PLANNING BOARD MEETING AGENDA

Thursday March 5, 2020
Town Hall Meeting Room
6:30 p.m.

Call to Order

Pledge of Allegiance

Introduction of Board Members

Public Comment

Approval of Minutes

1. February 20, 2020

Public Hearing

2. Conditional Use Application. Adult Use Marijuana Storefront. 60 Route 236 (R-57 55) RC/I Zone. Silver Therapeutics.

Old Business

2. Conditional Use Application. Adult Use Marijuana Storefront. 60 Route 236 (R-57 55) RC/I Zone. Silver Therapeutics.

New Business

3. Conditional Use Application. Substantial Expansion. 541 Portland Street (R72 7-A) RC/I Zone. Redimix Corporation.
4. Sketch Plan. Subdivision Amendment. 241 Cranberry Meadow Road (R32-15) R2 Zone. Hersom.
5. Site Plan Review. Funeral Home. Cemetery Road (R36-46) R2 Zone. Lang-Bibber Funeral Home
6. Site Plan Review. Adult Use Marijuana Cultivation Facility. 11 Pond Road (R70-16) RC/I Zone. CAF Realty of Maine.

Public Comment

Informational Items

Adjournment

PLANNING BOARD MEETING MINUTES

Thursday February 20, 2020
Town Hall Meeting Room
6:30 p.m.

Call to Order

Pledge of Allegiance

Introduction of Board Members

Dave Andreesen; Sean Winston; Michael LaRue
Regular Member Absent:
Nichole Fecteau; Frank Underwood
Alternate Member Present:
David Ross-Lyons (voting member)
Alternate Member Absent:
Staff Members Present:
Lee Jay Feldman, Director of Planning; James Bellissimo, Planner; Jenifer McCabe, Code Enforcement Officer

Public Comment

Approval of Minutes

1. February 6, 2020
   Dave Andreesen pointed out a typo.

Motion: Sean Winston motioned to approve the minutes as amended.
Second: Michael LaRue

VOTED – 4-0 in favor

Motion Passed

In favor: Dave Andreesen; Sean Winston; Michael LaRue; David Ross-Lyons
Opposed: None
Abstain: None

Public Hearing

2. Conditional Use Application. Adult Use Marijuana Storefront & Adult Use Marijuana Production Facility. 569 Portland Street (R72 9-1) RC/I Zone. Straight Fire Farms.

3. Land Use Ordinance Amendments & Subdivision Regulations Amendment

Old Business

2. Conditional Use Application. Adult Use Marijuana Storefront & Adult Use Marijuana Production Facility. 569 Portland Street (R72 9-1) RC/I Zone. Straight Fire Farms.

   James Bellissimo said the applicant submitted the requested information on the rain garden and that was the remaining item the Board requested for submittal. The Board discussed the addition of a Condition of Approval for the applicant to submit proof of State of Maine licensing before receiving a Certificate of Occupancy.

   Sean Winston asked how the rain garden will be maintained. Jenifer McCabe said she would be able to complete an annual inspection. David Ross-Lyons asked about the parking layout. Harvey Paul said the front of the building will have spaces dedicated to the storefront and said there is additional ample room for parking.

Motion: Michael LaRue motioned to approve the Findings of Fact.
Second: David Ross-Lyons

VOTED – 4-0 in favor

Motion Passed

In favor: Dave Andreesen; Sean Winston; Michael LaRue; David Ross-Lyons

Opposed: None

Abstain: None

Motion: Sean Winston motioned to approve the Conditions of Approval.
Second: Michael LaRue

VOTED – 4-0 in favor

Motion Passed

In favor: Dave Andreesen; Sean Winston; Michael LaRue; David Ross-Lyons

Opposed: None

Abstain: None

Motion: David Ross-Lyons motioned to approve the application.
Second: Michael LaRue

VOTED – 4-0 in favor

Motion Passed

In favor: Dave Andreesen; Sean Winston; Michael LaRue; David Ross-Lyons

Opposed: None

Abstain: None

3. Land Use Ordinance Amendments & Subdivision Regulations Amendment

James Bellissimo reviewed the amendment to the name and Performance Standards of Owner-Occupied Apartments to Accessory Dwelling Units. The definition now includes the ability for accessory structures to become Accessory Dwelling Units. An addition provision was removed and language was added to allow external expansion of structures. Sean Winston asked about dimensional requirements, Mr. Bellissimo said language will be added to ensure applicants know they must meet all dimensional requirements with the exception of the Minimum Lot Size requirement.

Additional Marijuana definitions were added as recommended by the Town Attorney. Medical Marijuana Storefront has been removed from C/I and SC/I.

Mr. Bellissimo said the Select Board recommended not to implement a cap on permits and rather to increase the requirements for Marijuana Establishments. Dave Andreesen said the cap is really more of a temporary pause and the Board can come back and readdress the topic. David Ross-Lyons said he agreed and taking some time to address standards is a good idea. Michael LaRue suggested adding in a date to revisit the cap on an annual basis. Mr. Bellissimo said the Office of Marijuana Policy said conditional licenses for Adult Use Marijuana are being issued soon, but sales will not start for another couple months.

Motion: Sean Winston motioned to approve the Land Use Ordinance Amendments & Subdivision Regulation amendment and forward the recommendations to the Select Board.

Second: David Ross-Lyons

VOTED – 4-0 in favor

Motion Passed

In favor: Dave Andreesen; Sean Winston; Michael LaRue; David Ross-Lyons

Opposed: None

Abstain: None

New Business

4. Conditional Use Application. Substantial Expansion. Redimix Corporation. 541 Portland Street (R72 7-A) RC/I Zone.

   The applicant was not in attendance.

Public Comment

Jody Rodgers of 420 Portland Street said she is supportive of increasing the license fee.

Informational Items

Jenifer McCabe said there is good progress at the new Fire Station.

Sean Winston asked about a Prime update. Mr. Bellissimo said he and Lee Jay Feldman met with Julie Smith of Great Falls Construction and Craig Burgess of Sebago Technics, the Civil Engineer firm for the project. The discussion centered around requirements of the Village Overlay District. Sebago Technics has past survey and infrastructure information.

The next community sessions with Great Falls Construction will be held April 14 and then again June 15 in the Burgess Meeting Room.

Adjournment

Motion: David Ross-Lyons
Second: Michael LaRue

VOTED – 4-0 in favor

Motion Passed

In favor: Dave Andreesen; Sean Winston; Michael LaRue; David Ross-Lyons

Opposed: None

Abstain: None

Minutes prepared by Berwick Planner James Bellissimo, for consideration at the next Berwick Planning Board meeting.

Signed as Approved by the Board:

_____ _____

Town of Berwick Planning Board
Conditional Use Findings of Fact

Applicant: Silver Therapeutics
60 Route 236 (Tax Map R-057, Lot 55)

Date: March 5, 2020

Silver Therapeutics filed an application with the Berwick Community Development & Planning Office on January 22nd, 2020 for an Adult Use Marijuana Storefront. The applicant proposed reuse of an existing automotive garage and a building expansion of 300 ft^2. The proposal included drainage improvements, minor landscaping and formalization to the entrance and parking lot. The store was proposed to operate from 10am until 8pm. The Berwick Police Chief was notified on January 22nd regarding the security plan. The Chief noted he did not have concerns at the time and would be willing to revisit when there is construction within the interior of the building. Loralie Gerard, land surveyor of Thorne Associates, certified the Hussey School is greater than 1,000 feet from the proposed Adult Use Marijuana Storefront. A detailed odor control plan, security plan and building interior layout was submitted as Project Supplement 1.

The application was heard at the February 6, 2020 Planning Board meeting, the Board requested a building elevation of proposed façade improvements and more information on lighting and signage. The application was found complete and a Public Hearing and Site Walk set for March 5, 2020 11 abutters were mailed and a notice was posted in the Fosters on February 18. For the March 5, 2020 meeting, Silver Therapeutics submitted Project Supplement 2 which included an updated site plan and requested materials.

At the Public Hearing _____

The Board voted _____

Findings of Fact

1. Conformance with the Comprehensive Plan: *All proposed conditional uses and site plans shall conform to the Comprehensive Plan of the Town of Berwick and with the provisions of all pertinent federal, state and local codes, ordinances, and regulations.*

   The application conforms to the Comprehensive Plan because it is permitting an appropriate commercial use within the RC/I zoning district.

2. Preserve and enhance the landscape: *The landscape shall be preserved in its natural state insofar as practicable by minimizing tree removal, disturbance of soil, retaining existing vegetation during construction. After construction is complete, landscape shall be designed and planted that will define, soften or screen the appearance of off street parking areas from the right of way and abutting*

properties and/or structures in order to enhance the physical design of the building(s) or site, and to minimize the encroachment of the proposed use on the neighboring land uses.

Several landscaping improvements were proposed, including infiltration trenches, plantings and screening. The only landscaping proposed to removed is to install a 6' fence to screen activity from an abutter.

Relationship of the proposed buildings to the environment: *Proposed structures shall be related harmoniously to the terrain and to the existing buildings in the vicinity which have a visual relationship to the proposed buildings. Special attention shall be paid to the bulk, location and height of the building(s) and such natural features such as slope, soil type and drainage ways.*

A building elevation was submitted on February 21 showing façade improvements to the existing garage.

3. Vehicular access: *The proposed site layout shall provide for safe access and egress from public and private roads by providing adequate location, numbers and controls of access points including site distances, turning lanes, traffic signalization when required by existing and projected traffic flow on municipal road systems.*

   The layout provides for safe access and egress from Route 236.

4. Parking and circulation: *The layout and design of all vehicular and pedestrian circulation, including walkways, interior drives, and parking areas shall provide for safe general interior circulation, separation of pedestrian and vehicular traffic, service traffic, loading areas, and arrangements and use of parking areas.*

   The parking lot includes 13 spaces and meets the Berwick Land Use Ordinance Standards. The entrance from Route 236 and parking lot will be paved with permeable pavement.

5. Surface water drainage: *Adequate provision shall be made for surface drainage so that removal of surface waters will not adversely affect neighboring properties, downstream conditions, soil erosion or the public storm drainage system. Whenever possible, on-site absorption of unpolluted run-off waters shall be utilized to permit groundwater recharge on the site.*

   Drainage conditions are proposed to be improved by infiltration trenches and reducing the amount of impervious surface overall.

6. Existing utilities**:** *The development shall not impose an unreasonable burden on sewers, sanitary and storm drains, water lines or other public utilities.*

   The proposed building will continue to utilize the existing municipal sewer and private well.

7. Advertising features: *The size, location, design, lighting and materials of all exterior signs and outdoor advertising structures or features shall not detract from the design of proposed buildings and structures and the surrounding properties.*

   Proposed signage was provided in Project Supplement 2 and will have to be permitted by the Code Enforcement Officer before installation.

8. Special features of the development: *Exposed storage areas, exposed machinery installation, service areas, truck loading areas, utility buildings and similar structures shall have sufficient setback and screening to provide an audio/visual buffer to minimize their adverse impact on other land uses within the development area and surrounding properties.*

   Not Applicable

9. Exterior lighting: *All exterior lighting shall be designed to minimize adverse impact on neighboring properties.*

   Lighting was provided in Project Supplement 2 showing the example of lighting on the building, lighting on the sign and lighting at the main building. All entrances will include lighting. All lighting proposed is meets the Berwick Land Use Ordinance.

10. Emergency vehicle access**:** *Provisions shall be made for providing and maintaining convenient and safe emergency vehicle access to all buildings and structures.*

    The proposed driveway is 26' wide and there is an existing gravel driveway surrounding the property.

11. Municipal services: *The development will not have an unreasonable adverse impact on the municipal services including municipal road systems, fire department, police department, solid waste program, sewer treatment plant, school, open spaces, recreational programs and facilities, and other municipal service and facilities.*

    No adverse impacts on municipal services have been identified.

12. Will not result in water or air pollution**:** *In making this determination, it shall at a minimum consider: The elevation of the land above sea level and its relationship to the floodplains, the nature of soils and subsoils and their ability to adequately support waste disposal; the slope of the land and its attest on effluents; and the applicable state and local health and water resources regulations.*

    No water impacts have been identified. The building will utilize negative air and carbon filtration.

13. Has sufficient water available for the reasonable foreseeable needs of the development *(this is usually considered to be ten years approximately).*

    This standard has been met.

Will not cause an unreasonable burden on an existing water supply, *if a municipal or community* water supply is to be utilized.

This standard is not applicable, the water supply comes from a well.

14. Will not cause soil erosion or reduction in the capacity of the land to hold water *so that dangerous or unhealthy conditions may result.*

    Not Applicable

15. Will provide for adequate sewerage waste disposal.

Waste will include typical materials and general garbage. Controlled substances will be secured within the building at all times.

16. Will not have adverse effects on the scenic or natural beauty of the area, aesthetics, or rare and irreplaceable natural areas.

    Façade and landscape improvements are proposed to the site.

17. The developer has adequate financial and technical capacity to meet the above stated standards.

    The applicant has provided proof of financial capacity and has shown technical capacity to meet the above standards.

18. Whenever situated in whole or in part within 250 feet of any pond, lake or river, will not adversely affect the quality of such body of water or affect the shoreline of such body of water, based on the standards outlined in Section 9.8.I.1.j.

    This standard does not apply because the site is not located within 250 feet any type of water body.

19. Low Impact Design: *Each applicant is required to submit a statement to the Planning Board documenting proposed Low Impact Design (LID) for the site, which will help to reduce storm water volumes and help to enhance storm water quality. LID includes, but is not limited to, green roofs, rain gardens, tree wells, infiltration basins and permeable pavement.*

    The applicant submitted a Low Impact Design including permeable pavement, LED lights and landscape enhancements.

I, David Andreesen, certify that I am Chair of the Planning Board of the Town of Berwick, Maine, a Planning Board established pursuant to Maine State Statute (30-A § 4401) and I further certify that this decision was approved by the Planning Board at its meeting of March 5, 2020

Findings of Fact Approved on March 5, 2020

Conditions of Approval

1. Silver Therapeutics shall provide the Town proof of State of Maine licensing for an Adult Use Storefront before a Certificate of Occupancy is granted.

Application Approved ____

_____ _____

David Andreesen, Planning Board Chair Date

Town of Berwick Planning Board
Conditional Use Findings of Fact
Applicant: Redimix Companies Inc.
541 Portland Street (Tax Map R-072, Lot 7-A)
March 5, 2020

The Applicant, Redimix Companies, submitted an application to the Town dated February 2020, seeking approval for an expansion of the current facility to include a garage and office to manage incoming and outgoing parts in the RC/I Zone. The addition proposed was 18' by 40' and because it was over 500 ft^2 the expansion was deemed a Substantial Expansion, requiring Planning Board approval.

The Planning Board voted _____

Findings of Fact

1. **Conformance with the Comprehensive Plan:** *All proposed conditional uses and site plans shall conform to the Comprehensive Plan of the Town of Berwick and with the provisions of all pertinent federal, state and local codes, ordinances, and regulations.*

   The application conforms to the Comprehensive Plan because it is an Industrial Use within the Rural Commercial Industrial (RC/I) District.

2. **Preserve and enhance the landscape:** *The landscape shall be preserved in its natural state insofar as practicable by minimizing tree removal, disturbance of soil, retaining existing vegetation during construction. After construction is complete, landscape shall be designed and planted that will define, soften or screen the appearance of off street parking areas from the right of way and abutting properties and/or structures in order to enhance the physical design of the building(s) or site, and to minimize the encroachment of the proposed use on the neighboring land uses.*

   This standard is being met insofar as it can. The site has been utilized as a concrete mix facility for a number of years. The applicant is proposing the expansion in an area that will not impact the buffers or abutting neighbors.

3. **Relationship of the proposed buildings to the environment:** *Proposed structures shall be related harmoniously to the terrain and to the existing buildings in the vicinity which have a visual relationship to the proposed buildings. Special attention shall be paid to the bulk, location and height of the building(s) and such natural features such as slope, soil type and drainage ways.*

   This is an addition to an existing structure that is proposed to relate to the existing building.

4. **Vehicular access:** *The proposed site layout shall provide for safe access and egress from public and private roads by providing adequate location, numbers and controls of access points including site distances, turning lanes, traffic signalization when required by existing and projected traffic flow on municipal road systems.*

   The applicant does not plan to modify the existing access to the site.

5. **Parking and circulation:** *The layout and design of all vehicular and pedestrian circulation, including walkways, interior drives, and parking areas shall provide for safe general interior*

circulation, separation of pedestrian and vehicular traffic, service traffic, loading areas, and arrangements and use of parking areas.

The addition will not increase activity on site. Parking and circulation are not proposed to change.

6. **Surface water drainage:** *Adequate provision shall be made for surface drainage so that removal of surface waters will not adversely affect neighboring properties, downstream conditions, soil erosion or the public storm drainage system. Whenever possible, on-site absorption of unpolluted run-off waters shall be utilized to permit groundwater recharge on the site.*

   This standard has been met. The stormwater pond on-site has been designed to accommodate the full buildout on the site.

7. **Existing utilities:** *The development shall not impose an unreasonable burden on sewers, sanitary and storm drains, water lines or other public utilities.*

   This standard is not applicable. There will be no impacts to the existing utilities.

8. **Advertising features:** *The size, location, design, lighting and materials of all exterior signs and outdoor advertising structures or features shall not detract from the design of proposed buildings and structures and the surrounding properties.*

   N/A

9. **Special features of the development:** *Exposed storage areas, exposed machinery installation, service areas, truck loading areas, utility buildings and similar structures shall have sufficient setback and screening to provide an audio/visual buffer to minimize their adverse impact on other land uses within the development area and surrounding properties.*

   N/A

10. **Exterior lighting:** *All exterior lighting shall be designed to minimize adverse impact on neighboring properties.*

    N/A

11. **Emergency vehicle access:** *Provisions shall be made for providing and maintaining convenient and safe emergency vehicle access to all buildings and structures.*

    Emergency vehicles may access the building from the parking area.

12. **Municipal services:** *The development will not have an unreasonable adverse impact on the municipal services including municipal road systems, fire department, police department, solid waste program, sewer treatment plant, school, open spaces, recreational programs and facilities, and other municipal service and facilities.*

    The proposed uses will not have adverse impacts on municipal services.

13. **Will not result in water or air pollution:** *In making this determination, it shall at a minimum consider: The elevation of the land above sea level and its relationship to the floodplains, the nature*

of soils and subsoils and their ability to adequately support waste disposal; the slope of the land and its attest on effluents; and the applicable state and local health and water resources regulations.

Nothing on the site will be changing to impact the site beyond what currently exists on the site.

14. **Has sufficient water available for the reasonable foreseeable needs of the development** *(this is usually considered to be ten years approximately).*

    This standard has been met. The public water system will be utilized. No wells will be impacted

15. **Will not cause an unreasonable burden on an existing water supply**, *if a municipal or community water supply is to be utilized.*

    This standard does not apply because water supply comes from a private well.

16. **Will not cause soil erosion or reduction in the capacity of the land to hold water** *so that dangerous or unhealthy conditions may result.*

    This standard has been met since the site has been designed to accommodate stormwater and the Maine DEP has reviewed and permitted this project.

17. **Will provide for adequate sewerage waste disposal.**

    This standard has been met the septic system will not be overburdened by the addition.

18. **Will not have adverse effects on the scenic or natural beauty of the area, aesthetics, or rare and irreplaceable natural areas.**

    The addition will not adversely impact the scenic or natural beauty of the area, which is already used for Industrial purposes.

19. **The developer has adequate financial and technical capacity to meet the above stated standards.**

    This standard has been met.

20. **Whenever situated in whole or in part within 250 feet of any pond, lake or river, will not adversely affect the quality of such body of water or affect the shoreline of such body of water, based on the standards outlined in Section 9.8.I.1.j.**

    This standard does not apply because the site is not located near any type of water body.

21. **Low Impact Design:** *Each applicant is required to submit a statement to the Planning Board documenting proposed Low Impact Design (LID) for the site, which will help to reduce storm water volumes and help to enhance storm water quality. LID includes, but is not limited to, green roofs, rain gardens, tree wells, infiltration basins and permeable pavement.*

    This standard has been met because the parking area as proposed will be gravel and an existing swale will be utilized for stormwater runoff.

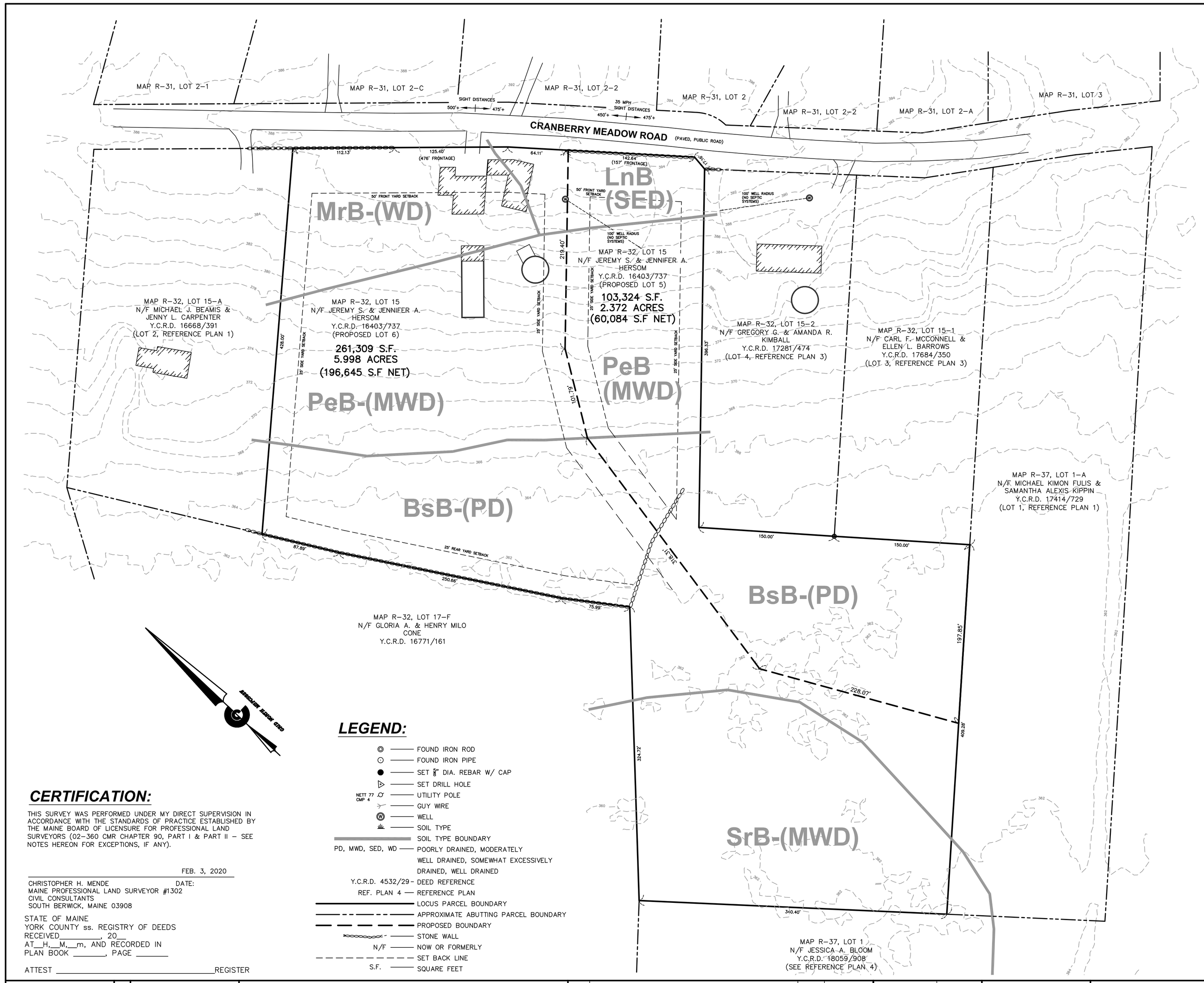
Conditions

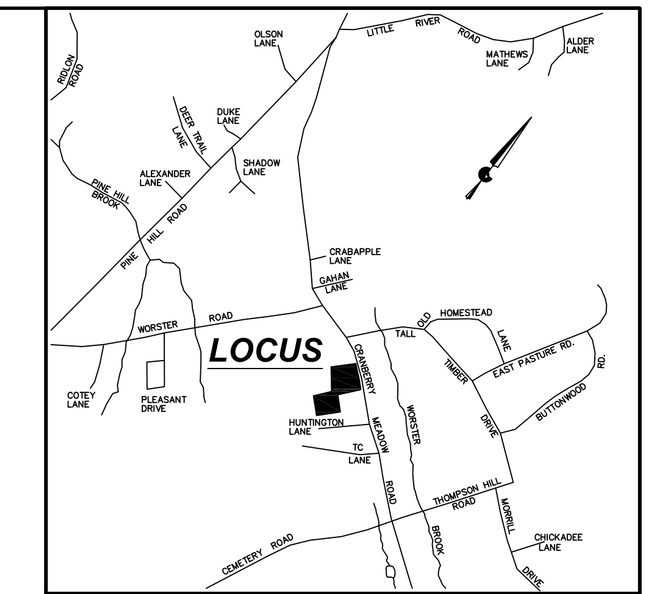
1. Per Section 9.8.H.2 conditional use approval for the use stated in this decision shall expire in one year if that use has not commenced.

2. This Conditional Use shall inure to the benefit of the Applicant, and bind its successors and assigns, and shall be deemed to run with the land.

I, David Andreesen, certify that I am Chair of the Planning Board of the Town of Berwick, Maine, a Planning Board established pursuant to Maine State Statute (30 MRSA § 1917 and Title 30-A § 4401) and I further certify that this decision was approved by the Planning Board at its meeting of March 5, 2020

March 5, 2020





LOCATION PLAN

(NOT TO SCALE)

NOTES:

1. PLANIMETRIC DETAIL DEPICTED HEREON IS COMPILED FROM REFERENCED PLANS AND GEOREFERENCED ORTHOPHOTOS, DATED 2018, FROM THE MAINE OFFICE OF GIS.

2. NORTH AS DEPICTED HEREON IS REFERENCED TO GRID NORTH, NAD83, MAINE STATE PLANE COORDINATE SYSTEM WEST ZONE. COORDINATE VALUES AND ORIENTATION ARE DERIVED FROM A GPS SURVEY COMPUTED UTILIZING THE NGS OPUS ON-LINE PROCESSING SERVICE. REFERENCE FRAME IS NAD83 (2011) EPOCH 2010.0000. THE SURVEY IS TIED TO CORS STATIONS GUNSTOCKMRNH2008 CORS ARP (P776), CORHAM CORS ARP (MEGO) AND NHDOT CONCORD CORS ARP (NHCO). DISTANCES DEPICTED HEREON ARE GRID. TO CONVERT GRID DISTANCES TO GROUND DISTANCES, MULTIPLY THE GRID DISTANCE BY 1.00000000 (AVERAGE COMBINED SCALE FACTOR FOR THE SITE).

3. CRANBERRY MEADOW ROAD IS A PAVED, PUBLIC HIGHWAY MAINTAINED BY THE TOWN OF BERWICK. THE SIDELINES AS SHOWN HEREON ARE BASED ON EXISTING ANCIENT STONE WALLS.

4. NO UTILITIES ARE DEPICTED. PUBLIC ELECTRIC POWER AND COMMUNICATION UTILITIES ARE AVAILABEL IN THE RIGHT-OF-WAY OF CRANBERRY MEADOW ROAD. THE PROPOSED LOTS WILL BE SERVED BY PRIVATE WELLS AND PRIVATE SEPTIC DISPOSAL SYSTEMS. CONTRACTORS NEED TO CONTACT DIGSAFE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.

5. THE LOCUS PROPERTY IS IN THE R2-TRANSITIONAL RESIDENTIAL ZONE; DIMENSIONAL REQUIREMENTS ARE AS FOLLOWS: MINIMUM LOT SIZE=60,000 S.F.(NET AREA), MINIMUM STREET FRONTAGE=150', MINIMUM LOT WIDTH=150', MINIMUM FRONT YARD=50', MINIMUM SIDE AND REAR YARDS=25', MAXIMUM BUILDING HEIGHT=35', MAXIMUM LOT COVERAGE=35%, MINIMUM SIGHT DISTANCE=XXX'. NET LOT AREA IS COMPUTED AS THE SUM OF 100% OF WELL DRAINED, MODERATELY WELL DRAINED AND SOMEWHAT EXCESSIVELY DRAINED SOILS, PLUS 25% OF POORLY DRAINED SOILS. FOR COMPLETE ZONING INFORMATION REFER TO THE TOWN OF BERWICK ZONING ORDINANCE.

6. THE LOCUS PROPERTY IS LOCATED IN "ZONE X" ON THE NATIONAL FLOOD INSURANCE PROGRAM, FLOOD INSURANCE RATE MAP (FIRM) FOR THE TOWN OF BERWICK, MAINE, YORK COUNTY, COMMUNITY PANEL NUMBER 230144 0003 B, EFFECTIVE DATE AUGUST 5, 1991. ZONE X IS DEFINED AS "AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOOD-PLAIN".

7. THE APPLICANTS PROPOSE TO DIVIDE THE SUBJECT PARCEL INTO TWO LOTS. THE SUBJECT PARCEL IS THE REMNANT OF TWO PRIOR SUBDIVISIONS. THE FIRST SUBDIVISON, SHOWN ON REFERENCE PLAN 1, CREATED TWO NEW LOTS (TAX MAP R-32, LOT 16-D AND TAX MAP R-37, LOT 1-A) AND A REMNANT LOT. THE SECOND SUBDIVISION, SHOWN ON REFERENCE PLAN 3, DIVIDED THE REMNANT AND CREATED TWO MORE NEW LOTS (TAX MAP R-32, LOT 15-1 AND TAX MAP R-32, LOT 15-2). BOTH SUBDIVISONS WERE APPROVED BY THE BERWICK PLANNING BOARD. THERE ARE NO CONDITIONS OF APPROVAL SHOWN ON REFERENCE PLAN 1. REFERENCE PLAN 3 LISTS THE FOLLOWING CONDITIONS OF APPROVAL:
   - i) WAIVERS GRANTED: STORMWATER MANAGEMENT PLAN, EROSION & SEDIMENT CONTROL PLAN, REDUCTION OF WELL SETBACK FROM 100' TO 50'
   - ii) WELLS SHALL BE DRILLED AND CASED INTO BEDROCK
   - iii) LOT DEVELOPERS ARE RESPONSIBLE FOR FOLLOWING BERWICK SUBDIVISION REGULATIONS
   - iv) DRIVEWAYS SHALL SLOPE AT NO GREATER THAN 3% GRADE FOR THE FIRST 30' FROM THE PAVEMENT OF CRANBERRY MEADOW ROAD
   - v) APPROVAL IS GRANTED BASED ON MATERIAL SUBMITTED AND ON FILE AT THE BERWICK PLANNING BOARD.

8. THE BOUNDARIES OF THE SUBJECT PARCEL ARE BASED ON REFERENCE PLANS 1 AND 3.

9. TWO FOOT CONTOURS ARE BASED ON MAINE OFFICE OF G.I.S. LIDAR FILES, GEO-REFERENCED TO THE SITE. THE VERICAL DATUM IS NAVD88.

10. SOIL TYPE DATA IS TAKEN FROM THE USDA, NATIONAL RESOURCES CONSERVATION SERVICE, WEB SOIL SURVEY - NATIONAL COOPERATIVE SOIL SURVEY (MEDIUM INTENSITY SURVEY).

REFERENCE PLANS:

1. SUBDIVISION OF LAND PREPARED FOR MICHAEL & SHARON EMERY LOCATED ON CRANBERRY MEADOW ROAD, BERWICK, MAINE, DATED MARCH 5, 1997, APPROVED MARCH 6, 1997, BY ATLANTIC SURVEY COMPANY, 81-135), RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 233, PAGE 30.

2. RESUBDIVISION OF EMERY SUBDIVISION FOR SUE & MATTHEW FISCHER, 233 CRANBERRY MEADOW ROAD, BERWICK, MAINE, DATED MARCH 13, 2002, APPROVED MARCH 21, 2002, BY CIVIL CONSULTANTS (PROJ. 01-51600), RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 268, PAGE 23.

3. RESUBDIVISION OF EMERY SUBDIVISION FOR SUE & MATTHEW FISCHER, 233 CRANBERRY MEADOW ROAD, BERWICK, MAINE, DATED APRIL 11, 2002, APPROVED APRIL 18, 2002, BY CIVIL CONSULTANTS (PROJ. 01-51600), RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 270, PAGE 5.

4. BOUNDARY PLAN PREPARED FOR KENNETH VINCENT LOCATED OFF OF CRANBERRY MEADOW ROAD, BERWICK, ME, DATED OCTOBER 17, 2002, BY CIVIL CONSULTANTS (PRO. 98-455.01), RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 275, PAGE 22.

LEGEND:

- FOUND IRON ROD
- FOUND IRON PIPE
- SET 5/8" DIA. REBAR W/ CAP
- SET DRILL HOLE
- NETT 77 CMP 4 — UTILITY POLE
- GUY WIRE
- WELL
- SOIL TYPE
- SOIL TYPE BOUNDARY
- PD, MWD, SED, WD — POORLY DRAINED, MODERATELY WELL DRAINED, SOMEWHAT EXCESSIVELY DRAINED, WELL DRAINED
- Y.C.R.D. 4532/29 — DEED REFERENCE
- REF. PLAN 4 — REFERENCE PLAN
- LOCUS PARCEL BOUNDARY
- APPROXIMATE ABUTTING PARCEL BOUNDARY
- PROPOSED BOUNDARY
- STONE WALL
- N/F — NOW OR FORMERLY
- SET BACK LINE
- S.F. — SQUARE FEET

CERTIFICATION:

THIS SURVEY WAS PERFORMED UNDER MY DIRECT SUPERVISION IN ACCORDANCE WITH THE STANDARDS OF PRACTICE ESTABLISHED BY THE MAINE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS (02-360 CMR CHAPTER 90, PART I & PART II - SEE NOTES HEREON FOR EXCEPTIONS, IF ANY).

FEB. 3, 2020

CHRISTOPHER H. MENDE DATE:
MAINE PROFESSIONAL LAND SURVEYOR #1302
CIVIL CONSULTANTS
SOUTH BERWICK, MAINE 03908

STATE OF MAINE
YORK COUNTY ss. REGISTRY OF DEEDS
RECEIVED_____, 20__
AT__H,__M,__m, AND RECORDED IN
PLAN BOOK _____, PAGE _____

ATTEST _____REGISTER

TAX MAP 32, LOT 15

© CIVIL CONSULTANTS

CIVIL CONSULTANTS
Engineers
Planners
Surveyors
P.O. Box 100
South Berwick
Maine
03908
207-384-2550
civcon@civcon.com

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

NO.	REVISIONS	INT.	DATE
8			
7			
6			
5			
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DRAWN CHM | CALC. CHM
DATE FEB. 3, 2020
CHECKED MPP
APPROVED CHM
SCALE 1"=50'
FIELD BOOK SEE FILE

SHEET TITLE:
• **SKETCH SUBDIVISION**

PROPOSED SUBDIVISION OF LAND OF JEREMY S. & JENNIFER A. HERSOM 241 CRANBERRY MEADOW ROAD BERWICK, YORK COUNTY, MAINE

PREPARED FOR:
JEREY & JENNIFER HERSOM
MAILING ADDRESS: 241 CRANBERRY MEADOW ROAD, BERWICK, ME 03901

SHEET NUMBER:
SK1
SHEET 1 OF 1
PROJECT # 20-111.00

DATE STAMP: FEBRUARY 3, 2020/10:45 A.M. DRAWING LOCATION: J:\AAA\2020\2011100\CARLSON\DRAWING\2020-SUBDIVISION-SKETCH-PLAN.DWG COORDINATE FILE: J:\AAA\2020\2011100\CARLSON\POINTS\MSPCS-W83-NAVD88.CRD

SMPDC
SOUTHERN MAINE PLANNING & DEVELOPMENT COMMISSION

To: Berwick Planning Board

From: Lee Jay Feldman

Date: March 5, 2020

Re: Site Plan review-Laing Bibber Funeral Home- Cemetery Road

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I. Proposal

This project is to construct a new 5,965 SF footprint funeral home building on the parcel located across from Evergreen Cemetery on Cemetery Road in Berwick, Maine. The 5.85 acre lot is situated in the Transitional Residential District (R2) zone. The new building will meet the 50 foot front setback and the 25 foot side and rear setbacks.

The lot is currently undeveloped woodlands. There will be 35,284 SF of new impervious area and approximately 75,000 SF of disturbance created as a result of this development. This includes the 5,965 SF proposed building, a 674 SF covered drop off area, and 28,645 SF of onsite parking and two new entrances for access to Cemetery Road. One of these will be located directly across the street from the northern entrance of the Evergreen Cemetery. This project requires a full Site Plan Review per the Town of Berwick Land Use Ordinance due to the construction of a building greater than 3,000 SF and the installment of more than 5,000 SF of impervious surface.

The project will require both a new private well and a new private septic system. The septic system will be designed by Civil Consultants using test pit information gathered from Ken Gardner on November 21, 2019. The proposed septic location is yet to be determined. Per section 7.17 of the Berwick Land Use Ordinance, Prior to final approval It would help to see the proposed septic system location and the separation from the proposed well.

Developments that create one or more acres of disturbed area shall meet the storm water management provisions specified in Chapters 500 and 502 of the Maine Department of Environmental Protection Stormwater Management rules. Since there will be less than an acre of impervious area, Chapter 500 requires only the basic standards be met. The ordinance indicates and a finding be made that the applicant is considering a Low Impact Development design (LID) the board will want to discuss this with the applicant. The current Stormwater design suggests that there will be a 1.4± cubic foot per second (cfs) increase in the water coming off the site during a 100-year storm. Although there are no runoff requirements for specific storm levels, the site has been designed to limit the storm water discharge off site. As part of this submission, an Erosion and Sedimentation Control Plan and a Stormwater Inspection and Maintenance Plan have been provided.

II. Waivers

None have been requested

III. Next Steps

Find the application Complete
Set a date for a site walk
Set the date for the Public Hearing

CIVIL CONSULTANTS

P. O. Box 100
South Berwick
Maine
03908
207-384-2550
FAX 384-2112

HAND DELIVERED

Transmittal

TOWN OF BERWICK

PLANNING DEPARTMENT

Date: February 10, 2020

Job No. 1928900

Attention James Bellissimo

We are sending you

_x_ *attached*
___ *shop drawings*
___ *plans*
___ *copy of letter*
___ *work sheets*
___ *prints*
___ *specifications*
___ *change order*
___ *other*
___ *under separate cover (via)*

copies	*date*	*pages*	*description*
8	02/2020	-	SITE PLAN REVIEW SUBMISSION FOR BIBBER FUNERAL HOME – CEMETERY ROAD, MAP R36 LOT 46
1			SITE PLAN REVIEW FEE $1,000
3	02/2020	–	STORMWATER MANAGEMENT PLAN

These are transmitted as checked below:

___ *for approval*
___ *for your use*
___ *as requested*
_X_ *for review & comment*
___ *submit copies for distribution*
___ *for your information*
___ *prints returned after loan to us*

Remarks: Please find a site plan submission for the proposed Funeral Home on Cemetery Road. Please schedule this project for the next available planning board for discussion. I am available to meet and discuss at your convenience.

Copies: *Client, Project file*

Signed: for G.R.A.

Geoffrey R Aleva, PE

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Town of Berwick

Where Tradition Meets Tomorrow

11 Sullivan Street, Berwick, Maine 03901

Phone: (207) 698-1101 Fax: (207) 698-5181

Website: www.berwickmaine.org

APPLICATION: CONDITIONAL USE PERMIT/SITE PLAN REVIEW

PLANNING BOARD REVIEW FEES *(All Fees are Non-Refundable)*	☐ $500.00 **Conditional Use Review** ☒ $1,000.00* **Site Plan Review** ** Site Plan Review requiring more than 10 hours of staff time will be billed at $80/hour.*	**Site Plan Review**† Please check any that apply: ☒ Construction of 3,000 or more ft² ☒ Installment of 5,000 ft² or more impervious surfaces. ☐ Mobile Home Park ☐ Extraction Industry ☐ Multi-Family ☐ None of the above

PROPERTY DESCRIPTION	Parcel ID	Map: R36	Lot: 46	Zoning District: R-2	Total Land Area: 5.85 AC	Part of a Subdivision **(Y/N)**	N
	Physical Address	CEMETERY ROAD BERWICK, ME 03901				Aquifer Protection **(Y/N)**	N
						Shoreland Protection **(Y/N)**	N
						Resource Protection **(Y/N)**	N
						Special Flood Hazard Area **(Y/N)**	N

APPLICANT OR REPRESENTATIVE INFORMATION	Name	GEOFF ALEVA, P.E.	Mailing Address	P.O. BOX 100 SOUTH BERWICK, ME 03908
	Phone	(207) 384-2550	Email Address	GEOFF@CIVCON.COM

PROJECT DESCRIPTION	Existing Use: UNDEVELOPED WOODLAND
	Project Name: LAING BIBBER FUNERAL HOME
	Proposed Use FUNERAL HOME
	Waiver(s) Requested: NONE

Planning Board meetings are the 1st and 3rd Thursday of each month at 6:30pm.

This application must be submitted at least **two weeks** in advance of the Planning Board meeting. On-going applications have a **one-week** submittal requirement. Please e-mail a complete application to planning@berwickmaine.org, submit the application fee and eight copies to the Planning Department with the requirements outlined on the other side of this application.

A Public Hearing and a site walk when necessary will be scheduled when the Planning Board finds the application complete. All expenses must be paid before a Certificate of Occupancy will be granted through the Code Enforcement Office. A performance guarantee may be required by the Planning Board.

CERTIFICATION: To the best of my knowledge, all information submitted with this application is true and correct.

Signature of Applicant

Jan 29, 2020

Date

Submitted	Waiver Request	Conditional Use Application Requirements
☒	N/A	List of Abutters located within 200 feet including tax map and lot number. Information can be found in the Assessing Database or GIS maps at www.berwickmaine.org
☒	N/A	Right, Title and Interest to the Property: Copy of Deed, Purchase & Sale Agreement or subdivision approval.
☒	☐	Site Plan to include requirements in Section 9.8(F) of the Land Use Ordinance. Including: ☒ Proposed buildings with room layout ☒ Approximate boundaries of the parcel ☒ Parking Plan ☒ Traffic circulation with proposed exists and entrances ☒ Lighting ☒ Landscaping.
☒	☐	Written narrative describing proposed use including: ☒ Total floor area ☒ Ground coverage ☒ Location of each proposed building ☒ Setbacks to property line ☒ Business Hours of Operation ☒ Number of Employees ☒ Materials to be Used Refuse/Garbage Disposal ☒ Noise ☒ Existing restrictions or easements on the site
☒	☐	☐ External Plumbing Permit or permission letter to enter municipal water and sewer lines. OR on-site soils investigation report by licensed site evaluator.
☒	☐	Written statement documenting proposed Low Impact Design (LID) for the site to reduce storm water volumes. LID includes, but is not limited to: green roofs, rain gardens, tree wells, infiltration basins, and permeable pavement.
☒	☐	Materials to satisfy Section of 9.8.I.1 a through s as they apply to Conditional Use Review.

Submitted	Waiver Request	**Site Plan Approval Requirements†** These requirements shall be met when the application meets any of the criterion of Section 9.8.E in the Land Use Ordinance.
☒	☐	Map or maps prepared at a scale of not less than 1" to 40'
☒	☐	Perimeter survey of parcel certified by registered land surveyor Which meets all requirements of 9.8. criterion 2.b.i
☒	☐	Topography indicating contours at intervals of not more than two feet in elevation unless otherwise specified by the Planning Board.
☒	☐	Existing and proposed locations and dimensions of any utility lines, sewer lines, water lines, easements, drainage ways, public or private ways
☒	☐	Location, ground floor area and elevations of buildings and other structures on site
☒	☐	On-site soils investigation which meets all requirements of 9.8.2.b.iv
☒	☐	Location and dimensions of on-site pedestrian and vehicular access ways, parking areas, loading and unloading facilities, design of ingress and egress of vehicles to and from the site on to public streets and curb and sidewalk lines
☒	☐	Landscape plan showing location, type and approximate size of plantings and location and dimensions of all fencing and screening
☒	☐	A written statement that meets all 11 requirements of 9.8.F.2.c
☒	☐	Materials to satisfy Section of 9.8.I.1 a through s as they apply to Site Plan Review.

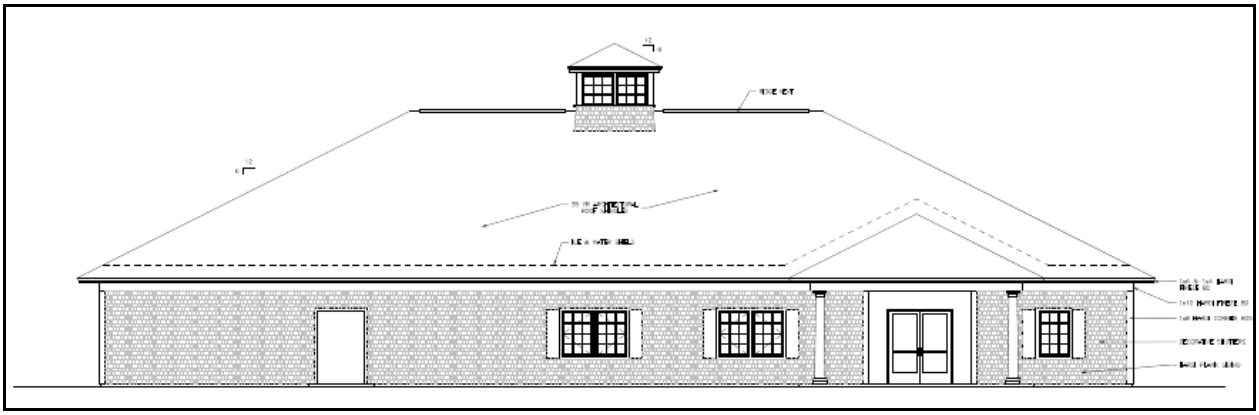
Cemetery Road – Bibber Funeral Home

SITE PLAN REVIEW APPLICATION

PROJECT NARRATIVE

This project is to construct a new 5,965 SF footprint funeral home building on the parcel located across from Evergreen Cemetery on Cemetery Road in Berwick, Maine. The 5.85 acre lot was previously part of Map R36, Lot 46 on the Town of Berwick Tax Map system and is situated in the Transitional Residential District (R2) zone. The new building will meet the 50 foot front setback and the 25 foot side and rear setbacks.

The lot is currently undeveloped woodlands. There will be 35,284 SF of new impervious area and approximately 75,000 SF of disturbance created as a result of this development. This includes the 5,965 SF proposed building, a 674 SF covered drop off area, and 28,645 SF of onsite parking and two new entrances for access to Cemetery Road. One of these will be located directly across the street from the northern entrance of the Evergreen Cemetery. This project qualifies for a full Site Plan Review per the Town of Berwick Land Use Ordinance due to the construction of a building greater than 3,000 SF and the installment of more than 5,000 SF of impervious surface.



Front Elevation View

The project will require both a new private well and a new private septic system. The septic system will be designed by Civil Consultants using test pit information gathered from Ken Gardner on November 21, 2019. The proposed septic location is yet to be determined.

Per section 7.17 of the Berwick Land Use Ordinance, developments that create one or more acres of disturbed area shall meet the storm water management provisions specified in Chapters 500 and 502 of the Maine Department of Environmental Protection Stormwater Management rules.

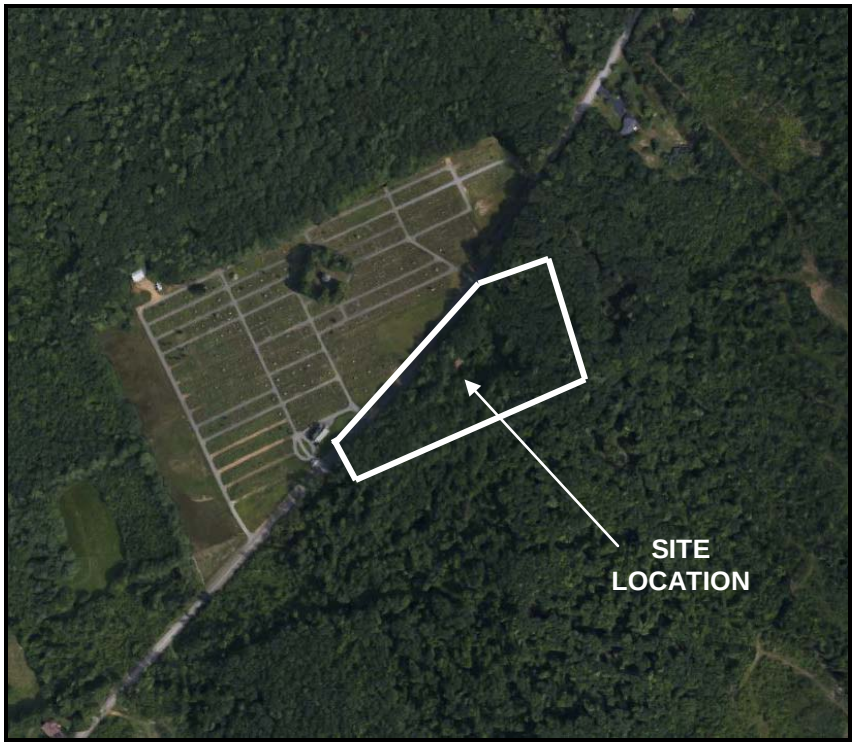
Since there will be less than an acre of impervious area, Chapter 500 requires only the basic standards be met. This includes the erosion and sedimentation control practices, inspection and maintenance, and housekeeping standards. Although there are no runoff requirements for specific storm levels, the site has been designed to limit the storm water discharge off site. As part of this submission, an Erosion and Sedimentation Control Plan and a Stormwater Inspection and Maintenance Plan have been provided.

The building will have hours of operation ranging from mid morning to evening each day of the week, although the building may close early or open later if necessary due to the nature of the proposed use.

There will be approximately 5 employees that will not be staffed daily. Refuse and garbage will be collected within the building. No outside dumpsters are proposed. Noise may be generated periodically due to an influx of cars from people attending funeral services. However, the funeral home itself will not produce any noise.

There is the potential for a one bedroom caretaker apartment if required by the funeral home. This will have no significant impact on traffic or municipal services.

Per section 7.8.C.3.i of the Berwick Land Use Ordinance, one parking space is required for every 100 square feet of floor space. There is approximately 3,570 SF of public area in the building, so a minimum of 36 parking spaces must be provided. The proposed site layout includes 49 parking spaces, with the possibility for an additional 8 spaces in the future. The number of spaces provided exceeds the Town requirements. It is also rare to have large services that exceed the provided parking.



Existing Aerial Image of Site 2018

CIVIL CONSULTANTS

P.O. Box 100 South Berwick, Maine 03908 207-384-2550

CIVIL CONSULTANTS MEMORANDUM

TO: **Town of Berwick Planning Office**

FROM: **Geoff Aleva, PE – Vice President**

SUBJECT: **Project Summary – Town of Berwick Ordinance Section 9.8.I.1**

DATE: **02/06/2020**

ROJECT: **19-289.00 BIBBER FUNERAL HOME**

As part of the site plan review process, the following memorandum has been prepared to address Section 9.8.I.1 of the Berwick Land Use Ordinance.

REQUIREMENTS	*APPLICANT'S RESPONSE*
9.8.I.1 Performance Standards for Conditional Use and Site Plan Review The following standards are to be used by the Planning Board in judging applications for site plan review and conditional use applications and shall serve as minimum requirements for approval of the application. The site plan shall be approved, unless in the judgment of the Planning Board the applicant is not able to reasonably meet any of these standards. In all circumstances the burden for proof shall be on the applicant and such burden of proof shall include the production of evidence necessary for the Planning Board to review the application.	
a. Conformance with Comprehensive Plan: All proposed conditional uses and site plans shall conform to the Comprehensive Plan of the Town of Berwick and with the provisions of all pertinent federal, state, and local codes, ordinances, and regulations	*The proposed use is associated with the adjacent cemetery use and conforms to the Town of Berwick's Comprehensive Plan.*
b. Preserve and enhance the landscape: The landscape shall be preserved in its natural state insofar as practicable by minimizing tree removal, disturbance of soil, retaining existing vegetation during construction. After construction is complete, landscape shall be designed and planted that will define, soften or screen the appearance of off street parking areas from the right of way and abutting properties and/or structures in order to enhance the physical design of the building(s) or site, and to minimize the encroachment of the proposed use on the neighboring land uses.	*The development will limit disturbance of existing vegetation where possible. All disturbed areas will be re-vegetated with new grass/landscaping. The project meets ordinance requirements for lot coverage.*
c. Relationship of the proposed buildings to the environment:	*The proposed single story structure fits into the surrounding neighborhood. See provided architectural elevations.*

Proposed structures shall be related harmoniously to the terrain and to the existing buildings in the vicinity which have a visual relationship to the proposed buildings. Special attention shall be paid to the bulk, location and height of the building(s) and such natural features such as slope, soil type and drainage ways.	
d. Vehicular access: The proposed site layout shall provide for safe access and egress from public and private roads by providing adequate location, numbers and controls of access points including site distances, turning lanes, traffic signalization when required by existing and projected traffic flow on municipal road systems.	*Proposed development will utilize two entrances from Cemetery Road. Sight distances have been provided on plan sheet L1.*
e. Parking and circulation: The layout and design of all vehicular and pedestrian circulation, including walkways, interior drives, and parking areas shall provide for safe general interior circulation, separation of pedestrian and vehicular traffic, service traffic, loading areas, and arrangements and use of parking areas.	*Provided on plan sheet L1.*
f. Surface water drainage: Adequate provision shall be made for surface drainage so that removal of surface waters will not adversely affect neighboring properties, downstream conditions, soil erosion or the public storm drainage system. Whenever possible, on-site absorption of unpolluted run-off waters shall be utilized to permit groundwater recharge on the site.	*Town requires stormwater to meet requirements of MDEP Chapter 500. There will be less than an acre of new impervious area, so the Basic Standards must be met. See drainage report provided as part of this submission.*
g. Existing utilities: The development shall not impose an unreasonable burden on sewers, sanitary and storm drains, water lines or other public utilities.	*The proposed development will utilize a private well and private septic system.*
h. Advertising features: The size, location, design, lighting and materials of all exterior signs and outdoor advertising structures or features shall not detract from the design of proposed buildings and structures and the surrounding properties	*All signs will meet the requirements per section 7.13 (Signs) of the Town of Berwick Land Use Ordinance.*
i. Special features of the development: Exposed storage areas, exposed machinery installation, service areas, truck loading areas, utility buildings and similar structures shall have sufficient setback and screening to provide an audio/visual buffer to minimize their adverse impact on other land uses within the development area and surrounding properties.	*No exposed storage or truck loading areas proposed.*
j. Exterior lighting: All exterior lighting shall be designed to minimize adverse impact on neighboring properties.	*All exterior lights to be down lit and shielded to reduce glare to abutting properties. See Note 13 on sheet L1.*

k. Emergency vehicle access: Provisions shall be made for providing and maintaining convenient and safe emergency vehicle access to all buildings and structures.	*A copy of the letter sent to Berwick Fire Department has been included as part of this submission. Their response is awaited. The site has been designed to allow access to 3 sides of the building.*
l. Municipal services: The development will not have an unreasonable adverse impact on the municipal services including municipal road systems, fire department, police department, solid waste program, sewer treatment plant, school, open spaces, recreational programs and facilities, and other municipal service and facilities	*The proposed development will utilize a private well and private septic system. There will be no impact on schools or open spaces. Letters have been sent to the Fire and Police Chiefs, as well as the director of public Works. Their comments are awaited and will be incorporated into the site design.*
m. Will not result in water or air pollution: In making this determination, it shall at a minimum consider: The elevation of the land above sea level and its relationship to the flood plains, the nature of soils and subsoils and their ability to adequately support waste disposal; the slope of the land and its attest on effluents; and the applicable state and local health and water resources regulations.	*Stormwater has been designed to meet basic general standards of MDEP Chapter 500. See drainage report provided as part of this submission. There will be no air pollution as a result of this development.*
n. Has sufficient water available for the reasonable foreseeable needs of the development (this is usually considered to be ten years approximately).	*Private well is proposed for the project.*
o. Will provide for adequate sewerage waste disposal.	*Private septic system to be designed.*
p. Will not have adverse affects on the scenic or natural beauty of the area, aesthetics, or rare and irreplaceable natural areas.	*The existing vegetation will be maintained to the greatest extent possible. A buffer will remain between the development and the abutting properties.*
q. The developer has adequate financial and technical capacity to meet the above stated standards.	*Statement of financial capacity to be provided.*
r. Whenever situated in whole or in part within 250 feet of any pond, lake or river, will not adversely affect the quality of such body of water or affect the shoreline of such body of water, based on the standards outlined in Section 9.8.I.1.j.	*Not within 200 feet of a pond, lake or river.*
s. Low Impact Design: Each applicant is required to submit a statement to the Planning Board documenting proposed Low Impact Design (LID) for the site, which will help to reduce storm water volumes and help to enhance storm water quality. LID includes, but is not limited to green roofs, rain gardens, tree wells, infiltration basins, and permeable pavement otherwise specified by the Planning Board	*Stormwater has been designed to meet basic and general standards of MDEP Chapter 500. See drainage report provided as part of this submission and site plans for additional details.*

CIVIL CONSULTANTS
P.O. Box 100 South Berwick, Maine 03908 207-384-2550

CIVIL CONSULTANTS MEMORANDUM

TO: **Town of Berwick Planning Office**

FROM: **Geoff Aleva, PE – Vice President**

SUBJECT: **Project Summary – Town of Berwick Ordinance Section 9.8.F**

DATE: **02/06/2020**

ROJECT: **19-289.00 BIBBER FUNERAL HOME**

As part of the site plan review process, the following memorandum has been prepared to address Section 9.8.F of the Berwick Land Use Ordinance.

