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Land Use Department

STATE OF CONNECTICUT

DEPARMENT OF ENERGY & ENVIRONMENTAL PROTECTION

GUIDANCE DOCUMENT FOR EVALUATING POTENTIAL HYDROGEOLOGIC IMPACTS ASSOCIATED WITH BLASTING & DEVELOPMENT ACTIVITIES

Bureau of Water Protection and Land Reuse
Remediation Division

December 2019
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The following guidance is provided by the Department of Energy & Environmental Protection's Remediation Division for use by municipal land-use officials when evaluating proposed developments, road construction projects, or quarries where significant earth removal and/or blasting activities are likely to occur. Because of those types of activities, there is concern for possible negative impacts to the quality and quantity of water in neighboring drinking water wells, as well as other environmental factors such as erosion, sedimentation, and decreased surface water quality conditions.

One of the primary concerns is acid rock drainage (ARD), which is a natural process, but can be exacerbated when rock is crushed and used for fill or other purposes that expose the freshly crushed rock to precipitation. ARD is caused by the presence of bedrock containing high levels of iron sulfide (which is present in Eastern and Western Highlands and sometimes the central valley of CT), especially such rock that is freshly exposed or crushed and has been subjected to the elements/precipitation. Under these conditions, there is an elevated risk for mobilizing naturally-occurring iron, manganese, and sulfur, which may adversely affect groundwater and drinking water quality. In addition, increased mobilization of arsenic, uranium and/or radon can occur in areas where these naturally-occurring minerals are present in the bedrock formation.

The Department recommends that land use officials consider the following as part of the overall application review process:

1. The developer or applicant (the Applicant) should retain a geologist/hydrogeologist or engineer (Environmental Professional) to evaluate the underlying bedrock in terms of its potential to cause ARD. The town's land-use office should make sure that the Applicant acquires the services of a qualified Environmental Professional that has experience testing the mineralogy and chemistry of the rock material and evaluating the potential impacts of ARD. As such, there needs to be a detailed site plan developed by the Applicant's Environmental Professional that addresses best management practices for minimizing ARD conditions by ensuring proper handling, storage or disposal of the rock material on- and off- site and minimizing its contact with infiltrating precipitation and surface water runoff at the site.

2. After identifying all drinking water wells within a 500-foot radius of the area to be disturbed by proposed construction activities, the Applicant's Environmental Professional should evaluate which drinking water wells need to be sampled in order to establish baseline drinking water quality conditions prior to any active earth work or blasting activity. Consideration should be given to factors such as: well type and construction details; the nature, geologic structure, and mineral make-up of the underlying bedrock; and blasting/rock removal techniques. The town's land-use office, as part of the permit application review process, or as part of the pre-blast survey if blasting is necessary, should also require that the Applicant document the yield and capacity of the wells before the site work or blasting commences. Testing the raw water quality (prior to any water treatment devices) of nearby drinking water wells prior to construction or blasting activities will establish a baseline for comparing post-project test results, in the event a property owner makes a complaint that the project activities negatively impacted their well.

3. In the absence of drinking water wells within 500 feet of the area to be disturbed, the Applicant's Environmental Professional should identify the closest drinking water wells, if any, within a 1,000-foot radius. Depending on the location, proximity, well construction and other factors, consideration should be made as to whether the proposed blasting activity poses a concern to the quantity or quality of water at these locations. Should a concern exist, and in the absence of closer drinking water wells to monitor, the Department recommends a minimum of annual monitoring of water levels and water quality of the closest drinking water well until the development project is completed and the site has been stabilized.

4. The Department recommends that drinking water wells at risk of ARD from proposed blasting and earth removal activities be analyzed for the following drinking water quality parameters:

    - pH
    - odor
    - color
    - turbidity
    - total iron
    - total manganese
    - nitrate
    - nitrite
    - sulfate
    - coliform bacteria
    - arsenic
    - uranium
    - radon
    - ammonia perchlorate *(if the salts ammonium, potassium, magnesium, or sodium perchlorate is an ingredient of the blasting agent)*
    - total petroleum hydrocarbons using the CT extractable total petroleum hydrocarbons test method *(if the blasting materials contain ammonium nitrate fuel oil mixtures)*

    All testing should be performed in an approved laboratory certified to test drinking water by the Connecticut Department of Public Health's Laboratory Certification Program.

5. Follow-up well water sampling should occur within one to two months following the blasting activity and again once the site has stabilized and ground cover has been established. The plan for such water sampling should be part of the Applicant's land-use application. Should the development project and site work continue over a prolonged period of time, annual testing of the potentially impacted drinking water wells should be performed to ensure there are no adverse effects to the drinking water quality.

6. If there is a change in drinking water quality during or after the blasting activity, the well owner should notify the Applicant and/or blasting contractor of the condition, and also

notify their local health department and DEEP's Remediation Division (860-424-3705) of the condition.

7. The static water level in potentially affected drinking water wells should also be monitored during and following completion of the site work and blasting activity to determine if the static water level in the well decreases to the extent there is a problem for domestic use. Major site work that significantly alters infiltration rates, diverts surface water flow, or creates deep rock cuts or fractures may seriously deplete the volume of water in nearby overburden or drilled bedrock drinking water wells. Wells accessed for purposes of water level monitoring will require the well to be properly disinfected prior to being reactivated following the Department of Public Health's *Publication #27: Disinfection Procedure for Private Wells*.

Other Considerations:

- There may be additional issues relating to blasting activities that the town, through its Fire Marshal, may need to address by the pre-blast survey. Such issues may include the potential for structural damage to neighboring properties due to air blasts and vibrations, and/or noise and dust control. Additionally, if municipal officials receive complaints regarding fugitive dust emissions due to the blasting and/or earth removal activities, DEEPs Bureau of Air Management (860-424-3436) can be contacted for guidance and possible follow-up inspection.

- The municipality may want to consider having large-scale developments, where significant site work including blasting is planned, be evaluated by the Connecticut Environmental Review Team (CTERT). A request for an ERT review must come from the municipality's chief elected official or the chairperson of one of the town's land-use or economic development commissions. Information regarding the CTERT and applying for an ERT review can be found at www.ctert.org or by calling 860-345-3977.

- Activities with proposed soil disturbances of one (1) acre or more that have not obtained local approval involving an erosion and sediment control review must register for the DEEP's General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. The Applicant can obtain information regarding the general permit at www.ct.gov/deep/stormwater.