NORTH CAROLINA DEPARTMENT
OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL HEALTH
ON-SITE WATER PROTECTION SECTION

INNOVATIVE WASTEWATER SYSTEM APPROVAL

INNOVATIVE WASTEWATER SYSTEM NO: IWWS-93-1-R6B

ISSUED TO: Robert B. Mayer, P.E.
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FOR: American Perc-Rite® Subsurface Drip System, Aerobic

APPROVAL DATE: October 22, 1993
February 9, 1996
March 7, 2001
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November 1, 2005
June 29, 2006
February 4, 2010

In accordance with 15A NCAC 18A .1969, an application by Robert B. Mayer, P.E., American Manufacturing Company, Inc. of Elkwood, VA, for modification to the approval of their subsurface wastewater drip system has been reviewed, and the system has been found to meet the standards of an innovative system when the following conditions for use, monitoring and operation are met:

I. General

A. System Description

1. Collection system — Conventional gravity, pressure sewer fed by grinder pumps or individual septic tank effluent pumping units.
2. Pretreatment — Approved Residential Wastewater Treatment System (RWTS) meeting at least NSF-40 standards, approved TS-I or TS-II advanced wastewater pretreatment system, or approved equal.
3. Filtration — Automatic, self-cleaning filter(s) (appropriately sized Arkal disc filters, or approved equal) capable of screening particles larger than or equal to 115 microns.
4. Manifold — Common line (Schedule 40 PVC) to connect all the dripline in a single field or zone at the start of the field or zone (supply end) and the distal ends of the dripline (flush end).
5. Air vent — Air vacuum breaker(s) installed at the high point(s) of each drip field to allow air to be rapidly evacuated from the tubing during pressurization and to keep soil from being aspirated into the drip emitters due to back siphoning or back pressure after the pumps shut off.
6. Dripline — NETAFIM PC dripline with pressure-compensating emitters spaced uniformly in the tubing (12, 18, or 24 inch centers). The dripline contains interior emitters and the outside layer is purple colored for easy identification. The emitters are

impregnated with a biocide to inhibit slime accumulations.

7. Drip lateral — Entire length of dripline, from the connection to the supply manifold to the connection to the return manifold.
8. Drip run — Single section, on contour, of a drip lateral between manifolds, a manifold and a loop, or between two loops. Multiple parallel drip runs may be used within a single drip lateral.
9. Field flushing valve — An automatic valve used to enable accumulated debris and sediment to be flushed from the dripline back to the pretreatment unit.
10. System Controls — Control/software package controlling all functions, including filter flushing, system dosing and flushing, and audible/visible alarms. Telemetry must be included for systems with a design daily flow larger than 600 gallons per day (gpd). Flow monitoring and self diagnostics capabilities must be included for systems with a design daily flow larger than 3,000 gpd.
11. Documentation — Current schematics, drawings and manuals must be filed with NCDENR for all major components utilized under this approval, for posting on the On-Site Water Protection Section Webpage.

B. Scope
   1. This Innovative Approval is for subsurface drip systems receiving effluent from an approved advanced wastewater pretreatment system designed to meet NSF-40, TS-I or TS-II standards, pursuant to Rule 15A NCAC 18A .1970, or more stringent standards.
   2. For systems with a daily design flow of up to 1,500 gallons per day (gpd), pretreatment may be by an RWTS designed to meet NSF-40 Standards, approved pursuant to Rule .1957(c), or by an E&I system designed to meet NSF-40, TS-I, TS-II or more stringent standards, approved pursuant to Rule .1969.
   3. For systems with a daily design flow greater than 1,500 gpd and up to 3,000 gpd, pretreatment may be by an I&E system designed to meet NSF-40, TS-I, TS-II or more stringent standards, approved pursuant to Rule .1969.
   4. Advanced pretreatment systems which have not received prior approval by the State may be proposed for use when designed by a Professional Engineer to meet applicable standards and submitted to the State for review and approval on a case by case basis. This would include the use of multiple RWTS for a system with a daily design flow greater than 1,000 gpd or as otherwise specified in the RWTS approval.
   5. State review of engineering plans for the system, including the advanced pretreatment components, are required for all systems with a daily design flow greater than 3,000 gpd, and for all systems receiving industrial process wastewater, in accordance with State Review/Approval Processes (Rule 15A NCAC 18A .1938).

C. System siting, sizing and horizontal setbacks shall be in accordance with this Approval. Where there are conflicts between the requirements of this approval and the June 1, 2006 version of Rule .1970, the requirements of this approval shall be applicable.

D. Consideration may be given to modifying the siting, sizing, horizontal setback or installation requirements delineated herein for conjunctive use reclaimed water systems, where all of the following conditions are met:
   1. The pretreatment system shall meet a reclaimed water effluent standard pursuant to Rule 15A NCAC 02T .0900.
   2. The conjunctive system drip dispersal area is separate from the required drainfield area and required repair area for the system, and shall be designed and operated to utilize the reclaimed water in a beneficial manner.
   3. Siting, sizing, setbacks, installation, and management requirements shall be proposed by the system designer and approved by the State on a case by case basis.

II. Siting Criteria

The Aerobic American Perc-Rite® subsurface drip system may be utilized when one or more of the conditions set

forth in Sections II.A through I of this approval are met, as applicable. Summary tables of siting criteria, including when a special site evaluation (Section IV) is required, are included in Appendix A.

A. An aerobic subsurface drip system may be utilized on sites that meet one of the following criteria:
   1. Sites classified suitable or provisionally suitable in accordance with Rules .1939-.1948;
   2. Sites reclassified to be provisionally suitable in accordance with Rules .1956(1), (2), (4), (5) or (6a); or
   3. Sites meeting the criteria for low pressure pipe (LPP) systems in accordance with Rule .1957(a)(2).
   4. A special site evaluation pursuant to Section IV shall only be required if needed to justify the proposed long term acceptance rate (LTAR), as set forth in Section III.

B. Required vertical separation requirements shall be measured from the trench bottom or point of application, whichever is deeper.

C. The minimum vertical separation distance to rock or tidal water for subsurface drip systems shall be 12 inches, regardless of treatment.

D. A minimum of 6 inches of soil cover shall be maintained over driplines receiving effluent treated to TS-II or a less stringent standard.

E. Minimum required soil cover shall be uniform over the entire drip dispersal field or zone.

F. If reuse quality water is being dispersed to a conjunctive system area, less than 6 inches of soil cover may be maintained over the drip tubing.

G. This requirement for at least 6 inches of cover may be met by the addition of up to 6 inches, after settling, of suitable Group II or III soil material over the drip field. If cover material is required and the slope is over 30 percent, a slope stabilization plan must be provided by an appropriately licensed individual.

H. Driplines shall be installed at least 1 inch into naturally occurring soil. The drip installation shall otherwise be considered a fill system.

