CERTIFICATE OF AUTHENTICITY

THIS IS TO CERTIFY THAT THE FOLLOWING ELECTRONIC RECORDS ARE TRUE AND ACCURATE REPRODUCTIONS OF THE ORIGINAL RECORDS OF JAMES CITY COUNTY GENERAL SERVICES DEPARTMENT- STORMW ATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HA VE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

BMPNUMBER: **WC028**

DATE VERIFIED: **May 11, 2016**

QUALITY ASSURANCE TECHNICIAN: **Charles E. Lovett II**

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 12, 2010

TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services

FROM: Tina Cantwell, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: WC028

PIN: 1240100030A

Subdivision, Tract, Business or Owner Name (if known): Roper Bros. Holdings, L.L.C.

Property Description: Branscome Concrete

Site Address: 7816 Richmond Road

(For internal use only) **Box** 13 **Drawer:** 8

Agreements: (in file as of scan date) **Y** **Book or Doc#:** 545 **Page:** 28-29

Comments

626

RECORDED 2-6-92

FILE COPY

DECLARATION OF COVENANTS

BOOK 545 PAGE 23

INSPECTION/MAINTENANCE OF RUNOFF CONTROL FACILITY

THIS DECLARATION, made this 9th day of January, 19 92, between Sheldon Lumber Company, Inc., Owner Branscome Concrete Inc., Tenant, and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: Located at 7812 Richmond Road and further described as a 2.66 ac. lease parcel and adjacent stormwater management basin as shown on the attached Exhibit "A", and James City County, Virginia, hereinafter referred to as the "COUNTY."

WITNESSETH:

We, the COVENANTOR(S), with full authority to execute deeds, mortgages, other covenants, and all rights, titles and interests in the property described above, do hereby covenant with the COUNTY as follows:

1. The COVENANTOR(S) shall provide maintenance for the runoff control facility, hereinafter referred to as the "FACILITY," located on and serving the above-described property to ensure that the FACILITY is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations.

2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the FACILITY to ensure that the FACILITY is properly maintained.

3. The COVENANTOR(S) shall provide and maintain perpetual access from public rights-of-way to the FACILITY for the COUNTY, its agent and its contractor.

4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the FACILITY for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the FACILITY.

5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the FACILITY in accordance with the approved design standards and with the law and applicable executive regulations, [illegible] necessary repair or maintenance work, and the COUNTY may assess the COVENANTOR(S) and/or all property served by the FACILITY for the cost of the work and any applicable penalties.

6. The COVENANTOR(S) shall indemnify and save the COUNTY harmless from any and all claims for damages to persons or property arising from the installation, construction, maintenance, repair, operation or use of the FACILITY.

7. The COVENANTOR(s) shall promptly notify the COUNTY when the COVENANTOR(S) legally transfers any of the COVENANTOR(S)' responsibilities for the FACILITY. The COVENANTOR(S)' shall supply the COUNTY with a copy of any document of transfer, executed by both parties.

8. The covenants contained herein shall run with the land and shall bind the COVENANTOR(S) and the COVENANTOR(S)' heirs, executors, administrators, successors and assignees, and shall bind all present and subsequent owners of property served by the FACILITY.

9. This COVENANT shall be recorded in the County Land Records.

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this 9th day of January, 19 92.

COVENANTOR(S)

ATTEST:

Howard G. Sheldon, Jr.
President
Sheldon Lumber Co., Inc.

COVENANTOR(S)

ATTEST:

Mark E. Hockaday
Vice President
Branscome Concrete Inc.

STATE OF VIRGINIA
CITY/COUNTY OF James City County

I hereby certify that on this 9th day of January 19 92, before the subscribed, a Notary Public of the State of Virginia, and for the City/County of James City County, aforesaid personally appeared before me Mark E. Hockaday, and Howard G. Sheldon, Jr.
(Name of Acknowledging Party)
and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 9th day of January, 19 92.

Notary Public

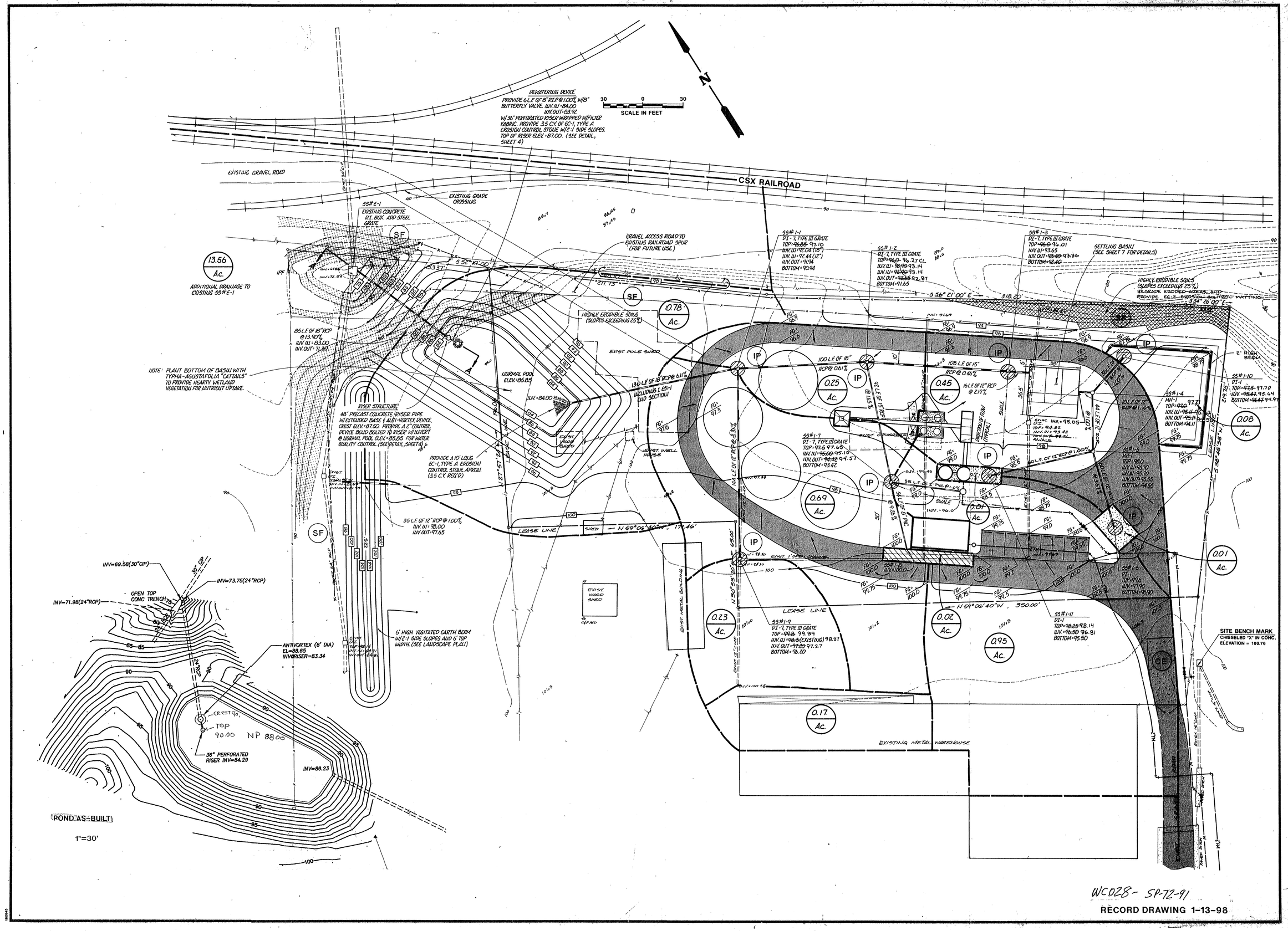
My Commission expires: March 22, 1992

Approved as to form:

0261U
Revised 3/91

VIRGINIA: City of Williamsburg and County of James City, to Wit:
In the Clerk's office of the Circuit Court of the City of Williamsburg and County of James City the 14 day of Jan, 19 92 This Deed was presented with certificate annexed and admitted to record at 2:40 o'clock
Teste: Helene S. Ward, Clerk
by
Deputy Clerk

PLAT RECORDED IN D.B. 545 30



No.	DATE	REVISION / COMMENT / NOTE	BY
1	1/14/98	RECORD DRAWING	GAM

COMMONWEALTH OF VIRGINIA
G. ARCHER MANSTON III
No. 018222
PROFESSIONAL ENGINEER

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Fax (804) 220-8994
CONSULTING ENGINEERS

GRADING, DRAINAGE AND EROSION AND SEDIMENT CONTROL PLAN
AGGREGATE & CEMENT STORAGE FACILITY

OWNER: SHELDON LUMBER COMPANY, INC.
OPERATOR/LESSEE/DEVELOPER: HENRY S. BRANSCOME, INC.
JAMES CITY COUNTY VIRGINIA

Designed	Drawn
GAM	BJJ
Scale	Date
1"=30'	7/91

Project No. 7574

Drawing No. 3

HANKINS INDUSTRIAL PARK

OWENS - ILLINOIS, INC.

CHESAPEAKE & OHIO RAILROAD (CHESSIE SYSTEM)

SPUR TRACK

PROPOSED STORMWATER MANAGEMENT BASIN SITE

SITE BOUNDARY AND LEASE LINE

ASPHALT DRIVE

CONCRETE RUNWAY FOR CONVEYOR WHEELS

AGGREGATE BIN

PUMP HOUSE

EX. OPEN CONC. D.I.

10,000 GALLON STORAGE TANK

30" CONVEYOR

AGGR. HOPPER

REMOVE

12' X 7'd' X 10" CONC. PAD

CEMENT SILOS

ASPHALT PARKING AREA

CONC. WASH RACK

FRENCH DRAIN

1 STORY CONTROL & SCALE HOUSE

10' X 60' TRUCK SCALES

EXIST. WOOD & EARTH OPEN DRAIN DITCH

EX. CONC. OPEN DRAIN

7' CHAIN LINK FENCE

FR. BLDG. REMOVE

CONC. SLAB

CONC. PIER

WELL & WELL HOUSE

FR. SHED

FR. BLDG.

OPEN FR. SHED

1 STY. METAL & FR. OPEN SHED

FRAME & TIN WAREHOUSE

FR. & TIN WAREHOUSE

1 STY. METAL & FR. STORAGE SHED

1 STY. METAL & FR. WAREHOUSE

1 STY. METAL & FR. BLDG.

FRAME WAREHOUSE

EX. ASPHALT

1 STY. BLOCK OFFICE BLDG.

DWELLING

GRASS - GRAVEL PARKING AREA

NEW ASPHALT OVERLAY

NEW 24' ASPHALT DRIVE

60' VARIABLE WIDTH GRAVEL DRIVE FOR INGRESS AND EGRESS

22" PLASTIC PIPE

5' X 5' OPEN CONC. D.I.

12" R.C.P.

4' CONC. V-DITCH

15" R.C.P.

4' CONC. H.W.

4' CONC. SWALE

CONC. H.W.

4' CONC. H.W.

EARTH SWALE

25' RADIUS

NEW STD. CG-2 CURBING

100'

NEW TURN LANE

12'

36' TAPER

NBL RTE. 60

TO RICHMOND

S 52° 19' 00" E

S 56° 21' 00" E

S 54° 26' 00" E

S 60° 59' 00" E

S 64° 11' 00" E

N 66° 56' 00" W

N 65° 38' 37" W

N 63° 24' 55" W

N 32° 23' 52" E

N 16° 14' 30" W

N 63° 05' W

N 59° 06' 40" W

N 31° 45' 00" E

S 88° 34' 00" W

365.10'

318.20'

139.31'

160.98'

160.02'

649.00'

421.60'

392.86'

465.49'

321.84'

286.80'

201.60'

350.00'

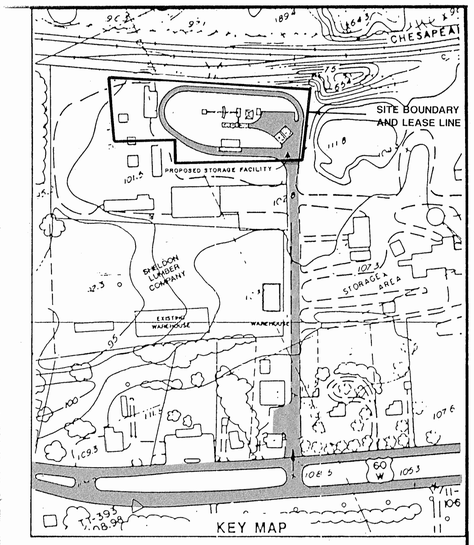
128.24'

86.33'

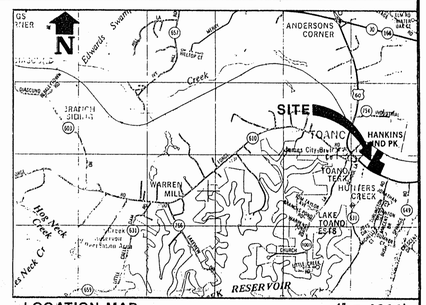
SCALE IN FEET

60 0 60

N



KEY MAP



LOCATION MAP 1" = 4000'

No.	DATE	REVISION / COMMENT / NOTE	BY

COMMONWEALTH OF VIRGINIA
G. ARCHER MARSTON III
No. 016232
PROFESSIONAL ENGINEER

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Fax: (804) 220-8994

CONSULTING ENGINEERS

PRELIMINARY PLAN

AGGREGATE & CEMENT STORAGE FACILITY

OWNER: SHELDON LUMBER COMPANY, INC.

LESSEE/ DEVELOPER: HENRY S. BRANSCOME, INC.

JAMES CITY COUNTY VIRGINIA

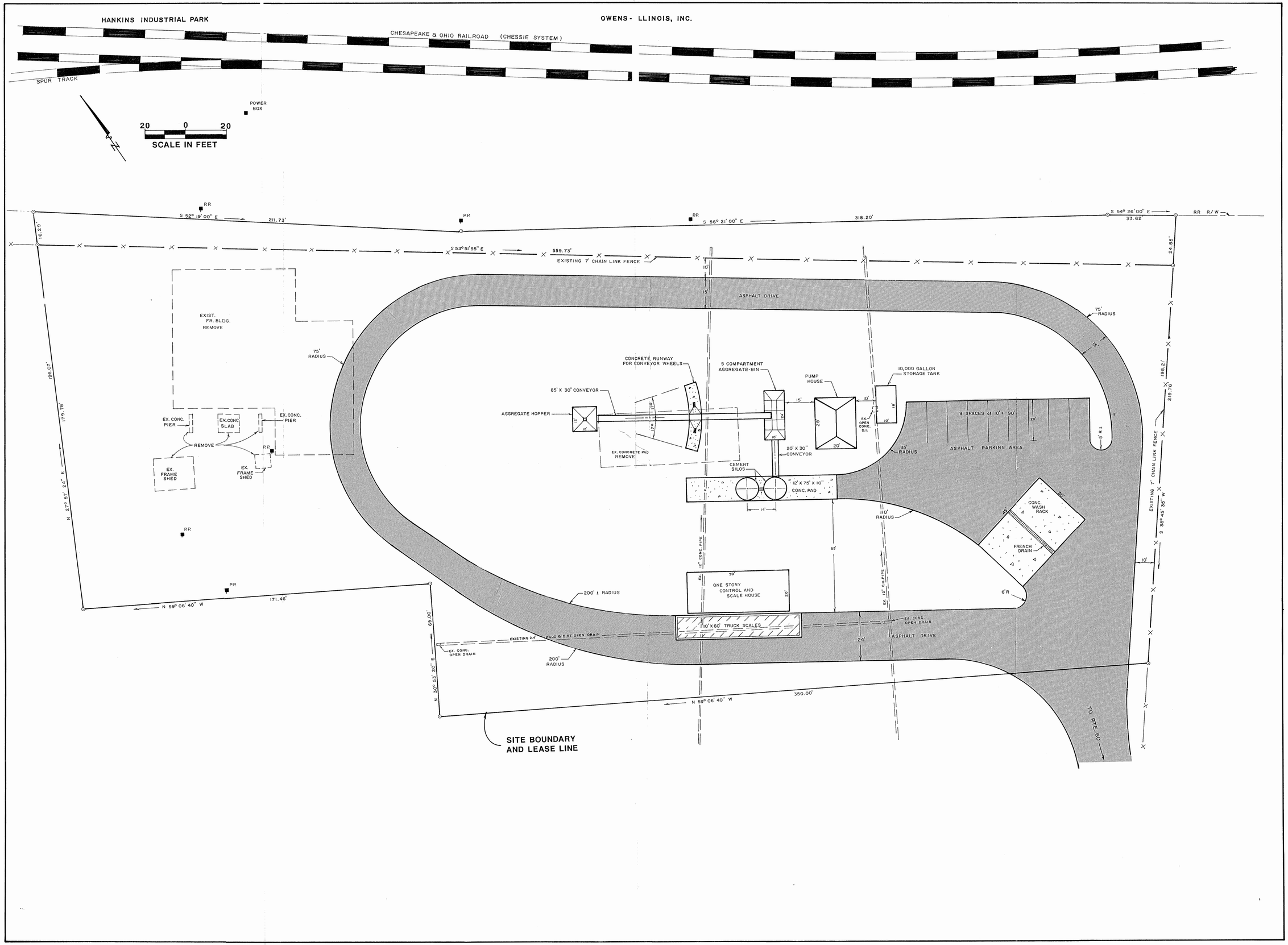
Designed	Drawn
	PLK
Scale	Date
1" = 60'	NOV. 1990

