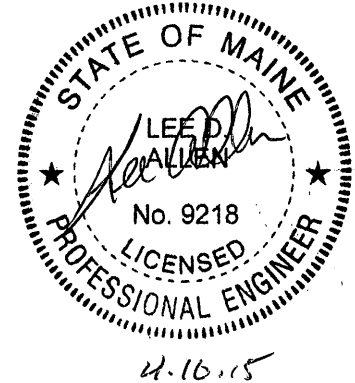




**Northeast  
Civil  
Solutions, Inc.**

381 Payne Road  
Scarborough, Maine 04074  
(800) 882-2227 / (207) 883-1000  
FAX: (207) 883-1001

**Memorandum**



TO: Mike Richman  
FROM: Lee Allen, P.E.  
DATE: April 10, 2015  
RE: House Island - Building #4

A stormwater analysis was completed for the north side of House Island, to evaluate the effects of the construction of 1,488 sf footprint for a caretakers house (a.k.a. Building #4). The south side of the northern portion of island is a 4.21 Acre watershed that sheet flows into Casco Bay (Atlantic Ocean) as can be seen in the attached drainage area plan. The proposed structure is located within this watershed.

PRE-DEVELOPMENT CONDITIONS

The pre-development drainage area (4.21 Ac) is comprised of mostly vegetated area with 5,309 sf of impervious area. Table 1 below shows the pre-development flows for the 2, 10, and 25-year storms events.

**Table 1- Pre-Development Drainage Summary**

	Q2 (cfs)	Q10 (cfs)	Q25 (cfs)
Pre	3.7	4.9	5.7

POST-DEVELOPMENT CONDITIONS

The post development drainage area is the same as the pre-development drainage area (4.21 Ac) with the addition of the 1,488 sf building. This additional impervious area increases the impervious area for the post development condition to 6,797 sf. Table 2 below shows the post development flows for the 2, 10, and 25-year storms events.

**Table 2 - Post-Development Drainage Summary**

	Q2 (cfs)	Q10 (cfs)	Q25 (cfs)
Post	3.8	5.0	5.9

Table 3 below compares the pre- and post-development flows for the 2-, 10-, and 25-year storms events.

**Table 3 – Pre and Post-Development Drainage Comparison**

	Q2 (cfs)	Q10 (cfs)	Q25 (cfs)
Pre	3.7	4.9	5.7
Post	3.8	5.0	5.9
Net	+0.1	+0.1	+0.2

### SUMMARY

The proposed building construction (1,488 sf) within the watershed has increased the amount of impervious area. Due to the location of the site on House Island and the relatively short distances to the surrounding Casco Bay the increase in impervious area slightly increases runoff for the 2, 10 and 25 year storm events (See Table 3). The increase is deemed to be insignificant and is not expected to create any erosion issues on the island. There are no downstream properties to be effected by the insignificant increase in flows; therefore the construction of this home will have no adverse impact on island, downstream properties or receiving waters (Casco Bay).

All calculations were made utilizing the Rational Method, see attached sheet for additional information. Please feel free to contact me with any questions.

# NORTHEAST CIVIL SOLUTIONS, INC.

Surveying Engineering Land Planning

381 Payne Road, Scarborough, Maine 04074

Tel: 207-883-1000 • Fax: 207-883-1001

PROJECT CUSTOM CONCEPTS - HOUSE ISLAND

SHEET NO. 1 OF 1

CALCULATED BY LDA DATE 4.10.2015

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE STORMWATER CALCULATIONS

RATIONAL METHOD - DRAINAGE AREA < 20 ACRES

$$Q = C i A$$

$C = .2$  VEGETATED/PASTURE

$C = .9$  IMPERVIOUS AREA

ASSUME  $T_c = 5$  MIN

$$i_2 = 4.0 \text{ in/hr}$$

$$i_{10} = 5.3 \text{ in/hr}$$

$$i_{25} = 6.2 \text{ in/hr}$$

SEE FOLLOWING PORTLAND, ME IDF CURVE

PRE DEVELOPMENT  $A = 4.21$  AC

$$Q = C i A$$

$$\text{WEIGHTED "C"} \quad .9 \times \frac{.12}{4.21} = .026$$

$$.2 \times \frac{4.09}{4.21} = .194$$

$$\underline{0.220} = \text{WEIGHTED "C"}$$

$$Q = C_{.2} A = (.22)(4.0)(4.21) = 3.7 \text{ cfs}$$

$$Q = C_{i_{10}} A = (.22)(5.3)(4.21) = 4.9 \text{ cfs}$$

$$Q = C_{i_{25}} A = (.22)(6.2)(4.21) = 5.7 \text{ cfs}$$

POST DEVELOPMENT  $A = 4.21$  AC

$$Q = C i A$$

$$\text{WEIGHTED "C"} \quad .9 \times \frac{.16}{4.21} = .034$$

$$.2 \times \frac{4.05}{4.21} = .192$$

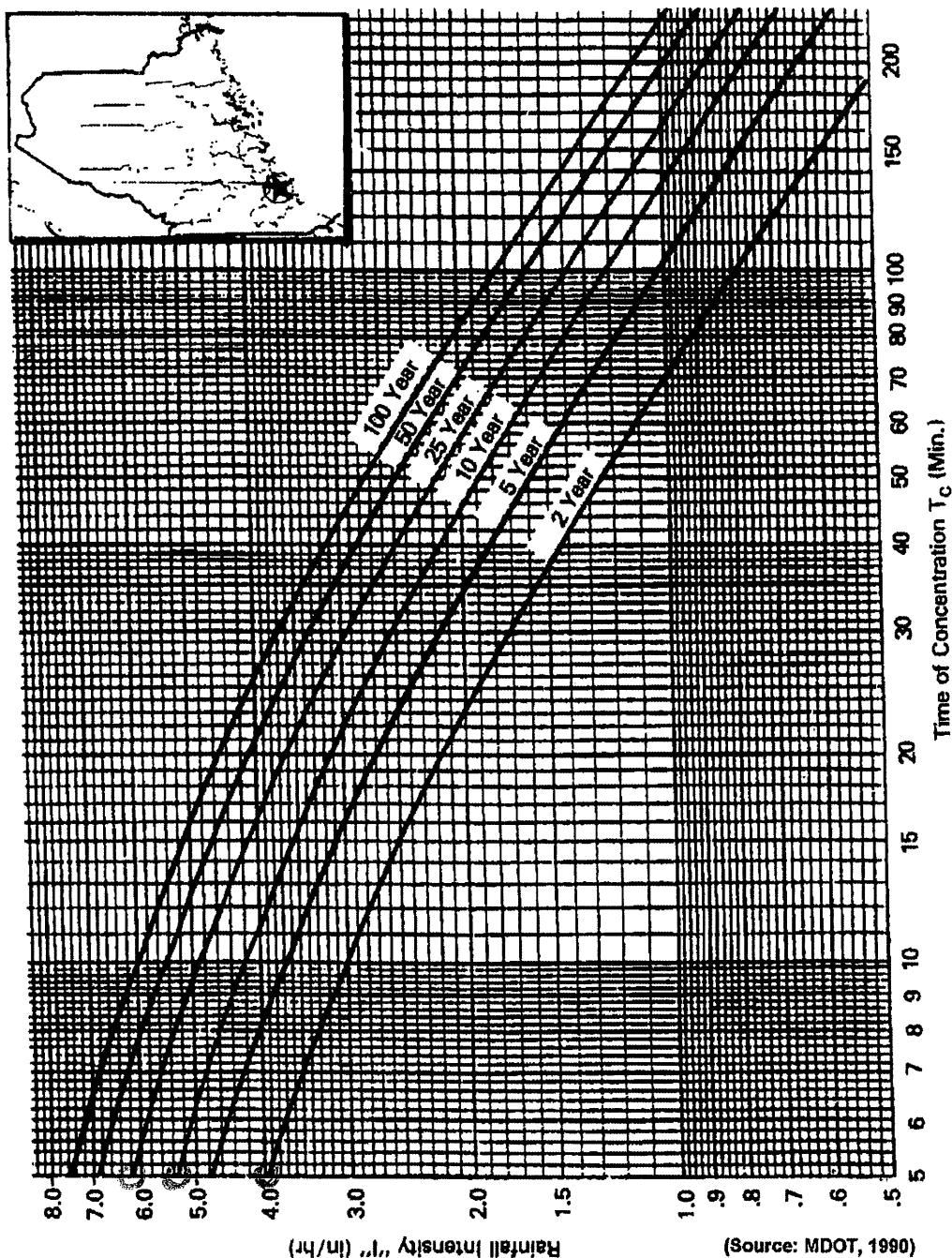
$$\underline{.226}$$

$$Q = C_{i_2} A = (.226)(4.0)(4.21) = 3.8 \text{ cfs}$$

$$Q = C_{i_{10}} A = (.226)(5.3)(4.21) = 5.0 \text{ cfs}$$

$$Q = C_{i_{25}} A = (.226)(6.2)(4.21) = 5.9 \text{ cfs}$$

### Appendix A-4: IDF Curve for City of Portland



**IDF CURVE FOR CITY OF PORTLAND  
(Rational Method)**



**LEGEND**

————— POST-DEVELOPMENT DRAINAGE SUBCATCHMENT

**NOTES**

TOTAL AREA = 183,590 SF = 4.21 Ac  
 PRE IMPERVIOUS = 5,309 SF  
 PROST IMPERVIOUS = 6,797 SF

THIS PLAN IS FOR REVIEW  
 PURPOSES ONLY AND IS NOT  
 INTENDED FOR CONSTRUCTION  
 OR RECORDING

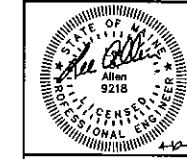
Revised	By	Date	Change

PROJECT NUMBER: 40323 ACAD FILE: 40323-DRAINAGE.DWG SCALE: 1" = 800' DATE: APRIL 10, 2014

Drawing Name:  
**DRAINAGE AREA PLAN**

Project Name:  
**HOUSE ISLAND -- NEW ENERGY BUILDING  
 & CARETAKER RESIDENCE**  
 HOUSE ISLAND, PORTLAND, MAINE

Client:  
**CUSTOM CONCEPTS, INC.**  
 383 US ROUTE 1, SUITE 1A, SCARBOROUGH, MAINE 04074



SURVEYING ENGINEERING LAND PLANNING  
**Northeast Civil Solutions**  
 INCORPORATED  
 381 PAYNE ROAD, SCARBOROUGH, MAINE 04074

tel 207.883.1000 fax 207.883.1001 e-mail info@northeastcivilsolutions.com  
 800.882.2227