1607

August 12, 2016

Amanda Lessard, Planner
Town of Windham
8 School Street
Windham, ME 04062

Landing Real Estate Office, 79 Tandberg Trail
Minor Site Plan Submission

Dear Amanda:

On behalf of Jack and Rose LLC, we are pleased to submit 15 copies of the site plans and application materials for a proposed two story commercial building at 79 Tandberg Trail in Windham. The information provided herein is intended to meet the submission requirements of Section 811 of the Town's Land Use Ordinance. The applicant requests that the project be scheduled for review at the next Staff Review Committee meeting.

EXISTING PROJECT SITE

The project site, identified as lot 8 on Tax Map 67, is 0.35 acres in size and is located on the southeast side of Tandberg Trail (Rt. 115), approximately 600 feet east of Route 302. The site is located within the Commercial-1 (C-1) zoning district and is currently owned by the applicant. The current deed is provided in Attachment B.

The site is currently comprised of meadow grasses with several individual trees on the east and west property boundaries. Residential homes abut the site to the east and west, and the parcel to the south is undeveloped forest. Commercial uses, including a veterinary hospital, are located across Tandberg Trail from the site. Based on historic aerial photography, it appears that a single family house previously existed on the site but was removed sometime between 2006 and 2010. The site is relatively flat, sloping gently from north to south at 1% - 2%. Stormwater runoff generally drains off the site at the southeastern property boundary via surface flow. Runoff is believed to be tributary to the Presumpscot River.

No unique natural areas, including floodplains, deer wintering areas, significant fisheries and wildlife habitats, scenic areas, habitat for rare and endangered plants and animals, and historic and archeological resources, are known to exist on the site. The site is located on a significant sand and gravel aquifer, mapped by the Maine Geological Survey.

Existing utilities in the vicinity of the project include a 12" water main on the north side of Tandberg Trail, a shallow storm drain network in Tandberg Trail, and overhead electric and telecommunications lines. Because the site was previously developed, existing surficial soils

may not be native. The Natural Resource Conservation Commission (NRCS) classifies onsite soils as Loamy Sand.

Existing conditions figures with the project site identified are provided in Attachment C, including a USGS map, aerial photo, NRCS Medium Intensity Soils map, and Abutters map, including a list of direct abutters to the project.

An existing conditions survey was performed by Wayne T. Wood & Co. and is provided in the attached plan set.

PROPOSED PROJECT

The proposed project includes construction of a two story, 1,290 square foot (footprint) commercial office building with associated parking, sidewalks, and utility infrastructure. The site will feature eleven total parking spaces, including three spaces in front of the building and eight behind. The site driveway, which will provide access to both parking areas, will be located on the east side of the site.

The building will feature traditional clapboard siding and is designed to have a residential scale and appearance to fit in with the neighborhood. Floor plans and building elevations are provided in Attachment D.

A project sign will be located adjacent to Tandberg Trail. The location of the sign is shown on the project drawings, and an elevation view of the sign is provided in Attachment E.

The proposed building will be served by the Portland Water District's 12" water main in Tandberg Trail. The closest fire hydrant is located approximately 350' from the site, at the corner of Tandberg Trail and Abby Road. Domestic water use has been estimated to be 120 gallons per day. A letter from the Portland Water District, confirming their ability to serve the project, is provided in Attachment F.

A subsurface wastewater disposal field will be constructed behind the building, under the parking lot. Test pit logs and the septic system design (HHE-200) is provided in Attachment G. A dumpster will be located at the southeast corner of the proposed parking lot. The dumpster will be located on a concrete pad and screened with a wooden fence enclosure. The composition of solid waste generated by the project is expected to be typical of a commercial office. No hazardous materials are expected to be generated by the office use.

Site lighting will be provided by three building mounted fixtures in locations shown on the Site Layout Plan (Sheet C-3.0). Additionally, four recessed lights will be installed in the porch ceiling at the front of the building. Catalog cut sheets of the proposed wall packs are provided in Attachment H.

An estimate of the amount of traffic that is expected to be generated by the proposed use is provided in Attachment I.

The project will include the creation of 9,689 square feet of impervious surface, made up of roof area, parking, and sidewalks. Runoff patterns will remain similar to the existing condition. An infiltration basin will be constructed on the north end of the site, and a stormwater buffer will be established on the south end of the site to provide runoff volume reduction and water quality treatment. A Stormwater Management Report and calculations are provided in Attachment J.

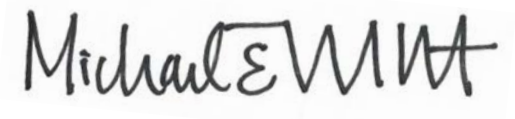
A site specific Erosion and Sediment Control Plan has also been developed for the project with the goal of reducing erosion and sedimentation during and after construction. The narrative and details are located directly on the project drawings for convenient reference during construction.

Robie Builders of Windham has been hired by the owners to develop the site, and Terradyn Consultants, LLC of New Gloucester has been retained to prepare site plans and permit applications. Robie Builders and Terradyn Consultants have completed several similar projects together in southern Maine and have the technical capability to successfully complete the project. Construction is expected to be completed this fall. The owner will finance the project with Norway Savings Bank. A letter from Norway Savings Bank describing their commitment to finance the project is provided in Attachment K.

CLOSURE

Attached is a check in the amount of $2,850, which includes the $850 application fee and a $2,000 deposit for review fees. We request to meet with the Development Review Committee at its earliest convenience in order to present the project and request approval. In the interim, if you have any questions or need additional information, please contact me at mtw@terradynconsultant.com or (207) 632-9010.

Sincerely,
TERRADYN CONSULTANTS LLC



Michael E. Tadema-Wielandt, P.E.
Vice President

Attachments:
Att. A – Site Plan Application Form
Att. B – Property Deed
Att. C – Existing Site Figures
Att. D – Building Plans
Att. E – Sign Detail
Att. F – PWD 'Ability to Serve' Letter
Att. G – Test Pit Logs & HHE 200
Att. H – Lighting Cut Sheets
Att. I – Traffic Generation Estimate
Att. J – Stormwater Report
Att. K – Financial Capability

cc: Jarod Robie

ATTACHMENT A

SITE PLAN APPLICATION

LANDING
REAL ESTATE

To Whom it May Concern Jack and Rose LLC (Matt and Lisa DiBiase) hereby give Jarod Robie permission to speak on our behalf for property located at 79 Tandberg Trail Windham Maine 04062

3/22/16
Matt DiBiase

3/22/16
Lisa DiBiase

44 EXCHANGE STREET // SUITE 200 // PORTLAND, MAINE 04101 // P: 207-775-7653 // F: 207-775-7622 // LANDINGHOMESMAINE.COM

Project Name:

Tax Map: 67 **Lot:** 8

Estimated square footage of building(s): 1,990 +/- under

If no buildings proposed, estimated square footage of total development/disturbance:

Contact Information

1. Applicant

Name: Jack and Rose, LLC

Mailing Address: 44 Exchange Street, Suite 200, Portland, Maine 04101

Telephone: Fax: E-mail:

2. Record owner of property

X (Check here if same as applicant)

Name:

Mailing Address:

Telephone: Fax: E-mail:

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

Name: Michael E. Tadema-Wielandt, P.E.

Company Name: Terradyn Consultants, LLC

Mailing Address: PO Box 339, New Gloucester, ME 04260

Telephone: (207) 632-9010 Fax: E-mail: mtw@terradynconsultants.com

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

Signature 3/22/12 Date

ATTACHMENT B

PROPERTY DEED

MAINE REAL ESTATE TAX-Paid

Warranty Deed
(Maine Statutory Short Form)

DLN: 1001640006214

KNOW ALL PERSONS BY THESE PRESENTS THAT, WE, Ronald A. Glantz, with a mailing address of 44 Peavey Avenue, Windham, Maine 04062 and **Andrea G. Littlefield,** with a mailing address of 5 Clover Lane, Windham, Maine 04062, for valuable consideration paid, by **Jack and Rose, LLC, a Maine Limited Liability Company,** with a mailing address of 44 Exchange Street, Suite 200, Portland, Maine 04101, the receipt and sufficiency whereof is hereby acknowledged, does hereby GIVE, GRANT, BARGAIN, SELL AND CONVEY, unto the said **Jack and Rose, LLC,** its successors and/or assigns, with ***WARRANTY COVENANTS***, a certain lot or parcel of real property situated in the Town of Windham, County of Cumberland, State of Maine, bounded and described as follows:

PROPERTY DESCRIBED IN "EXHIBIT A" ATTACHED HERETO AND MADE A PART HEREOF

Meaning and intending to convey the premises conveyed to Ronald A. Glantz, Andrea G. Littlefield, and Richard M. Littlefield by virtue of a deed from Forrest Jaynes dated April 30, 2008 and recorded on May 8, 2008 in Book 26033, Page 293 with the Cumberland County Registry of Deeds. Richard M. Littlefield died on May 5, 2012, leaving Andrea G. Littlefield as the surviving joint tenant to their 50% interest and leaving Ronald A. Glantz and Andrea G. Littlefield as tenants in common.

The premises are conveyed together with and subject to any and all easements or appurtenances of record, insofar as the same are in force and applicable.

Witness our hands and seal this 27 day of January, 2016.

WITNESS — **Ronald A. Glantz**

WITNESS — **Andrea G. Littlefield**

STATE OF Florida
COUNTY OF Lee

Personally appeared before me on this 27 day of January, 2016 the above named Ronald A. Glantz and Andrea G. Littlefield and acknowledged the foregoing instrument to be their free act and deed.

Notary Public/Attorney At Law

ASHLEY SOTOMAYOR
MY COMMISSION #FF218219
EXPIRES: APR 07, 2019
Bonded through 1st State Insurance

Ashley Sotomayor
Print Name

DOC :4555 BK:32889 PG:130
RECEIVED - RECORDED REGISTER OF DEEDS
01/29/2016, 02:49:36P
CUMBERLAND COUNTY, NANCY A. LANE

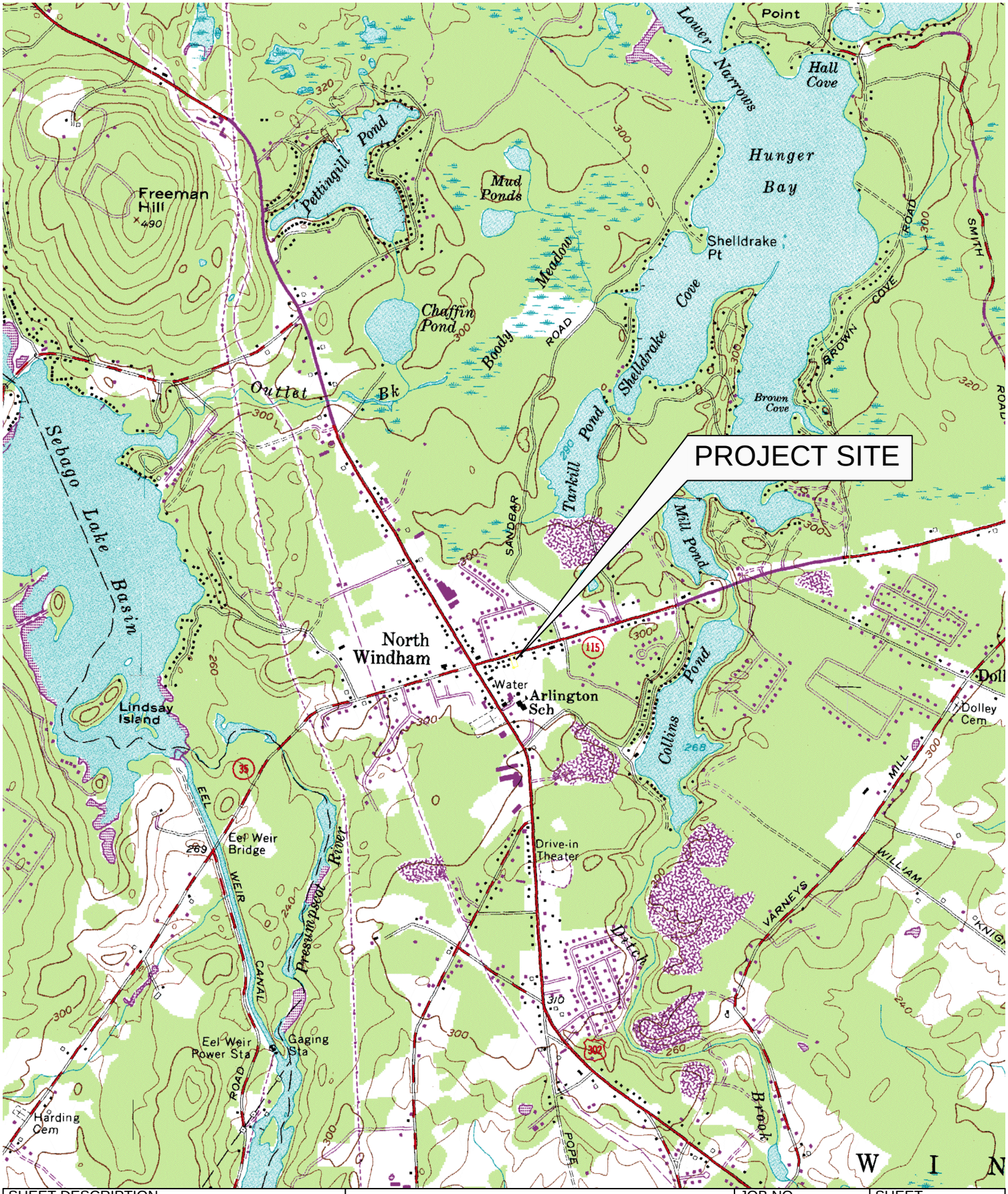
EXHIBIT A

A certain lot or parcel of land together with the buildings thereon situated in Windham in the County of Cumberland and State of Maine bounded and described as follows:

Beginning on the County Road leading from North Windham to Gray at the northeasterly corner of land now or formerly owned by Albert Hammond; thence southeasterly on a line with said Hammond's land twelve (12) rods; thence east on a line with land now or formerly owned by Amos Mann to a certain Lane one (1) rod in width bordering on land now or formerly owned by Estella Fields of said Town; thence northeasterly on the line of said land twelve (12) rods to the road aforesaid; thence along the line of said road to the point of beginning.

