Frank B. Hicks Associates, Inc.
Consulting Engineers • Surveyors • Planners
1817 Wedgedale Dr. • Charlotte, NC • 28210
Telephone: (704) 527-1586 • Fax: (704) 553-1643

March 14, 1994

Soil Conservation Service
700 N. Tryon Street
Charlotte, N. C.

Re: N. Mecklenburg Landfill
Application to DEHNR for C&D Landfill Approval
Last phase of property.

Gentlemen:

In September 1993, your office reviewed the Siltation and Erossion Control plans for the first 10 acres phase of this project. This submittal is intended to cover the remaining landfill and is part of a submittal to DEHNR Solid Waste Section. These drawings are intended to show the final finish grades on the whole landfill, the storm drainage system, erossion control and access and service roads.

The use of Sericea Lespedeza for ground cover as suggested by your office will continue to be used thru the remaining landfill construction.

Attached are Stormwater Drainage Computations and Siltation and Erossion Control Computations for the entire project as it is to be graded and drained.

If you have any questions please contact us.

Very truly yours,

FRANK B. HICKS ASSOCIATES, INC.

Frank B. Hicks, Jr, P.E.
FBH/s
Encl. Plans and Computations.

GENERAL NOTES ON STORM DRAINAGE AND SEDIMENTATION COMPUTATIONS:

STORM DRAINAGE DESIGN COMPUTATIONS - SEE DRAWING SHEET NO. 2.

DRAINAGE AREAS ARE DESIGNATED "A22," TO REFERENCE AREA USED IN COMPUTATIONS.

PIPE SIZES AND PROFILES ARE SHOWN ON DRAWING SHEET NO. 4. PIPE IS TO ALL BE CORRUGATED PLASTIC. SIZES ARER SHOWN ON THE PROFILES.

DRAINAGE DITCH SECTIONS AND CROSS SECTIONS ARE SHOWN ON DRAWING SHEET NO. 3.

DROP INLET, PRECAST CONCRETE, ARE SHOWN ON DRAWING SHEET NO. 3.

LOCATION OF THE USE OF THE DITCH SECTIONS IS SHOWN ON DRAWING SHEET NO. 2. ALSO SEE KEY TO "FLAGGING" SYMBOLS ON THIS SHEET.

SEDIMENTATION CONTROL DESIGN DATA:

LOCATION OF THE THREE SEDIMENTATION PONDS/ TRAP ARE SHOWN ON DRW. SHEET NO. 2 ALONG WITH REQ'D. AREA, DEPTH, RISER, ETC.

SECTIONS THRU SEDIMENTATION PONDS/TRAP ARE SHOWN ON DRAWING SHEET NO. 3.

