

# Designing and Operating Buildings for Zero Waste and Zero Litter

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NCRA - Recycling Update 2019, March 19<sup>th</sup>

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# Outline

- Why Zero Waste and Zero Litter?
- Efforts in San Mateo and Santa Clara Counties to Reduce Litter and Waste
- What are the Issues and Challenges?
- Best Practices and Implementation Tools
- Resources and References
- Extra Slides

# Why Zero Litter?

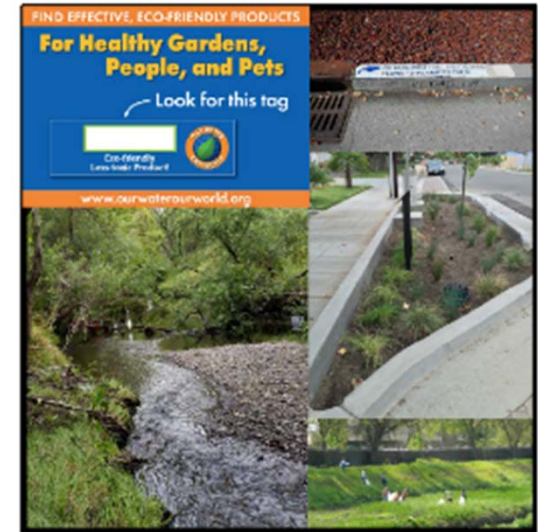
## The Clean Water Act

The Municipal Regional Stormwater Permit has issued a big challenge to Bay Area Municipalities...

Zero litter  
to the Bay  
by 2022!

California Regional Water Quality Control Board  
San Francisco Bay Region  
Municipal Regional Stormwater NPDES Permit

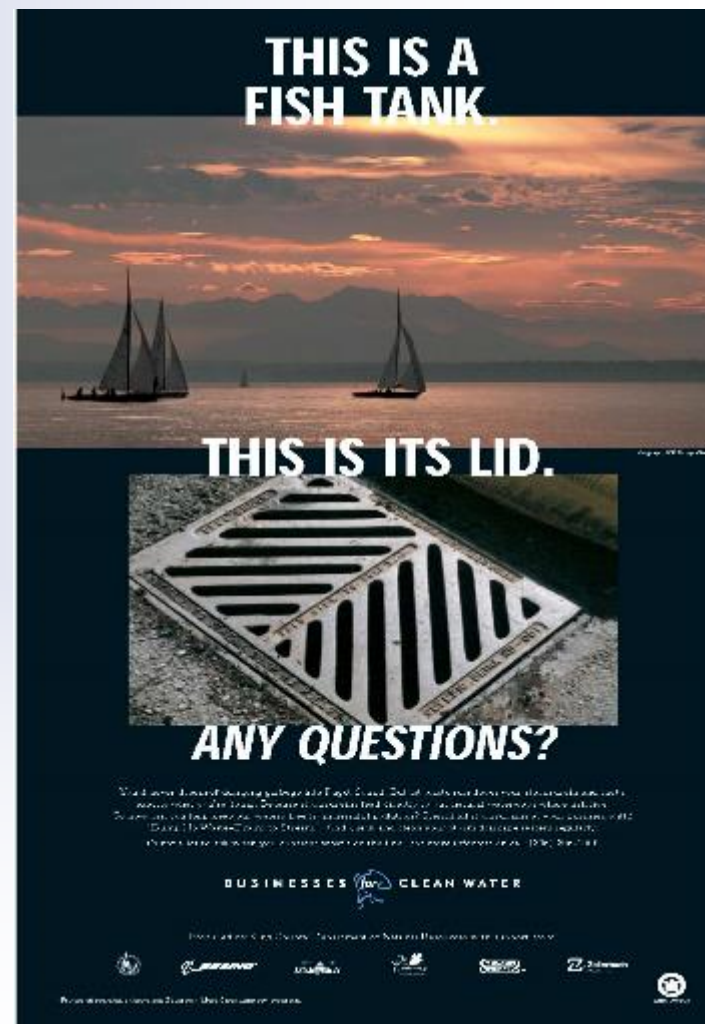
Order No. R2-2015-0049  
NPDES Permit No. CAS612008  
November 19, 2015



# Isn't Stormwater Treated?

- In the Bay Area, storm drains are **completely separate** from the sanitary sewer system (toilets etc.)\*
- Water entering storm drains generally **receives no treatment** before flowing into creeks, the Bay and the Ocean.
- In some areas trash capture devices have been installed

\*(except in most of San Francisco)



# Zero Litter & Zero Waste Efforts in Santa Clara & San Mateo Counties

- Both counties have work groups coordinating efforts between franchised haulers and municipal staff to reduce litter, waste, and integrate the goals of the programs & organizations.
- The San Mateo Countywide Stormwater Program (SMCWPPP) created the Multi-Family Dwelling Litter Reduction Toolkit.





