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MEMO

To: James Cassida, MDEP
From: David P. Rocque, State Soil Scientist
Re: Site Law Application
Date: January, 22, 2009

This is in regard to your Department's current undertaking to revise the Site Location of Development Law and associated Rules. I have no comments on the Law itself and will only be referring to certain provisions in the Rules as they only outline the basic information an applicant must submit when applying for a permit. My comments are instead, focused on the Site Law Application Form which is where specific submission requirements are listed. In particular, I will be commenting on Section 11, Soils. It is my professional opinion that the Site Law Application Form requirements for soil mapping for some of the various types of development need to be revised so that more specific information is provided to the project reviewer. Without sufficiently detailed soils maps and associated soils information, I believe it is not possible to assure compliance with Chapter 375 of the Site Law Rules: No Adverse Environmental Effect Standard Of The Site Location Law.

Chapter 375: No Adverse Environmental Effect Standard Of The Site law.

This Chapter includes rules designed to assure "no adverse effect on the natural environment" as well as groundwater quality and quantity, surface water quality and buffer strips, amongst others. In the case of groundwater quality and quantity and surface water quality, the standard states that they can not be adversely affected by any proposed development. In the case of buffer strips, the standard states that "the developer must make adequate provisions for screens and natural buffers". It is my contention that, to assure a proposed development will not have any adverse effect on these natural resources, a project designer and/or reviewer must have detailed soil survey information. Otherwise, they will have to rely on assumptions to form the basis for important land (soil) based decisions. Let me elaborate:

Ground and Surface Water Quality and Ground Water Quantity – I believe it is critical for any developer to have accurate and detailed soils information in order to design a development project such that it does not adversely impact groundwater quality or quantity. Some of the more important soil properties a developer should consider include the soil texture (clay v loam v sand) presence of a hardpan layer and depth to and type of groundwater table. Simply recommending the use of certain best management practices (BMP's) on the basis of project type, development feature or slope is not appropriate. Doing so will either require installation of the most expensive, difficult and time consuming practices, to cover all bases, or accepting the fact that less expensive, difficult and time consuming practices can be used to cover the average condition encountered. As an example, consider long sloping landforms where the typical road construction technique perpendicular to the slope is to cut into the upslope side and install ditches that extend deeply into the soil. If the soil is a glacial till with a hardpan and perched water table on the hardpan, groundwater as well as runoff water is collected in the ditches and then diverted to some form of detention or dispersion mechanism. Even though this technique can result in no net increase in post development discharge from the site, it can have a significant impact on the natural environment and groundwater quantity. That is because the intercepted groundwater (in the road ditch) no longer travels downgradient over a wide area to a wetland, stream or pond as cool clean ground water which is sustained over a long period of time. This groundwater now is collected in one or a few selected sites and is discharged in one location as concentrated flow or a narrow area of sheet flow. If, on the other hand, the soils are less permeable or do not have a shallow groundwater table, the ditch may not be a cause for concern. In addition, there may be groundwater seeps in the cut side of the road where special erosion control techniques are needed to stabilize the soil. In order to know how to best site and construct this road, detailed soils information is needed all along its length.

Surface Water Quality - The alteration of the natural hydrology described above, which impacts groundwater quality and quantity, also impacts surface water quality. Surface waterbodies depend on cool, clean, long term sources of water to support their functions. If groundwater is intercepted in ditches and discharged in a few select locations, it will not replicate the natural hydrology and will adversely impact the surface water resources downgradient (shorter time of concentration, warmer and carrying pollutants). Groundwater seeps not properly addressed are continuing sources of erosion and subsequent sedimentation of downgradient waterbodies. Road ditches which avoid groundwater seeps or which do not extend below the seasonal high water table do not need continual repair and result in more durable roads. In those cases where it is not possible to avoid groundwater seeps or where ditches must extend below the seasonal high water table, many times appropriate techniques can be incorporated into a road design so as to result in a stable road and ditch that does not have an undue adverse impact on the natural resources. This can only be done however, with detailed, site specific soils information.