NORTH MECKLENBURG LANDFILL

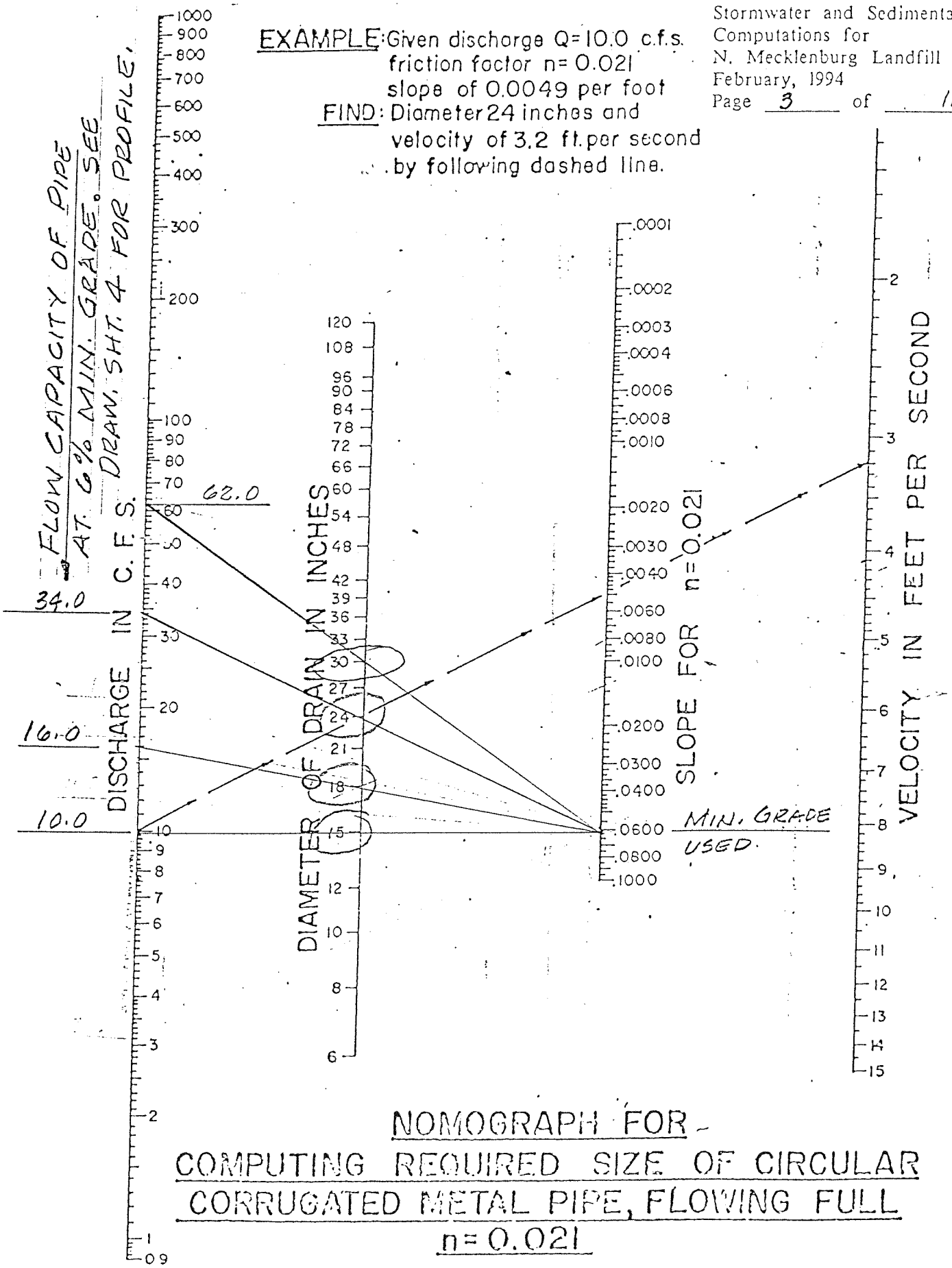
STORMWATER MANAGEMENT DESIGN COMPUTATIONS

STORMWATER DESIGN DATA:
1. DESIGN IS BY THE RATIONAL METHOD
2. INTENSITY OF RAINFALL IS BASED ON A STORM FREQUENCY OF 20 YEARS.
3. INTENSITY FACTOR IS 6.3.
4. STORM DRAINAGE PIPE IS CORRUGATED METAL OR PLASTIC. SEE DRAWINGS.
5. DROP INLET STRUCTURES ARE PRECAST NC DOT STANDARD UNITS.

LOCATION		AREA		C	INTENSITY			Q = CIA		PIPE					REMARKS
FROM	TO	SUB.	TOTAL		H'	L'	I	CFS		N	SLOPE	LGTH	SIZE	VEL.	
A1	DI-8	0.31	0.31	0.5	2	300	6.3		0.97	.021	6%		15"		
A2	DI-7	2.03	2.34		2	400		7.37	8.34		6%		15"		
A3	DI-6	1.93	4.27		2	350		13.4	21.74		6%		24"		
A4	DI-5	1.65	5.93		2	200		18.68	40.42		2.2%		30"		
A5															
A6	DI-4	0.40	0.40	0.5	2	400	6.3	1.26	1.26	.021	6%		15"		
A7	DI-3	2.22	2.62		2	550		7.31	8.57		6%		15"		
A8	DI-2	1.68	4.30		2	380		13.55	22.12		6%		24"		
A9	DI-1	0.46	4.76		2	200		15.00	37.12		6%		30"		
A10															
DITCHES:															
A11	DI-10	0.65	0.65	0.5	10	350	6.3		8.47	.021	2%		18"	2.0	DITCH DESIGNATION
A12		0.50	1.15		2	180									TD-3
A13		1.14	2.29		2.0	570									TD-3
A14	DI-10	0.40	2.69		3	800									TD-3
A15	TO DP#3		3.21	0.5			6.3		10.11		2% to 8%				TD-3
DIT."A"	(D2B)	0.65		0.5	18.	350.	6.3	2.05		.021	5.14%			2.0%	TD-2
DIT."B1"	(D2B)	1.03			22.	450.		3.24			6.28%			2.0	TD-2
DIT."B2"	(D2B)	2.30			20	600.		7.25			3.33%			2.0	TD-3
DIT."C"	(D2B)	0.83			60	400.		2.61			15.00%			5.0	TD-2
DIT."D"	(D2B)	2.0			2	200		6.30			1.0%			1.0	TD-3
DIT."E"	(D2B)	2.0			4	200		11.0			2.0%			1.5	TD-3

FLOW WITHIN A SYSTEM

EXAMPLE: Given discharge Q=10.0 c.f.s.
friction factor n=0.021
slope of 0.0049 per foot
FIND: Diameter 24 inches and
velocity of 3.2 ft. per second
by following dashed line.



