Wisconsin Department of Safety and Professional Services
Division of Policy Development
1400 East Washington Avenue
PO Box 8366
Madison WI 53708-8366

Phone: 608-266-2112
Web: http://dsps.wi.gov
Email: dsps@wisconsin.gov

Scott Walker, Governor
Laura Gutiérrez, Secretary

PRIVATE ONSITE WASTEWATER TREATMENT SYSTEMS (POWTS)
TECHNICAL CODE ADVISORY COMMITTEE
Room 121C, 1400 East Washington Avenue, Madison
Contact: Bradley Johnson (608) 266-2112
April 24, 2018

The following agenda describes the issues that the committee plans to consider at the meeting. At the time of the meeting, items may be removed from the agenda. Please consult the meeting minutes for a record of the actions of the committee.

AGENDA

9:00 A.M.

OPEN SESSION – CALL TO ORDER – ROLL CALL

A. Adoption of Agenda (1)

B. Approval of the Minutes of September 26, 2017 (2)

C. Administrative Matters – Discussion and Consideration

1. Department and Staff Updates
2. Committee Members
   a) Aaron Ausen
   b) Frederick Hegeman
   c) Daniel Keymer
   d) Robert Roy Schmidt
   e) Daniel Vander Leest
   f) Eric Wellauer

D. Review of the Role of the Advisory Committee

E. Technical Advisory Matters – Discussion and Consideration

1. Request for Approval (RFA) for Infiltrator Advanced Treatment Leachfield (ATL) in Wisconsin **(3-79)**

F. Public Comments

G. ADJOURNMENT

POWTS TECHNICAL ADVISORY COMMITTEE
MEETING MINUTES
September 26, 2017

PRESENT: Aaron Ausen, Frederick Hegeman, Robert Roy Schmidt, Daniel Vander Leest, Eric Wellauer

EXCUSED: Daniel Keymer

STAFF: Bradley Johnson, Section Chief; Tim Vander Leest, DIS Staff; Laura Smith, Bureau Assistant; and other Department staff

Called to order at 9:00 a.m. A majority of six members was present.

ADOPTION OF AGENDA

MOTION: Robert Roy Schmidt moved, seconded by Frederick Hegeman, to adopt the agenda as published. Motion carried unanimously.

APPROVAL OF MINUTES

MOTION: Robert Roy Schmidt moved, seconded by Aaron Ausen, to approve the minutes of May 16, 2017 as published. Motion carried unanimously.

TECHNICAL ADVISORY MATTERS

Eljen In-Ground and Mound Components Manuals

MOTION: Robert Schmidt moved, seconded by Eric Wellauer, to recommend to the Department to approve the three changes that Eljen proposed for its in-ground and mound manuals (see attachment 1). Motion carried unanimously.

Presby In-Ground and Mound Components Manuals

MOTION: Robert Schmidt moved, seconded by Aaron Ausen, to send the meeting recommendations, comments, and concerns to Presby for incorporation into their components manuals, and for those manuals to then be resubmitted to the Department (see attachment 2). Motion carried unanimously.

ADJOURNMENT

MOTION: Fred Hegeman moved, seconded by Robert Schmidt, to adjourn the meeting. Motion carried unanimously.

The meeting was adjourned at 3:10 p.m.

March 7, 2018

Mr. Glen Schlueter
Wisconsin Department of Safety and Professional Services
Safety and Buildings Division
Plumbing Product Review
P.O. Box 2658
Madison, WI 53701-2658

Re: Infiltrator ATL System
Application for Approval for Use

Dear Glen,

On behalf of Infiltrator Water Technologies (Infiltrator), I write to request Safety and Buildings Division (Division) review of the following information on the Infiltrator ATL System and approval for its use in the State of Wisconsin as a Sewage Treatment Apparatus (Tier 3 – downsizing and vertical separation credit) in accordance with chapters SPS 382 through 384, Wisconsin Administrative Code, and Chapters 145 and 160, Wisconsin Statutes. Specifically, we request an alternate approval to s. SPS 384.25(12), 384.30(6)(i), and 383.44(5)(a), based on the Wisconsin Statutes and the Wisconsin Administrative Code (Code). In addition, we request the Private Onsite Wastewater Treatment Systems Technical Advisory Committee (POWTS TAC), review this application at its next meeting on April 24, 2018.

A completed application form and check #125388, in the amount of $250.00 are provided under Tab 1.

In support of this request we provide the following information.

Required Information for Review of POWTS Component Designs

The information below is presented as suggested in the document titled "REQUIRED INFORMATION FOR REVIEW OF POWTS COMPONENT DESIGNS" (Rev. 9/99).

1. Copy of sales brochures, catalogs, or other promotional literature, if any exist.

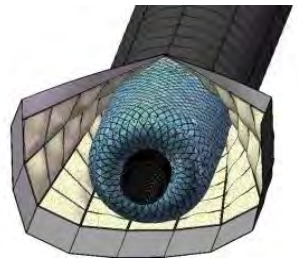
A copy of the Infiltrator ATL cutsheet is provided under Tab 2.

2. Written detailed description of the function of the design. This must also include any recognized limitations of the design.

The Infiltrator ATL System (ATL System) is a patent-pending, proprietary system consisting of six components and is designed for the treatment and dispersal of wastewater having the consistency and strength of typical domestic influent. The six components make up a media network designed to produce high-quality treated effluent.

Upon entering the ATL System, septic tank effluent progresses through each component of the system as follows:

- 4-inch-diameter pipe
- large-diameter synthetic aggregate
- coarse geotextile
- small-diameter synthetic aggregate
- fine geotextile
- 6-inch depth of system sand



ATL Conduit

The first five components are manufactured in modules (conduits), each of which is 10 feet long by 12 inches in nominal diameter. These conduits are connected end-to-end to create a row. ATL conduit rows are installed within a specified sand layer (system sand). Septic tank effluent entering the ATL System is filtered and treated by the components of the system through a combination of biological, physical, and chemical processes.

The first two of the five components which make up the ATL conduit – the 4-inch corrugated pipe and large-diameter synthetic aggregate – are the same materials used in the manufacture of Infiltrator's DSPS-approved EZflow bundled expanded polystyrene (EPS) absorption system product. The 4-inch-diameter pipe and large-diameter EPS aggregate components are encased in a coarse polyester geotextile. A layer of small-diameter EPS aggregate follows this layer of geotextile. A fine polypropylene geotextile encases all of this.

All ATL conduit rows are installed within system sand. "System Sand" is the term used to describe the specified sand material that is placed between and below and the ATL conduits. Use of acceptable system sand is critical to the function of the ATL System. Approved system sand shall be material that meets ASTM C33 specifications.

The following minimum system sand specifications are required for all approved ATL System configurations:

- 6 inches below the ATL conduit rows;
- 12 inches between adjacent ATL conduit rows;
- 12 inches beside (outside) any Infiltrator ATL conduit row with no adjacent conduit row;
- 12 inches extending beyond both ends of the ATL conduit row; and no system sand on top of the ATL conduit rows.

3. Written definitions of terms used in the information submitted. Terms that use their dictionary meaning, need not be defined.

ATL System – Acronym for the Infiltrator Advanced Treatment Leachfield System

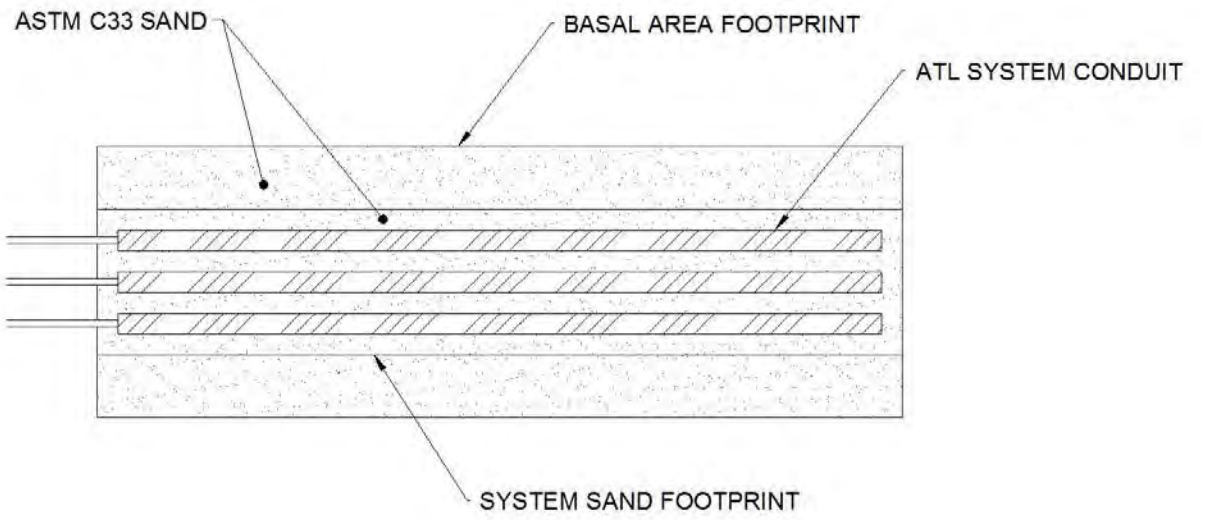
ATL Conduit – The ATL component containing a 4-inch-diameter pipe, large-diameter synthetic aggregate, coarse geotextile, small-diameter synthetic aggregate, and fine geotextile in a prescribed design as shown in the description section of this application. It is used to convey wastewater across the system (see schematic above).

Basal Area Footprint – The area at the bottom of the 6-inch system sand layer created to meet the minimum infiltrative surface area requirements at the interface between the system sand and the native soil (see schematic below).

Sand Extension – The minimum 6-inch-deep system sand layer added to the system sand footprint in order to meet the minimum basal area requirement.

System Sand – The specified sand material that is placed between, beside and below and the ATL conduits. Acceptable system sand shall meet ASTM C33 specifications.

System Sand Footprint – The area that is created by considering the amount of conduit and the system sand between and beside the individual conduit rows (see schematic below).



4. The sizes, colors, locations, information shown and methods for labeling the products and/or design, if any exist. (Actual labels are acceptable.)

A copy of the ATL conduit label is provided under Tab 3.

5. Copy of operation and maintenance manual or instructions.

A copy of the "Design and Installation Manual for the Infiltrator ATL System in Wisconsin" (ATL Manual) is provided under Tab 4. Operation and maintenance instructions are included therein on pages 10-11.

6. Detailed assembly drawings or exploded view of the design.

N/A. The ATL conduits are simply connected end-to-end to form a row, and then encased in system sand. This process is described in Tab 4.

The ATL Manual (see Tab 4) and the Infiltrator ATL System Mound Component Manual (Mound Component Manual) (draft copy provided in Tab 5) both include drawings of the ATL System as installed.

7. A list of all national standards and date of standard to which the finished product and/or design conforms to. Copy of the standards not adopted in chapters ILHR 81 through 86, Wisconsin Administrative Code that the product and/or design conforms to.

The ATL System is NSF/ANSI 40 certified and listed to produce Class I effluent in accordance with the standard. The ATL System NSF/ANSI 40 listing may be found at:

http://info.nsf.org/Certified/Wastewater/Listings.asp?Company=C0058147&Standard=040.

The ATL System has also been shown to produce 2 mg/L cBOD and 3 mg/L TSS as well as Fecal Coliform to less than 1,000 CFU/100mL through independent testing in a pressure-dosed configuration, which complies with SPS 383.41of the Code. Please see answer to Item #8 (below) for additional information on pressure-dosed configuration results.

8. A signed report, by a testing laboratory, or manufacturer; or evidence that the design meets recognized engineering principles for its function and performance in accordance with assertions submitted to the department. Treatment components shall include test reports that indicate treatment capabilities of the component for BOD_5, TSS, Nitrates, Nitrogen, Ammonia, and Fecal Coliform.

A copy of the ATL System NSF/ANSI 40 test report is being forwarded directly from NSF to the Division.

Please see Tab 6 for a letter describing the sampling and testing that was performed on the pressure-dosed ATL System installed at the Massachusetts Alternative Septic System Test Center (MASSTC), Buzzards Bay, MA. See Tab 7 for the data that was collected by MASSTC and Tab 8 for the drawings of the system that was tested.

9. Specifications for construction materials including soil and site.

Specifications for construction materials, including soil and site, are detailed in both the ATL Manual and the Mound Component Manual (see Tabs 4 and 5, respectively).

10. Copy of installation instructions.

Installation instructions are detailed in both the ATL Manual and the Mound Component Manual (see Tabs 4 and 5, respectively).

11. Copy of inspection requirements.

Infiltrator defers to state and local requirements and does not require specific inspection requirements.

Generic ATL System Information

Soil Absorption Field Sizing
Design of the absorption field basal area (in situ soil surface area) with use of the ATL System in Wisconsin shall be based upon soil application rates as specified in Table 383.44-1 or Table 383.44-2 of the Code.

Minimum ATL Conduit Lengths
The minimum design length of ATL conduit in residential applications is 70 feet per bedroom.

Minimum System Size
Each ATL System shall contain a minimum of 140 linear feet (lf) of ATL conduit and a minimum 300 Square feet (sf) of basal area footprint.

Effluent Distribution
The ATL System can accommodate all methods of effluent distribution, including gravity, pump-to-gravity, serial, and pressure distribution. To meet the Tier 3 vertical separation requirement in Wisconsin, the system must utilize pressure distribution.

Dosed Systems
If effluent is pumped to the ATL System, the maximum volume per cycle shall be ≤ 25% of the daily design flow.

Multiple Bed Systems
If site conditions prevent design and installation of a single ATL System bed along the contour, the ATL System may be installed in multiple bed configurations, with the following conditions:

- each bed must run along the length of any contour; and
- each bed must receive equal flow.

Wisconsin POWTS-Specific ATL System Specifications

Influent Strength
Any wastewater that is biologically degradable and of residential strength (300 mg/L BOD and TSS; 10^7 Fecal Coliform) or less can be treated with a properly sized and installed ATL System.

Chemicals
Chemicals, other than normal household cleaning chemicals, are not to be introduced into the ATL System. Do not introduce solvents, paint, aggressive cleaning products, or non-biodegradable objects (i.e. cigarette butts, diapers, feminine hygiene products or cat litter) into any onsite wastewater treatment system.

Maintenance Cycle
The ATL System shall be maintained in accordance with the requirements of the Code.

Level of Maintenance
The gravity ATL System requires no regular maintenance. The pressure dosed ATL System requires minimal maintenance. The level of maintenance required for the entire POWTS utilizing the ATL System is low.

Maintenance Schedule
The ATL System requires no regular maintenance. The maintenance schedule required for the entire POWTS shall be in accordance with the requirements of the Code.

System Owner Information
The ATL Manual (see Tab 4) provides system use recommendations as well as operation and maintenance information on pages 10-11.

Approval Request

Based upon the materials submitted herein, we respectfully request alternate approval to s. SPS 384.25(12), 384.30(6)(i), and 383.44(5)(a), based on the Wisconsin Statutes and the Wisconsin

Administrative Code, as a Sewage Treatment Apparatus (Tier 3 – downsizing for gravity and pressure dosed systems and vertical separation credit for pressure-dosed systems). Again, we request the Private Onsite Wastewater Treatment Systems Technical Advisory Committee (POWTS TAC) review this application at its next meeting on April 24, 2018.

Thank you in advance for your review of this approval request. Please contact me at (785) 760-6932 if any further information is required.

Sincerely,

Allison Blodig, REHS
Senior Regulatory Specialist
Science & Government Affairs

cc: Mr. Trever Wells, Infiltrator Water Technologies

INDEX

Tab 1	Completed Application Form and Check #125388
Tab 2	Infiltrator ATL Cutsheet
Tab 3	Photo of ATL Conduit Label
Tab 4	Design and Installation Manual for the Infiltrator ATL System in Wisconsin
Tab 5	Infiltrator ATL System Mound Component Manual
Tab 6	Signed Letter Describing the Sampling and Testing Done on the Pressure Dosed ATL System
Tab 7	Pressure-Dosed-Configuration Data
Tab 8	Drawings of the Pressure Dosed ATL System Tested at Massachusetts Alternative Septic System Test Center (MASSTC), Buzzards Bay, MA

Wisconsin Department of Safety and Professional Services
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Madison WI 53707-7302

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Scott Walker, Governor
Laura Gutierrez Secretary

Plumbing Standard or Product Review Application

Personal information you provide may be used for secondary purposes Privacy Law, s. 15.04(1)(m)].

This page may be utilized for fax appointments
Complete and indicate date plans will be in our office _____

Instructions: Only one review request may be submitted on this application. Type or clearly print in ink all the requested data. The submitting party must be the manufacturer or the manufacturer's representative. Submit this application to the address shown in the upper right corner. Lists of information required for product review are available from the division.

Make checks payable to: State of WI - DSPS.

1. Manufacturer or Standard Org. Information*			**2. Submitting Party Information***		
Contact Person: Allison Blodig			Contact Person: Same as Manufacturer		
Manufacturer or Standard Organization Name: Infiltrator Water Technologies			Company or Standard Organization Name:		
A Division of:			A Division of:		
No. & Street or P. O. Box 4 Business Park Road			No. & Street or P. O. Box		
City, Town, or Village Old Saybrook	State CT	Zip Code: 06475	City, Town, or Village	State	Zip Code:
Country If Other Than United States:			Country If Other Than United States:		
Telephone No. (include area code) 785-760-6932	Fax No. (include area code) 860-577-7158		Telephone No. (include area code)	Fax No. (include area code)	
E-Mail (contact person or general) ablodig@infiltratorwater.com			E-Mail (contact person or general)		
Web Access Address www.infiltratorwater.com			Web Access Address		

* It is the responsibility of the manufacturer to keep their contact information current and accurate.

3. Product Information

Existing Product File No. (if any)	Product Name: Infiltrator Advanced Treatment Leachfield (ATL)
Model Number(s) - use extra paper if necessary:	Product Description: See enclosed request for approval documents

4. Submittal Type and Required Fees (Check only one box below at left and enter applicable single fee at right for that box.)

