

Acheron

Engineering, Environmental & Geologic Consultants
www.AcheronEngineering.com

October 15, 2018

Amanda Lessard, Planner
Town of Windham
8 School Road
Windham, Maine 04062

RE: Revised Preliminary Subdivision Application Durant Homestead, Residential Subdivision.

Dear, Amanda

Since Matt Hancock Properties LLC filing of a Preliminary Subdivision Application, the project has been reviewed by Windham staff, the Planning Board, Army Corps of Engineers (ACOE) and partially by the Maine Department of Environmental Protection (MDEP). The purpose of this submittal is to address comments from the Town and provide the town with revised application materials based on ACOE and MDEP review comments. Additionally, Matt Hancock Properties LLC has elected to revise the number of lots in the original application from twenty six (26) to twenty five (25) and is no longer requesting a waiver from the Water Supply Standard 911.B.1.(a).

Below you will find comments provided by the Windham in italic font followed by a response by Matt Hancock Properties LLC in regular font.

Email Comments from Jonathan Earle, PE, dated September 6, 2018:

1. Waivers:

- a. The justification for the waiver request from providing public water to the project was that it would likely affect preservation of open space. With any public water main being located within either an existing ROW (Chute Road) or future town ROW (Penny Whistle Drive), I'm unclear how this would impact the open space when the main would be installed in areas already cleared and outside of open space?*

As mentioned above Matt Hancock Properties has elected to reduce the number of lots to 25 and is no longer seeking a waiver from the public water supply standard.

- i. Will the homes in the subdivision be sprinkled? The current ordinance requires all homes greater than 1000' from the project intersection to be sprinkled. It should be noted that there has been*

some discussion and ordinance language changes proposed to allow cisterns, fire ponds, or other means of fire protection instead of sprinklers, but nothing has been enacted at this time.

Homes within the subdivision will be sprinkled. The attached preliminary subdivision plan has been revised to include the following note: "All residential homes shall be equipped with a sprinkler system in accordance with the latest edition of NFPA-13D."

b. Open space – A waiver from the requirement for the project's open space to be contiguous has been requested. The request seems reasonable since separate public access points have been provided for accessing the two separate portions of open space. The open space calculations need to be shown on the approved subdivision plans. Is 50% of the open space suitable for development as required in the ordinance?

The open space calculation has been added to the attached Preliminary Subdivision Plan. 56% of the developable land within the parcel boundaries has been allocated to open space in the proposed design.

c. Landscape plan – A waiver from providing a landscaping plan has been requested. The ordinance requires a street tree every 50' and existing trees are allowed if they are protected during construction. Locations of existing trees to be saved or new trees planted need to be shown on the plan to demonstrate meeting this requirement.

Trees are shown on the attached Preliminary Subdivision Plan and sheet C-2 of the design drawings.

2. Cost estimate – The overall cost estimate provided appears reasonable for the scope of the project. A more detailed unit price cost estimate will be required prior to construction for the purposes of developing the project's performance guarantee amount.

A more detailed construction cost estimate will be provided to the Town of Windham prior to construction.

3. Stormwater :

a. Consider using the two letter soil type abbreviations and providing a table with each soil type and its respective hydrologic soil group on the pre and post development plans for ease of review.

A table has been added to the Pre-Development Stormwater Plan (sh. C-3) and the Post-Development Stormwater Plan (sh. C-4) that includes the soil series / phase name for each soil map unit (SMU).

b. *Show Tc flow paths for each subcatchment on both the pre and post development plans.*

Tc flow paths are shown on sheets C-3 and C-4 and have been revised with a bolder line weight for clarity.

e. *The proposed tree line on the plan should be reviewed and revised to reflect actual areas to be cleared and assumptions made for each lot's impervious and developed areas.*

A table has been added to the Preliminary Subdivision Plan with the impervious and developed area for each lot. Please note the Planning Board granted a waiver from the requirement to show the tree line for each lot.

4. *Nitrate Analysis – The report from MAI summarized that nitrate levels in the groundwater are at or below 10 mg/L at the property line. The nitrate plume from Lot 24 appears to extend just slightly past the property line onto the ROW of Chute Road. Please clarify.*

The plume for lot 24 terminates at the ROW of Chute Road. The attached site plan has been revised to clarify. Please note the report has been revised to address comments from the DEP and is attached.

5. *Traffic:*

a. *Show the sight distances at the intersection of Penny Whistle Drive and Chute Road on the approved plan.*

The Preliminary Subdivision Plan has been revised to include the sight distance from the intersection of Chute Road and Pennywhistle Drive and Lots 23, 24 and 25 along Chute Road.

c. *Additional clearing on Lot #1 was recommended to increase sight distance above the Town's ordinance requirement. Will this clearing be completed as part of the project? If so, this should be shown on the plans and provisions made in the association documents to maintain this clearing*

The clearing to improve the sight distance at the Chute Road and Pennywhistle intersection will be part of the project. The clearing is indicated on sheet C-7 and maintaining the area has been included in item 16 of the attached Restated Declaration of Restrictive Covenants.

6. *Plans:*

a. *Road profile – The profile shown shading which seems to represent gravel and bedrock material below subgrade, but is shown in seemingly random locations on the profile. Please clarify.*

Sheet C-10 has been revised to clarify.

b. Road cross section – The cross section provided exceeds the requirement for a minor public road by providing 1' extra of paved shoulder on each side of the road. Gravel and pavement thickness provided meet the public road standard.

As Matt Hancock Properties LLC understands the minor public road requirements the 1 foot additional shoulder is required. Please see the following comment from the Town review memo dated September 4, 2018; “Sidewalks are not required as the subdivision is more than 1,000 linear feet from an existing convenience store or public building. An additional one (1) foot of paved shoulder, on each side of the street, shall be added to the required minimum shoulder width.”

c. Show a location for installing a stop sign at the intersection of Penny Whistle Drive and Chute Road and provide an installation detail.

A location for the stop sign has been added to sheet C-2 and the Preliminary Subdivision Plan. The installation detail has been added to sheet C-11.

Memo Comments from Amanda Lessard, Planner dated September 4, 2018:

- Section 911.M.5.b.5.b of the subdivision ordinance requires that all dwellings on dead end streets over 1,000 linear feet in length not served by public water have an NFPA 13D monitored sprinkler system.*

A note has been added to the Preliminary Subdivision Plan requiring all dwelling be equipped with a sprinkler system in accordance with NFPA-13D.

- Septic system locations are shown on the Groundwater Assessment Overall Site Plan and should also be shown on the subdivision plan.*

All wastewater disposal beds are shown on the attached Preliminary Subdivision Plan.

- The total amount of wetland impacts should be noted on the subdivision plan.*

A note indicating the area of wetland impact has been added to the Preliminary Subdivision Plan. Please note, this project does require a NRPA Tier-1 permit for wetland alteration.

- A stormwater management plan prepared by Acheron Engineering Services dated August 2018 has been submitted as Section B.25 Preliminary Plan submission. The project proposes to treat the 17.84 acres of developed area and 3.88 acres of new impervious area with two (2) wet ponds and forested and meadow buffers.*

Please note, due to the reduction of lots the project now proposes to treat 17.54 acres of developed area and 3.81 acres of impervious area. The attached design drawings and pages of the stormwater management plan have been revised to include the change.

- *The stormwater treatment table is shown on Sheet 6 of the preliminary subdivision plan set. A note should be added to the recording plan that describes the assumed impervious and developed area for each lot.*

A table has been added to the attached Preliminary Subdivision plan indicating the amount of impervious and developed area for each lot.

- *The street name, Penny Whistle Drive, is shown on the Preliminary Plan. The street name approved by the Assessing Department was Pennywhistle Drive. The correct spelling should be shown on the Final Plan.*

The spelling has been revised on all plans.

Please let me know if you have any questions or concerns

Sincerely,
Acheron



Kirk J. Ball, PE

Enclosure: Revised Sections Preliminary Subdivision Application (5)
 Response to MEDEP Comments
 Response to ACOE Comments

Cc: Matt Hancock, MHP
 David Fowler, MHP

TOWN OF WINDHAM, MAINE

***PRELIMINARY SUBDIVISION APPLICATION FOR
DURANT HOMESTEAD SUBDIVISION***

SUBMITTED BY:

***MATT HANCOCK PROPERTIES, LLC
PO Box 295
CASCO, MAINE 04015***

WITH ASSISTANCE BY:

Acheron Engineering Services.
Engineering, Environmental & Geologic Consultants
www.AcheronEngineering.com
147 Main Street 24466 Powell Road
Newport, Maine 04953 Brooksville, Florida 34602
(207) 368-5700 (352) 796-6236

SUBMITTAL DATE:
AUGUST, 2018

REVISED
OCTOBER, 2018

Project Name: DURANT HOMESTEAD SUBDIVISION

Tax Map: 6 Lot: 25

Number of lots/dwelling units: 26 25 Estimated road length: 2,500 - FT

Is the total disturbance proposed > 1 acre? Yes No

Contact Information

1. Applicant

Name: MATT HANCOCK PROPERTIES, LLC

Mailing Address: PO Box 295, CASCO, ME 04015

Telephone: 207-655-5886 Fax: _____ E-mail: MATT@MEABRAM.COM

2. Record owner of property

(Check here if same as applicant)

Name: _____

Mailing Address: _____

Telephone: _____ Fax: _____ Email: _____

3. Contact Person/Agent (if completed and signed by applicant's agent, provide written documentation of authority to act on behalf of applicant)

Name: KIRK BALL, P.E.

Company Name: ACHERON ENGINEERING SERVICES

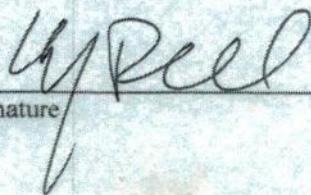
Mailing Address: 147 MAIN STREET, NEWPORT, ME 04953

Telephone: 207-368-5700 Fax: 207-368-5120 E-mail: _____

KBALL@ACHERONENGINEERING.COM

I certify all the information in this application form and accompanying materials is true and accurate to the best of my knowledge.

Signature



8/17/2018

Date

Preliminary Plan - Major Subdivision: Submission Requirements

**DURANT HOMESTEAD
RESTATEDED DECLARATION OF RESTRICTIVE COVENANTS**

This Declaration dated as of the _____ day of _____, 2018 is made by Matt Hancock Properties, LLC, the Grantor herein, ("Matt Hancock Properties" or "Grantor") with a mailing address of: P.O. Box 295, Casco, ME 04015.

WITNESSETH

WHEREAS, Matt Hancock Properties is the owner in fee simple of a certain parcel of land in the Town of Windham, Cumberland County, Maine, as conveyed by a deed from Matt Hancock as the sole member and successor-in-interest Matt Hancock International, LLC, recorded in the Cumberland County Registry of Deeds at Book 33191, Page 124, and as shown on a survey plan entitled "Subdivision Plan of 'Durant Homestead Cumberland County Windham, Maine" prepared by Plisga & Day Land Surveyors. dated _____, 2018 and recorded in the Cumberland County Registry of Deeds on _____, 2018 as Plan #_____ which said subdivision was approved by the Town of Windham Planning Board on _____, 2018 and by the Maine Department of Environmental Protection by Findings of Fact and Order signed by the Commissioner on _____, 2018 (hereinafter "the Property" or "the subdivision"); and

WHEREAS, the Grantor's predecessor in title, Matt Hancock International, LLC, recorded the Durant Homestead Declaration of Establishment of Lot Owners Association, such Declaration is recorded in the Cumberland County Registry of Deed at Book 25535, Page 151; and

WHEREAS, the Grantor's predecessor in title, Matt Hancock International, LLC, recorded the Durant Homestead Declaration of Restrictive Covenants in the Cumberland County Registry of Deeds at Book 25535, Page 140; and

WHEREAS, the Grantor's predecessor in title, Matt Hancock International, LLC, recorded the First Amendment to Durant Homestead Declaration of Restrictive Covenants in the Cumberland County Registry of Deeds at Book 27075, Page 16; and

WHEREAS, no lots of the Durant Homestead were conveyed from the Grantor's predecessor in title prior to the Grantor taking title to the Property; and

WHEREAS the Grantor wishes to restate the Declaration of Restrictive Covenants of the Durant Homestead Lot Owners Association; and

WHEREAS, the Restated Declaration of Establishment of the Durant Homestead Lot Owners Association of near or even date to be recorded in the Cumberland County Registry of Deeds provides that each lot owner in Durant Homestead shall join a lot owners association (the "Association"), which may be formed by the Grantor; and

WHEREAS, the Grantor of this Declaration wishes to control future development on the Property and to preserve and protect in perpetuity the appearance and features of the Property for the benefit of the lot owners, as shall be specified in this Declaration; and

WHEREAS, Declarant desires to place certain deed covenants over the portion of said real property depicted on the Plan as "FORESTED BUFFER," and "MEADOW BUFFER" (hereinafter referred to collectively as the "Buffer Areas"); and

WHEREAS, Declarant desires to place certain restriction, under the terms and conditions herein, over a portion of said real property (hereinafter referred to as the "Forested Buffer Area") being that area on those portions of Lots 3, 6, 7, 13, 14, 15, 17, 23, 24, 25 and over such Open or Common Space as depicted on the Plan; and

WHEREAS, Declarant desires to place certain restrictions, under the terms and conditions herein, over a portion of said real property (hereinafter the "Meadow Buffer Area") being that area on those portions of Lots 1, 2, and on such Open or Common Space as depicted on the Plan;

WHEREAS, pursuant to the Site Location of Development Law promulgated by the Maine Department of Environmental Protection, Declarant has agreed, in satisfaction of paragraph _____ and Conditions _____ of the Order, to impose certain covenants and restrictions on the Buffer Areas as more particularly set forth in Paragraphs 20 and 21 of this Declaration and has agreed that such covenants and agreements may be enforced by the Maine Department of Environmental Protection (hereinafter the "MDEP") or any successor in interest; and

WHEREAS, Declarant desires to place certain other deed covenants over the Durant Homestead Subdivision above and beyond those relating to the Buffer Areas;

NOW THEREFORE, the Grantor does hereby declare that all of the lots and premises shown as Durant Homestead Subdivision on the above plan are conveyed subject to the DEP Order, the Plan and all matters depicted thereon, and to the following restrictive covenants, which shall be real covenants running with the land, not conditions or restraints on alienability, and shall be binding upon the Grantor herein, Matt Hancock Properties, LLC, and the future owners of said lots, their heirs, personal representatives, devisees, successors and assigns. These restrictive covenants are imposed upon the premises for the benefit of all of the lots shown on the above-mentioned Plan as well as for the benefit of the owners of said premises and lots, their heirs, personal representatives, devisees, successors and assigns. These restrictive covenants shall be enforceable either in law or in equity by the Grantor, the owner or owners of the premises or any lot contained therein, and their respective heirs, personal representatives, devisees, successors and assigns, but said parties shall not be required to enforce said restrictive covenants, which are as follows:

1. Each lot will be for residential use only. Seasonal rentals of single family homes shall be considered a residential use.
2. Only one single-family dwelling with one attached garage which must be built and one detached garage is permitted on any lot. No more than one additional small outbuilding, with a footprint not to exceed two hundred (200) square feet with a similar outside appearance as the principal structure shall be permitted on any single lot at any time. No outside fuel tanks are permitted unless they are completely covered by a frame structure attached to the residence and designed to visually blend with the residence. Garage doors facing the Subdivision Roads shall remain closed when not in use. Driveways shall be paved.

3. Each dwelling unit shall be limited to two stories and supported by a full perimeter foundation or frost walls. No homes having a living area of less than fifteen hundred (1,500) square feet shall be constructed or occupied. Cellars, whether finished or unfinished, porches, garages and decks shall not be considered living areas. Buildings must have a minimum of 8" wide gable end overhangs. All portions of a chimney visible from the exterior, if any, must be constructed of natural stone, cultured stone, or brick. House siding colors shall fit in with the natural surroundings.
4. Lighting causing unreasonable glare to abutting lots or property is prohibited. Mercury vapor or other high intensity lighting and upward lighting is not permitted. Any exterior lighting shall be shielded from other lots or abutting property and access roads. To preserve night skies or dark skies, lights shall not be directed skyward.
5. No mobile homes, double-wide trailers, house trailers, motor homes, camping trailers, tents and/or temporary residences of any kind shall be stored or constructed on the premises. This restriction shall not apply to small tents for play by children. A lot owner may park on its lot a camper trailer, travel trailer, recreational vehicle, or other similar vehicular accessory provided that it shall not be used as a temporary or permanent living quarters at any time.
6. No further Subdivision of any lot is allowed.
7. Until Grantor no longer owns any lot depicted on said Plan of "Durant Homestead," a hand-drawn sketch of the locations of the septic system, well, buildings and driveway will be submitted by the lot owner to the Grantor for approval prior to the beginning of all construction.
8. No more than twenty-five percent (25%) of the trees of the size of five inches (5") in diameter or larger, measured at breast height, shall be cut within any five (5) year period within a thirty (30) foot interior buffer zone from each lot's property lines, other than the property line on the driveway side of the lot. For the driveway side of the lot, in this thirty (30) foot buffer zone no more than fifty percent (50%) of the trees of the size of five inches (5") in diameter or larger, measured at breast height, shall be cut within any five (5) year period except for the purposes of construction of a driveway or for clearing and establishing a lawn. These 30-foot buffers are not to interfere with restrictions imposed on the Buffer Area designated by the State of Maine Department of Environmental Protection as provided in Paragraphs 20 and 21 of this Declaration. The stipulated Buffer Area therein takes precedence over the buffers specified in this paragraph.
9. No business or commercial activities shall be conducted on any lot. This prohibition is not to be construed to prohibit professional activities such as the practice of craft work, artistic endeavors, private office work or occupations that are conducted entirely from within living areas of a private residence as defined in paragraph 3 above. No business or commercial signs shall be allowed.
10. No animals, livestock or poultry of any kind or species shall be raised, bred or kept on any lot except that dogs, cats or other domestic pets may be kept provided they are not bred, kept or maintained for any commercial purpose, and further provided that no pit bulls shall be allowed on any lot. So as not to become noisome or offensive to other owners, a maximum of two (2) dogs shall reside per lot and a maximum of two (2) cats shall reside per lot. All pets shall be restrained according to local leash laws.

11. No dumping of garbage, rubbish, or other refuse or hazardous or toxic material shall be permitted on any lot.
12. No more than one unregistered motor vehicle will be allowed on any lot.
13. No rooftop antennas, satellite dishes larger than 18" in diameter, or communications towers of any kind are allowed.
14. Any building under construction shall be completed on the outside within one year from receipt of a plumbing permit.
15. Although it is the intention of the Grantor that the Durant Homestead Subdivision roads shown on said plan, to wit, Pennywhistle Drive, will meet the Town of Windham's standards for private roads, Grantor makes no warranty or assurance that the Town will ever accept the roads as Town roads. Said roads shall remain private roads unless and until a duly organized lot owners association successfully petitions the Town to accept the Road.
16. Each owner who is granted a lot in said Durant Homestead Subdivision is hereby granted a right of way to that owner's lot as depicted on said Plan, but the Grantor is not obligated to provide any maintenance to or for said right-of-way or for any part or feature of the Property. Said rights of way shall be in common with the Grantor and others. Each lot is further subject to a right of the lot owners association created under paragraph 17 hereunder to maintain any common infrastructure as shown on the Plan, maintaining sight distances at the intersection of Chute Road and Pennywhistle Drive and the right to access and maintain the stormwater control devices described in the Maintenance Plan attached hereto as Exhibit A and the Buffer Areas as defined in the Recitals to this Declaration.
17. Each lot owner shall join the lot owners' association, which may be formed by the Grantor, its successors and assigns, or other lot owners, for the purpose of owning, maintaining, and controlling Pennywhistle Drive in Durant Homestead, any common infrastructure, and the common land of said Subdivision. The lot owners' association shall be governed by the terms set forth on the recorded Subdivision plan, this Restated Declaration, and a Restated Declaration of Establishment of Lot Owners Association of near or recent date and its duly enacted bylaws and provisions.
18. The lot owners' association described in paragraph 17 shall become operational no later than at such point as fourteen (14) lots in Durant Homestead have been sold and the Grantor no longer owns a majority of the lots in the Subdivision, or two years past from the date of the sale of the first lot, whichever shall occur first. Each lot owner must be a member of said lot owner association. Until the lot owners' association is formed, all costs associated with maintaining the Subdivision's roads, rights-of-ways, and common land and infrastructure shall be handled as follows:

Each lot owner shall contribute a proportionate share, based on the number of lots owned, of all costs of repairs, improvements, and maintenance of the roads and rights-of-way shown on said Plan and any common land or infrastructure. Said costs shall be personal obligations of each lot owner and may be assessed quarterly and enforced by notice of delinquency duly filed on the public land records by the Grantor. Notwithstanding the foregoing, Any vacant lot owned by the Grantor or any builder who has purchased a vacant lot from the Grantor for the purposes of erecting a dwelling thereon shall pay a

reduced annual maintenance charge and assessment equal to Ten Percent (10%) of the annual maintenance charge and assessment paid by lots with dwellings constructed thereon. Any such reduced maintenance charges and assessments shall cease upon the earlier of the lot becoming occupied, the termination of any construction thereon for a period of time greater than ninety (90) days, or the completion of any dwelling thereon. If required by law or upon consent by the Grantor, or for any other reasons, the Grantor is required to pay full annual maintenance charges and assessments on unoccupied lots, any builders who have purchased lots from the Grantor for the purpose of erecting a dwelling thereon shall likewise be required to pay full annual maintenance charges and assessments with respect to any such lots owned by them.

19. Each owner agrees to contribute to the Association, when formed, according to its rules and bylaws, and the Association shall have same right to enforce contributions as stated in the preceding paragraph. Said Grantor, and its successors and assigns, may transfer to such Association, and said Association shall accept title to all said roads and rights-of-way shown on said Plan, and any common land or infrastructure, and upon such transfer, the Association shall succeed to said Grantor's title, rights, liabilities, and duties therein. Said Association shall be responsible for the Subdivision infrastructure as provided in the "Maintenance Plan" attached hereto as Exhibit A. The President of the Association shall be responsible for overseeing, implementing and enforcing the "Maintenance Plan." All lot owners agree to indemnify and hold harmless Grantor, its successors and assigns, from any liability arising out of the use of the road or rights-of-way shown on the Plan or use of the common land or infrastructure by any lot owner, his family, guests, or licensees.

In the event of breach of any of the above restrictive covenants, the Grantor, as the Declarant hereof, and its successors and assigns, may exercise any remedies at law or equity to enforce the terms of these restrictions or of any corporate by-laws and acts pursuant hereto, and all costs, including reasonable attorney fees, incurred by Grantor, its successors and assigns, in enforcing these restrictions shall be paid personally by the owner of the lot which is in violation of any provision of the Declaration, together with all other rights and remedies permitted by law, which may be enforced personally and in rem.

20. Special Covenants and Restrictions with Respect to Forested Buffer Area. Pursuant to the Stormwater Management Law, 38 M.R.S. Section 420-D and Chapter 500 of rules promulgated by the Maine Board of Environmental Protection ("Stormwater Management Rules"), Declarant has agreed to impose certain restrictions on the Forested Buffer Area as located on the Plan and more particularly set forth herein and has agreed that these restrictions may be enforced by the Maine Department of Environmental Protection or any successor (hereinafter the "MDEP"). Declarant hereby declares that the Forested Buffer Area is and shall forever be held, transferred, sold, conveyed, occupied and maintained subject to the conditions and restrictions set forth herein. The Restrictions shall run with the Forested Buffer Area and shall be binding on all parties having any right, title or interest in and to the Forested Buffer Area, or any portion thereof, and their heirs, personal representatives, successors, and assigns. Any present or future owner or occupant of the Forested Buffer Area or any portion thereof, by the acceptance of a deed of conveyance of all or part of the Covenant Area or an instrument conveying any interest therein, whether or not the deed or instrument shall so express, shall be deemed to have accepted the Forested Buffer Area subject to the Restrictions and shall agree to be bound by, to comply with and to be subject to each and every one of the Restrictions hereinafter set forth.

1) **Restrictions on Forested Buffer Area.** Unless the owner of the Forested Buffer Area, or any successors or assigns, obtains the prior written approval of the MDEP, the Forested Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Forested Buffer Area to filter and absorb stormwater, and to maintain compliance with the Stormwater Management Law and the permit issued thereunder to the Declarant, the use of the Forested Buffer Area is hereinafter limited as follows.

- a) No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material may be placed, stored or dumped on the Restricted Buffer Area, nor may the topography of the area be altered or manipulated in any way;
- b) Any removal of trees or other vegetation within the Restricted Buffer Area must be limited to the following:
 - i) No purposefully cleared openings may be created and an evenly distributed stand of trees and other vegetation must be maintained. An "evenly distributed stand of trees" is defined as maintaining a minimum rating score of 24 points in any 25 foot by 50 foot rectangle (1,250 square feet) area, as determined by the rating scheme in the following Point System Table:

Point System for Determining an Evenly Distributed Stand of Trees

Diameter of tree at 4¹/₂ feet above ground level	Points
2 - 4 inches	1
4 - 8 inches	2
8 - 12 inches	4
>12 inches	8

Where existing trees and other vegetation result in a rating score less than 24 points, no trees may be cut or sprayed with biocides except for the normal maintenance of dead, windblown or damaged trees and for pruning of tree branches below a height of 12 feet provided two thirds of the tree's canopy is maintained;

- ii) No undergrowth, ground cover vegetation, leaf litter, organic duff layer or mineral soil may be disturbed except that one winding path, that is no wider than six feet and that does not provide a downhill channel for runoff, is allowed through the area;
- c) No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Restricted Buffer Area, except for a sign, utility pole (whether constructed of wood, steel or other materials) and appurtenant equipment such as guys and guy anchors, or fence;
- d) No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Restricted Buffer Area.

21. **Special Covenants and Restrictions with Respect to Meadow Buffer Area.** Pursuant to the Stormwater Management Law, 38 M.R.S. Section 420-D and Chapter 500 of rules promulgated by the Maine Board of Environmental Protection ("Stormwater Management Rules"), Declarant has agreed to impose certain restrictions on the Meadow Buffer Area as more particularly set forth herein and has agreed that these restrictions may be enforced by the Maine Department of Environmental Protection or any successor (hereinafter the "MDEP"). The Declarant hereby declares that the Meadow Buffer Area is and shall forever be held, transferred, sold, conveyed, occupied and maintained subject to the conditions and restrictions set forth herein. The Restrictions shall run with the Meadow Buffer Area and shall be binding on all parties having any right, title or interest in and to the Meadow Buffer Area, or any portion thereof, and their heirs, personal representatives, successors, and assigns. Any present or future owner or occupant of the Meadow Buffer Area or any portion thereof, by the acceptance of a deed of conveyance of all or part of the Covenant Area or an instrument conveying any interest therein, whether or not the deed or instrument shall so express, shall be deemed to have accepted the Meadow Buffer Area subject to the Restrictions and shall agree to be bound by, to comply with and to be subject to each and every one of the Restrictions hereinafter set forth.

- 1) **Restrictions on Meadow Buffer Area.** Unless the owner of the Meadow Buffer Area, or any successors or assigns, obtains the prior written approval of the MDEP, the Meadow Buffer Area must remain undeveloped in perpetuity. To maintain the ability of the Meadow Buffer Area to filter and absorb stormwater, and to maintain compliance with the Stormwater Management Law and the permit issued thereunder to the Declarant, the use of the Meadow Buffer Area is hereinafter limited as follows.
 - a) No soil, loam, peat, sand, gravel, concrete, rock or other mineral substance, refuse, trash, vehicle bodies or parts, rubbish, debris, junk waste, pollutants or other fill material will be placed, stored or dumped on the Meadow Buffer Area, nor may the topography or the natural mineral soil of the area be altered or manipulated in any way;
 - b) A dense cover of grassy vegetation must be maintained over the Meadow Buffer Area, except that shrubs, trees and other woody vegetation may also be planted or allowed to grow in the area. The Meadow Buffer Area may not be maintained as a lawn or used as a pasture. If vegetation in the Meadow Buffer Area is mowed, it may be mown no more than two times per year.
 - c) No building or other temporary or permanent structure may be constructed, placed or permitted to remain on the Meadow Buffer Area, except for a sign, utility pole or fence (whether constructed of wood, steel or other materials) and appurtenant equipment such as guys and guy anchors;
 - d) No trucks, cars, dirt bikes, ATVs, bulldozers, backhoes, or other motorized vehicles or mechanical equipment may be permitted on the Meadow Buffer Area, except for vehicles used in mowing;
 - e) Any level lip spreader directing flow to the Meadow Buffer Area must be regularly inspected and adequately maintained to preserve the function of the level spreader.
 - f) Any activity on or use of the Meadow Buffer Area inconsistent with the purpose of these Restrictions is prohibited. Any future alterations or changes in use of the Meadow Buffer Area must receive prior approval in writing from the MDEP. The MDEP may approve such

alterations and changes in use if such alterations and uses do not impede the stormwater control and treatment capability of the Meadow Buffer Area or if adequate and appropriate alternative means of stormwater control and treatment are provided.

22. Enforcement. The MDEP may enforce any of the Restrictions set forth in Paragraphs 20 and 21 above.

23. Binding Effect. The restrictions set forth herein shall be binding on any present or future owner of the Buffer Areas. If a Buffer Area is at any time owned by more than one owner, each owner shall be bound by the foregoing restrictions to the extent that any of the Buffer Areas are included within such owner's property.

24. Amendment. Any provision contained in this Declaration may be amended or revoked only by the recording of a written instrument or instruments specifying the amendment or the revocation signed by the owner or owners of the Buffer Areas and by the MDEP.

25. Effective Provisions of Declaration. Each provision of this Declaration, and any agreement, promise, covenant and undertaking to comply with each provision of this Declaration, shall be deemed a land use restriction running with the land as a burden and upon the title to the Buffer Areas.

IN WITNESS WHEREOF, the said Matt Hancock Properties, LLC, has caused this instrument to be signed and sealed by _____, its Member thereunto duly authorized, as of the date first written above.

Matt Hancock Properties, LLC

By:
Its: Member

STATE OF MAINE
Cumberland, ss.

_____, 2018

Then personally appeared the above-named _____, Member of Matt Hancock Properties, LLC, and acknowledged the foregoing instrument to be his free act and deed and the free act and deed of said Matt Hancock Properties, LLC.

Before me,

Notary Public – Attorney at Law

Print Name: _____

Exhibit A



P.O. Box 145, Orrington, ME 04474 (207) 825-4050

17-005

July 13, 2018

Revised September 27, 2018

Matt Hancock Properties
Attention: Matt Hancock
P.O. Box 295
Casco, ME 04015

Subject: Soil Site Evaluation Report
Durant Homestead Subdivision
Chute Road
Windham, Maine

Dear Matt,

We are pleased to present the findings of our Soil Site Evaluation services for the proposed Durant Homestead residential subdivision on Chute Road in Windham, Maine (Town of Windham Tax Map 6, Lot 25). The purpose of our services was to assess each of the proposed 25 lots for suitability for subsurface wastewater disposal for a typical 3-bedroom residence, as per the Maine Subsurface Wastewater Disposal Rules¹, and applicable portions of the Maine Department of Environmental Protection (MDEP) Site Location of Development Act (Site Law). The subdivision design was conducted by Acheron Engineering Services.

This Report is subject to the Limitations attached in Appendix A. Appendix B contains a Site Location Map and Well and Septic System Location Plan. Appendix C contains a Soil Conditions Summary Table (Form E) and test pit logs (Form F).

We understand that this Report will be submitted to the MDEP as part of a Site Law permit application prepared by Acheron Engineering Services for the proposed development. This

¹ State of Maine. Subsurface Wastewater Disposal Rules, 10-144 Chapter 241. Department of Health and Human Services, Maine Center for Disease Control & Prevention, Division of Environmental Health. Effective August 03, 3,2015.

William H. Burman
Licensed Professional Forester
Master Arborist
Master Pesticide Applicator

Aleita M. Burman
Certified Wetland Scientist
Certified Soil Scientist
Licensed Site Evaluator



17-005

July 13, 2018

Revised September 27, 2018

report is intended to be used in conjunction with the Soil Solutions Preliminary Soil Evaluation report and the MAI Environmental nitrate-nitrogen report.

The September 27, 2018 Report revisions include lot number changes in the Report and on Form E due to the removal of one lot (from 26 to the currently proposed 25 lots), the removal of TP 12C from page 4 of Form F, a revised Well and Septic System Location Plan, and other minor report and form clarifications. These changes were made in response to comments made during review of the Site Law Application by William T. Noble, C.G. of the MDEP on September 17, 2018.

Scope of Work and Methodology

Soil Solutions conducted soil site evaluation services on a preliminary 26-lot subdivision layout in June of 2017, as reported on August 09, 2017. MAI Environmental conducted a nitrate-nitrogen impact assessment on the preliminary lot layout, and based on their findings, a new layout was designed (Acheron Engineering Services) requiring additional soil site evaluation services. Burman Land & Tree, LLC conducted the additional soil site evaluation services on the new lot layout on June 12, 13 and 22, 2018. The Well and Septic System Location Plan shows the explorations of both Soil Solutions and Burman Land & Tree, LLC, and the Soil Conditions Summary Table (Form E) includes both companies test pits as the lot numbers changed since Soil Solutions services.

Soil Solutions evaluated 54 hand-dug test pits on the site, of which 15 were applicable to the final lot layout. Burman Land & Tree, LLC evaluated 38 hand-dug test pits, 4 auger borings, and 1 excavator-dug test pits on the site, all of which were applicable to the final lot layout. Test pits are marked in the field with labeled orange flagging.

Our soil site evaluation services were conducted in general accordance with the soil suitability and setback sections of the Maine Subsurface Wastewater Disposal Rules. Our services also included collection and reporting of information required for a Site Law permit application, including Forms E and F, additional explorations in certain soil conditions; and a site plan that includes additional information such as location of proposed wells, existing wells within 300 feet of the proposed development, and depiction of approximate fill extensions where the slopes are 10% or greater. Also included are minimum areas of suitable soils at each suitable leachfield location, as per a requirement of the Town of Windham.



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For this Report, we used information on depth to bedrock from our Soil Survey test pits, where they were nearby to the proposed septic system locations. Our Soil Survey test pits and findings are reported under separate cover.

Findings and Recommendations

Based on the findings of Burman Land & Tree, LLC and the reported findings of Soil Solutions, there is a suitable area for a subsurface wastewater disposal leachfield for a 3-bedroom residence on each of the 25 proposed lots, at the locations indicated on the attached Well and Septic System Location Plan, in conformance with the applicable sections of the Subsurface Wastewater Disposal Rules. Table 1, below, provides details of the findings with examples of systems that could potentially be designed on each lot.

