Chapter 2 Soils

Contents **NJ652.02**

NJ652.02 Soils

A basic understanding of soil characteristics and crop water demands is necessary to properly plan, design, and operate any type of irrigation system.

Four factors require primary concern in choosing the method of water distribution and planning the irrigation system:

(1) Water holding capacity of the soil;
(2) Water intake rate of the soil;
(3) Root system characteristics of the crop to be irrigated; and,
(4) The amount of water required by a crop at various stages of growth.

This chapter examines the soil characteristics that must be considered in developing an effective and efficient irrigation system. Chapter 3 looks at crops and how they affect the irrigation system.

(a) Water holding capacity

The water holding capacity of a soil, and the plant's use rate, will determine irrigation frequency and the amount to be applied at each irrigation. The soil acts as a reservoir, and its water supply must be replenished often enough to keep water available for the plant's withdrawal as required for optimum growth and production.

Water holding capacity of any soil is determined by its texture, structure, and the amount of organic matter it contains. The first factor may be considered constant, while the latter two may be changed and modified by the farmer through various land preparation and cultivation practices.

Soil Texture - is the relative proportions of various sized particles in the profile.

Soil Structure - is the manner in which the different sizes of mineral particles are arranged in groups and aggregated bodies within the growing depth of the soil.

Organic Matter – includes non-mineral substances that have been incorporated into the soil profile and will hold several times its weight in water.

All these factors determine the supply of water and air that can be held in a soil and the rate at which it can absorb water.

(b) Water Intake Rate

A soil's intake rate is the measure of its capacity to absorb water applied to the surface during the period of application and is determined by several factors and combinations of soil characteristics.

It is good to remember that the water intake rate of any soil can be changed by tillage practices and that it will differ from field to field, from irrigation to irrigation, and from season to season.

Generally, the amount of moisture taken in by the soil will be determined by its moisture content and structure.

Water will be taken in faster by a dry soil. The rate of intake slows as the soil profile approaches a condition of saturation.

If the soil profile is made up of layers having various textural characteristics, the intake rate will be determined by the horizon having the lowest water transmission rate, whether it be on the surface or in the lower part of the root zone.

Surface sealing, a breakdown in structure often caused by the beating action of raindrops or sprinkler drops, very often changes the intake rate. Water flowing over the surface and moving fine particles to the pores surrounding larger particles can also result in surface sealing.

Oftentimes tillage practices and use of heavy equipment on the land during the growing season will cause soil compaction, formation of a plow pan, and other conditions that change the soil's moisture absorbing ability. A buildup of salts in the soil will reduce the intake rate.

Refer to Table NJ 2.1 Soil Information for Design Purposes.

(c) Water Application Rates

The rate at which water is applied depends on the following:

a. The time required for the soil to absorb the calculated depth of application without runoff for the given conditions of soil, slope, and cover. The depth of application divided by this required time is the maximum application rate.

b. The minimum application rate that will result in reasonably uniform distribution and satisfactory efficiency under prevalent climatic conditions.

c. The desirable time for applying the required depth of water considering efficient use of available labor and the other operations on the farm.

d. The application rate adjusted to the number of operating sprinklers using the most practical layout of lateral and main lines.

In all cases, the selected water-application rate must fall somewhere between maximum and minimum values.

Table NJ 2.1 contains maximum water application rates for different soils and for clean tilled crops and sod or other close-grown crops. Actual water application rates should not exceed the maximum rates given in Table NJ 2.1.

With Center Pivot systems, application rates should not exceed soil intake rates unless soil surface storage or other considerations are made. To determine maximum application rates for center pivot and lateral move systems refer to Table NJ 2.2, Soil Intake Groups, and Table NJ 2.3, Maximum Sprinkler Application Rates.

For most overhead irrigated crops, the minimum practical rate of application to obtain reasonably good distribution and high efficiency is about 0.20 inch per hour under favorable climatic conditions. Where high temperatures and high wind velocities are common, the minimum application rate should be higher.

