

C&D WASTE MANAGEMENT SERIES

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

Chandigarh



Area of the municipal corporation (sq. km)	114
Number of sectors	56¹
Population (Census 2011)	1.05 million²
Population (2023, estimated)	1.2 million³
C&D waste generation	100 tonnes per day (TPD)
Status of C&D waste processing plant capacity	150 TPD at 241, Sector 13
Number of vehicles for transportation of C&D waste	5
Number of intermediate storage-collection points	22
Does a toll-free helpline and/or WhatsApp number exist?	Yes
Does an app/website exist?	Yes
Has the city notified C&D waste byelaws?	Yes

Source: Compiled from multiple sources



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Built in 1952 and declared a Union Territory since 1966, Chandigarh serves as the capital city for both Punjab and Haryana. Covering a total area of 114 sq. km, it is one of the first planned cities of post-British India. It is divided into 56 sectors, each equipped with essential amenities, green spaces and public facilities.

While the city was originally planned for a population of 0.5 million, its population had surged to over 1.05 million by 2011⁴ and is estimated to be around 1.2 million in 2023.⁵ In the coming decades, this population could rise to 1.6 million, according to the estimations of the city's planners.⁶

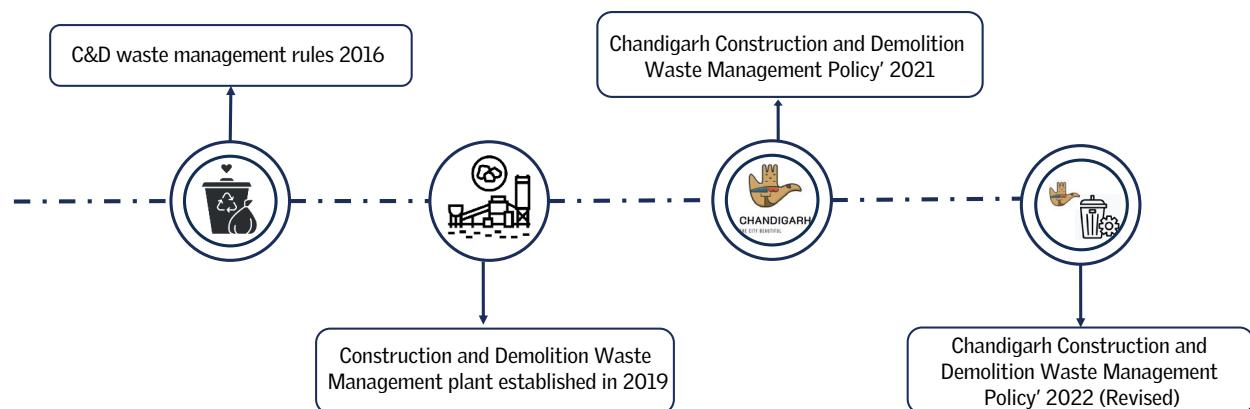
The city has well-developed infrastructure, distinctive urban planning integrated ecological networks, relatively low population density and goes through periodic renovations of housing and infrastructure every few years. Established

in 1994, Municipal Corporation Chandigarh (MCC) is the civic body that governs the city.

VOLUME OF C&D WASTE GENERATED

Chandigarh city approximately generates an average of 100 tonnes (ranging from 60 to 120 tonnes through the year) of C&D waste daily, according to interviews conducted by the Centre for Science and Environment (CSE) with officials from MCC and the Smart City Department of Chandigarh. Most of the constructions within the municipal boundary are renovations, demolition of old and dilapidated structures and their reconstruction, and upgradation of the existing infrastructure in the city. New development is happening in the outer fringes and emerging satellite towns of the city—near Panchkula and towards the Greater Mohali region.

Timeline of actions by ULB



Source: CSE



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According to the Chandigarh Perspective Plan 2031, the city covers an area of 28,169 acres and phase 1 and 2 of the same are largely completed.^{7,8} The 3rd phase is still under construction and differs from the previous phases in that it comprises of an IT hub, group housing schemes and four-storeyed flats instead of plots, resulting in higher densities. There is also a peripheral region, which has been developed to meet the emerging needs of development.^{9,10}

There are multiple housing projects being implemented by the Chandigarh Housing Board, under general housing schemes and housing for senior government employees.¹¹ Some other ongoing construction projects in the city are: Upgradation of Chandigarh Airport; construction of the Nehru Centre for Performing Arts; rejuvenation of the city centre in sector 17; construction of a sub-city centre,

botanical garden, and a second state library in sector 34; and expansion of Rajiv Gandhi Chandigarh Technology Park.^{12,13}

ACTIONS TAKEN BY THE ULB TO DEAL WITH INCREASING C&D WASTE

Unlike most other cities, the complete C&D waste management ecosystem was developed and is operated by the Municipal Corporation Chandigarh. This includes construction, financing and running of the C&D waste processing plant; setting up of collection centres; and establishing a public helpline for door-to-door collection.

