

**PRECAST  
REFUSE CHUTES**

# CHAPTER 4

Refuse chute is an integrated component of a dwelling unit. Under the Building Plan for environmental health, refuse storage and collection system shall be designed such that there will be minimum nuisance to occupants and neighbouring premises, and no pollution to the environment. It also stated that refuse chutes shall be provided for high-rise buildings so that occupants need not have to take their refuse into lifts or walk down the stairs with it.

Refuse chutes shall meet the following requirements:

- (a) The internal cross-sectional area of the refuse chute shall not be less than 0.3m<sup>2</sup>.
- (b) It shall be cross-ventilated at the top with at least two openings of not less than 0.1m<sup>2</sup> each above roof level.
- (c) Refuse chutes shall be designed with a system to wash and flush the whole length of the chute. The control valve for the flushing system shall be located at the chamber level.

## 4.1 Architectural Design Considerations

Other than the functional requirements, architectural design considerations are the layout, shape and size, hopper opening and wall finishes.

The two types of refuse collection systems in use in high-rise residential developments are:

- (a) Localised collection system.
- (b) Centralised collection system.

Localised refuse collection system is usually located at the service balcony next to the kitchen for convenience reason. An internal diameter of 610mm would comply with the minimum size requirement under the environmental health and serve the intended usage.

A centralised refuse collection system is usually located in the common area. It has to be properly screened off to minimise nuisance and complaints from owners. With the use of centralised refuse collection system, the number of refuse stacks could be reduced. Therefore, the long term maintenance cost of bin chamber and refuse chutes could be reduced.

To encourage the wider use of standard building components, the Committee has recommended standard sizes for precast concrete refuse chutes suitable for private housing. Details are tabled in Architectural Reference Sheet RC01.

## **4.2 Structural Design Considerations**

Precast refuse chute is not a load bearing structure. Only minimal reinforcement would be required to prevent surface cracks. Most designers would normally suspend the unit from beams and slab above. The Committee recommends locating refuse chutes next to structural wall / column stump, so that (1) the stability of the component could be enhanced through tie bars and (2) the side wall or walls of the refuse chute could also be utilised as permanent formwork during the construction of wall / column stump. The effective anchorage provided between the precast refuse chute and the surrounding beams and slabs is ensured through the use of starter bars. With this arrangement, the load transfer in the vertical and lateral directions and the overall stability of the structural framing system are ensured.

## **4.3 Standard Precast Refuse Chutes**

Based on the clear internal dimensions, refuse chutes can be categorised into two main types, i.e., circular and square. Circular refuse chutes are commonly found in private projects. However, some designers also used HDB's square type of refuse chute.

Circular refuse chutes come with a 610mm internal diameter. However, the sizing of hopper openings is not standardised.

HDB's standard square refuse chute has internal dimensions 800mm x 800mm square with rounded corners. As the weight of each unit is approximately 2.4 tonnes, they can be transported easily from precast yards to sites, and lifted to their final positions via towers or mobile cranes.

Standardised dimensions and details for circular and HDB's square refuse chutes are included in the Reference Sheets.

#### 4.4 Prefabrication and Labelling

Precast concrete refuse chutes can be constructed using steel mould for both the external and internal surfaces. The length could vary according to specification. However, for repeated usage, the Committee recommends standardising the internal dimension, which could be circular or square with rounded corners.

With the use of standard precast concrete refuse chutes produced from precast yards, the end users would enjoy the benefit of quality product. In addition, the unit cost of standard concrete refuse chute is likely to be reduced as the standard moulds could be re-used from one project to another.

The Committee recommends designers to make use of the recommended dimensions and details presented in the Reference Sheets to specify precast refuse chute. The labelling system for precast refuse chute type, for example,

RC	/	600C
----	---	------

is defined as:

- |     |   |                               |
|-----|---|-------------------------------|
| RC  | - | Standard Precast Refuse Chute |
| 600 | - | Internal diameter (in mm)     |
| C   | - | Circular internal dimension   |

