Appendices

Litter-Free Baltimore: A trash collection policy framework based on spatial analysis and social media

Appendix A: Definitions

Trash: Synonym for Municipal Solid Waste (see below).

Litter: Trash that is improperly discarded.

Municipal Solid Waste: Consists of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries. This comes from our homes, schools, hospitals, and businesses.[32]

Food Swamp: A food swamp is a place where unhealthy foods are more readily available than healthy foods. (Unhealthy foods include those that are dense in calories, high in sodium, and high in sugar.) Food swamps typically exist in food deserts, where there are limited options for purchasing healthy foods. For example, a food swamp might be an area where there is a predominance of small corner stores and carry-outs, but no healthy food sources, such as supermarkets or farmers markets. [33]

Food Desert: An area where the distance to a supermarket or supermarket alternative is more than 1/4 mile, the median household income is at or below 185% of the Federal Poverty Level, over 30% of households have no vehicle available, and the average Healthy Food Availability Index (HFAI) score for all food stores is low. [3]

Appendix B: Stakeholder Interviews and Public Online Survey

Stakeholder organizations, position of staff contacted, and method of interview:

1. Department of Public Works (DPW), Senior staff, phone interview. Founded in 1854, DPW provides "customers with safe drinking water and keeping neighborhoods and waterways clean."

2. Baltimore Trash Talk (BTT), Founder, email interview. BTT is "an open community forum/initiative seeking to expand the connection between Baltimore neighborhoods through education, action and events that inform people about the impact of trash and pollution on ourselves, our neighborhoods, our city, our health, our safety and our environment. BTT presently conducts its open forum through a variety of social media, trash pickups, trash related events and legislative support." BTT primarily works with Baltimore communities on education, awareness and litter clean up efforts.

3. Trash Free Maryland (TFD), Director, phone interview. TFD was "founded in 2010, is a nonprofit organization focused on lasting change to prevent trash pollution. We bring together organizations, businesses, government agencies and decision makers, and individuals committed to reducing trash in Maryland's environment. Many of our members have participated in community cleanup events and been discouraged by the futility of their efforts. Trash Free Maryland seeks to prevent litter from happening in the first place, and supports policies and programs to that end."

4. Chesapeake Bay Foundation (CBF), Director of Baltimore Initiative, phone interview. CBF "Founded in 1967, the Chesapeake Bay Foundation is the largest independent conservation organization dedicated solely to saving the Bay." CBF works with the watershed catchment of Chesapeake, which includes Maryland, Virginia, Delaware and District of Columbia.

5. Blue Water Baltimore (BWB), Water Quality Manager, phone interview. BWB was founded in 2010 and its "purpose is to use community based restoration, advocacy, and education to achieve clean water in the Baltimore watersheds. Much of our work is around cleaning up communities, planting trees, and other greening practices. This helps improve the way a community looks and feels in addition to improving environmental conditions."

6. Waterfront Partnership, Community Coordinator, phone interview. Waterfront Partnership aims to create "a cleaner, greener future for our neighborhoods, streams,

and harbor." They primarily work in Baltimore Inner Harbor and with the surrounding business districts to organize activities and clean up efforts.

The following questions were used for phone (and email interviews) to identified stakeholder organizations; below these are the questions that were used for our online survey for citizens who live or work in Baltimore.

Phone Interview Questions

1. What are your current efforts to towards trash reduction, and litter reduction, in Baltimore City?

2. What other organizations are working towards this goal and how do your efforts differ from theirs?

3. What efforts for trash and litter reduction in Baltimore City have been the most successful so far?

4. What effect do you believe new Baltimore City initiatives like the Rat Rubout and free residential trash cans will have on street litter? What are the most pressing aspects of trash and litter problems in Baltimore that remain unaddressed?

5. We are proposing a litter reduction policy framework for Baltimore based on land use, proximity to grocery stores, pedestrian traffic density, and topography. Do you have proposals / campaigns that address trash generations based on these factors?