I. A drip system receiving effluent treated to the NSF-40 standard, or a more stringent standard, may be utilized on sites where there is at least 18 inches of useable naturally occurring soil above an UNSUITABLE soil horizon, rock, or soil wetness condition. The minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE horizon, rock, or soil wetness condition shall be 12 inches.

J. A special site evaluation, pursuant to Section IV of this Approval, shall be required whenever Group IV soils are encountered within 18 inches of the naturally occurring soil surface or within 12 inches of the trench bottom or point of application, whichever is deeper, and the LTAR pursuant to Section III.B is proposed to exceed 0.10 gpd/ft^2 for NSF-40 effluent, 0.12 gpd/ft^2 for TS-I effluent, and 0.15 gpd/ft^2 for effluent treated to TS-II or a more stringent standard.

K. A drip system receiving aerobic effluent treated to TS-I, or a more stringent standard, may be utilized on sites where there is at least 15 inches of useable naturally occurring soil above an UNSUITABLE soil horizon, rock, or soil wetness condition.
   1. The minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and an UNSUITABLE soil horizon, or soil wetness condition shall be 9 inches for TS-I effluent.
   2. A special site evaluation, pursuant to Section IV of this Approval, shall be required whenever there is less than 18 inches of useable naturally occurring soil above an UNSUITABLE soil horizon, rock, or soil wetness condition.

L. A drip system receiving aerobic septic tank effluent treated to TS-II, or a more stringent standard, may be utilized on sites when there is at least 13 inches of useable naturally occurring soil above an

UNSUITABLE soil horizon, rock, or soil wetness condition.

1. The minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and an UNSUITABLE soil horizon, or soil wetness condition shall be 6 inches for TS-II effluent.
2. A special site evaluation, pursuant to Section IV of this Approval, shall be required whenever there is less than 18 inches of useable naturally occurring soil above an UNSUITABLE soil horizon, rock, or soil wetness condition,

M. A drip system receiving aerobic effluent treated to at least the NSF-40 standard, may be utilized when a groundwater lowering system (existing or proposed) is used to meet the vertical separation requirements to a soil wetness condition. In order to use a groundwater lowering system:
   1. When only Group I or Group II soils with suitable structure and clay mineralogy are present within 36 inches of the naturally occurring soil surface the system may receive effluent treated to the NSF-40 standard. A special site evaluation is required when the local health department or regional soil scientist require such an evaluation to determine the effectiveness of the groundwater lowering system.
   2. When there are Group III soils present at any depth above the invert elevation of the highest point of the drainage system or within 36 inches of the naturally occurring soil surface, whichever is deeper, effluent shall be treated to TS-I or a more stringent standard. A special site evaluation, pursuant to Section IV of this Approval shall be required.
   3. No groundwater lowering drainage of Group IV soils is allowed, regardless of treatment level.
   4. On new fill sites [Rule .1957(b)(1)], when all or part of the dripline is to be installed in approved fill, effluent shall be treated to TS-I or a more stringent standard when used in conjunction with a groundwater lowering system. A special site evaluation, pursuant to Section IV of this Approval shall be required.
   5. When a groundwater lowering system is used, the minimum vertical separation from the trench bottom or point of application, whichever is deeper, to the projected (drained) soil wetness condition shall be 12 inches.

N. An aerobic subsurface drip system receiving effluent treated to at least the NSF-40 standard may be utilized on new fill sites [Rule .1957(b)(1)], when all or part of the dripline is to be installed in approved fill material, when there is at least 18 inches of useable naturally occurring soil above an UNSUITABLE soil horizon or rock and at least 12 inches above a naturally occurring soil wetness condition,
   1. The minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE soil horizon or rock shall be 18 inches and any soil wetness condition shall be 12 inches.
   2. Except as provided for herein, all requirements for new fill sites and systems of Rule 1957(b)(1) are applicable to drip systems in fill.

O. An aerobic subsurface drip system receiving effluent treated to TS-I, or a more stringent standard, may be utilized on new fill sites [Rule .1957(b)(1)], when all or part of the drip tubing is to be installed in approved fill material, when there is at least 12 inches of useable naturally occurring soil above an UNSUITABLE soil horizon or rock and at least 12 inches above a naturally occurring soil wetness condition.
   1. The minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE soil horizon or rock shall be 12 inches and any soil wetness condition shall be 9 inches.
   2. A special site evaluation, pursuant to Section IV of this Approval, shall be required.
   3. Except as provided for herein, all requirements for new fill sites and systems of Rule 1957(b)(1) are applicable to drip systems in fill.

P. An aerobic subsurface drip system may be utilized on sites meeting the criteria for existing fill, in accordance with Rule .1957(b)(2), when all or part of the dripline is to be installed in approved fill material.
   1. For an aerobic drip system receiving effluent treated to the NSF-40 standard, the minimum vertical separation distance between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE soil horizon, rock, or soil wetness condition shall be 18 inches
   2. For an aerobic drip system meeting TS-I or TS-II standards, the minimum vertical separation distance

between the trench bottom or point of application, whichever is deeper, and any UNSUITABLE soil horizon, rock, or soil wetness condition shall be 12 inches

3. Except as provided for herein, all requirements for existing fill sites and systems of Rule 1957(b)(2) are applicable to all drip systems in existing fill.

Q. The minimum horizontal setback requirements of Rule .1970 shall be met for systems receiving effluent meeting the NSF-40, TS-I, or TS-II standard, as applicable.

R. For drip systems used on sites where there is at least 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, rock, or soil wetness condition, the horizontal setback reductions of Rule .1970 for NSF-40, TS-I or TS-II, as applicable, may be concurrently taken with LTARs as allowed in Section III.H of this Approval.

S. For drip systems used on sites where there is less than 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, rock, or soil wetness condition, effluent treated to TS-II or a more stringent standard, shall be required in order for reductions in horizontal setbacks allowed for TS-II in Rule .1970 to be taken. The LTAR shall be as allowed in Section III.I. A special site evaluation, pursuant to Section IV of the Approval, shall be required.

T. A special site evaluation, including a hydraulic assessment, shall be provided to the local health department on behalf of the owner, when required pursuant to Section IV of this Approval.

III. System Sizing

A. The LTAR shall be based on the most hydraulically limiting, naturally occurring soil horizon within 18 inches of the naturally occurring soil surface or to a depth of 12 inches below the trench bottom or point of application, whichever is deeper.

