

C&D Waste Management Framework

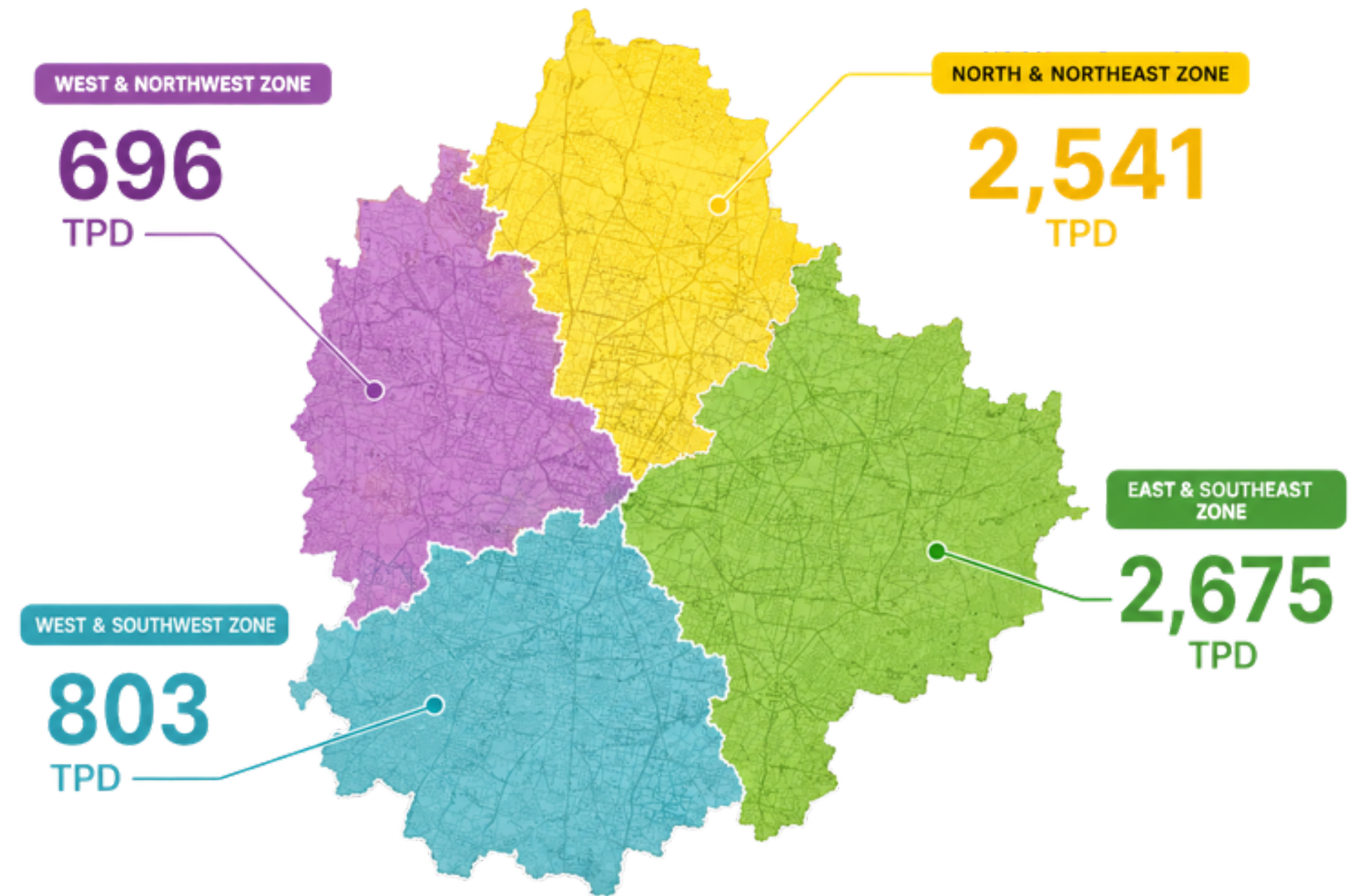


THE CHALLENGE

6,700 TPD

of C&D waste is generated daily in Bengaluru.