ATTACHMENT C

EXISTING SITE FIGURES



SHEET DESCRIPTION		JOB NO.	SHEET
79 TANDBERG TRAIL, WINDHAM U.S.G.S. QUADRANGLE MAP NORTH WINDHAM	TERRADYN CONSULTANTS, LLC P.O. Box 339 111 Elderberry Lane New Gloucester, ME 04260 Office: (207) 926-5111 Fax: (207) 221-1317 www.terradynconsultants.com	1607	1
PREPARED FOR		DATE	OF
ROBIE BUILDERS 742 ROOSEVELT TRAIL WINDHAM, ME 04062	Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting	3/9/2016	4
		SCALE	
		1"=2,000'	

SHEET DESCRIPTION
79 TANDBERG TRAIL, WINDHAM
AERIAL PHOTO 2012

PREPARED FOR
ROBIE BUILDERS
742 ROOSEVELT TRAIL
WINDHAM, ME 04062

TERRADYN
CONSULTANTS, LLC

P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com

Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

JOB NO.	SHEET
1607	2
DATE	OF
3/9/2016	4
SCALE	
1"=100'	

SOILS		
SYMBOL	SOIL NAME	HSG
HIB	HINKLEY LOAMY SAND	A

SHEET DESCRIPTION
79 TANDBERG TRAIL, WINDHAM
MEDIUM INTENSITY SOILS MAP

PREPARED FOR
ROBIE BUILDERS
742 ROOSEVELT TRAIL
WINDHAM, ME 04062

TERRADYN
CONSULTANTS, LLC

P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com

Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

JOB NO. 1607
DATE 3/9/2016
SCALE 1"=100'
SHEET 3
OF 4

ID	Map	Lot	Owner Name	Address	City	State	Zip
1	67	9	David H. Sawyer	77 Tandberg Trail	Windham	ME	04062
2	67	21	RSU 14	228 Windham Center Road	Windham	ME	04062
3	67	7	Aaron S. Bennett	1426 Islington Street	Portsmouth	NH	03801
4	67	80	Jeffrey L. Carr	1 Badger Run	Windham	ME	04062
5	67	80-1	Carr J L LLC	1 Badger Run	Windham	ME	04062

SHEET DESCRIPTION
79 TANDBERG TRAIL, WINDHAM
ABUTTERS MAP

PREPARED FOR
ROBIE BUILDERS
742 ROOSEVELT TRAIL
WINDHAM, ME 04062

TERRADYN
CONSULTANTS, LLC

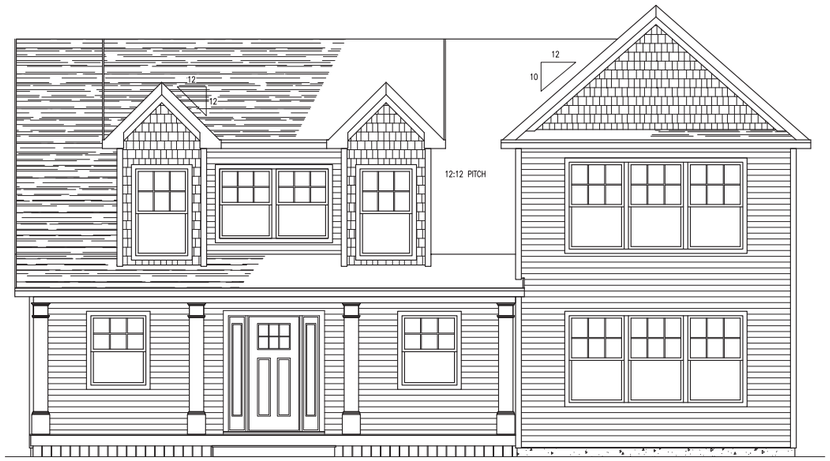
P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com

Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

JOB NO. 1607
DATE 3/9/2016
SCALE 1"=100'
SHEET 4
OF 4

ATTACHMENT D

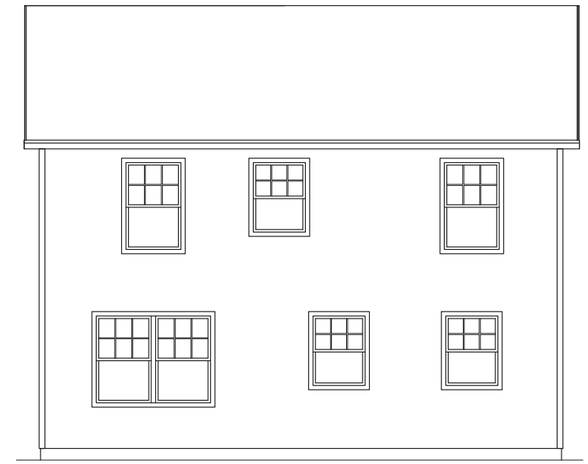
BUILDING PLANS



FRONT ELEVATION
1/4" = 1'-0"

CONSTRUCTION NOTE:

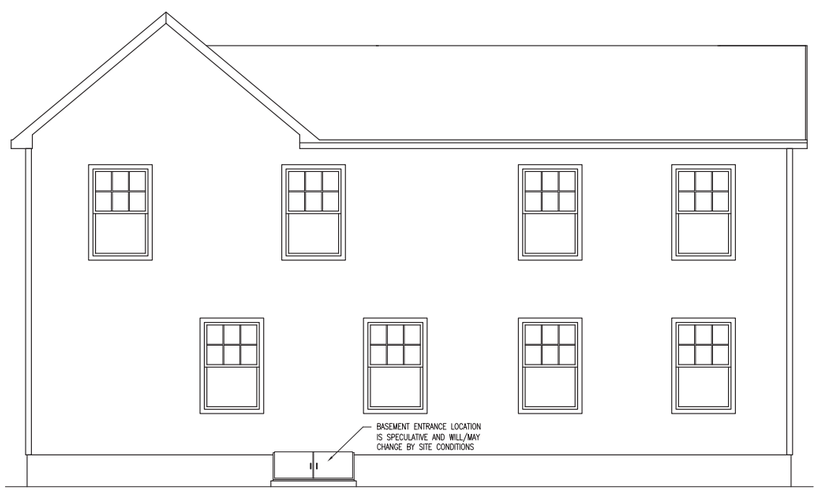
CONTRACTOR IS TO VERIFY GRADE AND ALL DIMENSIONS IN FIELD BEFORE CONSTRUCTION. DESIGN SHOWN MAY DIFFER FROM ACTUAL FINISHED CONSTRUCTION. FINAL MATERIALS, WINDOW/DOOR LOCATIONS AND SIZES, TO BE DETERMINED PER OWNER/CONT. SITE CONDITIONS; AND OR LOCAL CODES.



RIGHT ELEVATION
1/4" = 1'-0"

CONSTRUCTION NOTE:

CONTRACTOR IS TO VERIFY GRADE AND ALL DIMENSIONS IN FIELD BEFORE CONSTRUCTION. DESIGN SHOWN MAY DIFFER FROM ACTUAL FINISHED CONSTRUCTION. FINAL MATERIALS, WINDOW/DOOR LOCATIONS AND SIZES, TO BE DETERMINED PER OWNER/CONT. SITE CONDITIONS; AND OR LOCAL CODES.



RIGHT ELEVATION
1/4" = 1'-0"

CONSTRUCTION NOTE:

CONTRACTOR IS TO VERIFY GRADE AND ALL DIMENSIONS IN FIELD BEFORE CONSTRUCTION. DESIGN SHOWN MAY DIFFER FROM ACTUAL FINISHED CONSTRUCTION. FINAL MATERIALS, WINDOW/DOOR LOCATIONS AND SIZES, TO BE DETERMINED PER OWNER/CONT. SITE CONDITIONS; AND OR LOCAL CODES.

LEFT ELEVATION
1/4" = 1'-0"

CONSTRUCTION NOTE:

CONTRACTOR IS TO VERIFY GRADE AND ALL DIMENSIONS IN FIELD BEFORE CONSTRUCTION. DESIGN SHOWN MAY DIFFER FROM ACTUAL FINISHED CONSTRUCTION. FINAL MATERIALS, WINDOW/DOOR LOCATIONS AND SIZES, TO BE DETERMINED PER OWNER/CONT. SITE CONDITIONS; AND OR LOCAL CODES.

Proposed Elevations
Landing Realestate Office
Windham, ME

DRAWINGS ARE PROVIDED BY SOUTHERN MAINE DRAFTING & DESIGN AS A SERVICE TO HIS CUSTOMERS AND ARE INTENDED FOR INFORMATIONAL AND ILLUSTRATIVE PURPOSES ONLY. THE INFORMATION PRESENTED IN THESE DRAWINGS ARE NOT REPRESENTED BY A LICENSED OR REGISTERED ARCHITECT OR ENGINEER AND SHOULD NOT BE USED AS A BASIS FOR CONSTRUCTION. SOUTHERN MAINE DRAFTING & DESIGN SUGGESTS THAT HIS CUSTOMERS SEEK THE SERVICES OF A LICENSED OR REGISTERED ARCHITECT TO OBTAIN STRUCTURAL BUILDING PERMITS. IF THE CUSTOMER DESIRES TO PROCEED FURTHER, THESE DRAWINGS ARE NOT TO BE USED AS A BASIS FOR CONSTRUCTION AND SOUTHERN MAINE DRAFTING & DESIGN DISCLAIMS ANY RESPONSIBILITY IF THEY ARE SO USED.

Revisions:

03/22/16	REVISED PLANS

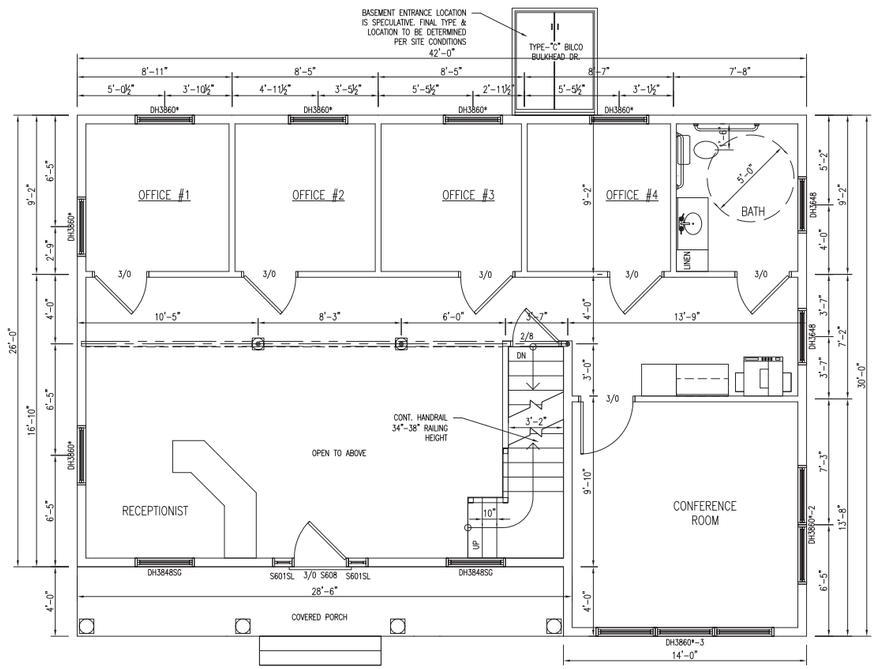
Date : 03/22/16

Scale : 1/4"=1'-0"

Drawn By: JTM

Project: M020116

Sheet Number:



FIRST FLOOR PLAN
1/4" = 1'-0"

SMOKE ALARMS

SHALL BE INTERCONNECTED & INSTALLED IN THE FOLLOWING LOCATIONS

1. EACH SLEEPING AREA
2. OUTSIDE EACH SEPARATE SLEEPING AREA IN THE IMMEDIATE VICINITY OF THE BEDROOMS
3. ON EACH ADDITIONAL STORY OF THE DWELLING INCLUDING BASEMENTS
4. FIRE SEPARATION PER TOWN AND LOCAL CODE WHEN REQUIRED

* EGRESS WINDOWS

CARBON MONOXIDE ALARMS:

SHALL BE INSTALLED IN THE FOLLOWING LOCATIONS

1. OUTSIDE EACH SEPARATE SLEEPING AREA IN THE IMMEDIATE VICINITY OF THE BEDROOMS
2. IN THE IMMEDIATE VICINITY OF THE BEDROOMS IN DWELLING UNITS WITHIN WHICH FUEL-FIRED APPLIANCES ARE INSTALLED AND IN DWELLING UNITS THAT HAVE ATTACHED GARAGES

FOUNDATION NOTES:

1. 4" DIA. CONTINUOUS PERF. PERIMETER DRAIN WITH HOLES ORIENTED DOWN. SLOPED TO DAYLIGHT OR TO STORM SEWER OR DRYWELL.
2. ALL LALLY COLUMNS THIS SHEET ASSUMED TO BE TYP.
3. ALL INTERIOR FOOTINGS TO BE DESIGNED PER SOIL CONDITIONS. CONTRACTOR TO VERIFY.
4. DECK SUPPORTS ASSUMED TO BE 10" DIA. SONOTUBES. SOIL CONDITIONS TO DETERMINE FOOTING DESIGN. CONTRACTOR TO VERIFY.
5. FOR PLUMBING LOCATION/LAYOUT, SEE GROUND FLOOR PLAN.
6. CONTRACTOR TO VERIFY CONDITIONS IN FIELD AND STEP FND./FTGS AS REQUIRED PER GRADE. AND SOIL CONDITIONS
7. BASEMENT FINISHES PER OWNER/CONT. (TO BE DETERMINED)
8. CONTRACTOR TO VERIFY GRADE IN FIELD BEFORE CONSTRUCTION OF TYPICAL FOUNDATION WALLS OR DAYLIGHT BASEMENT. DESIGN SHOWN MAY DIFFER FROM ACTUAL FINISHED CONSTRUCTION. FINAL MATERIALS, WINDOW/DOOR LOCATIONS AND SIZES, TO BE DETERMINED PER OWNER/CONT. AND LOCAL CODES.

