15A NCAC 18A .1970 ADVANCED WASTEWATER PRETREATMENT SYSTEM

(a) ADVANCED PRE-TREATMENT SYSTEM PERFORMANCE STANDARDS: A wastewater system with a design flow of up to 3000 gallons per day approved pursuant to 15A NCAC 18A .1957(c) or .1969 that includes an advanced pretreatment component shall be designed to meet one of the effluent quality standards specified in Table VII prior to dispersal of the effluent to the soil and shall comply with the requirements of this Rule.

Table VII (Effluent Quality Standards for Advanced Pretreatment Systems)

Parameter	NSF-40	TS-I	TS-II
Carbonaceous Biochemical Oxygen Demand (CBOD)	<25 (mg/l)*	<15 (mg/l)	<10 (mg/l)
Total Suspended Solids (TSS)	<30 (mg/l)	<15 (mg/l)	<10 (mg/l)
Total Ammonia Nitrogen (NH3)		<10 (mg/1), or at least 80% removal of NH3 if influent TKN exceeds 50 mg/l	<10 (mg/l)
Total Nitrogen (TN) (TN is Total Kjeldahl Nitrogen plus Nitrate+Nitrite Nitrogen)			<20 mg/l or >60% removal
Fecal Coliform		<10,000 (colonies/100 ml)	<1,000 (colonies/100 ml)

*mg/l is milligrams per liter

System performance monitoring, site and system compliance criteria pursuant to these standards are delineated in Paragraphs (n) and (o) of this Rule. These standards or modifications to these standards may be proposed to be complied with by the designer of systems with a design flow of over 3000 gallons per day or Industrial Process Wastewater Systems and approved by the State pursuant to Rules .1938(e) or .1938(f) of this Section, respectively, when documentation is provided that the performance criteria of Rule .1946 of this Section and 15A NCAC 02L will be met.

(b) Design influent quality shall not exceed the criteria specified in Table VIII, unless the system is designed and approved by the State to handle higher strength wastewater on a product or project-specific basis.

Table VIII (Influent Quality Standards for Advanced Pretreatment Systems)

Parameter	Influent Not to Exceed (mg/l)*
Biochemical Oxygen Demand (BOD)	350
Total Suspended Solids (TSS)	200
Total Kjeldahl Nitrogen (TKN)	100
Fats, Grease and Oil (FOG)	30

*mg/l is milligrams per liter

Maximum influent characteristics in Table VIII are based upon septic tank pretreatment. The product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable, may include alternate or additional influent limitations, such as for systems designed to handle untreated wastewater and special limitations for TS-I and TS-II systems to achieve the proper amount of nitrification.

(c) The site shall be initially evaluated and classified in accordance with the rules of this Section or as otherwise specified in a system-specific approval issued pursuant to 15A NCAC 18A .1969. A ground absorption system receiving effluent from an advanced wastewater pretreatment system may be used on sites classified as SUITABLE or PROVISIONALLY SUITABLE for conventional, modified, alternative, or E & I or accepted systems in accordance with this Section. Modifications to siting and system design criteria pursuant to Paragraphs (d), (e), (f), (g), (h), (i), and (j) of this Rule shall be acceptable, as applicable.

(d) NSF-40 SYSTEMS SITING AND SIZING REQUIREMENTS: For systems approved to achieve at least NSF-40 standards and designed for no more than 1500 gallons per day, the following siting and sizing factors apply when designing the soil absorption system:

(1) Trench or bed bottom separation distances are as specified in this Subparagraph. In Table IX, "SWC" means "Soil Wetness Condition," and "USC" means an "UNSUITABLE Soil/Fill Condition," other than a SWC.

Table IX: Vertical Separation Requirements for NSF-40 Systems ≤1500 gallons per day							
Soil/System Criteria	Rule* Reference	Depth from Surface** to UNSUITABLE Soil/Fill Condition		Minimum Vertical Trench/Bed Bottom Separation Requirement			
				Gravity Distribution		Pressure Dispersal	
		Gravity Distribution	Pressure Dispersal	Depth to USC	Depth to SWC	Depth to USC	Depth to SWC
Soil Group I	Rules .1955, .1956, and .1957(a)	24- inches	24-inches	12-inches	12-inches	12-inches	12-inches
Soil Groups II-IV	Rules .1955, .1956, and .1957(a)	24-inches	24-inches	12-inches	12-inches	12-inches	12-inches
New Fill	Rule .1957(b)(1)	18-inches to USC, and 12-inches to SWC	18-inches to USC, and 12-inches to SWC	18-inches	18-inches	18-inches	12-inches
Existing Fill (≤480 gpd only)	Rule .1957(b)(2)	36-inches of Group I Fill/Soils	24-inches of Group I Fill/Soils	36-inches	36-inches	18-inches	18-inches

*Except as allowed in this Rule, all other requirements of the Rules referenced remain applicable
**Minimum depth of soil/fill required at site to permit system. Depth shall be measured from the naturally occurring soil surface or Existing Fill surface, as applicable

(2) The total drainfield trench length or bed system bottom area, as required for a ground absorption system receiving septic tank effluent, is reduced by 25 percent in soils which are Groups I or II with SUITABLE structure and clay mineralogy. No other reductions in linear footage of nitrification trench, square footage of trench bottom area or system area shall be applied when a PPBPS or innovative trenches or accepted systems are used for the absorption field, except where based on an adjusted design daily flow rate granted in accordance with 15A NCAC 18A .1949(c). Bed systems remain restricted to a design flow of 600 gallons per day or less; and