TABLE 1 – Summary of Findings

<u>Lot #</u>	<u>Soil Profile/Condition</u>	<u>Type of System</u>	<u>SSWWDS Size</u>	<u>Area of Suitable Soils (minimum)</u>
1	8 AIII / C	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
2	8 AIII / C	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
3	8D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
4	8D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
5	8D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
6	2C	28 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 21'W	32' X 32'
7	3 AIII / C	28 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 21'W	32' X 32'
8	3C	28 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 21'W	32' X 32'
9	8C	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
10	3 AIII / D	28 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 21'W	32' X 32'
11	8C	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
12	8 AIII / C	24 Eljen In-Drain B43 Modules	25.5'L X 16.5'W	32' X 32'
13	8D	24 Eljen In-Drain B43 Modules	25.5'L X 16.5'W	32' X 32'
14	8D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
15	8 AIII / D	24 Eljen In-Drain B43 Modules	25.5'L X 16.5'W	32' X 32'
16	8D	24 Eljen In-Drain B43 Modules	25.5'L X 16.5'W	32' X 32'
17	8C	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
18	8 AIII / D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
19	8 AIII / D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
20	8 AIII / D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
21	8 AIII / D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
22	8 AIII/C	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
23	8D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'
24	3 AIII / C	28 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 21'W	32' X 32'
25	8D	35 Quick 4 Hi-Cap Plastic Chambers	30.41'L X 27'W	32' X 32'



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Please note that the system type, configuration, and design will be as per the determination of the Licensed Site Evaluator who designs the system. In Table 1, smaller system examples were given on Lots 12, 13, 15 and 16 to create smaller footprints with smaller fill extensions to avoid and minimize alteration of nearby wetlands. System requirements would also include a 1000 gallon (minimum) septic tank between the house and leachfield.

Please also note that the area of Lots 19, 20, and 21 were recently graded and were the location of previous residences and associated parking/lawn areas. This area has compaction in the upper soil layers. The area of the Lot 19 bed is also within and adjacent to an existing gravel driveway and is also compacted for this reason. Based on nearby test pits and observation, the compaction does not reflect natural conditions at the site. It is recommended that the compact soils in the leachfield footprints and fill extensions in these lots be removed and replaced with suitable backfill to the lower limit of compaction. The backfill should be tilled into the original soil to a 6-inch depth in the leachfield footprint and fill extensions to form a transitional horizon.

Based on review of the MDEP Chapter 376: Soil Types Standard of the Site Location Law, Lots 1, 2, 16, 17, 19, 20, and 21 do not meet the minimum lot size as indicated on Table A. According to the standard, "*Lots smaller than the minimum area specified in Table A may be allowed if a developer can present evidence that, because of unique characteristics of the site, or because of an innovative and acceptable method of on-lot sewage disposal, the minimum lot size requirement should not apply.*" This soil site evaluation report, in conjunction with the MAI Environmental nitrate-nitrogen impact assessment, finds that there are acceptable locations on each lot for leachfields for typical 3-bedroom residential dwellings. While this is not a "unique characteristic" of the site, it does show that the development is suitable for the site from a wastewater perspective. If, during their review of the Site Law Application and this Report, the MDEP requires additional measures, we recommend that wastewater pre-treatment systems (ex: SeptiTech) be part of the wastewater system design for those Lots that do not meet the standard.

This Report is subject to approval of the MDEP Site Law permit for the development, which will also require review and approval of the nitrate-nitrogen impact assessment. This Report is not an Application for Subsurface Wastewater Disposal Permit. Such an application must be completed by a Licensed Site Evaluator and approved by the Local Plumbing Inspector of the Municipality (and by the Div. of Health Engineering, Augusta, when necessary) before the owner may discharge any wastewater.



17-005

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We appreciate the opportunity to assist you during this phase of your project. If you have any questions, or need further assistance, please contact me.

Sincerely,

Burman Land & Tree, LLC

Aleita M. Burman

Aleita M. Burman, L.S.E.
Licensed Site Evaluator #344

(207) 825-4050 office / (207) 385-6056 cell
blburman@gmail.com

cc: Kirk Ball, Acheron Engineering



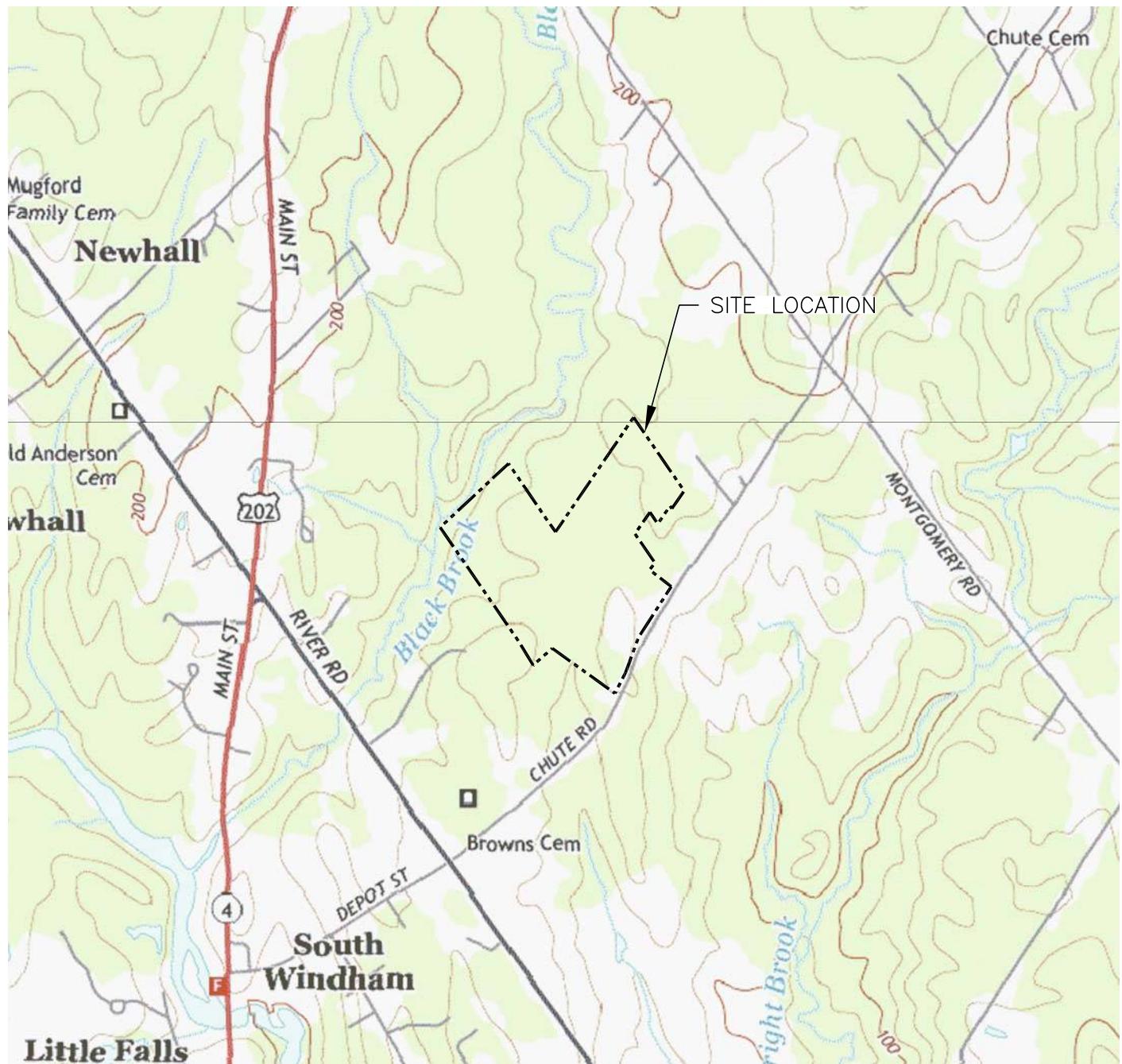
APPENDIX A

Limitations

Appendix A – Limitations

The scope of Burman Land & Tree, LLC services has been limited to Soil Site Evaluation services for the proposed Durant Homestead subdivision on Chute Road (Town of Windham Tax Map 6, Lot 25) in Windham, Maine. The Report has been prepared for the exclusive use Matt Hancock Properties and Acheron Engineering Services. No warranty, expressed or implied, is made. The conclusions made in this report are based on the data obtained from the areas explored at the time of services.

APPENDIX B
Site Location Map
Well and Septic System Location Plan

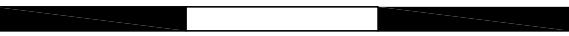


SITE LOCATION MAP



BURMAN
LAND & TREE COMPANY, LLC.

1,000 0 1,000 2,000



Scale in Feet

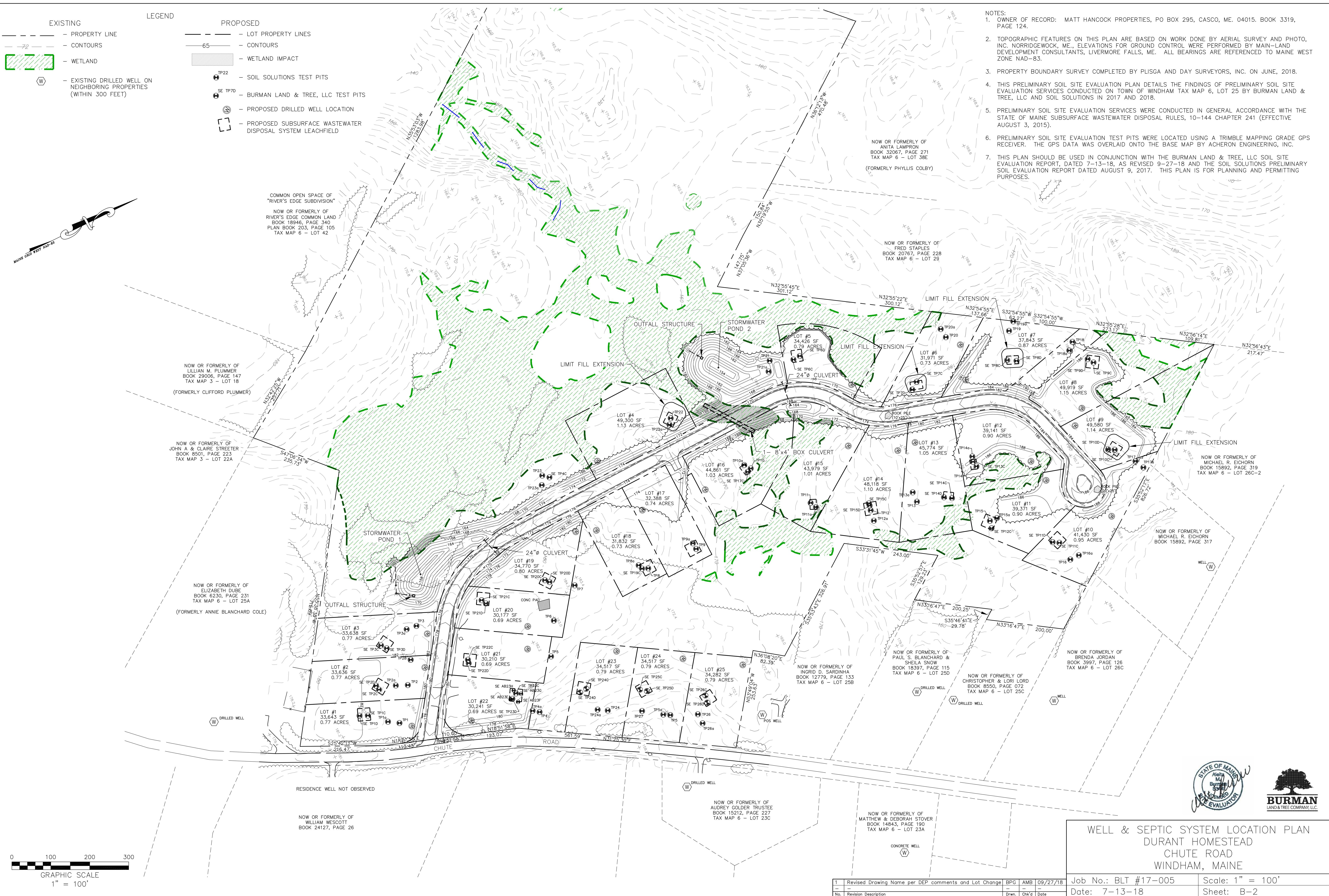
SITE LOCATION MAP
DURANT HOMESTEAD
CHUTE ROAD
WINDHAM, MAINE

Job No.: BLT #17-005

Scale: 1" = 1000'

Date: 7-13-18

Sheet: B-1



APPENDIX C
Soil Conditions Summary Table (Form E)
Test Pit Logs (Form F)

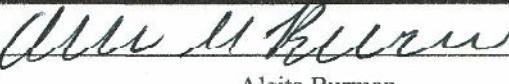
SOIL CONDITIONS SUMMARY TABLE

SUMMARY LOG OF SUBSURFACE EXPLORATIONS AT PROJECT SITES

Project Name: Durant Homestead, Chute Road	Applicant Name: Matt Hancock Properties	Project Location (municipality): Windham
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Lot No.	Exploration Symbol (TP 1, B 2, etc.)	X if at SSWD Field	Description of subsurface materials by: • Soil profile/condition (if by S.E.), • Soil series name (if by C.S.S.), or by • Geologic unit (if by C.G.)	Depths to (inches):				Ground Surface Slope (%)	Ground Surface Elevation
				Redoximorphic Features	Bedrock	Hydraulically Restrictive Layer	Limit of Exploration		
1	SE TP 1C	☒	8 AIII / C (BLT)	16"	see TP desc	16"	24"	2	
1	SE TP 1D	☒	8 AIII / C (BLT)	16"	see TP desc	16"	24"	2	
2	SE TP 2C	☒	8 AIII / C (BLT)	18"	see TP desc	18"	24"	0-2	
2	SE TP 2D	☒	8 AIII / C (BLT)	18"	see TP desc	18"	24"	0-2	
3	SE TP 3C	☒	8D (BLT)	10"	n.o.	10"	24"	3	
3	SE TP 3D	☒	8D (BLT)	10"	n.o.	10"	24"	2	
		□							
		□							
		□							
4	TP 22	☒	8D (SS)	13"	n.o.	13"	35"	8-15	
4	TP 22a	☒	8C (SS)	16"	n.o.	16"	35"	8-15	
5	SE TP 6C	☒	8C (BLT)	16"	n.o.	16"	24"	0-3	
5	SE TP 6D	☒	8D (BLT)	14"	n.o.	14"	24"	0-3	
6	SE TP 7C	☒	2C (BLT)	22"	n.o.	n.o.	34"	10	
6	SE TP 7D	☒	2C (BLT)	22"	n.o.	n.o.	34"	10	
7	SE TP 8C	☒	3 AIII / C (BLT)	16"	see TP desc	16"	28"	5	
7	SE TP 8D	☒	3 AIII / C (BLT)	18"	see TP desc	18"	30"	5-10	
8	SE TP 9C	☒	3C (BLT)	16"	n.o.	16"	28"	6	
8	SE TP 9D	☒	3C (BLT)	16"	n.o.	16"	28"	6	
9	SE TP10C	☒	8C (BLT)	16"	n.o.	16"	28"	10	
9	SE TP10D	☒	8C (BLT)	16"	n.o.	16"	28"	10	
10	SE TP11C	☒	3 AIII / D (BLT)	12"	see TP desc	12"	24"	7	
10	SE TP11D	☒	3 AIII / C (BLT)	15"	see TP desc	15"	24"	5	
11	TP 15	☒	8C (SS)	18"	n.o.	18"	35"	1	
11	TP 15a	☒	8C (SS)	18"	n.o.	18"	35"	1-6	
11	SE TP12C	☒	8C (BLT)	16"	n.o.	16"	24"	5	
12	TP 14	☒	7C (SS)	24"	n.o.	24"	35"	1-6	
12	SE TP13C	☒	8 AIII / C (BLT)	16"	see TP desc	16"	24"	4	
13	SE TP14C	☒	8D (BLT)	14"	n.o.	14"	24"	5	
13	SE TP14D	☒	8D (BLT)	14"	n.o.	14"	24"	7	
14	TP 12	☒	8C (SS)	21"	n.o.	21"	35"	1-8	
14	SE TP15C	☒	8D (BLT)	12"	n.o.	12"	24"	5	

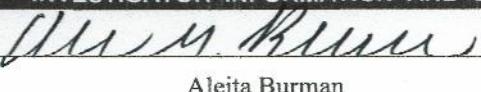
INVESTIGATOR INFORMATION AND SIGNATURE

Signature		Date	06/12; 06/13; 06/22, 2018
Name Printed	Aleita Burman	Cert/Lic/Reg. #	S344
Qualification	<input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist		
	<input type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Other:		



SOIL CONDITIONS SUMMARY TABLE				SUMMARY LOG OF SUBSURFACE EXPLORATIONS AT PROJECT SITES					
Project Name: Durant Homestead, Chute Road		Applicant Name: Matt Hancock Properties		Project Location (municipality): Windham					
Lot No.	Exploration Symbol (TP 1, B 2, etc.)	X if at SSWD Field	Description of subsurface materials by: • Soil profile/condition (if by S.E.), • Soil series name (if by C.S.S.), or by • Geologic unit (if by C.G.)	Depths to (inches):				Ground Surface Slope (%)	Ground Surface Elevation
				Redoximorphic Features	Bedrock	Hydraulically Restrictive Layer	Limit of Exploration		
14	SE TP15D	<input checked="" type="checkbox"/>	8D (BLT)	12"	n.o.	12"	24"	5	
15	TP 11	<input checked="" type="checkbox"/>	8 AIII / D (SS)	14"	nearby SS -	14"	35"	1-8	
15	TP 11a	<input checked="" type="checkbox"/>	8 AIII / D (SS)	14"	TP 24@27"	14"	35"	1-8	
16	TP 10	<input checked="" type="checkbox"/>	8D (SS)	11"	n.o.	11"	35"	0-3	
16	TP 10a	<input checked="" type="checkbox"/>	8D (SS)	13"	n.o.	13"	35"	0-3	
16	TP 17C	<input checked="" type="checkbox"/>	8D (BLT)	12"	n.o.	12"	35"	3-8	
17	TP 9	<input checked="" type="checkbox"/>	8C (SS)	17"	n.o.	17"	35"	3-8	
17	TP 9a	<input checked="" type="checkbox"/>	8C (SS)	18"	n.o.	18"	35"	3-8	
18	TP8	<input checked="" type="checkbox"/>	8D(SS)	13"	n.o.	13"	35"	3-8	
18	SE TP19C	<input checked="" type="checkbox"/>	8 AIII / C (BLT)	16"	see TP desc	16"	24"	5	
19	SE TP20C	<input checked="" type="checkbox"/>	8 AIII / D (BLT SSTP31)	12"	see TP desc	n.o.	32"	0	
19	SE TP20D	<input checked="" type="checkbox"/>	8 AIII / C (BLT)	15"	see TP desc	15'	17"	0	
20	SE TP21C	<input checked="" type="checkbox"/>	8 AIII / D (BLT SS BED21)	n.o.	36"	12"	36"	0	
20	SE TP21D	<input checked="" type="checkbox"/>	8 AIII / D (BLT SS BED21)	n.o.	36"	12"	36"	0	
21	SE TP22C	<input checked="" type="checkbox"/>	8 AIII / C (BLT)	16"	see TP desc	16"	24"	0	
21	SE TP22D	<input checked="" type="checkbox"/>	8 AIII / D (BLT)	12"	see TP desc	12"	24"	0	
22	SE TP23C	<input checked="" type="checkbox"/>	8AIII/C (BLT)	17"	18"	17"	18"	0-3	
22	SE TP23D	<input checked="" type="checkbox"/>	8AIII/C (BLT)	17"	18"	17"	18"	0-3	
22	SEAB23E	<input checked="" type="checkbox"/>	AIII (BLT auger boring only)		18"			0-3	
22	SEAB23F	<input checked="" type="checkbox"/>	AIII (BLT auger boring only)		18"			0-3	
22	SEAB23G	<input checked="" type="checkbox"/>	AIII (BLT auger boring only)		18"			0-3	
22	SEAB23H	<input checked="" type="checkbox"/>	AIII (BLT auger boring only)		18"			0-3	
23	SE TP24C	<input checked="" type="checkbox"/>	8D (BLT)	13"	n.o.	13"	24"	6	
23	SE TP24D	<input checked="" type="checkbox"/>	8D (BLT)	13"	n.o.	13"	24"	6	
24	SE TP25C	<input checked="" type="checkbox"/>	3 AIII / C (BLT)	15"	see TP desc	15"	24"	5	
24	SE TP25D	<input checked="" type="checkbox"/>	3 AIII / C (BLT)	16"	see TP desc	16"	24"	8	
25	SE TP26C	<input checked="" type="checkbox"/>	8D (BLT)	12"	n.o.	12"	24"	5	
25	SE TP26D	<input checked="" type="checkbox"/>	8D (BLT)	14"	n.o.	14"	24"	5	
		<input type="checkbox"/>							
		<input type="checkbox"/>							
		<input type="checkbox"/>							
		<input type="checkbox"/>							

INVESTIGATOR INFORMATION AND SIGNATURE

Signature		Date	6/12; 6/13; 6/22, 2018
Name Printed	Aleita Burman	Cert/Lic/Reg. #	S344
Qualification	<input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist	<input type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Other:	



SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. Health & Human Services
Division of Environmental Health
(207) 287-5072 Fax: (207) 287-3163

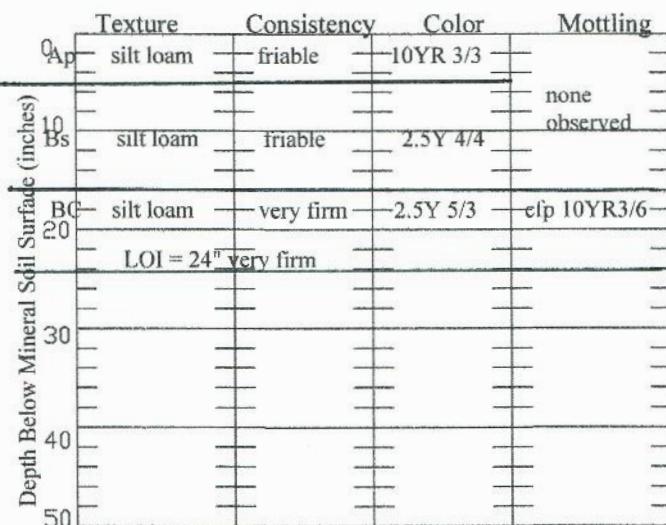
Town, City, Plantation
Windham

Street, Road, Subdivision
Durant Homestead, Chute Road

Owner's Name
Matt Hancock Properties

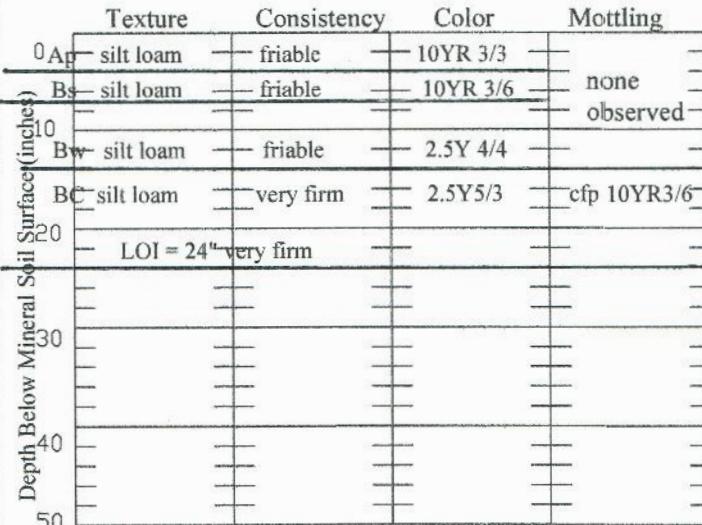
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 6C Test Pit Boring
2" " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water	<input checked="" type="checkbox"/> Restrictive Layer	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Pit Depth 24"
8 C	0-3 %	16 "				

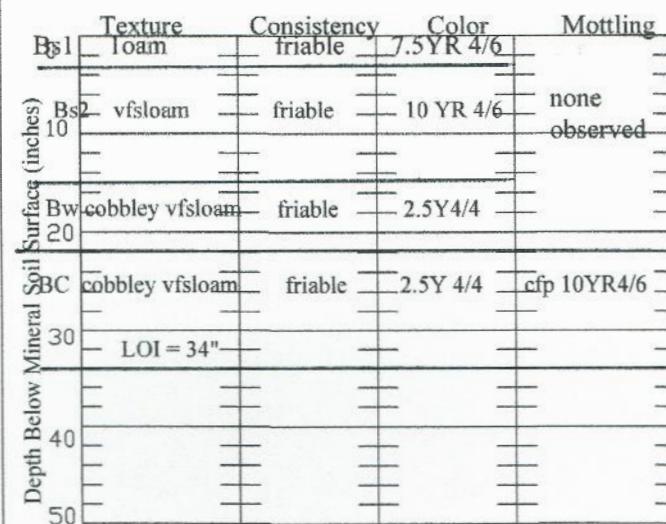
Observation Hole SE TP 6D Test Pit Boring
2" " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water	<input checked="" type="checkbox"/> Restrictive Layer	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Pit Depth 24"
8 D	0-3 %	14 "				

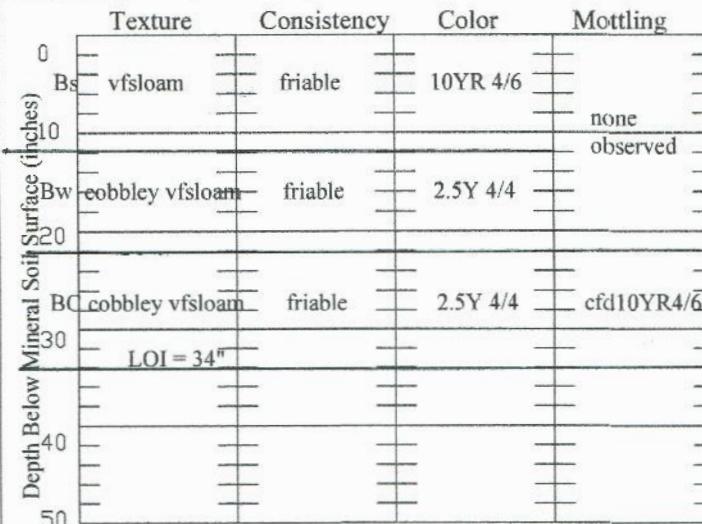
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 7C Test Pit Boring
3" " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water	<input checked="" type="checkbox"/> Restrictive Layer	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Pit Depth 34"
2 C	10 %	22 "				

Observation Hole SE TP 7D Test Pit Boring
2" " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water	<input checked="" type="checkbox"/> Restrictive Layer	<input type="checkbox"/> Bedrock	<input type="checkbox"/> Pit Depth 34"
2 C	10 %	22 "				

MM Hancock

#S344

Site Evaluator Signature

SE #

06/12/18

Date

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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
 Division of Environmental Health
 (207) 287-5072 Fax. (207) 287-3165

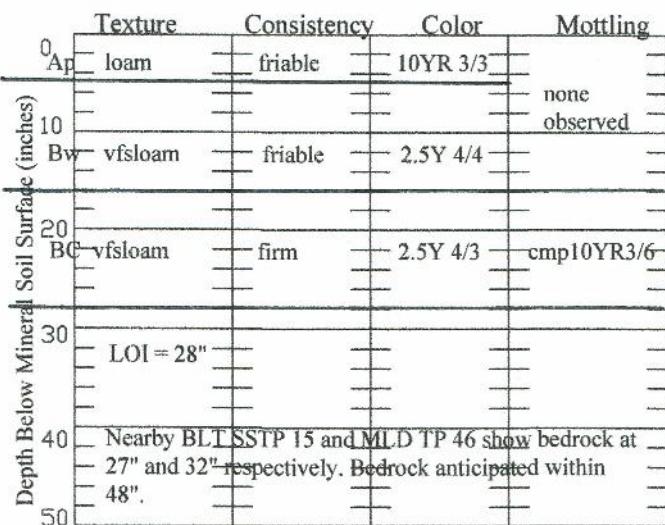
Town, City, Plantation
 Windham

Street, Road, Subdivision
 Durant Homestead, Chute Road

Owner's Name
 Matt Hancock Properties

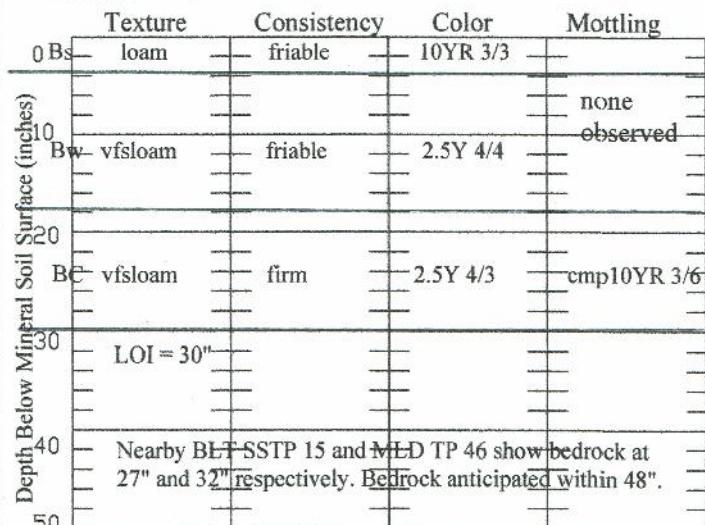
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 8C Test Pit Boring
 2 " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
3 AIII/C Profile	5 % Condition	16 "	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 28"

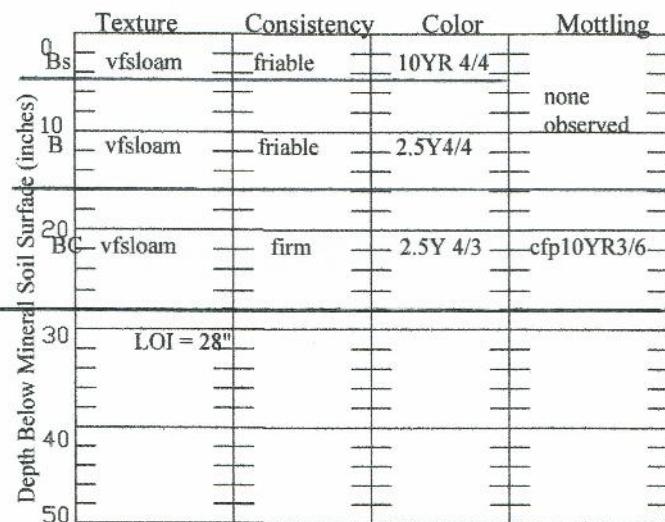
Observation Hole SE TP 8D Test Pit Boring
 2 " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
3 AIII/C Profile	5-10 % Condition	18 "	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 30"

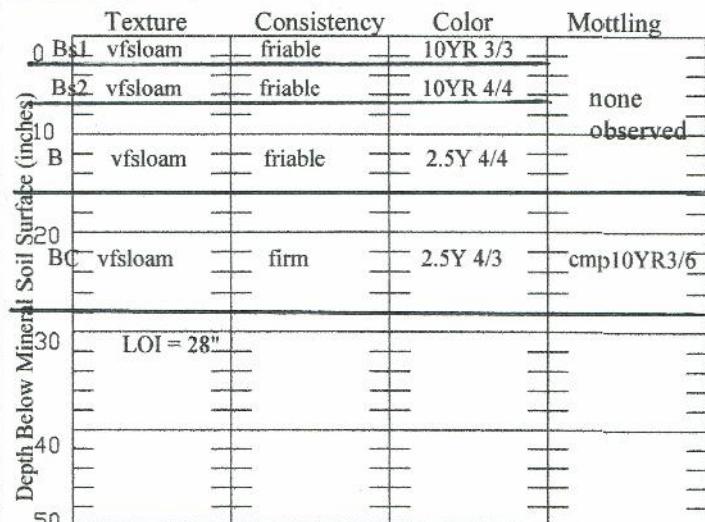
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 9C Test Pit Boring
 2 " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
3 C Profile	6 % Condition	16 "	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 28"

Observation Hole SE TP 9D Test Pit Boring
 2 " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
3 C Profile	6 % Condition	16 "	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 28"

dw

#S344

Site Evaluator Signature

SE #

06/12/18

Date

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. Health & Human Services
Division of Environmental Health
(207) 287-5072 Fax: (207) 287-3166

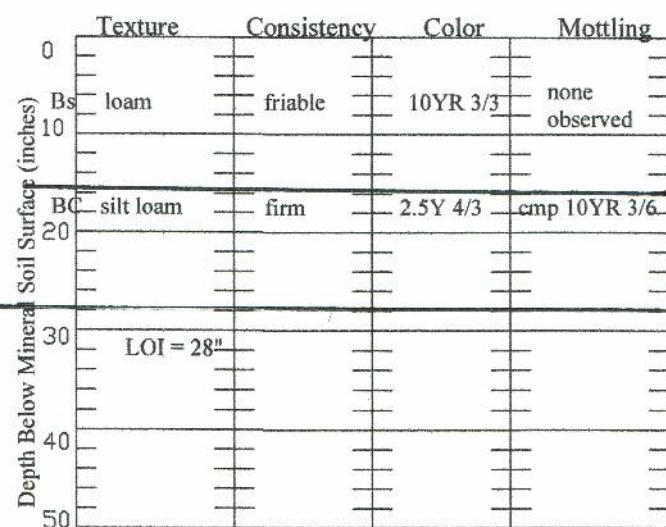
Town, City, Plantation
Windham

Street, Road, Subdivision
Durant Homestead, Chute Road

Owner's Name
Matt Hancock Properties

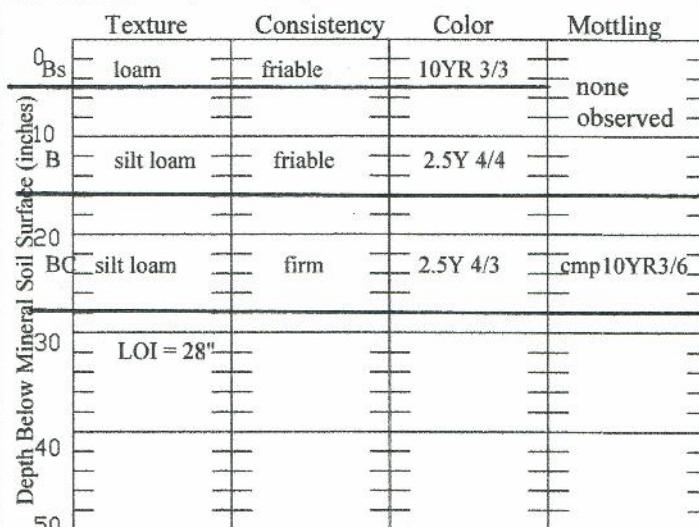
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP10C Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil



Soil Classification 8 Profile	Slope C Condition	Limiting Factor 16 "	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer [] Bedrock [] Pit Depth 28"
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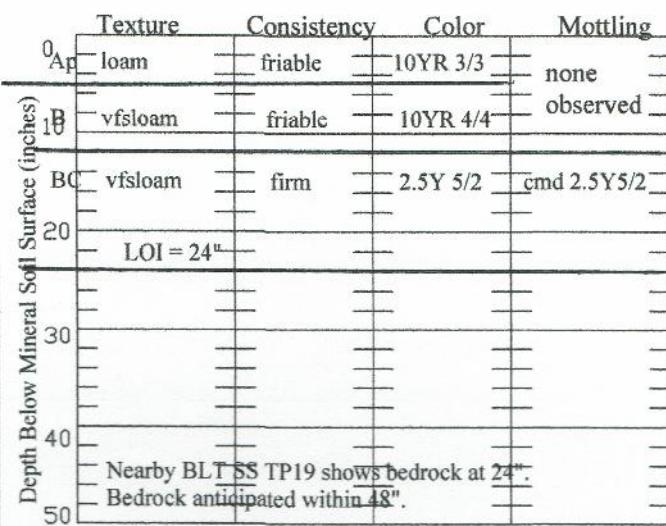
Observation Hole TP 10D Test Pit Boring
" Depth of Organic Horizon Above Mineral Soil