AES Project No. 7574

Drawing No. 1 of 2

RECEIVED
NOV 1990
PLANNING DEPARTMENT

SUP-55-90



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AES CONSULTING ENGINEERS

PRELIMINARY PLAN

AGGREGATE & CEMENT STORAGE FACILITY

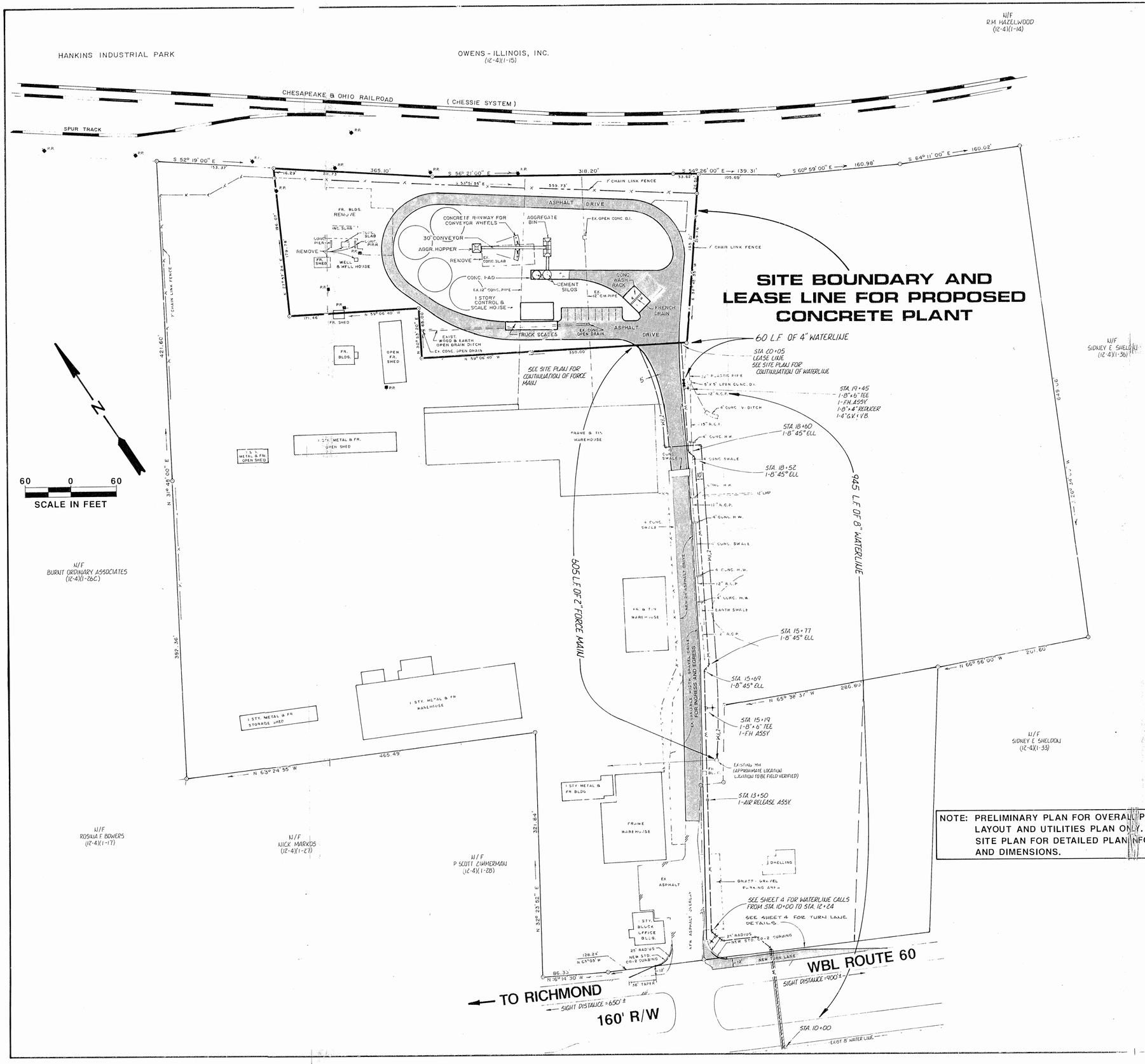
OWNER: SHELDON LUMBER COMPANY, INC.

LESSEE/DEVELOPER: HENRY S. BRANSCOME, INC.

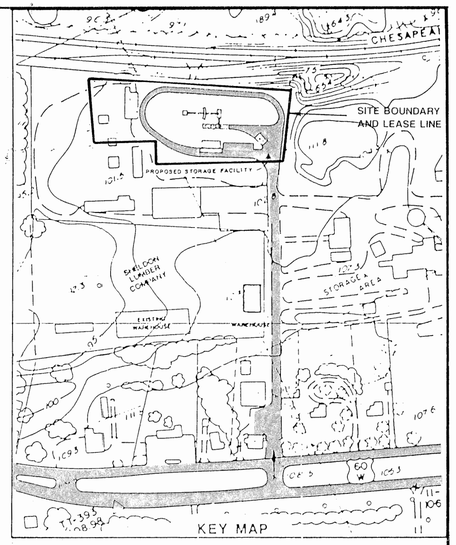
JAMES CITY COUNTY VIRGINIA

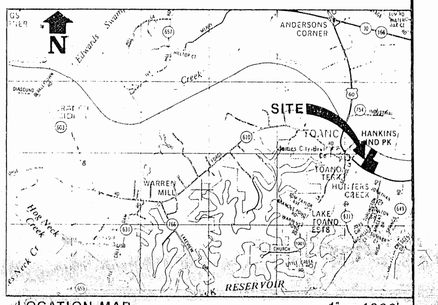
Designed	Drawn
	PLK
Scale 1" = 20'	Date NOV. 1990
AES Project No. 7574	
Drawing No. 2 of 2	

WC028_BRANSCOME_PLANT - 007



NOTE: PRELIMINARY PLAN FOR OVERALL PROJECT LAYOUT AND UTILITIES PLAN ONLY. SEE SITE PLAN FOR DETAILED PLAN INFORMATION AND DIMENSIONS.





No.	DATE	REVISION / COMMENT / NOTE	BY

COMMONWEALTH OF VIRGINIA
G. ARCHER MARSTON III
No. 016232
PROFESSIONAL ENGINEER

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Fax: (804) 220-8994
CONSULTING ENGINEERS

JAMES CITY COUNTY
FINAL SITE PLAN

RECEIVED

APPROVALS	DATE
FIRE DEPARTMENT RMM/RHH	8/15/91
HEALTH DEPARTMENT CLL/RHH	8/15/91
HIGHWAY DEPARTMENT BSS/RHH	10/24/91
PLANNING COMMISSION AZ	12/3/91
PUBLIC WORKS DEPARTMENT DBC/RHH	11/6/91
ZONING ADMINISTRATOR RST	12/16/91
JCSA AJO/RHH	11/27/91

OTHER

OTHER

SP-72-91
JAMES CITY COUNTY SITE PLAN NUMBER

RECEIVED
NOV 1991
PLANNING DEPARTMENT

INDEX OF SHEETS

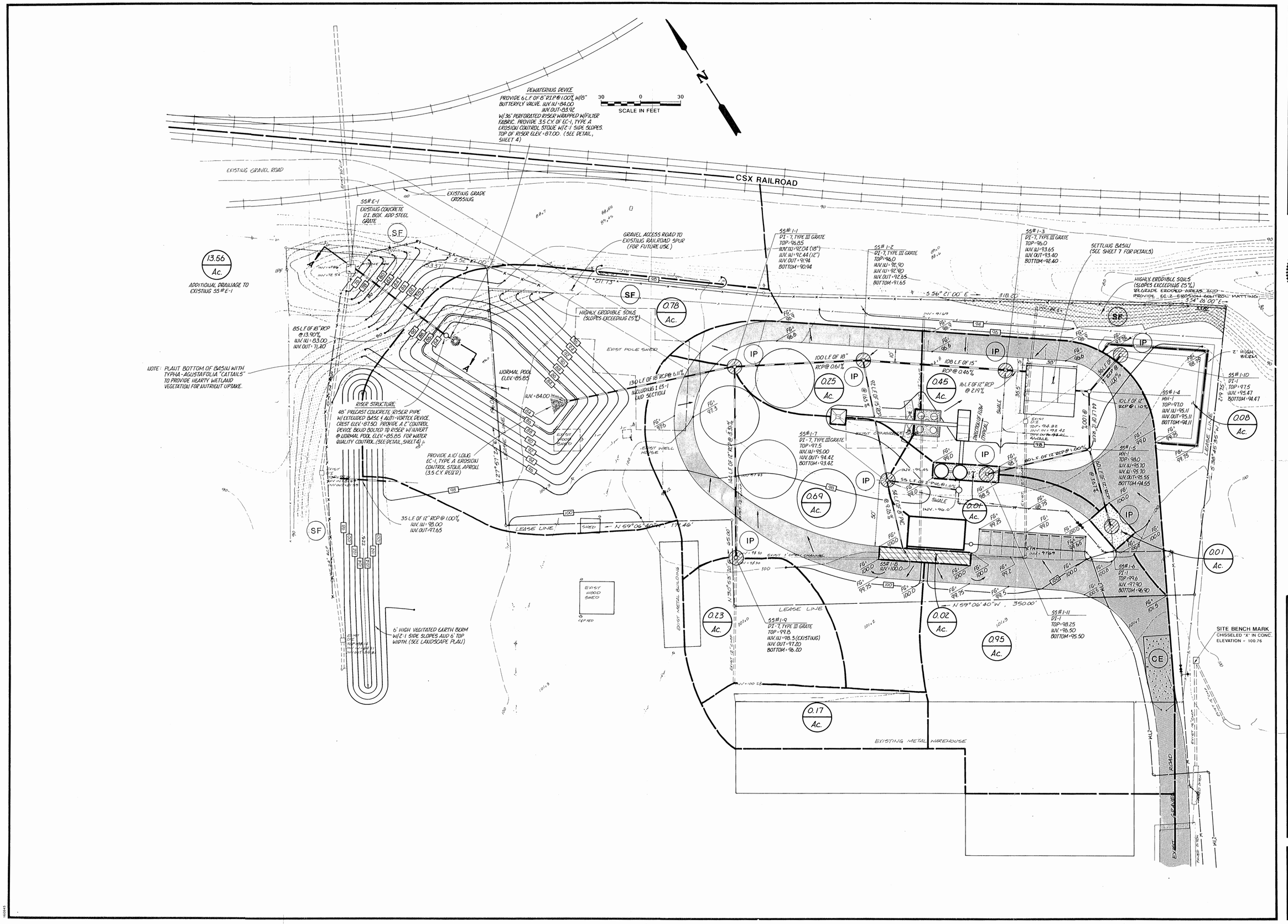
1.) PRELIMINARY PLAN
2.) SITE PLAN
3.) GRADING, DRAINAGE AND EROSION AND SEDIMENT CONTROL PLAN
4.) NOTES AND DETAILS
5.) WATERLINE PROFILE
6.) LANDSCAPE PLAN
7.) NOTES AND DETAILS
SD-3e STANDARD WATER DETAILS
SD-4 STANDARD GRINDER PUMP NOTES AND DETAILS

PRELIMINARY PLAN
AGGREGATE & CEMENT STORAGE FACILITY
OWNER: SHELDON LUMBER COMPANY, INC.
LESSEE/DEVELOPER: HENRY S. BRANSCOME, INC.
JAMES CITY COUNTY VIRGINIA

Designed	Drawn
	PLK
Scale	Date
1" = 60'	NOV. 1990
AES Project No.	
7574	
Drawing No.	
1	

SP-72-91

WC028_BRANSCOME_PLANT - 008



No.	DATE	REVISION / COMMENT / NOTE	BY

COMMONWEALTH OF VIRGINIA
G. ARCHER MARSTON III
No. 016232
PROFESSIONAL ENGINEER

5248 Olde Towne Road, Suite 1
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(804) 253-0040
Fax (804) 220-8994

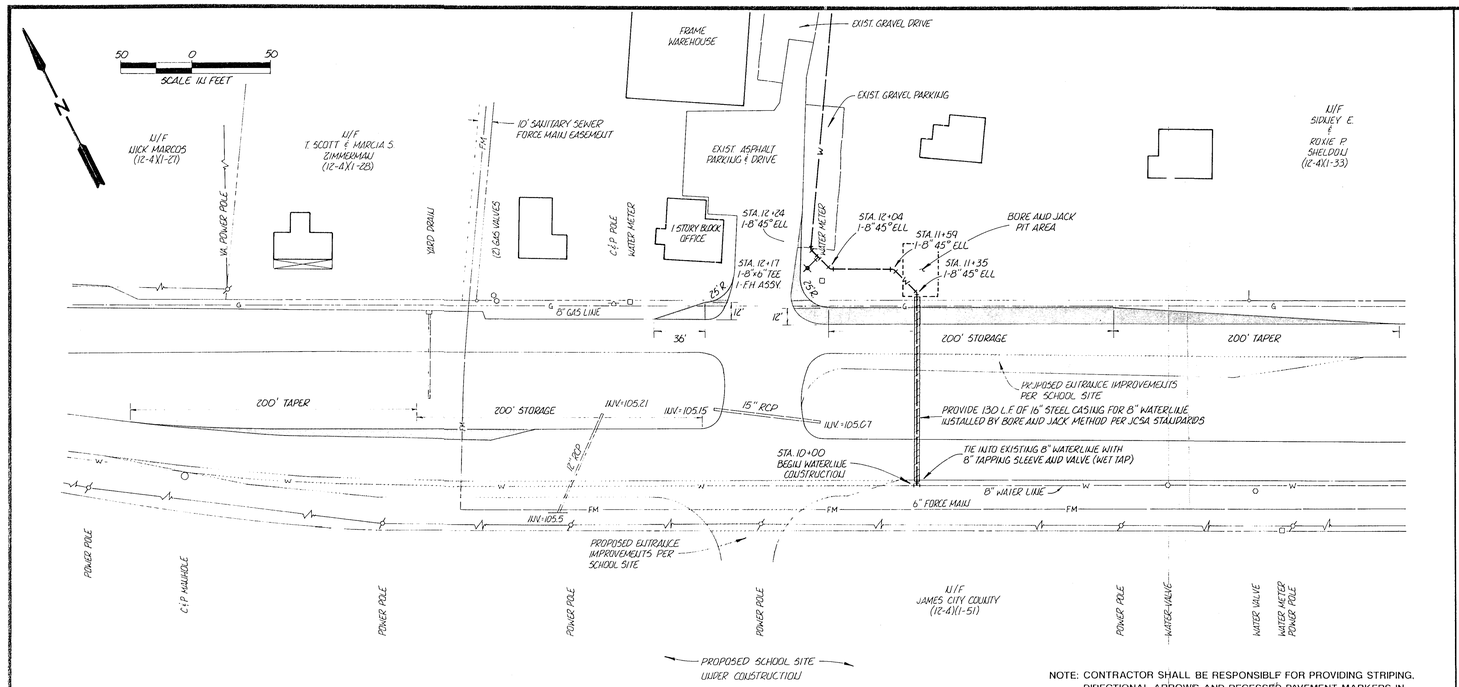
CONSULTING ENGINEERS

GRADING, DRAINAGE AND EROSION AND SEDIMENT CONTROL PLAN
AGGREGATE & CEMENT STORAGE FACILITY

OWNER: SHELDON LUMBER COMPANY, INC.
OPERATOR/LESSEE/DEVELOPER: HENRY S. BRANSCOME, INC.
JAMES CITY COUNTY VIRGINIA

Designed GAM	Drawn BJU
Scale 1"=30'	Date 7/91
Project No. 7574	
Drawing No. 3	

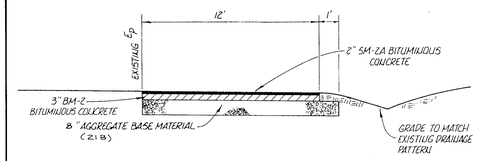
WC028_BRANSCOME_PLANT - 009



ROUTE 60 IMPROVEMENTS

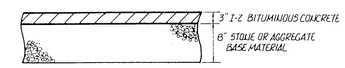
SCALE: 1"=50'

NOTE: CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING STRIPING. DIRECTIONAL ARROWS AND RECESSED PAVEMENT MARKERS IN ACCORDANCE WITH VDOT REQUIREMENTS. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING VDOT TO ASCERTAIN THESE REQUIREMENTS.



TURN LANE CROSS SECTION

NOT TO SCALE

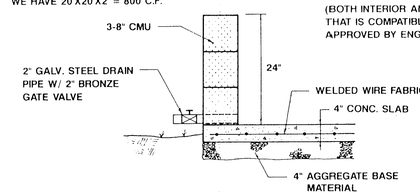


ON-SITE PAVING SECTION

NOT TO SCALE

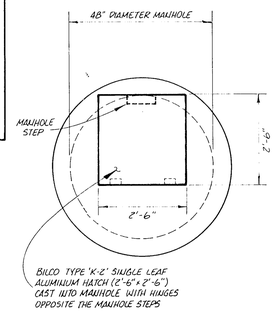
5-1000 GALLON TANKS
= 5000 GALLONS
7.48 GAL./C.F. NEED 669 C.F.
WE HAVE 20'X20'X2' = 800 C.F.

NOTE:
CONTRACTOR TO SEAL 8" CMU (BOTH INTERIOR AND EXTERIOR) W/ COATING THAT IS COMPATIBLE W/ DIESEL FUEL AND APPROVED BY ENGINEER.



