

## Water Quality analysis of the Euclid Ave. Transportation for Livable Communities Initiative study area

### Existing Conditions

Demographic data	Maps and tables	Community input
<p>There is an estimated 10 storm sewer outfalls within the City limits of Euclid, that carry stormwater from Euclid Avenue to Euclid Creek during a rainfall event.</p> <p>In the Euclid Ave. corridor area (geographically the portion of Euclid South of interstate 90) there are 13 combined sewer overflows (CSO's).</p> <ul style="list-style-type: none"> <li>• There are two CSO's in census tracts 1527.02.</li> <li>• There is one is census tract 1527.03.</li> <li>• There is fie in census tract 1526.04.</li> <li>• There are three in census tract 1526.03</li> <li>• There are two in census tract 1962.</li> </ul> <p>From 2/28/11 thru 2/11/13 the City of Euclid has had 101 CSO releases.</p> <p>Euclid is in three different watersheds all draining directly into Lake Erie, the source of the City's drinking water. The three watersheds are Euclid Creek, Green Creek and an Unnamed watershed.</p> <p>Euclid makes up 5.9% or 1.4 square miles of the entire Euclid Creek watershed.</p> <p>During the years of 2008-2012, 16 waterborne illness have been reported to the Cuyahoga County Board of Health:</p> <ul style="list-style-type: none"> <li>• Legionnaires = 9 cases</li> <li>• Giardiasis = 5 cases</li> <li>• Cryptosporidiosis = 2 cases</li> </ul>	<p>Map of CSO's within proximity to Euclid Avenue.</p>	<p>Of 201 residents polled in Euclid, 46.8% reported that they are concerned about pollution in their local streams.</p> <p>In a survey of Euclid residents, 73.9% were aware that stormwater run-off can pollute streams.</p> <p>In the same survey, 81.5% reported that they were aware that pet waste can pollute streams.</p> <p>Lastly, the same survey indicated that 53.1% of the residents support the existence of the sensible salt program, which decreases the amount of salts used on the roads in the winter months.</p>

### Findings: literature review

<p>Community design such as the amount of impervious surface in the community plays a large role in stormwater quantity and quality in addition to treatment types and costs (Gaffield, et al., 2003).</p> <p>Development that does not take stormwater BMP's into considered have shown to lead to an increase in potential flooding during storm events (Gaffield, et al., 2003).</p> <p>Stormwater that is not controlled leads to larger volumes generated ultimately increasing pollutant loads (Gaffield, et al., 2003).</p>	<p><b>Best Management Practices (BMP's):</b></p> <p>Filter strips are grassed filter strips, filter strips, and grassed filters) are vegetated surfaces that are designed to treat sheet flow from adjacent surfaces  <a href="http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&amp;view=specific&amp;bmp=76">http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&amp;view=specific&amp;bmp=76</a></p> <p>Agricultural studies have shown that a 15 foot wide grass buffer can remove 50% of nitrogen, phosphorus and sediment (Desbonette et al., 1994).</p> <p>Another study reviewed the effectiveness of a filter strip for</p>
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Pathogen loads may be increased if management of urban pet waste and wildlife waste.

The use of bio-retention would assist in filtering pollutants out before entering into the watershed. Bio-retention cells are shallow vegetated depressions that filter and store stormwater then gradually releases stored water (<http://www.neorsd.org/stormwater-watersheds.php>).

Stormwater is identified as rainwater and melted snow or ice that flow into streams, rivers and lakes (<http://www.neorsd.org/stormwater-watersheds.php>).

Diverting roof downspouts from sanitary sewers to yards can reduce storm flows in sewers by 25% to 62%, resulting in cost savings (Gaffield, et al., 2003).

Public Health protection through urban stormwater runoff reduction and nonpoint source pollution supports water treatment and health care interventions (Gaffield et al., 2003).

Under conditions of high soil saturation, rapid transport of microbial organisms can be enhanced (Curriero et al., 2001).

Waterborne related outbreaks increase when preceded by a period with heavy rainfall and runoff (Curriero et al., 2001).

As stormwater flows over the ground, it accumulates chemicals, debris and other pollutants that can contaminate our drinking and recreational water supplies. (<http://www.neorsd.org/stormwater-watersheds.php>)

Water that enters into storm sewers is not treated in a wastewater treatment plant; it flows directly into rivers, streams and Lake Erie (<http://www.neorsd.org/stormwater-watersheds.php>).

### **Economic Benefits:**

In a study conducted by the National Association of Home Builders, property value increased by up to 27.8% if near a beach, pond, or stream (NAHB, 1993).

In another study conducted by the Department of Housing and Urban Development, it also reported that when all elements were equal the price of a home located within 300 feet from a body of water increased by 27.8% (NAHB, 1993).

a large parking lot, the results yielded that the narrower the strip the lower percent of pollutants were removed (Yu et al., 1992).

One study exists determining the effectiveness of bio-retention use; it indicated that removal rates are relatively high. Depending on the pollutant removal rates between 29-81% were observed (Davis et al., 1998).

New studies indicate that mechanical broom and vacuum-assisted wet sweepers reduce non-point pollution by 5-10% and nutrient content by 0-15%; however newer dry vacuum sweepers reduce non-point pollution by 35-80% and nutrients by 15-40% for those areas capable of being swept (Runoff Report, 1998).