Soil Classification 8 Profile	Slope C Condition	Limiting Factor 16 "	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer [] Bedrock [] Pit Depth 28"
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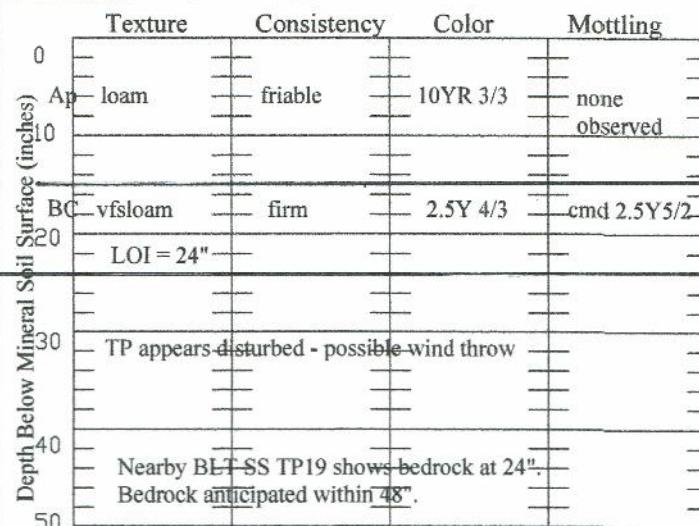
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP11C Test Pit Boring
1 " Depth of Organic Horizon Above Mineral Soil



Soil Classification 3 Profile	Slope AIIII / D Condition	Limiting Factor 12 "	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer [] Bedrock [] Pit Depth 24"
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Observation Hole SE TP 11D Test Pit Boring
1 " Depth of Organic Horizon Above Mineral Soil



Soil Classification 3 Profile	Slope AIIII / C Condition	Limiting Factor 15 "	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer [] Bedrock [] Pit Depth 24"
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dwkew

Site Evaluator Signature

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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3105

Town, City, Plantation
Windham

Street, Road, Subdivision
Durant Homestead, Chute Road

Owner's Name
Matt Hancock Properties

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 14C Test Pit Boring
1 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 Ap	silt loam	friable	10YR 3/3
			none observed
10 Bw	silt loam	friable	2.5Y 4/4
20 BC	silt loam	very firm	2.5Y 4/3 cmd 2.5Y 5/3
			LOI = 24"
30			
40			
50			

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8 Profile	D Condition	5 % 14 "	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 24"

Observation Hole SE TP 14D Test Pit Boring
1 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 Ap	silt loam	friable	10YR 3/3
			none observed
10 Bw	silt loam	friable	2.5Y 4/4
20 BC	silt loam	very firm	2.5Y 4/3 cmd 2.5Y 5/3
			LOI = 24"
30			
40			
50			

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8 Profile	D Condition	7 % 14 "	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 24"

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 17C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 Ap	vfsloam	friable	10YR 3/2
			none
10 Bw	vfsloam	friable	2.5Y 4/3 observed
20 BC	silt loam	firm	2.5Y 4/3 cmd 2.5Y 5/3
30			
40			
50			

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8 Profile	D Condition	5 % 12 "	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

MMR

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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax. (207) 287-3165

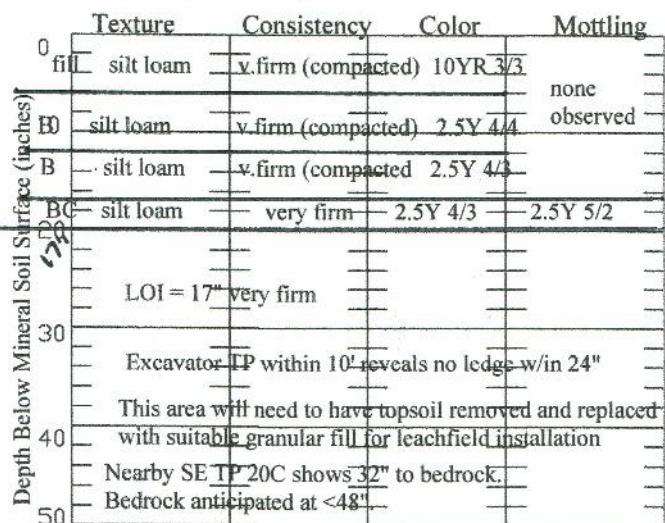
Town, City, Plantation

Street, Road, Subdivision

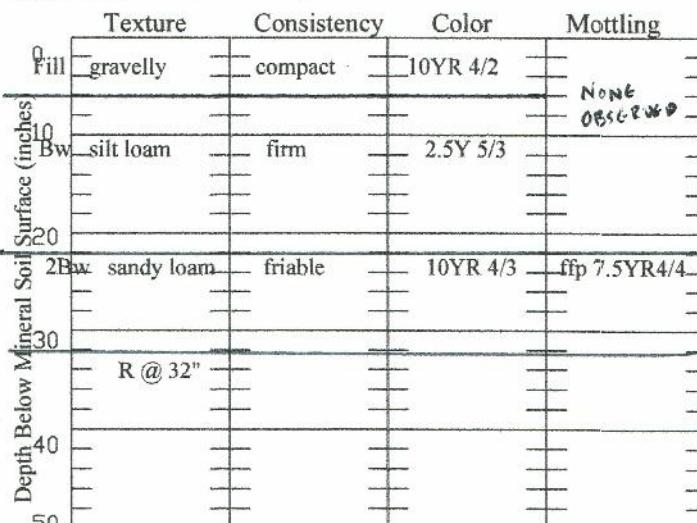
Owner's Name
Matt Hancock Properties

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 20D Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil



Observation Hole SE TP 20C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

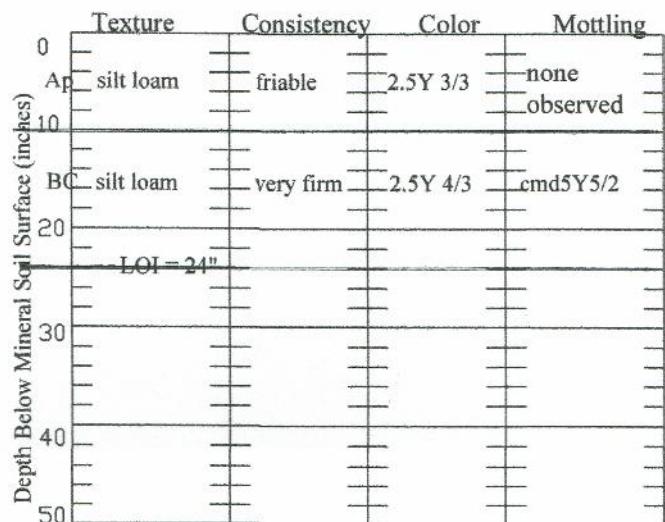


Soil Classification		Slope	Limiting Factor	Ground Water
Profile	AIHII / C Condition	0 %	15 "	Restrictive Layer
				<input checked="" type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 24"

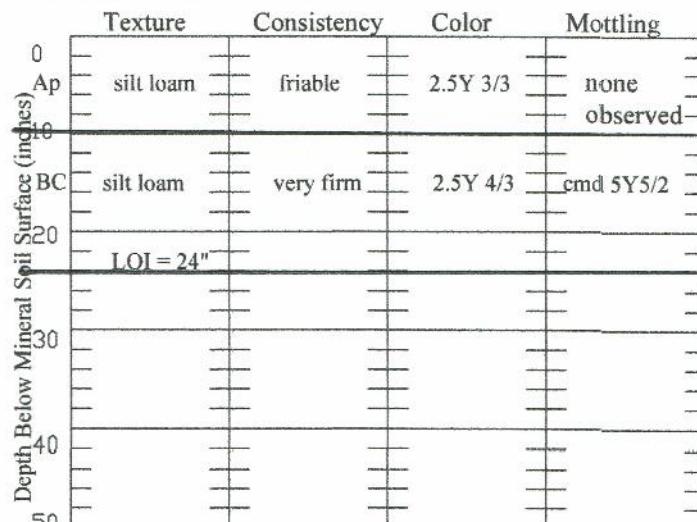
Soil Classification		Slope	Limiting Factor	[] Ground Water
8	AIII / D	0 %	12 "	[X] Restrictive Layer
Profile	Condition			[] Bedrock 32"

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 3C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil



Observation Hole SE TP 3D Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil



Soil Classification		Slope	Limiting Factor	[X] Ground Water
8	D	3 %		[X] Restrictive Layer
Profile	Condition		10 "	[] Bedrock [] Pit Depth 24"

Soil Classification		Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8	D	2 %	10 "	<input checked="" type="checkbox"/> Restrictive Layer
Profile	Condition			<input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 24"

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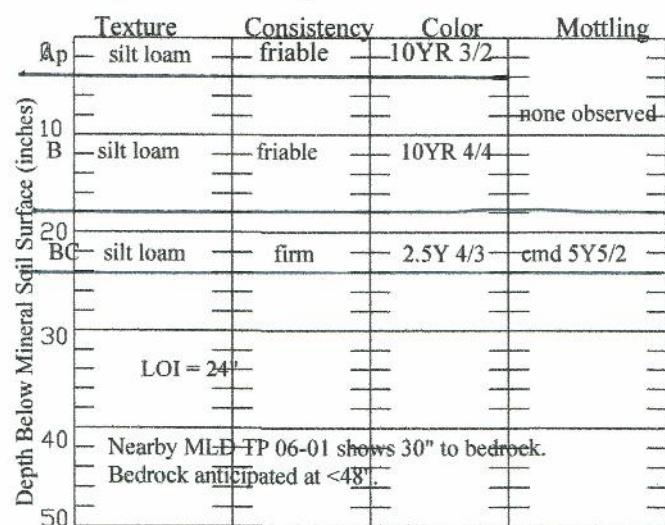
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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

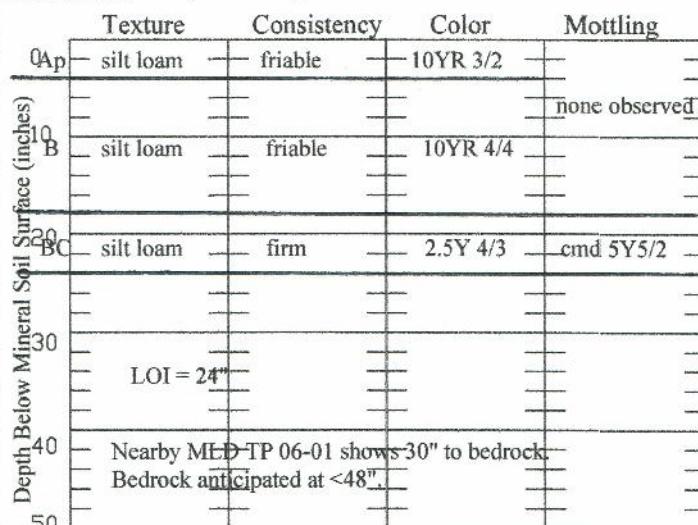
Maine Dept. Health & Human Services

Division of Environmental Health

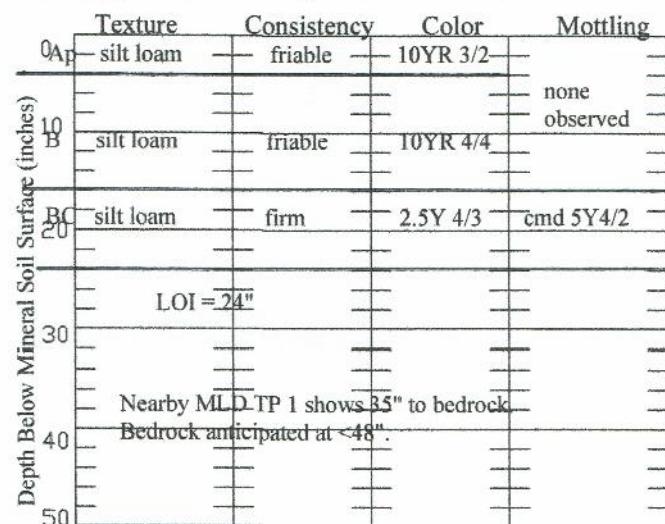
(207) 287-5072 Fax: (207) 287-3165

Town, City, Plantation
WindhamStreet, Road, Subdivision
Durant Homestead, Chute RoadOwner's Name
Matt Hancock Properties**SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)**Observation Hole SE TP 2C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

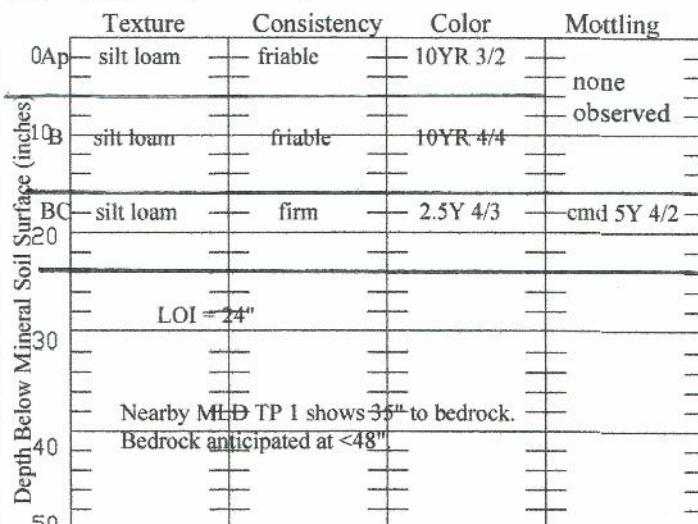
Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8 Profile	AIII / C Condition	0-2 % 18 "	<input checked="" type="checkbox"/> Restrictive Layer [] Bedrock [] Pit Depth 24"

Observation Hole SE TP 2D Test Pit Boring
" Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8 Profile	AIII / C Condition	0-2 % 18 "	<input checked="" type="checkbox"/> Restrictive Layer [] Bedrock [] Pit Depth 24"

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)Observation Hole SE TP 1C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8 Profile	AIII / C Condition	2 % 16 "	<input checked="" type="checkbox"/> Restrictive Layer [] Bedrock [] Pit Depth 24"

Observation Hole SE TP 1D Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8 Profile	AIII / C Condition	2 % 16 "	<input checked="" type="checkbox"/> Restrictive Layer [] Bedrock [] Pit Depth 24"

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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. Health & Human Services
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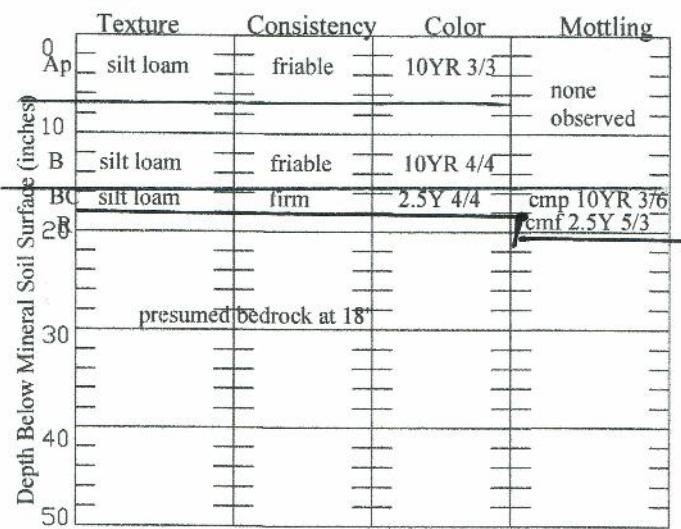
Town, City, Plantation
 Windham

Street, Road, Subdivision
 Durant Homestead, Chute Road

Owner's Name
 Matt Hancock Properties

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

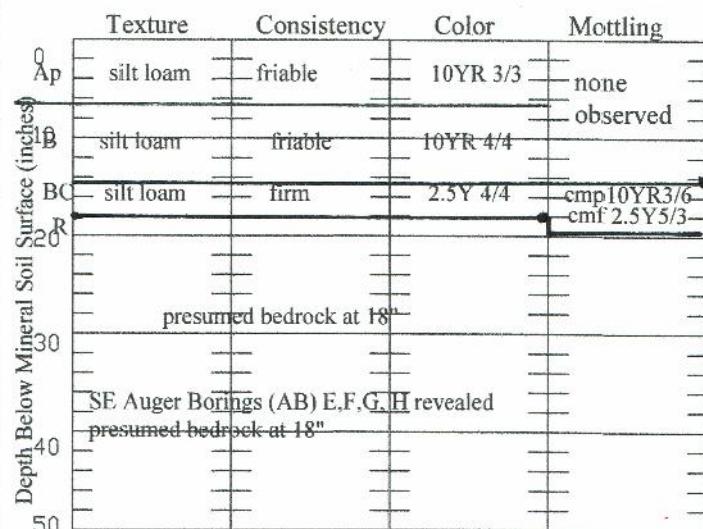
Observation Hole SE TP 23C Test Pit Boring
 0 " Depth of Organic Horizon Above Mineral Soil



Soil Classification		Slope	Limiting Factor	Ground Water	
8	AIII/C	0-3 %	18 "	<input type="checkbox"/>	<input type="checkbox"/>
Profile	Condition			<input checked="" type="checkbox"/>	<input type="checkbox"/>

[X] Bedrock
 Restrictive Layer
 Pit Depth

Observation Hole SE TP 23D Test Pit Boring
 0 " Depth of Organic Horizon Above Mineral Soil

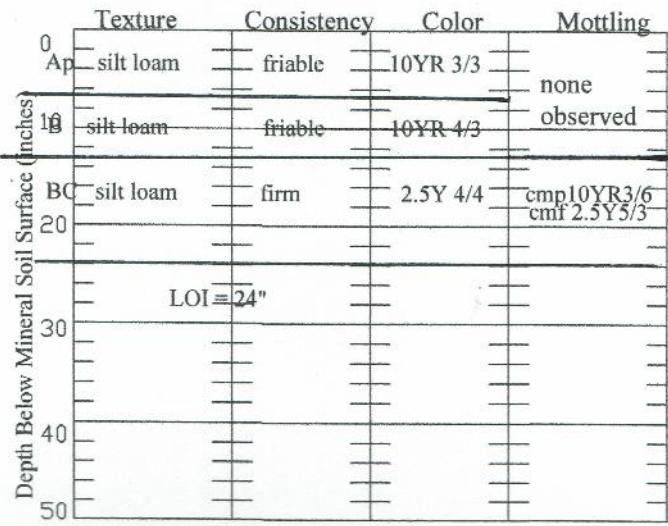


Soil Classification		Slope	Limiting Factor	Ground Water	
8	AIII/D	0-3 %	18 "	<input type="checkbox"/>	<input type="checkbox"/>
Profile	Condition			<input checked="" type="checkbox"/>	<input type="checkbox"/>

[X] Bedrock
 Restrictive Layer
 Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

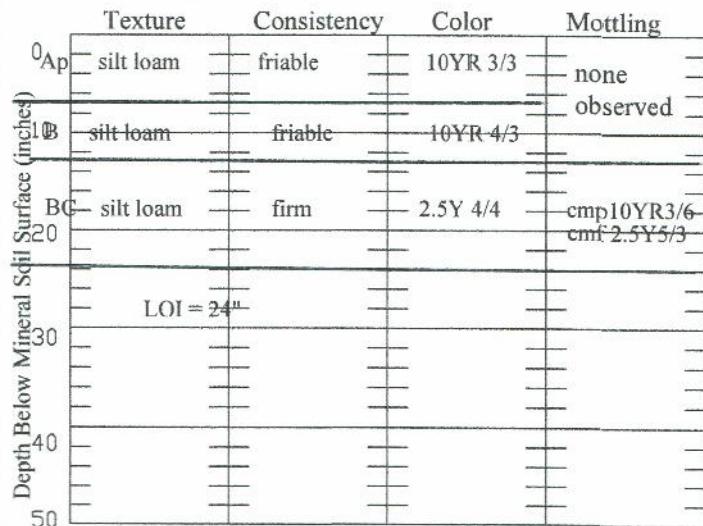
Observation Hole SE TP 24C Test Pit Boring
 0 " Depth of Organic Horizon Above Mineral Soil



Soil Classification		Slope	Limiting Factor	Ground Water	
8	D	6 %	13 "	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Profile	Condition			<input type="checkbox"/>	<input checked="" type="checkbox"/>

[X] Bedrock
 Restrictive Layer
 Pit Depth 24"

Observation Hole SE TP 24D Test Pit Boring
 0 " Depth of Organic Horizon Above Mineral Soil



Soil Classification		Slope	Limiting Factor	Ground Water	
8	D	6 %	13 "	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Profile	Condition			<input type="checkbox"/>	<input checked="" type="checkbox"/>

[X] Bedrock
 Restrictive Layer
 Pit Depth 24"

Mike Hancock

Site Evaluator Signature

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06/13/18

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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. Health & Human Services
Division of Environmental Health
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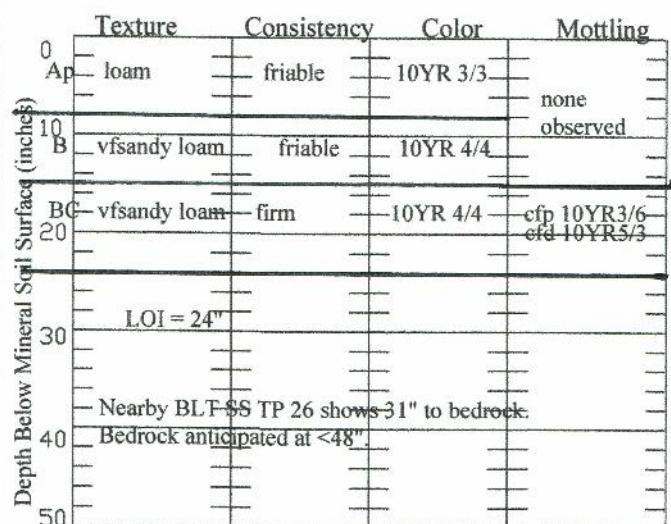
Town, City, Plantation
Windham

Street, Road, Subdivision
Durant Homestead, Chute Road

Owner's Name
Matt Hancock Properties

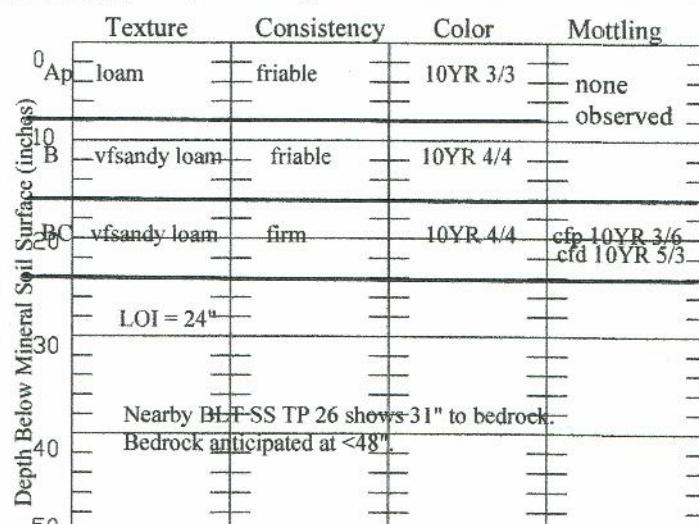
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 25C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil



Soil Classification 3 Profile	Slope 7 %	Limiting Factor 15 "	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 24"
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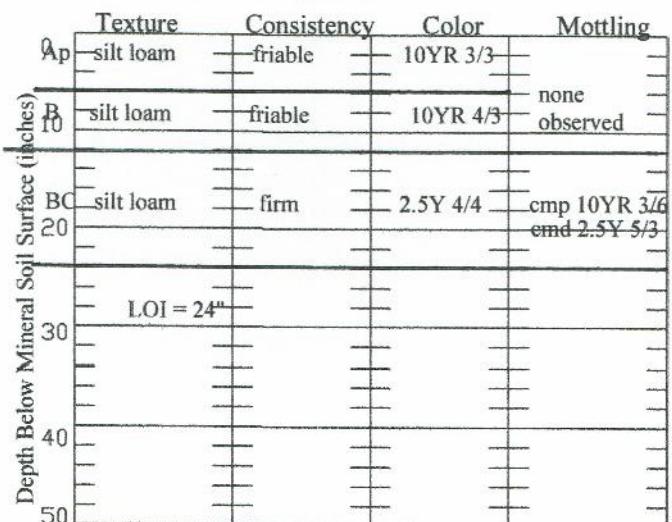
Observation Hole SE TP 25D Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil



Soil Classification 3 Profile	Slope 8 %	Limiting Factor 16 "	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 24"
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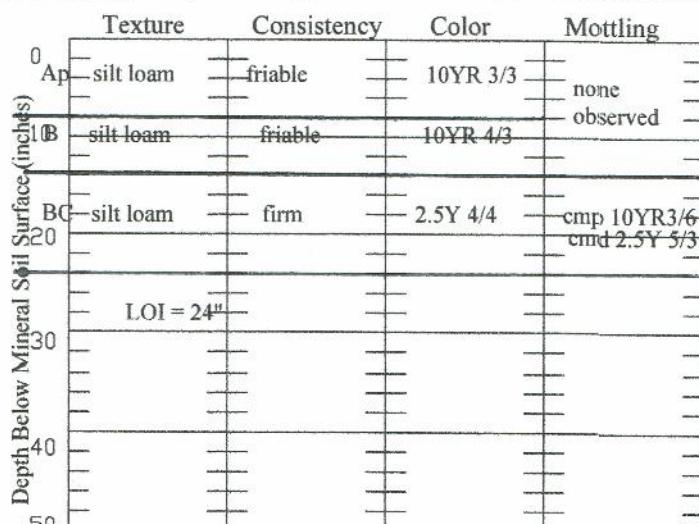
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 26C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil



Soil Classification 8 Profile	Slope 5 %	Limiting Factor 12 "	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 24"
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Observation Hole SE TP 26D Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil



Soil Classification 8 Profile	Slope 5 %	Limiting Factor 14 "	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 24"
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Allen Hancock

Site Evaluator Signature

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~~SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION~~

~~Maine Dept. Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3165~~

Town, City, Plantation

Street, Road, Subdivision

Owner's Name
Matt Hancock Properties

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 19C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

Soil Survey Profile Report

Depth Below Mineral Soil Surface (inches)

	Texture	Consistency	Color	Mottling
0-10 Ap	vf sandy loam	friable	10YR 3/3	none observed
10-20 B	silt loam	friable	10YR 4/4	
20-30 BC	silt loam	firm	2.5Y 4/3	cm 10YR 4/6
30-40 LOI = 24%				
40-50				
40-50	Nearby MLD TP 36 shows 25" to bedrock.			
40-50	Bedrock anticipated at <48".			

Soil Classification		Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8 Profile	AIII / C Condition	5 %	<input checked="" type="checkbox"/> Restrictive Layer	<input type="checkbox"/> Bedrock
		16 "	<input type="checkbox"/> Pit Depth 24"	

Observation Hole SE TP 22C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
Ap silt loam	friable (compacted)	10YR 3/3	none
B silt loam	friable (top 2" compacted)	10YR 4/4	observed
BC silt loam	firm	2.5Y 4/3	cmp 10YR 4/6
30	LOI = 24"		
30	surface compaction appears due to recent surface grading but profile appears intact mostly		
40	Nearby BLFSS TP's 2 and 33 show 31" to bedrock. Bedrock anticipated at <48".		
50			

Soil Classification 8 Profile	AIII / C Condition	Slope 0 %	Limiting Factor 16 "	<input checked="" type="checkbox"/> Ground Water <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth 24"
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SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 15C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

	Texture	Consistency	Color	Mottling
Ap	vf sandy loam	friable	10YR 3/3	none
10	vf sandy loam	friable	10YR 4/4	observed
BC	silt loam	friable	2.5Y 4/4	cmpl 10YR 4/6
20	silt loam	firm	2.5Y 4/3	cmpl 10YR 4/6
C				cmf 2.5Y 5/3
30				
40				
50				

Soil Classification		Slope	Limiting Factor	[X] Ground Water
8	D	5 %	12 "	[X] Restrictive Layer
Profile	Condition			[] Bedrock

Observation Hole SE TP 15D **X** Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

	Texture	Consistency	Color	Mottling
0-10	vf sandy loam	friable	10YR 3/3	none observed
10-20	vf sandy loam	friable	10YR 4/4	
20-30	silt loam	friable	2.5Y 4/4	cmp 10YR4/6
30-40	silt loam	firm	2.5Y 4/3	cmp 10YR4/6 cmf 2.5Y 5/3
40-50	LOI = 24%			

Soil Classification		Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8	D	5 %		<input checked="" type="checkbox"/> Restrictive Layer
Profile	Condition		12 "	<input type="checkbox"/> Bedrock

all the

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Date

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax. (207) 287-3165

Town, City, Plantation
Windham

Street, Road, Subdivision
Durant Homestead, Chute Road

Owner's Name
Matt Hancock Properties

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 12C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0Ap	silt loam	friable	10YR 3/3
			none observed
10	silt loam	friable	2.5Y 4/4
20	BC	silt loam	2.5Y 4/3
			cmp 10YR 4/6
			cmd 2.5Y 5/2
30			LOI = 24"
40			
50			

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8	C	5 %	<input checked="" type="checkbox"/> Restrictive Layer
Profile	Condition	16 "	<input type="checkbox"/> Bedrock
			<input type="checkbox"/> Pit Depth 24"

Observation Hole SE TP 13C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0Ap	vf sandy loam	friable	10YR 3/3
			none observed
10	vf sandy loam	friable	2.5Y 4/4
20	BC	silt loam	2.5Y 4/3
			cmp 10YR 4/6
30	C	silt loam	2.5Y 4/3
			emp 10YR 4/6
			cmd 2.5Y 5/3
40			LOI = 24"
50			

Nearby BLT SS TP 22 shows 32" to bedrock. Bedrock anticipated at <48".

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8	AIII / C	4 %	<input checked="" type="checkbox"/> Restrictive Layer
Profile	Condition	16 "	<input type="checkbox"/> Bedrock
			<input type="checkbox"/> Pit Depth 24"

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole SE TP 4C Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0Ap	silt loam	friable	10YR 3/2
			none
10	silt loam	friable	2.5Y 4/3
20	BC	silt loam	2.5Y 4/3
			cmd 2.5Y 5/2
			cmd 2.5Y 5/2
30			LOI = 24"
40			
50			

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8	D	6-18 %	<input checked="" type="checkbox"/> Restrictive Layer
Profile	Condition	12 "	<input type="checkbox"/> Bedrock
			<input type="checkbox"/> Pit Depth 24"

Observation Hole SE TP 22D Test Pit Boring
0 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0Ap	silt loam	compact	10YR 3/3 & 2.5Y 4/4
			none
10	B	compact top 4"	2.5Y 4/4
20	BC	silt loam	2.5 Y 4/4
			emp 10YR 4/6
			cmd 2.5Y 5/2
30	C	silt loam	2.5Y 4/3
			cmd 2.5Y 5/3
40			LOI = 24"
50			

surface compaction appears due to recent surface grading but profile appears intact mostly

Nearby BLT SS TP's 2 and 33 show 31" to bedrock. Bedrock anticipated at <48".