Screens and Natural Buffer Strips – Buffer strips are one of the best techniques known to protect the functions and values of waterbodies, including water quality. MDEP obviously recognizes their value as can be seen in your proposed revisions to Chapter 375, number 9, Screens and Natural Buffers. MDEP also understands that the effectiveness of a buffer strip is dependent upon the characteristics of that buffer strip including soil types. That is because some soils have a much greater ability to treat runoff water than others. Consider the following included in Chapter 375, number 9. Screens and Natural Buffers, (d) "The Department may determine that an enlarged buffer is required based upon factors such as the following":

> (d) (i) the erodability of the soils present, considering type of overburden and depth to underlying restrictive layer,
> (d) (iii) susceptibility of the buffer to windthrow (this is related to soil depth to water table, hardpan and/or bedrock), and whether the buffer will remain intact and function as intended if affected by windthrow,
> (d) (iv) Evidence that the ability of the buffer to attenuate eroded soil or other potential pollutants associated with the development may be insufficient so as to allow degradation of water quality (including thermal change).

From this discussion of reasons why an enlarged buffer may be required, it is evident that soils have been determined by MDEP to play a major role in buffer effectiveness. If that is the case, it becomes very important to have good site specific, detailed soils information from within the proposed buffer area.

Chapter 376: Soil Types Standards Of The Site Location Of Development Law

This chapter provides the framework for specific soil mapping requirements found in the Site Law Application. Included in this chapter are the following:

2. Standards.

A. **Development based on soil types**. The layout and design of the development must be based on the distribution of suitable soil types at the development site.

B. **Soil limitations**. Soil limitations to the development that cannot be avoided must be overcome by the application of accepted engineering principles and design.

3. **Submissions.** The application for approval of a proposed development must include evidence that affirmatively demonstrates that the development will be built on suitable soil types, or that soil limitations, where present, can be overcome,……

It becomes obvious to the reader that the Site Law, through this chapter, is concerned with directing development to those soils which are suitable for the intended use, to the extent possible. Then in those cases where less than suitable soils are to be developed, they must be developed in such a way as to overcome those limitations in such a way so as to pose "no adverse environmental effect". The only way this can be done properly is to have sufficiently detailed soils maps to guide the designer or project reviewer.

Site Law Application:

The Site Law Application, Section 11, Soils, is where the level of soil mapping detail required for the various types of development to be reviewed by MDEP are listed. In this section, the various classes of soil survey, as found in the Maine Association of Professional Soil Scientists, Guidelines For Maine Certified Soil Scientists For Soil Identification and Mapping, are listed along with the types of development for which the classes of mapping apply. I will go through them, class by class, providing you with my recommendations.

(1) Class A (High Intensity) Soil Survey.

a. OK
b. Subdivisions with any lot less than 2 acres and on-site subsurface wastewater disposal. Residential and commercial subdivisions where any lot is less than 2 acres and on-site subsurface wastewater disposal is proposed. – *Comment: I believe this requirement should apply to any subdivision where any lot is less than 2 acres, not just those where subsurface wastewater disposal is proposed. The soil mapping information is needed to evaluate the "Environmental Effect" of the development, not the suitability for subsurface wastewater disposal. Site Evaluators provide site specific information on the suitability for subsurface wastewater disposal.*

(2) Class B (High Intensity) Soil Survey.

a. Subdivisions with any lot less than 2 acres.
b. Condominiums.
c. Shopping Centers or similar developments.
d. Energy Facilities

Comment: These are relatively intense developments with the potential to significantly impact the environment including hydrology. A Class B Soil Survey only requires mapping soils that are over 1 acre in size, regardless of condition or suitability for development. Class A Soil Surveys require mapping soils that are over 1/8 acre in size if they might have a significant impact on use and management for the proposed use. I believe that a Class A Soil Survey would be more appropriate for these types of development. For instance, depending of the shape of a soil map unit, a subdivision road might cross several hundred feet of a wet or shallow to

bedrock soil that was not identified by a Class B Soil Survey but would be by a Class A Soil Survey.

(3) Class C (medium High-Intensity) Soil Survey.

a. Subdivisions with all lots greater than 2 acres and on-site subsurface wastewater disposal.
b. Multi-use recreational developments with green space. Golf courses, ski areas and trails.
c. Development requiring hydrogeological investigation.

