Chapter V: Processing and disposal of solid waste

SWM Rules, 2016 defines processing of waste as any scientific process by which segregated solid waste is handled for the purpose of reuse, recycling or transformation into new products. Indian laws and rules do not permit disposal of organic matter into sanitary landfills and mandate that only inert rejects (residual waste) from processing facilities, inert street sweepings, etc. can be landfilled. This chapter covers status of establishing and operation of solid waste processing plants, landfill sites and legacy wastes.

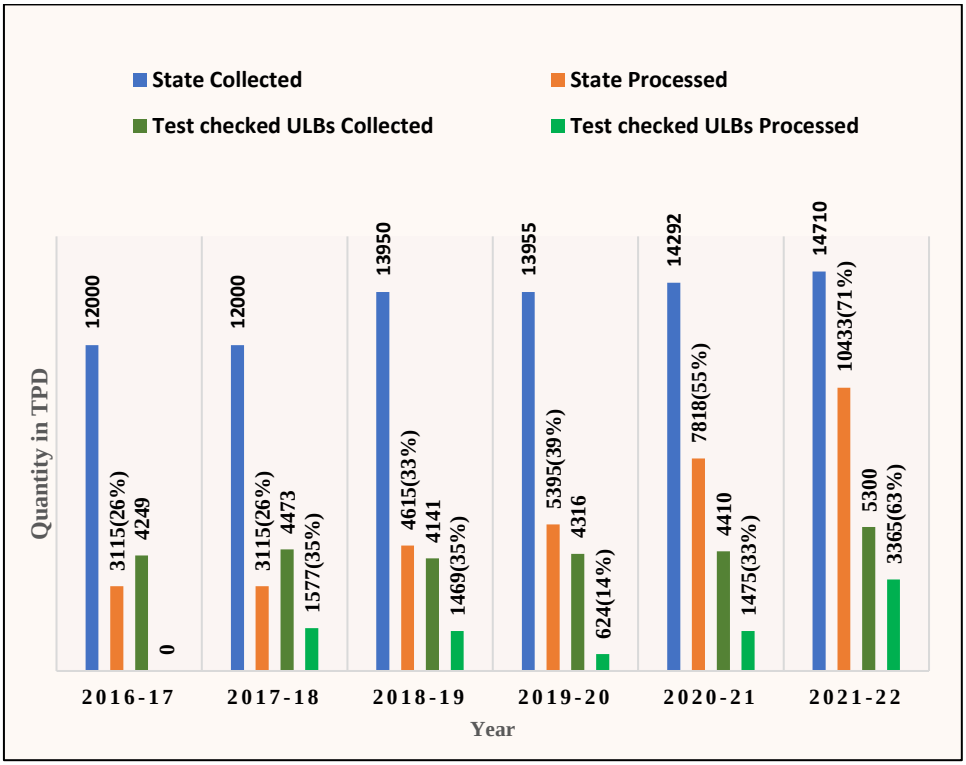
Brief snapshot of the Chapter:

- At the State level between 26 to 71 *per cent* of waste was processed during the year 2016-22 out of the total waste collected and at the ULBs level, between zero to 63 *per cent* waste was processed during the year 2016-22.
- Against the sanctioned 32 solid waste processing plants under Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Air Field Town scheme and State Sector scheme during 2005-15, only 20 plants were established of which only 15 plants were operational.
- Against 36 solid waste processing plants under Swachh Bharat Mission (Urban) scheme, the civil work of 19 plants was completed, however, these plants could not be made functional as machinery was not purchased.
- Operation and maintenance of solid waste processing plants were found deficient in test-checked ULBs.
- Out of 45 test-checked ULBs, 42 ULBs were allocated land for establishment of processing and disposal facilities for solid waste. However, in 36 ULBs, the allocated land was found to be insufficient as compared to the norms.
- Quantity of legacy waste had increased due to lack of proper disposal of waste in ULBs. The estimated legacy waste in 72 ULBs was 84.58 lakh metric ton. The quantity of legacy waste in the remaining ULBs could not be assessed due to not conducting of survey.

5.1 Status of processing of solid waste

The status of solid waste collected and processed in the State and in test-checked ULBs during the period 2016-22 is detailed in ***Appendices 5.1 (A)*** and ***5.1 (B)*** and depicted in **Chart 5.1**.

Chart 5.1: Status of waste processing against collection at State and test-checked ULB levels



(Source: Information furnished by Director LB and test- checked ULBs)

As detailed in **Chart 5.1**, during 2016-22, solid waste processed against waste collected at the State level ranged between 26 and 71 *per cent* and at the test-checked ULBs level, it ranged between zero and 63 *per cent* respectively**.** Thus, the status of waste processing in the State improved over the years from 26 *per cent* (2016-17) to 71 *per cent* (2021-22). Further, as detailed in ***Appendix 5.1 (A)***, during 2016-22, solid waste processed against waste generated at the State level ranged between 20 and 71 *per cent* and at the test-checked ULBs level, it ranged between zero and 60 *per cent* respectively**.**

5.2 Establishment of solid waste processing plant

As per Rule 15 (v) of the SWM Rules, 2016, local authorities are responsible for facilitating construction, operation and maintenance of solid waste processing facilities and associated infrastructure. These facilities can be developed by the local authorities themselves with private sector participation or through any agency with the aim of maximizing the utilization of different components of solid waste and adopting suitable technologies. The local authorities must adhere to the guidelines issued by Ministry of Urban Development and the standards prescribed by Central Pollution Control Board (CPCB). Preference should be given to decentralized processing methods[1] to minimize transportation costs and environmental impacts.

[1] Bio-methanation, microbial composting, vermi-composting, anaerobic digestion or any other appropriate processing for bio-stabilization of biodegradable wastes.

Further, according to Rule 22 of the SWM Rules, 2016, all local bodies with a population of one lakh or more are required to establish a solid waste processing facility within two years.

During the period of 2004-2015, State Government sanctioned 32 solid waste processing plants[2] with cumulative capacity of 8,550 TPD under various schemes[3]. Additionally, in the year 2020-22, 36 solid waste processing plants with cumulative capacity of 4,305 TPD were sanctioned under SBM (Urban) scheme for 36 ULBs of the State. Furthermore, three plants in NN Ghaziabad and one screening/processing machine in NP Khanpur Bulandshahr were to be established, which was funded by under the Central Finance Commission (CFC) grant.

5.2.1 Status of processing plants sanctioned under JNNURM, AFT and State Sector Schemes

Construction & Design Services (C&DS), Uttar Pradesh Jal Nigam was nominated as executive agency for setting up 32 solid waste processing plants sanctioned under JNNURM, AFT and State Sector Schemes during 2005-15. However, only 20 plants were established by C&DS, of which only 15 plants were operational and five plants were non-operational. Remaining 12 plants were not established. The status of these plants is given in ***Appendix 5.2*** and summarised in **Table 5.1**.