Soil Classification	Slope	Limiting Factor	<input checked="" type="checkbox"/> Ground Water
8	AIII / D	0 %	<input checked="" type="checkbox"/> Restrictive Layer
Profile	Condition	12 "	<input type="checkbox"/> Bedrock
			<input type="checkbox"/> Pit Depth 24"

all holes

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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

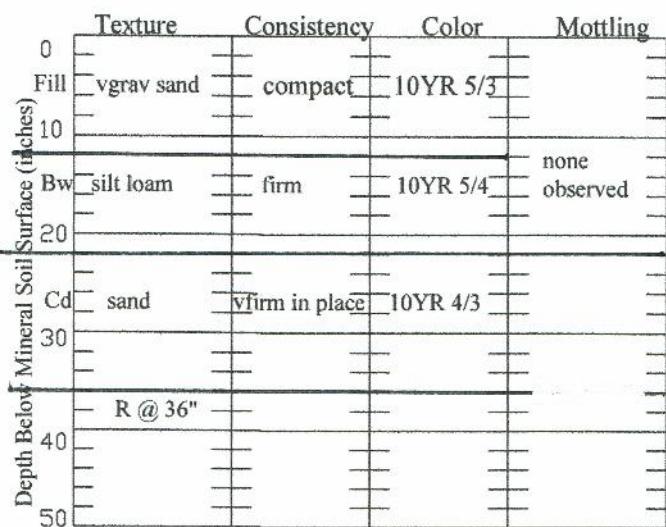
 Maine Dept. Health & Human Services
 Division of Environmental Health
 (207) 287-5672 Fax: (207) 287-3166

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 Windham

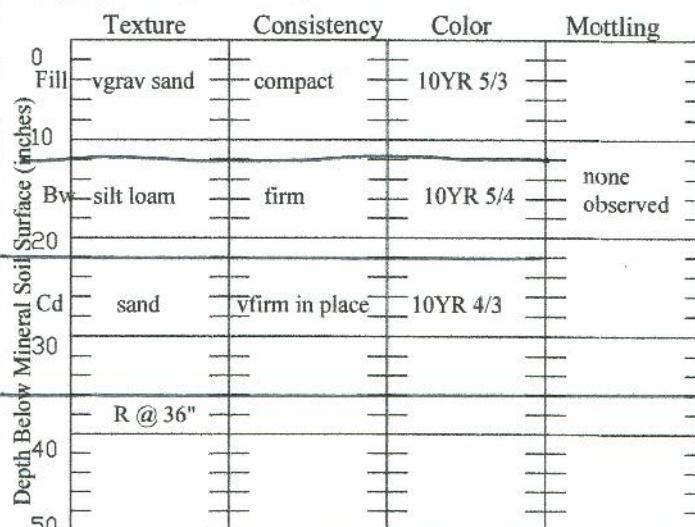
 Street, Road, Subdivision
 Durant Homestead, Chute Road

 Owner's Name
 Matt Hancock Properties

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

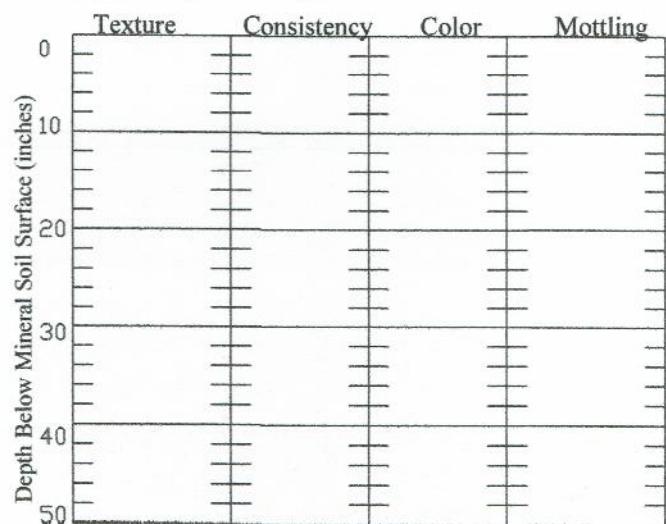
 Observation Hole SETP21C Test Pit Boring
 0 " Depth of Organic Horizon Above Mineral Soil


Soil Classification	Slope	Limiting Factor	<input type="checkbox"/> Ground Water
8	0 %	Profile AIII / D Condition	<input checked="" type="checkbox"/> Restrictive Layer
			<input type="checkbox"/> Bedrock 36"
			<input type="checkbox"/> Pit Depth

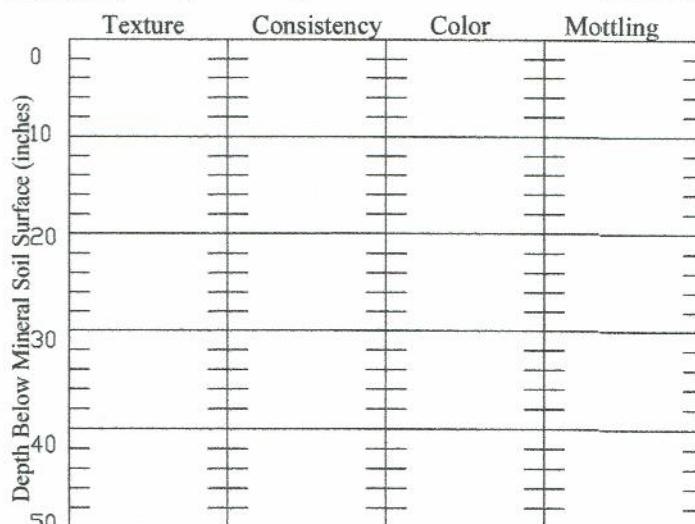
 Observation Hole SETP 21D Test Pit Boring
 0 " Depth of Organic Horizon Above Mineral Soil


Soil Classification	Slope	Limiting Factor	<input type="checkbox"/> Ground Water
8	0 %	Profile AIII / D Condition	<input checked="" type="checkbox"/> Restrictive Layer
			<input type="checkbox"/> Bedrock 36"
			<input type="checkbox"/> Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

 Observation Hole Test Pit Boring
 " Depth of Organic Horizon Above Mineral Soil


Soil Classification	Slope	Limiting Factor	<input type="checkbox"/> Ground Water
Profile Condition	%		<input type="checkbox"/> Restrictive Layer
			<input type="checkbox"/> Bedrock
			<input type="checkbox"/> Pit Depth

 Observation Hole Test Pit Boring
 " Depth of Organic Horizon Above Mineral Soil


Soil Classification	Slope	Limiting Factor	<input type="checkbox"/> Ground Water
Profile Condition	%		<input type="checkbox"/> Restrictive Layer
			<input type="checkbox"/> Bedrock
			<input type="checkbox"/> Pit Depth

Mike Hancock

Site Evaluator Signature

#S344

SE #

06/13/18

Date

12.0 Stormwater Management (Flooding and General Standards)

A. Project Narrative

Project Description

The applicant, Matt Hancock Properties, LLC, (MHP) owns a 65.5 acre parcel located on Chute Road in the Town of Windham, Cumberland County, Maine. The lot is identified by the Town of Windham as Tax Map 0006, Lot 025. The Durant Homestead Subdivision (the project) includes subdividing the parcel to create 25 residential lots, ranging from 0.69 to 1.15 acres and includes approximately 40.4 acres of common/open space conveyed to the Durant Homestead Home Owners Association (DHHOA). Access to the lots is provided by a paved road that is approximately 2,500 feet long. Each of the 25 lots will include a subsurface disposal system and potable water will be provided by installing a well within each lot. The project has been designed to include a sequence of construction where the subdivision road and single family homes can be constructed concurrently, if the housing market allows.

The proposed project includes the following:

- Construction of a 26 wide paved subdivision road, consisting of 20 foot travel way and 3 foot paved shoulders and 2 foot gravel shoulders, within a 50 foot right of way.
- The design includes ditches on both side of road.
- Clearing, grubbing and regrading portions of lots 1, 2, 3, 5, 7, 8, 9, 11, 12, 17 and 22, to convey stormwater to treatment areas (wet ponds or buffers).
- Construction of two wet ponds for stormwater treatment and retention.
- Establishing 16 vegetated stormwater buffers both forested and meadow.

Based on MHP's understanding of the requirements of Chapter 500: Stormwater Management, the basic, general and flooding standards have been applied to the project. The basic standards are described in detail in Section 14.0 of this application. Specific details of the project and how the project meets the general and flooding standards is provided below:

Development Location

The proposed development is located on a sloped piece of property that drains westerly to Black Brook, and easterly across Chute Road to Calley Wright Brook. Both brooks are tributaries of the Presumpscot River.

Surface Water on or Abutting the Site

Forested wetlands are located thought the parcel. There are no other surface waters on or abutting the site.

Downstream Ponds and Lakes

There are no ponds or lakes downstream from the project site.

General Topography

Topography of the site is best described as rolling. A majority of the site slopes westerly to Black Brook. The portion of the parcel along Chute Road slopes easterly to Calley Wright Brook. Slopes within the project area of the parcel range from 2% to 15%.

Flooding

There are no areas or structures that are subject to flooding either historically or as result of this project.

Alterations to Natural Drainage Ways

There are no alterations to natural drainage ways proposed.

Alteration to Land Cover

The existing land cover consists of an open area that approximately 8.5 acres in size at the south end on the parcel. Historically this area was the location of the small field and farm house. More recently, a firewood processing operation occupied the open area. The remaining area of the parcel and project area is wooded that was selectively cut for firewood sometime in 2013 and 2014.

Alterations associated with the project include the clearing of trees and removal of stumps for the construction of the paved subdivision road, the two stormwater wet ponds, and regrading of lots 1, 2, 3, 5, 7, 8, 9, 11, 12, 17 and 22. Other land cover change includes the typical alteration for single family homes.

Modeling Assumptions

The hydrology model for the proposed project was completed using HydroCAD 10.0. Runoff curve numbers were determined using SCS published charts (contained within the HydroCAD program) and the proposed site development soil types. Time of concentration flow values were determined from site topography maps and the type of ground cover. Please refer to the attached HydroCAD printouts in this section for additional information on specific assumptions utilized in the model.

Water Quantity Control

The project as described above, some of the proposed activities will entail the conversion of wooded and meadow to paved and landscaped areas. These conversions will cause a change in the peak runoff rate. The project design includes two separate stormwater wet ponds that have been specifically designed to mitigate the change in peak runoff rates. The ponds incorporate primary outlets and emergency spillways designed in accordance with applicable Best Management Practices (BMPs).

The results of the hydrologic analysis demonstrate that under both pre- and post-development conditions, site stormwater is conveyed to approximately the same offsite locations that existed prior to development of the site. During the 2-, 10-, and 25-year, 24-hour storm events, total peak runoff rate is less for the post-development condition from the project site. Please refer to attached plans, design calculations and HydroCAD model for details.

F. General Standards Submissions

The project requires compliance with the General Standards, as designed the project includes 3.81 acres (165,950 SF) of impervious area, which includes 1.73 acres (75,325 SF) of paved road, 0.70 acres (30,400 SF) for lots 1 through 9 and 16, (3,040 SF/lot which includes driveway and structures), and 1.38 acres (60,225 SF) for lots 10 through 15 and 17 through 25 (4,015 SF/lot which includes driveway and structures). Disturbed area equals 13.72 acres (598,064 SF) and total developed area equals 17.54 acres (764,014 SF).

The percentage of developed area to land available for development equals 36%, (total land area available for development = 48.53 acres, total area of development 17.54) Based on Chapter 500, Section 4.C.(2).(a).(iii) the treatment level required for the project is 90% of the total impervious area and 75% of the total developed area. To meet the treatment requirements of the general standards above the project includes two (2) wet ponds and 17 vegetated buffers. Combined these treatment BMPs achieve a treatment level of 91% for the project impervious area and 78% of the developed area. Please see drawing C-5 for specific locations of treatment BMPs. Each of the treatment measures are described in detail below.

Wet Pond #1:

Wet Pond #1 is designed to treat stormwater runoff from drainage catchment areas 4aS and 4bS (see design drawing C-4). These catchments areas include both lanes of the road from station 2+00 to Station 7+80, the northwest corner of Lot 3, Lot 19, most of Lot 20 and approximately two thirds of Lot 22. Stormwater is conveyed to a forebay at the inlet end of pond via ditched on both sides the road and a 24 inch culvert. The impervious area within these catchments equals 30,944 SF and landscaped area equals 112,166 SF. Stormwater wet pond #2 is clay lined and has been designed using a channel protection volume of 6,318 cubic feet (1-inch times the impervious area and 0.4-inches time the landscaped area). The permanent pool of the pond is design to have a permanent pool volume of greater than 12,635 cubic feet (2-inches times the impervious area and 0.8-inches time the landscaped area). Design of wetpond #2 includes an outlet structure to control the flow of stormwater exiting the pond to provide 24 to 48 hours of maximum detention time. Treated stormwater will be converted to sheet flow via a level lip spreader before discharging to the adjacent forested wetland. The length to width ratio at the permanent pool equals 3.1:1.

Per the Discharge from a wetpond exception from the General Standards 4.C.(5).(a), the underdrain outlet was omitted from the design of Wet Pond #1. The function of the wetland will be maintained without the underdrain outlet. Stormwater discharges into a large forested wetland and the discharge from Wet pond #1 is a small fraction of the stormwater entering the wetland naturally.

Wet Pond #2:

Wet Pond #2 is designed to treat stormwater runoff from drainage catchment areas 5aS and 5bS (see design drawing C-4). These catchments areas include both lanes of the road from station 7+80 to Station 24+90, the upland area of Lot 5, approximately half of Lot 7, upland area of Lot 8, upland area of Lot 9, upland area of Lot 12 and western third of Lot 13. Stormwater is conveyed to a forebay at the inlet end of pond via ditched on both sides the road and a 24 inch culvert. The impervious area within these catchments equals 74,591 SF and landscaped area equals 172,009 SF. Stormwater wet pond #2 is clay lined and has been designed using a channel protection volume of 11,950 cubic feet (1-inch times the impervious area and 0.4-inches time the landscaped area). The permanent pool of the pond is design to have a permanent pool volume of greater than 23,899 cubic feet (2-inches times the impervious area and 0.8-inches time the landscaped area). Design of wetpond #2 includes an outlet structure to control the flow of stormwater exiting the pond to provide 24 to 48 hours of maximum detention time. Treated stormwater will be converted to sheet flow via a level lip spreader before discharging to the adjacent forested wetland. The length to width ratio at the permanent pool equals 3.6:1.

Per the Discharge from a wetpond exception from the General Standards 4.C.(5).(a), the underdrain outlet was omitted from the design of Wet Pond #2. The function of the wetland will be maintained without the underdrain outlet. Stormwater discharges into a large forested wetland and the discharge from Wet pond #2 is a small fraction of the stormwater entering the wetland naturally.

Vegetated Buffer A:

Buffer A, is a vegetated meadow buffer within Lot 1, with a flow path length of 70 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG C loamy sand with a small portion HSG D. The project includes grading Lot 1 to promote sheet flow through the buffer. The design does not require grading within the buffer limits. Please see the photo below for the vegetative cover of Buffer A. Buffer A will be protected from alteration through the execution of a deed restriction with the language for a non-wooded meadow buffer in Appendix G of Chapter 500.

Vegetated Buffer C:

Buffer C, is a combination vegetated meadow/forested buffer some of the buffer is within Lot 3, and the remaining is located in an area designated as open space. The buffer within the lot has a flow path length of 70 feet, soils within this portion of the buffer are predominantly HSG C loamy sand. The portion of the buffer located outside of Lot 3 has a flow path length of 100 feet. Soils in this area are HSG D and land cover is forested. Both portions of the buffer are sized based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Please see the photo below for the vegetative cover of Buffer C. Buffer C will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Vegetated Buffer D:

Buffer B, is a vegetated forested buffer a portion of the buffer is within Lot 6, and the remaining buffer is in an area designated as open space. The flow path length is 100 feet and based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG D. see the photo below for the vegetative cover of Buffer D. Buffer D will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Vegetated Buffer E:

Buffer E, is a vegetated forested buffer within Lot 7, with a flow path length of 70 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG C loamy sand. Buffer E will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.

Vegetated Buffer F:

Buffer F, is a vegetated forested buffer to treat stormwater from Lot 10 and is located in the project’s open space. The flow path length for Buffer F is 50 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG C loamy sand. Please see the photo below for the vegetative cover of Buffer F. Buffer F will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Vegetated Buffer G:

Buffer G, is a vegetated forested buffer to treat stormwater from Lot 11 and is located in the project's open space. The flow path length for Buffer G is 50 feet based on Chapter 500, Appendix F, Table 10 "Alternative Buffer Size Requirements for Residential Subdivisions." Soils within the buffer are predominantly HSG C loamy sand. The project includes grading Lot 12 to promote sheet flow through the buffer. The design does not require grading within the buffer limits. Please see the photo below for the vegetative cover of Buffer G. Buffer G will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Vegetated Buffer H:

Buffer H, is a vegetated forested buffer within Lot 13, with a flow path length of 70 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG C silt loam. Please see the photo below for the vegetative cover of Buffer H. Buffer H will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Vegetated Buffer I:

Buffer I, is a vegetated forested buffer within Lot 14, with a flow path length of 70 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG C silt loam. Please see the photo below for the vegetative cover of Buffer I. Buffer I will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Vegetated Buffer J:

Buffer E, is a vegetated forested buffer within Lot 15, with a flow path length of 100 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG D. Please see the photo below for the vegetative cover of Buffer J. Buffer J will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Vegetated Buffer K:

Buffer K, is a vegetated forested buffer located within the open space area of the project and treat a portion of the stormwater from Lot 16, with a flow path length of the 100 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG D. Please see the photo below for the vegetative cover of Buffer K. Buffer K will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Vegetated Buffer L:

Buffer L, is a vegetated meadow buffer located within the open space area of the project and treat a portion of the stormwater from Lot 18, with a flow path length of the 100 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG C. Please see the photo below for the vegetative cover of Buffer L. Buffer L will be protected from alteration through the execution of a deed restriction with the language for a non-wooded meadow buffer in Appendix G of Chapter 500.



Vegetated Buffer M:

Buffer M, is a vegetated meadow buffer located within the open space area of the project and treat a portion of the stormwater from Lots 21 and 22, with a flow path length over 100 feet. The design calls for lot 22 to be regraded to ensure stormwater enters the buffer. Additionally, a 35 foot level spreader is required to convert stormwater runoff to sheet flow prior to entering the buffer. The length flow path through the buffer and length of level spreader is based on Chapter 500, Appendix F, Table 6 “Sizing Requirements for buffer with 0-8% slope and stone berm level lip spreader.” Buffer M also treats stormwater runoff from Lot 21 and the flow path length of the buffer is greater than 70 as required in Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are HSG C. Please see the photo below for the vegetative cover of Buffer M. Buffer M will be protected from alteration through the execution of a deed restriction with the language for a non-wooded meadow buffer in Appendix G of Chapter 500.



Vegetated Buffer N:

Buffer N, is a vegetated buffer located within Lot 23 with a flow path length of the 100 feet. Soils within the buffer are predominantly HSG D and land cover is a mix of meadow and trees. To establish the buffer as forested, MHC proposes to protect from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500. Please see the photo below for the vegetative cover of Buffer N.



Vegetated Buffer O:

Buffer O, is a vegetated forested buffer located within Lot 24 with a flow path length of the 100 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG D. Please see the photo below for the vegetative cover of Buffer O. Buffer O will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Vegetated Buffer P:

Buffer P, is a vegetated forested buffer located within Lot 25 with a flow path length of the 100 feet based on Chapter 500, Appendix F, Table 10 “Alternative Buffer Size Requirements for Residential Subdivisions.” Soils within the buffer are predominantly HSG D. Please see the photo below for the vegetative cover of Buffer P. Buffer P will be protected from alteration through the execution of a deed restriction with the language for a Forested buffer, limited disturbance in Appendix G of Chapter 500.



Summary for Subcatchment 6S: Open Space North & West

Runoff = 44.75 cfs @ 13.04 hrs, Volume= 9.479 af, Depth= 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 25yr Rainfall=5.80"

Area (sf)	CN	Adj	Description
10,320	98		Unconnected roofs, HSG C
2,926	96		Gravel surface, HSG C
9,223	83		Brush, Poor, HSG D
75,345	79		50-75% Grass cover, Fair, HSG C
547,412	77		Woods, Poor, HSG C
*	665,580	83	Wetland, Woods, Poor, HSG D
65,031	83		Woods, Poor, HSG D
1,375,837	81	80	Weighted Average, UI Adjusted
1,365,517			99.25% Pervious Area
10,320			0.75% Impervious Area
10,320			100.00% Unconnected

2018-09-24 Durant Homestead Revised 25 Lots*Type III 24-hr 25yr Rainfall=5.80"*

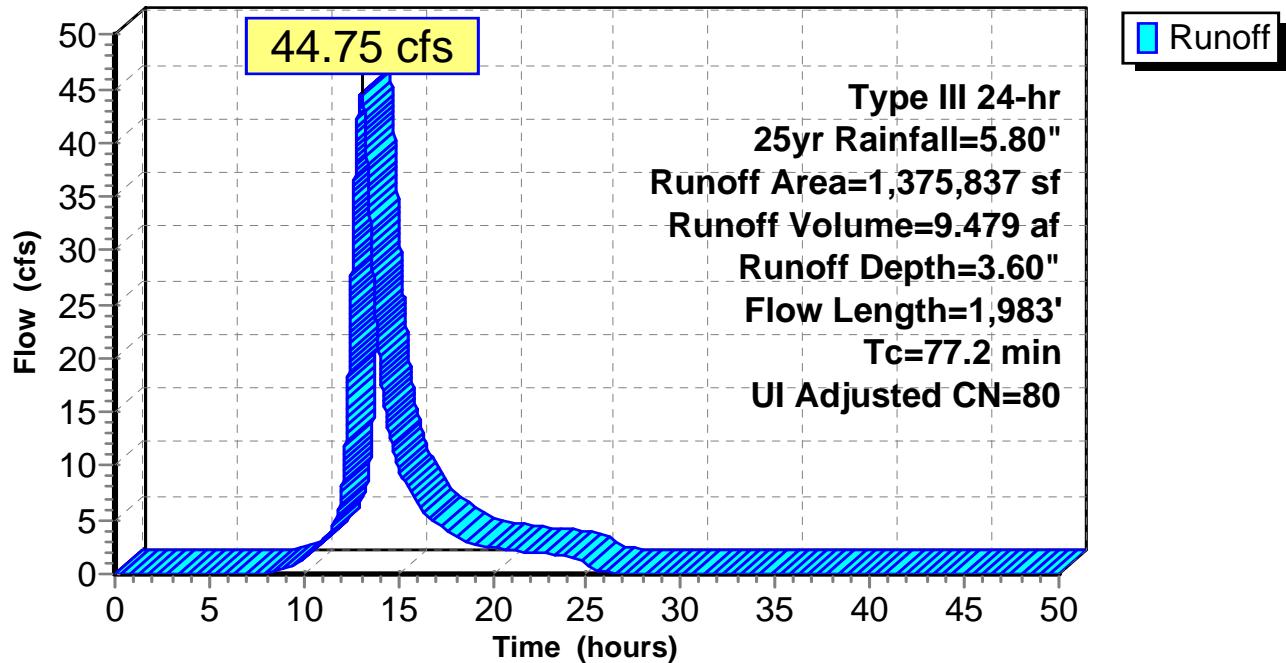
Prepared by Acheron Engineering

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Page 4

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	34	0.0200	0.13		Sheet Flow, Lawn 34 Grass: Short n= 0.150 P2= 3.10"
7.8	82	0.0250	0.18		Sheet Flow, Lawn 82 Grass: Short n= 0.150 P2= 3.10"
1.9	25	0.0780	0.22		Sheet Flow, Lawn 25.4 Grass: Short n= 0.150 P2= 3.10"
0.6	39	0.0510	1.13		Shallow Concentrated Flow, Woods 39 Woodland Kv= 5.0 fps
0.1	9	0.2330	2.41		Shallow Concentrated Flow, Woods 8.5 Woodland Kv= 5.0 fps
0.1	14	0.1459	1.91		Shallow Concentrated Flow, Woods 13.7 Woodland Kv= 5.0 fps
0.0	6	0.3267	2.86		Shallow Concentrated Flow, Woods Wetland 6.12 Woodland Kv= 5.0 fps
0.2	16	0.1250	1.77		Shallow Concentrated Flow, Woods 1Wetland 5.95 Woodland Kv= 5.0 fps
0.1	11	0.1910	2.19		Shallow Concentrated Flow, Woods Wetland 10.5 Woodland Kv= 5.0 fps
1.1	62	0.0324	0.90		Shallow Concentrated Flow, Woods Wetland 61.7 Woodland Kv= 5.0 fps
0.4	33	0.0615	1.24		Shallow Concentrated Flow, Woods Wetland 32.5 Woodland Kv= 5.0 fps
7.3	167	0.0030	0.38		Shallow Concentrated Flow, Field Wetland 166.5 Short Grass Pasture Kv= 7.0 fps
5.3	156	0.0096	0.49		Shallow Concentrated Flow, Woods Wetland 155.7 Woodland Kv= 5.0 fps
15.9	224	0.0022	0.23		Shallow Concentrated Flow, Woods Wetland 223.8 Woodland Kv= 5.0 fps
2.6	122	0.0123	0.78		Shallow Concentrated Flow, Field Wetland 121.8 Short Grass Pasture Kv= 7.0 fps
6.6	198	0.0100	0.50		Shallow Concentrated Flow, Woods Wetland 197.9 Woodland Kv= 5.0 fps
10.1	263	0.0076	0.44		Shallow Concentrated Flow, Woods 262.8 Woodland Kv= 5.0 fps
0.4	29	0.0700	1.32		Shallow Concentrated Flow, Woods 28.7 Woodland Kv= 5.0 fps
2.7	110	0.0180	0.67		Shallow Concentrated Flow, Woods 110.4 Woodland Kv= 5.0 fps
5.1	167	0.0120	0.55		Shallow Concentrated Flow, Woods 166.5 Woodland Kv= 5.0 fps
1.3	67	0.0300	0.87		Shallow Concentrated Flow, Woods 66.5 Woodland Kv= 5.0 fps
3.4	149	0.0210	0.72		Shallow Concentrated Flow, Woods 148.7 Woodland Kv= 5.0 fps
77.2	1,983	Total			

Subcatchment 6S: Open Space North & West**Hydrograph**

Summary for Pond RC2: (1) Clamshell BC 4x8 Crossing Sta 12+25

Inflow Area = 9.654 ac, 2.21% Impervious, Inflow Depth = 3.60" for 25yr event
 Inflow = 18.23 cfs @ 12.66 hrs, Volume= 2.897 af
 Outflow = 18.23 cfs @ 12.66 hrs, Volume= 2.897 af, Atten= 0%, Lag= 0.0 min
 Primary = 18.23 cfs @ 12.66 hrs, Volume= 2.897 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 162.80' @ 12.66 hrs

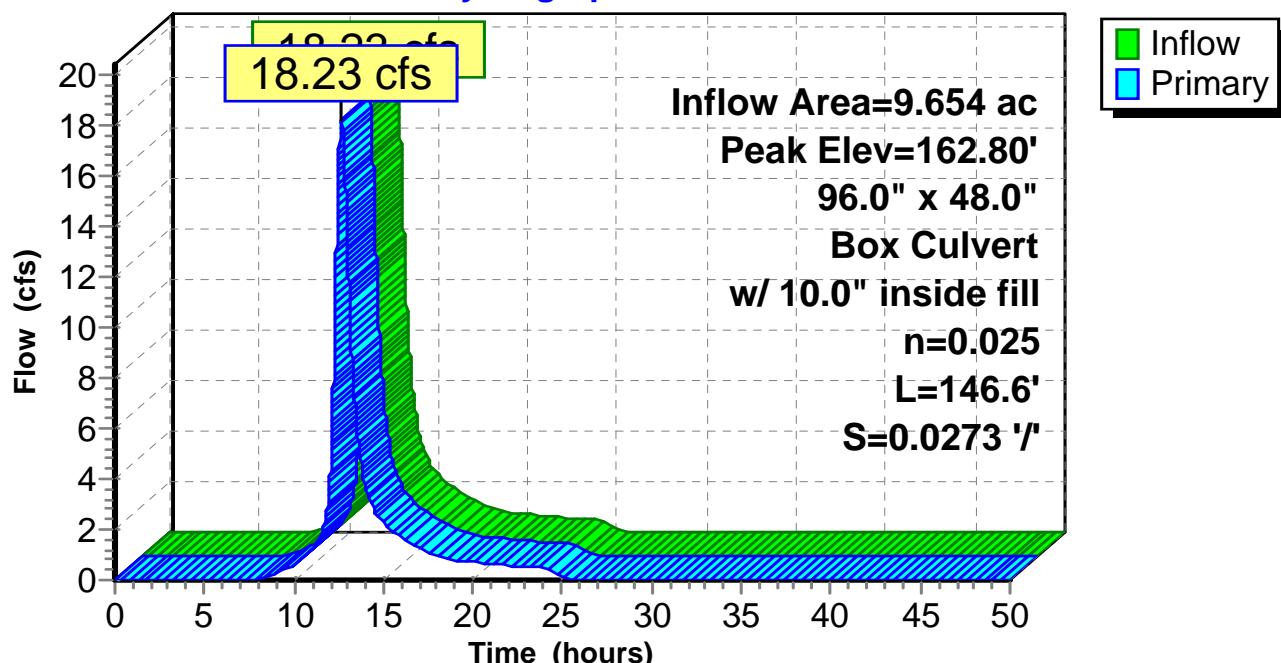
Flood Elev= 163.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	162.00'	96.0" W x 48.0" H Box Culvert w/ 10.0" inside fill L= 146.6' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 161.17' / 157.17' S= 0.0273 '/' Cc= 0.900 n= 0.025 Rubble masonry, cemented, Flow Area= 25.33 sf

Primary OutFlow Max=18.23 cfs @ 12.66 hrs HW=162.80' TW=0.00' (Dynamic Tailwater)
 ↗1=Culvert (Inlet Controls 18.23 cfs @ 2.86 fps)

Pond RC2: (1) Clamshell BC 4x8 Crossing Sta 12+25

Hydrograph



Summary for Subcatchment 6S: Open Space North & West

Runoff = 31.62 cfs @ 13.04 hrs, Volume= 6.704 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 10yr Rainfall=4.60"

Area (sf)	CN	Adj	Description
10,320	98		Unconnected roofs, HSG C
2,926	96		Gravel surface, HSG C
9,223	83		Brush, Poor, HSG D
75,345	79		50-75% Grass cover, Fair, HSG C
547,412	77		Woods, Poor, HSG C
*	665,580	83	Wetland, Woods, Poor, HSG D
65,031	83		Woods, Poor, HSG D
1,375,837	81	80	Weighted Average, UI Adjusted
1,365,517			99.25% Pervious Area
10,320			0.75% Impervious Area
10,320			100.00% Unconnected

2018-09-24 Durant Homestead Revised 25 Lots*Type III 24-hr 10yr Rainfall=4.60"*

Prepared by Acheron Engineering

Printed 10/8/2018

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	34	0.0200	0.13		Sheet Flow, Lawn 34 Grass: Short n= 0.150 P2= 3.10"
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1.9	25	0.0780	0.22		Sheet Flow, Lawn 25.4 Grass: Short n= 0.150 P2= 3.10"
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0.1	11	0.1910	2.19		Shallow Concentrated Flow, Woods Wetland 10.5 Woodland Kv= 5.0 fps
1.1	62	0.0324	0.90		Shallow Concentrated Flow, Woods Wetland 61.7 Woodland Kv= 5.0 fps
0.4	33	0.0615	1.24		Shallow Concentrated Flow, Woods Wetland 32.5 Woodland Kv= 5.0 fps
7.3	167	0.0030	0.38		Shallow Concentrated Flow, Field Wetland 166.5 Short Grass Pasture Kv= 7.0 fps
5.3	156	0.0096	0.49		Shallow Concentrated Flow, Woods Wetland 155.7 Woodland Kv= 5.0 fps
15.9	224	0.0022	0.23		Shallow Concentrated Flow, Woods Wetland 223.8 Woodland Kv= 5.0 fps
2.6	122	0.0123	0.78		Shallow Concentrated Flow, Field Wetland 121.8 Short Grass Pasture Kv= 7.0 fps
6.6	198	0.0100	0.50		Shallow Concentrated Flow, Woods Wetland 197.9 Woodland Kv= 5.0 fps
10.1	263	0.0076	0.44		Shallow Concentrated Flow, Woods 262.8 Woodland Kv= 5.0 fps
0.4	29	0.0700	1.32		Shallow Concentrated Flow, Woods 28.7 Woodland Kv= 5.0 fps
2.7	110	0.0180	0.67		Shallow Concentrated Flow, Woods 110.4 Woodland Kv= 5.0 fps
5.1	167	0.0120	0.55		Shallow Concentrated Flow, Woods 166.5 Woodland Kv= 5.0 fps
1.3	67	0.0300	0.87		Shallow Concentrated Flow, Woods 66.5 Woodland Kv= 5.0 fps
3.4	149	0.0210	0.72		Shallow Concentrated Flow, Woods 148.7 Woodland Kv= 5.0 fps
77.2	1,983	Total			

2018-09-24 Durant Homestead Revised 25 Lots

Type III 24-hr 10yr Rainfall=4.60"

Prepared by Acheron Engineering

Printed 10/8/2018

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Summary for Pond RC2: (1) Clamshell BC 4x8 Crossing Sta 12+25

Inflow Area = 9.654 ac, 2.21% Impervious, Inflow Depth = 2.55" for 10yr event

Inflow = 12.91 cfs @ 12.67 hrs, Volume= 2.049 af

Outflow = 12.91 cfs @ 12.67 hrs, Volume= 2.049 af, Atten= 0%, Lag= 0.0 min

Primary = 12.91 cfs @ 12.67 hrs, Volume= 2.049 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs / 3

Peak Elev= 162.64' @ 12.67 hrs

Flood Elev= 163.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	162.00'	96.0" W x 48.0" H Box Culvert w/ 10.0" inside fill L= 146.6' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 161.17' / 157.17' S= 0.0273 '/' Cc= 0.900 n= 0.025 Rubble masonry, cemented, Flow Area= 25.33 sf

Primary OutFlow Max=12.91 cfs @ 12.67 hrs HW=162.64' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 12.91 cfs @ 2.55 fps)

Summary for Subcatchment 6S: Open Space North & West

Runoff = 16.10 cfs @ 13.12 hrs, Volume= 3.489 af, Depth= 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs
Type III 24-hr 2yr Rainfall=3.10"

Area (sf)	CN	Adj	Description
10,320	98		Unconnected roofs, HSG C
2,926	96		Gravel surface, HSG C
9,223	83		Brush, Poor, HSG D
75,345	79		50-75% Grass cover, Fair, HSG C
547,412	77		Woods, Poor, HSG C
*	665,580	83	Wetland, Woods, Poor, HSG D
65,031	83		Woods, Poor, HSG D
1,375,837	81	80	Weighted Average, UI Adjusted
1,365,517			99.25% Pervious Area
10,320			0.75% Impervious Area
10,320			100.00% Unconnected

2018-09-24 Durant Homestead Revised 25 Lots

Type III 24-hr 2yr Rainfall=3.10"

Prepared by Acheron Engineering

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.2	34	0.0200	0.13		Sheet Flow, Lawn 34 Grass: Short n= 0.150 P2= 3.10"
7.8	82	0.0250	0.18		Sheet Flow, Lawn 82 Grass: Short n= 0.150 P2= 3.10"
1.9	25	0.0780	0.22		Sheet Flow, Lawn 25.4 Grass: Short n= 0.150 P2= 3.10"
0.6	39	0.0510	1.13		Shallow Concentrated Flow, Woods 39 Woodland Kv= 5.0 fps
0.1	9	0.2330	2.41		Shallow Concentrated Flow, Woods 8.5 Woodland Kv= 5.0 fps
0.1	14	0.1459	1.91		Shallow Concentrated Flow, Woods 13.7 Woodland Kv= 5.0 fps
0.0	6	0.3267	2.86		Shallow Concentrated Flow, Woods Wetland 6.12 Woodland Kv= 5.0 fps
0.2	16	0.1250	1.77		Shallow Concentrated Flow, Woods 1Wetland 5.95 Woodland Kv= 5.0 fps
0.1	11	0.1910	2.19		Shallow Concentrated Flow, Woods Wetland 10.5 Woodland Kv= 5.0 fps
1.1	62	0.0324	0.90		Shallow Concentrated Flow, Woods Wetland 61.7 Woodland Kv= 5.0 fps
0.4	33	0.0615	1.24		Shallow Concentrated Flow, Woods Wetland 32.5 Woodland Kv= 5.0 fps
7.3	167	0.0030	0.38		Shallow Concentrated Flow, Field Wetland 166.5 Short Grass Pasture Kv= 7.0 fps
5.3	156	0.0096	0.49		Shallow Concentrated Flow, Woods Wetland 155.7 Woodland Kv= 5.0 fps
15.9	224	0.0022	0.23		Shallow Concentrated Flow, Woods Wetland 223.8 Woodland Kv= 5.0 fps
2.6	122	0.0123	0.78		Shallow Concentrated Flow, Field Wetland 121.8 Short Grass Pasture Kv= 7.0 fps
6.6	198	0.0100	0.50		Shallow Concentrated Flow, Woods Wetland 197.9 Woodland Kv= 5.0 fps
10.1	263	0.0076	0.44		Shallow Concentrated Flow, Woods 262.8 Woodland Kv= 5.0 fps
0.4	29	0.0700	1.32		Shallow Concentrated Flow, Woods 28.7 Woodland Kv= 5.0 fps
2.7	110	0.0180	0.67		Shallow Concentrated Flow, Woods 110.4 Woodland Kv= 5.0 fps
5.1	167	0.0120	0.55		Shallow Concentrated Flow, Woods 166.5 Woodland Kv= 5.0 fps
1.3	67	0.0300	0.87		Shallow Concentrated Flow, Woods 66.5 Woodland Kv= 5.0 fps
3.4	149	0.0210	0.72		Shallow Concentrated Flow, Woods 148.7 Woodland Kv= 5.0 fps
77.2	1,983	Total			

2018-09-24 Durant Homestead Revised 25 Lots

Type III 24-hr 2yr Rainfall=3.10"

Prepared by Acheron Engineering

Printed 10/8/2018

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Summary for Pond RC2: (1) Clamshell BC 4x8 Crossing Sta 12+25

Inflow Area = 9.654 ac, 2.21% Impervious, Inflow Depth = 1.33" for 2yr event

Inflow = 6.60 cfs @ 12.67 hrs, Volume= 1.066 af

Outflow = 6.60 cfs @ 12.67 hrs, Volume= 1.066 af, Atten= 0%, Lag= 0.0 min

Primary = 6.60 cfs @ 12.67 hrs, Volume= 1.066 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-50.00 hrs, dt= 0.01 hrs / 3

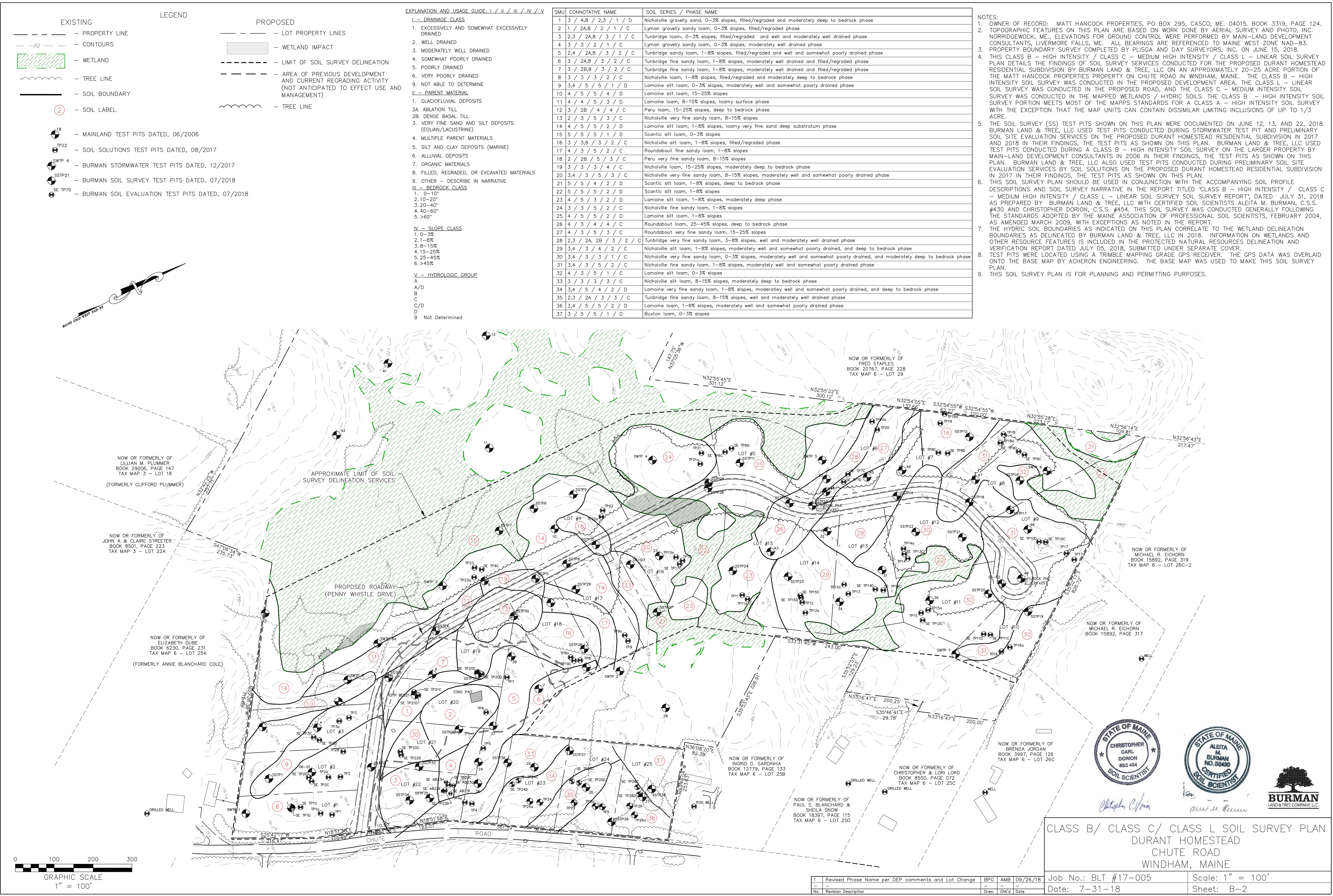
Peak Elev= 162.41' @ 12.67 hrs

Flood Elev= 163.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	162.00'	96.0" W x 48.0" H Box Culvert w/ 10.0" inside fill L= 146.6' Box, headwall w/3 square edges, Ke= 0.500 Inlet / Outlet Invert= 161.17' / 157.17' S= 0.0273 '/' Cc= 0.900 n= 0.025 Rubble masonry, cemented, Flow Area= 25.33 sf

Primary OutFlow Max=6.60 cfs @ 12.67 hrs HW=162.41' TW=0.00' (Dynamic Tailwater)

↑
1=Culvert (Inlet Controls 6.60 cfs @ 2.04 fps)



NITRATE IMPACT ANALYSIS

**WINDHAM SUBDIVISION
Chute Road
Windham, Maine**

Revised
October 9, 2018

Prepared for:

**ACHERON ENGINEERING
147 MAIN STREET
NEWPORT, MAINE 04953**

Prepared by:

**MAI ENVIRONMENTAL
1034 Broadway
South Portland, Maine 04106**

The following personnel prepared and/or reviewed this report for accuracy, and/or quality of presentation.