B. The following table shall be used in determining the LTAR for the American Perc-Rite® aerobic subsurface drip system.

Soil Group	LTAR (area basis) (gpd/ft^2)		
	NSF-40	TS-I	TS-II
I.	1.0-0.6	1.2-0.8	1.5-0.8
II.	0.6-0.4	0.8-0.5	0.8-0.6
III.	0.4-0.15	0.6-0.2	0.6-0.2
IV.	0.15-0.05	0.2-0.05	0.2-0.05

C. Special site and soil limitations in Rule .1970(f)(2)(E) and (F) apply where the LTAR exceeds 1.2 gpd/ ft^2 for TS-II systems on Group I Soils.

D. For aerobic drip systems in new fill [Rule .1957(b)(1)] receiving effluent treated to the NSF-40 standard, the LTAR shall not exceed 0.6 gpd/ft^2 for Group I, 0.4 gpd/ft^2 for Group II, 0.15 gpd/ft^2 for Group III, or 0.05 gpd/ft^2 for Group IV soils, respectively. Soil group is based on the most hydraulically limiting, naturally occurring soil horizon within 18 inches of the naturally occurring soil surface or 12 inches below the trench bottom or point of application, whichever is deeper.

E. For aerobic drip systems in new fill [Rule .1957(b)(1)] receiving effluent treated to the TS-I standard, the LTAR shall not exceed 1.0 gpd/ft^2 for Group I, 0.5 gpd/ft^2 for Group II, 0.2 gpd/ft^2 for Group III, or 0.07 gpd/ft^2 for Group IV, respectively. Soil group is based on the most hydraulically limiting, naturally occurring soil horizon within 18 inches of the naturally occurring soil surface or 12 inches below the trench bottom or point of application, whichever is deeper. An LTAR above 0.05 gpd/ft^2 in Group IV soil must be supported by a special site evaluation and hydraulic assessment, pursuant to Section IV of this Approval.

F. For aerobic drip systems in new fill [Rule .1957(b)(1)] receiving effluent treated to the TS-II standard, the LTAR shall not exceed 1.0 gpd/ft^2 for Group I, 0.6 gpd/ft^2 for Group II, 0.2 gpd/ft^2 for Group III, or 0.07 gpd/ft^2 for Group IV, respectively. Soil Group is based on the most hydraulically limiting naturally occurring soil horizon within 18 inches of the naturally occurring soil surface or 12 inches below the trench bottom or point of application, whichever is deeper. An LTAR above 0.05 gpd/ft^2 in Group IV soil must be supported by a special site evaluation and hydraulic assessment, pursuant to Section IV of this Approval.

G. For aerobic drip systems in existing fill [Rule .1957(b)(2)] receiving effluent treated to NSF-40, TS-I, or TS-II, the LTAR shall not exceed 0.8 gpd/ft^2 (NSF-40) and 1.0 gpd/ft^2 (TS-I or II)

H. When any reductions are taken in horizontal setbacks pursuant to the use of an NSF-40, TS-I, or TS-II system pursuant to Rule .1970 of this Approval, on sites where there is at least 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, rock, or soil wetness condition, any one of the following LTAR allowances may apply:
   1. The LTAR may be determined pursuant to Section III.B when the only horizontal reductions taken are reduced setbacks to drainage devices.
   2. When effluent is treated to NSF-40, or a more stringent standard, the LTAR in gallons per day per square foot shall not exceed the lowest LTAR for the applicable soil group for Soil Groups I, II and III, pursuant to Section III.B, and 0.10 gpd/ft^2 for Soil Group IV.
   3. When effluent is treated to TS-II or a more stringent standard, the LTAR in gallons per day per square foot shall not exceed the mid-range LTAR for the applicable soil group for Soil Groups I, II and III, pursuant to Section III.B, and 0.10 gpd/ft^2 for Soil Group IV.

I. For drip systems receiving effluent treated to TS-I, or a more stringent standard, on sites with less than 18 inches of naturally occurring soil to any UNSUITABLE soil horizon, rock, or soil wetness condition, the LTAR shall not shall not exceed the lowest LTAR for the applicable soil group for Groups I, II and III, pursuant to Section III.B, and 0.10 gpd/ft^2 for Group IV, and a special evaluation must be provided pursuant to Section IV of this Approval.

J. The following table shall be used in determining the LTAR for American Perc-Rite® aerobic subsurface drip systems installed in saprolite pursuant to Rule .1956(6). The LTAR shall be based on the most hydraulically limiting, naturally occurring saprolite to a depth of 24 inches below the trench bottom or point of application, whichever is deeper.

Saprolite Group	Texture	LTAR (area basis) (gpd/ft^2)	
		NSF-40	TS-I & II
I.	Sand	0.5-0.4	0.6-0.4
	Loamy sand	0.4-0.3	0.5-0.3
II	Sandy loam	0.35-0.25	0.4-0.25
	Loam	0.25-0.2	0.3-0.2
	Silt loam	0.1-0.05	0.15-0.05
III.	Sandy clay loam	0.1-0.05	0.15-0.05

K. In calculating the minimum number of square feet for the drainfield, the daily design flow shall be divided by the LTAR determined from the appropriate table above.

L. In calculating the minimum length of dripline to be used, the total square footage of drainfield as derived in Section III.K shall be divided by two feet, unless additional linear footage is determined to be needed pursuant in Subparagraph III.M of this approval or at the recommendation of the designer as soil and site conditions allow.

M. The required total linear footage of dripline shall not be less than 0.5 x Q for Group I, 0.83 x Q for Group II, 1.25 x Q for Group III, or 3.33 x Q for Group IV Soils (Q = daily design flow). This shall not affect the total area required for the system based on Section III.K above.

N. Sections of tubing without emitters (blank tubing) required to meet site specific conditions shall not count towards the minimum length of dripline needed when laying out the system or when calculating the linear footage of dripline needed (see Section V.G).

IV. Special Site Evaluation

A special site evaluation for an aerobic drip system shall be provided to the local health department on behalf of the owner, containing information required by Rule .1970(p)(2), as applicable, including a hydraulic assessment, to justify use at the proposed LTAR and system layout when any of the following conditions are applicable:

A. Group IV soils are encountered within 18 inches of the naturally occurring soil surface or within 12 inches of the trench bottom or point of application, whichever is deeper, and the LTAR, pursuant to Section III.B, is proposed to exceed 0.10 gpd/ft^2 for NSF-40, 0.12 gpd/ft^2 for TS-I effluent, and 0.15 gpd/ft^2 for effluent treated to TS-II or a more stringent standard.

B. The dripline is to be installed within the naturally occurring soil, and there is less than 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, soil wetness condition, or rock.

C. An existing or proposed groundwater lowering system is used to meet soil depth and vertical separation requirements to a soil wetness condition and
   1. There are Group III or IV soils present within 36 inches of the naturally occurring soil surface,
   2. There are Group III soils present at any depth above the invert elevation of the highest point of the drainage system, or
   3. When the local health department or regional soil scientist requires such an evaluation to determine the projected effectiveness of the groundwater lowering system.