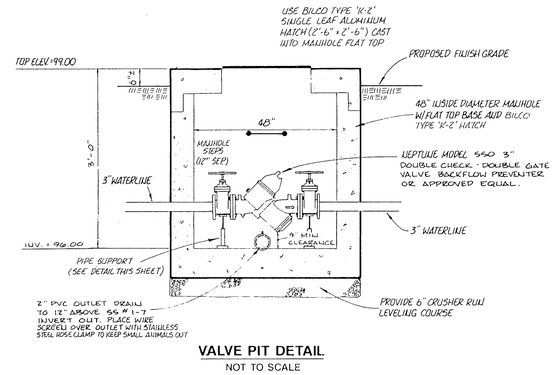
SPILL PREVENTION CONTAINMENT MEASURE STRUCTURE DETAIL

NOT TO SCALE



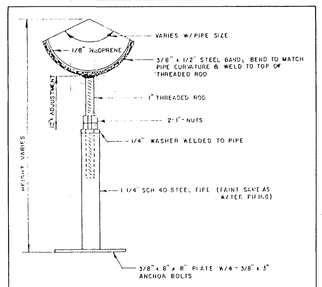
VALVE PIT TOP VIEW

NOT TO SCALE



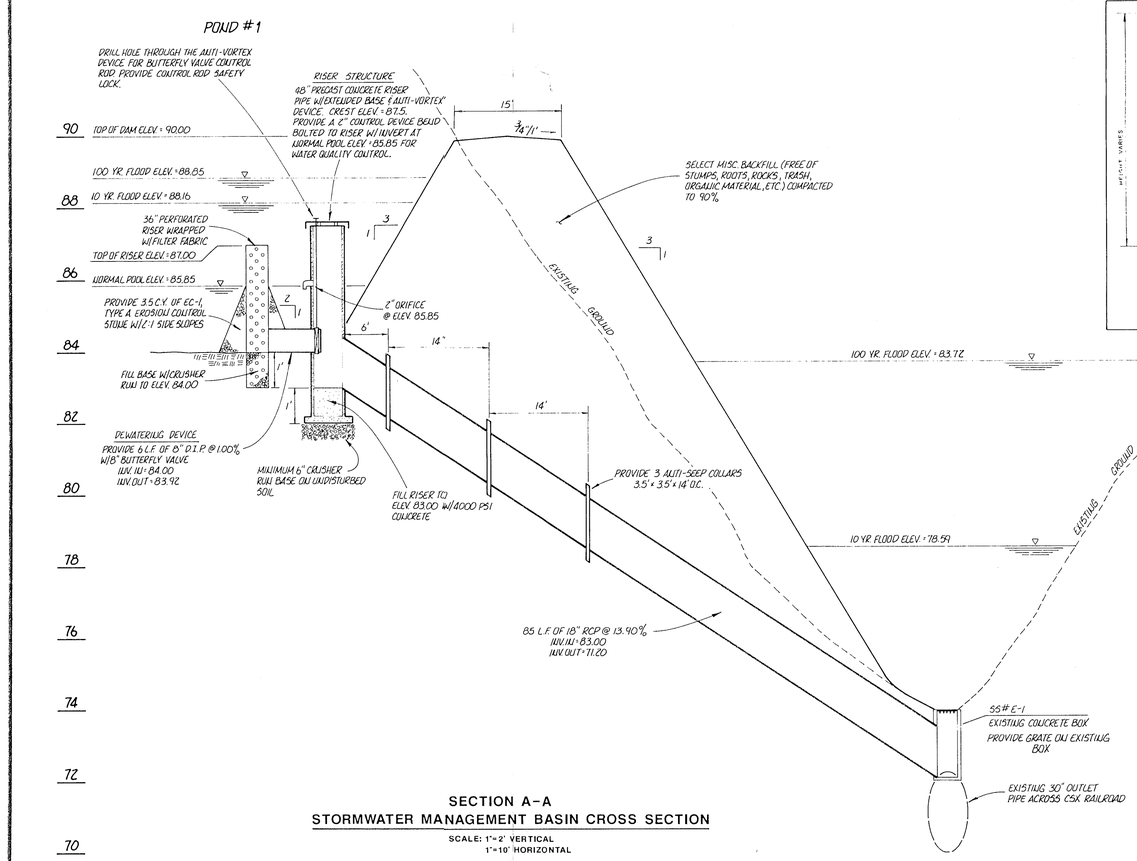
VALVE PIT DETAIL

NOT TO SCALE



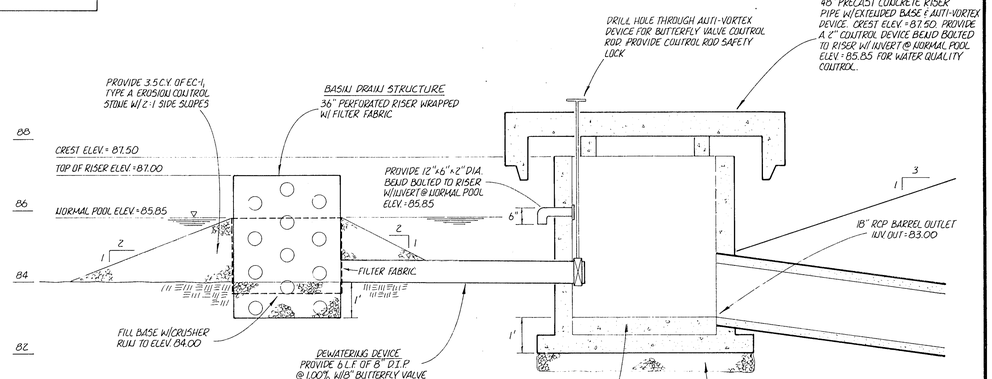
PIPE SUPPORT DETAIL

NOT TO SCALE



SECTION A-A
STORMWATER MANAGEMENT BASIN CROSS SECTION

SCALE: 1"=2' VERTICAL
1"=10' HORIZONTAL



RISER STRUCTURE DETAIL

SCALE: 1"=2'

No.	DATE	REVISION / COMMENT / NOTE	BY
1	11/20/91	REVISED PER COUNTY COMMENTS	HWP

COMMONWEALTH OF VIRGINIA
G. ARCHER MINASTOR III
No. 016232
PROFESSIONAL ENGINEER

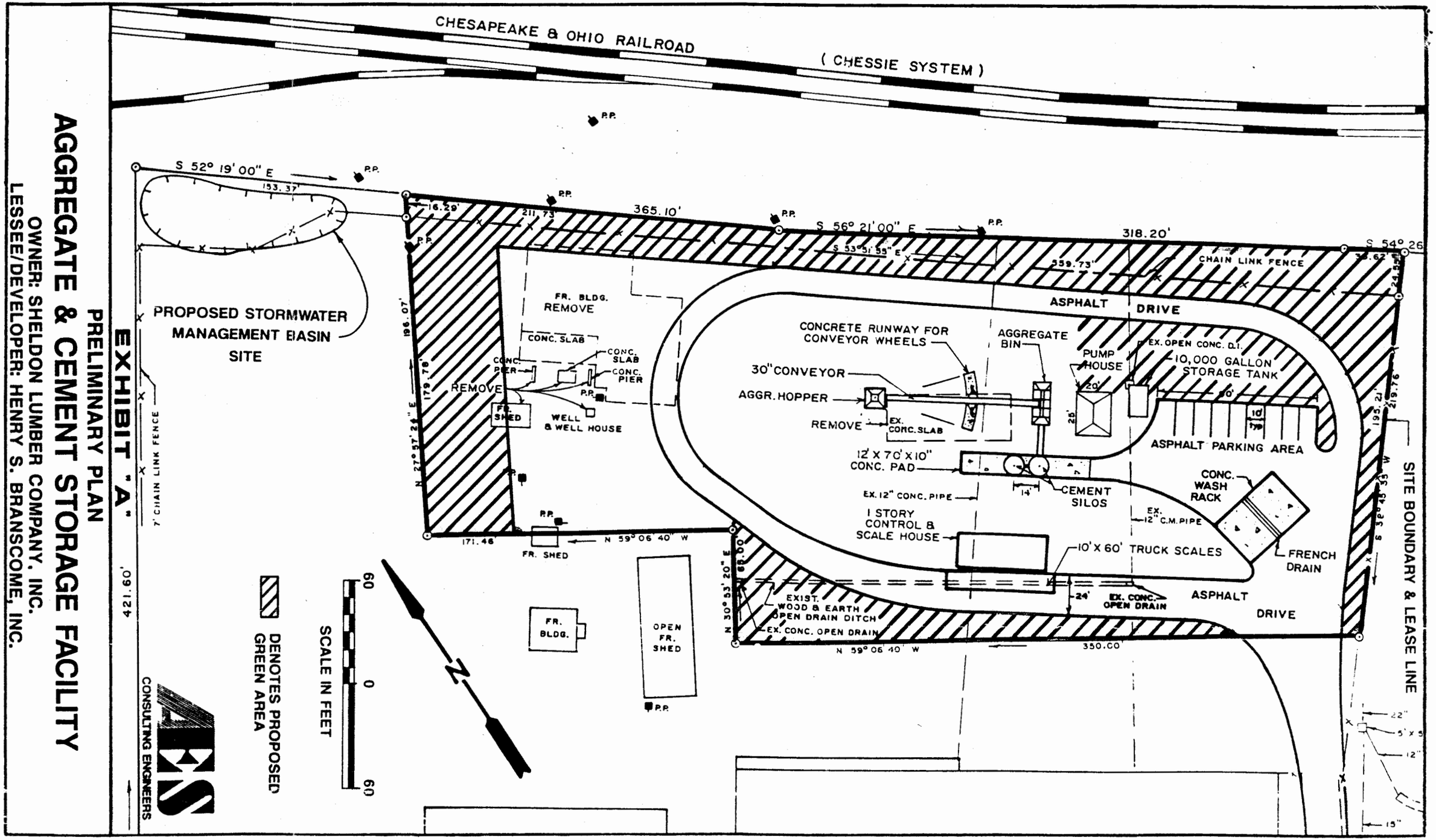
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Fax (804) 220-8994

CONSULTING ENGINEERS

NOTES AND DETAILS
AGGREGATE & CEMENT STORAGE FACILITY

OWNER: SHELDON LUMBER COMPANY, INC.
OPERATOR/LESSEE/DEVELOPER: HENRY S. BRANSCOME, INC.
JAMES CITY COUNTY VIRGINIA

Designed	Drawn
Scale NOTED	Date 7/91
Project No. 7574	
Drawing No. 4	

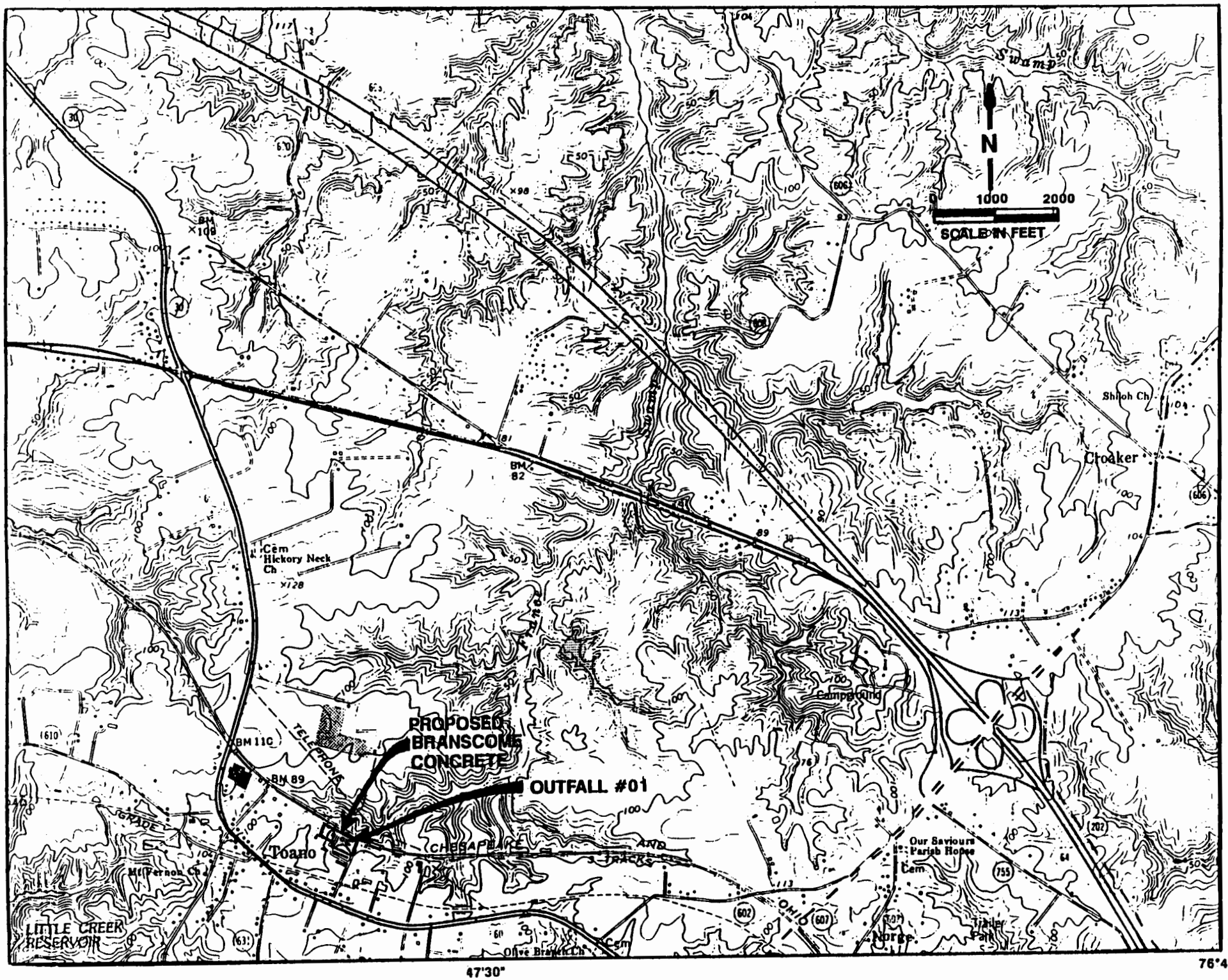


PRELIMINARY PLAN

AGGREGATE & CEMENT STORAGE FACILITY

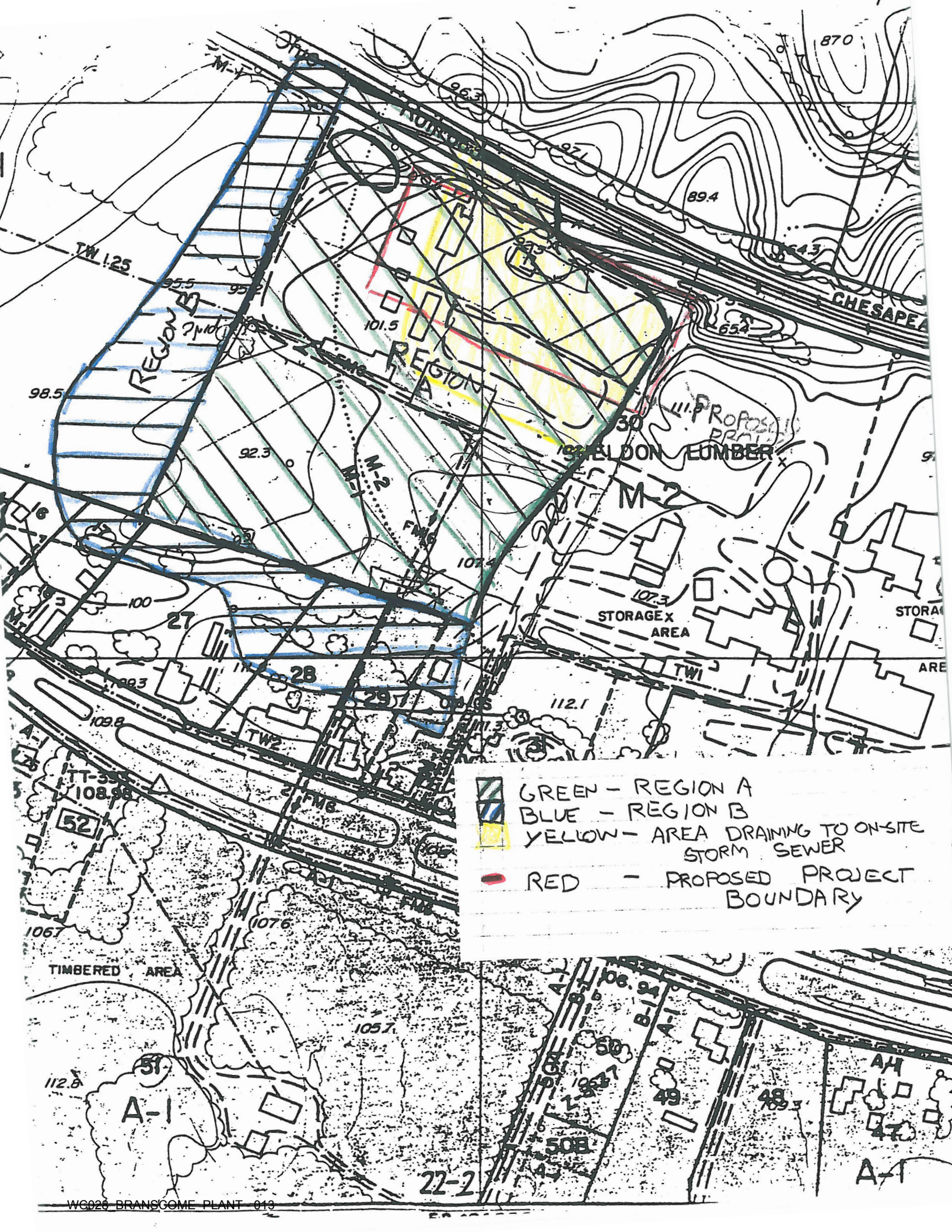
OWNER: SHELDON LUMBER COMPANY, INC.

LESSEE/DEVELOPER: HENRY S. BRANSCOME, INC.