## SECTION 3 New MFD Characteristics & Challenges

### Design and Construction Challenges

Many of the litter and waste reduction-related design challenges described in Table 1 could be addressed with targeted design review of proposed MFDs. Municipal staff should develop a process to involve the franchised hauler staff in the design review process allowing them to evaluate the draft design for practicability, service-ability and efficiency. Taking advantage of their knowledge and input early in the design review process will likely reduce operational problems for all stakeholders. Design and construction issues to review in the entitlement and building permit approval process include:

- Material disposal systems such as chutes, chute rooms
- The design of indoor and outdoor solid waste materials enclosure areas
- Collection container types
- Collection vehicle types, crew size and access to storage areas
- Bulky and special item disposal, storage and collection
- A Discard Collection Plan with service day collection location(s)
- Providing incentives for reducing waste and contamination

Figure 8 on the next page summarizes the proposed strategy and steps for reviewing new construction project plans, model conditions of approval and incorporating the hauler into the review process.



## Litter Reduction Toolkit for Multi-Family Dwellings



 SAN MATEO COUNTYWIDE  
Water Pollution Prevention Program  
Clean Water. Healthy Community.

February 2018

# **MULTI-FAMILY DWELLING LITTER ISSUES**



# Storage







Containers





Collection



# Vehicles



**CHALLENGES TO  
ADDRESSING LITTERING  
AT MFDS**









Storage

# Containers





# Collection





**CHUTES**























# Best Practices

- Use Entitlement Conditions of Approval to:
  - Require Discard Management Plan (DMP)
  - Require an Operation & Maintenance Plan
  - Use design guidelines for building systems
  - Require franchised hauler to approve DMP
  - Require equal treatment of discarded materials
- Use Franchise Agreement requirements for litter & overages
- Develop a "Right Size – Right Service" program with hauler

# **DISCARD MANAGEMENT PLAN (DMP)**



# WASTE MANAGEMENT PLAN

## 1. Plan for tenant disposal and separation

- Waste stream types and quantities
- Location of waste stations
- Types of bins
- Signage

## 3. Plan for waste storage

- Calculate area required
- Volume reduction equipment
- Location
- Layout of storage space
- Accessibility
- Time restrictions

## 2. Plan for movement of recyclables and waste to central storage

- Responsibility
- Frequency
- Transport containers
- Route

## 4. Plan for collection

If bags on curb:

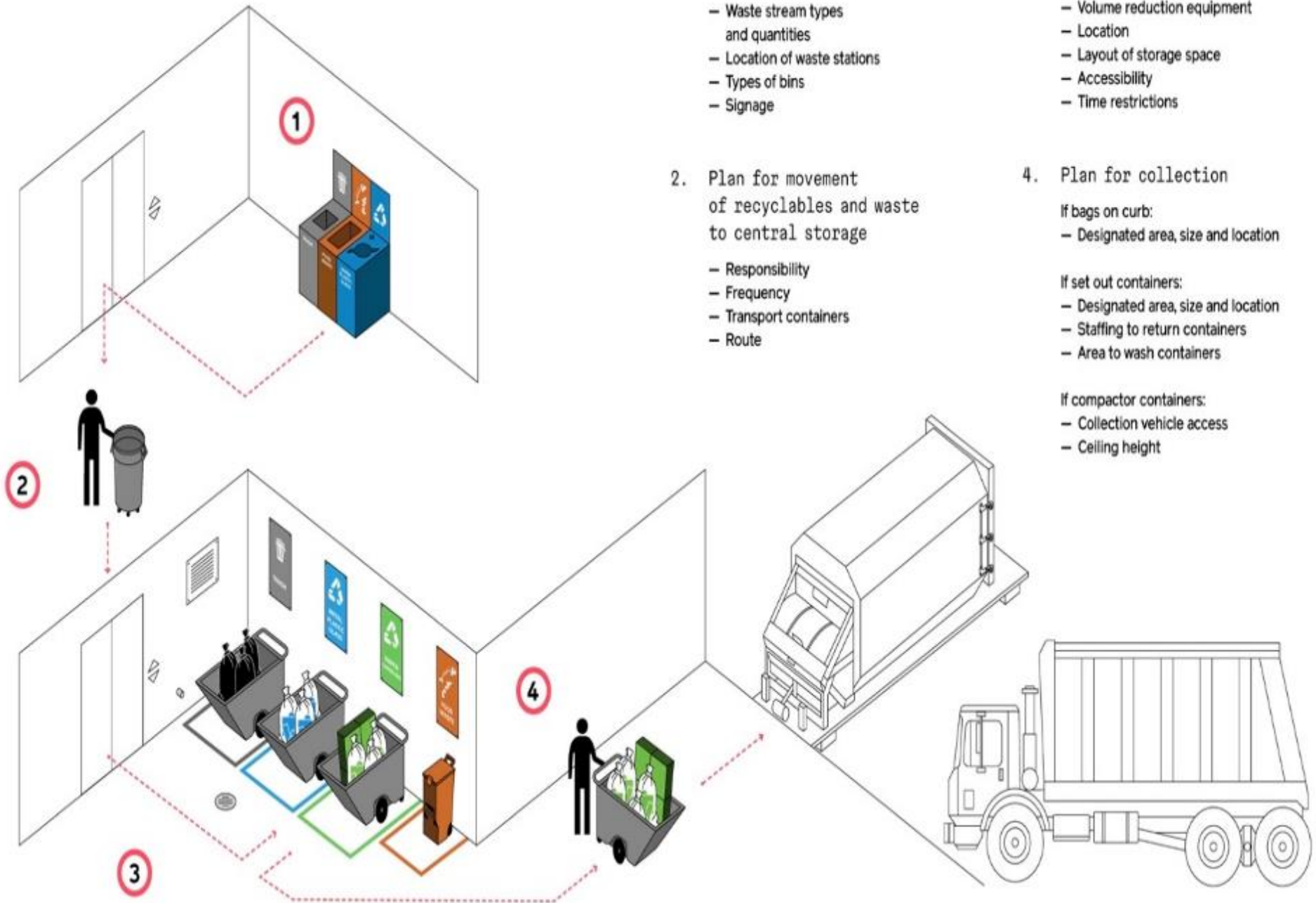
- Designated area, size and location

If set out containers:

- Designated area, size and location
- Staffing to return containers
- Area to wash containers

If compactor containers:

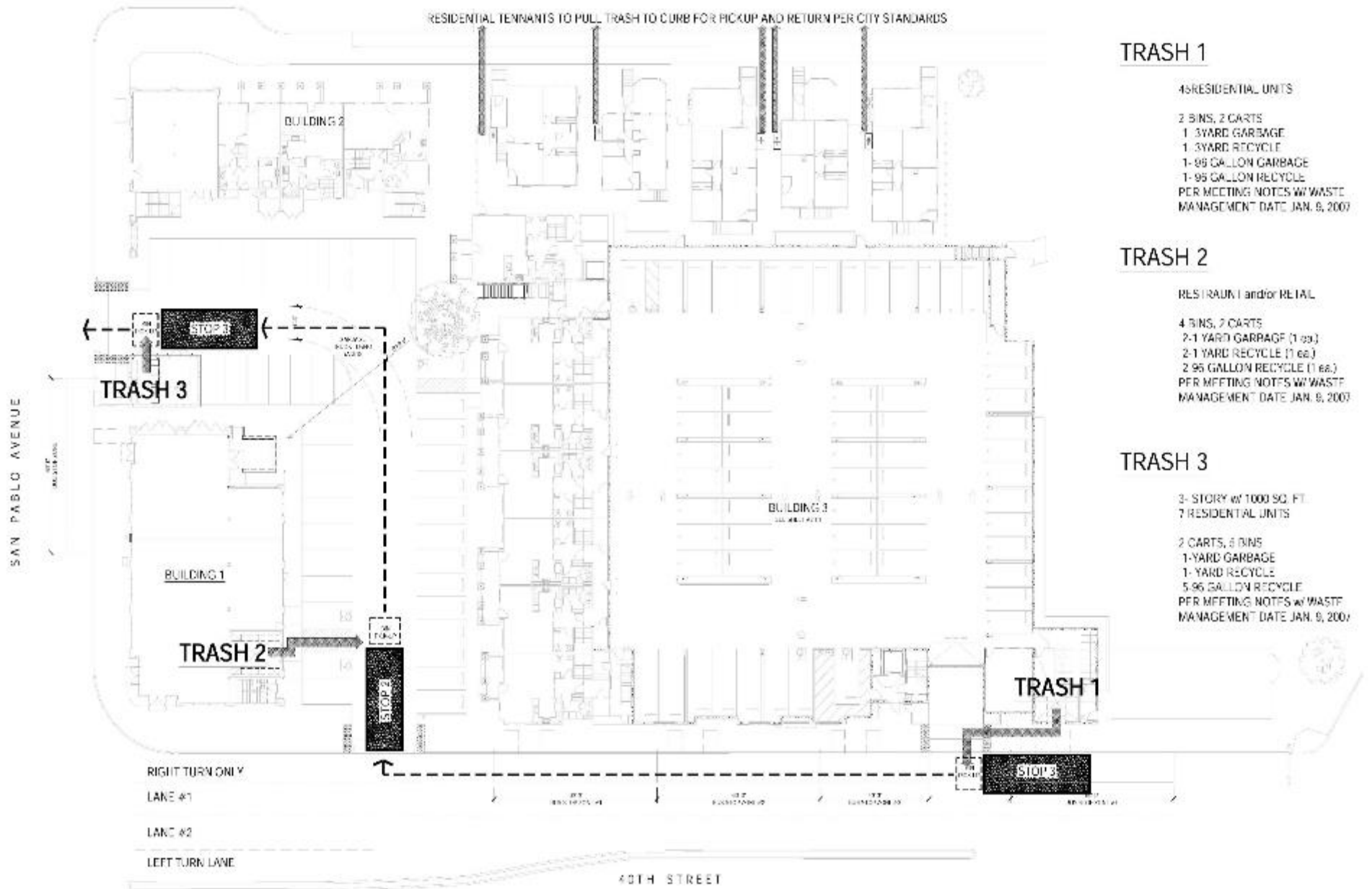
- Collection vehicle access
- Ceiling height