The Chandigarh administration notified the Chandigarh Construction and Demolition Waste Management Policy in 2022.¹⁴ It lays down the steps to be taken to get C&D waste collected and transported to the processing

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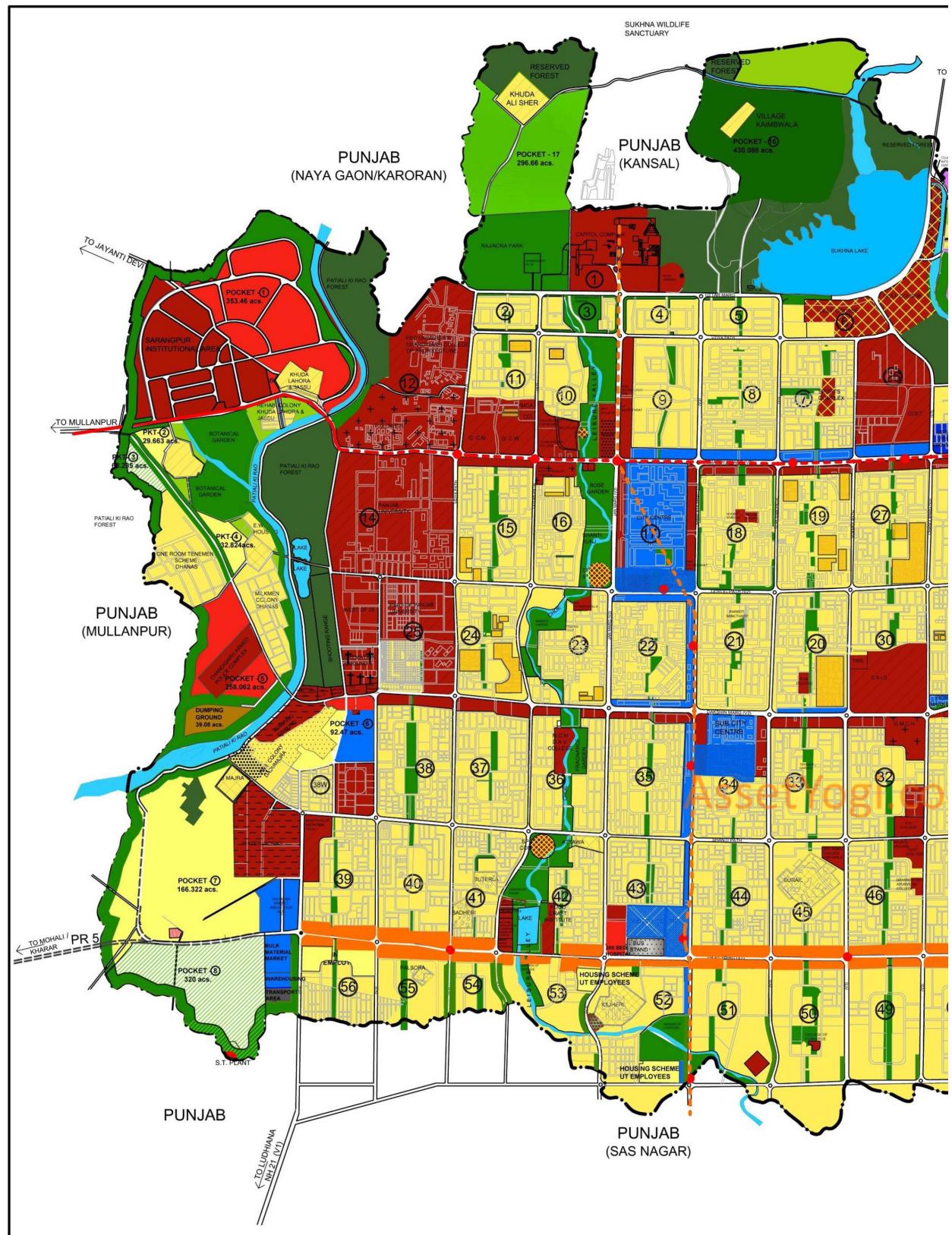
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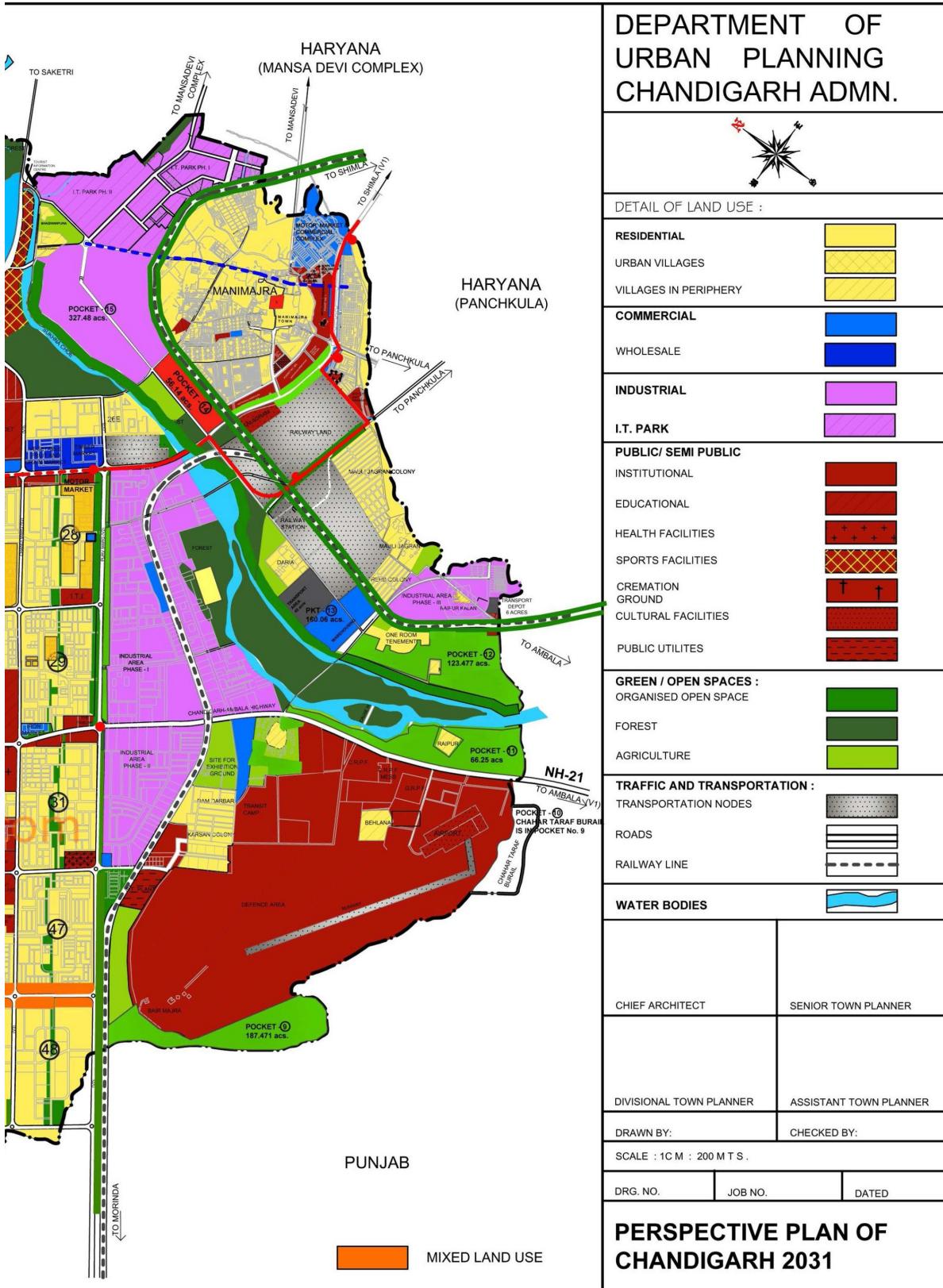
Map 1: Perspective plan of Chandigarh 2031



