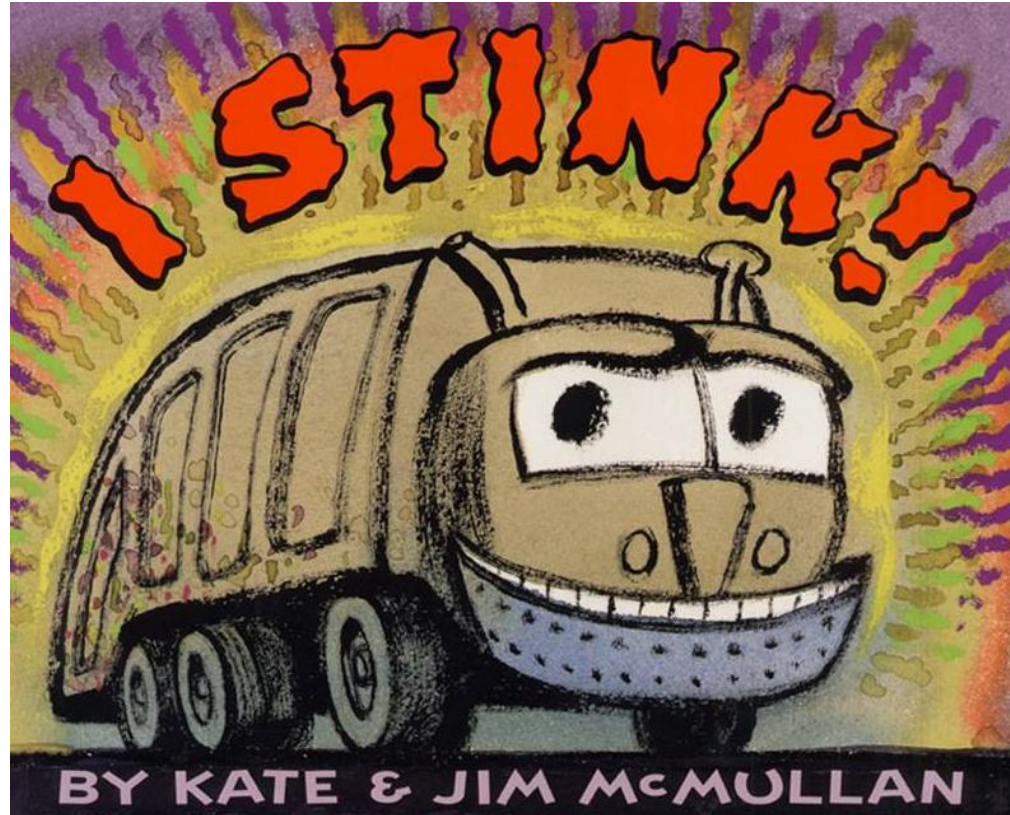




## ...but what about the garbage?

A Primer on Solid Waste Management for the Transportation Professional

# Inspiration



# Overview



- Background
- Types of Containers
- Typical Collection Vehicles
- Common Issues
- Case Studies

