

Potential Role of PWD Outfalls in Tookany - Tacony Creek Trash Problem

I started looking at Tacony Creek trash around Tacony Creek Park last August and quickly jumped to the conclusion that the CSO's must be the source. I was just as quickly convinced by knowledgeable current and former PWD staff that PWD's inlets were trapped and could not be contributing much floatable material to the Tacony Creek.

As I continued to walk the Creek, I found more trash in the Tookany and Tacony Creeks as well as 3 PWD MS4 and 5 CSO outfalls with evidence of trash discharges trash just below the outfalls:

- T-080-02: MS4 outfall to unnamed tributary of Tookany Creek
- T-080-03: MS4 outfall to unnamed tributary to Tookany Creek
- T-88-01: MS4 outfall to Mill Run Creek below Cheltenham Ave.
- T-03: CSO outfall to Tacony Creek below Adams Avenue
- T-05: CSO outfall to Tacony Creek below Rising Sun Ave
- T-08,09, 10: CSO outfalls just upstream and downstream of Roosevelt Blvd

While my survey findings are not absolute proof of PWD outfall trash discharges to Tookany – Tacony Creek, they do:

1. Provide circumstantial evidence that some trash is getting through PWD's trapped inlets and being discharged to Tookany - Tacony Creek.
2. Raise serious questions about whether significant quantities of floatable and neutrally buoyant materials are passing through PWD's trapped inlets and being discharged to Tookany – Tacony Creek.
3. If floatable – neutrally buoyant trash is passing through PWD trapped inlets, what are the implications for the long term benefits of the Green City, Clean Water program for the Tookany – Tacony Creek?

PWD Inlets are trapped, so why should we worry about potential floatable – neutrally buoyant trash discharge from PWD outfalls?

Previous communications with senior PWD staff indicate that PWD does not believe that significant quantities of trash are being discharged from PWD outfalls. PWD staff believe that much of the Tacony Creek trash problem is attributable to “illegal dumping”, overland flow of street litter into Tacony Creek and “upstream” sources.

My Tookany – Tacony Creek trash surveys coupled with literature review of Anacostia Watershed Society and a number of California stormwater agencies stream trash documents has given me a number of reasons to questions the role that PWD outfalls are playing in the Tookany – Tacony Creek trash problem.

- ❑ PWD relies on trapped inlets and active inlet cleaning to prevent floatables and neutrally buoyant trash from reaching outfalls and the Creek
- ❑ Neutrally buoyant plastic bags and food wrappers are found in Tookany and Tacony Creeks
- ❑ Indication that neutrally buoyant plastic bags and food wrappers are showing up below PWD outfalls, indicating potential “floatable trash leakage” through PWD inlets
 - Limited photographic evidence of plastic bags below PWD outfalls
 - MS4 outfalls: T-088-02 and T-088-03
 - CSO outfalls: T-03 and T-05
 - Potential Evidence
 - Mill Run MS4 Outfall– downstream creek trash extensive. PWD and Cheltenham both have outfalls
 - Rock Creek CSO Outfall – downstream creek trash extensive. PWD, Cheltenham and 3 large shopping centers could be sources
 - Creek Trash Pattern
 - Extent of creek trash dissipates with distance from the source
 - Rock Creek – just below Ogontz Ave has extensive trash, particularly plastic bags. This creek trash could be coming from PWD’s T-01 and/or the 3 large Cheltenham shopping malls.
 - Mill Run seems to have 2 trash sources, just below Cheltenham Ave. and near Asbury Ave. PWD MS4 outfall T-080-01 is likely causing the upper Mill Run creek trash, one or more Cheltenham MS4 outfall(s) is likely causing the Lenape Ave creek trash
 - Tacony Creek trash pattern
 - Moderate amounts of Creek trash coming from Tookany Creek visible upstream of Adams Ave. Note that PWD outfalls are contributing some of this “upstream” trash load.
 - Creek trash gets worse as one travels downstream from Adams Ave
 - Creek trash near Roosevelt Blvd considerably worse than at Adams Ave, indicating Philadelphia contribution to Tacony Creek trash
 - Trash below Roosevelt Blvd dramatically worse than upstream of T-08, suggesting that combination of T-08,09 and 10 are adding significant trash to Tacony Creek.
- ❑ PWD’s Inlet trapping is very helpful for floatables control; however, I am concerned that some neutrally buoyant plastic bags and food wrappers may be escaping inlet traps. Anacostia River studies found that

“..70 percent of the trash that is observed in the streams is neutrally buoyant objects such as plastic bags and snack wrappers which will float under quiescent conditions while clean, but are more likely to be entrained by velocity currents”.
 ANACOSTIA WATERSHED SOCIETY, James R. & Cynthia A. Collier

- ❑ Plastic bags are problematic in stormwater. Consider this information from Anacostia:
“The Plastic Bags category was the eighth most abundant pollutant found in the trap and comprised 3.3% of the total number of trash pieces.