Source: Municipal Corporation Chandigarh

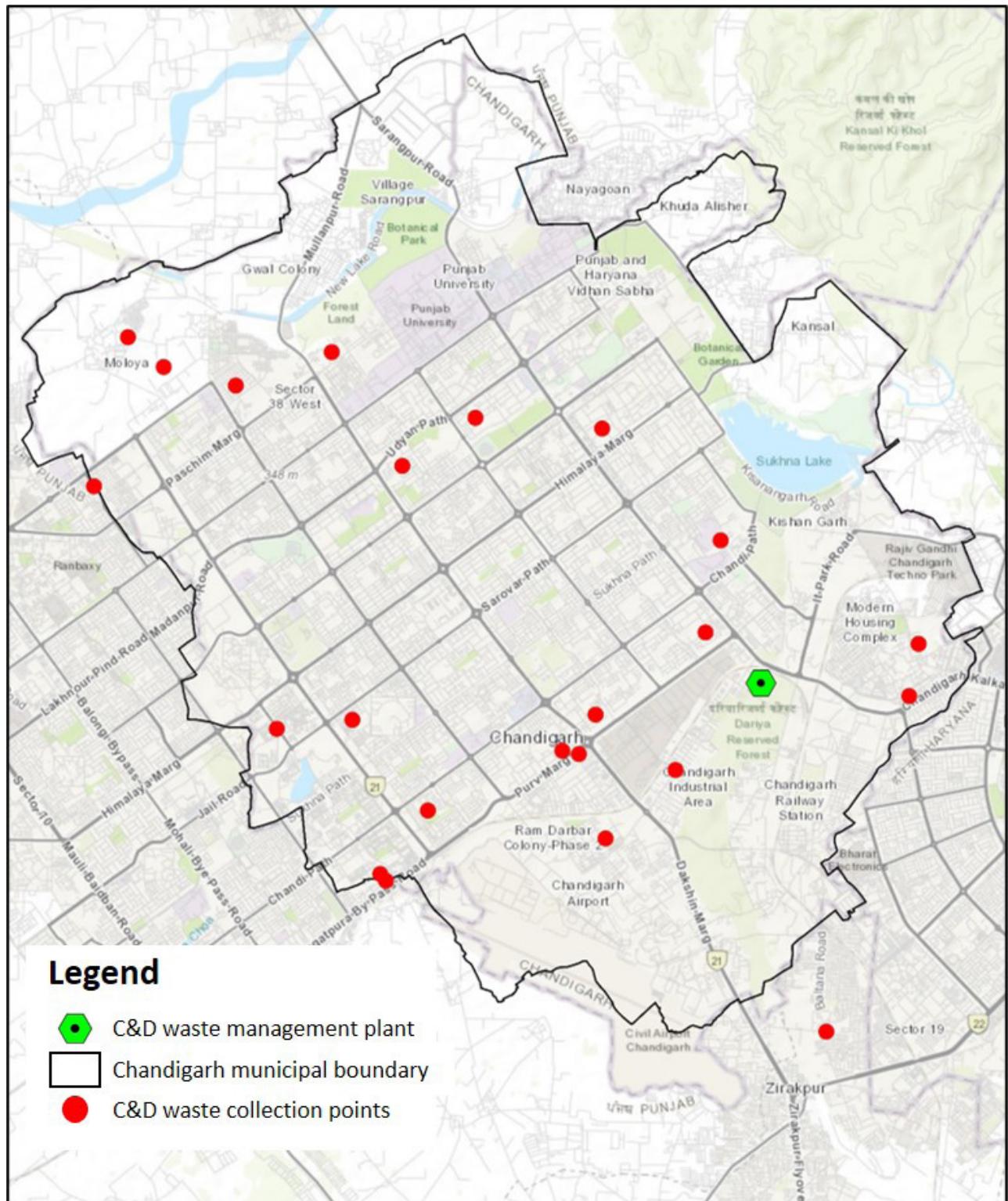


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Map 2: C&D waste collection points and waste management plant



Source: CSE



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plant, as well as the details of the processing charges, penalties, laws, and the duties of bulk generators and the municipal corporation. MCC has published the list of C&D waste collection points for generators as well.¹⁵