Table 5.1: Status of solid waste processing plant as on March 2022 sanctioned under JNNURM, AFT and State Sector Schemes

(₹ in crore)

Status of solid waste processing plant	Number of plant	Sanctioned amount
Established plants		
Operational plants	15	325.75
Non-operational plant[4]	5	41.55
Total	**20**	**367.30**
Not established plants		
Civil work completed but machinery not installed	1	11.81
Under construction	6	58.27
Land unavailable	2	23.13
Land dispute	3	54.89
Total	**12[5]**	**148.10**
Grand Total	**32**	**515.40**

(Source: Information provided by C&DS UP Jal Nigam and Directorate LB)

[2] 2004-05 (one plant), 2005-06 (one plant), 2006-07 (16 plants), 2007-08 (11 plants), 2011-12 (one plant) and 2014-15 (two plants).

[3] 27 plants were sanctioned under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) scheme, two plants were sanctioned under Air Field Town (AFT) scheme and remaining three projects under State Sector.

[4] Directorate LB did not provide reason for not operational plants at NPP Barabanki, Mainpuri and Raebarelli. Further, as per information provided by Directorate LB: (i) After operation of the plant in NN Bareili for about one year, plant was shut down due to objection of the NGT and (ii) In case of NPP Fatehpur, the plant ceased to operate due to dispute with the operator.

[5] Directorate LB stated in its reply (July 2023) that target for completion of 12 plants is December 2024.

Furthermore, audit observed that a total amount of ₹ 421.68 crore was released to C&DS Jal Nigam for the establishment of 32 solid waste processing plants. Out of this amount, ₹ 361.95 crore was utilised, while ₹ 59.73 crore remained unutilised with C&DS Jal Nigam due to various reasons[6]. As of July 2023, the remaining balance amount earned interest of ₹ 29.97 crore. Consequently, a total amount of ₹ 89.70 crore was blocked at the executing agency level, as detailed in ***Appendix 5.3***.

In reply (June 2023), the State Government stated that the issues causing the plants to be stuck or non-operational had been resolved between 2019 and 2022. State Government further stated that 10 plants had been constructed and the Detailed Project Reports (DPRs) for two other plants had been approved. Additionally, a new tender has been floated for operating the MSW processing plant in NPP Raebareli.

However, the response provided by the State Government is not acceptable, as the further status of these processing plants provided (July 2023) by the Directorate Local Body specified that 12 plants could not be established till date and five plants remained non-operational despite establishment. Furthermore, the reply did not address the issue of the fund blockade at the executing agency level. Deficiencies in case of these processing plants are discussed in Paragraphs 5.3.1, 5.3.2, 5.3.3 and 5.3.4.

5.2.2 Status of processing plants sanctioned under SBM scheme

Audit observed that C&DS UP Jal Nigam was executing agency for 36 solid waste processing plants sanctioned to be set up under SBM (Urban) scheme in 36 ULBs of the State. Out of the sanctioned cost[7] of ₹ 370.41 crore, a total of ₹ 323.38 crore was released[8] to the ULBs for civil works and an expenditure of ₹ 278.01 crore was incurred as detailed in ***Appendix 5.4*** and summarised in **Table 5.2**.

Table 5.2: Status of civil work of solid waste processing plants sanctioned under SBM scheme in the State

Status of plant	No. of ULBs	Capacity of plant (in TPD)	(₹ in crore)		
			Sanctioned cost	Released amount	Expenditure
Civil work completed and handed over	14	1370	119.87	118.75	110.55
Civil work completed	5	395	43.56	42.38	37.05
Civil work in progress	14	2390	188.97	153.24	129.96
Civil work not started	2	100	10.59	5.30	0
Civil work stopped due to dispute	1	50	7.42	3.71	0.45
Total	**36**	**4305**	**370.41**	**323.38**	**278.01**

(Source: Information provided by Directorate LB)

[6] Land dispute, land unavailable, plant under construction, completion of plant in less than released amount.

[7] The amount was sanctioned to various ULBs during October 2021, November 2021 and December 2021.

[8] The amount was released in instalments to various ULBs in the months of November 2021, December 2021, May 2022, August 2022, October 2022, January 2023, February 2023, March 2023 and June 2023.

As evident from **Table 5.2**, civil work of 17 solid waste processing plants was yet to be completed. Further, the remaining 19 plants where the civil work was completed, still could not be made functional as of June 2023 as machinery for these plants were not purchased.

Audit observed that in case of six[9] ULBs, where processing plant was of more than 200 TPD capacity, plants were to be operated under public-private partnership (PPP) model and machinery was to be purchased by ULBs/concessionaire. However, machinery for these six processing plants were not purchased till date (July 2023). In remaining 30 ULBs, funds for purchase of machinery were to be provided by the State Government. However, the State Government was yet to release fund to ULBs (July 2023).

Furthermore, in the case of one plant in Tanda, Ambedkar Nagar, an amount of ₹ 45.32 lakh was spent on civil work for the plant. However, the work was stopped (April 2022) due to land dispute.

In reply (June 2023), the State Government stated that 14 plants would become functional from June 2023 and an additional 22 plants would be operational by December 2023. However, the provided response lacks basis as the civil work of 17 plants was still incomplete and no funds had been released for the installation of machinery in any of the plants up to July 2023. Further, the alternative site for Tanda Ambedkar Nagar plant was yet to be provided to the executing agency (August 2023).

5.2.3 Status of processing plants funded under CFC grants

5.2.3.1 Unfruitful expenditure on solid waste processing plant, Pratap Vihar, Ghaziabad

Treatment and disposal plant with a capacity of 300 metric tons per day was sanctioned (September 2014) at an estimated cost of ₹ 4.61 crore in Pratap Vihar, Ghaziabad. The funds were released[10] to the executing agency, C&DS, UP Jal Nigam. The construction of the plant was scheduled to be completed by March 2016.

Audit observed that C&DS reported (May 2017) completion of the work at a cost of ₹ 4.61 crore. In view of inventory furnished by the executing agency, a joint committee consisting of representatives of NN and the executing agency was formed in May 2017 to assess the functionality and physical condition of the plant. The committee's report highlighted deficiencies[11] of equipment and machinery and the non-functional status of the plant, which prevented its takeover. However, the construction agency did not take any initiative to make the plant functional. In December 2021, the *Nagar Ayukt* requested C&DS UP Jal Nigam to hold the responsible officers accountable and hand over the project to the NN as per the original proposal. During a JPV conducted (January 2022) by the audit team and the NN, it was confirmed that the plant was non-functional and

[9] NN Bareilly, NN Firozabad, NN Gorakhpur, NN Jhanshi, NN Saharanpur, NPP Loni Ghaziabad.

[10] ₹ 2.30 crore in March 2013 and another instalment of ₹ 2.30 crore in November 2014.

[11] Sewer pump uninstalled, one JCB (cost ₹ 27 lakh) and two tractors (cost ₹ 12 lakh) not purchased, electric supply line damaged.

the trommel[12] at the site was in a deteriorated condition. However, as of January 2023, the plant was not made operational.

