/c consolidation of each layer	15.8/29.00	Filling available excavated earth in trenches, plinth side of foundation in layer not exceeding 20cm in depth i/c consolidation of each layer	2.25/59.00

Appendix 3.10

(Reference: Para 3.5(11) & 3.5(12))

Statement showing lumpsum payment and varied cost per MLD on construction of STPs

S.N.	Name of ULB	Project	PAC (in crore)	Tender %	No. of STP	Location	Capacity of STP (in MLD)	Cost of STP as per estimate(₹ in crore)	Payment towards STP (₹ in crore)	Estimated Cost Per MLD (Col.8/Col.9) (₹ in crore)
1	2	3	4	5	6	7	8	9	10	11
1	Vidisha	Vidisha	86.9	6.79	1	Jatrapura	22.25	17.8	18.16	0.80
2	Bhopal	Bhoj Wetland ADB	145	38.97	1	Professor Colony	2	3.17	4.94	1.59
					1	Sireen River	5	6.47	10.08	1.29
					1	MaholiDamkheda	35	30.75	47.86	0.88
		Kolar	135.15	19.87	1	Misrod (Maksi)	20.5	21.5	28.86	1.05
					1	Sankhedi	32	28.2	37.86	0.88
		Shahpura	105.35	31.93	1	Jamunia	3.5	7	6.42	2.00
					1	Bansal Hospital	9.5	10.5	15.51	1.11
					1	Char Imli	4.5	5.5	8.13	1.22
					1	Neelbad	6	7	10.35	1.17
3	Sagar	AMRUT	282.61	5.83	1	Pathariya Hat	43	38.7	43.34	0.90
4	Morena	AMRUT	125	2.456	1	Jauri	25	22.55	26.47	0.90
5	Indore	AMRUT	164.16	11.845	5	Pratiksetu	8	8.14	8.14	1.02
						Bilalpur	7	7.12	7.12	1.02
						Radhaswami	6	6.11	6.11	1.02
						Naharbhandara	11	11.19	11.19	1.02
						Zoo	35	27.34	27.34	0.78
		ABD	230.5	3.03	1	ABD Area	10	10.37	10.37	1.04
6	Gwalior	Lashkar	195.11	-11.165	2	Jalalpura	145	105.79	93.99	0.73
						Near NRI college	4	3.37	29.99	0.84
		Morar	204.9	1.49	2	Shatabadipuram	8	5.8	5.89	0.73
						Lalitpura	65	54.75	55.57	0.84
7	Bhind	Bhind	70.8	12.29	1	Ratnupura	12	12	13.48	1.00
Total									**537.17**	

GLOSSARY OF ABBREVIATIONS

Glossary of Abbreviations

S.N.	Abbreviation	Description
1	3Rs	Reduce, Reuse and Recycle
2	ADB	Asian Development Bank
3	AMPRI	Advanced Materials and Processes Research Institute
4	AMRUT	Atal Mission for Rejuvenation and Urban Transformation
5	BG	Bank Guarantee
6	Bio-CNG	Bio-compressed natural gas
7	BM	Bituminous Macadam
8	BOD	Biological oxygen demand
9	BT	Bituminous
10	C&D Waste	Construction and Demolition Waste
11	CB	Capacity Building
12	CBOs	Community-based organizations
13	CC	Cement concrete
14	CCA	Combined Consent Authorisation
15	CMP	City Master Plan
16	COD	Chemical Oxygen Demand
17	CPCB	Central Pollution Control Board
18	CPHEEO	Central Public Health and Environmental Engineering Organisation
19	CSIR	Council of Scientific and Industrial Research
20	CSP	City Sanitation Plan
21	CSTF	City Sanitation Task Force
22	CTE	Consent to Establish
23	CTO	Consent to Operate
24	DI	Ductile Iron
25	DM	District Magistrate
26	DPRs	Detailed Project Reports
27	DTDC	Door-to-Door Collection
28	EIA	Environment Impact Assessment
29	EPR	Extended producer's responsibility
30	FSM	Faecal Sludge Management
31	FSSM	Faecal Sludge and Septage Management
32	FSTP	Faecal Sludge Treatment Plant
33	GCC	General conditions of contract
34	GIS	Geographic Information Systems
35	GMC	Gwalior Municipal Corporation
36	GoI	Government of India
37	GoMP	Government of Madhya Pradesh
38	GPS	Global Positioning System

