

City of Ann Arbor  
Developer Offset-Mitigation Program  
Updated July 24, 2016

**Purpose**

This document establishes a written policy for the City of Ann Arbor program to offset development sewage flows through flow removal (*offset-mitigation*), and available alternatives.

**Introduction**

The City of Ann Arbor created the Developer Offset Mitigation (DOM) Program to protect the health and safety of our community and the environment, using a city-wide approach. The DOM Program was originally established on August 18, 2003 by Council Resolution R-362-8-03, modified on June 15, 2015 by Council Resolution R-15-213 and subsequently incorporated into City Code (Chapter 28, Section 2:42.5) on July 24, 2016 to reduce the potential for development sites to exacerbate sanitary sewer backups or sanitary system surcharging during wet weather rain events. At the time DOM was established, the City was removing wet weather flows from the sanitary system in response to sanitary basement backups that occurred in various locations during large storm events in 1998 and 2000. This effort was mainly implemented through the City's Footing Drain Disconnection (FDD) program, which occurred between 2001-2012.

DOM requires developments that are adding new flow into the City's sanitary system to effect a net reduction in overall flow to the sanitary system. Applicable development projects must mitigate 110% of the estimated net new flow contribution from the development into the sanitary system. DOM aids in protecting the health and safety of our community and environment by not allowing new development to exacerbate sewage collection system capacity issues or "MDEQ permitted" overflows of partially treated sewage by our wastewater treatment plant to the Huron River.

**I. Applicable Developments**

All developments within the City of Ann Arbor requiring any form of Site Plan approval, and/or projects requiring an application for a Part 41 Permit from the MDEQ, are required to offset-mitigate estimated sewage flows. In addition:

- County, public schools, colleges, universities and other government facilities on properties located within the City of Ann Arbor must mitigate new sanitary flows.
- Properties requiring site plan approval must disconnect any existing on-site footing drains from the sanitary sewer. These disconnects may used to offset any mitigation required.
- Properties annexing into the city must disconnect on-site footing drains from the sanitary sewer.

Where a township contributes flow and where adequate transport capacity within the city has not been purchased or constructed, the township must agree to institute policy equivalent to the city policy for offset-mitigation of new sanitary sewer flow. If the mitigation takes place within the City of Ann Arbor, city staff will verify the mitigation work, but will not provide compliance tracking. The township will be responsible for coordinating a compliance tracking and reporting procedure, that is equivalent to these guidelines, and that will provide the City of Ann Arbor with assurance that the mitigation work was completed.

New sanitary sewer system connections for single- or two-family homes currently using on-site sewage disposal systems shall be exempt from offset-mitigation requirements. New sanitary system connections for flow additions less than the equivalent flow from a duplex residential unit (as defined in Table A) shall be exempt from offset-mitigation requirements.

## **II. Mitigation Requirements and Calculation**

The City of Ann Arbor uses the procedures in this document to determine consistent and reasonable values for the sanitary flow added to the sanitary system based on the scope of proposed development. Calculations showing the proposed sanitary sewer flow being added by the proposed development shall be included on the utility sheet of the site plan and/or construction plan, as applicable, and be reviewed by the DOM program manager. The design dry weather flow rates shall be in accordance with the city's "Table A" which is included in this document.

The detailed method for sanitary flow removal must be proposed to the DOM program manager for approval prior to a request for credit for the flow removal. Flow mitigation performed after January 1, 2015, and verified and documented by the City, but not assigned to a particular development, may be credited to a specific development without being subject to expiration. Forms of sanitary flow removal are outlined in the below section. Flow removal credits can be used for a new development on the same site, or for development at another site.

## **III. Acceptable Flow Removal/Mitigation Alternatives**

Commonly used forms of mitigation accepted by the City include but are not limited to: building removal, footing drain disconnection, plumbing fixture retrofits, pool filter backwash retrofits. Other forms of mitigation may be submitted for review and consideration by the DOM program manager. A combination of various mitigation alternatives to meet the requirement of a development may be submitted for review and acceptance at the discretion of the DOM program manager.

When the mitigation effort reduces storm or ground water inflow or infiltration (I/I) from the sanitary system, the dry weather flows are peaked to correspond with a scenario in which the effects of a rain event happen to occur at the same time when the sanitary flow is at its peak on the normal diurnal curve.

When the mitigation involves removing dry weather sanitary flow, flows are not peaked because the reduced sanitary flow is considered generally to be on the same diurnal pattern as all typical sanitary flows.