# Problem / Opportunity

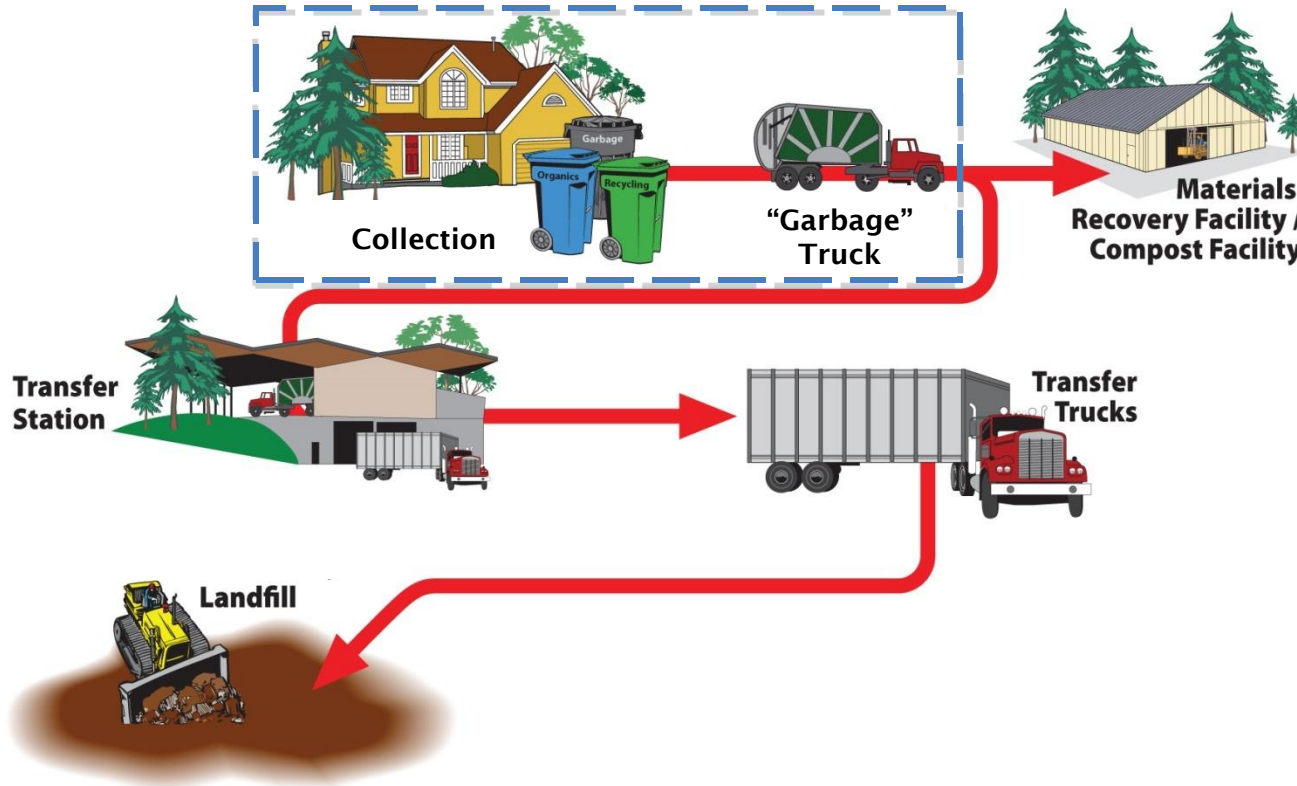
- In the past, waste storage space never properly designed or incorporated in buildings
- People and infrastructure increasingly compete for limited space as Canadian cities continue to densify

“Integral part of development process”

“No longer an afterthought during design stage”



# Solid Waste Collection



Presentation  
focuses on the  
"first mile"

Source: Smita Shukla, Noida Institute of Engineering & Technology

# Actually It's Not Just Garbage...



At least 4  
different waste  
streams

# Solid Waste Management Goal

Provide adequate waste storage and allow collection services to occur in a safe and efficient manner

# Increased Collaboration

## Design

- Developer
- Design Team
  - ☐ Architect
  - ☐ Landscape Architect
  - ☐ Civil Engineer
  - ☐ Structural Engineer

✓ **Transportation Engineer**

## Operation

- |                            |                          |
|----------------------------|--------------------------|
| ▪ Operator                 | ▪ Operator               |
| ▪ (Waste Disposal Company) | ▪ Waste Disposal Company |