(d) Available Water Capacity (AWC)

Available water capacity is the soil moisture (water) that can be extracted and used by plants. It is essential to plant growth in absorbing and assimilating the plant food from the soil. Available water capacity (AWC) is the amount of water the soil holds between the upper limit, field capacity, and the lower limit, permanent wilting point.

Field Capacity is the soil moisture that exists when the maximum amount of water is held against gravity in the soil profile. It may take from two days to several weeks for all gravitational water to drain through the subsoil. For practical purposes, the field capacity of a well-drained soil can be taken as the moisture condition when the drainage losses from the root zone are minor. This will be from one to two days after full wetting, depending on soil texture. The soil water above field capacity is equally or more available to plants than that at or below field capacity. Plant roots will use some of this free water. The amount the plant will use depends upon the rapidity of drainage down to field capacity and the frequency of irrigations. Even though the physical characteristics of a soil to be irrigated have not been established by laboratory tests, the percentage of water at field capacity can be measured in the field (Refer to “Measuring Soil Water Content”, Chapter 9). These measurements should be made during the growing season on bare ground one or two days following a soaking rain, adequate irrigation, or other artificial wetting. If measurements are being attempted without the entire field soaked by rain or irrigation, consult a soil scientist for the proper procedure.

Permanent Wilting Point - is the soil moisture that exists when plants can no longer obtain sufficient moisture to satisfy transpiration requirements and the plants wilt and remains wilted.

The permanent wilting point is determined accurately by a laboratory measurement. Where the wilting percentage is not available for a given soil, it may be estimated by comparing the soil to be irrigated with a similar soil that has been characterized by laboratory procedures.

The available water capacity of the soil within the root zone can be determined by subtracting the amount of moisture remaining in the soil at the permanent wilting point from the amount held at field capacity. The total available water capacity will vary on the same soil for different plants, depending upon their rooting depth and characteristics. For irrigation water management, the total available water is calculated for a soil depth based on the rooting characteristics of the mature plant. Generally, free water is available to plants for about one to two days when soil moisture is above field capacity.

The depth to which the main body of the plant roots penetrates the soil in search of food and moisture determines the effective depth of the soil. This depth will influence the amount of water to be applied at each irrigation. Any restrictions in depth of soil which limit root growth, such as solid rock, an impervious clay layer, hardpan, low pH, gravel, coarse sand, or presence of a high water table, limit the effective soil depth. Soil pH lower than 5.5 is especially limiting to legumes such as alfalfa and soybeans. Table NJ 2.1 contains values for available water capacity for different soils and soil depth.

(e) Erosion Control

If the area under consideration is on sloping land, appropriate conservation measures are needed for protection against erosion and possible aggravation of the erosion hazard by irrigation.

(f) Information for Design Purposes

Table NJ 2.1 contains information on maximum application rates, available water capacity, and irrigation management needs of soils in New Jersey.

Column (1) - Soil Series - This column shows the soils series name.

Column (2) - Maximum Application Rate - This column is subdivided to show, in inches per hour, the maximum safe sprinkler application rate for clean-tilled crops and for sod or other close-grown crops on flat lands. Rates shown assume flat land, good soil structure and soil management. If such conditions do not exist, application rates should be reduced accordingly. For slopes over 5%, rates should be reduced by at least 25%.

Column (3) - Total Available Water Capacity - This column shows, in inches, the total available water capacity normal for the soil series for the different depths of irrigation 6, 12, 18, and 24 inches. Depths less than 24 inches are given where there is a root restricting layer at less than 24 inches. It is recognized that deep-rooted crops and fruit trees have roots at depths greater than 24 inches, the deepest increment shown, but this depth is assumed to be the practical limit for most irrigation applications.

Column (4) - Allowable Time Between Irrigations - These values were calculated on the assumptions that the design consumptive use is 0.2 inch per day and the available water capacity is allowed to be 50% depleted.