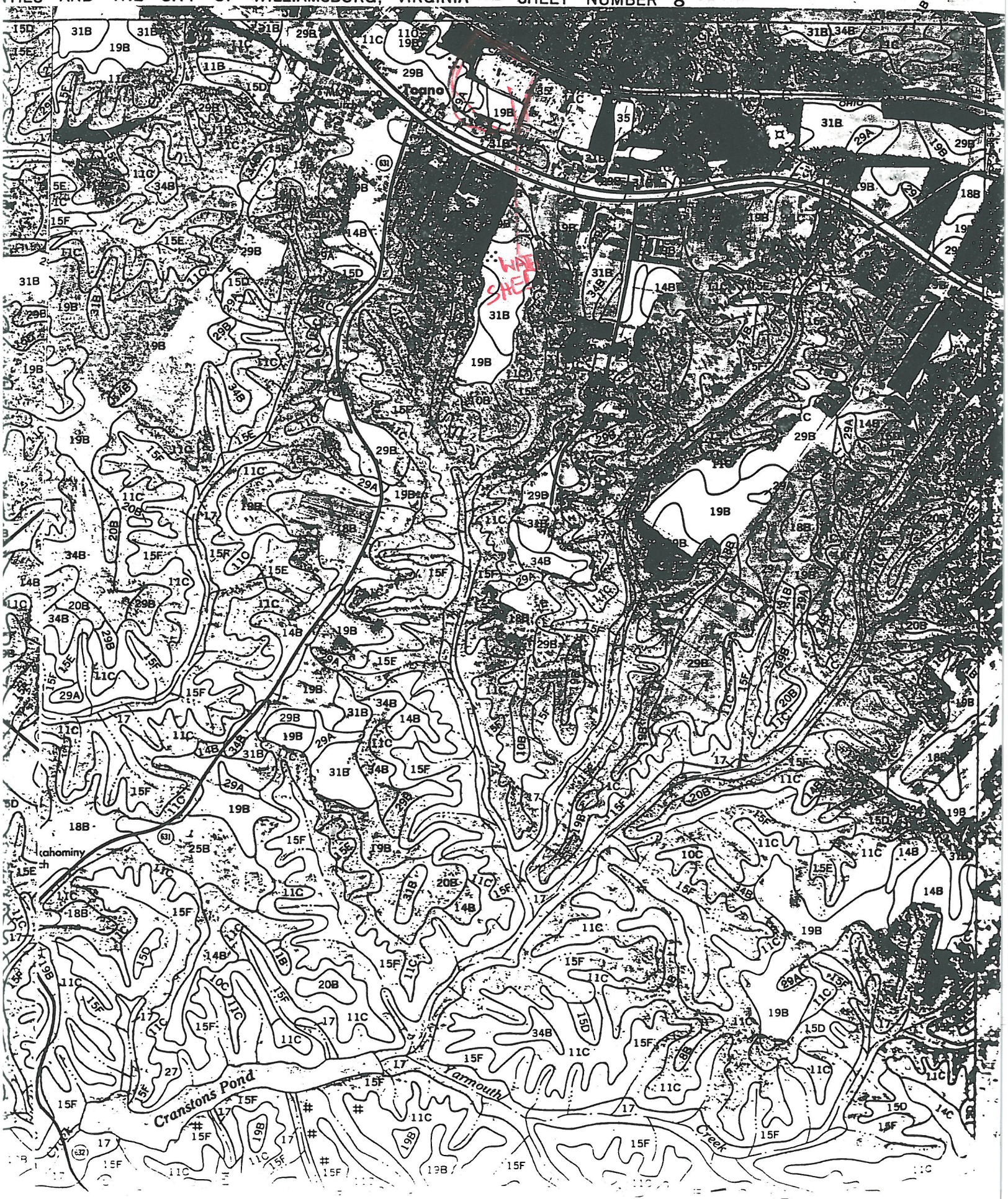


FROM TOANO, VIRGINIA USGS QUAD MAP

WC028_BRANSCOME_PLANT - 012


GREEN - REGION A
BLUE - REGION B
YELLOW - AREA DRAINING TO ON-SITE STORM SEWER
RED - PROPOSED PROJECT BOUNDARY
REGION A
REGION B
SHELDON LUMBER
STORAGE AREA
TIMBERED AREA
CHESAPEA
M-2
A-1
22-2
TW 1.25
TW1
TW2
FMB
30
28
29
27
52
51
50
49
48
47
50B
98.5
100
101.5
92.3
95.5
95.2
97.1
89.4
87.0
107.3
112.1
109.8
108.98
106.94
107.6
105.7
112.8

ITIES AND THE CITY OF WILLIAMSBURG, VIRGINIA — SHEET NUMBER 8



HYDRAULIC REPORT FOR

AGGREGATE AND CEMENT

STORAGE FACILITY

POND 1 AND ~~POND 2~~ EXISTING STORM SEWER 1-E

DESIGN AND EVALUATION

AES PROJECT NO 7574

JULY 11, 1991

AES CONSULTING ENGINEERS

5248 OLDE TOWNE ROAD

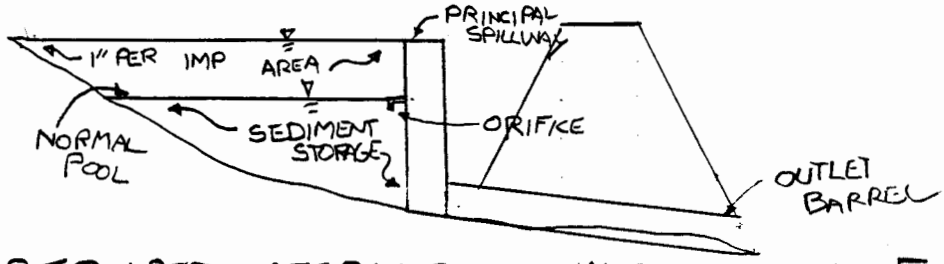
WILLIAMSBURG VA, 23188

RUNOFF CONTROL MEASURES FOR POND #1 HAS BEEN OUTLINED IN THE RESERVOIR OVERLAY DISTRICT RUNOFF ANALYSIS FOR PROPOSED CONCRETE PLANT JAMES CITY COUNTY, VIRGINIA, NOV 29, 1990. THE DESIGN REQUIRES THAT THE DETENTION BASIN STORE THE FOLLOWING, TO MEET JAMES CITY COUNTY WATER QUALITY REQUIREMENTS.

1) PROVIDE 67 CY SEDIMENT STORAGE PER ACRE OF WATERSHED. THIS STORAGE VOLUME WILL CREATE A NORMAL POOL ELEVATION AT WHICH A SMALL ORIFICE WILL BE PLACED.

2) AN ADDITIONAL 1" PER IMPERVIOUS SURFACE OF THE DRAINAGE AREA SHALL BE STORED ABOVE THE NORMAL POOL ELEVATION AND DRAIN THROUGH THE ORIFICE

3) A PRINCIPAL SPILLWAY WILL BE CONSTRUCTED AT THIS ELEVATION TO PASS THE 100 YEAR STORM



THE REQUIRED STORAGE VOLUME IS AS FOLLOWS:

1) SEDIMENT STORAGE REQUIREMENT = 67 CY/AC OF DRAINAGE AREA

D.A. = 3.65

$(3.65AC)\ 67 yd^3/Ac\ (27 FT^3/yd^3) = \underline{6{,}603\ FT^3}$

2) 1" OF RUN-OFF OVER THE IMPERVIOUS SURFACE OF D.A.

- 2.70 AC OF WATERSHED IS ON-SITE & 60% IMPERVIOUS
- 0.95 AC OF WATERSHED IS OFFSITE & 100% IMPERVIOUS

∴ IMP AREA = 2.70(.60) + .95 = 2.57AC

∴ VOLUME = (1")(2.57AC) (1'/12") 43560 FT²/AC

$= \underline{9{,}329\ FT^3}$

HYDRO GRAPHS

ONE-HUNDRED (100YR) AND TEN YEAR (10YR) HYDROGRAPHS WERE GENERATED USING SCS METHODOLOGY. "HYDRA-FLOW HYDROGRAPHS VOL #1 WAS USED TO MODEL THE HYDROGRAPHS AND ROUTE THESE HYDROGRAPHS THROUGH OUR BASINS.

THE HYDROGRAPHS INTO BASIN #1 WERE GENERATED BY USING A RUNOFF CURVE NUMBER OF 89.05 BECAUSE THE WATERSHED IS APPROXIMATELY 50% HARD COMPACTED EARTH, 30% OPEN SPACE AND 20% IMPERVIOUS AREA.
A CURVE NUMBER OF 83.95 WAS GENERATED FOR THE OFFSITE HYDROGRAPH INTO THE EXISTING STORM SEWER. THIS COMPOSIT CURVE NO. WAS CALCULATED BY WEIGHING THE CHARACTERISTICS OF REGION B AND REGION A WHICH COMPOSE THE WATERSHED

WATERSHED AREAS ARE AS FOLLOWS

1) WATERSHED INTO POND #1 3.65AC

2) OFF-SITE WATER SHED INTO EXISTING STORM SEWER 13.56 AC

3) TOTAL AREA INTO EXISTING STORM SEWER 17.21 AC

* FOR CONVIENCE, THE EXISTING STORM SEWER WILL BE REFERRED TO AS BASIN #2 FOR OUR REMAINING CALCULATIO

ALL OTHER HYDROGRAPH DATA CAN BE CHECKED ON THE DATA ENTRY REPORTS FOR EACH HYDROGRAPH (PAGES 10, 12, 19 & 21)

THE PEAK FLOWS FOR THE HYDROGRAPHS ARE AS FOLLOWS:

(P. 11)	BASIN 1 10YR Qp =		19.8 cf
(P. 13)	BASIN 1 100YR QP		29.4 cf
(P. 19)	OFFSITE Qp INTO BASIN #2	10YR	51.3 cf
(P. 21)	OFFSITE Qp INTO BASIN #2	100YR	79.8 cf

SPILLWAY DESIGN FOR BASIN #1

FROM THE STAGE VS STORAGE TABLE FOR BASIN #1 ON PAGE 14&15, ADEQUATE SEDIMENT STORAGE IS ACHIEVED AT ELEVATION 85.85. THEREFORE AN ORIFICE WILL BE PLACED AT THIS ELEVATION. ORIFICE CALCULATIONS ON PAGE 5 INDICATE THAT A 2" ORFICE WILL RELEASE THE REQUIRED 9,329 FT^2 OF WATER IN MORE THAN 30' HOURS. THIS ADDITIONAL WATER QUALITY STORAGE OF 9,329 FT^3 CAN BE STORED AT ELEVATION 87.5. THEREFORE WE WILL PLACE THE PRINCIPAL SPILLWAY AT ELEVATION 87.5 AND SIZE IT TO PASS THE 100YR STORM WITH A MINIMAL AMOUNT OF HEAD. A 48" RISER WITH AN 18" BARREL WILL WORK.

BASIN #1 CONT

THE 10 YR AND 100 YR HYDROGRAPHS WERE ROUTED THROUGH THROUGH BASIN #1 AND THE FOLLOWING WAS GENERATED

(P 16) 10YR PEAK OUTFLOW = 17.0 CFS

(P 17) 100YR PEAK OUTFLOW = 19.2 CFS

(P 16) 10 YR POOL ELEV = 88.16

(P 17) 100 YR POOL ELEV = 88.85

ANALYSIS OF BASIN #2 (EXISTING STORM SEWER

INFLOW HYDROGRAPHS WERE GENERATED BY COMBINING OUTFLOW HYDROGRAPHS FROM BASIN #1 AND OFF-SITE HYDROGRAPHS FLOWING INTO BASIN #2.

THE FOLLOWING COMBINED HYDROGRAPHS PEAK FLOWS WERE GENERATED:

(P23) Q_{P10} = 68.5 CFS

(P24) Q_{P100} = 104.1 CFS

THE ANALYSIS OF BASIN #2 WILL BE TO EVALUATE OF THE ADEQUACY OF AN EXISTING SYSTEM. BASIN #2 IS AN EXISTING BASIN THAT IS DRAINED BY A 30" CULVERT RUNNING UNDER THE RAILROAD TRACKS. HYDROGRAPHS WILL BE ROUTED THROUGH THE EXISTING SYSTEM TO SEE WHAT POOL LEVEL IS ACHIEVED FOR 10YR & 100 YR STORM EVENTS.

THE FOLLOWING POND ELEVATIONS WERE ACHIEVED.

check outlet conditions for pipes

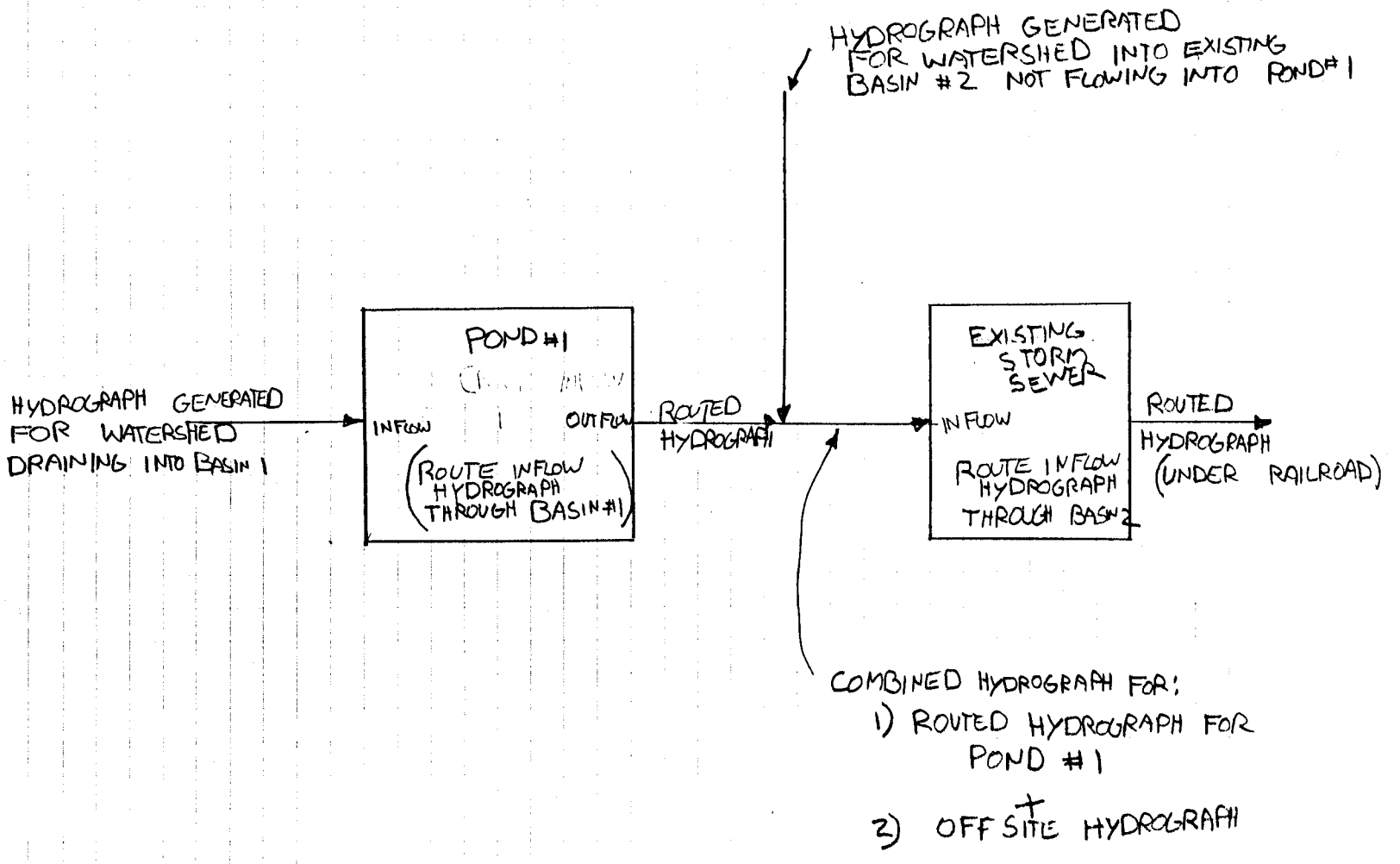
(P27) 10YR ELEVATION = 78.59

(P28) 100 YR ELEVATION = 83.72

THESE ELEVATIONS WOULD SEEM TO BE ACCEPTABLE. THEREFORE THE EXISTING 30" PIPE IS OF ADEQUATE SIZE TO FACILITATE THE INCREASE IN FLOW FROM OUR DEVELOPMENT.