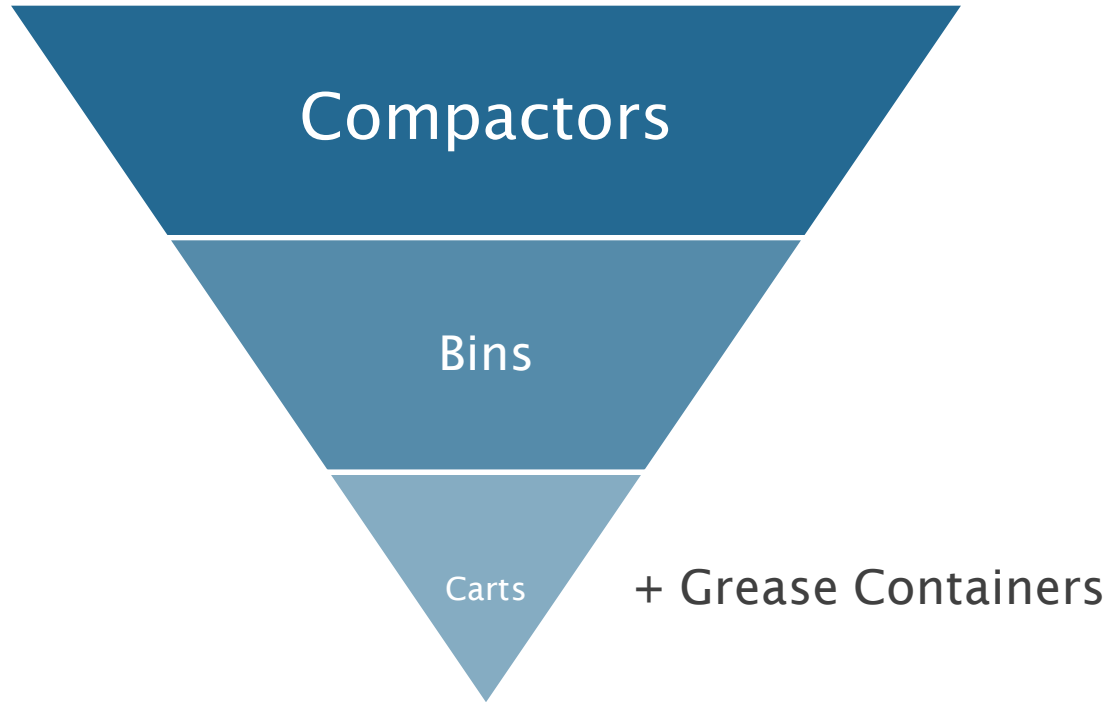
# Typical Services

## Transportation Engineer

- Traffic Impact Studies
- Site Plan Functional Designs
- Loading Management Plans



# Commonly Used Containers



# Compactors



*Marine Gateway (February 2016)*

- Commercial
- Ground Level
- Ground Level Cardboard
- Low Profile

**4:1**  
Compaction Ratio

# Commercial Compactors

**Very large**  
volume of waste  
&  
**Low** servicing  
frequency



*Marine Gateway (February 2016)*



*The Rise (February 2016)*

# Ground Level Compactors

**Large volume  
of waste  
&  
Low servicing  
frequency**



# Low Profile Compactors



*Credit: Metro Disposal Ltd.*

Ideal for tight spaces...



# Compactors

## Potential Benefits

- ✓ Less servicing frequency
- ✓ Can store more volume
- ✓ Less messy; less overflow
- ✓ Ideal for large volume generation (>90 units)
- ✓ Long life span (15-20 years)
- ✓ More secure
- ✓ Various types

## Potential Challenges

- X No cardboard
- X Odour
- X Not suitable for compostables
- X Requires electricity, drainage
- X Noise / vibration
- X Capital cost
- X Underground storage may have limited space
- X Must carry entire compactor container back and forth
- X Not everyone can have access

# Bins



- Most waste streams
- Various sizes
  - 2, 3, 4, 5, 6, 8 cubic yards

Back Lane, Vancouver  
(February 2016)

# Bins

## Potential Benefits

- ✓ Most waste streams
- ✓ Lower ceiling height
- ✓ Capital cost < compactor
- ✓ Drainage not a major concern
- ✓ Ideal for less than 100 units
- ✓ No electricity required
- ✓ Quick collection time
- ✓ Easily accessible

## Potential Challenges

- X Require more truck trips
- X Large loading envelope
- X Odour a concern
- X No extra capacity
- X Surface damage
- X May cost more than compactor
- X Unsightly; often end up in lanes
- X Vandalized or moved

# Carts



- **Recycling and Organics**
- **Smaller volumes (360 L)**

The Rise (February 2016)

# Grease Containers



- Bins
- Drums
- Jug-in-box

The Rise (February 2016)

