

Received

OCT 21 2024



# APPLICATION FOR PERMIT EAST LYME INLAND WETLANDS AGENCY

Town of East Lyme  
Land Use

Office Use Only		
Fee Paid <u>\$ 1160</u>	Date Submitted <u>10/21/2024</u>	Application # _____
Date of Receipt _____	Date Approved _____	Permit Number _____
Major Impact: YES NO    Public Hearing: YES NO    Agent Approved: YES NO		

Note: In accordance with the Inland Wetland and Watercourses Regulations, ~~Eleven (11)~~ copies of all application materials must be submitted.

1. SITE LOCATION (Street) and Description: 138 N. Bridebrook Rd, Niantic  
Assessor's Map 14.0 Lot # 77

Note: It is the applicant's responsibility to provide the correct site address, map/lot number for the legal notice. Provide a description of the land in sufficient detail to allow identification of the inland wetlands and watercourses, the area(s) (in acres or square feet) of wetlands and watercourses to be disturbed, soil type(s), and wetland vegetation.

2. APPLICANT: Alexander Nebelung  
Address: 87 Quarry Dock Rd Phone: \_\_\_\_\_  
Niantic, CT 06357 Fax: \_\_\_\_\_  
Business: \_\_\_\_\_ Cell: 860-823-7861  
Email: jane.nebelung@snet.net  
Applicant's interest in the land: managing member

\*\*If the applicant is a Limited Liability Corporation or a Corporation provide the managing member's or responsible corporate officer's name, address, and telephone number.

3. OWNER: Nebelung Farms LLC  
Address: 87 Quarry Dock Rd Phone: \_\_\_\_\_  
Niantic, CT 06357 Fax: \_\_\_\_\_  
Email: jane.nebelung@snet.net Cell: 860-823-7861

\*\*As the legal owner of the property listed on this application, I hereby consent to the proposed activities. And I hereby authorize the members and agents of the Agency to inspect the subject land, at reasonable times, during the pendency of the application and for the life of the permit.

Owners Printed Name: Alexander Nebelung  
Owners Signature: [Signature] Date: 10/20/24

4. Area of wetland to be disturbed: \_\_\_\_\_ sq. ft. or ac 0  
Area of watercourse to be disturbed: \_\_\_\_\_ sq. ft. or ac 0  
Upland review area to be disturbed: \_\_\_\_\_ sq. ft. or ac 1.6

Will fill be needed on site?  Yes  No  
If yes, how much fill is needed? 200 ± Cubic yards

5. The property contains (circle one or more)

WATERCOURSE      WATERBODY WOODED-WETLAND      SWAMP  
FLOODPLAIN      OTHER: \_\_\_\_\_

Description of soil types on site: \_\_\_\_\_

Description of wetland vegetation: \_\_\_\_\_

Name of Soil Scientist(s) and date of survey: \_\_\_\_\_

6. Provide a written narrative of the purpose and a description of the proposed activity and proposed erosion and sedimentation controls and other best management practices and mitigation measures which may be considered as a condition of issuing a permit for the proposed regulated activity including, but not limited to, measures to (1) prevent or minimize pollution or other environmental damage, (2) maintain or enhance existing environmental quality, or (3) in the following order of priority: restore, enhance and create productive wetland or watercourse resources. Depending on the complexity of the project, include the following: construction schedule, sequence of operations, drainage computations with pre and post construction runoff quantities and runoff rates, plans clearly showing the drainage areas corresponding to the drainage computation, existing wetland inventory and functional assessment, soils report, construction plans signed by a certified soils scientist, licensed surveyor, and licensed professional engineer.  
Single family house w/utilities off existing driveway.

7. Provide information of all alternatives considered. List all alternatives which would cause less or no environmental impact to wetlands or watercourses and state why the alternative as set forth in the application was chosen. All such alternatives shall be diagramed on a site plan or drawing. (Attach plans showing all alternates considered).  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Attach a site plan showing the proposed activity and existing and proposed conditions in relation to wetlands and watercourses and identifying any further activities associated with, or reasonably related to, the proposed regulated activity which are made inevitable by the proposed regulated activity and which may have an impact on wetlands and watercourses. Site plan on file - Permit 03-23 & attached.

9. Provide the name and mailing addresses of adjacent landowners (including across a street). Attach additional sheets if necessary.  
see attached

Name/Address: \_\_\_\_\_  
Name/Address: \_\_\_\_\_  
Name/Address: \_\_\_\_\_

10. Attach a completed DEP reporting form.

*The Agency shall revise or correct the information provided by the applicant and submit the form to the Commissioner of Environmental Protection in accordance with section 22a-30-14 of the Regulations of Connecticut State Agencies.*

11. Name of Erosion Control Agent (Person Responsible for Compliance):

To be determined

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

\_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Cell: \_\_\_\_\_

12. Are you aware of any wetland violations (past or present) on this property? Yes  No

If yes, please explain: \_\_\_\_\_

13. Are there any vernal pools located on or adjacent (within 500') to the property? Yes  No

14. For projects that do not fall under the ACOE Category I general permit – Have you contacted the Army Corps of Engineers? Yes  No

15. Is this project within a public water supply aquifer protection area or a watershed area? Yes  No

16. If so, have you notified the Commissioner of the Connecticut Department of Public Health and the East Lyme Water and Sewer Department? Yes  No  (Proof of notification must be submitted with your application).

17. Attach the appropriate filing fee based on the fee schedule established in Section 19 of the Regulations.

Fee: \$1160 (Make checks payable to "Town of East Lyme").