   The evaluation shall include site-specific determination of saturated hydraulic conductivities and other critical site factors, and the proper application of appropriate drainage models and assessment tools.

D. To verify a proposed LTAR that exceeds the LTAR assigned by the EHS/LHD, pursuant to Section III.B or Section III.J of this Approval.

E. Aerobic drip meeting NSF-40 standards is proposed, and the LTAR is proposed to exceed 0.8 gpd/ft^2 for Group I, 0.5 gpd/ft^2 for Group II, 0.25 gpd/ft^2 for Group III or 0.1 gpd/ft^2 for Group IV soils.

F. Aerobic drip meeting TS-I standards is proposed, and the LTAR is proposed to exceed 1.0 gpd/ft^2 for Group I, 0.6 gpd/ft^2 for Group II, 0.3 gpd/ft^2 for Group III or 0.12 gpd/ft^2 for Group IV soils.

G. Aerobic drip meeting TS-II or a more stringent standard is proposed, and the LTAR is proposed to exceed 1.2 gpd/ft^2 for Group I, 0.7 gpd/ft^2 for Group II, 0.4 gpd/ft^2 for Group III or 0.15 gpd/ft^2 for Group IV soils.

H. Aerobic drip meeting TS-I or a more stringent standard is proposed in new fill, and
   1. A groundwater lowering drainage system (existing or proposed) is also used to meet soil depth and vertical separation requirements to a soil wetness condition; or
   2. Group IV soils are encountered within 18 inches of the naturally occurring soil surface and the LTAR is proposed to exceed 0.05 gpd/ft^2; or
   3. There is less than 18 inches of naturally occurring soil to an UNSUITABLE soil horizon or rock.

I. When required in Rule .1970 unless otherwise specified in this Approval.

J. The daily design flow for the design unit exceeds 1,500 gpd.

K. When any of the conditions listed below are met, the hydraulic assessment of the special site evaluation

shall include one or more of the following: a lateral flow, linear loading, groundwater mounding, or water balance analysis.

1. The local health department or regional soil scientist determines that the combination of soil conditions, site topography and landscape position, daily design flow, system layout and proposed stormwater appurtenances creates the potential for hydraulic overloading of a site.
2. The daily design flow is greater than 720 gpd and there is less than 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, soil wetness condition, or rock.
3. The dripline is to be installed within the naturally occurring soil and there is 15 inches or less of naturally occurring soil to an UNSUITABLE soil horizon, soil wetness condition, or rock.
4. There is less than 18 inches of naturally occurring soil to an UNSUITABLE soil horizon, soil wetness condition, or rock, and reductions in horizontal setbacks allowed in Rule .1970 are taken with a drip system receiving effluent meeting TS-II or a more stringent standard.

In conjunction with the information required to be included by Rule .1970(p)(2), the report is to communicate to the designer site specific details of the delineated area and include a preliminary system layout and design that complies with the requirements of this approval. The report shall identify, comment on, and offer recommendations to address, as necessary, site specific conditions such as soil quality, slope, landscape position, stoniness, vegetation, surface drainage, site preparation, depth of installation, etc. that may, in the judgment of the evaluator, effect the design and /or field installation.

V. Design Criteria

A. Pretreatment

The drip system drainfield shall be preceded by a pretreatment process designed to meet at least NSF-40 or a more stringent standard, pursuant to Rule .1970. This level of pretreatment may be achieved by an approved RWTS, approved Advanced Wastewater Pretreatment Systems, or project-specific approved equal.

B. Dosing tank

1. The dosing system shall meet the design and construction criteria of Rules .1952-.1954.
2. The dosing tank shall be a separate approved pump tank with a minimum liquid capacity not less than the total liquid capacity of the septic tank that would be required for this system in accordance with Rule .1952, unless approved pursuant to Section V.B.3.
3. If the dosing tank is not separate it must be designed by an engineer or be an integral part of an approved advanced pretreatment system. The system designer must verify the following.
    a. The pretreatment system approval specifically includes the proposed integral dosing tank, where applicable.
    b. The drip dosing pump can be feasibly installed, repaired and maintained in the pretreatment system effluent dosing compartment.
    c. The level control float and alarm requirements of this Subparagraph V.B and the pump requirements of Subparagraph V.C of this approval are met.
    d. All applicable pump submergence, dosing volume, flow equalization and emergency storage capacity requirements of the system are met, without interfering with the performance of the advanced pretreatment system.
    e. Normal operating levels will not result in effluent backing up into a part of any pretreatment component designed for free gravity flow drainage, including any media filter.
    f. Additional flow equalization capacity in the dosing tank is not required if flow equalization is provided as part of the treatment system prior to the dosing tank.
    g. Emergency storage capacity requirements may be reduced to 8 hours when a telemetry system is provided, whereby the Operator in Responsible Charge (ORC) shall be notified immediately of alarm conditions (high water or power outage). The telemetry system and alarm shall include automatically rechargeable battery backup power supply.
4. Level control floats in the dosing tank shall be adjustable and replaceable from the ground surface without requiring entrance into the tank.

5. The Rule requirement for a separate high water alarm that is audible and visible by system users shall be met, in conjunction with any required self monitoring features of the American Perc-Rite® system.

C. Pumps

Pumps to be used shall include effluent rated turbine pumps with cooling flow collars, effluent rated suction lift self-priming centrifugal pump(s), or high head submersible effluent pump(s) in accordance with Rule .1952(c)(2), and as specified by American. For a suction lift pump, the intake pipe shall contain a screen and foot valve as specified by American. Pump, controls, intake pipe and screen, as applicable, shall be easily accessible, adjustable and replaceable from the ground surface without requiring entrance into the tank by the system ORC for routine operation, maintenance, monitoring and servicing.

D. Filters
1. Self-cleaning disc filter(s) capable of screening particles larger than or equal to 115 microns shall be used. Self-cleaning process shall be automatic. American Perc-Rite® Filters, or American approved equal, shall be used.
2. Filter flushing residuals shall be pumped into the upstream end of the pretreatment system, with provisions made to minimize disturbance of any solids in the septic tank or settling chamber (where applicable).
3. The number and size of filter(s) shall be at least adequate to operate at a flow rate, during both irrigation and flushing conditions, within the filter manufacturer's specified acceptable operating range.

E. Headworks

The headworks assembly typically includes the filters and associated filter backwash valves, field flush valve, and flow meter, and may also include zone dosing and isolation valves. Headworks components shall be in a separate enclosure that is freeze protected, UV and corrosion resistant and easily accessible for routine operation, maintenance, monitoring and servicing. Design shall facilitate reasonable access to all internal components.