# Collection Vehicles



Compactor truck



Cardboard recycling and garbage collection truck



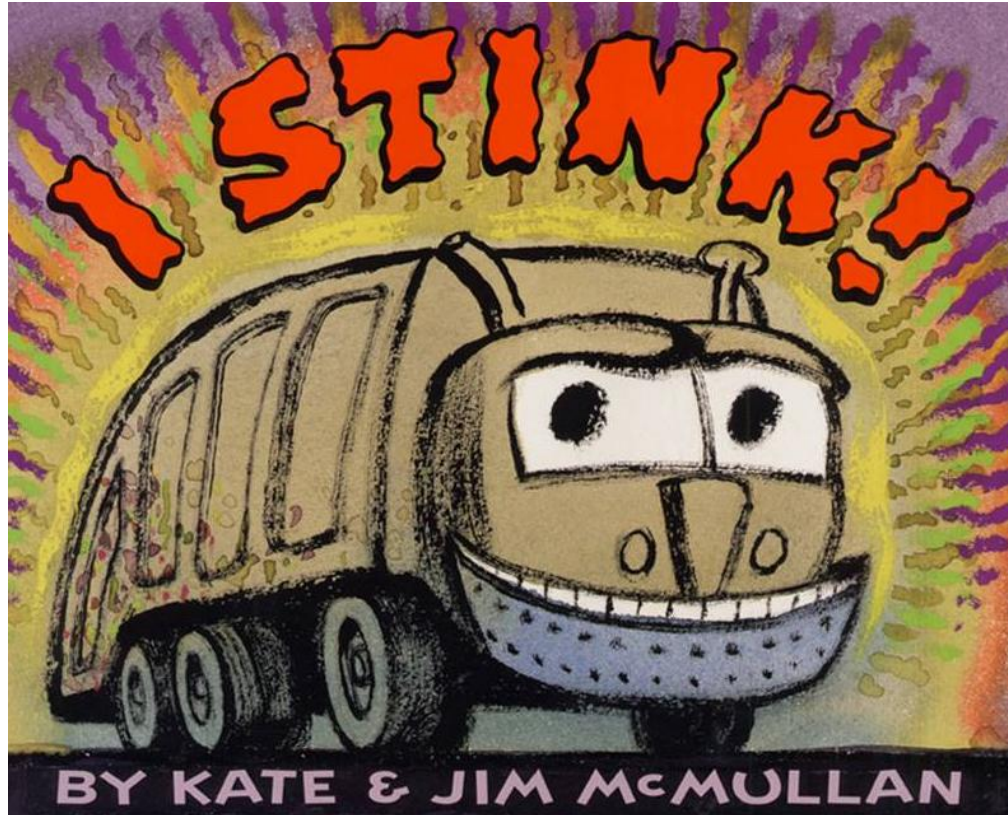
Recycling cart collection truck



Grease collection truck



# “Garbage Trucks”



- Large
- Slow
- Loud
- Smelly
- Messy

# Compactor Truck

For garbage collection and cardboard recycling...

...need extra length and overhead clearance...



# Front End Bin Truck



... also for  
garbage  
collection  
and cardboard  
recycling...

...also need  
extra length and  
overhead  
clearance...

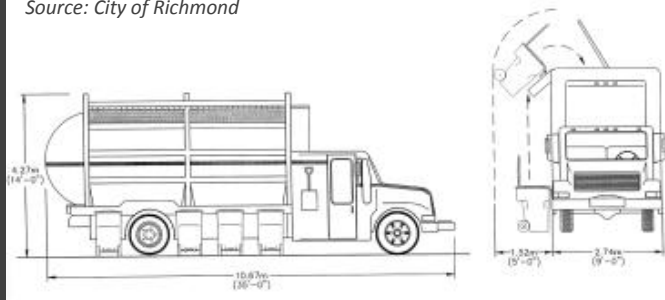
*Credit: Smithrite Disposal Ltd.*



# Recycling Cart Collection Truck



Source: City of Richmond



...for recycling and organics...

...need extra width and overhead clearance...

# Grease Collection Truck



...for bins  
and drums

Source: *The Sustainability Report* (West Coast Reductions Ltd. Spring/Summer 2011)