# DMP

4131 STREET

RESIDENTIAL TENNANTS TO PULL TRASH TO CURB FOR PICKUP AND RETURN PER CITY STANDARDS



## TRASH 1

- 4 RESIDENTIAL UNITS
- 2 BINS, 2 CARTS
- 1 3-YARD GARBAGE
- 1 3-YARD RECYCLE
- 1-96 GALLON GARBAGE
- 1-96 GALLON RECYCLE
- PER MEETING NOTES w/ WASTE MANAGEMENT DATE JAN. 9, 2007

## TRASH 2

- RES (RAUN) and/or RETAIL
- 4 BINS, 7 CARTS
- 2-1 YARD GARBAGE (1 ea.)
- 2-1 YARD RECYCLE (1 ea.)
- 2 96 GALLON RECYCLE (1 ea.)
- PER MEETING NOTES w/ WASTE MANAGEMENT DATE JAN. 9, 2007

## TRASH 3

- 3- STORY w/ 1000 SQ. FT.
- 7 RESIDENTIAL UNITS
- 2 CARTS, 3 BINS
- 1-YARD GARBAGE
- 1-YARD RECYCLE
- 5-96 GALLON RECYCLE
- PER MEETING NOTES w/ WASTE MANAGEMENT DATE JAN. 9, 2007



# Resources for more Information

- SMCWPPP
  - [www.Flowstobay.org](http://www.Flowstobay.org)
  - Multi-Family Dwelling Litter Prevention Toolkit
  - Franchise Agreement Best Practices
- SCVURPPP
  - <http://scvurppp-w2k.com/trash.shtml>
  - Zero Litter Initiative - [www.scbwmi.org/zli.htm](http://www.scbwmi.org/zli.htm)
- StopWaste - [Stopwaste Guidelines](#)
- NYC Design Guidelines - [www.zerowastedesign.org](http://www.zerowastedesign.org)

# References and Resources

## **New Development and Garbage Enclosure Guidance**

[www.recology.com/recology-san-mateo-county/new-development-projects/](http://www.recology.com/recology-san-mateo-county/new-development-projects/)  
[www.stopwaste.org/resource/space-guidelines-recycling-organics-and-refuse-services](http://www.stopwaste.org/resource/space-guidelines-recycling-organics-and-refuse-services)  
<https://fremont.gov/DocumentCenter/Home/View/1528>  
[www.zerowastedesign.org](http://www.zerowastedesign.org)  
<http://www.cityofpaloalto.org/civicax/filebank/documents/59536>  
[www.flowstobay.org/sites/default/files/Model%20COA%20July%202016%20final.pdf](http://www.flowstobay.org/sites/default/files/Model%20COA%20July%202016%20final.pdf)

## **Outreach and Behavior Change**

[www.recology.com/recology-san-mateo-county/sorting-guides-signage/](http://www.recology.com/recology-san-mateo-county/sorting-guides-signage/)  
[www.cleanwaterprogram.org/residents/multi-family-litter-prevention/item/litter-prevention-in-multi-family-buildings.html](http://www.cleanwaterprogram.org/residents/multi-family-litter-prevention/item/litter-prevention-in-multi-family-buildings.html)

## **Set-out rules, Bulky & Special Item Collection & Abandoned Waste in San Mateo County**

[www.recology.com/recology-san-mateo-county/bulky-items/](http://www.recology.com/recology-san-mateo-county/bulky-items/)  
[www.ssfscavenger.com/residential/bulky-item-collection-program/](http://www.ssfscavenger.com/residential/bulky-item-collection-program/)  
[www.republicservices.com/residents/bulk-waste](http://www.republicservices.com/residents/bulk-waste)  
[www.recology.com/recology-of-the-coast/pacifica/](http://www.recology.com/recology-of-the-coast/pacifica/)  
[www.greenwaste.com/](http://www.greenwaste.com/)  
[www.smcsustainability.org/waste-reduction/](http://www.smcsustainability.org/waste-reduction/)  
[www.cityofsanmateo.org/2174/Illegal-Dumping](http://www.cityofsanmateo.org/2174/Illegal-Dumping)

## **Franchise Agreements**

[www.flowstobay.org/Franchise-Agreement-Litter-Practices-Recommendations-20Jan2016.pdf](http://www.flowstobay.org/Franchise-Agreement-Litter-Practices-Recommendations-20Jan2016.pdf)  
[http://scvurppp-w2k.com/pdfs/1314/Final\\_BMP-Litter-Trash\\_Recommendations\\_060314.pdf](http://scvurppp-w2k.com/pdfs/1314/Final_BMP-Litter-Trash_Recommendations_060314.pdf)  
[http://scvurppp-w2k.com/pdfs/1516/Franchise\\_Agreement\\_Litter\\_Practices\\_Recommendations-Jan\\_2016.pdf](http://scvurppp-w2k.com/pdfs/1516/Franchise_Agreement_Litter_Practices_Recommendations-Jan_2016.pdf)



# Space Guidelines for Recycling, Organics and Refuse Services

for Designers of Multifamily & Commercial Buildings



**STOPWASTE**  
Fact Sheet

## Storage Space Floor Area

Bin sizes can vary in all dimensions; check with the local collection companies for exact dimensions. The typical space needed for a 6 cubic yard bin is about 8' wide, 6' deep (front to back) and 6' tall at the back, sloping down to 4 feet tall at the front<sup>2</sup>. Generally, 4 cubic yard or smaller bins can be provided with wheels, and larger bins cannot, for safety reasons. Bins without wheels will need to be situated so that the collection truck can service them head-on, without moving them. Most 96-gallon carts fit comfortably in a footprint that is 28x36"; they are around 46" tall. Most 64-gallon carts require a 26x30" footprint and are around 42" tall.