John S. Marchewka, C.G., P.G.
President

Revised 10-9-18

Date

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- Figure 3: Surficial Geology Map
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APPENDICES

- Appendix A: Soil Solutions Preliminary Soil Evaluation Report, August 2017
- Appendix B: Nitrate Steady State and Water Supply Calculations and Input Data

1.0 Introduction

MAI Environmental (MAI) was retained by Acheron Engineering to conduct a Nitrate Impact Analysis and Water Supply Recharge assessment of a proposed 25 lot residential subdivision off Chute Road in Windham, Maine (hereinafter “Site”) (**Figure 1, Site Location Map**). The prior submission included 26 lots, however MAI understands that former Lots 4 and 5 have been combined into Lot 4. The purpose of the study was to assess the potential for groundwater impacts associated with the proposed use of subsurface wastewater disposal systems (SWDSs) and to determine if there is adequate recharge to the Site for individual private water supply wells.

2.0 Potential Contaminant of Concern

Based on the nature of the project (i.e., residential subdivision), the contaminant of concern is Nitrate-Nitrogen ($\text{NO}_3\text{-N}$) or Nitrate (NO_3), which is released to the aquifer from the SWDSs.

For the purpose of estimating NO_3 concentrations in groundwater, the Maine Department of Environmental Protection (MEDEP) recommends assuming NO_3 enters the groundwater at a concentration of 40 milligrams per liter (mg/l) in residential SWDSs. The Primary Drinking Water Standard (PDWS) for NO_3 is 10mg/l.

3.0 Disposal Systems and Water Supplies

The proposed SWDSs will include 25 on-site stone bed disposal fields, and will be designed to serve three-bedroom homes with 270 gallons per day design flows. Individual water supply wells are proposed to be located outside the modeled “non-attainment” zones (i.e., the 10 mg/l NO_3 plumes as determined by this analysis) and at least 100 feet from the SWDSs. Locations of the proposed wells are presented on **Figure 2 – Nitrate Plume Map**.

4.0 Geological Conditions

The surficial geology map of the Gorham Quadrangle prepared by the Maine Geological Survey (MGS) (Open File No. 99-84) indicates that the subject site is located in an area mapped as till and Presumpscot Formation fine sand, silt, and marine clay (Pt and Pp). The surficial materials consist of till, loamy silt and sand. **Figure 3 - Surficial Geology Map**, shows the location of the surficial deposits on the subject site and **Figures 4 and 5** show the **Bedrock Resources Map** and the **Significant Sand and Gravel Aquifer Map**, respectively.

Hand dug test pits conducted by Stephen H. Howell, ME Site Evaluator #213 of Soil Solutions in August 2017 reveal that on-site soils consist soil profiles 2A, 3C, 7C, 8C and 8D. Hand dug test pits revealed the possibility of bedrock at Lots 19, 20, and 21 in the higher northern portions of the lots. A copy of the Soils report, logs and map showing the test pit locations are provided in **Appendix A – Soil Solutions Preliminary Soils Evaluation Report, August 2017**. Copies of the test pit and boring logs are presented in Appendix A.

Slopes on the subject site are slight to moderate and range from three to 19 percent. Drainage on-site is generally to the south-southeast.

5.0 Hydrogeological Conditions

This study evaluates the overburden unconfined aquifer of each proposed subdivision lot. Overburden groundwater flow is generally perpendicular to ground surface contours and migration of a nitrate plume will follow a flow path perpendicular to the contours with additional lateral and vertical spread due to dispersion and diffusion. MAI estimated plume migration and configuration downgradient of proposed SWDSs through the analysis of surface topographic contours.

The estimated hydraulic conductivity (K) of the on-site soils is estimated at 4.50 feet-per-day (ft/day) and the effective porosity of the on-site soils is estimated at 15 percent (Fetter, C.W., 1994, Todd, D.K., 1980, Freeze and Cherry, 1979).

6.0 Fate and Transport

Research has shown that NO_3 does not form insoluble minerals that precipitate, nor is NO_3 absorbed significantly under aquifer conditions. NO_3 can be removed from the groundwater by reduction (denitrification); however, this requires organic-rich soils, which will support a bacterially catalyzed reaction. In the absence of organic rich deposits, the primary process of NO_3 reduction is by dispersion and dilution within the aquifer. In areas of organic-rich soils (i.e., wetlands), significant additional NO_3 removal will occur through denitrification, Appelo, C.A.J. and Postma, D. (2005).

The organic-rich, anaerobic conditions in the on-site wetland soils will facilitate the denitrification process. Studies indicate NO_3 removal rates of 70% to 90% in riparian (i.e., forested wetlands) areas, Gilliam (1994). Furthermore, a study conducted on forested wetlands in New England showed NO_3 removal rates of 84% to 97%, Simmons et. al. (1992). Similar removal rates are expected from forested wetlands located on the subject site. A 70% nitrate removal rate at wetland boundaries was used for this nitrate plume analysis.

Groundwater within the aquifer flows very slowly. As the NO_3 infiltrates downward and intercepts the groundwater of the underlying aquifer, it is mixed and diluted into the groundwater. The NO_3 is transported with the flow of the groundwater. At some point in time, as a specific concentration of NO_3 is constantly discharged into an aquifer, the NO_3 concentrations will reach a “steady state” within the aquifer. Under “steady state” conditions, dilution rates from mixing with groundwater and recharge from precipitation combined with dispersion and diffusion will reach an equilibrium with the loading rate of NO_3 from the SWDSs.

7.0 Methods

MAI evaluated the potential for NO_3 impacts to the aquifer using a “steady state” analysis. This method determines the NO_3 concentration of a plume when the NO_3 loading rate equals the dilution rate.

A background NO_3 concentration of 1.22 mg/l was used for the steady state calculations. This background value is referenced in a June 1999, Maine Department of Environmental Protection (MEDEP) nitrate characterization study (Document No. DEPLW 1999-7), as the mean NO_3 concentration of 17,000 private wells that were tested for NO_3 between January 1989 and December 1991. We consider this to be a conservative value for background NO_3 based on the fact that the values collected for the study were from wells potentially influenced by agricultural use or septic systems. In cases where leach fields are located topographically down-gradient of another leach field the distance between the two leach fields is used to calculate the steady state concentration of the NO_3 upon interception with the down-gradient leach field or NO_3 plume. In turn, the calculated NO_3 steady state concentration is added to the background NO_3 concentration to more accurately depict the NO_3 steady state concentrations for SWDS's that are "stacked." SWDS's for this project were modified to eliminate NO_3 plume stacking.

The precipitation value used in the steady state calculations comes from the National Oceanic and Atmospheric Administration (NOAA) average annual precipitation for Portland, Maine for the years 1981 to 2010 47 inches per year. Calculations and input data are presented in **Appendix B**.

8.0 Recharge for Water Supply Wells

The subdivision plan calls for each of the 25 lots to have a private bedrock water supply well. A water balance analysis of recharge from precipitation versus water usage was completed to evaluate if recharge to the bedrock aquifer is adequate to support 26 private wells within the area of the subdivision.

Each private supply well is assumed to use 270 gallons per day (gpd) or 36.1 ft^3/day for a total daily water usage of 903 ft^3/day for the 25 lots. Recharge was calculated for each lot based on precipitation, drought and infiltration values provided in the Department of Health and Human Services (DHS), Waste Water Plumbing Code, Nitrate-Nitrogen Impact Analysis for Engineered Systems and soil profile types from Soil Solutions Preliminary Soils Evaluation Report, August 2017 (Appendix A). Calculations are provided in **Appendix B**.

Recharge analysis shows that there is 2,803 ft^3/day of available water recharge based on annual precipitation of 25.2 inches per year, which is 60% of the 42 inches per year annual average precipitation to adjust for drought years. Water usage by the 25 lots is approximately 32% of the available recharge.

9.0 Conclusions

- Using the layout of SWDSs as shown in Figure 2, the proposed development of the subject site into a 25 lot residential subdivision will not increase groundwater concentrations of NO_3 above 10mg/l outside the Site property boundary. Assuming the proposed individual drinking water wells are bedrock and located over 100 feet from the on-site SWDSs and are outside the “Nitrate non-attainment” zones, sufficient setbacks exist from the Site boundaries to ensure proper groundwater resource management with respect to on-site septic system discharges.
- Based on the aquifer recharge analysis, $2,803\text{ft}^3/\text{day}$ is available to the aquifer from recharge. A well usage of $903\text{ ft}^3/\text{day}$ by the 25 lots is approximately 32% of the available recharge. Therefore, there is adequate available water recharge to support the subdivision wells.

10.0 References

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Department of Health and Human Services (DHS), Waste Water Plumbing Code, Nitrate-Nitrogen Impact Analysis for Engineered Systems.

Preliminary Soil Evaluation Report, Chute Road, Windham, Soil Solutions, Orrington, ME, August 9, 2017

FIGURES

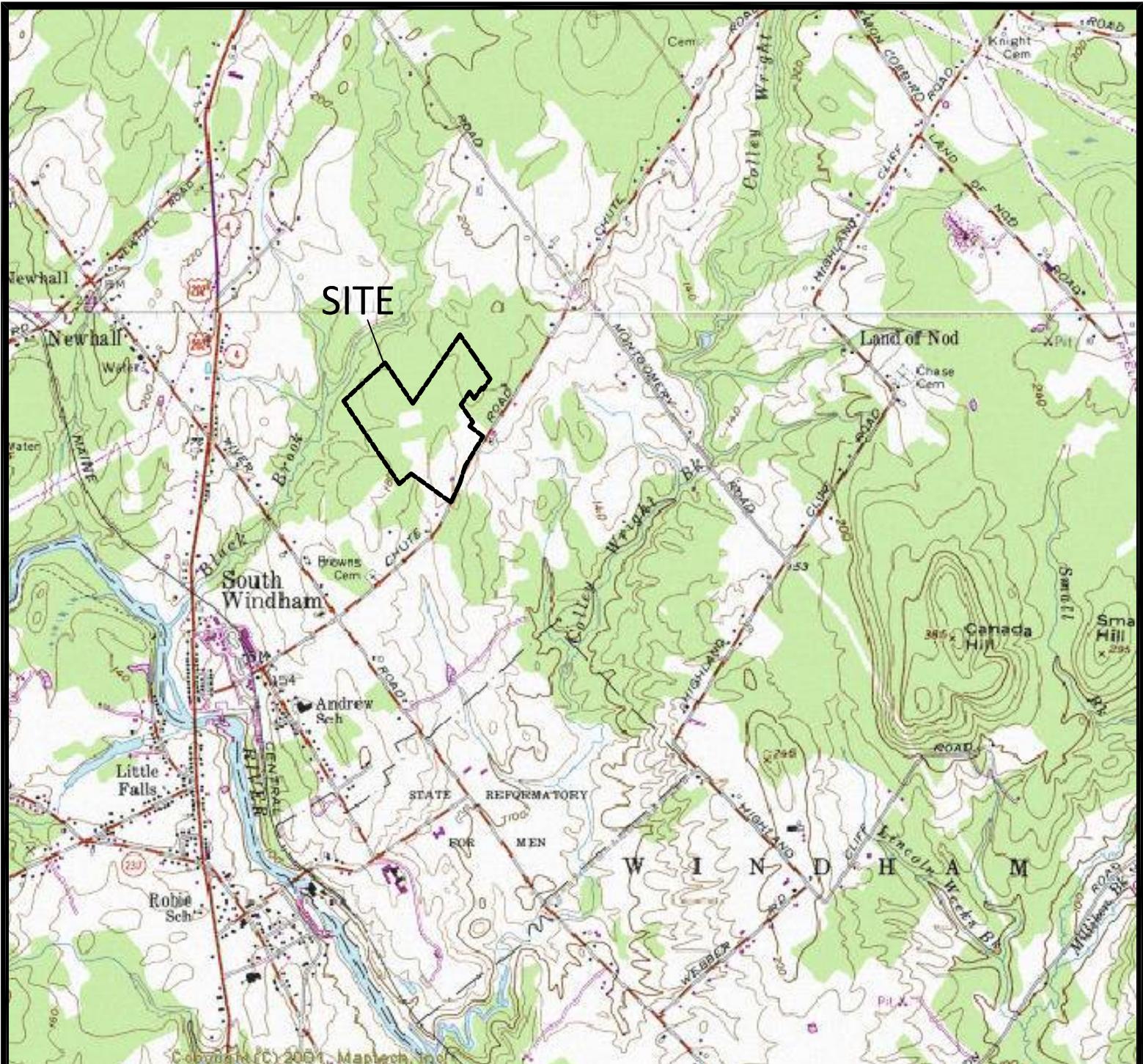


FIGURE 1
Site Location Map
Chute Rd Nitrate Analysis

**Windham Subdivision
Chute Road
Windham, ME**

SOURCE: U.S.G.S. 7.5 Minute Topographic Quadrangle of Gorham, Maine.

SCALE: 1" = 2000'

DATE: 03/24/18

DWG: A-1047-1-1

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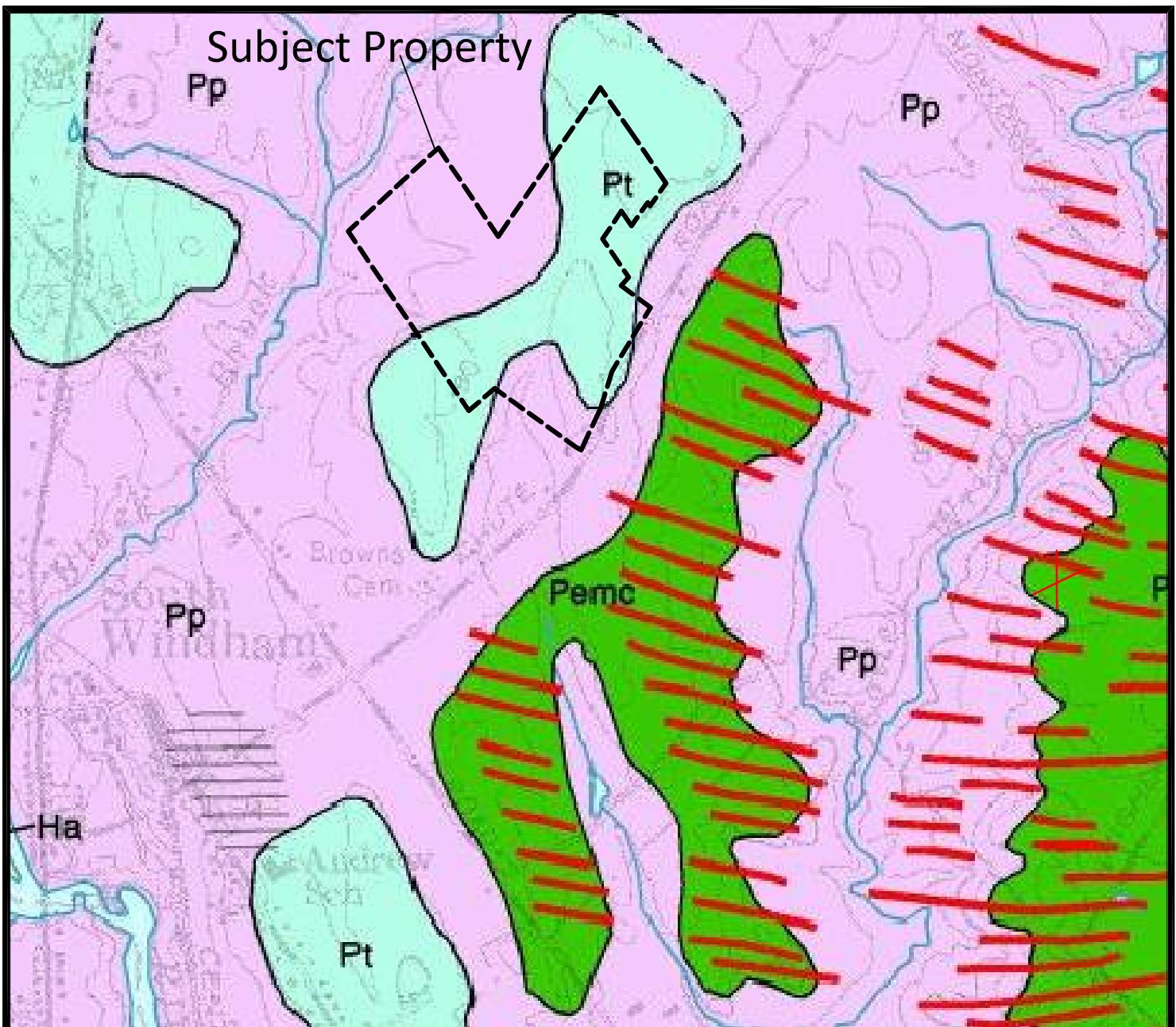


FIGURE 3
Surficial Geology
Chute Rd Nitrate Analysis

Windham Subdivision
Chute Road
Windham, Maine

SCALE: 1" = 1000'

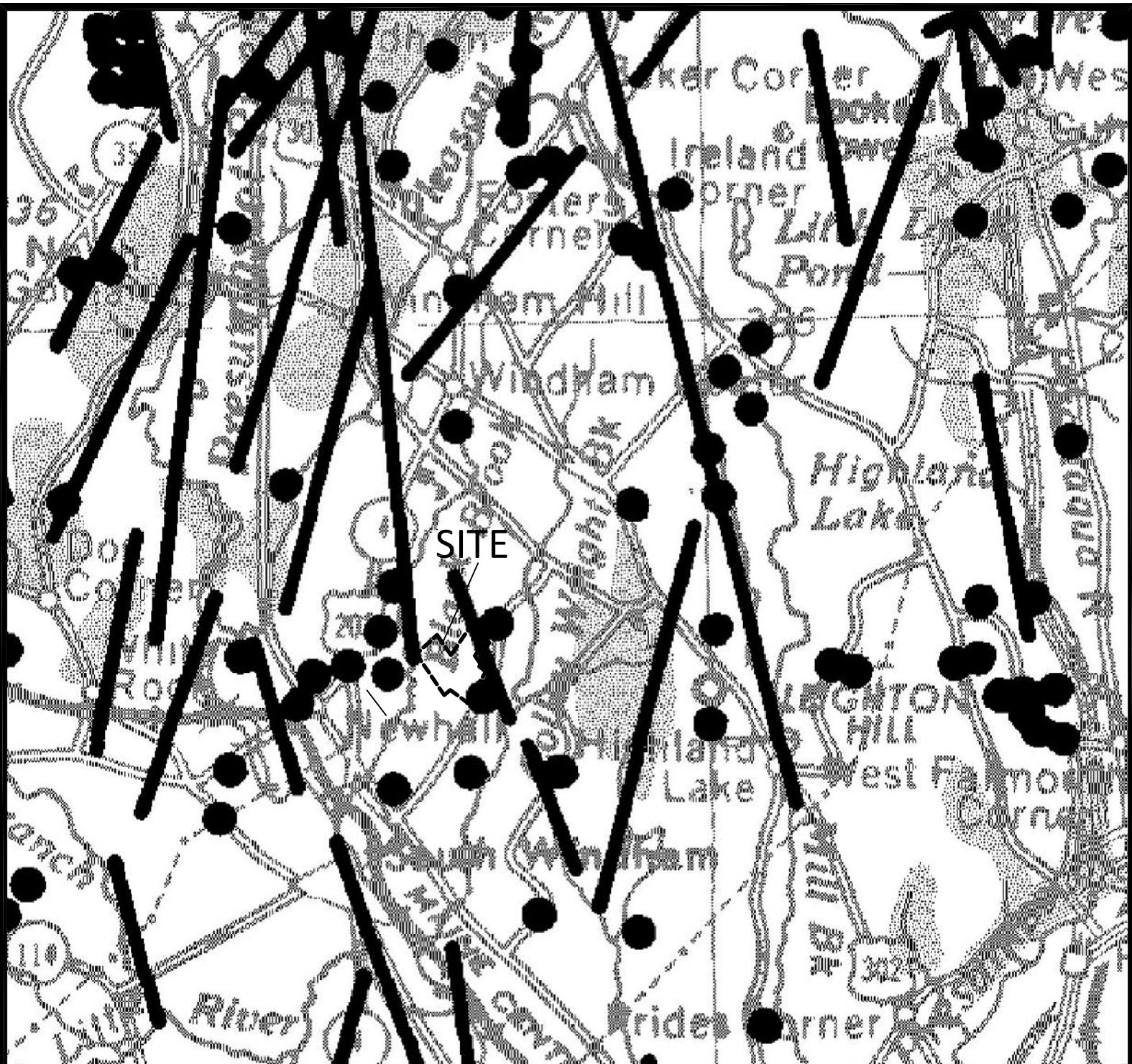
DATE: 03/14/18

DWG: A-279-4828

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Base Map obtained from Maine Geological Survey - Surficial Geology Gorham, ME

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High Yield Bedrock Well, Yield > 10 gpm

Linear feature mapped from 1:250,000 scale Side Looking Airborn Radar Imagery

Potential Bedrock Recharge

SOURCE:

Caswell, Eichler, and Hill, Inc., 1986, Lineaments, high-yield bedrock wells, and potential bedrock recharge areas in the Maine portion of the Portland and Bath 2 degree sheets: Maine Geological Survey, Open-File Map 86-67, map, scale 1:250,000.

FIGURE 4

Bedrock Resources Map

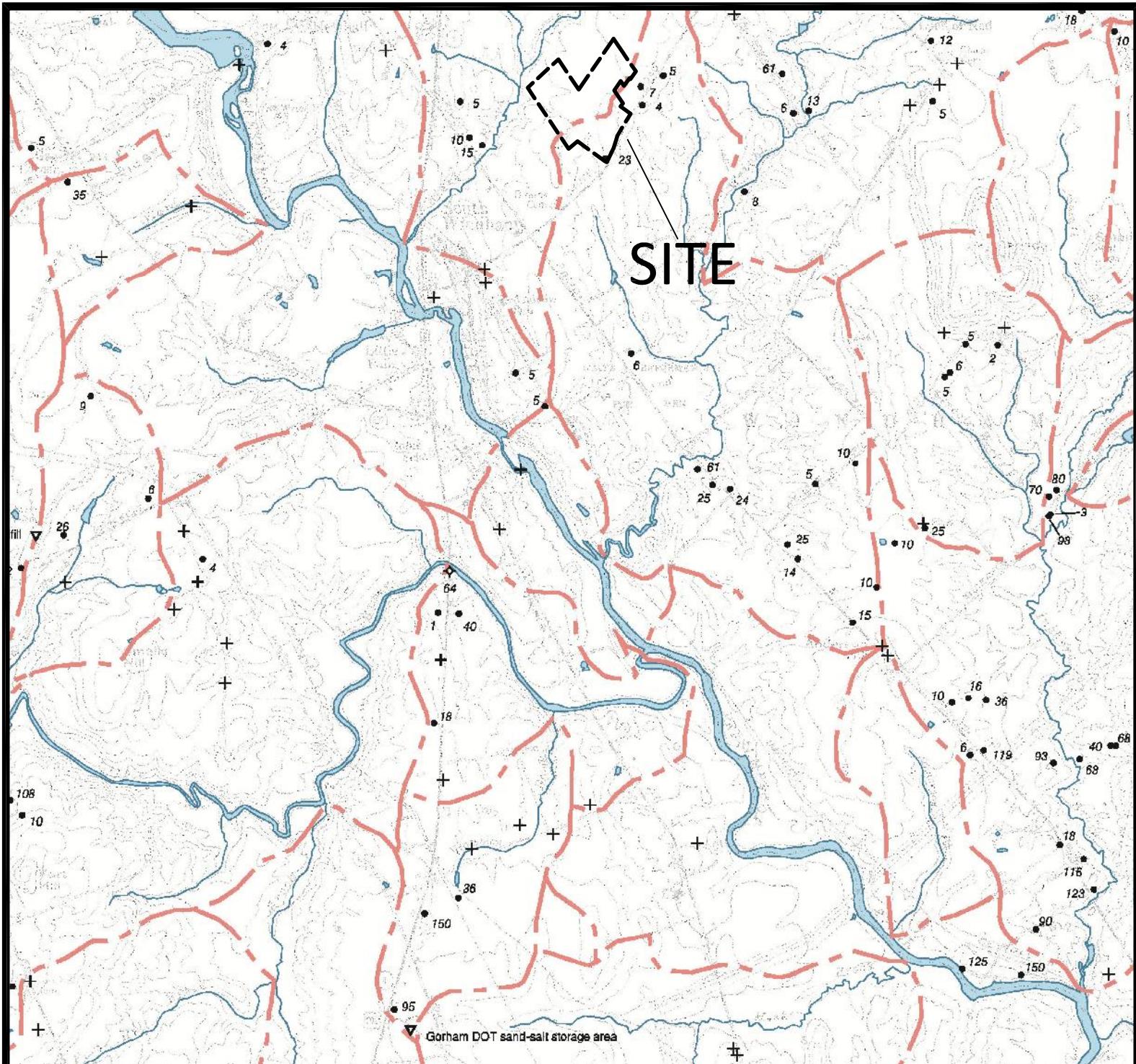
Chute Road

Windham, ME

SCALE: 1" = 3000'

DATE: 10/5/18

DWG: A-1047-1-1



There are No Mapped Sand & Gravel Aquifers in the Depicted Area.

SOURCE:
ME GIS - Significant Sand & Gravel Aquifers
Maine - Gorham Quadrangle Maine
Aquifer Map Open File 98-143 1998

FIGURE 5
Significant Sand & Gravel Aquifer Map

Chute Road
Windham, ME

SCALE: 1" = 2000'

DATE: 10/5/18

APPENDIX A

**Department of Health and Human Services
Bureau of Health, Division of Health Engineering
Wastewater and Plumbing Control Program**

NITRATE-NITROGEN IMPACT ANALYSIS FOR ENGINEERED SYSTEMS

GENERAL

Background: This Appendix is not intended to be enforced as part of the code's minimum requirements. Nitrogen contamination of ground and surface waters, due to on-site disposal of waste water, may be a public health and environmental problem in some areas. A public health problem of particular concern is nitrate contamination of drinking water supplies. Ingestion of water containing concentrations greater than 10 milligrams per liter of nitrate-nitrogen can be a cause of oxygen deficiency in young infants. Of environmental concern is the fact that nitrogen may be the limiting nutrient that controls eutrophication in coastal marine waters, estuaries, and some fresh water lakes and ponds. Therefore, excess nitrogen added to a water body may enhance eutrophication resulting in algal growth and other undesirable effects.

Intent: The intent of this Appendix is to provide a simple screening method for determining whether a more site-specific modeling of the nitrogen impact should be considered for those systems handling 2,000 gpd or more. The function of the nitrogen screening analysis is to show that nitrogen leaving the disposal field should not cause nearby domestic water supplies to exceed the acceptable nitrate-nitrogen limit of 10 milligrams per liter.

NITROGEN SCREENING ANALYSIS

Procedure: The following procedure provides a simple method of determining whether a more site-specific modeling of nitrogen impact is needed.

Step 1: Determine the overall size of the property in square feet;

Step 2: Determine the design flow from Chapter 9; and

Step 3: Using the most prominent soil profile condition, multiply the design flow by figure given in Table F-1. For example, assume a property has a soil profile 6, a soil condition C, and a system design flow of 3000 gpd. Reading down the left-hand column of Table F-1 to soil profile 6 and across to soil condition C gives the figure of 78 square feet needed to dilute each gallon of waste water. Now, multiplying the design flow of 3,000 gpd by the 78 square feet gives an answer of 234,000 square feet.

This answer gives the minimum square footage of land area needed to reduce nitrate-nitrogen to an acceptable level.

TABLE F-1

Minimum square feet needed to dilute each gallon of waste water

Waste water with 40 mg/l NO₃-N

Soil profile	Soil conditions						
	A I	A II	A III	B	C	D	E
1	112	82	82	78	82	82	112
2	112	82	78	78	78	82	112
3	112	82	82	82	82	82	112
4	112	82	78	78	78	82	112
5	112	82	78	78	78	82	112
6	112	82	78	62	78	82	112
7	112	82	82	82	82	82	112
8	112	82	82	78	82	82	112
9	112	82	82	82	82	82	112
11	112	82	78	78	78	82	112

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Bureau of Health, Division of Health Engineering
Wastewater and Plumbing Control Program**

Waste water with 20 mg/l NO₃-N.

Soil profile	Soil conditions						
	A I	A II	A III	B	C	D	E
1	37	27	27	26	27	27	37
2	37	27	26	26	26	27	37
3	37	27	27	27	27	27	37
4	37	27	26	26	26	27	37
5	37	27	26	26	26	27	37
6	37	27	26	21	26	27	37
7	37	27	27	27	27	27	37
8	37	27	27	26	27	27	37
9	37	27	27	27	27	27	37
11	37	27	26	26	26	27	37

Questionable sites: If the square footage calculated in "Step 3," is larger than the actual square footage on the property, suggested that a site-specific nitrate impact analysis may be needed.

ASSUMPTIONS USED

General: The NO₃-N impact screening analysis is based on the assumptions in this Section.

Assumption 1: The approach is a simple mass balance model assuming shallow ground water in the "interflow" and "throughflow" regime.

Assumption 2: All the nitrogen is converted to nitrate ions in the soil within the boundaries of the property.

Assumption 3: The nitrate-nitrogen concentration of the treated waste water leaving the disposal field is assumed to be in compliance with Table F-2.

TABLE F-2

NO₃-N concentration of effluent leaving the disposal field

Disposal system type	Initial NO ₃ -N concentrations
Disposal field	40 mg/l
Peat-bed or filter	20 mg/l
Denitrification (e.g. "RUCK" system)	See note below

Note: Initial NO₃-N concentration is to be determined on a case-by-case basis from valid field-test data provided by the designer and/or manufacturer of the proposed denitrification system.

Assumption 4: No allowance is made for nitrogen removal by vegetation.

Assumption 5: No allowance is made for nitrogen removal by soil sorption.

Assumption 6: No allowance is made for dilution by subsurface water moving onto the site.

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Bureau of Health, Division of Health Engineering
Wastewater and Plumbing Control Program**

Assumption 7: A fraction of the annual precipitation will infiltrate the soil and be available to mix with and dilute the nitrogen in the treated waste water. That fraction depends on ground cover, land usage, hydrologic soil group, and the amount and duration of precipitation. Most of these factors will vary on any given site.

Assumption 8: Dependent on site and soil conditions, varying percentages of the treated waste water and the infiltrated precipitation are able to move down to ground water used for water supplies. The remaining portions of the infiltrating precipitation and the treated waste water tend to move down slope, parallel to the ground surface, as perched water.