.	New Review	Revision or Renewal	Fee Required
☐ Health care plumbing appliance	$250.00	$125.00	_____
☐ Prefabricated plumbing	$250.00	$125.00	_____
☐ Chemical or biochemical treatment for POWTS	$250.00	$125.00	_____
☐ Physical or chemical restoration process for POWTS	$250.00	$125.00	_____
☒ Prefabricated holding or treatment component for POWTS (see note 1)	$250.00	$ 125.00	$250.00
☐ Voluntary POWTS component review in accordance with s. SPS 384.10 (3)	$400.00	$150.00	_____
☐ Wastewater treatment device used to meet the requirements in s. SPS 382.70	$250.00	$125.00	_____
☐ Water treatment device (see note 5) (water softener manufacturers/submitters see note 2)	$250.00	$125.00	_____
☐ Alternate approval in accordance with s. SPS 384.50	$400.00	$200.00	_____
☐ Experimental approval in accordance with s. SPS 384.50	$1,000.00	$500.00	_____
☐ Alternate standard in accordance with s. SPS 381.20 (2) (see notes 3, 4)	$500.00	$250.00	
☐ Minor revision, name and/or address for change of manufacturer's or standard organization (see reverse side)	(Complete information on see reverse side)		_____

Notes:

1. Prefabricated holding or treatment component for POWTS includes items such as anaerobic and aerobic treatment tanks, holding tanks, pump tanks, siphon tanks, sedimentation tanks, and trash tanks.
2. Water softeners that are tested and listed, FOR ALL ADVERTISED CLAIMS, by an ANSI accredited listing agency under NSF/ANSI Standard 44 are exempt from product review and approval.
3. See appendix SPS A-384.11 for list of nationally recognized listing agencies acceptable to the department. The list includes AGA, ASME, ASSE, CSA, IAPMO, ITS, NSF, WQA, and UL.
4. Alternate standards submitted on this form only apply to those standards used in plumbing systems, which are governed by this department.
5. The specific categories of water treatment devices subject to review and approval include:
   a. All residential water treatment devices. "Residential" is defined as one- and two-family dwellings, or up to two dwelling units in a multi-family dwelling.
   b. In-store, consumer self-service, bottled water vending machines.
   c. Commercial water treatment devices installed on non-transient, non-community (NTNC) and transient non-community (TNC) private water supplies to treat contaminants regulated under ch. NR 809, Wis. Adm. Code; and aesthetic commercial water treatment devices installed on NTNC or TNC private water supplies as required pre-treatment for commercial water treatment devices installed on non-transient, non-community (NTNC) and transient non-community (TNC) private water supplies to treat contaminants regulated under ch. NR 809.

Additionally: This form, and the guidance document "Required Information for the Review of Water Treatment Devices", is for use with water treatment devices that are intended for marketing and sales statewide. For site-specific designs, please refer to the General Plumbing Application form (SBD-6154) and associated guidance document "Required Information for the Review of Plumbing Plans for Site Specific Water Treatment Devices."

☐ **Minor revision and/or change of name and/or address for Manufacturer or Standard Organization**

Fee = _____ # of files x $10.00 + $70.00 = _____
(Enter calculated fee on front of form)

Note: Request for revision in accordance with s. SPS 302.66 (1) (c) b. or (2) (b) is not applicable if product is submitted with fees for revision or renewal. The expiration date of the original approval(s) will not be extended if the minor revision is approved. This fee does not apply if done at time or revision or renewal.

Current file numbers affected: (list in numerical order)

Former Manufacturer's or Standard Organization Name and Address information:			**New** Manufacturer's or Standard Organization Name and Address information:		
Contact Person:			Contact Person:		
Manufacturer or Standard Organization Name:			Manufacturer or Standard Organization Name:		
A Division of:			A Division of:		
No. & Street or P. O. Box			No. & Street or P. O. Box		
City, Town, or Village	State	Zip Code:	City, Town, or Village	State	Zip Code:
Country If Other Than United States:			Country If Other Than United States:		
Telephone No. (include area code)			Telephone No. (include area code)		
FAX No. (include area code)			FAX No. (include area code)		
Email (contact person or general):			Email (contact person or general):		
Web Address:			Web Address:		

Briefly describe the minor revision (include Product File No. where appropriate):

Wisconsin Department of Safety and Professional Services
Division of Industry Services
1400 East Washington Avenue
PO Box 7302
Madison WI 53707-7302

Phone: 608-266-2112
Web: http://dsps.wi.gov
Email: dsps@wisconsin.gov

PLUMBING PRODUCTS 7658
NEW SUBMITTALS, REVISIONS AND RENEWALS

Customers of Industry Services (formerly Safety & Buildings),

Effective 9/12/13 the voucher process has been suspended. Please enclose a check or money order for the appropriate amount along with the balance of your submittal. Checks/money orders should be payable to “DSPS”.

ATL™
by INFILTRATOR

ADVANCED TREATMENT LEACHFIELD

INFILTRATOR®
water technologies

Sand-Lined Wastewater Treatment and Dispersal

BENEFITS

- **Produces Class 1 (EPA Secondary) Treated Effluent**
- **A Passive Advanced Treatment Leachfield – No Moving Parts or Power Required**
- **Modules are Quick and Easy to Install**
- **Shallow System Maximizes Site Suitability and Reduces Amount of Sand Fill Requirements**

Proprietary Geotextile/Media
Multi-Layer Treatment System

Protecting the Environment with **Innovative Wastewater Treatment Solutions**

Infiltrator Water Technologies
4 Business Park Road, Old Saybrook CT 06475
1-800-221-4436 • www.infiltratorwater.com

GENERAL INFORMATION

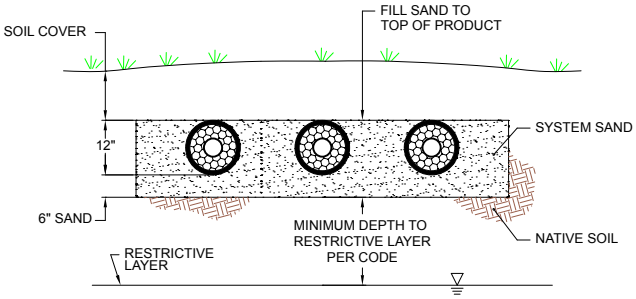
The Infiltrator ATL is a patent-pending, proprietary system consisting of six components. Upon entering the Infiltrator ATL, septic tank effluent progresses through each component as follows:

- 4-inch-diameter pipe
- Large-diameter synthetic aggregate;
- Coarse geotextile;
- Small-diameter synthetic aggregate;
- Fine geotextile; and
- 6-inch depth of specified system sand.

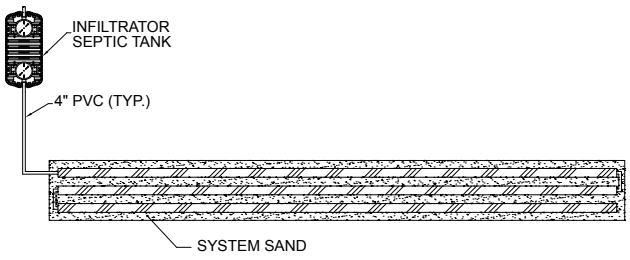
Upon exiting the specified system sand, effluent is dispersed in the native soil.

Level Subsurface Systems

Cross-Section View (not to scale)



Plan View (not to scale)



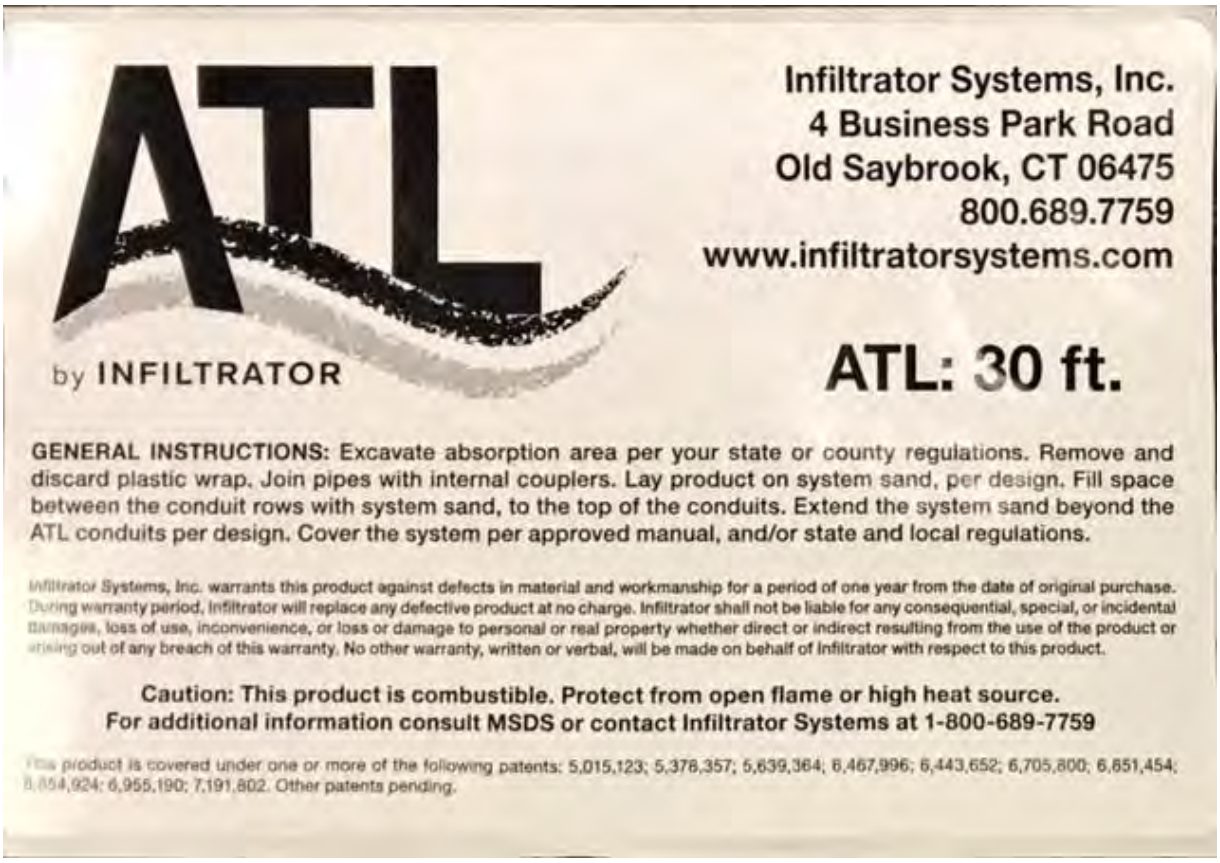
NOTES:

1. Number and length of conduit rows per design.
2. Serial distribution shown, but system may be served by distribution box or manifold to provide parallel distribution.
3. Pumping is not required unless gravity flow cannot be achieved.

INFILTRATOR® water technologies

4 Business Park Road
P.O. Box 768
Old Saybrook, CT 06475
860-577-7000 • Fax 860-577-7001
1-800-221-4436
www.infiltratorwater.com

ATL01 0315


ATL
by INFILTRATOR
Infiltrator Systems, Inc.
4 Business Park Road
Old Saybrook, CT 06475
800.689.7759
www.infiltratorsystems.com
ATL: 30 ft.
GENERAL INSTRUCTIONS: Excavate absorption area per your state or county regulations. Remove and discard plastic wrap. Join pipes with internal couplers. Lay product on system sand, per design. Fill space between the conduit rows with system sand, to the top of the conduits. Extend the system sand beyond the ATL conduits per design. Cover the system per approved manual, and/or state and local regulations.
Infiltrator Systems, Inc. warrants this product against defects in material and workmanship for a period of one year from the date of original purchase. During warranty period, Infiltrator will replace any defective product at no charge. Infiltrator shall not be liable for any consequential, special, or incidental damages, loss of use, inconvenience, or loss or damage to personal or real property whether direct or indirect resulting from the use of the product or arising out of any breach of this warranty. No other warranty, written or verbal, will be made on behalf of Infiltrator with respect to this product.
Caution: This product is combustible. Protect from open flame or high heat source.
For additional information consult MSDS or contact Infiltrator Systems at 1-800-689-7759
This product is covered under one or more of the following patents: 5,015,123; 5,378,357; 5,639,364; 6,467,996; 6,443,652; 6,705,800; 6,851,454; 6,854,924; 6,955,190; 7,191,802. Other patents pending.

INFILTRATOR®
water technologies

Design and Installation Manual for the Infiltrator ATL™ System in Wisconsin

The purpose of this manual is to provide the minimum specifications for design and installation of the Infiltrator ATL (Advanced Treatment Leachfield) System in the State of Wisconsin. All local ordinances, requirements, and procedures must be followed. Each revised version of this manual supersedes the previous version.

The systems presented in this document are common configurations and are provided for illustrative purposes. They are not intended to restrict the use of other configurations.

For more detailed design and installation information, please contact Infiltrator at 1-800-221-4436

Infiltrator ATL System in Wisconsin	
INTRODUCTION	2
STATE-SPECIFIC INFORMATION	3
SYSTEM DESIGN PROCESS	5
DESIGN EXAMPLE	7
INFORMATION FOR SYSTEM OWNERS	10
INSTALLATION INSTRUCTIONS	12
WARRANTY	15

WISCONSIN

Infiltrator ATL System Applications and Design Information

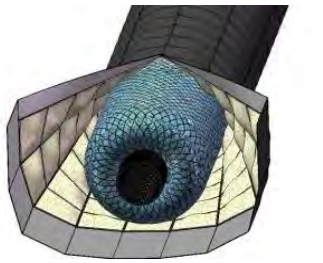
ATL System Type[1]	Infiltrator ATL System Design Document	1-ft Depth Credit Allowed	System Sand Depth (inches)	Effluent Distribution Method
Subsurface bed	Design and Installation Manual for the Infiltrator ATL System in Wisconsin	No	6	Gravity
Subsurface bed	Design and Installation Manual for the Infiltrator ATL System in Wisconsin	Yes	6	Pressure
Above-ground bed	ATL System Mound Component Manual	Yes	6	Pressure
Mound	ATL System Mound Component Manual	Yes	6	Pressure

[1] If any part of the ATL distribution cell is above grade then the ATL System Mound Component Manual shall be used.

The Infiltrator ATL System

The Infiltrator ATL System (ATL System) is a patent-pending, proprietary system consisting of six components. Upon entering the ATL System, septic tank effluent progresses through each component as follows:

- nominally 12-inch-diameter conduit
  - 4-inch-diameter pipe
  - large-diameter synthetic aggregate
  - coarse geotextile
  - small-diameter synthetic aggregate
  - fine geotextile
- 6-inch depth specified system sand



System Sand

"System sand" is the term used to describe the specified sand material that is placed between, beside and below and the ATL conduits. Acceptable system sand shall be material that conforms with ASTM C33 specifications.

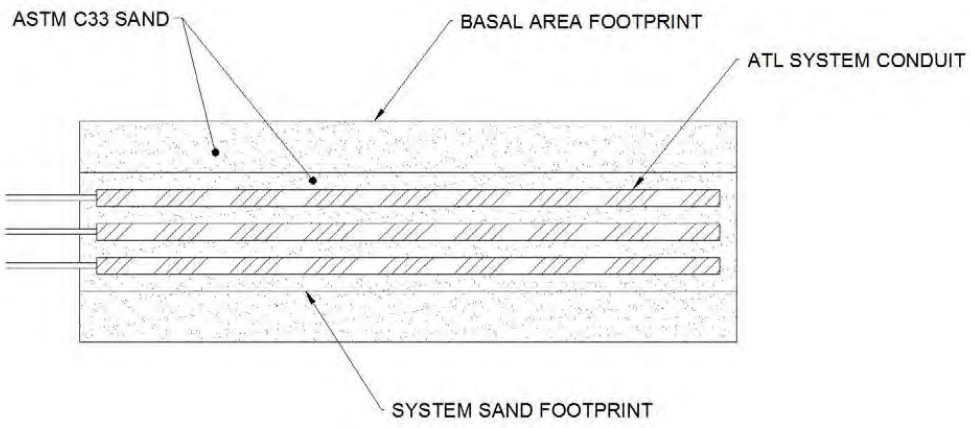
The following minimum system sand dimensions are required for all ATL System configurations:

- 6 inches below the ATL conduit rows;
- 12 inches adjacent to and between adjacent ATL conduit rows; and
- 12 inches extending beyond both ends of the ATL conduit rows.

There is no minimum requirement for system sand on top of the conduit rows

System Sand Footprint: area that is created by considering the amount of conduit and the system sand between and beside the individual conduit rows.

Basal Area Footprint: area beneath the 6-inch system sand layer created to meet the minimum infiltrative surface area requirements at the interface between the system sand and the native soil.



The ATL System specifications were reviewed and determined to comply with chapters SPS 382 through 384, Wisconsin Administrative Code (Code), and Chapters 145 and 160, Wisconsin Statutes. The ATL System has been approved for use in accordance with SPS 384.5(12) Other Treatment Components, 384.30 (6)(i) Special Materials-Synthetic Aggregate, and 383.44 (5)(a) Effluent Distribution as Sewage Treatment Apparatus with the following conditions of use:

- Tier 3 Downsizing with gravity distribution; and
- Tier 3 Downsizing and vertical separation credit with pressure distribution.

This approval allows for design and installation of the ATL System in the State of Wisconsin in accordance with the specifications and instructions in this manual. If design, installation, operation, or maintenance specifications are not specifically addressed in this manual, relevant requirements in chapters SPS 382 through 384 of the Code shall be applicable.

This manual is intended to provide system design, installation, and use information to the users in Wisconsin, including system designers, local health officials, system installers, and system owners. If an elevated system is being designed, the ATL System Mound Component Manual for Wisconsin (ATL Mound Manual) shall be used for the design. Illustrations presented in this manual are common configurations and are not intended to restrict the use of other configurations.

ATL System Sizing
ATL System design specification and instructions are detailed on pages 11-12 of this manual.

Daily Design Flows
Daily design flows shall be in accordance with section 383.43 of the Code.

Effluent Distribution
The ATL System can accommodate all methods of effluent distribution allowed in the Code. In all designs where a vertical separation credit is utilized based upon fecal coliform reduction, the ATL system must be pressurized.

Dosed Systems
If effluent is pumped to the ATL System, the maximum volume per cycle shall be 25 percent of the daily design flow.

Fill and Cover Materials
All cover and fill materials must conform to the requirements of the Code.

The ATL System requires a minimum 6 inches of cover material.

Minimum Separation Distances
Minimum separation distances shall comply with the requirements of the Code.

Horizontal separation distances (setbacks) shall be measured from the outside aspect of the system sand.

Vertical separation distances shall be measured from the bottom of the 6-inch layer of system sand below the conduit rows.

Minimum ATL Conduit Lengths
The minimum design length of ATL conduit in residential applications is 70 feet per bedroom.

Minimum System Size
Each ATL System shall contain a minimum of 140 linear feet (lf) of conduit and a minimum 300 square feet (sf) basal area footprint.

Multiple Bed Systems
If site conditions prevent design and installation of a single ATL System bed along the contour, the ATL System may be installed in multiple bed configurations, with the following conditions:

- each bed must run along the length of any contour; and
- each bed must receive proportional flow.

Elevated Systems
When any portion of the ATL System is above original grade, the system is considered an elevated system, or mound. All elevated systems shall be designed and installed in accordance with the Infiltrator ATL System Mound Component Manual and the Code.

Designing the ATL System in Wisconsin is a four-step process:

1. *Determine the minimum total ATL conduit length required*
2. *Design the system sand configuration*
3. *Calculate the minimum basal area required*
4. *Make area and width adjustments as necessary*

Step 1: Determine the minimum total ATL conduit length required

The minimum length of ATL conduit per bedroom is 70 feet. Determine the minimum total length of ATL conduit from Table 1, based on the number of bedrooms.

Number of Bedrooms	Minimum Conduit Length Required (ft)
2	140
3	210
4	280
5	350
Each additional	70

Table 1: Minimum total length of ATL conduit required

Step 2: Design the system sand configuration

Use Table 2 to determine the minimum system sand footprint using the minimum length of ATL conduit (determined using Table 1) and the number of rows into which the total length of ATL conduit will be divided. The system should be designed as long and narrow as site conditions allow.