Furthermore, MCC has stipulated that all construction projects must obtain a waste management plan approved by them before starting construction. According to the interview with MCC officials, the corporation organizes monitoring and enforcement drives, as well as identification of sites which are repeatedly used for illegal dumping of C&D waste, such as the N-Choe canal. Cameras have been installed at these locations and periodic checks are carried out by the monitoring squad to impose fines upon the defaulters. Notices and press notes regarding the same are also published in newspapers by the corporation to raise awareness among citizens regarding their duties, mandates, processes and helpline for C&D waste management.¹⁶ An online redressal system, named Centralised Public Grievance Redress and Monitoring System (CPGRAMS), is in place for the public.¹⁷

USER CHARGES AND PENALTIES

As per the notification of the C&D waste management policy dated 1 February 2022, and discussions with officials from MCC, processing charges, administrative charges and penalties are as follows:

FEES

There is a fixed charge of Rs 800 + GST, up to the first 5 kms, from collection point to C&D waste processing plant, with additional charges of Rs 50 per km for distance beyond 5 kms.

These charges are subject to change and notified to the public from time to time.

PENALTIES

Defaulters are charged with a fine of Rs 6,500 per vehicle for dumping C&D waste with an annual increase of 5 per cent in fines. The enforcement team will have an appointed official, such as a sub-divisional engineer or a junior engineer of the Enforcement Wing of the Municipal Corporation, who is authorized to issue penalties.

ADMINISTRATIVE SANCTION CHARGES FOR CONSTRUCTION AND DEMOLITION OF BUILDINGS

All reconstruction projects are charged with a C&D waste processing fee of Rs 170 per square meter of total covered area of all floors to be demolished. For new construction projects, a fee of Rs 20 is charged per square meter of total proposed covered area of all floors to be constructed, at the time of building plan approval and sanctioning.

CURRENT SYSTEM OF COLLECTION AND TRANSPORTATION OF C&D WASTE

The plant has its own vehicle fleet for collection, which is digitally monitored by the MCC. There are mainly two modes of C&D waste collection:

1. Call-based door-to-door collection service: Calling on the toll-free number 0172-2787200 for collection of segregated C&D waste. A team is dispatched to the location after the generator pays the specified charges.
2. Pick up from collection points: The

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1. Entrance to the C&D waste recycling facility



2. Vehicle fleet



3. and 4. Material storage of processed C&D waste into different storage areas



5, 6 and 7: C&D plant: Dry processing equipment (in sequence)



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generators can deposit their C&D waste at any of the 22 allocated collection points, from which the C&D plant's collection vehicles will collect and transport it to the plant.

RECYCLING FACILITY

The C&D waste recycling plant is in Industrial Area - Phase 2 and covers 2.13 acres. It has been setup by MCC on its own land and is operated through a public business model, by the corporation itself. The plant's capacity is 150 TPD and it runs in a single shift of nine hours daily. The plant uses dry processing technology and has a storage capacity of 10,000 MT.

The plant has installed dust mitigation features such as anti-smog guns, dust barriers and a green belt at the boundaries of the plot. The site is surrounded by reserved forest land which also acts as a natural dust mitigation feature.

The plant works with a fleet of five vehicles which includes tippers, JCBs and pickup trucks which are all RFID and GPS integrated.

RECYCLED PRODUCTS

The main recycled products after processing at the plant are aggregates of size 10 mm, 20 mm, 40 mm and sand. These aggregates are used for making various products which are used in various construction projects in the city.

The plant has a unit for manual and automatic casting for pavers and tiles, as well as a block making unit. The different kinds of value-added recycled products that are made from the processing plant are paver blocks of 100 mm, 80 mm and 60 mm; kerb stones of 300 x 300 x 100 mm and 600 x 230 x 100 mm, tiles,

channels and bricks.

Using automatic casting, which has a maximum capacity of making 10,000 bricks per day, an average of 3,000 bricks are made daily. About 5,500 units of paver blocks, 600 kerbstones, and channels are made through manual casting. As per the discussions with the plant operator, the demand for recycled products and materials is high, the most being for 40 mm aggregate, paver blocks and kerb stones. Most of the products are acquired by MCC for upgradation of city infrastructure.

CHALLENGES, ISSUES AND LESSONS

The city of Chandigarh and its municipal corporation are the first in the country to establish a public-owned and public-operated C&D waste management system. The C&D waste processing plant at Chandigarh was selected as a model unit in the nation.¹⁸ The plant was also awarded the ISO 9001:2015 certificate in October 2022, in recognition of MCC's service as manufacturer and supplier of recycled aggregates, and manufacturer and supplier of plain cement concrete products by using recycled aggregates.¹⁹

The entire C&D waste management ecosystem in the city has been running efficiently over the last few years and does not face any major operational or financial challenges. In fact, as of August 2023, the demand for recycled products is much higher than the supply rate, such that the contractors and builders have to wait for the materials to be made available.