4A

SCHEMATIC OF HYDROLOGIC ROUTING



ORIFICE DESIGN

NOW WE WILL DESIGN THE ORIFICE AT NORMAL POOL

USING THE METHODOLOGY FOR DISCHARGE UNDER A FALLING HEAD FROM <u>STANDARD HANDBOOK FOR CIVIL ENGINEERS</u>

$$t = \frac{2A}{Cq\sqrt{2g}}\left(\sqrt{h_1} - \sqrt{h_2}\right) \quad (21\text{-}52)$$

A = AREA OF RESERVOIR $A_{AVG} = 5422\ FT^2$
C = COEFF OF DISCHARGE = .6
q = AREA OF ORIFICE = ?
g = ACCELERATION OF GRAVITY 32.2 FT/S²
h_1 = HEAD AT START = 7.5 - 5.2 = 2.3 FT
h_2 = HEAD AT FINISH = 0

t = TIME 30 HRS = 108,000 SEC

$$108{,}000\ SEC = \frac{2\,(5422\,FT^2)}{.6\,(q)\sqrt{2\,(32.2\,FT/SEC^2)}}\sqrt{1.65\,FT}$$

1.28
8.03

$q = .027\ FT^2$

$$q = \frac{\pi (d)^2}{4}$$

$$d = \sqrt{\frac{.027\,(4)}{\pi}}$$

$d = .19'$

$\therefore$ DIA = 2.2" USE A 2" DIA

POST DEVELOPMENT

TOTAL WATERSHED AREA = 17.21 AC

I FIND COMPOSITE CURVE NUMBERS FOR EACH REGION

(A) REGION A = 11.66 AC

COVER	SOIL TYPE	% OF REGION	CN	COMPOS CN
1) NATURAL VEG	ADORTHENTS	5	79	3.95
2) IMPERVIOUS	ADORTHENTS	10	98	9.8
3) HARD COMPACTED EARTH	ADORTHENTS	85	89	75.65
			TOTAL	89.4

(B) REGION B = 5.55 AC

COVER		SOIL TYPE		% OF REGION	CN	COMPOSIT CN
1) GRASS	11C	CRAVEN UCHEE	(A,C)	45	69	31.05
2) GRASS	19B	KEMBSVILLE-EMPORIA	(B,C)	40	74	29.60
3 GRASS	29A	SLAGLE	(C)	15	79	11.85
						72.50

II NOW FIND THE COMPOSIT CURVE NUMBERS FOR THE TWO REGIONS

$$CN_{OFFSITE} = \frac{11.66\,(89.4) + 5.55\,(72.5)}{11.66 + 5.55}$$

$$= \frac{1042.4 + 402.4}{17.21} = \boxed{83.95}$$

OFFSITE CURVE NO. INTO STORM DRAIN EXISTING

$$CN_{FOR\ POND_1} = .5\,(89.4) + .3\,(72.5) + .20\,(98) = \boxed{89.05}$$

* CURVE NUMBERS WERE OBTAINED BY INTERPOLATION OF TABLE 2-29 FROM THE US DEPARTMENT OF AGRICULTURE'S URBAN HYDROLOGY FOR SMALL WATERSHEDS

- GRASS WAS INTERPOLATED AS OPEN SPACE LAWNS IN FAIR CONDITION

- HARD COMPACTED EARTH WAS INTERPOLATED AS GRAVEL COVER

ANTI-SEEP COLLAR DESIGN

SEEP COLLARS WILL BE DESIGNED IN ACCORDANCE WITH SECTION III OF THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK.

(I) FIND L_S = LENGTH OF BARREL IN SATURATED ZONE

Y = DEPTH OF WATER AT PRINCIPAL CREST
= 4.16' DURING A 10 YR STORM 88.16 − 84

S = PIPE SLOPE = 14%

UPSTREAM EMBANKMENT SLOPE = 3 : 1

FROM PLATE 1.26K

L_S = 60'

(II) FROM PLATE 1.26 I

USE THREE 3.5' COLLARS WILL WORK

(III) DETERMINE SPACING BETWEEN COLLARS ACCORDING TO THE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK, 14 TIMES THE PROJECTION OF THE COLLAR ABOVE THE BARREL.

∴ SPACING = 14 (3.5 − 1.5)/2 = 14'

HYDRAULIC REPORT FOR

BRANSCOME CONCRETE

STORAGE FACILITY

ANALYSIS OF POND NO 1

BASIN INFORMATION

10 & 100 YEAR HYDROGRAPHS

HYDROGRAPHS ROUTED THROUGH

BASIN

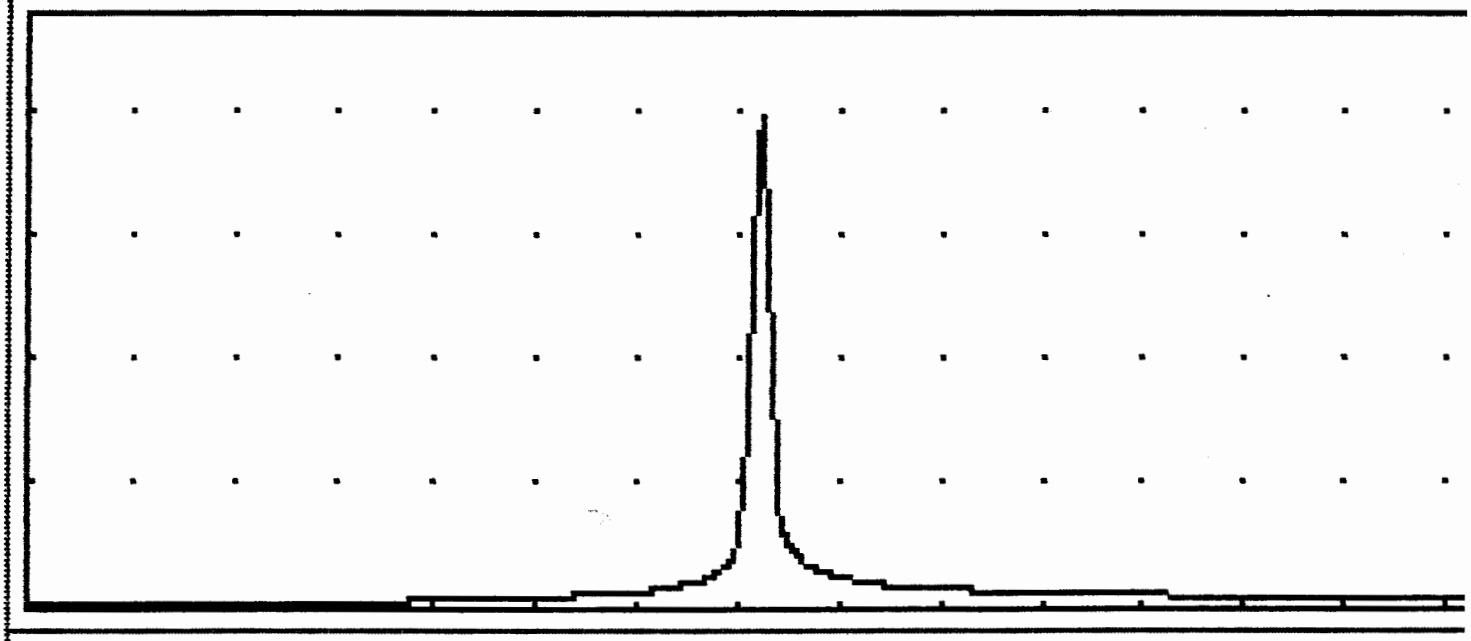
S.C.S. HYDROGRAPH a:7574.G

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
:
: 1. HYDROGRAPH No. = 2............          8. 24 HR PRECIPITATION = 5.
:
: 2. HYDROGRAPH DESCRIPTION                  9. RETURN PERIOD = 10.
:
:       A. STORAGE FACILITY .....            10. DISTRIBUTION = 3....
:       B. WATERSHED FOR POND
:       C. 10 YR STORM EVENT.....               1. I      2. IA      3. II
:
: 3. AREA (ac) = 3.65..............             4. III    5. SYNTH   6. MA
:
: 4. BASIN SLOPE (%) = 1...........             7. IIA    8. SOMERSET
:
: 5. HYDRAULIC LENGTH (ft) = 600...          11. STORM DUR (hrs) = 0..
:
: 6. CURVE NUMBER = 89.05.........
:
: 7. TIME INTERVAL (min) = 2.......
:
:
:
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
Change item number: 0

 Hyd No. 2                     UNIT HYDROGRAPH
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
:
: Curve number            =   89
:
: Time Interval (Min)     =   2
:
: Basin lag (min)         =    9.11
:
: Time to peak (min)      =   10.00
:
: Time base (min)         =   26.00
:
: Rainfall excess (in)    =    1
:
: Peak discharge (cfs)    =   16.56
:
: Time of Conc. (Min)     =   0        (Equals Tc-Lag when 0)
:
: Tc-Lag Method (Min)     =   15.22
:
: Shape Factor            =   484
:
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
[T] to edit Tc  [D] to edit Dur  [S] to edit Shp Fctr  [E] to SCS  [DY] to c
```

same as 100 yr ✓

Qp = 19.8 S.C.S. RUNOFF 10 Y



HGU = 100 min 2 VGU = 5.0 cf

VOL = (cuft/acft) = 57828 / 1.32

S.C.S. HYDROGRAPH a:7574.GI

IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

1. HYDROGRAPH No. = 4............
2. HYDROGRAPH DESCRIPTION
   A. 100 YEAR FLOW ....
   B. WATERSHED FOR POND....
   C. ....
3. AREA (ac) = 3.65.............
4. BASIN SLOPE (%) = 1...........
5. HYDRAULIC LENGTH (ft) = 600...
6. CURVE NUMBER = 89.05.........
7. TIME INTERVAL (min) = 2.......

8. 24 HR PRECIPITATION = 8.
9. RETURN PERIOD = 100
10. DISTRIBUTION = 3....
    1. I 2. IA 3. II
    4. III 5. SYNTH 6. MA
    7. IIA 8. SOMERSET
11. STORM DUR (hrs) = 0..

HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

Change item number: 0

Hyd No. 4 UNIT HYDROGRAPH

IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

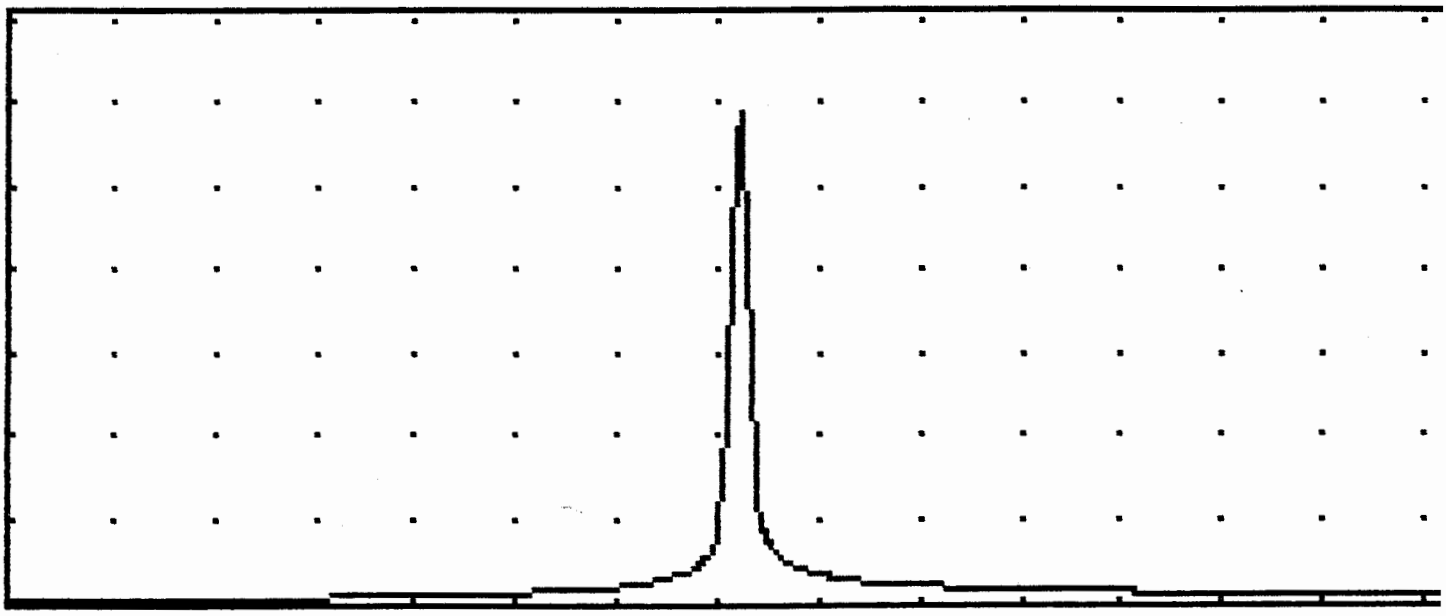
Curve number	=	89
Time Interval (Min)	=	2
Basin lag (min)	=	9.11
Time to peak (min)	=	10.00
Time base (min)	=	26.00
Rainfall excess (in)	=	1
Peak discharge (cfs)	=	16.56
Time of Conc. (Min)	=	0 (Equals Tc-Lag when 0)
Tc-Lag Method (Min)	=	15.22
Shape Factor	=	484

same @ 10y ✓

HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

[T] to edit Tc [D] to edit Dur [S] to edit Shp Fctr [E] to SCS [DY] to c

Qp = 29.4 S.C.S. RUNOFF 100 Y



HGU = 100 min 4 VGU = 5.0 cf

VOL = (cuft/acft) = 88037 / 2.02

Option 1 STAGE / STORAGE / DISCHARGE SUMMARY

IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

: RESERVOIR No = 1 RESERVOIR NAME = det pond....

: S = Ks * Z^b

: Ks = 0 b = 0

: START ELEV = 0 INCREMENT = 0

STAGE ft	ELEVATION ft	STORAGE cu ft	DISCHARGE cfs	
0.00	84.00	0	0.00	1.
2.00	86.00	7207	0.00	2.
4.00	88.00	18888	13.33	3.
6.00	90.00	35894	24.44	4.
0.00	0.00	0	0.00	5.
0.00	0.00	0	0.00	6.
0.00	0.00	0	0.00	7.
0.00	0.00	0	0.00	8.
0.00	0.00	0	0.00	9.
0.00	0.00	0	0.00	10.
0.00	0.00	0	0.00	11.

HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

[DY] cont [E] edit [R] reset [G] graph [S] screen [P] pr

```
Option 1                              STAGE / STORAGE TABLE                         R to re
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
: 1. RESERVOIR No = 1.       2. RESERVOIR NAME = det pond....
: 3. S = Ks * Z^b
:      Ks = 0............      b = 0..........
:      START ELEV = 0.....     INCREMENT = 0...
:
:      STAGE        ELEVATION       CO AREA        INC STORAGE       TOT STORAGE
:      ft           ft              sq ft          cu ft             cu ft
:
:  4     0.00          84.00.       2801....                 0                 0
:  5     2.00          86.00.       4406....              7207              7207
:  6     4.00          88.00.       7275....             11681             18888
:  7     6.00          90.00.       9731....             17006             35894
:  8     0.00           0.00.       0.......                 0                 0
:  9     0.00           0.00.       0.......                 0                 0
: 10     0.00           0.00.       0.......                 0                 0
: 11     0.00           0.00.       0.......                 0                 0
: 12     0.00           0.00.       0.......                 0                 0
: 13     0.00           0.00.       0.......                 0                 0
: 14     0.00           0.00.       0.......                 0                 0
:
:
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
Change item number: 0                                                           DY to c
```