NOMOGRAPH FOR
COMPUTING REQUIRED SIZE OF CIRCULAR
CORRUGATED METAL PIPE, FLOWING FULL
n=0.021

Adopted from Engineering Manual, War Department, Corps of Engineers, Part XIII, Chapt I, June 1955

SEE NEXT PAGE (5)

SEE PAGE 2 & DRW. SHTS. 2, 3

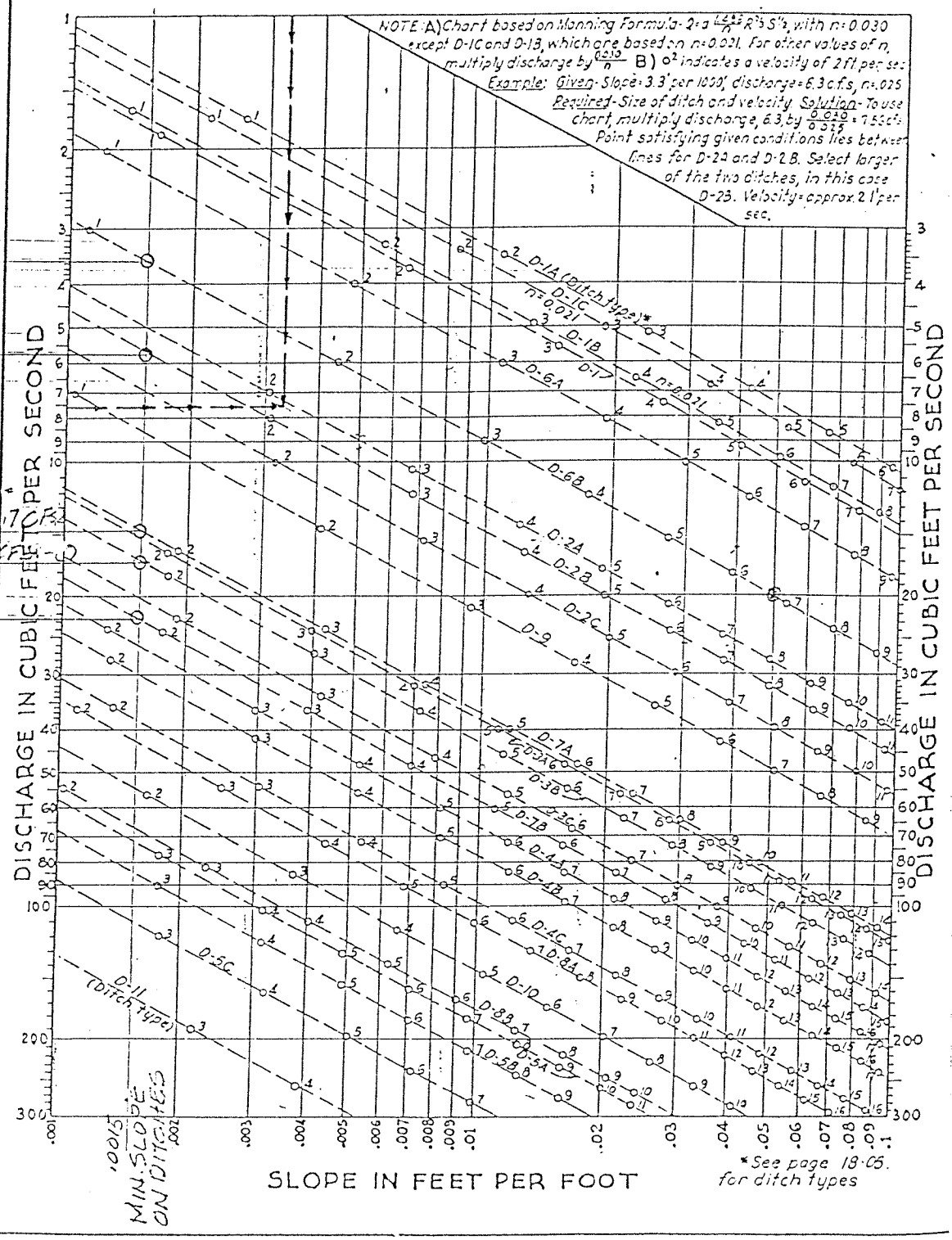
(D-6B) VD-1
Q = 3.5 CFS.