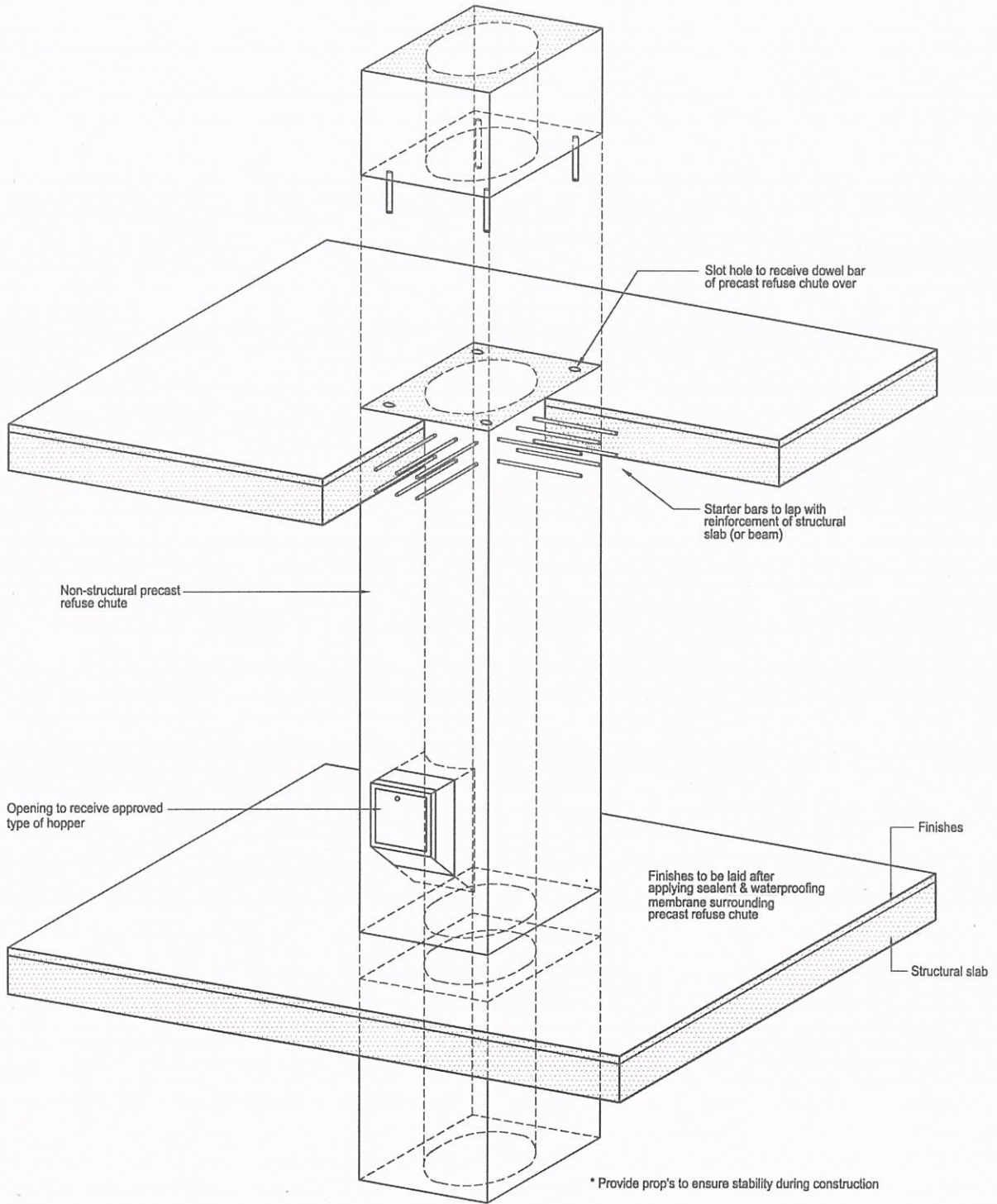
#### 4.5 Reference Sheets

**RECOMMENDED DIMENSIONS FOR STANDARD PRECAST REFUSE CHUTE**

Refuse Chute Type	Internal Shape	Internal Dimension	Recommended Component length *
RC/610C	Circular	610mm dia.	2790mm
			2990mm
			3140mm
			3290mm
			3490mm
			3590mm
			3840mm

Note: \* The length of the component takes account of 10mm joint gap between stack-up components at storey height.

