ANALYSIS OF TOWN OF BELMONT'S REFUSE AND RECYCLING COLLECTION PROGRAM

DSM ENVIRONMENTAL SERVICES, INC.

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Scope of Work

- Project Goals:
  - Primary goal was to determine the volume of refuse and recycling set-out by most Belmont households so that the proper cart size could be offered under cart based collection
  - Secondary goal was to evaluate Belmont's performance at recycling and waste diversion, and make recommendations (if any) for improving program efficiency.
- To achieve this, DSM designed and undertook a sampling program
  - Performed visual observations of refuse and recycling set-outs on 12 of the 16 recycling routes
  - Performed waste sampling and characterization on two representative refuse and recycling routes.

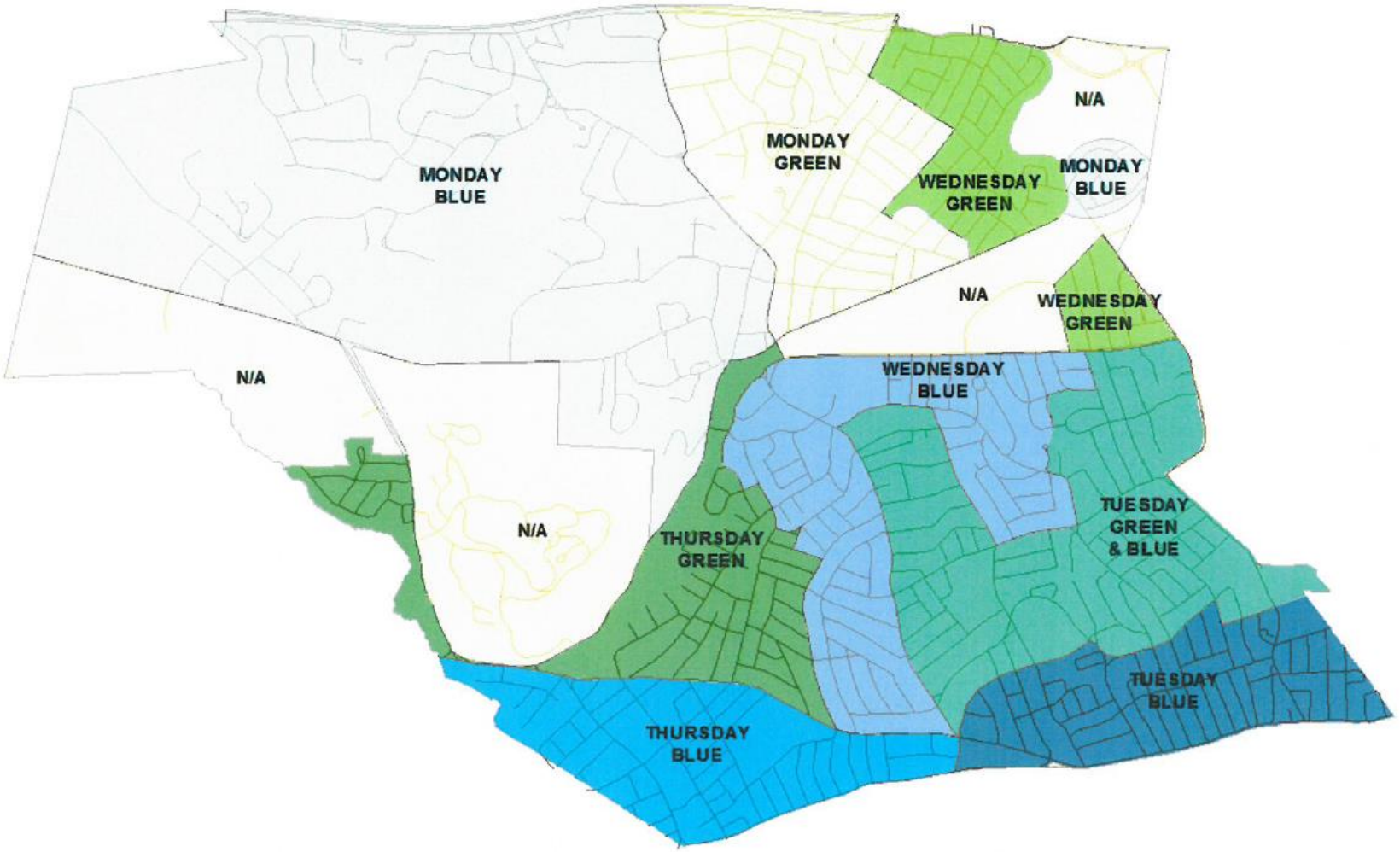
Existing Collection System

- Town contracts with Russell Disposal to:
  - Collect unlimited refuse and bulky waste weekly;
  - Collect dual stream recyclables (paper and containers set out separately in bins and bags) every other week;
  - Manage processing and marketing of recyclable material through a contract with Casella Recycling; and,
  - Collect yard waste.