(D-2B) TD-2
Q = 5.7 CFS

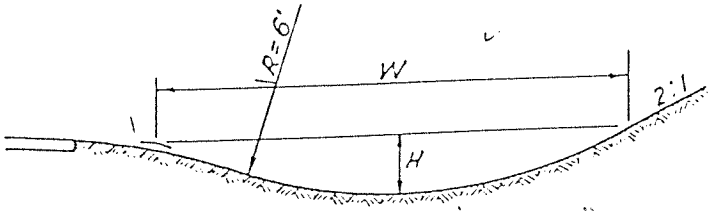
(D-7A) VD-2, 14.7 CFS
(D-3B) TD-3, 17 CFS

(D-7B) VD-3
Q = 22.5 CFS

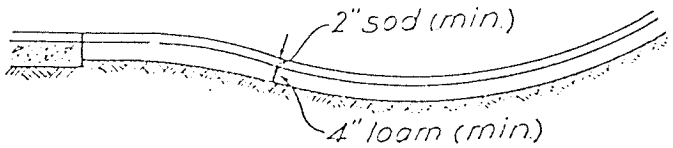
DRAINAGE-DITCHES-COMMON SECTIONS-2



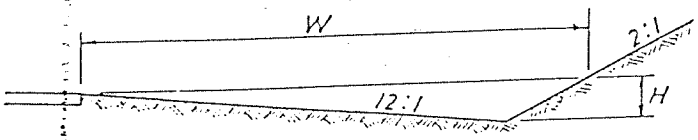
DRAINAGE-DITCHES-



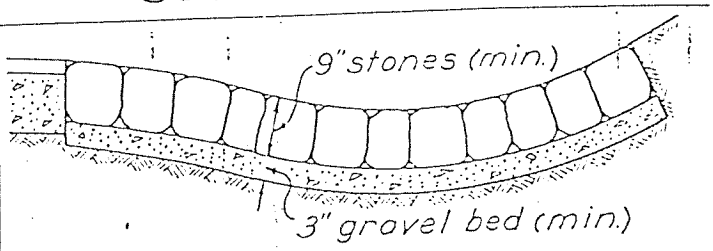
D-1 SEGMENTAL



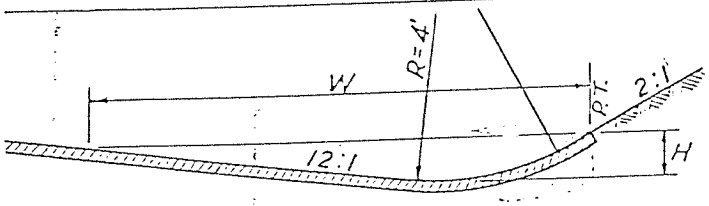
SODDED GUTTER



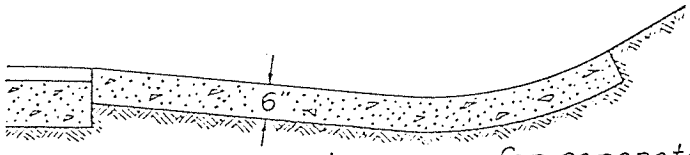
D-1A TRIANGULAR
Unequal side slopes



COBBLED GUTTER

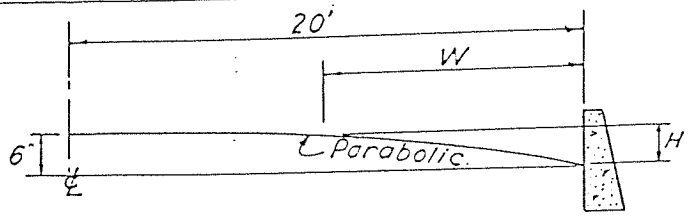


D-1B BITUMINOUS GUTTER

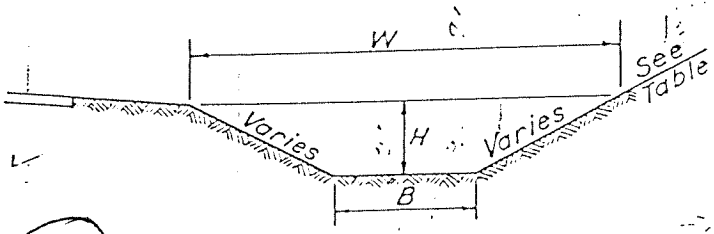


Base required same as for concrete pavement.