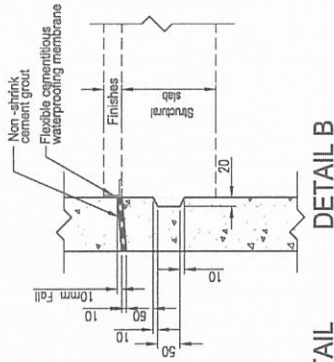
ISOMETRIC VIEW OF PRECAST REFUSE CHUTE



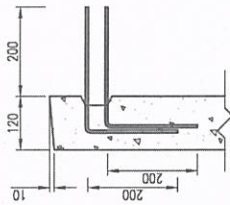
**GENERAL NOTES FOR PRECAST REFUSE CHUTE**

1. The two types of refuse collection system for high-rise residential developments are:
  - Localised collection system
  - Centralised collection system
2. Localised refuse collection system is usually located at the service balcony next to the kitchen for convenience reason.
3. Centralised refuse collection system is usually located in the common area. It has to be properly screened off to minimise nuisance and complaints from owners.
4. The number of refuse stacks for centralised collection system is less than localised collection system. The long term maintenance cost of bin chamber and refuse chutes could therefore be reduced.
5. The internal cross-sectional area of the refuse chute shall not be less than  $0.3\text{m}^2$ .
6. An internal diameter of 610mm would comply with the minimum size requirement under the environmental health.
7. HDB's standard square refuse chute has an internal dimension 800mm x 800mm square with rounded corners.
8. Hopper shall be of the approved type on size and material.

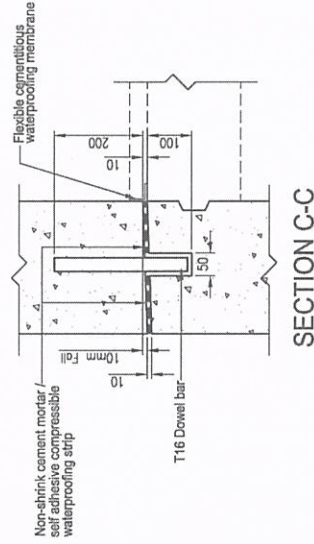
PRECAST REFUSE CHUTE DETAILS - TYPE: RC/610C



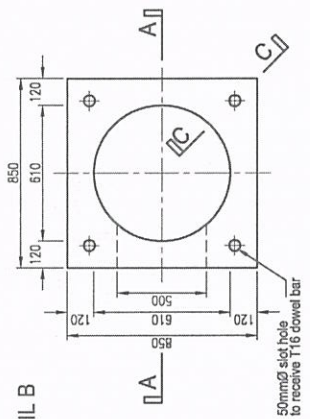
DETAIL B



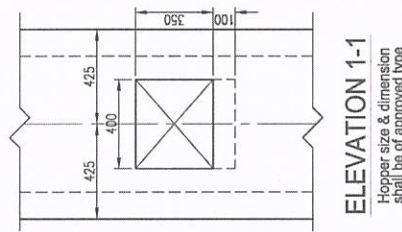
TYPICAL REINFORCEMENT DETAIL  
AT JOINT BETWEEN PRECAST  
REFUSE CHUTE & SLAB / BEAM