REQUIREMENTS		*APPLICANT'S RESPONSE*
9.8.F.1		
a.	Name and address of the applicant or his/her authorized agent and name of proposed development in which the applicant has title or interest; a deed for the property	*Applicant: Laing Bibber Funeral Home* *67 Summer Street* *Kennebunk, ME 04043* *Agent: Geoff Aleva, PE* *CIVIL CONSULTANTS* *PO Box 100* *South Berwick, ME 03908*
b.	Municipal tax maps and lot numbers and names and addresses of abutting landowners	*Tax Map R-36, Lot 46*
c.	Total floor area, ground coverage and location of each proposed building; setbacks to property lines;	*Proposed 5,965 sf building addition; 35,284 sf of total impervious area, min 32.7 ft setback to rear property line (see plan)*
d.	Approximate boundaries of the parcel	*Provided on plans.*
e.	If on-site sewage disposal is proposed, then an on-site soils investigation report by a licensed site evaluator shall be provided	*Test pits gathered by Ken Gardner on November 21, 2019. See provided test pit info.*
f.	If public water and/or sewer are to be used, a statement from the water and/or sewer district or utility as to the availability of public water and/or sewer;	*Private water and septic*
g.	Existing and proposed entrances/exits from the property	*Existing lot is undeveloped, proposed conditions provided on plans.*
h.	A parking plan shall also be provided	*Provided on plans. See sheet L1.*
i.	Any existing restrictions or easements on the site	*See deeds provided for easement information.*
j.	A brief written narrative shall be	*See attached.*

	provided on what type of business is proposed, hours of operation, number of employees, materials being used, waste disposal, etc	
9.8.F.2.b A map or maps prepared at a scale of not less than one inch to 40 feet and shall include:		*Provided on plans.*
i.	Perimeter survey of the parcel made and certified by a registered land surveyor depicting reference points, showing true north point, graphic scale, corners of the parcel and date of survey and total acreage. The perimeter survey shall be recorded at the York County Registry of Deeds after Planning Board approval but prior to the issuance of the land use permit. Areas within 200 feet of the proposed development site shall be included	*Provided on boundary plan entitled "Boundary Survey Plan Prepared for The Berwick Cemetery Association, P.O. Box 227, Berwick, Maine 03901, Cemetery Road, Berwick, Maine" prepared by Post Road Surveying, P.O. Box 1557, Wells, Maine 04090 dated 10/29/18.*
ii.	Existing and proposed locations and dimensions of any utility lines, sewer lines, water lines, easements, drainage ways, public or private rights of way	*Existing lot is undeveloped. See sheet L1 for proposed utilities.*
iii.	Location, ground floor area and elevations of buildings and other structures on the site	*Location and area provided on plan sheet L1. See architectural plans prepared by Graham Architects of Kennebunkport, Maine dated 09/19/19 for building elevations.*
iv.	If the site is not to be served by a public sewer line, then an on-site soils investigation report by a Department of Human Services licensed site evaluator shall be provided. The report shall contain the types of soil, location of test pits, and proposed location and design of the best practical subsurface disposal system for the site, all of which must meet the standards set forth in the Maine State Plumbing Code	*Test pits gathered by Ken Gardner on November 21, 2019. See provided test pit info.*
v.	Location and dimensions of on-site pedestrian and vehicular access ways, parking areas, loading and unloading facilities, design of ingress and egress of vehicles to and from the site on to public streets and curb and sidewalk lines	*Provided on plans.*
vi.	Landscape plan showing location, type and approximate size of plantings and location and dimensions of all fencing and screening	*Landscaping areas are shown on plan sheet L1.*
vii.	Topography indicating contours at	*Provided on plans.*

	intervals of not more than two feet in elevation unless otherwise specified by the Planning Board	
9.8.F.2.c A written statement by the applicant that shall consist of the following:		
i.	A description of the proposed uses to be located on the site, including quantity and type of building construction if any;	*See attached project narrative.*
ii.	Total floor area and ground coverage of each proposed building and structure and percentage of lot covered by each building or structure;	*Provided on plans.*
iii.	Method of solid waste disposal;	*All refuse/trash will be collected inside and removed from site.*
iv.	Erosion and sedimentation control plan prepared in accordance with Article 7.15 if required;	*Provided on plans. Also refer to the Stormwater Management Plan prepared for the DEP and provided to the Town.*
v.	Copies of letters to the town manager, selectmen, Planning Board, road commissioner/public works director, fire chief, police chief, etc. notifying them of the proposed development;	*See attached.*
vi.	Stormwater management plan prepared in accordance with Article 7.17 if required;	*Refer to the Stormwater Management Plan prepared for the DEP and provided to the Town.*
vii.	Statement of financial capacity which should include the names and sources of the financing parties including banks, government agencies, private corporations, partnerships and limited partnerships and whether these sources of financing are for construction loans or long-term mortgages	*Statement of financial capacity to be provided.*
viii.	The applicant's evaluation of the availability and suitability of off-site public facilities including sewer, water, and	*Not applicable.*
ix.	A statement from the fire chief as to the availability of fire hydrants and/or fire ponds, or provisions of fire protection	*See attached letter provided to the Fire Department. Any input that is received will be incorporated into the plan.*
x.	If public streets are proposed, a statement from the town engineer that the proposed road or street construction will meet town specifications	*Not applicable.*
xi.	An estimate of the date when construction will start and when the development will be completed	*Site work is expected to begin in the spring of 2020, with a completion date of Fall 2020 (dependent on permit approvals.)*

CIVIL CONSULTANTS
P.O. Box 100 South Berwick, Maine 03908 207-384-2550

LIST OF ABUTTERS

Cemetery Road
Berwick, ME
Tax Map R-36, Lot 46

MAP	***LOT***	***NAME & MAILING ADDRESS***
R-36	0046 Locus	Evergreen Cemetery Association PO Box 227 Berwick, ME 03901
R-36	0049	Maurice R. Boucher 70 Cemetery Road Berwick, ME 03901
R-36	0050	John & Lisa Lapierre 61 Pigtail Lane Berwick, ME 03901
R-36	0052	Steven A. Morrill PO Box 658 Berwick, ME 03901
R-44	0001	Steven A. Jr. and Shirley A. Morrill 291 Governor Goodwin Road North Berwick, ME 03906
R-44	0002	Steven A. Morrill Sr. 291 Governor Goodwin Road North Berwick, ME 03906
R-44	0040	Shirley Mitchell 25 Mitchell Lane Berwick, ME 03901

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WARRANTY DEED

Berwick Cemetery Association, a nonprofit corporation duly authorized under the laws of the State of Maine, with a mailing address of P. O. Box 227, Berwick, Maine 03901, for consideration paid, grant to **Patricia M. Bibber and Edward V. Bibber,** both with a mailing address of 6 Sea Road, Kennebunk, ME 04043, with **WARRANTY COVENANTS**, as joint tenants, two parcels of land, together with any improvements thereon, situate on the southerly side of Cemetery Road, in the Town of Berwick, County of York and State of Maine and being more particularly bounded and described as follows:

Parcel One:

A certain lot or parcel of land, situate on the southerly side of the highway leading from Pine Hill to Diamond Hill, so called, in said Berwick, County of York and State of Maine, past the cemetery. Said tract being bounded and described as follows:

Beginning on said highway at land now or formerly of the heirs of Philander G. Libbey and running thence southwesterly by said land now or formerly of Libbey to land now or formerly of Elmer Libbey; thence northerly by land now or formerly of said Elmer Libbey and land of the Estate of Charles W. Butler to said highway; thence easterly by said highway to the point of beginning.

Parcel Two:

Also a certain tract or parcel of land situated in said Berwick, bounded and described as follows: bounded northwesterly by land formerly of Joseph A. St. Pierre; southwesterly by land now or formerly of Sarah E. and Andrew J. Butler; and southeasterly by the highway leading from Berwick Cemetery to Diamond Hill, so-called; and the southwesterly end of said tract is designated on the face of the earth by two pieces of iron gas pipe driven into the ground at the two corners, said tract is a triangular shaped strip and contains about one acre of land.

Together with and subject to easements, restrictions, reservations, covenants, conditions and rights of way of record, if any.

Meaning and intending to convey the same premises conveyed to Berwick Cemetery Association by deed of Joseph A. St. Pierre, said deed being dated March 3, 1919 and recorded in the York County Registry of Deeds at Book 668, Page 278.

Witness its hand and seal this 15 day of August, 2019.

Berwick Cemetery Association

Witness

By: Anthony J. Cincotta, Jr., President

STATE OF MAINE
YORK, SS:

August 15, 2019

Then personally appeared the above-named Anthony J. Cincotta, Jr., in his capacity a President of Berwick Cemetery Association and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

~~Notary Public's~~ Name:
~~My commission expires~~:
Susan C Thibeau
Attorney At Law

Assessment of Traffic Generation

Laing Bibber Funeral Home is proposing to construct a 5,965 SF funeral home. The development is to be located on Cemetery Road, across from the existing Evergreen Cemetery. The lot contains undisturbed woodlands and is considered entirely undeveloped.

Part of the Town review process requires an estimate of the average daily traffic projected to be generated by the proposed use. This traffic assessment compares the traffic impact of the new mixed use building to that of the existing Antique Shop. The following information is provided as that estimate (based in the Institute of Traffic Engineer – ITE Trip Generation Manual, 9th Edition):

Proposed Development:

The proposed 5,965 SF building contains 3,570 SF of public accessible floor space. Per the Town of Berwick land use ordinance section 7.8.C.3.i, funeral homes must provide 1 parking space per 100 SF of floor space. This means 36 parking spaces are required. The proposed development will provide 49 parking spaces, with an additional 8 ready for future parking.

There will be two driveway entrances to safely circulate on site traffic. One entrance will be located across from an existing cemetery entrance. The other will be a new access point approximately 250 feet north on Cemetery Road. Sight distances have been included on the provided site plan.

There is no ITE Land Use category for funeral homes. The most similar use falls under ITE Land Use category Church (560), as funerals and visiting hours are typically scheduled in the morning, mid-afternoon and early evenings. A church has a higher traffic demand per square foot when compared to a funeral home. We have assumed a funeral home to generate 50% of the traffic created by a church.

Following this above scenario would result in the following:

ITE Land Use Code 560 – Church (3,570 SF)

	50% Church		Total
Daily Trip Ends Weekday/1,000 SF	4.56 ave	(range 4.35-30.20)	17 Trips
Peak Hour AM Trip Ends Weekday/1,000 SF	0.44 ave	(range 0.30-6.61)	2 Trips
Peak Hour PM Trip Ends Weekday/1,000 SF	0.47 ave	(range 0.38-4.04)	2 Trips
Daily Trip Ends Saturday/1,000 SF	5.19 ave	(range 2.35-56.83)	19 Trips
Peak Hour Generator Trip Ends Saturday/1,000 SF	1.77 ave	(range 0.40-23.32)	7 Trips
Daily Trip Ends Sunday/1,000 SF	18.32 ave	(range 19.15-113.38)	**66 Trips**
Peak Hour Generator Trip Ends Sunday/1,000 SF	6.02 ave	(range 5.17-51.27)	21 Trip

Based upon the above, the highest average day figure would be the Daily Trip Ends Sunday rate of 18.32 trip ends – or – (3,570 SF/1,000 SF) x 18.32 = 65.4 say ***66 trip ends for the day***

Based upon the above, the highest peak hour figure would be the Peak Hour Generator Trip Ends Sunday rate of 6.02 trip ends in the peak hour – or – (3,570 SF/1,000 SF) x 6.02 = 21.5 say ***22 trip ends in the peak hour***

Conclusion

As previously stated, there is no ITE Land Use Category for funeral homes. The most similar use was taken as a Church (560). It is well known that churches services held on Sundays are more popular than other days of the week.

Alternatively, funeral homes can host funeral services any day of the week. This means that the Sunday trip end data for a Church does not accurately depict the Sunday trip end data for a funeral home. For this reason, we have taken a 50% reduction to the traffic generation values.

Therefore, the maximum daily trip ends generated by a funeral home is approximately 66 trips, while the maximum peak hour generator trip ends is approximately 22.

Although the Town of Berwick's Land Use Ordinance does not state any specific requirements, the 22 peak hour trips expected to be generated is below the typical threshold for a full traffic study. It is our opinion that the proposed project will not adversely impact traffic on adjacent roadways, and that a full traffic study is not required for the proposed development.

SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

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

Town, City, Plantation: Berwick

Street, Road, Subdivision: Cemetery Rd.

Owner's Name: Bibber Funeral Home

SITE PLAN Scale 1" = _____ ft. or as shown

See attached Plan

SITE LOCATION PLAN
(map from Maine Atlas recommended)
☐ church
X site

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

Observation Hole 1+2 ☐ Test Pit ☑ Boring
1 " Depth of Organic Horizon Above Mineral Soil

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0–10	Sandy Loam	Friable	Dark Br 10YR3/3	
10–20	Loamy Sand		Yell. Br 10YR5/6	
20–30	Stoney Loamy Sand	Firm	light Olive Brown	None
30–40	To Sandy Loam		2.5Y5/4	

Suitable for Septic Med.-Large Rating

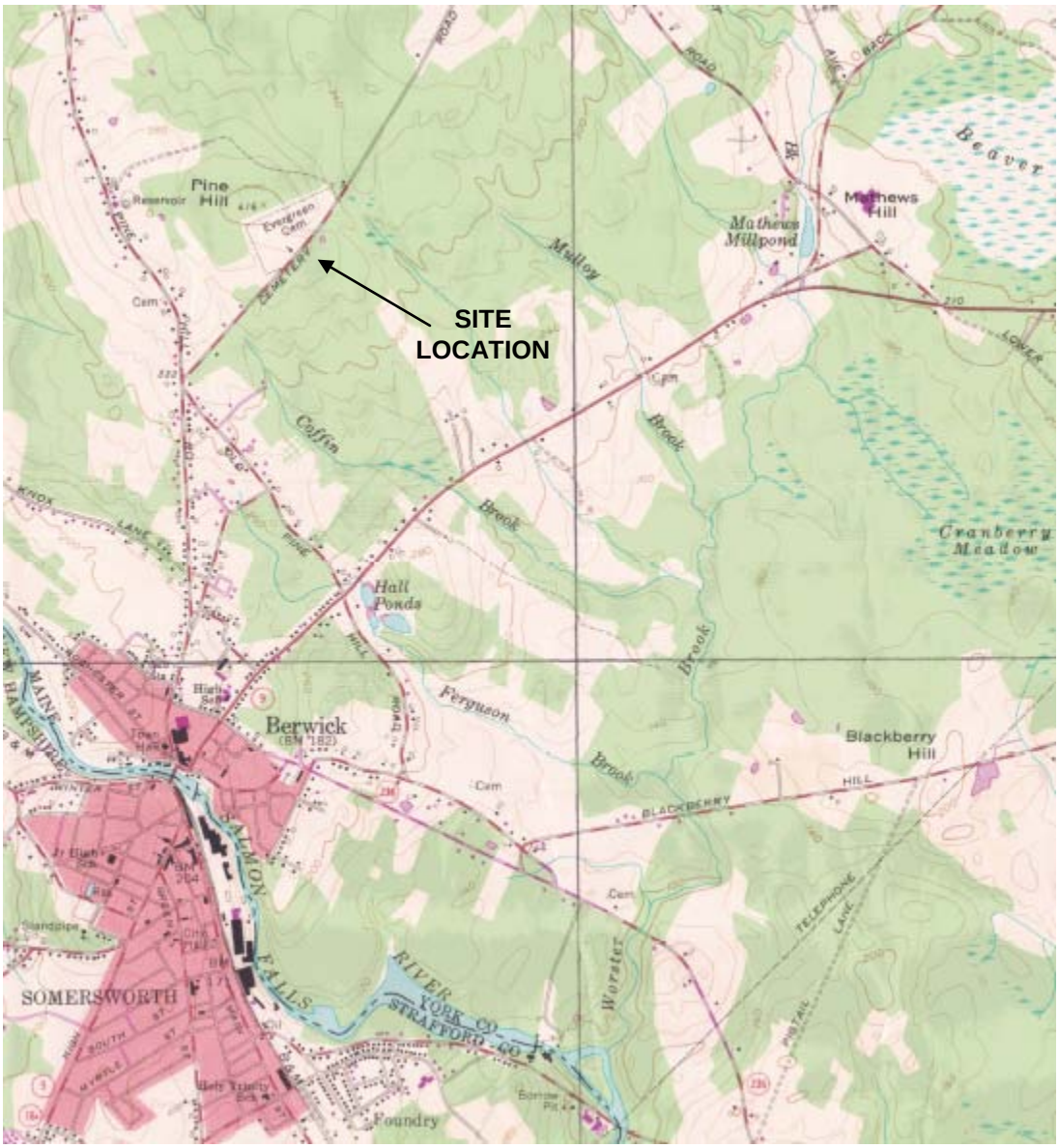
Soil Classification	Slope	Limiting Factor	
3 C (Profile / Condition)	3-5%	24"	[ ] Ground Water [✓] Restrictive Layer [ ] Bedrock [ ] Pit Depth

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

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0–10				
10–20				
20–30				
30–40				
40–50				

Soil Classification	Slope	Limiting Factor	
Profile / Condition	%	"	[ ] Ground Water [ ] Restrictive Layer [ ] Bedrock [ ] Pit Depth

Kenneth Gardner 73 11-21-19



PORTION OF USGS MAP Somersworth, Maine		PREPARED FOR:	Laing Bibber Funeral Home 67 Summer Street Kennebunk, ME 04043
JOB NO: 1928900	NTS	DATE: February 2020	

J:\aaa\ aaa\2019\1928900\Planning Board Town Review\USGSMap.doc

Google Earth Image *Berwick, Maine*		*PREPARED FOR:*	*Laing Bibber Funeral Home* *67 Summer Street* *Kennebunk, ME 04043*
JOB NO: 1928900	*NTS*	*DATE: February 2020*	

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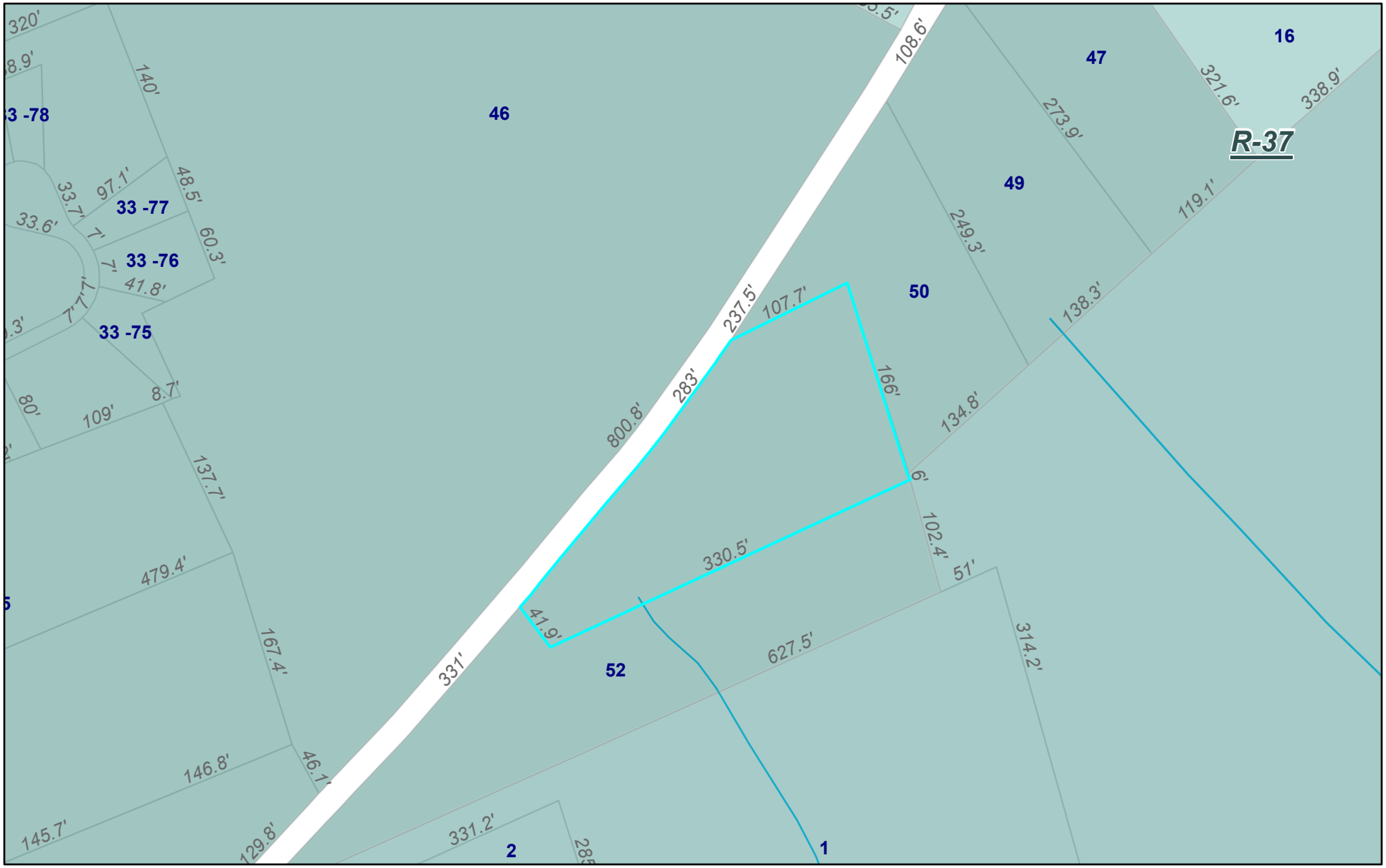
ArcGIS Web Map



12/9/2019, 10:05:41 AM

2018 Map Index

39,512.054688
5,867,404.351563

2018 Revised Parcels

2018 Revised Parcel Boundaries

Rivers & Streams

1:4,514

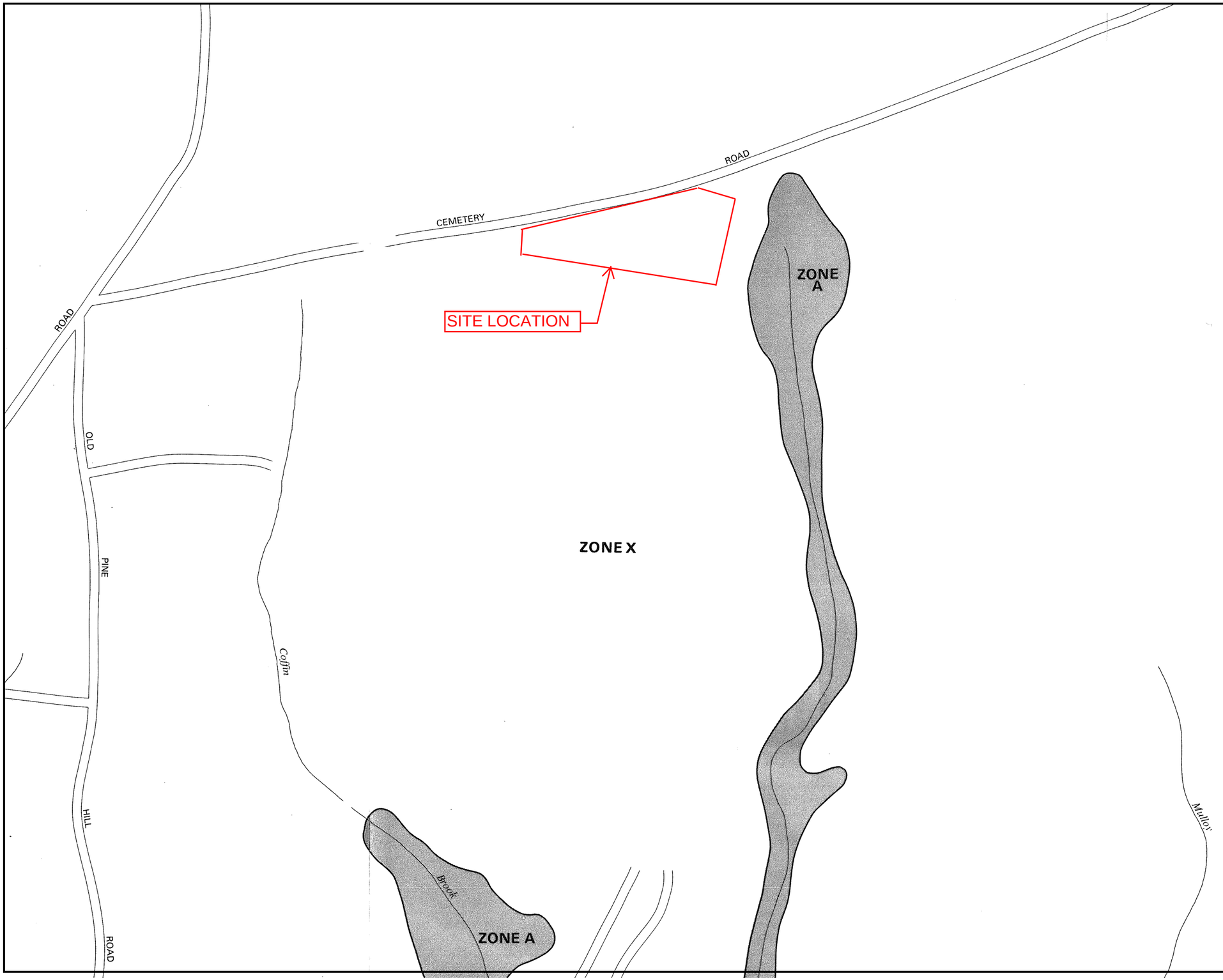
0 0.03 0.06 0.11 mi

0 0.04 0.09 0.17 km

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user

Web AppBuilder for ArcGIS

Esri, HERE |



APPROXIMATE SCALE

500 0 500 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

TOWN OF
BERWICK,
MAINE
YORK COUNTY

PANEL 6 OF 10
(SEE MAP INDEX FOR PANELS NOT PRINTED)

PANEL LOCATION

COMMUNITY-PANEL NUMBER
230144 0006 B

EFFECTIVE DATE:
AUGUST 5, 1991

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

LEGEND

- Waterbodies
- Wetlands Requiring Buffer
- Aquifer Protection District

STREAM PROTECTION DISTRICT

- 75 ft. Buffer

LIMITED RESIDENTIAL DISTRICT

- 250 ft. Buffer

SHORELAND COMMERCIAL/INDUSTRIAL DIST.

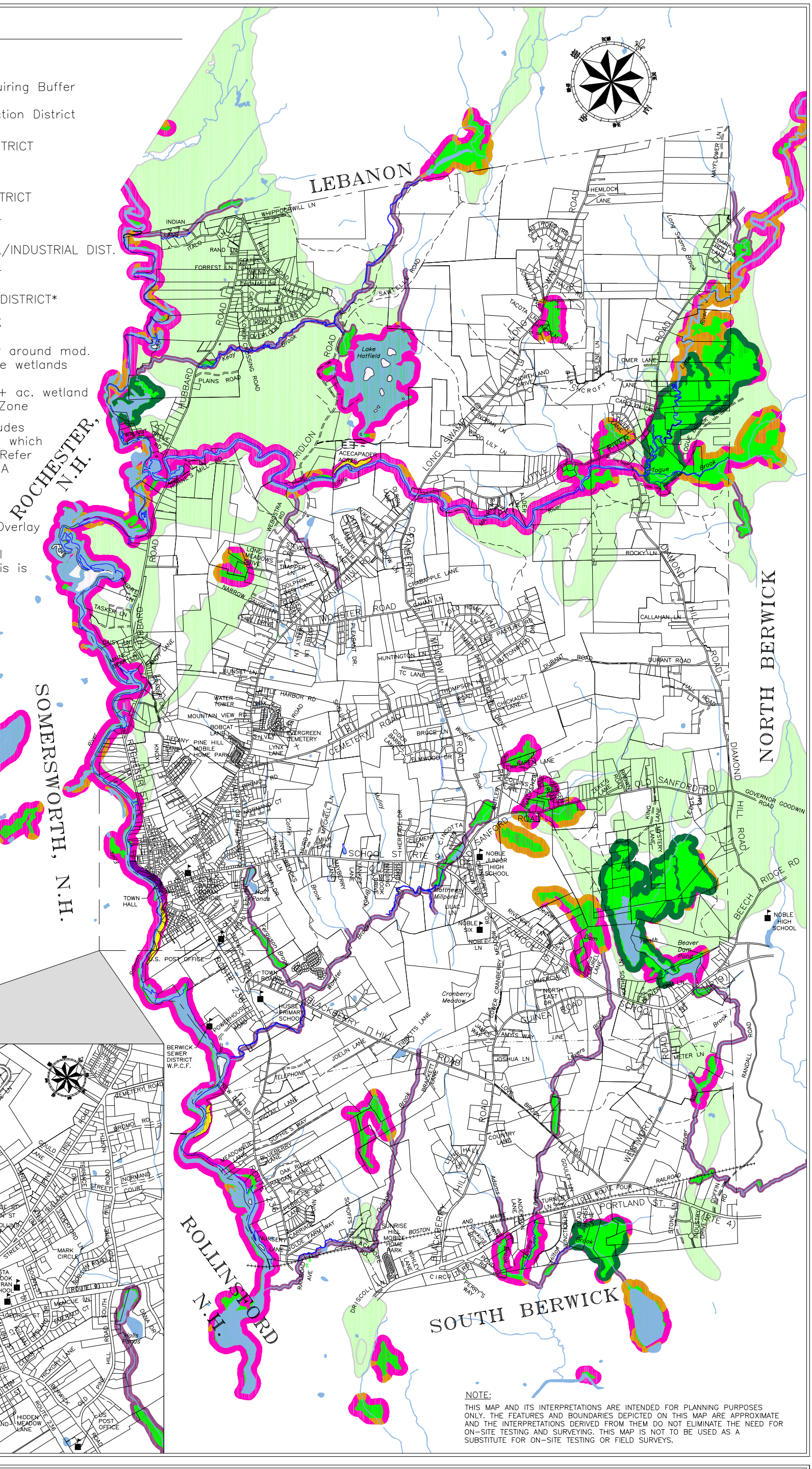
- 250 ft. Buffer

RESOURCE PROTECTION DISTRICT*

- Slopes > 20%
- 250 ft. buffer around mod. and high value wetlands
- Portions of 2+ ac. wetland in Shoreland Zone

* This district also includes FEMA 100-yr floodplain, which is not shown on map. Refer to latest edition of FEMA floodplain maps.

** NOTE:
Shoreland Zoning Map Overlay information provided by Southern Maine Regional Planning Commission this is not an official map.



NOTE:
THIS MAP AND ITS INTERPRETATIONS ARE INTENDED FOR PLANNING PURPOSES ONLY. THE FEATURES AND BOUNDARIES DEPICTED ON THIS MAP ARE APPROXIMATE AND THE INTERPRETATIONS DERIVED FROM THEM DO NOT ELIMINATE THE NEED FOR ON-SITE TESTING AND SURVEYING. THIS MAP IS NOT TO BE USED AS A SUBSTITUTE FOR ON-SITE TESTING OR FIELD SURVEYS.

REVISED: APRIL 1, 2014

2000 0 2000 4000
SCALE: 1 INCH = 4000 FT.

SHORELAND ZONING MAP OVERLAY**

TOWN OF BERWICK

MAINE

LEGEND:

- PAVED ROAD
- UNIMPROVED ROAD
- PIONEER ROAD
- TELEPHONE
- RAILROAD

CIVIL CONSULTANTS

Engineers
Planners
Surveyors
P.O. Box 100
293 Main Street
South Berwick
Maine
03908
207-384-2550

January 22, 2020

Via Email

Dennis Plante, Fire Chief
Berwick Fire Department
10 School Street
Berwick, Maine 03901

RE: **Laing Bibber Funeral Home**
Cemetery Road, Berwick, ME
Map 36 Lot 46

Dear Chief Plante:

Laing Bibber Funeral Home is proposing to develop a single story 5,965 SF funeral home. The development is to be located on Cemetery Road across from the existing Evergreen Cemetery. The lot contains undisturbed woodlands and is considered entirely undeveloped.

The property will be serviced by a new private well and septic system. The new building will be protected with an automatic fire alarm. The building will not be sprinklered. A knox box will be located on the building at your recommended location.

In accordance with Section 9.8.F.2.c.v of the Berwick Land Use Ordinance we are requesting your review and comments. We have provided a set of plans for your review.

Please feel free to contact us with any questions. If you would like to meet and discuss I am available at your convenience.

Respectfully yours,
CIVIL CONSULTANTS

Geoffrey R. Aleva, P.E.
Vice President

Enclosures: Sheet L1, Arch. Renderings, USGS location, Tax Map

J:\aaa\2019\1928900\Planning Boad\Town Review\Review Letters\Fire Chief\20200122-1928900-FireChiefLetter.docx

geoff@civcon.com

From: geoff@civcon.com
Sent: Friday, January 24, 2020 8:28 AM
To: Dennis Plante
Cc: 'Daniel Caiazzo'
Subject: RE: Cemetery Road - Bibber Funeral Home Site Plan (1928900)

Chief,

Yes, the architect is taking care of the Fire Marshal review.

Geoff Aleva
CIVIL CONSULTANTS

From: Daniel Caiazzo <Daniel.Caiazzo@civcon.com>
Sent: Thursday, January 23, 2020 5:32 PM
To: 'Geoff Aleva' <geoff@civcon.com>
Subject: FW: Cemetery Road - Bibber Funeral Home Site Plan (1928900)

FWD

From: Dennis Plante [mailto:dplante@berwickfire.org]
Sent: Thursday, January 23, 2020 2:37 PM
To: Daniel Caiazzo
Subject: RE: Cemetery Road - Bibber Funeral Home Site Plan (1928900)

Thanks I received the plans today. Are you also sending the proposal along to the State Fire Marshalls Office for Construction Permit ??

From: Daniel Caiazzo <Daniel.Caiazzo@civcon.com>
Sent: Wednesday, January 22, 2020 4:15 PM
To: Dennis Plante <dplante@berwickfire.org>
Cc: 'Geoff Aleva' <geoff@civcon.com>
Subject: Cemetery Road - Bibber Funeral Home Site Plan (1928900)

Chief,

Attached is a letter and information regarding a project we are working on. As part of the process we require your input. The project is to construct a new funeral home on the undeveloped property across from Evergreen Cemetery. The building will have a fire alarm system but will not be sprinkled. If you would like paper copies let me know and I will drop off a set.

Please call or email with any questions. Thank you for your time.

Dan Caiazzo, E.I.T.

CIVIL CONSULTANTS
Staff Engineer
293 Main Street, South Berwick, ME 03908

(207) 384-2550

Virus-free. www.avg.com

CIVIL CONSULTANTS

Engineers
Planners
Surveyors
P.O. Box 100
293 Main Street
South Berwick
Maine
03908
207-384-2550

January 22, 2020

Via Email

Timothy Towne, Chief of Police
York Police Department
9 Hannaford Drive
York, Maine 03909

RE: **Laing Bibber Funeral Home**
Cemetery Road, Berwick, ME
Map 36 Lot 46

Chief Towne:

Laing Bibber Funeral Home is proposing to develop a single story 5,965 SF funeral home. The development is to be located on Cemetery Road across from the existing Evergreen Cemetery. The lot contains undisturbed woodlands and is considered entirely undeveloped.

In accordance with Section 9.8.F.2.c.v of the Berwick Land Use Ordinance we are requesting your review and comments. We have provided a set of plans for your review.

Please feel free to contact us with any questions. If you would like to meet and discuss I am available at your convenience.

Respectfully yours,
CIVIL CONSULTANTS

Geoffrey R. Aleva, P.E.
Vice President

Enclosures: Sheets L1, Arch. Renderings, USGS location, Tax Map

J:\aaa\2019\1928900\Planning Boad\Town Review\Review Letters\Police Chief\20200122-1928900-PoliceChiefLetter.docx

geoff@civcon.com

From: geoff@civcon.com
Sent: Friday, January 24, 2020 8:30 AM
To: 'chief@berwickpd.org'
Cc: 'Daniel Caiazzo'
Subject: RE: Cemetery Road - Bibber Funeral Home Site Plan (1928900)

Chief,

We can make that happen for a tour before the project opens.

If you can send an email to James at the town with any or no comments that would be great for the planning board process.

If you copy Dan and myself on this that would be appreciated.

Geoff

Geoff Aleva
CIVIL CONSULTANTS

From: Daniel Caiazzo <Daniel.Caiazzo@civcon.com>
Sent: Thursday, January 23, 2020 11:55 AM
To: 'Geoff Aleva' <geoff@civcon.com>
Subject: FW: Cemetery Road - Bibber Funeral Home Site Plan (1928900)

FWD

From: chief@berwickpd.org [mailto:chief@berwickpd.org]
Sent: Thursday, January 23, 2020 11:31 AM
To: Daniel Caiazzo
Subject: RE: Cemetery Road - Bibber Funeral Home Site Plan (1928900)

Dan,

I have reviewed the plans and see no glaring issues in regards to the police departments point of view. As the project unfolds and approaches the final stages, prior to actually opening, I would like the opportunity to take a quick tour so that the officers have some idea about any alarm systems and the layout of the interior.It will assist us in the event that we are ever required to respond there. Do you need anything formal from me on letter head for your files?

Thank you,

Tim

Chief Timothy Towne

Berwick Police Department
20 Wilson Street
Berwick, Maine 03901

-------- Original Message --------
Subject: Cemetery Road - Bibber Funeral Home Site Plan (1928900)
From: "Daniel Caiazzo" <Daniel.Caiazzo@civcon.com>
Date: Wed, January 22, 2020 4:19 pm
To: <chief@berwickpd.org>
Cc: "'Geoff Aleva'" <geoff@civcon.com>

Chief,

Attached is a letter and information regarding a project we are working on. As part of the process we require your input. The project is to construct a new funeral home on the undeveloped property across from the existing Evergreen Cemetery. If you would like paper copies let me know and I will drop off a set.

Please call or email with any questions. Thank you for your time.

Dan Caiazzo, E.I.T.

CIVIL CONSULTANTS
Staff Engineer
293 Main Street, South Berwick, ME 03908
(207) 384-2550

Virus-free. www.avg.com

CIVIL CONSULTANTS

Engineers
Planners
Surveyors
P.O. Box 100
293 Main Street
South Berwick
Maine
03908
207-384-2550

January 22, 2020

Via Email

Robert Perschy – Foreman
Public Works Department
11 Sullivan Street
Berwick, ME 03901

RE: **Laing Bibber Funeral Home**
Cemetery Road, Berwick, ME
Map 36 Lot 46

Dear Mr. Perschy:

Laing Bibber Funeral Home is proposing to develop a single story 5,965 SF funeral home. The development is to be located on Cemetery Road across from the existing Evergreen Cemetery. The lot contains undisturbed woodlands and is considered entirely undeveloped. The building will utilize a new private well and private septic system.

In accordance with Section 9.8.F.2.c.v of the Berwick Land Use Ordinance we are requesting your review and comments. We have provided a site plan along with a traffic impact memorandum. The traffic generation is not expected to exceed the requirement for a full traffic study.

Please feel free to contact us with any questions. If you would like to meet and discuss I am available at your convenience.

Respectfully yours,
CIVIL CONSULTANTS

Geoffrey Aleva, P.E.
Vice President

Enclosures: Sheet L1, Arch. Renderings, Traffic Impact Memo,
Tax Map

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CIVIL CONSULTANTS

Engineers
Planners
Surveyors
P.O. Box 100
293 Main Street
South Berwick
Maine
03908
207-384-2550

January 22, 2020

Via Email

Dave Andreesen – Chairman
Berwick Planning Board
11 Sullivan Street
Berwick, ME 03901

RE: **Laing Bibber Funeral Home**
Cemetery Road, Berwick, ME
Map 36 Lot 46

Dear Mr. Andreesen:

Laing Bibber Funeral Home is proposing to develop a single story 5,965 SF funeral home. The development is to be located on Cemetery Road across from the existing Evergreen Cemetery. The lot contains undisturbed woodlands and is considered entirely undeveloped. The building will utilize a new private well and private septic system.

In accordance with Section 9.8.F.2.c.v of the Berwick Land Use Ordinance we are requesting your review and comments. We have provided a set of plans for your review.

Please feel free to contact us with any questions. If you would like to meet and discuss I am available at your convenience.

Respectfully yours,
CIVIL CONSULTANTS

Geoffrey Aleva, P.E.
Vice President

Enclosures: Sheet L1, Arch. Renderings, Tax Map

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CIVIL CONSULTANTS

Engineers
Planners
Surveyors
P.O. Box 100
293 Main Street
South Berwick
Maine
03908
207-384-2550

January 22, 2020

Via Email

Thomas Wright – Chairman
Berwick Board of Selectmen
11 Sullivan Street
Berwick, ME 03901

RE: **Laing Bibber Funeral Home**
Cemetery Road, Berwick, ME
Map 36 Lot 46

Dear Mr. Wright:

Laing Bibber Funeral Home is proposing to develop a single story 5,965 SF funeral home. The development is to be located on Cemetery Road across from the existing Evergreen Cemetery. The lot contains undisturbed woodlands and is considered entirely undeveloped. The building will utilize a new private well and private septic system.

In accordance with Section 9.8.F.2.c.v of the Berwick Land Use Ordinance we are requesting your review and comments. We have provided a set of plans for your review.

Please feel free to contact us with any questions. If you would like to meet and discuss I am available at your convenience.

Respectfully yours,
CIVIL CONSULTANTS

Geoffrey Aleva, P.E.
Vice President

Enclosures: Sheet L1, Arch. Renderings, Tax Map

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Site Plan Review Application

STORMWATER MANAGEMENT PLAN

"Laing Bibber Funeral Home"
Cemetery Street
Berwick, Maine

Prepared for:

Laing Bibber Funeral Home
67 Summer Street
Kennebunk, Maine 04043

February, 2020

INTRODUCTION:

The proposed development is located across from the existing Evergreen Cemetery on Cemetery Road in Berwick, Maine. The lot is known as Map R-36, Lot 46 on the Town of Berwick tax map system. The existing lot contains approximately 5.85 acres of undeveloped woodland.

The new development will consist of the construction of a 5,965 SF funeral home with covered entry and associated onsite parking.

The project will disturb more than an acre and will result in approximately 35,000 SF of new impervious area. This meets the allowable 35% lot coverage for the Transitional Residential District (R-2) that the site is located within.

DESIGN REQUIREMENTS:

Section 7.17 of the Town of Berwick Land Use Ordinance requires developments that disturb over an acre to meet the provisions of MDEP Chapter 500. Since the project disturbs over an acre but does not exceed an acre of impervious area, the project need only meet the basic standards of Chapter 500. This means there are no specific storm events required for post-development peak discharges to be reduced to pre-development levels.

The analysis for this report includes the 2-year and 100-year events to predict the downstream effects of the proposed site coverage changes.

EXISTING DRAINAGE CONDITIONS:

There is a high point in the front of the lot that directs runoff from Cemetery Road towards the southern and eastern property lines. This creates three distinct drainage areas.

The first is the western portion of the lot. The runoff from this subcatchment exits the site past the southern property line and continues south through the abutting property known as Map R-36 Lot 52. This is modeled as OUT 1.

The second drainage area is the middle portion of the site. The subcatchment directs water south to the same abutting lot as OUT 1, but the slope then carries the water east. This is modeled as OUT 2.

The final drainage area is the eastern portion of the site. The slope of this area directs all runoff east toward the abutting lot known as Map R-36 Lot 50. This is modeled as OUT 3.

Based on the Medium Intensity Soil Survey (see attached) obtained from the NRCA Web Soil Survey website, soils in the analyzed watershed area were found to be entirely hydrologic soil type D soils. See sheet D1 for the pre-development drainage conditions.

The area to be developed is not located in a flood zone. See attached copy of the FEMA map, community-panel number 2301440006B effective August 5, 1991.

PROPOSED DRAINAGE:

The proposed site has been designed to limit post-development flows to the greatest extent practical. This will ensure that there are minimal adverse downstream impacts as a result of the new development.

The post-development site will be broken into five drainage areas. Runoff from the west side of the property will be directed south and outlet to OUT 1 on the abutting lot. This is very similar to pre-development conditions.

A small portion in the middle of the lot will be directed south and outlet to OUT 2. Like the pre-development conditions, the runoff then flows east and combines with the flow OUT 3.

Two additional drainage areas are created in the post-development conditions to capture runoff produced by the increased impervious area.

One of these areas will collect runoff at the front of the property and direct the flow through a new 15" culvert under the second driveway access. This outlet flows to an existing channel which eventually flows to OUT 3.

Another drainage area collects stormwater from the rear of the proposed building. The runoff is directed through the use of swales and catch basins towards a shallow detention basin. This helps control the release of stormwater, which allows for a greater time of concentration and a reduced runoff flow rate.

The remaining part of the site will continue to direct stormwater towards OUT 3 on the east side of the property, similar to the pre-development conditions.

ANALYSIS:

The overall perimeter of the watershed remained the same for both Pre- and Post Development analyses. There were two subcatchments identified in the Pre-Development and five identified in the Post-Development.

Although the MDEP basic standards do not require flooding standards be met, three distinct discharge points were used to compare the pre and post-development storm water flows.

For further details regarding subcatchment determination, refer to the project drawings and D1 & D2 included with this report.

METHODOLOGY:

All runoff calculations were performed using methods based on USDA–SCS Technical Release No. 20 (also known as TR-20). The 2- and 100-year events (Type III rainfall distribution) were used for the site-specific analysis to determine pre- and post-development peak discharge rates and required stormwater treatment & conveyance systems per Town of Berwick requirements. Rainfall data was obtained from the Extreme Precipitation Map on the Cornell University Website.

Runoff curve numbers (CN) and times of concentration (Tc) were determined by the methods outlined in USDA-SCS Technical Release No. 55 (better known as TR-55). On site watershed areas were

determined using two-foot contour data obtained from the Maine GIS LIDAR files.

The detailed analysis for this project was performed by computer utilizing "HYDROCAD" stormwater modeling software. The computer printouts are attached.

The attached Pre- and Post Development plans (D1 & D2) show subcatchment boundaries, hydraulic flow lines, existing and proposed roads, and drainage features and facilities. Land cover type boundaries used in the model for on-site areas are also shown on the plan (i.e. tree lines, gravel, etc).

FLOW RATES:

TWO-YEAR EVENT -

Discharge Point Desig Pre/Post	Peak Runoff(in cfs) Pre	Post	Change (cfs)
OUT 1	0.00	0.00	0.00
OUT 2	0.00	0.00	0.00
OUT 3	0.00	0.87	+0.87

ONE HUNDRED-YEAR EVENT -

Discharge Point Desig Pre/Post	Peak Runoff(in cfs) Pre	Post	Change (cfs)
OUT 1	0.28	0.21	-0.07
OUT 2	0.36	0.07	-0.29
OUT 3	4.27	5.72	+1.45

The analysis reveals that the proposed BMP's will maintain expected flows at or below current levels for both OUT 1 and OUT 2 during a 2-year and 100-year storm.

A stormwater maintenance and inspection plan has also been included as part of this submission.

CONCLUSIONS:

The rules in the Town of Berwick Land Use Ordinance and MDEP Chapter 500 do not require flows to be reduced from pre-development conditions. However, the runoff has been restricted to the greatest extent practical using swales and a shallow detention basin.

The runoff flow rates to OUT 1 and OUT 2 have been reduced from pre-development conditions. There is an increase in flow to OUT 3 at both storm levels analyzed.

At the 100-year storm, there is an increase in runoff volume of 0.410 acre-feet in the pre- to post-development. According to the National Wetlands Inventory (NWI), a 9.51 acre wetland is located at OUT 3. An NWI map has been attached. This means there will be an increase in water level of approximately 0.52 inches at the 100-year storm event.

It is our opinion that there will be no adverse downstream impacts as a result of this project, and the surrounding lots have been sufficiently protected by the proposed stormwater management plan.