Minimum Length of Conduit (ft)	Minimum System Sand Footprint Dimensions and Area							
	3 Conduit Rows		4 Conduit Rows		5 Conduit Rows		6 Conduit Rows	
	Dimensions (W' x L')	Area (sf)	Dimensions (W' x L')	Area (sf)	Dimensions (W' x L')	Area (sf)	Dimensions (W' x L')	Area (sf)
140	7 x 52	364	9 x 42	378	11 x 32	352	13 x 32	416
210	7 x 72	504	9 x 62	558	11 x 52	572	13 x 42	546
280	7 x 102	714	9 x 72	648	11 x 62	682	13 x 52	676
350	7 x 122	854	9 x 92	828	11 x 72	792	13 x 62	806

Table 2: Minimum system sand footprint dimensions and area

NOTES:

1. *The conduits come in 10-foot lengths; all conduit row length calculations in Table 2 are rounded up to the nearest 10 feet.*
2. *The conduit rows must be extended to within 12 inches of each end of the bed. The dimensions above include 12 inches of sand on each end of the conduit rows.*
3. *The system should be designed as long and narrow as site conditions allow. Therefore, the number of conduit rows should be minimized.*
4. *Multiple bed systems: where site conditions or other considerations require multiple beds, the row-specific length dimensions in Table 2 may be modified to account for the number of beds.*
5. *Table 2 provides examples of dimensions and area; other configurations are allowed.*

Step 3: Calculate the minimum basal area required

Investigate the site in accordance with the Code to determine the soil loading rate. Calculate the minimum basal area required by dividing the daily design flow by this soil loading rate. Verify the 300-sf minimum area requirement is satisfied.

Step 4: Make area and width adjustments as necessary

First, verify that the minimum ATL conduit length required (140 ft) and minimum basal area required (300 sf) have been met.

The minimum areas required in Step 2 (system sand configuration) and Step 3 (basal area) cannot be reduced. These areas must be maintained to ensure adequate area for placement of the conduits and infiltration of treated effluent into the native soil.

Sand extensions are necessary as follows:

- If the minimum basal area determined in Step 3 is smaller than the area of the system sand footprint determined in Step 2, no sand extensions are necessary.
- If the minimum basal area determined in Step 3 is larger than the area of the system sand footprint determined in Step 2, sand extensions must be added to meet the minimum basal area footprint requirements. When adding sand extensions in level system applications, additional width shall be evenly divided on each side of the ATL System; and
- In sloped applications, additional width shall be placed entirely on the downslope side of the ATL System. For elevated or mound systems, this manual does not apply. See the Infiltrator ATL System Mound Component Manual.

NOTE: *The length of the bed area may be altered, but only by extending the conduit rows. This method may be preferred over increasing the width of the system under certain site and system design considerations.*

The following sample system design calculation is intended to illustrate the methodology for designing an in-ground ATL System on a site with no slope. The sample system design calculations are provided in the step-by-step format described above.

System sample specifications:

- 4-bedroom home
- 0.6 gallons per day per square foot (gal/day/sf) soil loading rate.
- 0% slope on site

Step 1: Determine the minimum total conduit length required

Based upon the number of bedrooms, the minimum length of ATL conduit from Table 1 is 280 ft.

Number of Bedrooms	Minimum Conduit Length Required (ft)
2	140
3	210
4 →	280
5	350
Each additional	70

Table 1: Minimum total length of ATL conduit required

Step 2: Design the system sand configuration

Per Table 2 below, for a system which must include a minimum of 280 ft of ATL conduit, the following configurations could be used, as allowed per site conditions. The design and system sand configurations below are examples, other configurations are allowed.

- **3 conduit rows – 7 ft wide x 102 ft long (714 sf)**
- 4 conduit rows – 9 ft wide x 72 ft long (648 sf)
- 5 conduit rows – 11 ft wide x 62 ft long (682 sf)
- 6 conduit rows – 13 ft wide x 52 ft long (676 sf)

Select a 3-conduit-row system for this example.

Minimum Length of Conduit (ft)	Minimum System Sand Footprint Dimensions and Area							
	3 Conduit Rows		4 Conduit Rows		5 Conduit Rows		6 Conduit Rows	
	Dimensions (W' x L')	Area (sf)	Dimensions (W' x L')	Area (sf)	Dimensions (W' x L')	Area (sf)	Dimensions (W' x L')	Area (sf)
140	7 x 52	364	9 x 42	378	11 x 32	352	13 x 32	416
210	7 x 72	504	9 x 62	558	11 x 52	572	13 x 42	546
280 →	7 x 102	714	9 x 72	648	11 x 62	682	13 x 52	676
350	7 x 122	854	9 x 92	828	11 x 72	792	13 x 62	806

Table 2: Minimum system sand footprint dimensions and area

Step 3: Calculate the minimum basal area required

At 150 gallons per day per bedroom (gal/day/br), the daily design flow for this 4-bedroom system is 600 gallons per day (gal/day). 600 gal/day divided by 0.6 gal/day/sf equals 1,000 sf.

The minimum basal area required for this 4-bedroom system in a 0.6 gal/day/sf soil is 1,000 sf.

Step 4: Make area and width adjustments as necessary

The minimum ATL conduit length required (140 ft) is met by the 280 lf of ATL conduit in this system design (Step 1). The minimum basal area required (300 sf) has been met by the 714-sf basal area in the system design (Step 2).

As determined in Step 2, the minimum length of the system is 102 feet and the minimum width of the system is 7 feet, creating a system sand footprint of 714 sf. Since the 1,000-sf minimum basal area (Step 3) is larger than the 714-sf system sand footprint (Step 2), sand extensions must be added.

- *Divide the minimum basal area required by the length of the system sand footprint as designed.* — *1,000 sf ÷ 102 ft = 9.8 ft*

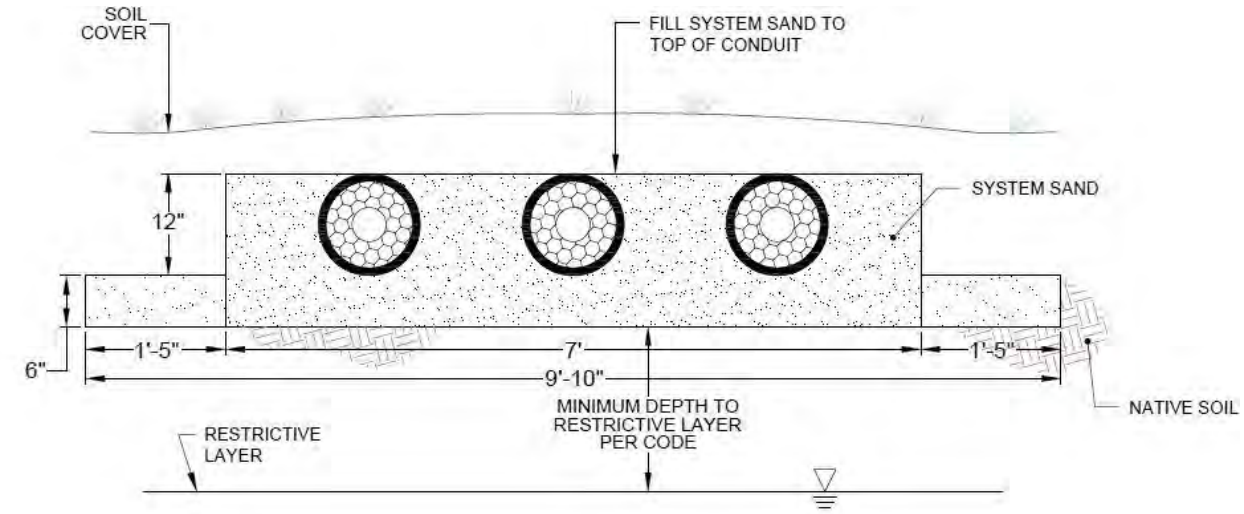
- *Subtract the design system sand footprint width from the above adjusted system sand footprint width to determine the width of the sand extension required.* — *9.8 ft - 7 ft = 2.8 ft*

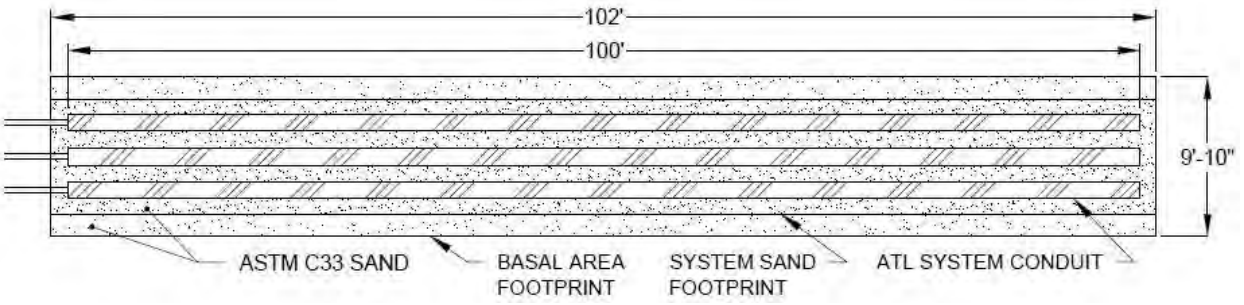
- *Divide the total width of the sand extension required as calculated above by 2 to determine the minimum width of the sand extension required on each side of the system.* — *2.8 ft ÷ 2 = 1.4 ft (1 ft 5 in)*

  NOTE: *Round up and convert to feet/inches for ease of installation.*

- *The system sand width must be widened by 2.8 ft. On a level site, this is accomplished by adding a 1-ft 5-in-wide sand extension to the entire length of each side of the system. This results in a total basal area footprint width of 9.8 ft.* — *9.8 ft x 102 ft = 1,000 sf*

NOTE: On a sloped site, the entire sand extension is added onto the downslope side of the system sand footprint. In the above example, a 2.8-ft sand extension would be added on the downslope side of the system.


SOIL COVER
FILL SYSTEM SAND TO TOP OF CONDUIT
SYSTEM SAND
12"
6"
1'-5"
7'
1'-5"
9'-10"
NATIVE SOIL
MINIMUM DEPTH TO RESTRICTIVE LAYER PER CODE
RESTRICTIVE LAYER


102'
100'
9'-10"
ASTM C33 SAND
BASAL AREA FOOTPRINT
SYSTEM SAND FOOTPRINT
ATL SYSTEM CONDUIT

Basic rules of onsite sewage treatment system use, and care apply to the ATL System. System owners shall operate the system in accordance with the procedures and specifications described in the Code, all local regulations, and the following:

System Use and Abuse

Your ATL System is intended for use with residential-strength wastewater within the design daily flow volume. To ensure long-term function of your system:

- Keep daily wastewater flow within design parameters.
- Do not connect the rainwater management system to the ATL System.
- Direct water from the rainwater management system away from the ATL System.
- Solvents, paint, pharmaceuticals, aggressive cleaning products, and non-biodegradable items should not enter the ATL System.
- Solids, such as but not limited to, cigarette butts, diapers, feminine hygiene products, cat litter, and paper towels should not be introduced into the ATL system.
- Introduce only normal residential wastewater into the system
- Maintain leak-free household plumbing fixtures, such as faucets and toilets.
- Do not utilize a garbage grinder.
- The ATL System is intended for use in non-traffic applications.

Operation and Maintenance

Your ATL System has no specific operating instructions. Proper use of the system as noted above is the primary operating concern.

Maintenance of the ATL System includes the following:

- If the septic tank has an effluent filter, it should be cleaned by a qualified professional on an annual basis.
- The septic tank should be pumped on a regular basis and, if concrete, checked for leaks and cracks. The interval for septic tank pumping varies depending upon use. Check with a qualified professional or your local health department for the appropriate pumping interval.
- If present, the alarm system should be tested annually by a qualified professional to ensure that it is functional.

If at any time you have concerns about the use, operation, or maintenance of your ATL System, contact the Infiltrator's Technical Services Department at 1-800-221-4436.

System Start-up

There are no specific requirements for placing the ATL System into service. If the system has an alarm, a qualified professional should, after system use has been initiated, test the alarm to ensure it is functional.

Intermittent Use

The ATL System is designed for intermittent use and requires no special attention if it is to be placed out of use for extended periods of time.

Trouble Shooting

In the event that any of the following indicators arise, contact a qualified professional.

- Wastewater back-up into the dwelling
- Persistent septic odor
- Unusually wet area atop and/or around the system
- "Breakout" of effluent along the side of a slope or other landscape feature

Repair

A qualified professional shall be contacted when there are indications of malfunction with the ATL System. When visiting the site, the qualified professional should, at a minimum, do the following:

- Assess the present condition of the ATL System and the surrounding area
- Research the history of use, including:
    - water volume use
    - contaminants
- Evaluate the site for groundwater intrusion
- Inspect the septic tank
- Inspect the conduit rows
- Check faucet and toilet function

Upon completion of the site visit, the qualified onsite wastewater system professional should contact the Infiltrator's Technical Services Department with the inspection report.

These installation instructions are for the ATL System in Wisconsin. ATL Systems may only be installed according to this manual, the Code, and any other local regulations.

If unsure of the installation requirements for a site, contact the qualified professional responsible for the design. If unsure of the use of the ATL System, contact Infiltrator. A permit which includes the soil evaluation and the design of the onsite system must be filed with and accepted by the local health department before installation.

Before You Begin

Materials and Equipment Needed

- ☐ conduits
- ☐ System sand
- ☐ PVC pipe and couplings
- ☐ Backhoe
- ☐ Laser or transit
- ☐ Shovel and rake
- ☐ Observation port and cap per design
- ☐ Endcaps
- ☐ 4-in internal corrugated pipe couplers
- ☐ Tape measure

Common practices shall apply to the installation of the ATL System. These include, but are not limited to:

- ☐ avoid soil compaction on the infiltrative surface area, including all areas downslope of a sloped system; and
- ☐ install the conduits and system sand on the same day that the system footprint is excavated/exposed.

The use of tracked vehicles for material installation is preferred.

Excavating and Preparing the Site

NOTE: *The ATL System may not be installed during periods when the soil is sufficiently wet to exceed its plastic limit, as this causes machinery to smear the soil.*

1. Stake out the locations of tank(s), pipes, conduit rows, and corners of the system to be scarified/excavated, per design. Set the elevations as shown on the approved plan. *[**NOTE:** The proper elevation of solid PVC header line going to each conduit row should be determined to ensure compliance with the required system bottom depth as shown* on *the approved permit. This height may vary dependent on system height and configuration used.]*
2. Install sedimentation and erosion control measures. *[**NOTE:** The installation of temporary drainage swales/berms (surface diversions) may be necessary to protect the site during rainfall events.]*
3. Excavate the bed area per design.
4. Rake the bed bottom and sides if smearing has occurred during excavation. Remove large stones and cut off protruding roots, fill voids with compacted system sand. *[**NOTE:** Smearing does not occur in sandy soils, so raking is not necessary. In fine textured soils (silts and clays), avoid walking on the excavation bottom to prevent compaction and loss of soil structure.]*
5. Verify that the bed area is at the proper slope from side-to-side and from end-to-end using a transit or laser.

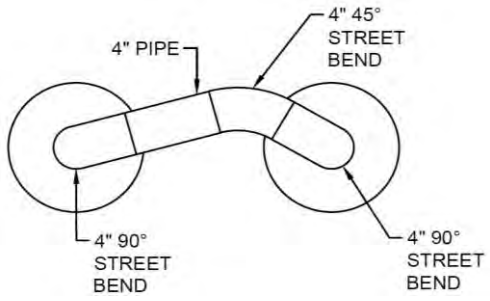
Installing the System

1. Install the system sand over the entire ATL System bed area as per design. ^”-deep system sand layer should be leveled and stabilized prior to introduction of the conduits. The installer should retain records verifying that system sand meets the specifications for ASTM C33 sand.
2. Remove plastic stretch wrap from conduits.
3. Place conduits on the surface of the system sand with the white stripe/seam in the 12 o’clock position, arranged in the configuration shown on the system design. Using the provided 4-in-diameter internal pipe couplings, connect the conduits end-to-end to create rows of the required length.
4. Conduits shall be installed level. A laser level or transit is recommended to ensure proper alignment.

5. Conduit rows shall be:
   - installed on a level plane with one another;
   - be installed parallel to any contours;
   - be separated by a minimum of 12 in of system sand; and
   - be installed with the white stripe/seam oriented in the 12 o'clock position.

NOTE: *Individual ATL conduits shall not be cut or modified.*

6. In serial distribution applications, use of a raised connection is recommended. One example of a raised connection is shown below:



7. Install a cap on the end of each conduit row that is not connected with piping.
8. Once the conduit is placed on the surface of the system sand and distribution piping is connected to the conduits per design, additional system sand shall be ladled beside and between, and to the top, of each of the conduit rows. System sand shall also be installed on each side and at each end of the backfilled conduit rows, per the design. This additional system sand shall be stabilized. Where possible, all machine work should be done from the uphill side of the infiltration area to reduce possible compaction of the receiving soil area.

Installing Observation/Monitoring Ports

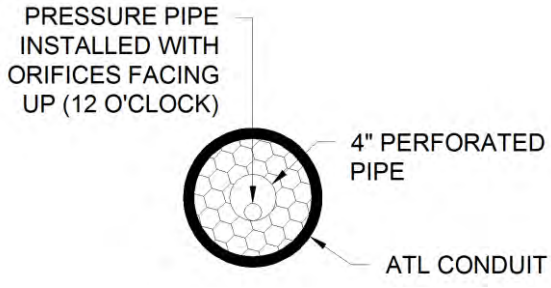
If observation or monitoring ports are specified in the system design:

1. Cut a 4-inch PVC pipe to the desired length, ensuring the pipe will extend a minimum of 6 inches above final grade.
2. Drill a minimum of ten ¼" to ½" holes within ½ to 6 inches of the bottom of the pipe, and wrap the bottom end of the pipe in filter fabric.
3. Install the monitoring pipe at the appropriate location, based on site conditions, and ensure the bottom of the pipe is at the bottom of the system sand footprint (at the system sand/native soil interface).
4. Install a removable, water-tight, secure cover cap.

Installing Pressure Distribution

If pressure distribution is preferred, the pressure distribution system shall be designed and installed in accordance with the Code. The orifices in the distribution lateral shall be oriented towards the top of the pipe.

The distribution laterals should be placed within the 4–inch-diameter ATL conduit distribution pipe for the entire length of each ATL conduit row, as shown below.



Sweeping cleanouts should be placed at the terminal end of each lateral and be accessible from grade and should be the same diameter piping as the main lateral.

- A ball valve or threaded cap should be located on the end of the cleanout that allows the lateral to be flushed.
- Prior to pressurization of the distribution laterals, the system should

be flushed with clean water while all of the terminal ball valves are open or caps are removed.

- Cleanout access risers shall not extend past the installation depth of the drainfield and native soil or medium sand interface."

In order to ensure that the small-diameter laterals are placed at the bottom of the 4-inch distribution pipe within the ATL conduit row, drill an appropriately-sized hole in the 4" end cap at its bottom (see picture below):

Covering the System

NOTE: *Before backfilling, the system shall be inspected as required in the Code and in compliance with all local ordinances and procedures.*

1. Material placed around the system sand and atop the conduits may be additional system sand or material which meets the requirements of the code.
2. Backfill the trench(es) or bed by pushing material over the ATL System. Cover material shall be a minimum of 6 inches deep. It is best to mound several extra inches of soil over the finish grade to allow for settling. This also ensures that runoff is diverted away from the system. *[**NOTE:** Do not drive over the system while backfilling in sand.]*
3. After the system is covered, the site should be seeded or sodded. Ensure that sand-based sod, and not clay-based sod, is used to mitigate the potential for erosion.