  (The yard waste program was not part of DSM's analysis.)

- Russell Disposal uses three rear loading compactor trucks to collect refuse four days each week, and two split body recycling trucks to collect dual stream recycling on the same day as refuse collection (over two weeks).

Belmont Collection Routes



Methodology - Visual Protocol

- Two DSM professionals collected data on twelve of the sixteen recycling routes (there are two recycling routes each refuse collection day).
- DSM started ahead of both the refuse and recycling trucks, recording data from a representative number of set-outs on each route.
  - DSM recorded information from each 4th set-out in most cases (actual number determined by route size)
- Data collected from each set-out sample was:
  - What was set out (refuse, bulky waste, recyclables)
  - Observed volume of refuse and of recycling; and,
  - The estimated volume of bulky waste, and types.
- Photographs were taken to document typical and unusual set-outs observed.

Visual Protocol

Methodology – Recovery Rate Sampling and Sorting

- DSM conducted two days of recovery rate sorting on representative refuse/recycling routes
- DSM met two empty trucks at the route start and proceeded to collect a random sample of refuse and recyclables from roughly 50 dwelling units spread over the route
  - At each stop, all refuse and/or recycling was collected
  - A dwelling unit count was recorded, as well as the presence and volume of refuse, recycling and/or bulky waste
- Once the sample was collected, both trucks drove to the Casella MRF to be met by the DSM sort team, weighed and then tipped separately
  - The team sorted the refuse first, removing all recyclables accepted in Belmont's program and sorting and weighing them by material type.
  - Then the team sorted the recyclables collected by the same material types, removing any contamination from the sample and weighing that as well.

Definition of Recovery Rates

Materials Recovery Rate =

Material Set Out for Recycling

(Material Set Out for Recycling + Material Placed in Trash)

Results – Table 1

- Visual data on 1,377 units set-out, of which 18% were multi-family
- Refuse set-out rate was 97%, Recycling 91%
  - Bulky set-out rate was 9%
- Refuse and recycling both averaged 46 gallons

SAMPLE	TOTAL
Sample Size (hh units)	1337
Number of MF Units	237
% MF Units (of total hhs)	18%
SET-OUTS	
Refuse Set-outs	1291
Recycling Set-outs	1220
Bulky Set-outs	116
Refuse Set-out Rate	***97%***
Recycling Set-out Rate	***91%***
Bulky Set-out Rate	***9%***
Average Volume (Per Set-out)	(Gallons)
Refuse	46
Recycling	46
Bulky	80
Bulky (per set-out)	7

Estimated Volume Per Cart Sizes

- For Refuse Set-outs Observed:
  - 51% less than 35 gallons
  - 25% were 35-60 gallons and 24% > 60 gallons
- For Recycling:
  - 44% less than 35 gallons
  - 32% 35 – 60 gallons and 24% > 60 gallons

Results – Recovery Rates

Route:	***Tues. Blue***	***Wed. Blue***
	Rate	**Rate**
Recyclables	(%)	(%)
Old Corrugated Cardboard	74%	90%
Box Board (Food Boxes)	63%	63%
Mixed Paper (All other Recyclable Paper)	64%	77%
Aseptic - Gable	57%	45%
Subtotal, Paper:	**67%**	**80%**
Plastic Bottles	66%	73%
Plastic Containers & Trays (1 - 7)	65%	66%
Aluminum Cans, Steel Cans, & Clean Foil	63%	63%
Glass Containers	83%	79%
Subtotal, Containers:	**77%**	**74%**
Total Recyclables:	**70%**	**78%**

Benchmarking Recovery Rates

- Recovery rates are the best measure of the effectiveness of Belmont's current recycling system.