Research estimates that the new vacuum assisted dry sweeper might achieve a 50-88% overall reduction in the annual sediment loading for a residential street, depending on sweeping frequency (Bannerman, 1999).

Increasing the frequency of catch basin cleanings can improve the performance of catch basins enabling for more sediment materials to be captured reducing the amount of sediment released into stormwater sources (rivers, stream, etc.) Increasing the cleaning frequency of catch basins significantly reducing the amount of sediment runoff into rivers, streams and lakes ([http://stormwatercenter.net/Pollution\\_Prevention\\_Factsheets/CatchBasins.htm](http://stormwatercenter.net/Pollution_Prevention_Factsheets/CatchBasins.htm)).

### **Community Design:**

Low Impact Development (LID) practices such as promoting narrower streets, reduce the amount of impervious cover created by new development thus reduces stormwater runoff and associated pollutant loads ([http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet\\_results&view=specific&bmp=124](http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=124)).

Since streets are the largest share of impervious cover, narrowing streets can result in 5 to 20% overall reduction of impervious area for typical residential subdivisions (Schuler, 1995).

Research indicates that paving a road costs on average \$15 per square yard, narrowing streets by at least four feet from existing streets widths can yield approximately \$35,000 per mile of residential street ([http://www.stormwatercenter.net/Assorted%20Fact%20Sheets/Tool4\\_Site\\_Design/narrow\\_streets.htm](http://www.stormwatercenter.net/Assorted%20Fact%20Sheets/Tool4_Site_Design/narrow_streets.htm)).

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<p>Development leads to an increase in pollutant loads within watersheds. Oil and gas leaks onto roads and parking lots, incorrectly applied fertilizers and pesticides, pet waste if not properly disposed of can all contribute to increase pollutant loads (USEPA).</p>	
<p>Trees serve as an important mechanism for controlling water temperature along shorelines and waterbodies, removal of shade increases water temperature which ultimately has negative impacts on plant and aquatic life (USEPA).</p>	

**Predictions**

<p>Health: Reducing the amount of stormwater runoff into local creeks/streams/rivers will improve the overall health of the watershed.</p>	<p>Health: A decrease in health impacts associated with waterborne diseases at bathing beaches after rainfall events when contaminated runoff is controlled, filtered, or treated.</p>
<p>Health: Reducing the amount of stormwater runoff into the watershed will assist in improving waters used for recreational activities.</p>	<p>Through the implementation of stormwater BMP's pollutant and nutrient loads will be decreased.</p>
	<p>Through the implementation of stormwater BMP's a reduction in the quantity of water overwhelming the storm sewers during a rainfall event can be expected.</p>

**How Draft Plan Addresses Water Quality**

<p>Page 9: Goal: Character –promote the concept of “Green Streets” which would mean incorporating stormwater best management practices (BMP).</p>	<p>Principle #4: potential policy development to enhance the Natural Environment through BMP's.</p>
<p>Page 26: Principle #2 Maximize the use of existing infrastructure “maximize the existing water and sanitary infrastructure to support the proposed landfill development at minimal cost.”</p>	<p>Page 40: Recommendation for streetscape improvements incorporate designs that support storm water BMP's</p>

**Recommendations**

<p>Agree with recommendation to utilize vegetated channels (such as medians) to allow for storm water to flow through the channels prior to entering existing stormwater infrastructure.</p>	<p>Incorporate the use of pervious pavement whenever possible while making streetscape improvements (i.e multi-purpose trail).</p>
<p>Continue sensible salting practices to minimize salt runoff into local creeks and streams.</p>	<p>Maintain a vegetated buffer strip and setback distance of at least 150 meters or 492 feet for impervious areas near water bodies (Gaffield, et al., 2003).</p>

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<p>Manage urban pet waste through ordinances and policies to reduce pathogen loads on the watershed.</p> <p>If vegetative strips are incorporated into the TLCI plan, it is recommended they be used in conjunction with other stormwater BMP's.</p> <p>When implementing vegetative strips, select materials that are conducive to surround environmental conditions and climate.</p> <p>If the use of bioretention as a stormwater BMP is incorporated into the TLCI plan it is recommended that it be designed in a location that follow's US EPA NPDES recommendations  <a href="http://water.epa.gov/scitech/wastetech/upload/2002_06_28_mtb_biortn.pdf">http://water.epa.gov/scitech/wastetech/upload/2002_06_28_mtb_biortn.pdf</a>.</p> <p>Depending on the type of street sweeping equipment the City of Euclid currently has, one recommendation is to build into future expenditures to purchase a dry vacuum-assisted street sweeper.</p> <p>Depending on current City catch basin cleaning frequency a recommended minimum of 1-2 times per year should become City policy or more frequently to maximize the amount of sediment captured and removed from entering into the local watershed.</p>	<p>Implement an ordinance that “reduces street widths and commercial parking to minimize impervious surfaces and enhance open space (Gaffield, et al., 2003).”</p> <p>It has been found that beautification of natural surroundings can increase real property values and enhance the quality of life, beautification of the land areas adjacent to waterways and detention ponds should be considered as a key component in planning by developers (USEPA).</p> <p>It is recommended that zoning regulations are reviewed to implement policies that allow for narrower street widths.</p>
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