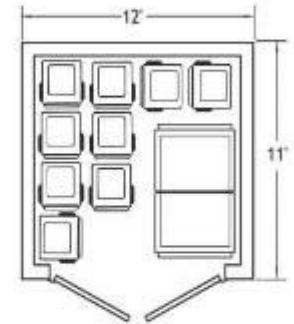
Bins and carts typically have hinged lids that must be lifted; these can damage low ceilings. In addition to space for the containers themselves, space is needed to walk among them and shift them around.

Where an enclosure will contain both carts and bins, an area that is 150% of the sum of bin and cart footprints will probably be needed. Enclosures that contain only carts or only bins will require less extra space because the containers fit together more easily.

Continuing with the example above for a multifamily setting, if the 60 units are in three buildings, each with an outdoor enclosure for discards, then each enclosure should hold one 4-cubic yard bin, five 96-gallon recycling carts and four 64-gallon organics carts. The total comes to 128 sq. ft., or less than one standard parking space.

$$\frac{28 \text{ sq. ft.}}{\text{One 4-cubic yard garbage bin}} + \frac{5 * 7 \text{ sq. ft.}}{\text{Five 96-gallon recycling carts}} + \frac{4 * 5.5 \text{ sq. ft.}}{\text{Four 64-gallon recycling carts}} = \frac{85 \text{ sq. ft.}}{\text{Total Container Footprint}}$$

$$\frac{85 \text{ sq. ft.}}{\text{Total Container Footprint}} * \frac{1.5}{\text{150% Additional Operation Space}} = \frac{128 \text{ sq. ft.}}{\text{Total Allocated Space}}$$



## Average Container Footprints

64-gallon cart	5½ sq. ft.
96-gallon cart	7 sq. ft.
4-cubic yard bin	28 sq. ft.
6-cubic yard bin	48 sq. ft.

<sup>2</sup> Example Bin Size: <http://www.greasettlement.com/park-recommendations-and-dimensions/>

Example Cart Size: <http://www.sajwrec.gov/index.asp?ID=2372>

Examples do not constitute an endorsement of any service provider. Sites vary, check locally.

# WASTE HANDLING GUIDELINES



## 2. Multi-Family Residential with Centralized Service Locations *Apartment/Condo/Plaza*

- Garbage may be collected up to six times per week. Recycling may be collected up to five times per week. Organics may be collected only on Mondays, Wednesdays, and Fridays. Twice a day pick up is not available.



### a. Internal Storage Requirements:

- All residential units need internal storage space to store garbage, recycling, and organics materials (e.g. under kitchen sink or in pantry).
- Equal amount of space should be reserved for storage of garbage, recycling, and organics materials.

### iii. Chutes:

- Chute systems must be pre-approved by the Environmental Services Division because of the unique space and access design challenges.
- Applicant must provide two chute systems side by side, one for garbage and one for recycling. Storage for organics collection must be provided in a centrally located area, in the trash room and/or in the trash enclosures. Chutes are not required or recommended for organics.
- The design and construction of chutes shall conform to the requirements in Fremont Municipal Code, the Fremont Waste Handling Guidelines, and the Site Plan and Architectural Approval standards.
- Chute vestibule rooms must be distributed to prevent any resident from traveling more than 250 feet to dispose of waste.

- Chute vestibule rooms must observe requirements of the current California Building Code regarding accessibility to solid waste collection receptacles for persons with disabilities (CCR Title 24, Part 2).

- Chute systems must comply with current building codes for 2014 fire sprinkler requirements.