Source: KSPCB



RECOMMENDATIONS

- 1. Ensure speedy implementation of the C&D waste management rules/bylaws with the following modifications:**
- 2. The KSPCB Report on C&D Waste is based on four zones which do not correspond to the five corporation boundary limits. The zoning framework for C&D waste collection and management should be aligned with existing corporation boundaries. It should be the responsibility of each corporation to collect its C&D Waste in the manner prescribed to facilitate efficient governance, streamline administration, and ensure clear accountability.**
- 3. There should be a single point of responsibility for collection of all the streams of waste, including C&D Waste, wet waste, dry waste, sanitary waste, Leaf waste, cut trees and branches, bio-medical waste, bulky waste, E-Waste, etc.**
 - **Currently C&D waste collection is the responsibility of the engineering department,** which has neither the resources nor the requisite equipment for the timely collection of C&D waste. Further, the engineering department has no performance KPI for timely waste collection. As a result, debris gets dumped across footpaths and roads, soon turning into mixed waste dumps. There is no collection facility for mixed waste.
 - **Currently collection of cut trees and branches is the responsibility of the forest department.** There is no regular collection system for the same. Therefore, trees and branches are left on the footpath uncollected, soon turning into mixed waste dumps. There is no collection facility for mixed waste.
 - We therefore recommend there should be a single point accountability for city cleanliness. So that citizens are aware whom to reach out to when they see any form of waste dump in public places.

RECOMMENDATIONS

4. Curent C&D Rules do not make clear distinction between micro, small and bulk generators. Segregation, Collection, Transporation, pricing and other responsbilities for each process for each category must be clearly described.

MICRO (<50 KG)

Free "Debris on Call"– Store waste in bags and book a pickup via the app or the toll-free helpline.

SMALL (50 KG–20 MT/DAY)

Paid "Debris on Call"– Pay volume-based tipping fee for on-call removal and retain the mandatory disposal receipt for your occupancy certificate.

BULK ($\geq$ 20 MT/DAY OR 300MT/ MOTNH)

Based on MoUs – BWGs to take full responsibility for strict on-site storing until collection, site cordoning, and mandatory scheduled collections to prevent overflow. BWGs should be responsible for full traceability of movement of C&D waste from point of generation to ultimate processing destination.

5. Debris on call' must be made mandatory for micro and small generators

6.Avoid transferring waste between bins; instead, stack containers directly to minimise handling and prevent spillages.

7. Multiple official documents on C&D Waste Management insists on segregation at source into various streams. But the segregation requires heavy machinery. Thus, do not insist on segregation on-site or at transfer stations, as all sorting should be conducted at the processing station. C&D Waste segregation is a complex process requiring heavy equipment and man power for segregation. This is best done at processing facility.

8. For Micro and Small waste generators, Loading of waste into the collection vehicle should be the responsibility of the authorized collector. This ensures standardized handling practices, reduces disputes and improves service reliability.

9. End to end tracking must be ensured for full traceability:

- **GPS Tracking with full traceability:** Real-time route monitoring and deviation alerts from pickup point to processing destination for BWGs and to Transfer stations for micro & small generators.
- **QR Verification:** Digital logging of every collection trip.
- **CCTV Monitoring:** Oversight of unloading and waste handling.
- **Weight Checks:** Pickup vs. disposal weight comparison via hookloaders picking the containers at each site, and at the end, once again to detect dumping.



Currently C&D waste collection is the responsibility of the engineering department. The engineering department has no performance KPI for timely waste collection. As a result, debris gets dumped across footpaths and roads, soon turning into mixed waste dumps. There is no collection facility for mixed waste.

SOURCE COLLECTION MECHANISM



MICRO GENERATORS

<50 KG DEBRIS ON CALL

- Store waste in cement bags/any other appropriate storage within the premises.
- Book collection through portal, app, or toll-free number.
- Hand over waste and pay prescribed charges.



SMALL GENERATORS

50 KG–20 MT/DAY DEBRIS ON CALL

- Collection charges based on waste volume.
- Waste removed through the Debris on Call system.
- The generator holds utmost responsibility to ensure proper disposal.
- Disposal receipt is mandatory for obtaining an occupancy certificate.



BULK WASTE GENERATORS

≥20 MT/DAY OR ≥300 MT/MONTH

- The generator/main contractor is responsible for end-to-end waste management.
- Waste must be segregated into concrete, soil, mixed recyclables (steel, wood, plastics), and bricks/mortar.
- Dedicated on-site C&D waste storage area is mandatory.
- Regular scheduled collection required to prevent overflow.
- Large project sites must be cordoned off, with no waste blocking roads or stormwater drains.

CONTAINER SYSTEM



5 Cu.m containers

are used for primary collection and local transportation.



20 Cu.m containers

are used for secondary transportation of consolidated waste.



The system enables
direct waste transfer
at IWSFs without ground handling.



COLLECTION WORKFLOW

1 PRIMARY COLLECTION (5 Cu.m Containers)

- Collection request received through the system.
- A 5 cu.m container is deployed to the waste generation site.
- C&D waste is loaded directly into the container.
- A 7.5T GVW hook loader collects the filled container.
- Waste is transported to the nearest IWSF.



2 INTERMEDIATE WASTE STORAGE FACILITY (IWSF)/ WAREHOUSE

- IWSFs are proposed at 18,000 sq.ft, potentially reducible to 5,000 sq.ft.
- Incoming containers are weighed upon arrival.
- The 5 cu.m container is placed on an elevated tipping platform.
- Waste is transferred directly into a 20 cu.m container without touching the ground.
- Multiple loads are consolidated until the 20 cu.m container is full.