J:\aaa\2019\1928900\DRAINAGE\20200129_1928900-DRAINAGE_NARRATIVE.docx

The seal affixed above applies to this report and all attachments including the HydroCAD calculations, Stormwater Plans D1, D2

Site Plan Review Application
Stormwater Management Plan

"LAING BIBBER FUNERAL HOME"
BERWICK, MAINE

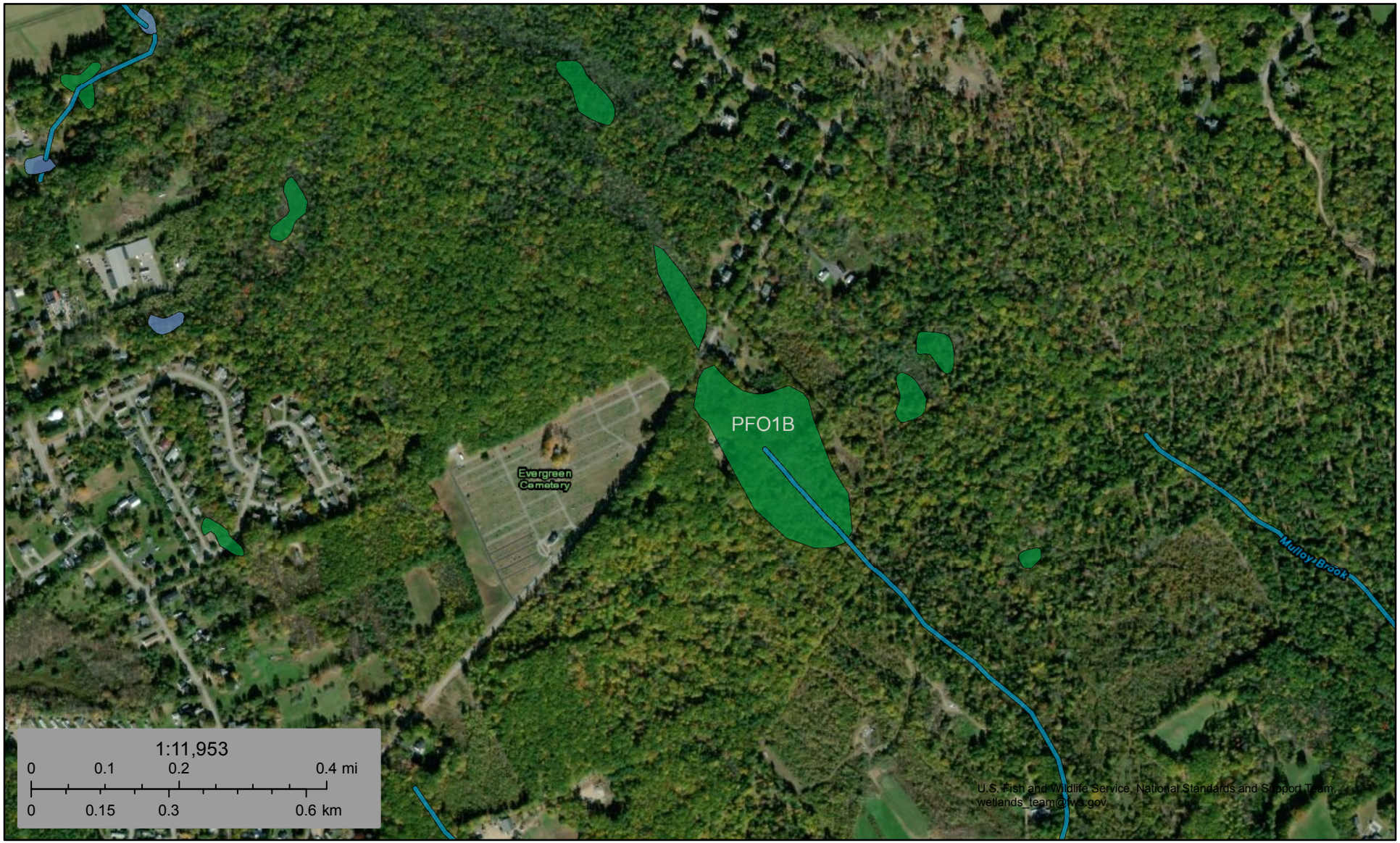
Prepared for

Laing Bibber Funeral Home
67 Summer Street
Kennebunk, ME 04043

February 2020

U.S. Fish and Wildlife Service
National Wetlands Inventory

Bibber Funeral Home



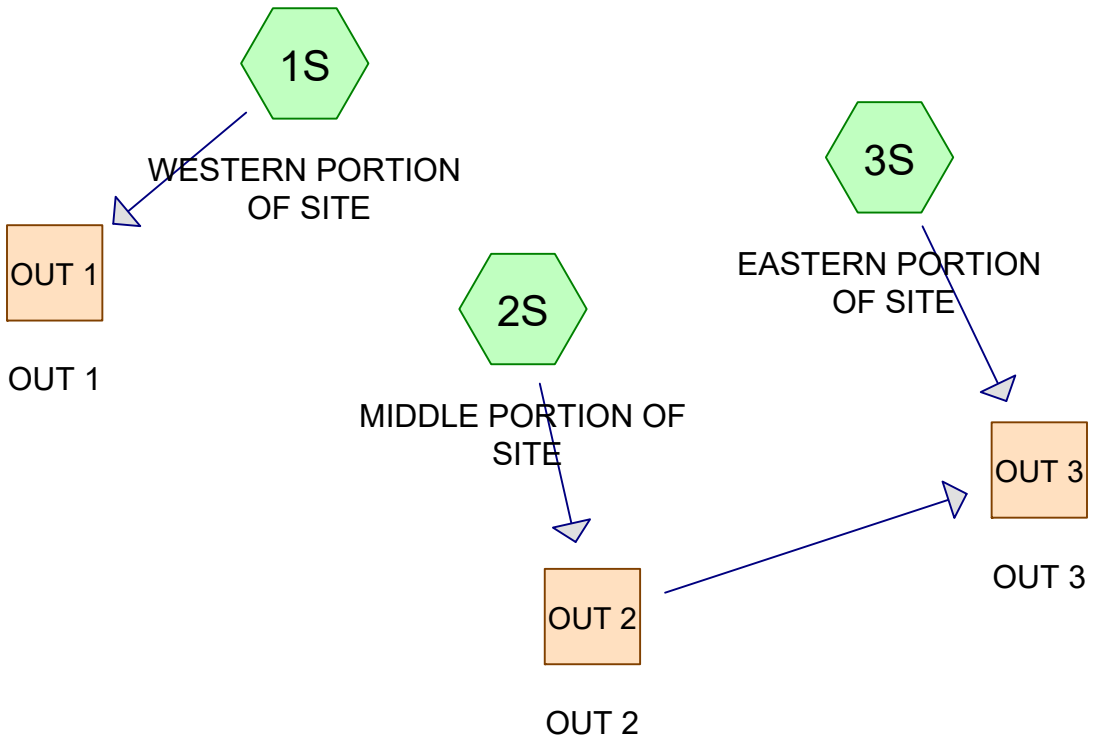
January 14, 2020

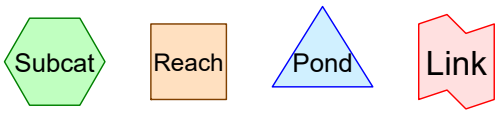
Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper





Routing Diagram for 20200206_1928900-DRAINAGE PRE
Prepared by CIVIL CONSULTANTS, Printed 2/6/2020
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.229	83	Paved roads w/open ditches, 50% imp, HSG A (1S, 3S)
5.790	36	Woods, Fair, HSG A (1S, 2S, 3S)
6.018	**38**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
6.018	HSG A	1S, 2S, 3S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
6.018		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchr Numbers
0.229	0.000	0.000	0.000	0.000	0.229	Paved roads w/open ditches, 50% imp	
5.790	0.000	0.000	0.000	0.000	5.790	Woods, Fair	
6.018	**0.000**	**0.000**	**0.000**	**0.000**	**6.018**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: WESTERN PORTION OF Runoff Area=14,226 sf 2.38% Impervious Runoff Depth=0.00"
Flow Length=166' Tc=10.1 min CN=38 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: MIDDLE PORTION OF Runoff Area=28,436 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=210' Slope=0.0500 '/' Tc=11.0 min CN=36 Runoff=0.00 cfs 0.000 af

Subcatchment 3S: EASTERN PORTION OF Runoff Area=219,500 sf 2.12% Impervious Runoff Depth=0.00"
Flow Length=467' Tc=13.8 min CN=38 Runoff=0.00 cfs 0.000 af

Reach OUT 1: OUT 1 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach OUT 2: OUT 2 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=492.0' S=0.0935 '/' Capacity=357.47 cfs Outflow=0.00 cfs 0.000 af

Reach OUT 3: OUT 3 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 6.018 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
98.10% Pervious = 5.904 ac 1.90% Impervious = 0.114 ac

Summary for Subcatchment 1S: WESTERN PORTION OF SITE

[45] Hint: Runoff=Zero

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (sf)	CN	Description
13,549	36	Woods, Fair, HSG A
677	83	Paved roads w/open ditches, 50% imp, HSG A
14,226	38	Weighted Average
13,888		97.62% Pervious Area
339		2.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
2.1	116	0.0345	0.93		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.1	166	Total			

Summary for Subcatchment 2S: MIDDLE PORTION OF SITE

[45] Hint: Runoff=Zero

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (sf)	CN	Description
28,436	36	Woods, Fair, HSG A
28,436		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		**Sheet Flow, 2.1** Woods: Light underbrush n= 0.400 P2= 3.18"
2.4	160	0.0500	1.12		**Shallow Concentrated Flow, 2.2** Woodland Kv= 5.0 fps
11.0	210	Total			

Summary for Subcatchment 3S: EASTERN PORTION OF SITE

[45] Hint: Runoff=Zero

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (sf)	CN	Description
210,206	36	Woods, Fair, HSG A
9,294	83	Paved roads w/open ditches, 50% imp, HSG A
219,500	38	Weighted Average
214,853		97.88% Pervious Area
4,647		2.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	50	0.0450	0.09		**Sheet Flow, 3.1** Woods: Light underbrush n= 0.400 P2= 3.18"
4.1	302	0.0596	1.22		**Shallow Concentrated Flow, 3.2** Woodland Kv= 5.0 fps
0.8	115	0.2260	2.38		**Shallow Concentrated Flow, 3.3** Woodland Kv= 5.0 fps
13.8	467	Total			

Summary for Reach OUT 1: OUT 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.327 ac, 2.38% Impervious, Inflow Depth = 0.00" for 2 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

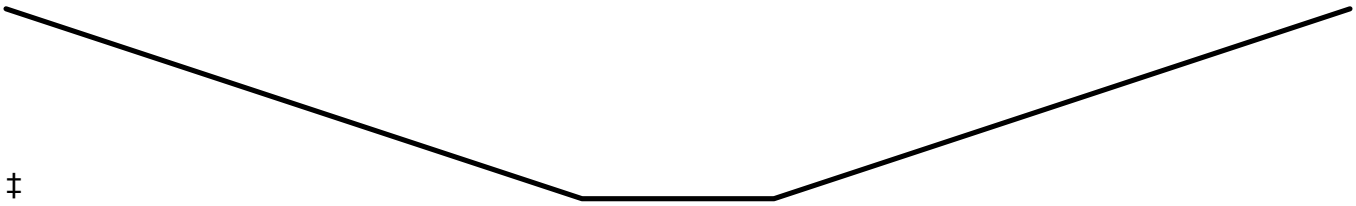
Summary for Reach OUT 2: OUT 2

Inflow Area = 0.653 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 357.47 cfs

10.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 30.0 '/' Top Width= 70.00'
Length= 492.0' Slope= 0.0935 '/'
Inlet Invert= 370.00', Outlet Invert= 324.00'



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Summary for Reach OUT 3: OUT 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.692 ac, 1.87% Impervious, Inflow Depth = 0.00" for 2 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: WESTERN PORTION OF Runoff Area=14,226 sf 2.38% Impervious Runoff Depth=1.29"
Flow Length=166' Tc=10.1 min CN=38 Runoff=0.28 cfs 0.035 af

Subcatchment 2S: MIDDLE PORTION OF Runoff Area=28,436 sf 0.00% Impervious Runoff Depth=1.09"
Flow Length=210' Slope=0.0500 '/' Tc=11.0 min CN=36 Runoff=0.40 cfs 0.059 af

Subcatchment 3S: EASTERN PORTION OF Runoff Area=219,500 sf 2.12% Impervious Runoff Depth=1.29"
Flow Length=467' Tc=13.8 min CN=38 Runoff=3.95 cfs 0.540 af

Reach OUT 1: OUT 1 Inflow=0.28 cfs 0.035 af
Outflow=0.28 cfs 0.035 af

Reach OUT 2: OUT 2 Avg. Flow Depth=0.03' Max Vel=1.16 fps Inflow=0.40 cfs 0.059 af
n=0.035 L=492.0' S=0.0935 '/' Capacity=357.47 cfs Outflow=0.36 cfs 0.059 af

Reach OUT 3: OUT 3 Inflow=4.27 cfs 0.599 af
Outflow=4.27 cfs 0.599 af

Total Runoff Area = 6.018 ac Runoff Volume = 0.634 af Average Runoff Depth = 1.26"
98.10% Pervious = 5.904 ac 1.90% Impervious = 0.114 ac

Summary for Subcatchment 1S: WESTERN PORTION OF SITE

Runoff = 0.28 cfs @ 12.20 hrs, Volume= 0.035 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.53"

Area (sf)	CN	Description
13,549	36	Woods, Fair, HSG A
677	83	Paved roads w/open ditches, 50% imp, HSG A
14,226	38	Weighted Average
13,888		97.62% Pervious Area
339		2.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
2.1	116	0.0345	0.93		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.1	166	Total			

Summary for Subcatchment 2S: MIDDLE PORTION OF SITE

Runoff = 0.40 cfs @ 12.24 hrs, Volume= 0.059 af, Depth= 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.53"

Area (sf)	CN	Description
28,436	36	Woods, Fair, HSG A
28,436		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		**Sheet Flow, 2.1** Woods: Light underbrush n= 0.400 P2= 3.18"
2.4	160	0.0500	1.12		**Shallow Concentrated Flow, 2.2** Woodland Kv= 5.0 fps
11.0	210	Total			

Summary for Subcatchment 3S: EASTERN PORTION OF SITE

Runoff = 3.95 cfs @ 12.26 hrs, Volume= 0.540 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.53"

Area (sf)	CN	Description
210,206	36	Woods, Fair, HSG A
9,294	83	Paved roads w/open ditches, 50% imp, HSG A
219,500	38	Weighted Average
214,853		97.88% Pervious Area
4,647		2.12% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	50	0.0450	0.09		**Sheet Flow, 3.1** Woods: Light underbrush n= 0.400 P2= 3.18"
4.1	302	0.0596	1.22		**Shallow Concentrated Flow, 3.2** Woodland Kv= 5.0 fps
0.8	115	0.2260	2.38		**Shallow Concentrated Flow, 3.3** Woodland Kv= 5.0 fps
13.8	467	Total			

Summary for Reach OUT 1: OUT 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.327 ac, 2.38% Impervious, Inflow Depth = 1.29" for 100 YR event
Inflow = 0.28 cfs @ 12.20 hrs, Volume= 0.035 af
Outflow = 0.28 cfs @ 12.20 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

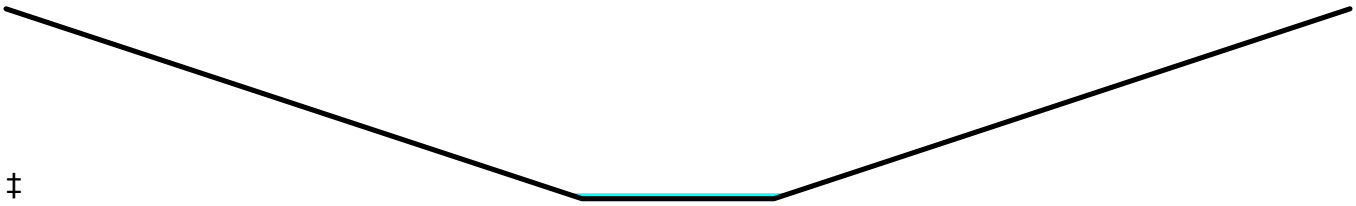
Summary for Reach OUT 2: OUT 2

Inflow Area = 0.653 ac, 0.00% Impervious, Inflow Depth = 1.09" for 100 YR event
Inflow = 0.40 cfs @ 12.24 hrs, Volume= 0.059 af
Outflow = 0.36 cfs @ 12.39 hrs, Volume= 0.059 af, Atten= 9%, Lag= 9.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.16 fps, Min. Travel Time= 7.0 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 12.9 min

Peak Storage= 153 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.03'
Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 357.47 cfs

10.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 30.0 '/' Top Width= 70.00'
Length= 492.0' Slope= 0.0935 '/'
Inlet Invert= 370.00', Outlet Invert= 324.00'



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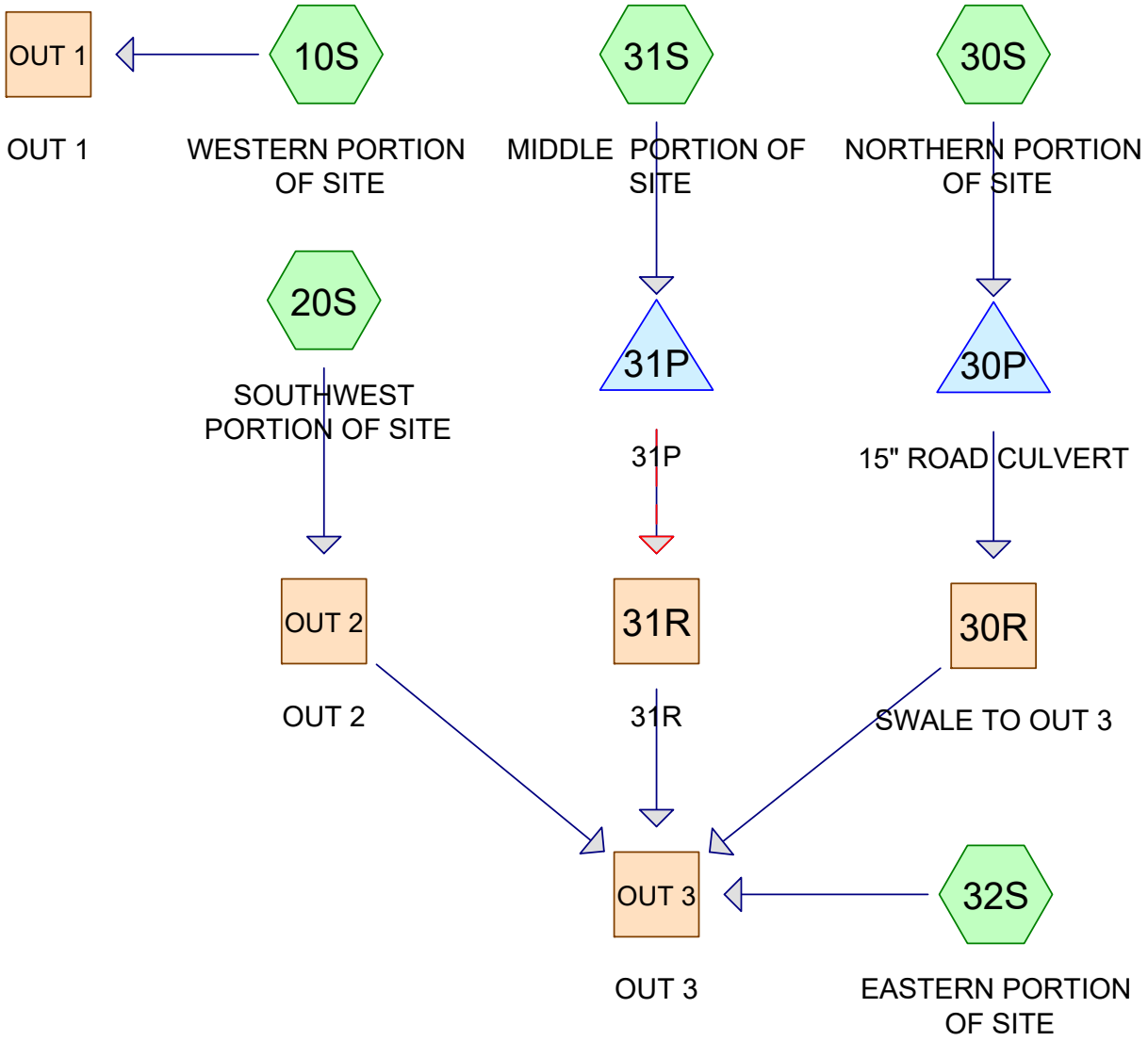
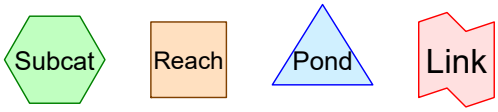
Summary for Reach OUT 3: OUT 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	5.692 ac,	1.87% Impervious,	Inflow Depth =	1.26"	for 100 YR event
Inflow =	4.27 cfs @	12.27 hrs,	Volume=	0.599 af	
Outflow =	4.27 cfs @	12.27 hrs,	Volume=	0.599 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3





Routing Diagram for 20200206_1928900-DRAINAGE POST
Prepared by CIVIL CONSULTANTS, Printed 2/6/2020
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.223	39	>75% Grass cover, Good, HSG A (10S, 20S, 30S, 31S, 32S)
0.675	98	Paved parking, HSG A (30S, 31S, 32S)
0.232	83	Paved roads w/open ditches, 50% imp, HSG A (10S, 30S, 32S)
0.152	98	Roofs, HSG A (30S, 31S)
3.736	36	Woods, Fair, HSG A (10S, 20S, 32S)
6.018	**47**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
6.018	HSG A	10S, 20S, 30S, 31S, 32S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
6.018		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchr Numbers
1.223	0.000	0.000	0.000	0.000	1.223	>75% Grass cover, Good	
0.675	0.000	0.000	0.000	0.000	0.675	Paved parking	
0.232	0.000	0.000	0.000	0.000	0.232	Paved roads w/open ditches, 50% imp	
0.152	0.000	0.000	0.000	0.000	0.152	Roofs	
3.736	0.000	0.000	0.000	0.000	3.736	Woods, Fair	
6.018	**0.000**	**0.000**	**0.000**	**0.000**	**6.018**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	30P	368.50	368.00	53.0	0.0094	0.013	15.0	0.0	0.0
2	31P	365.00	364.00	32.0	0.0313	0.013	12.0	0.0	0.0

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10S: WESTERN PORTION OF Runoff Area=8,408 sf 3.38% Impervious Runoff Depth=0.00"
Flow Length=161' Tc=10.1 min CN=40 Runoff=0.00 cfs 0.000 af

Subcatchment 20S: SOUTHWEST PORTION Runoff Area=5,450 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=70' Tc=9.0 min CN=37 Runoff=0.00 cfs 0.000 af

Subcatchment 30S: NORTHERN PORTION Runoff Area=41,815 sf 50.84% Impervious Runoff Depth=0.82"
Flow Length=94' Tc=7.3 min CN=70 Runoff=0.77 cfs 0.065 af

Subcatchment 31S: MIDDLE PORTION OF Runoff Area=28,469 sf 57.26% Impervious Runoff Depth=0.97"
Flow Length=24' Tc=3.1 min CN=73 Runoff=0.76 cfs 0.053 af

Subcatchment 32S: EASTERN PORTION Runoff Area=178,021 sf 1.82% Impervious Runoff Depth=0.00"
Flow Length=334' Tc=10.8 min CN=38 Runoff=0.00 cfs 0.000 af

Reach 30R: SWALE TO OUT 3 Avg. Flow Depth=0.04' Max Vel=1.24 fps Inflow=0.67 cfs 0.062 af
n=0.035 L=709.0' S=0.0592 '/' Capacity=157.37 cfs Outflow=0.56 cfs 0.062 af

Reach 31R: 31R Avg. Flow Depth=0.03' Max Vel=1.16 fps Inflow=0.31 cfs 0.022 af
n=0.035 L=357.0' S=0.1064 '/' Capacity=66.56 cfs Outflow=0.31 cfs 0.022 af

Reach OUT 1: OUT 1 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach OUT 2: OUT 2 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=492.0' S=0.0935 '/' Capacity=357.47 cfs Outflow=0.00 cfs 0.000 af

Reach OUT 3: OUT 3 Inflow=0.87 cfs 0.085 af
Outflow=0.87 cfs 0.085 af

Pond 30P: 15" ROAD CULVERT Peak Elev=369.26' Storage=50 cf Inflow=0.77 cfs 0.065 af
Discarded=0.03 cfs 0.003 af Primary=0.67 cfs 0.062 af Outflow=0.70 cfs 0.065 af

Pond 31P: 31P Peak Elev=365.73' Storage=291 cf Inflow=0.76 cfs 0.053 af
Discarded=0.07 cfs 0.030 af Primary=0.31 cfs 0.022 af Secondary=0.00 cfs 0.000 af Outflow=0.38 cfs 0.053 af

Total Runoff Area = 6.018 ac Runoff Volume = 0.118 af Average Runoff Depth = 0.24"
84.33% Pervious = 5.075 ac 15.67% Impervious = 0.943 ac

Summary for Subcatchment 10S: WESTERN PORTION OF SITE

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (sf)	CN	Description
5,883	36	Woods, Fair, HSG A
568	83	Paved roads w/open ditches, 50% imp, HSG A
1,957	39	>75% Grass cover, Good, HSG A
8,408	40	Weighted Average
8,124		96.62% Pervious Area
284		3.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
2.1	111	0.0315	0.89		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.1	161	Total			

Summary for Subcatchment 20S: SOUTHWEST PORTION OF SITE

[45] Hint: Runoff=Zero

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (sf)	CN	Description
3,092	36	Woods, Fair, HSG A
2,358	39	>75% Grass cover, Good, HSG A
5,450	37	Weighted Average
5,450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		**Sheet Flow, 2.1** Woods: Light underbrush n= 0.400 P2= 3.18"
0.4	20	0.0250	0.79		**Shallow Concentrated Flow, 2.2** Woodland Kv= 5.0 fps
9.0	70	Total			

Summary for Subcatchment 30S: NORTHERN PORTION OF SITE

Runoff = 0.77 cfs @ 12.12 hrs, Volume= 0.065 af, Depth= 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (sf)	CN	Description
3,559	83	Paved roads w/open ditches, 50% imp, HSG A
18,775	39	>75% Grass cover, Good, HSG A
3,639	98	Roofs, HSG A
15,842	98	Paved parking, HSG A
41,815	70	Weighted Average
20,555		49.16% Pervious Area
21,261		50.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.18"
0.3	44	0.0909	2.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	94	Total			

Summary for Subcatchment 31S: MIDDLE PORTION OF SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.76 cfs @ 12.06 hrs, Volume= 0.053 af, Depth= 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (sf)	CN	Description
13,302	98	Paved parking, HSG A
3,000	98	Roofs, HSG A
12,167	39	>75% Grass cover, Good, HSG A
28,469	73	Weighted Average
12,167		42.74% Pervious Area
16,302		57.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.0400	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.18"
0.7	9	0.3330	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.18"
3.1	24	Total			

Summary for Subcatchment 32S: EASTERN PORTION OF SITE

[45] Hint: Runoff=Zero

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YR Rainfall=3.18"

Area (sf)	CN	Description
153,774	36	Woods, Fair, HSG A
5,968	83	Paved roads w/open ditches, 50% imp, HSG A
18,029	39	>75% Grass cover, Good, HSG A
250	98	Paved parking, HSG A
178,021	38	Weighted Average
174,787		98.18% Pervious Area
3,234		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, 3.1** Woods: Light underbrush n= 0.400 P2= 3.18"
2.5	169	0.0503	1.12		**Shallow Concentrated Flow, 3.2** Woodland Kv= 5.0 fps
0.8	115	0.2260	2.38		**Shallow Concentrated Flow, 3.3** Woodland Kv= 5.0 fps
10.8	334	Total			

Summary for Reach 30R: SWALE TO OUT 3

Inflow Area = 0.960 ac, 50.84% Impervious, Inflow Depth = 0.78" for 2 YR event
Inflow = 0.67 cfs @ 12.17 hrs, Volume= 0.062 af
Outflow = 0.56 cfs @ 12.27 hrs, Volume= 0.062 af, Atten= 17%, Lag= 6.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.24 fps, Min. Travel Time= 9.5 min
Avg. Velocity = 0.53 fps, Avg. Travel Time= 22.3 min

Peak Storage= 318 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 157.37 cfs

10.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 10.0 '/' Top Width= 30.00'
Length= 709.0' Slope= 0.0592 '/'
Inlet Invert= 368.00', Outlet Invert= 326.00'

‡

Summary for Reach 31R: 31R

Inflow Area = 0.654 ac, 57.26% Impervious, Inflow Depth = 0.41" for 2 YR event
Inflow = 0.31 cfs @ 12.21 hrs, Volume= 0.022 af
Outflow = 0.31 cfs @ 12.30 hrs, Volume= 0.022 af, Atten= 2%, Lag= 5.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.16 fps, Min. Travel Time= 5.1 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 10.9 min

Peak Storage= 95 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.03'
Bank-Full Depth= 0.50' Flow Area= 10.0 sf, Capacity= 66.56 cfs

10.00' x 0.50' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 20.0 '/' Top Width= 30.00'
Length= 357.0' Slope= 0.1064 '/'
Inlet Invert= 364.00', Outlet Invert= 326.00'

‡

Summary for Reach OUT 1: OUT 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.193 ac, 3.38% Impervious, Inflow Depth = 0.00" for 2 YR event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

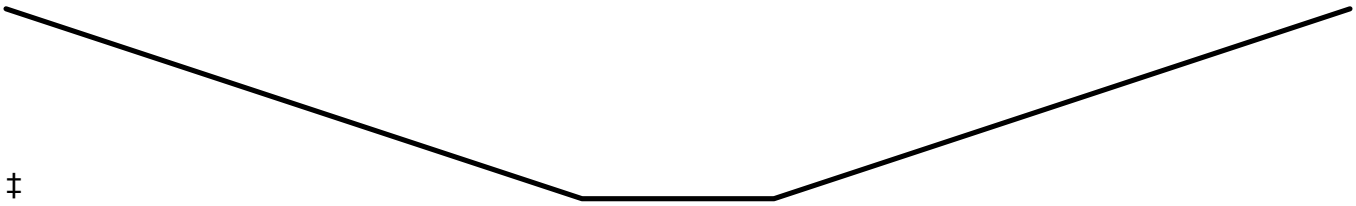
Summary for Reach OUT 2: OUT 2

Inflow Area = 0.125 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2 YR event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 357.47 cfs

10.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 30.0 '/' Top Width= 70.00'
Length= 492.0' Slope= 0.0935 '/'
Inlet Invert= 370.00', Outlet Invert= 324.00'



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Summary for Reach OUT 3: OUT 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.825 ac, 16.08% Impervious, Inflow Depth = 0.17" for 2 YR event
Inflow = 0.87 cfs @ 12.27 hrs, Volume= 0.085 af
Outflow = 0.87 cfs @ 12.27 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 30P: 15" ROAD CULVERT

Inflow Area = 0.960 ac, 50.84% Impervious, Inflow Depth = 0.82" for 2 YR event
Inflow = 0.77 cfs @ 12.12 hrs, Volume= 0.065 af
Outflow = 0.70 cfs @ 12.17 hrs, Volume= 0.065 af, Atten= 9%, Lag= 2.7 min
Discarded = 0.03 cfs @ 12.17 hrs, Volume= 0.003 af
Primary = 0.67 cfs @ 12.17 hrs, Volume= 0.062 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 369.26' @ 12.17 hrs Surf.Area= 202 sf Storage= 50 cf

Plug-Flow detention time= 0.6 min calculated for 0.065 af (100% of inflow)
Center-of-Mass det. time= 0.6 min (878.0 - 877.4)

Volume	Invert	Avail.Storage	Storage Description
#1	368.50'	5,147 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
368.50	8	10.6	0	0	8
369.00	69	31.4	17	17	78
370.00	987	144.9	439	456	1,673
372.00	2,517	267.0	3,387	3,843	5,696
372.30	6,488	341.3	1,305	5,147	9,294

Device	Routing	Invert	Outlet Devices
#1	Discarded	368.50'	**6.000 in/hr Exfiltration over Surface area**
#2	Primary	368.50'	**15.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 368.50' / 368.00' S= 0.0094 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	368.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.03 cfs @ 12.17 hrs HW=369.24' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.66 cfs @ 12.17 hrs HW=369.24' TW=368.04' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.66 cfs of 1.77 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 0.66 cfs @ 3.39 fps)

Summary for Pond 31P: 31P

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=80)

Inflow Area =	0.654 ac, 57.26% Impervious, Inflow Depth = 0.97" for 2 YR event				
Inflow =	0.76 cfs @	12.06 hrs,	Volume=	0.053 af	
Outflow =	0.38 cfs @	12.21 hrs,	Volume=	0.053 af,	Atten= 49%, Lag= 9.1 min
Discarded =	0.07 cfs @	12.21 hrs,	Volume=	0.030 af	
Primary =	0.31 cfs @	12.21 hrs,	Volume=	0.022 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 365.73' @ 12.21 hrs Surf.Area= 501 sf Storage= 291 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.6 min (869.7 - 863.1)

Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	4,994 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
365.00	306	86.7	0	0	306
367.00	956	128.2	1,202	1,202	1,048
369.00	1,861	162.7	2,767	3,969	1,897
369.50	2,244	183.4	1,025	4,994	2,474

Device	Routing	Invert	Outlet Devices
#1	Discarded	365.00'	**6.000 in/hr Exfiltration over Surface area**
#2	Primary	365.00'	**12.0" Round Culvert** L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0313 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Secondary	369.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Device 2	365.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.07 cfs @ 12.21 hrs HW=365.73' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.31 cfs @ 12.21 hrs HW=365.73' TW=364.02' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.31 cfs of 1.40 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.60 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=365.00' TW=364.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 10S: WESTERN PORTION OF Runoff Area=8,408 sf 3.38% Impervious Runoff Depth=1.49"
Flow Length=161' Tc=10.1 min CN=40 Runoff=0.21 cfs 0.024 af

Subcatchment 20S: SOUTHWEST PORTION Runoff Area=5,450 sf 0.00% Impervious Runoff Depth=1.19"
Flow Length=70' Tc=9.0 min CN=37 Runoff=0.10 cfs 0.012 af

Subcatchment 30S: NORTHERN PORTION Runoff Area=41,815 sf 50.84% Impervious Runoff Depth=4.92"
Flow Length=94' Tc=7.3 min CN=70 Runoff=5.23 cfs 0.394 af

Subcatchment 31S: MIDDLE PORTION OF Runoff Area=28,469 sf 57.26% Impervious Runoff Depth=5.28"
Flow Length=24' Tc=3.1 min CN=73 Runoff=4.37 cfs 0.288 af

Subcatchment 32S: EASTERN PORTION Runoff Area=178,021 sf 1.82% Impervious Runoff Depth=1.29"
Flow Length=334' Tc=10.8 min CN=38 Runoff=3.46 cfs 0.438 af

Reach 30R: SWALE TO OUT 3 Avg. Flow Depth=0.08' Max Vel=1.85 fps Inflow=1.63 cfs 0.359 af
n=0.035 L=709.0' S=0.0592 '/' Capacity=157.37 cfs Outflow=1.63 cfs 0.359 af

Reach 31R: 31R Avg. Flow Depth=0.04' Max Vel=1.64 fps Inflow=0.79 cfs 0.199 af
n=0.035 L=357.0' S=0.1064 '/' Capacity=66.56 cfs Outflow=0.79 cfs 0.199 af

Reach OUT 1: OUT 1 Inflow=0.21 cfs 0.024 af
Outflow=0.21 cfs 0.024 af

Reach OUT 2: OUT 2 Avg. Flow Depth=0.01' Max Vel=0.63 fps Inflow=0.10 cfs 0.012 af
n=0.035 L=492.0' S=0.0935 '/' Capacity=357.47 cfs Outflow=0.07 cfs 0.012 af

Reach OUT 3: OUT 3 Inflow=5.72 cfs 1.009 af
Outflow=5.72 cfs 1.009 af

Pond 30P: 15" ROAD CULVERT Peak Elev=371.73' Storage=3,204 cf Inflow=5.23 cfs 0.394 af
Discarded=0.32 cfs 0.035 af Primary=1.63 cfs 0.359 af Outflow=1.95 cfs 0.394 af

Pond 31P: 31P Peak Elev=368.71' Storage=3,456 cf Inflow=4.37 cfs 0.288 af
Discarded=0.24 cfs 0.088 af Primary=0.79 cfs 0.199 af Secondary=0.00 cfs 0.000 af Outflow=1.03 cfs 0.288 af

Total Runoff Area = 6.018 ac Runoff Volume = 1.156 af Average Runoff Depth = 2.30"
84.33% Pervious = 5.075 ac 15.67% Impervious = 0.943 ac

Summary for Subcatchment 10S: WESTERN PORTION OF SITE

Runoff = 0.21 cfs @ 12.18 hrs, Volume= 0.024 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.53"

Area (sf)	CN	Description
5,883	36	Woods, Fair, HSG A
568	83	Paved roads w/open ditches, 50% imp, HSG A
1,957	39	>75% Grass cover, Good, HSG A
8,408	40	Weighted Average
8,124		96.62% Pervious Area
284		3.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.18"
2.1	111	0.0315	0.89		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.1	161	Total			

Summary for Subcatchment 20S: SOUTHWEST PORTION OF SITE

Runoff = 0.10 cfs @ 12.18 hrs, Volume= 0.012 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.53"

Area (sf)	CN	Description
3,092	36	Woods, Fair, HSG A
2,358	39	>75% Grass cover, Good, HSG A
5,450	37	Weighted Average
5,450		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	50	0.0500	0.10		**Sheet Flow, 2.1** Woods: Light underbrush n= 0.400 P2= 3.18"
0.4	20	0.0250	0.79		**Shallow Concentrated Flow, 2.2** Woodland Kv= 5.0 fps
9.0	70	Total			

Summary for Subcatchment 30S: NORTHERN PORTION OF SITE

Runoff = 5.23 cfs @ 12.11 hrs, Volume= 0.394 af, Depth= 4.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.53"

Area (sf)	CN	Description
3,559	83	Paved roads w/open ditches, 50% imp, HSG A
18,775	39	>75% Grass cover, Good, HSG A
3,639	98	Roofs, HSG A
15,842	98	Paved parking, HSG A
41,815	70	Weighted Average
20,555		49.16% Pervious Area
21,261		50.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0	50	0.0300	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.18"
0.3	44	0.0909	2.11		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.3	94	Total			

Summary for Subcatchment 31S: MIDDLE PORTION OF SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.37 cfs @ 12.05 hrs, Volume= 0.288 af, Depth= 5.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.53"

Area (sf)	CN	Description
13,302	98	Paved parking, HSG A
3,000	98	Roofs, HSG A
12,167	39	>75% Grass cover, Good, HSG A
28,469	73	Weighted Average
12,167		42.74% Pervious Area
16,302		57.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	15	0.0400	0.11		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.18"
0.7	9	0.3330	0.22		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.18"
3.1	24	Total			

Summary for Subcatchment 32S: EASTERN PORTION OF SITE

Runoff = 3.46 cfs @ 12.21 hrs, Volume= 0.438 af, Depth= 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YR Rainfall=8.53"

Area (sf)	CN	Description
153,774	36	Woods, Fair, HSG A
5,968	83	Paved roads w/open ditches, 50% imp, HSG A
18,029	39	>75% Grass cover, Good, HSG A
250	98	Paved parking, HSG A
178,021	38	Weighted Average
174,787		98.18% Pervious Area
3,234		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0700	0.11		**Sheet Flow, 3.1** Woods: Light underbrush n= 0.400 P2= 3.18"
2.5	169	0.0503	1.12		**Shallow Concentrated Flow, 3.2** Woodland Kv= 5.0 fps
0.8	115	0.2260	2.38		**Shallow Concentrated Flow, 3.3** Woodland Kv= 5.0 fps
10.8	334	Total			

Summary for Reach 30R: SWALE TO OUT 3

Inflow Area = 0.960 ac, 50.84% Impervious, Inflow Depth = 4.49" for 100 YR event
Inflow = 1.63 cfs @ 12.40 hrs, Volume= 0.359 af
Outflow = 1.63 cfs @ 12.48 hrs, Volume= 0.359 af, Atten= 0%, Lag= 4.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.85 fps, Min. Travel Time= 6.4 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 15.5 min

Peak Storage= 623 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.08'
Bank-Full Depth= 1.00' Flow Area= 20.0 sf, Capacity= 157.37 cfs

10.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 10.0 '/' Top Width= 30.00'
Length= 709.0' Slope= 0.0592 '/'
Inlet Invert= 368.00', Outlet Invert= 326.00'

‡

Summary for Reach 31R: 31R

Inflow Area = 0.654 ac, 57.26% Impervious, Inflow Depth = 3.66" for 100 YR event
Inflow = 0.79 cfs @ 12.43 hrs, Volume= 0.199 af
Outflow = 0.79 cfs @ 12.47 hrs, Volume= 0.199 af, Atten= 0%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 1.64 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 8.3 min

Peak Storage= 172 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 0.50' Flow Area= 10.0 sf, Capacity= 66.56 cfs

10.00' x 0.50' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 20.0 '/' Top Width= 30.00'
Length= 357.0' Slope= 0.1064 '/'
Inlet Invert= 364.00', Outlet Invert= 326.00'

‡

Summary for Reach OUT 1: OUT 1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.193 ac, 3.38% Impervious, Inflow Depth = 1.49" for 100 YR event
Inflow = 0.21 cfs @ 12.18 hrs, Volume= 0.024 af
Outflow = 0.21 cfs @ 12.18 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

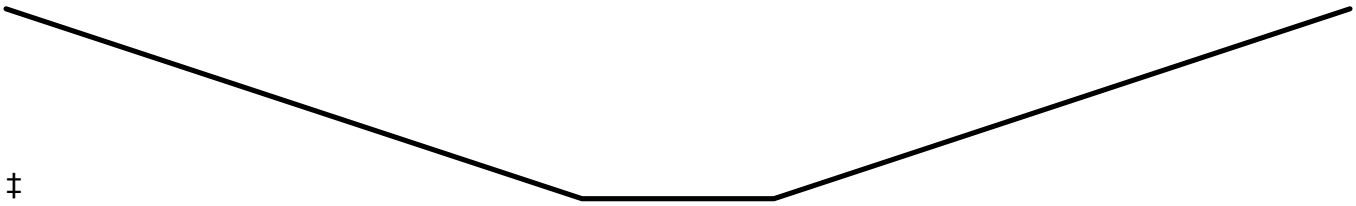
Summary for Reach OUT 2: OUT 2

Inflow Area = 0.125 ac, 0.00% Impervious, Inflow Depth = 1.19" for 100 YR event
Inflow = 0.10 cfs @ 12.18 hrs, Volume= 0.012 af
Outflow = 0.07 cfs @ 12.44 hrs, Volume= 0.012 af, Atten= 28%, Lag= 15.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 0.63 fps, Min. Travel Time= 13.1 min
Avg. Velocity = 0.59 fps, Avg. Travel Time= 13.9 min

Peak Storage= 54 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.01'
Bank-Full Depth= 1.00' Flow Area= 40.0 sf, Capacity= 357.47 cfs

10.00' x 1.00' deep channel, n= 0.035 Earth, dense weeds
Side Slope Z-value= 30.0 '/' Top Width= 70.00'
Length= 492.0' Slope= 0.0935 '/'
Inlet Invert= 370.00', Outlet Invert= 324.00'



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Summary for Reach OUT 3: OUT 3

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.825 ac, 16.08% Impervious, Inflow Depth = 2.08" for 100 YR event
Inflow = 5.72 cfs @ 12.22 hrs, Volume= 1.009 af
Outflow = 5.72 cfs @ 12.22 hrs, Volume= 1.009 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3

Summary for Pond 30P: 15" ROAD CULVERT

Inflow Area = 0.960 ac, 50.84% Impervious, Inflow Depth = 4.92" for 100 YR event
Inflow = 5.23 cfs @ 12.11 hrs, Volume= 0.394 af
Outflow = 1.95 cfs @ 12.40 hrs, Volume= 0.394 af, Atten= 63%, Lag= 17.8 min
Discarded = 0.32 cfs @ 12.40 hrs, Volume= 0.035 af
Primary = 1.63 cfs @ 12.40 hrs, Volume= 0.359 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 371.73' @ 12.40 hrs Surf.Area= 2,272 sf Storage= 3,204 cf

Plug-Flow detention time= 9.9 min calculated for 0.393 af (100% of inflow)
Center-of-Mass det. time= 9.9 min (833.1 - 823.2)

Volume	Invert	Avail.Storage	Storage Description
#1	368.50'	5,147 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
368.50	8	10.6	0	0	8
369.00	69	31.4	17	17	78
370.00	987	144.9	439	456	1,673
372.00	2,517	267.0	3,387	3,843	5,696
372.30	6,488	341.3	1,305	5,147	9,294

Device	Routing	Invert	Outlet Devices
#1	Discarded	368.50'	**6.000 in/hr Exfiltration over Surface area**
#2	Primary	368.50'	**15.0" Round Culvert** L= 53.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 368.50' / 368.00' S= 0.0094 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	368.50'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.32 cfs @ 12.40 hrs HW=371.73' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.32 cfs)

Primary OutFlow Max=1.63 cfs @ 12.40 hrs HW=371.73' TW=368.08' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.63 cfs of 7.53 cfs potential flow)
└─**3=Orifice/Grate** (Orifice Controls 1.63 cfs @ 8.32 fps)

Summary for Pond 31P: 31P

Inflow Area =	0.654 ac, 57.26% Impervious, Inflow Depth = 5.28" for 100 YR event				
Inflow =	4.37 cfs @	12.05 hrs,	Volume=	0.288 af	
Outflow =	1.03 cfs @	12.43 hrs,	Volume=	0.288 af,	Atten= 76%, Lag= 22.8 min
Discarded =	0.24 cfs @	12.43 hrs,	Volume=	0.088 af	
Primary =	0.79 cfs @	12.43 hrs,	Volume=	0.199 af	
Secondary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 368.71' @ 12.43 hrs Surf.Area= 1,713 sf Storage= 3,456 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.5 min (840.6 - 813.1)

Volume	Invert	Avail.Storage	Storage Description
#1	365.00'	4,994 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

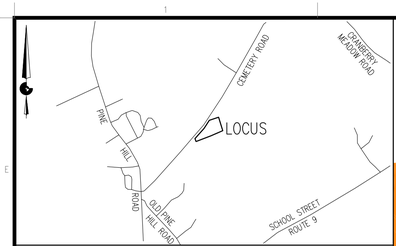
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
365.00	306	86.7	0	0	306
367.00	956	128.2	1,202	1,202	1,048
369.00	1,861	162.7	2,767	3,969	1,897
369.50	2,244	183.4	1,025	4,994	2,474

Device	Routing	Invert	Outlet Devices
#1	Discarded	365.00'	**6.000 in/hr Exfiltration over Surface area**
#2	Primary	365.00'	**12.0" Round Culvert** L= 32.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 365.00' / 364.00' S= 0.0313 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Secondary	369.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#4	Device 2	365.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.24 cfs @ 12.43 hrs HW=368.71' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.79 cfs @ 12.43 hrs HW=368.71' TW=364.04' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.79 cfs of 5.35 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 0.79 cfs @ 9.06 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=365.00' TW=364.00' (Dynamic Tailwater)
└─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)



LOCATION PLAN
(NOT TO SCALE)

POND — 4 — POND NUMBER

SUBCATCHMENT — 11 / 0.56 — SUBCATCHMENT NUMBER / SUBCATCHMENT ACREAGE

REACH — 50 — REACH NUMBER

Tc COMPONENTS — S = Sheet, Sc = Shallow Concentrated, C = Channel

ROUTING DIRECTION

SOILS LEGEND

- A Soils: SCS Soils: HeB, HmC, HmD HISS Soils:
- B Soils: SCS Soils: HISS Soils:
- C Soils: SCS Soils: HISS Soils:
- D Soils: SCS Soils: HISS Soils:

- Subcatchment Boundaries Pre-Development
- Subcatchment Boundaries Post-Development
- High Intensity Soil Line
- Tc Flow Path & Direction Pre-Development
- Tc Flow Path & Direction Post-Development

PREPARED FOR APPROVAL 2/6/2020

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NO.	REVISIONS	INT.	DATE
1			

RECORD OWNER:
PATRICIA M. & EDWARD V. BIBBER

OWNER ADDRESS:
6 SEA ROAD
KENNEBUNK, ME 04043

PROPOSED SITE DEVELOPMENT PLAN
BIBBER FUNERAL HOME
PORTION OF TAX MAP R36 LOT 46
CEMETERY ROAD BERWICK, MAINE

PREPARED FOR:
LAING BIBBER FUNERAL HOME
67 SUMMER STREET KENNEBUNK, MAINE 04043
CLIENT ADDRESS:

1"=50'
0' 50'

DATE: 02/06/2020
DRAWN BY: DRC
CHECKED BY: GRA
APPROVED BY: GRA

PRE-DEVELOPMENT STORMWATER MANAGEMENT PLAN

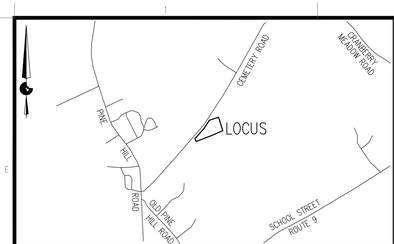
PROJECT NO: 1928900

D1

SHEET: 1 OF 2

CADD FILE: J:\aaa\2019\1928900\CARLSON\ENGR\20200123_1928900-SITEPLAN-OPT-2.dwg

PLOT DATE: 2/6/2020



LOCATION PLAN
(NOT TO SCALE)

POND — 4 — POND NUMBER

SUBCATCHMENT — 11 / 0.56 — SUBCATCHMENT NUMBER / SUBCATCHMENT ACREAGE

REACH — 50 — REACH NUMBER

Tc COMPONENTS — S = Sheet, SC = Shallow Concentrated, C = Channel

ROUTING DIRECTION

SOILS LEGEND

- A Soils: SCS Soils: HeB, HmC, HmD; HISS Soils:
- B Soils: SCS Soils: HISS Soils:
- C Soils: SCS Soils: HISS Soils:
- D Soils: SCS Soils: HISS Soils:

- Subcatchment Boundaries Pre-Development
- Subcatchment Boundaries Post-Development
- High Intensity Soil Line
- Tc Flow Path & Direction Pre-Development
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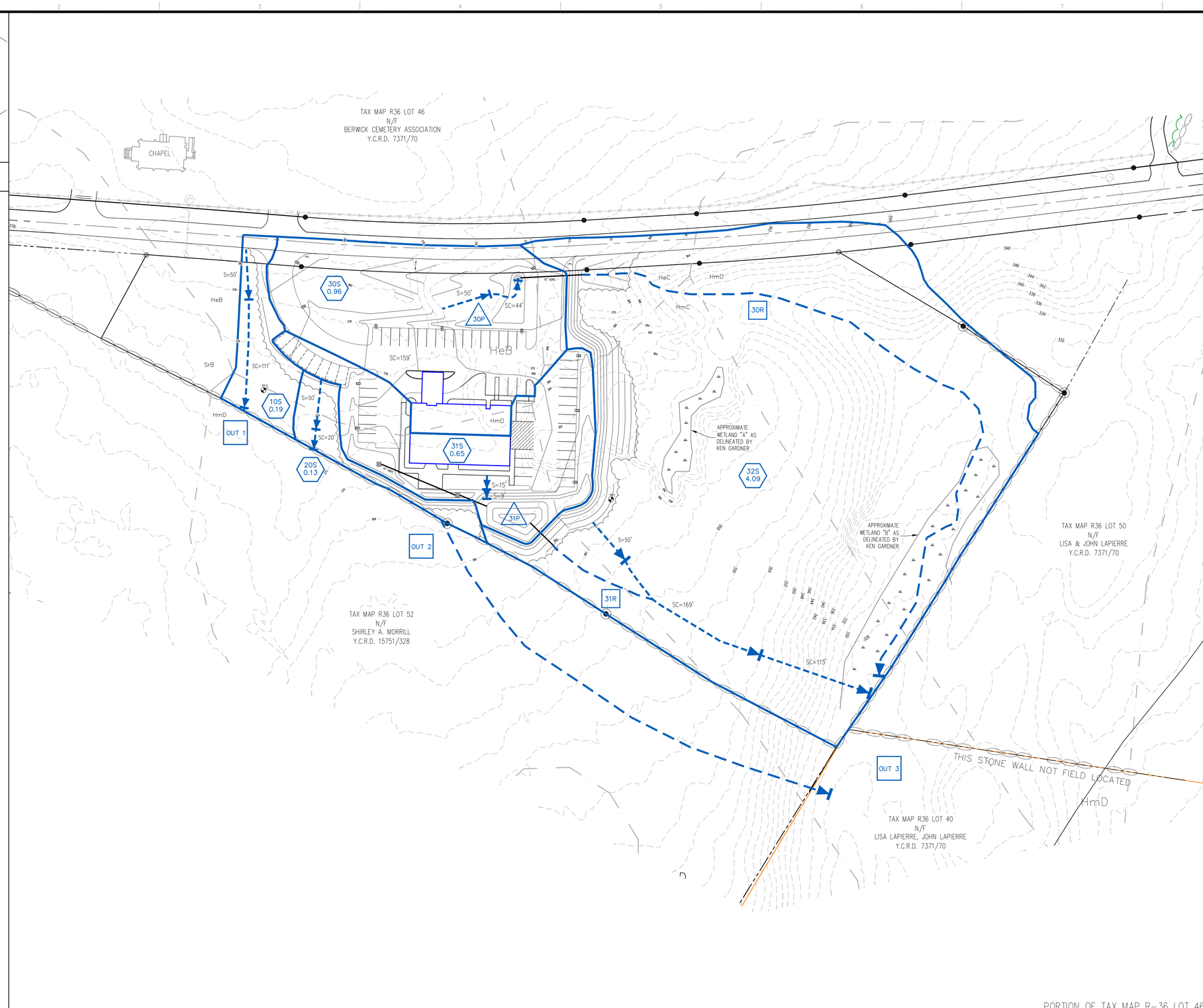

PORTION OF TAX MAP R-36 LOT 46

PREPARED FOR APPROVAL 2/6/2020

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Surveyors
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NO.	REVISIONS	INT.	DATE
1			

RECORD OWNER: PATRICIA M. & EDWARD V. BIBBER
OWNER ADDRESS: 6 SEA ROAD KENNEBUNK, ME 04043

PROPOSED SITE DEVELOPMENT PLAN
BIBBER FUNERAL HOME
PORTION OF TAX MAP R36 LOT 46
CEMETERY ROAD BERWICK, MAINE

PREPARED FOR:
LAING BIBBER FUNERAL HOME
67 SUMMER STREET KENNEBUNK, MAINE 04043
CLIENT ADDRESS:

1"=50'
0' 50'

DATE: 02/06/2020
DRAWN BY: DRC
CHECKED BY: GRA
APPROVED BY: GRA

POST-DEVELOPMENT STORMWATER MANAGEMENT PLAN

PROJECT NO: 1928900

D2

SHEET: 2 OF 2

CADD FILE: J:\aaa\2019\1928900\CARLSON\ENGR\20200123_1928900-SITEPLAN-OPT-2.dwg
PLOT DATE: 2/6/2020

Stormwater Maintenance/Inspection Plan

During the construction of parking and drainage facilities, maintenance of all erosion, sedimentation, and stormwater flow control structures and devices will be the responsibility of Laing Bibber Funeral Home.

Laing Bibber Funeral Home will be responsible for the continued maintenance of the stormwater treatment system.

During construction all erosion control devices and structures shall be checked weekly and after each "significant rainfall"**. Necessary repairs will be made to correct undermining or deterioration of the devices and/or structures. Sediment in the stormwater detention basins will be removed annually or as needed to maintain functionality of the facility.

Laing Bibber Funeral Home shall maintain inspection logs (attached) of all stormwater and erosion control measures. The log shall reflect the dates of the inspections and describe actions taken. The log shall be kept on file for a minimum of 5 years and be made available to the Town upon request.

If invasive species are observed in any of the stormwater facilities, they shall be removed immediately. Any damage to the surface of the basins or filters shall be repaired and stabilized as soon as possible after disturbance.

The activities listed in the inspection log will be accomplished in early spring and in late fall.

A major storm event is classified as a rainfall exceeding 2.0 inches in a 24-hr storm event.

** Significant rainfall is 0.5" in 24 hr

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Sweeping

Paved surfaces shall be swept or vacuumed at least annually in the Spring to remove all Winter sand, and periodically during the year on an as-needed basis to minimize transportation of sediment during rainfall events. **Applicable to: All parking lots and travel ways on site.**

Roadways and Parking Surfaces				
	Spring	Fall or Yearly	After a Major Storm	Every 2– 5 Years
Clear accumulated winter sand in parking lots and along roadways	**X**			
Sweep pavement to remove sediment	**X**			
Clean-out the sediment within water bars or open top culverts	**X**			
Ensure that stormwater is not impeded by accumulations of material or false ditches in the shoulder	**X**			

Catch Basins

All catch basins, and any other field inlets throughout the collection system, need to be inspected on a monthly basis to assure that the inlet entry point is clear of debris and will allow the intended water entry. These will be cleared, if necessary on a yearly basis or when sediment reaches two thirds of total sump volume. Catch basins need to be vacuumed and cleaned of all accumulated sediment. This work should be completed with a vacuum truck. The removed material must be disposed of in accordance with the Maine Solid Waste Management Rules. **Applicable to: All new and existing catch basins on site**.

Catch Basins Systems				
	Spring	Fall or Yearly	After a Major Storm	Every 2– 5 Years
Remove and legally dispose of accumulated sediments and debris from the bottom of the basin, inlet grates, inflow channels to the basin, and pipes between basins.	**X**	**X**		
Remove floating debris and floating oils (using oil absorptive pads) from any trap designed for such	**X**	**X**		

Vegetated Areas

All areas of maintained lawn are to be inspected regularly for signs of erosions and channelization. Areas where erosion is occurring or areas of sparse growth shall be replanted and stabilized. Channelized flows from the eroded land shall be diverted to buffers or other areas able to withstand the high sediment load in the erosive runoff. **Applicable to: Lawn areas receiving/conveying flows in any storm event.**

Vegetated Areas				
	Spring	Fall or Yearly	After a Major Storm	Every 2– 5 Years
Inspect all slopes and embankments	**X**		**X**	
Replant bare areas or areas with sparse growth	**X**		**X**	
Armor areas with fill erosions with an appropriate lining or divert the erosive flows to on-site areas able to withstand concentrated flows	**X**		**X**	

Ditches, Swales and Culverts

Open swales and ditches need to be inspected on a monthly basis or after a major rainfall event to assure that debris or sediments do not reduce the effectiveness of the system. Debris needs to be removed at that time. Any sign of erosion or blockage shall be immediately repaired to assure a vigorous growth of vegetation for the stability of the structure and proper functioning.

Vegetated ditches should be mowed at least monthly during the growing season. Larger brush or trees must not be allowed to become established in the channel. Any areas where the vegetation fails will be subject to erosion and should be repaired and revegetated.

If sediment in culverts or piped drainage systems exceeds 20% of the diameter of the pipe, it should be removed. This may be accomplished by hydraulic flushing or any mechanical means; however, care should be taken to not flush the sediments into the retention/detention pond as it will reduce the pond's capacity and hasten the time when it must be cleaned. All pipes should be inspected on an annual basis.

Stormwater Channels				
	Spring	Fall or Yearly	After a Major Storm	Every 2– 5 Years
Inspect ditches, swales and other open stormwater channels	**X**	**X**	**X**	
Remove any obstructions and accumulated sediments or debris	**X**	**X**		
Control vegetated growth and woody vegetation		**X**		
Repair any erosion of the ditch lining		**X**		
Mow vegetated ditches		**X**		
Remove woody vegetation growing through riprap		**X**		
Repair any slumping side slopes	**X**	**X**		
Replace riprap where underlying filter fabric or underdrain gravel is showing or where stones have dislodge	**X**			**X**

Stormwater Maintenance
Laing Bibber Funeral Home

Maintenance Checklist

This log is intended to accompany the Stormwater Management Facilities Maintenance Plan for Laing Bibber Funeral Home's Site Plan. The following items shall be checked, cleaned and maintained on regular basis as specified in the Maintenance Plan and as described in the table below. This log shall be kept on file for a minimum of five years and shall be available for review by the Town upon request. Qualified personnel familiar with drainage systems and soils shall perform all inspections.

Item	Maintenance Required & Frequency	Date Completed	Maintenance Personnel	Comments
Sweeping of Paved areas	Sweep annually in the Spring.			
Catch Basins	Clean sumps with vacuum pump annually or when sediment occupies more than two thirds of the sump capacity.			
Ditches, Swales and Culverts	Inspect after major rainfall event. Repair erosion or drainage immediately. Remove sediment if filtration times become greater than 12 hours. Clean culverts when sediment occupies more than 20% of pipe diameter.			
Vegetated Areas	Inspected regularly for signs of erosions and channelization. Areas where erosion is occurring or areas of sparse growth shall be replanted and stabilized.			