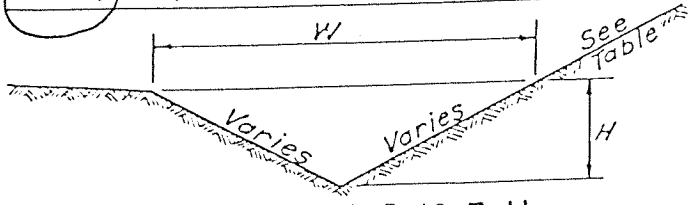
CONCRETE GUTTER



D-1C CURBED CROWNED STREET



D-2, D-3, D-4, D-5 TRAPEZOIDAL



D-6, D-7, D-8, D-9, D-10, D-11
ISOSCELES TRIANGULAR
D-9, D-10 and D-11 - Airport ditches

TABLE A - PROPERTIES OF DITCHES

NO.	DIMENSIONS				HYDRAULICS			
	SIDE SLOPES	B	H	W	a	p	R	$R^{2/3}$
D-1	—	—	6½"	5'-0"	1.84	5.16	0.356	0.502
D-1A	12:1 & 2:1	—	6"	7'-0"	1.75	7.14	0.245	0.392
D-1B	12:1 & 2:1	—	5"±	7'-0"	1.64	7.08	0.232	0.377
D-1C	½" to 1'-0"	—	4.5"	10'-0"	1.68	10.38	0.162	0.297
D-2A	1½:1	2'-0"	1'-0"	5'-0"	3.50	5.61	0.624	0.730
B	2:1	2'-0"	1'-0"	6'-0"	4.00	6.47	0.618	0.726
C	3:1	2'-0"	1'-0"	8'-0"	5.00	8.32	0.601	0.712
D-3A	1½:1	3'-0"	1'-6"	7'-6"	7.88	8.41	0.937	0.958
B	2:1	3'-0"	1'-6"	9'-0"	9.00	9.71	0.927	0.951
C	3:1	3'-0"	1'-6"	12'-0"	11.25	12.49	0.901	0.933
D-4A	1½:1	3'-0"	2'-0"	9'-0"	12.00	10.21	1.175	1.114
B	2:1	3'-0"	2'-0"	11'-0"	14.00	11.94	1.173	1.112
C	3:1	3'-0"	2'-0"	15'-0"	18.00	15.65	1.150	1.097
D-5A	1½:1	4'-0"	3'-0"	13'-0"	25.50	14.82	1.721	1.436
B	2:1	4'-0"	3'-0"	16'-0"	30.00	17.42	1.722	1.437
C	3:1	4'-0"	3'-0"	22'-0"	39.00	22.97	1.698	1.423
D-6A	2:1	—	1'-0"	4'-0"	2.00	4.47	0.447	0.584
B	3:1	—	1'-0"	6'-0"	3.00	6.32	0.475	0.609
D-7A	2:1	—	2'-0"	8'-0"	8.00	8.94	0.895	0.929
B	3:1	—	2'-0"	12'-0"	12.00	12.65	0.949	0.965
D-8A	2:1	—	3'-0"	12'-0"	18.00	13.42	1.341	1.216
B	3:1	—	3'-0"	18'-0"	27.00	18.97	1.423	1.265
D-9	7:1	—	1'-0"	14'-0"	7.00	14.14	0.495	0.626
D-10	7:1	—	2'-0"	28'-0"	28.00	28.28	0.990	0.993
D-11	7:1	—	3'-0"	42'-0"	63.00	42.43	1.435	1.302

SEDIMENTATION POND NO. 1

(SEE DRW. SHT #2)

		AC.
FLOW @ FE 5 =	40.42 CFS	5.93
@ FE 6 =	37.12	4.76
	77.54 CFS	.03
DIT. "C"	2.61	10.72
	80.15 CFS	

SURFACE AREA = 0.01 q

= 80.1 × 0.01 = 0.802 AC.

= 34,935 SF.

STORAGE VOLUME = 1800 CF/AC

1800 × 10.72 = 19,296

TOTAL DRAINAGE AREA @ FE5 + FE6 + "C"
= 10.72

SED. POND #1 SIZE = 34,935/19296 = 1.81'

"DEWATERING HOLE" = $\frac{A_s \sqrt{2h}}{T \times C_d \times 20{,}428}$ (1.752)