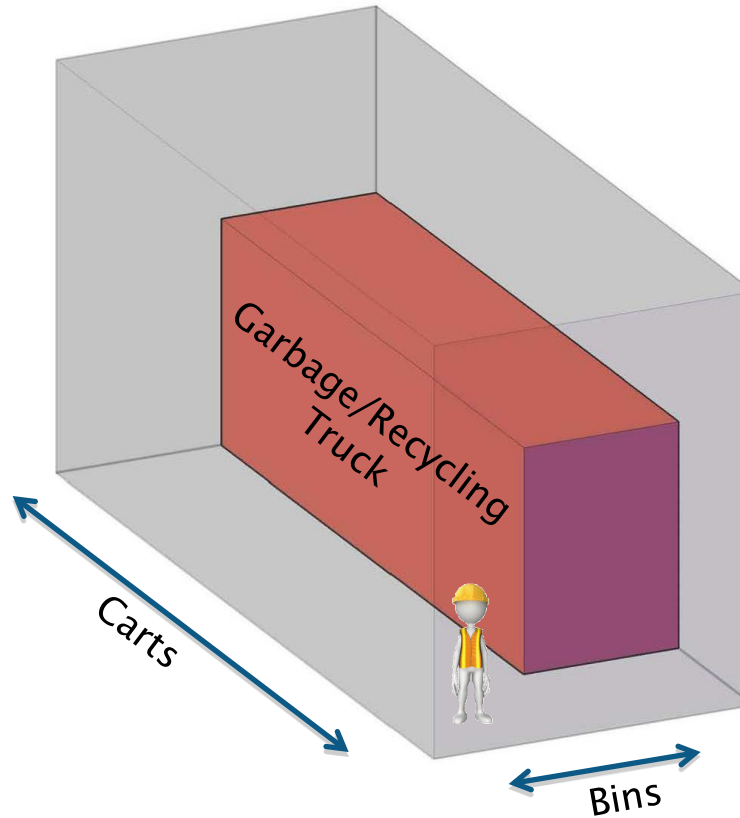
# Comparison of Design Vehicles

Characteristic	Compactor Truck	Front End Bin Collection Truck	Recycling Cart Collection Truck	HSU Truck
Length (m)	10.7	11.3	10.7	11.5
Width (m)	2.6	2.6	2.7	2.6
Height (m)	4.2	4.2	4.2	4.2
Width clearance (m)	2.6	2.6	4.3	2.6
Overhead clearance (m)	13.4	6.7	5.7	4.2
Minimum outside turning radius (m)	14.1	12.8	12.8	14.1

NB: These are approximate dimensions. Actual dimensions vary.



# Staging/Pick-up Area



## Dimensions:

- 7.5 m high
- 6.0 m wide
- 15.0 m long

*Source: City of Burnaby Solid Waste and Resource Storage Facility Requirements in Multi-Family Residential, Commercial, Industrial and Institutional Complexes (2017)*

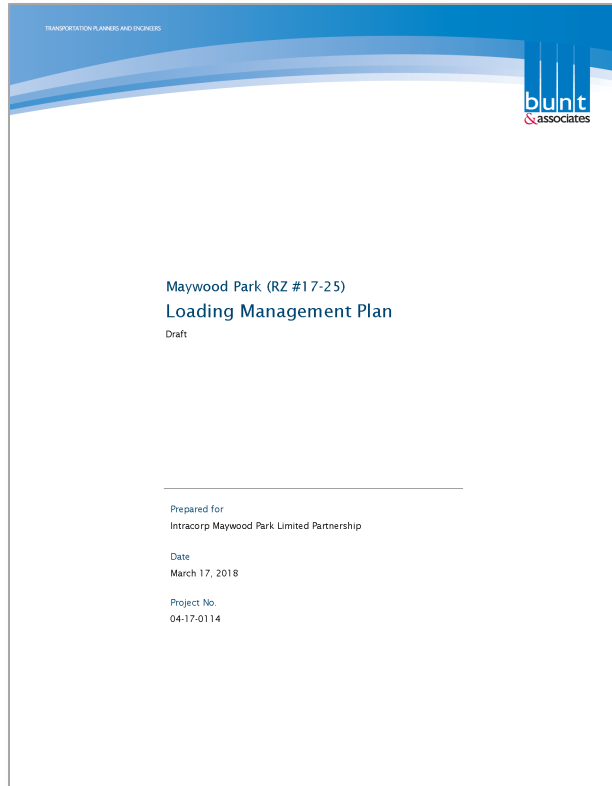
# Common Issues

- Multiple Waste Disposal Companies
- Horizontal Space
- Height Limits
- Ramps

# Multiple Waste Disposal Companies



# Solution



## Loading Management Plan

- Review proposed loading facilities
- Identify loading activities/schedules
- Confirm truck entering/exiting routes
- Review on-site circulation
- Develop measures to optimize loading operations