Stormwater Management System

Laing Bibber Funeral Home

Inspection & Maintenance Log

BMP/System Component	Date Inspected	Inspector	Cleaning/Repair Needed *(List Items/Comments)*	Date of Cleaning/Repair	Performed By

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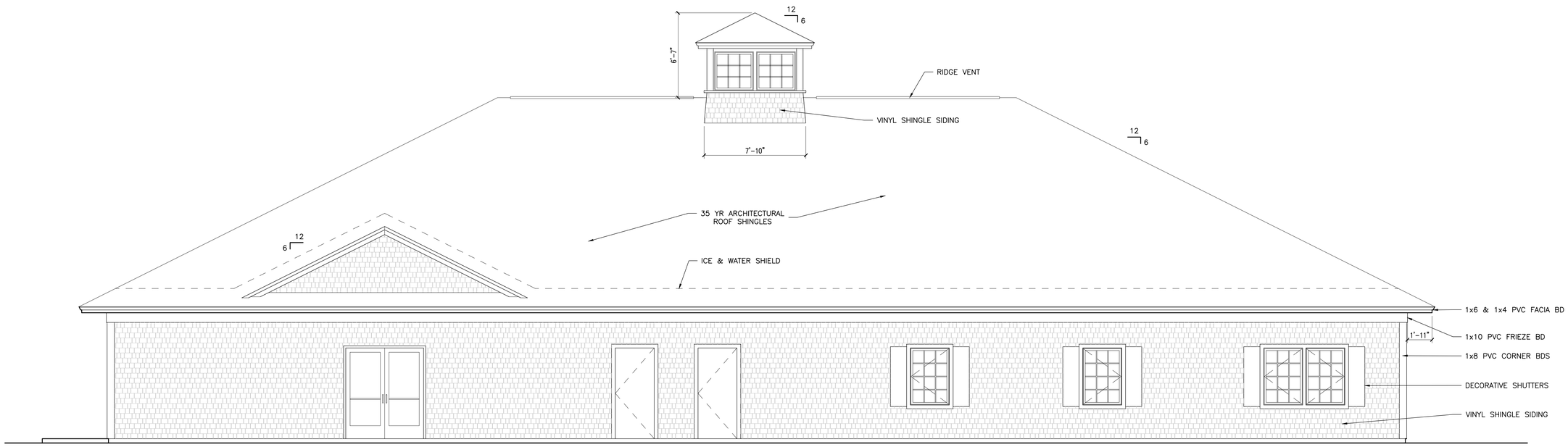

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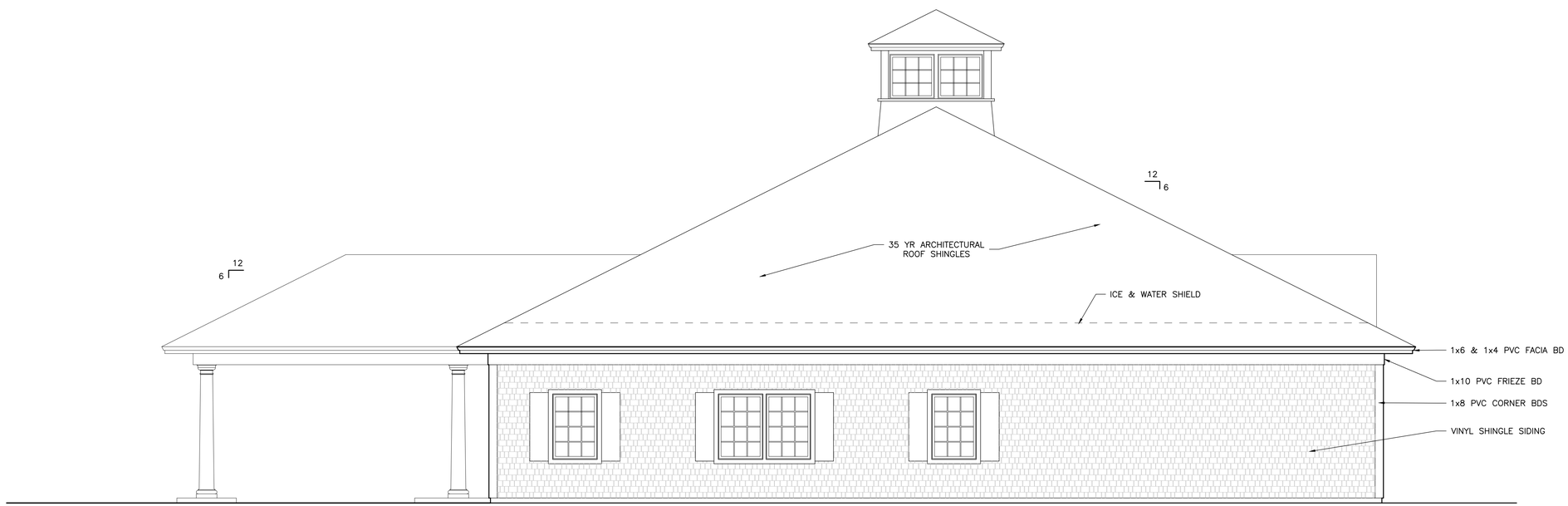

1 | 1/4"=1'-0" | RIGHT SIDE ELEVATION

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Bibber
Berwick, Maine

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Berwick, Maine

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INFORMATION
Path: m:\architecture\bibber\
Issue Date: TBD
Drawn By: DG
Checked By: DG
Revision:
1.
2.
3.
4.

TITLE
EXTERIOR ELEVATIONS

SCALE:
1/4"=1-0"

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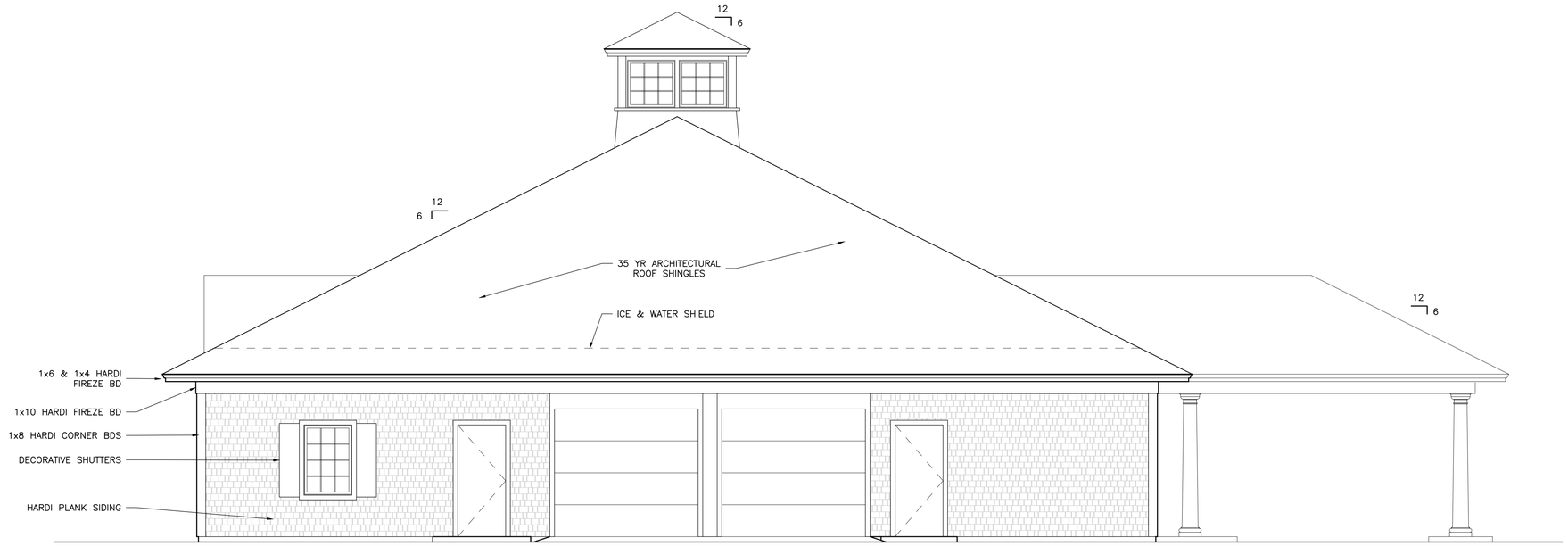
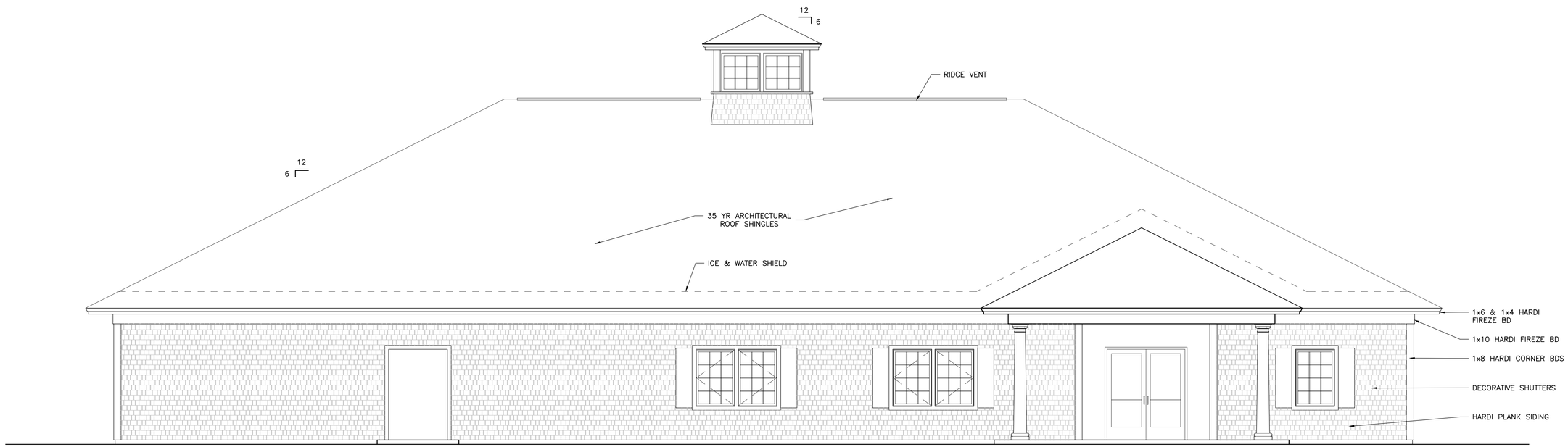


2 | 1/4"=1'-0" | LEFT SIDE ELEVATION



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

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PROJECT

Bibber

Berwick, Maine

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CLIENT

Ed Bibber
Berwick, Maine

CONTRACTOR

INFORMATION

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2.

3.

4.

TITLE

EXTERIOR ELEVATIONS

SCALE:

1/4"=1-0"

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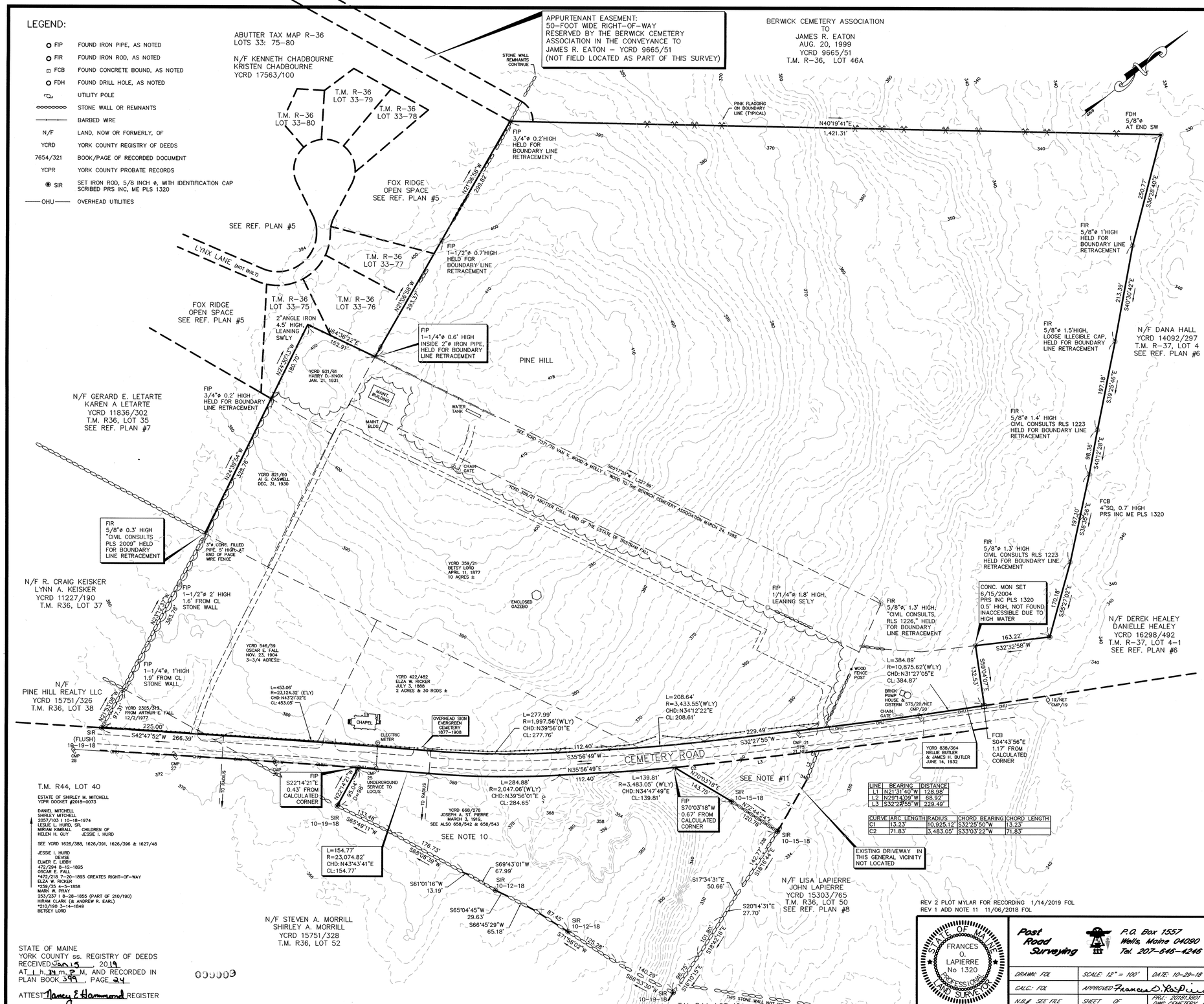
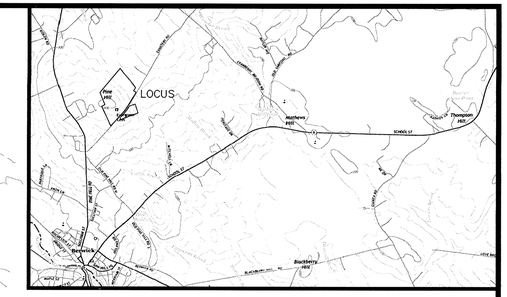


LINE	BEARING	DISTANCE
L1	N21°31'40"W	128.98'
L2	N29°14'09"W	68.92'
L3	S32°22'55"W	229.49'

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH
C1	13.23'	10,925.12'	S32°25'50"W	13.23'
C2	71.83'	3,483.05'	S33°03'22"W	71.83'



LOCATION MAP
n.t.s.

REFERENCE PLANS:

1.) "FALL ESTATE, BERWICK, MAINE," AS SURVEYED MARCH 21–23, 1908 BY W.D. SPENCE, COPY PROVIDED COURTESY OF CIVIL CONSULTANTS. (PRS PLAN 194)

2.) "STANDARD BOUNDARY SURVEY OF A PORTION OF LAND OF VAN & MOLLY WOOD, PINE HILL ROAD, BERWICK, MAINE," DATED 6/8/1988, LAST REVISED 2/19/1997, PREPARED BY CIVIL CONSULTANTS, RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 233, PAGE 20.

3.) PLAN OF PORTION OF LAND OF VAN & MOLLY WOOD, PINE HILL ROAD, BERWICK, MAINE, SURVEYED FOR DENNIS ROBILLARD," DATED 4/13/1990, PREPARED BY CIVIL CONSULTANTS (NOT SIGNED OR SEALED), COPY PROVIDED COURTESY OF CIVIL CONSULTANTS. (PRS PLAN 195).

4.) "SUBDIVISION OF LAND OF LITTLE HARBOR WINDOW COMPANY LOCATED EASTERLY OF PINE HILL ROAD, BERWICK, YORK COUNTY, MAINE, PREPARED FOR: JIM EATON, LITTLE HARBOR WINDOW COMPANY, 204 PINE HILL ROAD, BERWICK, MAINE 03901," DATED 5/09/1997, PREPARED BY CIVIL CONSULTANTS, RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 234, PAGE 33.

5.) "SUBDIVISION PLAN, FOX RIDGE (A MANUFACTURED HOUSING PARK), PINE HILL ROAD, BERWICK, MAINE, FOR PHP PROPERTIES INC.," DATED 1/21/1997, LAST REVISED 6/04/1997, PREPARED BY CIVIL CONSULTANTS, RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 234, PAGE 50, SEE CONDO FILE 482, PAGES 1–2.

6.) "FINAL PLAN AMENDED SUBDIVISION PLAN, LOTS 7–14, MAJOR SUBDIVISION, CEMETERY ROAD, BERWICK MAINE, PREPARED FOR DANA E. HALL," DATED 7/13/05, LAST REVISED 7/20/05, PREPARED BY POST ROAD SURVEYING, INC., RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 302, PAGE 47.

7.) "BOUNDARY PLAN OF LAND OWNED BY GERARD E. LETARTE & KAREN A. LETARTE, PREPARED FOR GERARD E. LETARTE, FOR LAND LOCATED ON PINE HILL ROAD, TOWN OF BERWICK, YORK COUNTY, MAINE," DATED 11/6/2008, PREPARED BY CIVIL CONSULTANTS, RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN BOOK 334, PAGE 18.

8.) "PLAN SHOWING LOTS ON CEMETERY ROAD IN BERWICK, MAINE, KENNETH HORNE, OWNER," DATED AUGUST 4, 1977, PREPARED BY EMERY S. LITTLEFIELD, R.L.S., RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 86, PAGE 21.

NOTES:

1.) BEARINGS DEPICTED ARE REFERENCED TO GRID NORTH, MAINE STATE PLANE COORDINATE SYSTEM, WEST ZONE, NAD83, DERIVED FROM REAL TIME GLOBAL POSITIONING, MAINE DOT STATION MEGO.

2.) THE APPARENT SIDELINE OF CEMETERY ROAD IS BASED ON A 24.75–FOOT (1–1/2 ROD) OFFSET FROM THE CENTERLINE OF THE EXISTING TRAVELED WAY. REFERENCE IS MADE TO YORK COUNTY COMMISSIONERS RECORDS, VOLUME 22, PAGE 225 FOR APRIL 1871 LAYOUT (3 RODS WIDE).

3.) RECORD REFERENCES (PARCELS NORTHWEST OF CEMETERY ROAD):

1.) YCRD 359/21 BETSY LORD, APRIL 11, 1877
2.) YCRD 422/482 ELZA W RICHER, JULY 3 1888
3.) YCRD 546/59 OSCAR E. FALL, NOV. 23, 1904
4.) YCRD 821/60 AI G. CASWELL, DEC. 31, 1930
5.) YCRD 821/61 HARRY D. KNOX
6.) YCRD 838/364 NELLIE BUTLER & JAMES H. BUTLER, JUNE 14, 1932
7.) YCRD 2305/313 ARTHUR E. FALL, DEC. 2, 1977
8.) YCRD 7371/70 VAN V. WOOD & MOLLY L. WOOD, MARCH 24, 1985 (OUTSALE TO JAMES R. EATON IN YCRD 9665/51, AUGUST 20, 1999)

APPURTENANT EASEMENTS: YCRD 7371/70 AND YCRD 9665/51 (NOT SURVEYED).

4.) RECORD REFERENCE (PARCEL SOUTHEAST OF CEMETERY ROAD):
YCRD 668/278 JOSEPH A. ST. PIERRE MARCH 3, 1919, SEE ALSO 658/542 & 658/543.

5.) MUNICIPAL REFERENCE: TAX MAP R–36, LOT 46.

6.) LOCUS AREA NORTHWEST OF CEMETERY ROAD: 53.51 ACRES
LOCUS ARE SOUTHEAST OF CEMETERY ROAD: 5.85 ACRES

7.) TWO–FOOT CONTOURS DEPICTED HEREON IMPORTED FROM THE MAINE OFFICE OF G.I.S. LIDAR DATA CATALOG (2006–2012 ACQUISITION DATES). DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

8.) WETLANDS HAVE NOT BEEN DELINEATED OR MAPPED.

9.) PERIMETER ROAD ONLY LOCATED WITHIN THE CEMETERY.

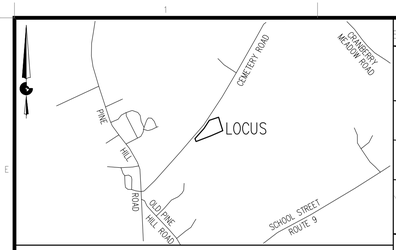
10.) THE JOSEPH ST. PIERRE PARCEL SOUTHEASTERLY OF CEMETERY ROAD IS SUBJECT TO AN EASEMENT IN FAVOR OF TAX MAP R44, LOT 40, CREATED IN A CONVEYANCE FROM ELZA W. RICKER TO OSCAR E. FALL ON JULY 20, 1895, RECORDED IN BOOK 472, PAGE 218: "WITH RIGHT OF WAY OVER MY LAND TO SAME." AN OPENING IN THE STONE WALL AT THE SOUTHEAST CORNER OF THE LOCUS PARCEL MAY INDICATE THE FORMER LOCATION OF A TRAVELED WAY. THE LOCATION OF THE RIGHT OF WAY ON THE LOCUS PARCEL IS UNDETERMINED DUE TO LACK OF OBSERVED EVIDENCE.

11.) JOSEPH ST. PIERRE TO THE BERWICK CEMETERY (YCRD 668/278) DESCRIBES 2 PARCELS:

1.) CHARLES A. RICKER TO JOSEPH A. ST. PIERRE YCRD 658/542 6/01/1918
2.) ANDREW J. BUTLER & SARAH E. BUTLER TO JOSEPH A. ST. PIERRE, YCRD 664/217 2/18/1919.

PARCEL 2 IS WITHIN THE BOUNDS OF LOT 4 AS DEPICTED ON REFERENCE PLAN 8.
AREA: 0.6 ACRES.

GRAPHIC SCALE
100' 0' 50' 100' 200' 400'
1' = 100'



LOCATION PLAN

(NOT TO SCALE)

NOTES:

1. ASSESSOR'S INFORMATION:
   TOWN OF BERWICK ASSESSOR'S MAP R36 LOT 46 (PORTION)
2. RECORD OWNER:
   PATRICIA M. BIBBER & EDWARD V. BIBBER
   6 SEA ROAD
   KENNEBUNK, MAINE 04043
3. DEED REFERENCE:
   Y.C.R.D. 18023/447
4. ZONING INFORMATION:
   TRANSITIONAL RESIDENTIAL DISTRICT (R-2)

LOT SIZE:	60,000 SQ.FT. (SEPTIC)
MINIMUM FRONTAGE:	150'
MINIMUM LOT WIDTH:	150'
SETBACKS:	
FRONT YARD:	50'
SIDE YARD:	25'
REAR YARD:	25'
MAXIMUM BUILDING HEIGHT:	35'
MAXIMUM LOT COVERAGE:	35%

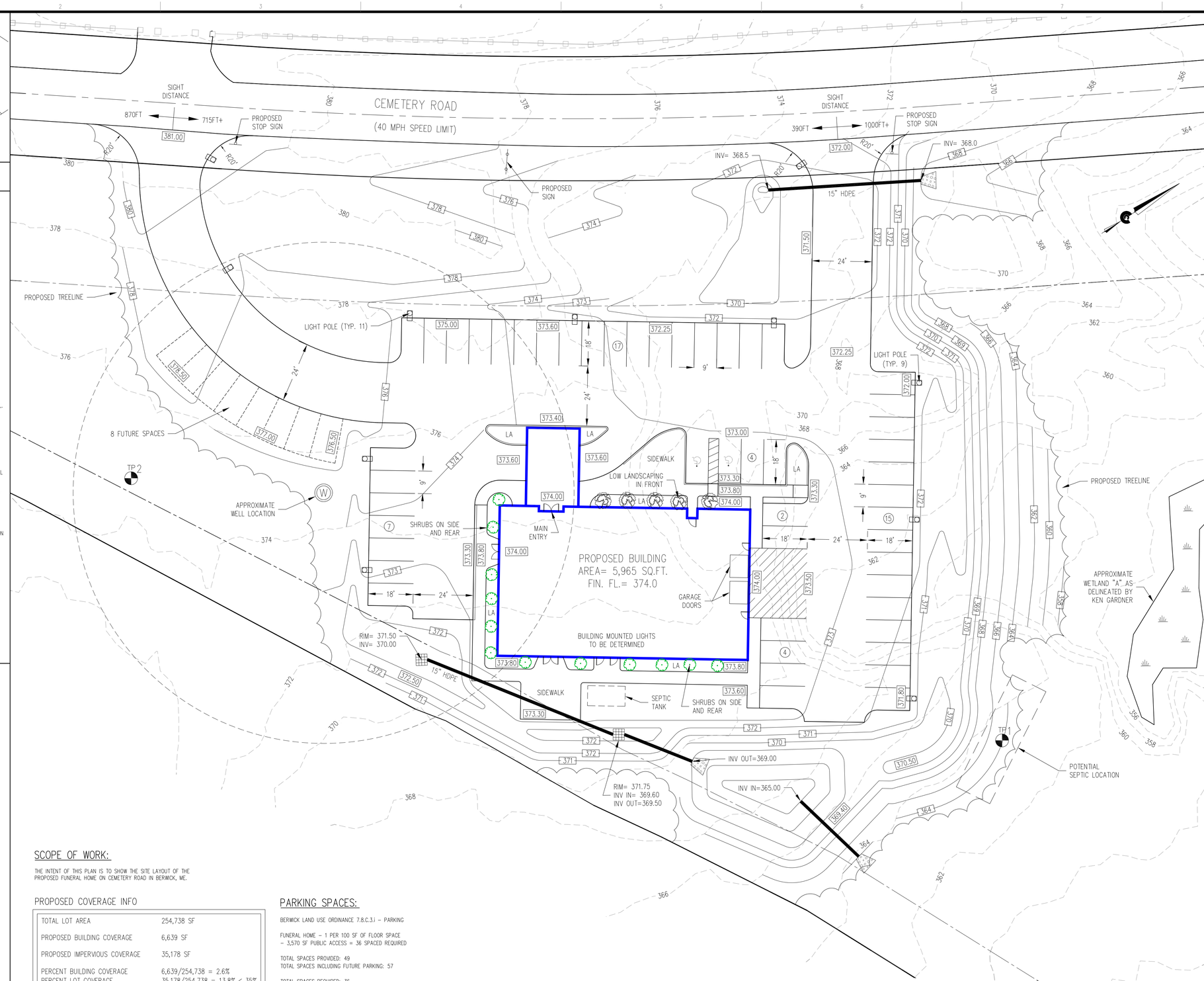
5. NORTH AS DEPICTED HEREON IS BASED ON REFERENCE PLAN #1.
6. THE PARCEL IS LOCATED IN FLOOD HAZARD ZONE X AS SHOWN ON THE FLOOD INSURANCE RATE MAP FOR THE TOWN OF BERWICK, COMMUNITY PANEL NO 230144 006 B, EFFECTIVE DATE AUGUST 5, 1991. ZONE X IS DEFINED AS AREAS OUTSIDE THE 500-YEAR FLOOD LEVEL.
7. LOCUS PARCEL CONTAINS 5.85 ACRES MORE OR LESS.
8. BOUNDARY SHOWN HEREON IS FROM PLAN REFERENCE 1 AND WAS PROVIDED DIGITALLY BY POST ROAD SURVEYING.
9. TOPOGRAPHIC INFORMATION SHOWN HEREON IS FROM MAINE GIS LIDAR FILES. THE VERTICAL DATUM IS NAVD88.
10. WETLANDS SHOWN HEREON ARE APPROXIMATED BY KENNETH GARDNER, MAINE CERTIFIED SOIL SCIENTIST. REPORT CONTAINS INFORMATION ON TEST PITS DESIGNATED AS TP 1 AND TP 2.
11. MINIMUM PARKING FOR FUNERAL HOME IS 1 SPACE FOR EVERY 100 SQUARE FEET OF FLOOR SPACE.
12. SIGHT DISTANCE INDICATED ON PLANS IS BASED ON INFORMATION GATHERED BY CIVIL CONSULTANTS ON 01/14/2020.
13. ANY BUILDING MOUNTED LIGHTS SHALL BE LED SHIELDED AND DOWNLIT TO REDUCE GLARE ON ABUTTING PROPERTIES.
14. KNOX BOX BUILDING ACCESS UNITS WILL BE INSTALLED ON THE BUILDING AT THE LOCATION SET BY THE BERWICK FIRE DEPARTMENT.
15. AFTER SITE CLEARING, INSTALL EROSION CONTROL MEASURES TO MITIGATE POTENTIAL SEDIMENT TRANSPORT OFF SITE DUE TO CONSTRUCTION. MAINTAIN MEASURES DURING THE WORK. ALL WORK TO FOLLOW TOWN OF BERWICK LAND USE ORDINANCE SECTION 7.15, EROSION AND SEDIMENTATION CONTROL STANDARDS.

REFERENCE PLANS:

1. "BOUNDARY SURVEY PLAN PREPARED FOR THE BERWICK CEMETERY ASSOCIATION P.O. BOX 673 BERWICK, MAINE 03901 CEMETERY ROAD, BERWICK, MAINE", BY POST ROAD SURVEYING, DATED: 10-29-18. PLAN RECORDED AT THE YORK COUNTY REGISTRY OF DEEDS IN PLAN BOOK 399 PAGE 24.

LEGEND

(R 110.77)	RECORD DISTANCE
	PROPERTY LINE
	APPROXIMATE ABUTTING PROPERTY
	SETBACK
200	EXISTING CONTOUR
	WETLAND
	EDGE OF WETAND
	WELL
TP	TEST PIT
	SIGN
	CATCH BASIN
	UTILITY POLE
	LIGHT POLE
380	PROPOSED CONTOUR
373.0	PROPOSED SPOT GRADE
LA	LANDSCAPING AREA
	LOW LANDSCAPING
	SHRUBBERY



SCOPE OF WORK:

THE INTENT OF THIS PLAN IS TO SHOW THE SITE LAYOUT OF THE PROPOSED FUNERAL HOME ON CEMETERY ROAD IN BERWICK, ME.

PROPOSED COVERAGE INFO

TOTAL LOT AREA	254,738 SF
PROPOSED BUILDING COVERAGE	6,639 SF
PROPOSED IMPERVIOUS COVERAGE	35,178 SF
PERCENT BUILDING COVERAGE	6,639/254,738 = 2.6%
PERCENT LOT COVERAGE	35,178/254,738 = 13.8% < 35%

PARKING SPACES:

BERWICK LAND USE ORDINANCE 7.8.C.3.i – PARKING

FUNERAL HOME – 1 PER 100 SF OF FLOOR SPACE
= 3,570 SF PUBLIC ACCESS = 36 SPACED REQUIRED

TOTAL SPACES PROVIDED: 49
TOTAL SPACES INCLUDING FUTURE PARKING: 57

TOTAL SPACES REQUIRED: 36

PREPARED FOR APPROVAL 2/6/2020

© CIVIL CONSULTANTS

CIVIL CONSULTANTS
Engineers
Planners
Surveyors
P.O. Box 100
South Berwick
Maine
03908
207-384-2550
www.civcon.com

NO.	REVISIONS	INT.	DATE
1			

RECORD OWNER:
PATRICIA M. & EDWARD V. BIBBER

OWNER ADDRESS:
6 SEA ROAD
KENNEBUNK, ME 04043

PROPOSED SITE DEVELOPMENT PLAN
BIBBER FUNERAL HOME
PORTION OF TAX MAP R36 LOT 46
CEMETERY ROAD BERWICK, MAINE

PREPARED FOR:
LAING BIBBER FUNERAL HOME
67 SUMMER STREET KENNEBUNK, MAINE 04043

CLIENT ADDRESS:

1"=20'
0' 20'

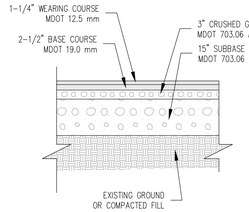
DATE: 02/06/2020
DRAWN BY: DRC/JAA
CHECKED BY: GRA
APPROVED BY: GRA

PROPOSED SITE PLAN

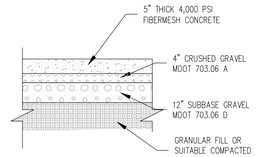
PROJECT NO: 19-289.00

L1

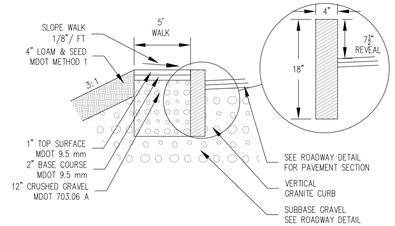
SHEET: 1 OF 2



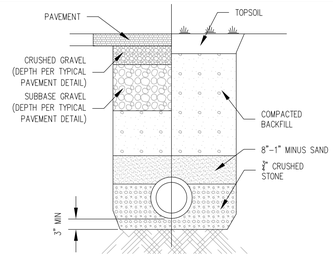
TYPICAL PAVEMENT SECTION
NOT TO SCALE



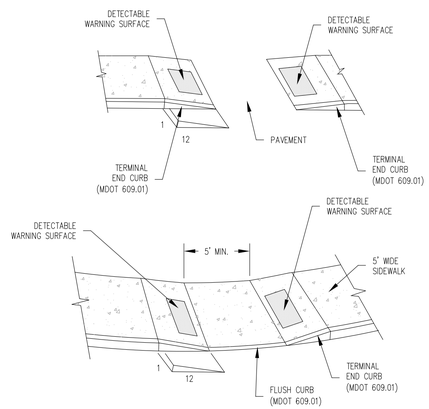
CONCRETE WALK DETAIL
NOT TO SCALE



VERTICAL GRANITE CURB WITH SIDEWALK DETAIL
NOT TO SCALE

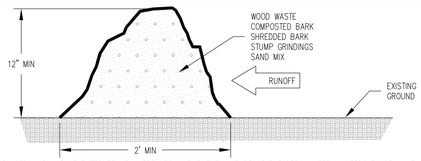


SEWER LINE TRENCH DETAIL
NOT TO SCALE



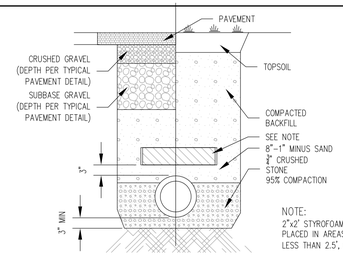
NOTE:
ALL SIDEWALK AREAS TO
HAVE DETECTABLE WARNING
SURFACES TO BE INSTALLED
TO MEET ADA REQUIREMENTS

TYPICAL SIDEWALK RAMP
NOT TO SCALE



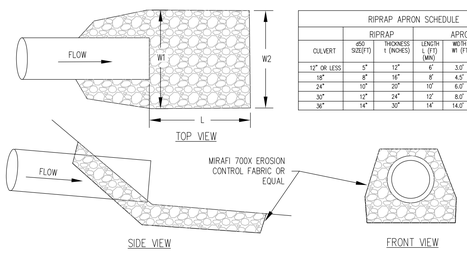
NOTES:
1. THIS BERM MAY BE USED IN PLACE OF FILTER FENCE WHERE APPLICABLE. THE MIXTURE OF THE BERM MATERIAL NEEDS TO BE A WELL-GRADE BLEND OF ORGANIC & MINERAL SUBSTANCE CONFORMING TO THE FOLLOWING STANDARDS:
   ORGANIC MATTER CONTENT: BETWEEN 80% AND 100%
   MOISTURE CONTENT: 30%-60%
   PH: BETWEEN 5.0 AND 8.0
   PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 5" SCREEN AND A MINIMUM OF 70% MAXIMUM OF 85%, PASSING A 0.75" SCREEN. LARGE PORTION OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE MIX
2. THE BERM SHALL BE PLACED ALONG A RELATIVELY LEVEL CONTOUR WHEREVER POSSIBLE. THE EXISTING SURFACE MUST BE SCOURED AND THE MIXTURE KEYED IN LIKE ANY OTHER SEDIMENT CONTROL MEASURE.

FILTER BERM DETAIL
NOT TO SCALE



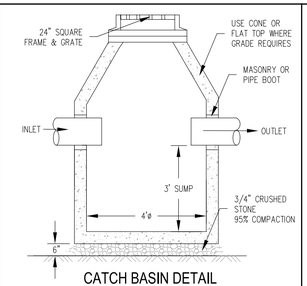
NOTE:
2"x2' STYROFOAM INSULATION BOARD SHALL BE PLACED IN AREAS WHERE COVER OVER LINE IS LESS THAN 2.5', OR WHERE SHOWN.

DRAINLINE TRENCH DETAIL
NOT TO SCALE



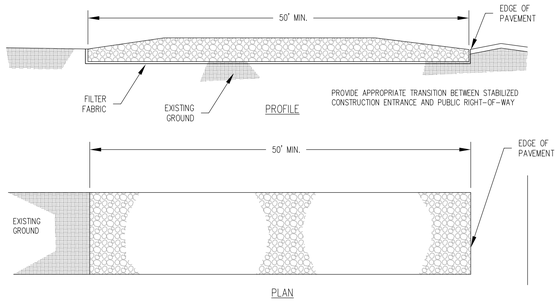
RIPRAP APRON SCHEDULE					
	RIPRAP		APRON		
CULVERT	d50 SIZE(FT)	THICKNESS t (INCHES)	LENGTH L (FT) (MIN)	WIDTH W1 (FT)	WIDTH W2 (FT)
12" OR LESS	5"	12"	6'	3.0'	7'
18"	8"	18"	8'	4.5'	9.5'
24"	10"	20"	10'	6.0'	14'
30"	12"	24"	12'	8.0'	14.5'
36"	14"	30"	14'	14.0'	17'

RIPRAP APRON PIPE OUTLET DETAIL
NOT TO SCALE



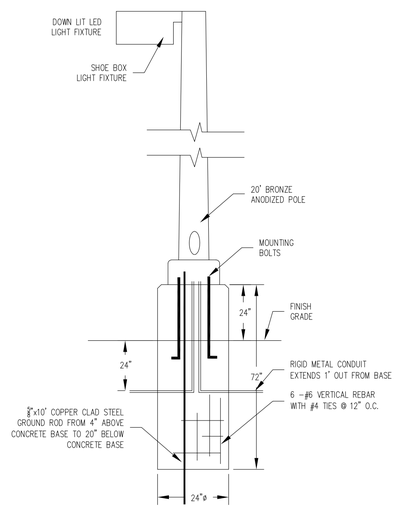
CATCH BASIN DETAIL
NOT TO SCALE

HANDICAP PARKING SIGN
NOT TO SCALE

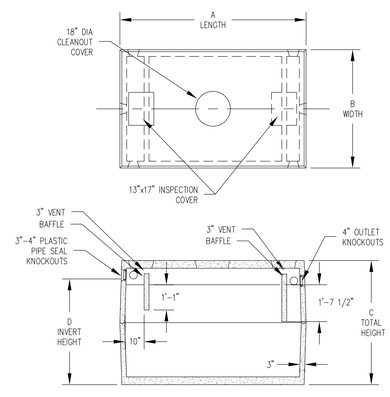


CONSTRUCTION SPECIFICATIONS
1. STONE SIZE – AASHTO DESIGNATION M43, SIZE NO 2 (2-1/2" TO 1-1/2"). USE CRUSHED STONE.
2. LENGTH – AS EFFECTIVE, BUT NOT LESS THAT 50 FEET.
3. THICKNESS – NOT LESS THAN EIGHT (8) INCHES.
4. WIDTH – NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.
5. WASHING – WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH, OR WATER COURSE THROUGH USE OF SAND BAGS, GRAVEL, BOARDS, OR OTHER APPROVED METHODS.
6. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED, ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

STABILIZED CONSTRUCTION ENTRANCE
NOT TO SCALE



TYPICAL LIGHT POLE
NOT TO SCALE



NOTES:
1. CONCRETE: 4,000 PSI AFTER 28 DAYS.
2. REINFORCING: 6X6/10X10 W.W.M. & FIBERS.
3. HEAVY DUTY SEPTIC TANK TOPS REINFORCED WITH 5/8" REBAR @ 12" O.C. EACH WAY.
4. KEYED JOINT SEALED WITH BUTY RUBBER.
5. EXCAVATION MUST BE AT LEAST 12" WIDER AND LONGER THAN TANK SIZE.

SEPTIC TANK DETAIL
NOT TO SCALE

EROSION AND SEDIMENT CONTROL PRACTICES

1. NO SOIL SHALL BE DISTURBED DURING THE PERIOD OF MARCH 1 THROUGH APRIL 15, NOR DURING ANY OTHER PERIOD WHEN SOILS ARE SATURATED DUE TO RAIN OR SNOW MELT.
2. DISTURBED SOILS SHALL BE STABILIZED WITHIN ONE (1) WEEK FROM THE TIME IT WAS LAST ACTIVELY WORKED USING TEMPORARY OR PERMANENT MEASURES SUCH AS PLACEMENT OF RIPRAP, MULCH OR EROSION CONTROL BLANKET, OR OTHER COMPARABLE MEASURES.
3. HAY OR STRAW MULCH SHALL BE APPLIED AT A RATE OF AT LEAST ONE (1) BALE PER 500 SQUARE FEET (1-2 TONS PER ACRE).
4. IF MULCH IS LIKELY TO BE REMOVED DUE TO TO STEEP SLOPES OR WIND, IT SHALL BE ANCHORED WITH NETTING, PEG OR TWINE, OR OTHER SUITABLE METHOD AND SHALL BE MAINTAINED UNTIL A CATCH OF VEGETATION IS ESTABLISHED OVER THE ENTIRE DISTURBED AREA.
5. IN ADDITION TO PLACEMENT OF RIPRAP, MULCH OR EROSION CONTROL BLANKETS, ADDITIONAL STEPS SHALL BE TAKEN WHERE NECESSARY IN ORDER TO PREVENT SEDIMENTATION OF THE WATER. EVIDENCE OF SEDIMENTATION INCLUDES VISIBLE GULLY EROSION, DISCOLORATION OF WATER BY SUSPENDED PARTICLES AND SLUMPING OF BANKS, SILT FENCES, STAKED HAY BALES AND OTHER SEDIMENTATION CONTROL MEASURES, WHERE PLANNED FOR, SHALL BE IN PLACE PRIOR TO COMMENCEMENT OF WORK, BUT SHALL ALSO BE INSTALLED WHEREVER NECESSARY DUE TO SEDIMENTATION.
6. MULCH OR OTHER TEMPORARY MEASURES SHALL BE MAINTAINED UNTIL THE SITE IS PERMANENTLY STABILIZED WITH VEGETATION OR OTHER PERMANENT CONTROL MEASURES AFTER WHICH TEMPORARY MEASURES WILL BE REMOVED.
7. PERMANENT RE-VEGETATION OF ALL DISTURBED AREAS, USING NATIVE PLANT MATERIAL WHEN POSSIBLE, SHALL OCCUR WITHIN 30 DAYS FROM THE TIME THE AREAS WERE LAST ACTIVELY WORKED, OR FOR FALL AND WINTER ACTIVITIES, BY JUNE 15, EXCEPT WHERE PRECLUDED BY THE TYPE OF ACTIVITY (E.G. RIRRAP, ROAD SURFACES, ETC.). THE VEGETATIVE COVER SHALL BE MAINTAINED.
8. DISPOSAL OF COLLECTED DEBRIS MUST BE IN CONFORMANCE WITH MAINE SOLID WASTE LAW, TITLE 38 MRSA SECTION 1301 ET. SEQ.
9. LIME AND FERTILIZER APPLICATION RATES SHALL NOT EXCEED THE FOLLOWING:

   GROUND LIMESTONE: 3 TONS/ACRE (130 LBS./1000 S.F.)
   FERTILIZER, 10-10-10 OF EQUIVALENT: 600 LBS./ACRE
   (14 LBS./1000 S.F.)

FERTILIZER SHALL NOT BE APPLIED BEFORE START OF THE GROWING SEASON NOR AFTER SEPTEMBER 30. FERTILIZED AREAS SHALL BE MULCHED TO REDUCE OFF-SITE TRANSPORT OF NUTRIENTS UNTIL USED BY VEGETATIVE GROWTH.

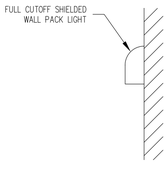
SEEDING MIXTURE AND SCHEDULE:

SPREAD TOPSOIL UNIFORMLY 6" DEEP OVER AREAS TO BE RECLAIMED. THE FOLLOWING SEED MIXTURE SHALL BE USED:

LAWNS:

KENTUCKY BLUEGRASS	0.46 LBS./1000 S.F.
CREEPING RED FESCUE	0.46 LBS./1000 S.F.
PERENNIAL RYE GRASS	0.11 LBS./1000 S.F.
TOTAL	1.03 LBS./1000 S.F.

APPLY LIME AND FERTILIZER AS SPECIFIED UNDER THE EROSION AND SEDIMENTATION CONTROL NOTES. WORK INTO THE TOP (4) INCHES OF SOIL PRIOR TO SEEDING. AFTER SEEDING, APPLY MULCH HAY AS SPECIFIED. ON FLAT AREAS AND NOT EXPOSED TO WIND, THE MULCH WILL BE ANCHORED BY WETTING DOWN. IN OTHER AREAS, JUTE NETTING SHALL BE USED FOR ANCHORAGE. THE ABOVE SEEDING SCHEDULE IS APPLICABLE IF SEEDING DURING THE GROWING SEASON (APRIL 15 TO JUNE 15 AND AUGUST 30 TO SEPTEMBER 30). BETWEEN JUNE 15 AND AUGUST 30, SEEDING WILL BE DELAYED UNTIL AUGUST 30. IF SOIL IS DISTURBED BETWEEN OCTOBER 1 AND NOVEMBER 1, DELAY SEEDING UNTIL NOVEMBER 1. AFTER NOVEMBER 1 AND BEFORE A SNOW COVER FORMS, THE SAME PROCEDURE WILL BE FOLLOWED EXCEPT THE SEED RATE WILL BE DOUBLED. AFTER SNOW COVER AND BEFORE APRIL 15, SEEDING WILL BE DELAYED UNTIL APRIL 15. HAY MULCH WILL BE APPLIED AT A RATE OF 150 LBS./1000 SQUARE FEET. THIS WILL BE ANCHORED BY NON-ASPHALTIC TACKIFIER SPRAYED ON LAWNS AND JUTE NETTING IN DRAINAGE WAYS AND OTHER AREAS.



WALL-MOUNT LIGHTING DETAIL
NOT TO SCALE

PREPARED FOR APPROVAL 2/6/2020

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CIVIL CONSULTANTS
Engineers
Planners
Surveyors
P.O. Box 100
South Berwick
Maine
03908
207-384-2550
www.civcon.com

NO.	REVISIONS	INT.	DATE
1			

RECORD OWNER:
PATRICIA M. & EDWARD V. BIBBER
OWNER ADDRESS:
6 SEA ROAD
KENNEBUNK, ME 04043

PROPOSED SITE DEVELOPMENT PLAN
BIBBER FUNERAL HOME
PORTION OF TAX MAP R36 LOT 46
CEMETERY ROAD BERWICK, MAINE

PREPARED FOR:
LAING BIBBER FUNERAL HOME
67 SUMMER STREET KENNEBUNK, MAINE 04043
CLIENT ADDRESS:

AS NOTED
0" 1"

DATE: 02/06/2020
DRAWN BY: DRC
CHECKED BY: GRA
APPROVED BY: GRA

CONSTRUCTION DETAILS PLAN

PROJECT NO: 19-289.00

L2

SHEET: 2 OF 2

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL

5 Railroad Street • P.O. Box 359
Newmarket, NH 03857
Phone: (603) 659-4979
Email: mjs@mjs-engineering.com

LETTER OF TRANSMITTAL

TO: Town of Berwick
11 Sullivan Street
Berwick, ME 03901

DATE 02/05/20 **PROJECT NO.:** 19-066

Attn: James Bellissimo, Planner

THE FOLLOWING ITEMS ARE: ☒ ENCLOSED ☐ ATTACHED ☐ UNDER A SEPARATE COVER

☐ OFFICE DRAWINGS ☒ BLACKLINES ☐ MYLARS ☐ CD
☐ SPECIFICATIONS ☐ COPY(S) OF LETTER(S)

NUMBER OF COPIES:	DATED:	DESCRIPTION:
8	02/05/20	Site Plan/CUP applications w/checklist & abutters list
8	02/05/20	Letter of Intent w/odor security plan & barn picture
8	02/05/20	Authorization letter
8	02/05/20	Deeds (2)
8	02/05/20	Tax Maps Berwick R70 & R71, So. Berwick 12
1	02/05/20	Drainage Report w/plans
8	02/05/20	Site Plans (3) full-size, (5) 11 x 17

THE ITEMS ARE TRANSMITTED AS CHECKED BELOW:

☒ FOR APPROVAL
☐ RETURNED FOR CORRECTIONS
☐ FOR REVIEW AND COMMENT
☐ RE-SUBMIT __ OF COPIES FOR APPRV'L
☐ SUBMIT __ COPIES FOR DISTRIBUTION
☐ APPROVED AS SUBMITTED
☐ APPROVED AS NOTED
☒ FOR YOUR USE
☐ AS REQUESTED
☐ FOR BIDS

REMARKS:

James,

Enclosed is the full Site Plan/CUP application for your review.

Digital package sent today.

COPY TO: file,

SIGNED: Michael Sievert

Town of Berwick

Where Tradition Meets Tomorrow

11 Sullivan Street, Berwick, Maine 03901

Phone: (207) 698-1101 Fax: (207) 698-5181

Website: www.berwickmaine.org

APPLICATION: CONDITIONAL USE PERMIT/SITE PLAN REVIEW

PLANNING BOARD REVIEW FEES *(All Fees are Non-Refundable)*	☒ $500.00 **Conditional Use Review** ☒ $1,000.00* **Site Plan Review** ** Site Plan Review requiring more than 10 hours of staff time will be billed at $80/hour.*	**Site Plan Review**† Please check any that apply: ☒ Construction of 3,000 or more ft² ☒ Installment of 5,000 ft² or more impervious surfaces. ☐ Mobile Home Park ☐ Extraction Industry ☐ Multi-Family ☐ None of the above

PROPERTY DESCRIPTION	Parcel ID	Map: R70	Lot: 16	Zoning District: RC/I	Total Land Area: 17.97	Part of a Subdivision **(Y/N)**	N
	Physical Address	11 Pond Road Berwick, ME				Aquifer Protection **(Y/N)**	N
						Shoreland Protection **(Y/N)**	Y
						Resource Protection **(Y/N)**	N
						Special Flood Hazard Area **(Y/N)**	Y

APPLICANT OR REPRESENTATIVE INFORMATION	Name	CAF Realty of Maine, LLC c/o David Ayer	Mailing Address	279 Merry Hill Road Barrington, NH 03825
	Phone	603-235-2882	Email Address	davidayer0@gmail.com

PROJECT DESCRIPTION	Existing Use: Mixed-use commercial/residential
	Project Name:
	Proposed Use: Residential in existing building and marijuana growing facility
	Waiver(s) Requested:

Planning Board meetings are the 1st and 3rd Thursday of each month at 6:30pm.

This application must be submitted at least **two weeks** in advance of the Planning Board meeting. On-going applications have a **one-week** submittal requirement. Please e-mail a complete application to planning@berwickmaine.org, submit the application fee and eight copies to the Planning Department with the requirements outlined on the other side of this application.

A Public Hearing and a site walk when necessary will be scheduled when the Planning Board finds the application complete. All expenses must be paid before a Certificate of Occupancy will be granted through the Code Enforcement Office. A performance guarantee may be required by the Planning Board.

CERTIFICATION. To the best of my knowledge, all information submitted with this application is true and correct.

Signature of Applicant

3/3/2020
Date

Submitted	Waiver Request	Conditional Use Application Requirements
☒	N/A	List of Abutters located within 200 feet including tax map and lot number. Information can be found in the Assessing Database or GIS maps at www.berwickmaine.org
☒	N/A	Right, Title and Interest to the Property: Copy of Deed, Purchase & Sale Agreement or subdivision approval.
☒	☐	Site Plan to include requirements in Section 9.8(F) of the Land Use Ordinance. Including: ☒ Proposed buildings with room layout ☒ Approximate boundaries of the parcel ☒ Parking Plan ☒ Traffic circulation with proposed exists and entrances ☒ Lighting ☒ Landscaping.
☒	☐	Written narrative describing proposed use including: ☐ Total floor area ☒ Ground coverage ☒ Location of each proposed building ☒ Setbacks to property line ☒ Business Hours of Operation ☒ Number of Employees ☒ Materials to be Used Refuse/Garbage Disposal ☒ Noise ☒ Existing restrictions or easements on the site
☒	☐	☒ External Plumbing Permit or permission letter to enter municipal water and sewer lines. OR on-site soils investigation report by licensed site evaluator.
☒	☐	Written statement documenting proposed Low Impact Design (LID) for the site to reduce storm water volumes. LID includes, but is not limited to: green roofs, rain gardens, tree wells, infiltration basins, and permeable pavement.
☒	☐	Materials to satisfy Section of 9.8.I.1 a through s as they apply to Conditional Use Review.

Submitted	Waiver Request	**Site Plan Approval Requirements†** These requirements shall be met when the application meets any of the criterion of Section 9.8.E in the Land Use Ordinance.
☒	☐	Map or maps prepared at a scale of not less than 1" to 40'
☒	☐	Perimeter survey of parcel certified by registered land surveyor Which meets all requirements of 9.8. criterion 2.b.i
☒	☐	Topography indicating contours at intervals of not more than two feet in elevation unless otherwise specified by the Planning Board.
☒	☐	Existing and proposed locations and dimensions of any utility lines, sewer lines, water lines, easements, drainage ways, public or private ways
☒	☐	Location, ground floor area and elevations of buildings and other structures on site
☒	☐	On-site soils investigation which meets all requirements of 9.8.2.b.iv
☒	☐	Location and dimensions of on-site pedestrian and vehicular access ways, parking areas, loading and unloading facilities, design of ingress and egress of vehicles to and from the site on to public streets and curb and sidewalk lines
☒	☐	Landscape plan showing location, type and approximate size of plantings and location and dimensions of all fencing and screening
☒	☐	A written statement that meets all 11 requirements of 9.8.F.2.c
☒	☐	Materials to satisfy Section of 9.8.I.1 a through s as they apply to Site Plan Review.