TABLE NJ 2.1 SOIL INFORMATION FOR DESIGN PURPOSES

(1) Soil Series	(2) Maximum Application Rate (Inches/Hour)		(3) Total Available Water Capacity (Inches)				(4) Allowable Time Between Irrigations (Days)			
	Clean Tilled	Sod or Close-Grown	Depth to be Irrigated				Depth to be Irrigated			
			6”	12”	18”	24”	6”	12”	18”	24”
Abbottstown	0.3	0.5	1.2	2.4	3.6	---	3	6	9	---
Adelphia	0.5	0.7	1.2	2.4.	3.6	4.8	3	6	9	12
Adrian	1.0	1.2	2.4	4.8	7.2	9.6	6	12	18	24
Alden	0.3	0.5	1.5	2.6	3.6	4.6	4	6	9	11
Alloway	0.4	0.6	1.1	2.1	3.3	4.4	3	5	8	11
Amwell	0.4	0.6	1.2	2.4	3.3	---	3	6	8	---
Annandale	0.5	0.7	0.9	1.8	2.7	3.6	2	4	7	9
Arendtsville	0.3	0.5	0.8	1.5	2.1	2.7	2	4	5	7
Arnot	0.2	0.4	1.0	1.6	2.1	---	2	4	5	---
Atherton	0.4	0.6	0.9	1.8	2.7	3.6	2	4	7	9
Athol	0.5	0.7	1.1	1.9	2.8	3.6	3	5	7	9
Atsion	1.0	1.2	0.4	0.8	1.2	1.8	1	2	3	4
Aura	0.4	0.6	0.8	1.7	2.5	3.4	2	4	6	8
Bartley	0.5	0.7	1.1	2.2	3.1	4.0	3	5	8	10
Bath	0.5	0.7	0.9	1.8	2.6	3.4	2	4	6	8
Bedington	0.5	0.7	0.8	1.6	2.4	3.2	2	4	6	8
Berks	0.5	0.7	0.6	1.2	1.6	2.0	1	3	4	5
Berryland	1.0	1.2	0.4	0.8	1.4	1.9	1	2	3	5
Biddeford	0.3	0.5	1.5	2.5	3.6	4.7	4	6	9	12
Bigapple	0.2	0.4	0.3	0.6	0.8	1.1	1	1	2	3
Birdsboro	0.4	0.6	1.0	2.0	3.0	4.0	2	5	7	10
Boonton	0.3	0.5	1.1	2.2	3.2	4.2	3	5	8	10
Bowmansville	0.4	0.6	1.1	2.2	3.2	4.3	3	5	8	11
Braceville	0.6	0.8	0.7	1.4	2.0	2.6	2	3	5	6
Broadkill	0.3	0.5	2.7	3.5	4.5	5.4	7	9	11	13
Bucks	0.4	0.6	1.3	2.6	3.8	5.0	3	6	9	12

TABLE NJ 2.1 SOIL INFORMATION FOR DESIGN PURPOSES (CONT.)