As a result, a substantial amount of legacy waste, approximately five lakh metric tons accumulated at the Pratap Vihar dump site and an expenditure of ₹ 15.40 crore was incurred for the disposal of this waste during December 2021 to July 2022.

In reply (June 2023), the State Government stated that NN had requested the executive agency to make the plant functional and hand it over to the NN.

5.2.3.2 Abnormal delay in setting up waste to energy project in NN Ghaziabad

GoUP made the decision to establish[13] a Waste to Energy plant (W2E) and a letter of acceptance was issued to G C International Netherland (Developer) in November 2018. In October 2019, a lease deed was executed between the developer and NN Ghaziabad to setup the plant. NN leased out 1,21,082 sqm of land to the developer for a period of 30 years, at an estimated annual rent of ₹ 1.21 lakh. The plant was projected to have a daily capacity of around 2,300 MT of solid waste, which would generate 50 to 60 MW of power to be exported to the grid under a power purchase agreement on PPP model.

Audit observed that Ghaziabad Development Authority (GDA) transferred 39.29 acres of land to the NN, and the NN acquired an additional 4.96 acres of land from farmers, incurring an expenditure of ₹ 14.28 crore. In spite of repeated correspondences by the NN, the developer did not respond and the work could not be commenced. As a result, in October 2020, the NN referred the matter to the GOUP, requesting their intervention to direct the developer to commence the work. Additionally, the NN raised (February 2021) concerns about the financial viability of the project[14], i.e., only after the acceptance of the proposal, the execution of the lease deed and incurring expenditure of ₹ 14.28 crore for land acquisition from farmers.

In reply (June 2023), the State Government without addressing the issue merely quoted the reply of NN Ghaziabad stating that the developer firm had not initiated the work to set up the waste to energy plant on the designated land and the matter had been forwarded to State Government for issuing direction to the developer.

Thus, the work on the Waste to Energy plant could not commence in NN Ghaziabad even after a lapse of over four years and incurring expenditure of ₹ 14.28 crore on land acquisition.

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[12] A trommel screen is a rotating circular mesh drum that can sort solid waste materials based on their size.

[13] At Galand in district Hapur.

[14] Rates quoted in proposal submitted (July 2019) by the developer for processing the solid waste was ₹ 1,711.00 per MT. As per the NN, the rates proposed being too high, NN was incapable to bear an estimated expenditure of ₹ 93.68 crore per year from own resources for disposal of 1,500 MT per day waste generated in the municipal area.

5.2.3.3 Injudicious expenditure of ₹ 13.02 crore on establishment of decentralised processing facility in NN Ghaziabad

In September 2020, NN decided to establish a decentralized system, known as a Garbage Factory (GF), for the scientific disposal of solid waste generated in its municipal area based on a PPP model. M/s Geron Engineering Private Limited was selected as the concessionaire to execute the project for a 25-year concession period.

As per agreement (October 2020), NN was to provide the land with completed civil work[15] infrastructure and some vehicles[16] to the concessionaire, while the concessionaire would install the required machinery[17] at its own cost for waste processing. Initially, the project was planned to operate at two locations, Sihani and Ret ki Mandi/Hindon Vihar, with a combined capacity[18] of 700 tons per day (TPD), which could be extended to 1,500 TPD at two additional locations. NN incurred expenditure of ₹ 13.02 crore[19] on construction of processing facilities at both locations (January 2023).

Audit further observed that GF established at both the locations could not be made functional for the purpose of waste processing. Moreover, the concessionaire displaced the machinery from the site of GF to Morta site in Ghaziabad and started (July 2022) waste processing. Whereas, NN was now using part of the GF (Sihani) as MRF and GF at Ret Ki Mandi was being used for sorting recyclables by rag pickers. Thus, despite incurring expenditure of ₹ 13.02 crore, NN failed to operationalize the decentralized processing facilities.

In their reply in June 2023, the State Government stated that NN had initiated the construction of the garbage factory with the intention of processing biodegradable waste, assuming that segregated waste would be collected from households and other establishments for processing at the facility. However, segregated waste was not being delivered to the garbage factory. As a result, the NN began utilizing the facility as a Material Recovery Facility (MRF).

Fact remains that GF was not being used for intended purpose of decentralised waste processing despite incurring expenditure of ₹ 13.02 crore on the project.

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[15] Boundary wall, processing shed, concrete floor, machine foundation, storage room, administrative block with fully operational office, conference room, toilet, weighbridge room, worker canteen and toilet, horticulture and green area, fire tank and high pressure fire hydrant system, borewell, painting, electrical, plumbing.

[16] JCBs, tractors, trollies and dumpers.

[17] Mechanised segregation machinery to achieve size and density segregation, electrical panel, digital weighbridge, IT software system, CCTV surveillance, IoT sensor wherever required.

[18] Sihani: 200 TPD and Ret ki Mandi/Hindon Vihar: 500 TPD.

[19] Expenditure- Sihani: ₹ 3.65 crore and Ret Ki Mandi/Hindon Vihar: ₹ 9.37 crore from 14th FC grant.

5.2.3.4 Inoperative solid waste screening machine at NP Khanpur Bulandshahar

Audit observed that a screening machine[20] with a conveyor, capable of processing 10 TPD was procured (March 2021) at a cost of ₹ 26.84 lakh in NP Khanpur Bulandshahr under the 15th FC grant for processing of solid waste. However, it was installed in an area without a proper shed and the machine was found to be inoperative and idle during JPV (January 2023). Additionally, no electric connection was available to operate the machine, though ULB had applied for the electric connection, indicating a lack of concern on the part of the ULBs regarding the operation of the machine.

In reply (June 2023), the State Government stated that NP Khanpur Bulandshahr did not furnish reply to the audit observation.

5.3 Operation and maintenance of solid waste processing plant

Audit observed that in test-checked ULBs, six[21] plants were commissioned, wherein only two[22] plants were currently operational and remaining four[23] plants were found to be closed, as discussed in succeeding paragraphs.

5.3.1 Status of solid waste processing plants at Lucknow

There are two processing plants in Lucknow city: the first is the Asia Bioenergy India Limited (ABIL) plant located at Barawan Khurd, Lucknow (Lucknow-Hardoi road) and the second is the solid waste processing plant situated at Shivri, Lucknow. However, the ABIL plant was shut down in February 2004 and has remained closed since then[24]. On the other hand, the solid waste processing plant at Shivri, Lucknow, is currently operational as discussed in the following paragraph.