Examples:

**i. Flow removal by building demolition**

Table A shall be used for estimating the amount of dry weather sanitary flow removed by building demolition. Calculations shall be submitted to the DOM program manager for approval. In addition, flow removal credit for any illicit connections to the sanitary sewer may be granted by the DOM program manager after review of proposed flow credit calculations submitted by the applicant. Calculations must be submitted for consideration prior to demolition.

**ii. Plumbing Fixture Retrofits**

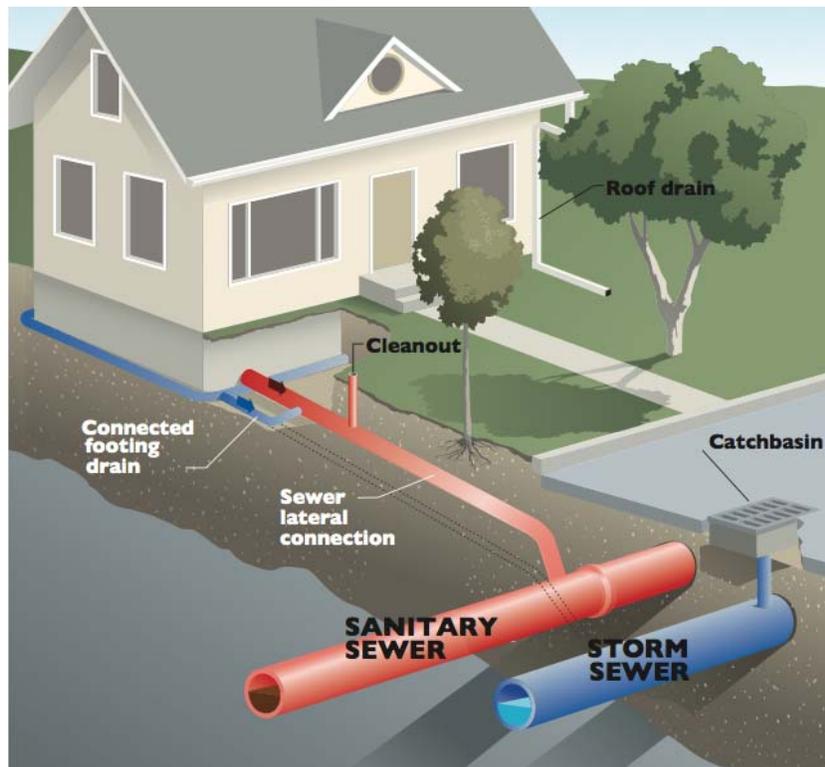
Sanitary flow reduction can be achieved by performing low flow plumbing fixture retrofits in existing buildings. Since this mitigation method involves removing dry weather sanitary flow, the existing flows to be removed are not peaked in the DOM mitigation calculation requirements because the reduced sanitary flow is considered generally to be on the same diurnal pattern as all typical sanitary flows.

**iii. Pool filter discharge modification**

Swimming pool filter backwash water discharged to the sanitary sewer can be rerouted to a dechlorination tank, and then directly discharged to the storm sewer. This method requires a National Pollutant Discharge Elimination System (NPDES) permit to be obtained. The existing flows to be removed are not peaked in the DOM mitigation calculation requirements as it's based on the maximum instantaneous pump rate.

**iv. Footing Drain Disconnection (FDD)**

Removal of a building's footing drains from discharging into the sanitary sewer and rerouted to a storm sewer or alternate discharge location. Connected footing drains are primarily found in structures built before 1982 and after 1930. In 1982, building code in Ann Arbor changed to require footing drains to use a sump pump or similar system to direct footing drain flows to a stormwater system or other suitable discharge location.



**Figure 1 Footing drains direct stormwater flow away from a building. In many structures built before 1981, footing drains were connected directly to the sanitary sewer system.**

Studies performed in Ann Arbor and in other cities have shown that footing drain flows during rain events are a major cause of system capacity issues and increase collection system flows by as much as 10 to 20 times the normal dry weather flow. In many instances, this results in the flow in the sanitary sewer system to exceed its capacity, causing basement backups in some neighborhoods. In past studies it was determined that even homes with no current basement backup problems were significant contributors to the basement backup problem for neighboring homes due to flow from their footing drains.