NOTE: *If the system is for new home construction, it is important to leave marking stakes along the boundary of the system.*

INFILTRATOR WATER TECHNOLOGIES, LLC ("Infiltrator")

ATL SYSTEM STANDARD LIMITED WARRANTY

(a) The structural integrity of the Infiltrator ATL System conduits manufactured by Infiltrator (collectively referred to as "Units"), when installed and operated in a leachfield of an onsite septic system in accordance with Infiltrator's installation instructions, is warranted to the original purchaser ("Holder") against defective materials and workmanship for one year from the date upon which Letter of Certification is issued for the septic system containing the Units provided, however, that if a septic permit is not required for the septic system by applicable law, the one (1) year warranty period will begin upon the date that installation of the septic system commences. In order to exercise its warranty rights, Holder must notify Infiltrator in writing at its corporate headquarters in Old Saybrook, Connecticut within fifteen (15) days of the alleged defect. Infiltrator will supply replacement Units for those Units determined by Infiltrator to be defective and covered by this Limited Warranty. Infiltrator's liability specifically excludes the cost of removal and/or installation of the Units.

(b) THE LIMITED WARRANTY AND REMEDIES IN SUBPARAGRAPH (a) ARE EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE UNITS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

(c) This Limited Warranty shall be void if any part of the ATL System components is manufactured by anyone other than Infiltrator. The Limited Warranty does not extend to incidental, consequential, special or indirect damages. Infiltrator shall not be liable for penalties or liquidated damages, including loss of production and profits, labor and materials, overhead costs, or other losses or expenses incurred by the Holder or any third party. Specifically excluded from Limited Warranty coverage are damage to the Units due to ordinary wear and tear, alteration, accident, misuse, abuse or neglect of the Units; the Units being subjected to vehicle traffic or other conditions which are not permitted by the installation instructions; failure to maintain the minimum ground covers set forth in the installation instructions; the placement of improper materials into the system containing the Units; failure of the Units or the septic system due to improper siting or improper sizing, excessive water usage, improper grease disposal, or improper operation; or any other event not caused by Infiltrator. This Limited Warranty shall be void if the Holder fails to comply with all of the terms set forth in this Limited Warranty.

Further, in no event shall Infiltrator be responsible for any loss or damage to the Holder, the Units, or any third party resulting from installation or shipment, or from any product liability claims of Holder or any third party. For this Limited Warranty to apply, the Units must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and Infiltrator's installation instructions.

(d) No representative of Infiltrator has the authority to change this Limited Warranty in any manner whatsoever, or to extend this Limited Warranty. No warranty applies to any party other than the original Holder.

* * * * * * *

The above represents the standard Limited Warranty offered by Infiltrator. A limited number of states and counties have different warranty requirements. Any purchaser of Units should contact Infiltrator's corporate headquarters in Old Saybrook, Connecticut, prior to such purchase, to obtain a copy of the applicable warranty, and should carefully read that warranty prior to the purchase of Units.

INFILTRATOR®
water technologies

P.O. Box 768 • Old Saybrook, CT 06475
800-221-4436

ATL SYSTEM MOUND

COMPONENT MANUAL

April 2018

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This component manual was produced exclusively for use with ATL products. This manual is originally based upon the "Mound Component Manual for Onsite Wastewater Treatment Systems" Ver. 2.0, October 2012, by the State of Wisconsin, Department of Safety and Professional Services, with periodic updates applied.

Infiltrator Water Technologies (Infiltrator) reserves the right to revise this component manual according to changes in regulations or ATL system installation instructions.

ATL SYSTEM APPLICATIONS INFORMATION

ATL System Type[1]	Infiltrator ATL System Design Document	1-ft Depth Credit Allowed	System Sand Depth (inches)	Effluent Distribution Method
Subsurface bed	Design and Installation Manual for the Infiltrator ATL System in Wisconsin	No	6	Gravity
Subsurface bed	Design and Installation Manual for the Infiltrator ATL System in Wisconsin	Yes	6	Pressure
Above-ground bed	ATL System Mound Component Manual	Yes	6	Pressure
Mound	ATL System Mound Component Manual	Yes	6	Pressure

[1] If any part of the ATL distribution cell is above grade then the ATL System Mound Component Manual shall be used.

I. INTRODUCTION AND SPECIFICATIONS

This Private Onsite Wastewater Treatment System (POWTS) component manual provides design, construction, inspection, operation, and maintenance specifications for an ATL mound component. However, these items must accompany a properly prepared and reviewed plan acceptable to the governing unit to help provide a system that can be installed and function properly. Violations of this manual constitute a violation of SPS 383 and 384, Wis. Adm. Code. The ATL System mound component must receive influent flows and loads less than or equal to those specified in Table 1. When designed, installed, and maintained in accordance with this manual, the ATL System mound component provides treatment and dispersal of domestic wastewater in conformance with SPS 383 of the Wis. Adm. Code. Final effluent characteristics will comply with SPS 383.41, Wis. Adm. Code when inputs are within the range specified in Tables 1 to 3.

Note: Detailed plans and specifications must be developed and submitted to be reviewed and approved by the governing unit having authority over the plan for the installation. Also, a Sanitary Permit must be obtained from the department or governmental unit having jurisdiction. See Section XII for more details.

Table 1
INFLUENT FLOWS AND LOADS

Design wastewater flow (DWF)	≤ 5000 gal/day
Monthly average value of Fats, Oil and Grease (FOG)	≤ 30 mg/L
Monthly average value of five-day Biochemical Oxygen Demand (BOD_5)	≤ 220 mg/L
Monthly average value of Total Suspended Solids (TSS)	≤ 150 mg/L
Design loading rate of fill	≤ 2.0 gal/ ft^2/day if BOD_5 and TSS ≤ 30 mg/L
Design loading rate of the basal area	= soil application rate of effluent with maximum monthly average values of BOD_5 and TSS of ≤ 30 mg/L as per SPS Table 383.44-1 or Table 383.44-2
Volume of a single dose to absorption component	≥ 5 times void volume of the distribution lateral (s) and ≤ 25% of the design wastewater flow.
Design wastewater flow (DWF) from one and two-family dwellings	Based on SPS 383.43 (3), (4), or (5), Wis. Adm. Code
Design wastewater flow (DWF) from public facilities	≥ 150% of estimated daily wastewater flow in accordance with Table 4 of this manual or SPS 383.43 (6), Wis. Adm. Code
Linear loading rate for systems with in situ soils having a soil application rate of ≤ 0.3 gal/ft^2/day within 12 inches of fill material	≤ 4.5 gal/ft/day
Wastewater particle size	≤ 1/8 inch
Distribution cell area per orifice	≤ 12 ft^2

Table 2a SIZE AND ORIENTATION	
Distribution cell width (A)[a]	≤ 9 ft = Product widths are shown in Table 2b
Distribution cell length (B)[a]	Product length is shown in Table 2c
Total distribution cell area (A x B)[a]	A x B (See Table 2b)
Required product amount	70 linear feet/bedroom
Orientation	Longest dimension parallel to surface grade contours on sloping sites.
Deflection of distribution cell on concave slopes	≤ 10%
Fill material depth at up slope edge of distribution cell (D)[a]	The depth of additional sand fill under the distribution cell is based on the minimum depth of unsaturated soil required from treatment listed in Table 383.44-1 or Table 383.44-3 WI Adm. Code. Under the 6 inches of system sand required for the ATL System, any additional sand fill that is required is on an inch-by-inch basis. If 24 inches of suitable insitu soil is available, then D = 0 inches. If 20 inches of in-situ soil is available, then D = 4 inches.
Distribution cell depth (F)[a]	Product height of 12 inches + system sand of 6 inches = 18 inches
Depth of cover material at top center of distribution cell area (H)[a]	≥ 12 inches
Depth of cover material at top outer edge of distribution cell area (G)[a]	≥ 6 inches
Basal area	≥ Design wastewater flow rate ÷ Design loading rate of basal area as specified in Table 1
Soil application rate	Per SPS Table 383.44-1 or Table 383.44-2 Wis. Adm. Code for BOD_5 ≤30 mg/L and TSS ≤30 mg/L

[a] Letter corresponds to letters referenced in figures, formulas and on worksheets

Table 2b MINIMUM SYSTEM SAND FOOTPRINT DIMENSIONS AND AREA						
Minimum Length of Conduit (ft)	**2 Conduit Rows**		**3 Conduit Rows**		**4 Conduit Rows**	
	Dimensions (A' x B') [a]	**Area (sf)**	**Dimensions (A' x B') [a]**	**Area (sf)**	**Dimensions (A' x B') [a]**	**Area (sf)**
140	3 x 70	210	5 x 50	250	7 x 40	280
210	3 x 110	330	5 x 70	350	7 x 60	420
280	3 x 140	420	5 x 100	500	7 x 70	490
350	3 x 180	540	5 x 120	700	7 x 90	630

Table 2c MINIMUM TOTAL LENGTH OF CONDUIT	
Number of Bedrooms	**Minimum Conduit Length Required (ft)**
2	140
3	210
4	280
5	350
Each additional	70

NOTES:

a. Corresponds to letters referenced in figures, formulas and on worksheets.
b. The conduit rows must be extended to within 12 inches of each end of the bed. The dimensions above include 12 inches of system sand in between each of the conduit rows.
c. Table 2b provides examples of dimensions and area; other configurations are allowed.
d. The conduits are manufactured in 10-foot lengths; all conduit row length calculations in Table 2c are rounded up to the nearest 10 feet.
e. Multiple bed systems: where site conditions or other considerations require multiple beds, the row-specific length dimensions in Table 2c may be modified to account for the number of beds.

Table 3 OTHER SPECIFICATIONS	
Bottom of distribution cell	Level
Slope of original grade	≤ 25% in area of basal area of the mound
Depth of in situ soil to high groundwater elevation and bedrock under basal area	≥ 6 inches
Vertical separation between distribution cell infiltrative surface and seasonal saturation defined by redoximorphic features, groundwater, or bedrock	≥ 2 ft measured to the bottom of the ATL system sand.
Horizontal separation between distribution cells	≥ 3 ft
Fill material	Meets ASTM Specification C33 for fine aggregate
Size for basal area (for level sites) (B x W) [a]	Cell length x [Total mound width]
Size for basal area (for sloping sites) (B x {A +I}) [a]	Cell length x [(# of cells x cell width) + ({# of cells – 1} x cell spacing) + down slope width]
Observation pipe material	Shall conform with requirements in SPS 383 Table 384.30-1, Wis. Adm. Code
Effluent application	By use of pressure distribution network only. Conforming to sizing methods of either Small Scale Waste Management Project publication 9.6, entitled "Design of Pressure Distribution Networks for Septic Tank – Soil Absorption Systems" or Dept. of Safety and Professional Services publications SBD-10573-P or SBD-10706-P, entitled "Pressure Distribution Component Manual for Private Onsite Wastewater Treatment Systems"
Piping Material	Meets requirements of SPS 384.30 (2), Wis. Adm. Code for its intended use
Distribution cell aggregate material	ATL conduits as listed in Table 2b
Number of observation pipes per distribution cell	≥ 2
Location of observation pipes	At opposite ends of the distribution cell. Observation pipes must be located at the junction point between two products to not create separation of the bundles within a product.
Maximum final slope of mound surface	≤ 3:1

Table 3 OTHER SPECIFICATIONS (continued)	
Cover material	Soil that will provide frost protection, prevent erosion and excess precipitation or runoff infiltration and allow air to enter the distribution cell
Grading of surrounding area	Graded to divert surface water around mound system
Limited activities	Unless otherwise specifically allowed in this manual, vehicular traffic, excavation, and soil compaction are prohibited in the basal area and 15 feet down slope of basal area, if there is a restrictive horizon that negatively affects treatment or dispersal
Installation inspection	In accordance with SPS 383, Wis. Adm. Code
Management	In accordance with SPS 383, Wis. Adm. Code and this manual

Note a: Letter corresponds to letters referenced in figures, formulas and on worksheets.

II. DEFINITIONS

Definitions not found in this section, are in SPS 381 of the Wisconsin Administrative Code or the terms use the standard dictionary definition.

A. "Basal Area" means the effective in situ soil surface area available for infiltration of partially treated effluent from the fill material.

B. "Conduit" means Infiltrator ATL System component made up of 4-inch-diameter pipe, large-diameter synthetic aggregate, coarse geotextile, small-diameter synthetic aggregate, fine geotextile

C. "Deflection of distribution cell" means the ratio between the maximum distance between the down slope edge of a concave distribution cell to the length of a perpendicular line that intersects the furthest points of the contour line along the down slope edge of the distribution cell.

D. "Distribution cell area" means the area within the ATL System mound where the effluent is distributed into the system sand and then into the fill material or in situ soil.

E. "Fill Material" means sand that meets specifications of ASTM Specification C33 for fine aggregate and is used along the sides of and could be under the distribution cell to provide treatment of effluent.

F. "Limiting Factor" means high groundwater elevation or bedrock.

G. "Mound" means an on-site wastewater treatment and dispersal component. The structure contains a distribution cell area surrounded by suitable fill material. The fill material provides a measurable degree of wastewater treatment and allows effluent dispersal into the natural environment under various soil permeability.

H. “Original Grade” means that land elevation immediately prior to the construction of the mound system.

I. “Parallel to surface grade contours on sloping sites” means the mound is on the contour except that a 1% cross slope is allowed along the length of the mound. See SPS 383 Appendix A-383.44 ORIENTATION (6).

J. “Permeable Soil” means soil with textural classifications according to the U.S. Department of Agriculture, Natural Resource Conservation Service, classification system of silt loam to gravelly medium sand.

K. “Product” means one ATL conduit manufactured by Infiltrator.

L. “Sand Extension” means addition system sand which is added to the system sand footprint to meet the minimum basal area requirement.

M. “Slowly Permeable Soil” means soil with textural classifications according to the U.S. Department of Agriculture, Natural Resource Conservation Service, classification system of clay loams and silty clay loams that exhibit a moderate grade of structure; and loams, silt loams, and silts with weak grades of structure; or soils with weak to moderate grades of platy structure.

N. “System Sand” means the sand material that is used along the sides of and under the ATL System Conduits to provide treatment of effluent. Acceptable system sand shall meet ASTM Specification C33.

O. “Unsaturated flow” means liquid flow through a soil media under a negative pressure potential. Liquids containing pathogens and pollutants come in direct contact with soil/fill material microsites, which enhances wastewater treatment by physical, biological, and chemical means.

P. “Vertical Flow” means the effluent flow path downward through soil or fill material, which involves travel along soil surfaces, or through soil pores.

Q. “Vertical Separation” means the total depth of unsaturated soil that exists between the infiltrative surface of a distribution cell and limiting factor (as indicated by redoximorphic features, groundwater, or bedrock).

III. DESCRIPTION AND PRINCIPLE OF OPERATION

The ATL System mound component operation is a two-stage process involving both wastewater treatment and dispersal. Treatment is accomplished within the ATL System mound by physical and biochemical processes within the product, the fill material, and the insitu soil. The fill material and insitu soil also provide dispersal and separation distance to limiting conditions and form the mound.

Cover material consisting of material that provides erosion protection, a barrier to excess precipitation infiltration, and allows gas exchange is added. See Figure 1 for a typical mound system.

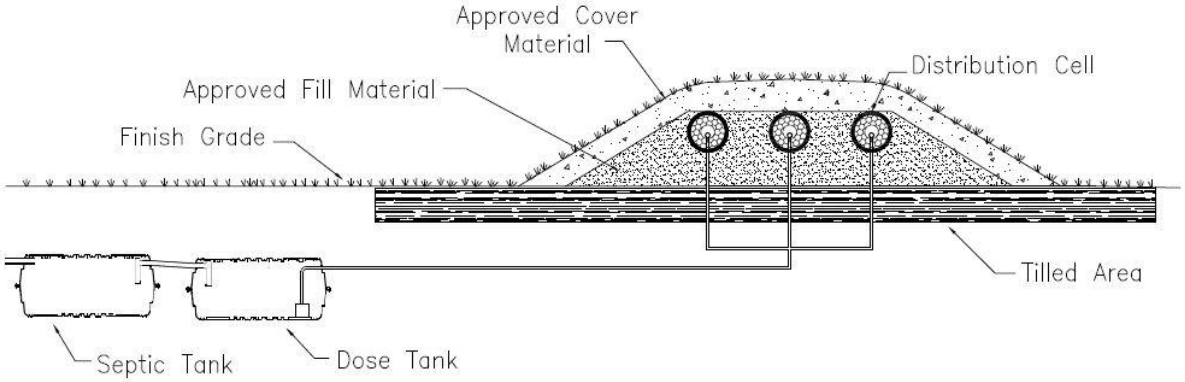


Figure 1. A cross-section of an ATL System mound for POWTS

IV. SOIL AND SITE REQUIREMENTS

Every ATL System mound design is ultimately matched to the given soil and site.

The design approach presented in this manual is based on criteria that all applied wastewater is successfully transported away from the system, that it will not affect subsequent wastewater additions, and that the effluent is ultimately treated.

A. Minimum Soil Depth Requirements - The minimum soil factors required for successful ATL System mound performance are listed in the introduction and specification section of this manual.

Soil evaluations must be in accordance with SPS 385 of the Wis. Adm. Code. In addition, soil application rates must be in accordance with SPS 383 of the Wis. Adm. Code.

B. Other Site Considerations -

1. Slopes - The slope on which an ATL System mound is to be installed may not indicate the direction of groundwater movement. If there is documentation that the direction of groundwater movement is different than the slope of the land, the direction of groundwater movement must be considered during ATL System mound design.

On a crested site the fill can be situated such that the effluent can move laterally down both slopes. A level site allows lateral flow in all directions but may present problems as the water table could rise higher beneath the fill in slowly permeable soils. The sloping site allows the liquid to move in one direction away from the fill. Figure 3

shows a cross-section of an ATL System mound and the effluent movement in a slowly permeable soil on a sloping site. Systems that are installed on a concave slope may have a deflection that does not exceed that allowed in Table 2a.

ATL System mound components rely on lateral effluent movement through the upper soil horizons. Lateral movement becomes more important as soil permeability decreases.

2. ATL System mound location - In open areas, exposure to sun and wind increases the assistance of evaporation and transpiration in the dispersal of the wastewater.

3. Sites with trees and large boulders - Generally, sites with large trees, numerous smaller trees or large boulders are less desirable for installing an ATL System mound because of difficulty in preparing the surface and the reduced infiltration area beneath the ATL System mound. Areas that are occupied with rock fragments, tree roots, stumps and boulders reduce the amount of soil available for proper treatment. If no other site is available, trees in the basal area of the ATL System mound must be cut off at ground level. A larger fill area is necessary when any of the above conditions are encountered, to provide sufficient infiltrative area.

4. Setback distances - The setbacks specified in SPS 383, Wis. Adm. Code for soil subsurface treatment/dispersal component apply to ATL System mounds. The distances are measured from the up slope and end slope edge of the distribution cell and from the down slope toe of the ATL System mound.