Reduces, if not eliminates traffic impacts and ensures safe and efficient movement of goods

# Height Limits and Ramps





# Solutions

## Low Profile Compactors

*Credit: Metro Disposal Ltd.*



## Jitney Service

*Credit: Smithrite Disposal Ltd.*





# Case Studies



## 1. Mid-Rise Residential Building



## 2. Office Building



## 3. Transit-Oriented Development

# Useful Reference Guides



- General requirements
- Steps to estimate number of containers and space
- Tables showing number of containers by building type
- Dimensions/specifications for containers and vehicles

# Case Study No. 1: Mid-Rise Residential Building

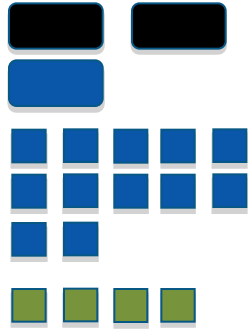
Residential	90 Dwelling Units
Retail	16,000 Sq. Ft.

- Serviced from laneway
- **Multiple waste disposal companies**
- Bins
- Carts



# How Much Solid Waste Per Week?

## Residential



**20**  
cubic yards  
per week

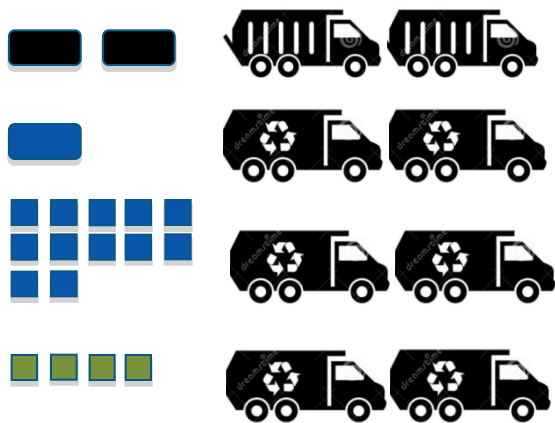
## Commercial



**15**  
cubic yards  
per week

# How Many Garbage Truck Trips Per Week?

## Residential



8

truck trip ends  
per week

## Commercial



4

truck trip ends  
per week



# Case Study No. 2: Office Building

Office	155,000 Sq. Ft.
Coffee Shop	3,000 Sq. Ft.

- **Underground Loading Area**
  - Steep ramp
  - Limited head room
- Single waste disposal company
- Low profile compactors
- Carts