FASTENER SPACING FOR SOUTHERN PINE OR HIM-FIR DECK LEDGER AND 2-INCH NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST (DECK LIVE LOAD=40PSF, DECKDEAD LOAD=10PSF)

JOIST SPAN	6'-0" AND LESS	6'-1" AND 8'-0"	8'-1" AND 10'-0"	10'-1" AND 12'-0"	12'-1" AND 14'-0"	14'-1" AND 16'-0"	16'-1" AND 18'-0"
CONNECTION DETAILS	ON-CENTER SPACING OF FASTENERS						
½" DIAMETER LAG SCREW WITH ⅜"- MAXIMUM SHEATHING	30	23	18	15	13	11	10
½" DIAMETER LAG SCREW WITH ⅝"- MAXIMUM SHEATHING	36	36	34	29	24	21	19
½" DIAMETER LAG SCREW WITH ⅝"- MAXIMUM SHEATHING & ½" STACKED WASHERS	36	36	29	24	21	18	16

[REF. TABLE R507.2]

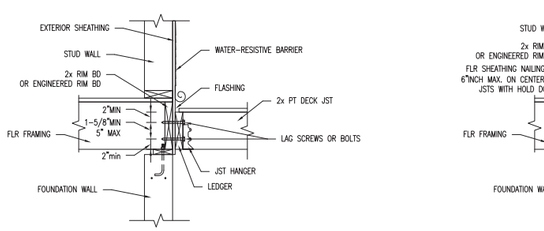


FIGURE R507.2.1(2)
PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS

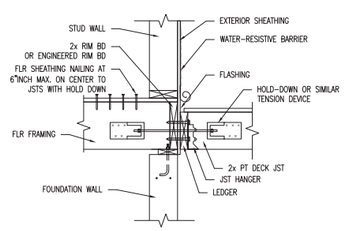
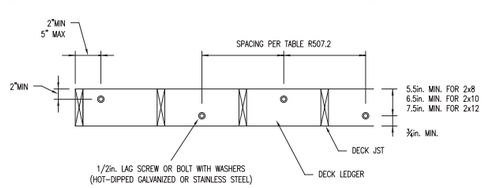
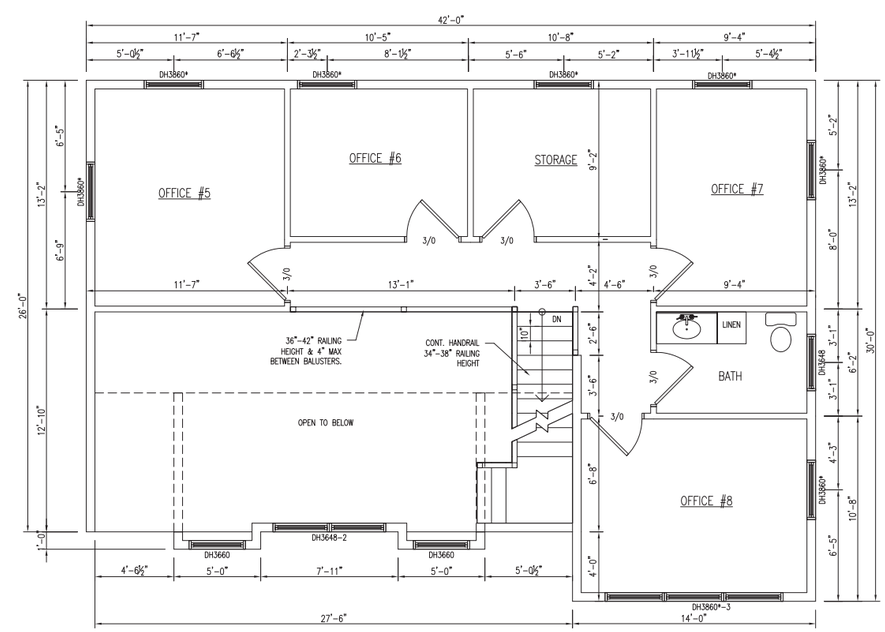


FIGURE R507.2.3
DECK ATTACHMENT FOR LATERAL LOADS





SECOND FLOOR PLAN
1/4" = 1'-0"

SMOKE ALARMS

SHALL BE INTERCONNECTED & INSTALLED IN THE FOLLOWING LOCATIONS

1. EACH SLEEPING AREA
2. OUTSIDE EACH SEPARATE SLEEPING AREA IN THE IMMEDIATE VICINITY OF THE BEDROOMS
3. ON EACH ADDITIONAL STORY OF THE DWELLING INCLUDING BASEMENTS
4. FIRE SEPARATION PER TOWN AND LOCAL CODE WHEN REQUIRED

* EGRESS WINDOWS

CARBON MONOXIDE ALARMS:

SHALL BE INSTALLED IN THE FOLLOWING LOCATIONS

1. OUTSIDE EACH SEPARATE SLEEPING AREA IN THE IMMEDIATE VICINITY OF THE BEDROOMS
2. IN THE IMMEDIATE VICINITY OF THE BEDROOMS IN DWELLING UNITS WITHIN WHICH FUEL-FIRED APPLIANCES ARE INSTALLED AND IN DWELLING UNITS THAT HAVE ATTACHED GARAGES

FOUNDATION NOTES:

1. 4" DIA. CONTINUOUS PERF. PERIMETER DRAIN WITH HOLES ORIENTED DOWN. SLOPED TO DAYLIGHT OR TO STORM SEWER OR DRYWELL.
2. ALL LALLY COLUMNS THIS SHEET ASSUMED TO BE TYP.
3. ALL INTERIOR FOOTINGS TO BE DESIGNED PER SOIL CONDITIONS. CONTRACTOR TO VERIFY.
4. DECK SUPPORTS ASSUMED TO BE 10" DIA. SONOTUBES. SOIL CONDITIONS TO DETERMINE FOOTING DESIGN. CONTRACTOR TO VERIFY.
5. FOR PLUMBING LOCATION/LAYOUT, SEE GROUND FLOOR PLAN.
6. CONTRACTOR TO VERIFY CONDITIONS IN FIELD AND STEP FND./FTGS AS REQUIRED PER GRADE. AND SOIL CONDITIONS
7. BASEMENT FINISHES PER OWNER/CONT. (TO BE DETERMINED)
8. CONTRACTOR TO VERIFY GRADE IN FIELD BEFORE CONSTRUCTION OF TYPICAL FOUNDATION WALLS OR DAYLIGHT BASEMENT. DESIGN SHOWN MAY DIFFER FROM ACTUAL FINISHED CONSTRUCTION. FINAL MATERIALS, WINDOW/DOOR LOCATIONS AND SIZES, TO BE DETERMINED PER OWNER/CONT. AND LOCAL CODES.

DRAWINGS ARE PROVIDED BY SOUTHERN MAINE DRAFTING & DESIGN AS A SERVICE TO HIS CUSTOMERS AND ARE INTENDED FOR INFORMATIONAL AND ILLUSTRATIVE PURPOSES ONLY. THE INFORMATION PRESENTED IN THESE DRAWINGS ARE NOT INTENDED OR REGARDED AS A LATENT OR PATENT REPRESENTATION AND SHOULD NOT BE USED AS A BASIS FOR CONSTRUCTION. SOUTHERN MAINE DRAFTING & DESIGN SUGGESTS THAT HIS CUSTOMERS SEEK THE SERVICES OF A LICENSED DESIGNER AND/OR ENGINEER WHOSE WORK MAY INCLUDE, BUT IS NOT LIMITED TO, THE CUSTOMER DESIRES TO PROCEED FURTHER, THESE DRAWINGS ARE NOT TO BE USED AS A BASIS FOR CONSTRUCTION AND SOUTHERN MAINE DRAFTING & DESIGN DISCLAIMS ANY RESPONSIBILITY IF THEY ARE SO USED.

Proposed 1st & 2nd FLR Plans
Landing Realestate Office
Windham, ME

Revisions:

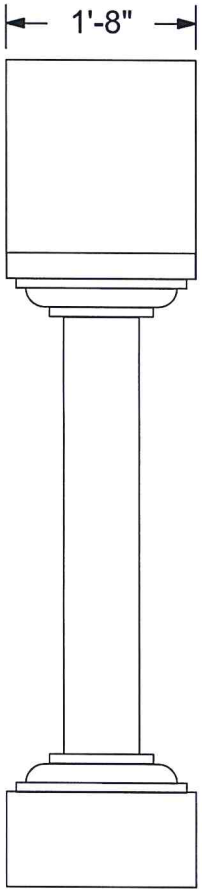
03/22/16	REVISED PLANS

Date : 03/22/16
Scale : 1/4"=1'-0"
Drawn By: JTM
Project: M020116
Sheet Number:
4 of 4

ATTACHMENT E

PROJECT SIGN

End View



Front and Back View

Time 4 Printing	Standard Model #5 Size: 7' 3" x 10' 0" Overall Sq/Ft: 72.5 Date: 4/13/16 Scale: 1/2" = 12"	Notes:	PROOF

ATTACHMENT F

PWD ‘ABILITY TO SERVE’ LETTER

Portland Water District
FROM SEBAGO LAKE TO CASCO BAY

March 25, 2016

Terradyn Consultants, LLC
P. O. Box 339
New Gloucester, ME 04260

Attn: Michael Tadema-Wielandt, P.E.
Re: 79 Tandberg Trail - Windham
Ability to Serve with PWD Water

Dear Mr. Tadema-Wielandt:

The Portland Water District has received your request for an Ability to Serve Determination for the noted site submitted on March 10, 2016. Based on the information provided, we can confirm that the District will be able to serve the proposed project as further described in this letter.

Conditions of Service

The following conditions of service apply:

- The existing 1" copper service installed at this site in 2003 may be used by the proposed development as long as the project team determines that they will provide adequate flow and pressure for the proposed use. Assuming a peak flow of 20 gpm, this service should be adequate for the proposed use.

- Once the project is ready for construction, the owner or contractor will need to make an appointment to come in and complete a service application form and pay the necessary fees which will include an application fee, the cost of the meter and meter installation. As the service is already installed, there will be no inspection fees.

Existing Site Service

According to District records, the project site does currently have existing water service. A 1-inch diameter copper water service line, located as shown on the attached water service card, provides water service to this site. Please refer to the "Conditions of Service" section of this letter for requirements related to the use of this service.

Water System Characteristics

According to District records, there is a 12-inch diameter ductile iron water main on the north side of Tandberg Trail and a public fire hydrant located 335 feet from the site. Recent flow data is not available in this area. The most recent static pressure reading was 86 psi on February 17, 2016.

225 DOUGLASS STREET P.O. BOX 3553 PORTLAND, MAINE 04104-3553
PHONE: 207.774.5961 FAX: 207.523.5440 WEB: WWW.PWD.ORG

Public Fire Protection

You have not indicated whether this project will include the installation of new public hydrants to be accepted into the District water system. It is your responsibility to contact the Windham Fire Department to ensure that this project is adequately served by existing and/or proposed hydrants.

Domestic Water Needs

The data noted above indicates there should be adequate pressure and volume of water to serve the domestic water needs of your proposed project. Based on the high water pressure in this area, we recommend that you consider the installation of pressure reducing devices that comply with state plumbing codes.

Private Fire Protection Water Needs

You have indicated that this project will not require water service to provide private fire protection to the site. Please note that the District does not guarantee any quantity of water or pressure through a fire protection service. Should private fire protection be required, please share these results with your sprinkler system designer so that they can design the fire protection system to best fit the noted conditions. If the data is out of date or insufficient for their needs, please contact MEANS to request a hydrant flow test and we will work with you to get more complete data.

If the District can be of further assistance in this matter, please let us know.

Sincerely,
Portland Water District

Gordon S. Johnson
Engineering Services Manager

SERVICE RECORD

NO. 79 TANDBERG TRL

REG. NO. SV33 NW47

Name

Name

Name

ST. DIVISION 33-WI

Code No.

Name

Name

SERVICE DATA

Size of Pipe 1"

Kind of Pipe COP

Main to Stop 47'

Stop to St. Line ON

Date 8-7-03

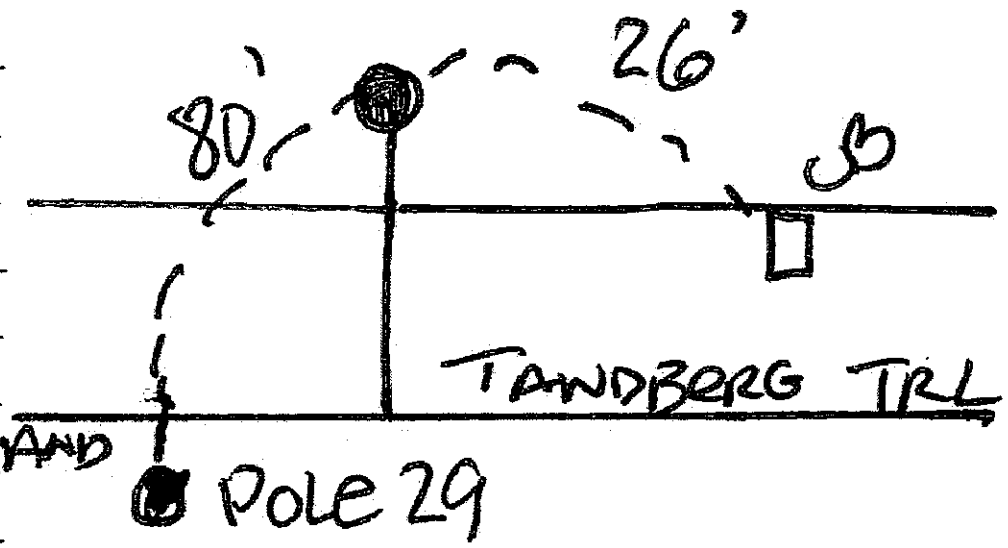
Mat. on Private 1/2" COP

Depth/Main 7' -12" DI-SAND

Depth/Private 6'

Shut at Corp

MEASURES



ATTACHMENT G

TEST PIT LOGS & SEPTIC DESIGN

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept Health & Human Services
Div of Environmental Health, 11 SHS
(207) 287-5672 Fax: (207) 287-4172

PROPERTY LOCATION

City, Town, or Plantation: WINDHAM

Street or Road: 97 TAMBERG TRAIL

Subdivision, Lot #:

>> CAUTION: LPI APPROVAL REQUIRED <<

Town/City _____ Permit # _____

Date Permit Issued __/__/__ Fee: $_____ Double Fee Charged [ ]

_____ L.P.I. # _____

Local Plumbing Inspector Signature

u Owner u Town u State

The Subsurface Wastewater Disposal System shall not be installed until a Permit is issued by the Local Plumbing Inspector. The Permit shall authorize the owner or installer to install the disposal system in accordance with this application and the Maine Subsurface Wastewater Disposal Rules.

Municipal Tax Map # _____ Lot # _____

OWNER/APPLICANT INFORMATION

Name (last, first, MI): ROBIE, JAMES (Owner / Applicant)

Mailing Address of Owner/Applicant: P.O. BOX 1463, WINDHAM, ME 04062

Daytime Tel. #: 831-3582

OWNER OR APPLICANT STATEMENT

I state and acknowledge that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department and/or Local Plumbing Inspector to deny a Permit.

Signature of Owner or Applicant _____ Date _____

CAUTION: INSPECTION REQUIRED

I have inspected the installation authorized above and found it to be in compliance with the Subsurface Wastewater Disposal Rules Application. _____ (1st) date approved

Local Plumbing Inspector Signature _____ (2nd) date approved _____

PERMIT INFORMATION

TYPE OF APPLICATION

(1) 1. First Time System
2. Replacement System
Type replaced: _____
Year installed: _____
3. Expanded System
a. <25% Expansion
b. ≥25% Expansion
4. Experimental System
5. Seasonal Conversion

THIS APPLICATION REQUIRES

(1) 1. No Rule Variance
2. First Time System Variance
a. Local Plumbing Inspector Approval
b. State & Local Plumbing Inspector Approval
3. Replacement System Variance
a. Local Plumbing Inspector Approval
b. State & Local Plumbing Inspector Approval
4. Minimum Lot Size Variance
5. Seasonal Conversion Permit

DISPOSAL SYSTEM COMPONENTS

(1) 1. Complete Non-engineered System
2. Primitive System (graywater & alt. toilet)
3. Alternative Toilet, specify: _____
4. Non-engineered Treatment Tank (only)
5. Holding Tank, _____ gallons
6. Non-engineered Disposal Field (only)
7. Separated Laundry System
8. Complete Engineered System (2000 gpd or more)
9. Engineered Treatment Tank (only)
10. Engineered Disposal Field (only)
11. Pre-treatment, specify: _____
12. Miscellaneous Components

SIZE OF PROPERTY

15,370 SQ FT
0.35 ACRES

SHORELAND ZONING

Yes (No)

DISPOSAL SYSTEM TO SERVE

1. Single Family Dwelling Unit, No. of Bedrooms: ____
2. Multiple Family Dwelling, No. of Units: ____
(3) 3. Other: OFFICE W/13 WORKERS (specify) (13 = 9 WORKERS)
Current Use Seasonal Year Round Undeveloped

TYPE OF WATER SUPPLY

1. Drilled Well 2. Dug Well 3. Private
(4) 4. Public 5. Other

DESIGN DETAILS (SYSTEM LAYOUT SHOWN ON PAGE 3)

TREATMENT TANK

(1) 1. Concrete
1a. Regular
1b. Low Profile
2. Plastic
(3) 3. Other: H-20
CAPACITY: 1000 GAL

DISPOSAL FIELD TYPE & SIZE

1. Stone Bed 2. Stone Trench
(3) 3. Proprietary Device
a. cluster array c. Linear
b. regular load (d) d. H-20 load
4. Other: _____
SIZE: 1290 sq. ft. lin. ft.