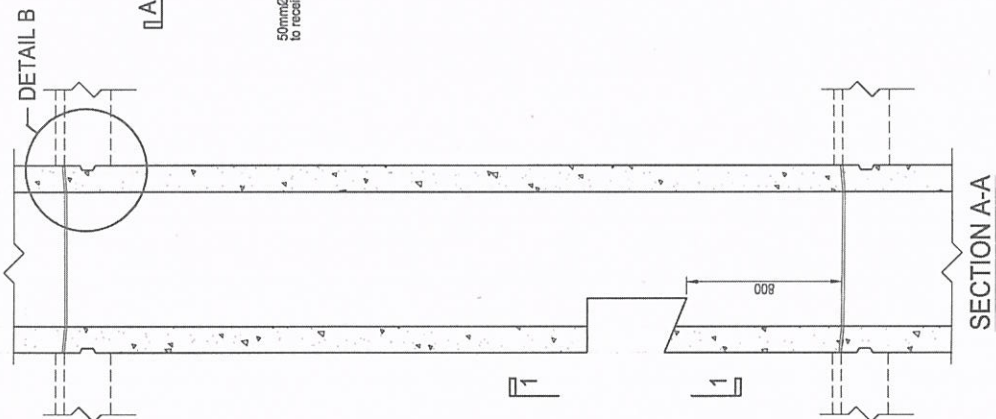
SECTION C-C



TOP PLAN OF PRECAST  
REFUSE CHUTE



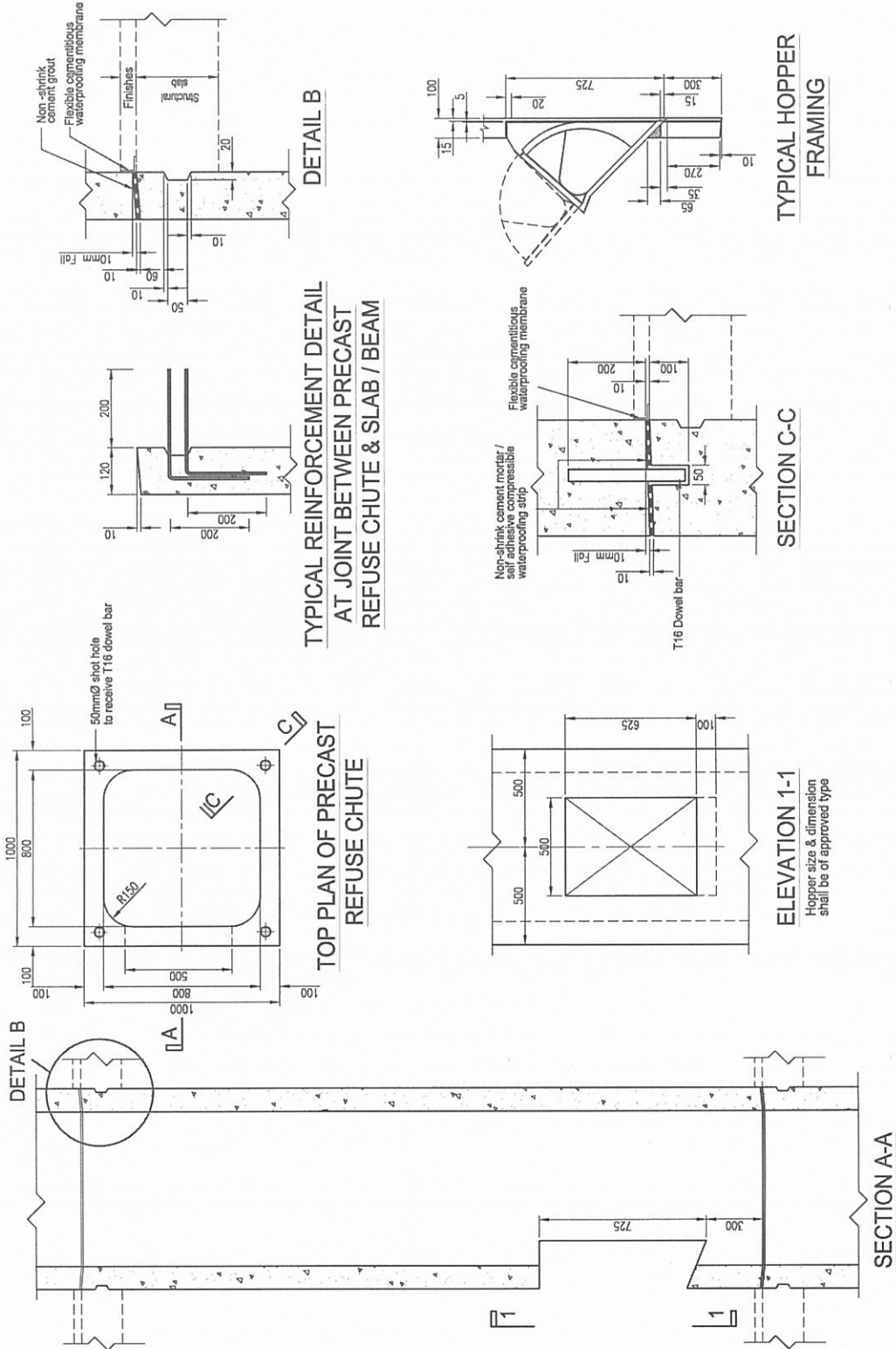
ELEVATION 1-1  
Hopper size & dimension  
shall be of approved type



SECTION A-A



**HDB'S PRECAST REFUSE CHUTE DETAILS**



## **GENERAL NOTES FOR PRECAST REFUSE CHUTE**

### General

1. Hopper shall be of the approved type on size and material.
2. The recommended length of precast refuse is tabled as in Architectural Reference Sheet RC01. 10mm joint gap between stack-up components at storey height was allowed for the adjustment of vertical and horizontal alignments.

### Concrete

1. Minimum concrete grade shall be C35, normal weight concrete.
2. Minimum cover to reinforcement shall be 35mm.
3. Surface finishes shall be off-form.