(1) 50ii Series	(2) Maximum Application Rate (Inches/Hour)		(3) Total Available Water Capacity (Inches)				(4) Allowable Time Between Irrigations (Days)			
	Clean Tilled	Sod or Close-Grown	Depth to be Irrigated				Depth to be Irrigated			
			6”	12”	18”	24”	6”	12”	18”	24”
Buddtown	0.3	0.5	1.1	2.1	3.3	4.3	3	5	8	11
Califon	0.5	0.7	1.3	2.5	3.6	4.4	3	6	9	11
Carlisle	0.5	0.7	2.4	4.8	7.2	9.6	6	12	18	24
Catden	0.1	0.3	2.4	4.7	7.2	9.6	6	12	18	24
Chalfont	0.4	0.6	1.2	2.2	3.1	3.8	3	5	8	9
Chatfield	0.2	0.4	1.7	2.4	3.2	4.0	4	6	8	10
Chenango	0.6	0.8	0.8	1.4	2.0	2.5	2	3	5	6
Chicone	0.4	0.6	1.3	2.1	3.0	3.8	3	5	8	10
Chillum	0.3	0.5	1.2	2.4	3.7	4.9	3	6	9	12
Chippewa	0.3	0.5	0.9	1.7	---	---	2	4	---	---
Cokesbury	0.4	0.6	1.3	2.7	4.0	5.0	3	7	10	12
Colemantown	0.4	0.6	1.3	2.6	3.9	5.2	3	6	to	13
Collington	0.6	0.8	0.9	1.8	2.7	3.8	2	4	7	9
Colonie	0.6	0.8	0.8	1.5	1.9	2.4	2	4	5	6
Colts Neck	0.7	0.9	1.0	1.9	2.8	3.7	2	5.	7	9
Croton	0.4	0.6	1.4	2.8	4.2	---	3	7	10	---
Delaware	0.3	0.5	1.1	2.2	3.0	3.9	3	5	7	10
Dennisville	0.3	0.5	0.7	1.3	1.9	2.5	2	3	5	6
Donlonton	0.4	0.6	1.0	2.0	3.3	4.6	2	5	8	11
Downer	0.7	0.9	0.8	1.6	2.3	3.1	2	4	6	8
Doylestown	0.4	0.6	0.9	1.7	2.5	3.2	2	4	6	8
Duffield	0.4	0.6	1.1	2.2	3.2	4.2	3	5	8	10
Dunellen	0.6	0.8	0.9	1.8	2.7	3.6	2	4	7	9
Edneyville	0.5	0.7	0.8	1.7	2.6	3.5	2	4	6	9
Elkton	0.3	0.5	1.1	2.2	3.2	4.2	3	5	8	10
Ellington	0.5	0.7	1.1	2.2	3.2	1.3	3	5	8	11
Evesboro	1.0	1.2	0.4	0.8	1.2	1.6	1	2	3	4

TABLE NJ 2.1 SOIL INFORMATION FOR DESIGN PURPOSES (CONT.)

(1) Soil Series	(2) Maximum Application Rate (inches/Hour)		(3) Total Available Water Capacity (Inches)				(4) Allowable Time Between Irrigations (Days)			
	Clean Tilled	Sod or Close-Grown	Depth to be Irrigated				Depth to be Irrigated			
			6”	12”	18”	24”	6”	12”	18”	24”
Fallsington	0.6	0.8	1.2	2.3	3.3	4.3	3	6	8	11
Farmington	0.3	0.5	1.2	1.9	2.2	2.2	3	5	6	6
Fort Mott	0.7	0.9	0.4	0.9	1.3	1.9	1	2	3	4
Fredon	0.6	0.8	1.0	1.9	2.9	3.8	2	5	7	9
Freehold	0.6	0.8	1.0	2.0	3.1	4.1	2	5	8	10
Galestown	1.0	1.2	0.4	0.8	1.3	1.7	1	2	3	4
Galloway	0.7	0.9	0.5	1.0	1.5	2.0	1	2	4	5
Galway	0.3	0.5	1.6	2.5	3.2	3.7	4	6	8	9
Glassboro	0.6	0.9	0.6	1.3	2.0	2.7	1	3	5	7
Haledon	0.3	0.5	1.1	2.2	3.2	4.2	3	5	8	10
Halsey	0.5	0.7	1.3	2.6	4.0	4.9	3	6	10	12
Hammonton	0.7	0.9	0.8	1.6	2.3	3.1	2	4	6	8
Hasbrouck	0.2	0.4	1.2	2.4	3.5	4.4	3	6	9	11
Hazen	0.5	0.7	1.0	1.9	2.6	3.3	2	5	6	8
Hazleton	0.6	0.8	0.8	1.4	2.0	2.6	2	3	5	6
Hero	0.6	0.8	1.1	2.2	3.3	4.3	3	5	8	11
Hibernia	0.4	0.6	0.8	1.6	2.3	3.1	2	4	6	8
Hinckley	0.2	0.4	0.5	1.0	1.4	1.7	1	2	3	4
Hollis	0.2	0.4	1.6	2.4	2.9	2.9	4	6	7	7
Holmdel	0.7	0.9	1.0	2.0	3.0	4.0	2	5	7	10
Holyoke	0.6	0.8	1.0	2.0	---	---	2	5	---	---
Hoosic	0.6	0.8	0.6	1.0	1.5	1.9	1	2	4	5
Horseneck	0.3	0.5	0.8	1.5	2.3	3.0	2	4	6	7
Howell	0.4	0.6	1.1	2.2	3.3	4.9	3	5	8	12
Humaquepts	0.3	0.5	0.7	1.4	2.2	2.9	2	3	5	7
Ingleside	0.5	0.7	0.8	1.6	2.6	3.6	2	4	6	9