F. American Perc-Rite® processing and control unit
1. Controls shall:
   a. Provide for delivery of designer specified preprogrammed volumes of effluent to each field zone (adjustable and variable between zones) at designer specified time intervals (24 hour flow equalization);
   b. Provide for automatic flushing of integral unit filters (filter flushing), initiated by a timer (adjustable duration);
   c. Provide for automatic flushing (at least weekly) of the drip laterals (field flushing) with filtered effluent for designer specified duration; and
   d. Monitor pump cycles and run times (for each pump and field zone) and flow (with totalizing flow meter, or equal).
2. A telemetry system shall be provided for systems with a daily design flow greater than 600 gpd. The ORC shall be immediately notified of alarm conditions (high water and power outage). A telemetry system will also be necessary when the dosing system serves as the discharge from an advanced pretreatment system and telemetry is required in the pretreatment system approval.
3. For systems with a daily design flow greater than 3,000 gpd, controls shall also monitor flow volume to each zone and provide a flow variance indication when flow is + or - 20% of design. Telemetry system and alarm shall include an automatically rechargeable battery backup power supply.
4. Any special equipment to monitor system performance shall either be provided with the system, or determined to be in the possession of the manufacturer authorized ORC prior to system approval.
5. Controls and float levels shall be synchronized to assure the minimum dose is available prior to initiating a dosing cycle to a zone or subfield.
6. Minimum dose volume per zone shall be set as needed so that at least 80 percent of each dose is delivered when the minimum pressure in the field network pressure is at least 10 pounds per square

inch (psi). This shall be approximated by using five times the liquid capacity of the drip laterals plus the liquid capacity of the supply and return manifold lines (only the portion which drain between doses), unless a smaller volume is field determined to meet this performance criteria. For example, the minimum dose time can be field determined as follows:

a. When zone is "dry", measure the time from pump start until the top of return pressure is greater than 10 psi. This time shall be designated "Ti". Also measure the total gallons it takes to reach 10 psi. This "fill" volume is designated "Gi".
b. Determine minimum additional dose time as (4xGI)/(irrigation flow rate) = "Tf".
c. Total adjusted minimum dose time can be reduced to "Ti" plus "Tf", and adjusted dose volume is 5x "Gi".

7. Minimum automatic field flushing volume per zone shall be two times the liquid capacity of the drip laterals plus the liquid capacity of supply and return and manifold lines that drain between doses.
8. Either the drip system control panel or the pretreatment system control panel shall enable the daily, 7-day and 30-day monitoring requirements of Rule .1970 to be met. The system designer must specify whether the pretreatment system manufacturer or the American Perc-Rite® control panel shall record the flow monitoring requirements of Rule .1970.
9. A duplex pump dosing system shall be provided whenever the daily design flow exceeds 3,000 gpd or when the total length of driplines exceeds 5,000 feet.
10. Floats and controls shall be set up as follows:
    a. The off ("redundant off") float is set to provide at least the minimum level of effluent required to keep the pump submerged based on recommendations by the pump manufacturer and American. The purpose of the off float is to help ensure that the pump shuts off prior to the system being pumped dry.
    b. The timer enable ("on") float is set to initiate the pump cycle which will last until the preset "on" cycle times out (set to deliver desired dose volume). The float shall be set sufficiently above the redundant "off" level so that one dose volume to the largest drip dispersal zone is available, and the effluent level in the tank remains above the deactivation ("off") float level at the end of each pump cycle. The cycle "off" time begins to time out at the start of each dose event. The purpose of the timer enable float is to deliver up to 60 percent of the daily design flow to the drainfield.
    c. The peak enable float is set to initiate an accelerated (more frequent) pump cycle by reducing the "off" time period. This float shall be set one-half the distance between the high water alarm float and the timer enable float. The purpose of the peak enable float is to deliver up to 100 percent of the daily design flow to the drainfield.
    d. The high water alarm float is set to provide the minimum required emergency storage capacity for the system, which shall be at least 24 hours or as otherwise approved pursuant to Rule .1952(c)(1)(D). The purpose of the high water alarm float is to maximize storage capacity to help ensure that effluent does not exceed the pump tank/collection system capacity and discharge to the surface or back up into the facility.

    Alternative setups for floats and controls may be proposed by the system designer on a project specific basis. Such alternative proposals must receive the concurrence of American and the local health department or the State.
11. Floats, pump and control circuits, and the control panel shall meet the requirements of Rule .1952(c). Panel and control equipment shall include lightning protection, be protected from unauthorized access, and remain accessible at all times to the ORC. The bottom of the panel shall be at least 36 inches above the ground surface.
12. The drip system control panel shall be manufactured by American Manufacturing, unless the conditions of Subparagraph V.F.13 of this Approval are met. The same panel may include the capability to operate a portion of an advanced pretreatment system, if this is proposed by the pretreatment system manufacturer and meets all of their requirements. Documentation shall be provided to the State for inclusion on the On-Site Water Protection Section's Homepage.
13. The drip system control panel may alternately be a combination panel supplied or manufactured by an approved advanced pretreatment system manufacturer, and concurrently approved to serve some or all of the control system requirements of the advanced pretreatment system. This option must first be jointly proposed by American Manufacturing and the applicable pretreatment system manufacturer and shall meet all of the control requirements of this Approval for this drip system and applicable control

requirements for the pretreatment system. Documentation of this shall be provided to the State for inclusion on the On-Site Water Protection Section's Homepage.