Assumption 9: The annual precipitation rate is 25.2 inches per year. (This figure is 60% of the 42 inches per year average annual precipitation rate to adjust for drought years.)

Assumption 10: To dilute each gallon of waste water containing 40 milligrams of nitrate-nitrogen per liter to a desired 10 milligrams of nitrate-nitrogen per liter requires 3 gallons of infiltrating precipitation for each gallon of waste water. For a peat disposal field the assumption is that 1 gallon of infiltrating precipitation is needed for each gallon of waste water for peat disposal field effluent containing 20 milligrams of nitrate-nitrogen per liter.

Assumption 11: A certain amount of background $\text{NO}_3\text{-N}$ exists in the ground water being evaluated. This parameter is not considered in these calculations because of the conservatism built into assumptions 4, 5, and 6.

Assumption 12: $\text{NO}_3\text{-N}$ is contained in the precipitation that falls and infiltrates the site at an average concentration of 0.5 mg/l. This parameter is not considered because of the conservatism built into assumptions 4, 5, and 6.

Assumption 13: A certain amount of $\text{NO}_3\text{-N}$ may be contributed by the development itself or from post-development activity (e.g., lawn fertilizer). This parameter is not considered because of the conservatism built into assumptions 4, 5, and 6.

Assumption 14: Since the nitrate plume may or may not disperse and its width and direction are difficult to predict therefore it is assumed that any precipitation falling on the property may be available for diluting the waste water.

Assumption 15: A certain percentage of the annual precipitation will infiltrate and recharge the soil. This will be available to mix with and dilute $\text{NO}_3\text{-N}$ as determined by the type of surficial geologic deposits, or by the hydrologic soil group as defined by the U.S. Soil Conservation Service. Used together, Table F-3 and Table F-4 give the percentage of infiltration for each soil group. Note: The percentage of the infiltrating water that reaches the permanent ground water table is in the range of 5% to 20%.

First, read down the side of Table F-3 and find the appropriate soil profile. Then read across to the column for the appropriate soil condition. For example, for a soil profile 4 and a soil condition C, the hydrologic soil group is "B."

Now, using Table F-4, find the slope of the land down the left-hand column. Then read across to the hydrologic soil group to find the annual infiltration rate. For example, for a slope of 8-15% and a hydrologic soil group "B," the annual infiltration rate is 0.024 gallons per day for each square foot of area.

TABLE F-3

Hydrologic soil groups vs soil profile and soil conditions

Soil profile	Soil Conditions						
	AI	AII	AIII	B	C	D	E
1	D	D	C	C	C	C	D
2	D	D	C	B	B	C	D
3	D	D	C	C	C	C	D
4	D	C	C	B	B	C	D
5	D	C	C	B	B	C	D
6	D	C	C	A	B	C	D
7	-	C	C	C	C	C	D
8	D	D	C	C	C	D	D

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Bureau of Health, Division of Health Engineering
Wastewater and Plumbing Control Program**

9	D	D	C	C	C	D	D
11	D	C	C	B	B	C	D

Note: Recharge rates for shallow upland soils that are underlain by fractured bedrock and that are designated in hydrologic soil group D, should be determined according to geologic properties, rather than by the hydrologic soil group.

Some profile conditions have dual designations (C/D,A/B,etc.) The most restrictive hydrologic group was used in preparation of this chart. (Source - Maine Soil and Water Conservation Commission with the assistance by the U.S.D.A. Soil Conservation Service)

TABLE F-4

Annual average infiltration vs hydrologic soil group

Slope	Average infiltration			
	Hydrologic soil group			
	A	B	C	D
0-8%	.036	.030	.024	.018
8-15%	.029	.024	.022	.016
16-25%	.023	.019	.019	.014
>25%	.016	.016	.016	.012

Soil Solutions

276 HOXIE HILL ROAD, ORRINGTON, MAINE 04474 (207) 825-4792

August 9, 2017

Matt Hancock Properties
c/o Mr. Matt Hancock
P.O. Box 295
Casco, ME 04015

RE: Preliminary Soil Evaluation of a proposed 26 lot subdivision on Chute Road in Windham, ME

Dear Mr. Hancock;

As you requested, on June 27 and 28, 2017, I conducted preliminary soil evaluations for subsurface wastewater disposal on a proposed 26 lots subdivision on Chute Road in Windham, Maine. The location of our test pits was based on a Site Plan prepared by Acheron Engineering Services of Newport, Maine.

Evaluation of 54 hand dug test pits, with at least one test pit in each of the proposed 26 lots, revealed at least one area on each lot where soil conditions meet the minimum drainage requirements for subsurface wastewater disposal. Soil conditions observed ranged from 2A, 3C, 7C, 8C and 8D with evidence of a seasonal groundwater table, restrictive layer, or bedrock from 11 to 35 inches in depth. Soil condition and depth to seasonal groundwater table, restrictive layer, or bedrock for each lot and each test pit are summarized in the attached "Soil Conditions Summary Table" and specified in the attached "Soil Condition and Classification" test pit logs. Where soil conditions 2A, 3C and 7C were observed, a 1000 gallon septic tank followed by a 900 square foot disposal bed, would provide adequate treatment of wastewater for a 3 bedroom house. Where 8C and 8D soil conditions were observed, a 1000 gallon septic tank followed by a 1200 square foot disposal bed, would provide adequate treatment of wastewater for a 3 bedroom house. Each test pit location is identified on the ground with a wooden stake or orange flagging and is shown on a plan prepared by our office titled "Preliminary Soil and Site Evaluation Test Pit Location".

As with any subsurface wastewater disposal system, proper setback of a disposal system from well, structures, lot lines, bodies of water, and protected natural resources is a necessary consideration in determining whether an area that appears suitable for subsurface wastewater disposal can meet minimum setback requirements. Based on information available and my evaluation, it appears the suitable areas observed at the test pits described in this report meets minimum setback requirements under the Maine State Plumbing Code. In addition, in anticipation of a possible subdivision permit application to the Maine Department of Environmental Protection (DEP) under a Site Location of Development Application (SLODA) we have excavated and described a sufficient

number of test pits to meet minimum SLODA requirements. We have also prepared the Maine DEP required test pit reporting forms identified as Form E and Form F in the SLODA permit application. As with any DEP SLODA application, additional testing, such as nitrate-nitrogen impact assessment, may be requested during the permit review process, to evaluate proposed subsurface wastewater disposal systems. This potential additional testing cannot be determined at this time prior to the preapplication meeting.

It is the responsibility of the owner or his agent to contact appropriate local officials, such as the Code Enforcement Officer or Planning Board in the Town of Windham, to check on local ordinances, such as setback requirements, that may be more restrictive than the Plumbing Code. This information may be important prior to submitting a subdivision or subsurface wastewater disposal permit applications to the Town.

Please call me at (207) 825-4792 if you have any questions.

Sincerely,



Stephen H. Howell
Site Evaluator # 213

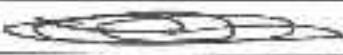


SOIL CONDITIONS SUMMARY TABLE

SUMMARY LOG OF SUBSURFACE EXPLORATIONS AT PROJECT SITES

Lot No.	Exploration Symbol (TP 1, D 2, etc.)	X if at SSWID Field	Description of subsurface materials by: • Soil profile/condition (if by S.E.), • Soil series name (if by C.S.S.), or by • Geologic unit (if by G.G.)	Depth to (inches):				Ground Surface Slope (%)	Ground Surface Elevation
				Radiometric Features	Bedrock	Hydraulically Restrictive Layer	Limit of Exploration		
1	TP1	X	Lamoline/SC	16	>35	16	35	1-5	NA
1	TP1A	X	Lamoline/SC	15	>35	15	35	1-5	NA
2	TP2	X	Buxton/SC	18	>35	18	35	1-5	NA
2	TP2A	X	Buxton/SC	18	>35	18	35	1-5	NA
3	TP3	X	Lamoline/SD	14	>35	14	35	1-8	NA
3	TP3A	X	Lamoline/SD	14	>35	14	35	1-8	NA
4	TP23	X	Lamoline/SD	13	>35	13	35	8-15	NA
5	TP23	X	Lamoline/SD	13	>35	13	35	8-15	NA
5	TP22A	X	Lamoline/SC	16	>35	16	35	8-15	NA
6	TP21	X	Lamoline/SD	14	>35	14	35	0-5	NA
6	TP21A	X	Lamoline/SD	14	>35	14	35	0-5	NA
7	TP20	X	Lamoline/SC	15	>35	15	35	3-8	NA
7	TP20A	X	Lamoline/SC	15	>35	15	35	3-8	NA
8	TP19	X	Lamoline variant/7C	24	>35	24	35	1-6	NA
8	TP19A	X	Lamoline variant/7C	24	>35	24	35	1-6	NA
9	TP18	X	Lamoline/SC	15	>35	15	35	1-5	NA
9	TP18A	X	Lamoline/SC	15	>35	15	35	1-5	NA
10	TP17	X	Lamoline/SC	17	>35	17	35	1-6	NA
10	TP17A	X	Buxton/SC	18	>35	18	35	1-6	NA
11	TP16	X	Lamoline/SD	14	>35	14	35	1-5	NA
11	TP16A	X	Buxton/SC	18	>35	18	35	1-5	NA
12	TP15	X	Buxton/SC	18	>35	18	35	1	NA
12	TP15A	X	Buxton/SC	18	>35	18	35	1-6	NA
13	TP14	X	Buxton variant/7C	24	>35	24	35	1-6	NA
13	TP14A	X	Buxton variant/7C	24	>35	24	35	1-6	NA
14	TP13	X	Lamoline/SD	12	>35	12	35	1-6	NA
14	TP12A	X	Buxton/SC	22	>35	22	35	1-5	NA
15	TP12	X	Buxton/SC	21	>35	21	35	1-8	NA
15	TP12A	X	Buxton/SC	21	>35	21	35	1-8	NA
16	TP11	X	Lamoline/SD	14	>35	14	35	1-8	NA
16	TP11A	X	Lamoline/SD	14	>35	14	35	1-8	NA

INVESTIGATOR INFORMATION AND SIGNATURE

Signature		Date	8/03/17
Name Printed	Stephen H. Howell	Cent/Lic/Reg. #	SS # 187
Qualification	<input checked="" type="checkbox"/> Licensed Site Evaluator <input type="checkbox"/> Certified Geologist	<input checked="" type="checkbox"/> Certified Soil Scientist <input type="checkbox"/> Other	



SOIL CONDITIONS SUMMARY TABLE

SUMMARY LOG OF SUBSURFACE EXPLORATIONS AT PROJECT SITES

Project Name: Chris Keat Subdivision

Applicant Name:
Matt Hancock Properties

Project location (municipality):
Mysore

INVESTIGATOR INFORMATION AND SIGNATURE

Signature

Final

Figure 5-14

Stephen H. Howell

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2000-01

IV Licensed Site Evaluators

■ Certified Soil Scientist



SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3165

Town, City, Plantation

WINDHAM

Street, Road, Subdivision

WINDHAM SUBDIV.
CHUTE ROAD

Owner's Name

MATT HANCOCK
PROPERTIES

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP1 Test Pit Boring
41 * Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0	VERY FINE	FRAGILE	BROWN
10	SANDY	BROWN	
20	LOAM	YELLOWISH	BLACK
30	LOAM	FIRM	BLACK
40	SILTY CLAY	VERY FIRM	OLIVE
50	LOAM	DISKET	MANY DISTINCT

LIMIT OF OBSERVATION = 35'

Soil Classification	Slope	Limiting Factor	Ground Water
8 C	1-5%	16"	Ground Water Restrictive Layer Bedrock Pit Depth

Observation Hole TP1A Test Pit Boring
41 * Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0	VERY FINE	FRAGILE	BROWN
10	SANDY	DARK	
20	LOAM	YELLOWISH	BLACK
30	LOAM	FIRM	BLACK
40	SILTY CLAY	VERY FIRM	OLIVE
50	LOAM	DISKET	MANY DISTINCT

LIMIT OF OBSERVATION = 35'

Soil Classification	Slope	Limiting Factor	Ground Water
8 C	1-5%	15"	Ground Water Restrictive Layer Bedrock Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP2+2A Test Pit Boring
41 * Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0	VERY FINE	FRAGILE	BROWN
10	SANDY	YELLOWISH	BROWN
20	LOAM	FIRM	BLACK
30	SILTY CLAY	VERY FIRM	OLIVE
40	LOAM	DISKET	MANY DISTINCT

LIMIT OF OBSERVATION = 35'

Soil Classification	Slope	Limiting Factor	Ground Water
8 C	1-5%	18"	Ground Water Restrictive Layer Bedrock Pit Depth

Observation Hole TP2+3A Test Pit Boring
41 * Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0	VERY FINE	FRAGILE	BROWN
10	SANDY	YELLOWISH	BROWN
20	LOAM	FIRM	BLACK
30	SILTY CLAY	VERY FIRM	OLIVE
40	LOAM	DISKET	MANY DISTINCT

LIMIT OF OBSERVATION = 35'

Soil Classification	Slope	Limiting Factor	Ground Water
8 D	1-8%	19"	Ground Water Restrictive Layer Bedrock Pit Depth

Site Evaluator Signature

#213

SE #

7/20/17

Date

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5872 Fax: (207) 287-3165

Town, City, Plantation

Street, Road, Subdivision

WINDHAM

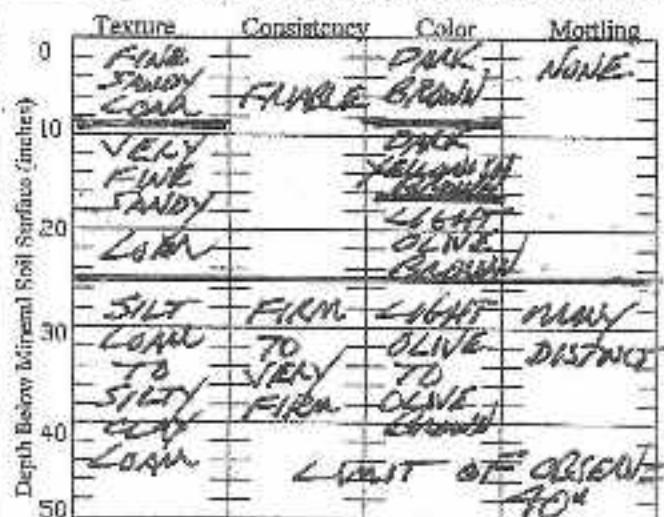
Street, Road, Subdivision
WINDHAM SUBDIV.,
CHUTE ROAD

Owner's Name

Owner's Name
Merr Hancock
Properties

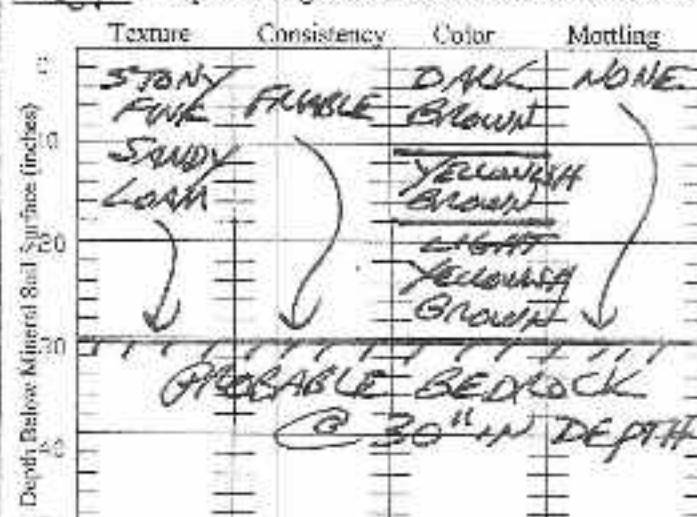
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP444 Test Pit Boring
<1 " Depth of Organic Horizon Above Mineral Soil



Sed. Classification	Slope	Limiting Soil	Ground Water Level
Probe Condition	8-15%	25°	Descriptive Layer Bedrock Pit Depth

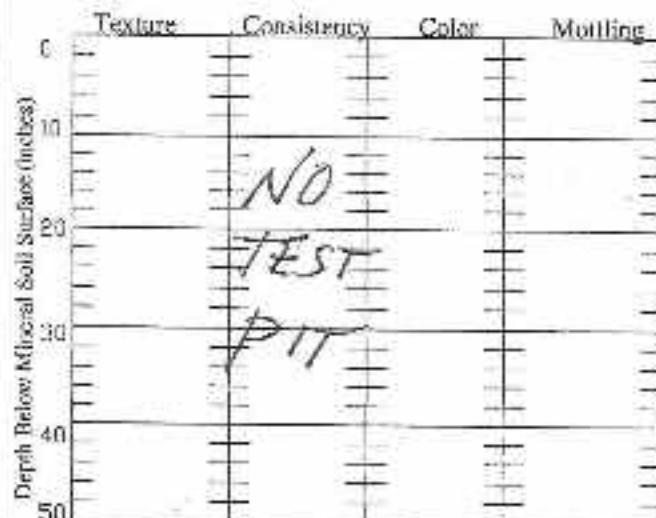
Observation Hole **TP5** Test Pit Boring
11 " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Angle	Limiting Factor	Ground Water
2A	<u>15%</u>	<u>30%</u>	<u>Restrictive Layer</u>
Profile Condition			<u>Clayrock</u>

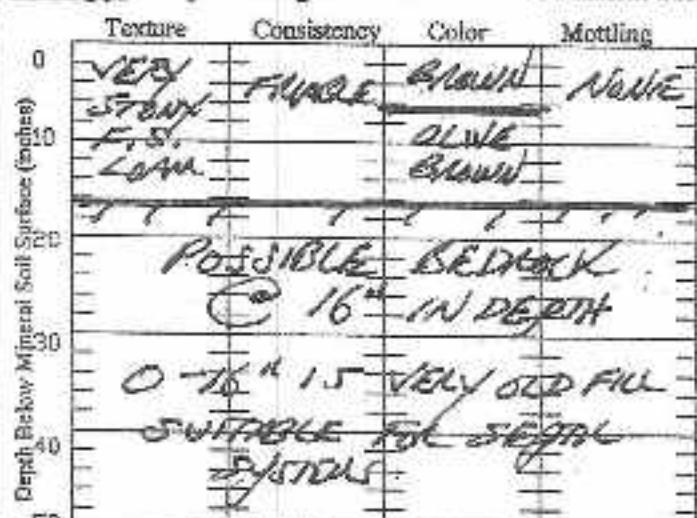
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole Test Pit Boring
"Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	Ground Water Restrictive Layer
Profile Condition	%		Bedrock Pit Depth

Observation Hole TP6 Test Pit Boring
1" Depth of Organic Horizon Above Mineral Soil



Soil Classification 2	Slip Factor 4	Limiting Factor 15%	<input type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input checked="" type="checkbox"/> Bedrock <input type="checkbox"/> Bit Depth
Profile Condition		16%	



Site Evaluator Signature:

227/3

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7/22/17

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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3165

Town, City, Plantation

WINDHAM

Street, Road, Subdivision

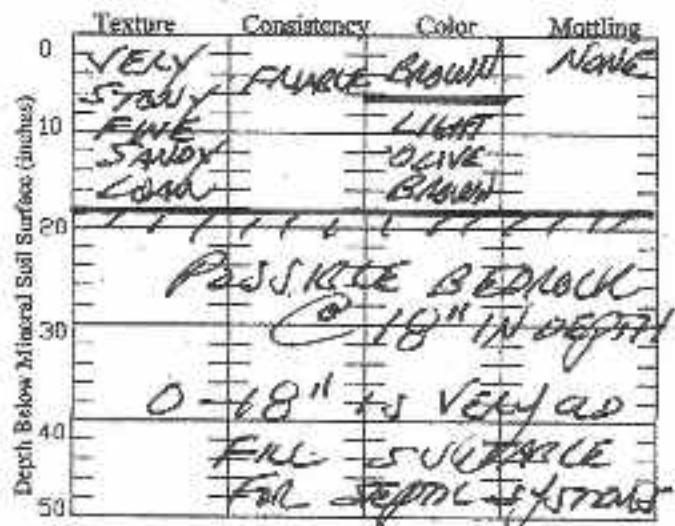
WINDHAM SUBDIV.
CHUTE ROAD

Owner's Name

MATT HANCOCK
PROPERTIES

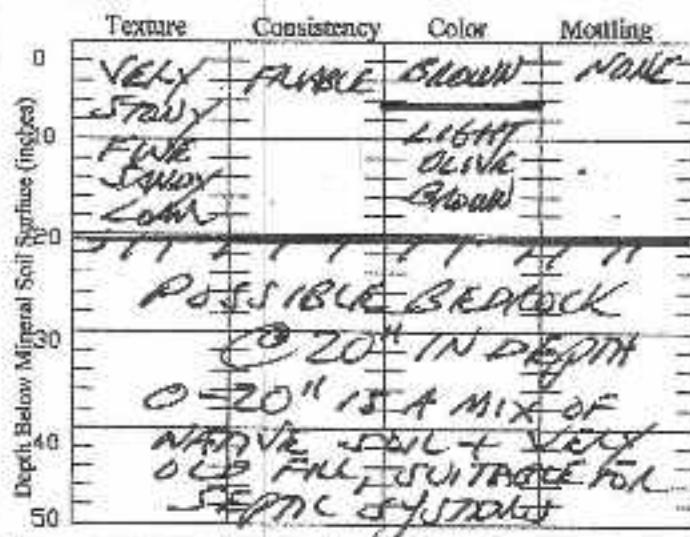
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole 1660 Test Pit Boring
SL " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	Ground Water
2 A	1-5%	Profile Condition	18" Bedrock 11 ft. Depth

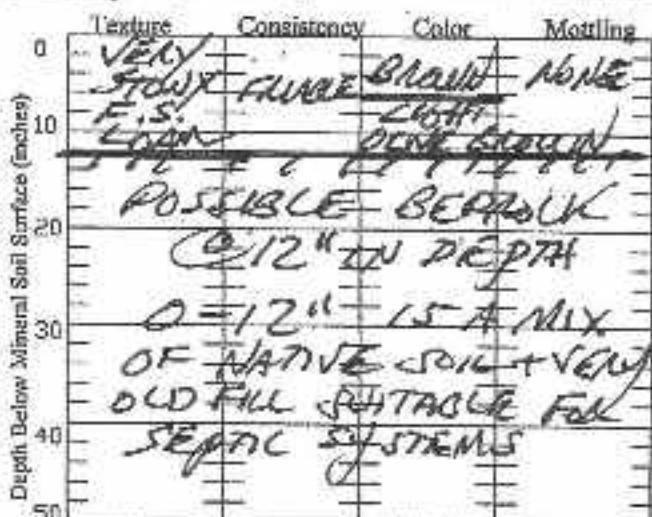
Observation Hole 777 Test Pit Boring
SL " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	Ground Water
2 A	1-5%	Profile Condition	20" Bedrock 11 ft. Depth

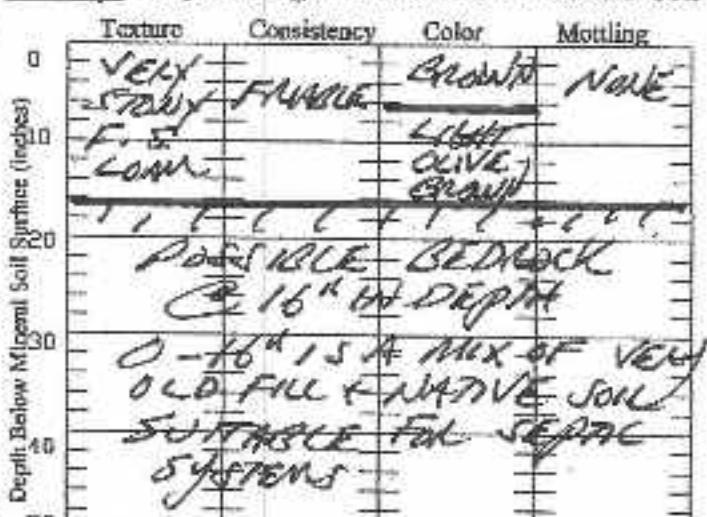
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole 1784 Test Pit Boring
SL " Depth of Organic Horizon Above Mineral Soil

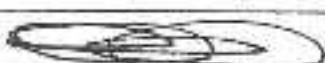


Soil Classification	Slope	Limiting Factor	Ground Water
2 A	1-5%	Profile Condition	12" Bedrock 11 ft. Depth

Observation Hole 1784 Test Pit Boring
SL " Depth of Organic Horizon Above Mineral Soil



Soil Classification	Slope	Limiting Factor	Ground Water
2 A	1-5%	Profile Condition	16" Bedrock 11 ft. Depth



Site Evaluator Signature

#213

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7/20/17

Date

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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3165

Town, City, Plantation

WINDHAM

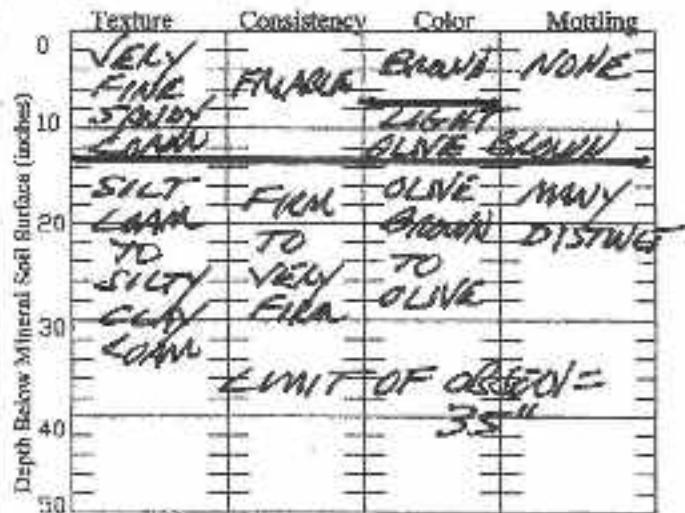
Street, Road, Subdivision

WINDHAM SUBDIV.
CHUTE ROAD

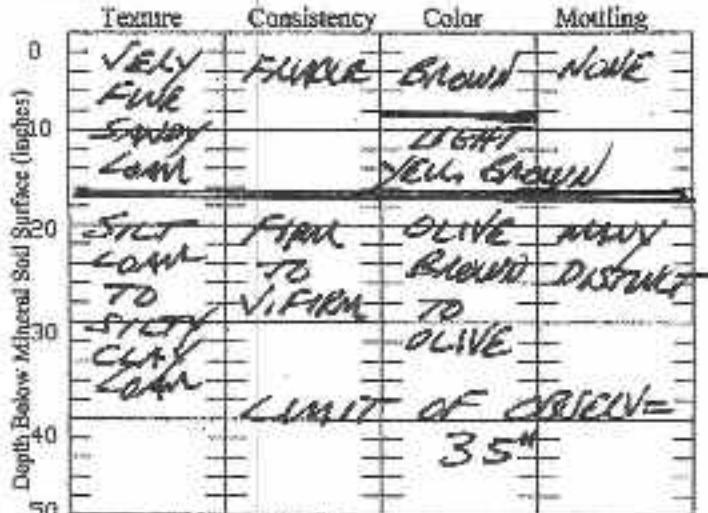
Owner's Name

MATT HANCOCK
PROPERTIES

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

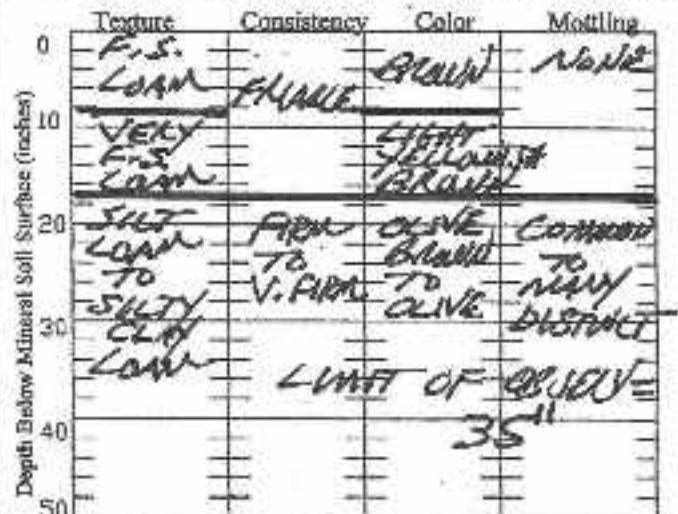
Observation Hole TP8 Test Pit Boring
21 " Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	Ground Water
<u>S</u> <u>D</u> Profile Condition	<u>3.8%</u>	<u>13"</u>	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

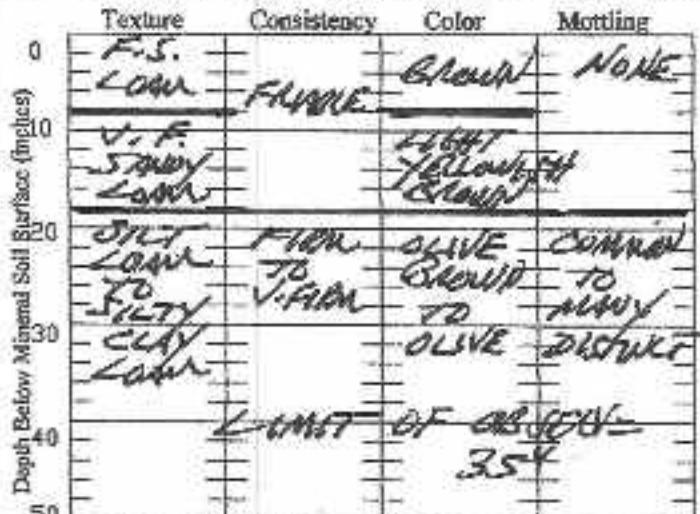
Observation Hole TP8A Test Pit Boring
21 " Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	Ground Water
<u>S</u> <u>C</u> Profile Condition	<u>3.8%</u>	<u>16"</u>	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP9 Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	Ground Water
<u>S</u> <u>C</u> Profile Condition	<u>3.8%</u>	<u>17"</u>	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

Observation Hole TP9A Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	Ground Water
<u>S</u> <u>C</u> Profile Condition	<u>3.8%</u>	<u>18"</u>	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

#213

7/20/17

SE #

Date

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3165

Town, City, Plantation

WINDHAM

Street, Road, Subdivision

WINDHAM SUBDIV.
CHUTE ROAD

Owner's Name

MATT HANCOCK
PROPERTIES

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP10 Test Pit Boring
21 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 FINE	V. FIRM	OLIVE	NONE
SANDY LOAM	FLUID	BROWN	
10 CLAY	SOFT-OLIVE	BROWN	
20 SILT	FIRM	OLIVE	MANY
LOAM	TO	BROWN	DISTINCT
30 SILTY CLAY	VERY FIRM	TO OLIVE	
LOAM			
<u>LIMIT OF OBSERV=</u>			
<u>35"</u>			
40			
50			

Soil Classification	Slope	Limiting Factor	Ground Water
<u>8 D</u>	<u>0.3%</u>	<u>11"</u>	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile Condition			

Observation Hole TP10A Test Pit Boring
21 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 FINE	V. DARK	OLIVE	NONE
SANDY LOAM	FLUID	BROWN	
10 CLAY	SOFT	OLIVE	
20 SILT	FIRM	OLIVE	MANY
LOAM	TO	BROWN	DISTINCT
30 SILTY CLAY	VERY FIRM	TO OLIVE	
LOAM			
<u>LIMIT OF OBSERV=</u>			
<u>35"</u>			
40			
50			

Soil Classification	Slope	Limiting Factor	Ground Water
<u>8 D</u>	<u>0.3%</u>	<u>13"</u>	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile Condition			

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP11/HACK Test Pit Boring
21 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 VERY FINE	FLUID	BROWN	NONE
FINE	FLUID	BROWN	
SANDY LOAM	LIGHT	YEL. BROWN	
10 CLAY	SOFT	OLIVE	
SILT	FIRM	OLIVE	COMMON
LOAM	TO	BROWN	
20 TO	FLUID	TO	
SILTY	V. FIRM	TO	MANY
CLAY	OLIVE	OLIVE	DISTINCT
30 LOAM			
<u>LIMIT OF OBSERV=</u>			
<u>35"</u>			
40			
50			

Soil Classification	Slope	Limiting Factor	Ground Water
<u>8 D</u>	<u>1-8%</u>	<u>14"</u>	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile Condition			

Observation Hole TP11/HACK Test Pit Boring
21 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 FINE	FLUID	BROWN	NONE
SANDY LOAM	FLUID	FLUID	
10 SILTY LOAM	FLUID	FLUID	
SILT	FIRM	OLIVE	COMMON
LOAM	TO	BROWN	TO
20 TO	V. FIRM	TO	MANY
SILTY CLAY	FLUID	OLIVE	DISTINCT
CLAY LOAM			
<u>LIMIT OF OBSERV=</u>			
<u>35"</u>			
40			
50			

Soil Classification	Slope	Limiting Factor	Ground Water
<u>8 C</u>	<u>1-8%</u>	<u>21"</u>	<input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile Condition			

Site Evaluator Signature

SE #

Date

#213

7/20/17

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MEHE-200 Rev. 05/08

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5872 Fax: (207) 287-3165

Town, City, Plantation

WINDHAM

Street, Road, Subdivision

WINDHAM SUBDIV.
CHUTE ROAD

Owner's Name

Matt Hancock
Properties

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP13 Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 VERY FINE	FRAGILE	Group None	
5 Sandy	LIGHT		
10 Loam	SOIL. BROWN		
15 SILT	FIRM	OLIVE	COMMON
20 Loam	TO	BROWN	TO
25 TO	V. FIRM	TO	MANY
30 SILTY CLAY	OLIVE	DISTINCT	
35 Loam	LIMIT OF OBSERV-		
	35"		
40			
45			
50			

Soil Classification	Slope	Limiting Factor	Ground Water
8 D Profile Condition	1-6 %	12"	<input checked="" type="checkbox"/> Restrictive Layer Bedrock Pit Depth

Observation Hole TP13A Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 FINE	GROUP	GRAY	None
5 Sandy	FRAGILE	LIGHT	
10 Loam	SOIL. BROWN		
15 SILT	FIRM	OLIVE	COMMON
20 Loam	TO	BROWN	TO
25 TO	V. FIRM	TO	MANY
30 SILTY CLAY	OLIVE	DISTINCT	
35 Loam	LIMIT OF OBSERV-		
40	35"		
45			
50			

Soil Classification	Slope	Limiting Factor	Ground Water
8 C Profile Condition	1-6 %	22"	<input checked="" type="checkbox"/> Restrictive Layer Bedrock Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP14 Test Pit Boring
3 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 Sandy	FRAGILE	BROWN	None
5 FINE		LIGHT	
10 Sandy		BROWN	
15 Loam	LIGHT		
20 SILT	FIRM	OLIVE	COMMON
25 Loam	TO	BROWN	TO
30 TO	V. FIRM	TO	MANY
35 SILTY CLAY	OLIVE	DISTINCT	
40 Loam	LIMIT OF OBSERV-		
45	35"		
50			

Soil Classification	Slope	Limiting Factor	Ground Water
7 C Profile Condition	1-6 %	24"	<input checked="" type="checkbox"/> Restrictive Layer Bedrock Pit Depth