TABLE NJ 2.1 SOIL INFORMATION FOR DESIGN PURPOSES (CONT.)

(1) Soil Series	(2) Maximum Application Rate (Inches/Hour)		(3) Total Available Water Capacity (inches)				(4) Allowable Time Between Irrigations (Days)			
	Clean Tilled	Sod or Close-Grown	Depth to be Irrigated				Depth to be Irrigated			
			6”	12”	18”	24”	6”	12”	18”	24”
Jade Run	0.5	0.7	1.3	2.6	3.9	4.9	3	6	10	12
Keansburg	0.4	0.6	1.4	2.7	4.0	5.2	3	7	10	13
Keyport	0.3	0.5	0.8	1.9	3.0	4.0	2	5	7	10
Klej	0.7	0.9	0.5	1.0	1.5	2.0	1	2	4	5
Klinesville	0.8	1.0	0.5	1.1	---	---	1	3	--	---
Knickerbocker	0.2	0.4	0.8	1.6	2.5	3.4	2	4	6	8
Kresson	0.7	0.9	1.0	2.0	3.0	4.1	2	5	7	10
Lackawanna	0.5	0.7	0.8	1.6	2.3	3.0	2	4	6	8
Lakehurst	1.0	1.2	0.4	0.8	1.2	1.6	1	2	3	4
Lakewood	1.0	1.2	0.4	0.8	1.2	1.6	1	2	3	4
Lamington	0.4	0.6	1.0	1.9	2.6	3.6	2	5	6	9
Lansdale	0.5	0.7	1.1	2.3	3.1	3.8	3	6	8	9
Lansdowne	0.4	0.6	1.4	2.7	3.8	4.9	3	7	9	12
Lawrenceville	0.4	0.6	1.2	2.3	3.2	4.2	3	6	8	10
Legore	0.7	0.9	1.0	2.0	3.1	4.1	2	5	8	10
Lehigh	0.4	0.6	1.1	2.1	3.1	4.0	3	5	8	10
Lenni	0.4	0.6	1.2	2.4	3.4	4.3	3	6	8	11
Lenior	0.4	0.6	1.0	1.9	2.7	3.6	2	5	7	9
Livingston	0.2	0.4	1.0	2.0	2.8	3.5	2	5	7	9
Lordstown	0.2	0.4	1.1	1.9	2.7	3.4	3	5	7	8
Lyons	0.4	0.6	1.2	2.5	3.3	4.0	3	6	8	10
Manahawkin	0.6	0.8	2.0	3.9	5.8	7.8	5	9	14	19
Manlius	0.3	0.5	0.8	1.5	2.2	2.6	2	4	5	6
Mannington	0.3	0.5	1.1	2.2	3.5	4.8	3	5	9	12
Marlton	0.5	0.7	1.1	2.3	3.4	4.5	3	6	8	11
Matapeake	0.4	0.6	1.2	2.4	3.6	4.9	3	6	9	12

