15A NCAC 18A .1942 SOIL WETNESS CONDITIONS

(a) Soil wetness conditions caused by seasonal high-water table, perched water table, tidal water, seasonally saturated soil or by lateral water movement shall be determined by the first indication of colors of chroma two or less (equal to or greater than 1 percent of soil volume as determined by reference to Munsell Soil Color Charts) in mottles or a solid mass. However, colors of chroma two or less which are relic from minerals of the parent material shall not be considered indicative of a soil wetness condition.

(b) The Department may substitute a determination of soil wetness conditions by direct observation of the water surface in wells during periods of typically high water elevations utilizing monitoring procedures in Paragraph (c) of this Rule and one of the interpretation methods in Paragraph (d) of this Rule, when:

(1) drainage modifications have been made on the lot or tract of land, including the installation of subsurface drain tile, open drainage ditches or surface landscape modifications;

(2) regional ground water lowering features are present, including drainage canals or ditches and streams, which are close enough to influence the soil wetness depth on the site;

(3) there are observed shallow soil wetness conditions but no observed low chroma colors; or

(4) when other factors are specifically identified which bring into question the determination of soil wetness based upon Paragraph (a) of this Rule.

(c) The following procedure shall be used to monitor water surface elevation and precipitation for determining soil wetness conditions by direct observation.

(1) The property owner/applicant shall notify the local health department of the intent to monitor water surface elevations by submitting a site monitoring plan no later than November 1 prior to the well monitoring period. An applicant other than the property owner shall have written authorization from the owner to be the owner's representative.

(A) The monitoring plan shall include a site plan showing proposed wastewater system area(s) and specify any proposed site modifications.

(B) The monitoring plan shall indicate the proposed number, location, installation depth, screening depth, materials of construction and installation procedures for each monitoring well.

(C) The local health department shall be given the opportunity to conduct a site visit and verify the appropriateness of the proposed plan. Well locations shall include portions of the initial and replacement drainfield areas containing the most limiting soil/site conditions. Prior to installation of the wells the LHD shall approve the plan. Well observations shall not be made prior to plan approval.

(2) Water surface observations and rainfall shall be recorded at least daily from January 1 to April 30, taken at the same time during the day (plus or minus two hours).

(3) A minimum of three water level monitoring wells shall be installed for water surface observation at each site.

(4) Wells shall extend four feet below the natural soil surface, except one or more shallower wells may be required on sites where shallow lateral water movement or perched soil wetness conditions are anticipated.

(5) A rain (precipitation) gauge is required at every non-contiguous site. At least daily rainfall shall be recorded beginning no later than December 1 prior to the well monitoring period.

(6) Soil wetness and rainfall monitoring shall be conducted under the responsible charge of a third-party consultant(s), licensed or registered in accordance with G.S. 89C (Engineers), G.S. 89E (Geologists), G.S. 89F (Soil Scientists), or G.S. 90A, Article 4 (Registered Sanitarians), or by the property owner/applicant. The owner/applicant shall submit the name(s) of the consultant(s) performing any monitoring on their behalf to the local health department.

(d) One of the following interpretation procedures shall be used for the determination of soil wetness condition from the direct observation of the water surface in wells.

(1) An approved ground water simulation model, such as DRAINMOD, or equivalent, shall be used to predict daily water levels over at least a 30-year historic time period after the model is calibrated using the water surface and rainfall observations made on-site during the monitoring period. The soil wetness condition shall be determined as the level which

is saturated for at least one 14-day continuous period between January 1 and April 30 with a recurrence frequency of 30 percent (an average of 9 years in 30).

(A) Weather input files, required to run the approved groundwater simulation model, shall be developed from the on-site rainfall observations and from rainfall and temperature data collected over at least a 30-year period from the closest available National Weather Service, or equivalent, measuring station to the site. Daily maximum and minimum temperature data for the January 1 through April 30 monitoring period, plus for at least 30 days prior to this period, shall be obtained from the closest available weather station.

(B) Soil and site inputs for the approved groundwater simulation model, including a soils data file specific to the soil series identified, depths of soil horizons, hydraulic conductivity of each horizon, depth and spacing of drainage features and depression storage, shall be selected in accordance with procedures outlined in the user guide for the approved simulation model (e.g. DRAINMOD User's Guide, in Report No. 333 of the University of North Carolina's Water Resources Research Institute and in the Water Resources Research Institute Project No. 70175 final report). Inputs shall be based upon site-specific soil profile descriptions and at least one of the following:

(i) site-specific drain depth and spacing, when parallel drains are present, or

(ii) site-specific hydraulic conductivity measurements for each identified soil layer.

Soil and site input factors not determined by on-site measurement shall be adjusted during the model calibration process to achieve a best fit by least squares analysis of the daily observations (measured-vs.-predicted), and to achieve the best possible match between the duration of periods (measured-vs.-predicted) when the water tables are within 24 inches of the natural soil surface;

(C) The ground water simulation analysis shall be prepared and submitted to the local health department by individuals who are qualified to use the ground water simulation model by training and experience.

(2) The following method of determining depth to soil wetness condition from water surface observations in wells may be used whenever the total measured rainfall for the January 1 through April 30 monitoring period equals or exceeds the long-term (historic) January to April rainfall with a 30 percent or more recurrence frequency at the closest National Weather Service station, or equivalent, that has at least a 30-year historic rainfall record.

(A) The soil wetness condition shall be determined as the highest level that is continuously saturated for at least two consecutive days during the January through April monitoring period.

(B) If data is collected during monitoring periods which span multiple years, the highest (shallowest) level determined shall be applicable 15A NCAC 18A Rule .1956(2).

(C) The owner/applicant may subsequently choose to apply the ground water simulation method described in Subparagraph (d)(1) of this Rule to support a depth to soil wetness deeper than determined by application of this method.

(e) Notwithstanding which method is used to determine soil wetness condition from the observations of the water surface elevation in wells pursuant to Paragraph (d) of this Rule, the following conditions shall apply.

(1) Whenever the observed water surface is within 12-inches of the naturally occurring soil surface for 14 or more consecutive days during the monitoring period, the site shall be considered UNSUITABLE.

(2) Existing fill sites meeting the requirements of 15A NCAC 18A .1957(b)(2) shall be considered UNISUITABLE when the observed water surface is within 18 inches of the ground surface of the existing fill for 14 or more consecutive days.

(3) When direct observation in wells is utilized to determine soil wetness conditions on drainage modified sites, the requirements of Rule .1956(2) are also applicable.

(f) Sites where soil wetness conditions, determined pursuant to Paragraph (a) of this Rule or Paragraphs (b) through (d) of this Rule, are greater than 48 inches below the naturally occurring soil surface shall be

considered SUITABLE with respect to soil wetness. Sites where soil wetness conditions are between 36 and 48 inches below the naturally occurring soil surface shall be considered PROVISIONALLY SUITABLE with respect to soil wetness. Sites where soil wetness conditions are less than 36 inches below the naturally occurring soil surface shall be considered UNSUITABLE with respect to soil wetness.

(g) Where the site is UNSUITABLE with respect to soil wetness conditions, it may be reclassified PROVISIONALLY SUITABLE after an investigation indicates that a modified or alternative system can be installed in accordance with Rules .1956, .1957, or .1969 of this Section.

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