LIST OF OWNERS OF ABUTTING PROPERTY

PROPERTY OWNER/APPLICANT: MAP R70/LOT 16 11 Pond Road MAP 12/LOT 16 SOUTH BERWICK CAF REALTY OF MAINE, LLC 279 MERRY HILL ROAD BARRINGTON, NH 03825	**AGENT:** MJS ENGINEERING, PC P. O. BOX 359 NEWMARKET, NH 03857
MAP R70/LOT 16-B 13 Pond Road MARLENE McDONALD HEIDI M. LEVEILLE 13 POND ROAD BERWICK, ME 03901	**LAND SURVEYOR:** HORIZONS ENGINEERING 34 SCHOOL STREET LITTLETON, NH 03561
MAP R71/LOT 14-A Pond Road MAP 12/LOT 18-A SOUTH BERWICK DAVID H. & HEATHER B. WEBSTER, TRUSTEES D.H. WEBSTER & H.B. REVOCABLE LIVING TRUST 15 POND ROAD SOUTH BERWICK, ME 03908	MAP R70/LOT 18 2 Pond Road AMANDA ST. JEAN BENJAMIN GAUTHIER 2 POND ROAD BERWICK, ME 03901
MAP 12/LOT 18-B 3 Adams Brook Lane SOUTH BERWICK JUSTIN WOOD 3 ADAMS BROOK LANE SOUTH BERWICK, ME 03908	MAP R70/LOT 16-A 386 Portland Street CHRISTY & DIANE MASSIOS 386 PORTLAND STREET BERWICK, ME 03901
MAP R71/LOT 14 Off Portland Street NATHAN WEBSTER P.O. BOX 178 SOUTH BERWICK, ME 03908	MAP R70/LOT 16-1 380 Portland Street NORTHEAST CREDIT UNION ATTN: ACCOUNTING P.O. BOX 1240 PORTSMOUTH, NH 03802
MAP 12/LOT 18-C Pond Road SOUTH BERWICK NATE WEBSTER AND 12 DIABIASE STREET PORTLAND, ME 04103	MAP 12/LOT 18-C Pond Road SOUTH BERWICK JOHN WEBSTER 59 JUNCTION ROAD SOUTH BERWICK, ME 03908
MAP 12/LOT 14 Pond Road SOUTH BERWICK CHARLES S. & CAROL S. BAER 36 SHARON ROAD SOUTH HAMILTON, MA 01982	MAP R70/LOT 17 10 Pond Road MAP 12/LOT 14-B SOUTH BERWICK JERRY & ALYSON GRAYBILL 10 POND ROAD SOUTH BERWICK, ME 03908
MAP R71/LOT 14-1 Off Portland Street JUSTIN WEBSTER 59 JUNCTION ROAD SOUTH BERWICK, ME 03908	MAP R71/LOT 12-B 404 Portland Street PETER G. GSCHEIDLE P.O. BOX 221 SOUTH BERWICK, ME 03908
	SOIL SCIENTIST: MIKE CUOMO 6 YORK POND ROAD YORK, ME 03909

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL

5 Railroad Street • P. O.Box 359
Newmarket, NH 03857
Phone: (603) 659-4979
Email: mjs@mjs-engineering.com

Letter of Intent – Site Plan and Conditional Use Permit Applications for CAF Realty of Maine, LLC Located at Pond Road Tax Map R-70, Lot 16

February 5, 2020

1.0 Project Purpose

The intent of this project is to permit the construction of a marijuana grow facility on the subject parcel. The project is phased and phase 1 includes one building and the site improvements as described. The future phases only included the addition of additional buildings. The facility will be access via the existing gravel driveway that currently services the parcel from Pond Road. A new gravel driveway will be constructed leading from the existing drive approximately 450' to the northwesterly portion of the parcel where the proposed grow building will be constructed. The proposed developed area will be fenced, screened, landscaped and include stormwater treatment facilities to treat the runoff from the new impervious surfaces.

2.0 Existing Conditions

The subject parcel is located in the Rural Commercial/Industrial zone. A small triangular area on the southerly corner of the parcel is located in South Berwick. The area in South Berwick totals approximately 7700 SF and has approximately 135' of frontage on Pond Road. The parcel is bordered on the south by Pond Road with approximately 507' of frontage in Berwick, and the additional 135'+/- of frontage in South Berwick and on all other sides by residential property. There is one existing structure on the property at the westerly end near the intersection of Portland Street and Pond Road, which is currently used for residential rentals and storage. There are no exterior changes proposed for the existing structure, just interior remodeling. The property is served by onsite water and sewer and overhead utilities. There are approximately 15 existing parking spaces on the property that serve the existing building. The current septic system is failed and will be replaced with this proposal to handle the wastewater from both the existing building and the proposed building.

3.0 Redevelopment Proposal

The proposal is to construct a marijuana growing facility on the northeasterly portion of the parcel. The construction of the buildings will be phased. Phase 1 includes the construction of one 44' x 80' barn for the proposed operation. The building will contain an office, restrooms utility area and growing, harvesting and processing rooms. Approximately 85% of the building will be used for the growing, harvesting and processing and the remainder will be used for business support and utility. The building, access and parking area will have 24-hour surveillance inside and out. There will also be 24-hour security alarm monitoring. The subsequent phases will include construction of up to three additional

barn structures. Each structure is 32' x 80' for a total of an additional 7680 SF. The total build out will be 11,200 Sf. There will be a total of 5 full time employees and approximately 8 total employees during harvesting. A new driveway is being proposed to access the new building(s) from the existing driveway access and parking area. There will be a gate installed with an electronic code to limit entrance to employees only. A Knox box or other access will be provided for the fire department. 5 additional parking spaces are proposed for the new facility with additional gravel parking area available during the harvesting time where more temporary employees are needed. The proposal is to permit the access, utilities, parking and other appurtenances for the first building as phase 1 and permit the location of up to three additional 32' x 80' buildings with minimal additional site disturbance required when the other buildings are constructed. The intent is to construct the large bioretention stormwater pond to handle the full buildout during construction of phase 1. The construction of the smaller bioretention stormwater pond to the east side of the buildings will be constructed in the future phase when the second building is constructed, to handle any additional roof runoff in that direction that cannot be channeled into the larger stormwater treatment pond.

Approvals Being Requested from the Planning Board

The Regulations will require the following approvals based on the current proposed development scope of work.

1. Planning Board Approval for:
    - Site Plan
    - Conditional use

A. *Request for Site Plan Approval*

In accordance with Section 9.8 of the development regulations, this submission package includes the Application, checklist, and the following plans:

1. Existing Conditions Plan
2. Site Plan
3. Grading, Drainage & Erosion Control Plans
4. Detail Sheets
5. Drainage Report/Stormwater Management Plan (Report).

The following statements, along with the above plan set outline how this project complies with the performance standards for a Conditional Use Permit and Site Plan Review as required in section 9.8.I.1 a-s. The numbering below coincides with the applicable section.

a) *<u>Conformance with Comprehensive Plan</u>:*

The development of this site is in conformance with the Comprehensive Plan because it expands the commercial/industrial development while maintaining the rural character of the neighborhood. The property is easily accessed from existing roads and does not impose a burden to municipal services.

b) *Preserve and enhance the landscape:*

The existing property where the proposed development will be located is currently a field. There is a dense tree cover on the northeasterly portion of the property approximately 160' past the development area which will not be disturbed. No trees will be removed with this proposal. Soil disturbance will be required for the construction of the access driveway, septic, utilities, buildings and stormwater system. All of the material will be reused on the site for the construction and only a minimal amount of fill and select materials will be required to raise the grade for the driveway and building area. The disturbed areas will be loamed and reseeded to stabilize and match the existing vegetation. Evergreen trees will be planted on the north and south sides of the proposed parking and building areas to provide screening from the neighboring residential properties and roads.

c) *Relationship of the proposed buildings to the environment:*

The design is compatible with the neighborhood because the building(s) are agricultural barn structures one story in height with standard pitched roofs to fit the scale of the surroundings. The buildings are being placed on level ground and raised as minimal as possible to allow stormwater to runoff via sheet flow into grass swales and a stormwater pond for treatment. The building(s) are designed to resemble barns to match the surrounding structures and fit into the character of the neighborhood.

d) *Vehicular access:*

The vehicular access to the new facility will be via the existing gravel driveway access to the property. This access was previously used for access to an existing building for an auto repair business which is no longer exists. This access is adequate for ingress and egress for the proposed use as the traffic will be similar in nature to the past use. The driveway will be extended from the existing gravel drive down the slope to the proposed buildings. The driveway will provide safe access to parking and emergency vehicles and commercial vehicles for trash removal. The driveway is private and will be adequate for two way traffic and access to parking. There is no issue with site distance at the entrance. This access has been historically used and there is an easement in place with the adjacent abutter. One additional paved driveway exists at the property and will be used for access to the existing residential building.

e) *Parking and circulation:*

The interior driveways, parking areas and loading areas are all adequate for the intended use. The parking area for the proposed growing facility will be close to the new building and provide pedestrian access to the building separate from vehicle traffic. Adequate maneuvering area is provided for vehicle circulation for both employees and service vehicles. Access and parking to and from the existing building is provided and maintained with this design.

f) *Surface water drainage:*

The proposed stormwater drainage system is designed to collect, treat and improve the quality of runoff from the proposed development. The system is designed to collect runoff and treat it using long level grass treatment swales and bioretention ponds to treat, detain and provide for some minimal infiltration. The system will lessen the impact of stormwater runoff from the site and maintain or improve the quality draining into the brook. The runoff from the property will not adversely affect the neighboring properties.

g) *Existing utilities:*

The development incorporates onsite sewage treatment, water supply and a stormwater management system. There is no burden to existing public utilities.

h) *Advertising features:*

There is no signage for this facility as it does not provide any retail sales. All product is delivered to off site retail facilities.

i) *Special Features of the development*:
There are no outside storage areas or loading areas. Building utilities will be screened. The dumpster area is fenced and secured with a lock, and close to the proposed building which is setback from the adjacent properties and public ways. Screening is provided to buffer any adverse impacts.

j) *Exterior lighting*:
There will be one light at the pedestrian entrance to the building. This light will be mounted to the building and have a shield to direct the light downward.

k) *Emergency vehicle access*:

Emergency vehicle access is currently provided to the existing building which will not change. The driveway is design to be a minimum of 20' wide to provide adequate emergency access to the proposed building. An access way will be provided between the buildings for future phases to provide access to the buildings.

l) *Municipal services:*

The proposed development will not have an adverse impact to municipal services. There will be adequate access provided for emergency vehicles. The site will generate very minimal vehicle traffic except for the employees and deliveries from the facility in small vehicles. Water and sewer are onsite, and the solid waste will be handled by a private water hauler paid by the owner.

m) *Will not result in water or air pollution:*

The proposed developed area is well outside the 100-year floor area and raised slightly above the existing grade. Test pits have been completed and witnessed by Mike Cuomo and the site

has been determined to be adequate for sewage disposal. There is currently a wastewater disposal system on the site that is being redesigned to adequately treat the existing and proposed buildings. The land has moderate to very low slope. The existing vegetation is being retained and with the design of a stormwater collection and treatment system and the large vegetated buffer stormwater runoff will be adequately treated prior to discharge to the wetland and river. There is a proposed onsite well with adequate protective radius provided onsite.

n) *Has sufficient water available:*

There is an existing well on the site for the existing uses. There are other onsite wells on the adjacent parcels with appropriate protective radius that imposes no adverse impact to this property. This parcel is approximately 18 acres and the proposed water use is approximately 250 – 200 GPD including employees. Based on the adequacy of the existing well we anticipate there will be no issues with the water availability for this use.

o) *Provide adequate sewage disposal:*

Mike Cuomo Site Evaluator #211 completed test pits on 27 September 2019 and determined that the site is suitable for sewage disposal. Mike is currently designing a new sewage disposal system for the site.

p) *No adverse visual impacts:*

The proposed development will not adversely impact the scenic or natural beauty of the area as the buildings will be properly scaled, designed, setback and screened to fit into the surrounding neighborhood. There is no impact to rear or irreplaceable natural areas as the development is proposed within a field.

q) *Adequate financial and technical capacity*:

The owner of the property is personally financing the development without any bank financing. The owner has hired licensed professionals to prepare the design and permit the development. The owner is a licensed electrical contractor and owns and manages a commercial electrical contracting business.

r) *250' shoreland buffer protection*:

The proposed development of impervious areas including driveways, parking areas and buildings are outside of the 250' buffer from the brook. The only construction within 250' is for stormwater treatment systems and they will help to improve the quality of the runoff and protect the wetland and brook.

s) *Low impact design:*

Low impact design (LID) standards are being incorporated into the stormwater system design. Vegetated swales, bioretention ponds that provide treatment, detention and some infiltration are being provided. In addition, pavement is not being used to help reduce runoff and large vegetated buffers are remaining in place to provide treatment of runoff from these surfaces.

If you have any questions or need additional information, please do not hesitate to contact me.

Sincerely;

Michael J. Sievert PE
MJS Engineering

Odor Control Plan:

Section 1: Specific odor emitting activities
The following rooms are considered odor producing areas

a) Flower Rooms #1 & 2: rooms contain all flowering plants

b) Drying/curing room: room will be periodically used to hang and dry harvested plants

Section 2: Odor mitigation practice

a) Flower rooms #1 & 2: All flower rooms will be sealed from other areas and exterior via non porous finishes. Air pulled through HVAC system will be carbon filtered prior to exhausting. In addition each flower room will have an interior carbon filter in order to filter odors from air circulating within the rooms.

b) Drying/curing room: Will operate under same procedures as flower rooms. **Drying/curing room will only be in use for a period of 2 weeks post-harvest, and will only be considered odor producing during these times.*

Facility Security Plan

a) Cultivation: All cultivation will occur within facility. No exterior cultivation.

b) Facility: Entire building will be considered a controlled access area. All entryways locked 24/7. Security cameras will be placed on all access points including but not limited to; parking area, all entry/doorways, and interior of all rooms. All rooms will have adequate lighting for effective camera usage, and cameras in cultivation rooms will be equipped with low light vision in order to accommodate mandatory dark periods. Exterior of building will be lit to accommodate cameras as well. Camera records will be recorded and archived indefinitely.

c) Access: Access to facility is granted only to employees who are actively on the clock. All employees will be background checked; age verified (21+) and in possession of a state issued individual identification card. In addition state/local officials, vendors and service providers will be allowed access as necessary to perform job/regulatory functions, provided they meet the state mandated age requirement (21+) and provide proof of such.
**No other access will be granted to any individual for any reason.*

d) Shipping/receiving: All marijuana products will be entered into state run tracking system, and will be handled by authorized employees only. Shipping will be controlled by the trip ticket generated by tracking system. All product shipped will be locked in a separate enclosed space within vehicle and accessible only to authorized transporter and receiving licensee. Marijuana products will not be received at this facility. All supply deliveries will be received at building main entrance and transferred into facility by authorized employee only.

e) Other: There will be no consumption of marijuana products on property exterior or within facility. Facility is designed to blend with character of neighborhood, and all cultivation activities within facility will be hidden from public viewpoints. Disposal of marijuana byproducts (leafs/stems/excess product, etc.) will comply with state disposal standards including, grinding all material until it is unidentifiable and mixing 50/50 with an inert material such as soil.

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL

5 Railroad Street • P.O. Box 359
Newmarket, NH 03857
Phone: (603) 659-4979
Email: mjs@mjs-engineering.com

TYPICAL PICTURE OF PROPOSED STRUCTURE

This photo represents the actual barn structure that is proposed for this project. This is the owner's current barn which he is proposing to construct a similar structure on the subject parcel on Pond Rd. This barn is 32' x 40' and the proposed phase 1 barn will be 44' x 80' with a lower roof on one side. The proposed future structures will be 32' x 80'. The difference will be the windows and doors on the proposed barn. The roof and siding will be the same. The buildings will be set up for future solar panel installation.

February 3, 2020

Berwick Planning Board
11 Sullivan Street
Berwick, ME 03901

Dear Chairperson:

I hereby authorize Michael J. Sievert, P.E. of MJS Engineering, P.C. to represent me at the Berwick Planning Board meetings for site plan review and conditional use permitting. The subject parcel is shown on Tax Map R70 as Lot 16 located on 11 Pond Road.

Sincerely;

Authorized Agent or Owner

RETURN TO:
Stewart Title Company - New Hampshire
110 Corporate Drive, Suite 1
Portsmouth, NH 03801

WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS THAT Roberge Rentals, LLC. with a principal place of business in ,11 Pond Road, Berwick, ME 03901 , for consideration paid, grant(s) to CAF Realty of Maine, LLC., whose mailing address is 279 Merry Hill Road, Barrington, NH 03825, with WARRANTY COVENANTS, the real property situated in Berwick in the County of York and State of Maine more particularly described as follows:

A parcel of land located on the northerly sideline of Pond Road in the Towns of Berwick and South Berwick, County of York, and State of Maine, shown as Lot 3 on a survey labeled "Final Plan Roberge Subdivision for Roxanne Roberge" by Roaring Brook Consultants, Inc. dated 5/4/06 with the final revision 4/25/08 and recorded at the York County Registry of Deeds in Plan Book 330, Page 11 and being more particularly bounded and described as follows:

Beginning at a #5 rebar set on the northerly sideline of Pond Road, which rebar is set at the southwesterly corner of adjoining land formerly of Roxanne M. Roberge and now of Stephen and Michelle M. Smith; then running along land of said Smith on the following courses and for the following distances; North 16° 29' 50" East for of 189.97 feet to a #5 rebar; the continuing North 16° 29' 50" East for 20.03 feet to a #5 rebar; then turning and running South 76° 32' 47" East for 574.42 feet to a #5 rebar; then turning and running South 13° 51' 50" West for 138.90 feet to a #5 rebar: then turning and running North 85° 58' 30" West for 88.69 feet to a #5 rebar; then North 83° 20' 45" West for 66.94 feet to a #5 rebar; then turning and running South 06° 39' 15" West for 50 feet to a #5 rebar set on the northerly sideline of Pond Road; then turning and running South 83° 20' 45" East along said Road for 68.42 feet; then continuing along said Road South 85° 58' 30" East for 131.91 feet to a point at land of David Webster; then turning and running North 13° 51' 50" East along land now or formerly of John Webster on the following courses and for the following distances; North 58° 49' 50" East for 261 feet; North 50° 03' 10" East for 95 feet; then turning and running North 37° 59' 10" West for 365 feet; then continuing North 39° 38' 00" West along land now or formerly of Peter G. and Joanne M. Gsheidle for a distance of 299.98 feet; then continuing North 34° 44' 40" West for 88.44 feet; then turning and running South 40° 21' 24" West along land of Christy and Diane Massios for a distance of 647.68 feet (inadvertently stated to be 47.68 feet in a deed recorded in the York Registry of Deeds in Book 15533, Page 655); then continuing South 40° 21' 25" West along land of said Massios for a distance of 208 feet to a #5 rebar; then continuing South 40° 21' 25" West along land of said Massios for a distance of 100 feet to a rebar; then turning and running North 49° 38' 35" West still along land of said Massios for a distance of 118.33 feet to a #5 rebar; then turning and running South 35° 47' 21" West along land being conveyed by Roxanne M. Roberge to the Northeast Credit Union for a distance of 245.73 feet to a #5 rebar; then turning and running North 85° 47' 12" West still along land being conveyed by said Roberge to said Credit Union for a distance of 305.19 feet to a #5 rebar; then turning and running South 14° 23' 09" West still along land conveyed by said Roberge to said Credit Union for a distance of 193.18 feet to a #5 rebar set on the northerly sideline of Pong Road; then turning and running southeasterly along Pond Road on a curve having a radius of 1,534.08 feet for an arc length of 265.34 feet to a concrete bound; then turning and running southeasterly

on a curve having a radius of 1,534.08 feet for an arc length of 140.99 feet; then running South 73° 30' 10" East still along Pond Road for a distance of 100.41 feet to a rebar and being the point of beginning.

This parcel of land contains 17.97 acres.

The above described 17.97-acre premises are conveyed together with a 20 foot wide appurtenant easement to be used in common with other as a right of way to gain access to and exit from the northerly sideline of Pond Road and the westerly boundary of the above described 3.69 acre parcel. Said right of way to commence on the northerly sideline of said right of way and to be located on the area shown as " Secondary Gravel Access" on the "Final Site Plan Map 70, Lots 16 Berwick, Maine for Northeast Credit Union" by Roaring Brook Consultants, Inc. and approved by the Berwick Planning Board on 12/04/08. Said easement is conveyed subject to those terms and conditions of use and insurance as set out in the deed of Roxanne M. Roberge to Northeast Credit Union dated December 17, 2008 and to be recorded together with this deed at the York County Registry of Deeds.

The above-described premises are conveyed subject to an outstanding easement to Central Maine Power for an electrical transmission line, known as Section 118.

The above-described 17.97 acre parcel is conveyed subject to an easement to be used for the installation, use, maintenance, repair and replacement of a septic system leach field and a 20 foot wide easement for the installation and maintenance of septic system pipes all as set forth in the deed of Roxanne M. Roberge to Stephen Smith and Michelle M. Smith dated OCtober 23, 2008 and recorded at the York County Registry of Deeds in Book 15511, Page 405.

The above-described 17.97 acre parcel is further conveyed subject to a temporary negative easement benefiting an adjoining 3.69 acre parcel shown as Lot 1 on a survey labeled "Final Plan Roberge Subdivision for Roxanne Roberge" and recorded at the York County Registry of Deeds in Plan Book 330, Page 11 (hereafter referred to as the NECU Parcel). Said temporary negative easement is set forth in the deed of Roxanne M. Roberge to Northeast Credit Union by deed dated December 17, 2008 and to be recorded at the York County Registry of Deeds herewith. Said temporary negative easement provides that:

1. There shall be no credit union, banking or lending institution of any type, whether commercial or mutual, allowed to be constructed or used on the above described 17.97 acre parcel or any portion thereof for so long as any retail credit union, banking or lending institution of any type, whether commercial or mutual is located and operating on the adjoining NECU Parcel.

2. The above negative easement shall automatically cease and terminate when a retail credit union, banking or lending institution is no longer located and operating on the adjoining NECU Parcel.

3. This negative easement shall be deemed to benefit the NECU Parcel and be enforceable by the owner of the NECU Parcel, its successor, assigns and grantees and shall be deemed to burden and be binding upon the above described 17.97 acre parcel.

Reference is made to title vested in Roberge Rentals, LLC by virtue of a Warranty Deed from Roxanne M. Roberge dated March 23, 2009 and recorded in the York County Registry of Deeds in Book 15594, Page 996.

IN WITNESS WHEREOF, Roberge Rentals, LLC. has caused this instrument to be signed in its corporate name and sealed by Roxanne Roberge, its Member thereunto duly authorized, this 22nd day of November, 2019.

Roberge Rentals, LLC.

Roxanne M Roberge

By: Roxanne M. Roberge, Member

State of New Hampshire
County of Rockingham

On this 22nd day of November, 2019, personally appeared, before me, the above named Roxanne Roberge, Member of Roberge Rentals, LLC., a limited liability company, known to me or satisfactorily proven to be the person(s) whose name(s) is/are subscribed to the foregoing instrument, and acknowledged that he/she/they executed the same as his/her/their free act and deed, duly authorized on behalf of said Roberge Rentals, LLC..

Stephanie Thompson

Justice of the Peace/Notary Public/Attorney at Law
Print Name: Stephanie Thompson
My commission expires: 6.19.24

STEPHANIE M. THOMPSON
STATE OF NEW HAMPSHIRE
-MY-
COMMISSION
EXPIRES
JUNE 19,
2024
NOTARY PUBLIC

Return to:
Bruce A. Whitney, Esq.
PO Box 187
S Berwick ME 03908

3p

Doc# 2008055154
Bk 15533 Pg 0652 - 0654
Received York SS
12/17/2008 11:44AM
Debra L. Anderson
Register of Deeds

WARRANTY DEED

Maine Statutory Short Form

Roxanne M. Roberge of 11 Pond Road, South Berwick, ME 03908 for consideration paid, grant to **Northeast Credit Union** of 100 Borthwick Avenue, Portsmouth, New Hampshire with **WARRANTY COVENANTS**, the real estate in Berwick, County of York and State of Maine, described as follows:

A parcel of land located on the southeasterly sideline of State Route 4, also known as Portland Street in the Town of Berwick, County of York, and State of Maine, shown as Lot 1 on a survey labeled "Final Plan Roberge Subdivision for Roxanne Roberge" by Roaring Brook Consultants, Inc. dated 5/4/06 with final revision 4/25/08 and recorded at the York County Registry of Deeds in Plan Book 330, Page 11 and being more particularly bounded and described as follows:

Beginning at the intersection of the southeasterly sideline of Portland Street and northerly sideline of Pond Road; which point is at the southwesterly corner of the premises herein described; then running North 41° 06' 56" East along Portland Street for a distance of 108.59 feet; then continuing North 52° 16' 36" East for 66 feet to a stone bound; then running northeasterly still along Portland Street on a curve having a radius of 2939.79 feet for an arc length of 65.68 feet; then continuing northeasterly along Portland Street on a curve having a radius of 2,939.79 feet for an arc length of 521.87 feet to a rebar; then turning and running South 49° 38' 35" East along land now or formerly of Christy and Diane Massios for a distance of 297.77 feet to a #5 rebar; then turning and running South 35° 47' 21" West along land being retained by Roxanne M. Roberge for a distance of 245.73 feet to a #5 rebar; then turning and running North 85° 47' 12" West still along land being retained by said Roberge for a distance of 305.19 feet to a #5 rebar; then turning and running South 14° 23' 09" West still along land being retained by said Roberge for a distance of 193.18 feet to the northerly sideline of Pond Road; then turning and running westerly along Pond Road on a curve having a radius of 1,534.08 feet for an arc length of 44.95 feet to a #5 rebar; then turning and running North 02° 52' 30" West still along Pond Road for a distance of 24.10 feet; then turning and running South 87° 07' 50" West along Pond Road for a distance of 109.22 feet to a stone bound; then continuing westerly on a curve having a radius of 426.54 feet for an

Maine R.E. Transfer Tax Paid

arc length of 74.10 feet; then continuing westerly along Pond Road on a curve having a radius of 426.54 feet for an arc length of 52 feet to the easterly sideline of Portland Street and being the point of beginning. This parcel of land contains 3.69 acres.

Meaning to describe and conveying a portion of the premises described in the deed of R & D Properties, LLC to this grantor dated August 28, 2007 and recorded at the York County Registry of Deeds in Book 15243, Page 889.

Excepting and reserving a 20 foot wide easement to be used in common with others as a right of way to gain access to and exit from the northerly sideline of Pond Road and the westerly boundary of the above described 3.69 acre parcel. Said right of way to commence on the northerly sideline of said right of way and to be located on the area shown as "Secondary Gravel Access" on the "Final Site Plan Map 70, Lots 16 Berwick, Maine for Northeast Credit Union" by Roaring Brook Consultants, Inc. and approved by the Berwick Planning Board on 12/4/08. Said easement may be used on foot or for vehicles (excluding oil trucks or other vehicles carrying any potentially hazardous materials – except for oil trucks delivering residential heating oil to grantee's residence). The Grantor shall maintain liability insurance in favor of the Grantee in such amount as shall be reasonably acceptable to the Grantee, and shall provide a certificate of such insurance naming the Grantee as an additional insured. The Grantor shall construct, maintain, plow and repair the gravel access, being approximately 40 feet in length, from the "Secondary Gravel" roadway to her land.

Creation of a Temporary Negative Easement

Roxanne M. Roberge is the owner of a parcel of land that adjoins the above-described 3.69-acre parcel (hereafter referred to as the NECU Parcel). This adjoining parcel consists of 17.97 acres and is shown as Lot 3 on the survey labeled "Final Plan Roberge Subdivision for Roxanne Roberge" and recorded at the York County Registry of Deeds in Plan Book 330, Page 11 (hereafter referred to as the Remaining Property). Roxanne M. Roberge for herself, her heirs, devisees and assigns subjects said Remaining Property to the following temporary negative easement:

1. There shall be no credit union, banking or lending institution of any type, whether commercial or mutual, allowed to be constructed or used on the Remaining Property or any portion thereof for so long as any retail credit union, banking or lending institution of any type, whether commercial is mutual is located and operating on the above described NECU Parcel.

2. The above negative easement shall automatically cease and terminate when a retail credit union, banking or lending institution is no longer located and operating on the NECU Parcel.

3. This negative easement shall be deemed to benefit the NECU Parcel and be enforceable by the owner of said NECU Parcel, its successor, assigns and grantees and shall be deemed to burden and be binding upon the Remaining Property.

Witness my hand this 17th day of December 2008.

Bruce A Whitney
Witness

Roxanne M Roberge
Roxanne M. Roberge

STATE OF MAINE
COUNTY OF YORK, ss

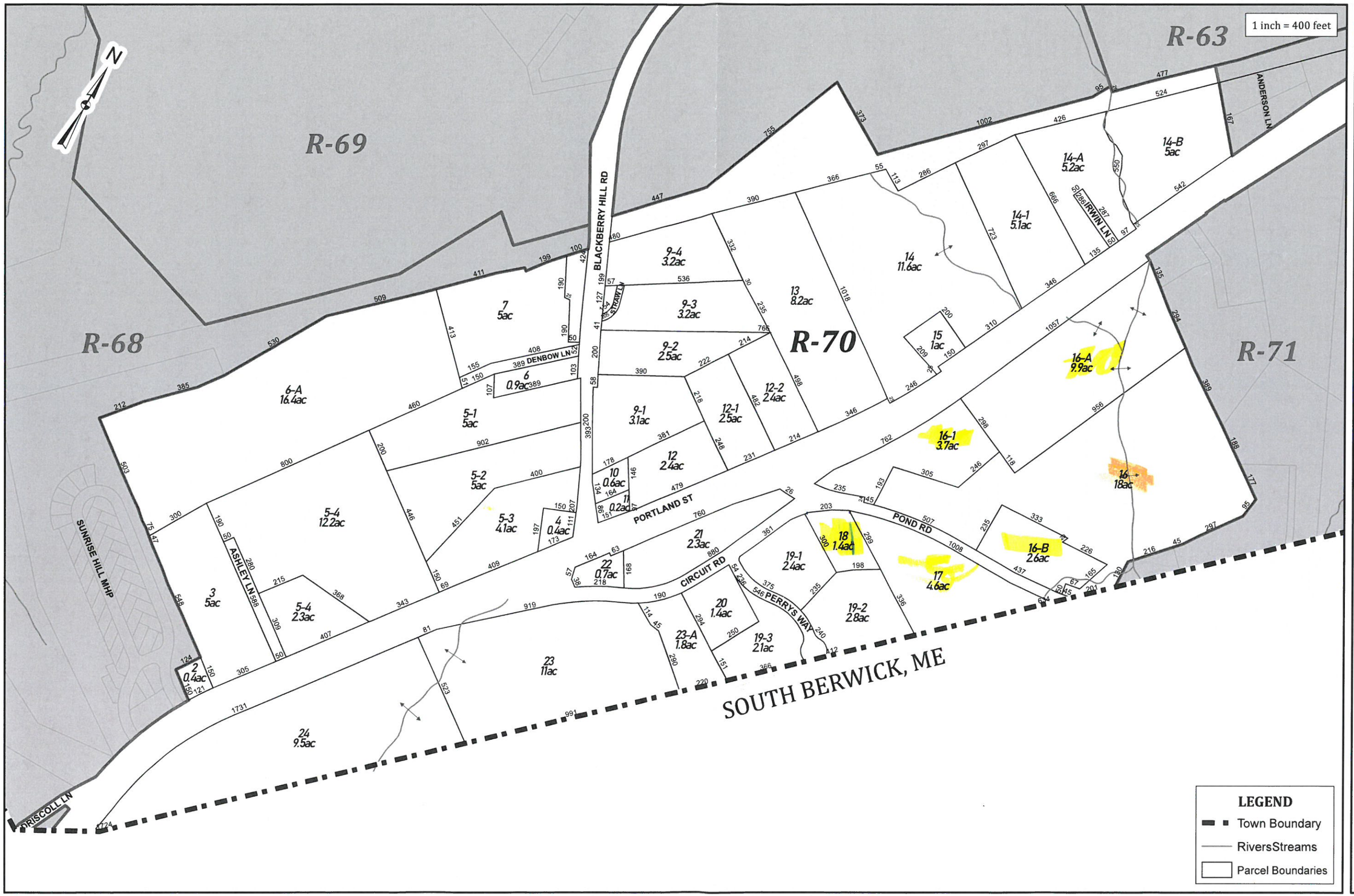
December 17, 2008

Then personally appeared the above named Roxanne M. Roberge and acknowledged the foregoing instrument to be her free act and deed, before me:

Bruce A Whitney
Bruce A. Whitney
Attorney at Law

Roxanne Roberge to Credit Union revised deed

End of Document



R-70

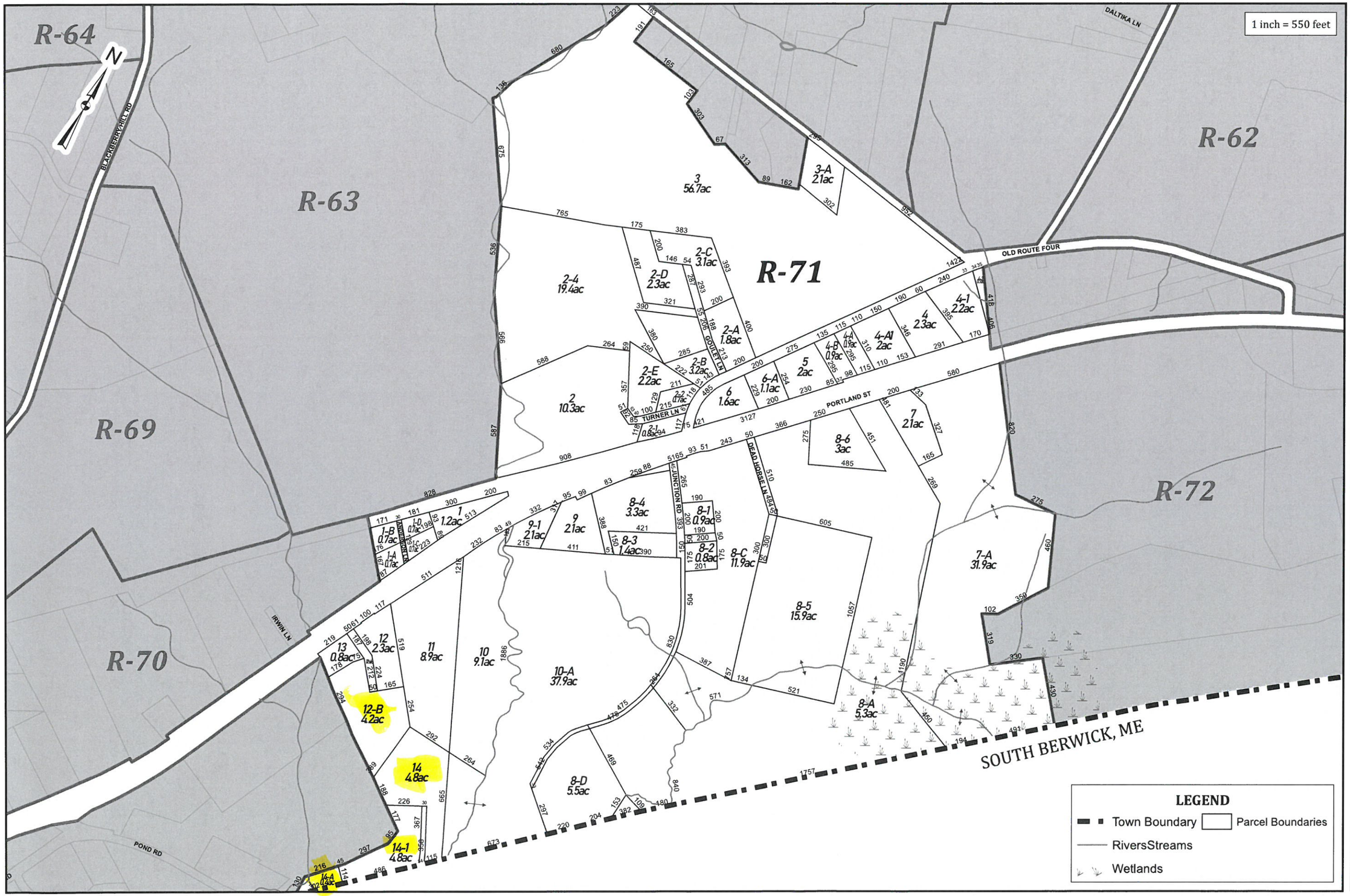
Northern Forests, LLC
GIS/GPS Mapping Services

NOTE: MAP REFLECTS CHANGES AS OF APRIL, 2019

PROPERTY MAP
BERWICK
MAINE

ALL DIMENSIONS ARE IN FEET.
MAP SCALE MAY VARY WITH PAGE.
FOR ASSESSMENT PURPOSES ONLY
NOT FOR PROPERTY CONVEYANCES

Label Format:
Block - Lot Number
Assessed Acreage



R-71

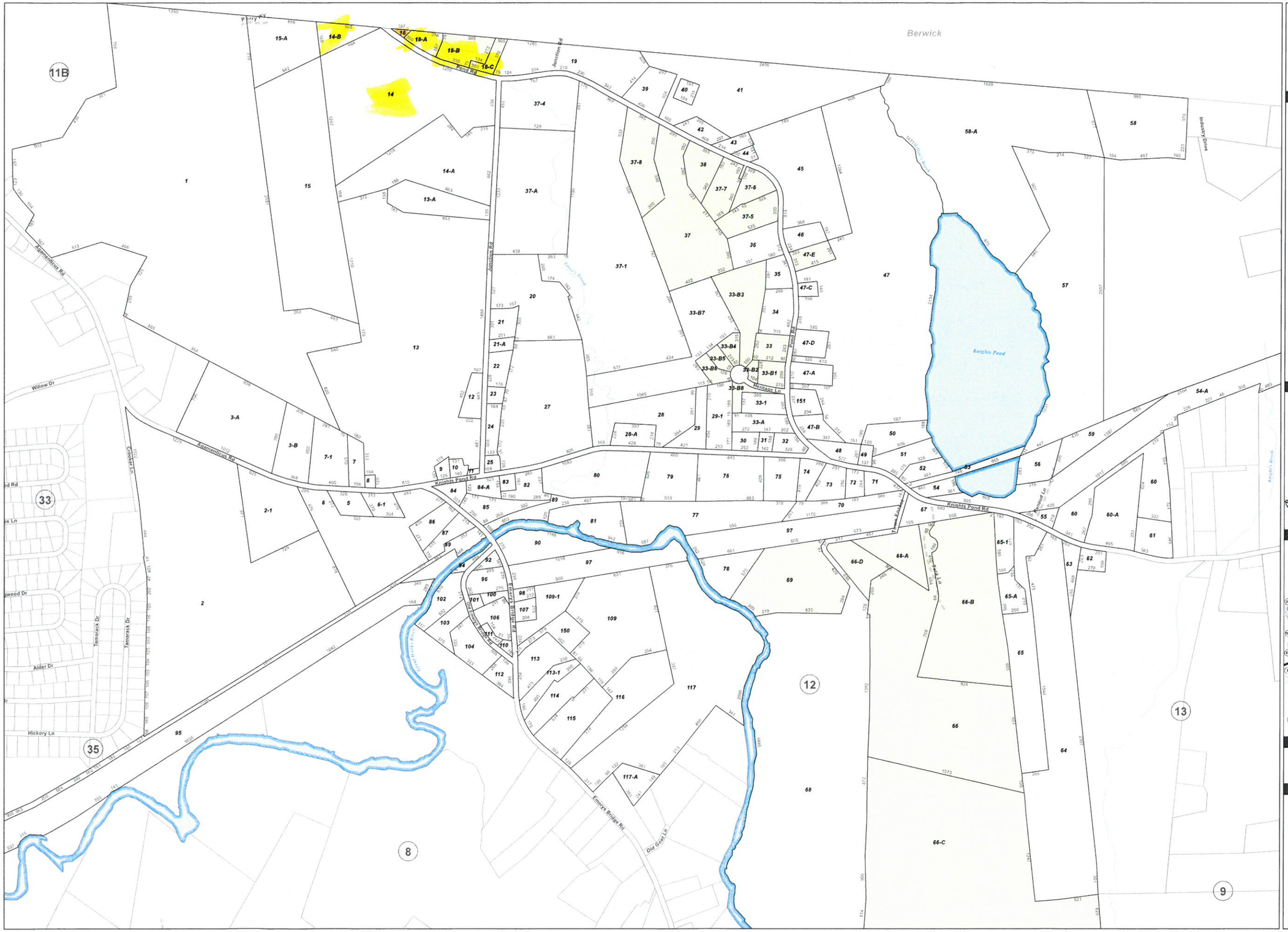
Northern Forests, LLC
GIS/GPS Mapping Services

NOTE: MAP REFLECTS CHANGES AS OF APRIL, 2019

PROPERTY MAP
BERWICK
MAINE

ALL DIMENSIONS ARE IN FEET.
MAP SCALE MAY VARY WITH PAGE.
FOR ASSESSMENT PURPOSES ONLY
NOT FOR PROPERTY CONVEYANCES

Label Format:
Block - Lot Number
Assessed Acreage



Assessor's Maps

Legend

- Property Boundary
- Local Road
- Private Road
- River, Stream, Brook
- Waterbody
- 17 Map Number
- Calculated Approximate Dimension — Map 8, Lot 81, Sub 2
- Calculated Dimension From Survey Lines — Map 8, Lot 81, Sub 2

Town-Wide Locator Map

Local Locator Map

Scale and Orientation

0 200 400

1 inch = 400 feet

Notes

Disclaimer:
The Town of South Berwick shall not be held liable for discrepencies in land conveyance based on the content of these maps. These maps are for assessing purposes only. Copywright Town of South Berwick.

Source:
The map design was originally developed by Ransom Consulting Inc. Updates provided by JDR Consulting, Kennebunk, Maine.

Revised:
April 2017

MAP 12

SITE PLAN

prepared for:
CAF REALTY OF MAINE, LLC
POND ROAD
BERWICK, MAINE

SUBMITTED: FEBRUARY 5, 2020

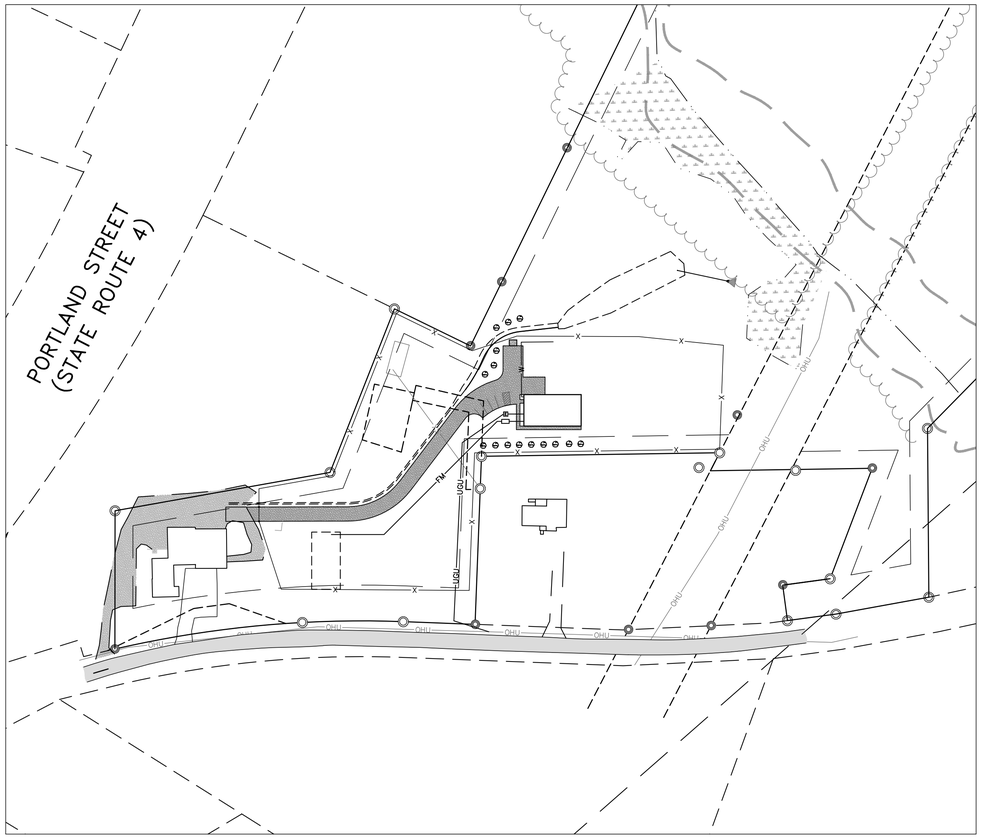


TABLE OF CONTENTS: **SHEET:**

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SITE PLAN	C1
GRADING, DRAINAGE, & UTILITIES PLAN	C2
CONSTRUCTION DETAILS	D1-D3
PROPOSED BUILDING PLANS	

ENGINEER:

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL
5 Railroad St., P.O. Box 359
Newmarket, NH 03857
Phone: (603) 659-4979, Fax: (603) 659-4627
E-mail: mjs@mjs-engineering.com

SURVEYOR:

horizons Engineering
LITTLETON NH • NEWPORT VT
NEW LONDON NH • POMFRET VT • KENNEBUNK ME

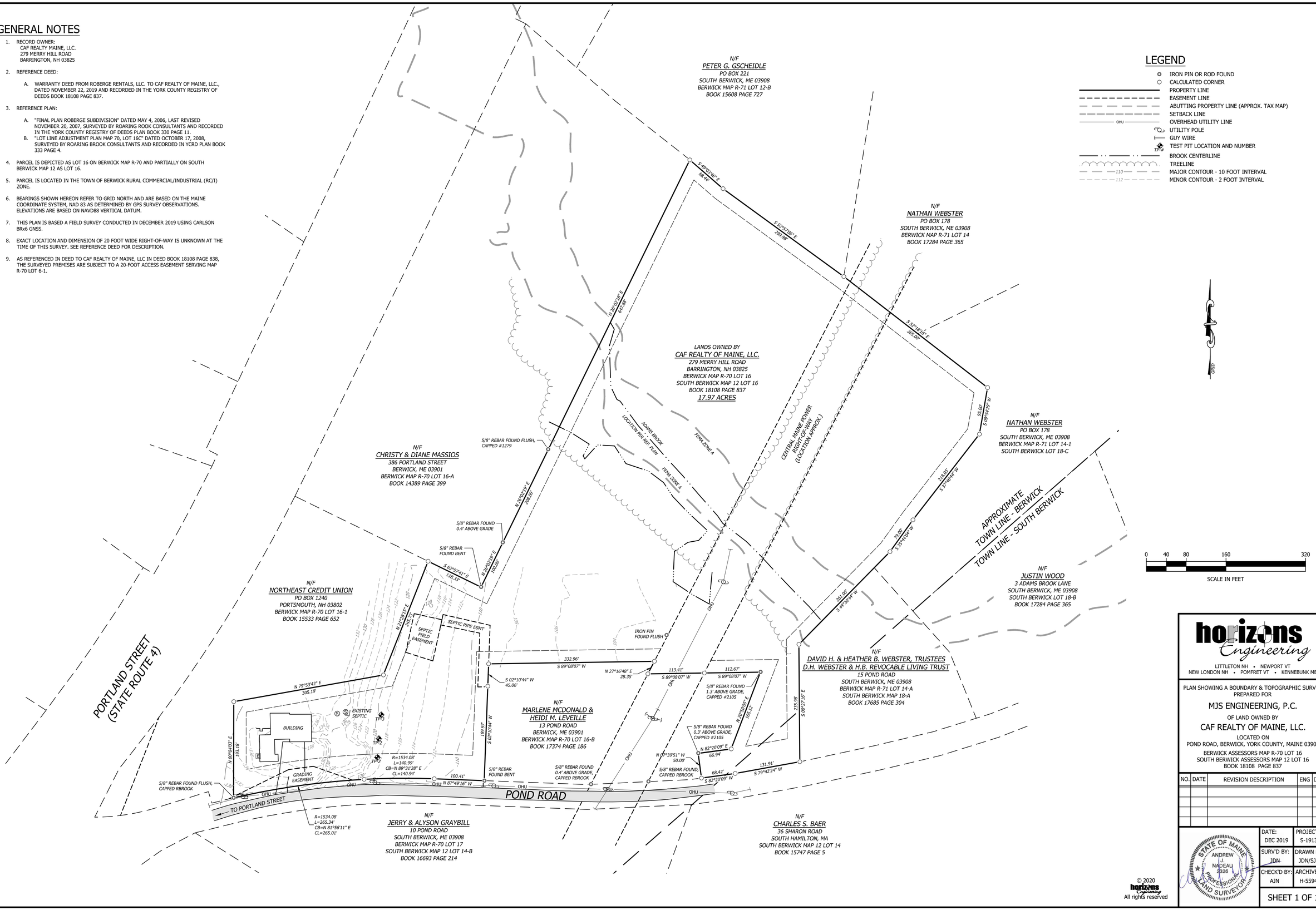
NO.	REVISIONS	DATE	INT.
0.	INITIAL SUMBISSION TO THE BERWICK PLANNING BOARD	2/5/20	MCS

GENERAL NOTES

1. RECORD OWNER:
   CAF REALTY MAINE, LLC.
   279 MERRY HILL ROAD
   BARRINGTON, NH 03825
2. REFERENCE DEED:
   A. WARRANTY DEED FROM ROBERGE RENTALS, LLC. TO CAF REALTY OF MAINE, LLC., DATED NOVEMBER 22, 2019 AND RECORDED IN THE YORK COUNTY REGISTRY OF DEEDS BOOK 18108 PAGE 837.
3. REFERENCE PLAN:
   A. "FINAL PLAN ROBERGE SUBDIVISION" DATED MAY 4, 2006, LAST REVISED NOVEMBER 20, 2007, SURVEYED BY ROARING ROOK CONSULTANTS AND RECORDED IN THE YORK COUNTY REGISTRY OF DEEDS PLAN BOOK 330 PAGE 11.
   B. "LOT LINE ADJUSTMENT PLAN MAP 70, LOT 16C" DATED OCTOBER 17, 2008, SURVEYED BY ROARING BROOK CONSULTANTS AND RECORDED IN YCRD PLAN BOOK 333 PAGE 4.
4. PARCEL IS DEPICTED AS LOT 16 ON BERWICK MAP R-70 AND PARTIALLY ON SOUTH BERWICK MAP 12 AS LOT 16.
5. PARCEL IS LOCATED IN THE TOWN OF BERWICK RURAL COMMERCIAL/INDUSTRIAL (RC/I) ZONE.
6. BEARINGS SHOWN HEREON REFER TO GRID NORTH AND ARE BASED ON THE MAINE COORDINATE SYSTEM, NAD 83 AS DETERMINED BY GPS SURVEY OBSERVATIONS. ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
7. THIS PLAN IS BASED A FIELD SURVEY CONDUCTED IN DECEMBER 2019 USING CARLSON BRx6 GNSS.
8. EXACT LOCATION AND DIMENSION OF 20 FOOT WIDE RIGHT-OF-WAY IS UNKNOWN AT THE TIME OF THIS SURVEY. SEE REFERENCE DEED FOR DESCRIPTION.
9. AS REFERENCED IN DEED TO CAF REALTY OF MAINE, LLC IN DEED BOOK 18108 PAGE 838, THE SURVEYED PREMISES ARE SUBJECT TO A 20-FOOT ACCESS EASEMENT SERVING MAP R-70 LOT 6-1.

LEGEND

- IRON PIN OR ROD FOUND
- CALCULATED CORNER
- PROPERTY LINE
- EASEMENT LINE
- ABUTTING PROPERTY LINE (APPROX. TAX MAP)
- SETBACK LINE
- OHU — OVERHEAD UTILITY LINE
- UTILITY POLE
- GUY WIRE
- TP# — TEST PIT LOCATION AND NUMBER
- BROOK CENTERLINE
- TREELINE
- 110 — MAJOR CONTOUR - 10 FOOT INTERVAL
- 112 — MINOR CONTOUR - 2 FOOT INTERVAL



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LITTLETON NH • NEWPORT VT
NEW LONDON NH • POMFRET VT • KENNEBUNK ME

PLAN SHOWING A BOUNDARY & TOPOGRAPHIC SURVEY
PREPARED FOR
MJS ENGINEERING, P.C.
OF LAND OWNED BY
CAF REALTY OF MAINE, LLC.
LOCATED ON
POND ROAD, BERWICK, YORK COUNTY, MAINE 03901
BERWICK ASSESSORS MAP R-70 LOT 16
SOUTH BERWICK ASSESSORS MAP 12 LOT 16
BOOK 18108 PAGE 837

NO.	DATE	REVISION DESCRIPTION	ENG	DWG

STATE OF MAINE
ANDREW J. NADEAU
2326
PROFESSIONAL LAND SURVEYOR

DATE: DEC 2019	PROJECT #: S-19138
SURV'D BY: JDN	DRAWN BY: JDN/SJB
CHECK'D BY: AJN	ARCHIVE #: H-5594

SHEET 1 OF 1

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GENERAL NOTES:

1. OWNER OF RECORD:
   CAF REALTY OF MAINE, LLC
   279 MERRY HILL ROAD
   BARRINGTON, NH 03825
   Y.C.R.D. BK 18108, PG 837
2. LOT AREA: 17.9 ACRES
3. REFERENCE PLANS:
   A. "FINAL PLAN ROBERGE SUBDIVISION" DATED MAY 4, 2006, LAST REVISED NOVEMBER 20, 2007, SURVEYED BY ROARING ROOK CONSULTANTS AND RECORDED IN THE YORK COUNTY REGISTRY OF DEEDS PLAN BOOK 330 PAGE 11.
   B. "LOT LINE ADJUSTMENT PLAN MAP 70, LOT 16C" DATED OCTOBER 17, 2008, SURVEYED BY ROARING BROOK CONSULTANTS AND RECORDED IN YCRD PLAN BOOK 333 PAGE 4.
5. IMPERVIOUS SURFACE RATIO FOR SUBJECT LOT:
   EXISTING = 2.9% (22,501 S.F.)
   PROPOSED = 5.0% (39,033 S.F.)
6. ALL OUTSIDE CONSTRUCTION RELATED ACTIVITY FOR THE DEVELOPMENT OF THIS SITE IS RESTRICTED TO THE HOURS OF 7:00 A.M. TO 5:00 P.M. MONDAY THROUGH FRIDAY AND 8:00 A.M. TO 3:00 P.M. SATURDAY.
7. ALL EXTERIOR LIGHTING MUST BE FULLY SHIELDED AND NOT PROJECT GLARE TOWARD ANY ABUTTING PROPERTIES.
8. ACCESS INTO THE SITE FOR FIRE APPARATUS SHALL BE MAINTAINED AT ALL TIMES DURING THE CONSTRUCTION PROCESS.
9. BEARINGS SHOWN HEREON REFER TO GRID NORTH AND ARE BASED ON THE MAINE COORDINATESYSTEM, NAD 83 AS DETERMINED BY GPS SURVEY OBSERVATIONS. ELEVATIONS ARE BASED ON NAVD88 VERTICAL DATUM.
10. SNOW SHALL BE CLEARED FROM ALL ACCESS AND PARKING AREAS TO MAINTAIN SAFE ACCESS..
11. THE GENERAL CONTRACTOR IS RESPONSIBLE TO VERIFY ALL DIMENSIONS, ELEVATIONS AND CONDITIONS AT THE SITE. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER OF RECORD BEFORE PROCEEDING WITH THE AFFECTED PART OF THE WORK. THIS INCLUDES DISCREPANCIES BETWEEN THESE PLANS AND ANY OTHER PLANS OR CONTRACT DOCUMENTS.