(3) The minimum horizontal setback requirements of 15A NCAC 18A .1950, .1951 and .1956(6)(g), as applicable, shall be met, except as follows:

Table X

Minimum horizontal setbacks for ground absorption systems Where NSF-40 Pretreatment System are used for ≤ 1500 gallons per day	
Land Feature or Component	NSF-40 (feet)
Streams classified as WS-1, except for saprolite	70
Waters classified as S.A., from mean high water mark	70
Other coastal waters from mean high water mark	35
Any other stream, canal, marsh or other surface waters, from normal pool elevation	35
Any Class I or Class II reservoir from normal pool elevation	70
Any permanent storm water retention pond from flood pool elevation	35
Any other lake or pond from normal pool or mean high water elevation	35

The Provisions of Subparagraphs (1), (2) and (3) of this Paragraph are also applicable to systems approved as meeting TS-I or TS-II standards pursuant to 15A NCAC 18A .1969, unless otherwise restricted elsewhere in this Rule.

(e) TS-I SYSTEMS SITING AND SIZING REQUIREMENTS: Except as allowed in Parts (3)(A) and (3)(B) of this Paragraph, when trenches are used for the drainfield in conjunction with an advanced pretreatment system meeting TS-I

standards, one and only one of the following siting, sizing or system factors pursuant to Subparagraphs (1), (2) or (3) of this Paragraph apply when designing the ground absorption component of the system. When a system is permitted pursuant to this Paragraph, the provisions of Paragraph (d) of this Rule do not apply.

(1) Trench bottom separation distances for a system with a design flow no greater than 1000 gallons per day are as specified in this Subparagraph. In Table XI, "SWC" means "Soil Wetness Condition," and "USC" means an "UNSUITABLE Soil/Fill Condition," other than a SWC.

Table XI: Vertical Separation Requirements for TS-I Systems ≤ 1000 gallons per day

Soil/System Criteria	Rule* Reference	Depth from Surface** to UNSUITABLE Soil/Fill Condition		Minimum Vertical Trench Bottom Separation Requirement			
				Gravity Distribution		Pressure Dispersal	
		Gravity Distribution	Pressure Dispersal	Depth to USC	Depth to SWC	Depth to USC	Depth to SWC
Soil Group I	Rules .1955, .1956, and .1957(a)	24- inches	18-inches	12-inches	12-inches	9-inches	9-inches
Soil Groups II-IV	Rules .1955, .1956, and .1957(a)	21-inches	18-inches	9-inches	9-inches	9-inches	9-inches
New Fill	Rule .1957(b)(1)	14-inches to USC, and 12-inches to SWC	12-inches	18-inches	14 -inches	12-inches	9-inches
Existing Fill (≤480 gpd only)	Rule .1957(b)(2)	36-inches of Group I Fill/Soil	24-inches of Group I Fill/Soil	36-inches	36-inches	12-inches	12-inches

*Except as allowed in this Rule, all other requirements of the Rules referenced remain applicable

**Minimum depth of soil/fill required at site to permit system. Depth shall be measured from the naturally occurring soil surface or Existing Fill surface, as applicable

(A) The trench bottom vertical separation distance shall not be reduced to less than 12 inches to rock or tidal water;

(B) With the exception of the reduced setbacks to drainage devices pursuant to Table XII of this Rule, the minimum horizontal setback requirements of 15A NCAC 18A .1950, .1951 and .1956(6)(g), as applicable, shall be met; and

(C) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule;

(2) The long term acceptance rate (LTAR) that would be assigned by the local health department for a ground absorption system using septic tank effluent may be increased by up to a factor of two when all of the following conditions are met:

(A) A special site evaluation is provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule, when Group III or IV soils or saprolite occur within three feet of the trench bottom or the site requires drainage of Group II or III soils or whenever the design flow exceeds 1000 gallons per day;

(B) No further reductions in linear footage of nitrification trench or system area is applied when a PPBPS or innovative trenches or accepted systems are used for the absorption field;

(C) For systems to be installed in fill, pressure dispersal (LPP or Drip distribution) is utilized; and

(D) With the exception of the reduced setbacks to drainage devices pursuant to Table XII of this Rule or as allowed pursuant to Part (3)(B) of this Paragraph, the minimum horizontal setback requirements of 15A NCAC 18A .1950, .1951, and .1956(6)(g), as applicable, are met. For systems with a design flow in excess of 1000 gallons per day, a 25-foot horizontal separation shall be maintained to the property line, unless a site-specific nitrogen migration analysis

indicates that a nitrate concentration at the property line will not exceed 10 milligrams per liter (mg/l); or

(3) The minimum horizontal setback requirements of 15A NCAC 18A .1950, .1951 and .1956(6)(g), as applicable, shall be met, except as follows for a system with a design flow not to exceed 1000 gallons per day:

Table XII

Minimum horizontal setbacks for ground absorption systems Where TS-I Pretreatment Systems are used for ≤ 1000 gallons per day	
Land Feature or Component	TS-I (feet)
Any public water supply	100
Streams classified as WS-I, except for saprolite	70
Waters classified as S-A, from mean high water mark	70
Other coastal waters, from mean high water mark	35
Any other stream, canal, marsh or other surface waters, from normal pool elevation	35
Any Class I or Class II reservoir, from normal pool elevation	70
Any permanent storm water retention pond, from flood pool elevation	35
Any other lake or pond, from normal pool or mean high water elevation	35
Any building foundation	5
Any basement	15
Any property line	10
Top of slope of embankments or cuts of 2 feet or more vertical height	15
Any water line	10
Upslope interceptor/foundation drains/diversions	7
Sideslope interceptor/foundation drains/diversions	10
Downslope interceptor/foundation drains/diversions	20
Groundwater lowering ditches or devices	20
Any swimming pool	15
Any other nitrification field (except the system repair area)	10

(A) With the exception of the reduced setbacks to drainage devices or as allowed pursuant to Part (B) of this Subparagraph, when any horizontal setbacks are proposed to be reduced pursuant to Table XII, the vertical separation modifications or LTAR increases shall not be concurrently applied pursuant to Subparagraphs (1) and (2) of this Paragraph, respectively.