5.3.1.1 Solid waste processing plant located at Shivri in Lucknow city

The firm M/s Jyoti Envirotech Private Limited was selected for a period of 30 years to handle waste transportation and the operation and maintenance of a solid waste processing plant with a capacity of 1,200 TPD located in Shivari, Lucknow. A tripartite concessionaire agreement was executed (October 2010) between NN Lucknow, C&DS UP Jal Nigam and M/s Jyoti Envirotech Private Limited. However, the services of the firm were terminated (March 2017) due to a breach of contract. Subsequently, another firm, Ecogreen Energy Private Limited (EEPL), was selected for the same purpose, and a tripartite agreement was executed (March 2017) between NN Lucknow, M/s EEPL and C&DS UP Jal Nigam. As per the

[20] For screening of compost converted from garbage.

[21] Two plants in Lucknow, one plant in Kanpur , one plant in Raebareli, one plant in Muzaffarnagar and one plant in Reoti Ballia. These plants (except ABIL plant Lucknow and Reoti Ballia) were included in the 32 sanctioned. plants mentioned in paragraph 5.2.1.

[22] One plant in Lucknow (Shiveri plant) and one plant in Kanpur.

[23] One plant in Lucknow (ABIL), one plant in Raebareli, one plant in Muzaffarnagar and one plant in Reoti Ballia.

[24] The Plant was established 20 years ago with the requirement of 300 TPD segregated bio-waste. The firm claimed dearth of organic content in the waste being supplied by the NN and therefore, closed the plant.

contract, NN was to pay a tipping fee to EEPL at a rate of ₹ 1,604 per metric ton.

The deficiencies observed in the plant have been discussed in subsequent paragraphs as well as in ***Appendix 5.5*** and status of the same on the basis of Joint Physical Verification is shown in ***Appendix 5.6.***

Generation of bill by concessionaire and payment thereof by NN

As per Article 10.2 (c) of the agreement, monthly invoice of the concessionaire was required to be supported by the original copy of daily weighment statement duly signed by the authorised representative of ULB responsible for verifying the weighment of incoming waste and Independent Engineer.

Audit noticed that the firm EEPL commenced waste transportation and processing work in the city from April 2017, with the presentation of tipping fee bills starting from that period. However, due to the absence of an Independent Engineer[25] or any other alternative arrangement to monitor the quantity of waste transported and processed at the plant, it was impossible to verify the actual quantity of waste handled.

Audit further observed that there was a significant difference between the bills submitted by the firm (amounting to ₹ 215.89 crore) and the bills paid (amounting to ₹ 169.21 crore) after verification by Environment Engineer in the NN for the period January 2018 to March 2022, as detailed in ***Appendix 5.7***. Thus, it was apparent from the bills presented by the firm that the quantity of solid waste mentioned in the bills was arbitrary. Further, there was concern regarding the authenticity of the processed waste and the tipping fee paid as the payment of ₹ 169.21 crore towards tipping fee was not made as per procedure prescribed under Article 10.2 (c) of the agreement.

NN accepted (June 2023) that bills submitted by the firm were not supported by daily weighment statement duly signed by the authorised representative of ULB and Independent Engineer. ULB, however, stated that the payment was made on the basis of weighing bridge record of the plant monitored by command control centre. The State Government did not furnish (June 2023) reply on the audit observation.

Payments of ₹ 5.28 crore for doubtful processing of waste

Audit further observed that during inspections conducted by UPPCB on various dates[26], the waste processing plant at Shivri, Lucknow was found to be non-functional.

[25] Independent Engineer had to be appointed for the review/oversee/supervision of operation and maintenance of the project.

[26] Plant inspection dates: 03.09.2019, 23.11.2019, 01.12.2019, 02.06.2020, 04.07.2020, 14.07.2020 and 28.10.2020.

Therefore, UPPCB imposed environmental compensation of ₹ 14.41 crore[27] and ₹ 25.33[28] crore on the firm for a total of 409 days of non-operation between September 2019 and October 2020. However, the firm presented the bills for processing charges for this period and NN paid totalling ₹ 5.28 crore to the concessionaire for processing of 3.20 lakh metric tons of waste during September 2019 to September 2020, as detailed in ***Appendix 5.8***. Thus, NN paid the bill for processing waste even for the period when the plant was not operational.

During Joint Physical Verification conducted by audit with the representative of NN Lucknow on January 14, 2022, it was found that the plant was inoperative and had not been in use for several months though employees of the plant informed that it was inoperative since approximately one month. Audit further observed a significant accumulation of waste/legacy waste having environmental impact[29].

In reply (June 2023), the State Government stated that according to records, the UPPCB visited the Shivri plant on 28 October 2020 for regular monitoring and observed the plant was not in operational condition. The plant restarted on 3 November 2020. The State Government further mentioned that no payment was made for the period of October-November 2020 by NN Lucknow. If any payments were made during the non-operational phase of the plant as per reports of UPPCB, NN Lucknow would deduct the amount from the upcoming bills of the concessionaire.

The reply is not acceptable, as UPPCB had found that the plant was not operating between September 2019 to October 2020 and accordingly imposed a total compensation of ₹ 39.74 crore for the period 3 September 2019 to 28 October 2020. Further, NN Lucknow have also stated in reply to audit observation that the plant was not operated during the period for which compensation was imposed by UPPCB. Additionally, a processing fee of ₹ 41.81 lakh was paid to the firm for November 2020. The State Government, therefore, should investigate and fix the responsibility of erring officers for payment of ₹ 5.28 crore made to the firm for processing of waste during the period when plant was not operating.

[27] UPPCB had imposed (July 2020) an environmental compensation of ₹ 14.41 crore on the firm on default of 107 days (from 03.09.2019 to 18.12.2019).

[28] UPPCB had issued a show cause notice (November 2020) against the firm for imposition of environmental compensation of ₹ 25.33 crore for default of 302 days (01.01.2020 to 28.10.2020). However, after receiving non-satisfactory reply from the firm, UPPCB had imposed (January 2023) environmental compensation of ₹ 25.33 crore on default of the period. The compensation was yet to be deposited (February 2023).

[29] At the time of inspection (July 2020) by authorized officials of UPPCB, a sample of leachate was collected from the leachate accumulated in the plant premises and the quantity of various constituents in the analysis report was found to be higher than the prescribed standards. UPPCB inspection (August 2022) further revealed that there was unregulated and unsegregated solid waste accumulated in the form of heaps or mounds. Thus, the provisions for pollution control was being severely violated in the plant.

5.3.2 Status of solid waste processing plant at Kanpur

A solid waste processing plant with a capacity of 1,500 TPD was established at Panki Bhausingh in February 2011 under the JNNURM scheme. In October 2010, a tripartite concessionaire agreement was signed between NN Kanpur, C&DS UP Jal Nigam and A2Z Infra Ltd Gurgaon for the operation and maintenance of the plant. However, A2Z Infra Ltd completely ceased operations in April 2014. Consequently, GoUP appointed a new concessionaire, M/s Earth Environmental Management Services Private Limited (EEMSPL) in March 2016. EEMSPL was a special purpose vehicle (SPV) under the technical management of M/s IL&FS Environmental Infrastructure and Services Limited (IEISL). This appointment was valid for a period of 30 years replacing A2Z. In December 2016, a Project Implementation Agreement was signed among GoUP, C&DS UP Jal Nigam, NN Kanpur, M/s EEMSPL and ILFS.