V. FILL AND COVER MATERIAL

A. Fill Material - The fill material and its placement are one of the most important components of the ATL System mound. Quality control of the fill material is critical to system performance, each truckload of material must meet specifications for the fill.

Determining whether a proposed fill material is suitable or not requires that a textural analysis be performed. The standard method to be used for performing this analysis conforms to ASTM C-136, Method for Sieve Analysis of Fine and Coarse Aggregates, and ASTM E-11, Specifications for Wire-Cloth Sieves for Testing Purposes, Annual Book of ASTM Standards, Volume 04.02. Information concerning these methods can also be obtained from Methods of Soils Analysis Part 1, C. A. Black, ed., ASA, Monograph #9, American Society of Agronomy, Inc., 1975.

B. Cover material - The cover material is a soil that will allow air exchange while promoting plant growth. The gas exchange will increase the treatment performance of the system by providing oxygen to the wastewater to help ensure aerobic conditions in the ATL System mound. The plant growth will provide frost protection in the winter season. Clays may not be used for cover material, as they will restrict oxygen transfer. Often, excavated soil from the site can be used. Seeding or other means must be done to prevent erosion of the ATL System mound.

VI. DESIGN

A. Location, Size and Shape - Placement, sizing and shaping of the ATL System mound and the distribution cell within the ATL System mound must be in accordance with this manual.

The means of pressurizing the distribution network must provide equal distribution of the wastewater. A pressurized distribution network using a method of sizing as described in either Small Scale Waste Management Project publication 9.6, entitled "Design of Pressure Distribution Networks for Septic Tank – Soil Absorption System" or Dept. of Safety and Professional Services publications SBD-10573-P or SBD-10706-P, entitled "Pressure Distribution Component Manual for Private Onsite Wastewater Treatment Systems" is acceptable.

B. Component Design - Design of the ATL System mound is based upon the design wastewater flow and the soil characteristics. It must be sized such that it can accept the design wastewater flow without causing surface seepage or groundwater pollution. Consequently, the basal area, which is the insitu soil area beneath the fill, must be sufficiently large enough to absorb the effluent into the underlying soil. The system must also be designed to avoid encroachment of the water table into the required minimum unsaturated zone.

Design of the ATL System mound includes the following three steps: (A) calculating design wastewater flow, (B) design of the distribution cell within the fill, (C) design of the entire ATL mound. This includes calculating total width, total length, system height, distribution lateral location and observation pipes. Each step is discussed. A design example is provided in Section XI, page 26, of this manual. The letters for the various dimensions correlate with those in Figures 2 and 3.

Step A. Design Wastewater Flow Calculations

One and two-family dwellings. Distribution cell size for one and two-family dwelling application is determined by calculating the design wastewater flow (DWF). To calculate DWF use, Formulas 1, 2 or 3. Formula 1 is for combined wastewater flows, which consist of blackwater, clearwater and graywater. Formula 2 is for only clearwater and graywater. Formula 3 is blackwater only.

Formula 1	Formula 2	Formula 3
Combined wastewater	Clearwater & Graywater	Blackwater
DWF = 150 gal/day/bedroom	DWF = 90 gal/day/bedroom	DWF = 60 gal/day/bedroom

Public Facilities. Distribution cell size for public facilities application is determined by calculating the DWF using Formula 4. Only facilities identified in Table 4 are included in this manual. Estimated daily wastewater flows are determined in accordance with Table 4 or SPS 383.43(6), Wis. Adm. Code. Many commercial facilities have high BOD_5, TSS and FOG (fats, oils and grease), which must be pretreated in order to bring their values down to an acceptable range before entering into the ATL System mound component described in this manual.

Formula 4

DWF = Sum of each estimated wastewater flow per source per day x 1.5

Where 1.5 = Conversion factor to convert estimated wastewater flow to design wastewater flow

Table 4 Public Facility Wastewater Flows		
Source	**Unit**	**Estimated Wastewater Flow (gpd)**
Apartment or Condominium	Bedroom	100
Assembly hall (no kitchen)	Person (10 sq. ft./person)	1.3
Bar or cocktail lounge (no meals served)	Patron (10 sq. ft./patron)	4
Bar or cocktail lounge* (w/meals – all paper service)	Patron (10 sq. ft./patron)	8
Beauty salon	Station	90
Bowling alley	Bowling lane	80
Bowling alley (with bar)	Bowling lane	150
Camp, day and night	Person	25
Camp, day use only (no meals served)	Person	10
Campground or Camping Resort	Space, with sewer connection and/or service building	30
Campground sanitary dump station	Camping unit or RV served	25
Catch basin	Basin	65
Church (no kitchen)	Person	2
Church* (with kitchen)	Person	5
Dance hall	Person (10 sq. ft./person)	2
Day care facility (no meals prepared)	Child	12
Day care facility* (with meal preparation)	Child	16
Dining hall* (kitchen waste only without dishwasher and/or food waste grinder)	Meal served	2
Dining hall* (toilet and kitchen waste without dishwasher and/or food waste grinder)	Meal served	5
Dining hall* (toilet and kitchen waste with dishwasher and/or food waste grinder)	Meal served	7
Drive-in restaurant* (all paper service with inside seating)	Patron seating space	10
Drive-in restaurant* (all paper service without inside seating)	Vehicle space	10
Drive-in theater	Vehicle space	3
Employees (total all shifts)	Employee	13
Floor drain (not discharging to catch basin)	Drain	25
Gas station / convenience store	Patron (minimum 500 patrons)	3
Gas station (with service bay) Patron Service bay	 Patron Service bay	 3 50
Hospital*	Bed space	135
Hotel, motel or tourist rooming house	Room	65
Medical office building Doctors, nurses, medical staff Office personnel Patients	 Person Person Person	 50 13 6.5
Migrant labor camp (central bathhouse)	Employee	20
Mobile Home (Manufactured home) (served by its own POWTS)	Bedroom	100
Mobile home park	Mobile home site	200
Nursing, Rest Home, Community Based Residential Facility	Bed space	65
Outdoor sport facilities (toilet waste only)	Patron	3.5
Parks (toilets waste only)	Patron (75 patrons/acre)	3.5
Parks (toilets and showers)	Patron (75 patrons/acre)	6.5

Table 4 **Public Facility Wastewater Flows** (continued)		
Source	**Unit**	**Estimated Wastewater Flow (gpd)**
Public shower facility	Shower taken	10
Restaurant*, 24-hr. (dishwasher and/or food waste grinder only)	Patron seating space	4
Restaurant*, 24-hr. (kitchen waste only without dishwasher and/or food waste grinder)	Patron seating space	12
Restaurant, 24-hr. (toilet waste)	Patron seating space	28
Restaurant*, 24-hr. (toilet and kitchen waste without dishwasher and/or food waste grinder)	Patron seating space	40
Restaurant*, 24-hr. (toilet and kitchen waste with dishwasher and/or food waste grinder)	Patron seating space	44
Restaurant* (dishwasher and/or food waste grinder only)	Patron seating space	2
Restaurant* (kitchen waste only without dishwasher and/or food waste grinder)	Patron seating space	6
Restaurant (toilet waste)	Patron seating space	14
Restaurant* (toilet and kitchen waste without dishwasher and/or food waste grinder)	Patron seating space	20
Restaurant* (toilet and kitchen waste with dishwasher and/or food waste grinder)	Patron seating space	22
Retail store	Patron (70% of total retail area ÷ 30 sq. ft. per patron)	1
School* (with meals and showers)	Classroom (25 students/classroom)	500
School* (with meals or showers)	Classroom (25 students/classroom)	400
School (without meals or showers)	Classroom (25 students/classroom)	300
Self-service laundry (toilet waste only)	Clothes washer	33
Self-service laundry (with only residential clothes washers)	Clothes washer	200
Swimming pool bathhouse	Patron	6.5

* = May be high strength waste

Step B. Design of the Distribution Cell - This section determines the required infiltrative surface area of the distribution cell/fill interface, as well as the dimensions of the distribution network within the fill.

a. Design of the ATL System distribution cell is a four-step process:

1. Determine the minimum total conduit length
2. Design the system sand configuration
3. Calculate the minimum basal area required
4. Make basal area adjustments as necessary

Step 1: Determine the minimum total conduit length

The minimum length of conduit per bedroom is 70 feet. Determine the minimum total length of conduit from Table 5 below, based on the number of bedrooms.

Table 5
MINIMUM TOTAL LENGTH OF CONDUIT

Number of Bedrooms	Minimum Conduit Length Required (ft)
2	140
3	210
4	280
5	350
Each additional	70

Step 2: Design the system sand configuration

Use Table 6 below to determine the minimum system sand footprint using the minimum length of conduit (determined using Table 5 above) and the number of rows into which the total length of conduit will be divided. The system should be designed as long and narrow as site conditions allow.

Table 6
MINIMUM SYSTEM SAND FOOTPRINT DIMENSIONS AND AREA

Minimum Length of Conduit (ft)	2 Conduit Rows		3 Conduit Rows		4 Conduit Rows	
	Dimensions (A' x B')	Area (sf)	Dimensions (A' x B')	Area (sf)	Dimensions (A' x B')	Area (sf)
140	3 x 70	210	5 x 50	250	7 x 40	280
210	3 x 110	330	5 x 70	350	7 x 60	420
280	3 x 140	420	5 x 100	500	7 x 70	490
350	3 x 180	540	5 x 120	700	7 x 90	630

NOTES:

1. The conduits are manufactured in 10-foot lengths; all conduit row length calculations in Table 5 are rounded up to the nearest 10 feet.
2. The conduit rows must be extended to within 12 inches of each end of the bed. The dimensions above include 12 inches of system sand in between each of the conduit rows.
3. Multiple bed systems: where site conditions or other considerations require multiple beds, the row-specific length dimensions in Table 6 may be modified to account for the number of beds.
4. Table 6 provides examples of dimensions and area; other configurations are allowed.

Step 3: Calculate the minimum basal area required

Investigate the site in accordance with The Code to determine the soil loading rate. Calculate the minimum basal area required by dividing the daily design flow by this soil loading rate.

Step 4: Make basal area adjustments as necessary

The minimum basal area required in Step 3 cannot be reduced. This area must be maintained to ensure adequate infiltration of treated effluent into the native soil.

Sand extensions are necessary as follows:

- If the minimum basal area determined in Step 3 is smaller than the area of the system sand footprint determined in Step 2, no sand extensions are necessary.
- If the minimum basal area determined in Step 3 is larger than the area of the system sand footprint determined in Step 2, sand extensions must be added to meet the minimum basal area footprint requirements. When adding sand extensions in level system applications, additional width shall be evenly divided on each side of the ATL System;
- In sloped or mound systems applications, additional width shall be entirely placed on the downslope side of the ATL System.

The length of the bed area may be altered by extending the conduit rows. This method may be preferred over increasing the width of the system under certain site and system design considerations.

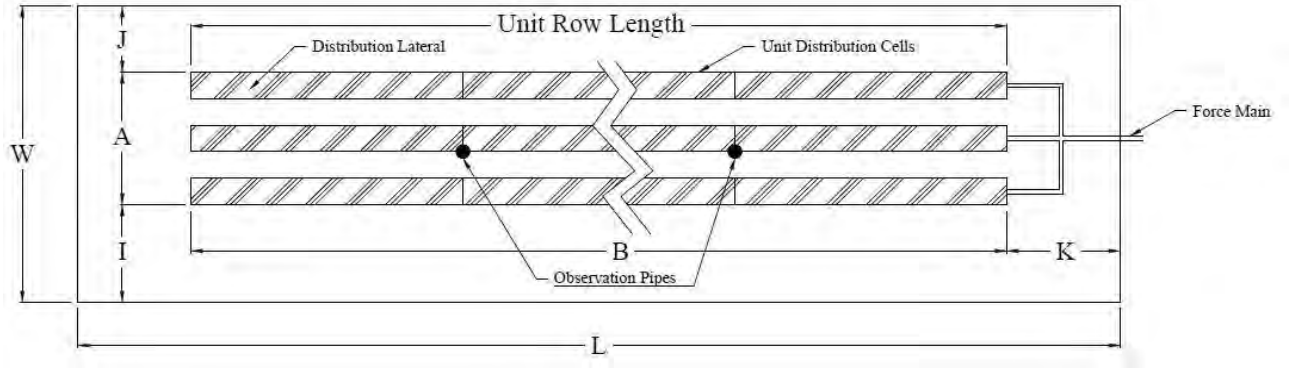


Figure 2. Detailed plan view of an ATL System mound

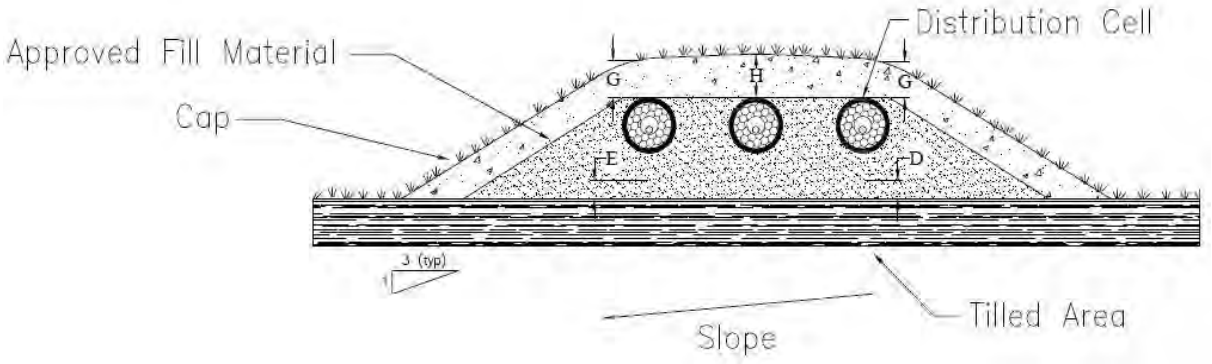


Figure 3. Detailed cross-section of an ATL System mound

2. System Configuration - The ATL System mound distribution cell must be longer than it is wide. The maximum width of the distribution cell is 9 feet. The maximum length of the distribution cell is dependent on setback requirements and soil evaluation.

   The distribution cell is aligned with its longest dimension parallel to surface grade contours on sloping sites as required by the specifications of this package so as not to concentrate the effluent into a small area as it moves laterally down slope.

   The bottom of the distribution cell is level, so no area of the distribution cell is not overloaded.

3. Concave ATL System Mound Configuration – The maximum deflection of a concave distribution cell of an ATL System mound is 10%. The percent of deflection of a distribution cell is determined by dividing the amount of deflection by the effective distribution cell length of the concave distribution cell. The deflection is the maximum distance between the down slope edge of a concave distribution cell to the length of a perpendicular line that intersects furthest points of the contour line along the down slope edge of the distribution cell. The effective distribution cell length of the concave distribution cell is the distance between the furthest points along the contour line of the down slope edge of the concave distribution cell. See Figures 4 and 5.

The deflection of a distribution cell on concave slopes is calculated using Formula 4.

Formula 4

Percent of Deflection = (Deflection ÷ Effective distribution cell length) x 100

Where: Deflection = Maximum distance between the down slope edge of a concave distribution cell to the length of a perpendicular line that intersects furthest points of the contour line along the down slope edge of the distribution cell

Effective distribution cell length = Distance between the furthest points along the contour line of the down slope edge of the concave distribution cell

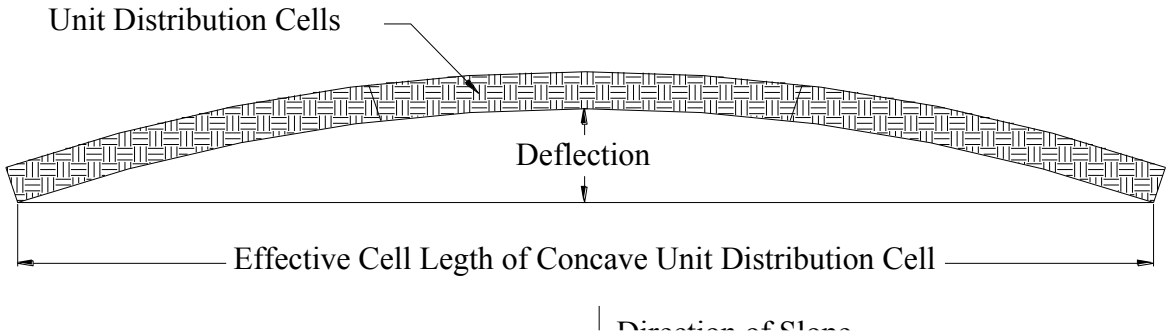
100 = Conversion factor

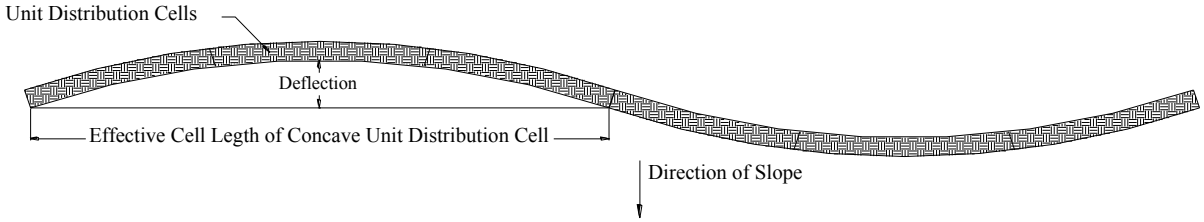
The actual distribution cell length must be checked to determine if the cell area is sufficient. The actual distribution cell length is calculated using Formula 5.

Formula 5

Actual distribution cell length = [(% of deflection x 0.00265) + 1] x effective distribution cell length

Where: % of deflection = Determined by Formula 4





Step C. Sizing the ATL System Mound

1. Mound Height - The ATL System mound height on sloping sites is calculated using Formula 6.

   Formula 6

   ATL System Mound Height = (D + E) ÷2 + F + H

   Where: D = Sand fill depth
   E = Down slope fill depth
   F = ATL product distribution cell depth
   H = Cover material depth

2. Fill Depth - The depth of additional sand fill under the distribution cell is based on the minimum depth of unsaturated soil required from treatment listed in Table 383.44-1 or Table 383.44-3 WI Adm. Code. Beneath the 6 inches of sand required for the ATL System, any additional sand fill that is required is on an inch-by-inch basis. So that if 24 inches of suitable insitu soil is available, then D = 0 inches. If 20 inches of insitu soil is available, then D = 4 inches.

   For sloping sites, the fill depth below the down slope edge of distribution cell (E) ≥ D + [% slope of original grade as a decimal x width of distribution cell (A)]

3. Distribution Cell Depth - The distribution cell depth (F) provides wastewater storage within the distribution cell. For an ATL System mound, the distribution cell depth (F) shall be defined as the height of the product and system sand.

   Formula 7

   Distribution cell depth (F) = 18 inches

4. Cover Material - The cover material (G & H) provides frost protection and a suitable growth medium for vegetation. For design purposes, use a depth of 12 inches above the center of the distribution cell (H) and 6 inches above the outer edge of the distribution cell (G).