(B) When an accepted system is used which allows for a 25 percent reduction in drainfield trench length, compared with a conventional trench system, for a system designed for 1000 gallons per day or less, the horizontal setback modifications in Table XII and a 25 percent trench length reduction may be concurrently applied when the site has space for an equivalently sized repair system. A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule, when Group III or IV soils or saprolite occur within three feet of the trench bottom.

(f) TS-II SYSTEMS SITING AND SIZING REQUIREMENTS: Except as allowed in Parts (3)(A) and (3)(B) of this Paragraph, when trenches are used for the drainfield in conjunction with an advanced pretreatment system meeting TS-II standards, one and only one of the following siting, sizing or system factors pursuant to Subparagraphs (1), (2) or (3) of this Paragraph apply when designing the ground absorption component of the system. When a system is permitted pursuant to this Paragraph, the provisions of Paragraph (d) of this Rule do not apply.

(1) Trench bottom separation distances for systems with a design flow no greater than 1000 gallons per day are as specified in this Subparagraph. In Table XIII, "SWC" means "Soil Wetness Condition," and "USC" means an "UNSUITABLE Soil/Fill Condition," other than a SWC.

Table XIII: Vertical Separation Requirements for TS-II Systems ≤ 1000 gallons per day							
Soil/System Criteria	Rule* Reference	Depth from Surface** to UNSUITABLE Soil/Fill Condition		Minimum Vertical Trench Bottom Separation Requirement			
				Gravity Distribution		Pressure Dispersal	
		Gravity Distribution	Pressure Dispersal	Depth to USC	Depth to SWC	Depth to USC	Depth to SWC
Soil Group I	Rules .1955, .1956, and .1957(a)	24- inches	15-inches	12-inches	12-inches	6-inches	6-inches
Soil Groups II-IV	Rules .1955, .1956, and .1957(a)	21-inches	15-inches	9-inches	9-inches	6-inches	6-inches
New Fill	Rule .1957(b)(1)	14-inches to USC, and 12-inches to SWC	12-inches	18-inches	14-inches	12-inches	9-inches
Existing Fill (≤480 gpd only)	Rule .1957(b)(2)	36-inches of Group I Fill/Soil	24-inches of Group I Fill/Soils	36-inches	36-inches	12-inches	12-inches

*Except as allowed in this Rule, all other requirements of the Rules referenced remain applicable

**Minimum depth of soil/fill required at site to permit system. Depth shall be measured from the naturally occurring soil surface or Existing Fill surface, as applicable

(A) The trench bottom vertical separation distance shall not be reduced to less than 12 inches to rock or tidal water;

(B) With the exception of the reduced setbacks to drainage devices pursuant to Table XIV of this Rule, the minimum horizontal setback requirements of 15A NCAC 18A .1950, .1951 and .1956 (6)(g), as applicable, shall be met; and

(C) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule;

(2) The long term acceptance rate (LTAR) that would be assigned by the local health department for a ground absorption system using septic tank effluent may be increased by up to a factor of 2.0 in Group II, III and IV Soils and by up to a factor of 2.5 in Group I Soils when all of the following conditions are met:

(A) A special site evaluation is provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule, when Group III or IV Soils or saprolite occur within three feet of the trench bottom or the site requires drainage of Group II or III soils, or whenever the design flow exceeds 1000 gallons per day;

(B) No further reductions in linear footage of nitrification trench or system area are applied when a PPBPS or innovative trenches or accepted systems are used for the absorption field;

(C) For systems to be installed in fill, a pressure dispersal system (LPP or Drip distribution) is utilized;

(D) With the exception of the reduced setbacks to drainage devices pursuant to Table XIV of this Rule or as allowed pursuant to Part (3)(B) of this Paragraph, the minimum horizontal setback requirements of 15A NCAC 18A .1950, .1951 and .1956 (6)(g), as applicable, are met;

(E) For the LTAR to be increased by a factor above 2.0 (up to 2.5) for a system designed for 1000 gallons per day, or less, there is at least 36 inches of Group I Soils from the naturally occurring soil surface, the depth to a soil wetness condition below the naturally occurring soil surface is at least 24 inches, a pressure dispersal system (LPP or Drip) is utilized, and there is a 100-percent repair area; and

(F) For the LTAR to be increased by a factor above 2.0 (up to 2.5) for a system designed for greater than 1000 gallons per day, there is at least 48 inches of Group I Soils from the naturally occurring soil surface, the depth to a soil wetness condition below the naturally

occurring soil surface is at least 30 inches, a pressure dispersal system (LPP or Drip) is utilized, and there is a 100-percent repair area; or

(3) The minimum horizontal setback requirements of 15A NCAC 18A .1950, .1951 and .1956(6)(g), as applicable, shall be met, except as follows for a system with a design flow not to exceed 1000 gallons per day:

Table XIV: Minimum horizontal setbacks for ground absorption systems Where TS-II Pretreatment Systems are used for ≤ 1000 gallons per day	
Land Feature or Component	TS-II (feet)
Any public water supply	100
Streams classified as WS-I, except for saprolite	50
Waters classified as S-A, from mean high water mark	50
Other coastal waters, from mean high water mark	25
Any other stream, canal, marsh or other surface waters, from normal pool elevation	25
Any Class I or Class II reservoir, from normal pool elevation	50
Any permanent storm water retention pond, from flood pool elevation	25
Any other lake or pond, from normal pool or mean high water elevation	25
Any building foundation	5
Any basement	15
Any property line	10
Top of slope of embankments or cuts of 2 feet or more vertical height	15
Any water line	10
Upslope interceptor/foundation drains/diversions	7
Sideslope interceptor/foundation drains/diversions	10
Downslope interceptor/foundation drains/diversions	15
Groundwater lowering ditches and devices	15
Any swimming pool	15
Any other nitrification field (except the system repair area)	10

(A) With the exception of the reduced setbacks to drainage devices or as allowed pursuant to Part (B) of this Subparagraph, when any horizontal setbacks are proposed to be reduced pursuant to Table XIV, the vertical separation modifications or LTAR increases shall not be concurrently applied pursuant to Subparagraphs (1) and (2) of this Paragraph, respectively.

(B) If the horizontal setbacks for a TS-II system are only proposed to be reduced to the extent allowed for a TS-I system (Table XII), for a system designed for 1000 gallons per day or less, a 25 percent trench length reduction may be concurrently applied, compared to the length required for any type of trench system receiving septic tank effluent, when the site has space for an equivalently sized repair system. A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule when Group III or IV soils or saprolite occur within three feet of the trench bottom. No further reductions in linear footage of nitrification trench or system area shall be applied when a PPBPS or innovative trenches or accepted systems are used for the absorption field.

(g) ARTIFICAL DRAINAGE SYSTEMS which include a TS-I or TS-II pretreatment system may be used when soils are Group I, II or III with SUITABLE clay mineralogy, and all other soil and site factors are SUITABLE or PROVISIONALLY SUITABLE or when a groundwater lowering system is proposed to meet the requirements for a fill system, provided all other soil and site factors are met pursuant to 15A NCAC 18A .1957(b)(i). The following conditions shall be met:

(1) The drainage system shall meet the requirements of Rule .1956(2)(c), (d) and (e) of this Section;

(2) The provisions for LTAR or Horizontal Setbacks pursuant to Paragraphs (e) or (f) of this Rule for TS-I or TS-II systems, respectively, shall also apply to Artificial Drainage Systems. However, there shall be no vertical separation modifications pursuant to Subparagraph (e)(1) or (f)(1) of this Rule from as specified elsewhere in the rules of this Section;

(3) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule, when there are Group III soils at any depth above the proposed drainage system invert elevation, when a groundwater lowering system is proposed for a fill system, or whenever the system is designed for greater than 1000 gallons per day; and

(4) Plans and specifications are provided to the local health department of the drainage system pursuant to 15A NCAC 18A .1938(c).

(h) SAPROLITE SYSTEMS which include a TS-I or TS-II pretreatment system may be used for systems with a design flow not to exceed 1000 gallons per day when the following conditions are met:

(1) The requirements of Rule .1956(6) of this Section shall be met, except where modifications are allowed in this Paragraph.

(2) Allowable saprolite textures include sandy clay loam in addition to sand, loamy sand, sandy loam, loam, or silt loam.

(3) Maximum trench depth is five feet.

(4) The provisions for LTAR or Horizontal Setback modifications as allowed in Paragraphs (e) or (f) of this Rule for TS-I or TS-II systems, respectively, shall also apply to Saprolite Systems. However, there shall be no vertical separation modifications from as specified elsewhere in the Rules of this Section;

(5) For systems installed in saprolite with sandy clay loam texture, the maximum LTAR for gravity trenches shall be 0.2 gallons per day per square foot and 0.1 gallons per day per square foot for pressure dispersal (LPP or Drip) systems and

(6) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule.

(i) BED GROUND ABSORPTION SYSTEMS may be used in conjunction with a TS-I or TS-II system as specified in the system approval on sites with a design flow not to exceed 1000 gallons per day under the following circumstances:

(1) Bed Systems designed for 1000 gallons per day or less shall be subject to the siting and system criteria of this Subparagraph. In Table XV, "SWC" means "Soil Wetness Condition," and "USC" means an "UNSUITABLE Soil/Fill Condition," other than a SWC.

Table XV: Vertical Separation Requirements for TS-I and TS-II Bed Systems Designed for ≤1000 Gallons Per Day

Soils/System Criteria to Permit System	Allowable Adjustments to Soil Criteria to Permit System	Depth from Surface* to Soil Wetness Condition	Minimum Vertical Bed Bottom Separation Requirement	
			Depth to USC	Depth to SWC
SUITABLE or PROVISIONALLY SUITABLE Soils, 30-inches Group I or II Soils from naturally occurring soil surface, and slope≤2%	can increase allowable slope from ≤2% to ≤10% based on hydraulic assessment	36 -inches	24-inches	12-inches
36-inches of Group I Soils from naturally occurring soil surface, and slope≤2%	can reduce from 36 to 18-inches of Group I Soils based on hydraulic assessment, and/or b. can increase allowable slope from ≤2% to ≤10% based on hydraulic assessment	12-inches	12-inches	12-inches
24-inches of Group I Existing Fill meeting Rule .1957(b)(2)(A),(B), and (C), and only when design flow ≤480 gallons per day	No Adjustments Applicable	18-inches	18-inches	18-inches

*Minimum depth of soil/fill required at site to permit system. Depth shall be measured from the naturally occurring soil surface or Existing Fill surface, as applicable

(A) Vertical separation requirements may be met by adding additional SUITABLE Group I fill material, but shall not be met with the use of a groundwater lowering system.