GARBAGE DISPOSAL UNIT

1. No 2. Yes 3. Maybe
If Yes or Maybe, specify one below:
a. multi-compartment tank
b. ___ tanks in series
c. increase in tank capacity
d. Filter on Tank Outlet

DESIGN FLOW

492.307692 gallons per day
BASED ON:
1. Table 4A (dwelling unit(s))
2. Table 4C (other facilities)
SHOW CALCULATIONS for other facilities
13 WORKERS 20 X 12 = 120 GPD
PUBLIC RESTROOM = 325 GPD
3. Section 4G (meter readings)
ATTACH WATER METER DATA
445 GPD

SOIL DATA & DESIGN CLASS

PROFILE CONDITION
5 / B
at Observation Hole # TP2
Depth 748
of Most Limiting Soil Factor

DISPOSAL FIELD SIZING

(1) 1. Medium—2.6 sq. ft. / gpd
2. Medium—Large 3.3 sq. ft / gpd
3. Large—4.1 sq. ft. / gpd
4. Extra Large—5.0 sq. ft. / gpd

EFFLUENT/EJECTOR PUMP

(1) 1. Not Required ELEVATE DRAIN
2. May Be Required
3. Required
Specify only for engineered systems:
DOSE: _____ gallons

LATITUDE AND LONGITUDE

at center of disposal area
Lat. 43 d 50 m 06.3 s
Lon. 70 d 25 m 54.7 s
If g.p.s, state margin of error: 20'

SITE EVALUATOR STATEMENT

I certify that on 3/18/16 (date) I completed a site evaluation on this property and state that the data reported are accurate and that the proposed system is in compliance with the State of Maine Subsurface Wastewater Disposal Rules (10-144A CMR 241).

Site Evaluator Signature _____ SE #: 247 Date: MARCH 22, 2016

Site Evaluator Name Printed: JAMES GOTTLANDWL Telephone Number: 892-9498 E-mail Address: _____

Note: Changes to or deviations from the design should be confirmed with the Site Evaluator.

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Department of Human Services
Division of Health Engineering
(207) 287-5672 FAX (207) 287-4172

Town, City, Plantation: WINDHAM

Street, Road, Subdivision: 97 SANDBERG TRAIL

Owner's Name: ROBIE, MARCO

SITE PLAN — Scale 1" = 223 Ft. or as shown

SITE LOCATION PLAN

SEE ATTACHED SURVEY

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

Observation Hole TP2 ☒ Test Pit ☐ Boring
_____" Depth of Organic Horizon Above Mineral Soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0–10	SANDY LOAM		VERY DARK BROWN	
10–20	GRAVELLY LOAMY SAND	FRIABLE	DARK YELLOWISH BROWN 10YR 4/6	
30–40	SAND		PALE BROWN	
40–50				NONE EVIDENT

Soil Classification: Profile S, Condition B
Slope: 0 %
Limiting Factor: >48 ☒ Pit Depth ☐ Ground Water ☐ Restrictive Layer ☐ Bedrock

Observation Hole TP1 ☒ Test Pit ☐ Boring
_____" Depth of Organic Horizon Above Mineral Soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
0–10	SANDY LOAM		DARK BROWN	
10–20	VERY COBBLY, GRAVELLY LOAMY SAND	FRIABLE	DARK YELLOWISH BROWN 10YR 4/6	
30–40	GRAVELLY SAND		PALE BROWN	NONE EVIDENT
40–50				

Soil Classification: Profile S, Condition B
Slope: ____ %
Limiting Factor: >48 ☒ Pit Depth ☐ Ground Water ☐ Restrictive Layer ☐ Bedrock

James H. Martini — Site Evaluator Signature — SE #

MARCH 22, 2006 — Date

HHE-200 Rev. 7/97

JAMES G. MANCINI

SITE EVALUATOR

824 ROOSEVELT TR. PMB #160
P.O. BOX 4000
WINDHAM, MAINE 04062

Town, City, Plantation: WINDHAM | Street, Road Subdivision: 97 TANNBERG TRAIL | Owner's Name: ROBIE, JARED

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

Observation Hole TP3 ☒ Test Pit ☐ Boring
_____" Depth of Organic Horizon Above Mineral Soil

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Texture	Consistency	Color	Mottling
SANDY LOAM		DARK BROWN	
GRAVELLY LOAMY SAND		YELLOWISH BROWN	
GRAVELLY SAND	FRIABLE	PALE BROWN	
			NONE EVIDENT

Soil Classification		Slope	Limiting Factor	
5 (Profile)	B (Condition)	____ %	24"	☐ Ground Water ☐ Restrictive Layer ☐ Bedrock ☒ Pit Depth

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

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Texture	Consistency	Color	Mottling

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

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

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

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Texture	Consistency	Color	Mottling

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

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

DEPTH BELOW MINERAL SOIL SURFACE (inches)

Texture	Consistency	Color	Mottling

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

James G. Mancini — Site Evaluator Signature

247 — SE #

MARCH 22, 2016 — Date

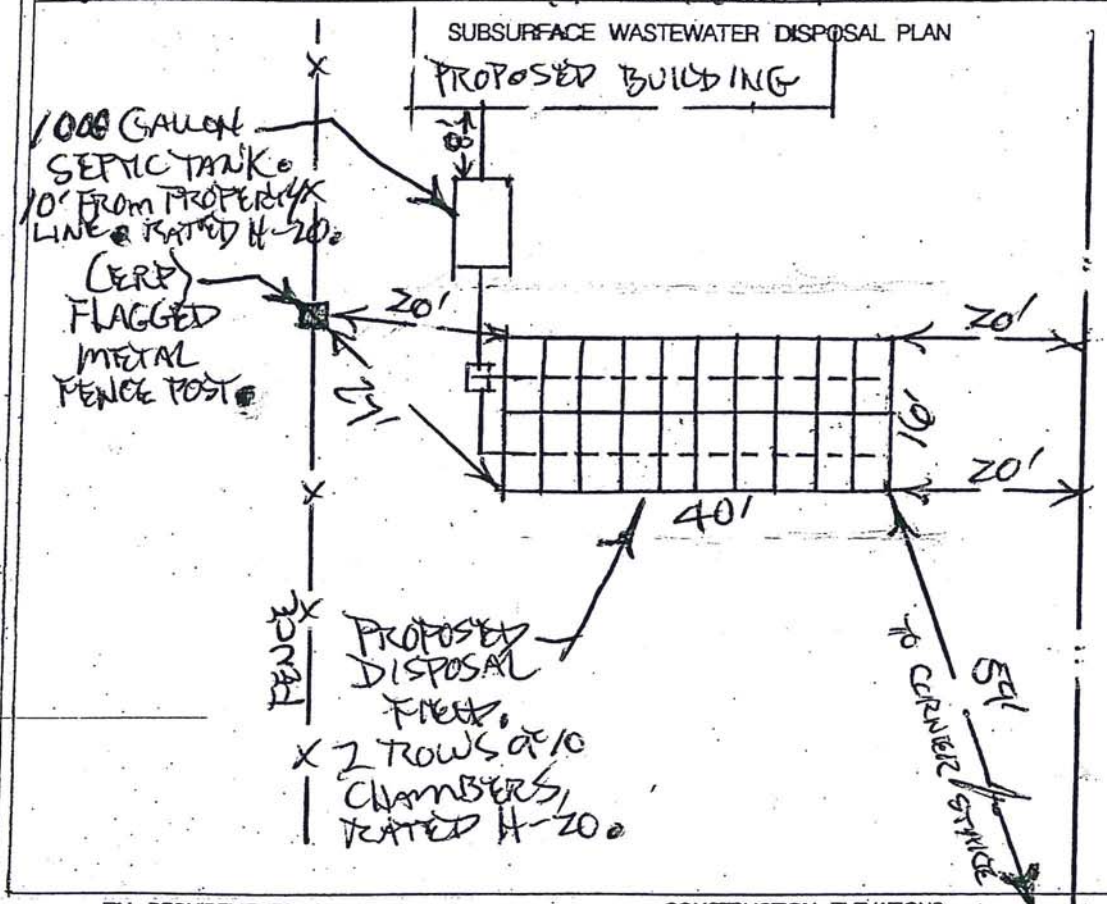
SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Department of Human Services
Division of Health Engineering
(207) 287-5672 FAX (207) 287-4172

Town, City, Plantation	Street, Road, Subdivision	Owner's Name
WINDHAM	97 TANNBERG TRAIL	ROBIE, JARED

SUBSURFACE WASTEWATER DISPOSAL PLAN

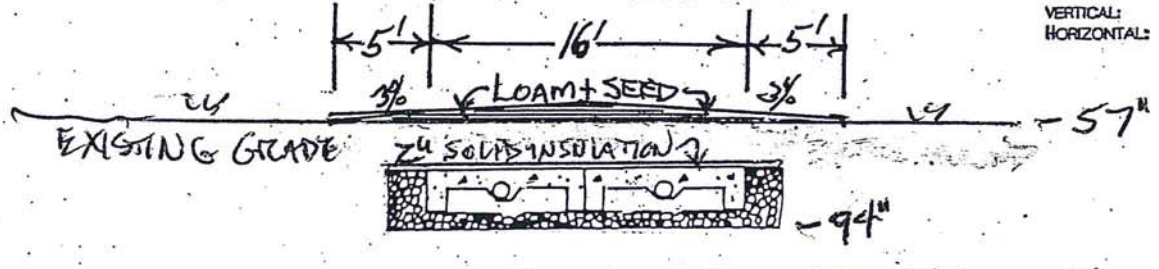
SCALE 1" = 20 FT.



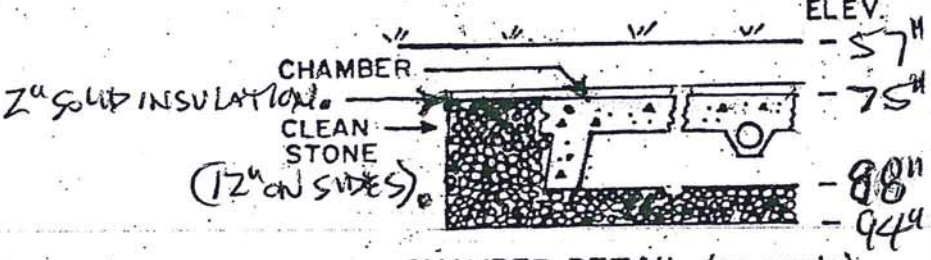
FILL REQUIREMENTS (ABOVE GRADE)		CONSTRUCTION ELEVATIONS		ELEVATION REFERENCE POINT
Depth of Fill (Upslope)	0"	Finished Grade Elevation	-57"	Location & Description TOP OF METAL FENCE POST.
Depth of Fill (Downslope)	0"	Top of Distribution Pipe or Proprietary Device	-75"	Reference Elevation AT 00"
		Bottom of Disposal Area (STONE BASE)	-94"	

DISPOSAL AREA CROSS SECTION

SCALE:
VERTICAL: 1" = 5
HORIZONTAL: 1" = 10



NOTE: EXCAVATE 3' EXTRA MINIMUM AROUND CHAMBERS, REFILL WITH COARSE SAND.



CHAMBER DETAIL (no scale)

James H. Moncini — Site Evaluator Signature

247 — SE #

MARCH 22, 2016 — Date

ATTACHMENT H

LIGHTING CATALOG CUT SHEETS

HD SUPPLY FACILITIES MAINTENANCE
MAINTENANCE SOLUTIONS

Phone Orders: 1-800-431-3000 Website Help: 1-877-694-4932

Username: Password: Sign In
Forgot Username? Forgot Password? Remember Me
Register To Order

Home / Lighting / Light Fixtures / Exterior Light Fixtures / 100 Watt High Pressure Sodium Bronze Cutoff Wall Pack With Tempered Glass Lens

100 Watt High Pressure Sodium Bronze Cutoff Wall Pack With Tempered Glass Lens

★★★★★ Write a review

Part #: 325522

100 Watt High Pressure Sodium Cut-Off Wall Pack - 120/208/240/277 Volt - Bronze Cast Aluminum Housing - Patterned Tempered Glass Lens - 10-1/2H x 13W x 8-15/32"D - Bulb Included - Mfg #TWR1C 100STBLPI

1-2	$159.25
3-4	$143.44
5+	$128.89

Free Shipping (lower 48 states)
Next-Day Delivery*
Hassle-Free Returns

QTY
1 Add to Cart Add to List

Check Stock

Customers Who Viewed This Item Also Viewed

Lithonia Lighting® LED Wall...
Part # 504041

Lithonia Lighting® LED Wall...
Part # 504043

Lithonia Lighting® LED Wall...
Part # 326934

LED 12 Watt Wall Pack, 120...
Part # 326808

LED 40 Watt Floodlight...
Part # 326187

LED Flood Light, 13.5 Watt...
Part # 326907

PRODUCT DETAILS

- Product Documentation
- Make & Model
- Specifications
- Packaging Dimensions
- Assembled Dimensions
- Product Features
- Certification & Standards

Product Details

- UL listed
- Finish is bronze polyester powder paint for lasting durability
- Ballast is high-reactance, high-power-factor for 70-150W
- Medium-base lamp included in carton

Product Documentation

Product Specification
View the product specification

Make & Model	
UNSPSC	39111524
Brand	Lithonia Lighting

Customers Who Purchased This Item Also Purchased

T8 Ballast Philips Advance Programmed Start 2 Bulb 32W 120-277V
Part # 339601

Compact Fluorescent Bulb Philips 18W

HD SUPPLY FACILITIES MAINTENANCE
MAINTENANCE SOLUTIONS

Phone Orders: 1-800-431-3000 Website Help: 1-877-694-4932

Username: Password: Sign In
Forgot Username? Forgot Password? Remember Me
Register To Order

Home / Lighting / Light Fixtures / Exterior Light Fixtures / 100 Watt High Pressure Sodium Wall Pack Fixture 120V Bronze

100 Watt High Pressure Sodium Wall Pack Fixture 120V Bronze

★★★★★ Write a review

Part #: 325423

100 Watt High Pressure Sodium Wall Pack - 120 Volt - Bronze Cast Aluminum Housing - Clear Prismatic Tempered Glass Lens - 9-1/4H x 8-3/4W x 8"D - Bulb Included