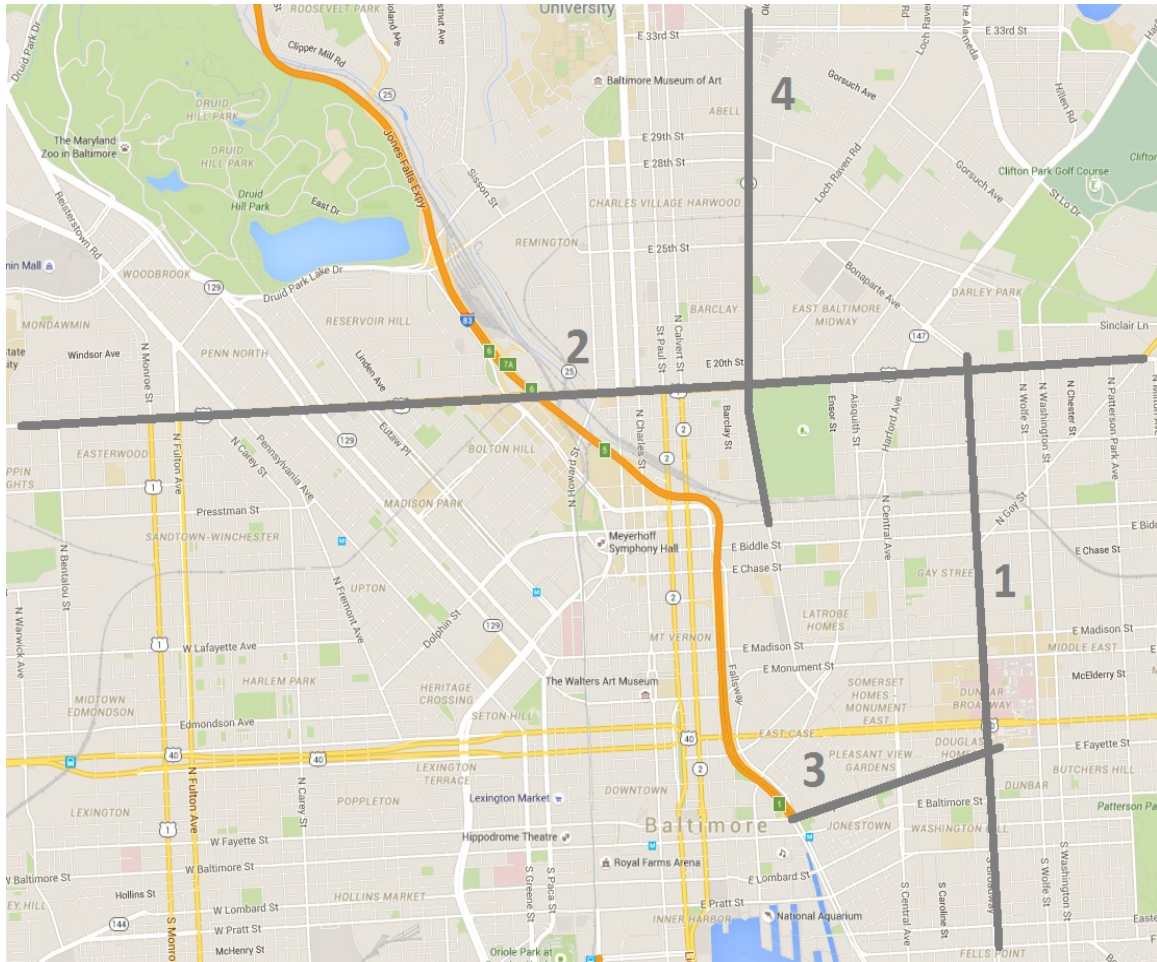(Follow-up questions were stakeholder-specific, and based on answers to the five core questions.)

Online Survey Questions

1. Is litter a problem in your neighborhood? (*Never, Rarely, Sometimes, Often, Always, Other*)

2. What are common items of litter you see in your neighborhood? (*Snack bags, Cigarette butts, Plastic bags, Styrofoam containers / take out boxes, Soda cans or bottles, Paper bags, Condoms, Needles, Other*)

3. Did you know there is a 311 phone app available for Apple & Android? (*Yes, No*)

4. Have you ever reported litter or trash on the mobile 311 app? (*Yes, No*)

5. If you could use the 311 app to report litter in your neighborhood, would you use this app? (*Six-point Likert, Not Likely to Likely*)

6. Would you post pictures of litter in Baltimore City on social media (Facebook, Twitter, etc.) if it would help the city to target clean up effort? (*Six-point Likert, Not Likely to Likely*)

7. Do you live or work in Baltimore City (*Yes, No*)

8. What could Baltimore City do (better) to keep streets litter-free? (*[Optional] Open-ended*)

9. Any other comments or suggestion on Baltimore City trash or litter issue? (*[Optional] Open-ended*)

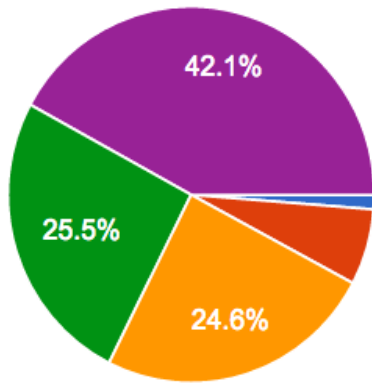10. What is your zip code? (*[Optional] Open-ended*)

Appendix C: Supplementary Figures

Figure C-1: Transect survey of public trash receptacles along sections of (1) Broadway St., (2) North Ave., (3) Fayette St., and (4) Greenmount Ave.