#### **IV. Payment-in-Lieu of Performing Flow Mitigation**

Developments have the option to make a payment to the City in lieu of performing sanitary flow mitigation. Payment will be used by the City to fund sanitary sewer wet weather capacity improvement projects. The amount will be on per gallon per minute (GPM) basis, and standard program rounding rules will apply. The amount for payment in lieu is \$3,000 per 1 gpm of new peak flow. Developers opting to make a payment in lieu of performing flow mitigation must make the payment prior to the request for any Certificate of Occupancy.

If approved as an acceptable mitigation alternative by the township, the township is responsible for collecting the payments in lieu from their developers and making the payment to the City.

## **V. Footing Drain Disconnection Guidelines**

A **footing drain disconnection** (FDD) is defined as identifying all direct connections between a footing drain and the sanitary drain piping of a property, removing the connection(s), and directing the footing drain flows to an approved stormwater discharge location.

### ***Single Family Home Disconnections***

The applicant is responsible for the following items to verify the disconnection for a single-family residential home:

- Arrange an on-site inspection through the DOM program manager after the disconnection has been made and prior to backfill. The contractor in charge of the work must be present to answer questions
- Provide photos of the pre-existing condition of the property and intermediate photos confirming a disconnection was made
- Provide final plumbing and electrical permits for work performed
- Provide city stormwater tap permit, county drain permit, and/or right-of-way permits as needed
- Provide as-built documentation in PDF format of any installed curb drain showing dimensions of the curb drain with respect to the right-of-way, as well as provide video inspection of the installed pipe
- Notify the DOM program manager of any other relevant information
- A DOM verification fee of \$250 per single or two-family home is required to be submitted with all paperwork prior to credit approval

Any exceptions to the verification items above need to be approved by the DOM Project Manager.

### ***Multi-Unit and Commercial Disconnections***

The purpose of this section is to establish a standard policy for determining the number of credits granted for footing drain disconnections completed at multi-unit and commercial structures. It also presents the requirements for the discharge system required at these locations, which can vary significantly in size and configuration from that for a single-family structure. Generally, these types of structures include apartment complexes, duplexes, townhouses, commercial and industrial buildings.

Compared to a typical single-family residence, multi-unit residential or commercial structures have widely varying footprints and will have correspondingly different contributions of footing drain flows during wet weather conditions. This section establishes a policy for calculating the disconnection credit for non-single-family structures if footing drain disconnection work is performed at these locations.

A typical single-family residence in Ann Arbor contains 1,200 square feet of footprint area, most often with a standard basement depth of 5' to 8'. These structures have been found to generate an average of 4 gallons per minute (gpm) from monitoring data within the City during peak wet weather conditions.

After reviewing the mechanism for generation of flows into footing drains, it has been determined that the number of credits provided for non-single-family structures will be based on both the footprint area and basement depth of the structure compared to a typical single-family residence. For each building, the number of credits will be calculated as follows:

$$\text{Credits} = (\text{Building Footprint Area}) / (1200 \text{ sq ft}) * (\text{Depth Factor})$$

The average depth of the basement for a structure will be used to determine the depth factor, where the depth factor is 1 for a standard full-height basement. The following table describes the basement depth factor for structures with single basement levels:

<b><u>Basement Depth Range</u></b> (Measured from highest finish grade outside of the building to the basement floor)	<b><u>Depth Factor</u></b>
< 2'	0.25
2' – 5'	0.5
>5'	1.0

The number of credits calculated above must then be rounded to the nearest whole number. Note that this formula cannot be applied to any single-family structures. Multiple credits can only be obtained for non-single-family residential structures that have documented connections of footing drains and/or roof drains to the sanitary sewer system.

The applicant is responsible for providing "Preconstruction Multi-Unit FDD Calculations" to the DOM program manager as a proposal prior to starting any disconnection work. Upon review, the City will affirm or deny the request for multiple FDD credits.

The applicant is responsible for providing the following items to receive credit for the disconnection for multi-unit structures:

- Preconstruction Multi-Unit FDD Calculations – Calculation of the proposed site credit, with City approval required prior to construction
- Surface Drainage Report – Part of FDD Credit Application
- Arrange an on-site inspection through the DOM program manager after the disconnection has been made and prior to backfill
- Provide photos of the pre-existing condition of the property and photos confirming a disconnection was made
- Provide final plumbing and electrical permits work performed

- Provide city stormwater tap permit, county drain permit, and/or right-of-way permits as needed
- Provide any additional design documents and calculations for structures
- A DOM verification fee charged at the current hourly rate as approved by City Council is required to be paid prior to credit approval

Any exceptions to the verification items above must be approved by the DOM program manager.