(B) The hydraulic assessment in Table XV shall be completed pursuant to Paragraph (p) of this Rule, and shall demonstrate that effluent will not discharge to the ground surface and the required separation distance to soil wetness can be maintained.

(C) When effluent is distributed to the bed by a pump or siphon and the bed is not located directly beneath the pretreatment component, effluent shall be uniformly distributed by a pressure dispersal system (LPP or Drip).

(2) Horizontal separation distances specified in Subparagraphs (e)(3) and (f)(3) of this Rule are applicable for systems receiving TS-I or TS-II effluent, respectively. The setbacks shall be measured from the nearest edge of the gravel bed, except for fill systems. For fill systems, the setbacks shall be measured from a point five feet from the nearest edge of the gravel bed sidewall, or from the projected toe of the side slope of the fill that is required to meet soil and site limitations, whichever is greater. The system shall be considered to be a fill system only if the gravel bed bottom is installed less than six inches below the naturally occurring soil surface. For fill systems, the requirements of Rule .1957(b) of this Section, for the side slope of the fill shall be met, as determined beginning at a point six-inches above the top edge of the gravel bed.

(3) The minimum number of square feet of bottom area shall be determined by dividing the design daily sewage flow by the LTAR, determined in accordance with Rule .1955 of this Section. When the bed is installed in fill material, the LTAR shall not exceed 1.0 gallons per day per square foot. The minimum bed size may be reduced as follows:

(A) The minimum bed size may be reduced by 25 percent, unless the bed is installed in existing fill, in which case the bed area shall not be reduced; or

(B) For sites that have Group I Soil in the first 36 inches of naturally occurring soil and no soil wetness condition exists within the first 30 inches below the naturally occurring soil surface, the minimum bed size may be reduced by 40 percent when a pressure dispersal system is utilized to distribute flow uniformly throughout the bed area; a timer controller is used to distribute flow evenly over a 24-hour period; and the system is designed and approved to meet TS-II performance standards. Furthermore, the repair area exemption in 15A NCAC 18A .1945(c) does not apply when the bed size is reduced by more than 25 percent pursuant to this Part.

With the exception of reduced setbacks to drainage devices (Tables XII or XIV), whenever the minimum bed size is reduced pursuant to Parts (A) or (B) of this Subparagraph, the minimum horizontal setbacks as specified in Rules. 1950, .1951 and .1956(6)(g) of this Section, as applicable, shall apply and with no reductions applied.

(j) BED GROUND ABSORPTION SYSTEMS may be used in conjunction with a TS-I or TS-II system as specified in the system approval on sites with a design flow greater than 1000 gallons per day not to exceed 3000 gallons per day under the following circumstances:

(1) Bed Systems designed for greater than 1000 gallons per day but not exceeding 3000 gallons per day shall be subject to the siting and system criteria of this Subparagraph.

Table XVI: Vertical Separation Requirements for TS-I and TS-II Bed Systems Designed for >1000 to ≤3000 Gallons Per Day

Soils/System Criteria	Depth from Surface* to Soil Wetness Condition	Minimum Vertical Bed Bottom Separation Requirement	
		Depth to Soil Wetness Condition	Allowable Adjustment in Depth to Soil Wetness Condition
54-inches of Group I Soils from naturally occurring soil surface	48-inches	24-inches	Can reduce from 24-inches to 12-inches in naturally occurring soil, or to 18-inches for fill systems based on groundwater mounding analysis

*Minimum depth required at site to permit system shall be measured from the naturally occurring soil surface.

(A) Vertical separation requirements may be met by adding additional SUITABLE Group I fill material, but shall not be met with the use of a groundwater lowering system.

(B) A special site evaluation shall be provided to the local health department on behalf of the owner, pursuant to Paragraph (p) of this Rule. The groundwater mounding analysis in Table XVI must demonstrate that required vertical separations between bed bottom and a soil wetness condition shall be maintained after accounting for projected groundwater mounding.

(C) Two or more equally sized beds shall be utilized for any TS-I system designed for over 1000 gallons per day, or for any TS-II system designed for over 1500 gallons per day. When two beds are used, the minimum separation between beds shall be 20 feet, and when three or more beds are used, the minimum separation between beds shall be 10 feet. Effluent shall be distributed to the beds by a pump and timer control system to distribute flow evenly over a 24-hour period.

(D) When the system is designed for greater than 1500 gallons per day, the beds shall be located in an area separate from the pretreatment components.

(E) Whenever the beds are not located directly beneath the pretreatment components, effluent shall be uniformly distributed by a pressure dispersal system (LPP or Drip).

(2) Horizontal separation distances specified in Rules .1950(a), .1951, or .1956(6)(g) of this Section shall apply without reduction for bed systems designed for greater than 1000 gallons per day. Furthermore, a 25-foot horizontal separation distance shall be maintained from the bed to the property line and the bed, unless a site-specific nitrogen migration analysis indicates that the nitrate concentration at the property line will not exceed 10 milligrams per liter (mg/l), or TS-II effluent is produced by the approved system.