G. American Perc-Rite® Subsurface Drip System Field Design (See Section VII for designer responsibilities)
1. The field network shall utilize 1/2-inch (0.67 inch O.D., 0.57 inch I.D.) nominal size NETAFIM PC polyethylene dripline.
2. Pressure compensating emitters, containing a biocide, are spaced uniformly along the dripline on a maximum of two foot centers and designed to deliver 0.61 to 0.65 gallons per hour per emitter (+ or - 5%) at internal pressures of 7 to 60 psi.
3. The field shall consist of multiple separately and automatically dosed and valved zones whenever needed to meet irrigation and/or flushing requirements, and in adherence with manufacturer's recommendations.
4. The minimum zone size and linear feet of dripline in each zone shall adhere to the manufacturer's recommendations. The linear feet of dripline may be increased utilizing reduced dripline spacing as the site and this Innovative Approval allow, without requiring an increase in the total area requirement as calculated in Section III.K. Also refer to subparagraphs pertaining to "Blanking," below for further guidance on options and constraints associated with system size and layout in the field.
5. Driplines and drip runs shall be designed and installed level, following the naturally occurring ground contour. A maximum variance of + or - 2 inches off dead level may be allowed within any drip run or any contiguous section of dripline containing drip emitters between fittings.
6. Individual driplines and drip runs are designed and installed on contour and on at least 2 foot centers, unless approved to be spaced uniformly on less than 2 foot centers as described in section V.G.4 above to address site-specific situations or for short sections as needed to avoid field obstructions, without reducing total area requirements.
    a. In no case shall dripline spacing be less than 12 inches on center.
    b. In order to keep on contour, driplines or portions of driplines may be installed on greater than 2 foot centers, requiring additional total application area.
    c. Short sections installed on less than 2 foot centers as needed to avoid field obstructions shall account for less than 5 percent of the total linear feet of dripline within any zone.
7. Solvent welded heavy duty non-perforated flexible PVC pipe shall be used to connect the supply and return manifolds with the driplines, or to connect common driplines installed at varying depths or locations (e.g.: in stepdowns or to connect looped drip runs). The connection lines shall be made to the driplines by solvent welded American Perc-Rite® compression or insert adapters or fittings, or approved equal.
8. Connection lines shall be conveyed over compacted earthen dams constructed at least 2 inches higher than the maximum elevation of each dripline served. These dams are to retain effluent in the driplines at the end of each dose cycle. If the "TopFeed™" system is used, the manifold feed lines shall be on a continuous positive grade from the supply/return manifolds to each drip lateral, through an earthen dam, without passing over a 2 inch rise. The loops between runs must be elevated so that they drain freely into the run lines. Connection lines and loops shall be schedule 40 pvc or solvent-welded, non-perforated flexible pvc.
9. "Blanking" describes interior watertight sections of tubing without any drip emitters, which may be installed where unfavorable site conditions are encountered along a drip lateral, such as rock, shell fragments (> 35%), trees, large roots, large tree stumps as identified by the system designer, soil scientist, installer or local health department.
10. Short sections of blanking tubing may also be used where minimum horizontal separation requirements between adjacent driplines as specified in Section V.G.6 of this Approval cannot be met.
11. Sections of blank tubing shall not be included in meeting the minimum linear footage of dripline requirement calculated for the zone containing the blanking section.
12. No more than 20 percent of the total drip lateral length in a zone shall be compromised of blanking sections.
13. Blanking tubing shall be either
    a. Black or otherwise differently colored HDPE tubing of the same material, specifications and inside diameter as the connecting dripline; or
    b. Non-perforated Flexible PVC.

14. Non-perforated Flexible PVC shall be used whenever the blanking section passes through an area having excessive abrasion hazards due to number or condition of rocks or an area where uniform bedding cannot be effectively insured.
15. Blanking sections shall also meet the following conditions:
    a. Connection lines shall be made to the driplines (with emitters) by solvent welded American Perc-Rite® compression or insert adapters or fittings, or American approved equal.
    b. Blanking sections and connections shall be provided by the drip system manufacturer.
    c. Blanking sections shall be installed in hand shaped trenches with a minimum of 2 inches of clean acceptable soil, free of organic material, on all sides. The entire length of the blanking section shall be protected from abrasion or damage from contact with rocks, roots, voids or other obstructions.
    d. All direction changes shall be gentle, sweeping bends which eliminate any danger of kinking, pinching or collapse of the tubing.
    e. Where possible, blanking sections shall be installed level and at the same elevation as the dripline. Where the blanking tubing trench floor elevation must vary from the dripline elevation due to specific obstructions, the blanking section shall go above in elevation around the obstruction, rather than below, with a single, sweeping high point in a manner which will not retain water in the blanking section.
    f. The dripline at both ends of any given section of blanking shall be maintained at the same elevation or the blanked section be constructed as a raised contour dam, preventing flow at pump cut off from the upper portion to the lower portion.
    g. A minimum of 6 inches of soil cover shall be maintained over blanking sections with care taken to provide proper surface drainage without creating areas of concentrated runoff or ponding. Less cover (a minimum of three inches is required) may be considered when utilizing flexible PVC if necessary to allow the dripline to be installed at the specified depth.
    h. When driplines must be installed closer than 12 inches apart, both shall be blanking sections and those sections shall be backfilled with hand compacted clayey material.
    i. At least a single blanking section is to be used whenever a drip lateral must be installed where the horizontal separation between adjacent sections of dripline is less than the minimum spacing as set forth in Section V.G.6, above. This portion of the blank section shall be backfilled with well compacted, low permeability, clay.
    j. Locations and lengths of blanking sections shall be noted on the as-built drawings for the project.
16. The hydraulic design shall be based on achieving the following conditions:
    a. No more than a 10 percent variation in flow between any individual emitters anywhere within a separately dosed zone, including any effluent redistribution due to drain back.
    b. On sites with a discernable slope (typically greater than 4 percent), "Top Feed™" manifolds will be utilized to minimize disproportionate amount of drainage into the lowest area of the zone.
    c. Maintenance of velocities of at least 1.2 feet per second in the supply line from the dosing tank to the beginning of the drip field during normal dosing cycles.
    d. Maintenance of velocities of at least 1.2 feet per second in each supply manifold segment during field flushing.
    e. Minimum pressure of 10 psi during flushing flows and a maximum of 60 psi during normal dosing flows.
    f. Maintenance of field network velocities of at least 2 feet per second at the distal end of each drip lateral line during automatic field flushing.
17. The hydraulic design shall include documentation that minimum scour velocities and maximum pressure restrictions will be maintained, including project-specific calculations, computer simulations as necessary, or verification of adherence to pre-approved design criteria. Hydraulic calculations are to take into account sections of top feed lateral feed/return lines and blanking, where applicable.
18. Field appurtenances include an air/vacuum release valve at the high point(s)/outlet of each zone; an isolation valve and check valve at the high point/outlet of each zone (when there are more than one zone); pressure sustaining valves where needed; solenoid valve with separate isolation valves on each side at the inlet to each zone or in the headworks assembly (or by an appropriate alternate method which enables all valves to be isolated and serviced without effluent discharge from supply/return lines); cleanout at each end of the supply and return manifolds; a separate cleanout at the distal end of

the supply line to each zone; and pressure monitoring fittings at the field inlet and outlet points, and at the headworks for measuring deadhead and operating pressures.

19. The ORC must be able to access all solenoid valves, air vents, pressures monitoring points and isolation valves at all times for inspection, testing and maintenance. Valves, pressure monitoring fittings, vents and cleanouts shall be provided with protective vaults or boxes that are decay resistant, ultraviolet rated, and that extend at least to finished grade. Routine maintenance and monitoring shall be possible without effluent discharging from the network in preparation for or during these procedures.

H. Return Line
This shall be directed into the upstream end of the pretreatment system, with provisions made to minimize disturbance of any solids in the tank. For fields remotely located in relation to the pretreatment system, an intermediate pump tank may be used to receive the field flush effluent prior to its direct conveyance back to the pretreatment system, or a separate settling tank provided to receive the field flush effluent prior to its conveyance back to the drip dosing tank.

VI. Installation and Testing Procedures

A. A preconstruction conference shall be required prior to beginning any site modifications or construction of the American subsurface drip system. The conference shall be attended by the American authorized system designer, American authorized installer, and the local health department. The licensed soil scientist and registered professional engineer shall also be present, as applicable.