Audit observed that the SPV, M/s EEMSPL, did not come into existence. In response to M/s IEISL's request in September 2017, NN Kanpur approved the operation of the Panki solid waste processing plant by M/s IEISL. However, M/s IEISL also discontinued the operation and maintenance of the plant in October 2019 due to insufficient financial support from IL&FS Financial Services. Thereafter, the plant was being operated by NN Kanpur.

According to the agreement, the concessionaire (M/s EEMSPL) was supposed to establish a waste-to-energy plant in 83 weeks of the project implementation agreement, which was executed in December 2016. However, the waste-to-energy plant had not been established (January 2022). Moreover, the power connection to the plant was disconnected from September 2014 to June 2019 and the NN informed (January 2022) Audit that the firm was using its own generator for processing of waste. The Commercial Operation Date (COD) had not been obtained and the Consent to Operate (CTO) was issued to NN Kanpur by UPPCB in January 2021 with the condition to deposit the environmental compensation[30]. Moreover, significant deficiencies noticed during JPV (January 2022) of the plant are shown in ***Appendix 5.9.***

The State Government stated (June 2023) that for remediation of legacy waste a new contract has been made under which approximately 6.60 lakh MT of legacy waste out of 14.50 lakh MT was already remediated and the process was undergoing, also entire fresh waste arriving daily at solid waste management plant was processed. However, State Government did not provide specific reply to deficiencies noticed during JPV and not establishing waste-to-energy plant.

5.3.3 Status of solid waste processing plant at Raebareli

A solid waste processing plant with a capacity of 70 TPD was established (October 2008) by the executive agency C&DS UP Jal Nigam in village Jaitpur, Raebareli under the JNNURM scheme. In November 2011, an

[30] Show cause notice (January 2020) for environmental compensation of ₹ 19.73 crore was issued by UPPCB, but due to non-compliance of notice and subsequent reminders, UPPCB imposed (July 2023) penalty of ₹ 19.73 crore.

agreement was signed among NPP Raebareli and M/s Accord Hydro Air Private Limited Lucknow (firm) for the operation and maintenance of the plant, as well as waste disposal for the city, for a duration of 30 years. The firm began operating the plant in November 2011.

During a JPV on February 10, 2022, it was noticed that the plant was completely closed. The condition of the plant indicated that it had been non-functional for several years. There were many houses in close proximity of the plant. The installed machinery and vehicles were in a deteriorated state. Additionally, there was a legacy waste dump of 76,000 metric tons both inside and outside the plant.

In reply (June 2023), the State Government stated that the plant had been operational until mid-2021. However, after 2021, when the plant ceased operations, multiple letters were sent to the firm requesting an explanation and urging them to restore the functionality of the plant. Unfortunately, no response was received from the firm. Consequently, the NPP issued a termination letter to the firm in July 2022. Furthermore, despite written and verbal communication with the Raebareli Development Authority (RDA) regarding the establishment of a buffer zone, the construction of habitats continued.

The State Government's reply is not acceptable, as there was no documentary evidence of the plant's operation till mid-2021. Further, as per information provided (August 2023) by NPP Raebareli, the NPP had made payment to the firm only up to March 2016 for door-to-door collection of waste and transportation indicating firm had not provided service in the NPP thereafter.

5.3.4 Status of solid waste processing plant at Muzaffarnagar

A plant with a capacity of 120 TPD was established in Kidwai Nagar, Muzaffarnagar, in October 2011. It was operated by M/s A to Z Infrastructure Private Limited. However, the plant was shut down in November 2018. As a result of the prolonged shutdown, the machinery of the plant deteriorated significantly.

Recognizing the need to repair the machinery to resume plant operations, the tender of ₹ 39.50 lakh from M/s Rollz Material Handling Systems Private Limited Ghaziabad was accepted. An agreement was executed[31] between the ULB and the firm in October 2020 for the operation and maintenance of the plant.

During JPV on July 5, 2022, the plant was found closed. Furthermore, since the plant was in a low-lying area, water logging had occurred inside, making it inaccessible. Additionally, there was a significant amount of mixed/legacy waste dumped at the plant site, the exact quantity of which was difficult to calculate.

[31] As per the agreement, processing fee was to be paid to the firm at the rate of ₹ 297 per MT.

Photograph 5.1

Non-operational plant at Kidwai Nagar, Muzaffarnagar (NPP Muzaffarnagar)

The State Government stated (June 2023) that at present, solid waste processing plant is functioning properly. However, the reply did not address the issue why the plant was non-functional till July 2022 and no information was furnished with respect to dumped legacy waste.

5.3.5 Status of solid waste processing plant at Reoti Ballia

In July 2020, NP invited bids for the development and operation of an integrated municipal solid waste facility with a capacity of 10 TPD. The contract for the installation of machinery and equipment was awarded to M/s AFC India at a lump-sum cost of ₹ 49.99 lakh[32]. The tipping fee for processing the municipal solid waste was approved at ₹ 297.00 per ton. The work order was issued to the firm in August 2020 and the plant became operational in January 2021. NP incurred an expenditure of ₹ 165.88 lakh[33] on the construction of the processing plant.

Audit noticed that the waste processing work had commenced without obtaining the necessary statutory clearances from UPPCB (Uttar Pradesh Pollution Control Board). These clearances, including consent to establish and consent to operate, were required as per Rule 19(3) of the Solid Waste Management Rules, 2016. The firm began waste processing in January 2021 and processed only 564 MT of waste, for which a tipping fee of ₹ 1.68 lakh was paid to the firm in January and February 2021. However, waste processing was halted in March 2021 and remained suspended until June 2022 due to waterlogging issues in the plant premises, as disclosed in JPV.

[32] NP paid ₹ 19.03 lakh to firm (August 2020) and ₹ 30.96 lakh was initially invested by firm which was to be returned by NP to firm with interest.

[33] Civil work: ₹ 115.89 lakh, Expenditure on purchase of machinery: ₹ 19.03 lakh (NP) and ₹ 30.96 lakh (firm).

The JPV conducted in June 2022 revealed that although the machinery was installed at the plant site, it was not operational, and the processing of waste was hindered due to waterlogging inside the premises. Additionally, important infrastructure elements such as drains, windrow platform and latchets tank were not constructed.

In reply (June 2023), the State Government stated that an online application had been submitted for the issuance of a No Objection Certificate (NOC), inspection had been carried out by the zonal UPPCB office and the NOC would be issued shortly.

5.4 Disposal of Waste

All the waste that cannot be reused, recycled or further processed ultimately ends up in landfills, which serve as the final destination for solid waste. Landfills are designed with the objective of minimizing the environmental impact of the waste through proper containment.

