APPENDIX H: FIRST FLUSH RETENTION

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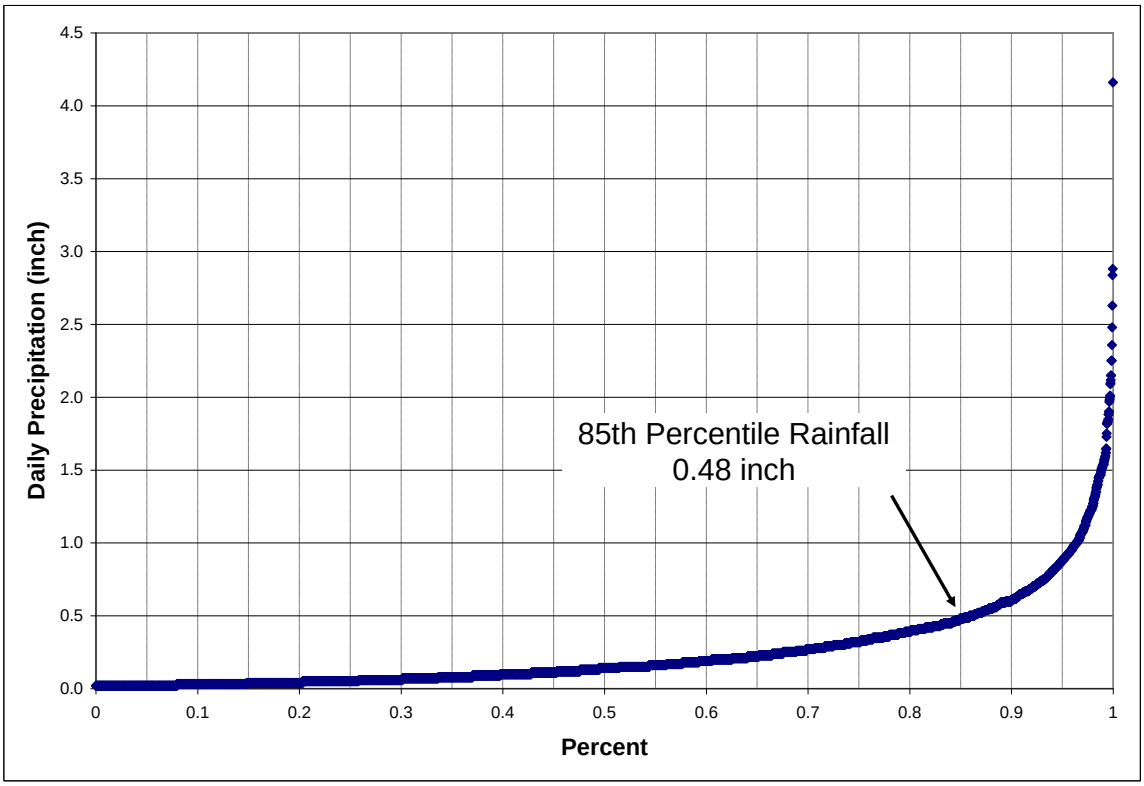
The District selected a first flush retention requirement to capture the 0.5 inch rainfall event. This value is approximately the 85% daily rainfall depth (i.e. 85% of all daily rainfall depths are less than this value). The American Society of Civil Engineers (ASCE, 1998) identified capture of this 85% precipitation event as a useful target for mitigating storm water volume impacts regardless of climate, and many regulatory agencies have found it to be a reasonable and attainable target. Using the 105 years of daily rainfall collected at the University of Arizona, the 85% precipitation event has been determined to be 0.48 inch as shown in the figure below:



While the 85% precipitation event can be expected to vary across Pima County because of orographic effects, selecting the 0.5 inch value allows for more simplified calculation of the first flush.

In most cases, capturing more stormwater can be viewed as greater net benefit. The United States Green Building Council (USGBC) LEED for neighborhood development therefore awards LEED points for Green Infrastructure based on the 80th to 95th percentile rainfall volume captured by a neighborhood site design (USGBC – Green Infrastructure Credit 8, 2009). Based on 105 years of daily rainfall at the University of Arizona, these values are as follows:

- 80th Percent – 0.37 inch
- 85th Percent – 0.48 inch

- 90th Percent – 0.61 inch
- 95th Percent – 0.88 inch

It is also important to note, however, that in some cases, capture of greater volumes of stormwater may reduce flows into riparian areas that rely on the upstream flows. Therefore, while stormwater harvesting is an important tool for mitigating the impacts of development, the decision to capture volumes above the first flush requirement must be made on a case by case basis.

American Society of Civil Engineers. 1998. *Urban Runoff Quality Management*, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, by Joint Task Force of the Water Environment Federation and the American Society of Civil Engineers, Larry A. Roesner and Ben R. Urbonas, chmn. (pages 175-178 [approximately the 85th percentile 24-hour storm runoff event]).

United State Green Building Council. 2009 (updated November, 2011). *LEED for Neighborhood Development Rating System*. USGBC.org