

HYDRAULIC CALCULATIONS

94 NORMAN AVENUE
BROOKLYN
ZONING: R6A
BLOCK: 2647
MAP: 13a
LOT: 4

LOT AREA (As) = 2,375.00 sq. ft. ~ 0.0545 acre

SANITARY Q = $\frac{170 \times 0.0545 \times 150}{7.48 \times 86,400}$

Qpeak = $Q = \frac{0.0022 \text{ cfs}}{0.0022 \times 4} = 0.0086 \text{ cfs}$

STORM DRAINAGE AREA (As):
ROOF= 1,543.00 sf ~ 0.0354 acre
PAVED AREA= 346.00 sf
GRASS AREA= 486.00 sf

STORM DRAINAGE TRIBUTARY AREA (At):
ROOF= 1,543.00 sf
PAVED AREA= 346.00 sf
GRASS AREA= 486.00 sf
TOTAL (At) = 2,375.00 sf

ALLOWABLE STORM FLOW TO SEWER (Qall) = $\frac{As}{2,375.00} \times \frac{17,400}{17,400} = 0.1365 \text{ cfs}$

WEIGHTED RUNOFF COEFFICIENT (CWT) = $\frac{(C1 \times A1 + C2 \times A2 + C3 \times A3) / At}{\text{TOTAL}}$
ROOF AREA 0.95 x 1,543.00 / 2,375.00 = 0.6172
PAVED AREA 0.85 x 346.00 / 2,375.00 = 0.1238
UNPAVED AREA 0.20 x 486.00 / 2,375.00 = 0.0409
TOTAL = 0.7820

ACTUAL DEVELOPED FLOW RATE (Qdev) = $\frac{(C1 \times A1 + C2 \times A2 + C3 \times A3) / 7,320}{\text{TOTAL}}$
ROOF AREA 0.95 x 1,543.00 / 7,320.00 = 0.2003 cfs
PAVED AREA 0.85 x 346.00 / 7,320.00 = 0.0402 cfs
UNPAVED AREA 0.20 x 486.00 / 7,320.00 = 0.0133 cfs
TOTAL = 0.2537 cfs

Qallow FOR DETENTION
ALLOWABLE STORM TO SEWER (Qall) = 0.1365 cfs
PAVED & UNPAVED (unrestricted) = 0.0535 cfs
DETENTION RESTRICTED FLOW (max) = 0.0830 cfs

TOTAL DEVELOPED SITE TO STORM (Qdev) = 0.2537 cfs
TOTAL Q TO SEWER ALLOW. (Qall) = 0.1365 cfs
TOTAL Q TO SEWER (Storm - unrestricted) = 0.0535 cfs
TOTAL Q TO SEWER (Storm - restricted), see roof drain calculations below = 0.0668 cfs
TOTAL Q DETAINED ON ROOFTOP = 0.2003 cfs
TOTAL Q TO SEWER (Storm) = 0.1203 cfs
TOTAL Q TO SEWER (Sanitary) = 0.0086 cfs
TOTAL Q TO COMBINED (Storm + Sanitary) = 0.1289 cfs

NOTE:
TOTAL DEVELOPED STORM IS 0.2537, OF WHICH 0.0535 WILL NOT BE RESTRICTED AND THE REMAINING 0.2003 WILL BE DETAINED ON ROOFTOP DETENTION FACILITY. THE DEVELOPED STORM DETAINED ON THE ROOFTOP DETENTION FACILITY WILL BE RESTRICTED TO 0.0668 CFS BY MEANS OF ROOF DRAINS WITH WEIRS AS SPECIFIED. SEE ROOF DRAIN CALCULATIONS AND DETAILS ON THIS SHEET.

NOTE:
TOTAL DEVELOPED STORM ON PAVED AND UNPAVED AREAS (0.0535) WILL BE DIRECTLY DISCHARGED TO STORM SEWER WITHOUT ANY RESTRICTIONS. TOTAL DEVELOPED STORM ON ROOFED AREAS (0.2003) WILL BE RESTRICTED TO 0.0668 CFS BY MEANS OF CONTROLLED FLOW ROOF DRAINS.

DETENTION CALCULATION
Qall(detention) = $\frac{Qall}{0.0830} \times \frac{A}{0.0354} \times \frac{Cw}{0.9500} = 2.4676 \text{ cfs}$

t = $0.27 \times \sqrt{Qw \times At} / Qdrr = 15$
= $0.27 \times \sqrt{0.95 \times 1543} / 0.0668 = 15$
= 24,9842

V = $\frac{[0.19 \times C \times A / (t + 15) - 40Q] \times t}{[0.19 (0.95)(1543) / (24.9842 + 15) - 40 (0.0668)] (24.9842)} = 107.23 \text{ cf}$

ROOF TOP DETENTION
Roof Slope (height of) = 1.5625 in based on 0.125" pitch per foot
Roof volume under slope = 100.4557292 cu.ft.
area under slope = 1.62760417 sq.ft. based on 25' width of building
Volume required above slope = 6.77 cu.ft.
Head of water at above slope = 0.0527 in
Head of Water = 1.6152 in

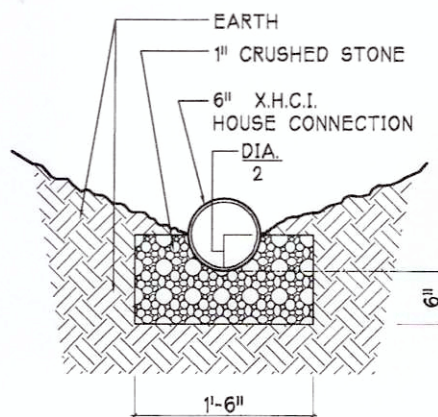
Total design roof volume = 128.5833 cu.ft.
128.5833 cu.ft. > 107.23 cu.ft.

1 cfd of water = 7.4805 gallons
1 weir = 10.0000 gallons per minute (2" Head of Water at FULLY EXPOSED POSITION)
= 1.3368 cfd per minute
= 0.0223 cfd per second

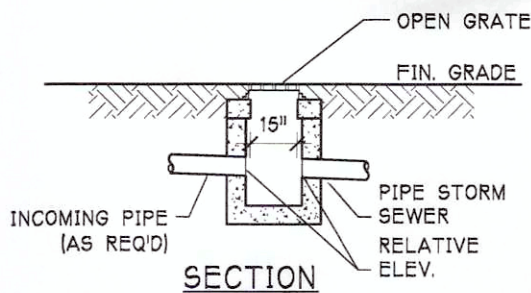
1 weir(s) = 0.0223 cfd per second
ROOF DRAIN CALCULATION
WEIR OPENING(S) = 1
MAX FLOW = 0.0223 cfs PER ROOF DRAIN (controlled)
Qty of Roof Drains = 0.0830 / 0.0223 = 3.7270
3 PROPOSED = 3.0000 * 0.0223 = THEREFORE 3 PROPOSED
Qdrr = 0.0668 STORM FLOW FROM ROOF RESTRICTED

ROOF DRAINS SHALL BE MANUFACTURED BY WATTS DRAINAGE MODEL RD-100 WITH ACCUTROL WIER (1 SLOT(S)). SEE MANUFACTURER'S SPECIFICATIONS AND DETAILS ON THIS SHEET.

AS PER MANUFACTURER, WIER OPENING SET TO 1 WILL RESTRICT THE FLOW OF 0.083 CFS TO 0.0668 CFS. 3 ROOF DRAINS ARE REQUIRED TO MAINTAIN A MAX FLOW OF 0.0668 CFS. 0.0668 CFS IS LESS THAN 0.083 CFS, THEREFORE OK.



TYPICAL BEDDING DETAIL
SCALE: N.T.S.



TYPICAL YARD DRAIN DETAIL
SCALE: N.T.S.

TOTAL DEVELOPED STORM

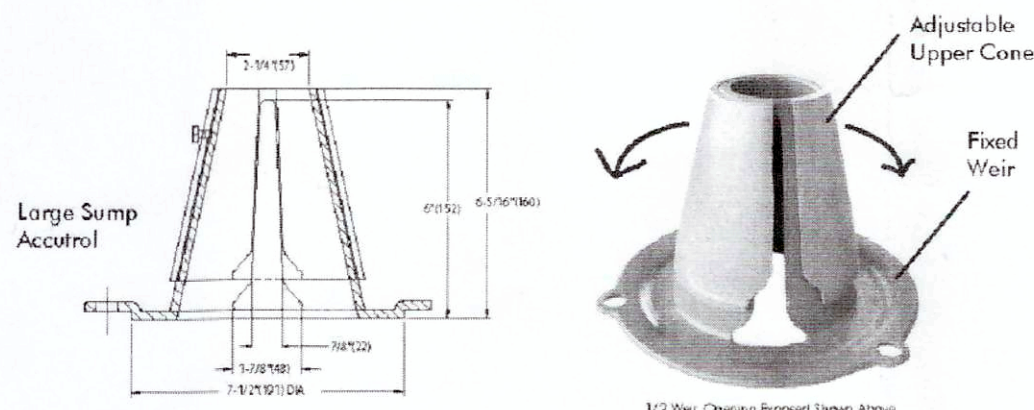
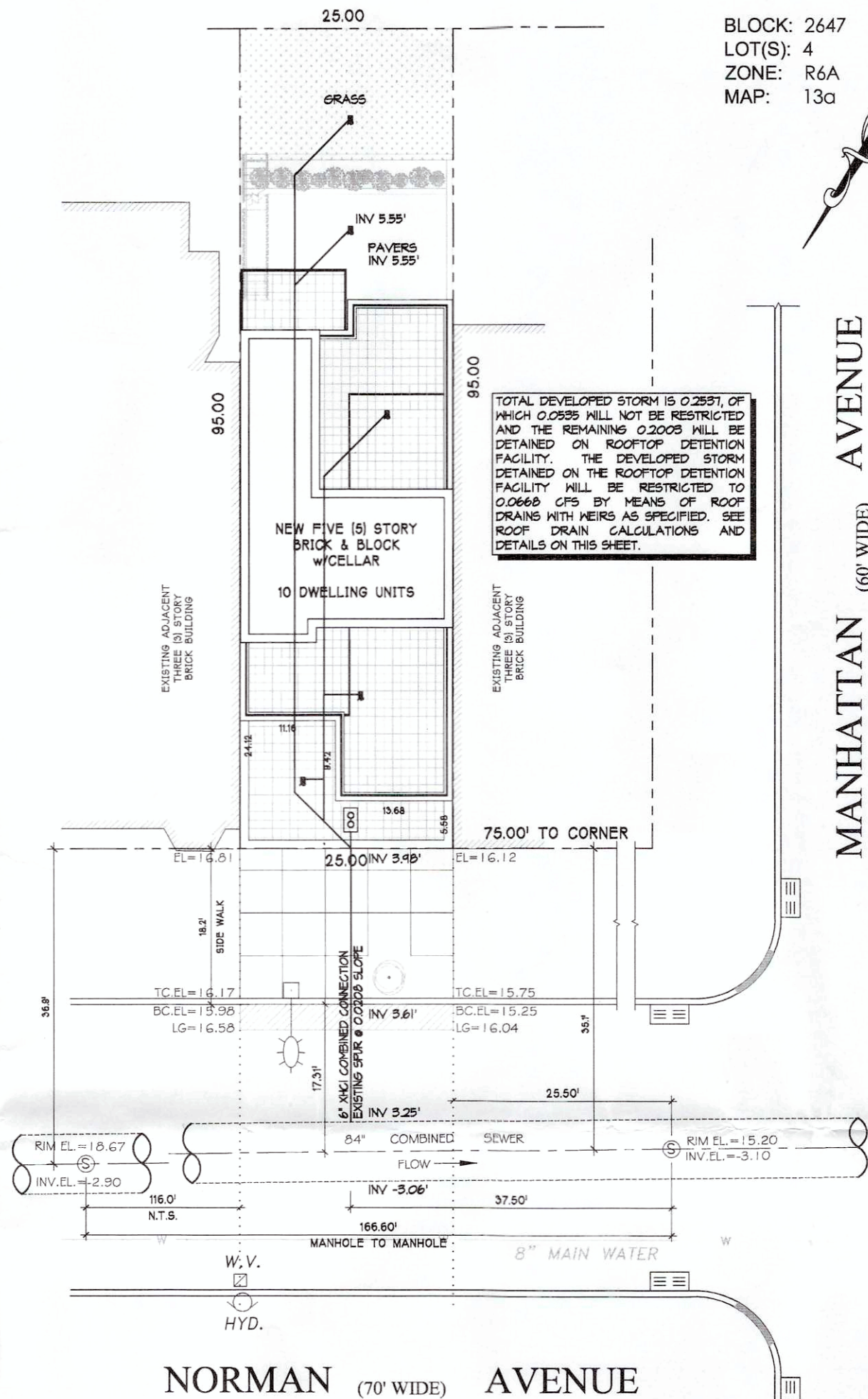


TABLE 1. Adjustable Accutrol Flow Rate Settings

Weir Opening Exposed	Head of Water					
	1"	2"	3"	4"	5"	6"
Fully Exposed	5	10	15	20	25	30
3/4	5	10	13.75	17.5	21.25	25
1/2	5	10	12.5	15	17.5	20
1/4	5	10	11.25	12.5	13.75	15
Closed	5	10	10	10	10	10

MANUFACTURER'S CATALOG/SPECIFICATIONS
NOTE: NO SUBSTITUTION OF MATERIAL IS ALLOWED.

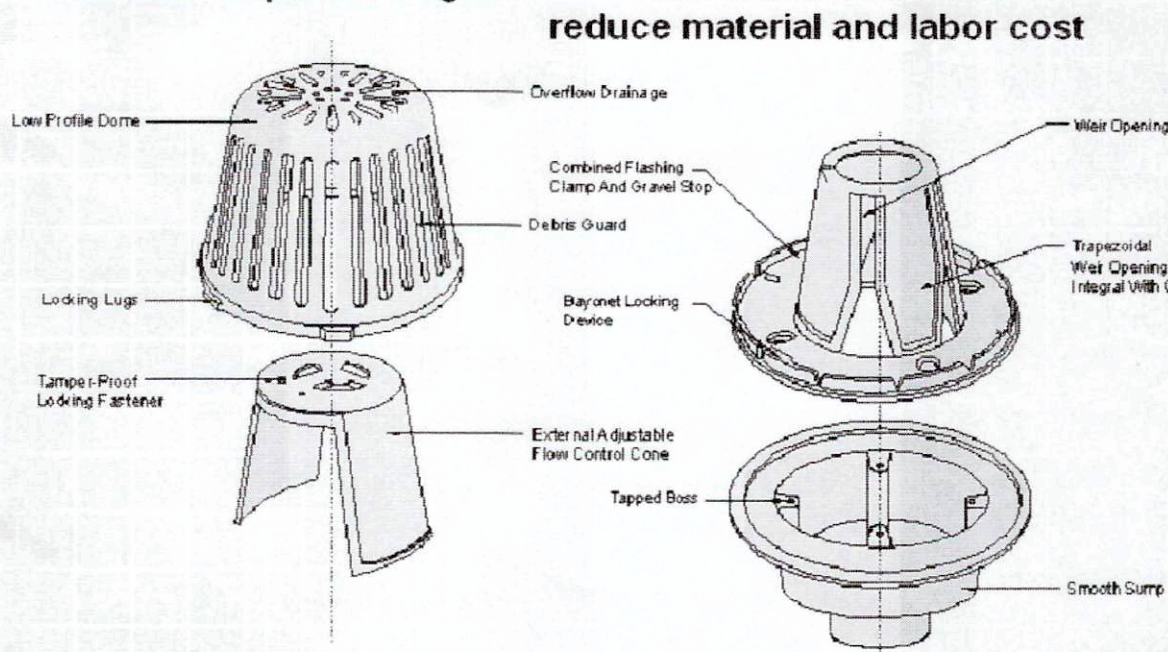


PROPOSED SITE PLAN
SCALE: 1/16" = 1'-0"



THIS CERTIFICATION IS VALID FOR TWO (2) YEARS ONLY.

RAINTROL - Exploded Diagram



control flow to sewers
reduce material and labor cost

Ordering Guidelines

Seal:
Date: 09/23/2013
Project No.: 13004
Drawing by: M.JUN
Checked by: C.V.P.
Drawing No.: SCP
Sheet: 1 of 1

Orient and affix BIS job number label here



DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATER & SEWER OPERATIONS

SITE CONNECTION PROPOSAL FORM
VALID FOR TWO (2) YEARS
[SC K- 370 / 13]



A. PROJECT DATA:

Borough of BROOKLYN Building Dept. No (s) 320590277
Tax Block 2647 Lot (s) 4 Zoning R6A Map No. 13a
Project Location 94 NORMAN AVENUE
Applicant CHRISTOPHER V. PAPA, RA, AIA
Address 22-02 STEINWAY STREET Zip 11105 Phone (718) 777-5200
Owner 94 NORMAN AVE MGT LLC
Address 105 CLAY STREET Zip 11222 Phone (718) 777-5200

B. PROJECT USE:

TYPE: ☐ 1, 2, 3, Family ☒ Multiple Dwelling ☐ Commercial
Number of Buildings 1 Total Number of Dwelling Units 10
Ownership: ☒ Fee Simple ☐ Condominium ☐ Home Owner Association ☐ Other.....

C. SITE CONNECTIONS REQUESTED:

Total Developed Site Storm Flow 0.2537 cfs
Allow. Storm Flow to the Sewers 0.1365 cfs
☒ Detention ☐ Retention

	Sanitary	Storm	Comb.	Drywells
No. Requested	xxxxxxx	xxxxxxx	1	xxxxxxx
Size	xxxxxxx	xxxxxxx	6"	xxxxxxx
Material (s)	xxxxxxx	xxxxxxx	X.H.C.I	xxxxxxx
Total Q (s)	0.0086	0.1203	0.1289	xxxxxxx

Note: The property owner is responsible for plugging all inactive pre-existing sewer connections

D. CONNECTION INFO:

- ☒ Connection to exist:
☒ Spur ☐ Riser ☐ Curb Connection
- ☐ Proposed New Riser
- ☐ Fold Spur in
- ☐ Drill in
- ☐ M.H. Conn. ☐ Exist. ☐ Prop.
- ☐ Reuse Plugged Connections

E. PRIVATE SEWER/DRAIN DATA:

- P.D. Plan No. N/A Date Approved N/A Expiration Date N/A
- Date Construction Permit Was Issued N/A
- Date Sewer Was Accepted By DEP N/A
- Sanitary Discharge Tributary to:

		Location
Private Sewage Treatment Plant	☐ No ☐ Yes	<u>N/A</u>
Private Pumping Station	☐ No ☐ Yes	<u>N/A</u>
Private Sewer	☐ No ☐ Yes	<u>N/A</u>

F. LOCATION PLAN:

- ☐ As Shown Below ☒ See Attached Location Plan Attachment "F"
(8 1/2 x 14 Size)

SEE ATTACHMENT "F"

STORM FLOW RESTRICTED BY MEANS OF ROOF DRAINS AT
ROOFTOP DETENTION FACILITY

G. SUPPORT DOCUMENTS:

- *1. Site Plan – 6 copies with hydraulic calculations ✓
- *2. Survey – 3 copies with watercourse note ✓
- *3. Tentative Lot Number Request Form – Attached Not Applicable ✓
- **4. Owner’s Consent for STP/PS Connection – Attached Not Applicable ✓
- 5. Department of Health Approval – Attached Not Applicable ✓
- 6. Department of Buildings Amendment – Attached Not Applicable ✓
- ***7. Condo/HOA Prospectus or Affidavit – Attached Not Applicable ✓
- 8. Industrial Waste Approval – Attached Not Applicable ✓
- 9. Associated Mapping/Demapping Action – Attached Not Applicable ✓
- 10. Builders Pavement Plan – Attached Not Applicable ✓
- 11. Boring Logs – Attached Not Applicable ✓
- 12. Other (Specify) Attached

- * Requires PE/RA Stamp and Original Signature (L.S. for Survey)
- ** Must Be Notarized and have Corporate Seal
- *** Must be Notarized

SEWER INFORMATION CERTIFIED BY DEP

		PUBLIC	PRIVATE
1. There (is) (is not) a sanitary sewer fronting the property available for connections.	SIZE		
2. There (is) (is not) a storm sewer fronting the property available for connections.	SIZE		
3. There (is) (is not) a combined sewer fronting the property available for connections.	SIZE	84"	X
4. Sanitary discharge tributary to:			
City Treatment Plant -	☐ NO ☒ YES	Location Newtown Creek app	
Private Sewage Treatment Plant -	☒ NO ☐ YES		
Private Pumping Station -	☒ NO ☐ YES		
5. Distance to, and location of nearest allowable drainage plan sewer:			
a) Sanitary Outlet	NIA		
b) Storm Outlet	NIA		
c) Combined Outlet	NIA		

CERTIFICATION, RESTRICTIONS, SPECIAL CONDITIONS:

No sewer connection permit will be issued until the Building Department as applicable authority certifies that the storm flow detention facilities have been satisfactorily built.



No Sewer Connection Permits Will Be Issued Until Local Law 103/89 Requirements Are Met To The Satisfaction Of The Department of Buildings.

THIS CERTIFICATION IS VALID FOR TWO (2) YEARS ONLY

ADDITIONAL INFORMATION, COMMENTS BY DEP OFFICE:

- 1. Topo Map No. Watercourse shown: ☐ YES ☐ NO
- 2. Comments:



PE/RA Original Signature
and seal

NB

320590277

SCK - 370 / 13

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BLOCK: 2647
LOT(S): 4
ZONE: R6A
MAP: 13a

BUREAU OF WATER & SEWER OPERATIONS
DIVISION OF REVIEW & CONSTRUCTION COMPLIANCE
SEWER INFORMATION CERTIFIED
1/23/14
DATE
DRAINAGE REVIEW SECTION
THIS CERTIFICATION IS VALID FOR TWO (2) YEARS ONLY

