Chapter Six: Requirements for Transportation and Storage System of Municipal Solid Waste

6.1 Scope

This chapter addresses the waste transportation system starting from transfer stations to recycling sites or final disposal sites. This chapter also addresses the design of transfer stations, the requirements for the selection of sites, construction and operation, in addition to the specifications of equipment with the goal of achieving the highest possible efficiency of the waste transport system.

6.2 Requirements for Site Selection of Intermediate Stations

- Factors to be taken into account when determining the m=need of transfer station and while choosing its location are:
    - Time saving.
    - Cost savings.
    - Fuel savings.
    - Route optimization, reducing the number of total trips required for both collection and transfer.
- The collection and storage area need to be sized correctly for the expected capacity.
- The transfer station must be provided with sanitation, electricity and water.
- Appropriate signage needs to be erected, including the name of the transfer station and a contact number for the service provider.

6.3 Requirements for the design of transfer stations

6.3.1 The initial design requirements for transfer stations

The following data must be available before starting the design of the intermediate station

- The sources of wastes that will be received either from contracted companies or contractors or non - contracted waste collectors or members of the public
- Types of waste allowed to be received
- Additional functions: Sorting - Separation –Storage
- Technology used: Compressing – conveying …
- The amount of waste required to be transferred
- Maximum volume of waste received in peak seasons
- Residential sites nearby.

6.3.2 Schematic design requirements for the site

1) Provision of a map outlining preferred routes to and from the transfer stations with consideration of high traffic and sensitive receptors.

2) Installation of driving direction, pavement, and intersection signs.
3) Identification of low and high-speed access routes allowing smooth access while reducing congestion and the possibility of accidents.

1) Provision of enough temporary parking spaces for the collection vehicles.
2) The entrances and exits of the station including ramps, special routes from the highways to the station, points of entry, reception, and exit to be planned and provided to service providers
3) Ramp angles to be minimized so as not to prohibit easy movement of large vehicles
4) The layout should consider that entrances are not in front of neighboring properties that are sensitive to noise or odor.
5) Surfaces should adopt an easy-to-clean approach, with ground slopes connected to an appropriately designed drainage system. All cracks, angles that will accumulate waste must
6) Integration of odor control systems. be removed.
7) Provision of liquid collection tanks at the drainage system so as not to accumulate odor causing liquids.
8) Regular treatment of drainage systems and the use of effective odor and bacterial control substances.
9) Provision of a weigh bridge for weighing collection trucks as they enter and transfer trucks before leaving the site. It should be linked to a centralized registration and data collection system. truck inspection area before bridge.
10) Provision of special collection points to receive hazardous or electronic waste
11) Space for expansion, if necessary.
12) Tree fence as buffer zone not less than one row of 5m height

6.4 Transfer stations alternatives and their uses

It is necessary to select the correct type of transfer station based on the following:

1) Available space
2) Quantity of waste
3) The quality of wastes
4) Proximity to residential areas
5) The transfer distance to the transfer station
6) Condition of the roads.

6.5 Calculation of the Intermediate Station Area and Capacity

A number of different service types will be operated at transfer stations, each requiring sufficient space. The following outlines the minimum requirements for all stations:

1) Area for receiving and unloading small size trucks.
2) Equipment to transfer waste from the receiving area to where it is loaded into larger trucks for transport to treatment or disposal facility.

3) Weight bridge.
4) Administration rooms and restrooms for workers.
5) A fence and gate/s; allowing separate entry and exit.
6) Where sorting activities are carried out, sufficient space must be provided for sorted waste, as well as space for any equipment that is to be used so that this must not be performed on the streets.
7) Appropriate ventilation for closed stations.

Transfer station space requirements is calculated as follows Figure (2):

Station area = Truck scale space + Dumping area + Transferring Trucks Maneuvering Area

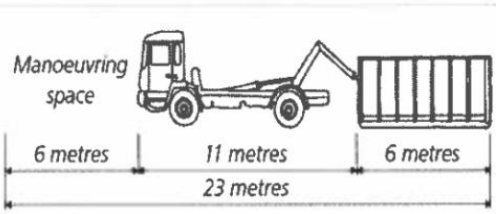

Figure 1 space required to maneuver a hook container

6.6 Requirements for Transfer Stations

The following requirements must be taken into account when planning all transfer stations.

6.6.1 Implementation of Fixed Stations

1) Compliance with recommendations of Environmental and Social Impact Assessments completed for the station.
2) Transfer stations should be designed so that waste is not visible from surrounding buildings.

3) In permanent transfer stations the dumping, temporary storage and loading area has to be shaded and have side walls that prevent littering and dust. This area should be equipped with proper odor control system such as bio filters operating 24/7 hours.
4) Adequate storage needs to be provided for all waste containers.
5) Walls should be lined to a height of 2.5 m with a washable material
6) Provide high-pressure hose for cleaning floors and walls, streets, containers and trucks.
7) Provide a back-up generator to run the crane, compressors and filters.
8) All vehicles and equipment comply with applicable environmental and technical regulations.
9) Provide drainage system to the public sewer with a station to remove impurities before connecting to the public network.

6.6.2 Mobile Stations

1) The compactor or container should be easy for collection truck to unload. loading hopper be provided if needed for small vehicles.
2) The waste should be inserted directly into the container or compressor, not allowed to rest on the ground.
3) Mobile stations placed on public streets should be located not to obstruct traffic

6.6.3 Specialized Stations

In each residential community or in major commercial areas, specialized intermediate stations or containers are installed for receiving certain types of waste:

1) Electronic waste.
2) Hazardous waste station to receive items such as batteries, pesticide containers, fluorescent lamps, and medical waste
3) Textile waste station for items such as clothes, carpets, and mattresses.
4) Waste station for books, paper and cardboard.