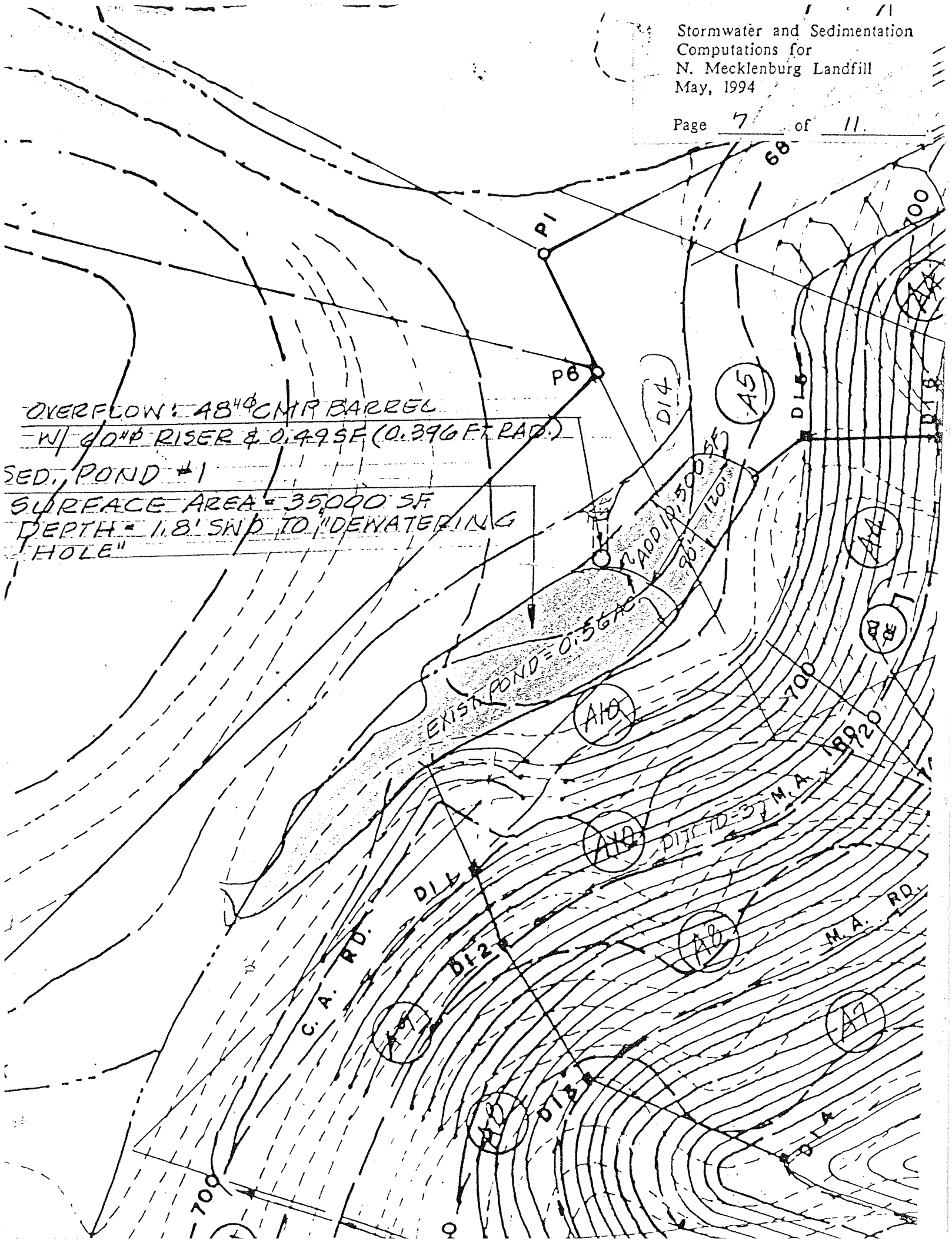
$= \frac{34{,}935 \sqrt{2(1.5)}}{10 \times 0.6 \times 20{,}428}$

$= \frac{60{,}509.}{122{,}568.} = 0.4937$ SF

USE 48" ϕ BARREL W/ 60" ϕ RISER

$A = \pi r^2$

$r = \sqrt{\frac{.494}{3.14}} = 0.3966'$


OVERFLOW: 48"Φ CMP BARREL
W/ 60"Φ RISER & 0.49 SF (0.396 FT RAD.)
SED. POND #1
SURFACE AREA = 35,000 SF
DEPTH = 1.8' SWD TO "DEWATERING HOLE"
P1
P6
D14
A5
D16
ADD 10,500 SF
120'
90'
EXIST. POND = 0.56 AC
A10
700
720
M.A. RD.
D11
D12
C.A. RD.
A8
A7
D13
D14
68

SEDIMENTATION POND NO. 2.