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(1) Soil Series	(2) Maximum Application Rate (Inches/Hour)		(3) Total Available Water Capacity (Inches)				(4) Allowable Time Between Irrigations (Days)			
	Clean Tilled	Sod or Close-Grown	Depth to be Irrigated				Depth to be Irrigated			
			6”	12”	18”	24”	6”	12”	18”	24”
Matawan	0.5	0.7	0.7	1.4	2.2	2.9	2	3	5	7
Mattapex	0.4	0.6	1.1	2.2	3.2	4.4	3	5	8	11
Meckesville	0.3	0.5	0.9	1.8	2.6	3.5	2	4	6	9
Middlebury	0.5	0.7	1.0	1.9	2.8	3.7	2	5	7	9
Minoa	0.5	0.7	1.0	2.0	3.0	4.0	2	5	7	10
Mispillion	0.3	0.5	2.4	4.7	7.2	9.6	6	12	18	24
Mount Lucas	0.4	0.6	1.1	2.2	3.0	3.8	3	5	7	9
Mullica	0.5	0.7	0.9	1.9	2.8	3.8	2	5	7	9
Nanticoke	0.3	0.5	1.1	2.0	3.0	3.9	3	5	7	10
Nassau	0.5	0.7	0.7	1.3	---	---	2	3	---	---
Natchaug	0.1	0.3	2.4	4.7	7.2	9.6	6	12	18	24
Neshaminy	0.5	0.7	1.0	1.9	2.6	3.3	2	5	6	8
Netcong	0.5	0.7	0.8	1.6	2.4	3.2	2	4	6	8
Nixon	0.6	0.8	0.8	1.7	2.4	3.1	2	4	6	8
Norton	0.4	0.6	1.3	2.3	3.2	4.1	3	6	8	10
Norwich	0.4	0.6	1.0	1.9	2.5	3.0	2	5	6	7
Oquaga	0.5	0.7	0.7	1.1	1.6	2.1	2	3	4	5
Othello	0.4	0.6	1.2	2.3	3.4	4.4	3	6	8	11
Otisville	0.7	0.9	0.6	0.8	1.0	1.2	1	2	2	3
Palms	0.3	0.5	2.7	5.3	8.2	10.8	7	13	20	27
Palmyra	0.4	0.6	0.9	1.7	2.4	3.0	2	4	6	7
Parker	0.8	1.0	0.7	1.4	2.2	2.9	2	3	5	7
Parsippany	0.3	0.5	1.2	2.3	3.2	4.2	3	6	8	10
Pascack	0.4	0.6	1.0	1.7	2.6	3.3	2	4	6	8
Passaic	0.4	0.6	1.2	2.3	3.3	4.2	3	6	8	10
Pattenburg	0.5	0.7	1.0	2.0	2.9	3.8	2	5	7	9

TABLE NJ 2.1 SOIL INFORMATION FOR DESIGN PURPOSES (CONT.)