18. PUBLIC HEARINGS ONLY: The applicant must provide proof of mailing notices to the abutters prior to the hearing date.

*The undersigned Applicant hereby consents to necessary and proper inspection of the above mentioned property by the East Lyme Inland Wetlands Agency and/or its agents at reasonable times both before and after the permit in question has been granted.*

*The Applicant affirms that the information supplied in this application is accurate to the best of his/her knowledge and belief. As the applicant I hereby certify that I am familiar with the information provided in this application and I am aware of the penalties for obtaining a permit through deception or through inaccurate or misleading information.*

Printed Name: Alexander Nebelung Date: 10/20/24

Signature: 

Please note:

*Above notice to be published in legal section of newspaper having general circulation in the Town of East Lyme. Applicant to pay cost of publication. You or a representative must attend the Inland Wetlands Agency meeting to present your application.*

## CHECKLIST FOR A COMPLETE APPLICATION

- completed application form including Department of Environmental Protection reporting form (green copy)
- A narrative of the purpose and description and methodology of all proposed activities;
- Alternatives considered by the applicant, reasons for leaving less than a 10' buffer between clearing and the wetlands. Such alternatives to be diagrammed on a site plan or drawing and submitted to the commission as part of the application;
- Names and mailing addresses of abutting property owners;
- Three copies of approximately 1"=40' scale plans
- Locations of existing and proposed land uses
- Locations of existing and proposed buildings
- Locations of existing and proposed subsurface sewage disposal systems, and test hole descriptions
- Existing and proposed topographical and man-made features including roads and driveways, on and adjacent to the site
- Location and diagrams of proposed erosion control structures
- Assessor map and lot number
- Key or inset map
- North arrow
- Flood zone classification and delineation
- Use of wetland and watercourse markers where appropriate.
- Soil types classification and boundary delineation (flagged and numbered boundary), Soil Scientist's original signature and certification on plans
- Soil Scientist's (or other wetland scientist) report on the function of the wetlands
- Watercourse channel location and flow direction, where appropriate
- 300 ft. regulated area depicted on plans
- Conservation easements where appropriate
- A detailed erosion and sediment control plan which meets requirements set forth in the most recent revision of the *Connecticut Guidelines for Soil Erosion and Sediment Control*, published by the Connecticut Council on Soil and Water Conservation, including:
  - Location of areas to be stripped of vegetation and other unprotected areas
  - Schedule of operations including starting and completion dates for major development phases
  - Seeding, sodding, or re-vegetation plans for all unprotected or un-vegetated areas
  - Location and design of structural sediment control measures
  - Timing of planned sediment control measures
  - Use of wetland and watercourse markers
  - Proper certification on the application documents and plans

In the case of filling in wetlands, watercourses, or regulated upland areas, the following items are necessary:

- Area to be filled
- Volume of requested fill
- Finished slopes of filled areas
- Containment and stabilization measures
- Proposed finished contours
- Evaluation of the effect of filling the wetlands with respect to storage volume and its impact downstream showing before and after development flows, and the evaluation of storm water detention including the existing need for flood control downstream

Other required items:

- Proof of adjoining Town notification, where required;
- All application fees required by Section 16 of these regulations;
- A written narrative detailing how the effects of the applicant's proposed activities upon wetlands and watercourses shall be mitigated.
- A written description of any and all future plans which may be linked to the activities proposed in the current application.
- Address the potential to enhance the current buffer area.
- Review drainage information with Town Engineering
- Mailing requirements for abutters (public hearing only)

**Appendix D - ORDINANCE ESTABLISHING SCHEDULE OF FEES FOR CONSERVATION, PLANNING AND ZONING COMMISSIONS**

1.1	Application Fee **	
1.1.1	Residential Uses.....	\$150.00 Plus *\$50.00/LOT
	Plus Fee from Schedule A	
1.1.2	Commercial Uses.....	\$400.00
	Plus Fee from Schedule A	
1.1.3	All Other Uses .....	\$200.00
	Plus Fee from Schedule A	
	*Each lot with regulated activities	
	**\$60 fee required by C.G.S 22a-27j will be added to the base fees.	
1.2	Approval by Duly Authorized Agent **	\$100.00
1.3	Appeal of Duly Authorized Agent Decision.....	\$300.00
1.4	Significant Activity Fee	\$300.00
1.5	Public Hearing Fee	
1.5.1	Single Residential	\$200.00
1.5.2	Commercial/Industrial/Multi-Family	\$450.00
1.6	Complex Application Fee .....	Actual Cost
	The Inland Wetlands Agency may charge an additional fee sufficient to cover the cost of reviewing and acting on complex applications. Such fee may include, but not be limited to, the cost of retaining experts, to advise, analyze, review, and report on issues requiring such experts. The Agency or the duly authorized agent shall estimate the complex application fee, which shall be paid pursuant to section 19.1 of these regulations within 10 days of the applicant's receipt or notice of such estimate. Any portion of the complex application fee in excess of the actual cost shall be refunded to the applicant no later than 30 days after publication of the agency's decision.	
1.7	Permitted and Nonregulated Uses :	
1.7.1	Permitted Uses as of Right .....	\$0.00
1.7.2	Nonregulated ... ..	\$0.00
1.8	Regulation Amendment Petitions .....	\$500.00
	(Does not include Notices or Regulation Advisories from DEP)	
1.8.1	Map Amendment Petitions .....	\$500.00
	Plus Fee from Schedule B	
1.9	Modification of Previous Approval: .....	\$100.00
1.10	Renewal of Previous Approval .. ..	\$100.00
1.11	Monitoring Compliance Fee .....	\$100.00
1.12	SCHEDULE A. For the purpose of calculating the permit application fee, the area in schedule A is the total area of wetlands and watercourses and the upland review area upon which a regulated activity is proposed.	
	SQUARE FEET of AREA	
1.12.1	Less than 1,000. ....	\$0.00
1.12.2	1,000 to 5,000 ... ..	\$250.00
1.12.3	More than 5,000 .....	\$750.00
1.13	SCHEDULE B. For the purpose of calculating the map amendment petition fee, linear feet in schedule B is the total length of wetlands and watercourses boundary subject to the proposed boundary change.	
	LINEAR FEET	
1.13.1	Less than 500 ....	\$0.00
1.13.2	500 to 1,000 ....	\$250.00
1.13.3	More than 1,000.....	\$750.00

Total  
\$ 1,160.00

14.0 82  
BEAN SANDRA  
156 N BRIDE BROOK RD  
NIANTIC, CT 06357

14.0 78  
COLLINS JON S &  
PO BOX 1145  
WATERFORD, CT 06385

10.0 2  
CONNECTICUT STATE OF  
199 W MAIN ST  
NIANTIC, CT 06357

14.0 81  
DESAUTELS DONALD J JR &  
154 N BRIDE BROOK RD  
NIANTIC, CT 06357

14.0 73  
HANNEY CHRISTOPHER T  
124 N BRIDE BROOK RD  
NIANTIC, CT 06357

14.0 76  
MANWARING THOMAS E  
136 N BRIDE BROOK RD  
NIANTIC, CT 06357

14.0 75  
MCPARTLIN LEONARD BRIAN  
132 N BRIDE BROOK RD  
NIANTIC, CT 06357

14.0 77  
NEBELUNG FARMS LLC  
72 QUARRY DOCK RD  
NIANTIC, CT 06357

14.0 74  
OKSUZ PASA  
128 N BRIDE BROOK RD  
NIANTIC, CT 06357

14.0 79  
SCHRAFFT GREGORY A  
146 N BRIDE BROOK RD  
NIANTIC, CT 06357

14.0 80  
VIGGIANO MARY ELLEN  
152 N BRIDE BROOK RD  
NIANTIC, CT 06357



## EAST LYME CONSERVATION COMMISSION

**INLAND WETLANDS PERMIT NUMBER: 03-23**

Approved	02-Jun-03
Expires	<b>02-Jun-08</b>
<i>Date Effective</i>	<i>02-Jul-03</i>
<b>Completed</b>	<b>No</b>

**Property Owner:** Nebelung Farms LLC

**Site Plan Title:** Nebelung Farms LLC 138 N Bride Brook - 2 pages- Finn Survey, revsd

**Owner Address:** 87 Quarry Dock Rd  
Niantic CT 06357

**Site Address** 138 N Bride Brook Rd

### Permitted Activity

**Map/ Lot: 14.0 77**

Construction of house and driveway within the upland review area  
Activities are clearing and re-vegetation altering 1.6 acres of upland area

### Conditions

1-4 Standard Conditions Apply

5. Erosion controls will be inspected and replaced if needed, after a rain event of 0.5 inches by the person responsible for compliance stated on the plans to be Alexander Nebelung.

6. A bond in the amount of \$1000 will be submitted prior to construction activities for erosion control.

7. The seeding and vegetation will be overseen by a wetlands scientist with a report and pictures to be submitted once a year for two growing seasons.

8. A plan and profile with inlet and outlet detail will be provided for pipe 3 and reviewed by Town staff prior to construction.

9. The two existing pipes will be field checked to make sure they are not obstructed and a letter from a professional (either a surveyor or engineer) will be provided certifying the pipes will function as proposed.

### STANDARD CONDITIONS

1. NOTIFY CONSERVATION OFFICER AT LEAST 2 DAYS PRIOR TO CONSTRUCTION TO INSPECT EROSION CONTROLS.

2. NOTIFY CONSERVATION OFFICER AT COMPLETION OF PERMIT FOR FINAL INSPECTION AND SIGN OFF.

3. ADDITIONAL WORK BEYOND THIS PERMIT IN THE WETLANDS OR WATERCOURSE OR ITS 100' REGULATED AREA WILL REQUIRE APPROVAL FROM THE CONSERVATION COMMISSION OR ITS CERTIFIED AGENT.

4. CHANGES TO THE PLAN LISTED ON THIS PERMIT REQUIRE NOTIFICATION TO THE CONSERVATION OFFICER AND MAY REQUIRE COMMISSION APPROVAL- A NEW PLAN WILL BE GIVEN TO AGENT BEFORE WORK BEGINS.

### PERMIT NOTES

1. NOTIFY CONSERVATION IF REQUESTING PERMIT EXTENSION (FOR TOTAL OF 10 YEARS)

2. IF PROPERTY IS SOLD, INFORM CONSERVATION DEPT OF NEW OWNER.

3. THIS AGENCY HAS RELIED IN WHOLE OR PART ON INFORMATION PROVIDED BY THE APPLICANT, IF SUCH INFORMATION PROVES TO BE FALSE, DECEPTIVE, INCOMPLETE OR INACCURATE, THE PERMIT MAY BE MODIFIED, SUSPENDED OR REVOKED.

4. CONSERVATION TAGS, IF REQUIRED FOR THIS PERMIT, ARE PROVIDED BY THE CONSERVATION OFFICER AND INSTALLED BY PERMIT OWNER.

5. IF THE ACTIVITY AUTHORIZED BY THE AGENCY'S PERMIT ALSO INVOLVES AN ACTIVITY WHICH REQUIRES ZONING OR SUBDIVISION APPROVAL, SPECIAL PERMIT, VARIANCE, OR SPECIAL EXCEPTION, UNDER SECTIONS 8-3G, 8-3C, OR 8-26 OF THE CT GENERAL STATUTES, NO WORK PURSUANT TO THE WETLAND PERMIT MAY BEGIN UNTIL SUCH APPROVAL IS OBTAINED.

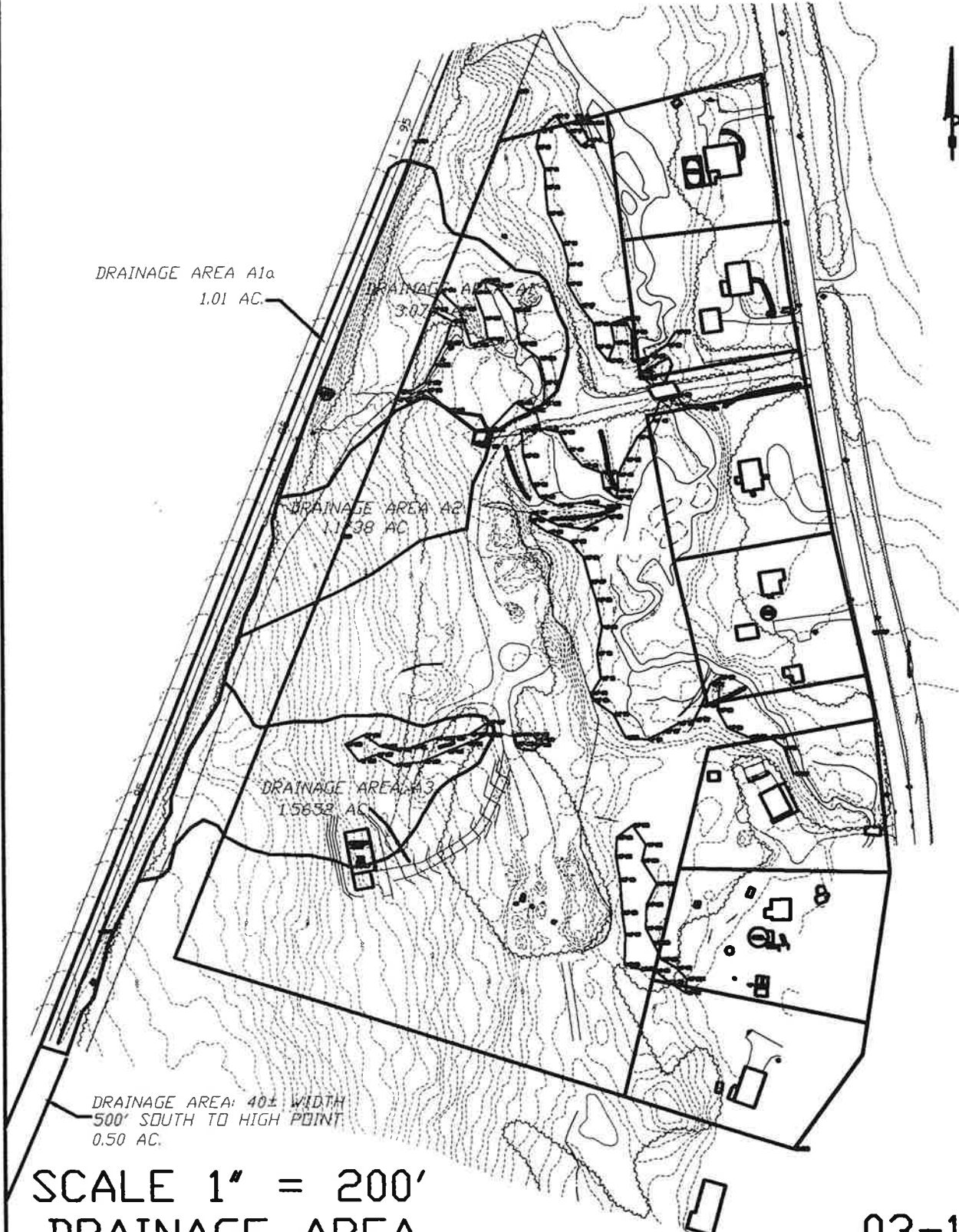
6. THE PERMITEE SHALL IMPLEMENT SUCH MANAGEMENT PRACTICES CONSISTENT WITH THE TERMS AND CONDITIONS OF THE PERMIT AS NEEDED TO CONTROL STORM WATER DISCHARGES AND PREVENT EROSION AND SEDIMENTATION AND TO OTHERWISE PREVENT POLLUTION OF WETLANDS AND WATERCOURSES.

#### **MINIMIZATION OF ENVIRONMENTAL IMPACT**

**WORK IN WETLANDS: HEAVY EQUIPMENT WORKING IN WETLANDS SHALL BE AVOIDED AND IF APPROVED UNDER THIS PERMIT, SHALL BE PLACED ON MATS TO MINIMIZE SOIL/ VEGETATION DISTURBANCE. DISTURBED AREAS IN WETLANDS SHALL BE RESTORED TO PRECONSTRUCTION CONTOURS UPON COMPLETION OF THE WORK.**

**SEDIMENTATION AND EROSION CONTROL: ADEQUATE SEDIMENTATION AND EROSION CONTROL MANAGEMENT MEASURES, PRACTICES AND DEVICES, SUCH AS PHASED CONSTRUCTION, VEGETATED FILTER STRIPS, GEOTEXTILE SILT FENCES AND OTHER DEVICES, SHALL BE INSTALLED ACCORDING TO THE MOST RECENT DEPT. ENV. PROTECTION GUIDELINES AND PROPERLY MAINTAINED TO REDUCE EROSION AND RETAIN SEDIMENT ON- SITE DURING CONSTRUCTION AND AFTER CONSTRUCTION. THESE DEVICES SHALL BE REMOVED UPON COMPLETION OF THE WORK, AND THE DISTURBED AREAS SHALL BE STABILIZED.**

# NEBELUNG PIPE DRAINAGE AREAS



SCALE 1" = 200'  
DRAINAGE AREA

03-142

03-142  
Nebelung Property  
Bride Brook Road  
Drainage

A1

Area information was taken from the USGS Niantic Quadrangle from High Point on Interstate 95 to 500' south west of the site. The remainder of the drainage area was taken from the detail site drainage map.

USGS Map

Avg. width of highway drainage = 40' ± for a length of 500' = 0.46 ac.

Detailed northern portion by area = 1.01 ac.

I-95 total area = 1.47 ac.

C pavement = 0.9

C shoulder = 0.3 avg. C with 50/50 split of pavement and Shoulder

C<sub>avg.</sub> = 0.6

A1a (I-95) 1.47 ac @ C = 0.6 = 0.88

A1b (wetlands) 0.45 ac @ C = 0.9 = 0.41

A1c (woods) 2.86 ac - 1.01 ac - 0.46 ac = 1.39 ac. @ C = 0.25 = 0.35

CA = 0.88 + 0.41 + 0.35 CA<sub>A1</sub> = 1.64

A2

A2a (wetlands) 0.02 ac @ C = 0.9 = 0.02

A2b (woods) 1.17 ac - .02 ac = 1.15 ac. @ C = 0.25 = 0.29

CA = 0.02 + 0.28 CA<sub>A21</sub> = 0.31

A3

A3a (wetlands) 0.084 ac @ C = 0.9 = 0.075

A3b (woods) 1.57 ac - .084 ac = 1.48 ac. @ C = 0.25 = 0.37

CA = 0.37 + 0.075 CA<sub>A21</sub> = 0.45

Time of Concentration of 20 minutes was used for A1 area. The Time of Concentration for the pipe on I-95 is assumed to be less than 5 minutes

Intensity

$$A1 \text{ 25 year} = 4.5$$

$$A2 \text{ 25 year} = 4.4$$

$$A3 \text{ 25 year} = 3.5$$

$$Q_{A1 \text{ 25}} = CA \times I$$

$$Q = 1.70 \times 4.5$$

$$Q = 7.65 \text{ c.f.s.}$$

$$Q_{A2 \text{ 25}} = CA \times I$$

$$Q = 0.31 \times 4.4$$

$$Q = 1.36 \text{ c.f.s.}$$

$$Q_{A3 \text{ 25}} = CA \times I$$

$$Q = 0.45 \times 3.5$$

$$Q = 1.58 \text{ c.f.s.}$$

NEBELUNG PIPE 1

Tc COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID		1	
Surface description		WOODS	
Manning's roughness coeff., n		0.4000	
Flow length, L (total < or = 300)	ft	200.0	
Two-yr 24-hr rainfall, P2	in	3.500	
Land slope, s	ft/ft	0.0900	
		0.8	
		.007 * (n*L)	
T =	hrs	0.33	= 0.33
		0.5 0.4	
		P2 * s	

SHALLOW CONCENTRATED FLOW

Segment ID		2	
Surface (paved or unpaved)?		Unpaved	
Flow length, L	ft	190.0	
Watercourse slope, s	ft/ft	0.0520	
		0.5	
Avg.V = Csf * (s)	ft/s	3.6792	
where: Unpaved Csf = 16.1345			
Paved Csf = 20.3282			
T = L / (3600*s)	hrs	0.01	= 0.01

CHANNEL FLOW

Segment ID			
Cross Sectional Flow Area, a	sq.ft	0.00	
Wetted perimeter, Pw	ft	0.00	
Hydraulic radius, r = a/Pw	ft	0.000	
Channel slope, s	ft/ft	0.0000	
Manning's roughness coeff., n		0.0000	
		2/3 1/2	
V =	ft/s	0.0000	
		n	
Flow length, L	ft	0	
T = L / (3600*s)	hrs	0.00	= 0.00

.....  
 TOTAL TIME (hrs) 0.34

Quick TR-55 Ver.5.47 S/N:  
Executed: 13:53:11 05-14-2003 03142P1.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS  
(Solved for Time using TR-55 Methods)

NEBELUNG PIPE 1

Subarea descr.	Tc or Tt	Time (hrs)
	Tc	0.34

Quick TR-55 Ver.5.47 S/N:  
 Executed: 13:53:57 05-14-2003 03142P2.TCT

NEBELUNG PIPE 2

Tc COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID		1	
Surface description		WOODS	
Manning's roughness coeff., n		0.4000	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.500	
Land slope, s	ft/ft	0.1400	
		0.8	
		.007 * (n*L)	
T =		hrs	0.38
			= 0.38
		0.5	0.4
		P2	* s

SHALLOW CONCENTRATED FLOW

Segment ID		2	
Surface (paved or unpaved)?		Unpaved	
Flow length, L	ft	140.0	
Watercourse slope, s	ft/ft	0.1200	
		0.5	
Avg.V = Csf * (s)	ft/s	5.5892	
where: Unpaved Csf = 16.1345			
Paved Csf = 20.3282			
T = L / (3600*V)	hrs	0.01	
			= 0.01

CHANNEL FLOW

Segment ID			
Cross Sectional Flow Area, a	sq.ft	0.00	
Wetted perimeter, Pw	ft	0.00	
Hydraulic radius, r = a/Pw	ft	0.000	
Channel slope, s	ft/ft	0.0000	
Manning's roughness coeff., n		0.0000	
		2/3	1/2
V =		1.49 * r * s	
		n	
	ft/s	0.0000	
Flow length, L	ft	0	
T = L / (3600*V)	hrs	0.00	
			= 0.00

.....  
 TOTAL TIME (hrs) 0.39

Quick TR-55 Ver.5.47 S/N:  
Executed: 13:53:57 05-14-2003 03142P2.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS  
(Solved for Time using TR-55 Methods)

NEBELUNG PIPE 2

Subarea descr.	Tc or Tt	Time (hrs)
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	Tc	0.39

Quick TR-55 Ver.5.47 S/N:  
 Executed: 13:54:18 05-14-2003 03142P3.TCT

NEBELUNG PIPE 3

Tc COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

Segment ID		1	
Surface description		WOODS	
Manning's roughness coeff., n		0.4000	
Flow length, L (total < or = 300)	ft	300.0	
Two-yr 24-hr rainfall, P2	in	3.500	
Land slope, s	ft/ft	0.0630	
		0.8	
		.007 * (n*L)	
T =	hrs	0.52	= 0.52
		0.5 0.4	
		P2 * s	

SHALLOW CONCENTRATED FLOW

Segment ID		2	
Surface (paved or unpaved)?		Unpaved	
Flow length, L	ft	295.0	
Watercourse slope, s	ft/ft	0.0640	
		0.5	
Avg.V = Csf * (s)	ft/s	4.0817	
where: Unpaved Csf =		16.1345	
Paved Csf =		20.3282	
T = L / (3600*V)	hrs	0.02	= 0.02

CHANNEL FLOW

Segment ID			
Cross Sectional Flow Area, a	sq.ft	0.00	
Wetted perimeter, Pw	ft	0.00	
Hydraulic radius, r = a/Pw	ft	0.000	
Channel slope, s	ft/ft	0.0000	
Manning's roughness coeff., n		0.0000	
		2/3 1/2	
		1.49 * r * s	
V =	ft/s	0.0000	
		n	
Flow length, L	ft	0	
T = L / (3600*V)	hrs	0.00	= 0.00

.....  
 TOTAL TIME (hrs) 0.54

Quick TR-55 Ver.5.47 S/N:  
Executed: 13:54:18 05-14-2003 03142P3.TCT

SUMMARY SHEET FOR Tc or Tt COMPUTATIONS  
(Solved for Time using TR-55 Methods)

NEBELUNG PIPE 3

<u>Subarea descr.</u>	<u>Tc or Tt</u>	<u>Time (hrs)</u>
	Tc	0.54

18" PIPE  
Worksheet for Circular Channel

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Project Description	
Project File	c:\haestad\fmw\nebelung.fm2
Worksheet	25 YR
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

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Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.020000 ft/ft	ESTIMATED
Depth	1.50	ft
Diameter	18.00	in

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Results		
Discharge	14.85	cfs
Flow Area	1.77	ft <sup>2</sup>
Wetted Perimeter	4.71	ft
Top Width	0.37e-7	ft
Critical Depth	1.40	ft
Percent Full	100.00	
Critical Slope	0.017287	ft/ft
Velocity	8.41	ft/s
Velocity Head	1.10	ft
Specific Energy	2.60	ft
Froude Number	0.21e-3	
Maximum Discharge	15.98	cfs
Full Flow Capacity	14.85	cfs
Full Flow Slope	0.020000	ft/ft
Flow is subcritical.		

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**15" PIPE**  
**Worksheet for Circular Channel**

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<b>Project Description</b>	
Project File	c:\haestad\fmw\nebelung.fm2
Worksheet	25 YR
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

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<b>Input Data</b>	
Mannings Coefficient	0.013
Channel Slope	0.020000 ft/ft <i>ESTIMATED</i>
Depth	1.25 ft
Diameter	15.00 in

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<b>Results</b>	
Discharge	9.14 cfs
Flow Area	1.23 ft <sup>2</sup>
Wetted Perimeter	3.93 ft
Top Width	0.33e-7 ft
Critical Depth	1.16 ft
Percent Full	100.00
Critical Slope	0.017309 ft/ft
Velocity	7.44 ft/s
Velocity Head	0.86 ft
Specific Energy	2.11 ft
Froude Number	0.22e-3
Maximum Discharge	9.83 cfs
Full Flow Capacity	9.14 cfs
Full Flow Slope	0.020000 ft/ft
Flow is subcritical.	

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12" PIPE  
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\nebelung.fm2
Worksheet	25 YR
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data	
Mannings Coefficient	0.013
Channel Slope	0.020000 ft/ft <i>ESTIMATED</i>
Depth	1.00 ft
Diameter	12.00 in

Results	
Discharge	5.04 cfs
Flow Area	0.79 ft <sup>2</sup>
Wetted Perimeter	3.14 ft
Top Width	0.3e-7 ft
Critical Depth	0.92 ft
Percent Full	100.00
Critical Slope	0.017372 ft/ft
Velocity	6.41 ft/s
Velocity Head	0.64 ft
Specific Energy	1.64 ft
Froude Number	0.22e-3
Maximum Discharge	5.42 cfs
Full Flow Capacity	5.04 cfs
Full Flow Slope	0.020000 ft/ft
Flow is subcritical.	

*New Pipe*

Figure 9-2 - Values of Runoff Coefficient (C)  
for Rational Formula

Land use	C	Land use	C
<b>Business:</b>		<b>Lawns:</b>	
Downtown areas	0.70-0.95	Sandy soil, flat, 2%	0.05-0.10
Neighborhood areas	0.50-0.70	Sandy soil, average, 2-7%	0.10-0.15
		Sandy soil, steep, 7%	0.15-0.20
<b>Residential:</b>		Heavy soil, flat, 2%	0.13-0.17
Single family areas	0.30-0.50	Heavy soil, average, 2-7%	0.18-0.22
Multi units, detached	0.40-0.60	Heavy soil, steep, 7%	0.25-0.35
Multi units, attached	0.60-0.75		
Suburban	0.25-0.40	<b>Agricultural land:</b>	
		Bare packed soil	
<b>Industrial:</b>		Smooth	0.30-0.60
Light areas	0.50-0.80	Rough	0.20-0.50
Heavy areas	0.60-0.90	Cultivated rows	
		Heavy soil no crop	0.30-0.60
<b>Parks, cemeteries</b>	0.10-0.25	Heavy soil with crop	0.20-0.50
		Sandy soil no crop	0.20-0.40
<b>Playgrounds</b>	0.20-0.35	Sandy soil with crop	0.10-0.25
		<b>Pasture</b>	
<b>Railroad yard areas</b>	0.20-0.40	Heavy soil	0.15-0.45
		Sandy soil	0.05-0.25
<b>Unimproved areas</b>	0.10-0.30	<b>Woodlands</b>	0.05-0.25
<b>Streets:</b>			
Asphaltic	0.70-0.95		
Concrete	0.80-0.95		
Brick	0.70-0.85		
<b>Drives and walks</b>	0.75-0.85		
<b>Roofs</b>	0.75-0.95		
<p>Note: The designer must use judgement to select the appropriate C value within the range. Generally, larger areas with permeable soils, flat slopes and dense vegetation should have lowest (C) values. Smaller areas with dense soils, moderate to steep slopes, and sparse vegetation should be assigned highest (C) values.</p>			

Source: Virginia Erosion and Sediment Control Handbook, 1980. Virginia Soil and Water Conservation Commission.

## Sheet flow

Sheet flow is flow over plane surfaces. It usually occurs in the headwater of streams. With sheet flow, the friction value (Manning's  $n$ ) is an effective roughness coefficient that includes the effect of raindrop impact; drag over the plane surface; obstacles such as litter, crop ridges, and rocks; and erosion and transportation of sediment. These  $n$  values are for very shallow flow depths of about 0.1 foot or so. Table 3-1 gives Manning's  $n$  values for sheet flow for various surface conditions.

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overton and Meadows 1976) to compute  $T_t$ :

$$T_t = \frac{0.007 (nL)^{0.8}}{(P_2)^{0.5} s^{0.4}} \quad [\text{Eq. 3-3}]$$

Table 3-1.—Roughness coefficients (Manning's  $n$ ) for sheet flow

Surface description	$n^1$
Smooth surfaces (concrete, asphalt, gravel, or bare soil) .....	0.011
Fallow (no residue) .....	0.05
Cultivated soils:	
Residue cover $\leq 20\%$ .....	0.06
Residue cover $> 20\%$ .....	0.17
Grass:	
Short grass prairie .....	0.15
Dense grasses <sup>2</sup> .....	0.24
Bermudagrass .....	0.41
Range (natural) .....	0.13
Woods: <sup>3</sup>	
Light underbrush .....	0.40
Dense underbrush .....	0.80

<sup>1</sup>The  $n$  values are a composite of information compiled by Engman (1986).

<sup>2</sup>Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.

<sup>3</sup>When selecting  $n$ , consider cover to a height of about 0.1 ft. This is the only part of the plant cover that will obstruct sheet flow.

where

- $T_t$  = travel time (hr),
- $n$  = Manning's roughness coefficient (table 3-1),
- $L$  = flow length (ft),
- $P_2$  = 2-year, 24-hour rainfall (in), and
- $s$  = slope of hydraulic grade line (land slope, ft/ft).

This simplified form of the Manning's kinematic solution is based on the following: (1) shallow steady uniform flow, (2) constant intensity of rainfall excess (that part of a rain available for runoff), (3) rainfall duration of 24 hours, and (4) minor effect of infiltration on travel time. Rainfall depth can be obtained from appendix B.

## Shallow concentrated flow

After a maximum of 300 feet, sheet flow usually becomes shallow concentrated flow. The average velocity for this flow can be determined from figure 3-1, in which average velocity is a function of watercourse slope and type of channel. For slopes less than 0.005 ft/ft, use equations given in appendix F for figure 3-1. Tillage can affect the direction of shallow concentrated flow. Flow may not always be directly down the watershed slope if tillage runs across the slope.

After determining average velocity in figure 3-1, use equation 3-1 to estimate travel time for the shallow concentrated flow segment.

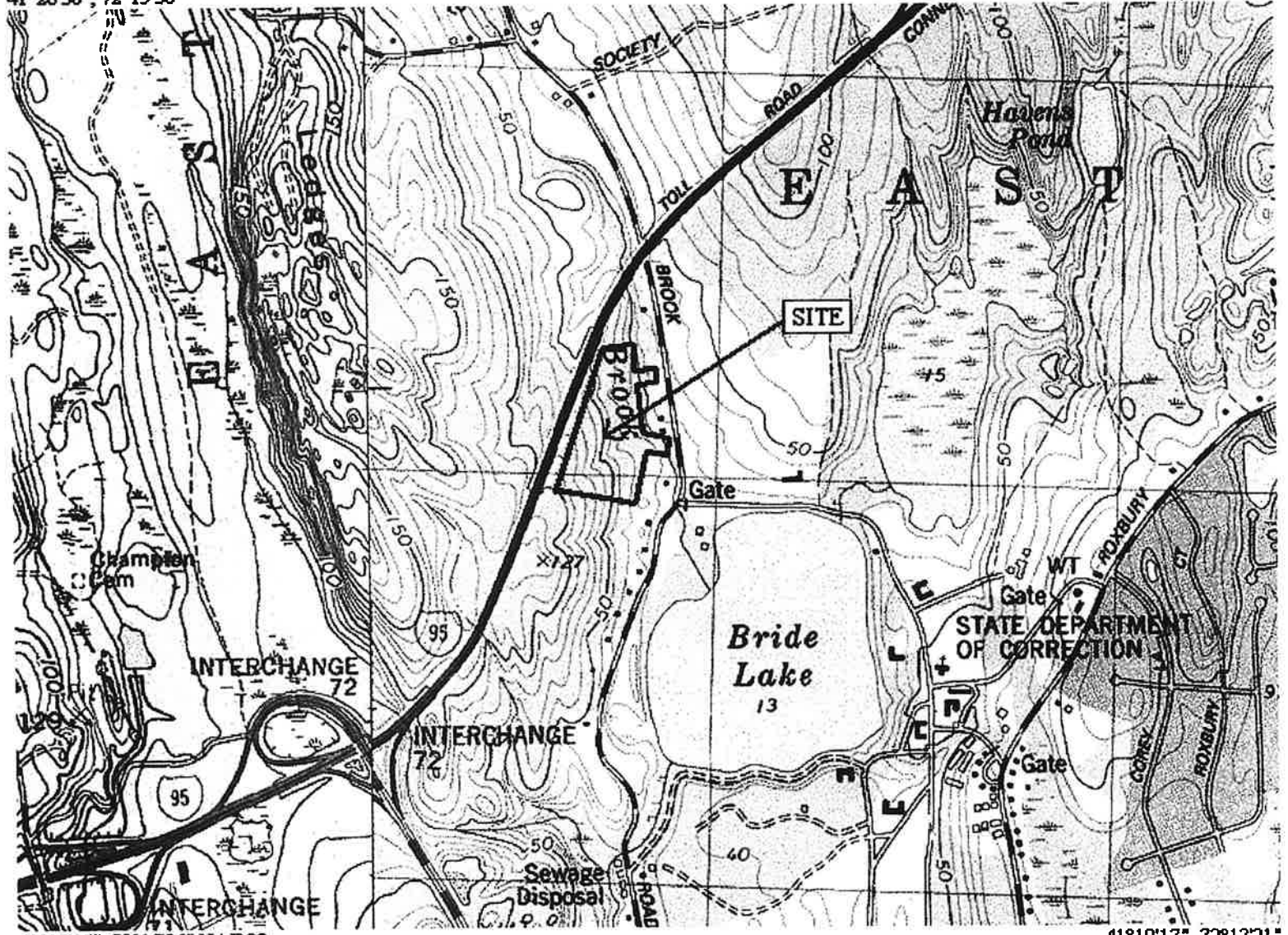
## Open channels

Open channels are assumed to begin where surveyed cross section information has been obtained, where channels are visible on aerial photographs, or where blue lines (indicating streams) appear on United States Geological Survey (USGS) quadrangle sheets. Manning's equation or water surface profile information can be used to estimate average flow velocity. Average flow velocity is usually determined for bank-full elevation.

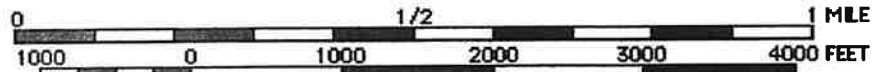
NEBELUNG

41°20'30", 72°15'36"

41°20'30", 72°13'21"



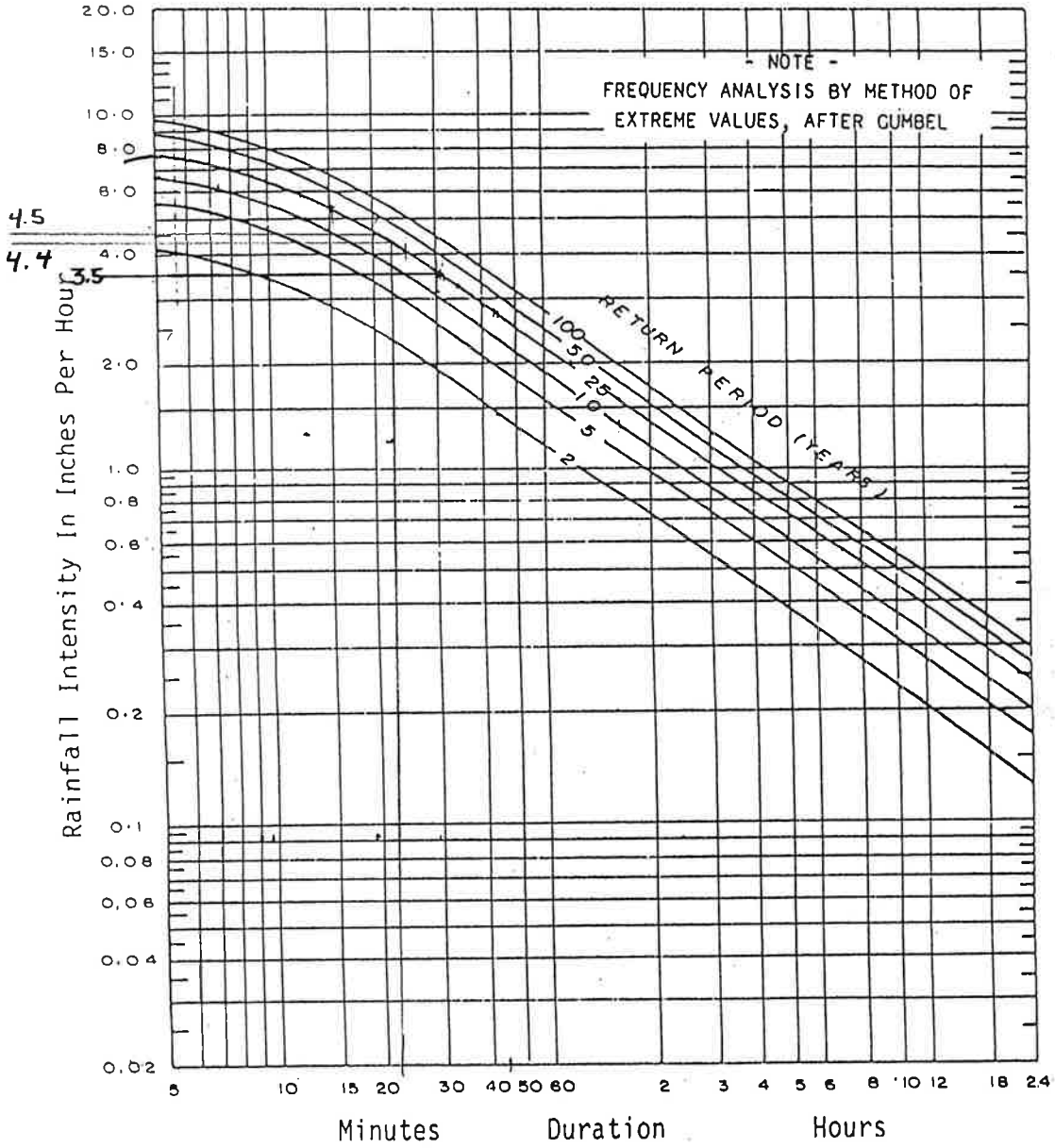
MN | TN  
15°



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Figure 9-4 - Rainfall Frequency-Intensity-Duration Chart

NEW HAVEN, CONNECTICUT  
1905-1951



Source: Connecticut Department of Transportation, Wethersfield, Connecticut.