In a report titled ANACOSTIA WATERSHED TRASH REDUCTION PLAN (the Plan) published in 2008 by the Anacostia Watershed Society for the District Department of the Environment, it reported that about 50% of trash in free-flowing streams was plastic bags.

This discrepancy can be explained as follows:

- *In the Plan, a surveyor walked along a stream counting visible trash pieces in the stream channel. As a result, the survey demonstrates trash characteristics for the “most unsightly trash in streams,” or the trash pieces most visible to the naked eye. Since plastic bags are easily snagged by twigs, branches, and roots, they tend to be more concentrated in streams than other trash items.*
- *Because the Nash Run Trash Trap strains the stream flow in order to capture trash, it collects pieces that otherwise would not be caught by overhanging branches, roots, or twigs.*

This accounts for the seemingly lower ratio of plastic bags.”

Source: Demonstration of Trash Reduction Technologies in the Anacostia Watershed, (Nash Run Trash Trap Project), Anacostia Watershed Society, Oct., 2010

Are Plastic Bags and Food Wrappers Escaping PWD’s Inlets and Discharging to Tookany - Tacony Creek?

As of April 10, 2013 my answer to this question is “**We don’t know**”. PWD conducted a 12 year pilot study of net floatables control at PWD’s T-04 outfall on Rising Sun Avenue. In an October, 2010 PWD memo, PWD discussed captured floatables composition as follows:

“Although no formal analysis has been conducted on the ratio of organic matter to floatables collected, visual inspection and historic field notes show that the nets mostly collect leaves and very little floatables like cans or bottles. This is mainly because most of the floatables that get in the wastewater system are removed by existing catch basins before they get to the outfalls, so the majority of what the nets collect is organic matter.” PWD, October, 2010

PWD subsequently discontinued the Rising Sun net operation.

Note that there is no mention of plastic bags and food wrappers in the October, 2010 memo. We are left with a dilemma:

- We know there are plenty of plastic bags and food wrappers in the Tookany - Tacony Creek,
- We see some evidence of plastic bags and food wrappers below PWD outfalls
- PWD conducted a 12 year pilot study of netting technology, yet we don’t know whether there were plastic bags in the T-04 outfall discharge during the pilot study
- The Anacostia study found that plastic bags were only 3% of the trash load to their trash net yet they were 50% of the observed stream trash in visual surveys.

PWD needs to find out if plastic bags and food wrappers and other neutral buoyancy material are escaping PWD's inlets and being discharged to Tookany - Tacony Creek.

My Concerns with PWD's Green City, Clean Water Program

PWD has embarked on an innovative and widely acclaimed stormwater control program (Green City, Clean Waters) that may not adequately address the street litter – creek trash problem. My concern can be summarized as follows:

- Philadelphia has a major street litter and illegal dumping problem
- PWD has used trapped inlets for about 100 years, a situation that many other cities envy because trapped inlets have significantly less trash discharge than untrapped inlets .
- PWD routinely cleans its trapped inlets to control trash discharge, a practice that PWD has employed for many years.
- The Green City, Clean Water program will reduce storm water flows and the frequency of CSO overflows, however, it does not address street litter or potential discharge of neutrally buoyant trash from PWD outfalls.
- Since PWD does not plan any significant changes in outfall trash discharge control, PWD's current outfall trash discharge will continue into the future with only slight trash discharge reductions from CSO overflow frequency decreases. It is not clear that there will be any MS4 outfall improvements at all.
- This raises the question, are PWD outfalls currently discharging significant quantities of trash to the Tookany - Tacony Creek. If the answer is yes, then PWD will need to address outfall trash discharges to achieve PWD's clean water goal for the Tacony Creek.

How Can We Monitor Outfall Trash Contributions?

We need hard data to see whether or not PWD outfalls are contributing significant trash loads to the Tookany - Tacony Creek. Here are 2 simple ideas to get some basic PWD outfall trash discharge data:

- ❑ **Time Lapse Photography:** use a series of simple, rugged time lapse cameras at key outfalls to photographically monitor outfalls discharges to qualitatively assess trash discharges from the target outfalls.

While we can not get quantitative measurements, the camera could qualitatively resolve the question of whether or not PWD outfalls are contributing trash to the Creek. Time lapse photos of an outfall over several storms that showed no trash discharge would remove that outfall from the suspect outfall list. On the other hand, photos that

show an outfall had trash discharge would indicate that that outfall needs further evaluation.

- ❑ **Monitor Trash Discharge from PWD Outfall T-03:** There is a significant quantity of trash in the channel below this CSO outfall, however, there is a possibility that some of the channel trash may be coming from overland flow of the substantial trash accumulation just upstream of the outfall. This site provides an excellent opportunity for PWD to quantify the trash discharges from T-03 and overland flow of the trash accumulation.