Figure 3: Garbage and recycling chutes





# Zero Waste

# Design Guidelines

Design Strategies and Case Studies for a Zero Waste City



Kiss + Cathcart, Architects



CLOSEDLOOPS

With support from

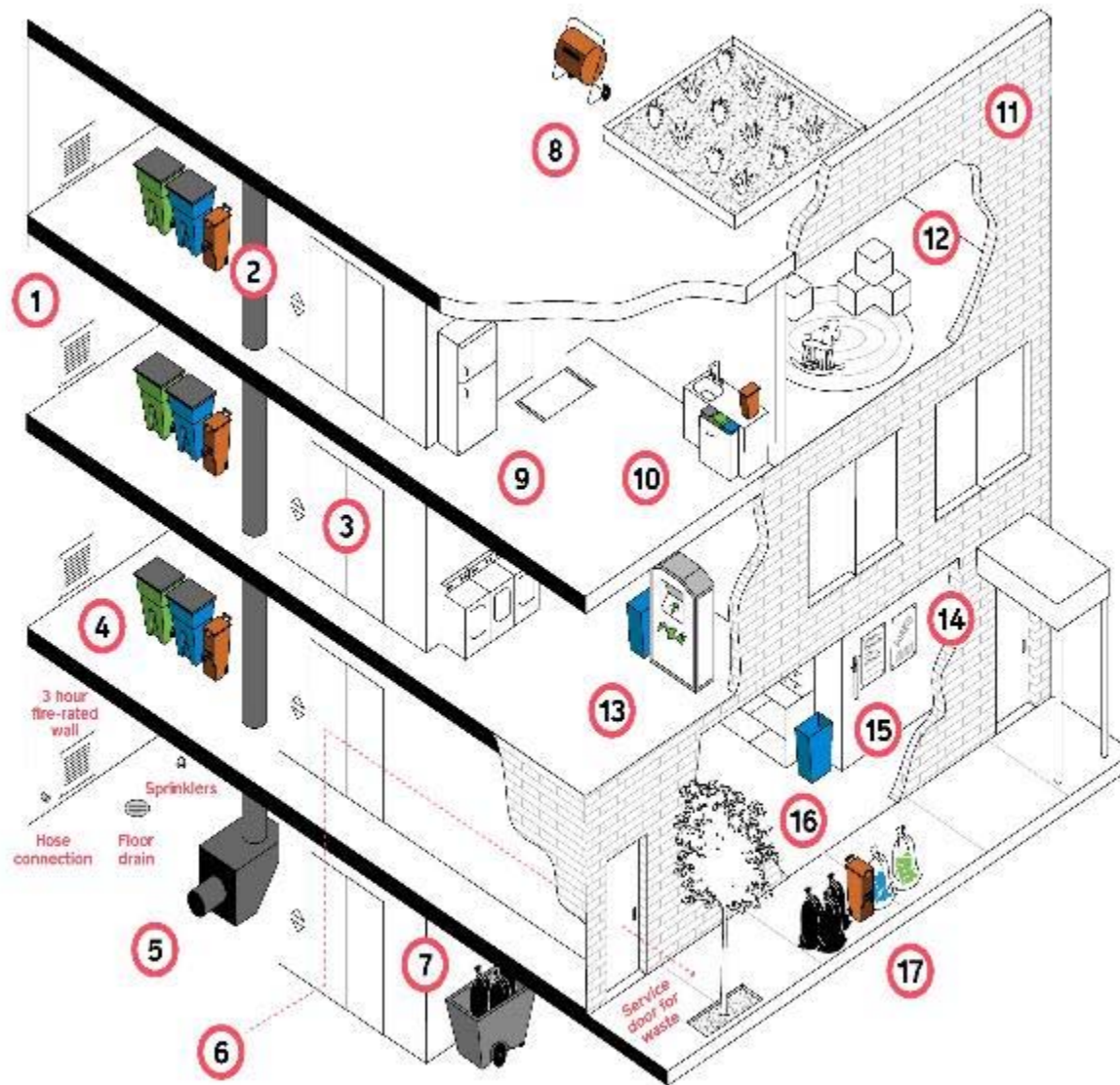


**EXTRA SLIDES**



## RESIDENTIAL BUILDING DESIGN CONSIDERATIONS

1. Waste room: consider area, ventilation, lighting, signage. 2.23, 2.18
2. Chute and disposal of recycling on every floor required by BC 1213.3 (≥ 5 stories and ≥ 9 units)
3. Consider how waste travels vertically (by chute, by residents or by building staff in regular/service elevator). 2.32
4. Provide co-location disposal for all waste streams including organics. Consider other waste streams that may block chutes, e.g., cardboard, textiles, hangers. 2.88
5. Trash compactor required by BC 1213.2 for ≥ 4 stories and ≥ 12 units
6. Consider path of waste to curb and staff time required. 2.82, 2.85
7. Waste storage room per BC 1213.1 or BC 707.13.4. Use containers unless room is ratproof and fireproof room per HMC 27-2021. Consider area required, ventilation, and washing of containers. 2.21, 2.25
8. Compost can be made and used on-site in gardens. 2.25



9. Shallow refrigerators and shelves to reduce "lost food," or smart refrigerators. 2.17
10. Pull-out cabinet with bins (all waste streams) and counterop organics bin. 2.88
11. Consider Impacts of building materials selection and construction process. Optimize material usage, consider end of life. 2.27-2.35
12. Consider amenities that reduce material consumption (e.g., children's play areas with toys, shared goods library, cleaning service with vacuums). 2.15
13. Provide textile recycling and plastics recycling in laundry room. 2.13
14. Consider possibilities for reuse such as online bulletin boards and donation refrigerators. 2.18
15. Provide feedback on waste generation to residents and staff to change behavior. Consider how to incorporate SAYT back to resident. 2.11
16. Provide paper recycling in mail room and cardboard collection in parcel room. 2.15
17. Provide set out area coordinate with street, trees, furniture, curb cuts and entrance. See NYC Rules for setout. 2.84