1-2	$110.97
3-4	$99.85
5+	$89.89

Free Shipping (lower 48 states)
Next-Day Delivery*
Hassle-Free Returns

QTY

1 Add to Cart Add to List

Check Stock

Customers Who Viewed This Item Also Viewed

Lithonia Lighting® LED Wall...
Part # 504041

Lithonia Lighting® LED Wall...
Part # 326934

Lithonia Lighting® LED Wall...
Part # 504043

LED 12 Watt Wall Pack, 120...
Part # 326808

LED Wall Pack, 27 Watt, 120...
Part # 326111

LED 40 Watt Floodlight...
Part # 326187

PRODUCT DETAILS

- Make & Model
- Specifications
- Packaging Dimensions
- Assembled Dimensions
- Product Features
- Certification & Standards

Product Details

Make & Model	
UNSPSC	39111524
Brand	HD Supply
Manufacturer Part Number	325423

Specifications	
Country of Origin	CHINA
Color / Finish	Bronze Cast Aluminum
Housing Material	Aluminum
Made in the USA	No

Customers Who Purchased 100 Watt High Pressure Sodium Wall Pack Fixture 120V Bronze Also Purchased

Seasons 52" Dual-Mount Ceiling Fan Polished Brass Tulip Light Kit
Part # 269257

42" Hugger-Mount Ceiling Fan White

ATTACHMENT I

TRAFFIC GENERATION ESTIMATE

TRAFFIC GENERATION ESTIMATE
LANDING REAL ESTATE OFFICE BUILDING

Vehicle trip generation was estimated for the proposed Landing Real Estate Office Building, a proposed 2,400 sq. ft. office building, based on the trip tables provided in the Eighth Edition of the Institute of Transportation Engineers (ITE) "Trip Generation" handbook. The following trip rates were used:

Land-Use Code 715 – Single Tenant Office Building		
Peak Hour – AM Peak	1.8 trips/1,000 sq.ft. Gross Floor Area	5 Trips AM Peak Hour
Peak Hour – PM Peak	1.73 trips/1,000 sq.ft. Gross Floor Area	5 Trips PM Peak Hour
Daily Trips	11.57 trips/1,000 sq.ft. Gross Floor Area	28 Trips Daily
Land-Use Code 710 – General Office Building		
Saturday Peak Hour trips	0.41 trips/1,000 sq.ft. Gross Floor Area	1 Trip Saturday Peak Hour

The proposed project is expected to generate approximately 28 daily trips, including 5 trips in the morning peak hour and 5 trips during the afternoon peak hour. Saturday peak hour trips are expected to be approximately 1 trip.

ATTACHMENT J

STORMWATER MANAGEMENT REPORT

LANDING REAL ESTATE OFFICE
79 TANDBERG TRAIL
WINDHAM, MAINE

STORMWATER MANAGEMENT REPORT

PREPARED FOR:

ROBIE BUILDERS
742 ROOSEVELT TRAIL
WINDHAM, MAINE 04062

PREPARED BY:

TERRADYN CONSULTANTS LLC
PO BOX 339
NEW GLOUCESTER, MAINE 04260

AUGUST 2016

INTRODUCTION

Terradyn Consultants LLC has been retained by Robie Builders to assist with site design and permit applications for a proposed two story commercial building at 79 Tandberg Trail in Windham, Maine.

The project is required to meet the stormwater management standards of Section 812(E) of the Town of Windham Land Use Ordinance. The standards require that peak flow rates for stormwater discharges be limited to pre-development levels for the 2-year, 10-year, and 25-year design storm events.

The proposed project includes construction of a two story, 1,290 square foot (footprint) commercial office building with associated parking, sidewalks, and utility infrastructure. The project will result in approximately 14,806 square feet of developed area and 9,689 square feet of impervious area. This report analyzes the effect that the proposed project is expected to have on adjacent and downstream properties and waterways.

EXISTING PROJECT SITE

The project site is 0.35 acres in size and is located on the southeast side of Tandberg Trail (Rt. 115), approximately 600 feet east of Route 302. The site is located within the Commercial-1 (C-1) zoning district and is currently owned by Jack and Rose, LLC, who has hired Robie Builders to develop the proposed project on its behalf.

The site is currently comprised of meadow grasses with several individual trees on the east and west property boundaries. Residential homes abut the site to the east and west, and the parcel to the south is undeveloped forest. Commercial uses, including a veterinary hospital, are located across Tandberg Trail from the site. Based on historic aerial photography, it appears that a single family house previously existed on the site but was removed sometime between 2006 and 2010. The site is relatively flat, sloping gently from north to south at 1% - 2%. Stormwater runoff generally drains off the site at the southeastern property boundary via surface flow. Runoff is believed to be tributary to the Presumpscot River.

No unique natural areas, including floodplains, deer wintering areas, significant fisheries and wildlife habitats, scenic areas, habitat for rare and endangered plants and animals, and historic and archeological resources, are known to exist on the site. The site is located on a significant sand and gravel aquifer, mapped by the Maine Geological Survey.

Existing utilities in the vicinity of the project include a 12” water main on the north side of Tandberg Trail, a shallow storm drain network in Tandberg Trail, and overhead electric and telecommunications lines. Because the site was previously developed, existing surficial soils may not be native. The Natural Resource Conservation Commission (NRCS) classifies onsite soils as Loamy Sand. Test pits performed on the site confirm the existence of approximately 12” of sandy loam over sand and gravel. Evidence of groundwater was not found within 48” of the ground surface, which was the limit of the test pits.

Existing conditions figures with the project site identified are provided in Attachment C of the Site Plan Application, including a USGS map, aerial photo, NRCS Medium Intensity Soils map, and Abutters map.

PROPOSED PROJECT

The proposed project includes construction of a two story, 1,290 square foot (footprint) commercial office building with associated parking, sidewalks, and utility infrastructure. The site will feature eleven total parking spaces, including three spaces in front of the building and eight behind. The site driveway, which will provide access to both parking areas, will be located on the east side of the site.

The project will result in approximately 14,806 square feet of developed area and 9,689 square feet of impervious area.

Stormwater runoff will generally split at the center of the proposed building. Runoff north of the building will flow north, toward Tandberg Trail, to an infiltration basin that will be located north of the parking area. Runoff south of the building will flow south to a forested buffer, generally following pre-development runoff patterns.

METHODOLOGY OF ANALYSIS – STORMWATER QUANTITY

A hydrologic analysis of pre-development and post-development conditions has been conducted based upon the methodology contained in the USDA Soil Conservation Service's Technical Releases No. 20 and 55 (SCS TR-20 and TR-55). For Cumberland County, Maine, a 24-hour SCS Type III storm distribution was used for the analysis using the following storm frequencies and rainfall amounts, per Maine DEP Chapter 500:

Storm Event	24-Hour Rainfall
2–Year Storm	3.1 inches
10–Year Storm	4.6 inches
25–Year Storm	5.8 inches

Land use, cover, delineation of watershed subcatchments, hydraulic flow paths, and hydrologic soil group (HSG) types were obtained using the following data:

1. North Windham, Maine USGS 7.5 minute quadrangle map.

2. NRCS Medium Intensity Soils Survey.

3. Orthoimagery, GeoLibrary 6in 2012, from Maine Office of GIS

4. Existing conditions topographic survey, provided by Wayne T. Wood & Co. of Gray, Maine

5. Field reconnaissance by Terradyn Consultants.

Runoff curve numbers, time of concentration, and travel time data were established based on methods outlined in the USDA TR-55 manual.

PRE-DEVELOPMENT CONDITIONS

In the pre-development condition, three subcatchments, tributary to three Study Points were identified to study the effect of the proposed development on the peak rates of runoff from the site. Study Point SP1 represents the southern property boundary, where runoff leaves the site via overland flow.

Study Point SP2 represents the northern site boundary, adjacent to Tandberg Trail. Subcatchment 2 is tributary to SP2. Runoff tributary to SP2 eventually enters the storm drain network within Tandberg Trial via an existing catch basin located adjacent to the site.

Study Point SP3 represents the eastern site boundary. Runoff from subcatchment 3 is tributary to SP3.

The following is a summary of the characteristics of the pre-development subcatchments.

Pre-Development Conditions			
Subarea	**Area (s.f.)**	**CN**	**Time of Concentration (minutes)**
1	12,794	30	15.2
2	2,950	30	14.5
3	1,008	30	5.0

A Pre-development Watershed Map, showing sub-watershed boundaries, time of concentration flow paths, and Study Points, is provided in Appendix A. The Pre-development HydroCAD model is attached in Appendix B.

Peak rates of runoff at the Study Points, computed for the existing condition are as follows:

Pre-Development Peak Rates of Runoff (cfs)			
Study Point	**2-Year**	**10-Year**	**25-Year**
SP1	0.0	0.0	0.0
SP2	0.0	0.0	0.0
SP3	0.0	0.0	0.0

In the pre-development condition, the model predicts that no runoff will leave the site. These pre-development peak rates of runoff are a baseline used for comparison to post-development rates.

POST-DEVELOPMENT CONDITIONS

The proposed post-development condition includes the construction of the building, driveway, parking, and lawn areas. An infiltration basin will also be constructed at the north end of the site to provide stormwater treatment as well as peak flow attenuation at Study Point SP2. The project is expected to result in an increase in impervious area of approximately 9,689 sq. ft. Five post-development subcatchments tributary to four Study Points were identified and defined in the post-development hydrologic model.

Subcatchment 10 includes the southern half of the building roof and the area south of the building. Runoff will sheet flow into a stormwater buffer located off the southern edge of the parking area, prior to reaching Study Point SP1.

Subcatchment 20 includes the northern half of the building roof and the area north of the building. Runoff from subcatchment 20 will flow to the proposed infiltration basin located at the north end of the site. Runoff that exceeds the capacity of the infiltration basin will flow to Study Point SP2 and the storm drain network in Tandberg Trial.

Subcatchment 30 contains a small lawn area east of the site driveway. Runoff from subcatchment 30 will flow overland across the eastern property boundary, represented by Study Point SP3.

Subcatchment 40 contains a small lawn area west of the building and parking areas. Runoff from subcatchment 40 will flow overland across the western property boundary, represented by Study Point SP4.

Subcatchment 50 includes a portion of the site driveway, adjacent to Tandberg Trail. Because of flat nature of the site, runoff from this area is difficult to capture and direct to the infiltration basin or another BMP, and will flow directly onto Tandberg Trail, where it will enter the storm drain network.

The following is a summary of the characteristics of the post-development subareas described above.

Post-Development Conditions			
Subarea	**Area (s.f.)**	**CN**	**Time of Concentration (minutes)**
10	7,264	74	15.2
20	5,975	79	5.0
30	1,207	39	5.0
40	786	39	5.0
50	1,510	81	5.0

A Post-development Watershed Map, showing sub-watershed boundaries, time of concentration flow paths, and Study Points, is provided in Appendix A. The Post-development HydroCAD model is attached in Appendix C.

Peak rates of runoff at the Study Points, computed for the proposed condition are as follows:

Post-Development Peak Rates of Runoff (cfs)			
	2-Year	**10-Year**	**25-Year**
SP1	0.1	0.3	0.4
SP2	0.1	0.1	0.2
SP3	0.0	0.0	0.0
SP4	0.0	0.0	0.0

STORMWATER PEAK FLOW RATE ANALYSIS

The results of the pre-development and post-development models were analyzed at the defined Points of Interest described above. The direct comparison of the pre-development and post-development conditions at the Study Points are as follows:

Peak Runoff Flow Rates Comparison								
Storm Event	**Study Point SP1**		**Study Point SP2**		**Study Point SP3**		**Study Point SP4**	
	Pre-Dev. Peak Rate (cfs)	**Post-Dev. Peak Rate (cfs)**	**Pre-Dev. Peak Rate (cfs)**	**Post-Dev. Peak Rate (cfs)**	**Pre-Dev. Peak Rate (cfs)**	**Post-Dev. Peak Rate (cfs)**	**Pre-Dev. Peak Rate (cfs)**	**Post-Dev. Peak Rate (cfs)**
2-Year	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0
10-Year	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0
25-Year	0.0	0.4	0.0	0.2	0.0	0.0	0.0	0.0

According to the models, no runoff will leave the site at Study Points SP3 and SP4. At SP1 and SP2, small increases in peak rates of runoff compared to existing rates are expected as a result of the proposed project.

At SP1, which represents the site's southern boundary, increases of 0.1, 0.3, and 0.4 cfs are predicted in the 2-year, 10-year, and 25-year design storm events, respectively. The relatively small flow rates are expected to have no impact on the downstream property, which is undeveloped woodland.

At SP2, which represents the site's northern boundary, increases of 0.1, 0.1, and 0.2 cfs are predicted in the 2-year, 10-year, and 25-year design storm events, respectively. Similarly to SP1, these low peak rates are expected to have no impact downstream of the project.

WATER QUALITY PROVISIONS

The project is not required to meet stormwater quality standards. However, the proposed infiltration basin, roof dripline filter, and stormwater buffer will provide treatment in accordance with Maine Department of Environmental Protection (MDEP) standards for

Subcatchments 10 and 20. All three BMPs were designed in accordance with the MDEP BMP Technical Design Manual. Design calculations are provided in Appendix D.

EROSION & SEDIMENTATION CONTROL

A site specific Erosion & Sedimentation Control Plan has been developed for the project. Means and methods to control erosion and sedimentation during and after construction are detailed in the erosion control plan, narrative, and construction details, which are included directly on the project drawings for ease of reference during construction.

CONCLUSIONS

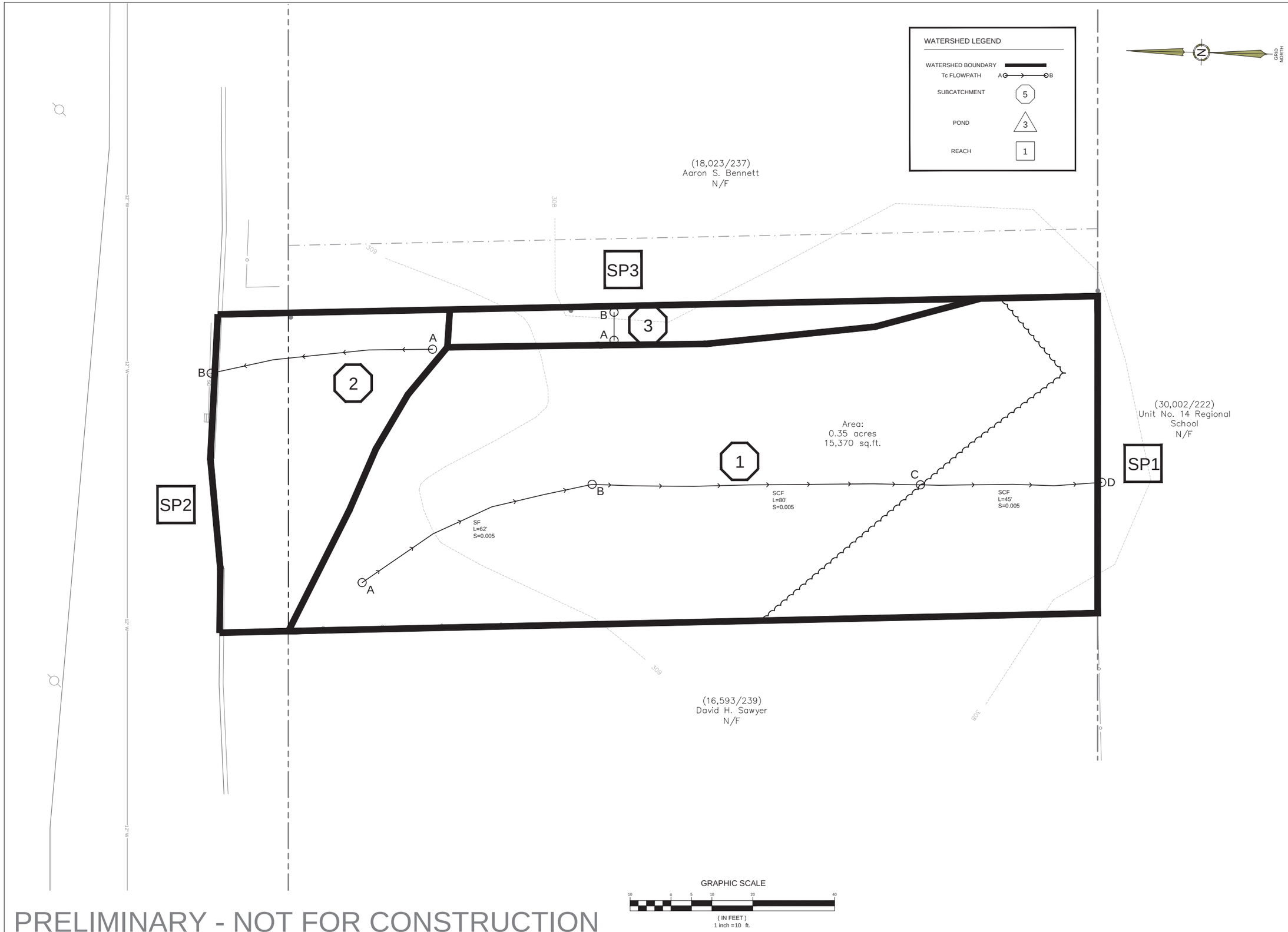
With the implementation of the stormwater measures described above and detailed on the project drawings the proposed project is not expected to have a detrimental effect on downstream properties or waterbodies.

APPENDICES

A – Pre and Post-Development Watershed Maps
B – Pre-development HydroCAD Model
C – Post-development HydroCAD Model
D – BMP Design Calculations

APPENDIX A

Pre & Post-Development Watershed Maps



PRELIMINARY - NOT FOR CONSTRUCTION

STATE OF MAINE
MICHAEL E. TADEMA-WIELANDT
No. 11587
LICENSED
PROFESSIONAL ENGINEER

P.E.: MICHAEL E. TADEMA-WIELANDT

NO.	DATE	REVISIONS	APP'D BY
1	8-10-16	SUBMITTED TO TOWN OF WINDHAM FOR SITE PLAN APPROVAL	MTW

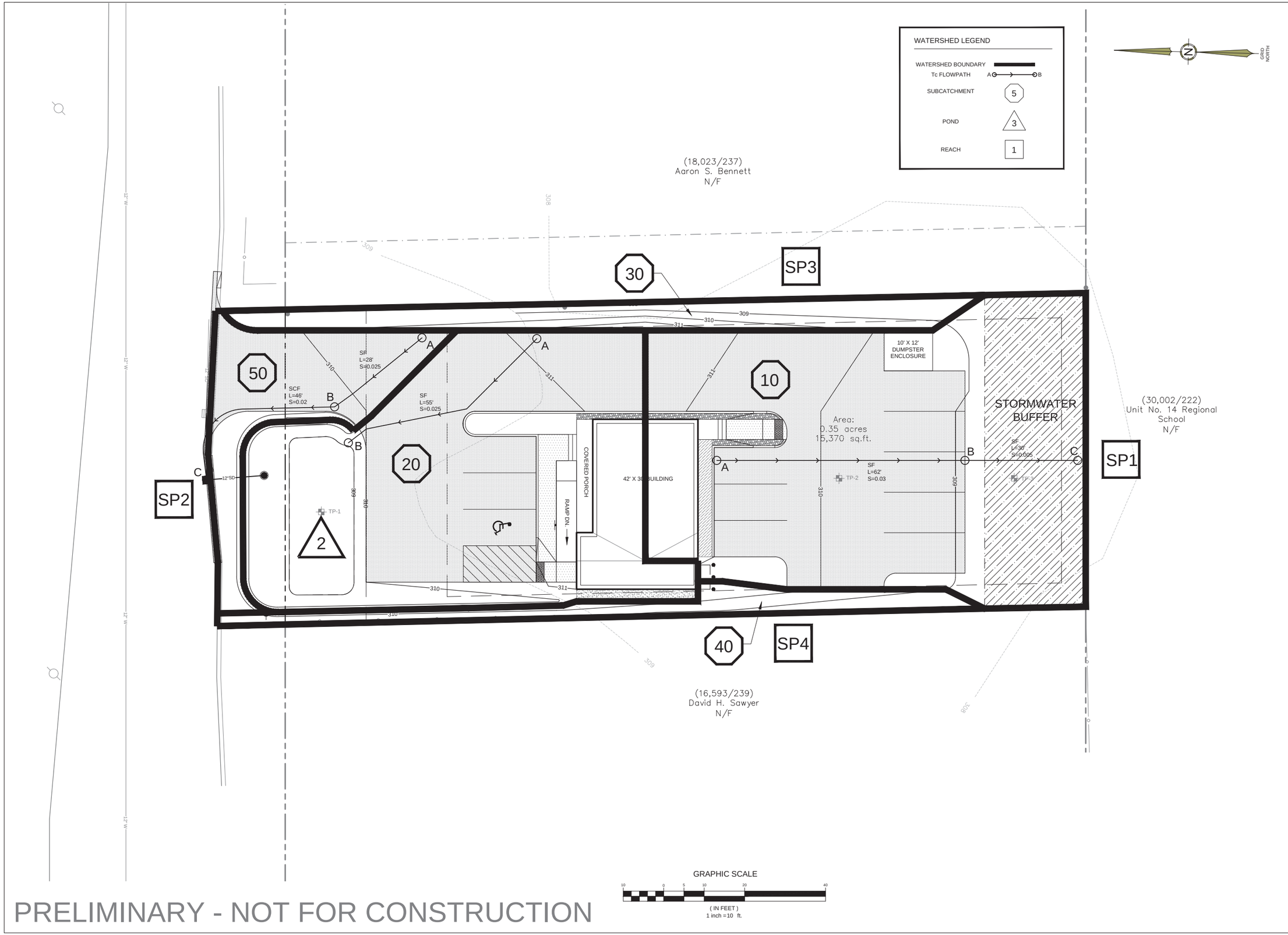
TERRADYN CONSULTANTS, LLC
P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com

Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

SHEET DESCRIPTION
LANDING REAL ESTATE OFFICE
79 TANDBERG TRAIL, WINDHAM, MAINE
PRE-DEVELOPMENT WATERSHED PLAN

PREPARED FOR
ROBIE BUILDERS
472 ROOSEVELT TRAIL
WINDHAM, MAINE 04062

DATE:	3-3-2016
SCALE:	1"=10'
DESIGNED:	MTW
JOB NO:	1565
FILE: 1607-WATERSHED.DWG	
SHEET	WS-1



PRELIMINARY - NOT FOR CONSTRUCTION

STATE OF MAINE
MICHAEL E. TADEMA-WIELANDT
No. 11587
LICENSED
PROFESSIONAL ENGINEER

P.E.: MICHAEL E. TADEMA-WIELANDT

NO.	DATE	REVISIONS	APP'D BY
1	8-10-16	SUBMITTED TO TOWN OF WINDHAM FOR SITE PLAN APPROVAL	MTW

Permitting

TERRADYN CONSULTANTS, LLC
P.O. Box 339
111 Elderberry Lane
New Gloucester, ME 04260
Office: (207) 926-5111
Fax: (207) 221-1317
www.terradynconsultants.com

Civil Engineering - Land Planning - Stormwater Design - Environmental Permitting

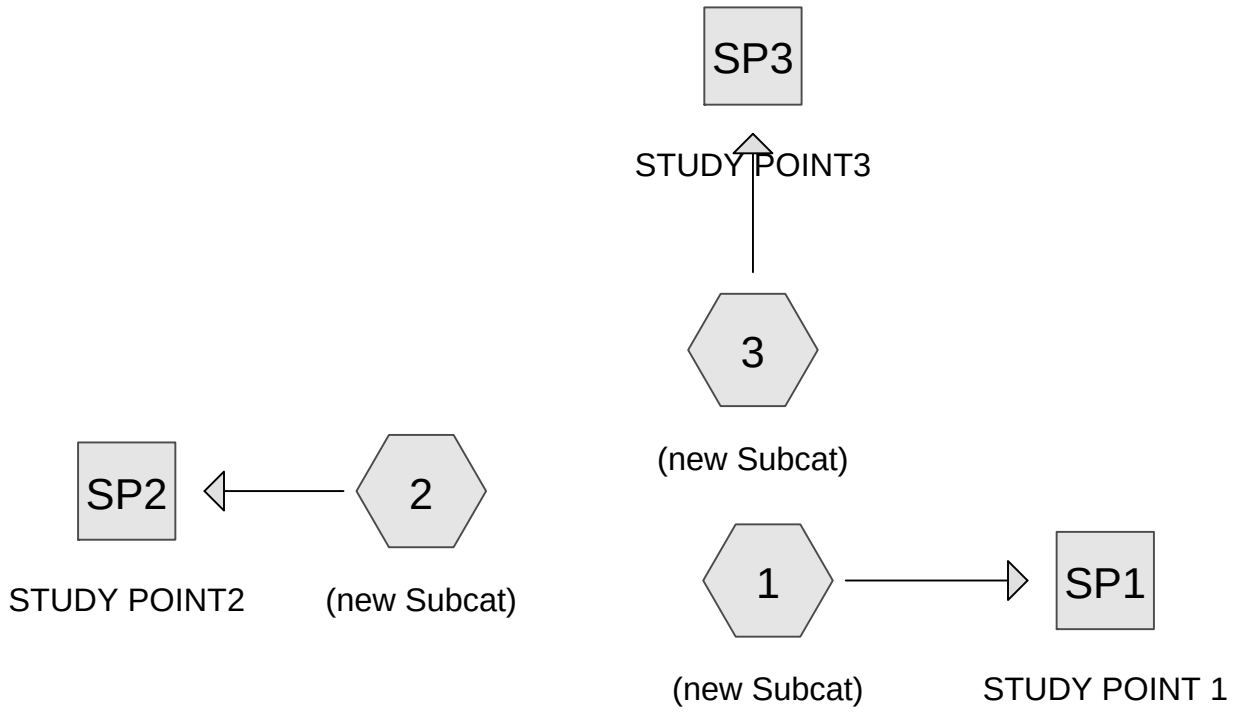
SHEET DESCRIPTION
LANDING REAL ESTATE OFFICE
79 TANDBERG TRAIL, WINDHAM, MAINE
POST-DEVELOPMENT WATERSHED PLAN

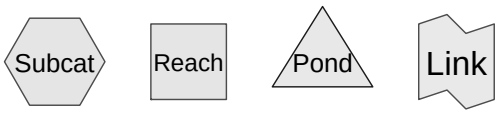
PREPARED FOR
ROBIE BUILDERS
472 ROOSEVELT TRAIL
WINDHAM, MAINE 04062

DATE:	3-3-2016
SCALE:	1"=10'
DESIGNED:	MTW
JOB NO:	1565
FILE: 1607-WATERSHED.DWG	
SHEET	WS-2

APPENDIX B

Predevelopment Runoff Calculations





Drainage Diagram for 1607-PRE
Prepared by Terradyn Consultants, Printed 8/12/2016
HydroCAD® 9.00 s/n 03654 © 2009 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: (new Subcat) Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=187' Slope=0.0050 '/' Tc=15.2 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 2: (new Subcat) Runoff Area=2,950 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=50' Slope=0.0050 '/' Tc=14.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 3: (new Subcat) Runoff Area=1,008 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=10' Slope=0.0050 '/' Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

Reach SP1: STUDY POINT 1 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach SP2: STUDY POINT2 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach SP3: STUDY POINT3 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Summary for Subcatchment 1: (new Subcat)

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
3,024	30	Woods, Good, HSG A
9,770	30	Brush, Good, HSG A
12,794	30	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	62	0.0050	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.10"
1.3	80	0.0050	1.06		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
2.1	45	0.0050	0.35		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
15.2	187	Total			

Summary for Subcatchment 2: (new Subcat)

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
2,950	30	Brush, Good, HSG A
2,950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	50	0.0050	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"

Summary for Subcatchment 3: (new Subcat)

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,008	30	Brush, Good, HSG A
1,008		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	10	0.0050	0.04		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.0					**Direct Entry, 5 MINUTE MINIMUM TC**
5.0	10	Total			

Summary for Reach SP1: STUDY POINT 1

Inflow Area = 0.294 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: STUDY POINT2

Inflow Area = 0.068 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: STUDY POINT3

Inflow Area = 0.023 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: (new Subcat) Runoff Area=12,794 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=187' Slope=0.0050 '/' Tc=15.2 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 2: (new Subcat) Runoff Area=2,950 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=50' Slope=0.0050 '/' Tc=14.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 3: (new Subcat) Runoff Area=1,008 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=10' Slope=0.0050 '/' Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

Reach SP1: STUDY POINT 1 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach SP2: STUDY POINT2 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach SP3: STUDY POINT3 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Summary for Subcatchment 1: (new Subcat)

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
3,024	30	Woods, Good, HSG A
9,770	30	Brush, Good, HSG A
12,794	30	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	62	0.0050	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.10"
1.3	80	0.0050	1.06		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
2.1	45	0.0050	0.35		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
15.2	187	Total			

Summary for Subcatchment 2: (new Subcat)

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
2,950	30	Brush, Good, HSG A
2,950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	50	0.0050	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"

Summary for Subcatchment 3: (new Subcat)

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
1,008	30	Brush, Good, HSG A
1,008		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	10	0.0050	0.04		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.0					**Direct Entry, 5 MINUTE MINIMUM TC**
5.0	10	Total			

Summary for Reach SP1: STUDY POINT 1

Inflow Area = 0.294 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: STUDY POINT2

Inflow Area = 0.068 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: STUDY POINT3

Inflow Area = 0.023 ac, 0.00% Impervious, Inflow Depth = 0.00" for 10-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: (new Subcat) Runoff Area=12,794 sf 0.00% Impervious Runoff Depth>0.03"
Flow Length=187' Slope=0.0050 '/' Tc=15.2 min CN=30 Runoff=0.00 cfs 0.001 af

Subcatchment 2: (new Subcat) Runoff Area=2,950 sf 0.00% Impervious Runoff Depth>0.03"
Flow Length=50' Slope=0.0050 '/' Tc=14.5 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 3: (new Subcat) Runoff Area=1,008 sf 0.00% Impervious Runoff Depth>0.03"
Flow Length=10' Slope=0.0050 '/' Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

Reach SP1: STUDY POINT 1 Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach SP2: STUDY POINT2 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach SP3: STUDY POINT3 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Summary for Subcatchment 1: (new Subcat)

Runoff = 0.00 cfs @ 16.94 hrs, Volume= 0.001 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
3,024	30	Woods, Good, HSG A
9,770	30	Brush, Good, HSG A
12,794	30	Weighted Average
12,794		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8	62	0.0050	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.10"
1.3	80	0.0050	1.06		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
2.1	45	0.0050	0.35		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
15.2	187	Total			

Summary for Subcatchment 2: (new Subcat)

Runoff = 0.00 cfs @ 16.94 hrs, Volume= 0.000 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
2,950	30	Brush, Good, HSG A
2,950		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	50	0.0050	0.06		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"

Summary for Subcatchment 3: (new Subcat)

Runoff = 0.00 cfs @ 16.76 hrs, Volume= 0.000 af, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
1,008	30	Brush, Good, HSG A
1,008		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	10	0.0050	0.04		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
1.0					**Direct Entry, 5 MINUTE MINIMUM TC**
5.0	10	Total			

Summary for Reach SP1: STUDY POINT 1

Inflow Area = 0.294 ac, 0.00% Impervious, Inflow Depth > 0.03" for 25-YR event
Inflow = 0.00 cfs @ 16.94 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 16.94 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: STUDY POINT2

Inflow Area = 0.068 ac, 0.00% Impervious, Inflow Depth > 0.03" for 25-YR event
Inflow = 0.00 cfs @ 16.94 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 16.94 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

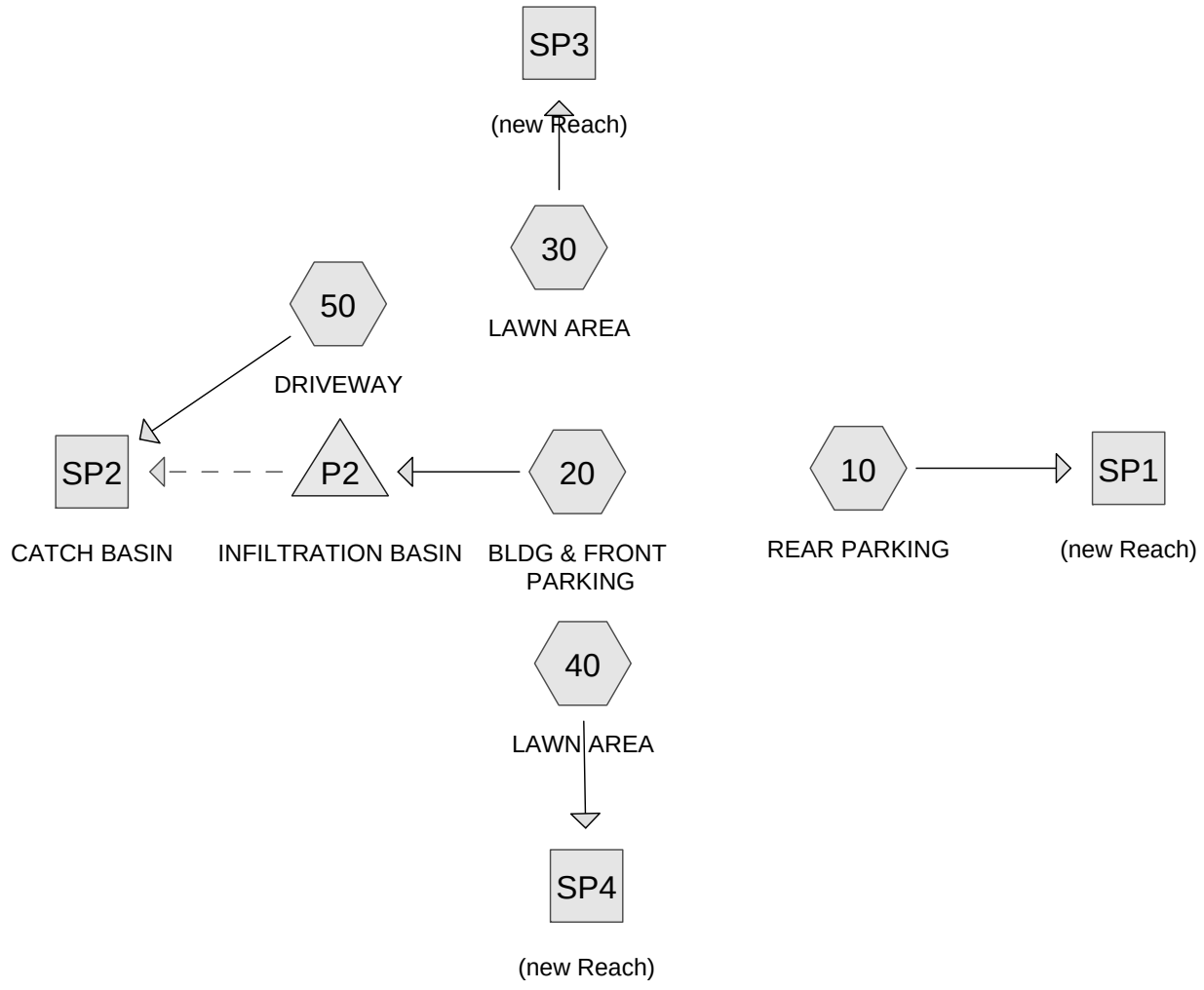
Summary for Reach SP3: STUDY POINT3

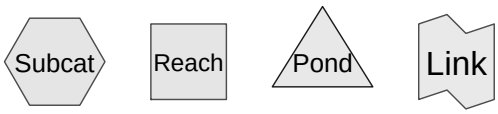
Inflow Area = 0.023 ac, 0.00% Impervious, Inflow Depth > 0.03" for 25-YR event
Inflow = 0.00 cfs @ 16.76 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 16.76 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

APPENDIX C

Postdevelopment Runoff Calculations





Drainage Diagram for 1607-POST
Prepared by Terradyn Consultants, Printed 8/12/2016
HydroCAD® 9.00 s/n 03654 © 2009 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: REAR PARKING Runoff Area=7,264 sf 62.36% Impervious Runoff Depth>0.88"
Flow Length=92' Tc=15.2 min CN=74 Runoff=0.13 cfs 0.012 af

Subcatchment 20: BLDG & FRONT Runoff Area=5,975 sf 68.47% Impervious Runoff Depth>1.16"
Flow Length=55' Slope=0.0250 '/' Tc=5.0 min CN=79 Runoff=0.20 cfs 0.013 af

Subcatchment 30: LAWN AREA Runoff Area=1,207 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 40: LAWN AREA Runoff Area=786 sf 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 50: DRIVEWAY Runoff Area=1,510 sf 70.66% Impervious Runoff Depth>1.29"
Flow Length=74' Tc=5.0 min CN=81 Runoff=0.06 cfs 0.004 af

Reach SP1: (new Reach) Inflow=0.13 cfs 0.012 af
Outflow=0.13 cfs 0.012 af

Reach SP2: CATCH BASIN Inflow=0.06 cfs 0.004 af
Outflow=0.06 cfs 0.004 af

Reach SP3: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach SP4: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond P2: INFILTRATION BASIN Peak Elev=309.22' Storage=159 cf Inflow=0.20 cfs 0.013 af
Discarded=0.05 cfs 0.013 af Secondary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.013 af

Summary for Subcatchment 10: REAR PARKING

Runoff = 0.13 cfs @ 12.23 hrs, Volume= 0.012 af, Depth> 0.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
4,530	98	Paved parking, HSG A
797	39	>75% Grass cover, Good, HSG A
1,937	32	Woods/grass comb., Good, HSG A
7,264	74	Weighted Average
2,734		37.64% Pervious Area
4,530		62.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	62	0.0300	1.45		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
14.5	30	0.0050	0.03		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 3.10"
15.2	92	Total			

Summary for Subcatchment 20: BLDG & FRONT PARKING

Runoff = 0.20 cfs @ 12.08 hrs, Volume= 0.013 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
4,091	98	Paved parking, HSG A
1,884	39	>75% Grass cover, Good, HSG A
5,975	79	Weighted Average
1,884		31.53% Pervious Area
4,091		68.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	55	0.0250	1.31		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	55	Total			

Summary for Subcatchment 30: LAWN AREA

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,207	39	>75% Grass cover, Good, HSG A
1,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 40: LAWN AREA

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
786	39	>75% Grass cover, Good, HSG A
786		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 50: DRIVEWAY

Runoff = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
1,067	98	Paved parking, HSG A
443	39	>75% Grass cover, Good, HSG A
1,510	81	Weighted Average
443		29.34% Pervious Area
1,067		70.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	28	0.0250	1.15		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.10"
0.3	46	0.0200	2.87		**Shallow Concentrated Flow, B-C**
					Paved Kv= 20.3 fps
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	74	Total			

Summary for Reach SP1: (new Reach)

Inflow Area = 0.167 ac, 62.36% Impervious, Inflow Depth > 0.88" for 2-YR event
Inflow = 0.13 cfs @ 12.23 hrs, Volume= 0.012 af
Outflow = 0.13 cfs @ 12.23 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: CATCH BASIN

Inflow Area = 0.035 ac, 70.66% Impervious, Inflow Depth > 1.29" for 2-YR event
Inflow = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.08 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: (new Reach)

Inflow Area = 0.028 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP4: (new Reach)

Inflow Area = 0.018 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P2: INFILTRATION BASIN

Inflow Area = 0.137 ac, 68.47% Impervious, Inflow Depth > 1.16" for 2-YR event
Inflow = 0.20 cfs @ 12.08 hrs, Volume= 0.013 af
Outflow = 0.05 cfs @ 12.52 hrs, Volume= 0.013 af, Atten= 77%, Lag= 26.1 min
Discarded = 0.05 cfs @ 12.52 hrs, Volume= 0.013 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 309.22' @ 12.52 hrs Surf.Area= 810 sf Storage= 159 cf

Plug-Flow detention time= 25.9 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 25.4 min (832.1 - 806.7)

Volume	Invert	Avail.Storage	Storage Description
#1	309.00'	1,055 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
309.00	610	0	0
310.00	1,500	1,055	1,055

Device	Routing	Invert	Outlet Devices
#1	Discarded	309.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	309.60'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.52 hrs HW=309.22' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=309.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: REAR PARKING Runoff Area=7,264 sf 62.36% Impervious Runoff Depth>1.89"
Flow Length=92' Tc=15.2 min CN=74 Runoff=0.30 cfs 0.026 af

Subcatchment 20: BLDG & FRONT Runoff Area=5,975 sf 68.47% Impervious Runoff Depth>2.29"
Flow Length=55' Slope=0.0250 '/' Tc=5.0 min CN=79 Runoff=0.40 cfs 0.026 af

Subcatchment 30: LAWN AREA Runoff Area=1,207 sf 0.00% Impervious Runoff Depth>0.10"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 40: LAWN AREA Runoff Area=786 sf 0.00% Impervious Runoff Depth>0.10"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 50: DRIVEWAY Runoff Area=1,510 sf 70.66% Impervious Runoff Depth>2.46"
Flow Length=74' Tc=5.0 min CN=81 Runoff=0.11 cfs 0.007 af

Reach SP1: (new Reach) Inflow=0.30 cfs 0.026 af
Outflow=0.30 cfs 0.026 af

Reach SP2: CATCH BASIN Inflow=0.11 cfs 0.007 af
Outflow=0.11 cfs 0.007 af

Reach SP3: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach SP4: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond P2: INFILTRATION BASIN Peak Elev=309.50' Storage=413 cf Inflow=0.40 cfs 0.026 af
Discarded=0.06 cfs 0.026 af Secondary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.026 af

Summary for Subcatchment 10: REAR PARKING

Runoff = 0.30 cfs @ 12.22 hrs, Volume= 0.026 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
4,530	98	Paved parking, HSG A
797	39	>75% Grass cover, Good, HSG A
1,937	32	Woods/grass comb., Good, HSG A
7,264	74	Weighted Average
2,734		37.64% Pervious Area
4,530		62.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	62	0.0300	1.45		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
14.5	30	0.0050	0.03		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 3.10"
15.2	92	Total			

Summary for Subcatchment 20: BLDG & FRONT PARKING

Runoff = 0.40 cfs @ 12.08 hrs, Volume= 0.026 af, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
4,091	98	Paved parking, HSG A
1,884	39	>75% Grass cover, Good, HSG A
5,975	79	Weighted Average
1,884		31.53% Pervious Area
4,091		68.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	55	0.0250	1.31		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.10"
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	55	Total			

Summary for Subcatchment 30: LAWN AREA

Runoff = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
1,207	39	>75% Grass cover, Good, HSG A
1,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 40: LAWN AREA

Runoff = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
786	39	>75% Grass cover, Good, HSG A
786		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 50: DRIVEWAY

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.60"

Area (sf)	CN	Description
1,067	98	Paved parking, HSG A
443	39	>75% Grass cover, Good, HSG A
1,510	81	Weighted Average
443		29.34% Pervious Area
1,067		70.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	28	0.0250	1.15		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.10"
0.3	46	0.0200	2.87		**Shallow Concentrated Flow, B-C**
					Paved Kv= 20.3 fps
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	74	Total			

Summary for Reach SP1: (new Reach)

Inflow Area = 0.167 ac, 62.36% Impervious, Inflow Depth > 1.89" for 10-YR event
Inflow = 0.30 cfs @ 12.22 hrs, Volume= 0.026 af
Outflow = 0.30 cfs @ 12.22 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: CATCH BASIN

Inflow Area = 0.035 ac, 70.66% Impervious, Inflow Depth > 2.46" for 10-YR event
Inflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af
Outflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: (new Reach)

Inflow Area = 0.028 ac, 0.00% Impervious, Inflow Depth > 0.10" for 10-YR event
Inflow = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP4: (new Reach)

Inflow Area = 0.018 ac, 0.00% Impervious, Inflow Depth > 0.10" for 10-YR event
Inflow = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 14.56 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P2: INFILTRATION BASIN

Inflow Area = 0.137 ac, 68.47% Impervious, Inflow Depth > 2.29" for 10-YR event
Inflow = 0.40 cfs @ 12.08 hrs, Volume= 0.026 af
Outflow = 0.06 cfs @ 12.61 hrs, Volume= 0.026 af, Atten= 85%, Lag= 32.1 min
Discarded = 0.06 cfs @ 12.61 hrs, Volume= 0.026 af
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 309.50' @ 12.61 hrs Surf.Area= 1,052 sf Storage= 413 cf

Plug-Flow detention time= 64.0 min calculated for 0.026 af (100% of inflow)
Center-of-Mass det. time= 63.3 min (854.8 - 791.4)

Volume	Invert	Avail.Storage	Storage Description
#1	309.00'	1,055 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
309.00	610	0	0
310.00	1,500	1,055	1,055

Device	Routing	Invert	Outlet Devices
#1	Discarded	309.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	309.60'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.06 cfs @ 12.61 hrs HW=309.50' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=309.00' (Free Discharge)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10: REAR PARKING Runoff Area=7,264 sf 62.36% Impervious Runoff Depth>2.80"
Flow Length=92' Tc=15.2 min CN=74 Runoff=0.44 cfs 0.039 af