Figure C-2: Data summary for online survey question 1 & 2
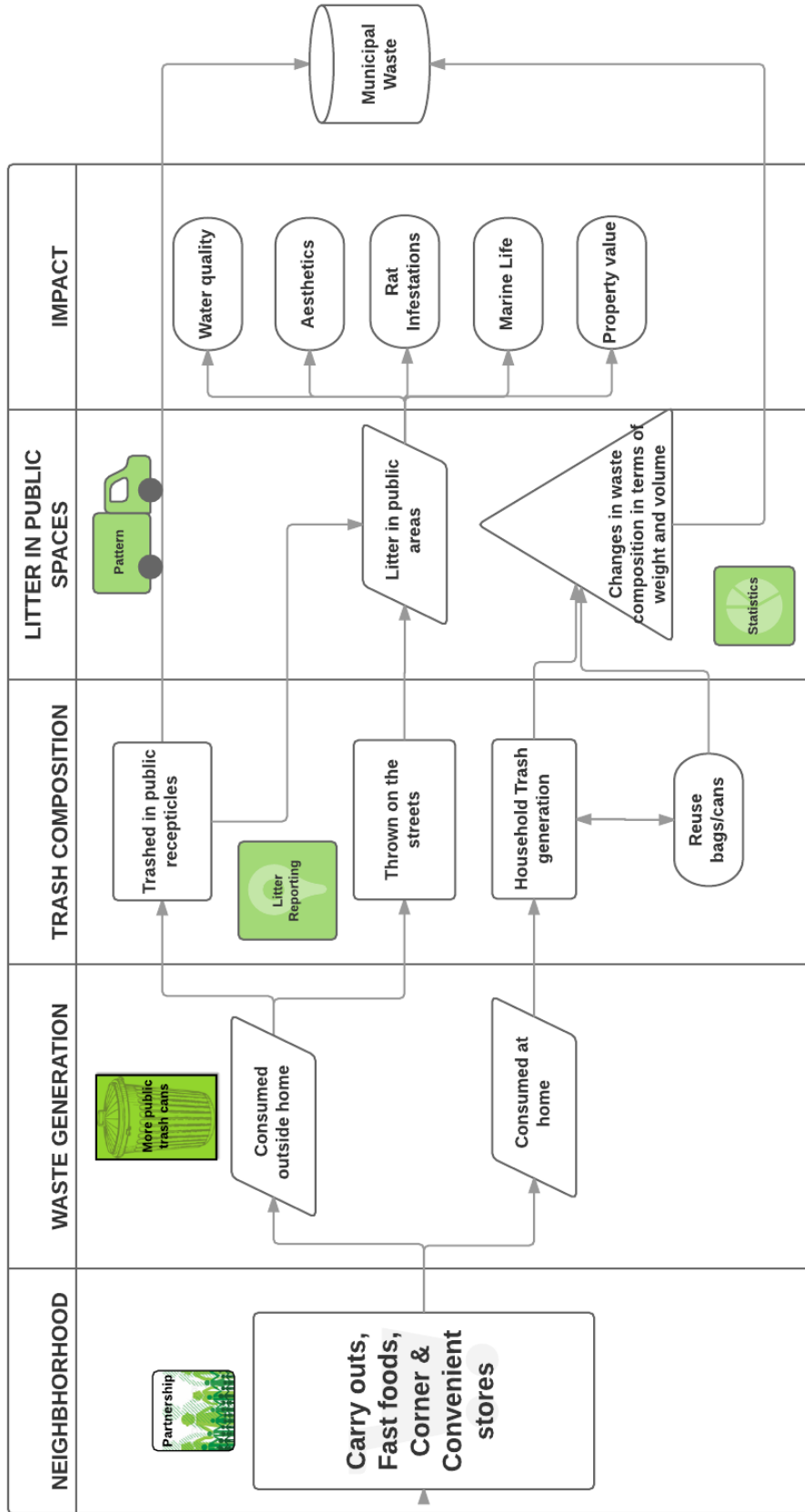
Is litter a problem in your neighborhood?

Never	**4**	1.2%
Rarely	**21**	6.5%
Sometimes	**79**	24.6%
Often	**82**	25.5%
Always	**135**	42.1%
Other	**0**	0%

What are common items of litter you see in your neighborhood?

Items of Litter	# of Responses	% of Responses
Snack bags	263	81.7%
Cigarette butts	229	71.1%
Plastic bags	240	74.5%
Styrofoam containers / take out boxes	199	61.8%
Soda cans or bottles	269	83.5%
Paper bags	141	43.8%
Condoms	47	14.6%
Needles	31	9.6%
Other	54	16.8%

Figure C-3: Conceptual diagram of trash and litter generation in Baltimore

Table C-1: Summary of textual analysis of 311 call descriptions

Category*	# of 311 calls	Search terms (includes both lower and upper case)
Bulk	945	bulk
Boxspring	936	boxspring, boxspring, bed, mattress
Tire	273	tire
Sofa	270	sofa, couch
Furniture	205	furniture
Chair	126	chair
Building material	115	building
TV	104	tv
Construction material	77	construction
Toilet	27	toilet
Christmas Tree	16	christmas tree, xmas tree
Pallet	5	pallet
Rubble	2	rubble

*8.8% of the total calls were included in multiple categories.