MCC also organizes special drives to create awareness among the general public regarding proper disposal of C&D waste and dust

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8. Automatic block making machine



9. Recycled aggregate collection



10, 11, 12 and 13: Recycled products

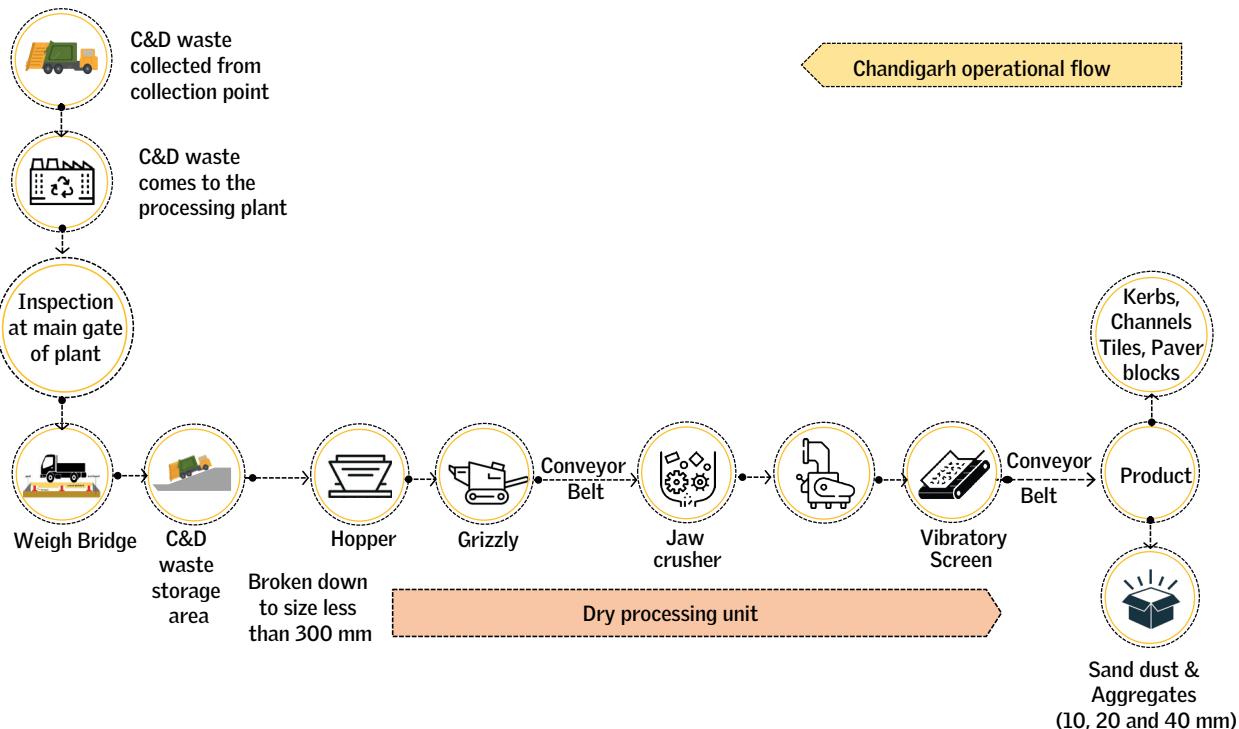


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Financial framework of the plant

Element	Details
Land	Owned by the MCC
Area of the plant	2.13 acres
Fee for land	None
Type of processing	Dry
Contract type	Public business model
Contract tenure	NIL since its a government run project
Capital cost for setting up the plant	Rs 1.75 crore (Grant received under NCAP and SBM)
Responsibilities of plant operator	MCC is the operator
Responsibilities of ULB	Collection, transportation, processing, monitoring and enforcement
C&D waste generated in the city	100 TPD
C&D plant processing capacity	150 TPD
Amount of C&D waste processed	100 TPD
Plant's official operation started in	May 2019
Expected breakeven	Not considered as funds were received through government channels

Operational flow of C&D waste management ecosystem in Chandigarh



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mitigation measures during construction and demolition activities.²⁰ According to discussions with officials from MCC, the toll-free number and doorstep collection system has been both a robust management system and an effective tool in creating awareness.

