



TECHNO-GRAM 005-2016



- SUBJECT:** Setting Basement Elevation Above The Groundwater Table
- PURPOSE:** To clarify the Department of Permitting, Inspections and Enforcement's (DPIE) policy for setting basements above the groundwater table in residential construction
- SCOPE:** Policy and procedures to be used in the review of Building permits for buildings with proposed basements as established per CB-94-2004

Per Prince George's County Code Section 4-191 and Section 4-251, the procedures for geotechnical analysis to achieve a freeboard between the groundwater table and basement floor of each building, and to mitigate water-related problems that otherwise may affect basements are as follows:

PROCEDURES:

I. Required Explorations:

1. Determination of groundwater table and soils is to be provided for each residential structure with a basement. This includes in-ground, partially above-ground, and walkout (full/partial) basements. Slab-on-grade construction is not included.
2. One soil boring is required for each structure to a depth of at least 6 feet below the proposed basement floor level. The groundwater elevation and soil types are to be provided to DPIE prior to issuance of the Building Permit. The Building Permit may not be issued until groundwater elevation has been compared to the proposed basement floor elevation, mitigated if needed per this Policy, reviewed and then approved by DPIE.
3. Two soil test borings per building or row are required for condominium buildings or townhouse rows with proposed below-grade basements.
4. Initial borings may be performed at any time of the year, and in any construction phase of the development to verify the existing groundwater table and aid in the building design and site grading.
5. Final borings shall be undertaken after the site is fine-graded, but not less than 10 weeks from initial borings in clay-type soils to determine the final groundwater elevations required for a Building Permit Application.



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6. At least two groundwater readings shall be obtained at each soil boring: one while advancing the boring and another one at least a day after completion of the boring. The highest groundwater reading of a building shall be used to define its freeboard, per the County Code.
7. Use of a hand-auger with Dynamic Cone Penetrometer (DCP) or any other standard means to advance a soil boring at least 6 feet below the proposed basement floor is acceptable.

II. Permit Review

For a Building Permit, DPIE requires the following:

1. Soil report submitted for Site Development and Fine-Grading (SDFG) Permit, which includes initial borings. All soil reports shall include: a boring log of each soil test boring, soil types confirmed by lab testing, and water levels measured per this document;
2. Soil report for all proposed buildings, per this Policy, that includes both initial and final borings, and a table showing ALL of the following: street names, lot numbers, proposed basement floor elevations (or range of elevations for townhouses), the highest groundwater elevation, and the available freeboard (distance between the highest ground-water elevation and the basement floor elevation);
3. Cross-sections of grouped boring logs in soil reports of projects with multiple SDFG permits. The cross-sections shall be drafted to vertical and horizontal scales. The vertical axis must be magnified, such as: 1"=10' vertical axis and 1"=50' horizontal axis. For one-permit projects, cross-sections are preferred, not required; and
4. Site plans on which the following are clearly depicted: proposed basement floor elevations (or range of elevations for townhouses), locations of all soil borings, and typical foundation detail and/or standard Perimeter Underdrain Detail.

III. **Groundwater Evaluation and Mitigation:**

Groundwater conditions may exist requiring evaluation for under-ground structures. Design engineers/architects shall evaluate the basement elevation as compared to groundwater elevation and include appropriate mitigation on the permit drawings to avoid future problems with groundwater intrusion into basements. The required groundwater mitigations are outlined below.



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Condition #1: Freeboard (distance between the highest tested groundwater level and basement floor elevation) **is greater than 2.5 feet (i.e., Groundwater is more than 2.5 feet from the surface of the basement floor.)**

For this condition, groundwater mitigation is not required and standard perimeter underdrains, both exterior and interior, connected to a sump pit are considered adequate. Typical foundation-drainage detail is required on the permit plans.

Condition #2: Freeboard is between 0 and 2.5 feet, while higher groundwater levels are not evident

For this condition, Mitigation 2a. shall be considered first. **Mitigation 2a. - Raise Basement Elevation:** Every effort must be exerted to raise the structure to achieve the required freeboard of Condition #1. If raising the structure is not feasible, this must be defended by the design engineer/architect. The County reviewer should concur that all options to raise the structure have been thoroughly evaluated before considering Mitigation 2b.

Mitigation 2b. - Underdrain Connected to a Gravity Outfall: Install underdrain system that connects to a gravity storm-drain system or to a free gravity outfall condition, per the standard Perimeter Underdrain Detail. The hydraulic gradient (HGL) of the underdrain pipe is to be calculated from the 10-year HGL of the mainline storm-drain system. The building underdrain HGL shall be below the basement elevation. The detail and notes of the Perimeter Underdrain indicating that the foundation drainage system for the structure are in accordance with this standard Perimeter Underdrain Detail (attached) are to be included on the permit drawings.

Condition #3: Freeboard is negative and groundwater is above the surface of the basement floor

This is NOT permitted. Efforts shall be made to raise the basement to Condition #1 first. If that is proven not to be feasible and the County reviewer concurs, raising it to Condition #2 and following Mitigation 2b. will be considered for County acceptance. If Mitigation 2b also is not feasible, a crawl-space may be used or the basement eliminated altogether.