(3) The minimum number of square feet of bed bottom area shall be determined by dividing the design daily sewage flow by the LTAR, determined in accordance with Rule .1955 of this Section. When the bed is installed in fill material, the LTAR shall not exceed 1.0 gallons per day per square foot. The minimum bed size may be reduced as follows:

(A) The minimum bed size may be reduced by 25 percent, unless the bed is installed in existing fill, in which case the bed area shall not be reduced; or

(B) For sites that have Group I Soil in the first 54 inches below the naturally occurring soil surface and no soil wetness condition exists within the first 36 inches below the naturally occurring soil surface, the minimum bed size may be reduced by 40 percent when a pressure dispersal system (LPP or Drip) is utilized to distribute flow uniformly throughout the bed area; a timer controller is used to distribute flow evenly over a 24-hour period; the system is designed and approved to meet TS-II performance standards; and there shall be a 100-percent repair area.

(k) DESIGN:

(1) Special system design requirements shall be as prescribed in the product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable;

(2) Provisions shall be made to allow for the influent to and effluent from the system to be sampled while the system is operational; and

(3) The system design shall include a means to measure and record daily wastewater flows. The recording device shall provide a means for determining at least the last 30 days of wastewater flow to the system.

(l) INSTALLATION: Pre-treatment systems shall be installed according to the manufacturer's installation specifications and system-specific installation conditions prescribed in the product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable, by a manufacturer-authorized installer. Installation and construction specifications for the ground absorption system shall be in accordance with this Section and site-specific conditions as specified in the Authorization to Construct.

(m) OPERATION AND MAINTENANCE: Maintenance, as specified in the product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable, shall be performed by the certified operator pursuant to 15A NCAC 18A .1961 and as specified in the product approval. The following provisions apply to the Operation and Maintenance of Advanced Pretreatment Systems:

(1) For systems installed after July 1, 2006, the manufacturer of a proprietary advanced pretreatment system shall provide for the ongoing operation and maintenance of its systems. The manufacturer shall

make available to the owner an operation and maintenance contract that meets the management entity requirements for the system pursuant to 15A NCAC 18A .1961. The contract shall be renewable and the contract term shall be for a minimum of one year.

(2) For systems installed prior to July 1, 2006, the manufacturer shall provide an optional renewable yearly operation and maintenance contract with the owner that fulfills the management entity requirements for the system pursuant to 15A NCAC 18A .1961.

(3) Prior to the issuance or re-issuance of an Operation Permit for a proprietary advanced pretreatment system after July 1, 2006, the owner shall provide to the health department documentation that a contract for operation and maintenance of the system is in place with either the manufacturer, manufacturer's representative, or with a certified operator authorized in writing by the manufacturer or manufacturer's representative to operate the system.

(4) The manufacturer shall notify the local health department and the State when the owner chooses to not renew an operation and maintenance contract executed pursuant to Subparagraphs (1) or (2) of this Paragraph.

(n) SYSTEM PERFORMANCE: The performance of each system shall be monitored by the certified wastewater treatment facility operator (ORC). A performance report shall be submitted annually to the local health department by the ORC. Type of monitoring and monitoring frequency shall vary by type of approval, the designated performance standard, system design flow, and history of system performance as follows:

(1) Each system shall be visually inspected by the ORC at least annually using a procedure proposed by the manufacturer and approved by the state as part of the product's RWTS, Experimental, Controlled Demonstration, Innovative or Accepted System approval, as applicable.

(2) The 7-day and 30-day influent wastewater flow from the facility to the system prior to a monitoring visit shall be measured by the ORC using the recording device delineated in Subparagraph (k)(3) of this Rule, or by an alternate approved means. For systems serving Vacation Rentals subject to the North Carolina Vacation Rental Act, G.S. 42A, this visit shall be scheduled during the seasonal high use period and shall be coincident with any required water quality sampling. For existing systems where it is not feasible to directly obtain the past 7-day and 30-day influent wastewater flow data, wastewater usage during the 7 to 30 day period prior to the monitoring visit shall be estimated by using either elapsed time clock readings when an effluent pump is present, water meter readings, or as otherwise specified in the product or site-specific system approval.

(3) Effluent from an approved Controlled Demonstration, RWTS and Innovative System shall be sampled prior to disposal in the absorption field as follows:

(A) A Controlled Demonstration system shall be sampled quarterly for all applicable performance parameters until the system receives Innovative approval, unless the product specific approval includes an alternate monitoring schedule proposed by the manufacturer and approved by the State;

(B) Sites with an approved RWTS or Innovative system shall be grab or composite sampled annually for all applicable performance parameters (semi-annually when the design flow is 1500 to 3000 gallons per day). After two years of data have been collected from at least 50 separate sites that indicate compliant system performance, the number of parameters sampled for TS-I and TS-II Systems may be reduced by 50 percent. An alternative monitoring schedule may be proposed by the manufacturer and approved by the State when determined to provide an equal or more reliable indication of system performance compliance; or

(C) Sites with a design flow up to 1500 gallons per day, which are being managed under an on-going maintenance and operation contract between the owner and the system manufacturer or ORC authorized by the manufacturer, may alternatively be sampled randomly if the manufacturer chooses to comply with the performance audit requirements as stipulated in 15A NCAC 18A .1969(h)(8), when there are at least 10 operational systems covered under such contracts. The manufacturer may also choose to include other existing sites in the performance audit required prior to obtaining accepted system status. Notwithstanding this provision for random sampling, sampling at any other site not being sampled during the audit may be determined to be necessary by the ORC during the visual inspection of the system pursuant to Subparagraph (1) of this Paragraph.

