

ENGINEERING CONSISTENCY MEETING

JANUARY 2006

MEETING MINUTES

Attendees:

John Gysling, P.E.
Doug Hokuf
Eric Laramore
Stacy McNatt
Hap Ryan, P.E.

Purpose: The purpose of the engineering consistency meetings is to promote consistency among the engineering staff in the application of the County Code and Departmental Policies. During the meetings, current regulatory issues will be discussed. When a consensus is achieved, the decision will be documented. The goal is to clearly communicate Departmental positions to the professional engineering community by providing a copy of the meeting minutes on the County's Engineering internet page. It is the intent of the Engineering Section to apply the decision uniformly; however, due to the uniqueness of each land development application all plans are reviewed on a case by case basis.

Items Discussed:

1. Septic systems

Question: Does the field for a proposed septic system have to be sized and located on each individual lot of the Record Plan?

Discussion: As the area available to install a septic system is dependent upon soil characteristics and as the septic feasibility area is restricted by the lot size, the amount of anticipated flow and the size of the proposed development, the need to document specific septic field information on the Record Plan is imperative.

Decision: Each lot shall have a septic field sized for the maximum anticipated flow and this area shall be designated on the Record Plan such that it is protected from development. Additionally, a note shall be provided on the Record Plan that states the number of bedrooms that the septic field sizes are based upon.

2. The Cockeysville Formation as it relates to building permit applications

Question: What data and/or documentation are required for the approval of building permit applications located within the Cockeysville Formation?

Discussion: As the UDC Sec. 40.10.381 and 40.22.110 require a subsurface investigation report prepared by a professional geologist for land development plans within the Cockeysville Formation and as single family dwelling and their habitable attachments do not strictly meet the definition of a UDC land development plan clarification is needed.

Decision: For single family dwellings or habitable additions that are proposed within the Cockeysville Formation, a subsidence report is required from a professional geologist or, for habitable additions, the option to provide an assessment of the existing footers as it relates to subsidence from a structural engineer that certifies constructability. In either case, if the possibility exists, the Department requires the report/assessment to include a prescriptive guide on the construction of the proposed foundation. A subsidence report is not required for uninhabitable accessory structures, decks or pools.

3. TSS removal requirements for rooftop runoff

Question: Is there a standard for managing stormwater quality treatment from rooftop surfaces that can be used when the 80% removal of TSS cannot be met?

Discussion: As this question regards the interpretation of the Delaware Sediment and Stormwater Regulations, the Engineering Section referred the matter to DNREC and received the following response:

“If you look at the Event Mean Concentrations for TSS from impervious areas used in DURMM (cells R16 -R21 on the post-development sheet), you'll see that the TSS concentration in roof runoff is 15-20ppm, as compared to pavement runoff, which varies from 60-180ppm. The EPA uses an average TSS value of around 100ppm for "urban runoff", and when viewed in this context, 80% removal would result in a TSS concentration of 20ppm after treatment in the BMP.

So, when designing a bio-swale to treat roof runoff only, if the 80% removal can't be met, we suggest the following:

- maximize the length and width of the bio-swale that is practical to fit on the site (within the guidelines of the Green Technology Standards and Specs)
- achieve a minimum residence time of 9 minutes
- achieve a maximum TSS concentration of 20ppm, lower if possible

If these objectives can be met and the TSS removal rate is below 80%, we would consider this acceptable, as long as the bio-swale was only treating roof runoff and not runoff from other types of impervious area.”

Decision: In agreement with DNREC, the Engineering Section will accept a TSS concentration of 20ppm or less for the quality treatment of **rooftop only** runoff provided that the BMP is designed in accordance with its recommended parameters.

4. Groundwater assessment for green technology BMP's

Question A: Is the seasonally high groundwater elevation at the practice location commonly referred to as the reference elevation to determine feasibility?

Discussion A: As this question regards the interpretation of the Delaware Sediment and Stormwater Regulations, the Engineering Section referred the matter to DNREC and received the following response:

“Yes, we typically use the seasonally high groundwater elevation as the reference. A soil scientist has to be able to pick up the soil chroma characteristics during the soils exploration to determine this in the field. If the soil isn't saturated frequently enough (i.e., on an annual basis) these indicators will not be distinguishable.”

Decision A: In agreement with DNREC, the Engineering Section recognizes the seasonal high water table elevation and the reference elevation as being synonymous.

Question B: What is the minimum differential between the bottom of a practice and the groundwater reference elevation?

Discussion B: As this question regards the interpretation of the Delaware Sediment and Stormwater Regulations and DURMM, the Engineering Section referred the matter to DNREC and received the following response:

“On a straight infiltration practice, the current Regulations require a minimum 3-foot separation. We have relaxed this somewhat on bio-retention systems having an under-drain. However, in no case should the seasonal high groundwater elevation be higher than the bottom of the facility.”

Decision B: In agreement with DNREC, the Engineering Section will allow the minimum separation distance of three-feet between the bottom of a bio-retention system having an under-drain and the seasonal high groundwater elevation to be eliminated provided that there is no coinciding.

5. Pilot channel in a bio-filtration swale

Question A: What value does a pilot channel within a bio-swale offer?