### Reinforcement

1. All reinforcement shall conform to the latest BS4449 with a minimum yield stress:
  - T - Denotes 460 N/mm<sup>2</sup> high yield deformed bar, Type 2
  - R - Denotes 250N/mm<sup>2</sup> for mild steel bars
2. Steel fabric shall conform to the latest BS4483 with minimum yield stress of 485N/mm<sup>2</sup>.

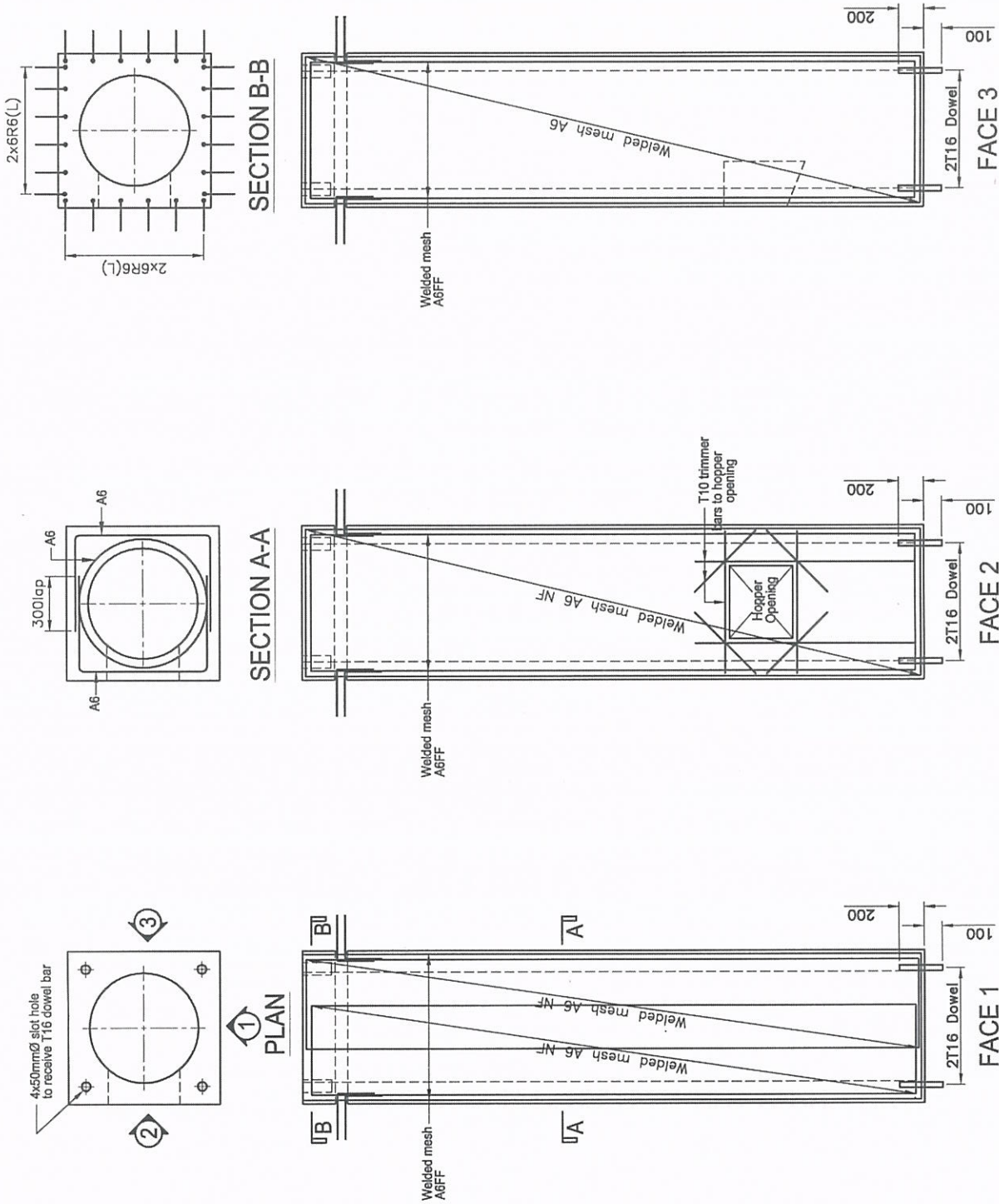
### Design Considerations

1. The recommended precast refuse chute was not designed as load bearing element.
2. Refuse chute shall be designed in accordance with the provisions of BS8110.
3. Precast refuse chute shall be suspended from beams and slab above.
4. Stability of precast refuse chute could be enhanced through tie bars anchored into structural wall or column.