Observation Hole TP15 Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 F.S.	FRAGILE	GRAY	None
5 Loam	FRAGILE	LIGHT	
10 SILT		YEL. BROWN	
15 Loam	LIGHT		
20 SILT	FIRM	OLIVE	COMMON
25 Loam	TO	BROWN	TO
30 TO	V. FIRM	TO	MANY
35 CLAY	OLIVE	DISTINCT	
40			
45			
50			

Soil Classification	Slope	Limiting Factor	Ground Water
8 C Profile Condition	1-6 %	18"	<input checked="" type="checkbox"/> Restrictive Layer Bedrock Pit Depth



#213

SE #

7/20/17

Date

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SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3165

Town, City, Plantation

Street, Road, Subdivision

WINDHAM

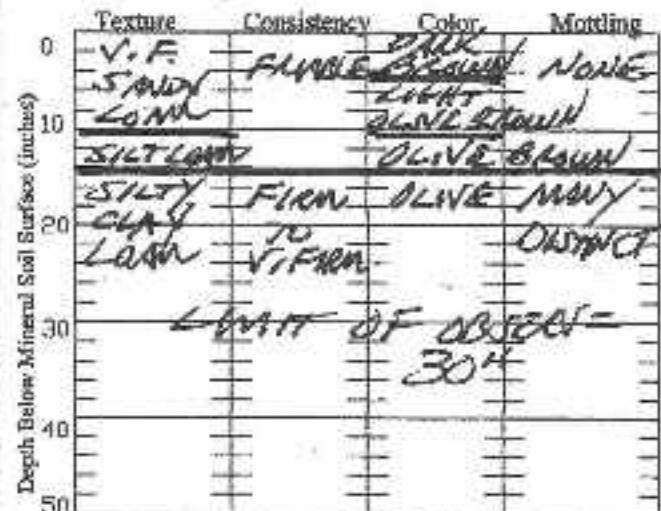
Street, Road, Subdivision
**WINDHAM SUBDIV.,
CHUTE ROAD**

Owner's Name _____

Owner's Name
MATT HANCOCK
Properties

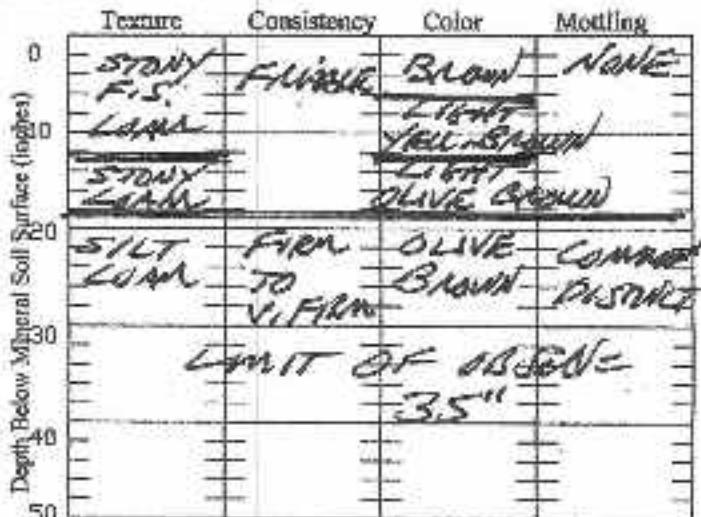
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 16 Test Pit Boring
1 " Depth of Organic Horizon Above Mineral Soil



Soil Classification 8 D	Slope 1-5%	Limiting Factor 14!!	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile	Condition		

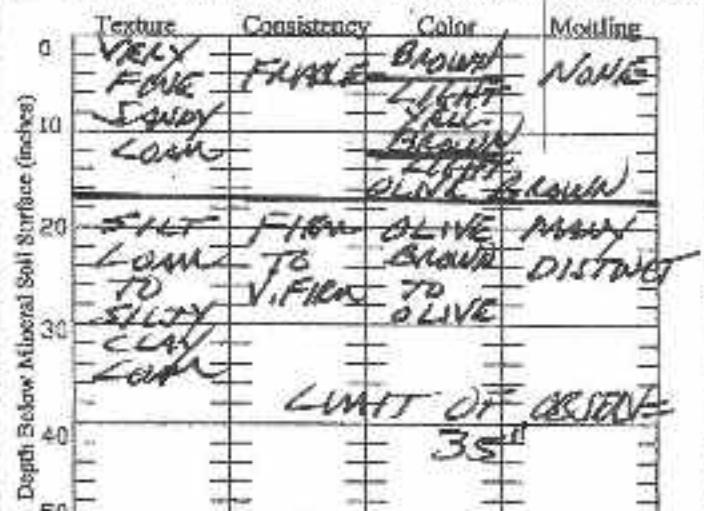
Observation Hole PI6A ~~X~~ Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil



Soil Classification  Profile	Slope  1-5%	Limiting Factor  10°	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Condition  C			

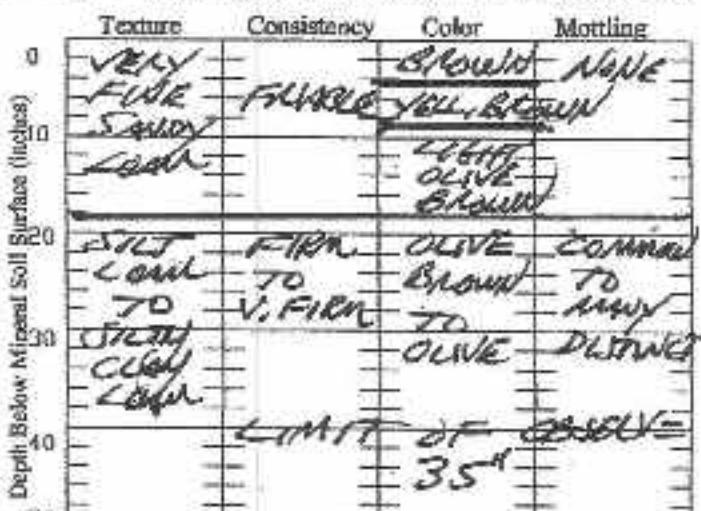
SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole 717 Test Pit Boring
3 " Depth of Organic Horizon Above Mineral Soil

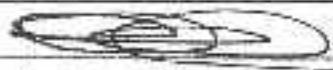


Soil Classification 8	Slope 1-6%	Limiting Factor 17"	<input checked="" type="checkbox"/> Ground Water <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile C	Condition		

Observation Hole TP174X Test Pit Boring
3 "Depth of Organic Horizon Above Mineral Soil



Soil Classification 8	Slope 1-6%	Limiting Factor 18.16	Ground Water <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile C	Condition		



#213

7/20/17

Site Evaluator Signature

SE 44

Date:

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3165

Town, City, Plantation

WINDHAM

Street, Road, Subdivision

WINDHAM SUBDIV.
CHUTE ROAD

Owner's Name

MATT HANCOCK
PROPERTIES

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole ~~P19H8A~~ Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 FINE	FLUID	YELL.	NONE
SANDY	FLUID	YELL.	NONE
CLAY	FLUID	BROWN	
V.FIRM	FLUID	BROWN	
LOAM	FLUID	BROWN	
SILT	FLUID	OLIVE	COMMON
LOAM	FLUID	BROWN	DISINCT
SILT	FIRM	OLIVE	MANY
LOAM	FIRM	OLIVE	DISINCT
TO	TO		
SILTY	V.FIRM		
CLAY			
LOAM			LIMIT OF OBSENV = 35"
50			

Soil Classification	Slope	Limiting Factor	Ground Water
8 C	1-5%	15"	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

Observation Hole ~~P19H9A~~ Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 FINE	FLUID	YELL.	NONE
SANDY	FLUID	YELL.	NONE
LOAM	FLUID	BROWN	
V.FIRM	FLUID	BROWN	
LOAM	FLUID	BROWN	
SILT	FIRM	OLIVE	COMMON
LOAM	FIRM	BROWN	DISINCT
TO	TO		
SILTY	V.FIRM		
CLAY			
LOAM			LIMIT OF OBSENV = 35"
50			

Soil Classification	Slope	Limiting Factor	Ground Water
7 C	1-6%	24"	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole ~~P20H3A~~ Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil

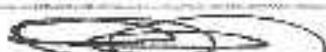
Texture	Consistency	Color	Mottling
0 VERY	BLAND	YELL.	NONE
FINE	FLUID	YELL.	NONE
SANDY	FLUID	YELL.	STAMP
LOAM	FLUID	OLIVE	
SILT	FIRM	OLIVE	MANY
LOAM	FIRM	OLIVE	DISINCT
TO	TO		
SILTY	V.FIRM		
CLAY			
LOAM			LIMIT OF OBSENV = 35"
50			

Soil Classification	Slope	Limiting Factor	Ground Water
8 C	3-8%	15"	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

Observation Hole ~~P20H3A~~ Test Pit Boring
3 " Depth of Organic Horizon Above Mineral Soil

Texture	Consistency	Color	Mottling
0 V.F.	BLAND	YELL.	NONE
SANDY	FLUID	YELL.	BROWN
LOAM	FLUID	OLIVE	
SILT	FIRM	OLIVE	COMMON
LOAM	FIRM	BROWN	TO
TO	TO		
SILTY	V.FIRM	OLIVE	MANY
CLAY			DISINCT
LOAM			LIMIT OF OBSENV = 35"
50			

Soil Classification	Slope	Limiting Factor	Ground Water
8 D	0-5%	14"	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth



#213

7/20/17

SE#

Date

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3165

Town, City, Plantation

Street, Road, Subdivision

Owner's Name

WINDHAM

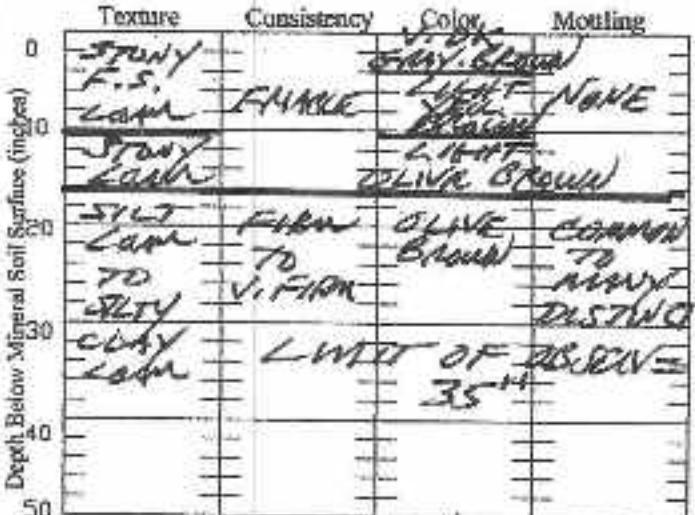
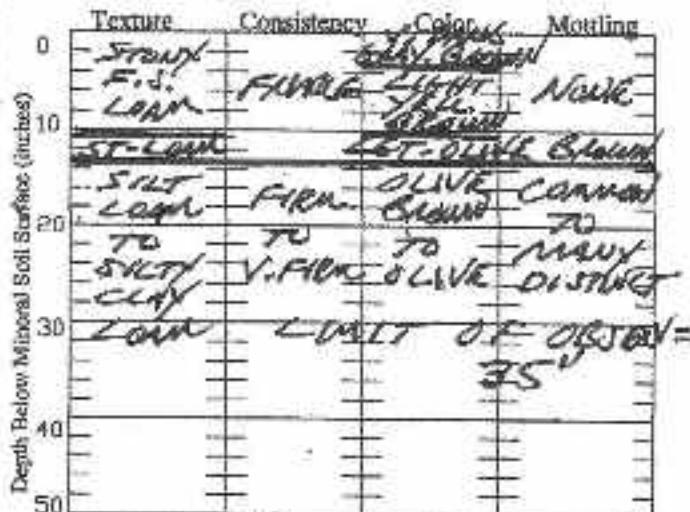
Street, Road, Subdivision
WINDHAM SUBDIV.,
CHUTE ROAD

Owner's Name
MATT HANCOCK
PROPERTIES

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole 7722 Test Pit Boring
2 "Depth of Organic Horizon Above Mineral Soil

Observation Hole P22A Test Pit Boring
2 " Depth of Organic Horizon Above Mineral Soil



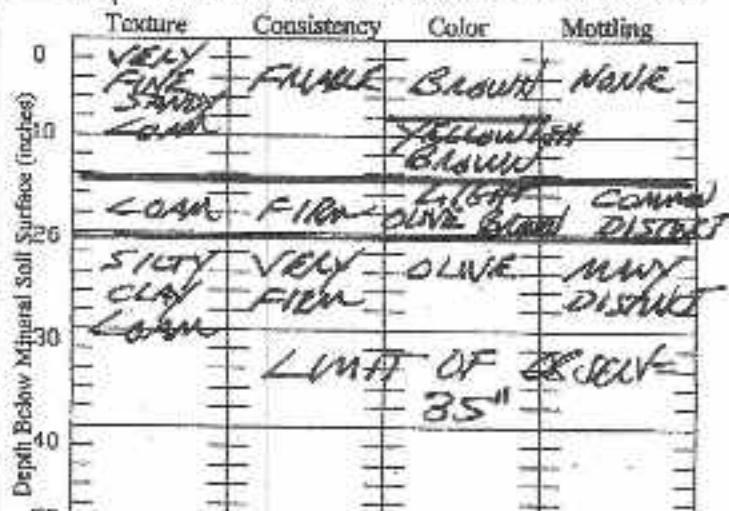
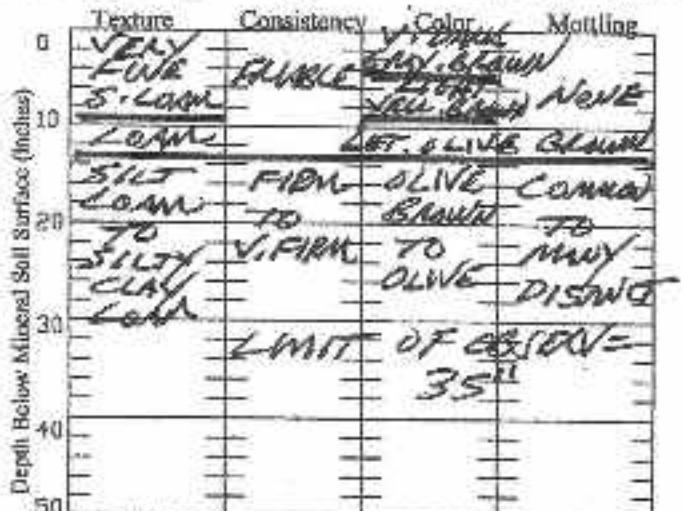
Soil Classification 8 D	Slope 8-15%	Limiting Factor 13"	<input checked="" type="checkbox"/> Ground Water <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile	Condition		

Soil Classification <i>E</i>	Slope <i>8-15%</i>	Limiting Factor <i>16"</i>	Ground Water <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pt. Depth
Profiles	Conditions		

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole 723A Test Pit Boring
2 "Depth of Organic Horizon Above Mineral Soil

Observation Hole ~~P24-24~~ X Test Pit Boring
1" Depth of Organic Horizon Above Mineral Soil



Soil Classification 8	Profile Condition D	Slope 8-15	Limiting Factor 13%	Ground Water Stratigraphic Layer Bedrock Pit Depth
--------------------------	------------------------	---------------	------------------------	---

Soil Classification B D	Slope 572%	Limiting Factor 17%	<input checked="" type="checkbox"/> Ground Water <input checked="" type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
Profile 	Condition 		

Site Evaluator Signature

SE 4

Dept.

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services
Division of Environmental Health
(207) 287-5672 Fax: (207) 287-3165

Town, City, Plantation

Street, Road, Subdivision

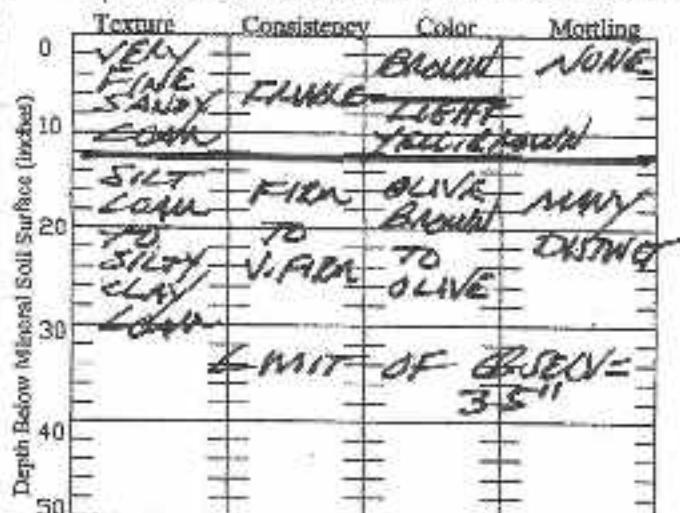
WINDHAM

WINDHAM SUBDIV.
CHUTE ROAD

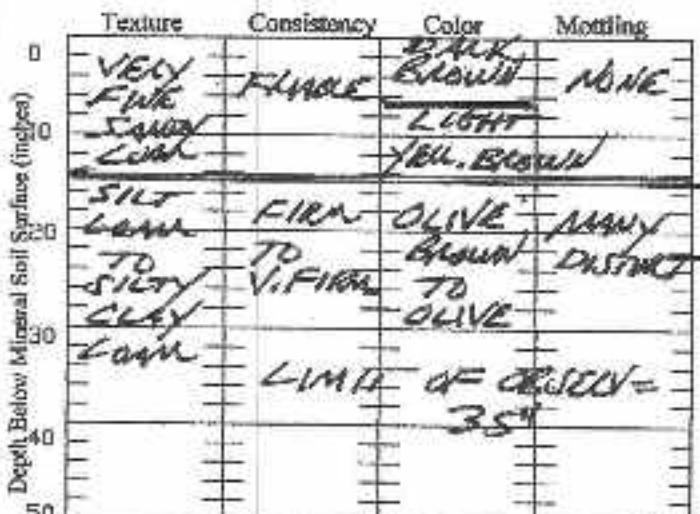
Owner's Name

MATT HANCOCK
PROPERTIES

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

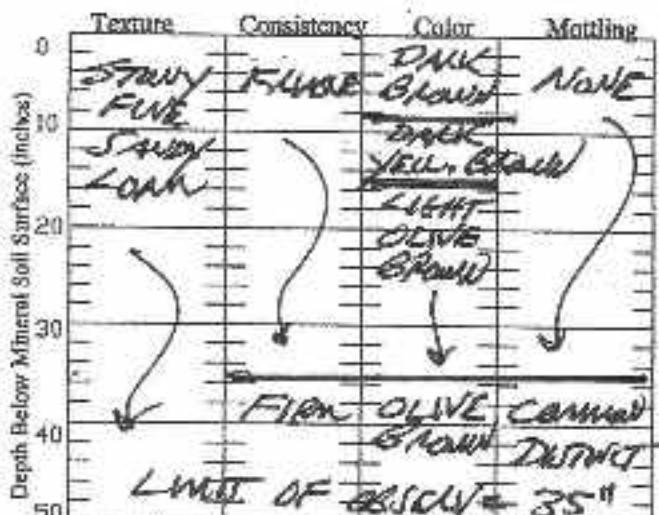
Observation Hole ~~TP 26~~ Test Pit Boring
~~1~~" Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	Ground Water
8 D	18%	12"	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

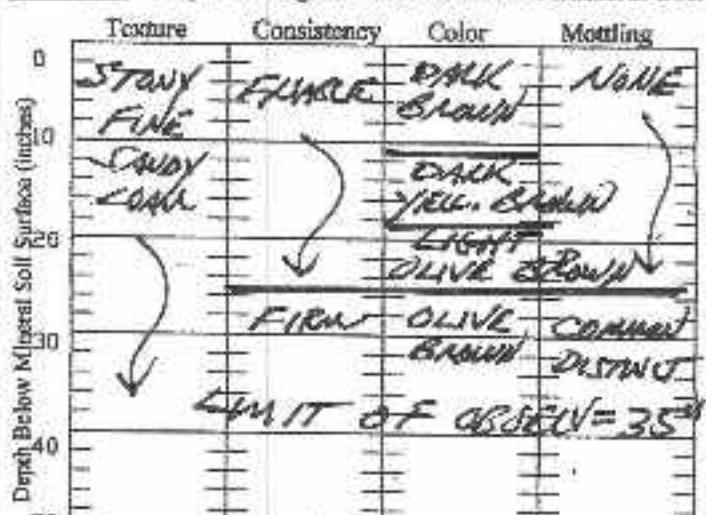
Observation Hole ~~TP 26A~~ Test Pit Boring
~~1~~" Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	Ground Water
8 D	18%	14"	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole ~~TP 27~~ Test Pit Boring
~~1~~" Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	Ground Water
3 C	6.5%	35"	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth

Observation Hole ~~TP 28~~ Test Pit Boring
~~1~~" Depth of Organic Horizon Above Mineral Soil

Soil Classification	Slope	Limiting Factor	Ground Water
3 C	1.5%	2.5"	<input checked="" type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth



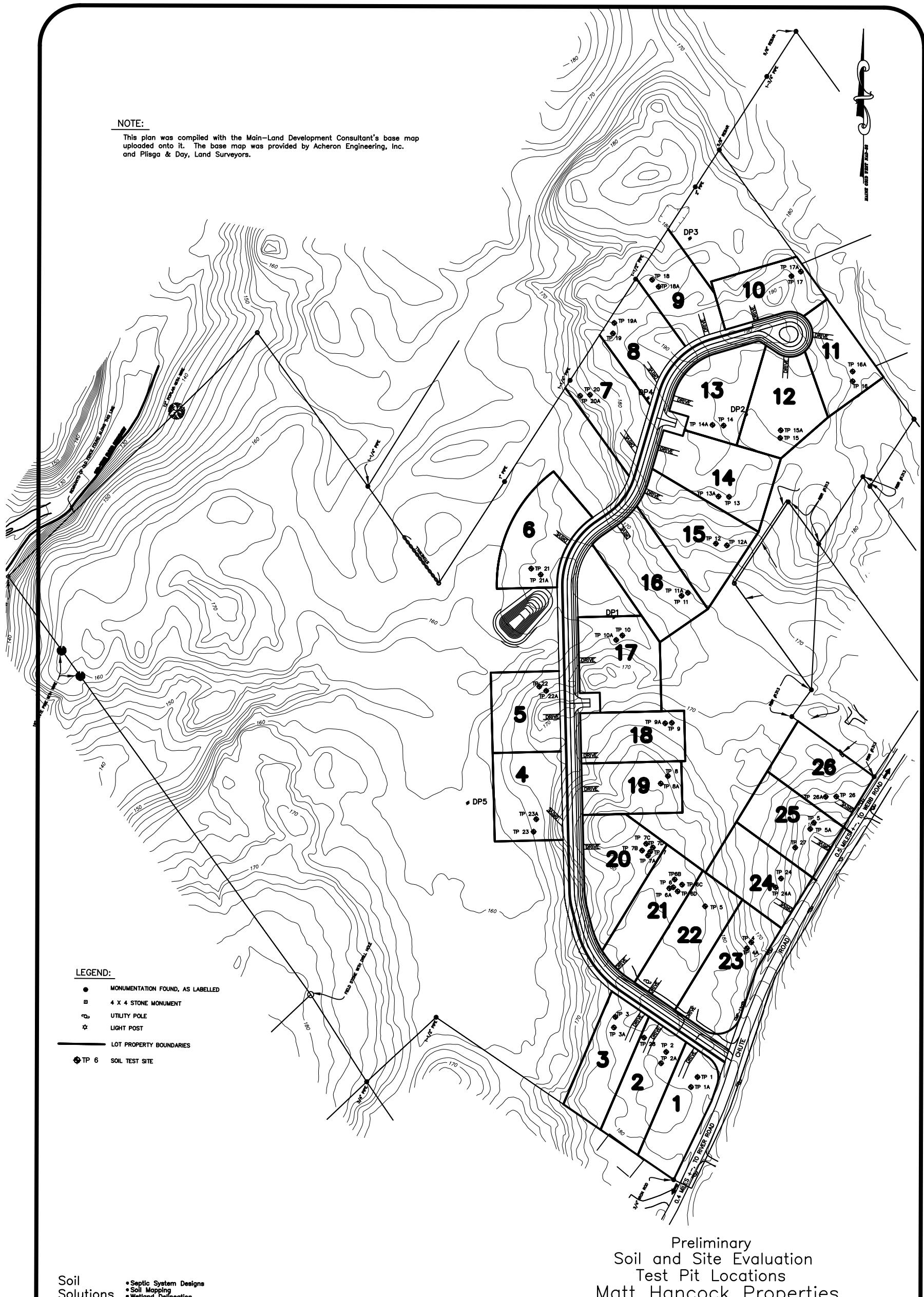
#213

SF #

7/20/17
Date

NOTE:

This plan was compiled with the Main-Land Development Consultant's base map uploaded onto it. The base map was provided by Acheron Engineering, Inc. and Plisga & Day, Land Surveyors.



Soil
Solutions

- Septic System Designs
- Soil Mapping
- Wetland Delineation

Stephen H. Howell
Certified Soil Scientist
Licensed Site Evaluator
Wetland Scientist

276 Hoxie Hill Road, Orrington, Maine 04474 (207) 825 - 4792
e-mail: showellsolutions@gmail.com

APPENDIX B

Steady State Calculations

NO₃ plume perimeter concentration in milligrams per liter [mg/L] under Steady State Condition (SS)

$$SS = \frac{GWF \cdot N_1}{TF} + \frac{SF \cdot L}{TF} + \frac{PF \cdot N_2}{TF}$$

N₁ (mg/l) = Background NO₃ concentration in groundwater (1.22 mg/l)

N₂ (mg/l) = Background NO₃ concentration in precipitation (0.5 mg/l)

L (mg/l) = Loading rate of septic system (40 mg/l)

GWF (ft³/day) = Groundwater Flux

SF (ft³/day) = System flux

PF (ft³/day) = Precipitation flux

TF (ft³/day) = Total flux (i.e., the sum of GWF, SF, and PF)

Groundwater Flux (GWF)

$$GWF = K \cdot A \cdot (dh/dl)$$

K = hydraulic conductivity (ft/day)

A = cross-section area of plume (ft²), Avg width x depth of SS plume

dh/dl = hydraulic gradient (ft/ft)

System Flux (SF)

$$SF = \text{Disposal Field Design Flow (ft}^3/\text{day})$$

Precipitation Flux (PF)

$$PF = p \cdot Sa \cdot I$$

p = Estimated annual precipitation (ft/day)

Sa = Surface area of the SS plume (ft²). Area scaled using Cad.

I (%) = Estimated infiltration rate (10% precip)

Steady State Nitrate Plum Calculations - Revised, Combined Lot 4 and 5 into Lot 5
 Chute Road, Windham, ME

Lot #	Approx Dist. to PL or Wetld (ft), Reference Only	Width of Plume	K (ft/day)	n	(dh/dt)	I	Xsec A (ft ²)	p (ft/day)	GWF (ft ² /day)
1	135	190	4.50	0.15	0.025	0.10	1900.00	0.011	213.75
2	240	100	4.50	0.15	0.030	0.10	1000	0.011	135
3	190	90	4.50	0.15	0.070	0.10	900	0.011	284
4	80	70	4.50	0.15	0.088	0.10	700	0.011	277
5	80	70	4.50	0.15	0.025	0.10	700	0.011	79
6	85	60	4.50	0.15	0.060	0.10	600	0.011	162
7	79	80	4.50	0.15	0.067	0.10	800	0.011	241
8	120	100	4.50	0.15	0.036	0.10	1000	0.011	162
9	110	80	4.50	0.15	0.064	0.10	800	0.011	230
10	240	90	4.50	0.15	0.040	0.10	900	0.011	162
11	70	80	4.50	0.15	0.022	0.10	800	0.011	79
12	60	55	4.50	0.15	0.030	0.10	550	0.011	74
13	90	70	4.50	0.15	0.030	0.10	700	0.011	95
14	150	50	4.50	0.15	0.080	0.10	500	0.011	135
15	130	70	4.50	0.15	0.044	0.10	700	0.011	139
16	130	40	4.50	0.15	0.020	0.10	400	0.011	36
17	110	70	4.50	0.15	0.047	0.10	700	0.011	148
18	230	60	4.50	0.15	0.055	0.10	600	0.011	149
19	220	80	4.50	0.15	0.067	0.10	400	0.011	121
20	200	100	4.50	0.15	0.060	0.10	500	0.011	135
21	280	90	4.50	0.15	0.100	0.10	450	0.011	203
22	75	100	4.50	0.15	0.120	0.10	1000	0.011	540
23	100	90	4.50	0.15	0.100	0.10	900	0.011	405
24	110	60	4.50	0.15	0.076	0.10	600	0.011	205
25	125	50	4.50	0.15	0.067	0.10	500	0.011	151

Lot #	PF (ft ² /day)	N ₁ (mg/L)	L(mg/L)	N ₂ (mg/L)	SF (ft ² /day)	TF (ft ² /day)	SS* (mg/L)	Wetland Discharge (Yes?)	SS** (mg/L) 80% reduction
1	28.95	1.22	40	0.5	36.1	278.80	6.17		
2	22.88	1.22	40	0.5	36.1	193.98	8.35	y	1.67
3	10.35	1.22	40	0.5	36.1	329.95	5.44	y	1.09
4	5.15	1.22	40	0.5	36.1	318.45	5.60	y	1.12
5	6.16	1.22	40	0.5	36.1	121.01	12.75	y	2.55
6	5.61	1.22	40	0.5	36.1	203.71	8.07	y	1.61
7	15.44	1.22	40	0.5	36.1	292.74	5.96		
8	10.46	1.22	40	0.5	36.1	208.56	7.90	y	1.58
9	11.97	1.22	40	0.5	36.1	278.47	6.22	y	1.24
10	25.89	1.22	40	0.5	36.1	223.99	7.39		
11	10.61	1.22	40	0.5	36.1	125.91	12.28	y	2.46
12	2.83	1.22	40	0.5	36.1	113.18	13.57	y	2.71
13	7.35	1.22	40	0.5	36.1	137.95	11.33	y	2.27
14	9.31	1.22	40	0.5	36.1	180.41	8.94	y	1.79
15	11.26	1.22	40	0.5	36.1	185.96	8.70	y	1.74
16	7.58	1.22	40	0.5	36.1	79.68	18.72	y	3.74
17	8.30	1.22	40	0.5	36.1	192.45	8.46	y	1.69
18	20.06	1.22	40	0.5	36.1	204.66	7.99		
19	17.02	1.22	40	0.5	36.1	173.72	9.21	y	1.84
20	27.22	1.22	40	0.5	36.1	198.32	8.18	y	1.64
21	13.20	1.22	40	0.5	36.1	251.80	6.74	y	1.35
22	12.73	1.22	40	0.5	36.1	588.83	3.58		
23	11.76	1.22	40	0.5	36.1	452.86	4.29		
24	9.55	1.22	40	0.5	36.1	250.85	6.77		
25	8.95	1.22	40	0.5	36.1	195.80	8.34		

Note:

* Figure 2 plume perimeter concentration at steady state

** Figure 2 plume concentration at wetland boundary after reduction, at steady state.

MAI Environmental Services, Inc.

1034 Broadway • South Portland, ME 04106

Telephone: (207) 767-3663 • Fax: (207) 767-7110

JOB: Durant Homestead

1 OF SHEET NO.:

CALCULATED BY: JSM

CHECKED BY: _____

DATE:

9/25/18

PP

Nitrate Calculation Sheets for Lots 1, 7, and 22-25

Durant Homestead Subdivisions
Windham, ME

Lot 1

$$GWF = (4.5 \text{ ft/d}) (1900 \text{ ft}^2) (0.025 \text{ ft/ft})$$

$$GWF = 214 \text{ ft}^3/\text{d}$$

$$SF = 36.1 \text{ ft}^3/\text{d}$$

$$PF = (0.011 \text{ ft/day}) (26,318 \text{ ft}^2) (0.10)$$

$$PF = 28.95 \text{ ft}^3/\text{d}$$

$$TF = (214 \text{ ft}^3/\text{d}) + (36.1 \text{ ft}^3/\text{d}) + (28.95 \text{ ft}^3/\text{d})$$

$$TF = 279 \text{ ft}^3/\text{d}$$

$$SS_{\text{Lot 1}} = \frac{(214 \text{ ft}^3/\text{d}) (1.22 \text{ mg/L})}{279 \text{ ft}^3/\text{d}} + \frac{(36.1 \text{ ft}^3/\text{d}) (40 \text{ mg/L})}{279 \text{ ft}^3/\text{d}}$$

$$+ \frac{(28.95 \text{ ft}^3/\text{d}) (0.5 \text{ mg/L})}{279 \text{ ft}^3/\text{d}}$$

$$SS_{\text{Lot 1}} = (0.94 \text{ mg/L}) + (5.16 \text{ mg/L}) + (0.05 \text{ mg/L})$$

$$SS_{\text{Lot 1}} = 6.15 \text{ mg/L}$$

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100

Durant Homestead

JOB: Durant Homestead SHEET NO: 2 OF _____
CALCULATED BY: JSM DATE: 9/25/18
CHECKED BY: _____
SCALE: _____

Lot 7

$$GWF = (4.5 \text{ ft/d}) (800 \text{ ft}^2) (0.067 \text{ ft/ft})$$

$$GWF = 241 \text{ ft}^3/\text{d}$$

$$SF = 36.1 \text{ ft}^3/\text{d}$$

$$PF = (0.011 \text{ ft/day}) (14032 \text{ ft}^2) (0.10)$$

$$PF = 15.44 \text{ ft}^3/\text{d}$$

$$TF = (241 \text{ ft}^3/\text{d}) + (36.1 \text{ ft}^3/\text{d}) + (15.44 \text{ ft}^3/\text{d})$$

$$TF = 292.54 \text{ ft}^3/\text{d}$$

$$SS_{\text{Lot 7}} = \frac{(241 \text{ ft}^3/\text{d})(1.22 \text{ mg/L}) + (36.1 \text{ ft}^3/\text{d})(40 \text{ mg/L})}{292.54 \text{ ft}^3/\text{d}} + \frac{(15.44 \text{ ft}^3/\text{d})(0.5 \text{ mg/L})}{292.54 \text{ ft}^3/\text{d}}$$

$$SS_{\text{Lot 7}} = (1.0 \text{ mg/L}) + (4.94 \text{ mg/L}) + (0.26 \text{ mg/L})$$

$$SS_{\text{Lot 7}} = \underline{6.2 \text{ mg/L}}$$

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JOB: Durant Homestead

SHEET NO.: 3 OF 3

CALCULATED BY: JSM

CHECKED BY: _____

DATE: 9/25/18

SCALE: _____

Lot 22

$$GWF = (4.5 \text{ ft/d}) (1,000 \text{ ft}^3) (0.12 \text{ ft/ft})$$

$$GWF = 540 \text{ ft}^3/\text{d}$$

$$SF = 36.1 \text{ ft}^3/\text{d}$$

$$PF = (0.011 \text{ ft/dy}) (11,573 \text{ ft}^3) (0.10)$$

$$= 12.73 \text{ ft}^3/\text{d}$$

$$TF = (540 \text{ ft}^3/\text{d}) + (36.1 \text{ ft}^3/\text{d}) + (12.73 \text{ ft}^3/\text{d})$$

$$TF = 588.8 \text{ ft}^3/\text{day}$$

$$SS_{\text{Lot 22}} = \frac{(540 \text{ ft}^3/\text{d}) (1.22 \text{ mg/L})}{588.8 \text{ ft}^3/\text{d}} + \frac{(36.1 \text{ ft}^3/\text{d}) (40 \text{ mg/L})}{588.8 \text{ ft}^3/\text{d}}$$

$$+ \frac{(12.73 \text{ ft}^3/\text{d}) (0.5 \text{ mg/L})}{588.8 \text{ ft}^3/\text{day}}$$

$$SS_{\text{Lot 22}} = (1.12 \text{ mg/L}) + (2.45 \text{ mg/L}) + (0.01 \text{ mg/L})$$

$$SS_{\text{Lot 22}} = \frac{3.58 \text{ mg/L}}{2}$$

MAI Environmental Services, Inc.