FLOW VIA FES #4 = 8.47 CF

SURFACE AREA = 8.47 X 0.01 = 0.0847 AC.
3689 SF

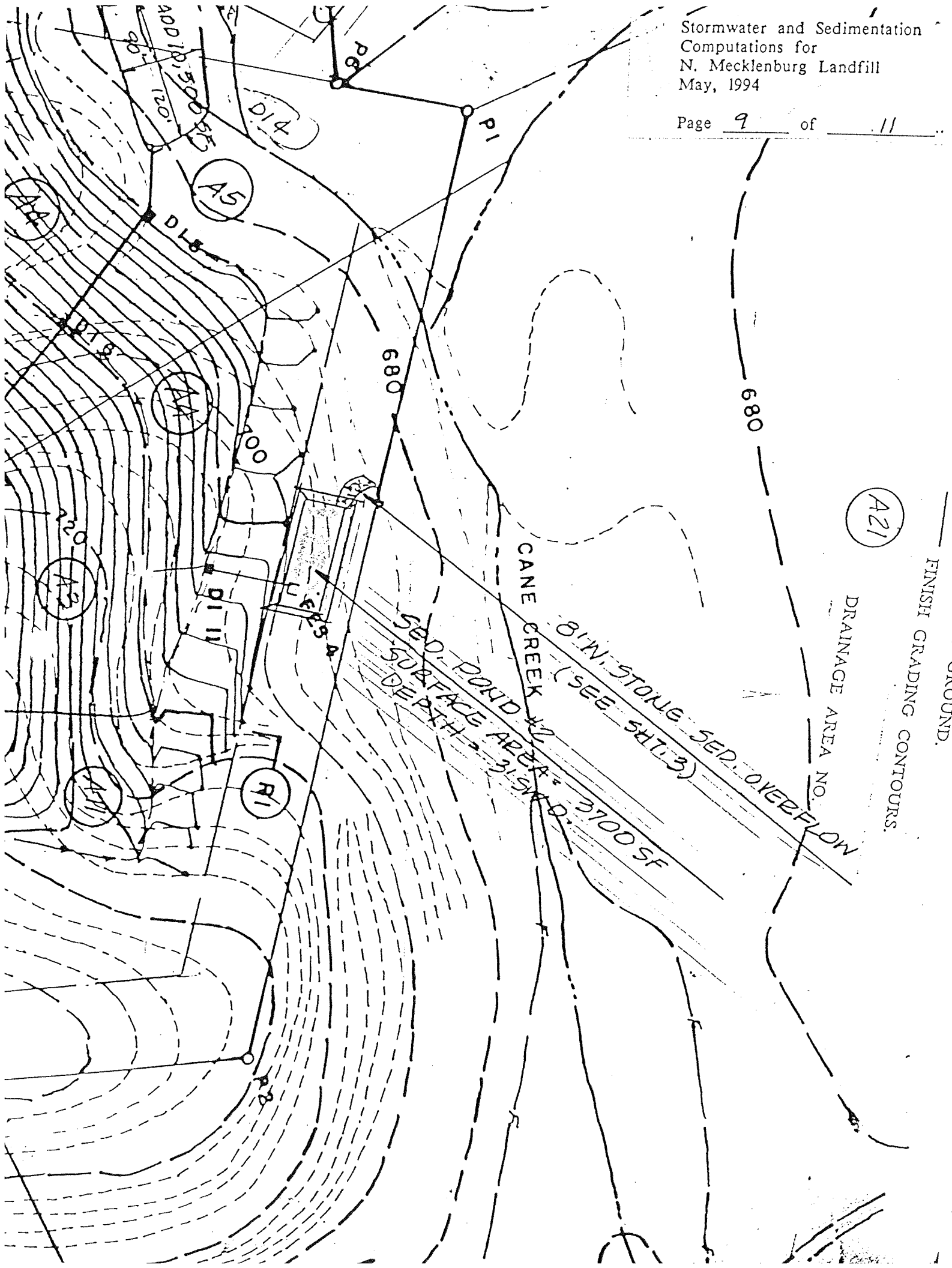
REQ'D. STORAGE = 1800 X 2.69 = 4842 CF

DEPTH = $\frac{4842}{3689}$ = 1.31 FT.

$\frac{3689}{40}$ = 92'

USE: 40 X 92 (BOT.) X 3 SWD DEEP.

USE "STONE SEDIMENT TRAP OVERFLOW"
SEE DRAWINGS.