Discussion A: As this question regards the interpretation of DURMM, the Engineering Section referred the matter to DNREC and received the following answer:

“The pilot channel helps solve a couple design problems that are essentially diametrically opposed to each other. For water quality purposes, the depth of flow should be approximately half the height of the vegetation. However, momentum forces increase exponentially as a function of the depth of a channel. So, if a channel

is limited to 8' in width for all the other storms that must be conveyed, the depth often increases to the point that these momentum forces will tend to re-suspend any captured sediments. (A good rule of thumb is to keep the depth for the maximum design storm at 2' or less whenever possible. Momentum forces increase significantly above 2'.) The typical response to this would be to simply increase the width of the channel. However, this then tends to promote meandering during the more frequent, low intensity events. The pilot channel actually, I prefer "compound section" but most engineers grasp the "pilot channel" concept easier provides a channel-within-a-channel solution for this situation. We haven't put out any standards for this, but I have always envisioned the pilot channel being off to one side or the other of the main channel, more similar to a natural base flow channel with an over-bank floodplain. I have seen several designs using a pilot channel right down the middle of the main channel which is less aesthetically pleasing in my opinion. However, it would probably function just as well."

Decision A: In agreement with DNREC, the Engineering Section accepts the utilization of a pilot channel within a bio-filtration swale provided it is designed in accordance with DURMM and the above stated parameters.

Question B: Does DURMM allow for the modeling of the pilot channel as a separate section in DURMM?

Discussion B: As this question regards the functionality of the DURMM software, the Engineering Section referred the matter to DNREC and received the following response:

"No, DURMM does not include an analysis based on a pilot channel design."

Decision B: Based upon the response from DNREC, the Engineering Section recognizes that although DURMM is capable of providing a quality assessment of the pilot channel other appropriate software must be employed to determine the adequate conveyance of the flooding event.

6. Wet bio-filtration swales

Question: Is the wet vegetation option desirable compared to an under-drain when the minimum slope cannot be attained?

Discussion: As this question regards design parameters detailed within the DURMM manual, the Department referred the matter to DNREC and received the following answer:

"I [DNREC representative] just met with Dr. Jack Gingrich [mosquito habitat researcher] last week to go over the preliminary raw data he collected this summer from bio-swales. Not surprisingly, these can be problematic as they tend to have pockets of standing water. Therefore, the current standards and specifications

requiring either 2% slope or some sort of drain should be adhered to for the time being.”

Decision: Based upon the response from DNREC and internal discussions with the Department of Special Services, the Land Use Department has decided that only bio-filtration swales with a minimum slope of 2% or an under-drain will be permitted.

7. Sediment trap selection

Question: We [Engineering Section] are looking for opinion and background information regarding trap selection - for the past year we have been advocating pipe outlet traps over rip-rap traps because capacity (and therefore effectiveness) can quickly be recovered between storm events. We have noted that the pipe outlet trap specification does not recommend its use for as large a drainage area as the rip-rap specification which compromises our position somewhat. Can you [DNREC] explain why this is so and also let us know whether you concur with this position?

Answer: As this question was posed by the Engineering Section to DNREC regarding the interpretation of the Delaware Erosion and Sediment Control Handbook the following is DNREC response and the answer to the question:

“The ESC Handbook was developed with the intention of providing a suite of BMP’s that could be used for as many situations as possible that are encountered on typical construction sites. Therefore, some BMP’s are better suited to minor disturbances while others can handle larger disturbed areas. In general, as the area being treated increases there is an increase in the engineering design requirement. Although the pipe outlet sediment trap is limited to a drainage area of 5 acres, there are details for two (2) standard temporary sediment basins contained in the Handbook, one for drainage areas less than 10 acres and one for drainage areas from 10 to 20 acres. Other than some consideration for the emergency spillway capacity, the design criteria for these two standard basins are minimal. In addition, the design guidelines for a temporary sediment basin can be used for drainage areas up to 100 acres. Therefore, the disturbed area that can be managed by a pipe trap/sediment basin exceeds the capabilities of stone/riprap traps considerably.

The big advantage of using a pipe outlet is the ability to attach a skimmer relatively easily. I have seen some attempts to use a skimmer with a stone/riprap outlet trap using a separate pipe through the berm, but it works a lot better with a pipe.”

8. Floodplain adjacency

Question: As the UDC Sec. 40.10.316 establishes criteria for building near or adjacent to the floodplain, how are the terms “adjacent” or “near” defined?

Discussion: Based upon the established width for the floodplain riparian buffer of 50-feet, the Department has determined that this section of the UDC is applicable when the building occurs within 50-feet of the floodplain.

Decision: The terms “near” and “adjacent”, as they relate to the UDC Sec. 40.10.316, shall be defined as 50-feet.

9. Temporary C/O

Question: Can the Engineering Section sign-off on the Temporary C/O without having received an as-built for the stormwater management facilities?

Discussion: As building and site related issues often come to a close prior to the completion of the stormwater management facilities, it is difficult to have the complete stormwater management as-built finalized prior to or simultaneously with the owners expectations to occupy the building. Summarized is a list of criteria that shall be signed, dated and sealed by a qualified professional to be provided in lieu of a complete stormwater management as-built package:

- A certification that no sediment is migrating off-site and any necessary erosion and sediment controls are installed and in good functioning condition
- A certification that stormwater peak management control is being provided
- A complete list of incomplete stormwater management related tasks that must be complete prior to the finalization of the as-built
- A schedule that details a timeline for the completion of the outstanding tasks
- A certification that no health, safety or welfare issues exist, as it relates to the conveyance or management of stormwater

Decision: The Department has determined that if the above parameters are met **in full** that the Engineering Section may sign-off on the Temporary C/O.