```
 Reservoir No. 1                     OUTLET STRUCTURES
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
: CULVERT STRUC  A. Q=CoA[2gh/k]^.5     CULVERT STRUC  B. Q=CoA[2gh/k]^.5
:
: 1. WIDTH  (in)     = 18.               9. WIDTH  (in)     = 2..
: 2. HEIGHT (in)     = 18.              10. HEIGHT (in)     = 2..
: 3. No. BARRELS     = 1..              11. No. BARRELS     = 1..
: 4. INVERT ELEV.    = 83.......        12. INVERT ELEV.    = 85.85....
: 5. Co = 0.60                          13. Co = 0.60
: 6. CULVERT LENGTH (ft) = 75..         14. CULVERT LENGTH (ft) = 0...
: 7. CULVERT SLOPE (%)   = 12..         15. CULVERT SLOPE (%)   = 0...
: 8. MANNING'S N-VALUE   = .013         16. MANNING'S N-VALUE   = .013
:                                       17. MULTI-STAGE OPTION ? (Y/N) Y
:
: WEIR STRUCTURE A.      Q=CwLH^EXP     WEIR STRUCTURE B.      Q=CwLH^EXP
:
: 18. CREST LENGTH (ft)  = 12.57..      23. CREST LENGTH (ft)  = 0......
: 19. CREST ELEVATION    = 87.5...      24. CREST ELEVATION    = 0......
: 20. Cw = 3.00                         25. Cw = 3.00
: 21. EXP = 1.50                        26. EXP = 1.50
: 22. MULTI-STAGE OPTION ? (Y/N) Y      27. MULTI-STAGE OPTION ? (Y/N) N
:
:
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
Change item number: 0                                                           DY to c
```

RESERVOIR ROUTING a:7574.GP1

1. INFLOW HYD No = 2..

2. OUTFLOW HYDROGRAPH No = 5.

3. HYDROGRAPH DESCRIPTION

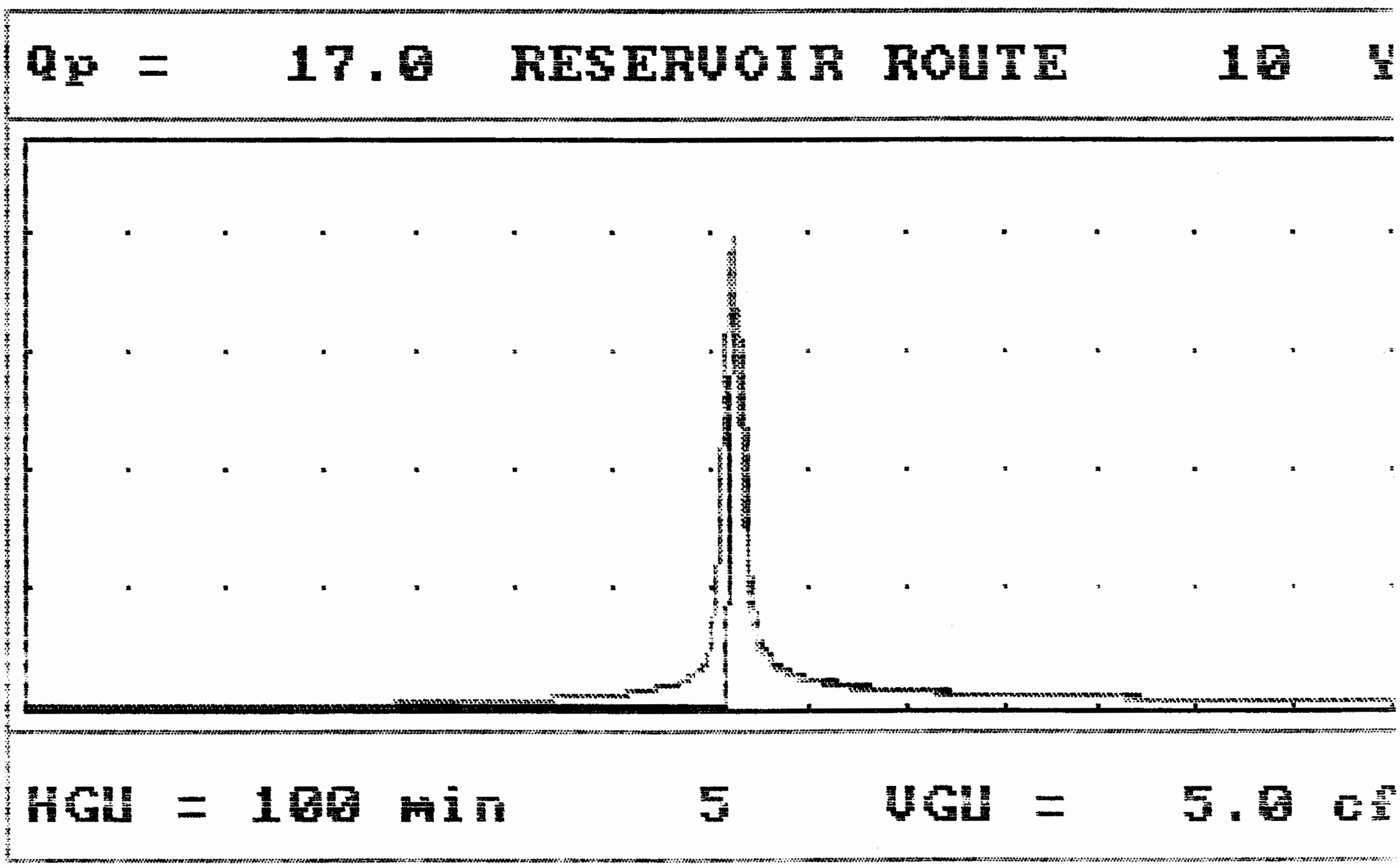
A. 10 YR ROUTED ....
B. THROUGH POND..........
C. ....

4. RESERVOIR No. = 1.

Reservoir name = "det pond...."

Hyd.	Qpeak	Hyd.	Qpeak
1	101.31	2	19.80
3	50.70	4	29.44
5	16.96	6	19.21
7	3.33	8	0.00
9	0.00	10	0.00
11	51.29	12	79.82
13	68.46	14	104.15
15	64.63	16	83.92
17	50.29	18	0.00
19	0.00	20	0.00

Change item number: 0



MAX STORAGE = 20212

MAX ELEVATION = 83.16

RESERVOIR ROUTING a:7574.GP1

1. INFLOW HYD No = 4..

2. OUTFLOW HYDROGRAPH No = 6.

3. HYDROGRAPH DESCRIPTION

A. 100 YR FLOW ROUTED....

B. THROUGH POND.....

C. .....

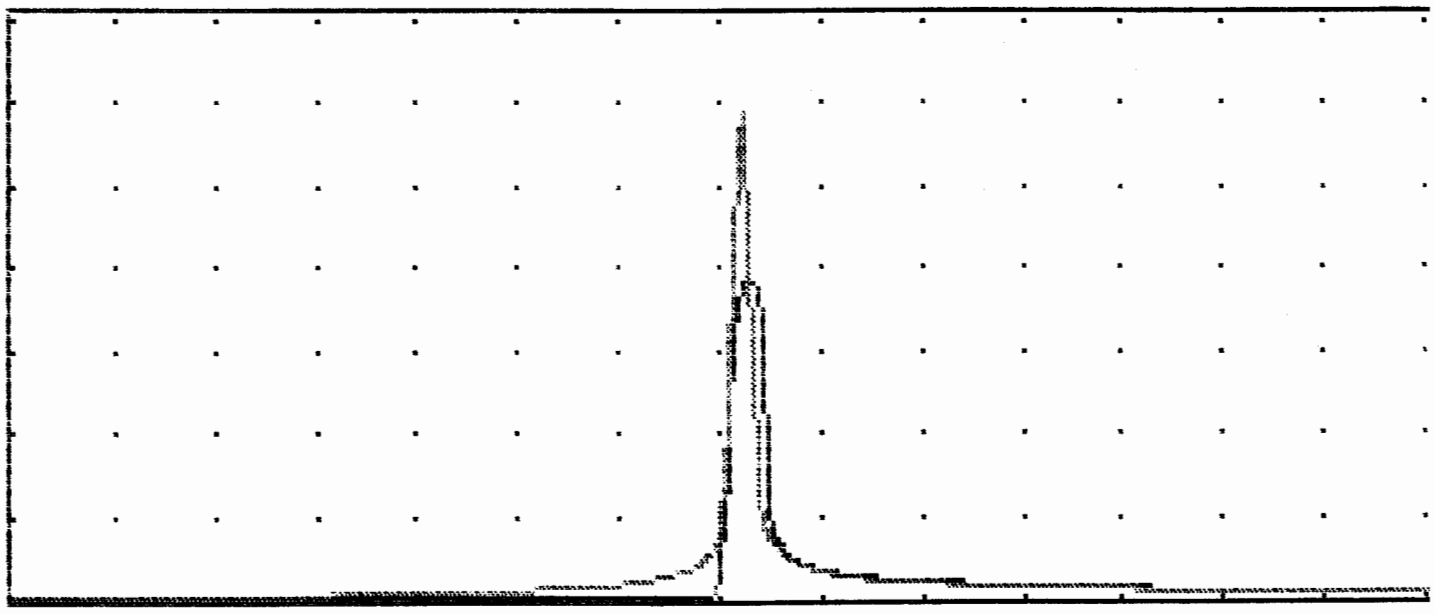
4. RESERVOIR No. = 1.

Reservoir name = "det pond...."

Hyd.	Qpeak	Hyd.	Qpeak
1	101.31	2	19.80
3	50.70	4	29.44
5	18.01	6	19.21
7	3.33	8	0.00
9	0.00	10	0.00
11	51.29	12	79.82
13	68.46	14	104.15
15	64.63	16	83.92
17	50.29	18	0.00
19	0.00	20	0.00

Change item number: 0

Qp = 19.2 RESERVOIR ROUTE 100 Y



HGU = 100 min 6 VGU = 5.0 cf

MAX STORAGE = 26121

MAX ELEVATION = 88.85

HYDRAULIC REPORT FOR

BRANSCOME CONCRETE

STORAGE FACILITY

ANALYSIS OF POND NO 2 EXISTING STORM SEWER

BASIN INFORMATION

10 & 100 YEAR HYDROGRAPHS

COMBINED HYDROGRAPHS

HYDROGRAPHS ROUTED THROUGH

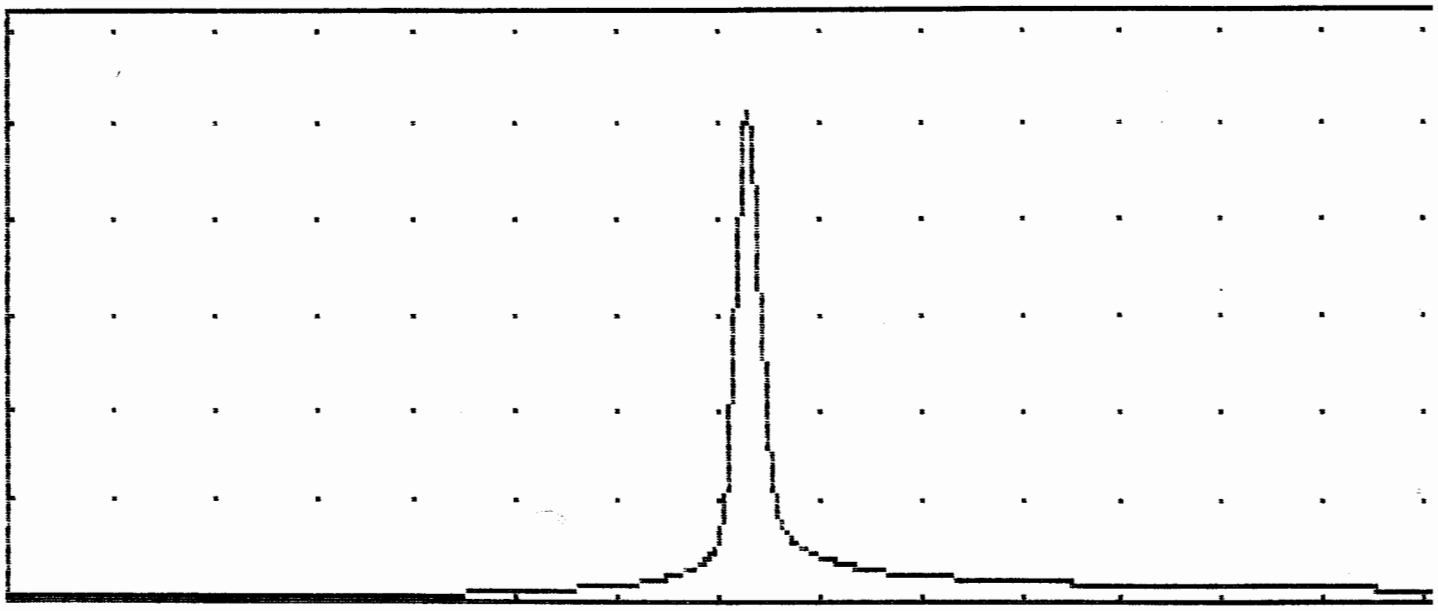
BASIN

S.C.S. HYDROGRAPH A:7574.GP1

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                                  :
: 1. HYDROGRAPH No. = 11..........          8. 24 HR PRECIPITATION = 5.7. :
:                                                                                  :
: 2. HYDROGRAPH DESCRIPTION                 9. RETURN PERIOD = 10.        :
:                                                                                  :
:      A. 10 YR FLOW WATERSHED..           10. DISTRIBUTION = 3....       :
:      B.  TO 30' PIPE, BUT NOT,                                          :
:      C. ROUTED THROUGH POND...              1. I     2. IA     3. II    :
:                                                                                  :
: 3. AREA (ac) = 13.56............            4. III   5. SYNTH  6. MAN   :
:                                                                                  :
: 4. BASIN SLOPE (%) = 1.5........            7. IIA   8. SOMERSET        :
:                                                                                  :
: 5. HYDRAULIC LENGTH (ft) = 1100..         11. STORM DUR (hrs) = 0..     :
:                                                                                  :
: 6. CURVE NUMBER = 83.95.........                                        :
:                                                                                  :
: 7. TIME INTERVAL (min) = 2.......                                       :
:                                                                                  :
:                                                                                  :
:                                                                                  :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
Change item number: 0
```

```
 Hyd No. 11                    UNIT HYDROGRAPH
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                                  :
: Curve number         =   84                                                      :
:                                                                                  :
: Time Interval (Min)  =   2                                                       :
:                                                                                  :
: Basin lag (min)      =   14.77                                                   :
:                                                                                  :
: Time to peak (min)   =   16.00                                                   :
:                                                                                  :
: Time base (min)      =   42.00                                                   :
:                                                                                  :
: Rainfall excess (in) =    1                                                      :
:                                                                                  :
: Peak discharge (cfs) =   38.46                                                   :
:                                                                                  :
: Time of Conc. (Min)  =   0       (Equals Tc-Lag when 0)                          :
:                                                                                  :
: Tc-Lag Method (Min)  =   24.67                                                   :
:                                                                                  :
: Shape Factor         =   484                                                     :
:                                                                                  :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
[T] to edit Tc  [D] to edit Dur  [S] to edit Shp Fctr  [E] to SCS  [DY] to cont
```

Qp = 51.3 S.C.S. RUNOFF 10 Y



HGU = 100 min 11 VGU = 10.0 cf

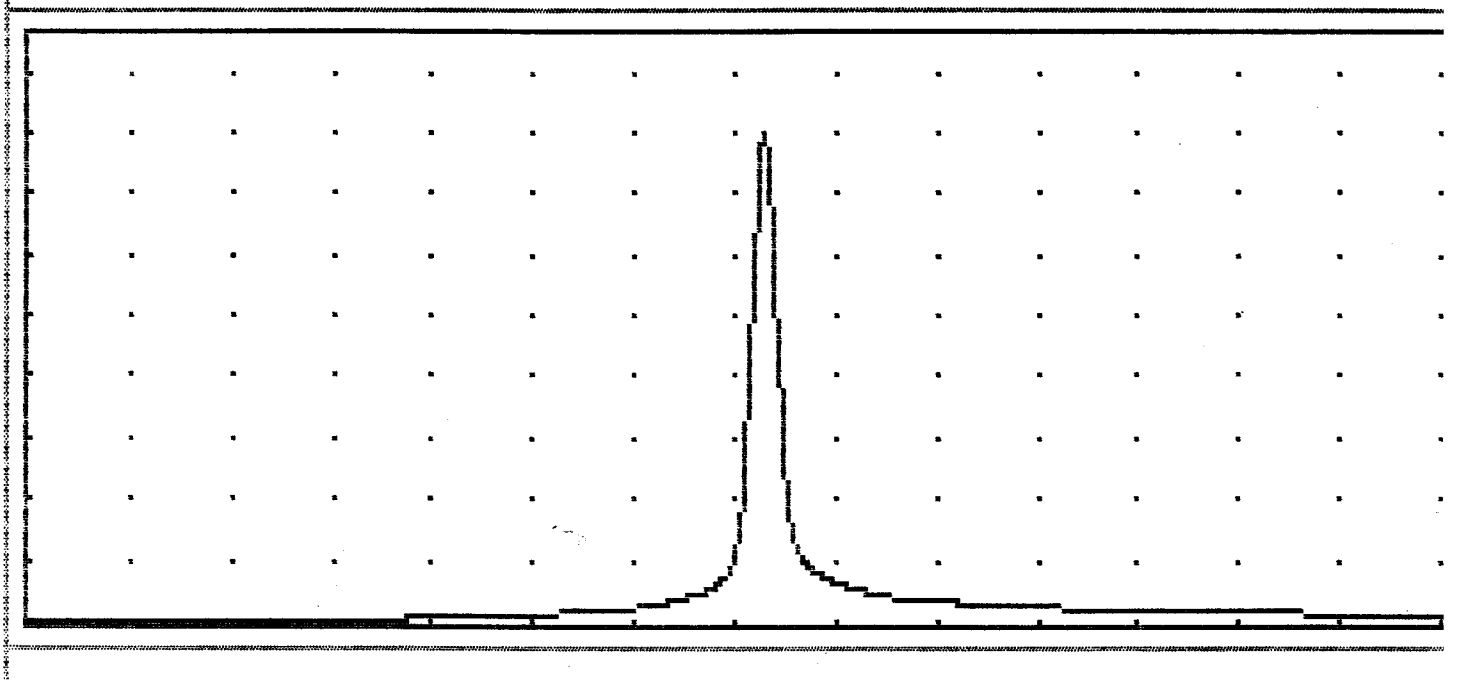
VOL = (cuft/acft) = 188602 / 4.33

S.C.S. HYDROGRAPH A:7574.GP1

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                              :
: 1. HYDROGRAPH No. = 12..........          8. 24 HR PRECIPITATION = 8.1.     :
:                                                                              :
: 2. HYDROGRAPH DESCRIPTION                  9. RETURN PERIOD = 100            :
:                                                                              :
:       A. 100 YR FLOW, WATERSHED            10. DISTRIBUTION = 3....          :
:       B. TO 30' PIPE NOT ROUTED                                              :
:       C. THROUGH POND.........                1. I     2. IA     3. II       :
:                                                                              :
: 3. AREA (ac) = 13.56............              4. III   5. SYNTH  6. MAN      :
:                                                                              :
: 4. BASIN SLOPE (%) = 1.5........              7. IIA   8. SOMERSET           :
:                                                                              :
: 5. HYDRAULIC LENGTH (ft) = 1100..          11. STORM DUR (hrs) = 0..         :
:                                                                              :
: 6. CURVE NUMBER = 83.95.........                                             :
:                                                                              :
: 7. TIME INTERVAL (min) = 2......                                             :
:                                                                              :
:                                                                              :
:                                                                              :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
Change item number: 0
```