- Other Massachusetts communities with recent recovery rate data (collected by DSM)
  - Boston (2013) Charlestown 66% ; Beacon Hill (41%); Back Bay (50%), and the South End (58%)
    - Contamination measured 8.4 to 13.5%.
  - Lowell (2016) - Recovery rates of 58 and 66% and contamination rates of 17 – 32%
  - West Springfield (2016) – Recovery rates from 45 – 79% with contamination rates of 16 – 36%
  - Holden (2016) – Recovery rates of 72 and 78% and contamination rates at 18 and 19%;
  - Central Massachusetts subscription curbside (2015) – Average recovery rate 72% and contamination at 9.3 and 14%
  - Worcester (2015) – Recovery rates from 76 – 82% and contamination ranging from 10 – 20%
  - **Belmont (2016) – Recovery rates of 70 and 78%) and contamination at 3 and 3.8%**

Benchmarking Based on Annual Tons

- Annualizing the Recovery Rate Data from the two representative routes DSM estimates that the average household is setting out
  - 1,797 pounds of refuse per year
  - 589 pounds of recycling
- These averages are consistent with our volume estimates from the 12 days of route visual data

But They Are Not Consistent With The Reported Tons Recycled and Disposed

- Per household tons based on annual recycling and disposal data
  - 1,521 pounds of refuse per household per year
  - 421 pounds of recyclables per household per year
- Does this mean Belmont is not doing a good job of recycling
  - We do not believe it based on all of our survey and sampling data
- It is DSM's professional opinion that there is a problem with the count of actual households served
  - Consistent with the times that it takes Russell to finish their routes

Program Costs

- FY '17 collection contract cost is $1,816,992, or $151,416 per month.
  - Includes yard waste collection for 22 – 23 weeks of the year.

- Dividing the monthly charge by the number of households served provides an estimated monthly household cost of service:
  - Refuse, recycling and yard waste collection for a household count of 9,760 is $15.51 per month plus an estimated $4 per household for refuse disposal (billed separately).

- Annualized costs per household are roughly $186 for collection or $234 in total, including disposal
  - This can be used for comparison against other communities of similar demographics, density and housing stock.
  - Number changes with household served count

Findings

- Average household refuse set out was 46 gallons
  - A 35-gal cart isn't sufficient for 49% of households
  - Observed participation rates over 90% and recovery rates of 70 – 78% means there isn't a lot of recycling that can be moved from refuse (to recycling) to allow for a smaller refuse cart.
- Based on the data, a 45-gal cart is sufficient for 60% of households assuming (open) recycling bins (not closed top carts) are used
- Switching to single stream carts (where it's hard to monitor contamination) would indicate that a 60-gal refuse cart might work best to avoid contamination of the recycling cart
- Any switch to refuse carts requires a change in bulky waste collection
  - Most bulky waste won't fit in a cart, and collection efficiency relies on the driver staying in the truck
  - But with a 9% bulky waste set-out rate, a call in system might be acceptable if the Town were to automate refuse collection

Findings

- Recycling set-out rates are very high (91%) which indicates actual participation is even higher (95 percent).

- It is DSM's opinion that Belmont households are doing an excellent job at recycling with high recovery rates (70 and 78%) and very low contamination rates (3 – 4%).
  - 95% participation and 80% recovery by participants equals 76% recovery
  - Target material for more recovery is mixed paper (Tables 3A and 3 B – *In the Refuse*)

- Maintaining dual stream recycling but with carts requires two recycling carts
  - While two 45-gal carts should be sufficient, corrugated requires a 64-gal paper cart
  - Low weight, high volume plastic packaging keeps increasing and probably means a 64-gal cart for commingled as well

- Single stream recycling every other week would dictate 95-gal recycling cart
  - Very large recyclers could request a second cart
  - But the paper fraction could no longer be delivered separately to the paper building

Recommendations

- Cart based system would enable haulers to automate collection and improve aesthetics of Belmont's streets on refuse collection days
  - Should offer standardized 60 - 64 gallon refuse cart
- Automating refuse collection requires separate bulky waste collection
  - Call in system where requests are scheduled for efficient routing within a week of the call might be most effective
- Town might *first* automate refuse collection with manual recycling collection using bins and bags
  - Would provide an accurate count of households using system when refuse carts are delivered (RFID tags could track/inventory carts).