5.4.1 Status of landfill

Rule 15(w) and 22 of SWM, Rules, 2016 state that ULBs are required to construct, operate, and maintain sanitary landfills and associated infrastructure within three years from the date of notification of these rules, either by themselves or through any other agency.

Audit observed that out of the 45 ULBs examined, processing plants were established in only five[34] ULBs for the purpose of processing the generated municipal solid waste. However, out of these five plants, only two[35] were found to be functional. It is noteworthy that in the ULBs where processing plants were established, sanitary landfills were not developed. Furthermore, the remaining ULBs examined did not have any sanitary landfills in place.

In reply (June 2023), the State Government stated that sanitary landfills have been made a part of DPR of every MSW being set up in the State. The land for the same is to be provided by the concerned district administration.

5.4.1.1 Failure to designate land for setting up landfills

The provisions outlined in Rule 11(f) and 12(a) of SWM Rules, 2016 state that the State and District authorities are responsible for facilitating the identification and allocation of suitable land for the establishment of solid waste processing and disposal facilities to local bodies. This process should be completed within one year from the date of notification of the Rules.

According to the report of UPPCB for the year 2020-21, out of 651 ULBs, 592 ULBs have identified and allocated land for the purpose of setting up processing and disposal facilities in the State. However, during the audit, it was observed that three[36] out of the 45 test-checked ULBs had not yet

[34] NN Kanpur, NN Lucknow, NPP Raebareli, NPP Muzaffarnagar and NP Reoti Ballia.
[35] NN Kanpur and NN Lucknow.
[36] NP Bilsanda Pilibhit, NP Chitbadagaon Ballia and NP Bakewar Etawah.

identified land for the establishment of processing facilities as of March 2022.

These ULBs, which lacked designated landfill sites, resorted to improper waste disposal practices such as dumping waste alongside roads, near ponds, rivers and open areas within wards. This unauthorized and unhygienic dumping of mixed municipal solid waste observed during the joint physical verification with ULB staff, would pose significant health and environmental hazards in the affected areas.

In reply (June 2023), the State Government stated that all ULBs and District Magistrates have been directed in 2016 to identify and acquire land according to their population which was reiterated in 2019.

Fact remains that 59 ULBs were not allocated land for establishment of processing facilities as of March 2022.

5.4.1.2 Instances of allocation of insufficient land for SWM by district authorities

According to Rule 12(a) of the SWM Rules, 2016, it is the responsibility of the State and District level authorities to facilitate the identification and allocation of appropriate land for the establishment of solid waste processing and disposal facilities by local bodies. Further, the State Mission Director of SBM (Urban) issued directions (June 2016) to the District Magistrates of various districts instructing them to arrange land for the ULBs to set up solid waste management projects. The order also outlined the norms for land requirements for ULBs, which are detailed in **Table 5.3**.

Table 5.3: Norms for allotment of land for SWM

Population	Land for processing plant	Land for Sanitary Landfill (SLF) for 10 years
Upto 1 lakh	1 hectare	4 hectare
1 lakh to 5 lakh	1 hectare per lakh population	2.5 hectare per lakh population
More than 5 lakh population	1 hectare per lakh population	1.5 hectare per lakh population

(Source: State Mission Director, SBM (Urban))

Audit further noticed that out of 45 test-checked ULBs, only 42 ULBs were allocated land by the district authorities for SWM purposes. However, in 36 ULBs (18 NPPs and 18 NPs), the allocated land was found to be insufficient as compared to the norms mentioned in Table 5.3. The shortage of land against the requirement ranged from six to 98 *per cent* for NPPs and from 47 to 96 *per cent* for NPs, as detailed in ***Appendix 5.10*.**

The State Government stated (June 2023) that district administration has been entrusted to provide the required land for SWM. The land mentioned in ***Appendix 5.10*** where the shortfall is large was identified for other projects (MRF, pit composting, *etc*.) and SLF land was still in the process of being procured.

5.4.1.3 Non-authorisation from UPPCB for setting up of Landfill/ processing plants

As per Rule 15(y) of SWM Rules 2016, ULBs are required to obtain authorization from the UPPCB for disposal facility if the volume of waste generated exceeds five metric tons per day.

The report from the UPPCB for the year 2020-21 revealed that out of the 17 functional MSW processing facilities in the State, only three[37] had obtained authorization from UPPCB.

During the audit, it was observed that out of the 45 test-checked ULBs, 36 ULBs were generating solid waste exceeding five tons per day. However, only five[38] ULBs had established processing facilities, and out of those, only two[39] were found to be functional. Further, the plants in Muzaffarnagar and Raebareli, which were reported as functional in the UPPCB report, were found to be non-functional during the audit. None of these ULBs[40] had obtained authorization from the UPPCB for the functional processing facilities or for the establishment of a landfill.

In reply (June 2023), the State Government stated that application for authorization was under process in case of NPP Muzaffarnagar and No Objection Certificate (NOC) would be obtained from the UPPCB for processing facility in NPP Raebareli.

5.4.1.4 Buffer zone not notified

Rule 11(l) of SWM Rules 2016 states that the secretary-in-charge of the Urban Development Department (UDD) is responsible for notifying the buffer zone for solid waste processing and disposal facilities in consultation with UPPCB for ULBs generating more than five tons per day of waste. Additionally, Rule 14(h) mandates that the Central Pollution Control Board (CPCB) should publish guidelines for maintaining buffer zones, which restrict any residential, commercial, or other construction activities outside the outer boundary of waste processing and disposal facilities for different facility sizes handling more than five tons per day of solid waste.

Further, CPCB had issued guidelines for maintaining buffer zones in April 2017, followed by subsequent clarifications in April 2019. According to the clarification, a land area of 200-500 meters from the boundary of the processing unit should be excluded from facility setup, and it should be designated as a "No development area" for 30 years. However, this land can be utilized for agricultural purposes.

Out of the 45 test-checked ULBs, 36 ULBs were found to be generating solid waste exceeding five metric tons per day, as detailed in ***Appendix 5.11***. Land for solid waste management projects was allocated to 35 ULBs (excluding Bilsanda Pilibhit). However, Director Local Body informed (November 2021) that buffer zone had not been notified at

[37] Mainpuri, Etawah and Prayagraj.
[38] NN Kanpur, NN Lucknow, NPP Raebareli, NPP Muzaffarnagar and NP Reoti Ballia.
[39] NN Kanpur and NN Lucknow.
[40] NN Kanpur, NN Lucknow, NPP Raebareli, NPP Muzaffarnagar and NP Reoti Ballia.