B. It shall be the responsibility of the system designer to specify equipment to be used, and site-specific procedures to be followed, including blanking provisions.

C. The septic tank(s), dosing tank(s), and any other pretreatment system tank(s) shall be demonstrated to be watertight by vacuum test or 24 hour leakage test conducted at the installation site. Test shall be run after tank installation with risers/and inlet/outlet pipes in place, but before the tanks are covered (backfilled). A water level change of ½ inch or more, within a 24-inch riser, over 24 hours, or visual observation of leakage shall be cause for failure of a leakage test. Initial water level shall be to 2 inches above the riser/adapter seam in the tanks.

D. The preservation of the original structure of the soil in the drainfield and repair areas is essential to maintaining the absorptive capacity of the soil. No activity other than the construction of the system is permitted within these areas before, during and after installation of the system.

E. Drainfield area shall be prepared in a manner that minimizes site disturbance.
1. No equipment shall cross the field areas during rainfall events, or when the soil moisture content of the fields is above field capacity (“too wet to plow”).
2. Only equipment light enough to not compact the soil shall be used to remove trees, roots, and rocks, with hand incorporation of select fill material used to eliminate weak spots where roots or boulders must be removed.
3. Fill material and final cover shall be in accordance with Rule .1957(b)(1)(F). In some instances, final cover material may be approved to be added after dripline installation.
4. Field shall be prepared as needed to enable the final cover to be established and maintained prior to dripline installation.
5. The selection, transportation, and incorporation procedures of fill or cover must be carefully reviewed and concurred with by the system designer, soil evaluator, and local health department prior to and during installation.

F. Drip laterals shall be staked out by use of an engineer’s or laser level and taped prior to permitting. At least every fourth drip run or parallel adjacent dripline shall be field staked. However, staking shall be more frequent if needed, as determined by the system designer or local health department, to assure conformation with natural contours and design requirements for sizing, location and separations. Maximum dripline

depth shall be in accordance with permit conditions.

G. Dripline shall be installed in accordance with the designer's and manufacturer's recommendations for each site. A vibratory plow, static plow, trencher, or rock saw is most typically used, or the system is installed by hand. Soil moisture must be dry enough so that soil compaction or smearing will not occur. The system shall not be constructed during periods of wet weather when the soil is sufficiently wet at the depth of installation to exceed its plastic limit. The plastic limit is exceeded when the soil can be rolled between the palms of the hands to produce a roll (wire) 1/8 inch in diameter (>1.5 inches in length) without breaking and crumbling. Questions about site workability shall be reviewed with the system designer, soil evaluator, and local health department prior to proceeding.

H. Leaf litter and debris shall be removed prior to the installation of dripline, where applicable. When a trencher is used or trenches are hand dug, the trench bottoms shall be hand cleaned of roots, debris and litter, and the dripline shall be secured to the center of the trench bottom prior to backfilling.

I. Minimum soil cover over dripline shall be 6 inches to finished grade. Cover material shall be free of rocks, debris, construction and demolition (C+D) waste, hazardous or contaminated waste, or material with concentrations or layers containing more than 35 percent by volume of shell fragments or more than 10 percent by volume of fibrous organics.

J. Minimum depth of valves in protective vaults or boxes shall be at least 12-18 inches below finished grade (as needed to be below normal frost depth).

K. Air vents shall be installed in a valve box so that the entire vent is below finished grade. The outlet of the vent must be above the installation depth of the dripline.

L. Extreme care must be taken during and after system installation to assure no extraneous debris enters the tankage, supply lines, and dripline network. Supply lines and manifolds shall be flushed out prior to system startup.

M. Designer's and manufacturer's recommendations shall be followed for system startup. All leaks in pipe network or from emitters exhibiting excessive emission rates, as evidenced by wet spots during dosing cycles comparable to normal operating conditions, shall be repaired.

N. Dosing and flushing flow rates must be measured. Dosing pressure must be measured at the lowest point in the supply manifold to verify need for a pressure sustaining valve and its effectiveness, if valve is present. Flushing pressures at the ends of each zone supply and return manifold shall be measured and determined to be in accordance with design criteria.

O. Fields shall be finished graded to shed surface water and in a manner which facilitates system inspection, operation, maintenance, and repair as well as turf management with standard mowing equipment (if applicable). Provisions shall be made to establish and maintain a vegetative cover (e.g., grass) to prevent erosion and allow mowing with standard equipment and to allow for effective system inspection.

P. Other methods of site stabilization may be proposed, such as in woodland sites. Equivalent provisions for finished grading to shed surface water and as needed to facilitate inspection, operation, maintenance, and repair apply. Establishment of a permanent vegetative cover on a wooded site is not necessary if the site is otherwise effectively stabilized from erosion after construction until a protective litter cover is naturally reestablished. Site-specific procedures should be reviewed by the system designer, soil evaluator and local health department. To facilitate inspection and maintenance, new woody vegetation must be prevented from becoming established over driplines and appurtenances.

Q. All mechanical components, pumps, pump cycling, filters, valves, vents, flushing, high water alarm and telemetry systems, as applicable, must be demonstrated to be fully operable in accordance with their design.

VII. Operation, Maintenance and Monitoring Requirements

A. System management entity, inspection/maintenance and reporting frequency requirements shall be comparable to at least Type V(a) systems in Rule .1961(b), Table V(b), except that the maximum inspection interval for systems up to 1,500 gpd shall be quarterly for the first year of operation. Inspections shall be more frequently as required for advanced pretreatment units, where applicable.

B. During the first operational inspection after system start-up, an American Manufacturing representative will meet with the ORC and the property owner to explain the system and answer any questions.

C. In the event any system is found to be out of compliance, American Manufacturing will assist in the development of an action plan to bring the system back into compliance.

D. The maximum inspection/maintenance/inspection frequency shall revert to quarterly for a period of one year after a system found to be out of compliance is repaired.

E. The ORC shall provide monitoring reports to the health department which include a log of all malfunction incidences/notifications, maintenance activities and wastewater volume delivered to each zone between each required monitoring period.

F. Minimum activities during each required inspection shall include visual observation of the dripfield(s), checking/cleaning filter(s), measured dosing flow rate to each zone, and recording of flow meter reading, pump run times and cycle counts.

G. Flushing flow rates and pressure head measurements during flushing at the inlet and outlet of each field zone shall be taken at least once per year.

H. The ORC shall report inspection findings and measurements on the report form and spread sheet provided by American and appended to this Innovative Approval.

I. For systems with a daily design flow of greater than 600 gpd, the ORC shall be telemetrically notified of high water and power outage. For systems with a daily design flow of greater than 3,000 gpd, the ORC shall also be telemetrically notified of flow variance (+ or – 20%) and catastrophic failure (+ or – 50%) conditions.