An influent sample to the pre-treatment system (e.g., septic tank effluent) shall be taken concurrently whenever the system effluent is sampled and analyzed for at least BOD and TKN. Effluent shall be re-

sampled within 15 days when laboratory results indicate non-compliance with Part (o)(1)(C) of this Rule and analyzed at least for the non-compliant parameter(s), unless an alternate re-sampling schedule is required for a site included in a performance audit. When re-sampling, an influent sample shall be collected concurrently and analyzed for the corresponding parameter.

(4) An Accepted System with a design flow up to 1500 gallons per day shall comply with Subparagraphs (n)(1) and (n)(2) of this Rule and 15A NCAC 18A .1969(h)(9). Routine sampling of individual sites shall no longer be carried out, unless determined to be necessary during the visual inspection of the system pursuant to Subparagraph (n)(1) of this Rule or if required as part of an enforcement action by the local health department or the State. If sampling is determined to be necessary, an alternative monitoring schedule may be proposed by the manufacturer or the State and approved by the Commission when the system is granted accepted Status.

(5) All samples shall be collected, preserved, transported and analyzed in compliance with 40 CFR 136. The manufacturer shall demonstrate that the system can be sampled in compliance with 40 CFR 136 and that the method for system sampling accurately monitors system performance. Samples shall be analyzed by a state certified laboratory. Samples shall be analyzed for the applicable parameters. The sample collector shall maintain a complete chain of custody from sample collection to analysis for each sample collected. The results of all analyses for each sample shall be reported by the certified wastewater laboratory directly to the ORC and simultaneously to the health department and the state. Repeat sampling at any site shall be performed as required in the system approval, approved performance audit, this Rule, or as otherwise directed by the health department or state as part of an enforcement action. The owner or manufacturer or manufacturer's representative may also re-sample a system to verify or refute sample results, as long as the results of all samples collected are similarly reported.

(o) SITE AND SYSTEM COMPLIANCE: Compliance with the performance standards shall be determined as follows:

(1) An individual advanced pretreatment system at a single site shall be considered to be in compliance when:

(A) The annual visual inspection indicates compliant conditions as specified in the visual inspection procedure approved pursuant to Subparagraph (n)(1) of this Rule;

(B) The 7-day inflow does not exceed 1.3 times the design daily flow and the 30-day inflow does not exceed the design daily flow;

(C) Influent wastewater to the system does not exceed the requirements in Table VIII, at sites where influent sampling is required; and

(D) When annual effluent sampling is required, sample value is no more than two times (2.5 times for fecal coliform) the designated standard for one or more parameters in Table VII, even after re-sampling; or if four or more effluent samples are collected on different operating days over a one year period, the arithmetic mean (geometric mean for fecal coliform) of the data does not exceed the designated standard for one or more parameters in Table VII, even when excluding from the mean a statistical outlier or an instance of non-compliance that has been remedied by corrective maintenance.

(2) An approved system shall be considered in compliance when:

(A) The arithmetic mean (geometric mean for fecal coliform) of all data collected from all sites during a given one-year period, or from a representative sampling of sites in the state (excluding statistical outliers) does not exceed the designated standard;

(B) No more than 20 percent of the sites from which the data were collected in Part (o)(2)(A) of this Rule shall exceed the designated standard for one or more parameters (an individual non-compliant site shall be reclassified "compliant" if found to meet the designated standard upon re-sampling within 30 days); and

(C) No more than 10 percent of samples collected from all sites during a given one-year period or from a representative sampling of sites in the state shall exceed two times the designated standard for one or more parameters (with the exception of fecal coliform, for which a 2.5 multiplication factor shall be used).

When determining compliance with system performance standards set forth in Parts (A), (B) and (C) of this Subparagraph, data shall be excluded from individual advanced pretreatment systems at single sites found to be out of compliance pursuant to Parts (1)(B) and (1)(C) of this Paragraph and from individual sites that have otherwise been documented to have been subjected to significant abuse, as

specified by the manufacturer in its operation and maintenance manual which has been provided to the system owner.

(3) When a site or system is found to be out of compliance the following actions shall occur:

(A) The Operator (ORC) shall inform the owner and the local health department of an individual system at a single site found to be out of compliance, including when wastewater flow is greater than the system design flow rate; influent wastewater quality exceeds the standards set forth in Table VII; or maintenance/repairs are found to be needed as identified during system inspection. This notice shall identify non-compliant condition(s), explain potential impacts, and suggest methods to bring the system or use back into compliance.

(B) The local health department shall issue a notice of violation to the owner of an individual system at a single site found to be out of compliance when, the system is found to be malfunctioning as determined during the visual inspection specified in Part (1)(A) of Paragraph (o) of this Rule; wastewater flow exceeds wastewater flow standards in Part (1)(B) of this Paragraph; or the effluent sample results are out of compliance as specified in Parts (1)(D) or (1)(E) of this Paragraph, even upon re-sampling. The notice shall identify the violations and steps necessary to remedy the problems, including modification of the system, establish time frame to achieve compliance, and other follow-up requirements and set forth further enforcement possibilities if compliance is not achieved.

(C) The state shall issue a notice of violation to the manufacturer of a system found to be out of compliance as specified in Subparagraph (2) of this Paragraph. The notice shall identify the violations and steps necessary to remedy the problems, including modification of the system, establish time frame to achieve compliance, and other follow-up requirements and set forth further enforcement possibilities if compliance is not achieved which may include action on the system's approval status pursuant to applicable Laws and Rules.