Comment: A Class C Medium-Intensity Soil Survey only requires soils that would significantly affect use and management to be mapped if they are over 5 acres in size. That is an area almost 500' x 500' in area. If that standard is used, any development lot less than 5 acres in size could simply be an allowable inclusion within a soil map unit. That means a soil map may indicate a suitable soil type when, in fact, one or more entire lots could be an inclusion of a totally unsuitable soil type. A Class C Soil Survey is acceptable for general planning purposes only and is not suitable for site specific decisions.

(4) Special Soil Survey Requirements for Linear Projects.

Comment: You should cite the new, draft Class L Soil Survey for this section.

Based upon discussions with third part inspectors (see e-mail of January 16 regarding transmission lines), I believe transmission lines should be included for this class of soil survey (or a modified version). Contractors need to know where they can operate without special consideration during times of the year that there is a seasonal high groundwater table and where special construction techniques will likely be needed. Otherwise, it can be costly for the contractor and/or the environment.

General Comments: For many years I have worked closely with the Land Use Regulation Commission Staff to develop soil survey requirements that allow for proper design and review for each type of development. I believe we have reached that point. The LURC standards generally require Class A High Intensity Soil Surveys but include the provision for LURC to waive those standards for part or the whole development. That allows for the maximum flexibility to obtain what soils information is needed but not any more than is required to properly design and review a development project. Many times, a subdivision will have areas of intense development with other areas where no development is planned. For the intensely developed areas, a Class A Soil Survey (or a soil survey with Class A High Intensity Soil Survey minimum map unit size) would be required but for areas where no development is planned, a less detailed soil survey would be allowed. I strongly recommend a similar approach for MDEP. It doesn't make much sense to require a costly and time consuming Class A High Intensity Soil

Survey for an entire 100 acre property when only 20 acres of it are to be developed. On the other hand, it does not make any sense to only require a Class C Soil Survey for the entire property due to the fact that only 20% of it is to be developed. What does make sense is to require a Class A Soil Survey for the 20 acres to be developed with a Class L Soil Survey for any connecting access road and a Class C Soil Survey for the remainder of the property to give a general picture of future development potential. Sometimes, it is appropriate to use a modified version of a Class A, B, or C soil survey because not all of the requirements of a higher class of soil survey are needed (scale, contours, base map) but minimum map unit size is important. The bottom line is that a soil survey should be structured to provide all of the soils information needed to design and review a proposed development project but not information that is unnecessary. I believe this is the most effective approach to obtaining the soils information needed for the proper design and construction of a development, both from the MDEP's and developers prospective.

I believe it is critical that Class A High Intensity Soil Surveys should be required for all buffer strips designed to protect water quality and for areas where stormwater treatment measures are to be installed. The effectiveness of a buffer strip to treat stormwater is directly related to the character of that buffer strip, including soil types. If sections of a proposed buffer strip have reduced ability to treat runoff due to such soil characteristics as depth to water table, hardpan, or bedrock or soil texture, there could be a short circuit of the buffer strip if that area is not identified and steps taken to prevent the short circuit. Very detailed soils information is needed to properly evaluate the effectiveness of a buffer strip and assure that is properly used.

I believe any project proposed within the shoreland zone, that will result in soil disturbance, alter the natural hydrology or alter runoff characteristics, should have a Class A High Intensity Soil Survey. The shoreland zone is a very sensitive area as it is adjacent to a waterbody and any development within it is likely to have a direct impact upon the quality of the waterbody. Typically, shoreland zone areas are low lying as they are at or near the low point in the watershed with a considerable amount of groundwater discharging to the waterbody through some of their soils. Without site specific, detailed soils information, it is very difficult to know where these saturated soil areas are and to design a development such that it does not significantly alter the natural hydrology, so vital to the health of the waterbody. The best way to understand potential hydrologic impacts from a development on a waterbody is by having a detailed knowledge of soil conditions.

I am available to sit down and discuss these recommendations with you and others within your department, should you wish to pursue them further.