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NOTES

- 1. Review the disclaimer on the attached Perimeter Underdrain Detail. When necessary, the designer shall enhance that detail. Enhancements may include specifying multiple drain pipes to increase the volume of drained water, thicker clay cap on top of the backfill material to limit infiltration of surface water ... etc., among other enhancements deemed necessary by the design engineer.**
- 2. County Code states: Residential sump pumps are not to be relied on for lowering groundwater level.**

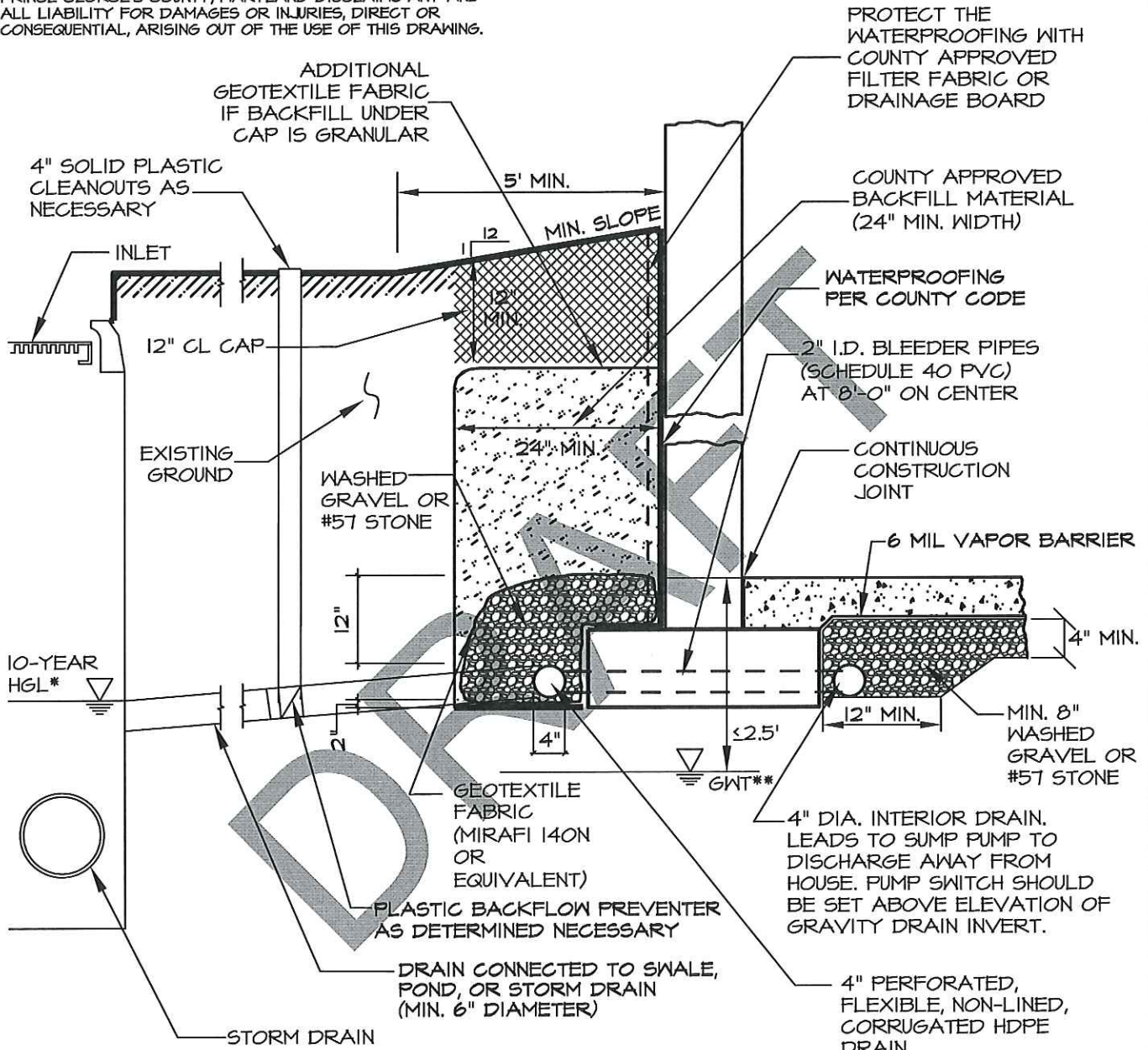
APPROVED BY:

A handwritten signature in blue ink, consisting of several overlapping loops and curves.

Haitham A. Hijazi, Director

May 31, 2016
Date

WARNING AND DISCLAIMER: THIS DRAWING IS INTENDED ONLY TO BE ILLUSTRATIVE OF THE MINIMUM REQUIREMENTS OF APPLICABLE COUNTY ORDINANCES. IT IS NOT A BLUE PRINT, NOR A SET OF PLANS AND SPECIFICATIONS. PRINCE GEORGE'S COUNTY, MARYLAND DOES NOT WARRANT OR GUARANTEE IN ANY MANNER OR TO ANY EXTENT THE SUFFICIENCY OF THIS DRAWING. PERSONS TO WHOM THIS DRAWING IS DISTRIBUTED SHOULD NOT RELY ON IT AS AN ACCEPTABLE PLAN OR BLUE PRINT FOR ANY STRUCTURE. PRINCE GEORGE'S COUNTY, MARYLAND DISCLAIMS ANY AND ALL LIABILITY FOR DAMAGES OR INJURIES, DIRECT OR CONSEQUENTIAL, ARISING OUT OF THE USE OF THIS DRAWING.



*10-YEAR HYDRAULIC GRADIENT LINE (HGL) MUST BE AT OR BELOW THE TOP OF THE UNDERDRAIN WHEN CONNECTING TO STORM DRAIN STRUCTURES.
 **GWT = GROUNDWATER TABLE

APPROVED:	
DIRECTOR	DATE
REVISION DATE:	APPROVED BY:



DEPARTMENT OF PERMITTING, INSPECTION, AND ENFORCEMENT Prince George's County, MD	
GRAVITY PERIMETER UNDERDRAIN DETAIL FOR CONDITION NO. 2 (≤ 2.5' OF FREEBOARD)	STD. 00.0