   Cover material depth at product distribution cell center (H) ≥ 12 inches

   Cover material depth at product distribution cell edges (G) ≥ 6 inches

5. Fill Length and Width - The length and width of the fill are dependent upon the length and width of the product, fill depth and side slopes of the fill. Side slopes may not be steeper than 3:1 over the basal area, (i.e. 3 feet of run to every 1 foot of rise). Soil having textures other than those specified for the fill media may be used to make the slopes gentler than the required 3:1 slopes, once the 3:1 slope exists with the fill material. The distribution cell length is generally perpendicular to the direction of slope, so the effluent is spread out along the contour.

The fill length consists of the end slopes (K) and the distribution cell length (B). The fill width consists of the up-slope width (J), the distribution cell width (A), and the down slope width (I). On sloping sites, the up-slope width (J) is less while the down slope width (I) is greater than on a level site to maintain the 3:1 side slope (see Fig. 2). To calculate the up slope and down slope widths when a 3:1 side slope is maintained, multiply the calculated width by the correction factor found by using the following equations or the correction factor listed in Table 7.

Up slope correction factor = 100 ÷ [100 + (3 x % of slope)]
Down slope correction factor = 100 ÷ [100 - (3 x % of slope)]

Table 7
Down slope and up slope width correction factors

Slope %	Down slope correction factor	Up Slope correction factor
0	1.00	1.00
1	1.03	0.97
2	1.06	0.94
3	1.10	0.915
4	1.14	0.89
5	1.18	0.875
6	1.22	0.85
7	1.27	0.83
8	1.32	0.81
9	1.37	0.79
10	1.43	0.77
11	1.49	0.75
12	1.56	0.735
13	1.64	0.72
14	1.72	0.705
15	1.82	0.69
16	1.92	0.675
17	2.04	0.66
18	2.17	0.65
19	2.33	0.64
20	2.50	0.625
21	2.70	0.61
22	2.94	0.60
23	3.23	0.59
24	3.57	0.58
25	4.00	0.57

The most critical dimensions of the fill are: fill depths (D) & (E), distribution cell length (B), distribution cell width (A), and the down slope width (I).

End slope width (K) = Total fill at center of distribution cell {[(D + E) ÷2] + F + H} x horizontal gradient of selected side slope (3 if 3:1 side-slope)

Fill Length (L) = Distribution cell length (B) + 2 x end slope width (K)

Up slope width (J) = Fill depth at up slope edge of distribution cell (D + F + G) x horizontal gradient of side slope (3 if 3:1) x slope correction factor {100 ÷ [100 + (3 x % of slope)] if 3:1}

Down slope width (I) = Fill depth at down slope edge of distribution cell (E + F + G) x horizontal gradient of side slope (3 if 3:1) x slope correction factor {100 ÷ [100 - (3 x % of slope)] if 3:1}

Fill Width (W) = Up slope width (J) + down slope width (I) + width of distribution cell (A)

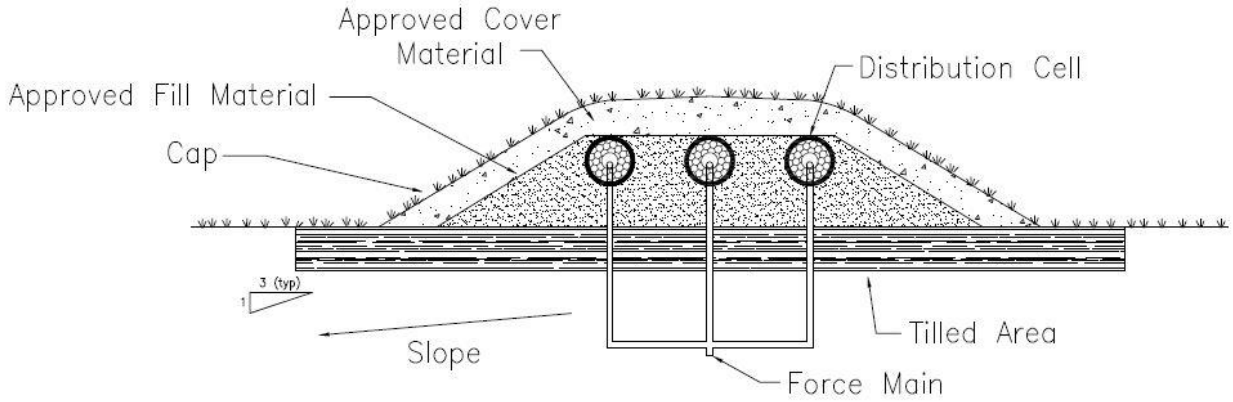


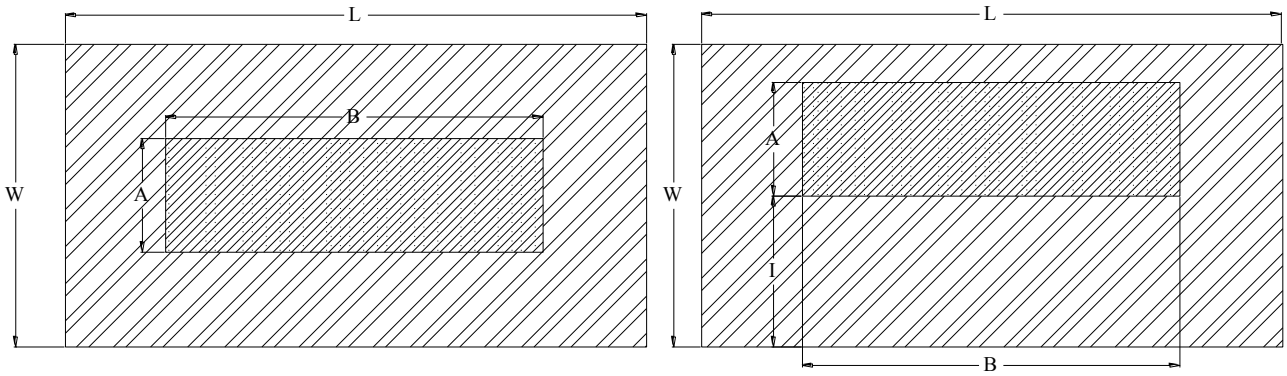
Figure 6. Cross-section of an ATL System mound

6. Basal Area - The basal area is the insitu soil/fill interface between the soil and the fill material. Its function is to accept the effluent from the fill, assist the fill in treating the effluent, and transfer the effluent to the subsoil beneath the fill or laterally to the subsoil outside of the fill.

   The soil infiltration rate of the insitu soil determines how much basal area is required. When the wastewater applied to fill material or in situ soil has gone through the ATL distribution cell it has values for BOD_5 and TSS of ≤ 30 mg/L so the soil application rates for the basal area may be those specified in Table 383.44-1 or Table 383.44-2 for maximum monthly average BOD_5 and TSS of ≤ 30 mg/L.

   For level sites, the total basal area, excluding end slope area [(B) x (W)] beneath the fill and soil cover is available for effluent absorption into the soil (see Figure 7a.). For sloping sites, the available basal area is the area down slope of the upslope edge of the distribution cell to the down slope edge of the fill and soil cover or (A + I) x (B) (see Figure 7b.). The upslope width and end slopes are not included as part of the total basal area. It is important to compare the required basal area to the available basal area.

   The available basal area must equal or exceed the required basal area.



Basal area required = B x I = Infiltration rate of in situ soil

Basal area available = B x W on a level site or = B x (A+I) on a sloping site.

If sufficient area is not available for the given design and site conditions, corrective action is required to increase (J) and (I) on level sites or (I) on sloping sites.

7. Location of the observation pipes - Each product distribution cell shall have two observation pipes, located approximately 1/5 to 1/10 of the distribution cell length from each end of distribution cell along the center of the cell width. Observation pipes must be located at the junction point between two products to not create separation of the bundles within a product.

Step D. Distribution Network and Dosing System A pressurized distribution network based on a method of sizing as described in either Small Scale Waste Management Project publication 9.6, entitled "Design of Pressure Distribution Networks for Septic Tank – Soil Absorption Systems" or Dept. of Safety and Professional Services publications SBD-10573-P or SBD-10706-P, entitled "Pressure Distribution Component Manual for Private Onsite Wastewater Treatment Systems" is acceptable.

VII. SITE PREPARATION AND CONSTRUCTION

Procedures used in the construction of an ATL System mound are just as critical as the design of the system. A good design with poor construction results in system failure. It is emphasized that the soil only be tilled when it is not frozen, and the moisture content is low to avoid compaction and puddling. The construction plan to be followed includes:

A. Equipment - Proper equipment is essential. Track type equipment that will not compact the ATL System mound area or the down slope area is required.

B. Sanitary Permit - Prior to the construction of the system, a sanitary permit, obtained for the installation must be posted in a clearly visible location on the site. Arrangements for inspection(s) must also be made with the department or governmental unit issuing the sanitary permit.

C. Construction Procedures

1. Check the moisture content of the soil to a depth of 8 inches. Smearing and compacting of wet soil will result in reducing the infiltration capacity of the soil. Proper soil moisture content can be determined by rolling a soil sample between the hands. If it rolls into a 1/4-inch wire, the site is too wet to prepare. If it crumbles, site preparation can proceed. If the site is too wet to prepare, do not proceed until it dries.

2. Lay out the fill area on the site so that the distribution cell runs perpendicular to the direction of the slope.

3. Establish the original grade elevation (surface contour) along the upslope edge of the distribution cell. This elevation is used throughout the ATL System mound construction as a reference to determine the bottom of the distribution cell, lateral elevations, etc., and is referenced to the permanent bench mark for the project. A maximum of 4 inches of sand fill may be tilled into the surface.

4. Determine where the force main from the dosing chamber will connect to the distribution system in the distribution cell. Place the pipe either before tilling or after placement of the fill. If the force main is to be installed in the down slope area, the trench for the force main may not be wider than 12 inches.

5. Cut trees flush to the ground and leave stumps, remove surface boulders that can be easily rolled off, remove vegetation over 6 inches long by mowing and removing cut vegetation. Prepare the site by breaking up, perpendicular to the slope, the top 7-8 inches to eliminate any surface mat that could impede the vertical flow of liquid into the insitu soil. When using a moldboard plow, it should have as many bottoms as possible to reduce the number of passes over the area to be tilled and minimize compaction of the subsoil. Tilling with a moldboard plow is done along contours. Chisel type plowing is highly recommended especially in fine textured soils. Rototilling or other means that pulverize the soil is not acceptable. The important point is that a rough, unsmeared surface be left. The sand fill will intermingle between the clods of soil, which improves the infiltration rate into the natural soil.

   Immediate application of at least 6 inches of fill material is required after tilling. All vehicular traffic is prohibited on the tilled area. For sites where the effluent may move laterally, vehicle traffic is also prohibited for 15 ft. down slope and 10 ft. on both sides of level sites. If it rains after the tilling is completed, wait until the soil dries out before continuing construction, and contact the local inspector for a determination on the damage done by rainfall.

6. Place the approved sand fill material, around the edge of the tilled area being careful to leave adequate perimeter area, not covered by the sand fill, on which to place the soil cover. There should be approximately two feet of basal area adjacent to the ATL System mound perimeter that is not covered by the sand fill. This area serves to tie the soil cover into the natural surface material that has been tilled and helps seal the toe from leakage. Work from the end and up slope sides. This will avoid compacting the soils on the down slope side, which, if compacted, affects lateral movement away from the fill and could cause surface seepage at the toe of the fill on slowly permeable soils.

7. Move the fill material into place using a small track type tractor with a blade or a large backhoe that has sufficient reach to prevent compaction of the tilled area. Do not use a tractor/backhoe having tires. Always keep a minimum of 6 inches of fill material beneath tracks to prevent compaction of the insitu soil.
8. Place the fill material to the required depth.
9. Form the distribution cell. Hand level the bottom of the distribution cell.
10. Shape the sides with additional fill to the desired slopes.
11. Install the ATL products and pressure distribution piping per instructions, pressure distribution design and applicable sections of SPS 382, 383, and 384, Wis. Adm. Code. Distribution pipe should be sleeved through the 4-inch corrugated pipe located in the ATL product. One out of every five orifices in each distribution pipe shall be installed at the 6 o'clock position to allow for thorough drainage of the distribution pipe following each dose. The remaining four orifices shall be installed in the 12 o' clock position. All pipes must drain after dosing.
12. At the end of the lateral, place a 90° long sweep with a capped piece of pipe pointing up through the soil surface. Cover the capped pipe with a valve box and lid of an adequate size. The cover of the valve box shall be located above the final grade of the ATL System mound (Figure 8).

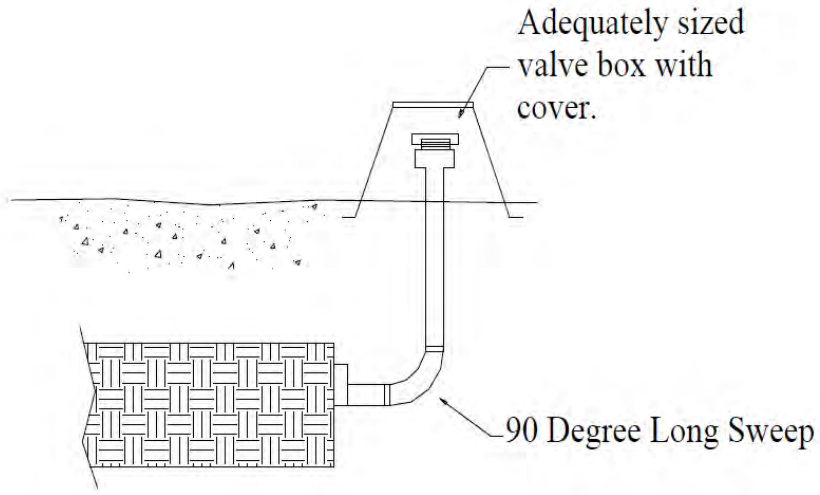
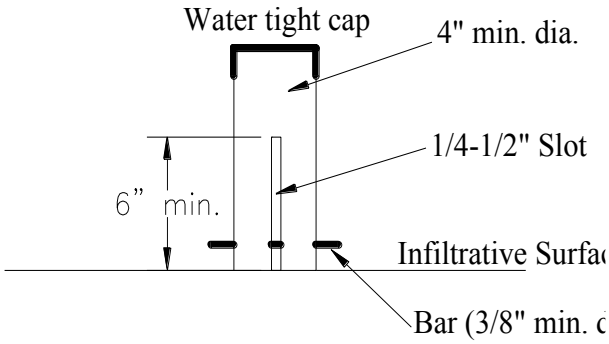
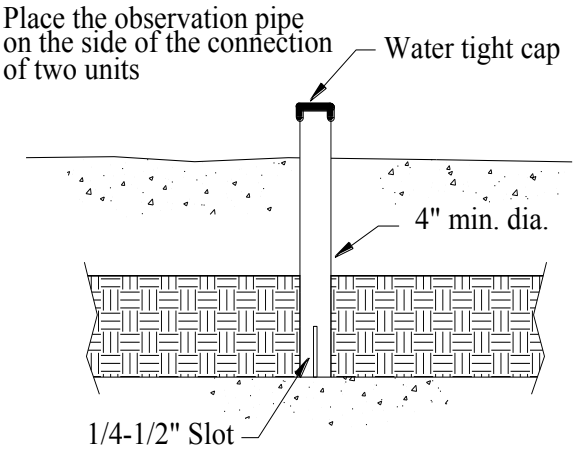


Figure 8

13. Install an observation pipe in each row of ATL products with the bottom 6 inches of the observation pipe slotted. Installations of all observation pipes include a suitable means of anchoring (Figures 9 and 10).





14. Place approved barrier cover, conforming to requirements of SPS 384, Wis. Adm. Code or otherwise approved by the Dept. of Safety and Professional Services, over the product rows, cover barrier cover with cover material, and extend the soil cover to the boundaries of the overall component. Be sure to keep the required 6-inch minimum compacted cover over the system.
15. Complete final grading to divert surface water drainage away from ATL mound. Sod or seed and mulch the entire ATL System mound component.

VIII. OPERATION, MAINTENANCE AND PERFORMANCE MONITORING

A. The component owner is responsible for the operation and maintenance of the component. The county, department or POWTS service contractor may make periodic inspections of the components, checking for surface discharge, treated effluent levels, etc.

   The owner or owner's agent is required to submit necessary maintenance reports to the appropriate jurisdiction and/or the department.

B. Design approval and site inspections before, during, and after the construction are accomplished by the county or other appropriate jurisdictions in accordance to SPS 383 of the Wis. Adm. Code.

C. Routine and preventative maintenance aspects:

   1. Treatment and distribution tanks are to be inspected routinely and maintained when necessary in accordance with their approvals.
   2. Inspections of the ATL System mound component performance are required at least once every three years. These inspections include checking the liquid levels in the observation pipes and examination for any seepage around the ATL System mound component.
   3. Winter traffic on the ATL System mound is not advised to avoid frost penetration and to minimize compaction.

4. A good water conservation plan within the house or establishment will help assure that the ATL System mound component will not be overloaded.

D. User's Manual: A user's manual is to accompany the component. The manual is to contain the following as a minimum:

1. Diagrams of all components and their location. This should include the location of the reserve area, if one is provided.
2. Names and phone numbers of local health authority, component manufacturer or POWTS service contractor to be contacted in the event of component failure or malfunction.
3. Information on periodic maintenance of the component, including electrical/mechanical components.
4. Information on limited activities on reserve area if provided.

E. Performance monitoring must be performed on ATL System mounds installed under this manual.

1. The frequency of monitoring must be:

a. At least once every three years following installation and,

b. At time of problem, complaint, or failure.

2. The minimum criteria addressed in performance monitoring of ATL System mounds are:

a. Type of use.

b. Age of system.

c. Nuisance factors, such as odors or user complaints.

d. Mechanical malfunction within the system including problems with valves or other mechanical or plumbing components.

e. Material fatigue or failure, including durability or corrosion as related to construction or structural design.

f. Neglect or improper use, such as exceeding the design rate, poor maintenance of vegetative cover, inappropriate cover over the ATL mound, or inappropriate activity over the ATL mound.

g. Installation problems such as compaction or displacement of soil, improper orientation or location.

h. Pretreatment component maintenance, including dosing frequency, structural integrity, groundwater intrusion or improper sizing.

i. Dose chamber maintenance, including improper maintenance, infiltration, structural problems, or improper sizing.

j. Distribution piping network, including improper maintenance or improper sizing.

k. Ponding in distribution cell, prior to the pump cycle, is evidence of development of a clogging mat or reduced infiltration rates.

l. Siphon or pump malfunction including dosing volume problems, pressurization problems, breakdown, burnout, or cycling problems.

m. Overflow/seepage problems, as shown by evident or confirmed sewage effluent, including backup if due to clogging.

3. Reports are to be submitted in accordance with SPS 383, Wis. Adm. Code.

IX. REFERENCES

"Wisconsin Mound Soil Absorption System: Siting, Design and Construction." Converse, J.C., and E. J. Tyler. Publication 15.22, Small Scale Waste Management Project., 1 Agriculture Hall, University of Wisconsin, Madison, WI.

"Mound Component Manual for Private Onsite Wastewater Treatment Systems." State of Wisconsin Department of Safety and Professional Services Division of Industry Services. Version 2.0, January 30, 2001.

X. ATL SYSTEM MOUND WORKSHEET

A. SITE CONDITIONS

Evaluate the site and soils report for the following:

- Surface water movement.
- Measure elevations and distances on the site so that slope, contours, and available areas can be determined.
- Description of several soil profiles where the component will be located.
- Determine the limiting conditions such as bedrock, high groundwater level, soil permeability, and setbacks.

Slope - ____%

Occupancy – One or Two-Family Dwelling - ___(# of bedrooms)

Public Facility - _____ gal/day (Estimated wastewater flow)

Depth to limiting factor - _____inches

Minimum depth of unsaturated soil required by Table 383.44-3, Wis. Adm. Code - ____ inches

In situ soil application rate used - _____ gal/ft^2/day

FOG value of effluent applied to component - _____ mg/L

BOD_5 value of effluent applied to component - <30 mg/L

TSS value of effluent applied to component - <30 mg/L

Fecal Coliform monthly geometric mean value of effluent applied to component > 10^4 CFU/100ml ___Yes X No

Product(s) to be installed in one laying length of distribution cell - _____

Total width of installed product(s) per laying length of product - ____ ft

Area of product(s) per 10- ft. laying length of distribution cell - _____ ft^2

B. DESIGN WASTEWATER FLOW (DWF)

One or Two-family Dwelling.

Combined wastewater flow:

DWF = 150 gal/day/bedroom x # of bedrooms

= 150 gal/day/bedroom x ____# of bedrooms

= _____ gal/day

Clearwater and graywater only:

DWF = 90 gal/day/bedroom x # of bedrooms

= 90 gal/day/bedroom x _____# of bedrooms

= _____ gal/day

Blackwater only:

DWF = 60 gal/day/bedroom x # of bedrooms

= 60 gal/day/bedroom x _____# of bedrooms

= _____ gal/day

Public Facilities.

DWF = Estimated wastewater flow x 1.5

= _____ gal/day x 1.5

= _____ gal/day

C. DESIGN OF THE ATL SYSTEM DISTRIBUTION CELL

a. Determine the minimum total conduit length

The minimum length of conduit per bedroom is 70 feet. Determine the minimum total length of conduit from Table 5, based on the number of bedrooms.

Table 5
MINIMUM TOTAL LENGTH OF CONDUIT

Number of Bedrooms	Minimum Conduit Length Required (ft)
2	140
3	210
4	280
5	350
Each additional	70

b. Design the system sand configuration

Use Table 6 below to determine the minimum system sand footprint using the minimum length of conduit (determined using Table 5) and the number of rows into which the total length of conduit will be divided. The system should be designed as long and narrow as site conditions allow.

Table 6
MINIMUM SYSTEM SAND FOOTPRINT DIMENSIONS AND AREA

Minimum Length of Conduit (ft)	2 Conduit Rows		3 Conduit Rows		4 Conduit Rows	
	Dimensions (A' x B')	Area (sf)	Dimensions (A' x B')	Area (sf)	Dimensions (A' x B')	Area (sf)
140	3 x 70	210	5 x 50	250	7 x 40	280
210	3 x 110	330	5 x 70	350	7 x 60	420
280	3 x 140	420	5 x 100	500	7 x 70	490
350	3 x 180	540	5 x 120	700	7 x 90	630

NOTES:

1. The conduits are manufactured in 10-foot lengths; all conduit row length calculations in Table 6 are rounded up to the nearest 10 feet.
2. The conduit rows must be extended to within 12 inches of each end of the bed. The dimensions above include 12 inches of system sand on each end of the conduit rows.
3. Multiple bed systems: where site conditions or other considerations require multiple beds, the row-specific length dimensions in Table 6 may be modified to account for the number of beds.
4. Table 6 provides examples of dimensions and area; other configurations are allowed.

c. Check percent of deflection and actual length of concave distribution cell length

Percent of deflection = Deflection ÷ Effective distribution cell length x 100

Percent of deflection = _____ ft ÷ _____ ft x 100

Percent of deflection = _____ % (≤ 10%)

Actual distribution cell length = [(% of deflection x 0.00265) + 1] x effective distribution cell length

Actual distribution cell length = [(__ % x 0.00265) +1] x _____ ft

Actual distribution cell length = _____ ft

d. Check the distribution cell length (B)

For linear loading rate:

Linear Loading Rate ≤ DWF ÷ Cell length (B) or effective cell length for concave mound

Linear Loading Rate ≤ ___gal/day ÷ ___ft

Linear Loading Rate ≤ ___ gal/ft

Linear loading rate for systems with in situ soils having a soil application rate of ≤ 0.3 gal/ft^2/day within 12 inches of fill must be less than ≤ 4.5 gal/ft/day.

Is the linear loading rate ≤ what is allowed? __ yes ____no. If no, then the length and/or width of the distribution cell must be changed so it does.

D. DESIGN OF ENTIRE ATL PRODUCT MOUND AREA

1. Fill Depth

a. The depth of additional sand fill under the distribution cell is based on the minimum depth of unsaturated soil required from treatment listed in Table 383.44-1 or Table 383.44-3 WI Adm. Code. Beneath the 6 inches of sand required for the ATL System, any additional sand fill that is required is on an inch-by-inch basis. If 24 inches of suitable insitu soil is available, then D = 0 inches. If 20 inches of insitu soil is available, then D = 4 inches.

1) Depth at up slope edge of distribution cell (D) = distance required by Table 383.44-3, Wis. Adm. Code, minus distance in inches to limiting factor

D = ____ inches - ____ inches

D = ____ inches (at least 6 inches, but not greater than 36 inches in accordance with Table 2a)

2) Depth at down slope edge of distribution cell (E)

E = Depth at up slope edge of distribution cell (D) + (% natural slope expressed as a decimal x distribution cell width (A))

E = ____ inches + (__ x ____ feet x 12 inches/ft)

E = _____ or _____ inches

b. Distribution cell depth for ATL product distribution cell.

F = ATL conduit diameter + system sand height = 12 inches + 6 inches
F = 18 inches

c. Cover material

Depth at distribution cell center (H) ≥ 12 inches

Depth at distribution cell edges (G) ≥ 6 inches

2. ATL System mound length

a. End slope width (K)= Total fill at center of distribution cell x horizontal gradient of side slope

K = {([(D + E) ÷ 2] + F + H) x horizontal gradient of side slope} ÷ 12 inches/foot

K = {([(_ inches + _____ inches) ÷ 2] + _____ inches + _____ inches) x ___} ÷ 12 inches/ft

K = _____ or _____ ft

b. ATL System mound length (L) = Distribution cell length + (2 x end slope width)

L = B + 2K

L = _____ ft + (2 x _____ ft)

L = _____ feet

3. ATL System mound width

a. Up slope width (J) = Fill depth at up slope edge of distribution cell (D + F + G) x Horizontal gradient of side slope x Slope correction factor {100 ÷ [100 + (gradient of side slope x % of slope or value from Table 7)]}

J = (D + F + G) x horizontal gradient of side slope x Slope correction factor 100 ÷ [100 + (gradient of side slope x % of slope or value from Table 7)]}

J = (__ in + _____ in + _____ in) ÷ 12 in/ft x _____ x 100 ÷ [100 + (_____ x _____) or (__)]

J = _____ or _____ feet

b. Down slope width (I) = Fill depth at down slope edge of distribution cell (E + F + G) x Horizontal gradient of side slope x Down slope correction factor {100 ÷ [100 - (gradient of side slope x % of slope or value from Table 7)]}

I = (E + F + G) x Horizontal gradient of side slope x Down slope correction factor {100 ÷ [100 - (gradient of side slope x % of slope or value from Table 7)]}

I = (_____ in + _____ in + _____ in) ÷ 12 in/ft x 3 x 100 ÷ [100 - (_____ x _____) or (_____)]

I = _____ in ÷ 12 in/ft x 3 x 100 ÷ _____

I = _____ or _____ feet

c. ATL System mound width (W) = Up slope width (J) + Distribution cell width (A) + Down slope width (I)

W = J + A + I

W = _____ ft + ____ ft + _____ ft

W = _____ feet

4. Check the basal area

a. Basal area required = Daily wastewater flow ÷ soil application rate of in situ soil (See Table 1.)

Basal area required = _____ gal/day ÷ _____ gal/ft^2/day

= _____ft^2

b. Basal area available

1) Sloping site = Cell length (B) x [(# of cells x cell width) + ({# of cells – 1} x cell spacing) + down slope width] (I)

Basal area available = _____ ft x [(__ x ___ ft) + ({ ___ -1} x 0 ft) + _____ ft]

= _____ ft x (__ft + ___ ft + _____ ft)

= _____ ft x _____ ft

= _____ ft^2

2) Level site = Cell length (B) x total ATL System mound width (W)

Basal area available = _____ft x ____ ft

= _____ ft^2

c. Is available basal area sufficient? ___ yes _____ no

Basal area required < Basal area available

_____ft^2 ≤ _____ft^2

The available basal area must be increased by ____ ft^2. This can be accomplished by increasing the down slope width (I) by ___ ft making it ___ ft.

See d. for recalculation of basal area.

d. Basal area available (recalculation of basal area)

1) Sloping site = Cell length (B) x [(# of cells x cell width) + ({# of cells – 1} x cell spacing) + down slope width] (A+I)

= ___ ft x [(___ x ___ ft) + ({__ -1} x 0 ft) + ____ ft]

= ___ ft x (___ ft + __ ft + ___ ft)

= ____ ft x ___ ft

= _____ ft^2

2) Level site = Cell length (B) x total ATL System mound width (W)

= _____ft x ____ ft

= _____ ft^2

5. Determine the location of observation pipes along the length of distribution cell.

At opposite ends of the distribution cell. Observation pipes must be located at the junction point between two products to not create separation of the conduit ends within a product.

XI. EXAMPLE ATL SYSTEM MOUND WORKSHEET

A. SITE CONDITIONS

Evaluate the site and soils report for the following:

- Surface water movement.
- Measure elevations and distances on the site so that slope, contours and available areas can be determined.
- Description of several soil profiles where the component will be located.
- Determine the limiting conditions such as bedrock, high groundwater level, soil permeability, and setbacks.

Slope - 6 %

Occupancy – One or Two-Family Dwelling - 3 (# of bedrooms)

Public Facility - 0 gal/day (Estimated wastewater flow)

Depth to limiting factor - 13 inches

Minimum depth of unsaturated soil required by Table 383.44-3, Wis. Adm. Code - 24 inches

In situ soil application rate used - 0.5 gal/ft^2/day

FOG value of effluent applied to component - < 30 mg/L

BOD_5 value of effluent applied to component - ≤ 30 mg/L

TSS value of effluent applied to component - ≤ 30 mg/L

Fecal Coliform monthly geometric mean value of effluent applied to component > 10^4 CFU/100ml __Yes X No

B. DESIGN WASTEWATER FLOW (DWF)

One or Two-family Dwelling.

Combined wastewater flow:

DWF = 150 gal/day/bedroom x # of bedrooms

= 150 gal/day/bedroom x 3 # of bedrooms

= 450 gal/day

Clearwater and graywater only:

DWF = 90 gal/day/bedroom x # of bedrooms

= 90 gal/day/bedroom x _____# of bedrooms

= _____ gal/day

Blackwater only:

DWF = 60 gal/day/bedroom x # of bedrooms

= 60 gal/day/bedroom x _____# of bedrooms

= _____ gal/day

Public Facilities.

DWF = Estimated wastewater flow x 1.5

= _____ gal/day x 1.5

= _____ gal/day

C. DESIGN OF THE ATL SYSTEM DISTRIBUTION CELL

a. Determine the minimum total conduit length

The minimum length of conduit per bedroom is 70 feet. Determine the minimum total length of conduit from Table 5, based on the number of bedrooms.

Table 5
MINIMUM TOTAL LENGTH OF CONDUIT

Number of Bedrooms	Minimum Conduit Length Required (ft)
2	140
3 →	210
4	280
5	350
Each additional	70

c. Design the system sand configuration

Use Table 6 below to determine the minimum system sand footprint using the minimum length of conduit (determined using Table 5 above) and the number of rows into which the total length of conduit will be divided. The system should be designed as long and narrow as site conditions allow.

Table 6 MINIMUM SYSTEM SAND FOOTPRINT DIMENSIONS AND AREA							
Minimum Length of Conduit (ft)	**2 Conduit Rows**		**3 Conduit Rows**		**4 Conduit Rows**		
	Dimensions (A' x B')	**Area (sf)**	**Dimensions (A' x B')**	**Area (sf)**	**Dimensions (A' x B')**	**Area (sf)**	
140	3 x 70	210	5 x 50	250	7 x 40	280	
210 →	3 x 110	330	5 x 70	350	7 x 60	420	
280	3 x 140	420	5 x 100	500	7 x 70	490	
350	3 x 180	540	5 x 120	700	7 x 90	630	

c. Check percent of deflection and actual length of concave distribution cell length

Percent of deflection = Deflection ÷ Effective distribution cell length x 100

Percent of deflection = _____ ft ÷ _____ ft x 100

Percent of deflection = _____ % (≤ 10%)

Actual distribution cell length = [(% of deflection x 0.00265) + 1] x effective distribution cell length

Actual distribution cell length = [(_ % x 0.00265) +1] x _____ ft

Actual distribution cell length = _____ ft

e. Check the distribution cell length (B)

For linear loading rate:

Linear Loading Rate ≤ DWF ÷ Cell length (B) or effective cell length for concave mound

Linear Loading Rate ≤ 450 gal/day ÷ 110 ft

Linear Loading Rate ≤ 4.09 gal/ft

Linear loading rate for systems with in situ soils having a soil application rate of ≤ 0.3 gal/ft^2/day within 12 inches of fill must be less than ≤ 4.5 gal/ft/day.

Is the linear loading rate ≤ what is allowed? X yes ____no. If no, then the length and/or width of the distribution cell must be changed so it does.

D. DESIGN OF ENTIRE ATL PRODUCT MOUND AREA

Fill Depth

a. The depth of additional sand fill under the distribution cell is based on the minimum depth of unsaturated soil required from treatment listed in Table 383.44-1 or Table 383.44-3 WI Adm. Code. Beneath the 6 inches of sand required for the ATL System,

any additional sand fill that is required is on an inch-by-inch basis. So that if 24 inches of suitable insitu soil is available, then D = 0 inches. If 20 inches of insitu soil is available, then D = 4inches.

1) Depth at up slope edge of distribution cell (D) = distance required by Table 383.44-1 or -3, Wis. Adm. Code, minus distance in inches to limiting factor

D = 24 inches - 13 inches

D = 11 inches (at least ≥ 6, but not greater than 36 inches in accordance with Table 2a)

2) Depth at down slope edge of distribution cell (E)

E = Depth at up slope edge of distribution cell (D) + (% natural slope expressed as a decimal x distribution cell width (A))

E = 11 inches + (0.06 x 5 feet x 12 inches/ft)

E = 14.6 or 14.6 inches

b. Distribution cell depth for ATL product distribution cell.

F = ATL conduit diameter + system sand height = 12 inches + 6 inches

F = 18 inches

c. Cover material

1) Depth at distribution cell center (H) ≥ 12 inches

2) Depth at distribution cell edges (G) ≥ 6 inches

2. ATL System mound length

a. End slope width (K) = Total fill at center of distribution cell x horizontal gradient of side slope

K = {([(D + E) ÷ 2] + F + H) x horizontal gradient of side slope} ÷ 12 inches/foot

K = {([(11 inches + 14.6 inches) ÷ 2] + 12 inches + 12 inches) x 3} ÷ 12 inches/ft

K = 9.2 ft or 9.5 ft

b. ATL System mound length (L) = Distribution cell length + (2 x end slope width)

L = B + 2K

L = 110 ft + (2 x 9.5 ft)

L = 129 feet

3. ATL System mound width

   a. Up slope width (J) = Fill depth at up slope edge of distribution cell (D + F + G) x Horizontal gradient of side slope x Slope correction factor {100 ÷ [100 + (gradient of side slope x % of slope or value from Table 7)]}

      J = (D + F + G) x horizontal gradient of side slope x Slope correction factor 100 ÷ [100 + (gradient of side slope x % of slope or value from Table 7)]}

      J = (11 in + 18 in + 6 in) ÷ 12 in/ft x 3 x 100 ÷ [100 + (3 x 6)]

      J = 7.42 or 7.5 feet

   b. Down slope width (I) = Fill depth at down slope edge of distribution cell (E + F + G) x Horizontal gradient of side slope x Down slope correction factor {100 ÷ [100 - (gradient of side slope x % of slope or value from Table 7)]}

      I = (E + F + G) x Horizontal gradient of side slope x Down slope correction factor {100 ÷ [100 - (gradient of side slope x % of slope or value from Table 7)]}

      I = (14.6 in + 18 in + 6 in) ÷ 12 in/ft x 3 x 100 ÷ [100 - (3 x 6)]

      I = 11.77 or 12.0 feet

   c. ATL System mound width (W) = Up slope width (J) + Distribution cell width (A) + Down slope width (I)

      W = J + A + I

      W = 7.5 ft + 3 ft + 12.0 ft

      W = 22.5 feet

4. Check the basal area

   a. Basal area required = Daily wastewater flow ÷ soil application rate of in situ soil (The soil application rate is that which is listed for BOD_5 and TSS ≤ 30 mg/L. See Table 1.)

      = 450 gal/day ÷ 0.5 gal/ft^2/day

      = 900 ft^2

b. Basal area available

1) Sloping site = Cell length (B) x [(# of cells x cell width) + ({# of cells – 1} x cell spacing) + down slope width] (I)

= 100 ft x [(1 x 3 ft) + ({1 - 1} x 0 ft) + 12.0 ft]

= 100 ft x (3 ft + 0 ft + 12.0 ft)

= 100 ft x 15.0 ft

= 1,500 ft^2

2) Level site = Cell length (B) x total ATL System mound width (W)

= _____ft x ____ ft

= _____ ft^2

c. Is available basal area sufficient? X yes ___ no

Basal area required < Basal area available _____ft^2 ≤ _____ft^2

The available basal area must be increased by ___ ft^2. This can be accomplished by increasing the down slope width (I) by ___ ft. making it ___ ft.

See d. for recalculation of basal area.

d. Basal area available (recalculation of basal area)

1) Sloping site = Cell length (B) x [(# of cells x cell width) + ({# of cells – 1} x cell spacing) + down slope width] (A+I)

= ___ ft x [(___ x ___ ft) + ({__ -1} x 0 ft) + ____ ft]

= ___ ft x (___ ft + __ ft + ___ ft)

= ____ ft x ___ ft

= _____ ft^2

2) Level site = Cell length (B) x total ATL System mound width (W)

= _____ft x ____ ft

= _____ ft^2

5. Determine the location of observation pipes along the length of distribution cell.]

At opposite ends of the distribution cell. Observation pipes must be located at the junction point between two products to not create separation of the conduit ends within a product.

XII. PLAN SUBMITTAL AND INSTALLATION INSPECTION

A. Plan Submittal

In order to install a system correctly, it is important to develop plans that will be used to install the system correctly the first time. The following checklist may be used when preparing plans for review. The checklist is intended to be a **general guide**. Not all needed information may be included in this list. Some of the information may not be required to be submitted due to the design of the system. Conformance to the list is not a guarantee of plan approval. Additional information may be needed or requested to address unusual or unique characteristics of a particular project. Contact the reviewing agent for specific plan submittal requirements, which the agency may require that are different than the list included in this manual.

General Submittal Information

- Photocopies of soil report forms, plans, and other documents are acceptable. However, an original signature is required on certain documents.
- Submittal of additional information requested during plan review or questions concerning a specific plan must be referenced to the Plan Identification indicator assigned to that plan by the reviewing agency.
- Plans or documents must be permanent copies or originals.

Forms and Fees

- Application form for submittal, provided by reviewing agency along with proper fees set by reviewing agent.

Soils Information

- Complete Soils and Site Evaluation Report (form # SBD-8330) for each soil boring described; signed and dated by a certified soil tester, with license number.
- Separate sheet showing the location of all borings. The location of all borings and backhoe pits must be able to be identified on the plot plan.

Documentation

- Architects, engineers or designers must sign, seal and date each page of the submittal or provide an index page, which is signed, sealed and dated.
- Master Plumbers must sign, date and include their license number on each page of the submittal or provide an index page, which is signed, sealed and dated.
- Three completed sets of plans and specifications (clear, permanent and legible); submittals must be on paper measuring at least 8-1/2 by 11 inches.
- Designs that are based on department approved component manual(s) must include reference to the manual by name, publication number and published date.

Plot Plan

- Dimensioned plans or plans drawn to scale (scale indicated on plans) with parcel size or all property boundaries clearly marked.
- Slope directions and percent in system area.
- Bench mark and north arrow.
- Setbacks indicated as per appropriate code.
- Two-foot contours or other appropriate contour interval within the system area.
- Location information; legal description of parcel must be noted.
- Location of any nearby existing system or well.

Plan View

- Dimensions for distribution cell(s).
- Location of observation pipes.
- Dimensions of ATL mound.
- Pipe lateral layout, which must include the number of laterals, pipe material, diameter and length; and number, location and size of orifices.
- Manifold and force main locations, with materials, length and diameter of each.

Cross Section of System

- Include tilling requirement, distribution cell details, percent slope, side slope, and cover material.
- Lateral elevation, position of observation pipes, dimensions of distribution cell, and type of cover material such as geotextile fabric, if applicable.

System Sizing

- For one and two-family dwellings, the number of bedrooms must be included.
- For public buildings, the sizing calculations must be included.

Tank and Pump or Siphon Information

- All construction details for site-constructed tanks.
- Size and manufacturer information for prefabricated tanks.
- Notation of pump or siphon model, pump performance curve, friction loss for force main and calculation for total dynamic head.
- Notation of high water alarm manufacturer and model number.
- Cross section of dose tank / chamber to include storage volumes; connections for piping, vents, and power; pump "off" setting; dosing cycle and volume, high water alarm setting, and storage volume above the highwater alarm; and location of vent and manhole.
- Cross section of two compartments tanks or tanks installed in a series must include information listed above.

B. Inspections

Inspection shall be made in accordance with ch. 145.20, Wis. Stats. and SPS 383.26, Wis. Adm. Code. The inspection form on the following two pages may be used. The inspection of the system installation and/or plans is to verify that the system at least conforms to specifications listed in Tables 1 - 3 of this manual.

XIII. POWTS INSPECTION REPORT

(ATTACH TO PERMIT)

GENERAL INFORMATION

Permit Holder's Name	☐ City ☐ Village ☐ Town of	County	Sanitary Permit No.
State Plan ID No.	Tax Parcel No.	Property Address if Available	

TREATMENT COMPONENT INFORMATION			**SETBACKS (FT)**				
TYPE	MANUFACTURER AND MODEL NUMBER	CAPACITY	P/L	WELL	WATER LINE	BLDG.	VENT
SEPTIC							
DOSING							
AERATION							
HOLDING							
FILTER							

PUMP / SIPHON INFORMATION

Manufacturer:	Model No.	Demand in GPM	TDH - Design

FORCE MAIN INFORMATION			**FRICTION LOSS (FT)**			
Length	Diameter	Dist. To Well	Component Head	Force Main Losses	Vert. Lift	TDH - As Built

SOIL ABSORPTION COMPONENT

TYPE OF COMPONENT:				COVER MATERIAL:		
Cell Width	Cell Length	Cell Depth	Cell Spacing	No. of Cells		
UNIT		Manufacturer: ATL L.P.		Model No.		
SETBACK INFO. (FT)	Property Line	Bldg.	Well	Water Line	OHWM	

DISTRIBUTION COMPONENT

Elevation data on back of form

Header / Manifold		Distribution Lateral(s)			Orifice size	Orifice Spacing	Obs. Pipes Inst. & No.
Length	Dia.	Length	Dia.	Spacing			

SOIL COVER

Depth over center of cell:	Depth over edge of cell:	Depth of Cover material	Texture	Seeded / Sodded	Mulched

DEVIATIONS FROM APPROVED PLAN

DATE OF INST. DIRECTIVE:	DATE OF ENFORCEMENT ORDER:
DATE OF REFERRAL TO LEGAL COUNSEL:	

COMMENTS (Persons present, discrepancies, etc.)

COMPONENTS NOT INSPECTED

Plan Revision Required ☐ Yes ☐ No	Date:	Signature of Inspector:	Cert. Number

Sketch on other side

ELEVATION DATA

Point	Back sight	Height of instrument	Foresight	Elevation	Comments
Bench mark					
Bldg. Sewer					
Tank inlet					
Tank outlet					
Tank inlet					
Tank outlet					
Dose tank inlet					
Bottom of dose tank					
Dist. lateral 1					
System elev. 1					
Dist. lateral 2					
System elev. 2					
Dist. lateral 3					
System elev. 3					
Grade elev. 1					
Grade elev. 2					
Grade elev. 3					

SKETCH OF COMPONENT & ADDITIONAL COMMENTS

March 7, 2018

Mr. Glen Schlueter
Wisconsin Department of Safety and Professional Services
Safety and Buildings Division
Plumbing Product Review
P.O. Box 2658
Madison, WI 53701-2658

Re: Pressure-Dosed Advanced Treatment Leachfield (ATL) Data and Drawings

Dear Glen,

On behalf of Infiltrator Water Technologies (Infiltrator), I am submitting the data sheet with the results of testing done on the ATL System at the Massachusetts Alternative Septic System Test Center (MASSTC) in Buzzards Bay, MA (see Tab 7). The data provided were taken from November 30, 2016 to December 28, 2017. I am also providing plan-view and cross-section drawings of the system as it was tested (see Tab 8).

The ATL System tested was the same system that was certified to the NSF/ANSI 40 testing protocol, with the addition of low-pressure pipe installed in the ATL conduits. The system was dosed with 450 gallons per day per the NSF/ANSI 40 protocol and a pump distributed wastewater uniformly over the system. All the samples were taken by the staff at MASSTC and analyzed by the Barnstable County Laboratory.

Please contact me at (785) 760-6932 if any further information is required.

Sincerely,

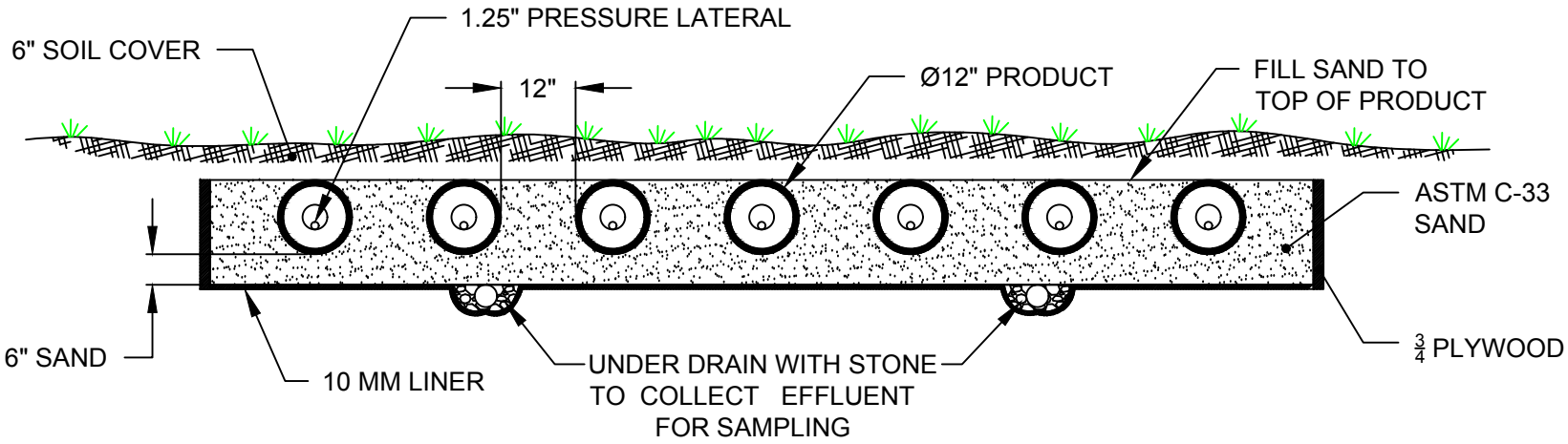
Allison Blodig, REHS
Sr. Regulatory Specialist
Science & Government Affairs

cc: Mr. Trevor Wells, Infiltrator Water Technologies

Pressure-Dosed Advanced Treatment Leachfield (ATL) Data From MASSTC, Buzzards Bay, MA

Collection Date	BOD (mg/L)		TSS (mg/L)		Fecal Coliform (CFU/100 ml)		TKN (mg/L)		Ammonia NH3 (mg/L)		Nitrate NO3 (mg/L)	Nitrite NO2 (mg/L)
	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Effluent	Effluent
11/30/2016	150	5	120	6	4,000,000	4,800	35	17	27	16	11	0.05
12/5/2016	260	2	130	4		390	46	15	37	14	15	0.45
12/14/2016	240	2	130	4	5,300,000	1,100	41	12	25	10	16	0.61
12/21/2016	280	2	190	2		810	42	14	25	11	17	0.42
12/28/2016	210	2	140	4	4,400,000		38	14	24	10	17	0.54
1/4/2017	190	2	240	2			40	10	21	10	18	0.40
1/11/2017		8	170	6		5,400		12		10	11	0.80
1/18/2017	190		400	2		700						
1/24/2017	210	3	180	2	2,500,000	60,000	38	12	26	10	20	0.05
1/25/2017		2		2	2,800,000	44	37	10	25	10	21	0.05
2/1/2017	250	2	170	2	3,500,000	31	45	11	32	8	13	0.16
2/7/2017	250	2	170	2	3,800,000	8	40	10	26	9	24	0.05
2/14/2017	190	2	170	4	2,900,000	2	40	6	24	7	26	0.11
2/22/2017	140	2	100	2		4	25	11	19	8	29	0.05
3/9/2017	240	2	210	2	4,600,000	4	42	11	27	9	14	0.05
3/22/2017	220	4	160	4		4	35	7	25	6	25	0.05
3/30/2017	180	2	150	5	3,600,000	4	37	8	24	6	26	0.35
4/6/2017		2	150	3	3,300,000	8	40	8	26	6	26	0.74
4/13/2017	150	4	52	32		4	36	5	25	3	30	0.05
4/20/2017	310	2	300	2	1,500,000	2	39	4	25	2	37	0.05
4/27/2017	230	2	210	3	3,500,000	8	35	6	24	3	28	0.05
5/4/2017	240	7	230	8	3,100,000	14	55	15	41	15	3	1.00
5/11/2017	200	2	140	4	4,800,000	33	47	0	38	3	37	0.05
5/16/2017		2	190	4		18		2		2	26	0.05
5/24/2017	220	4	150	9	2,900,000	190	31	6	12	3	20	0.11
6/1/2017	110	2	110	5	3,600,000	4	24	3		2	22	0.05
6/6/2017	230	2	230	8	5,800,000	16	42	4		4	23	0.67
6/12/2017	240	3	210	7	3,300,000	2	46	2	47	5	32	0.05
6/21/2017	270	2	200	3	10,000,000	260	29	4	33	6	34	0.05
6/29/2017	180	34	230	7	7,300,000	4	35	3	36	2	0	0.05
7/6/2017	150	2	220	4	7,700,000	69	27	2	36	2	26	0.05
7/12/2017		3	160	2	4,300,000	19	34	2	32	2	24	0.05
7/19/2017	160	2	140	5	6,700,000	19	34	3	32	3	32	0.05
8/2/2017	160	2	120	5	5,400,000	12	21	4	29	3	39	0.05
8/9/2017	230	2	200	3	9,600,000	200	25	4	35	4	33	0.05
8/16/2017	290	3	280	5	5,600,000	460	28	8	36	7	34	0.05
8/24/2017	290	2	40	5	3,500,000	220	40	5	39	4	30	0.05
8/30/2017	34	2	180	5	7,100,000	54	31	4	30	3	32	0.05
9/7/2017	160	3	180	3	9,200,000	740	20	3		1	9	0.05
9/13/2017	170	2	170	5	6,300,000	4	33	2	33	1	42	0.05
9/20/2017	200	2	190	4		10	33	2	33	1	44	0.05
10/4/2017	240	2		4	6,500,000	440	34	3	31	1	35	0.05
10/11/2017	240	2	200	4	7,200,000	500	29	2	27	1	30	0.05
10/18/2017	150	2	140	4	5,700,000	680	28	3	23	1	38	0.05
10/26/2017	180	2	190	8	7,500,000	6,700	28	3	25	2	23	0.68
11/2/2017	270	2	180	3	5,400,000	140	35	3	31	2	26	0.05
11/9/2017	250	2	250	2	5,000,000	230	39	3	28	2	33	0.63
11/15/2017	180	2	70	3		2,300	25	3	26	2	26	0.27
11/21/2017	280	2	220	3	900,000	310	36	4	31	3	20	0.19
11/30/2017	310	2	260	2		2,400	38	2	34	2	27	0.14
12/6/2017	240	2	220	6	5,000,000	5,100	34	7	29	5	23	0.22
12/14/2017	190	3	140	2	3,600,000	3,000	41	6	34	5	17	0.17
12/20/2017	230	2	170	2		3,300	41	7	30	7	18	0.20
12/28/2017	220	2	140	2	4,200,000	27	37	5	30	4	11	0.07
Average:	212	3	179	4	4,948,780	1,938	36	6	29	5	24	0.20

Notes: Non Detect, values below the detection limit, and "less than" values are shown in red.



DOSE CALCULATIONS:
450 GPD CURRENT LOADING
DOSE 75 GAL 6 TIMES A DAY

NOTES:

- ⅛" ORIFICES LOCATED EVERY 3 FT
- FIRST AND LAST ORIFICES DRILLED IN 6 O'CLOCK (DOWN) POSITION FOR DRAINAGE
- ALL OTHER ORIFICES DRILLED IN 12 O'CLOCK (UP) POSITION

INFILTRATOR water technologies

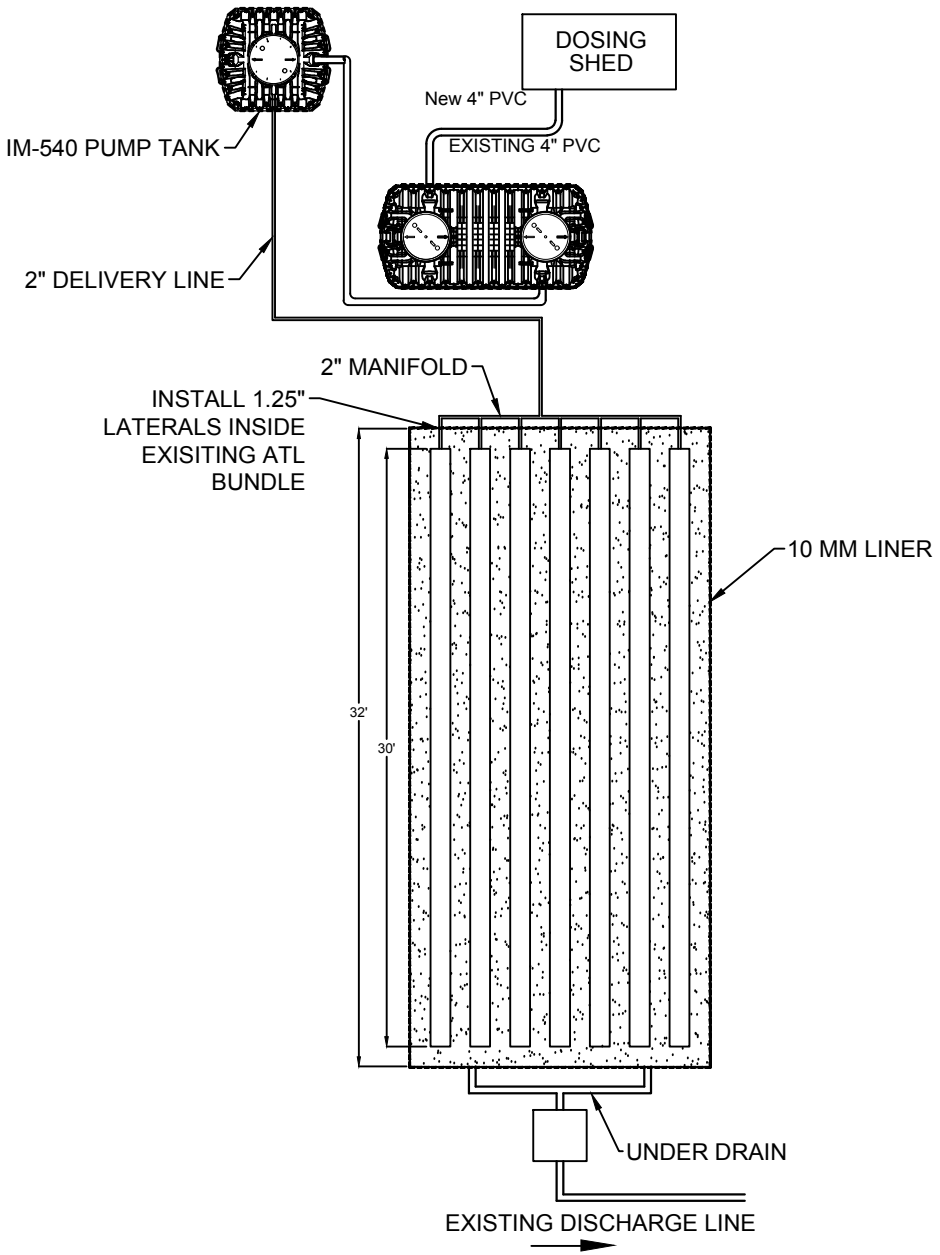
INFILTRATOR WATER TECHNOLOGIES
4 Business Park Rd. Old Saybrook, CT 06475
(800) 221-4436

WI ATL PRESSURE DOSED
CROSS SECTION

Drawn by: E.Alv.		Date: 03/01/2018
Scale: NOT TO SCALE	Checked by:	Sheet: 2 of 2

Q:\Technical Resources New\01--STATES\WISCONSIN\WI ATL

Q:\Technical Resources New\01--STATES\WISCONSIN\WI ATL



INFILTRATOR water technologies

INFILTRATOR WATER TECHNOLOGIES
4 Business Park Rd. Old Saybrook, CT 06475
(800) 221-4436

WI ATL PRESSURE DOSED
PLAN VIEW

Drawn by: E.Alv.		Date: 03/01/2018
Scale: NOT TO SCALE	Checked by:	Sheet: 1 of 2