SITE DATA BLOCK

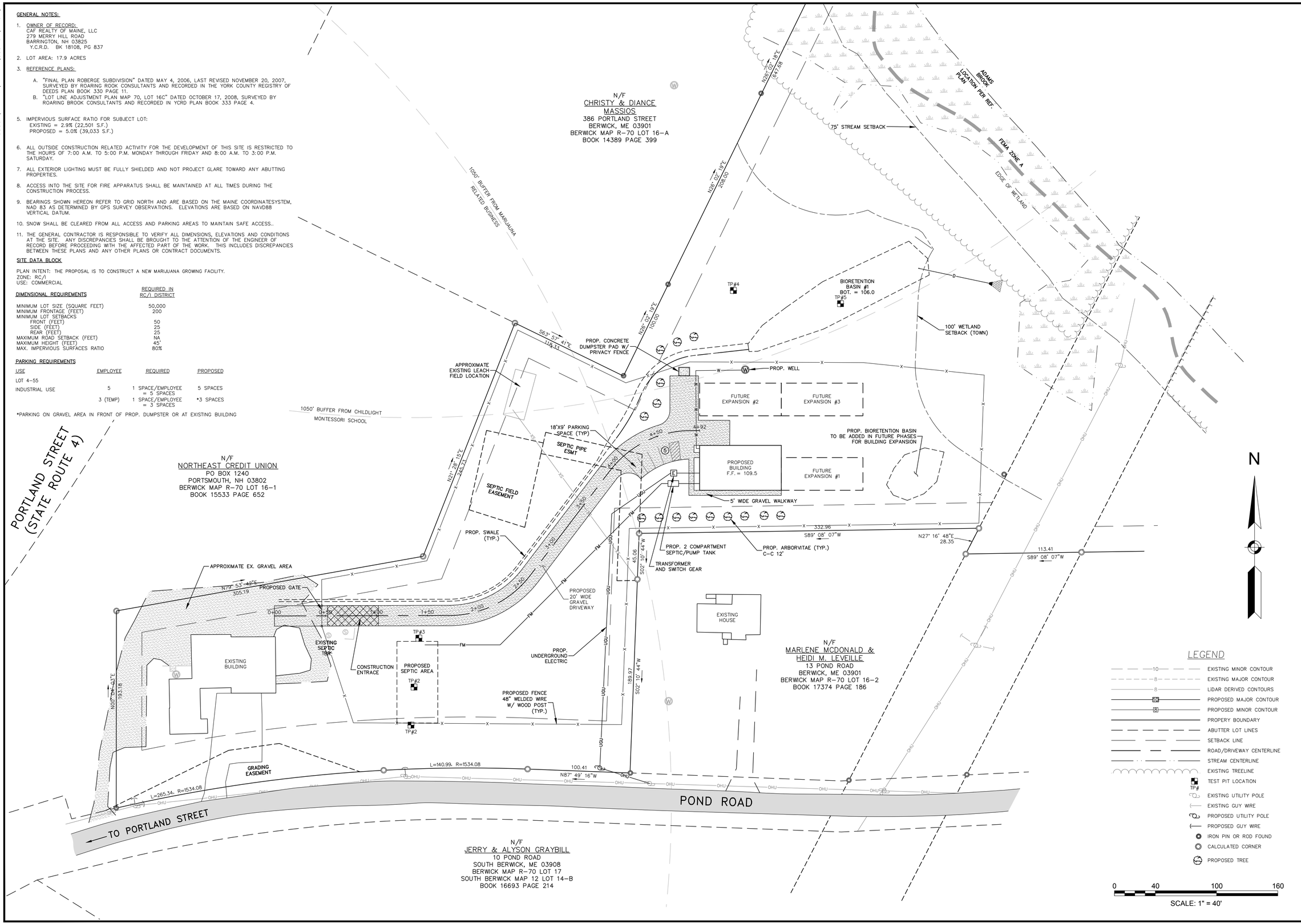
PLAN INTENT: THE PROPOSAL IS TO CONSTRUCT A NEW MARIJUANA GROWING FACILITY.
ZONE: RC/I
USE: COMMERCIAL

DIMENSIONAL REQUIREMENTS	REQUIRED IN RC/I DISTRICT
MINIMUM LOT SIZE (SQUARE FEET)	50,000
MINIMUM FRONTAGE (FEET)	200
MINIMUM LOT SETBACKS	
FRONT (FEET)	50
SIDE (FEET)	25
REAR (FEET)	25
MAXIMUM ROAD SETBACK (FEET)	NA
MAXIMUM HEIGHT (FEET)	45'
MAX. IMPERVIOUS SURFACES RATIO	80%

PARKING REQUIREMENTS

USE	EMPLOYEE	REQUIRED	PROPOSED
LOT 4-55			
INDUSTRIAL USE	5	1 SPACE/EMPLOYEE = 5 SPACES	5 SPACES
	3 (TEMP)	1 SPACE/EMPLOYEE = 3 SPACES	*3 SPACES

*PARKING ON GRAVEL AREA IN FRONT OF PROP. DUMPSTER OR AT EXISTING BUILDING



C	INITIAL SUBMISSION TO THE TOWN OF BERWICK	2/5/20 MCS

REVISIONS

DATE | INT.

STATE OF MAINE * MICHAEL J. SIEGERT 6191 * PROFESSIONAL ENGINEER

DATE: 1/16/20
SCALE: 1" = 40'
DESIGNED BY: MCS
DRAWN BY: MCS
APPROVED BY: MJS
FILE: 19066 civild.dwg

SITE PLAN
prepared for
CAF REALTY MAINE
TAX MAP R-70, LOT 16
11 POND ROAD BERWICK, ME

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL
5 RAILROAD ST., P.O. BOX 359
NEWMARKET, NH 03857
PHONE: (603) 659-4027 FAX: (603) 659-4027
E-MAIL: MCS@MJS-ENGINEERING.COM

JOB: 19-066

C1

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GRADING, DRAINAGE, UTILITY & EROSION CONTROL NOTES

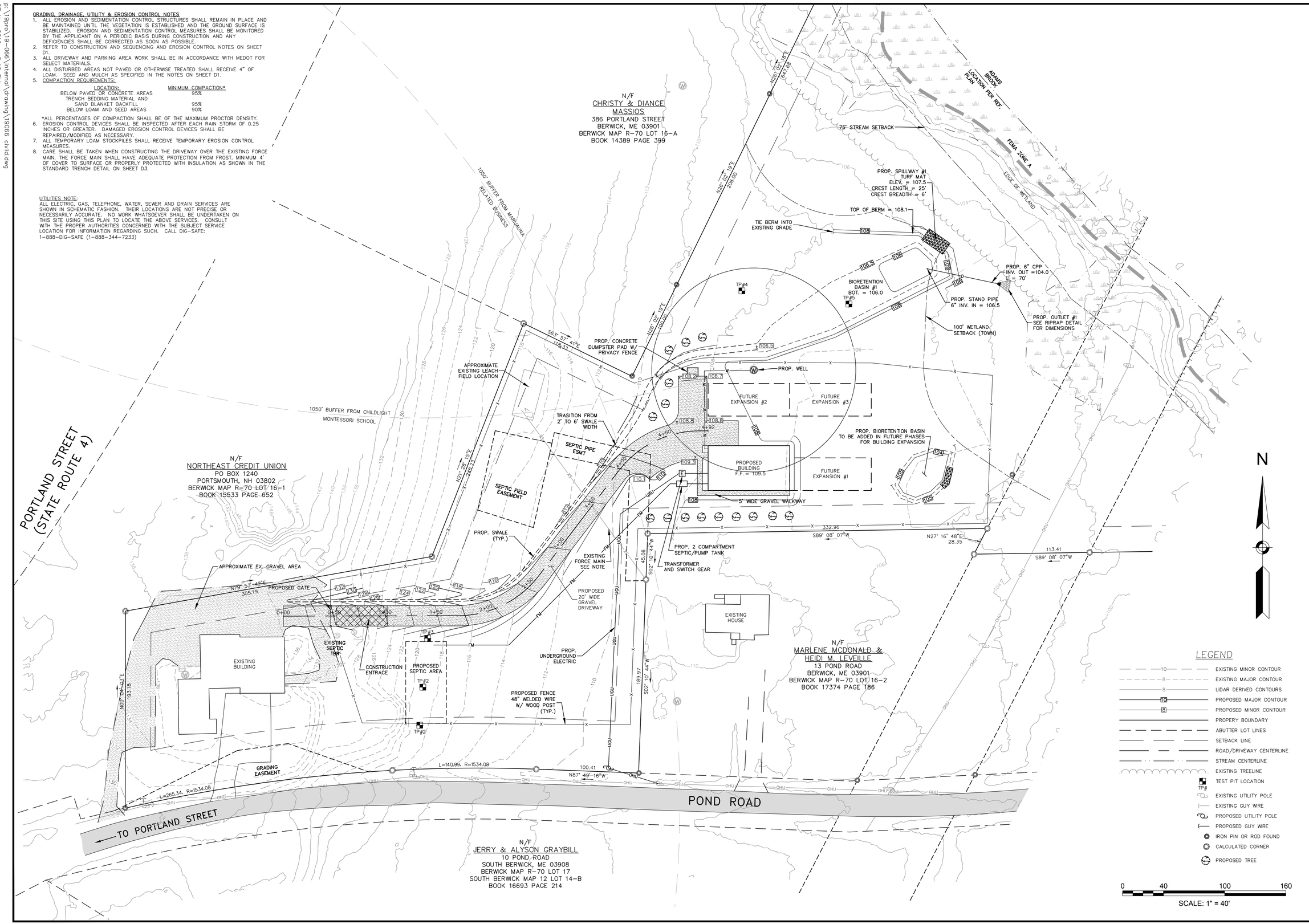
1. ALL EROSION AND SEDIMENTATION CONTROL STRUCTURES SHALL REMAIN IN PLACE AND BE MAINTAINED UNTIL THE VEGETATION IS ESTABLISHED AND THE GROUND SURFACE IS STABILIZED. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE MONITORED BY THE APPLICANT ON A PERIODIC BASIS DURING CONSTRUCTION AND ANY DEFICIENCIES SHALL BE CORRECTED AS SOON AS POSSIBLE.
2. REFER TO CONSTRUCTION AND SEQUENCING AND EROSION CONTROL NOTES ON SHEET D1.
3. ALL DRIVEWAY AND PARKING AREA WORK SHALL BE IN ACCORDANCE WITH MEDOT FOR SELECT MATERIALS.
4. ALL DISTURBED AREAS NOT PAVED OR OTHERWISE TREATED SHALL RECEIVE 4" OF LOAM. SEED AND MULCH AS SPECIFIED IN THE NOTES ON SHEET D1.
5. COMPACTION REQUIREMENTS:

LOCATION:	MINIMUM COMPACTION*
BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL	95%
BELOW LOAM AND SEED AREAS	90%

*ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM PROCTOR DENSITY.

6. EROSION CONTROL DEVICES SHALL BE INSPECTED AFTER EACH RAIN STORM OF 0.25 INCHES OR GREATER. DAMAGED EROSION CONTROL DEVICES SHALL BE REPAIRED/MODIFIED AS NECESSARY.
7. ALL TEMPORARY LOAM STOCKPILES SHALL RECEIVE TEMPORARY EROSION CONTROL MEASURES.
8. CARE SHALL BE TAKEN WHEN CONSTRUCTING THE DRIVEWAY OVER THE EXISTING FORCE MAIN. THE FORCE MAIN SHALL HAVE ADEQUATE PROTECTION FROM FROST. MINIMUM 4' OF COVER TO SURFACE OR PROPERLY PROTECTED WITH INSULATION AS SHOWN IN THE STANDARD TRENCH DETAIL ON SHEET D3.

UTILITIES NOTE:
ALL ELECTRIC, GAS, TELEPHONE, WATER, SEWER AND DRAIN SERVICES ARE SHOWN IN SCHEMATIC FASHION. THEIR LOCATIONS ARE NOT PRECISE OR NECESSARILY ACCURATE. NO WORK WHATSOEVER SHALL BE UNDERTAKEN ON THIS SITE USING THIS PLAN TO LOCATE THE ABOVE SERVICES. CONSULT WITH THE PROPER AUTHORITIES CONCERNED WITH THE SUBJECT SERVICE LOCATION FOR INFORMATION REGARDING SUCH. CALL DIG-SAFE: 1-888-DIG-SAFE (1-888-344-7233)



REVISIONS		
0	INITIAL SUBMISSION TO THE TOWN OF BERWICK	2/5/20 MCS
		DATE INT.

STATE OF MAINE * MICHAEL J. SIEGLERT 8191 * PROFESSIONAL ENGINEER

DATE: 1/16/20
SCALE: 1" = 40'
DESIGNED BY: MCS
DRAWN BY: MCS
APPROVED BY: MJS
FILE: 19066 civil.dwg

GRADING, DRAINAGE, AND UTILITIES PLAN

prepared for
CAF REALTY MAINE
TAX MAP R-70, LOT 16
11 POND ROAD BERWICK, ME

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL
5 RAILROAD ST., P.O. BOX 359
NORTH BERWICK, ME 03906
PHONE: (603) 749-9671 FAX: (603) 659-4627
E-MAIL: MCS@MJS-ENGINEERING.COM

JOB: 19-066

C2

CONSTRUCTION SEQUENCING AND EROSION CONTROL NOTES:

AREA OF DISTURBANCE/STABILIZATION

A. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL THE AREA OF UNSTABILIZED SOIL EXCEED 5 ACRES AT ANY ONE TIME BEFORE THE AREA IS STABILIZED.
B. AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
   1. IN AREAS TO BE PAVED, BASE COURSE GRAVELS MEETING THE GRADATION REQUIREMENTS OF NHDOT STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, 2006, ITEM NO. 304.1 OR 304.2 HAVE BEEN INSTALLED;
   2. IN AREAS NOT TO BE PAVED
      2.A. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
      2.B. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED;
      2.C. EROSION CONTROL BLANKETS HAVE BEEN INSTALLED IN ACCORDANCE WITH ENV-WQ 1506.03.
C. DISTURBED AREAS SHALL BE TEMPORARILY STABILIZED WITHIN 45 DAYS AND PERMANENTLY STABILIZED NO LATER THAN 3 DAYS AFTER FINAL GRADING.

EROSION CONTROL PRACTICES:

A. INSTALLATION:
   1. INSTALL ALL EROSION CONTROLS AS SHOWN ON THE GRADING PLAN, TYPICAL DETAILS, AND IN CONFORMANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES ON THIS PAGE. MANUFACTURER'S SPECIFICATIONS SHALL BE FOLLOWED.
B. INSPECTION:
   1. INSPECT ALL EROSION CONTROLS WEEKLY AND AFTER EVERY RAIN EVENT OF 0.5 INCHES OR GREATER UNLESS OTHERWISE NOTED.
   2. TEMPORARY STABILIZATION PRACTICES SHALL BE INSPECTED ONCE PER WEEK DURING CONSTRUCTION UNTIL EXPOSED SURFACES ARE STABILIZED.
   3. ANY SIGNS OF RILL OR GULLY EROSION SHALL BE IMMEDIATELY REPAIRED.
C. MAINTENANCE:
   1. MAINTAIN EROSION CONTROLS PER THE TYPICAL DETAILS AND IN CONFORMANCE WITH THE EROSION AND SEDIMENT CONTROL NOTES ON THIS PAGE.
D. REMOVAL
   1. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED ONCE 85% VEGETATIVE COVER HAS BEEN ESTABLISHED.
   2. AFTER REMOVAL, ALL DISTURBED AREAS SHALL BE REGRADED, FERTILIZED, AND RESEEDED. MONITOR TO ENSURE VEGETATIVE GROWTH IS ESTABLISHED AND REPAIR AS NEEDED UNTIL MINIMUM OF 85% VEGETATIVE COVER IS ESTABLISHED.

COLD WEATHER SITE STABILIZATION

A. TO ADEQUATELY PROTECT WATER QUALITY DURING COLD WEATHER AND DURING SPRING RUNOFF, THE ADDITIONAL STABILIZATION TECHNIQUES SPECIFIED IN THIS SECTION SHALL BE EMPLOYED DURING THE PERIOD FROM OCTOBER 15 THROUGH MAY 1.
B. SUBJECT TO (C), BELOW, THE AREA OF EXPOSED, UNSTABILIZED SOIL SHALL BE:
   1. LIMITED TO ONE ACRE; AND
   2. PROTECTED AGAINST EROSION BY THE METHODS DESCRIBED IN THIS SECTION PRIOR TO ANY THAW OR SPRING MELT EVENT.
C. THE ALLOWABLE AREA OF EXPOSED SOIL MAY BE INCREASED IF A WINTER CONSTRUCTION PLAN IS DEVELOPED BY A QUALIFIED ENGINEER OR A CPESC SPECIALIST AND SUBMITTED TO THE DEPARTMENT FOR APPROVAL AS A REQUEST TO WAIVE THE ONE-ACRE LIMIT.
D. SUBJECT TO (F) AND (G), BELOW, ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF LESS THAN 15% THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR THAT ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH 3 TO 4 TONS OF HAY OR STRAW MULCH PER ACRE SECURED WITH ANCHORED NETTING OR TACKIFIER OR WITH AT LEAST 2 INCHES OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV-WQ 1506.05(B).
E. SUBJECT TO (F) AND (G), BELOW, ALL PROPOSED VEGETATED AREAS HAVING A SLOPE OF 15% OR GREATER THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR THAT ARE DISTURBED AFTER OCTOBER 15, SHALL BE SEEDED AND COVERED WITH A PROPERLY INSTALLED AND ANCHORED EROSION CONTROL BLANKET OR WITH AT LEAST 4 INCHES OF EROSION CONTROL MIX MEETING THE CRITERIA OF ENV-WQ 1506.05(B).
F. ANCHORED HAY MULCH OR EROSION CONTROL MIX THAT MEETS THE CRITERIA OF ENV-WQ 1506.05(B) SHALL NOT BE INSTALLED OVER SNOW GREATER THAN ONE INCH IN DEPTH.
G. EROSION CONTROL BLANKETS SHALL NOT BE INSTALLED OVER SNOW GREATER THAN ONE INCH IN DEPTH OR ON FROZEN GROUND.
H. ALL PROPOSED STABILIZATION IN ACCORDANCE WITH (D) OR (E), ABOVE, SHALL BE COMPLETED WITHIN A DAY OF ESTABLISHING THE GRADE THAT IS FINAL OR THAT OTHERWISE WILL EXIST FOR MORE THAN 5 DAYS.
I. ALL DITCHES OR SWALES THAT DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15, OR THAT ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS, AS DETERMINED BY THE OWNER'S ENGINEERING CONSULTANT.
J. AFTER OCTOBER 15, INCOMPLETE ROAD OR PARKING AREAS WHERE ACTIVE CONSTRUCTION OF THE ROAD OR PARKING AREA HAS STOPPED FOR THE WINTER SEASON SHALL BE PROTECTED WITH A MINIMUM 3-INCH LAYER OF BASE COURSE GRAVELS MEETING THE GRADATION REQUIREMENTS OF NHDOT STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION, 2016, TABLE 304-1, ITEM NO. 304.1, 304.2, OR 304.3, AVAILABLE AS NOTED IN APPENDIX B.

TEMPORARY VEGETATION

A. SITE PREPARATION
   1. INSTALL EROSION AND SEDIMENT CONTROL MEASURES AS SPECIFIED ABOVE.
   2. ENSURE RUNOFF IS DIVERTED FROM SEEDED AREA.
   3. ON SLOPES OF 4:1 OR STEEPER, CREATE HORIZONTAL GROOVES PERPENDICULAR TO THE DIRECTION OF THE SLOPE TO CATCH SEED AND REDUCE RUNOFF.
B. SEED BED PREPARATION
   1. REMOVE STONES AND TRASH FROM AREA TO BE SEEDED.
   2. COMPACTED SOIL SHALL BE LOOSENED TO A DEPTH OF 2 INCHES BEFORE APPLYING FERTILIZER, LIME, AND SEED.
   3. APPLY FERTILIZER AT A RATE OF 600 LBS PER ACRE OF 10-10-10. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF 3 TONS PER ACRE.
C. SEEDING
   1. SEED PER THE FOLLOWING RECOMMENDATIONS

SEASON	APPLICATION DATE	MIXTURE TYPE	QUANTITY (lb./Ac.)
EARLY SPRING	NO LATER THAN 5/15	OATS	80
LATE SPRING/ FALL	4/1 TO 6/1 & 8/15 TO 9/15	PERENNIAL RYE	30
EARLY SPRING/ FALL	4/1 TO 5/15 & 8/15 TO 9/15	ANNUAL RYE	40
FALL	8/15 TO 9/15	WINTER RYE	112

   2. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER). NORMAL SEEDING DEPTH IS FROM ¼ TO ½ INCH. HYDROSEEDING THAT INCLUDES MULCH MAY BE LEFT ON SOIL SURFACE. SEEDING RATES MUST BE INCREASED 10% WHEN HYDROSEEDING.
   3. TEMPORARY SEEDING SHALL OCCUR PRIOR TO SEPTEMBER 15TH IN THE YEAR IN WHICH THE AREA BEING SEEDED WAS DISTURBED.
   4. AREAS SEEDED BETWEEN MAY 15TH AND AUGUST 15TH SHALL BE COVERED WITH HAY OR STRAW MULCH MEETING THE FOLLOWING CRITERIA:
      4.A. HAY AND STRAW MULCHES SHALL BE ANCHORED WITH MULCH NETTING OR TACKIFIER SO THAT THEY ARE NOT BLOWN AWAY BY WIND OR WASHED AWAY BY FLOWING WATER;
      4.B. MULCH MATERIALS SHALL BE SELECTED BASED UPON SOILS, SLOPE, FLOW CONDITIONS, AND TIME OF YEAR;
      4.C. HAY OR STRAW MULCH SHALL BE APPLIED AT A RATE OF 1.5 TO 2 TONS PER ACRE, EQUIVALENT TO 70 TO 90 POUNDS PER 1,000 SQUARE FEET;
   5. IF VEGETATED GROWTH COVERING AT LEAST 85% OF THE DISTURBED AREA IS NOT ACHIEVED PRIOR TO OCTOBER 15TH, ONE OR MORE ADDITIONAL EROSION CONTROL METHODS SHALL BE IMPLEMENTED.
D. MAINTENANCE
   1. TEMPORARY SEEDING SHOULD BE INSPECTED WEEKLY AND AFTER ANY RAINFALL EXCEEDING ½ INCH IN 24 HOURS ON ACTIVE CONSTRUCTION SITES. TEMPORARY SEEDING SHOULD ALSO BE INSPECTED JUST PRIOR TO SEPTEMBER 15, TO ASCERTAIN WHETHER ADDITIONAL SEEDING IS REQUIRED TO PROVIDE STABILIZATION OVER THE WINTER PERIOD.
   2. BASED ON INSPECTION, AREAS SHOULD BE RESEEDED TO ACHIEVE FULL STABILIZATION OF EXPOSED SOILS. IF IT IS TOO LATE IN THE PLANTING SEASON TO APPLY ADDITIONAL SEED, THEN OTHER TEMPORARY STABILIZATION MEASURES SHOULD BE IMPLEMENTED.
   3. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION.
   4. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHOULD BE MADE AND AREAS SHOULD BE RESEEDED, WITH OTHER TEMPORARY MEASURES (E.G., MULCH) USED TO PROVIDE EROSION PROTECTION DURING THE PERIOD OF VEGETATION ESTABLISHMENT.

PERMANENT VEGETATION

A. SITE PREPARATION
   1. REFER TO SITE PREPARATION FOR TEMPORARY SEEDING.
B. SEED BED PREPARATION
   1. REFER TO SEED BED PREPARATION FOR TEMPORARY SEEDING IN CONJUNCTION WITH THESE NOTES.
   2. WORK LIME AND FERTILIZER INTO THE SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH A DISC, SPRING TOOTH HARROW OR OTHER SUITABLE EQUIPMENT. THE FINAL HARROWING OPERATION SHOULD BE ON THE GENERAL CONTOUR. CONTINUE TILLAGE UNTIL A REASONABLY UNIFORM, FINE SEEDBED IS PREPARED. ALL BUT CLAY OR SILTY SOILS AND COARSE SANDS SHOULD BE ROLLED TO FIRM THE SEEDBED WHEREVER FEASIBLE.
   3. REMOVE FROM THE SURFACE ALL STONES 2 INCHES OR LARGER IN ANY DIMENSION. REMOVE ALL OTHER DEBRIS, SUCH AS WIRE, CABLE, TREE ROOTS, CONCRETE, CLODS, LUMPS, TRASH OR OTHER UNSUITABLE MATERIAL.
   4. INSPECT SEEDBED JUST BEFORE SEEDING. IF TRAFFIC HAS LEFT THE SOIL COMPACTED; THE AREA MUST BE TILLED AND FIRMED AS ABOVE.
   5. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF 2 INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED.
   6. APPLY FERTILIZER AT A RATE OF 600 LBS PER ACRE OF 10-10-10. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF 3 TONS PER ACRE.
C. SEEDING
   1. UNLESS OTHERWISE NOTED, GRASS SEED MIXTURE 'C' SHALL BE APPLIED AT THE SPECIFIED RATE AS NOTED IN THE 'SEED MIXTURES FOR PERMANENT VEGETATION' TABLE.
   2. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER). NORMAL SEEDING DEPTH IS FROM ¼ TO ½ INCH. HYDROSEEDING THAT INCLUDES MULCH MAY BE LEFT ON SOIL SURFACE. SEEDING OPERATIONS SHOULD BE ON THE CONTOUR.
   3. WHERE FEASIBLE, EXCEPT WHERE EITHER A CULTIPACKER TYPE SEEDER OR HYDROSEEDER IS USED, THE SEEDBED SHOULD BE FIRMED FOLLOWING SEEDING OPERATIONS WITH A ROLLER, OR LIGHT DRAG.
   4. WHEN HYDROSEEDING (HYDRAULIC APPLICATION), PREPARE THE SEEDBED AS SPECIFIED ABOVE OR BY HAND RAKING TO LOOSEN AND SMOOTH THE SOIL AND TO REMOVE SURFACE STONES LARGER THAN 2 INCHES IN DIAMETER.
   5. SLOPES MUST BE NO STEEPER THAN 2 TO 1.
   6. LIME AND FERTILIZER MAY BE APPLIED SIMULTANEOUSLY WITH THE SEED. THE USE OF FIBER MULCH ON CRITICAL AREAS IS NOT RECOMMENDED (UNLESS IT IS USED TO HOLD STRAW OR HAY). BETTER PROTECTION IS GAINED BY USING STRAW MULCH AND HOLDING IT WITH ADHESIVE MATERIALS OR 500 POUNDS PER ACRE OF WOOD FIBER MULCH.
   7. SEEDING RATES MUST BE INCREASED 10% WHEN HYDROSEEDING.
   8. TEMPORARY SEEDING SHALL OCCUR PRIOR TO SEPTEMBER 15TH IN THE YEAR IN WHICH THE AREA BEING SEEDED WAS DISTURBED.
   9. AREAS SEEDED BETWEEN MAY 15TH AND AUGUST 15TH SHALL BE COVERED WITH HAY OR STRAW MULCH MEETING THE FOLLOWING CRITERIA:
      9.A. HAY AND STRAW MULCHES SHALL BE ANCHORED WITH MULCH NETTING OR TACKIFIER SO THAT THEY ARE NOT BLOWN AWAY BY WIND OR WASHED AWAY BY FLOWING WATER;
      9.A. MULCH MATERIALS SHALL BE SELECTED BASED UPON SOILS, SLOPE, FLOW CONDITIONS, AND TIME OF YEAR;
      9.B. HAY OR STRAW MULCH SHALL BE APPLIED AT A RATE OF 1.5 TO 2 TONS PER ACRE, EQUIVALENT TO 70 TO 90 POUNDS PER 1,000 SQUARE FEET;
   10. IF VEGETATED GROWTH COVERING AT LEAST 85% OF THE DISTURBED AREA IS NOT ACHIEVED PRIOR TO OCTOBER 15TH, ONE OR MORE ADDITIONAL EROSION CONTROL METHODS SHALL BE IMPLEMENTED.
D. MAINTENANCE
   1. PERMANENTLY SEEDED AREAS SHOULD BE INSPECTED MONTHLY.
   2. MOW SEEDED AREAS AS NECESSARY.
   3. BASED ON INSPECTION, AREAS SHOULD BE REPAIRED AND/OR RESEEDED TO ENSURE 85% OF THE SOIL SURFACE IS COVERED BY VEGETATION.

MULCHING & EROSION CONTROL MATTING

A. GENERAL
   1. APPLY PRIOR TO A STORM EVENT. CLOSELY MONITOR THE WEATHER TO HAVE ADEQUATE WARNING OF SIGNIFICANT STORMS.
   2. MULCHING WITHIN A SPECIFIED TIME PERIOD FROM ORIGINAL SOIL EXPOSURE
      2.A. WITHIN 100 FEET OF WETLANDS THE TIME PERIOD SHOULD BE NO GREATER THAN 7 DAYS.
      2.B. IN OTHER AREAS IT SHALL BE NO GREATER THAN 14 DAYS.
   3. MULCH MATERIALS SHALL BE SELECTED BASED UPON SOILS, FLOW CONDITIONS, AND TIME OF YEAR.
B. TEMPORARY MULCHING
   1. HAY OR STRAW MULCHES
      1.A. ORGANIC MULCHES INCLUDING HAY AND STRAW SHALL BE AIR-DRIED, FREE OF UNDESIRABLE SEEDS AND COARSE MATERIALS.
      1.B. APPLICATION RATE SHALL BE 2 BALES/1,000 SF (70-90 POUNDS) OR 1.5-2.0 TONS/ACRE TO COVER 75-90% OF THE GROUND.
      1.C. ANCHORING SHALL BE ONE OF THE FOLLOWING
         1.C.1. NETTING SHALL BE JUTE, WOOD FIBER, OR BIODEGRADABLE PLASTIC NETTING INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
         1.C.2. TACKIFIER: APPLY POLYMER OR ORGANIC TACKIFIER TO ANCHOR HAY OR STRAW MULCH. APPLY PER MANUFACTURER'S SPECIFICATIONS. TYPICAL APPLICATION RATES ARE 40-60 LBS/ACRE FOR POLYMER MATERIAL AND 80-120 LBS/ACRE FOR ORGANIC LIQUID.
      1.D. WINTER APPLICATION: APPLY TO A DEPTH OF 4 INCHES OR DOUBLE THE ABOVE LISTED APPLICATION RATE. NOTE THAT IF SEEDING IS NECESSARY, MULCH WILL NEED TO BE REMOVED AND THE AREA SEEDED AND MULCHED IN THE SPRING.
      1.E. MAINTENANCE
         1.E.1. INSPECT PERIODICALLY AND AFTER RAIN STORMS FOR RILLS OR DISPLACEMENT OF MULCH. REPAIR AS NECESSARY. CONTINUE INSPECTIONS UNTIL 85% VEGETATIVE COVER IS ESTABLISHED.
   2. EROSION CONTROL BLANKET OR MATTING
      2.A. REFER TO PLANS FOR TYPICAL EROSION CONTROL MATTING DETAIL. INSTALL PER MANUFACTURERS SPECIFICATIONS.
      2.B. APPLICATION AND TIMING
         2.B.1. DURING THE GROWING SEASON (APRIL 15 - SEPTEMBER 15) USE ON THE BASE OF GRASSED WATERWAYS, STEEP SLOPES (15% OR GREATER), ANY DISTURBED SOIL WITHIN 100 FEET OF LAKES, STREAMS, AND WETLANDS.
         2.B.2. DURING THE LATE FALL AND WINTER (SEPTEMBER 15 - APRIL 15) IN ADDITION TO THOSE LISTED ABOVE USE ON SIDE SLOPES OF GRASSED WATERWAYS AND MODERATE SLOPES (GREATER THAN 8%).
   3. MAINTENANCE
      3.A. INSPECT PERIODICALLY AND BEFORE AND AFTER STORM EVENTS TO ENSURE CONTACT WITH THE SOIL UNTIL 85% VEGETATIVE COVER IS ESTABLISHED. REPAIR AND RESTAPLE AS NECESSARY.
C. PERMANENT MULCHING
   1. WOOD CHIPS OR GROUND BARK
      1.A. APPLY TO A THICKNESS OF 2 TO 6 INCHES. APPLICATION RATES ARE 10-20 TONS/ACRE OR 460-920 POUNDS/1,000 SF.
      1.B. MAINTENANCE: INSPECT ANNUALLY AND AFTER RAIN EVENTS OF 2.5 INCHES OR MORE IN A 24 HOUR PERIOD. REPAIR/REPLACE AS NECESSARY.
   2. EROSION CONTROL MIX
      2.A. SHALL BE PLACED AT A THICKNESS OF 2 INCHES OR MORE FOR MULCHING.
      2.B. COMPOSITION OF THE MIX SHALL BE AS FOLLOWS:
         2.B.1. ORGANIC MATTER CONTENT SHALL BE BETWEEN 25-65% DRY WEIGHT BASIS.
         2.B.2. PARTICLE SIZE BY WEIGHT SHOULD BE 100% PASSING THE 3" SCREEN, 90-100% PASSING THE 1" SCREEN, 70-100% PASSING THE 0.75 INCH SCREEN, AND 30-75% PASSING THE 0.25 INCH SCREEN.
         2.B.3. THE ORGANIC PORTION SHALL BE ELONGATED AND FIBROUS SUCH AS FROM SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR EQUIVALENT MANUFACTURED PRODUCTS. IT SHALL NOT CONTAIN WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS, OR REPROCESSED WOOD PRODUCTS.
         2.B.4. THE MIX SHALL NOT CONTAIN SILTS, CLAYS, OR FINE SANDS.
         2.B.5. SOLUBLE SALTS CONTENT SHALL BE < 4.0MMHOS/CM AND A pH OF 5.0-8.0,
      2.C. PLACEMENT OF BERM
         2.C.1. PLACE BERM ALONG A LEVEL CONTOUR. BERM MUST BE A MINIMUM OF 12" HIGH ON THE UPHILL SIDE AND 2 FEET WIDE. UPSLOPE AREA MUST HAVE A SLOPE OF LESS THAN 5%.
      2.D. MAINTENANCE: INSPECT PERIODICALLY AND AUGMENT AS NEEDED TO MAINTAIN INITIAL THICKNESS. REPLACE IF NO LONGER FUNCTIONING AS INTENDED.

SOIL STOCKPILES

A. GENERAL
1. STOCKPILES MUST BE LOCATED 50 FEET FROM DITCHES AND CULVERT INLETS.
B. PROTECTION OF STOCKPILES
1. PROTECT SOIL AND AGGREGATE STOCKPILES WITH TEMPORARY PERIMETER SEDIMENT BARRIER SUCH AS SILT FENCE OR SILT SOCK.
2. COVER ACTIVE STOCKPILES WITH ANCHORED PROTECTIVE COVERING PRIOR TO EXPECTED STORM EVENTS.
3. INACTIVE STOCKPILES SHALL BE COVERED WITH ANCHORED TARPS OR TEMPORARILY SEEDED AND MULCHED PER THE TEMPORARY VEGETATION AND MULCHING NOTES ON THIS PAGE.
4. STOCKPILES THAT ARE A SOURCE OF DUST SHALL BE COVERED.

DUST CONTROL

A. DUST SHALL BE CONTROLLED ON SITE DURING CONSTRUCTION BY IMPLEMENTING THE FOLLOWING DUST CONTROL MEASURES
1. MULCHING AND VEGETATIVE COVER TO REDUCE DUST.
2. MECHANICAL SWEEPERS AND FINE WATER SPRAYS.
3. COVER SURFACES WITH CRUSHED STONE OR COARSE GRAVEL.

SEED MIXTURE SELECTION BASED ON SOIL TYPE

		SOIL DRAINAGE		
USE	SEEDING MIXTURE	DROUGHTY	WELL DRAINED	MODERATELY WELL DRAINED
STEEP CUTS AND FILLS, BORROW AND DISPOSAL AREAS	A B C D	FAIR POOR POOR FAIR	GOOD GOOD GOOD EXCELLENT	GOOD FAIR EXCELLENT EXCELLENT
WATERWAYS, EMERGENCY SPILLWAYS, AND OTHER CHANNELS WITH FLOWING WATER.	A C	GOOD GOOD	GOOD EXCELLENT	GOOD EXCELLENT
LIGHTLY USED PARKING LOTS, ODD AREAS, UNUSED LANDS, AND LOW INTENSITY USE RECREATION SITES.	A B C	GOOD GOOD GOOD	GOOD GOOD EXCELLENT	GOOD FAIR EXCELLENT
PLAY AREAS AND ATHLETIC FIELDS. (TOPSOIL IS ESSENTIAL FOR GOOD TURF.)	E F	FAIR FAIR	EXCELLENT EXCELLENT	EXCELLENT EXCELLENT
NOTE: POORLY DRAINED SOILS ARE NOT DESIRABLE FOR USE AS PLAYING AREAS AND ATHLETIC FIELDS.				

SEED MIXTURES FOR PERMANENT VEGETATION

MIXTURE	SPECIES	POUNDS PER ACRE	POUNDS PER 1,000 SF
A	TALL FESCUE CREEPING RED FESCUE REDTOP *TOTAL*	20 20 2 *42*	0.45 0.45 0.05 *0.95*
B	TALL FESCUE CREEPING RED FESCUE CROWN VETCH OR FLATPEA *TOTAL*	15 10 15 - 30 *40 OR 55*	0.35 0.25 0.35 - 0.75 *0.95 OR 1.35*
C	TALL FESCUE CREEPING RED FESCUE BIRDSFOOT TREFOIL *TOTAL*	20 20 8 *48*	0.45 0.45 0.20 *1.10*
D	TALL FESCUE FLATPEA *TOTAL*	20 30 *50*	0.45 0.75 *1.20*
E	CREPPING RED FESCUE KENTUCKY BLUEGRASS *TOTAL*	50 50 *100*	1.15 1.15 *2.30*
F	TALL FESCUE	*150*	*3.60*

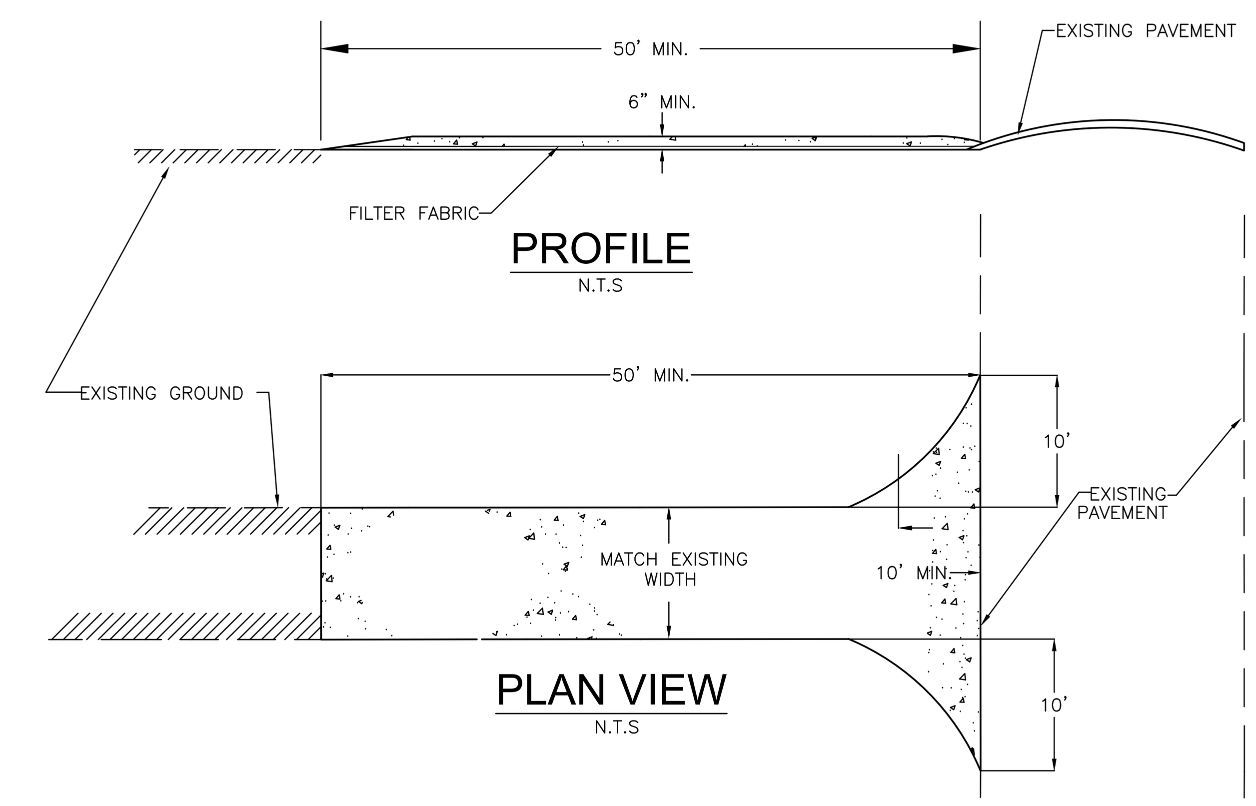
CONSTRUCTION SEQUENCING:

1. SCHEDULE A PRE-CONSTRUCTION MEETING WITH TOWN OFFICIALS, OWNER, AND CONTRACTORS IF REQUIRED BY THE CONDITIONS OF APPROVAL PRIOR TO BEGINNING CONSTRUCTION.
2. CONTACT DIG-SAFE, INDIVIDUAL UTILITIES, AND CITY DEPARTMENTS TO GET ALL UTILITIES MARKED PRIOR TO START OF CONSTRUCTION.
3. INSTALL AND STABILIZE ALL TEMPORARY AND PERMANENT SEDIMENT AND EROSION CONTROLS.
   A. SEDIMENT AND EROSION CONTROLS SHALL BE INSTALLED PRIOR TO EARTH MOVING OPERATIONS.
4. CLEAR/GRUB ONLY WITHIN THE LIMITS OF GRADING AS SHOWN ON THE PLANS. REMOVE ORGANICS ONLY FROM THOSE AREAS THAT CAN BE WORKED AND STABILIZED WITHIN 45 DAYS OF REMOVAL.
5. TOTAL SITE DISTURBANCE DEPICTED ON THESE PLANS IS 13,600 S.F.
   A. REFER TO VEGETATION AND EROSION CONTROL NOTES ON THIS PLAN DURING CONSTRUCTION.
6. STOCKPILES
   A. STOCKPILE LOAM FOR RE-USE AS NEEDED.
   B. TEMPORARILY STABILIZE LOAM STOCKPILES WITH:
      1. WINTER RYE GRASS- PRIOR TO SEPTEMBER 15TH
      2. MULCH- FROM SEPTEMBER 15TH TO MAY 1ST
7. CONSTRUCT AND STABILIZE ALL TEMPORARY AND PERMANENT SEDIMENT AND EROSION CONTROLS. CONSTRUCT SWALES AND STABILIZE. ADD A TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION.
   A. THESE SHALL BE INSTALLED BEFORE ANY MAJOR EARTH MOVING OPERATIONS.
8. THE BIORETENTION SYSTEM ALLOWS INFILTRATION OF RUNOFF. DO NOT CONSTRUCT THE BIORETENTION SYSTEM UNTIL ALL UPSLOPE AREAS ARE STABILIZED. UNSTABILIZED AREAS THAT DRAIN TO THE BIORETENTION SYSTEM WILL DECREASE THE INFILTRATION CAPACITY OF THE UNDERLYING SOILS.
9. DRIVEWAY AND PARKING CONSTRUCTION
   A. CUTS AND FILLS:
      1. CONSTRUCT IN LOCATIONS AND TO GRADES AS SHOWN ON THE PLANS.
      2. FILLS:
         A. PLACE MAXIMUM 12" LIFTS AND COMPACT TO 95% MAXIMUM DRY DENSITY.
         B. ALL MATERIAL BASED ON PROCTOR TEST SHALL BE FREE OF DELETERIOUS MATERIALS SUCH AS LOAM, STUMPS, BRUSH, AND ROCKS LARGER THAN 3/4 THE DEPTH OF THE LIFT BEING PLACED.
      3. LOAM AND SEED SLOPES WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
   C. BASE MATERIALS: BANK RUN AND CRUSHED GRAVEL SHALL BE PLACED IN 4" LIFTS AND COMPACTED TO 95% MAXIMUM DRY DENSITY TO THE DEPTHS SPECIFIED IN THE PARKING LOTS CROSS-SECTION DETAILS.
   D. STABILIZE ALL PAVED GRAVEL AREAS WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.

11. CONSTRUCT BIORETENTION SYSTEM AFTER UP SLOPE AREAS ARE STABILIZED.
12. INSPECT, MAINTAIN, AND IF NECESSARY, REPAIR ALL EROSION AND SEDIMENT CONTROL MEASURES AS STATED IN EROSION CONTROL NOTES ON THIS SHEET.
13. REMOVE ALL TEMPORARY EROSION CONTROL MEASURES ONCE INITIAL GROWTH IS ESTABLISHED.

ADDITIONAL NOTES:

1. NO FUEL SHALL BE STORED ON SITE DURING CONSTRUCTION.
2. DURING CONSTRUCTION DUST SHALL BE PREVENTED FROM BECOMING A SAFETY OR HEALTH HAZARD BY THE IMPLEMENTATION OF ACCEPTED CONTROL METHODS SUCH AS WATERING.
3. ALL CONSTRUCTION MATERIALS THAT ARE SPILLED OR DEPOSITED ON THE PUBLIC ROADWAYS SHALL BE REMOVED BY THE CONTRACTOR.
4. DO NOT BEGIN CONSTRUCTION UNTIL ALL LOCAL, STATE, AND FEDERAL PERMITS HAVE BEEN APPLIED FOR AND RECEIVED.
5. THE GENERAL CONTRACTOR IS RESPONSIBLE TO VERIFY ALL DIMENSIONS, ELEVATIONS AND CONDITIONS AT THE SITE. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER BEFORE PROCEEDING WITH THE AFFECTED PART OF THE WORK.
6. NO CONSTRUCTION VEHICLES SHALL USE MAIN ST. ENTRANCE



STABILIZED CONSTRUCTION ENTRANCE NOTES:

1. GRADE AND COMPACT ACCESS ROAD ENTRANCE AS NECESSARY. PLACE FILTER FABRIC (MIRAFI 140N OR EQUAL) AND PLACE 6" OF 3" STONE TO MATCH SLOPE OF EXISTING ROAD.
2. PROVIDE NECESSARY SWALES OR DIVERSIONS TO MINIMIZE DIRECT FLOW OF WATER ONTO STONE AREA.
3. CONSTRUCTION ENTRANCE SHALL BE MAINTAINED AS NECESSARY TO REMOVE SILT FROM TIRES PRIOR TO ENTERING PUBLIC ROADS. A SMALL SWALE SHALL BE CONSTRUCTED ON THE DOWN GRADIENT SIDE TO TRAP ANY SILT WASHED FROM THE STONE ENTRANCE.

STABILIZED CONSTRUCTION ENTRANCE DETAIL

N.T.S

NO.	REVISIONS	DATE	INT.
0.	INITIAL SUBMISSION TO THE TOWN OF BERWICK	2/5/20	MCS

STATE OF MAINE ★ MICHAEL J. SIEVERT 8191 LICENSED ★ PROFESSIONAL ENGINEER

DATE: 2/4/20
SCALE: AS SHOWN
DESIGNED BY: MCS
DRAWN BY: MCS
APPROVED BY: MJS
FILE: 19066 detla.dwg

CONSTRUCTION DETAILS
prepared for
CAF REALTY MAINE
POND ROAD
BERWICK, ME

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL
5 RAILROAD ST., P.O. BOX 359
NEWMARKET, NH 03857
PHONE: (603) 659-4979, FAX: (603) 659-4627
E-MAIL: MJS@MJS-ENGINEERING.COM

JOB: 19-066

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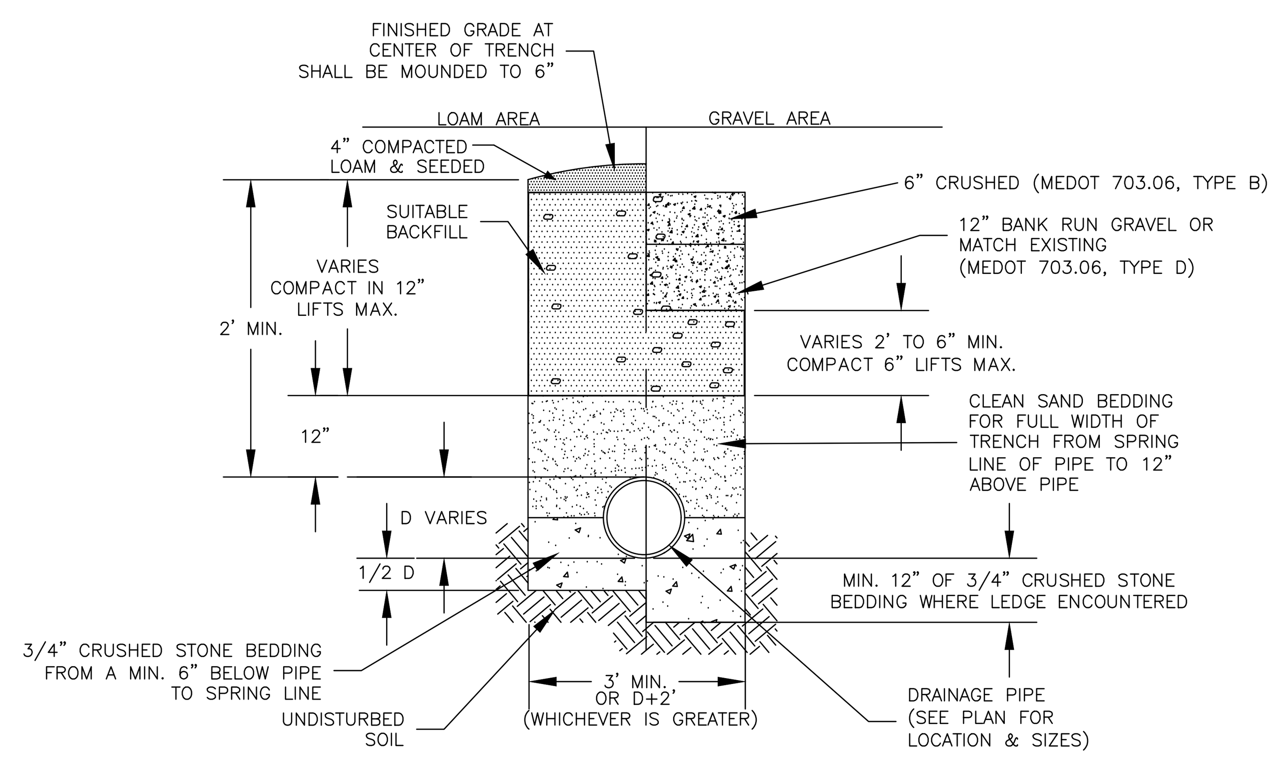
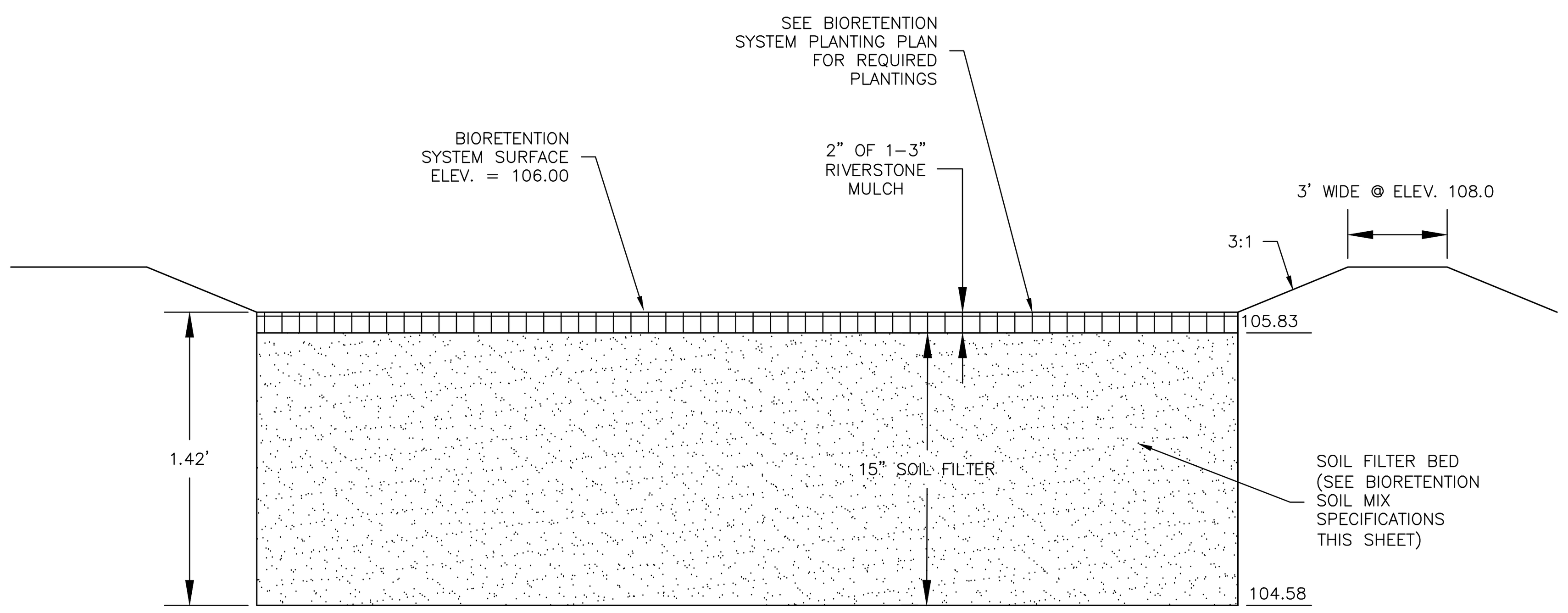


STANDARD DRAINAGE PIPE TRENCH

N.T.S



BIORETENTION SYSTEM CROSS SECTION

N.T.S

CONSTRUCTION NOTES:

1. DO NOT PLACE BIORETENTION SYSTEM INTO SERVICE UNTIL THE BMP HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.

2. TO PREVENT DEGRADATION OF INFILTRATION FUNCTION: DO NOT DISCHARGE SEDIMENT-LADEN WATERS FROM CONSTRUCTION ACTIVITIES (RUNOFF, WATER FROM EXCAVATIONS) TO THE BIORETENTION SYSTEM DURING ANY STAGE OF CONSTRUCTION. DO NOT TRAFFIC EXPOSED SOIL SURFACE WITH CONSTRUCTION EQUIPMENT. IF FEASIBLE, PERFORM EXCAVATIONS WITH EQUIPMENT POSITIONED OUTSIDE THE LIMITS OF THE INFILTRATION COMPONENTS OF THE SYSTEM.

3. CLEAR AND GRUB THE AREA WHERE THE BIORETENTION SYSTEM IS TO BE LOCATED. STOCKPILE LOAM FOR REUSE LATER.

4. THE FOUNDATION AREA SHALL BE SCARIFIED PRIOR TO PLACING FILL. ALL UNSUITABLE MATERIAL UNDER THE BERM SHALL BE REMOVED AND REPLACED WITH SUITABLE FOUNDATION MATERIAL.

5. THE BERM SHALL BE CONSTRUCTED BEGINNING FROM THE LOWEST POINT UNIFORMLY ALONG ITS ENTIRE LENGTH. PLACE MATERIALS IN MAXIMUM 12" LOOSE LIFTS COMPACTED TO 95% MAXIMUM MODIFIED PROCTOR DENSITY. EMBANKMENT SOIL SHALL HAVE NO ORGANIC MATTER OR FROZEN MATERIAL AND NO STONES LARGER THAN 2/3 OF THE MAXIMUM LOOSE LIFT THICKNESS. STONES AROUND ANY STRUCTURES AND/OR CONDUITS SHALL NOT EXCEED 3 INCHES. EMBANKMENT FILL MATERIAL SHALL HAVE THE FOLLOWING GRADATION:

SIEVE SIZE:	% PASSING:
#4	80-90
#40	50-80
#100	30-45
#200	15-30

6. ALL PIPE TO PIPE CONNECTIONS SHALL BE WATER-TIGHT.

7. ALL DISTURBED AREAS NOT OTHERWISE LANDSCAPED SHALL RECEIVE FOUR INCHES OF LOAM AND SEED.

GENERAL MAINTENANCE:
1. THE BIORETENTION BASIN SHALL BE INSPECTED TWICE EACH YEAR WITH PREVENTATIVE MAINTENANCE PROVIDED.
2. SYSTEMS SHALL BE INSPECTED ANNUALLY AND FOLLOWING ANY RAINFALL EVENT EXCEEDING 2.5 INCHES IN A 24 HOUR PERIOD, WITH MAINTENANCE OR REHABILITATION CONDUCTED AS WARRANTED BY SUCH INSPECTION.
3 TRASH AND DEBRIS SHOULD BE REMOVED AT EACH INSPECTION.
4. AT LEAST ONCE ANNUALLY, SYSTEM SHOULD BE INSPECTED FOR DRAWDOWN TIME. IF BIORETENTION SYSTEM DOES NOT DRAIN WITHIN 72-HOURS FOLLOWING A RAINFALL EVENT, THEN A QUALIFIED PROFESSIONAL SHOULD ASSESS THE CONDITION OF THE FACILITY TO DETERMINE MEASURES REQUIRED TO RESTORE FILTRATION FUNCTION OR INFILTRATION FUNCTION (AS APPLICABLE), INCLUDING BUT NOT LIMITED TO REMOVAL OF ACCUMULATED SEDIMENTS OR RECONSTRUCTION OF THE FILTER MEDIA.
5. VEGETATION SHOULD BE INSPECTED AT LEAST ANNUALLY, AND MAINTAINED IN HEALTHY CONDITION, INCLUDING PRUNING, REMOVAL AND REPLACEMENT OF DEAD OR DISEASED VEGETATION, AND REMOVAL OF INVASIVE SPECIES.