(1) Soil Series	(2) Maximum Application Rate (Inches/Hour)		(3) Total Available Water Capacity (Inches)				(4) Allowable Time Between Irrigations (Days)			
	Clean Tilled	Sod or Close Grown	Depth to be Irrigated				Depth to be Irrigated			
			6”	12”	18”	24”	6”	12”	18”	24”
Pawcatuck	0.3	0.5	1.6	3.2	4.9	6.5	4	8	12	16
Paxton	0.2	0.4	0.8	1.5	2.4	3.1	2	4	6	8
Peckmantown	0.3	0.5	1.2	2.4	3.4	4.2	3	6	8	11
Pedricktown	0.3	0.5	1.9	2.9	3.7	4.3	5	7	9	11
Pemberton	0.8	1.0	0.4	0.8	1.3	1.7	1	2	3	4
Penn	0.4	0.6	1.0	2.0	3.0	4.0	2	5	7	10
Phalanx	0.8	1.0	0.6	1.3	2.1	2.5	1	3	5	6
Plummer	0.7	0.9	0.3	0.7	1.0	1.3	1	2	2	3
Pompton	0.6	0.8	1.0	1.9	2.7	3.5	2	5	7	9
Pope	0.7	0.9	1.0	2.0	2.8	3.7	2	5	7	9
Portsmouth	0.4	0.6	0.9	1.8	2.8	3.7	2	4	7	9
Preakness	0.6	0.8	1.1	2.3	3.1	4.0	3	6	8	10
Psamments	0.2	0.4	0.2	0.5	0.7	1.0	0.5	1	2	2
Quakerbridge	0.1	0.3	1.0	1.4	1.8	2.2	2	3	4	5
Quakertown	0.4	0.6	1.3	2.6	3.7	4.8	3	6	9	12
Raritan	0.4	0.6	1.0	2.0	2.8	3.7	2	5	7	9
Raynham	0.3	0.5	1.5	2.8	4.1	5.5	4	7	10	14
Readington	0.4	0.6	1.0	1.9	2.5	3.2	2	5	6	8
Reaville	0.4	0.6.	1.0	1.9	2.5	3.0	2	5	6	7
Ridgebury	0.4	0.6	0.8	1.6	2.2	2.6	2	4	5	6
Riker	0.2	0.4	0.4	0.8	1.3	1.6	1	2	3	4
Riverhead	0.6	0.9	0.9	1.7	2.4	3.1	2	4	6	8
Rockaway	0.5	0.7	0.9	1.7	2.5	3.2	2	4	6	8
Rowland	0.4	0.6	1.0	1.9	2.9	3.8	2	5	7	9
Royce	0.4	0.6	1.2	2.4	3.6	4.8	3	6	9	12
Sassafras	0.5	0.7	0.8	1.6	2.6	3.6	2	4	6	9

TABLE NJ 2.1 SOIL INFORMATION FOR DESIGN PURPOSES (CONT.)

(1) Soil Series	(2) Maximum Application Rate (Inches/Hour)		(3) Total Available Water Capacity (Inches)				(4) Allowable Time Between Irrigations (Days)			
	Clean Tilled	Sod or Close Grown	Depth to be Irrigated				Depth to be Irrigated			
			6”	12”	18”	24”	6”	12”	18”	24”
Scio	0.5	0.7	1.2	2.4	3.6	4.7	3	6	9	12
Sharptown	0.4	0.6	1.2	2.3	3.5	4.5	3	6	9	11
Shrewsbury	0.6	0.8	1.3	2.5	3.7	4.9	3	6	9	12
Steinsburg	0.5	0.7	0.7	1.4	2.0	2.3	2	3	5	6
Swainton	0.3	0.5	0.9	1.6	2.3	3.0	2	4	6	7
Swartswood	0.6	0.8	0.6	1.2	1.8	2.4	1	3	4	6
Swedesboro	0.2	0.4	0.4	0.9	1.8	2.5	1	2	4	6
Tinton	0.7	0.9	0.4	0.8	1.3	1.7	1	2	3	4
Tioga	0.5	0.7	1.0	1.8	2.6	3.4	2	4	6	8
Transquaking	0.1	0.3	2.7	5.3	8.2	10.8	7	13	20	27
Trussum	0.4	0.6	1.2	2.5	3.8	5.0	3	6	9	12
Tunkhannock	0.2	0.4	0.7	1.3	1.9	2.5	2	3	5	6
Turbotville	0.5	0.7	1.2	2.3	3.4	4.2	3	6	8	10
Unadilla	0.6	0.8	1.2	2.3	3.4	4.6	3	6	8	11
Venango	0.3	0.5	1.1	2.2	3.2	3.7	3	5	8	9
Wallkill	0.5	0.7	1.0	2.0	3.1	4.1	2	5	8	10
Wallpack	0.4	0.6	1.0	1.8	2.5	3.1	2	4	6	8
Washington	0.5	0.7	1.1	2.2	3.3	4.4	3	5	a	11
Wassaic	0.5	0.7	0.9	1.7	2.6	3.4	2	4	6	8
Watchung	0.4	0.6	1.0	2.0	2.9	3.8	2	5	7	9
Wayland	0.4	0.6	1.2	2.3	3.4	4.5	3	6	8	11
Weeksville	0.5	0.7	1.3	2.6	4.0	5.3	3	6	10	13
Wellsboro	0.2	0.4	2.4	3.7	4.5	5.2	6	9	11	13
Westphalia	0.5	0.7	1.1	2.1	3.1	4.1	3	5	8	10
Wethersfield	0.3	0.5	0.9	1.9	2.9	3.8	2	5	7	9
Whippany	0.4	0.6	1.3	2.5	3.5	4.6	3	6	9	11