## RESIDENTIAL TYPOLOGIES

1. Central Location
2. Service Corridor
3. Corridor Chute with Central Recycling
4. Trash Room with Chute and Bins
5. Single Chute with Sorter
6. Multiple Chutes





**CHUTES**

## CHUTE OPTIONS

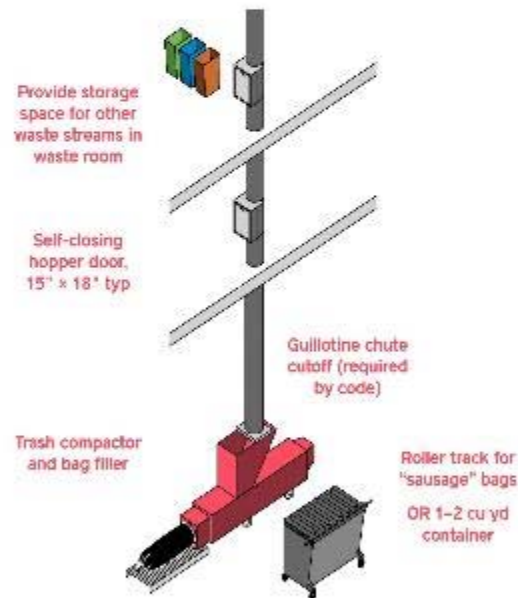
### 1 Single Chute

**Pros:**

- Multiple chute doors may be open at one time

**Cons:**

- Only transports trash (recycling and organics need to be transported by building staff)



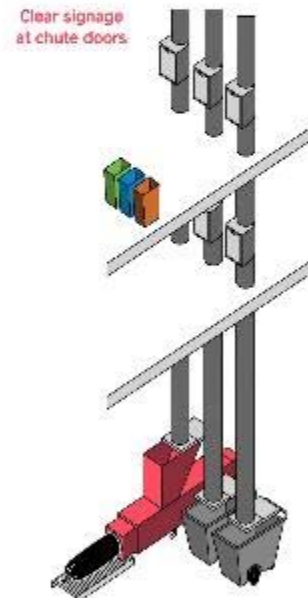
### 2 Multiple Chutes

**Pros:**

- Multiple chute doors may be open at one time

**Cons:**

- Higher cost



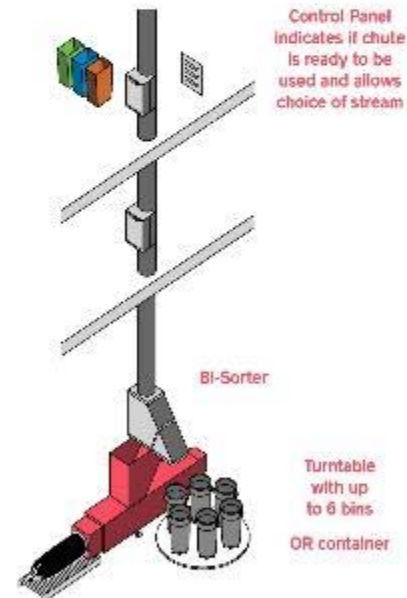
### 3 Chute with Bi-Sorter/Turntable

**Pros:**

- Flexibility to add other waste streams with turntable
- Requires less floor area

**Cons:**

- May be a time delay—only one chute door can be used at a time
- Maintenance required
- Higher cost