PLANTING REQUIREMENTS
1. THE BIORETENTION BASIN AND SEDIMENT FOREBAY BERM, BOTTOM AND INTERIOR SIDE SLOPES SHALL BE PLANTED WITH A 50:50 MIX OF NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES AND NEW ENGLAND CONSERVATION/WILDLIFE MIX AT 1,500 SF/LB AVAILABLE FROM:

NEW ENGLAND WETLAND PLANTS. INC.
820 WEST AMHERST STREET
AMHERST, MA 01002

BIORETENTION SYSTEM GENERAL NOTES:

1. BIORETENTION SYSTEM FILTER SOIL MIX SHALL MEET THE FOLLOWING REQUIREMENTS OF FILTER MEDIA OPTION A OR OPTION B.

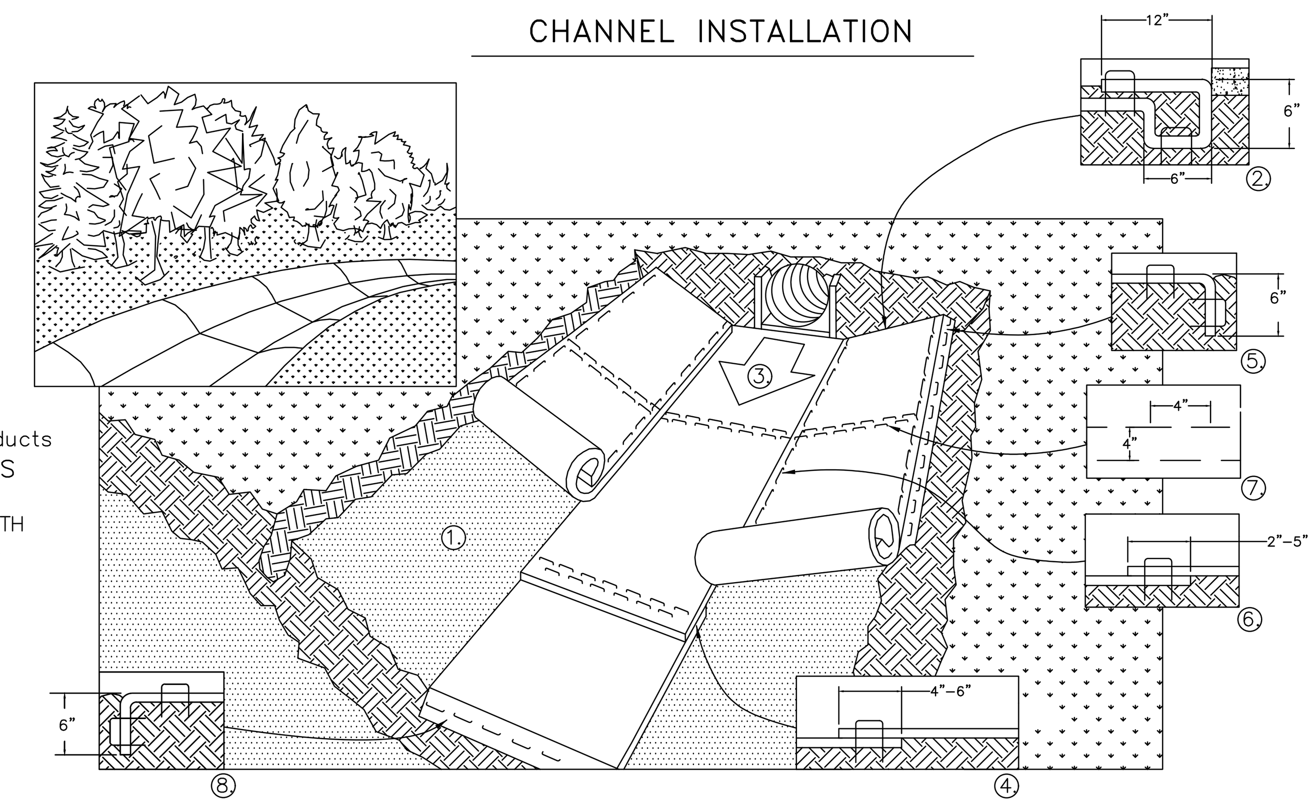
BIORETENTION SYSTEM SOIL MIX SPECIFICATIONS

		GRADATION OF MATERIAL	
COMPONENT MATERIAL	PERCENT OF MIXTURE BY VOLUME	SIEVE NO.	% BY WEIGHT PASSING STANDARD SIEVE
FILTER MEDIA OPTION A			
ASTM C-33 CONCRETE SAND	50 TO 55		
LOAMY SAND TOPSOIL, WITH FINES AS INDICATED	20 TO 30	200	15 TO 25
MODERATELY FINE SHREDDED BARK OR WOOD FIBER MULCH, WITH FINES AS INDICATED	20 TO 30	200	< 5
FILTER MEDIA OPTION B			
MODERATELY FINE SHREDDED BARK OR WOOD FIBER MULCH, WITH FINES AS INDICATED	20 TO 30	200	< 5
LOAMY COARSE SAND	70 TO 80	10	85 TO 100
		20	70 TO 100
		60	15 TO 40
		200	8 TO 15

NORTH AMERICAN GREEN
EROSION CONTROL Products
Guaranteed SOLUTIONS

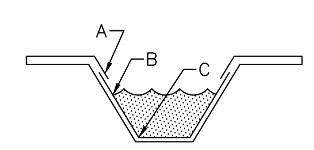
14649 HIGHWAY 41 NORTH
EVANSVILLE, IN 47725
800-772-2040
www.nagreen.com

CHANNEL INSTALLATION



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL-O-SEED DO NOT SEED PREPARED AREA. CELL-O-SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30 CM) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) ACROSS THE WIDTH OF THE RECP's.
3. ROLL CENTER RECP's IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM™, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. PLACE CONSECUTIVE RECP's END OVER END (SHINGLE STYLE) WITH A 4" - 6" (10 CM -15 CM) OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10 CM) APART AND 4" (10 CM) ON CENTER TO SECURE RECP's.
5. FULL LENGTH EDGE OF RECP's AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. ADJACENT RECP's MUST BE OVERLAPPED APPROXIMATELY 2" - 5" (5 CM -12.5 CM) (DEPENDING ON RECP's TYPE) AND STAPLED.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT (9 M - 12 M) INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" (10 CM) APART AND 4" (10 CM) ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
8. THE TERMINAL END OF THE RECP's MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

NOTE:
* IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.

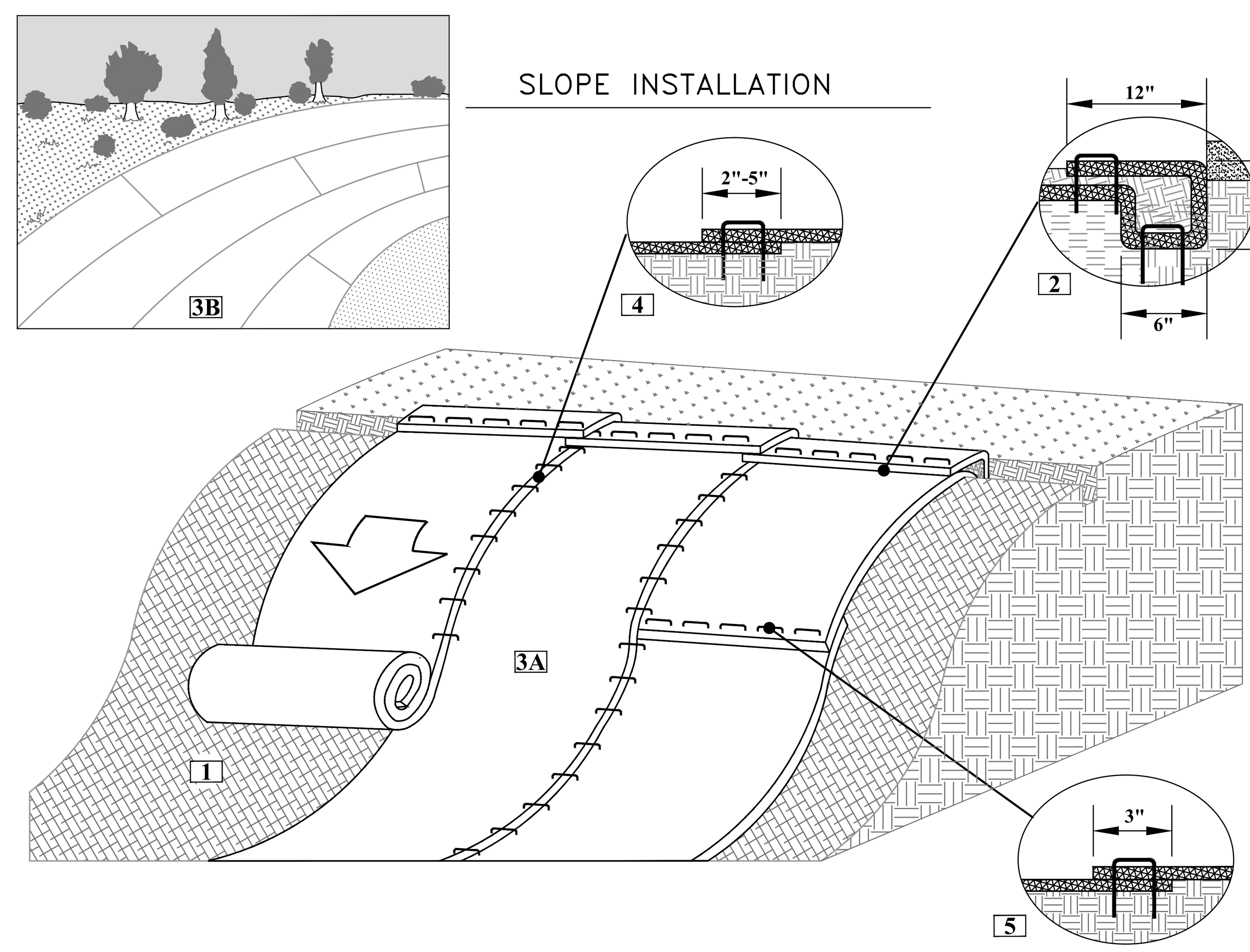


CRITICAL POINTS
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM/SIDE SLOPE VERTICES

NOTE:
* HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.

** IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 cm) MAY BE REQUIRED.

SLOPE INSTALLATION

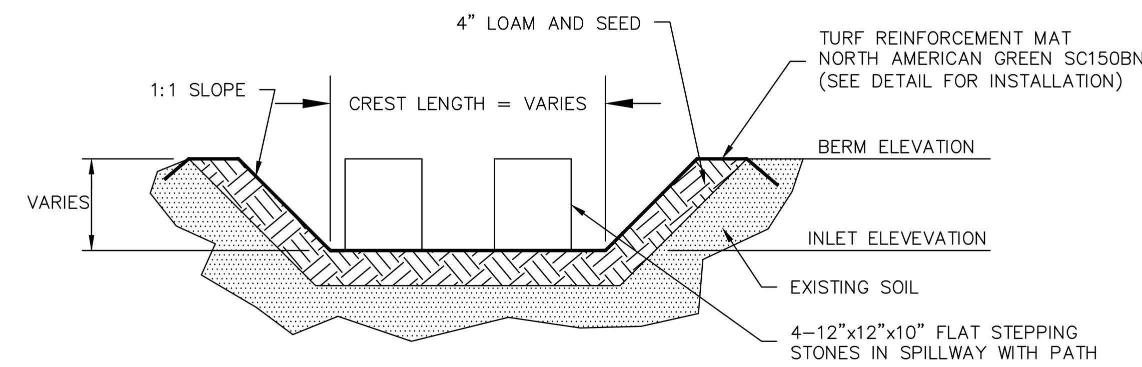


1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECPS), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECPS IN A 6"(15CM) DEEP X 6"(15CM) WIDE TRENCH WITH APPROXIMATELY 12" (30CM) OF RECPS EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECPS WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO THE COMPACTED SOIL AND FOLD THE REMAINING 12"(30CM) PORTION OF RECPS BACK OVER THE SEED AND COMPACTED SOIL. SECURE RECPS OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12"(30CM) APART ACROSS THE WIDTH OF THE RECPS.
3. ROLL THE RECPS (A) DOWN OR (B) HORIZONTALLY ACROSS THE SLOPE. RECPS WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECPS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE.
4. THE EDGES OF PARALLEL RECPS MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5-12.5CM) OVERLAP DEPENDING ON THE RECPS TYPE.
5. CONSECUTIVE RECPS SPLICED DOWN THE SLOPE MUST BE END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3"(7.5CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12"(30CM) APART ACROSS ENTIRE RECPS WIDTH.

NOTES:
1. BIORETENTION SYSTEM SPILLWAYS TO BE LINED WITH NORTH AMERICAN GREEN SC150BN EROSION CONTROL BLANKET OR APPROVED EQUAL.
2. FOR SALES CONTACT:
EJ PRESCOTT, INC.
210 SHEEP DAVIS RD.
CONCORD, NH
603-224-9545

TYPICAL TURF REINFORCEMENT MATTING DETAIL

N.T.S



NOTES: CREST BREADTH IS WIDTH OF BERM AT SPILLWAY.

NOTE: SPILLWAY TO BE CONSTRUCTED TO THE DIMENSIONS AND SPECIFICATIONS SHOWN.

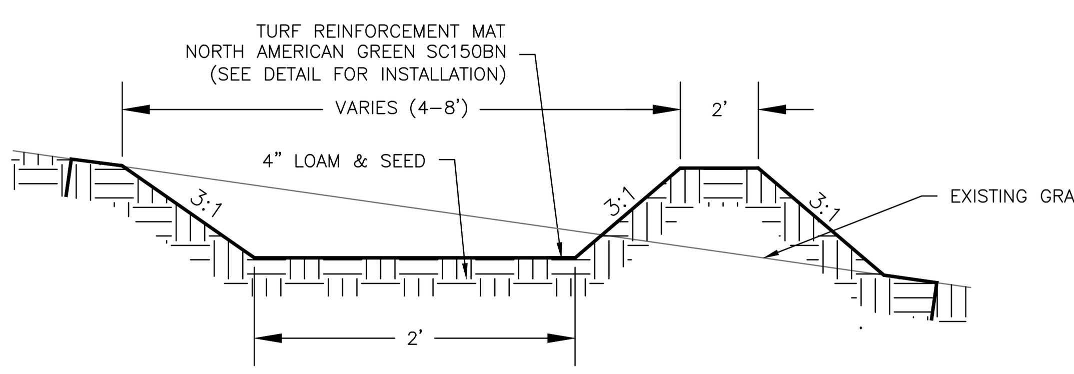
SPILLWAY DIMENSION TABLE

LOCATION	CREST ELEV.	BERM ELEV.	LENGTH*	WIDTH*
SPILLWAY #1 - SEDIMENT FOREBAY	107.5	108.1	25'	6'

*REFER TO DETAIL ABOVE FOR LOCATION OF WIDTH AND LENGTH

BIORETENTION SYSTEM SPILLWAY CROSS SECTION

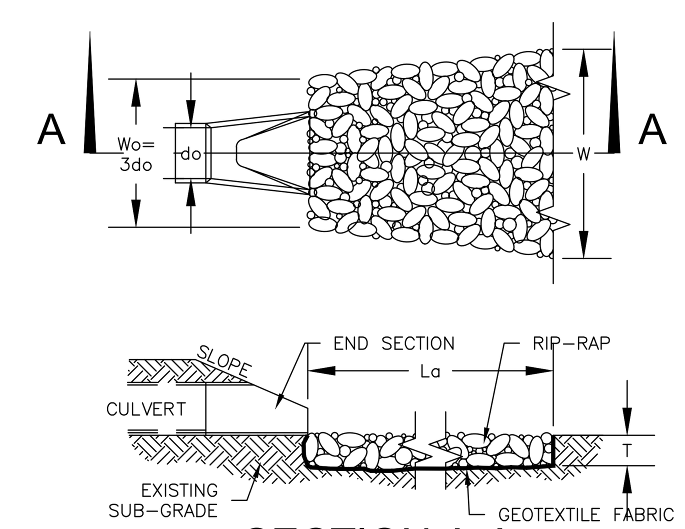
N.T.S.



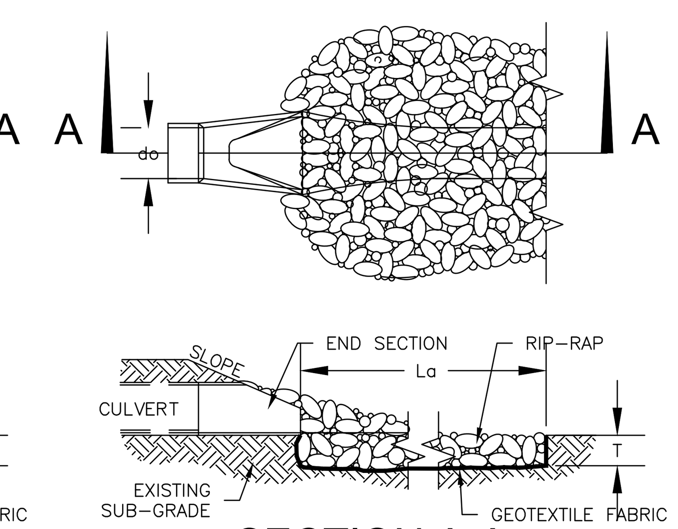
NOTES:
1. REFER TO BERM CONSTRUCTION NOTES IN BIORETENTION SYSTEM DETAIL FOR BERM CONSTRUCTION REQUIREMENTS.
2. THE SWALE SHALL BE MOWED WITH THE REST OF THE SITES LAWN AREAS TO PROMOTE HEALTHY GROWTH AND PREVENT THE ENCROACHMENT OF WEEDS AND WOODY VEGETATION. DO NOT MOW GRASS IN SWALE TOO SHORT. THIS WILL REDUCE THE SWALES FILTERING ABILITY.
3. THE SWALE SHOULD BE FERTILIZED ON AN AS NECESSARY BASIS, TO KEEP THE GRASS HEALTHY.
4. REFER TO THE STORMWATER MANAGEMENT PLAN FOR ADDITIONAL INSPECTION AND MAINTENANCE REQUIREMENTS.

VEGETATED SWALE DETAIL

N.T.S



SECTION A-A
(PIPE OUTLET TO FLAT AREA NO WELL DEFINED CHANNEL)



SECTION A-A
(PIPE OUTLET TO WELL DEFINED CHANNEL)

RIP-RAP GRADATION

6" RIP RAP

% OF WEIGHT SMALLER THAN THE GIVEN SIZE	SIZE OF STONE (INCHES)		
100	9	TO	12
85	7.8	TO	10.8
50	6	TO	9
15	1.8	TO	3

APRON DIMENSION TABLE

PIPE OUTLET	Wo	W	La	T	d50
# 1	18"	7'	13'	18"	6"

CONSTRUCTION SPECIFICATIONS:
1. PREPARE THE SUB-GRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIP-RAP TO THE GRADES SHOWN ON THE PLANS.
2. MINIMUM 6" SAND/GRAVEL BEDDING OR GEOTEXTILE FABRIC REQUIRED UNDER ALL ROCK RIP-RAP.
3. THE ROCK OR GRAVEL USED FOR FILTER OR RIP-RAP SHALL CONFORM TO THE SPECIFIED GRADATION.
4. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF ROCK RIP-RAP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR REPAIRS OR JOINING TWO (2) PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
5. STONE FOR THE RIP-RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.

MAINTENANCE NOTES:
1. OUTLETS SHALL BE INSPECTED AND CLEANED ANNUALLY AND AFTER ANY MAJOR STORM EVENT. ANY EROSION OR DAMAGE TO THE RIP-RAP SHALL BE REPAIRED IMMEDIATELY.
2. THE CHANNEL IMMEDIATELY DOWNSTREAM FROM THE OUTLET SHOULD BE CHECKED TO SEE THAT NO EROSION IS OCCURRING.
3. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO THE OUTLET PROTECTION APRON.

PIPE OUTLET PROTECTION DETAIL

NOT TO SCALE

NO.	REVISIONS	DATE	INT.
0.	INITIAL SUBMISSION TO THE TOWN OF BERWICK	2/5/20	MCS

STATE OF MAINE * MICHAEL J. SIEVERT 8191 LICENSED * PROFESSIONAL ENGINEER

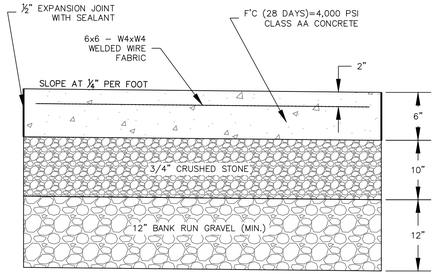
DATE: 2/4/20
SCALE: AS SHOWN
DESIGNED BY: MCS
DRAWN BY: MCS
APPROVED BY: MJS
FILE: 19066 detla.dwg

CONSTRUCTION DETAILS
prepared for
CAF REALTY MAINE
POND ROAD
BERWICK, ME

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL
5 RAILROAD ST., P.O. BOX 359
NEWMARKET, NH 03857
PHONE: (603) 659-4979, FAX: (603) 659-4627
E-MAIL: MJS@MJS-ENGINEERING.COM

JOB: 19-066

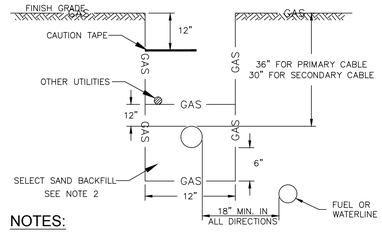
D2



DUMPSTER PAD CROSS SECTION

N.T.S

NOTES:
1. CONCRETE PADS TO BE 10' WIDE X 20' LONG, EXCEPT THAT 10' X 7' SHALL BE ALLOWED IF THE HEAVY DUTY PAVEMENT ALTERNATIVE IS USED.
2. CONCRETE STRENGTH FOR SLAB SHALL BE 4000 PSI AT 28 DAYS.
3. REFER TO PLAN FOR LOCATIONS OF DUMPSTER PAD.

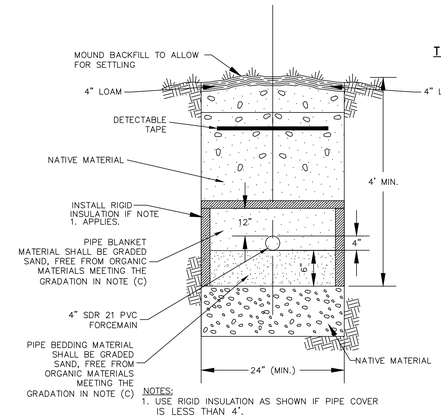


NOTES:

1. CONSTRUCTION TO BE IN ACCORDANCE WITH PSNH CONSTRUCTION STANDARDS FOR NEW ELECTRICAL SERVICE WORK BY CONTRACTORS, MOST RECENT EDITION.
2. SELECT SAND BACKFILL SHALL CONSIST OF A FINE GRANULAR MATERIAL OF WHICH 100% SHALL PASS THROUGH A 1/4" SIEVE. EXCEPT NATURALLY OCCURING SMOOTH ROUND PEBBLES NO GREATER THAN 3/8" IN DIAMETER ARE PERMITTED AS LONG AS THEIR TOTAL VOLUME PER CUBIC FOOT OF SAND DOES NOT EXCEED 1%. THE SAND SHALL BE COMPLETELY FREE OF FROZEN LUMPS, ROCKS, STONES, DEBRIS AND RUBBISH. BACKFILL SHALL BE THOROUGHLY COMPACTED IN 6" LIFTS.
3. CONDUIT SIZES TO BE 5" 3–PHASE PRIMARY AND 4" 3–PHASE SECONDARY. ALL CONDUIT SIZES TO BE VERIFIED BY PSNH.
4. ALL CONDUIT INSTALLATIONS MUST CONFORM TO THE CURRENT EDITION OF THE NATIONAL ELECTRIC SAFETY CODE, STATE AND LOCAL CODES AND ORDINANCES, AND WHERE APPLICABLE THE NATIONAL ELECTRIC CODE.

TELEPHONE & ELECTRIC TRENCH

N.T.S



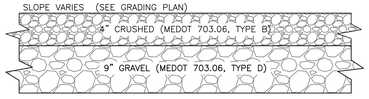
NOTES:
1. USE RIGID INSULATION AS SHOWN IF PIPE COVER IS LESS THAN 4'.

SEWER FORCEMAIN TRENCH

N.T.S

TRENCH CONSTRUCTION

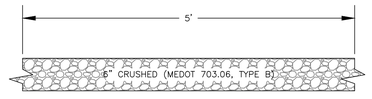
(A) TRENCH DIMENSIONS SHALL BE AS FOLLOWS:
(1) FOR SEWER PIPE LESS THAN 15" IN DIAMETER, THE ALLOWABLE TRENCH WIDTH AT A PLANE 12 INCHES ABOVE THE PIPE SHALL BE NO MORE THAN 36".
(B) PIPE TRENCH BEDDING MATERIAL AND FILL MATERIAL FOR EXCAVATION BELOW GRADE SHALL BE SCREENED GRAVEL OR CRUSHED STONE TO ASTM C33–03 STONE SIZE NO. 67.
(C) THE PIPE SAND BLANKET MATERIAL SHALL BE GRADED SAND, FREE FROM ORGANIC MATERIALS, GRADED SUCH THAT 100% PASSES THROUGH A 1/2 INCH SIEVE AND A MAXIMUM OF 15% PASSES THROUGH A #200 SIEVE.
(E) PIPE BEDDING MATERIAL SHALL EXTEND FROM A HORIZONTAL PLANE THROUGH THE PIPE AXIS TO 6 INCHES BELOW THE BOTTOM OF THE OUTSIDE SURFACE OF THE PIPE.
(F) PIPE SAND MATERIAL SHALL COVER THE PIPE A MINIMUM OF 12 INCHES ABOVE THE CROWN OF THE OUTSIDE SURFACE.
(G) COMPACTION SHALL BE IN 12 INCH LAYERS FOR BEDDING AND BLANKET MATERIALS.
(H) BACKFILL MATERIALS SHALL BE COMPACTED IN 3–FOOT LAYERS TO THE GROUND SURFACE EXCEPT FOR ROAD CONSTRUCTION (OR OTHER PAVED AREAS) WHERE THE FINAL 3 FEET SHALL BE COMPACTED IN 12–INCH LAYERS TO THE ROAD BASE SURFACE.
(I) TRENCH BACKFILL MATERIAL IN ROADWAY LOCATIONS SHALL BE NATURAL MATERIALS EXCAVATED FROM THE TRENCH DURING CONSTRUCTION, EXCLUDING: DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, ALL WET OR SOFT MUCK, PEAT OR CLAY, ALL EXCAVATED LEDGE MATERIAL, AND ALL ROCKS OVER SIX INCHES IN LARGEST DIMENSION, OR ANY MATERIAL WHICH AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION.
(J) TRENCH BACKFILL AT CROSS–COUNTRY LOCATIONS SHALL BE AS DESCRIBED IN (I) ABOVE, EXCEPT THAT TOP SOIL, LOAM, MUCK OR PEAT, MAY BE USED PROVIDED THE COMPLETED CONSTRUCTION WILL BE STABLE, AND PROVIDED THAT ACCESS TO THE SEWER FOR MAINTENANCE AND RECONSTRUCTION IS PRESERVED.
(K) BACKFILL SHALL BE MOUNDED 6 INCHES ABOVE ORIGINAL GROUND AT CROSS–COUNTRY LOCATIONS.
(L) PRECAUTIONS SHALL BE TAKEN TO AVOID GROUNDWATER POOLING AT THE SURFACE BY PROVIDING DRAINAGE TO A SUITABLE OUTLET AT CATCH BASINS OR RUNOFF SWALES.



NOTES:
1. DELETERIOUS MATERIALS ENCOUNTERED BELOW PARKING AREA SHALL BE COMPLETELY REMOVED.
2. COMPACT SUBGRADE TO 95% MAX. DRY DENSITY.

GRAVEL DRIVEWAY/PARKING CROSS SECTION

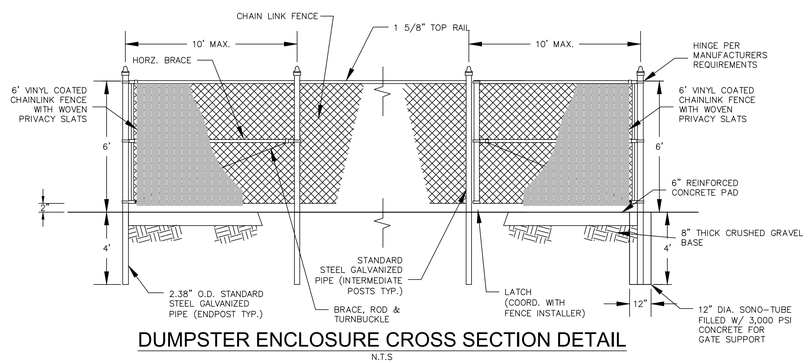
N.T.S.



NOTES:
1. DELETERIOUS MATERIALS ENCOUNTERED BELOW PARKING AREA SHALL BE COMPLETELY REMOVED.
2. COMPACT SUBGRADE TO 95% MAX. DRY DENSITY.

GRAVEL WALKWAY CROSS SECTION

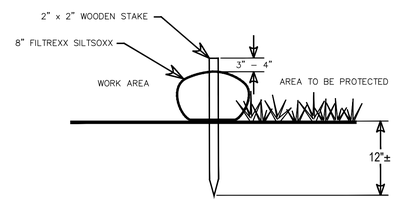
N.T.S.



DUMPSTER ENCLOSURE CROSS SECTION DETAIL

N.T.S

NOTES:
1. ALL FENCING MATERIALS SHALL BE MASTER HALCO OR APPROVED EQUAL.
2. FENCING TO BE PERMAFUSED II COMMERCIAL COLOR CHAIN–LINK FENCE SYSTEM WITH PRIVACY SLATS.
3. FENCING SUPPLY: GC/AAA FENCES, INC. (OR EQUAL) (603) 742–0833
4. FOLLOW MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.



PROFILE

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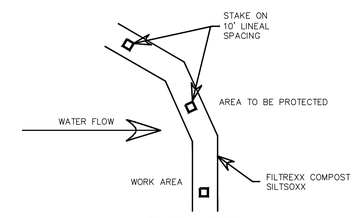

PLAN VIEW

N.T.S

NOTES:
1. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS.
2. USE CERTIFIED FILTREX FILTERMEDIA.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE UPSLOPE FROM PROTECTED AREA.

SILTSOXX DETAIL

N.T.S.

0	INITIAL SUBMISSION TO THE TOWN OF BERWICK	2/5/20 MCS

REVISIONS

DATE: 2/4/20
SCALE: AS SHOWN
DESIGNED BY: MCS
DRAWN BY: MCS
APPROVED BY: MJS
FILE: 19066 detla.dwg

CONSTRUCTION DETAILS
prepared for
CAF REALTY MAINE
POND ROAD
BERWICK, ME

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL
5 Railroad St., P.O. Box 359
Newmarket, NH 03857
Phone: (603) 659-5170 Fax: (603) 659-4627
E-MAIL: MJS@MJS-ENGINEERING.COM

JOB: 19–066

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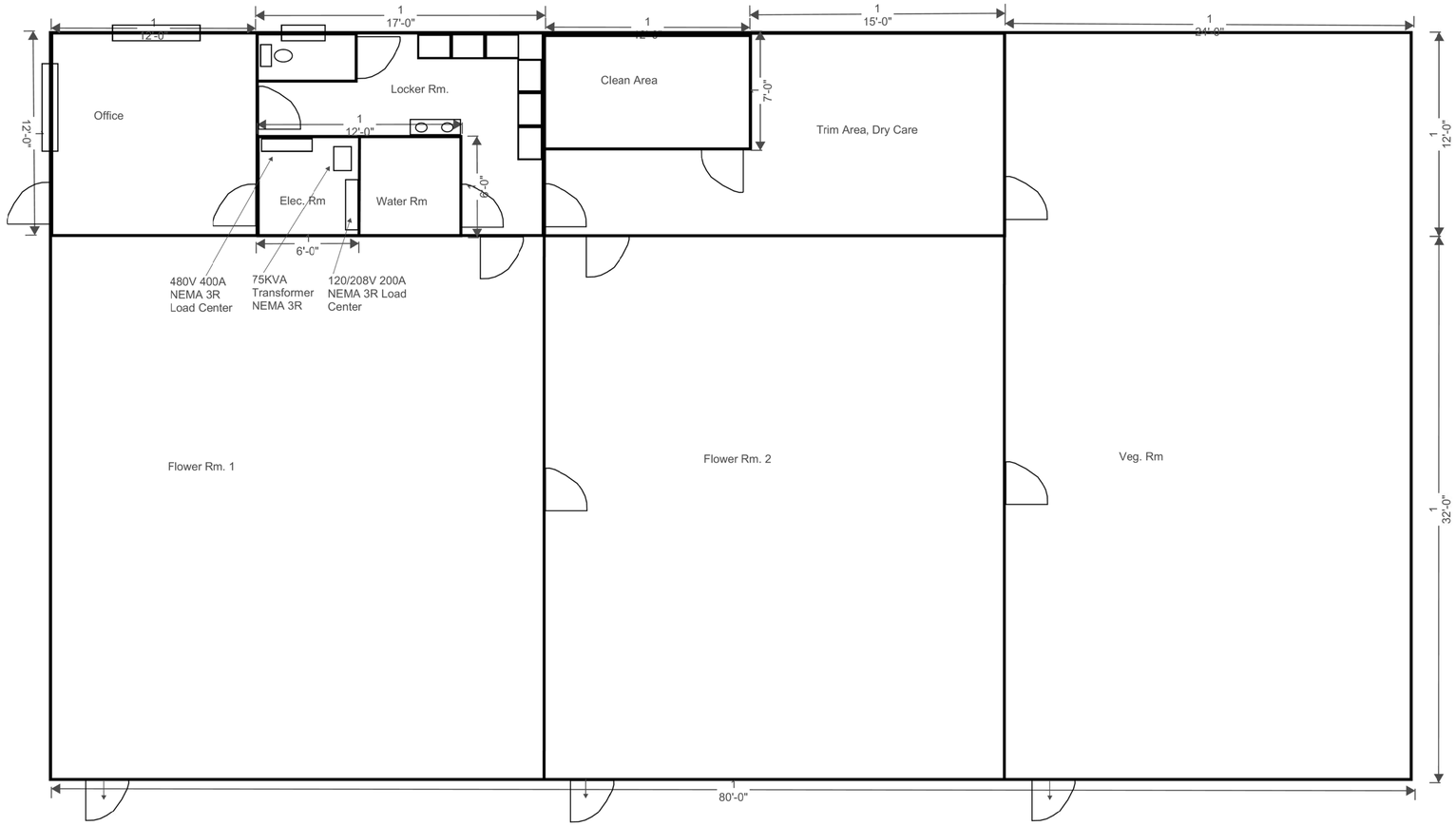
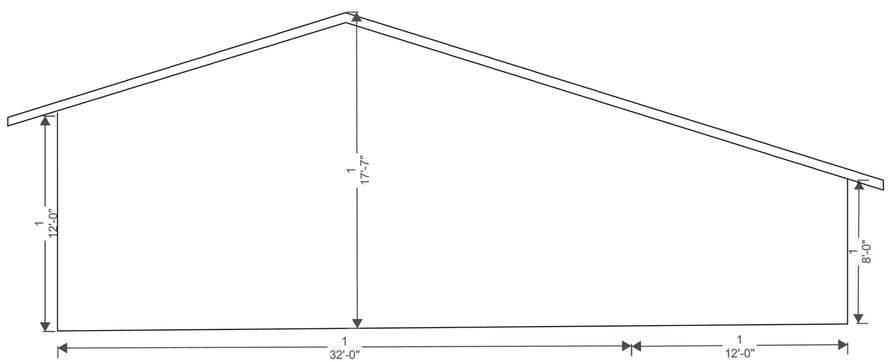


CAF Maine LLC,
Agricultural Building #1
Pond Rd
Berwick, ME 03908
Date: 02/04/20220
By: MRW



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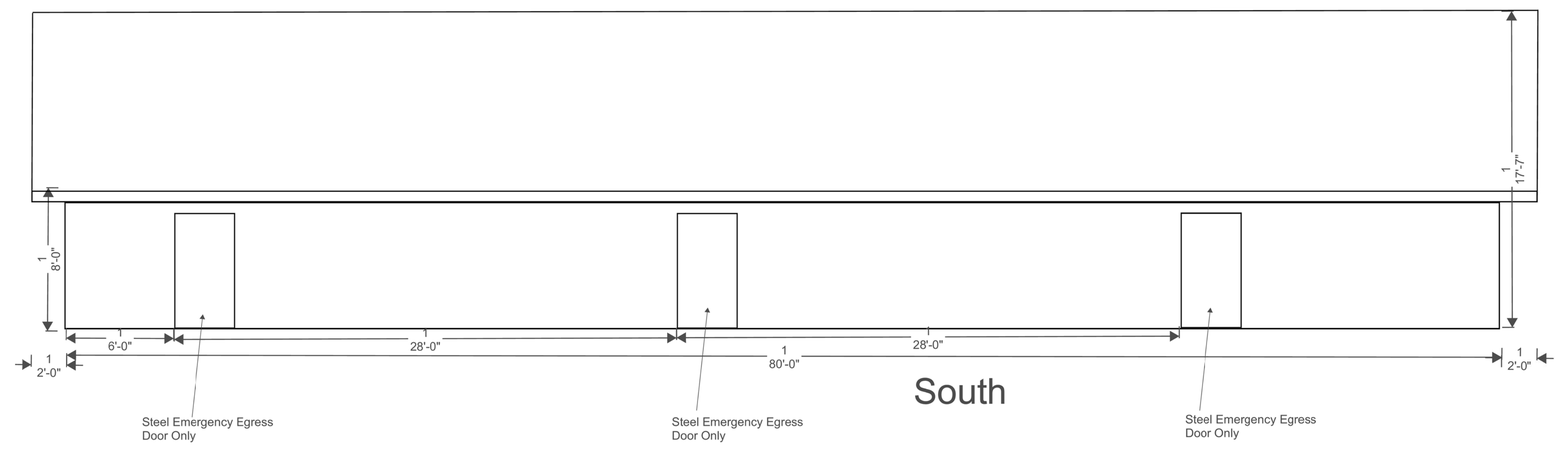
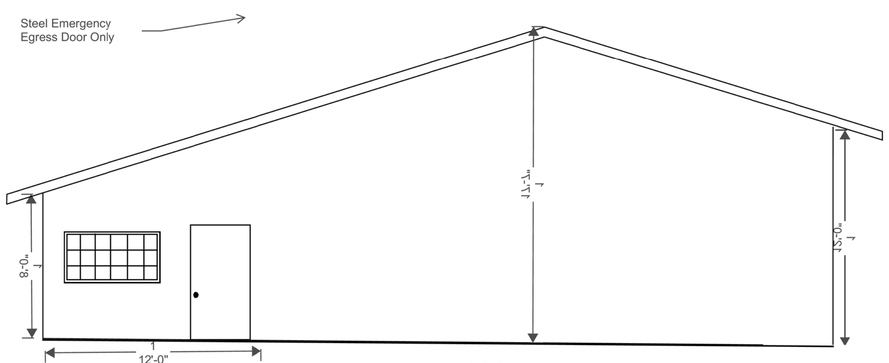


South



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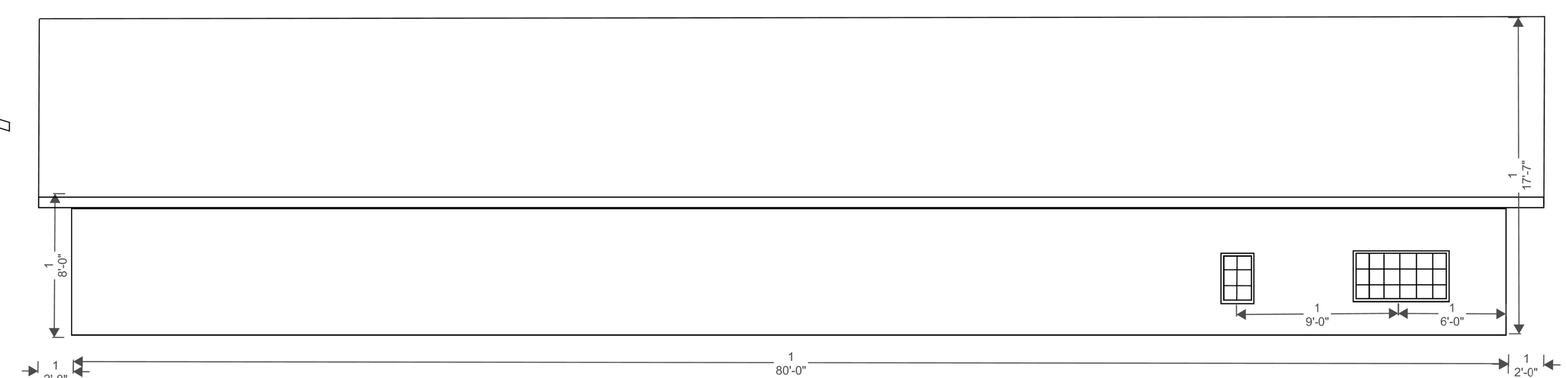

North

CAF Maine LLC,
Agricultural Building #1
Pond Rd
Berwick, ME 03908
Date: 02/04/20220
By: MRW

DRAINAGE REPORT

Prepared for:

CAF REALTY MAINE

11 POND ROAD

BERWICK, ME 03901

TAX MAP R-70, LOT 16

Prepared on:

February 5, 2020

MJS ENGINEERING, P.C.
CIVIL • STRUCTURAL • ENVIRONMENTAL

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4. Pre-Development Conditions 2
5. Post-Development Conditions 2
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Appendix Number	Description
A	Pre- and Post-Development Drainage Plan
B	Pre-Development HydroCAD Analysis
C	Post-Development HydroCAD Analysis

1. Project Background / Purpose

CAF Realty of Maine, LLC is the owner of the subject lot (Map R-70, Lot 16). The proposed project is for the construction of a new agricultural barn and driveway on the subject lot. The parcel is located in the Rural Commercial/Industrial (RC/I) district. The lot is accessed by Pond Road and is bisected by Adams Brook. The proposed location of the new building is approximately 300 feet off of Pond Road. The proposed building has a footprint of approximately 3500 sq. ft. The proposed building may be expanded at a later date and an additional building may be built that will be accessed by the same driveway. The purpose of this drainage analysis is to estimate the flow pre- and post-development to ensure that the project does not increase peak flows during large rainstorms and to size the required LID features to meet these goals.

2. Methodology

In order to assess the pre- and post-development condition of the site, a hydrological/hydraulic model of the site was created using HydroCAD (version 10.00-25). The software uses the SCS CN method (TR-20) to estimate runoff of subcatchments. This model require data inputs for the rainfall, catchment area, land cover, hydrologic soil group, and time of concentration.

The existing catchment areas have been delineated from topography gathered by a field survey conducted by Horizons Engineering. Additional topographic data from LiDAR was used outside the bounds of the survey. Proposed catchment areas were based off the proposed grading changes. Land cover data was taken from aerial photography of the site. The land cover data was used in combination with the topography to determine the time of concentration of the catchment areas.

This analysis compares the runoff rates for the 2, 10, and 25-year USDA/SCS Type III 24-hour extreme storm events. The rainfall data used in the model is referenced from the Appendix H of MEDEP Chapter 500, as specified for York County.

3. Soils

The soils used for the hydrologic model were from the soil map depiceted on the plan "HIGH INTENSITY SOILS MAP" dated 8/23/05 by Roaring Brook Consultants. The soils are primarily HSG C.

Soil Types

Label	Description	HSG:
La	Lamoine	C
Md	Madeland	C
Ni	Nichoville	C
Ru	Rumney	C
Sc	Scantic	D
Sw	Swanton	C
Ts	Tunbridge -Skerry Complex	C

4. Pre-Development Conditions

The enclosed Pre-Development portion of the Drainage Plan (Appendix A) depicts the contributing runoff area of the property. The area analyzed is approximately seventeen (17) acres in size. It includes portions of Pond road and three abutting properties that are upgradient. Only the portion of the lot located on the southwest side of Adams Brook has been included in this analysis, as no modification will be done on the otherside of the brook. The existing project area primarily drains from Portland Street in the west towards Adams Brook in the east. Of the seventeen (17) acres analyzed, approximately 1.6 acres are impervious (9%).

Two points of analysis have been identified. The first point (POA1) is located at the downstream end of Adams brook. The second point (POA2) is located on Pond Road. The catchment area draining to POA1 has been split into two subcatchments, the first (1A) drains along the roadside ditch of Pond Road, and then into a channel which meets with Adams Brook. The second subcatchment drains from a high point near Portland street across a relatively flat field before flowing into adams Brook.

5. Post-Development Conditions

The enclosed Post-Development portion of the Drainage Plan (Appendix A) depicts the contributing runoff area of the property. The proposed driveway cuts through the natural drainage path of the the lot and concentrates some of the runoff that is upgrade of the project size. A bioretention pond has been proposed to treat the runoff of the driveway and to mitigate the impacts of concentrating the runoff from upgrade. The subcatchment draining to the biorention basin (1B) is approximately four (4) acres in size. The proposed building is located in subcatchment 1C and is not routed to the bioretention basin. The runoff generated by the impervious building is small in relation to the runoff reduction due to change in flow pattern from the proposed road.

6. Comparison of Pre- and Post-Development Conditions

The following table quantifies the peak rate of discharge leaving the parcel at POA 1 as shown on the Pre- and Post-Development Drainage Plan. The analysis has been modeled using the extreme rainfall quantities.

Table 1: Peak Rate of Runoff at POA 1 Summary Table

Storm	Pre-Development (cfs)	Post-Development (cfs)	Difference
1-Inch	0.09	0.07	-0.02
2-Year	17.64	14.14	-3.50
10-Year	36.81	29.52	-7.29
25-Year	53.61	46.38	-7.23

The peak runoff rate decreases from pre- to post-development conditions for all storms that were analyzed.

The following table quantiiesy the peak rate of at POA2, as shown on the Pre- and Post-Development Drainage Plan. The analysis has been modeled using the extreme rainfall quantities.

Table 3: Peak Rate of Runoff at POA2 Summary Table

Storm	Pre-Development (cfs)	Post-Development (cfs)	Difference
1-Inch	0.07	0.07	0.00
2-Year	0.87	0.87	0.00
10-Year	1.50	1.50	0.00
25-Year	2.02	2.02	0.00

No changes were made to subcatchements 2 and the peak runoff to POA2 remains the same in the pre- and post- development.

7. Erosion & Sediment Control

Temporary and permanent practices are used to prevent and minimize erosion and sedimentation on site. The installation of Silt Soxx at the perimeter of construction areas will provide sediment retention during the construction phase of the development. Erosion control matting is proposed on all spillways to prevent erosion prior to the establishment of permanent vegetation.

8. Conclusion

The proposed development will reduce the runoff from the site by detaining and treating the stormwater runoff in the proposed bioretention basin.