### ***Direct Surface Connections to Foundation Drain***

If there are direct surface connections to the foundation drainage system, these must be removed. Direct surface connections include area drains, stairwell drains, roof downspout discharges, and similar connections. An inspection report must be provided as part of each credit application of all surface drainage around each structure. This surface drainage report must include:

- Drainage Sketch – Provide a sketch of the surface drainage in relation to the structure(s), including the area of drainage toward the structure. Sketch shall be to scale with dimensions provided.
- Surface Connection Identification – Identify on the drainage sketch and provide photographs of all surface drainage inlets such as area drains, stairwell drains, roof downspouts, and similar connections.
- Removal Verification – Verification of the removal of all surface drainage connections shall be provided in the form of clearly identified photographs of the modification. In the case of stairwell drains, disconnection is recommended, but not required. If stairwell drains are not disconnected, surface flow must be directed away from the stairwell with a minimum 6" curb around the stairwell.
- Flow removal credit of up to 50% of the flow removed from eliminating these illicit connections to the sanitary sewer may be granted by the DOM program manager. The applicant shall submit proposed flow credit calculation for review and consideration.
- A DOM verification fee charged at the current hourly rate as approved by City Council is required to be paid prior to credit approval.

### ***Discharge Locations***

For properties that have a private, on-site storm water discharge location available for connection (including curb inlets, manholes, storm drains, detention basins, ponds, etc.), or one fronting the property in a public right-of-way or easement, the contractor shall tap into this facility with the sump pump discharge line (or approved surface

discharge to open channel storm drain). In many cases, a storm water discharge location is unavailable.

In some areas, the City of Ann Arbor has installed a shallow drainage network of HDPE pipe to provide a suitable discharge location for sump pumps, also known as curb drains.

In areas where public storm sewer or curb drain is not available, the developer/contractor may propose to manage the sump pump discharges on the property. Some options include the installation of an acceptable infiltration system, a surface discharge, or a sump garden designed to handle these flows. For this to be approved for a credit, a stormwater management plan must be submitted for approval to the City's Land Development Coordinator. The plan shall show how the discharge water will be managed on-site, without causing any nuisance flows for the property owner, neighboring properties, or the public right-of-way/easement. If the proposed on-site management of the sump pump discharge is determined by the City to be infeasible, then the developer/contractor must extend public storm sewer and/or curb drain to connect the sump pump discharge.

## **VI. Contact Information**

The following individuals are currently involved with the implementation of the developer mitigation program:

Alison Heatley, Private Development Coordinator and DOM Program Manager

Ph) 734-794-6000 ext. 43621

[aheatley@a2gov.org](mailto:aheatley@a2gov.org)

Peter Stephens, Land Development Coordinator

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**Appendix A - Developer Mitigation - Sample Calculations**  
 Discharge Line Calculations

Professional Engineer: John Doe  
 License Number: Mi 601099999

Signature: \_\_\_\_\_  
 Date: 10/13/2005

Survey Point	Ground (ft)	Invert (ft)	Depth (ft)	Length (ft)	Selected		Maximum Pipe Capacity (gpm)	Peak Upstream Q (gpm)	Pipe Size	
					Slope (ft/ft)	Diameter (in)				
0	16.8	14.3	2.5							
1	16.8	14.1	2.8	15	0.0167	4	130	122	OK	
2	16.4	13.9	2.6	12	0.0167	4	130	122	OK	
3	16.3	13.4	2.9	25	0.0167	4	130	122	OK	
4	15.4	12.8	2.6	36	0.0167	4	130	122	OK	
5	10.0	7.2	2.8	34	0.1667	4	412	244	OK	
6	7.0	4.3	2.7	69	0.0417	6	607	244	OK	
7	4.9	2.7	2.2	39	0.0417	6	607	244	OK	
8	0.0	-2.4	2.4	68	0.0750	6	815	305	OK	
10	17.4	14.9	2.5							
4	15.4	12.8	2.6	25	0.0833	4	291	122	OK	
11	16.5	13.7	2.8	70	0.0750	4	276		OK	
9	13.8	11.2	2.6	60	0.0417	4	206	61	OK	
7	4.9	2.7	2.2	29	0.2917	4	545	61	OK	
13	14.0	11.5	2.5							
8	0.0	-2.4	2.4	88	0.1583	4	402	61	OK	
<b>Subtotal (4")</b>				<b>394</b>						
<b>Subtotal (6")</b>				<b>176</b>						
<b>Total</b>				<b>570</b>						
								n =	0.011	(PVC)

