**Environmental Justice League / Groundwork Providence Stormwater Walk - October 20, 2012**

This walk is intended to highlight particular storm water issues that affect the water quality of Mashapaug Pond. These highlighted issues will touch on a range of problems and solutions so they may be taught to local school youth and the community at large. Each element along the walk is organized in four parts: **The Evidence, The Effect, The Culprit and The Solution**. The walk passes through land with a variety of zoned uses, property owners and landscape conditions. Although issues are site specific, the 4 general elements will help identify similar problems in other urban watersheds.

***Location A - J T Owens Park***

Visible Evidence - scouring around the boat ramp infrastructure and visible erosion of soil from the driveway area into the pond. Effect-The process of erosion damages water quality and soil conditions. Water quality is affected when sands, silts and clays are washed into the water body. The materials cloud the water creating a turbid condition. This condition blocks sunlight from aquatic plants, makes breathing difficult for fish, and deposits smothering sediment on the pond floor. Excessive sediment in water bodies leads to more frequent flooding and to clogged culverts and drain inlets. Culprits- **Compacted soils** that do not allow for infiltration encourage storm water to move quickly across the ground surface. Due to the **lack of vegetation** the flow increases in velocity and quantity taking fine materials with it. On site **grading**, or the contour of the ground plane, channels water in one direction contributing to the problem. Solutions- Slowing the velocity of the water, Allow for infiltration through check dams and detention areas.

***Location B – Parking lot and receiving area north of access road***

Visible Evidence – Discoloration from petroleum stream on asphalt channel, along with location of dumpsters shows pollutants being carried via storm water into Mashapaug pond. Effect- In this case the loading dock channels all storm water directly into the pond bringing with it the contaminants from cars and trucks. Hydraulic fluids, oils & gas, as well as tire particulates and brake pad particulates contribute to the degradation of the water body. Generally, these hydrocarbons settle to the pond floor where they are eaten by the smallest organisms. These organisms are eaten by predators and move up the food chain. Culprits- Poorly managed or non-existent sediment control systems. In an area where it is common to have leaks it is important to catch/contain the contaminant before it reaches a water stream or water body. Solutions- Leaks are common in this situation. There are control and management steps that can be taken to capture contaminants and filter the storm water before it enters the pond. These products are specifically made for problem sites with limited space. These pads are specifically made for petroleum and must be disposed of properly after use.

For more information regarding P.H.C. pollution <http://www.atsdr.cdc.gov/phs/phs.asp?id=422&tid=75>

<http://www.waterkeeper.org/ht/a/GetDocumentAction/i/10521>

***Location C- Metal Dynamics / Dupont Drive***

Visible Evidence – Sand and sediment in the street carried by large quantities of sheet flow over paved areas, including roof runoff. Effect- Large quantities of sheet-flow present multiple problems for Mashapaug Pond. Large paved areas and roofs retain heat. During a storm event heat is transferred to sheet flow (storm water) and may enter Mashapaug Pond up to 7 degrees warmer than the water body. Thermal pollution raises the ambient temperature of a water body causing thermal shock to aquatic species and decreases the dissolved oxygen. This anaerobic state encourages bacteria growth and impedes normal aquatic ecologies. Large quantities of water moving directly into the Pond from its watershed can cause flooding.

Sheet flow from parking lots and roof-tops bring with it, among other things, pollution from warm blooded animals especially geese. This pollution creates a breeding environment for the E-Coli bacteria. Culprits-Unshaded expanses of blacktop and roof, large quantities of animal waste and little to no opportunity for infiltration or velocity change of storm water. Solutions-Depaving overflow parking and replace with crushed stone. Create opportunities for evapotranspiration and water storage with storm water planters. These planters are designed to protect buildings from leakage and terrace water throughout the entire system. Create bioswales to infiltrate water where there is room or pave with permeable concrete.

For more information regarding thermal pollution

<http://www.pollutionissues.com/Te-Un/Thermal-Pollution.html>

***Location D- A H Duffy / Bank of America Dupont Drive***

Downspout removal

Successful application of bioswale accepting water from roof runoff

**Location E-Boat House**

Native plants

Discussion of native plants both surrounding the pond and available in the nursery trade

**Location F and G (Crescent / Adelaide)**

Visible Evidence – Downspouts, driveways, sidewalks and lawns. Effect- Even though individual residential footprints are smaller than the precedents previously reviewed, the combined efforts of the Mashapaug Community can effect grand change. Small-scale interventions repeated throughout the watershed can make a difference. The neighborhood contains approximately 180 homes including driveways. If each home had 1 rain barrel to collect 55 gallons of storm runoff, then 9900 gallons of water could be kept from flowing over ground into the Pond. Residential pollutants such as fertilizers, pesticides, automobile pollutants, animal waste and household cleaners all find their way into the Pond.

**Some definitions: 1) Swale:** a low-lying or depressed and often wet stretch of land; *also* **:** a shallow depression on a golf course (<http://www.merriam-webster.com/dictionary/swale>) **2) Evapotranspiration:** (Life Sciences & Allied Applications / Environmental Science) the return of water vapour to the atmosphere by evaporation from land and water surfaces and by the transpiration of vegetation(http://www.thefreedictionary.com/evapotranspiration)