Most of the city's infrastructure

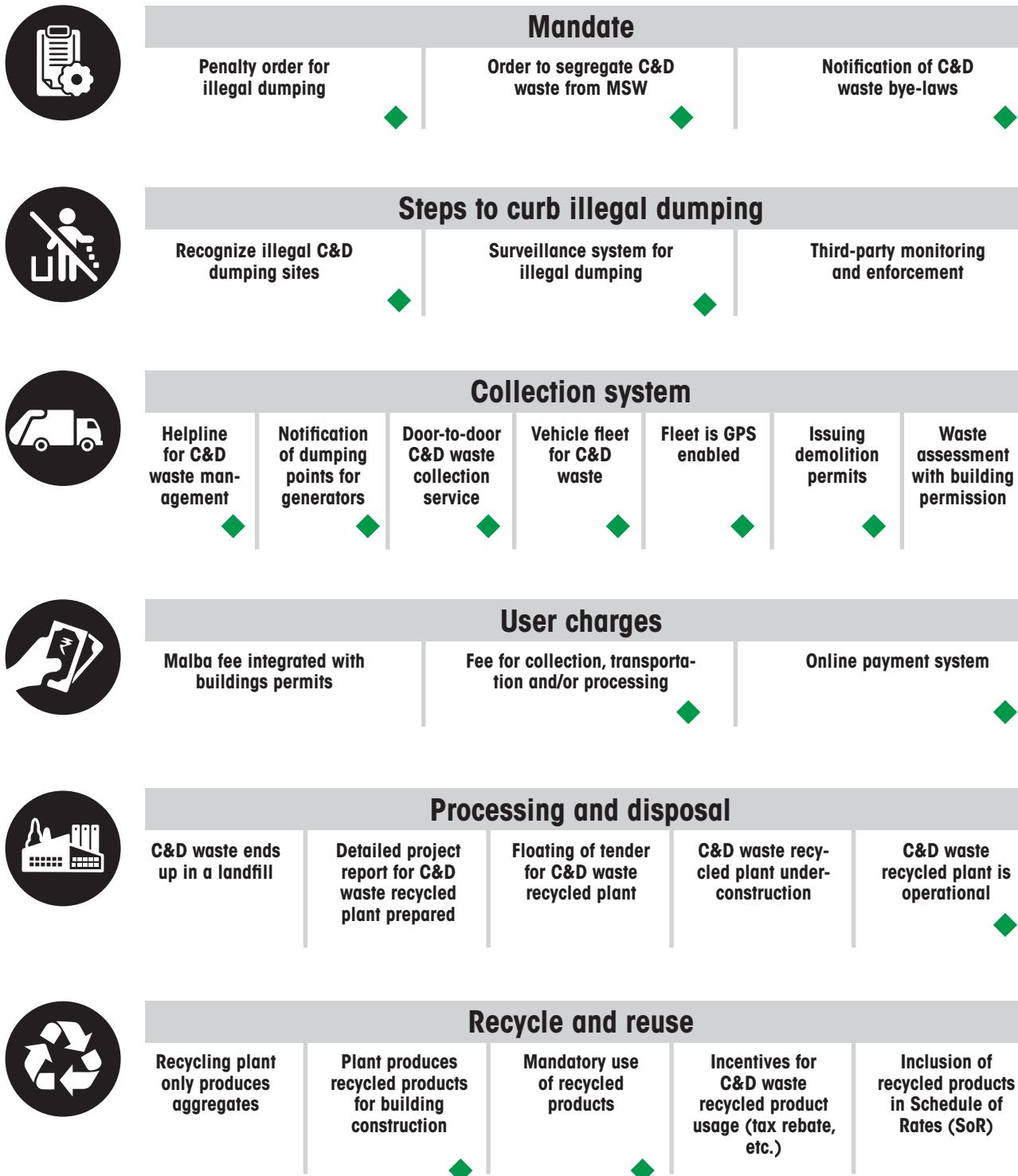
redevelopment and maintenance is done using the recycled products produced at the plant. In the long term, MCC plans to manufacture public health related items such as PCC-based gully covers, manhole covers, etc., taking the city one step beyond in terms of self-reliance and circularity.



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◆ Yes/exists ◆ In process



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