# How Much Solid Waste Per Week?

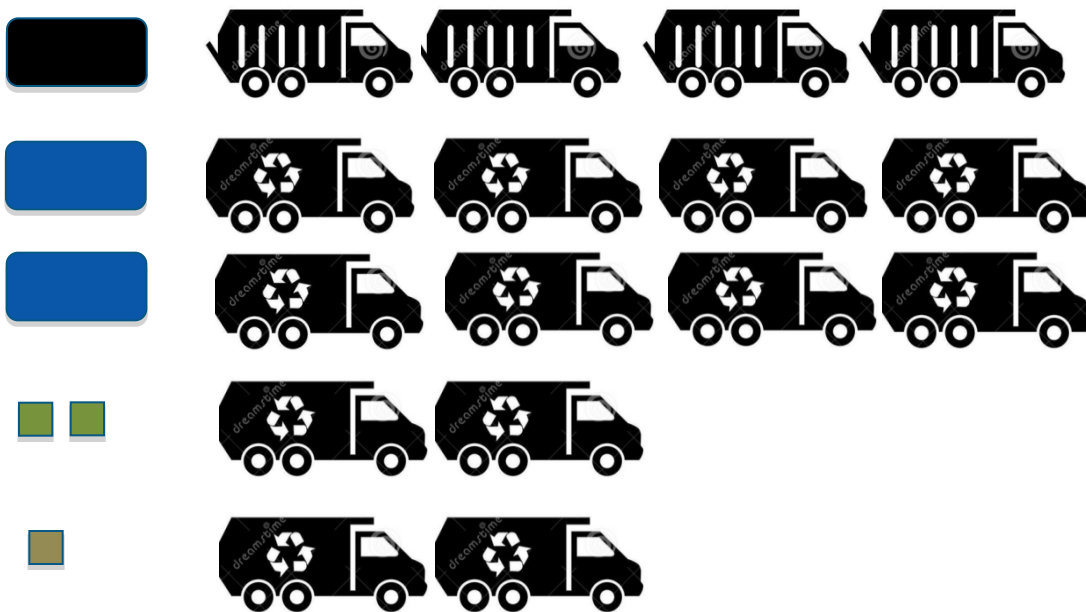
**45**  
cubic yards  
per week

**13**  
cubic yards  
per week



**4:1**  
Compaction Ratio

# How Many Garbage Truck Trips Per Week?



**16**  
truck trip ends  
per week

# Case Study No. 3: Transit-Oriented Development

Office	245,000 Sq. Ft.
Retail	160,000 Sq. Ft.
Theatre	50,000 Sq. Ft.
Restaurant	12,000 Sq. Ft.
Medical Office	6,000 Sq. Ft.
Residential	460 DU

- Underground loading area
- Single waste disposal company
- Loading Management Plan
- 40CY compactors
- Low profile compactors



Source: PCI Developments Corp.

# How Much Solid Waste Per Week?

**355**  
cubic yards  
per week

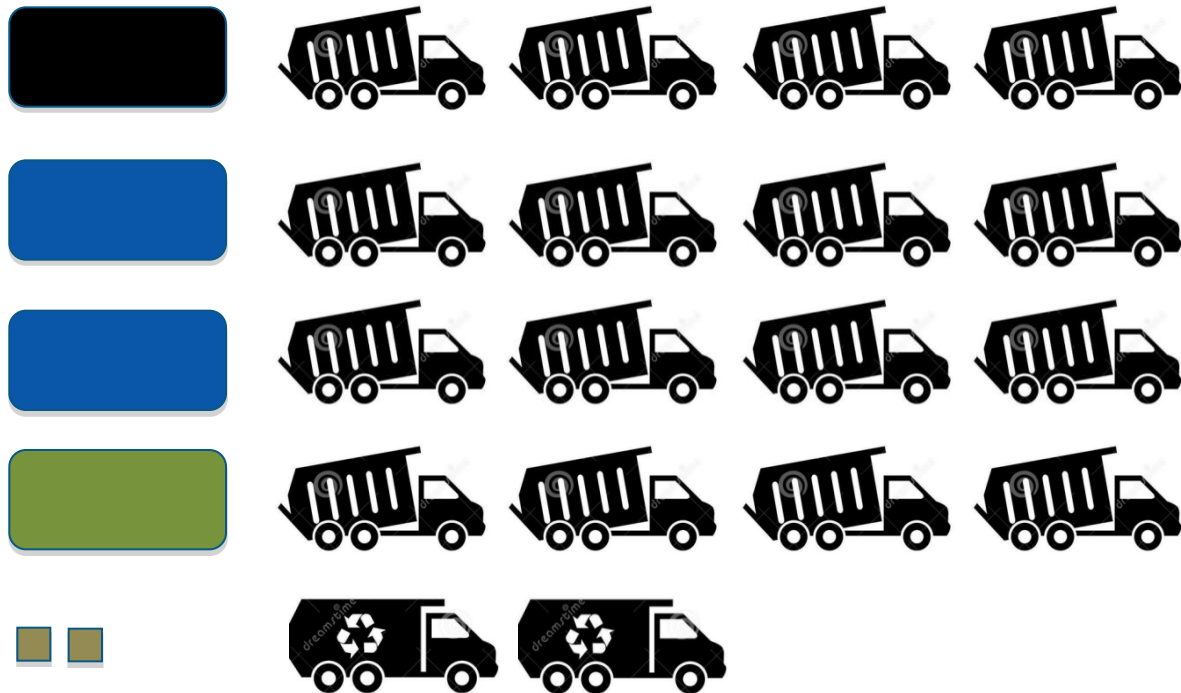
**100**  
cubic yards  
per week



**4:1**  
Compaction Ratio



# How Many Garbage Truck Trips Per Week?



**18**  
truck trip ends  
per week

# Summary

- Background
- Types of Containers
- Typical Collection Vehicles
- Common Issues
- Case Studies



# Final Thought



...but what about the drivers?

# Thank You

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