```
 Hyd No. 12                    UNIT HYDROGRAPH
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
:                                                                              :
: Curve number          =   84                                                 :
:                                                                              :
: Time Interval (Min)   =   2                                                  :
:                                                                              :
: Basin lag (min)       =   14.77                                              :
:                                                                              :
: Time to peak (min)    =   16.00                                              :
:                                                                              :
: Time base (min)       =   42.00                                              :
:                                                                              :
: Rainfall excess (in)  =    1                                                 :
:                                                                              :
: Peak discharge (cfs)  =   38.46                                              :
:                                                                              :
: Time of Conc. (Min)   =   0       (Equals Tc-Lag when 0)                     :
:                                                                              :
: Tc-Lag Method (Min)   =   24.67                                              :
:                                                                              :
: Shape Factor          =   484                                                :
:                                                                              :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
[T] to edit Tc  [D] to edit Dur  [S] to edit Shp Fctr  [E] to SCS  [DY] to cont
```

Qp = 79.8 S.C.S. RUNOFF 100 Y



HGU = 100 min 12 VGU = 10.0 cf

VOL = (cuft/acft) = 298356 / 6.84

COMBINE HYDROGRAPHS A:7574.GP1

1. HYDROGRAPH NO's
   1. 11..
   2. 5...

2. NEW HYDROGRAPH NO = 13..

3. HYDROGRAPH DESCRIPTION

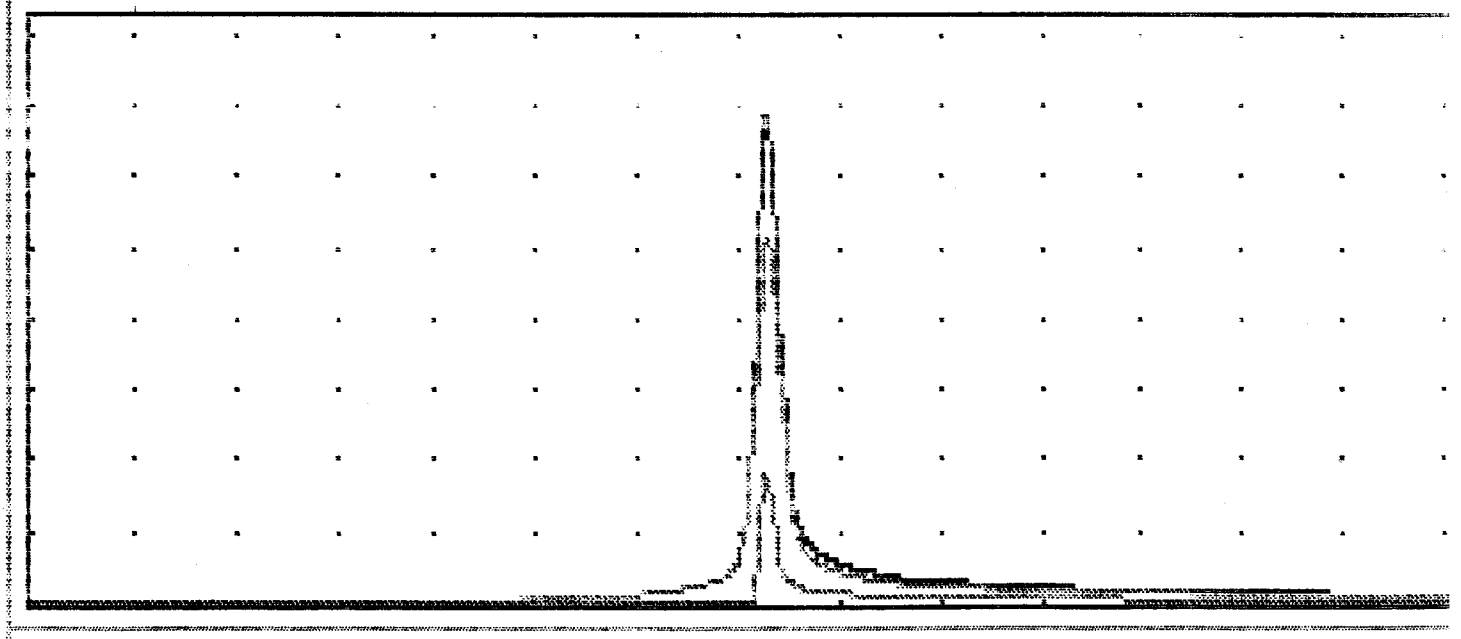
   A. COMBINE HYDROGRAPH....
   B. RELEASED FROM POND AND
   C. OFFSITE FLOW 10 YR ...

Hyd.	Qpeak	Hyd.	Qpeak
1	65.10	2	19.80
3	50.70	4	29.44
5	18.01	6	22.21
7	3.33	8	0.00
9	0.00	10	0.00
11	51.29	12	79.82
13	0.00	14	0.00
15	0.00	16	0.00
17	0.00	18	0.00
19	0.00	20	0.00

- 10 into Pond
- 100 "
- 100 pipe

[Esc] Menu

Qp = 68.5 COMBINED 10 Y



HGU = 100 min 13 VGU = 10.0 cf

VOL = (cuft/acft) = 239853 / 5.50

COMBINE HYDROGRAPHS A:7574.GP1

1. HYDROGRAPH NO's
   1. 4...
   2. 12..

2. NEW HYDROGRAPH NO = 14..

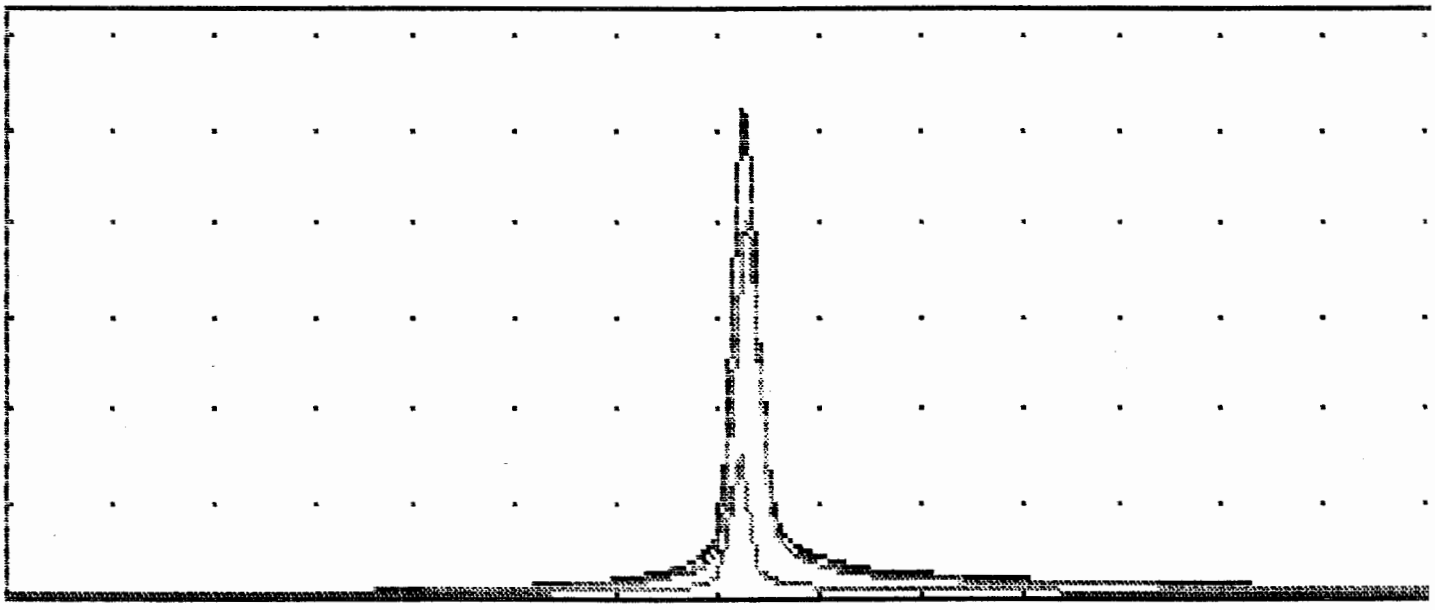
3. HYDROGRAPH DESCRIPTION

   A. COMBINE HYDROGRAPH....
   B. RELEASED FROM POND AND
   C. OFFSITE FLOW (100 YR)

Hyd.	Qpeak	Hyd.	Qpeak
1	65.10	2	19.80
3	50.70	4	29.44
5	18.01	6	22.21
7	3.33	8	0.00
9	0.00	10	0.00
11	51.29	12	79.82
13	68.46	14	0.00
15	0.00	16	0.00
17	0.00	18	0.00
19	0.00	20	0.00

Change item number: 0

Qp = 104.1 COMBINED 100 Y



HGU = 100 min 14 VGU = 20.0 cf

VOL = (cuft/acft) = 386393 / 8.87

Reservoir No. 3 OUTLET STRUCTURES

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
: CULVERT STRUC  A. Q=CoA[2gh/k]^.5    CULVERT STRUC  B. Q=CoA[2gh/k]^.5      :
:                                                                             :
: 1. WIDTH  (in)    = 30.              9. WIDTH  (in)    = 0..                :
: 2. HEIGHT (in)    = 30.             10. HEIGHT (in)    = 0..                :
: 3. No. BARRELS    = 1..             11. No. BARRELS    = 0..                :
: 4. INVERT ELEV.   = 69.86....       12. INVERT ELEV.   = 0........          :
: 5. Co = 0.60                        13. Co = 0.60                           :
: 6. CULVERT LENGTH (ft) = 180.       14. CULVERT LENGTH (ft) = 0...          :
: 7. CULVERT SLOPE (%)   = 1.87       15. CULVERT SLOPE (%)   = 0...          :
: 8. MANNING'S N-VALUE   = .013       16. MANNING'S N-VALUE   = .013          :
:                                     17. MULTI-STAGE OPTION ? (Y/N) N        :
:                                                                             :
: WEIR STRUCTURE A.      Q=CwLH^EXP   WEIR STRUCTURE B.       Q=CwLH^EXP      :
:                                                                             :
: 18. CREST LENGTH (ft)  = 0......    23. CREST LENGTH (ft)  = 0......        :
: 19. CREST ELEVATION    = 0......    24. CREST ELEVATION    = 0......        :
: 20. Cw = 3.00                       25. Cw = 3.00                           :
: 21. EXP = 1.50                      26. EXP = 1.50                          :
: 22. MULTI-STAGE OPTION ? (Y/N) N    27. MULTI-STAGE OPTION ? (Y/N) N        :
:                                                                             :
:                                                                             :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
Change item number: 0                                              DY to cont
```

Option 1 STAGE / STORAGE / DISCHARGE SUMMARY

```
IMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM;
: RESERVOIR No = 3        RESERVOIR NAME = POND 2......                      :
: S = Ks * Z^b                                                                :
:     Ks = 0                 b = 0                                            :
:     START ELEV = 0         INCREMENT = 0                                    :
:                                                                             :
:     STAGE     ELEVATION        STORAGE      DISCHARGE                       :
:     ft        ft               cu ft        cfs                             :
:                                                                             :
:      0.00       70.00              0            0.30  1.                    :
:      2.00       72.00             72           23.25  2.                    :
:      4.00       74.00            272           40.18  3.                    :
:      6.00       76.00           1179           52.26  4.                    :
:      8.00       78.00           3159           62.03  5.                    :
:     10.00       80.00           6711           70.46  6.                    :
:     12.00       82.00          12892           77.99  7.                    :
:     14.00       84.00          22658           84.85  8.                    :
:     16.00       86.00          35558           91.19  9.                    :
:      0.00        0.00              0            0.00 10.                    :
:      0.00        0.00              0            0.00 11.                    :
:                                                                             :
:                                                                             :
HMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM<
[DY] cont    [E] edit    [R] reset     [G] graph     [S] screen     [P] print
```

Option 1 STAGE / STORAGE TABLE R to reset

1. RESERVOIR No = 3. 2. RESERVOIR NAME = POND 2.....

3. S = Ks * Z^b

Ks = 0..... b = 0.....

START ELEV = 0..... INCREMENT = 0...

	STAGE ft	ELEVATION ft	CO AREA sq ft	INC STORAGE cu ft	TOT STORAGE cu ft
4	0.00	70.00.	36.....	0	0
5	2.00	72.00.	36.....	72	72
6	4.00	74.00.	164.....	200	272
7	6.00	76.00.	743.....	907	1179
8	8.00	78.00.	1237....	1980	3159
9	10.00	80.00.	2315....	3552	6711
10	12.00	82.00.	3866....	6181	12892
11	14.00	84.00.	5900....	9766	22658
12	16.00	86.00.	7000....	12900	35558
13	0.00	0.00.	0.....	0	0
14	0.00	0.00.	0.....	0	0

Change item number: 0 DY to cont

RESERVOIR ROUTING A:7574.GP1

1. INFLOW HYD No = 13.

2. OUTFLOW HYDROGRAPH No = 15

3. HYDROGRAPH DESCRIPTION

A. COMBINED HYDROGRAPHS .
B. ROUTED THROUGH .....
C. BASIN 3 .....

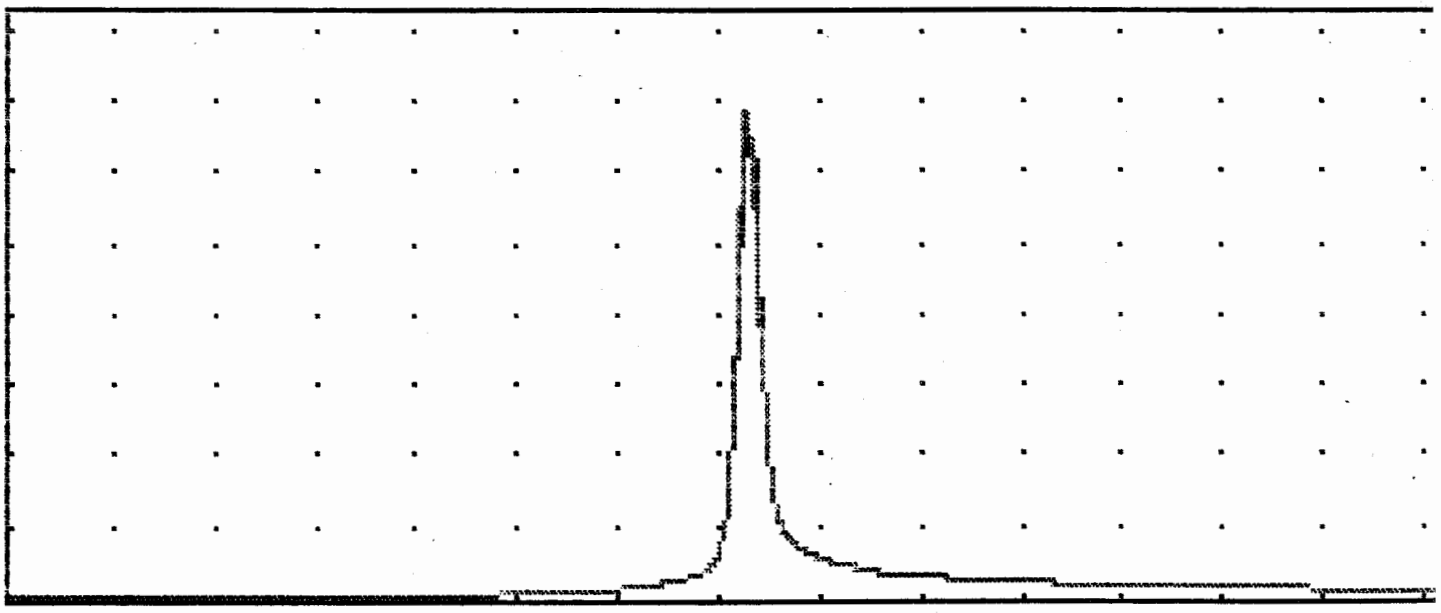
4. RESERVOIR No. = 3.

Reservoir name = "POND 3....."

Hyd.	Qpeak	Hyd.	Qpeak
1	101.31	2	19.80
3	50.70	4	29.44
5	18.01	6	22.21
7	3.33	8	0.00
9	0.00	10	0.00
11	51.29	12	79.82
13	68.46	14	104.15
15	64.63	16	83.92
17	50.29	18	0.00
19	0.00	20	0.00

Change item number: 0

Qp = 64.6 RESERVOIR ROUTE 10 Y



HGU = 100 min 15 VGU = 10.0 cf

MAX STORAGE = 4206

MAX ELEVATION = 78.59

RESERVOIR ROUTING A:7574.6P1

1. INFLOW HYD No = 14.

2. OUTFLOW HYDROGRAPH No = 16

3. HYDROGRAPH DESCRIPTION

A. COMBINED HYDROGRAPHS .
B. ROUTED THROUGH .....
C. BASIN 3 (100YR) .....

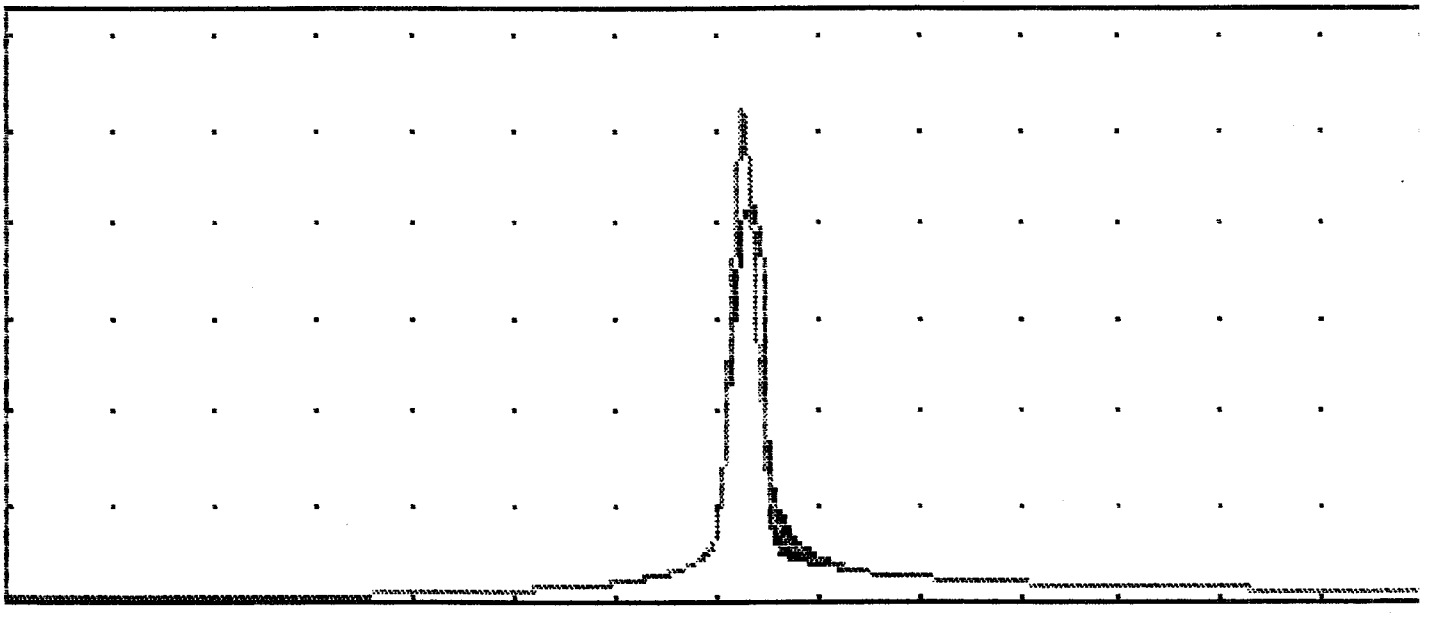
4. RESERVOIR No. = 3.