Subcatchment 20: BLDG & FRONT Runoff Area=5,975 sf 68.47% Impervious Runoff Depth>3.28"
Flow Length=55' Slope=0.0250 '/' Tc=5.0 min CN=79 Runoff=0.56 cfs 0.037 af

Subcatchment 30: LAWN AREA Runoff Area=1,207 sf 0.00% Impervious Runoff Depth>0.32"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.001 af

Subcatchment 40: LAWN AREA Runoff Area=786 sf 0.00% Impervious Runoff Depth>0.32"
Tc=5.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment 50: DRIVEWAY Runoff Area=1,510 sf 70.66% Impervious Runoff Depth>3.47"
Flow Length=74' Tc=5.0 min CN=81 Runoff=0.15 cfs 0.010 af

Reach SP1: (new Reach) Inflow=0.44 cfs 0.039 af
Outflow=0.44 cfs 0.039 af

Reach SP2: CATCH BASIN Inflow=0.17 cfs 0.013 af
Outflow=0.17 cfs 0.013 af

Reach SP3: (new Reach) Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach SP4: (new Reach) Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond P2: INFILTRATION BASIN Peak Elev=309.63' Storage=564 cf Inflow=0.56 cfs 0.037 af
Discarded=0.07 cfs 0.035 af Secondary=0.12 cfs 0.003 af Outflow=0.19 cfs 0.037 af

Summary for Subcatchment 10: REAR PARKING

Runoff = 0.44 cfs @ 12.21 hrs, Volume= 0.039 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
4,530	98	Paved parking, HSG A
797	39	>75% Grass cover, Good, HSG A
1,937	32	Woods/grass comb., Good, HSG A
7,264	74	Weighted Average
2,734		37.64% Pervious Area
4,530		62.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	62	0.0300	1.45		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.10"
14.5	30	0.0050	0.03		**Sheet Flow, B-C**
					Woods: Light underbrush n= 0.400 P2= 3.10"
15.2	92	Total			

Summary for Subcatchment 20: BLDG & FRONT PARKING

Runoff = 0.56 cfs @ 12.08 hrs, Volume= 0.037 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
4,091	98	Paved parking, HSG A
1,884	39	>75% Grass cover, Good, HSG A
5,975	79	Weighted Average
1,884		31.53% Pervious Area
4,091		68.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	55	0.0250	1.31		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.10"
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	55	Total			

Summary for Subcatchment 30: LAWN AREA

Runoff = 0.00 cfs @ 12.35 hrs, Volume= 0.001 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
1,207	39	>75% Grass cover, Good, HSG A
1,207		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 40: LAWN AREA

Runoff = 0.00 cfs @ 12.35 hrs, Volume= 0.000 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
786	39	>75% Grass cover, Good, HSG A
786		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, 5 MINUTE MIN. Tc**

Summary for Subcatchment 50: DRIVEWAY

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af, Depth> 3.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=5.80"

Area (sf)	CN	Description
1,067	98	Paved parking, HSG A
443	39	>75% Grass cover, Good, HSG A
1,510	81	Weighted Average
443		29.34% Pervious Area
1,067		70.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	28	0.0250	1.15		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.10"
0.3	46	0.0200	2.87		**Shallow Concentrated Flow, B-C**
					Paved Kv= 20.3 fps
4.3					**Direct Entry, 5 MINUTE MIN. Tc**
5.0	74	Total			

Summary for Reach SP1: (new Reach)

Inflow Area = 0.167 ac, 62.36% Impervious, Inflow Depth > 2.80" for 25-YR event
Inflow = 0.44 cfs @ 12.21 hrs, Volume= 0.039 af
Outflow = 0.44 cfs @ 12.21 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP2: CATCH BASIN

Inflow Area = 0.035 ac, 70.66% Impervious, Inflow Depth > 4.46" for 25-YR event
Inflow = 0.17 cfs @ 12.38 hrs, Volume= 0.013 af
Outflow = 0.17 cfs @ 12.38 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP3: (new Reach)

Inflow Area = 0.028 ac, 0.00% Impervious, Inflow Depth > 0.32" for 25-YR event
Inflow = 0.00 cfs @ 12.35 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 12.35 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach SP4: (new Reach)

Inflow Area = 0.018 ac, 0.00% Impervious, Inflow Depth > 0.32" for 25-YR event
Inflow = 0.00 cfs @ 12.35 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 12.35 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Pond P2: INFILTRATION BASIN

Inflow Area = 0.137 ac, 68.47% Impervious, Inflow Depth > 3.28" for 25-YR event
Inflow = 0.56 cfs @ 12.08 hrs, Volume= 0.037 af
Outflow = 0.19 cfs @ 12.39 hrs, Volume= 0.037 af, Atten= 67%, Lag= 19.0 min
Discarded = 0.07 cfs @ 12.39 hrs, Volume= 0.035 af
Secondary = 0.12 cfs @ 12.39 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 309.63' @ 12.39 hrs Surf.Area= 1,173 sf Storage= 564 cf

Plug-Flow detention time= 74.7 min calculated for 0.037 af (100% of inflow)
Center-of-Mass det. time= 74.0 min (857.2 - 783.2)

Volume	Invert	Avail.Storage	Storage Description
#1	309.00'	1,055 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
309.00	610	0	0
310.00	1,500	1,055	1,055

Device	Routing	Invert	Outlet Devices
#1	Discarded	309.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	309.60'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.07 cfs @ 12.39 hrs HW=309.63' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=0.12 cfs @ 12.39 hrs HW=309.63' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 0.12 cfs @ 0.59 fps)

APPENDIX D

BMP Design Calculations

INFILTRATION BASIN DESIGN

Total Tributary Area:	5,975	SF	
Impervious Area:	4,091	SF	
Landscape Area:	1,884	SF	
Required Storage Volume:	404	CF	1" x Imp. Area + 0.4" x LS Area

STAGE STORAGE

ELEVATION	AREA (SF)	INCREMENTAL VOLUME (CF)	TOTAL VOLUME (CF)	
309	610	0	0	<-- Surface of Filter
309.6	1,144	526	526	<-- Outlet Elevation
310	1,500	529	1055	

ROOF DRIPLINE FILTER SIZING CALCULATIONS

EAST SIDE OF BUIDLING

UNIT STORAGE VOLUME CALCULATION:	
[L] ROOF LENGTH (FT)	7
[D] RAINFALL DEPTH (IN)	1
[US] REQUIRED RUNOFF STORAGE PER LINEAR FOOT (CF) = [L][D]/12	0.58
STONE RESERVOIR DEPTH CALCULATION	
[P] STONE POROSITY	40%
[W] DRIPEDGE WIDTH (IN)	36
STONE RESERVOIR DEPTH (IN) = [US]/[P][W/12]	5.83

ATTACHMENT K

EVIDENCE OF FINANCIAL CAPABILITY

Norway Savings Bank
COLORFUL SOLUTIONS™

August 4, 2016

Jack and Rose, LLC
Matthew A. DiBiase
Lisa D. DiBiase
9 Country Lane
Portland, ME 04103

Dear Matt & Lisa:

This letter, when properly signed and accepted, will constitute an agreement between Norway Savings Bank (the "Bank") which agrees to lend, and Jack and Rose, LLC (the "Borrower") which agrees to borrow in accordance with the following terms and conditions.

Borrower:	Jack and Rose, LLC
Amount of Loan:	A. $186,313 B. $149,050
Purpose:	The proceeds of the loan will be used to pay out Robie Contracting Inc. who funded the construction of 79 Tandberg Trail, Windham, Maine and to reimburse Matthew DiBiase for some of the personal funds used to purchase the land at 79 Tandberg Trail, Windham, Maine.
Interest Rate:	A. Fixed at 4.75% for five years, then WSJ Prime + 0.50%, variable, thereafter B. SBA 504 rate at the time of debenture. Current rate is 4.091%
Repayment Terms:	A. Principal and interest, payable monthly, amortized over 240 months B. Interest only during the first 3 months (until SBA debenture), then principal and interest, payable monthly, for 240 months
Maturity:	A. The entire loan balance will be due in full in 20 years B. The entire loan balance will be repaid by the sale of a SBA Debenture within 3 months. The SBA mortgage will be due in full in 20 years
Construction Loan Fee:	A. None B. SBA fees assessed and paid at closing
Prepayment Penalty:	A. There will be a prepayment penalty of 5% in year one, 4% in year two, 3% in year 3, 2% in year 2 , and 1% in year 5, if refinanced with another lender B. Standard SBA prepayment penalties
Guarantors:	The unlimited personal guaranties of: Matthew A. DiBiase Lisa D. DiBiase The corporate guaranty of: Landing Real Estate LLC The guaranties shall be joint and several.

Tax Escrow:	The Bank is requiring 1/12 of the annual estimated real estate taxes assessed to the property to be paid monthly to be held in an escrow account. These escrow payments would be in addition to the regular installments of principal and interest required above.
Agency Guarantee:	Subject to approval (and all terms and conditions required) by the United States Small Business Administration (SBA) for financing under the 504 Debenture Program.
Collateral:	A. First position mortgage and assignment of leases and rents on property located at 79 Tandberg Trail, Windham, Maine 04062 First security position in all business assets of Landing Real Estate, LLC now owned or hereafter acquired (secures the guarantee of Landing Real Estate, LLC) B. Second position mortgage and assignment of leases and rents on property located at 79 Tandberg Trail, Windham, Maine 04062 Second security position in all business assets of Landing Real Estate, LLC now owned or hereafter acquired (secures the guarantee of Landing Real Estate, LLC)
Appraisal:	An "as completed" real estate appraisal will be performed on 79 Tandberg Trail, Windham, Maine 04062 by an independent appraisal firm acceptable to the Bank. The appraisal is to be commissioned by the Bank and satisfactory in all respects to the Bank. The final loan to value ratio based on the appraised value must be no greater than 90% prior to the SBA 504 debenture sale and take-out. The cost of the appraisal shall be borne by the Borrower. A "final inspection" of the completed construction by the appraiser is required prior to closing.
Authority of Borrower:	Borrower shall provide to Bank at closing proof satisfactory to Bank counsel of 1) the due organization, legal existence and good standing of Borrower in its state of organization; 2) all loan documents are duly authorized, executed and delivered by Borrower and any Guarantors; 3) no action, suit or proceeding pending or threatened against or affecting Borrower, any Guarantors or the Project, before any court administration agency, arbitrator or governmental authority.
Environmental Inspection:	Prior to loan closing, the Bank, at Borrower's expense, shall have received an Environmental Transaction Screen Evaluation of the Project acceptable to the Bank. The Lender shall have the right to terminate this commitment if the environmental evaluation is not satisfactory. Borrower and Guarantor will be required to indemnify the Bank for any hazardous waste.
Insurance:	The Borrower will provide casualty, hazard, liability; business interruption insurance coverage on the subject property in a form acceptable to the Bank. The policy shall name Norway Savings Bank as mortgagee.
Title Insurance:	The Borrower shall provide the Bank with an ALTA Lender's Title Insurance Policy on the property issued by a title insurance company acceptable to the Bank. The cost of the title insurance shall be borne by the Borrower. The policies shall have mechanic's lien, survey, and tenants-in-possession exceptions deleted.
Flood Insurance:	If the subject property is located in a federally designated flood hazard zone A, flood insurance shall be required to be maintained for the life of the loan. The terms of the flood insurance policy shall be acceptable to the Bank, and shall name Norway Savings Bank as mortgagee.

Mortgage Inspection Plan:	A mortgage inspection plan shall be provided once the building footprint is established showing a state of facts acceptable to Bank's counsel allowing deletion of survey exception from lender's title insurance policy.
Compliance With Law:	This commitment is subject to the subject real estate's compliance with all applicable federal, state and local laws and ordinances pertaining to land use, the environment and equal access to public accommodations.
Legal:	All legal and loan documentation will be satisfactory in all respects to the Bank and its counsel. This commitment does not contain all terms and conditions that shall be contained in the loan documents. Whether or not this loan is closed, the Borrower shall be responsible for all expenses associated with the transaction including, but not limited to, the fees for Bank's counsel, title insurance premiums, appraisal fee, filing fees, mortgage inspection plan, environmental studies, and recording fees.
Deposit Relationship:	The rate and terms of this commitment are in express reliance on your maintenance of a comprehensive deposit relationship with Norway Savings Bank.
Financial Statement:	Borrower and Guarantors will provide the Bank with financial statements and income tax returns for any related entity for which they have 20% or greater ownership interest, complete with property cash flow statements, rent rolls, schedules and other information in a form and frequency satisfactory to Norway Savings Bank, within 120 days of their fiscal year end but at least annually.
Other:	Subject to the receipt and satisfactory review of the construction plans, specifications and budget of the project at 79 Tandberg Trail, Windham, Maine Verification of signed leases from Landing Real Estate, LLC and the two other tenants expected to occupy the property at 79 Tandberg Trail, Windham, Maine. The leases need to be satisfactory to the bank and the SBA Monthly loan payments will automatically be deducted from Borrower's Norway Savings Bank account. Subject to evidence of the borrower's (guarantors') 10% equity injection prior to closing.

This is notification to you under Maine law, no promise, contract, or agreement to lend money, extend credit, forbear from collection of a debt or make any other accommodation for the repayment of a debt for more than $250,000 may be enforced against Lender unless the promise, contract, or agreement is in writing and signed by Lender, nor can any change, forbearance or other accommodation relating to the loan be enforced against Lender unless it is in writing and signed by Lender.

This commitment assumes that all information provided to date by the Borrowers is accurate. It shall be a condition for closing this loan that the financial condition of the Borrowers be satisfactory to the Bank. The Bank reserves the right to terminate this commitment and not close the loan in the event: 1) of an adverse change, as determined by the Bank, in the financial condition of the Borrowers prior to closing; 2) any information provided to Bank which proves to be inaccurate; or 3) a case or proceeding is commenced by or against the Borrowers under any bankruptcy or insolvency law.

All parties hereto agree that this commitment shall survive the Loan closing and that each of the obligations and undertakings of the Borrower and any Guarantor hereunder shall continue until the entire loan, together with interest and fees, is paid in full. In the event of a conflict between this commitment and the loan documents, the language of the loan documents shall govern.

This commitment represents the entire agreement between the parties and supersedes all prior agreements or discussions with respect to the loan(s). This commitment letter cannot be waived, modified, amended or changed except by a writing signed by all parties to the commitment letter and, that until or unless it is modified and signed by all parties, it shall continue unchanged as a valid and enforceable obligation. This commitment is non-assignable and non-transferable.

If the terms of this commitment letter are acceptable to you, please sign as indicated and return to me along with a check for $2,500.00, for the construction fee. This commitment must be signed and returned to the Bank by August 31, 2016. This commitment will expire December 30, 2016, if the loan is not closed by that date.

Sincerely,

Dana Myles

Dana Myles
Vice President

SEEN AND ACKNOWLEDGED:

BORROWER: Jack and Rose, LLC

_____
Matthew A. DiBiase, Member/Manager Date

_____
Lisa D. DiBiase, Member/Manager Date

GUARANTORS:

_____
Matthew A. DiBiase, Individually Date

_____
Lisa D. DiBiase, Individually Date

Landing Real Estate, LLC

By: _____
It's Date