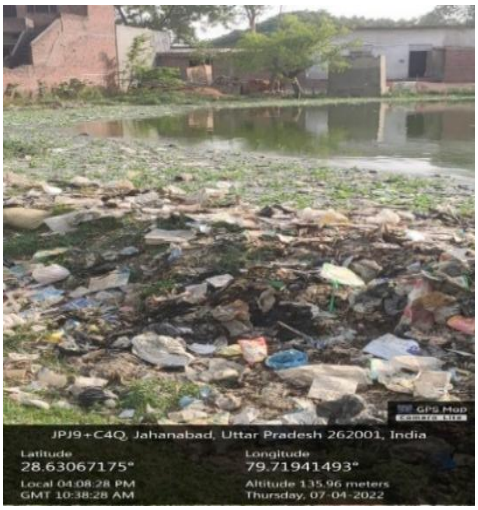
present and directions had been issued for declaring buffer zone. Subsequently, the State Government informed (June 2023) that NN Lucknow, NPP Raebareli and NP Reoti Balia have declared buffer zone. Thus, 33 ULBs were yet to notify the buffer zone.

5.4.1.5 Irregularities in selection/operation of landfill sites

Schedule I (A) (VII) of the Solid Waste Management (SWM) Rules, 2016 provides the criteria for the selection of sites for landfills. According to these criteria, a landfill site should be located 100 meters away from rivers, 200 meters away from ponds, highways, habitations, public parks, and water supply wells, and 20 km away from airports or airbases. However, several irregularities were observed in the selection and operation of landfill sites and open dumpsites as follows:

- In the case of NP Jahanabad, Pilibhit, 0.54 hectare of land located in village Jahanabad (Gata number 830) was allocated for the landfill. However, this land was disputed and the matter was sub-judice in court. In December 2019, the NP pursued the matter with the District Magistrate for the allocation of another suitable land for solid waste management. As of January 2023, alternative land parcel had not yet been allocated. Consequently, due to the unsuitable site selection, the NP resorted to dumping solid waste along roadsides, near water bodies and in close proximity to residential areas, as revealed during the JPV conducted with the staff of NP Jahanabad.

Photograph 5.2



NP Jahanabad, Pilibhit

- NP Katra, Shahjahanpur purchased 0.740 hectare land at a cost of ₹19.09 lakh in village Bhamauri, tehsil Tilhar for SWM in February 2020. Due to opposition of local farmers this land was not being used either for construction of MRF or for dumping of waste. JPV disclosed that NP was dumping mixed waste along the roadside, which was against the provisions of SWM Rules 2016.

Photograph 5.3

NP Katra, Shahajahanpur

- NP Rudhauli Bazar, Basti started (June 2020) construction of MRF at Rudra Nagar. There was no approach road to this site. The transportation vehicles could not reach at this site due to unavailability of approach road. JPV (February 2022) disclosed that MRF was under construction and NP was dumping mixed waste along the road side which was against the provisions of SWM Rules, 2016.

Photograph 5.4

NP Rudhauli Bazar , Basti

- DM had allocated (November 2020) one hectare land at Gram Sabha Sikandra Rao Dehat to NPP Sikandra Rao, Hathras for developing sanitary landfill site but approach road was not available for reaching the landfill site. Therefore, NPP requested (March 2022) the DM for providing approach road for transporting the waste at landfill site, however, the same was not provided so far (November 2022).

- NP Rajapur, Chitrakoot was allocated one hectare land for SWM at village Majhgawan, tehsil Rajapur by DM Chitrakoot. The allocated land was situated adjacent to the river Yamuna and the Solid Waste accumulated on this land was likely to mix in the river during floods and the leachate seeped out during rainy season might contaminate the water of the river. Due to unsuitability and soil condition of land, the Executive Officer of NP requested DM Chitrakoot either to allocate free of cost land for SWM or to permit NP to purchase land from SWM tied grant under

15th FC. Audit noticed that neither suitable land was allocated by DM nor permission to purchase land was granted to NP and the NP continued to dump the solid waste at this site which was not suitable. During JPV, it was revealed that a heap of waste was piled up at the allocated site in close proximity to the river. It was observed that there were no arrangements in place to prevent the mixing of solid waste with the river water during rainfall.

Photograph 5.5

NP Rajapur, Chitrakoot, solid waste dumped in the close proximity of the river Yamuna

In reply (June 2023), the State Government stated that land for establishment of MRF centre has been provided by the DM at other site and SWM dumped at the land of village Majhgawan, tehsil Rajapur has been disposed of.

- In December 2020, the NP of Jarwal, Bahraich was allocated 0.500 hectares of land by the District Magistrate (DM) of Baharaich for Solid Waste Management (SWM) purposes. This land was located adjacent to the river Saryu. Dumping of solid waste along with construction of MRF was proposed at this site. However, the allocated land was sandy and prone to flooding during the rainy season due to the water from the river. In June 2021, the Executive Officer of NP sent a proposal for the allocation of another suitable land for SWM to the DM, Bahraich. As of May 2022, no alternative land for SWM had been allocated.

As noticed during JPV (May 2022), as a result of the lack of suitable land for SWM, the NP resorted to dumping waste along the roadside of the Lucknow-Bahraich state highway and in close proximity to residential areas at Mill Road Chauraha.

Photograph 5.6	
	
NP Jarval, Baharaich	NP Jarval, Baharaich

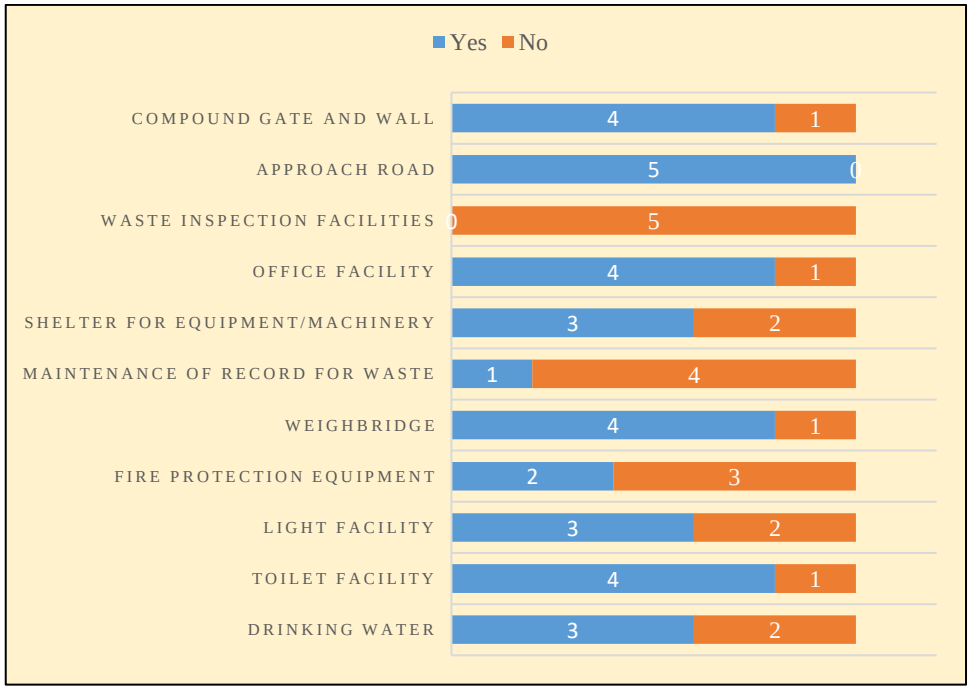
- DM Auraiya allocated (November 2019) 1.2 hectares of land in Saundhemau village for SWM purposes. Since the allocated site was remote (15 km) from the town, the NPP was not transporting the solid waste to this location. As a result, the waste was being disposed of in close proximity to residential areas along the Gursahayganj-Jalaun road and alongside the roadside in village Saba Khanpur on the Jalaun main road. Consequently, the allocated site was not being utilized for its intended purpose.