3 SECONDARY TRANSPORTATION

- The filled 20 cu.m container is mounted on a 28T GVW hook loader vehicle.
- Consolidated waste is transported to the processing facility.
- Empty containers are returned to the IWSF for reuse.



TECHNICAL INFRASTRUCTURE & ACCOUNTABILITY

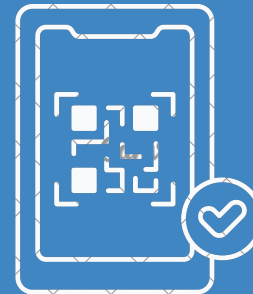
GPS TRACKING

All collection vehicles are equipped with GPS for real-time monitoring and automatic route deviation alerts to prevent illegal dumping.

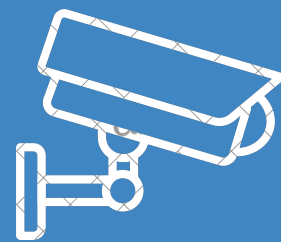


QR-BASED TRIP VERIFICATION

Drivers scan a unique QR code at the collection site to initiate and digitally record each waste collection trip.



IWSFs are monitored through CCTV systems to ensure proper unloading operations, prevent unauthorized dumping, and eliminate blind spots.



CCTV MONITORING

Digital tracking from collection to disposal ensures transparency, accountability, and regulatory compliance.



END-TO-END TRACKING

VEHICLE AND EQUIPMENT ASSESSMENT

TARGET HANDLING QUANTITY: **100TPD**

HOOK LOADER AND CONTAINER REQUIREMENT ESTIMATION

ITEM / VEHICLE TYPE	QUANTITY
5 CU.M(PRIMARY)	30
7.5 T GVW HOOK LOADER(PRIMARY)	5
20 CU.M (SECONDARY)	10
28TGVW HOOK LOADER (SECONDARY)	3
GPS AND IOT SYSTEMS	TBD

VEHICLE AND EQUIPMENT ASSESSMENT

REVENUE STREAMS



a) Tipping Fee

Primary source of income (Current fee – Rs. 1,138 per metric ton)



b) EPR Certificates

Revenue through EPR ecosystem.



c) Carbon and Sustainability Incentives

Potential future climate linked financing opportunities.

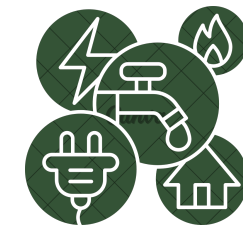
OPEX COMPONENTS



Labour



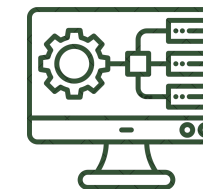
Enforcement



Utilities



Maintenance



Technology
systems

ALL AS PER REQUIREMENT

THE PROCESS



CONCERNS

RECOMMENDATIONS



What is the proposed city-wide zoning strategy for C&D waste collection and management?

While the KSPCB report adopts a four-zone approach (North & Northeast, East & Southeast, West & Southwest, and West & Northwest) the C&D waste collection and management framework should instead be aligned with existing corporation boundaries to facilitate efficient governance, and clear accountability, with each corporation responsible for the collection and management of C&D waste within its jurisdiction.



Whose responsibility is it to load the waste at the generator's site?

Loading of waste into the collection vehicle should be the responsibility of the authorised collector. This ensures standardised handling practices, reduces disputes and improves service reliability.



How will the movement of waste be tracked throughout transportation to prevent illegal dumping?

The hook loader vehicle should record the container weight during lifting at the point of collection using an integrated load measurement system. The container should then be weighed again at the processing facility, with both records linked to GPS-tracked trip data. Any significant weight discrepancy can automatically trigger an investigation for potential illegal dumping or unauthorized unloading.



How will proper handling of waste be ensured at the transfer stations?

Transfer Stations should make sure the C&D Waste is handled appropriately, so that the waste collected from primary collection is not dumped on the ground and is stored in containers at all times. In order to make sure this is followed, the monitoring cell may conduct surprise checks, and install CCTV cameras on site. Stacking should be seriously evaluated over container transfer at the transfer station to avoid any spillage.

ALTERNATE METHOD OF TRANSPORTATION TO THE PROCESSING FACILITY.



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This report has been prepared and compiled by Suman M P, Research and Program Associate, B.ENGAGED, Interns - Spandna Somani, Ashoka University and Pranav Holla M, whose efforts in research, analysis, ideating and creating the proposal have shaped it into a comprehensive and actionable resource. The report has been designed and visually compiled by intern Sankya Shet from NMIMS School of Design.

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THANK YOU