TABLE NJ 2.1 SOIL INFORMATION FOR DESIGN PURPOSES (CONT.)

(1) Soil Series	(2) Maximum Application Rate (Inches/Hour)		(3) Total Available Water Capacity (Inches)				(4) Allowable Time Between Irrigations (Days)			
	Clean Tilled	Sod or Close Grown	Depth to be Irrigated				Depth to be Irrigated			
			6”	12”	18”	24”	6”	12”	18”	24”
Whitman	0.5	0.7	1.0	2.0	2.7	3.3	2	5	7	8
Willette	0.3	0.5	2.7	5.3	8.2	10.8	7	13	20	27
Woodmansie	1.0	1.2	0.4	0.8	1.4	2.1	1	2	3	5
Woodstown	0.6	0.8	0.9	1.8	2.7	3.7	2	4	7	9
Woodster	0.4	0.6	1.1	2.2	3.2	4.1	3	5	8	10
Wurtsboro	0.4	0.6	0.8	1.6	2.3	3.0	2	4	6	7
Yalesville	0.3	0.5	1.2	2.1	3.0	3.8	3	5	7	9

Table NJ 2.2 Soil Intake Groups

Soil Texture	NRCS Intake Family
Coarse Sand, Sand, Fine Sand Loamy Sand, Loamy Coarse Sand, Loamy Fine Sand, Loamy Very Fine Sand	1
Silt Loam, Fine Sandy Loam, Very Fine Loam, Loam	0.5
Silt Loam, Sandy Clay Loam, Clay Loam, Silty Clay Loam	0.3
Sandy Clay, Silty Clay, Clay	0.1

Table NJ 2.3 Maximum sprinkler application rate (Inches/Hour) For 2000# Actual Residue at Planting

NRCS Intake Family	Design Slope Group	Maximum Application per Revolution 0.5	0.75	1	1.25
		Net Irrigation Application (Inches)			
1	0-1	4.8	4.8	4.8	4.8
	1.1-3	4.8	4.8	4.6	3.7
	3.1-5	4.8	3.2	3.2	2.8
	>5	3.1	2.6	2.2	2.1
.5	0-1	4.8	4.8	4.2	3.0
	1.1-3	4.8	3.6	2.5	2.0
	3.1-5	2.8	1.9	1.5	1.2
	>5	1.8	1.4	1.1	1.0
.3	0-1	4.8	4.8	3.0	1.8
	1.1-3	4.8	2.4	1.5	1.2
	3.1-5	1.9	1.1	0.9	0.7
	>5	1.2	0.8	0.6	0.6
.1	0-1	4.8	3.0	1.0	0.6
	1.1-3	4.8	0.8	0.5	0.4

Application rate adjustment for residue other than 2000#

With >4000# residue use 125% of above rate
With 4000# residue use 120% of above rate
With 3500# residue use 115% of above rate
With 3000# residue use 110% of above rate
With 2500# residue use 105% of above rate
With 1500# residue use 95% of above rate
With 1000# residue use 90% of above rate
With <1000# residue use 85% of above rate