5.4.1.6 Absence of basic facilities in landfills/processing plants

Schedule I of the Solid Waste Management (SWM) Rules, 2016 outlines the necessary facilities that should be present at landfill sites or processing plants. **Chart 5.2** illustrates the status of the availability of these facilities in the five solid waste processing plants established in five[41] test-checked ULBs. Further, no plants were set up in the remaining 40 ULBs and there were no prescribed basic facilities available at the dump sites being used in violation of SWM Rules, 2016.

[41] NN Kanpur, NN Lucknow, NPP Raebareli, NPP Muzaffarnagar, NP Reoti Ballia.

Chart 5.2: Status of basic facilities at landfill site



(Source: Information furnished by test-checked ULBs)

It is evident in **Chart 5.2** that the landfills or processing plants in test-checked ULBs lacked basic facilities as specified in the SWM Rules 2016.

The State Government did not furnish (June 2023) the reply on the audit observation.

5.4.2 Disposal of legacy waste

Clause 'J' of Schedule I of SWM Rules 2016 states that solid waste dumps that have reached their full capacity or will not receive additional waste after the establishment of new and properly designed landfills should be closed and rehabilitated[42].

Audit observed that during the period from April 2020 to June 2021, UPPCB issued notices to impose environmental compensation of ₹110.40 crore[43] on 650 out of 651 ULBs due to the non-establishment of prescribed facilities and the failure to remediate and safely dispose of legacy waste. This indicates that the State Government did not adequately arrange for the disposal of legacy waste in the ULBs.

Audit further observed that the estimation of legacy waste had been completed in 72 out of 651 ULBs revealing a total of 84,57,782 MT of legacy waste dumped ***(Appendix 5.12)***. However, the quantity of legacy

[42] Rehabilitation has to done by examining following option: (i) Reduction of waste by bio mining and waste processing followed by placement of residues in new landfills or capping as in (ii) below; (ii) Capping with solid waste cover or solid waste cover enhanced with geomembrane to enable collection and flaring/utilisation of greenhouse gases; (iii) Capping as in (ii) above with additional measures (in alluvial and other coarse grained soils) such as cut-off walls and extraction wells for pumping and treating contaminated ground water; (iv) Any other method suitable for reducing environmental impact to acceptable level.

[43] ₹ 14.55 crore on 15 NNs and ₹ 95.85 crore on 635 NPPs/NPs.

waste in the remaining 579 ULBs could not be assessed due to not conducting of a survey. Thus, the State Government made no significant efforts towards the disposal of legacy waste.

In addition, tenders were invited in November 2021 for the bio-remediation (disposal) and clearing of legacy waste sites in 20 ULBs. Out of these, bio-remediation of legacy waste was in progress in 17 ULBs. However, in one[44] ULB, despite the selection of a firm, the bio-remediation of legacy waste could not commence due to the unavailability of land for machinery establishment. Furthermore, in the remaining two[45] ULBs, firm for bio-remediation of legacy waste had not yet been selected ***(Appendix 5.13)***. The status of bio-remediation of legacy waste in the test-checked ULBs are discussed in the subsequent paragraph.

Status of legacy waste in NPP Muzaffarnagar

- ***North Rampuri Roorkee road, Muzaffarnagar***

During the JPV conducted in July 2022, it was observed that previously the solid waste was dumped on the sides of Roorkee road within the densely populated area of the city. Presently, this landfill site is situated in the middle of the city, which poses significant challenges due to its proximity to residential areas. The site has accumulated a substantial amount of legacy waste over time, and no action has been taken thus far for its disposal.

Photograph 5.8

Legacy waste (North Rampuri Roorkee road Muzaffarnagar)

- ***Kidwainagar, Muzaffarnagar***

Audit noticed that the State High-Powered Committee had in its meeting held on 17 November 2021 approved a detailed project report for disposal of legacy waste in NPP Muzaffarnagar. Accordingly, tender was invited (November 2021) for the bio-remediation of legacy waste and the tender of M/s Environmental Techno, Agra and M/s Daya Charan and Company, New Delhi, amounting to ₹986.24 lakh (₹439 per metric ton excluding

[44] NPP Ballia.
[45] NPP Bahriach and NPP Sitapur.

GST) was accepted for the bio-remediation of 2.25 lakh MT of dumped legacy waste in Prempuri Near Fish Talab Kidwai Nagar, Muzaffarnagar. The scheduled date for commencing and completing the work of bio-remediation by the said firm was 5 January 2022 and 4 September 2022 respectively.

After the said firm disposed of 41,041.56 MT of legacy waste, a bill amounting to ₹ 2.02 crore was presented to NPP Muzaffarnagar for payment in May 2022. However, as of July 2022, the NPP had not made the payment. Furthermore, during the JPV conducted on 5 July 2022, it was observed that the plant was closed and, instead of proper disposal, the RDF (Refuse Derived Fuel), inert materials and soil were segregated and dumped at the same site, which raised concerns about the justification of the bio-remediation of legacy waste.

In reply (June 2023), the State Government stated that the plant for the bio-remediation of legacy waste was currently functioning properly and a total of 58,341 metric tons of legacy waste had been processed as of July 2022. However, the reply does not provide the current status of the bio-remediation of legacy waste.

To sum up, against the sanctioned 32 solid waste processing plants sanctioned under JNNURM, AFT and State Sector schemes, only 20 plants were established by the executive agency, of which five plants were non-operational. Against the 36 solid waste processing plants sanctioned under SBM (Urban) scheme, the civil work of 17 plants could not be completed and remaining 19 plants where the civil work was completed, still could not be made functional as of June 2023 as machinery for these plants were not procured. Operation and maintenance of solid waste processing plants in test-checked ULBs were found deficient. Further, ULBs were lacking designated land for SWM activities and in case of 36 test-checked ULBs, allocated land was found insufficient. Quantity of legacy waste had increased due to lack of proper disposal of waste in ULBs which subsequently attributes for the environment getting polluted and surroundings becoming filthy.

Recommendation 10: *The State Government should ensure scientific disposal of the solid waste generated regularly and legacy waste dumped in the ULBs at the earliest.*

Recommendation 11: *The State Government should ensure the operation of solid waste processing plants sanctioned to various ULBs under the various schemes.*

Recommendation 12: *The State Government should ensure allotment of sufficient land to ULBs at suitable places for solid waste management activities.*