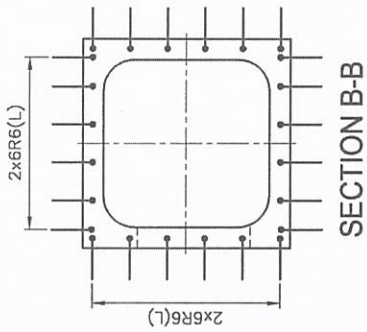
### Construction Considerations

1. Contractor shall provide safe temporary propping and bracing system when erecting precast refuse chute.
2. Precast refuse chute shall be stacked on top of each other after the completion of floor slab.
3. Starter bars projecting at top edges shall be cast together with the floor above.

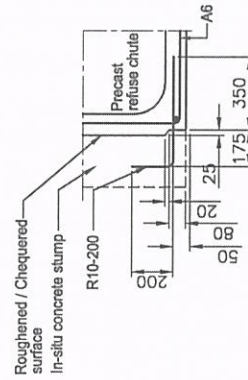
**PRECAST REFUSE CHUTE REINFORCEMENT DETAILS - TYPE: RC/601C**



HDB'S PRECAST REFUSE CHUTE REINFORCEMENT DETAILS

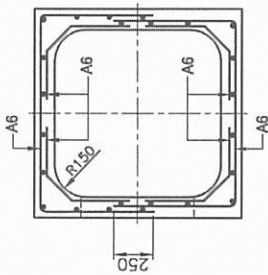


SECTION B-B

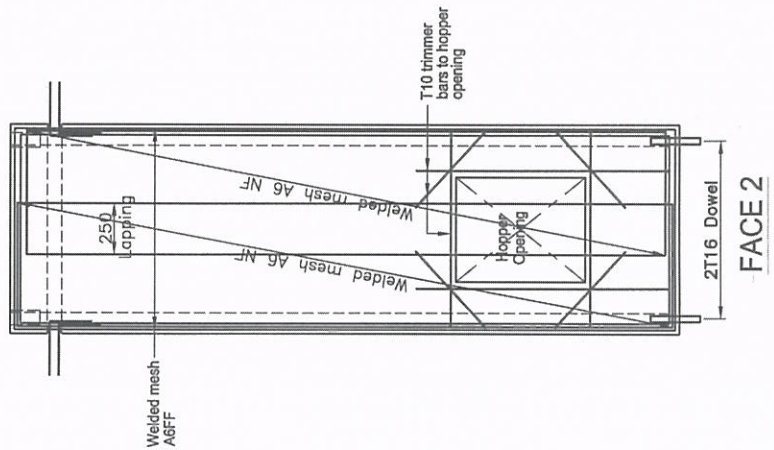


TYPICAL CONCRETE STUMP / PRECAST REFUSE CHUTE CONNECTION

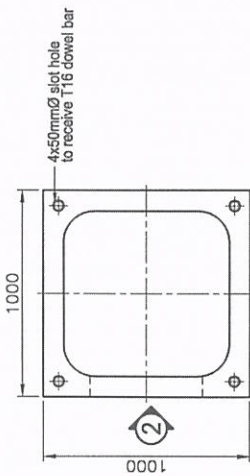
Where applicable, stability of precast refuse chute is enhanced through in-situ reinforced concrete stump



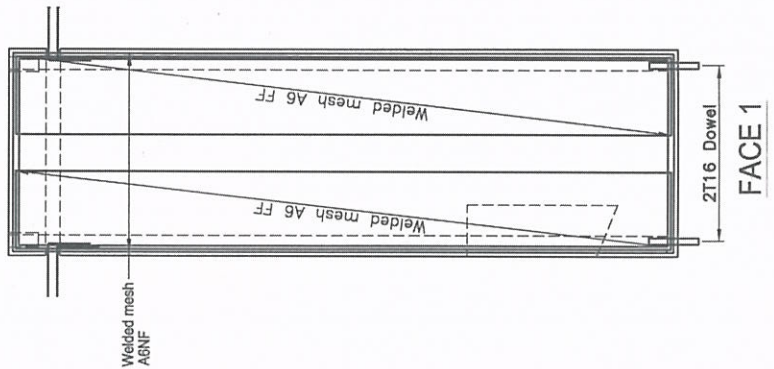
SECTION A-A



FACE 2



PLAN



FACE 1