(D) The local health department shall issue the manufacturer or manufacturer's representative an intent to suspend issuance of new construction authorizations for new systems of a particular manufacturer that has installed and has in operation at least 10 systems in the county if more than 10 percent of the manufacturer's systems installed in the county are found to be malfunctioning during the visual inspection specified in Subparagraph (n)(1) of this Rule or in violation of effluent performance standards as specified in Parts (1)(D) or (1)(E) of this Paragraph in any single year excluding single sites found to be out of compliance pursuant to Parts (1)(B) or (1)(C) of this Paragraph, sites where the owner has not maintained a contract for operation and maintenance of the system pursuant to Rule .1961 of this Section, and individual sites that have otherwise been documented to have been subjected to significant abuse, as specified by the manufacturer in its operation and maintenance manual which has been provided to the system owner.

(E) The local health department shall issue the manufacturer or manufacturer's representative an intent to suspend issuance of new construction authorizations for new systems of a particular manufacturer that has installed and has in operation at least 10 systems in the county if more than five percent of the manufacturer's systems installed in the county that are being managed under an ongoing maintenance and operation contract between the owner and the system manufacturer or ORC authorized by the manufacturer have required operation and maintenance activities under the control of the manufacturer that have not been completed for the last reported year.

(F) The Operator (ORC) shall submit all individual system compliance data and all operations and maintenance records to the local health department. The local health department shall convey information on individual system compliance to the State on at least an annual basis. Action by a local health department on approval of a system in a county does not preclude action by the State on the system's approval status, pursuant to applicable Laws and Rules.

(G) Notwithstanding the activities delineated for dealing with non-compliance elsewhere in Subparagraph (3) of this Paragraph, nothing shall preclude the local health department or State from using any available remedy when an imminent health hazard is determined to exist, in accordance with applicable Laws and Rules.

(p) RESPONSIBILITIES AND PERMITTING PROCEDURES: Special responsibilities and permitting procedures for pre-treatment systems shall be as prescribed in the system approval and applicable rules of this Section. The following

summarize the conditions requiring a special evaluation of a site where the ground absorption system is to be preceded by an advanced pretreatment system, and what such an evaluation shall include:

(1) Prior to the issuance of the Improvement Permit at a site where the drainfield is to be preceded by an advanced pre-treatment system, an evaluation shall be provided to the local health department on behalf of the owner when any of the following conditions are applicable:

(A) the initial vertical separation siting criteria or vertical separation distances for trench bottoms are proposed to be reduced in accordance with Subparagraphs (e)(1) or (f)(1) of this Rule,

(B) drainage is proposed for Group III soils or a groundwater lowering system is proposed to be used in conjunction with a fill system in accordance with Paragraph (g) of this Rule,

(C) sandy clay loam texture saprolite is proposed to be used in accordance with Paragraph (h) of this Rule,

(D) the LTAR is proposed to be increased on a site with Group III or IV soils within three feet of the proposed trench bottom or on a site where drainage of Group II or III soils is proposed, or on any site when the design flow exceeds 1000 gallons per day, in accordance with Subparagraphs (e)(2) or (f)(2) of this Rule, or

(E) for a bed system with flow exceeding 1000 gallons per day in accordance with Paragraph (j) of this Rule, or if required for other bed systems in accordance with Subparagraph (i)(1) of this Rule.

(2) When a special site evaluation is required pursuant to Subparagraph (1) of this Paragraph, it shall contain the following information, as applicable. This evaluation shall be prepared by a person or persons who are licensed or registered to consult, investigate, or evaluate soil and rock characteristics, hydraulic conductivity, lateral flow, groundwater hydrology and nutrient transport, if required pursuant to G.S. 89F or 89E. This evaluation shall be provided to the local health department in a written report sealed, signed and dated by any licensed or registered professionals who contributed to the report.

(A) descriptions of soil profiles and soil morphological conditions to a depth of at least three feet below the proposed trench or bed bottom and description of landscape setting in the initial system area and repair area. Descriptions shall be in accordance with the methodology and standards in the *Field Book for Describing and Sampling Soils*, NRCS, USDA, which is hereby incorporated by reference, including any subsequent amendments and editions. Copies of the Field Book may be inspected at the Environmental Health Section Raleigh Office, 2728 Capital Boulevard, Raleigh, 27609, and copies may be downloaded at no cost from the internet at: http://soils.usda.gov/technical/fieldbook/;

(B) field measurements of the depth and thickness of each of the soil horizons;

(C) recommended location and depth for placement of the trenches or beds and the recommended LTAR;

(D) hydraulic assessment, based on site-specific information, substantiating the projected effectiveness of system performance. This shall include supporting documentation that indicates the treated effluent applied at the proposed LTAR will not result in the discharge of effluent to the surface of the ground after the system is installed and operated within design parameters; that all required vertical separation distances shall be maintained; and justification for any proposed drainage systems or other site modifications. This hydraulic assessment shall require in-situ tests of saturated hydraulic conductivity, groundwater mounding analysis, lateral flow analysis, and monitoring or modeling of existing or projected depth to a soil wetness condition based upon procedures of Rule .1942 of this Section, as needed;

(E) site-specific nitrogen migration analysis, if needed pursuant to Subparagraphs (e)(2) or (j)(2) of this Rule; and

(F) proposed site-specific requirements for system design, installation, site preparation, modifications, final landscaping and vegetative cover.

History Note: *Authority G.S. 130A-334; 130A-335; 130A-336; 130A-337; 130A-340; 130A-342; 130A-343;*
Eff. June 1, 2006;
Amended Eff. October 1, 2011.