S.N.	Abbreviation	Description
39	GSB	Granular Sub-base
40	GST	Goods and Service Tax
41	HDPE	High Density Polyethylene
42	HPC	High Powered Committee
43	HRIDAY	Heritage City Development and Augmentation Yojana
44	ICBP	Integrated Capacity Building Program
45	ICCC	Integrated Command and Control Centre
46	IDEA	Interactive Data Extraction and Analysis
47	IEC	Information, Education & Communication
48	IMC	Indore Municipal Corporation
49	ISSR	Integrated Standard Schedule of Rates
50	ISWM	Integrated Solid Waste Management
51	JMC	Jabalpur Municipal Corporation
52	JPV	Joint Physical Verifications
53	LD	Liquidated Damages
54	LOA	Letter of Acceptance
55	LPCD	Litres per capita per day
56	M&E	Monitoring and Evaluation
57	MC	Municipal Corporation
58	MCl	Municipal Council
59	MIC	Mayor in Council
60	MIS	Management information system
61	MLD	Million litres per day
62	MoEF	Ministry of Environment and Forests
63	MoEFCC	Ministry of Environment, Forest and Climate Change
64	MoUD	Ministry of Urban Development
65	MPERC	Madhya Pradesh Electricity Regulatory Commission
66	MPPCB	Madhya Pradesh Pollution Control Board
67	MPs	Micro plastics
68	MPWD	Madhya Pradesh Public Works Department
69	MRF	Material Recovery Facility
70	MSW	Municipal Solid Waste
71	MSWM	Municipal Solid Waste Management
72	MT	Metric Tonne
73	MTPA	Million Tonnes per Annum
74	NACOF	M/s National Federation of Farmers Procurement Processing and Retailing Cooperative of India
75	NARC	National Advisory and Review Committee
76	NGOs	Non-Governmental Organizations
77	NGT	National Green Tribunal
78	NIT	Notice Inviting Tender

S.N.	Abbreviation	Description
79	NN	Nagar Nigam (Municipal Corporation)
80	NOAA	United State National Oceanic and Atmospheric Administration
81	NPP	Nagar Palika Parishad
82	NULM	National Urban Livelihoods Mission
83	NVVN Ltd	NTPC Vidyut Vyapar Nigam Limited
84	O&M	Operation and Maintenance
85	OCEMS	Online Continuous Effluent Monitoring Systems
86	PDMC	Project Development Management Consultant
87	pH	Potential of Hydrogen
88	PHED	Public Health Engineering Department
89	PPE	Personal Protection Equipment
90	PQC	Pavement Quality Concrete
91	PWM Rules, 2016	Plastic Waste Management Rules, 2016
92	R. Bill	Running bill
93	RA Bill	Running Account bill
94	RCC	Reinforced Cement Concrete
95	RDF	Refuse Derived Fuel
96	RFP	Request for proposal
97	RWAs	Resident Welfare Associations
98	SBM	Swachh Bharat Mission
99	SBM (U)	Swachh Bharat Mission (Urban)
100	SEIAA	State Environment Impact Assessment Authority
101	SHGs	Self-help groups
102	SLAC	State-level advisory committee
103	SLBs	Service Level Benchmarks
104	SOP	Standard Operating Procedure
105	SOR	Schedule of Rates
106	SPCB	State Pollution Control Board
107	SPV	Special Purpose Vehicle
108	Sqm	Square Metre
109	SSTS	Sewerage and Sewage Treatment Systems
110	STPs	Sewage Treatment plants
111	SW	Solid Waste
112	SWM	Solid Waste Management
113	SWM Rules	Solid Waste Management Rules 2016
114	TPD	Tonnes Per Day
115	TSS	Total Suspended Solids
116	UADD	Urban Administration and Development Directorate
117	UDD	Urban Development Department
118	UDHD	Urban Development and Housing Department

S.N.	Abbreviation	Description
119	ULBs	Urban Local Bodies
120	UTs	Union Territories
121	W to C	Waste to Compost
122	*w.r.t*	with reference to
123	WBM	Water Bound Macadam
124	WtE	Waste to Energy
125	WTPs	Water Treatment Plants
126	XGN	Extended Green Node

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