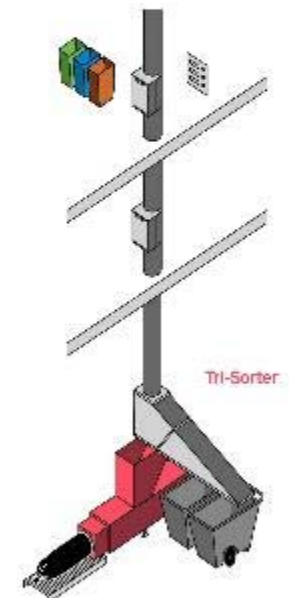
### 4 Chute with Tri-sorter

**Pros:**

- Requires less floor area

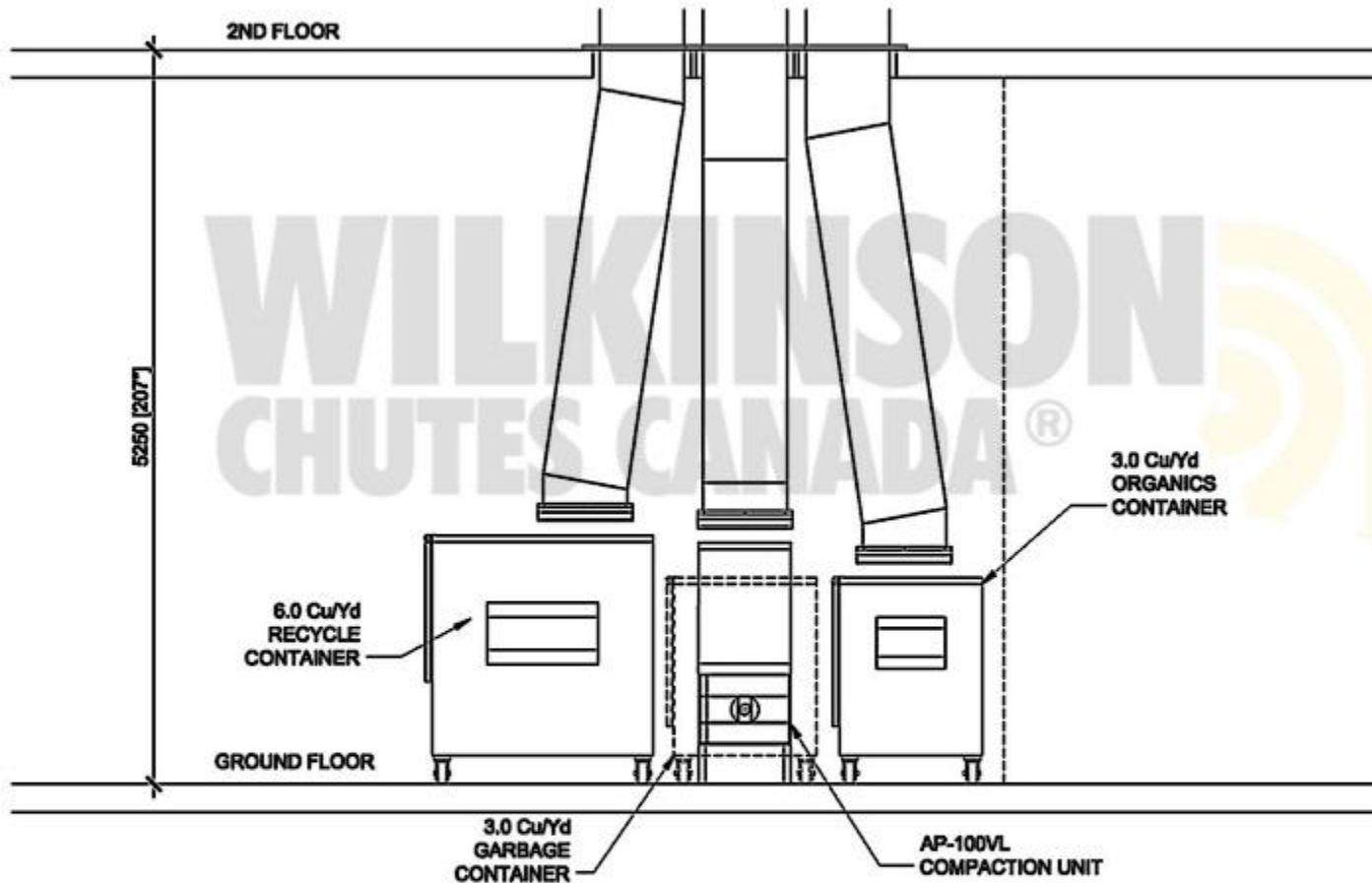
**Cons:**

- May be a time delay—only one chute door can be used at a time
- Maintenance required
- Higher cost



**Bottom of chute container options (see DSNY Rules and BC Requirements):**

- **Trash chute:** vertical compactor to sausage bag or 1-2 cu yd container
- **Recycling chutes:** Wheeled bins or tilt trucks or 1-2 cu yd containers (or turntable for Bi-Sorter only)



1 RECYCLING CHUTES SECTION  
NTS

WASTE, RECYCLING AND ORGANICS CHUTES SYSTEM  
SECTION VIEW

REV

DATE

BY

CHKD

NTS

NO

1 OF 1



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# Discard Management Plan

- Key Elements:
  - Map of property
  - Hauler collection vehicles access routes
  - Areas for containers on collection service days
  - Enclosure areas for discards (L,R,C)
    - Types of collection containers (compactors, bins etc.)
  - Internal collection systems (chutes, rooms etc.)
  - Special material storage and collection areas

# O&M Plan

- Collection practices
- Storage areas
- Diversion goal
- Education of residents
- Signage maintenance
- Move in and Move out procedures
- Provision of services
- Overflows prohibited - Right Size/Right Service







# Design Guidelines for Building Systems

- Chute and chute chamber dimensions
- Enclosure dimensions and access
- Collection vehicle access (ceiling height)
- Collection vehicle personnel issues
  - Pavement slope, distance, container weight/size
- Collection vehicle type (FEL, REL, SL)
- Collection vehicle service day assistance
- Storage space for special materials



# Require Franchised Hauler to Review and Approve DMP

- Hauler should review design at entitlement stage (before Planning Commission approval)
- Hauler should provide comments to design team
- Hauler should approve final design during building permit stage (before the building permit is approved)



# Equal Treatment of Discarded Materials

- Internal collection of discarded materials must be provided for each stream of materials in an equal manner so that users of the building are not incentivized to landfill materials.
- For example, if chutes are provided, then three chutes must be provided.
- Space for all three materials must be provided in units and in common areas.



# Franchise Agreement Requirements

- SMCWPPP Franchise Agreement Recommendations
- Right Size - Right Service program
- Preventing litter during collection
- Overage prevention and billing
- Rate Structure - incenting desired behavior
- Bulky material program and services
- Communication with Hauler
- Diversion and litter reduction goals