P6
P1
D14
A5
A4
D15
D16
A4
680
700
720
A3
D11
FES 4
CANE CREEK
8' W. STONE SED. OVERFLOW
(SEE SHT. 3)
SED. POND #2
SURFACE AREA = 3700 SF
DEPTH = 3' SW. D.
A21
680
DRAINAGE AREA NO.
FINISH GRADING CONTOURS.
GROUND.
A11
R1
P2

SEDIMENTATION POND #3

FLOW @ DIT. "B-2" TO POND = 10.11 CFS

SURFACE AREA = 10.11 X 0.01 = 0.101 AC
= 4400 SF

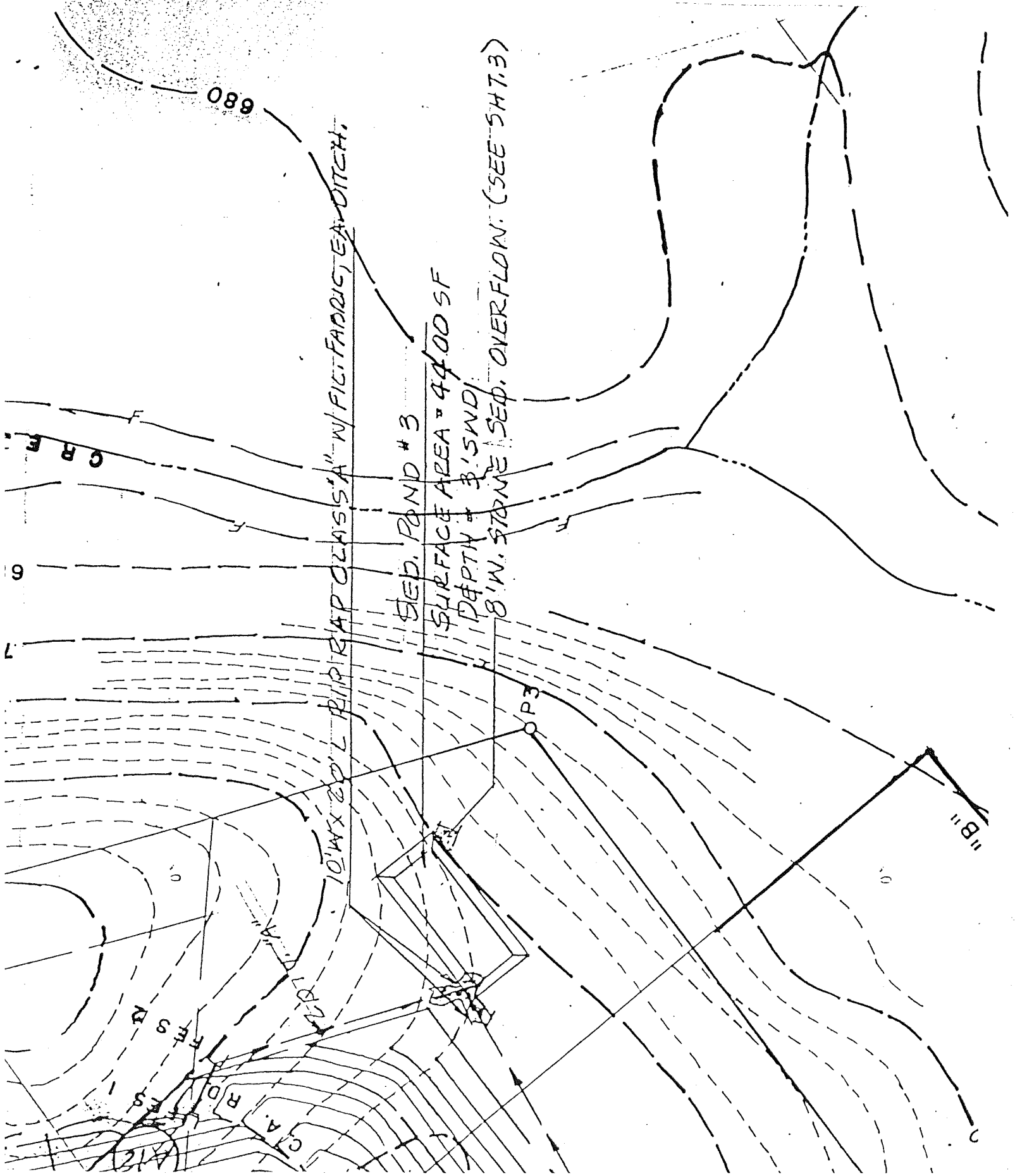
REQ'D STORAGE = 1800 X 2.3 = 4140 CF

DEPTH = $\frac{18,198}{4400}$ = 4.14 FT.

$\frac{4400}{40}$ = 110'

USE: 40' X 110' (BOT) X 3.5 WD DEEP.

USE "STONE SEDIMENT TRAP OVERFLOW", SEE DRAWINGS.


680
10'W x 20'L RIP RAP CLASS "A" W/ FIL. FABRIC, EA. DITCH.
SED. POND # 3
SURFACE AREA = 4400 SF
DEPTH = 3' SWD
8'W. STONE SED. OVERFLOW. (SEE SHT. 3)
P3
"B"