J. The ORC shall also conduct other additional observations, measurements, monitoring, and maintenance activities as specified in the Operation Permit and as recommended by American and as required for any applicable advanced pretreatment system that may also be present.

VIII. Responsibilities and Permitting Procedures

A. Prior to the installation of an American Subsurface Drip System at a site, or modification to a site for an American subsurface drip system, the owner or owner's legal representative shall notify the local health department of their proposed use of such a system. The local health department shall issue an Improvement Permit or Authorization to Construct or amend a previously issued Improvement Permit or Authorization to Construct allowing for the use of the proposed Innovative System upon a finding that all provisions of this approval and all other applicable rules shall be met.

B. Use of the proposed Innovative System and any conditions shall be described in the Improvement Permit and Authorization to Construct or amended Improvement Permit and Authorization to Construct, as well as described on the Operation Permit to be issued upon the acceptable completion of the system installation.

C. All systems shall be designed by a professional engineer or by individuals authorized in writing by the manufacturer. The system shall be designed by a professional engineer when:

1. Pretreatment components have not received prior State approval, or the pretreatment system approval requires the system to be designed by a professional engineer,
2. The system daily design flow exceeds 600 gpd,
3. Drip lateral lengths in a single field zone vary by more than 25 percent,
4. Duplex pumps are required in accordance with Section V.F.9, above, or
5. The complexity of the site or system dictates non-standard design as determined by the local health department or the manufacturer.

D. When required, plans and specifications shall be prepared, reviewed and approved in accordance with Rules .1938(e) and (f). Systems designed by an authorized designer shall include a review letter from the manufacturer along with a submittal checklist signed by the manufacturer for each system.

E. The system shall be installed by a NCOWCICB certified Level IV Installer that is authorized in writing by the manufacturer to install the system. The installer shall coordinate the installation with the system designer and manufacturer's field representative.

F. Prior to issuance of an operation permit a contract for operation and maintenance shall be executed between the system owner and an ORC as required in accordance with Rule .1961(b). The ORC shall have been trained and certified in writing by American to operate and maintain American Perc-Rite® subsurface drip dispersal systems. American shall provide as needed classroom and field training for licensed operators.

G. A condition of the operation permit shall be that a contract for operation and maintenance with an American certified ORC shall remain in effect for as long as the system is to remain in use.

H. A professional engineer or American authorized designer, as applicable, must certify in writing that the system was installed in accordance with the approved plans and specifications prior to Operation Permit issuance. The manufacturer or the manufacturer's authorized field representative and authorized designer shall provide written confirmation of their acceptance of the system installation prior to operation permit issuance.

I. For sites required to be evaluated by a Licensed Soil Scientist or Professional Geologist, the local health department shall specify as a condition on the Improvement Permit and Authorization to Construct that a Licensed Soil Scientist or Professional Geologist oversee critical phases of the ground absorption system installation and certify in writing that the installation was in accordance with their specified site/installation requirements prior to the Operation Permit issuance.

J. American Manufacturing Company, Inc. shall provide lists of manufacturer’s authorized designers, installers and operators to the State and applicable local health departments. The Manufacturer shall also provide notice of all scheduled manufacturer authorized training programs for individuals seeking authorization, or on-going training.

IX. Repair of System

The provisions of 15A NCAC 18A .1961(c) shall govern the use of the American Perc-Rite® Subsurface Drip System for repairs to existing malfunctioning wastewater systems.

Approved by:_____Date:_____

Appendix A

In the Tables "SWC" means "Soil Wetness Condition" and "USC" means an "UNSUITABLE Soil Condition," other than a SWC and "NOSS" means "naturally occurring soil surface"

Table A-1 – Siting criteria for aerobic drip systems where dripline is installed below the elevation of the naturally occurring soil surface (NOSS).

Criteria or requirement	Treated to NSF-40 or more stringent	Treated to TS-I or more stringent	Treated to TS-II or more stringent
Minimum useable soil depth below NOSS to USC or SWC	18 inches	15 inches	13 inches
Minimum vertical separation between the trench bottom or point of application, whichever is deeper, and USC or SWC	12 inches	9 inches (12 inches to rock or tidal water)	6 inches (12 inches to rock or tidal water)
Allowance to meet 6 inches cover requirement	Addition of up to 6 inches suitable Group II or III soil material, after settling		
Special site evaluation not required, unless specifically required below	18 inches or more of useable soil		
Special site evaluation required (Section IV)	Group IV within 18 inches of NOSS and LTAR >.10	Group IV within 18 inches of NOSS and LTAR >0.12	Group IV within 18 inches of NOSS and LTAR > 0.15
	Proposed LTAR exceeds LTAR assigned by EHS/LHD per Section III.B		
		Groundwater lowering system used and any Group III soil above invert elevation of drain or any Group III or IV soil within 36 inches of NOSS	
	Groundwater lowering system used and LHD or RSS determines evaluation needed		
	Daily design flow exceeds 1,500 gpd		
		Less than 18 inches from NOSS to USC or SWC	
	LTAR: >0.8 (Group I) >0.5 (Group II) >0.25 (Group III); >0.10 (Group IV)	LTAR: >1.0 (Group I) >0.6 (Group II) >0.3 (Group III) >0.12 (Group IV)	LTAR: > 1.2 (Group I) >0.7 (Group II) >0.4 (Group III) >0.15 (Group IV)

Table A-2 – Siting criteria for aerobic drip systems on new fill sites, when all or part of the dripline is to be installed in approved fill material.

Criteria or requirement	Treated to NSF-40 or more stringent	Treated to TS-I or more stringent	Treated to TS-II or more stringent
Minimum useable soil depth below NOSS to USC or SWC	18 inches to USC 12 inches to SWC	12 inches to USC 12 inches to SWC	
Minimum vertical separation between the trench bottom or point of application, whichever is deeper, and USC or SWC	18 inches to USC 12 inches to SWC	12 inches to USC 9 inches to SWC	
Special site evaluation not required, unless specifically required below	18 inches or more of useable soil		
Special site evaluation required (Section IV)		<18 inches to USC	
		Group IV soil within 18 inches of NOSS and LTAR >0.05	
		Groundwater lowering system is used with fill	
	Daily design flow exceeds 1,500 gpd		

Table A-3 – Siting criteria for aerobic drip systems on existing fill sites, when all or part of the dripline is to be installed in approved fill material

Criteria or requirement	Treated to NSF-40 or higher	Treated to TS-I or higher	Treated to TS-II or higher
Minimum depth Group I fill/soil below existing fill surface to USC or SWC	24 inches		
Minimum vertical separation between the trench bottom or point of application, whichever is deeper, and USC or SWC	18 inches	12 inches	