APPENDIX A

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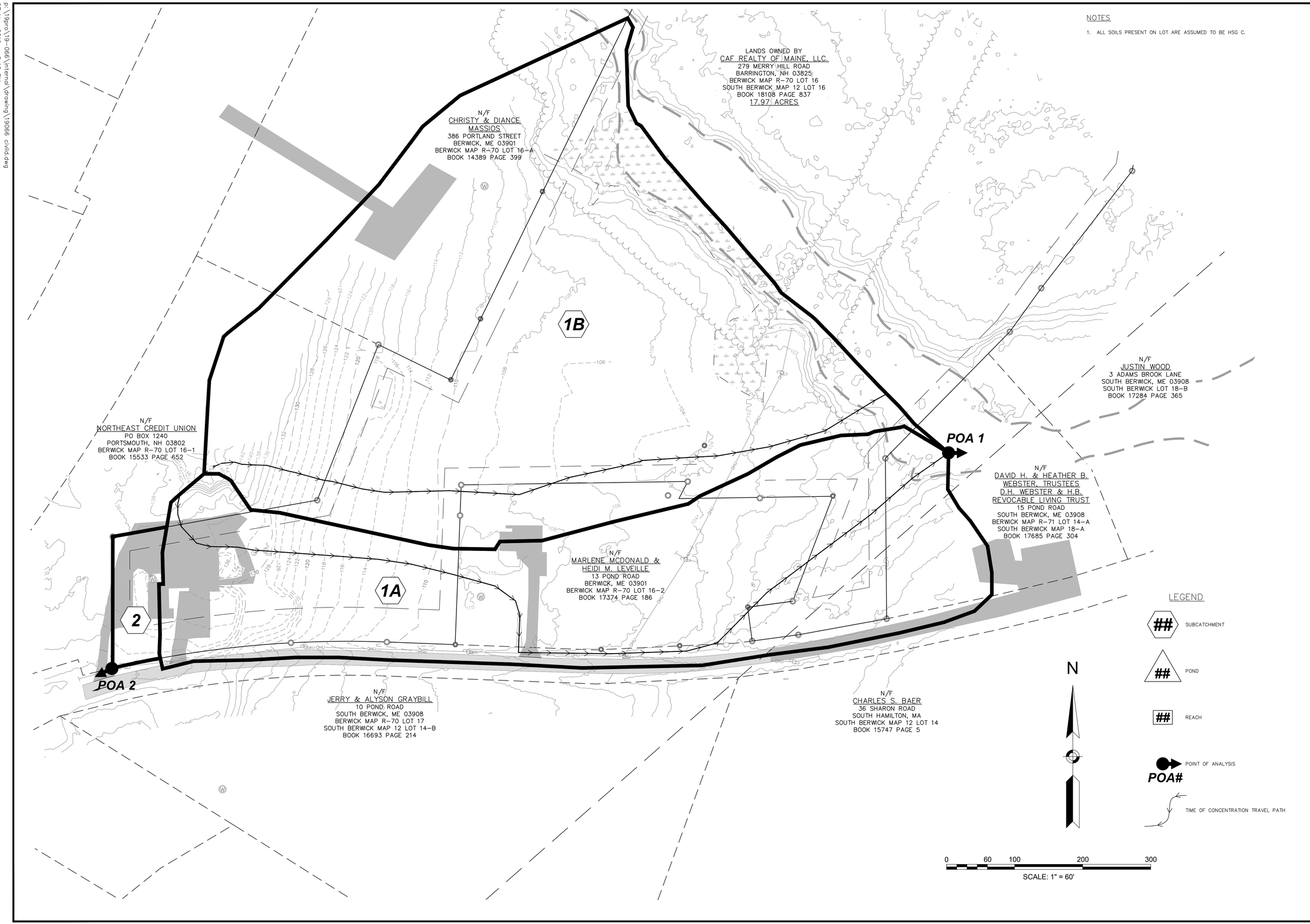
NOTES

1. ALL SOILS PRESENT ON LOT ARE ASSUMED TO BE HSG C.



NO.	REVISIONS	DATE	INT.
2.			
1.		2/5/20	MCS
0.	INITIAL SUBMISSION TO THE TOWN OF BERWICK		

DATE: 2/4/20
SCALE: 1" = 60'
DESIGNED BY: MCS
DRAWN BY: MCS
APPROVED BY: MJS
FILE: 19066 civil2.dwg

PRE-DEVELOPMENT DRAINAGE ANALYSIS PLAN

prepared for

CAF REALTY MAINE
TAX MAP R-70, LOT 16
11 POND ROAD BERWICK, ME

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JOB: 19-066

PRE

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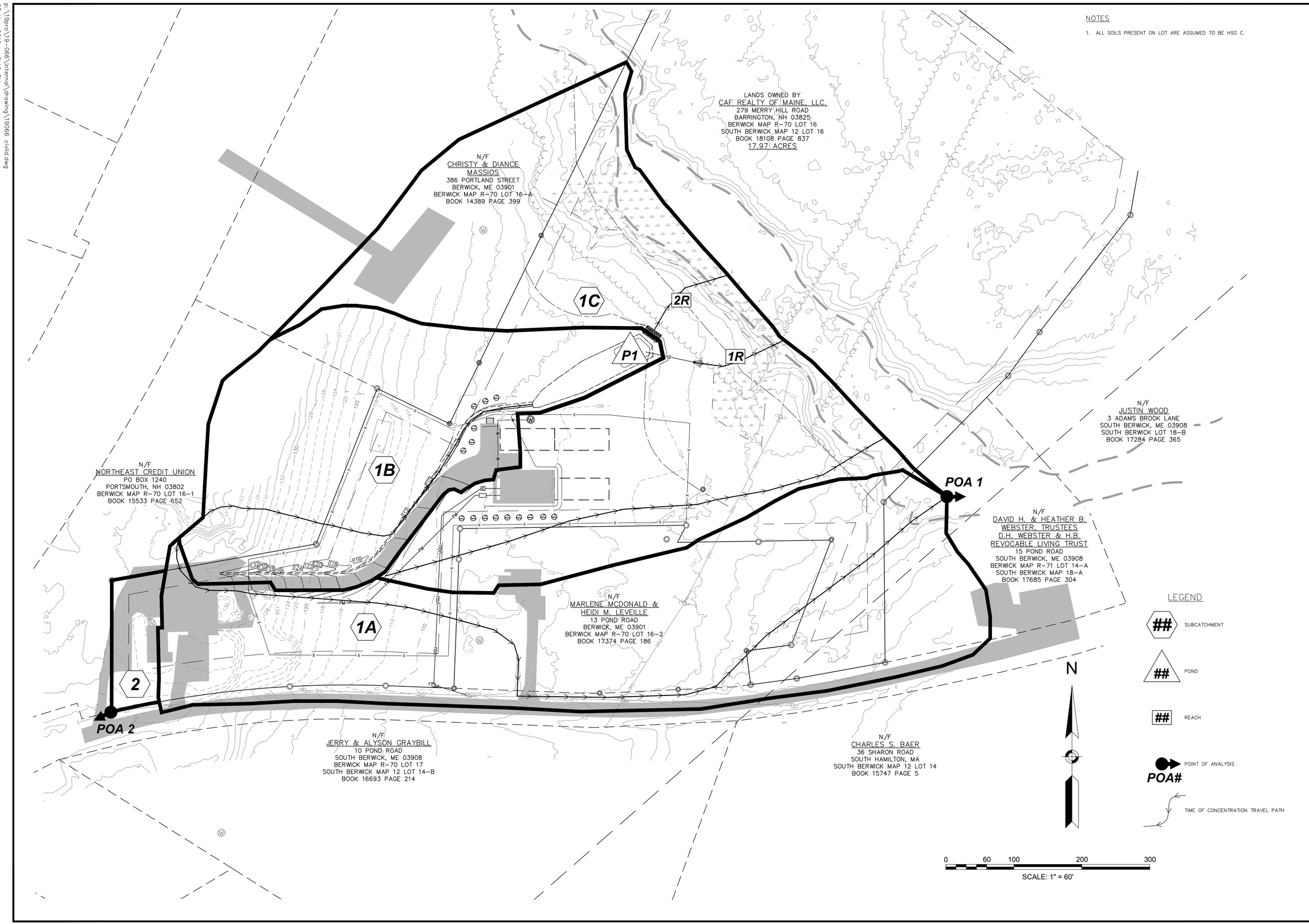
NOTES

1. ALL SOILS PRESENT ON LOT ARE ASSUMED TO BE HSG C.



NO.	REVISIONS	DATE	INT.
0.	INITIAL SUBMISSION TO THE TOWN OF BERWICK	2/5/20	MCS

DATE: 2/14/20
SCALE: 1" = 60'
DESIGNED BY: MCS
DRAWN BY: MCS
APPROVED BY: MJS
FILE: 19066 civil2.dwg

POST-DEVELOPMENT DRAINAGE ANALYSIS PLAN

prepared for

CAF REALTY MAINE
TAX MAP R-70, LOT 16
11 POND ROAD BERWICK, ME

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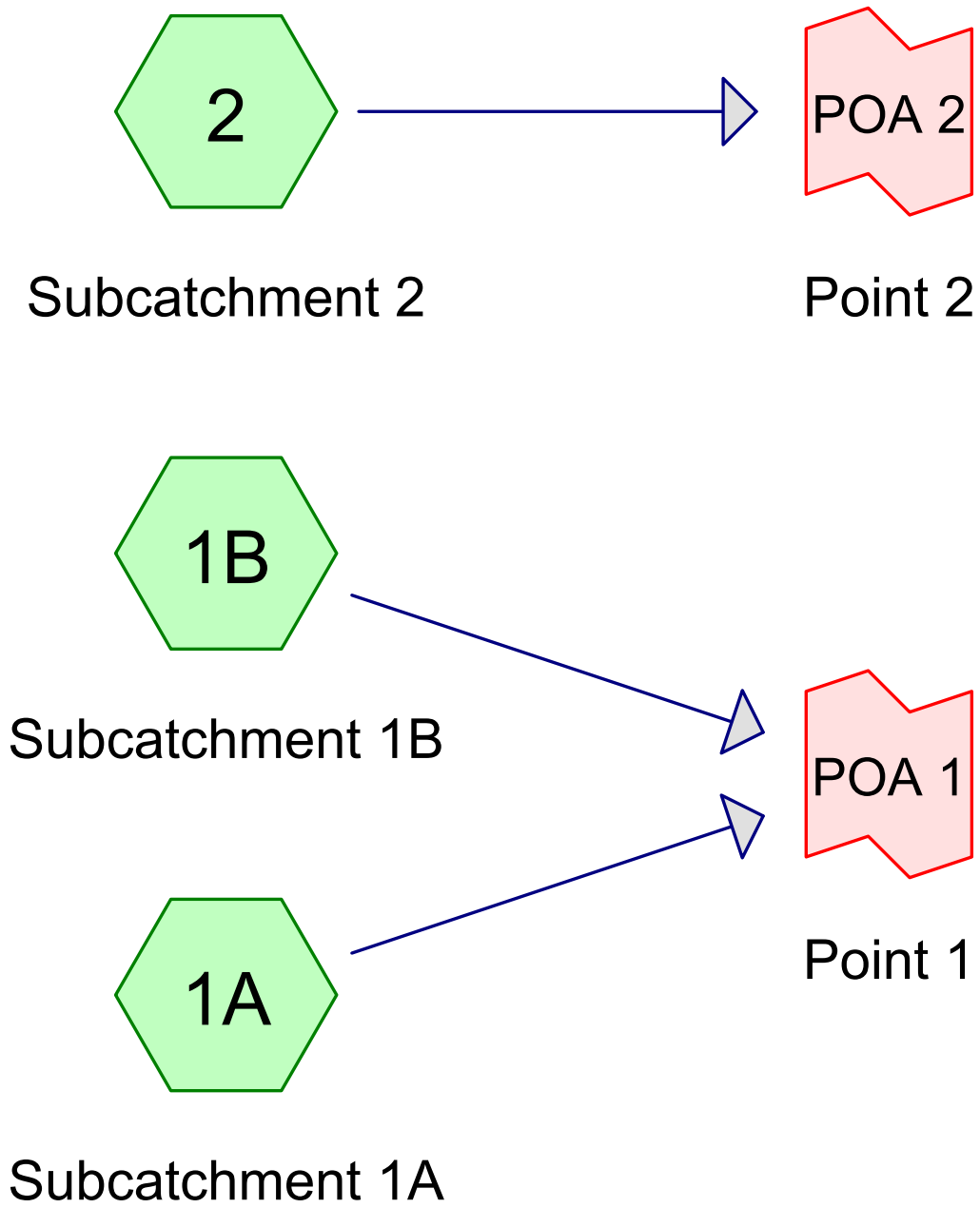
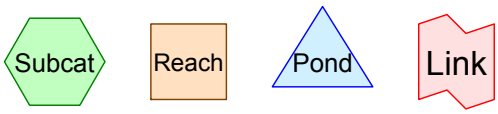
JOB: 19-066

POST

APPENDIX B





Routing Diagram for 19066-CivilD-Pre
Prepared by MJS Engineering, PC, Printed 2/4/2020
HydroCAD® 10.00-25 s/n 08064 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
691,945	74	>75% Grass cover, Good, HSG C (1A, 1B, 2)
52,211	98	Paved parking, HSG C (1A, 1B, 2)
744,156	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
744,156	HSG C	1A, 1B, 2
0	HSG D	
0	Other	
744,156		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	691,945	0	0	691,945	>75% Grass cover, Good
0	0	52,211	0	0	52,211	Paved parking
0	**0**	**744,156**	**0**	**0**	**744,156**	**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: Subcatchment 1A Runoff Area=276,406 sf 12.63% Impervious Runoff Depth=0.05"
Flow Length=1,365' Tc=9.9 min CN=77 Runoff=0.07 cfs 1,101 cf

Subcatchment 1B: Subcatchment 1B Runoff Area=454,044 sf 2.24% Impervious Runoff Depth=0.03"
Flow Length=1,026' Tc=15.0 min CN=75 Runoff=0.04 cfs 1,147 cf

Subcatchment 2: Subcatchment 2 Runoff Area=13,706 sf 51.98% Impervious Runoff Depth=0.20"
Tc=0.0 min CN=86 Runoff=0.07 cfs 226 cf

Link POA 1: Point 1 Inflow=0.09 cfs 2,248 cf
Primary=0.09 cfs 2,248 cf

Link POA 2: Point 2 Inflow=0.07 cfs 226 cf
Primary=0.07 cfs 226 cf

Total Runoff Area = 744,156 sf Runoff Volume = 2,474 cf Average Runoff Depth = 0.04"
92.98% Pervious = 691,945 sf 7.02% Impervious = 52,211 sf

Summary for Subcatchment 1A: Subcatchment 1A

Runoff = 0.07 cfs @ 12.50 hrs, Volume= 1,101 cf, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
241,501	74	>75% Grass cover, Good, HSG C
34,905	98	Paved parking, HSG C
276,406	77	Weighted Average
241,501		87.37% Pervious Area
34,905		12.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.1200	2.49		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 3.30"
0.8	100	0.0430	2.07		**Shallow Concentrated Flow, B-->C** Nearly Bare & Untilled Kv= 10.0 fps
5.6	485	0.0430	1.45		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.2	730	0.0170	3.85	6.47	**Trap/Vee/Rect Channel Flow, D-->E** Bot.W=1.00' D=0.60' Z= 3.0 '/' Top.W=4.60' n= 0.025 Earth, clean & winding
9.9	1,365	Total			

Summary for Subcatchment 1B: Subcatchment 1B

Runoff = 0.04 cfs @ 13.92 hrs, Volume= 1,147 cf, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
443,862	74	>75% Grass cover, Good, HSG C
10,182	98	Paved parking, HSG C
454,044	75	Weighted Average
443,862		97.76% Pervious Area
10,182		2.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	100	0.1400	0.38		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 3.30"
10.6	926	0.0430	1.45		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
15.0	1,026	Total			

Summary for Subcatchment 2: Subcatchment 2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.07 cfs @ 12.01 hrs, Volume= 226 cf, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
6,582	74	>75% Grass cover, Good, HSG C
7,124	98	Paved parking, HSG C
13,706	86	Weighted Average
6,582		48.02% Pervious Area
7,124		51.98% Impervious Area

Summary for Link POA 1: Point 1

Inflow Area = 730,450 sf, 6.17% Impervious, Inflow Depth = 0.04" for 1" event
Inflow = 0.09 cfs @ 13.72 hrs, Volume= 2,248 cf
Primary = 0.09 cfs @ 13.72 hrs, Volume= 2,248 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Link POA 2: Point 2

Inflow Area = 13,706 sf, 51.98% Impervious, Inflow Depth = 0.20" for 1" event
Inflow = 0.07 cfs @ 12.01 hrs, Volume= 226 cf
Primary = 0.07 cfs @ 12.01 hrs, Volume= 226 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: Subcatchment 1A Runoff Area=276,406 sf 12.63% Impervious Runoff Depth=1.28"
Flow Length=1,365' Tc=9.9 min CN=77 Runoff=8.15 cfs 29,570 cf

Subcatchment 1B: Subcatchment 1B Runoff Area=454,044 sf 2.24% Impervious Runoff Depth=1.16"
Flow Length=1,026' Tc=15.0 min CN=75 Runoff=10.27 cfs 43,974 cf

Subcatchment 2: Subcatchment 2 Runoff Area=13,706 sf 51.98% Impervious Runoff Depth=1.92"
Tc=0.0 min CN=86 Runoff=0.87 cfs 2,196 cf

Link POA 1: Point 1 Inflow=17.64 cfs 73,544 cf
Primary=17.64 cfs 73,544 cf

Link POA 2: Point 2 Inflow=0.87 cfs 2,196 cf
Primary=0.87 cfs 2,196 cf

Total Runoff Area = 744,156 sf Runoff Volume = 75,739 cf Average Runoff Depth = 1.22"
92.98% Pervious = 691,945 sf 7.02% Impervious = 52,211 sf

Summary for Subcatchment 1A: Subcatchment 1A

Runoff = 8.15 cfs @ 12.15 hrs, Volume= 29,570 cf, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR (3.3")(DEP CH.500) Rainfall=3.30"

Area (sf)	CN	Description
241,501	74	>75% Grass cover, Good, HSG C
34,905	98	Paved parking, HSG C
276,406	77	Weighted Average
241,501		87.37% Pervious Area
34,905		12.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.1200	2.49		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 3.30"
0.8	100	0.0430	2.07		**Shallow Concentrated Flow, B-->C** Nearly Bare & Untilled Kv= 10.0 fps
5.6	485	0.0430	1.45		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.2	730	0.0170	3.85	6.47	**Trap/Vee/Rect Channel Flow, D-->E** Bot.W=1.00' D=0.60' Z= 3.0 '/' Top.W=4.60' n= 0.025 Earth, clean & winding
9.9	1,365	Total			

Summary for Subcatchment 1B: Subcatchment 1B

Runoff = 10.27 cfs @ 12.22 hrs, Volume= 43,974 cf, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR (3.3")(DEP CH.500) Rainfall=3.30"

Area (sf)	CN	Description
443,862	74	>75% Grass cover, Good, HSG C
10,182	98	Paved parking, HSG C
454,044	75	Weighted Average
443,862		97.76% Pervious Area
10,182		2.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	100	0.1400	0.38		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 3.30"
10.6	926	0.0430	1.45		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
15.0	1,026	Total			

Summary for Subcatchment 2: Subcatchment 2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.87 cfs @ 12.00 hrs, Volume= 2,196 cf, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR (3.3")(DEP CH.500) Rainfall=3.30"

Area (sf)	CN	Description
6,582	74	>75% Grass cover, Good, HSG C
7,124	98	Paved parking, HSG C
13,706	86	Weighted Average
6,582		48.02% Pervious Area
7,124		51.98% Impervious Area

Summary for Link POA 1: Point 1

Inflow Area = 730,450 sf, 6.17% Impervious, Inflow Depth = 1.21" for 2-YR (3.3")(DEP CH.500) event
Inflow = 17.64 cfs @ 12.18 hrs, Volume= 73,544 cf
Primary = 17.64 cfs @ 12.18 hrs, Volume= 73,544 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Link POA 2: Point 2

Inflow Area = 13,706 sf, 51.98% Impervious, Inflow Depth = 1.92" for 2-YR (3.3")(DEP CH.500) event
Inflow = 0.87 cfs @ 12.00 hrs, Volume= 2,196 cf
Primary = 0.87 cfs @ 12.00 hrs, Volume= 2,196 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: Subcatchment 1A Runoff Area=276,406 sf 12.63% Impervious Runoff Depth=2.54"
Flow Length=1,365' Tc=9.9 min CN=77 Runoff=16.53 cfs 58,496 cf

Subcatchment 1B: Subcatchment 1B Runoff Area=454,044 sf 2.24% Impervious Runoff Depth=2.37"
Flow Length=1,026' Tc=15.0 min CN=75 Runoff=21.77 cfs 89,614 cf

Subcatchment 2: Subcatchment 2 Runoff Area=13,706 sf 51.98% Impervious Runoff Depth=3.37"
Tc=0.0 min CN=86 Runoff=1.50 cfs 3,853 cf

Link POA 1: Point 1 Inflow=36.81 cfs 148,110 cf
Primary=36.81 cfs 148,110 cf

Link POA 2: Point 2 Inflow=1.50 cfs 3,853 cf
Primary=1.50 cfs 3,853 cf

Total Runoff Area = 744,156 sf Runoff Volume = 151,963 cf Average Runoff Depth = 2.45"
92.98% Pervious = 691,945 sf 7.02% Impervious = 52,211 sf

Summary for Subcatchment 1A: Subcatchment 1A

Runoff = 16.53 cfs @ 12.14 hrs, Volume= 58,496 cf, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR (4.9")(DEP CH.500) Rainfall=4.90"

Area (sf)	CN	Description
241,501	74	>75% Grass cover, Good, HSG C
34,905	98	Paved parking, HSG C
276,406	77	Weighted Average
241,501		87.37% Pervious Area
34,905		12.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.1200	2.49		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 3.30"
0.8	100	0.0430	2.07		**Shallow Concentrated Flow, B-->C** Nearly Bare & Untilled Kv= 10.0 fps
5.6	485	0.0430	1.45		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.2	730	0.0170	3.85	6.47	**Trap/Vee/Rect Channel Flow, D-->E** Bot.W=1.00' D=0.60' Z= 3.0 '/' Top.W=4.60' n= 0.025 Earth, clean & winding
9.9	1,365	Total			

Summary for Subcatchment 1B: Subcatchment 1B

Runoff = 21.77 cfs @ 12.21 hrs, Volume= 89,614 cf, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR (4.9")(DEP CH.500) Rainfall=4.90"

Area (sf)	CN	Description
443,862	74	>75% Grass cover, Good, HSG C
10,182	98	Paved parking, HSG C
454,044	75	Weighted Average
443,862		97.76% Pervious Area
10,182		2.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	100	0.1400	0.38		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 3.30"
10.6	926	0.0430	1.45		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
15.0	1,026	Total			

Summary for Subcatchment 2: Subcatchment 2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.50 cfs @ 12.00 hrs, Volume= 3,853 cf, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR (4.9")(DEP CH.500) Rainfall=4.90"

Area (sf)	CN	Description
6,582	74	>75% Grass cover, Good, HSG C
7,124	98	Paved parking, HSG C
13,706	86	Weighted Average
6,582		48.02% Pervious Area
7,124		51.98% Impervious Area

Summary for Link POA 1: Point 1

Inflow Area = 730,450 sf, 6.17% Impervious, Inflow Depth = 2.43" for 10-YR (4.9")(DEP CH.500) event
Inflow = 36.81 cfs @ 12.18 hrs, Volume= 148,110 cf
Primary = 36.81 cfs @ 12.18 hrs, Volume= 148,110 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Link POA 2: Point 2

Inflow Area = 13,706 sf, 51.98% Impervious, Inflow Depth = 3.37" for 10-YR (4.9")(DEP CH.500) event
Inflow = 1.50 cfs @ 12.00 hrs, Volume= 3,853 cf
Primary = 1.50 cfs @ 12.00 hrs, Volume= 3,853 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1A: Subcatchment 1A Runoff Area=276,406 sf 12.63% Impervious Runoff Depth=3.65"
Flow Length=1,365' Tc=9.9 min CN=77 Runoff=23.81 cfs 84,173 cf

Subcatchment 1B: Subcatchment 1B Runoff Area=454,044 sf 2.24% Impervious Runoff Depth=3.45"
Flow Length=1,026' Tc=15.0 min CN=75 Runoff=31.92 cfs 130,656 cf

Subcatchment 2: Subcatchment 2 Runoff Area=13,706 sf 51.98% Impervious Runoff Depth=4.60"
Tc=0.0 min CN=86 Runoff=2.02 cfs 5,254 cf

Link POA 1: Point 1 Inflow=53.61 cfs 214,829 cf
Primary=53.61 cfs 214,829 cf

Link POA 2: Point 2 Inflow=2.02 cfs 5,254 cf
Primary=2.02 cfs 5,254 cf

Total Runoff Area = 744,156 sf Runoff Volume = 220,083 cf Average Runoff Depth = 3.55"
92.98% Pervious = 691,945 sf 7.02% Impervious = 52,211 sf

Summary for Subcatchment 1A: Subcatchment 1A

Runoff = 23.81 cfs @ 12.14 hrs, Volume= 84,173 cf, Depth= 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR (6.2")(DEP CH.500) Rainfall=6.20"

Area (sf)	CN	Description
241,501	74	>75% Grass cover, Good, HSG C
34,905	98	Paved parking, HSG C
276,406	77	Weighted Average
241,501		87.37% Pervious Area
34,905		12.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.1200	2.49		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 3.30"
0.8	100	0.0430	2.07		**Shallow Concentrated Flow, B-->C** Nearly Bare & Untilled Kv= 10.0 fps
5.6	485	0.0430	1.45		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.2	730	0.0170	3.85	6.47	**Trap/Vee/Rect Channel Flow, D-->E** Bot.W=1.00' D=0.60' Z= 3.0 '/' Top.W=4.60' n= 0.025 Earth, clean & winding
9.9	1,365	Total			

Summary for Subcatchment 1B: Subcatchment 1B

Runoff = 31.92 cfs @ 12.21 hrs, Volume= 130,656 cf, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR (6.2")(DEP CH.500) Rainfall=6.20"

Area (sf)	CN	Description
443,862	74	>75% Grass cover, Good, HSG C
10,182	98	Paved parking, HSG C
454,044	75	Weighted Average
443,862		97.76% Pervious Area
10,182		2.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	100	0.1400	0.38		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 3.30"
10.6	926	0.0430	1.45		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
15.0	1,026	Total			

Summary for Subcatchment 2: Subcatchment 2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.02 cfs @ 12.00 hrs, Volume= 5,254 cf, Depth= 4.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR (6.2")(DEP CH.500) Rainfall=6.20"

Area (sf)	CN	Description
6,582	74	>75% Grass cover, Good, HSG C
7,124	98	Paved parking, HSG C
13,706	86	Weighted Average
6,582		48.02% Pervious Area
7,124		51.98% Impervious Area

Summary for Link POA 1: Point 1

Inflow Area = 730,450 sf, 6.17% Impervious, Inflow Depth = 3.53" for 25-YR (6.2")(DEP CH.500) event
Inflow = 53.61 cfs @ 12.17 hrs, Volume= 214,829 cf
Primary = 53.61 cfs @ 12.17 hrs, Volume= 214,829 cf, Atten= 0%, Lag= 0.0 min

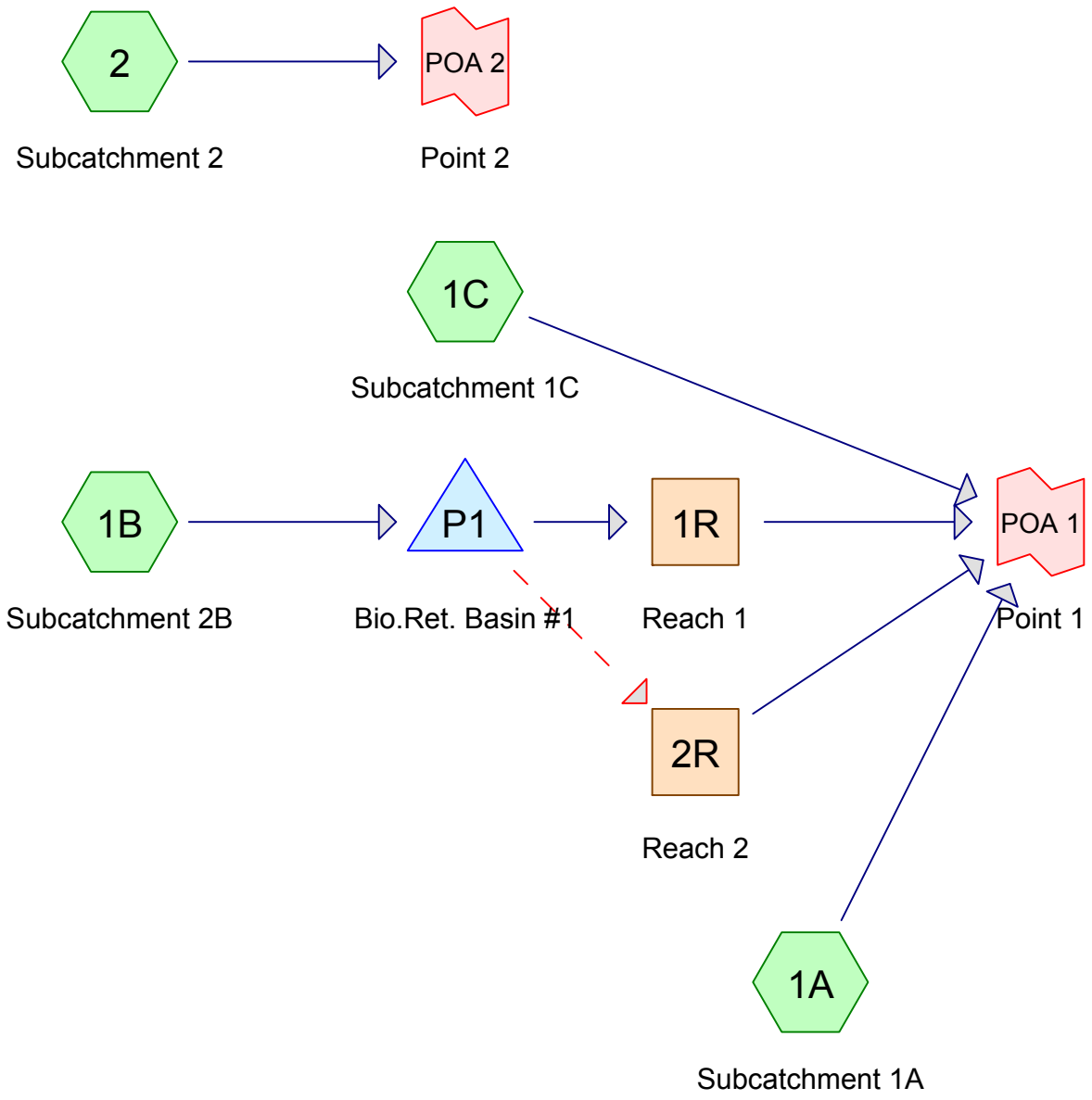
Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

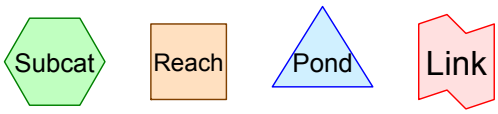
Summary for Link POA 2: Point 2

Inflow Area = 13,706 sf, 51.98% Impervious, Inflow Depth = 4.60" for 25-YR (6.2")(DEP CH.500) event
Inflow = 2.02 cfs @ 12.00 hrs, Volume= 5,254 cf
Primary = 2.02 cfs @ 12.00 hrs, Volume= 5,254 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

APPENDIX C





Routing Diagram for 19066-CivilD-Post-PHASE1
Prepared by MJS Engineering, PC, Printed 2/4/2020
HydroCAD® 10.00-25 s/n 08064 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
675,413	74	>75% Grass cover, Good, HSG C (1A, 1B, 1C, 2)
68,744	98	Paved parking, HSG C (1A, 1B, 1C, 2)
744,157	**76**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
744,157	HSG C	1A, 1B, 1C, 2
0	HSG D	
0	Other	
744,157		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	675,413	0	0	675,413	>75% Grass cover, Good
0	0	68,744	0	0	68,744	Paved parking
0	**0**	**744,157**	**0**	**0**	**744,157**	**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1A Runoff Area=262,216 sf 12.54% Impervious Runoff Depth=0.05"
Flow Length=1,365' Tc=9.9 min CN=77 Runoff=0.07 cfs 1,045 cf

Subcatchment 1B: Subcatchment 2B Runoff Area=170,643 sf 8.37% Impervious Runoff Depth=0.04"
Flow Length=900' Tc=11.4 min CN=76 Runoff=0.02 cfs 547 cf

Subcatchment 1C: Subcatchment 1C Runoff Area=297,592 sf 4.85% Impervious Runoff Depth=0.03"
Tc=15.0 min CN=75 Runoff=0.03 cfs 751 cf

Subcatchment 2: Subcatchment 2 Runoff Area=13,706 sf 51.98% Impervious Runoff Depth=0.20"
Tc=0.0 min CN=86 Runoff=0.07 cfs 226 cf

Reach 1R: Reach 1 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
n=0.030 L=140.0' S=0.0700 '/' Capacity=727.33 cfs Outflow=0.00 cfs 0 cf

Reach 2R: Reach 2 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
n=0.030 L=140.0' S=0.0929 '/' Capacity=402.50 cfs Outflow=0.00 cfs 0 cf

Pond P1: Bio.Ret. Basin #1 Peak Elev=106.15' Storage=547 cf Inflow=0.02 cfs 547 cf
Primary=0.00 cfs 0 cf Secondary=0.00 cfs 0 cf Outflow=0.00 cfs 0 cf

Link POA 1: Point 1 Inflow=0.07 cfs 1,796 cf
Primary=0.07 cfs 1,796 cf

Link POA 2: Point 2 Inflow=0.07 cfs 226 cf
Primary=0.07 cfs 226 cf

Total Runoff Area = 744,157 sf Runoff Volume = 2,569 cf Average Runoff Depth = 0.04"
90.76% Pervious = 675,413 sf 9.24% Impervious = 68,744 sf

Summary for Subcatchment 1A: Subcatchment 1A

Runoff = 0.07 cfs @ 12.50 hrs, Volume= 1,045 cf, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
229,334	74	>75% Grass cover, Good, HSG C
32,882	98	Paved parking, HSG C
262,216	77	Weighted Average
229,334		87.46% Pervious Area
32,882		12.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.1200	2.49		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 3.30"
0.8	100	0.0430	2.07		**Shallow Concentrated Flow, B-->C** Nearly Bare & Untilled Kv= 10.0 fps
5.6	485	0.0430	1.45		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.2	730	0.0170	3.85	6.47	**Trap/Vee/Rect Channel Flow, D-->E** Bot.W=1.00' D=0.60' Z= 3.0 '/' Top.W=4.60' n= 0.025 Earth, clean & winding
9.9	1,365	Total			

Summary for Subcatchment 1B: Subcatchment 2B

Runoff = 0.02 cfs @ 12.58 hrs, Volume= 547 cf, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
156,352	74	>75% Grass cover, Good, HSG C
14,291	98	Paved parking, HSG C
170,643	76	Weighted Average
156,352		91.63% Pervious Area
14,291		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	100	0.1400	0.38		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 3.30"
5.8	500	0.0420	1.43		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
1.2	300	0.0200	4.09	7.15	**Trap/Vee/Rect Channel Flow, C-->D** Bot.W=2.00' D=0.50' Z= 3.0 '/' Top.W=5.00' n= 0.025 Earth, clean & winding
11.4	900	Total			

Summary for Subcatchment 1C: Subcatchment 1C

Runoff = 0.03 cfs @ 13.92 hrs, Volume= 751 cf, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
283,145	74	>75% Grass cover, Good, HSG C
14,447	98	Paved parking, HSG C
297,592	75	Weighted Average
283,145		95.15% Pervious Area
14,447		4.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment 2: Subcatchment 2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.07 cfs @ 12.01 hrs, Volume= 226 cf, Depth= 0.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 1" Rainfall=1.00"

Area (sf)	CN	Description
6,582	74	>75% Grass cover, Good, HSG C
7,124	98	Paved parking, HSG C
13,706	86	Weighted Average
6,582		48.02% Pervious Area
7,124		51.98% Impervious Area

Summary for Reach 1R: Reach 1

Inflow Area = 170,643 sf, 8.37% Impervious, Inflow Depth = 0.00" for 1" event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 3.00' Flow Area= 39.0 sf, Capacity= 727.33 cfs

4.00' x 3.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 140.0' Slope= 0.0700 '/'
Inlet Invert= 104.00', Outlet Invert= 94.20'

‡

Summary for Reach 2R: Reach 2

Inflow	=	0.00 cfs @	0.00 hrs, Volume=	0 cf	
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0 cf,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 402.50 cfs

4.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 20.00'
Length= 140.0' Slope= 0.0929 '/'
Inlet Invert= 107.00', Outlet Invert= 94.00'

‡

Summary for Pond P1: Bio.Ret. Basin #1

Inflow Area =	170,643 sf,	8.37% Impervious,	Inflow Depth =	0.04"	for 1" event
Inflow	=	0.02 cfs @	12.58 hrs, Volume=	547 cf	
Outflow	=	0.00 cfs @	0.00 hrs, Volume=	0 cf,	Atten= 100%, Lag= 0.0 min
Primary	=	0.00 cfs @	0.00 hrs, Volume=	0 cf	
Secondary	=	0.00 cfs @	0.00 hrs, Volume=	0 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 106.15' @ 24.66 hrs Surf.Area= 2,962 sf Storage= 547 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	17,740 cf	**Custom Stage Data (Irregular)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
106.00	1,402	150.0	0	0	1,402
106.50	6,715	431.0	1,864	1,864	14,395
108.00	15,000	567.0	15,876	17,740	25,222

Device	Routing	Invert	Outlet Devices
#1	Secondary	107.50'	**25.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Primary	105.00'	**6.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	106.50'	**6.0" Horiz. Top of stand pipe** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.00' TW=104.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 0.73 cfs potential flow)
  └─**3=Top of stand pipe** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.00' TW=107.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link POA 1: Point 1

Inflow Area = 730,451 sf, 8.44% Impervious, Inflow Depth = 0.03" for 1" event
Inflow = 0.07 cfs @ 12.53 hrs, Volume= 1,796 cf
Primary = 0.07 cfs @ 12.53 hrs, Volume= 1,796 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Link POA 2: Point 2

Inflow Area = 13,706 sf, 51.98% Impervious, Inflow Depth = 0.20" for 1" event
Inflow = 0.07 cfs @ 12.01 hrs, Volume= 226 cf
Primary = 0.07 cfs @ 12.01 hrs, Volume= 226 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1A Runoff Area=262,216 sf 12.54% Impervious Runoff Depth=1.28"
Flow Length=1,365' Tc=9.9 min CN=77 Runoff=7.73 cfs 28,052 cf

Subcatchment 1B: Subcatchment 2B Runoff Area=170,643 sf 8.37% Impervious Runoff Depth=1.22"
Flow Length=900' Tc=11.4 min CN=76 Runoff=4.53 cfs 17,379 cf

Subcatchment 1C: Subcatchment 1C Runoff Area=297,592 sf 4.85% Impervious Runoff Depth=1.16"
Tc=15.0 min CN=75 Runoff=6.73 cfs 28,822 cf

Subcatchment 2: Subcatchment 2 Runoff Area=13,706 sf 51.98% Impervious Runoff Depth=1.92"
Tc=0.0 min CN=86 Runoff=0.87 cfs 2,196 cf

Reach 1R: Reach 1 Avg. Flow Depth=0.07' Max Vel=2.24 fps Inflow=0.68 cfs 15,462 cf
n=0.030 L=140.0' S=0.0700 '/' Capacity=727.33 cfs Outflow=0.68 cfs 15,462 cf

Reach 2R: Reach 2 Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0 cf
n=0.030 L=140.0' S=0.0929 '/' Capacity=402.50 cfs Outflow=0.00 cfs 0 cf

Pond P1: Bio.Ret. Basin #1 Peak Elev=107.02' Storage=7,352 cf Inflow=4.53 cfs 17,379 cf
Primary=0.68 cfs 15,462 cf Secondary=0.00 cfs 0 cf Outflow=0.68 cfs 15,462 cf

Link POA 1: Point 1 Inflow=14.14 cfs 72,335 cf
Primary=14.14 cfs 72,335 cf

Link POA 2: Point 2 Inflow=0.87 cfs 2,196 cf
Primary=0.87 cfs 2,196 cf

Total Runoff Area = 744,157 sf Runoff Volume = 76,448 cf Average Runoff Depth = 1.23"
90.76% Pervious = 675,413 sf 9.24% Impervious = 68,744 sf

Summary for Subcatchment 1A: Subcatchment 1A

Runoff = 7.73 cfs @ 12.15 hrs, Volume= 28,052 cf, Depth= 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR (3.3")(DEP CH.500) Rainfall=3.30"

Area (sf)	CN	Description
229,334	74	>75% Grass cover, Good, HSG C
32,882	98	Paved parking, HSG C
262,216	77	Weighted Average
229,334		87.46% Pervious Area
32,882		12.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.1200	2.49		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 3.30"
0.8	100	0.0430	2.07		**Shallow Concentrated Flow, B-->C** Nearly Bare & Untilled Kv= 10.0 fps
5.6	485	0.0430	1.45		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.2	730	0.0170	3.85	6.47	**Trap/Vee/Rect Channel Flow, D-->E** Bot.W=1.00' D=0.60' Z= 3.0 '/' Top.W=4.60' n= 0.025 Earth, clean & winding
9.9	1,365	Total			

Summary for Subcatchment 1B: Subcatchment 2B

Runoff = 4.53 cfs @ 12.17 hrs, Volume= 17,379 cf, Depth= 1.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR (3.3")(DEP CH.500) Rainfall=3.30"

Area (sf)	CN	Description
156,352	74	>75% Grass cover, Good, HSG C
14,291	98	Paved parking, HSG C
170,643	76	Weighted Average
156,352		91.63% Pervious Area
14,291		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	100	0.1400	0.38		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 3.30"
5.8	500	0.0420	1.43		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
1.2	300	0.0200	4.09	7.15	**Trap/Vee/Rect Channel Flow, C-->D** Bot.W=2.00' D=0.50' Z= 3.0 '/' Top.W=5.00' n= 0.025 Earth, clean & winding
11.4	900	Total			

Summary for Subcatchment 1C: Subcatchment 1C

Runoff = 6.73 cfs @ 12.22 hrs, Volume= 28,822 cf, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR (3.3")(DEP CH.500) Rainfall=3.30"

Area (sf)	CN	Description
283,145	74	>75% Grass cover, Good, HSG C
14,447	98	Paved parking, HSG C
297,592	75	Weighted Average
283,145		95.15% Pervious Area
14,447		4.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment 2: Subcatchment 2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.87 cfs @ 12.00 hrs, Volume= 2,196 cf, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-YR (3.3")(DEP CH.500) Rainfall=3.30"

Area (sf)	CN	Description
6,582	74	>75% Grass cover, Good, HSG C
7,124	98	Paved parking, HSG C
13,706	86	Weighted Average
6,582		48.02% Pervious Area
7,124		51.98% Impervious Area

Summary for Reach 1R: Reach 1

Inflow Area = 170,643 sf, 8.37% Impervious, Inflow Depth > 1.09" for 2-YR (3.3")(DEP CH.500) event
Inflow = 0.68 cfs @ 13.02 hrs, Volume= 15,462 cf
Outflow = 0.68 cfs @ 13.03 hrs, Volume= 15,462 cf, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.24 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 1.6 min

Peak Storage= 43 cf @ 13.03 hrs
Average Depth at Peak Storage= 0.07'
Bank-Full Depth= 3.00' Flow Area= 39.0 sf, Capacity= 727.33 cfs

4.00' x 3.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 140.0' Slope= 0.0700 '/'
Inlet Invert= 104.00', Outlet Invert= 94.20'

‡

Summary for Reach 2R: Reach 2

Inflow	=	0.00 cfs @	0.00 hrs,	Volume=	0 cf
Outflow	=	0.00 cfs @	0.00 hrs,	Volume=	0 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 402.50 cfs

4.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 20.00'
Length= 140.0' Slope= 0.0929 '/'
Inlet Invert= 107.00', Outlet Invert= 94.00'

‡

Summary for Pond P1: Bio.Ret. Basin #1

Inflow Area = 170,643 sf, 8.37% Impervious, Inflow Depth = 1.22" for 2-YR (3.3")(DEP CH.500) event

Inflow	=	4.53 cfs @	12.17 hrs,	Volume=	17,379 cf
Outflow	=	0.68 cfs @	13.02 hrs,	Volume=	15,462 cf, Atten= 85%, Lag= 50.9 min
Primary	=	0.68 cfs @	13.02 hrs,	Volume=	15,462 cf
Secondary	=	0.00 cfs @	0.00 hrs,	Volume=	0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 107.02' @ 13.02 hrs Surf.Area= 9,579 sf Storage= 7,352 cf

Plug-Flow detention time= 184.3 min calculated for 15,462 cf (89% of inflow)
Center-of-Mass det. time= 131.6 min (990.4 - 858.8)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	17,740 cf	**Custom Stage Data (Irregular)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
106.00	1,402	150.0	0	0	1,402
106.50	6,715	431.0	1,864	1,864	14,395
108.00	15,000	567.0	15,876	17,740	25,222

Device	Routing	Invert	Outlet Devices
#1	Secondary	107.50'	**25.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Primary	105.00'	**6.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	106.50'	**6.0" Horiz. Top of stand pipe** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.68 cfs @ 13.02 hrs HW=107.02' TW=104.07' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.68 cfs of 0.94 cfs potential flow)
  └─**3=Top of stand pipe** (Orifice Controls 0.68 cfs @ 3.47 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=106.00' TW=107.00' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link POA 1: Point 1

Inflow Area = 730,451 sf, 8.44% Impervious, Inflow Depth > 1.19" for 2-YR (3.3")(DEP CH.500) event
Inflow = 14.14 cfs @ 12.18 hrs, Volume= 72,335 cf
Primary = 14.14 cfs @ 12.18 hrs, Volume= 72,335 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Link POA 2: Point 2

Inflow Area = 13,706 sf, 51.98% Impervious, Inflow Depth = 1.92" for 2-YR (3.3")(DEP CH.500) event
Inflow = 0.87 cfs @ 12.00 hrs, Volume= 2,196 cf
Primary = 0.87 cfs @ 12.00 hrs, Volume= 2,196 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1A Runoff Area=262,216 sf 12.54% Impervious Runoff Depth=2.54"
Flow Length=1,365' Tc=9.9 min CN=77 Runoff=15.68 cfs 55,493 cf

Subcatchment 1B: Subcatchment 2B Runoff Area=170,643 sf 8.37% Impervious Runoff Depth=2.45"
Flow Length=900' Tc=11.4 min CN=76 Runoff=9.39 cfs 34,887 cf

Subcatchment 1C: Subcatchment 1C Runoff Area=297,592 sf 4.85% Impervious Runoff Depth=2.37"
Tc=15.0 min CN=75 Runoff=14.27 cfs 58,735 cf

Subcatchment 2: Subcatchment 2 Runoff Area=13,706 sf 51.98% Impervious Runoff Depth=3.37"
Tc=0.0 min CN=86 Runoff=1.50 cfs 3,853 cf

Reach 1R: Reach 1 Avg. Flow Depth=0.09' Max Vel=2.56 fps Inflow=1.01 cfs 28,438 cf
n=0.030 L=140.0' S=0.0700 '/' Capacity=727.33 cfs Outflow=1.01 cfs 28,438 cf

Reach 2R: Reach 2 Avg. Flow Depth=0.15' Max Vel=3.98 fps Inflow=2.84 cfs 4,527 cf
n=0.030 L=140.0' S=0.0929 '/' Capacity=402.50 cfs Outflow=2.84 cfs 4,527 cf

Pond P1: Bio.Ret. Basin #1 Peak Elev=107.63' Storage=13,844 cf Inflow=9.39 cfs 34,887 cf
Primary=1.01 cfs 28,438 cf Secondary=2.84 cfs 4,527 cf Outflow=3.84 cfs 32,965 cf

Link POA 1: Point 1 Inflow=29.52 cfs 147,193 cf
Primary=29.52 cfs 147,193 cf

Link POA 2: Point 2 Inflow=1.50 cfs 3,853 cf
Primary=1.50 cfs 3,853 cf

Total Runoff Area = 744,157 sf Runoff Volume = 152,969 cf Average Runoff Depth = 2.47"
90.76% Pervious = 675,413 sf 9.24% Impervious = 68,744 sf

Summary for Subcatchment 1A: Subcatchment 1A

Runoff = 15.68 cfs @ 12.14 hrs, Volume= 55,493 cf, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR (4.9")(DEP CH.500) Rainfall=4.90"

Area (sf)	CN	Description
229,334	74	>75% Grass cover, Good, HSG C
32,882	98	Paved parking, HSG C
262,216	77	Weighted Average
229,334		87.46% Pervious Area
32,882		12.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.1200	2.49		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 3.30"
0.8	100	0.0430	2.07		**Shallow Concentrated Flow, B-->C** Nearly Bare & Untilled Kv= 10.0 fps
5.6	485	0.0430	1.45		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.2	730	0.0170	3.85	6.47	**Trap/Vee/Rect Channel Flow, D-->E** Bot.W=1.00' D=0.60' Z= 3.0 '/' Top.W=4.60' n= 0.025 Earth, clean & winding
9.9	1,365	Total			

Summary for Subcatchment 1B: Subcatchment 2B

Runoff = 9.39 cfs @ 12.16 hrs, Volume= 34,887 cf, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR (4.9")(DEP CH.500) Rainfall=4.90"

Area (sf)	CN	Description
156,352	74	>75% Grass cover, Good, HSG C
14,291	98	Paved parking, HSG C
170,643	76	Weighted Average
156,352		91.63% Pervious Area
14,291		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	100	0.1400	0.38		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 3.30"
5.8	500	0.0420	1.43		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
1.2	300	0.0200	4.09	7.15	**Trap/Vee/Rect Channel Flow, C-->D** Bot.W=2.00' D=0.50' Z= 3.0 '/' Top.W=5.00' n= 0.025 Earth, clean & winding
11.4	900	Total			

Summary for Subcatchment 1C: Subcatchment 1C

Runoff = 14.27 cfs @ 12.21 hrs, Volume= 58,735 cf, Depth= 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR (4.9")(DEP CH.500) Rainfall=4.90"

Area (sf)	CN	Description
283,145	74	>75% Grass cover, Good, HSG C
14,447	98	Paved parking, HSG C
297,592	75	Weighted Average
283,145		95.15% Pervious Area
14,447		4.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment 2: Subcatchment 2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 1.50 cfs @ 12.00 hrs, Volume= 3,853 cf, Depth= 3.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-YR (4.9")(DEP CH.500) Rainfall=4.90"

Area (sf)	CN	Description
6,582	74	>75% Grass cover, Good, HSG C
7,124	98	Paved parking, HSG C
13,706	86	Weighted Average
6,582		48.02% Pervious Area
7,124		51.98% Impervious Area

Summary for Reach 1R: Reach 1

Inflow Area = 170,643 sf, 8.37% Impervious, Inflow Depth > 2.00" for 10-YR (4.9")(DEP CH.500) event
Inflow = 1.01 cfs @ 12.49 hrs, Volume= 28,438 cf
Outflow = 1.01 cfs @ 12.50 hrs, Volume= 28,438 cf, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.56 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.67 fps, Avg. Travel Time= 1.4 min

Peak Storage= 55 cf @ 12.50 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 3.00' Flow Area= 39.0 sf, Capacity= 727.33 cfs

4.00' x 3.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 140.0' Slope= 0.0700 '/'
Inlet Invert= 104.00', Outlet Invert= 94.20'

‡

Summary for Reach 2R: Reach 2

Inflow	=	2.84 cfs @	12.49 hrs,	Volume=	4,527 cf
Outflow	=	2.84 cfs @	12.50 hrs,	Volume=	4,527 cf, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.98 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.09 fps, Avg. Travel Time= 1.1 min

Peak Storage= 100 cf @ 12.50 hrs
Average Depth at Peak Storage= 0.15'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 402.50 cfs

4.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 20.00'
Length= 140.0' Slope= 0.0929 '/'
Inlet Invert= 107.00', Outlet Invert= 94.00'

‡

Summary for Pond P1: Bio.Ret. Basin #1

Inflow Area = 170,643 sf, 8.37% Impervious, Inflow Depth = 2.45" for 10-YR (4.9")(DEP CH.500) event

Inflow	=	9.39 cfs @	12.16 hrs,	Volume=	34,887 cf
Outflow	=	3.84 cfs @	12.49 hrs,	Volume=	32,965 cf, Atten= 59%, Lag= 20.0 min
Primary	=	1.01 cfs @	12.49 hrs,	Volume=	28,438 cf
Secondary	=	2.84 cfs @	12.49 hrs,	Volume=	4,527 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 107.63' @ 12.49 hrs Surf.Area= 12,967 sf Storage= 13,844 cf

Plug-Flow detention time= 168.5 min calculated for 32,956 cf (94% of inflow)
Center-of-Mass det. time= 139.1 min (977.4 - 838.3)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	17,740 cf	**Custom Stage Data (Irregular)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
106.00	1,402	150.0	0	0	1,402
106.50	6,715	431.0	1,864	1,864	14,395
108.00	15,000	567.0	15,876	17,740	25,222

Device	Routing	Invert	Outlet Devices
#1	Secondary	107.50'	**25.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Primary	105.00'	**6.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	106.50'	**6.0" Horiz. Top of stand pipe** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.01 cfs @ 12.49 hrs HW=107.63' TW=104.09' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.01 cfs of 1.05 cfs potential flow)
  └─**3=Top of stand pipe** (Orifice Controls 1.01 cfs @ 5.12 fps)

Secondary OutFlow Max=2.84 cfs @ 12.49 hrs HW=107.63' TW=107.15' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.84 cfs @ 0.86 fps)

Summary for Link POA 1: Point 1

Inflow Area = 730,451 sf, 8.44% Impervious, Inflow Depth = 2.42" for 10-YR (4.9")(DEP CH.500) event
Inflow = 29.52 cfs @ 12.17 hrs, Volume= 147,193 cf
Primary = 29.52 cfs @ 12.17 hrs, Volume= 147,193 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Link POA 2: Point 2

Inflow Area = 13,706 sf, 51.98% Impervious, Inflow Depth = 3.37" for 10-YR (4.9")(DEP CH.500) event
Inflow = 1.50 cfs @ 12.00 hrs, Volume= 3,853 cf
Primary = 1.50 cfs @ 12.00 hrs, Volume= 3,853 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A: Subcatchment 1A Runoff Area=262,216 sf 12.54% Impervious Runoff Depth=3.65"
Flow Length=1,365' Tc=9.9 min CN=77 Runoff=22.59 cfs 79,852 cf

Subcatchment 1B: Subcatchment 2B Runoff Area=170,643 sf 8.37% Impervious Runoff Depth=3.55"
Flow Length=900' Tc=11.4 min CN=76 Runoff=13.65 cfs 50,529 cf

Subcatchment 1C: Subcatchment 1C Runoff Area=297,592 sf 4.85% Impervious Runoff Depth=3.45"
Tc=15.0 min CN=75 Runoff=20.92 cfs 85,635 cf

Subcatchment 2: Subcatchment 2 Runoff Area=13,706 sf 51.98% Impervious Runoff Depth=4.60"
Tc=0.0 min CN=86 Runoff=2.02 cfs 5,254 cf

Reach 1R: Reach 1 Avg. Flow Depth=0.09' Max Vel=2.62 fps Inflow=1.07 cfs 33,661 cf
n=0.030 L=140.0' S=0.0700 '/' Capacity=727.33 cfs Outflow=1.07 cfs 33,661 cf

Reach 2R: Reach 2 Avg. Flow Depth=0.29' Max Vel=5.74 fps Inflow=8.62 cfs 14,943 cf
n=0.030 L=140.0' S=0.0929 '/' Capacity=402.50 cfs Outflow=8.62 cfs 14,943 cf

Pond P1: Bio.Ret. Basin #1 Peak Elev=107.77' Storage=15,335 cf Inflow=13.65 cfs 50,529 cf
Primary=1.07 cfs 33,661 cf Secondary=8.62 cfs 14,943 cf Outflow=9.69 cfs 48,603 cf

Link POA 1: Point 1 Inflow=46.38 cfs 214,090 cf
Primary=46.38 cfs 214,090 cf

Link POA 2: Point 2 Inflow=2.02 cfs 5,254 cf
Primary=2.02 cfs 5,254 cf

Total Runoff Area = 744,157 sf Runoff Volume = 221,270 cf Average Runoff Depth = 3.57"
90.76% Pervious = 675,413 sf 9.24% Impervious = 68,744 sf

Summary for Subcatchment 1A: Subcatchment 1A

Runoff = 22.59 cfs @ 12.14 hrs, Volume= 79,852 cf, Depth= 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR (6.2")(DEP CH.500) Rainfall=6.20"

Area (sf)	CN	Description
229,334	74	>75% Grass cover, Good, HSG C
32,882	98	Paved parking, HSG C
262,216	77	Weighted Average
229,334		87.46% Pervious Area
32,882		12.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.3	50	0.1200	2.49		**Sheet Flow, A-->B** Smooth surfaces n= 0.011 P2= 3.30"
0.8	100	0.0430	2.07		**Shallow Concentrated Flow, B-->C** Nearly Bare & Untilled Kv= 10.0 fps
5.6	485	0.0430	1.45		**Shallow Concentrated Flow, C-->D** Short Grass Pasture Kv= 7.0 fps
3.2	730	0.0170	3.85	6.47	**Trap/Vee/Rect Channel Flow, D-->E** Bot.W=1.00' D=0.60' Z= 3.0 '/' Top.W=4.60' n= 0.025 Earth, clean & winding
9.9	1,365	Total			

Summary for Subcatchment 1B: Subcatchment 2B

Runoff = 13.65 cfs @ 12.16 hrs, Volume= 50,529 cf, Depth= 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR (6.2")(DEP CH.500) Rainfall=6.20"

Area (sf)	CN	Description
156,352	74	>75% Grass cover, Good, HSG C
14,291	98	Paved parking, HSG C
170,643	76	Weighted Average
156,352		91.63% Pervious Area
14,291		8.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	100	0.1400	0.38		**Sheet Flow, A-->B** Grass: Short n= 0.150 P2= 3.30"
5.8	500	0.0420	1.43		**Shallow Concentrated Flow, B-->C** Short Grass Pasture Kv= 7.0 fps
1.2	300	0.0200	4.09	7.15	**Trap/Vee/Rect Channel Flow, C-->D** Bot.W=2.00' D=0.50' Z= 3.0 '/' Top.W=5.00' n= 0.025 Earth, clean & winding
11.4	900	Total			

Summary for Subcatchment 1C: Subcatchment 1C

Runoff = 20.92 cfs @ 12.21 hrs, Volume= 85,635 cf, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR (6.2")(DEP CH.500) Rainfall=6.20"

Area (sf)	CN	Description
283,145	74	>75% Grass cover, Good, HSG C
14,447	98	Paved parking, HSG C
297,592	75	Weighted Average
283,145		95.15% Pervious Area
14,447		4.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment 2: Subcatchment 2

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.02 cfs @ 12.00 hrs, Volume= 5,254 cf, Depth= 4.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-YR (6.2")(DEP CH.500) Rainfall=6.20"

Area (sf)	CN	Description
6,582	74	>75% Grass cover, Good, HSG C
7,124	98	Paved parking, HSG C
13,706	86	Weighted Average
6,582		48.02% Pervious Area
7,124		51.98% Impervious Area

Summary for Reach 1R: Reach 1

Inflow Area = 170,643 sf, 8.37% Impervious, Inflow Depth > 2.37" for 25-YR (6.2")(DEP CH.500) event
Inflow = 1.07 cfs @ 12.29 hrs, Volume= 33,661 cf
Outflow = 1.07 cfs @ 12.30 hrs, Volume= 33,661 cf, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.62 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.74 fps, Avg. Travel Time= 1.3 min

Peak Storage= 57 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 3.00' Flow Area= 39.0 sf, Capacity= 727.33 cfs

4.00' x 3.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 3.0 '/' Top Width= 22.00'
Length= 140.0' Slope= 0.0700 '/'
Inlet Invert= 104.00', Outlet Invert= 94.20'

‡

Summary for Reach 2R: Reach 2

Inflow	=	8.62 cfs @	12.29 hrs,	Volume=	14,943 cf
Outflow	=	8.62 cfs @	12.29 hrs,	Volume=	14,943 cf, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.74 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.47 fps, Avg. Travel Time= 0.9 min

Peak Storage= 210 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 402.50 cfs

4.00' x 2.00' deep channel, n= 0.030 Short grass
Side Slope Z-value= 4.0 '/' Top Width= 20.00'
Length= 140.0' Slope= 0.0929 '/'
Inlet Invert= 107.00', Outlet Invert= 94.00'

‡

Summary for Pond P1: Bio.Ret. Basin #1

Inflow Area = 170,643 sf, 8.37% Impervious, Inflow Depth = 3.55" for 25-YR (6.2")(DEP CH.500) event

Inflow	=	13.65 cfs @	12.16 hrs,	Volume=	50,529 cf
Outflow	=	9.69 cfs @	12.29 hrs,	Volume=	48,603 cf, Atten= 29%, Lag= 7.8 min
Primary	=	1.07 cfs @	12.29 hrs,	Volume=	33,661 cf
Secondary	=	8.62 cfs @	12.29 hrs,	Volume=	14,943 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 107.77' @ 12.29 hrs Surf.Area= 13,745 sf Storage= 15,335 cf

Plug-Flow detention time= 136.4 min calculated for 48,603 cf (96% of inflow)
Center-of-Mass det. time= 114.9 min (942.5 - 827.6)

Volume	Invert	Avail.Storage	Storage Description
#1	106.00'	17,740 cf	**Custom Stage Data (Irregular)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
106.00	1,402	150.0	0	0	1,402
106.50	6,715	431.0	1,864	1,864	14,395
108.00	15,000	567.0	15,876	17,740	25,222

Device	Routing	Invert	Outlet Devices
#1	Secondary	107.50'	**25.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Primary	105.00'	**6.0" Round Culvert** L= 70.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 105.00' / 104.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	106.50'	**6.0" Horiz. Top of stand pipe** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.07 cfs @ 12.29 hrs HW=107.77' TW=104.09' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.07 cfs of 1.07 cfs potential flow)
  └─**3=Top of stand pipe** (Orifice Controls 1.07 cfs @ 5.43 fps)

Secondary OutFlow Max=8.62 cfs @ 12.29 hrs HW=107.77' TW=107.29' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 8.62 cfs @ 1.26 fps)

Summary for Link POA 1: Point 1

Inflow Area = 730,451 sf, 8.44% Impervious, Inflow Depth = 3.52" for 25-YR (6.2")(DEP CH.500) event
Inflow = 46.38 cfs @ 12.22 hrs, Volume= 214,090 cf
Primary = 46.38 cfs @ 12.22 hrs, Volume= 214,090 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs

Summary for Link POA 2: Point 2

Inflow Area = 13,706 sf, 51.98% Impervious, Inflow Depth = 4.60" for 25-YR (6.2")(DEP CH.500) event
Inflow = 2.02 cfs @ 12.00 hrs, Volume= 5,254 cf
Primary = 2.02 cfs @ 12.00 hrs, Volume= 5,254 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs