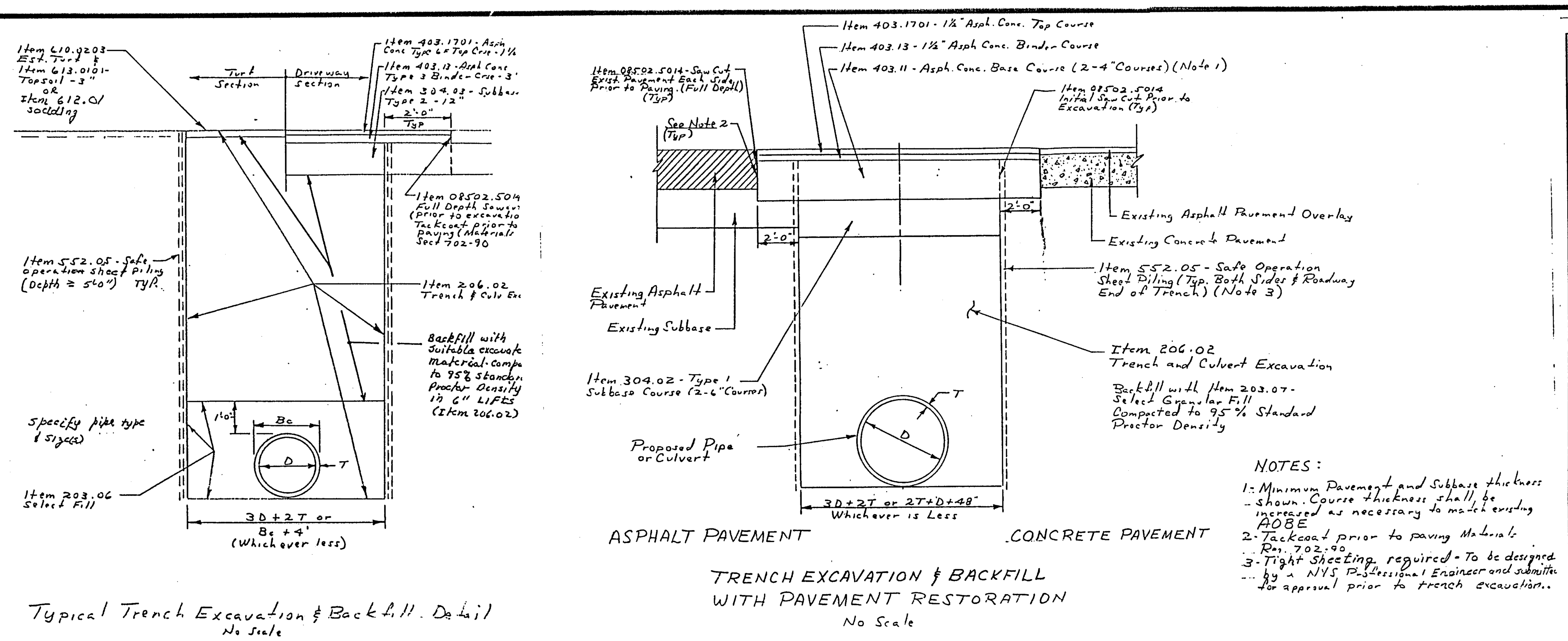
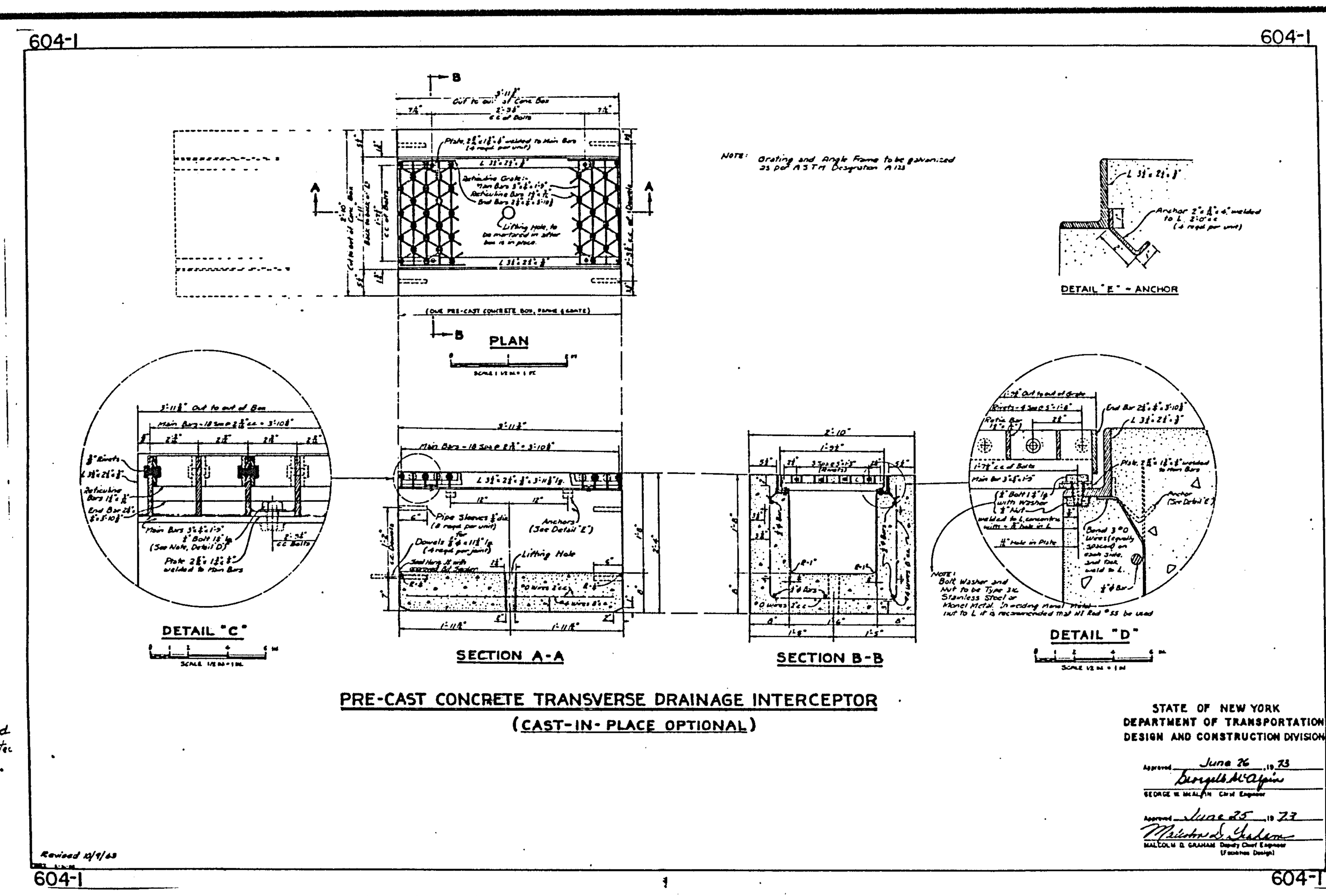




HOFFMAN ENGINEERS & SURVEYORS
P.O. Box 104 Lansingburgh Station
Troy, New York 12182-0104
TEL: (518) 237-0232
FAX: (518) 237-9415

FAXED TO: (518) 785-3888

July 20, 1994

Mr. Thomas Stang
Construction Engineer
Midon Management Corporation
Twenty Wade Road
Lathem, New York 12110

RE: 1 Elsmer Avenue
Town of Bethlehem
Albany County, New York

Dear Tom,

REFERENCES:

1. Report by the Environmental Design Partnership, entitled "Drainage Study For Midon Management Corp., Proposed Boston Chicken Restaurant, Delaware Avenue, Delmar.
2. NYS DOT Letter from William E. Logan, dated January 12, 1994 (copy of S.J. Slattery Memorandum dated January 7, 1994 attached).
3. NYS DOT Letter from William E. Logan, dated July 8, 1994 (copy of S.J. Slattery Memorandum dated June 28, 1994 attached.)

After reviewing all of the above referenced documents and in particular the Slattery Memorandum attached to Reference 3, we have redesigned the drainage system to conform to the parameters as outlined in the Slattery Memorandum. Those being that:

a. the system be redesigned as a "detention" system,

b. the system be capable of retaining 1850 cubic feet of storm water and,

c. the system have a controlled release of 2.5 cubic feet per second (cfs) to the States system.

We propose meeting those requirements by providing the required storage capacity in approximately 264 lineal feet of 3 foot diameter corrigated metal pipe (cmp). The controlled release will be through a length of 12" diameter cmp discharging into the NYS DOT existing catch basin.

The plan view of the proposed drainage system is as shown on sheet 5 of the plans. The following calculations are provided:

a. STORAGE CAPACITY (Vol):

1. Size of pipe: 3 ft. diameter
2. Pipe material: cmp
3. Length of pipe = l = 174 + 21 + 69 = 264 ft.
4. Therefore storage capacity at zero grade:

Vol = pi $r^2 l$ = 3.14 x 1.5^2 x 264 = 1865 cf
1865 greater than 1850 therefore OK

b. CONTROLLED RELEASE FROM MH # 2 THRU MH # 3 TO THE NYS DOT CATCH BASIN:

1. Size of pipe : 12" diameter
2. Pipe material : cmp
3. Length of pipe = 49 + 17 = 66 ft.
4. Invert Elevation MH # 2 = 91.00
5. Invert Elevation NYS DOT CB = 90.70
6. Therefore Slope (s) :
$\frac{91.00 - 90.70}{66}$ = 0.00454
7. Therefore Velocity (V) :

V = (1.486/n) $r^{0.67}$ $s^{0.5}$
n = manning value = 0.032 for cmp
r = hydraulic radius = R = radius for pipe flowing full
V = (1.486/0.032) x $1^{0.67}$ x $0.00455^{0.5}$
V = 46.4375 x 1 x 0.067453
V = 3.13 ft/sec

8. Therefore Quantity (Q) :

Q = VA where A = pi r^2, r = 0.5 ft.

Q = 3.13 x 3.14 x 0.5^2
Q = 3.13 x 3.14 x 0.25
Q = 2.457 cfs
2.457 LESSER than 2.5 therefore OK

REVISED

Accordingly, this system should meet the DOT requirements as outlined in Reference 3.

If you have any questions please do not hesitate to call.

Sincerely,

CONRAD P. HOFFMAN, CE,PE,LS

CLIENT: MIDON CORPORATION

ADDRESS: 1 ELSMERE AVENUE
TOWN OF BETHLEHEM
ALBANY COUNTY

SUBJECT: COMPUTATIONS TO DETERMINE REROUTING OF STORM SEWER AND NEW MANHOLE ELEVATIONS.

NOTE: THESE COMPUTATIONS REPLACE THOSE AS FORWARDED UNDER DATE OF JULY 20, 1994 AND CONTAINED IN PARAGRAPH b.

1. Size of pipe : 12" diameter.
2. Pipe material : cmp
3. Length of pipe : 71 + 25 + 14 = 110 ft.
4. Invert Elevation Manhole # 2 = 91.00
5. Invert Elevation NYS DOT CB = 90.70
6. Therefore slope (s) :
$\frac{91.00 - 90.70}{110}$ = 0.00273
7. Therefoe velocity (V) =

V = (1.486/n $r^{0.67}$ $s^{0.5}$

n = Manning value = 0.032 for cmp
r = hydraulic radius = R = radius for pipe flowing full

V = (1.486/0.032 x $1^{0.67}$ x $0.00273^{0.5}$
V = 46.4375 x 1 x 0.05225 = 2.426 ft/sec

8. Therefore Quantity (Q) :

Q = VA = where A = pi r^2 = 3.14 x 0.5^2 = 0.785 ft^2

Q = 2.426 x 0.785 = 1.904 ft^3/sec

9. Therefore Invert Elevations:

Manhole # 2	91.000
Manhole # 3	90.806
Manhole # 4	90.738

CLIENT: MIDON CORPORATION

ADDRESS: 1 ELSMERE AVENUE
TOWN OF BETHLEHEM
ALBANY COUNTY

SUBJECT: COMPUTATIONS TO DETERMINE SIZE OF RESTRICTIVE ORIFICE AT MANHOLE NUMBER 2 TO INSURE 2.5 FT^2/SEC FLOW IN 12 " DIAMETER PIPE.

SOURCE REFERENCE: "HANDBOOK OF CONCRETE PIPE HYDRAULICS"

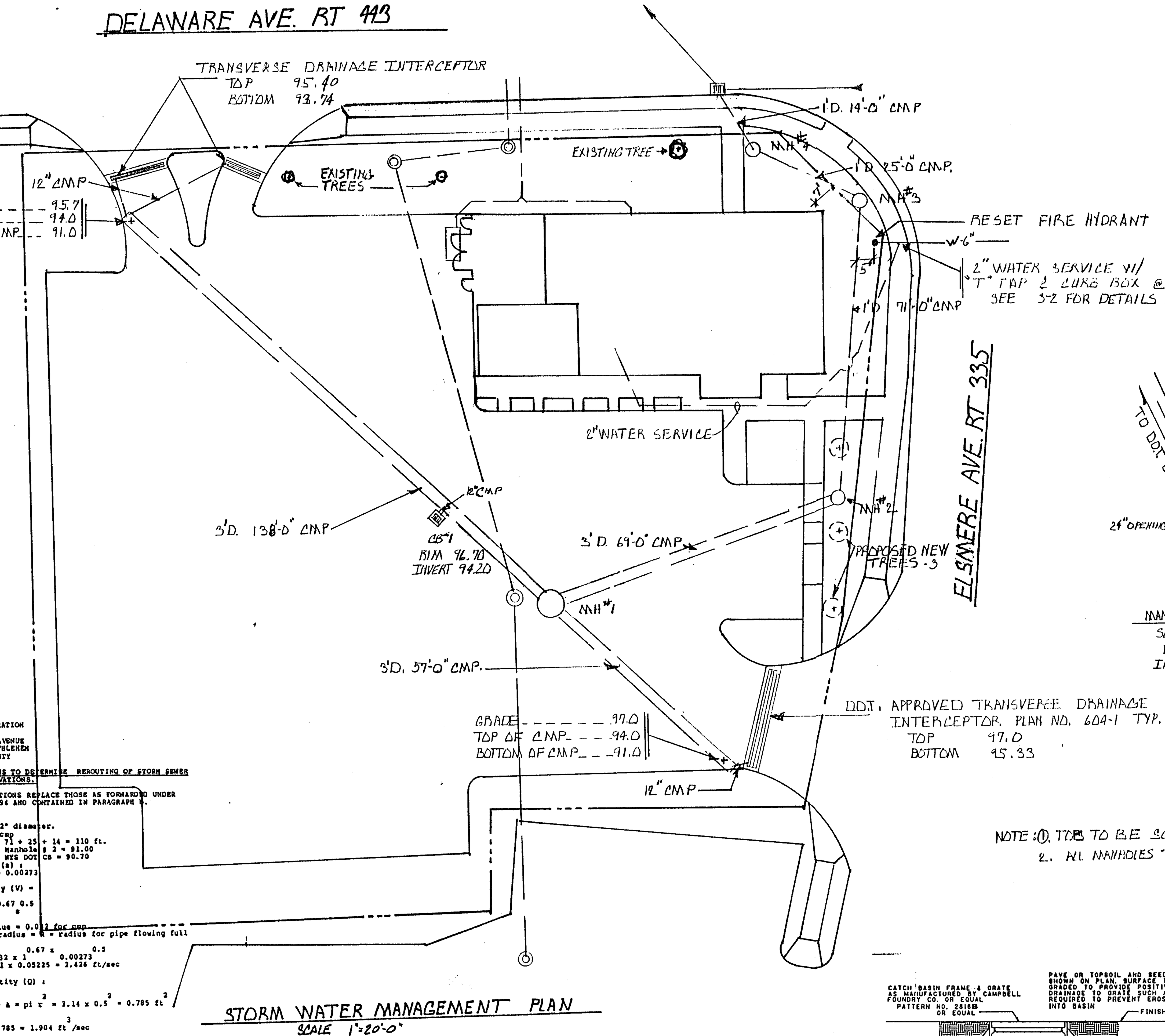
THE ORIFICE FLOW EQUATION IS DERIVED FROM "BERNOULI'S EQUATION AND IS:

Q = CoAo $\sqrt{2gH}$

WHERE: Co = CONTRACTION COEFFICIENT OR 0.61 (PG. 70 REF.)
Ao = AREA OF ORIFICE, a = side Therefore A = a^2 ASSUMING A SQUARE ORIFICE
g = ACCELERATION OF GRAVITY (32.2 FT/SEC/SEC)
H = HEAD (2.5 FT.)
Q = 2.5 FT^3/SEC (GIVEN)

THEREFORE:
Q = CoAo $\sqrt{2gH}$
2.5 = 0.61 x a^2 x $\sqrt{2 \times 32.2 \times 2.5}$
a = 0.568 FT OR 6 3/4 INCHES

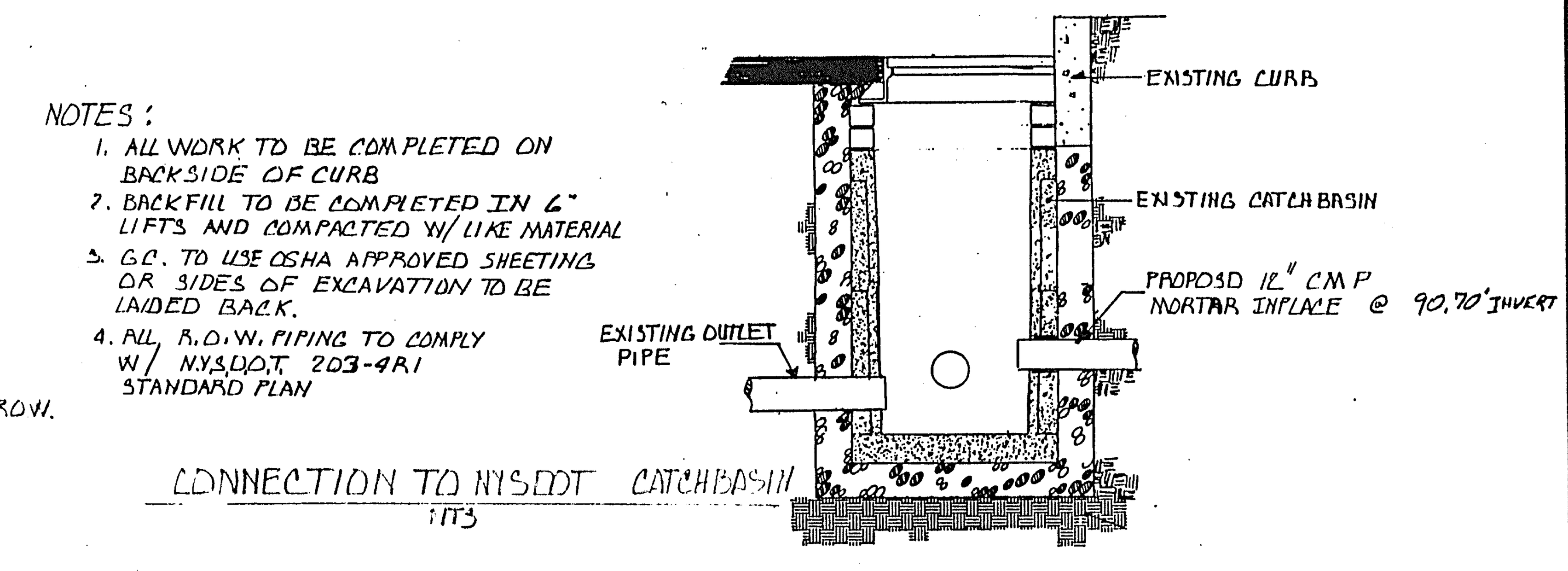
THEREFORE: ORIFICE SHOULD BE 6 3/4 INCHES INCHES SQUARE WITH THE INVERT AT THE BOTTOM OF THE MANHOLE.

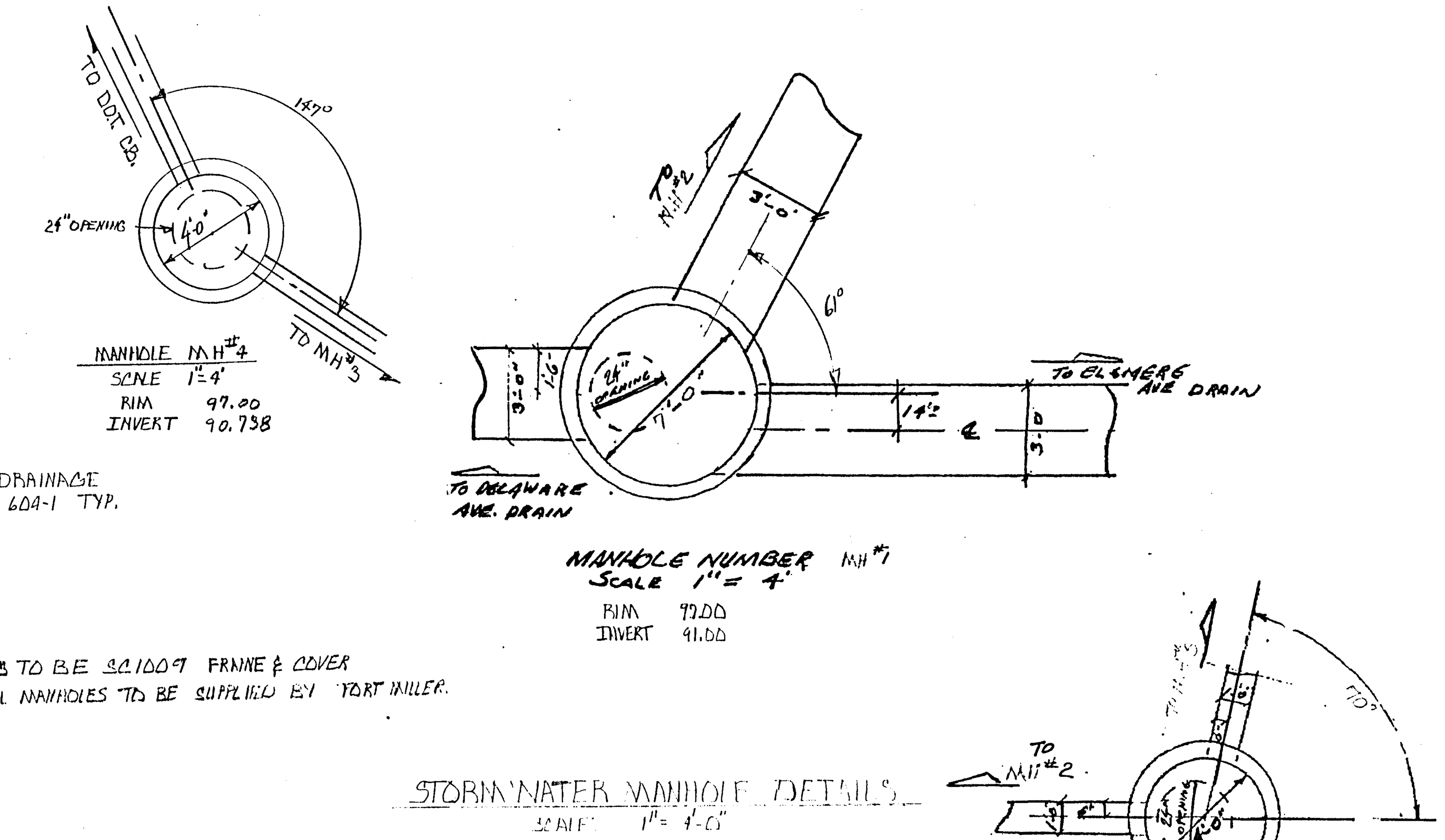


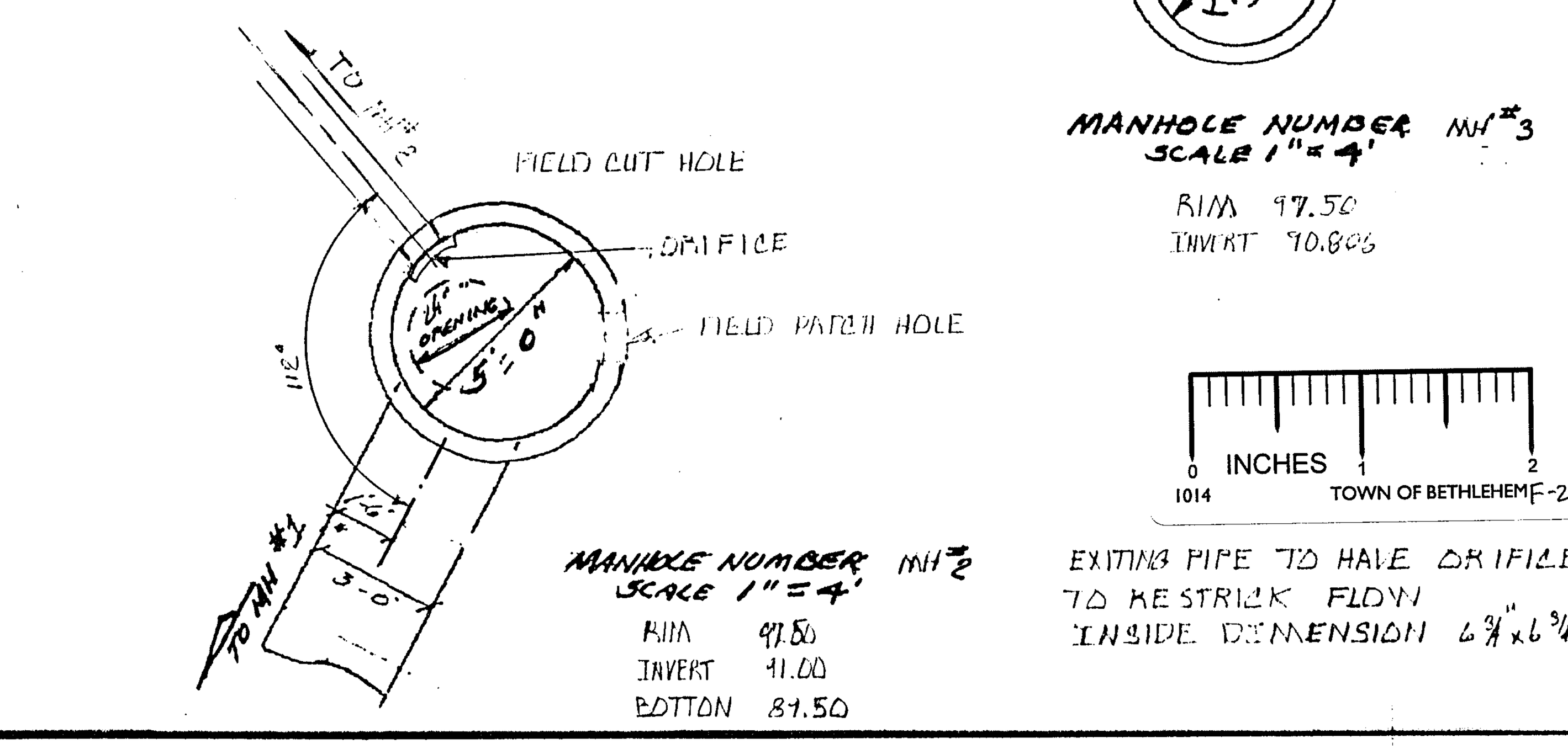
CB#1	
RIM	96.70
INVERT	94.20

NOTES:

1. ALL WORK TO BE COMPLETED ON BACKSIDE OF CURB
2. BACKFILL TO BE COMPLETED IN 6" LIFTS AND COMPACTED W/ LIKE MATERIAL
3. G.C. TO USE OSHA APPROVED SHEETING OR SIDES OF EXCAVATION TO BE LAIDED BACK.
4. ALL R.O.W. PIPING TO COMPLY W/ NYSDOT 203-4R1 STANDARD PLAN

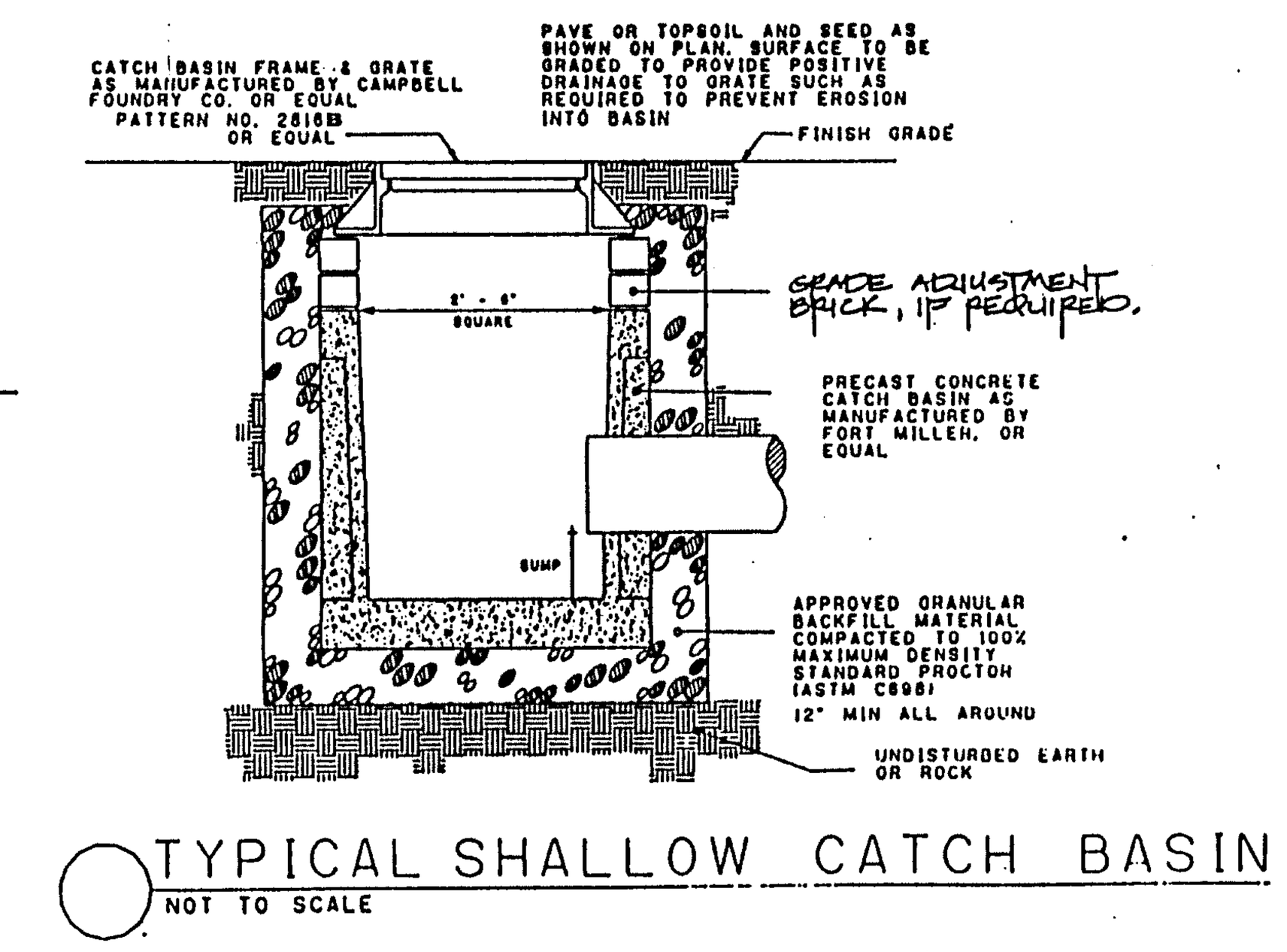






NOTE: ① TOPS TO BE SC1009 FRAME & COVER
2. ALL MANHOLES TO BE SUPPLIED BY FORT MILLER.

EXITING PIPE TO HAVE ORIFICE TO RESTRICK FLOW INSIDE DIMENSION 6¾" x 6¾"



INCHES
TOWN OF BETHLEHEM F-22

REVISION:
① 7/20/94 TCS RE-DESIGNED
② 7/22/94 TCS DOT
③ 8/10/94 TCS REROUTE STORM WATER & UPDATE 8" SANITARY
④ 8/11/94 TCS TREES & FIRE HYDRANT

BOSTON CHICKEN

1 ELSMERE AVENUE
TOWN OF BETHLEHEM NEW YORK
DELMAR

STORM WATER MANAGEMENT PLAN

MIDON MANAGEMENT CORP.
20 WADE RD
LATHAM NY 12110
518-785-3334

DRAWN BY:	TCS
CHECKED BY:	
DATE:	7/20/94
SCALE:	AS NOTED
SHEET	S-5