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Telephone: (207) 767-3663 • Fax: (207) 767-7110

JOB: Durant Homestead

4

SHEET NO.:

CALCULATED BY: JSM

OF

DATE:

9/25/18

CHECKED BY:

DATE:

SCALE:

Lot 23

$$GWF = (4.5 \text{ ft/d}) (900 \text{ ft}^3) (0.10 \text{ ft/f}^2)$$

$$GWF = 405 \text{ ft}^3/\text{day}$$

$$SF = 36.1 \text{ ft}^3/\text{d}$$

$$PF = (0.011 \text{ ft/d}) (10,687 \text{ ft}^2) (0.10)$$

$$PF = 11.76 \text{ ft}^3/\text{d}$$

$$TF = (405 \text{ ft}^3/\text{d}) (36.1 \text{ ft}^3/\text{d}) (11.76 \text{ ft}^3/\text{d})$$

$$TF = 452.8 \text{ ft}^3/\text{d}$$

SS
Lot 23

$$\frac{(405 \text{ ft}^3/\text{d}) (1.22 \text{ mg/L})}{452.8 \text{ ft}^3/\text{d}} + \frac{(36.1 \text{ ft}^3/\text{d}) (40 \text{ mg/L})}{452.8 \text{ ft}^3/\text{d}}$$

$$+ \frac{(11.76 \text{ ft}^3/\text{d}) (0.5 \text{ mg/L})}{452.8 \text{ ft}^3/\text{d}}$$

$$SS_{\text{Lot 23}} = (1.1 \text{ mg/L}) (3.19 \text{ mg/L}) (0.01 \text{ mg/L})$$

$$SS_{\text{Lot 23}} = 4.30 \text{ mg/L}$$

MAI Environmental Services, Inc.

1034 Broadway • South Portland, ME 04106
Telephone: (207) 767-3663 • Fax: (207) 767-7110

JOB: Durant Homestead

PP

SHEET NO.: 5 OF

CALCULATED BY: Jsm

DATE: 9/25/18

CHECKED BY:

DATE:

SCALE:

Lot 24

$$GWF = (4.5 \text{ ft/d}) (600 \text{ ft}^2) (0.076 \text{ ft/d})$$

$$GWF = 205.2 \text{ ft}^3/\text{d}$$

$$SF = 36.1 \text{ ft}^3/\text{d}$$

$$PF = (0.011 \text{ ft/d}) (8680 \text{ ft}^2) (0.10)$$

$$PF = 9.55 \text{ ft}^3/\text{d}$$

$$TF = (205.2 \text{ ft}^3/\text{d}) + (36.1 \text{ ft}^3/\text{d}) + (9.55 \text{ ft}^3/\text{d})$$

$$TF = 250.85 \text{ ft}^3/\text{d}$$

$$SS_{\text{Lot 24}} = \frac{(205.2 \text{ ft}^3/\text{d})(1.22 \text{ mg/L})}{250.85 \text{ ft}^3/\text{d}} + \frac{(36.1 \text{ ft}^3/\text{d})(40 \text{ mg/L})}{250.85 \text{ ft}^3/\text{d}}$$

$$+ \frac{(9.55 \text{ ft}^3/\text{d})(0.5 \text{ mg/L})}{250.85 \text{ ft}^3/\text{d}}$$

$$SS_{\text{Lot 24}} = (1.0 \text{ mg/L}) + (5.76 \text{ mg/L}) + (0.02 \text{ mg/L})$$

$$SS_{\text{Lot 24}} = \underline{6.78 \text{ mg/L}}$$

MAI Environmental Services, Inc.

1034 Broadway • South Portland, ME 04106

Telephone: (207) 767-3663 • Fax: (207) 767-7110

JOB: Durant Homestead PDP
 SHEET NO.: 6 OF 6
 CALCULATED BY: JSM
 CHECKED BY: _____
 SCALE: _____
 DATE: 9/25/18

Lot 25

$$GWF = (4.5 \text{ ft/d}) (500 \text{ ft}^2) / (0.067 \text{ ft/d})$$

$$GWF = 150.8 \text{ ft}^3/\text{d}$$

$$SF = 36.1 \text{ ft}^3/\text{d}$$

$$PF = (0.011 \text{ ft/d}) (8137 \text{ ft}^3) (0.10)$$

$$PF = 8.95 \text{ ft}^3/\text{d}$$

$$TF = (150.8 \text{ ft}^3/\text{d}) + (36.1 \text{ ft}^3/\text{d}) + (8.95 \text{ ft}^3/\text{d})$$

$$TF = 195.85 \text{ ft}^3/\text{d}$$

$$SS_{\text{Lot 25}} = \frac{(150.8 \text{ ft}^3/\text{d})(1.27 \text{ mg/L})}{195.85 \text{ ft}^3/\text{d}} + \frac{(36.1 \text{ ft}^3/\text{d})(40 \text{ mg/L})}{195.85 \text{ ft}^3/\text{d}} + \frac{(8.95 \text{ ft}^3/\text{d})(0.5 \text{ mg/L})}{195.85 \text{ ft}^3/\text{d}}$$

$$SS_{\text{Lot 25}} = (0.94 \text{ mg/L}) + (7.37 \text{ mg/L}) + (0.02 \text{ mg/L})$$

$$SS_{\text{Lot 25}} = \underline{8.33 \text{ mg/L}}$$

Attachment B

DHS Infiltration Rates based on Soil Survey
 Water Supply Calcs

<u>Lot</u>	<u>Area (ft2)</u>	Soil Type	Avg Slope (%)	DHS Recharge			
				Rate (Gallons/day *ft2)	Recharge per Lot (gal/day)	Recahrge per Lot (ft3/day)	Well Useage per Lot (ft3/day)
1	33652	C	3	0.024	808	108	36
2	33636	C	3	0.024	807	108	36
3	33636	D	4.5	0.018	605	81	36
4	34000	D	3	0.018	612	82	36
5	40624	D	3	0.018	731	98	36
6	35503	C	5.5	0.024	852	114	36
7	31189	C	3.5	0.024	749	100	36
8	34306	C	3	0.024	823	110	36
9	31430	C	3.5	0.024	754	101	36
10	30115	D	3	0.018	542	72	36
11	39568	C	3.5	0.024	950	127	36
12	37496	C	3.5	0.024	900	120	36
13	45024	D	3.5	0.018	810	108	36
14	48104	C	4.5	0.024	1154	154	36
15	43771	D	4.5	0.018	788	105	36
16	44330	D	2	0.018	798	107	36
17	32387	C	5.5	0.024	777	104	36
18	31832	D	5.5	0.018	573	77	36
19	42516	A	3	0.036	1531	205	36
20	35474	A	3	0.036	1277	171	36
21	39347	A	3	0.036	1416	189	36
22	41614	C	11.5	0.022	916	122	36
23	34516	D	8.5	0.016	552	74	36
24	34516	D	3	0.018	621	83	36
25	34282	D	4.5	0.018	617	82	36
				Total Recharge (ft3/day)	2803		
				Total Usage (ft3/day)	903		
				Useage as % of Available Racharge	32%		



**Maine Drilling
& Blasting**

Blasting Plan

for

Windham Subdivision

Chute Road
Windham, ME

Date: October 03, 2018
Revision #1
Prepared For:

Acheron Engineering
147 Main Street
Newport, ME 04953

Prepared By: Brett Doyon

Maine Drilling & Blasting, Inc.
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General

Maine Drilling & Blasting considers safety as the priority during all phases of blasting operations. We are knowledgeable of and will follow all local, state and federal regulations related to transportation and use of explosives. The project specifications and conditions have been reviewed. Details of procedures for pre-blast surveys, explosives use, blast security, monitoring and documentation are enclosed. Blasting will be in accordance with blasting law for site location of development projects: 38 MRS A paragraph 490-Z(14)(Blasting).

Pre-Blast Surveys / Notifications

Pre-blast surveys will be offered to all property owners within a 500 foot radius of the blast site. Appropriate notices will be given and appointments arranged for those owners who desire a survey. Pre-blast surveys will be conducted by a Company Representative. Results of those surveys will be documented through video or still photographs and appropriate narration or written reports. The property owner will be offered to have their well water tested for quantity and quality of water. These results will be submitted to the Department at the property owner's authorization.

Property owners within 500 feet of the blast area will be provided a blasting schedule. The blasting schedule shall contain, at a minimum - (1) Name, address, and telephone number of the operator, (2) Identification of the specific areas in which blasting will take place, (3) Dates and time periods when explosives are to be detonated, (4) Methods to be used to control access to the blasting areas, and (5) Type and patterns of audible warning and all-clear signals to be used before and after blasting. All pre-blast surveys will be retained by either the site owner or responsible blaster for at least 1 year from the date of the last blast at the development site as outlined in subsection F of 38 MRS §490-Z(14).

Blast Monitoring

All blasts will be monitored by a representative of Maine Drilling & Blasting, Inc. who has been properly trained in the setup and use of seismic monitoring equipment. At least one seismograph will be in use at all times. Placement of monitoring equipment will be at the nearest structure to the blast site with the instrument's transducer firmly coupled to the ground. Maine Drilling & Blasting, Inc. monitoring equipment will consist of InstanTel type seismographs. Details are enclosed. Seismographs meet all requirements outlined in subsection M of 28 MRS A paragraph 490-Z(14). Results of blast monitoring will typically be available before the next blast, usually immediately following a blast. Results can be reviewed and modifications can be made to the blast design for the next blast if necessary.

Sequence of Blasting

All blasting operations will be strictly coordinated with Engineers, and Fire Department. Emphasis will be on the safe and efficient removal of the rock existing on this project without impact to surrounding structures. Blasts will be developed so as to create adequate

relief which will minimize ground vibrations and offer the greatest protection possible to the surrounding structures.

Blasting Procedures

1. Blasting may not occur in the period between sundown and sunrise the following day or in the period between 7:00 p.m. and 7:00 a.m., whichever is greater. Blasting will not occur more frequently than 4 times per day. Blasting will not be allowed on Saturday and Sunday.
2. Blasting cannot be conducted at times different from those announced in the blasting schedule except in emergency situations, such as electrical storms or public safety required unscheduled detonation.
3. Warning and all-clear signals of different character that are audible within a range of one-quarter mile from the point of the blast shall be given. All persons within the permit area shall be notified of the meaning of the signals through appropriate instructions and signs posted.
4. Access to blasting area shall be regulated to protect the public from the effects of blasting. Access to the blasting area shall be controlled to prevent unauthorized entry before each blast and until the perimeter's authorized representative has determined that no unusual circumstances exist after the blast. Access to and travel in or through the area can then safely resume.
5. Areas in which charged holes are awaiting firing shall be guarded, barricaded and posted, or flagged against unauthorized entry.
6. All blasts shall be made in the direction of the stress relieved face previously marked out or previously blasted.
7. All stemming shall be minimum as specified using clean, dry 3/8" crushed stone.
8. Blasting mats shall be used as necessary to cover blasts.
9. The Blasting Contractor shall insure that extra safety and judgment is exercised by his blaster to prevent the simultaneous blasting of numerous holes.
10. If a blast is initiated by a detonating cord, the detonating cord will be covered by crushed stone or other suitable cover to reduce noise and other concussion effects.
11. Sufficient stemming, matting or natural protective cover will be used to prevent flyrock from leaving property owned or under control of the owner or operator from entering protected natural resources or natural buffer strips as outlined in subsection A of 38 MRS §490-Z(14).

Blasting Mats

Blasting mats and backfill will be used to control excessive amounts of rock movement when blasting in close proximity to structures. Placement and number of mats are typically determined by the blaster. Mats will be placed so as to protect all people and structures on, or surrounding the blast site and property, the mats will prevent flyrock from entering protected natural resources or natural buffer strips. Rubber tire type blasting mats will be utilized on this project and will be approximately 12' x 12' in size; Rubber mat @ 12' x 12' 38 lbs/sqft = 5,472 lbs/ea.

Blast Security and Warning Whistles

Each blast will be preceded by a security check of the affected area and then a series of warning whistles. Communications will be made with job site supervisors and local officials as required to ensure the safest possible operation. All personnel in the vicinity closest to the blast area will be warned. The warning whistles will follow the following sequence:

3 Audible Signal Pulses - 5 Minutes to Blast

2 Audible Signal Pulses - 1 Minute to Blast

1 Audible Signal Pulses - All Clear

No blast will be fired until the area has been secured and determined safe. The blast site will be examined by the blaster prior to the all-clear signal to determine that it is safe to resume work.

Explosives

All explosives will be delivered to the job site on a daily basis. Overnight storage will be a licensed secure magazine site. Only the amount of explosives required to perform the day's work will be brought to the site. All explosives will be stored in approved magazines when not in use.

Enclosed are Technical Data and MSDS sheets for the explosive products proposed for use on this project. Any one of, or a combination of these products may be in use at any one time on the site.

Blaster Qualifications

All Maine Drilling & Blasting, Inc blasters on this job will be licensed in the State of Maine and have received various amounts of training in the safe use and handling of explosives. Additionally, Maine Drilling & Blasting, Inc. blasters are familiar with all OSHA Regulations, State Regulations, and Federal Regulations regarding construction site safety, including transportation, use, and handling of explosive materials. Weekly safety meetings are to be held on site by the Maine Drilling & Blasting, Inc. job foreman, with a record of that meeting returned to the Maine Drilling & Blasting, Inc. office.

Blasting Personnel

All blasting operations shall be conducted by experienced, trained and competent persons who understand the hazards involved. Persons working with explosive materials shall:

1. Have demonstrated knowledge of, and a willingness to comply with, safety and security requirements.
2. Be capable of using mature judgment in all situations.
3. Be of good physical condition and not addicted to intoxicants, narcotics, or other similar type of drugs.
4. The person(s) responsible for the explosives shall possess current knowledge of the local, State and Federal laws and regulations applicable to his work.
5. The person(s) responsible for the explosives shall have obtained a Certificate of Competency or a license as required by State law.

Licenses and Permits

Maine Drilling & Blasting, Inc. is fully licensed and insured for the transportation, use, and handling of explosives. Evidence of insurance is available. Blasting permits will be applied for as required from the local authorities by the Maine Drilling & Blasting, Inc. Blaster/Foreman when blasting is about to begin.

Blast Vibration & Air-Blast

The maximum allowable air-blast at an inhabited building not owned or controlled by the developer may not exceed 129 decibels peak when measured by an instrument having a flat response (+ or - 3 decibels) over the range of 5 to 200 hertz. Additionally, sound from blasting may not exceed the following limits at any inhabited building not owned or controlled by the developer.

- Blast 1: Less than 129 decibel
- Blast 2: Less than 126 decibel
- Blast 3: Less than 124 decibel
- Blast 4: Less than 123 decibel

The maximum allowable air-blast at an uninhabited building not owned or controlled by the developer may not exceed 140 decibels peak when measured by an instrument having a flat response (+ or - 3 decibels) over a range of 5 to 200 hertz.

Blast vibration will be monitored at the blast site, typically at the structure(s) closest to the blast site. Vibration limits will closely follow limits described in the project specifications and the State Regulations. Blast designs will be modified as required to stay within the guidelines and meet project schedules as well. Blasting operations will be modified accordingly when approaching buildings and utilities. Enclosed are preliminary vibration

calculations based on known distances to the structures of concern and anticipated initial blast designs.

Ground Vibration peak particle velocity limits shall not exceed:

Refer to Appendix B, Figure B-1, U.S. Bureau of Mines RI 8507.

In addition, the maximum peak particle velocity at inhabitable structures not owned or controlled by the developer will not exceed the levels established below:

Distance from the Blast (ft.)	Max PPV
0 to 300 feet	1.25 in/sec
301 5000 feet	1.00 in/sec
Greater than 5000 feet	0.75 in/sec

Blast Reports

Enclosed is a sample of a Maine Drilling & Blasting, Inc last Report. This report will be filled out for each blast and copies supplied as needed. The reports will be kept for at least one year and will be available for inspection. The Maine DEP will be notified within 48 hours of any blast which exceeds the standards of 38 MRSA paragraph 490 Z-(14), the information in subsection N will be provided with the notification.

Typical Blast Design

Enclosed is what would be considered typical blast designs for this project. Hole sizes, depths, spacing and loading information is provided. These designs are to be considered a good starting point. Modifications are usually made, if necessary, following the first blast to meet control and seismic considerations.

Acheron

Engineering, Environmental & Geologic Consultants
www.AcheronEngineering.com

October 12, 2018

Robert Green
Maine Department of Environmental Protection
312 Canco Road
Portland, Maine 04103

RE: Site Location of Development Permit Application Revision and Response to Comments by the Environmental Geology Unit for the Durant Homestead, Residential Subdivision, Windham, Maine

Mr. Green:

As we discussed, Matt Hancock Properties LLC, has made the decision to reduce the scope of the Durant Homestead Residential Subdivision, located in Windham. Specifically, the project has been reduced to 25-lots from 26-lots, by combining lots-4 and 5, shown in the August 10th submission. A local requirement to provide public water to the project is the reason for the change in scope.

The change of scope results in a minor reduction in the amount of impervious and developed area for the project and requires revisions to the following sections of the application submitted on August 10, 2018:

- Cover sheet of application (page 1 of application)
- Form A Page 1 (page 4 of application)
- Section 1.0 Development Description (page 17 of application)
- Section 11.0 Soils, Revised Soil Survey Site Plan (page 210 of application)
- Section 12.0 Stormwater Management (pages 235-236, 241-242, 244-252, 260, 285-293, 351-353, 361, 375-376, 383, 396-397, and 404 of the application.).
- Section 17.0 Wastewater Disposal (pages 429-453, 469-502 of the application)
- Section 20.0 Blasting (pages 509 – 515 of the application)

In addition to the above changes to the application, below are responses to review comments by the Environmental Geology Unit, dated September 17, 2018. Review comments are in italic font followed by Matt Hancock Properties, LLC response in regular font.

1. *While the connotative classification method provides detailed information on soil conditions, USDA/NRCS soil series/phase names should have also been included for soil mapping units in the soil survey report, dated 7-31-18, as was indicated in a letter from the Department to the Maine Association of*

Professional Soil Scientists, dated 4-16-15. The investigating soil scientists should be aware of this request for future site location projects

The NRCS Soil Series/phase names have been included in the revised Class B / Class C / Class L Soil Survey Plan, attached.

2. *The meaning of the "BED" prefix for test pit (TP) BED-21, noted as being located at lot 21 in the soil logs, should be described. Location of this TP was not found, and should be shown on a site plan (e.g. soil survey map).*

The BED-21 test pit as described in the Soil Survey Report is a backhoe dug test pit that was dug at the proposed location of the subsurface wastewater disposal bed on Lot 21 (currently Lot 20), the same location as hand-dug SE TP's 21C and 21D. Because of the surface compaction in this area, hand-dug test pits were difficult to excavate and so the site evaluator requested that the soil scientist dig a test pit in this area to confirm the hand-dug findings. During reporting for the Soil Survey, the BED-21 test pit data was used, and so it was included in the test pit logs. The BED-21 test pit location is shown on the revised Class B / Class C / Class L Soil Survey Plan, attached.

3. *Logs for the SWTP series of TPs were not found (except for SWTP8 and SWTP8A), and should be provided.*

The soil documentation report with SWTP1 – 7 was mistakenly omitted from the application. Please see the attached Soil Documentation Report, dated December 11, 2017.

4. *Design of the wetponds (wetpond 1 in particular) should ensure that sidewalls of the liners will extend to above the elevation of the seasonal high watertable. Elevations of the top edges of the liners should also be specified (based on seasonal high watertable data from TPs) in the wetpond cross-sections.*

The sidewall of the clay liners extend above the seasonal high watertable and the elevations of the top edges of the liner have been added to the wetpond cross sections attached.

5. *It is recommended that synthetic impermeable liners be considered for the wetponds instead of "clay" liners, as it may be impractical to construct and maintain clay liners properly.*

Thank you for your recommendation. Since receiving comments, Matt Hancock Properties consulted with engineers and prospective contractors and has elected to keep "clay" liners in the design.

6. *A bedrock geology map, and sand & gravel aquifer map, of the project site were not found in the packet of materials submitted for review, and should be provided. See Part II, Section 15.A.1 of the site application. For the bedrock map, an MGS*

groundwater resources/bedrock lineaments map (catalog #86-67), with the project location delineated, plus any interpretations, may address this requirement.

The attached Nitrate Impact Analysis has been revised to include the bedrock and sand & gravel aquifer map referenced above.

7. *Water supply wells should be installed with casing set and grouted a minimum of 20 feet below the solid bedrock surface, where bedrock is encountered at a depth of 10 feet or less at any well site. See Part II, Section 16.A.3 of the application. For emphasis and ease-of-reference this requirement could be stated as a NOTE in appropriate plan sheets, and be included either in the findings-of-fact or as a condition of the site approval of this project*

The attached plan sheet C-2 and the Preliminary Subdivision Plan have been revised to include the requirement referenced above.

8. *The soil/site evaluation report, dated 7-13-18, is titled as "preliminary". A final report should be provided.*

Please find attached the final report.

9. *Duplicate logs for SE TP12C (with different soil profiles) were found on pages 4 and 10 of Appendix C of the preliminary soil/site evaluation report, dated 7-13-18, which should be resolved*

Resolved, please see the attached report.

10. *Adequate separation distance should be provided between the proposed disposal field and well on lot 3 on plan sheet B-2 of the soil/site evaluation report, dated 7-13-18. The distance shown on the plan appears to be less than 100 feet as measured by scale rule, which does not comply with Table 7B of the Subsurface Wastewater Disposal Rules.*

The attached plan sheet C-2 and the Preliminary Subdivision Plan have been revised to include the following requirement: "Lot 3: LPI approval required for a reduction in the setback between the leachfield and the drilled well, to include greater depth of well casing or liner seal below ground level, as per Table 7A in Section 7 of the Subsurface Wastewater Disposal Rules (as amended August 03, 2015)."

11. *Proposed water supply wells and subsurface wastewater disposal fields should be limited to the locations shown on plan sheet B-2 of the soil/site evaluation report, dated 7-13-18 (or the date of the final report noted in previous comment 8). For ease-of-reference, sheet B-2 should be retitled "Well and Septic System Location Plan", or something similar. For emphasis and ease-of-reference, this*

requirement could be included either in the findings-of-fact or as a condition of the site location approval of this project.

Sheet B-2 title has been revised in addition the attached Preliminary Subdivision Plan shows the location of wells and disposal fields. The Preliminary Subdivision Plan will be recorded with the Registry of Deeds once all approval for the project have been obtained.

12. *The Groundwater Assessment Overall Site Plan, included with the Nitrate Impact Analysis re-port, dated 5-15-18, should be signed, stamped, and dated by the certified geologist responsible for its preparation. In addition, this plan should be labeled Figure 2 – Nitrate Plume Map, to coincide with this reference to it in the report narrative.*

The title of the plan has been revised and the certified geologist's stamp has been added.

13. *While the nitrate analysis narrative states that nitrate concentration calculations are included, only a table (in Appendix B of the report) with input parameters and results were found. Calculations should be provided, but are only necessary for lots 1, 8, and 23 through 26. Note that the distances to the project boundary for lots 1, and 23 through 26 cited in the Appendix B table do not match distances as measured by scale rule on the nitrate plume map, which are approximately 130', 75', 100', 110' and 125', respectively.*

Calculations for lots 1, 7 and 22 through 25 have been provided in the revised report attached. Please note the lot numbers have been revised due to the reduction of the number of lots proposed. Distance to property lines have been revised in Appendix B.

14. *In conjunction with the previous comment, a key should be provided that identifies the abbreviations used in the header of the Appendix B nitrate plume table. Projected nitrate-nitrogen concentrations at downgradient property lines or project boundaries should be clearly identified in the table.*

Appendix B has been revised per the comment above.

15. *Evidence should be provided that Condition 11 of a previous site location approval of the project site (Department Order, dated 7-17-07) has or will be met. This condition requires environmentally acceptable disposition of an abandoned well and oil tank on proposed lots 24 and 25 (currently proposed lots 3 and 20/21). Other debris has also been noted at the site (barrels, containers, woodwaste, etc.), which should also be addressed.*

Disposition of the existing well on site has not been performed. The oil tank is in use at another location. All debris from the firewood processing mentioned above has been removed from the parcel.

16. Adequate separation distance should be provided, if necessary, between the proposed disposal field and level lip spreader on lot 23, such that the function of neither of these structures will be impaired.

The level lip spreader on lot 22 has been relocated to provide a greater separation.

17. The blasting plan, dated 7-18-18, was reviewed for conformance with the blasting standards of the statute 38 MRS §490-Z(14) (Blasting). Comments are as follows:

- The Pre-Blast Surveys/Notifications section of the plan should state that a copy of all pre-blast surveys will be retained by either the site owner or responsible blaster for at least 1 year from the date of the last blast at the development site. See subsection F of 38 MRS §490-Z(14).
- The Blasting Procedures section of the plan should state (as item 11) that sufficient stemming, matting or natural protective cover will be used to prevent flyrock from leaving property owned or under control of the owner or operator from entering protected natural resources or natural buffer strips. See subsection A of 38 MRS §490-Z(14).

The attached blast plan has been revised to include both requirements referenced above.

Please let me know if you have any questions or concerns and please advise how the department will handle a refund of the permit fee, due to the reduction of the number of lots.

Sincerely,
Acheron



Kirk J. Ball, PE

Enclosure: Revised Section of Site Law Permit Application (3)

Cc: Matt Hancock, MHP
David Fowler, MHP

To: Greenan, Colin M CIV (US)
Cc: Green, Robert L
Subject: RE: Matt Hancock Properties, LLC: Durant Homestead Residential Subdivision off Chute Road at Windham, ME Corps File No. NAE-2006-02988-MOD
Attachments: 2018-09-18, Subdivision NRPA, SET.pdf

Colin,

Thank you for the thorough review of the project and clear comments. You will find a response to each comment below in italic font. Please note, that the Matt Hancock Properties LLC has made the decision to reduce the number of lots to 25. The amount of wetland impact did not change due to the reduction of lots. The attached design sheets have been revised

Thank you,

Kirk

Kirk,

We have received your permit application for the subject project; thank you for submitting a quality and complete application.

In order to complete our review of the project, please respond to the following items:

1. In 2006 we issued a permit authorizing your client to fill 5,243 s.f. of wetland to develop a 26-lot subdivision on the subject property. In the 2006 application it was stated that the subdivision was a "cluster type design", that common land would be maintained (and "this common land contains a majority of the wetlands on the parcel") and the natural resource "impacts are kept to the minimum necessary to open up the land to its highest use for the landowner". The current project similarly intends to develop a 26-lot subdivision but would impact almost 3x more wetland. I don't fully understand, and I can't make assumptions why the current layout is "The least environmentally damaging but practicable alternative" when the previous layout demonstrated that the property could meet the stated purpose of the project with less wetland impact. Please describe what has changed since 2006 that requires the greater wetland impact and expand further how the current proposal is truly the least environmentally damaging but practicable alternative (I believe that you can and will address the value of other "environmental resources" on the site besides just wetlands). Please include in this discussion the unnamed tributary to Black Brook and the abutters common open space entitled "River's Edge Subdivision" and how this abutting open space enhances the common space of the current project.

Maine Department of Environmental Protection (MDEP) Site Location of Development Act (Site Law) and Natural Resources Protection Act (NRPA) Tier 1 permits (MDEP #L-23215-L3-A-N and #L-23215-TB-B-N) were issued for a 26-lot residential subdivision on the project site in 2007. Based on our review, the Tier 1 permit authorized 13,415 square feet of wetland fill for the project. We are not in receipt of the Corps permit authorizing 5,243 square feet of impact, and are unclear as to why there is a discrepancy between the MDEP and Corps permits, as all of the previously permitted wetland fill appears to have been Corps jurisdictional at the time of permitting. That being said, the current proposal of 14,569 square feet of wetland impact is similar to the previous proposal of 13,415 square feet, with a difference of only 1,154 square feet.

The reason for this difference has much to do with changing MDEP and Town of Windham laws and standards regarding design of residential subdivisions over time. Changes to MDEP Site Law standards. The biggest change effecting this proposed subdivision are changes to stormwater design. As you will note on the subdivision plan, 3,483 square feet of the proposed wetland impact is due to stormwater management systems.

Since 2006 the sizing requirement for wetponds for stormwater treatment has increased significantly. Also of note, the Applicant chose to include all proposed development in their stormwater plan (which is required if the applicant will develop all of the lots as opposed to the individual buyers), instead of only including the portion of the project they were developing (i.e. the road), thereby having to meet a more stringent stormwater design standard. If the Applicant chose to sell the lots and let individual buyers develop them, there would be no stormwater plan in place for the impervious area created by the new residences, from which the untreated stormwater flow could potentially affect nearby wetlands. The previous stormwater plan did not consider stormwater from residences. The current proposal may have slightly more wetland fill than was proposed previously, however, with a complete stormwater plan in place, we feel that more wetland protection is in place.

Another change since 2006 is that the wetlands were re-delineated for this proposal due to Corps wetland delineation standards being updated in 2012 (2012 Northeast Regional Supplement). While the wetland boundaries were very similar to those previously mapped, there were likely slight changes due to flag placement and flag location technology changes.

Aside from the state changes and new delineation, the current proposal is the least environmentally damaging but practicable alternative due to less alteration of other important environmental resources on the property. The current proposal limits the proposed development to the southern portion of the property, closer to Chute Road and neighboring development, and does not intrude into a large forested area in the northern portion of the property. With this proposal, the undeveloped northern 34-acres of the property will be protected as open space. This open space area has environmental value in the larger landscape context as it is adjacent to Black Brook (a significant perennial watercourse) and its riparian corridor, is adjacent to the 25-acre Rivers Edge Common Lot and 7-acre common land of another subdivision, and many acres of undeveloped "back land" of other lots. The proposed open space is a mix of uplands and wetlands and includes the headwaters of an intermittent stream that flows off-site but eventually into Black Brook. The open space area provides conservation of land within a wildlife corridor (along Black Brook), within a rapidly developing area of the state.

2. please quantify the area of tree clearing for the project in square feet; this is required for our consultation with the U.S. Fish and Wildlife Service regarding the northern long-eared bat.

Proposed clearing for the road, grading, stormwater management and residential lots is approximately 496,150 square feet (11.4 acres).

3. you have proposed triple 3' dia. pipe culverts for the wetland crossing. We appreciate that you are not proposing anything smaller as the Maine General Permit recommends at least 3' spans. Would there be any consideration given to having a single and larger culvert that could convey the same amount of overland flow but would also be more passage-friendly to terrestrial and fur-bearing species (like an arch pipe maybe, it looks like you have enough cover for larger culverts). Perhaps you may also consider twin 42" pipes(?). As you probably know, one of the concerns with duplicate or triplicate pipes is that they can plug with debris easier than a single culvert, and a larger culvert with more light is more conducive to wildlife passage.

Based on comment 3 and comment 5 below the conduit for the wetland crossing has been revised to a single 8 foot wide by 4 foot tall, precast concrete clamshell type box culvert with a 10 inch natural bottom. Please refer to the attached design sheets for specific details.

4. please confirm that the road embankment on the southwest side of the wetland crossing culvert is also 2:1 (it looks like there may be a slope conflict here with the stormwater pond?).

The road embankment on the south side of the road is confirmed to be 2:1. The proposed contours were missed labeled on the plan view crossing.

5. Road Crossing Section 1 on Sheet B-10 does not seem to indicate that the culvert(s) are embedded at least 6" with a natural bottom. We would like to see that closed bottom wetland crossing culvert(s) are embedded at least 6" with a natural bottom.

Please see the response to comment number 3 above. The design for the crossing includes a 10 inch natural bottom.

6. please submit a pdf of the design sheets electronically to me (and any updates you might make to the sheets).

Attached are the revised design sheets. Please note, that our client has elected to reduce the number of lots for the project from 26 to 25. There is no change in the area of wetland impact due to the change.

Kirk Ball, PE
Acheron Engineering
207-368-5700

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-----Original Message-----

From: Greenan, Colin M CIV (US) <Colin.M.Greenan@usace.army.mil>
Sent: Friday, September 07, 2018 7:42 AM
To: kball@acheronengineering.com
Cc: Green, Robert L <Robert.l.Green@maine.gov>
Subject: Matt Hancock Properties, LLC: Durant Homestead Residential Subdivision off Chute Road at Windham, ME Corps File No. NAE-2006-02988-MOD

Kirk,

We have received your permit application for the subject project; thank you for submitting a quality and complete application.

In order to complete our review of the project, please respond to the following items:

1. In 2006 we issued a permit authorizing your client to fill 5,243 s.f. of wetland to develop a 26-lot subdivision on the subject property. In the 2006 application it was stated that the subdivision was a "cluster type design", that common land would be maintained (and "this common land contains a majority of the wetlands on the parcel") and the natural resource "impacts are kept to the minimum necessary to open up the land to its highest use for the landowner". The current project similarly intends to develop a 26-lot subdivision but would impact almost 3x more wetland. I don't fully understand, and I can't make assumptions why the current layout is "The least environmentally damaging but practicable alternative" when the previous layout demonstrated that the property could meet the stated purpose of the project with less wetland impact. Please describe what has changed since 2006 that requires the greater wetland impact and expand further how the current proposal is truly the least environmentally damaging but practicable alternative (I believe that you can and will address the value of other "environmental resources" on the site besides just wetlands). Please include in this discussion the unnamed tributary to Black Brook and the abutters common open space entitled "River's Edge Subdivision" and how this abutting open space enhances the common space of the current project.

2. please quantify the area of tree clearing for the project in square feet; this is required for our consultation with the U.S. Fish and Wildlife Service regarding the northern long-eared bat.

3. you have proposed triple 3' dia. pipe culverts for the wetland crossing. We appreciate that you are not proposing anything smaller as the Maine General Permit recommends at least 3' spans. Would there be any consideration given to having a single and larger culvert that could convey the same amount of overland flow but would also be more passage-friendly to terrestrial and fur-bearing species (like an arch pipe maybe, it looks like you have enough cover for larger culverts). Perhaps you may also consider twin 42" pipes(?). As you probably know, one of the concerns with duplicate or triplicate pipes is that they can plug with debris easier than a single culvert, and a larger culvert with more light is more conducive to wildlife passage.

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6. please submit a pdf of the design sheets electronically to me (and any updates you might make to the sheets).

Thank you-

--
Colin M. Greenan
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442 Civic Center Drive, Suite 350
Augusta, Maine 04330

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In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0