Reservoir name = "POND 3....."

Hyd.	Qpeak	Hyd.	Qpeak
1	101.31	2	19.80
3	50.70	4	29.44
5	18.01	6	22.21
7	3.33	8	0.00
9	0.00	10	0.00
11	51.29	12	79.82
13	68.46	14	104.15
15	64.63	16	83.92
17	50.29	18	0.00
19	0.00	20	0.00

Change item number: 0

Qp = 83.9 RESERVOIR ROUTE 100 Y



HGU = 100 min 16 VGU = 20.0 cf

MAX STORAGE = 21298

MAX ELEVATION = 83.72

RESERVOIR PROTECTION OVERLAY DISTRICT
RUNOFF ANALYSIS
FOR
PROPOSED CONCRETE PLANT
JAMES CITY COUNTY, VIRGINIA

LAND OWNER: SHELDON LUMBER COMPANY
LESSEE/DEVELOPER: HENRY S. BRANSCOME, INC.

BMP #7

prepared by

AES Consulting Engineers
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040

COMMONWEALTH OF VIRGINIA
G. ARCHER MARSTON III
No. 018232
PROFESSIONAL ENGINEER

AES PROJECT NO. 7574

November 29, 1990

AES
CONSULTING ENGINEERS

Description of Project

The proposed project is located within the existing Sheldon Lumber Company Incorporated site, which is situated on the north side of U.S. Route 60 between Turlington Road and Chickahominy Road in the Toano area of James City County. The concrete plant site consists of approximately 2.7 acres located on the north side of the lumber company property, which is adjacent to the CSX Railroad right-of-way. (See attached Exhibit "A.") The site is currently a rather gentle sloping, hard-packed, earth and stone surface which was used for lumber storage, but which is now basically vacant except for some minor, unused pole barn-type structures. The proposed facility will consist of two minor buildings, approximately 1,500 square feet; a water storage tank, two (2) cement storage silos and the aggregate bins with conveyor apparatus. A paved roadway will be provided from U.S. Route 60 to the site. Pavement will also be provided on site in truck travel areas as shown on Exhibit "A."

The soils for the site, per the United States Department of Agriculture Soil Survey of James City and York Counties and the City of Williamsburg, Virginia, are classified as Udorthents. Udorthents in this survey consist of deep, excessively drained to moderately well drained soils. These soils are formed mostly in loamy fluvial and marine sediments. Udorthents are found mainly on ridge tops and side slopes along drainage ways and generally comprise areas that have been mined for sand, gravel, or roadfill. Please note no permeability rates are given in the above-referenced soil survey for the Udorthent soil classification.

Present and Proposed Runoff Analysis

At present, the 2.7 acre± site plus the 0.3 acre± off-site area, which drains onto the site, creates a 3.0 acre drainage area which must be analyzed. The following pre- and post-development annual pollutant loadings are estimated for the three-acre drainage area. Please note that the James City County Design Manual For Run-off Analysis (Design Manual) was utilized for calculating the sediment and phosphorous loadings.

Sediment Loading

Pre-development
3.0 acres x 0.22* tons/acre/year = 0.66 tons/year

*Loading rate per Design Manual Table 2-1.0, Industrial B for loam soils.

Post-development
3.0 acres x 0.18* tons/acre/year = 0.54 tons/year

*Loading rate per Design Manual, Table 2-1.0, Industrial A for loam soils.

Phosphorous Loadings

Pre-development
3.0 acres x 1.5* pounds/acre/year = 4.5 pounds/year

*Loading rate per Design Manual Table 2-2.0, Industrial B for loam soils.

Post-development
3.0 acres x 1.2* pounds/acre/year = 3.6 pounds/year

*Loading rate per Design Manual, Table 2-2.0, Industrial A for loam soils.

These pollutant loading calculations show a reduction in both sediment and phosphorous due to the development of the concrete plant. This is due to the new County

ordinance which mandates that new development shall have no more than 60% of the site covered with impervious surfaces. The site currently is less than 10% pervious. The remainder of the site is a hard-packed bare earth and stone surface which, while not being totally impervious, has so high a coefficient of run-off (C=0.75) that it can and should be classified as impervious. Due to the small size of this site and the nature of the operation, other pollutants are difficult to predict.

need to verify this

As in the past, for small sites, the rational method of computing stormwater run-off rates is utilized. The rational method yields the following pre-development and post-development run-off rates:

Pre-Development

Site Area = 3.00 acres±

0.20 acres undisturbed (natural vegetation)	C = 0.30
2.64 acres hard packed earth	C = 0.75
0.16 acres impervious	C = 0.90

$$C = \frac{(.2)(.3) + (2.64)(.75) + (.16)(.90)}{3.00} = 0.73$$

Time of Concentration - Overland Flow

T_c = 20 minutes I_2 = 3.5 inches/hour I_{10} = 4.50 inches/hour

$Q_2 = (0.73)(3.5)(3.00) = \underline{7.67\ CFS}$

$Q_{10} = (0.73)(4.50)(3.00) = \underline{9.86\ CFS}$

WC028_BRANSCOME_PLANT - 047

Post-Development

1.20 acres undisturbed and landscape area C = 0.30
0.55 acres paved or impervious C = 0.90
1.25 acres hard packed earth and gravel C = 0.90

$$C = \frac{(1.2)(.3) + (0.55)(.9) + (1.25)(0.75)}{3.00} = 0.60$$

Time of Concentration - Overland = 13 minutes + pipe flow = 2 minutes
T_c = 15 minutes I_2 = 3.9 inches/hour I_{10} = 5.1 inches/hour

$Q_2 = (0.60)(3.9)(3.00) =$ 7.02 CFS
$Q_{10} = (0.60)(5.1)(3.00) =$ 9.18 CFS

These calculations, like the pollutant loading calculations, show a decrease due to development of the concrete plant. Again, this is due to the 40% green space (pervious cover) required in the ordinance. Therefore, the proposed run-off control measures need only address water quality - not flow attenuation.

Run-off Control Measures

Currently, the project area drains to the center of the site and then northeast to the CSX Railroad right-of-way. Grading for the proposed concrete plant will cause the site to drain, via a storm sewer system, to the northwest corner of the site to an existing depression which will become the basis for a permanent detention basin.

Since the stormwater run-off rate for the post-developed state is less than the pre-development state, no storage for flow attenuation is required. The storage requirement for the basin will be based solely on the sediment storage requirement plus the storage volume

of 1.0 inch of run-off over the impervious surface of the drainage area. The storage volume is as follows:

Sediment storage requirement = 67 CY per acre of drainage area

D.A. = 3.0 acres

3.0 acres x 67 = 201 CY

1.0 inch of run-off over the impervious surface of the drainage area

D.A. = 3.0 acres

3.0 acres x 0.60 (maximum impervious cover) = 1.8 acres

1.0 inch x 1.8 acres = 242 CY

mean storm I acres

R_v = .45 x .59 x 3.0 = .8 "acre-in

or 108 cyds

Total storage volume required = 443 CY

0.09

will meet 9 pt BMP

– 40% open space =

The permanent design of the basin will include a permanent pool storage volume of at least 201 CY (the minimum sediment storage volume). The principal spillway elevation will be set so to store at least the 242 CY of run-off (1.0 inch over the impervious area) between the normal pool elevation and the principal spillway elevation. An orifice, or multiple orifices, placed in the riser at the normal pool elevation will be provided to allow a minimum of thirty (30) hours to release the stored volume. Other design features of the basin will be as follows:

- Minimum length to width ration of 2:1.
- All basin side slopes shall not be steeper than 3:1.
- Fescue or perennial rye shall be used to stabilize exposed banks and a minimum 15' wide strip around the perimeter of the basin.

- Since the site will be used for aggregate storage and distribution sediment production will be a constant throughout the life of the facility. The plant operators will be responsible for the removal of the sediment from the basin at a minimum of once a year or at shorter intervals as necessary. Experience at similar facilities indicates once a year should be sufficient.
- Provisions for draining the basin will be provided in order to facilitate sediment removal from the basin.

Pollutant Removal Efficiency and Criteria

The decreases in pollutant loadings due to the additional green space required, in addition to those decreases provided by the wet basin design, exceed the criteria as set forth in the County Design Manual for run-off analysis. The minimum removal efficiency specified for both sediment and phosphorous is 75%. The wet pond design alone provides the 75% removal efficiency for both pollutants. The development of the site, with the required 40% green space, reduces the sediment load by 18% and phosphorous load by 20%. Therefore, per the Design Manual, the combination of added green space and the wet pond design produces an overall reduction of sediment by 79.5% and phosphorous by 80%. Considering the nature of the operation, i.e. constant storage and distribution of stone, the reduction percentage for sediment may be slightly inflated. However, the minimum of 75% removal is achieved by implementation of the wet basin design alone.

7574K30.GAM/sgc

LIST OF SOURCES

1. **Design Manual For Run-off Analysis**
   Reservoir Protection Overlay District
   James City County, James City Service Authority

2. **Soil Survey of James City and York Counties, and the City of Williamsburg**
   issued April, 1985
   United States Department of Agriculture
   Soil Conservation Service

3. **Drainage Manual**
   Virginia Department of Transportation, adopted January 1, 1980

4. **Virginia Erosion and Sediment Control Handbook, Second Edition, 1980**
   Virginia Department of Conservation and Historic Resources
   Division of Soil and Water Conservation

HYDRAULIC REPORT FOR

BRANSCOME CONCRETE

STORAGE FACILITY

ON-SITE STORM SEWER

ANALYSIS

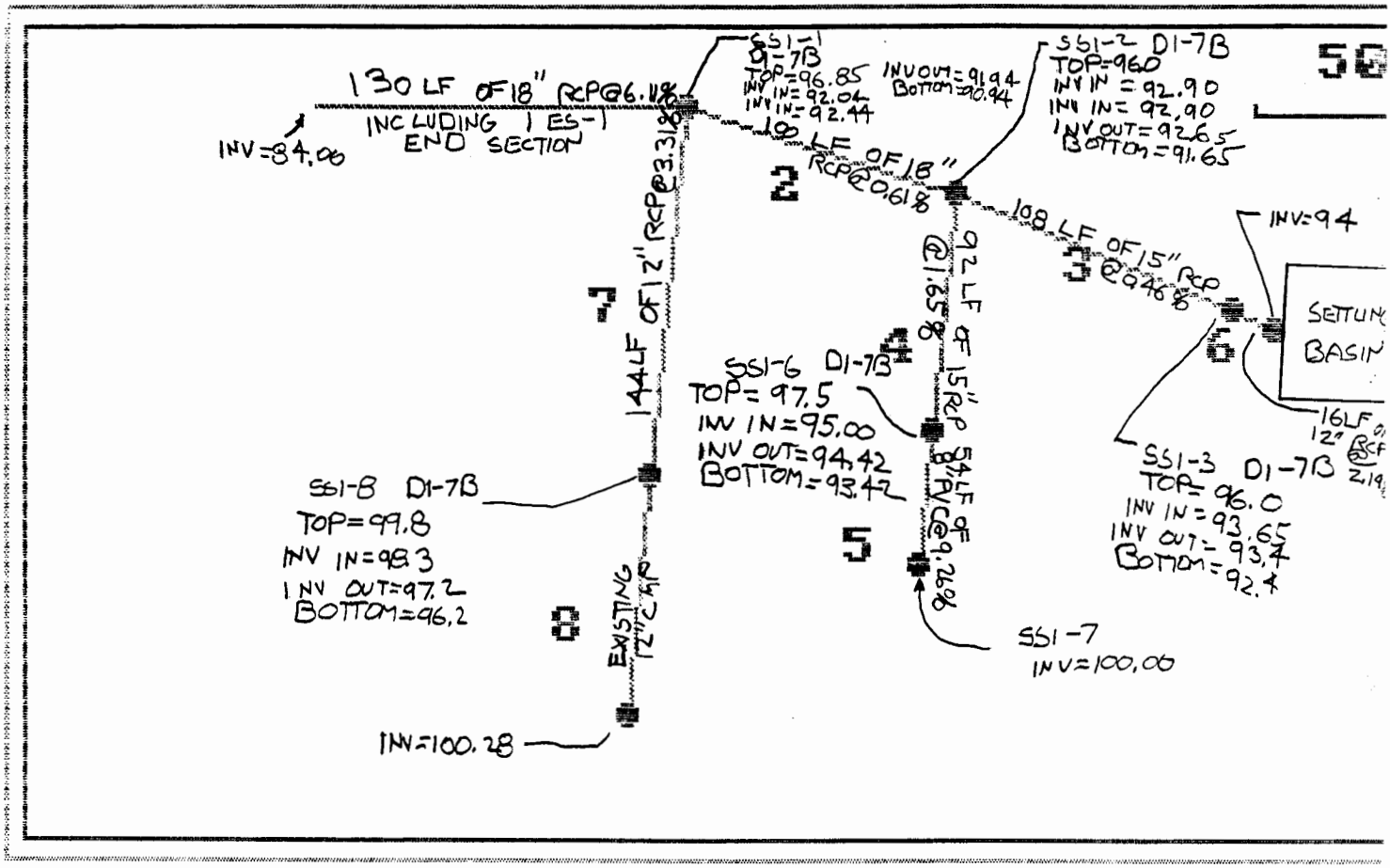
AES, CONSULTING ENGINEERS

5248 OLDE TOWNE ROAD

SUITE 1

WILLIAMSBURG, VA 23188

JULY 8, 1991



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HYDRAULIC ANALYSIS

Run date: 07-11-1991
File: a:7574-2.ST3

Return Period = 10 Yrs
Rainfall file: JAMES CITY COUNTY

LINE 1 / Q = 11.7 / HT = 18 / WID = 18 / N = .013 / L = 130 / JLC = 1

SS1-4 ..... / Outfall

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	88.11	18.00	~~92~~ 84.00	6.60	88.79	0.00	N/A	1.77
UPSTRM	93.27	15.96	91.94	7.04	94.04	11.41	3.4	1.66

Drainage area (ac) =	.69	Slope of invert (%) =	~~7.345~~ 6.11
Runoff coefficient =	.6	Slope energy grade line (%) =	4.041
Time of conc (min) =	8	Critical depth (in) =	15.93
Inlet time (min) =	7	Req'd length curb inlet (ft) =	0.0
Intensity (in/hr) =	6.32	Req'd grate area (sf) =	0.0
Cumulative CtA =	1.8	Depth at inlet opening (in) =	0
Flow contrib (cfs) =	2.6	Confluence angle (deg) =	0
Default Q (cfs) =	0	Natural ground elev (ft) =	96.85
Line capac. (cfs) =	29.0	Line storage (cuft) =	223

LINE 2 / Q = 7.3 / HT = 18 / WID = 18 / N = .013 / L = 100 / JLC = 1.2

SS1-2 TO SS1-1 ..... / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	94.04	18.00	92.04	4.15	94.31	0.00	3.3	1.77
UPSTRM	94.53	18.00	92.65	4.15	94.80	0.00	1.84	1.77

Drainage area (ac) =	.25	Slope of invert (%) =	0.610
Runoff coefficient =	.45	Slope energy grade line (%) =	0.489
Time of conc (min) =	8	Critical depth (in) =	13.15
Inlet time (min) =	5	Req'd length curb inlet (ft) =	0.0
Intensity (in/hr) =	6.45	Req'd grate area (sf) =	0.0
Cumulative CtA =	1.1	Depth at inlet opening (in) =	0
Flow contrib (cfs) =	1	Confluence angle (deg) =	20
Default Q (cfs) =	0	Natural ground elev (ft) =	96
Line capac. (cfs) =	9.2	Line storage (cuft) =	177

LINE 3 / Q = 2.8 / HT = 15 / WID = 15 / N = .013 / L = 108 / JLC = 1

SS1-3 TO SS1-2 ..... / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	94.85	15.00	92.90	2.26	94.93	0.00	1.84	1.23
UPSTRM	95.05	15.00	93.40	2.26	95.13	0.00	1.34	1.23

Drainage area (ac) =	.45	Slope of invert (%)	= 0.463
Runoff coefficient =	.65	Slope energy grade line (%)	= 0.185
Time of conc (min) =	5	Critical depth (in)	= 8.47
Inlet time (min) =	5	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr) =	7.09	Req'd grate area (sf)	= 0.0
Cumulative C*A =	0.4	Depth at inlet opening (in)	= 0
Flow contrib (cfs) =	2	Confluence angle (deg)	= 5
Default Q (cfs) =	0	Natural ground elev (ft)	= 96
Line capac. (cfs) =	4.4	Line storage (cuft)	= 133

LINE 4 / Q = 3.8 / HT = 15 / WID = 15 / N = .013 / L = 92 / JLC = 1

SS1-~~6~~ 7 SS1-2 ..... / DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	94.85	15.00	92.90	3.13	95.00	0.00	1.84	1.23
UPSTRM	95.25	9.96	94.42	4.44	95.56	14.17	1.83	0.87

Drainage area (ac) =	.95	Slope of invert (%)	= 1.652
Runoff coefficient =	.6	Slope energy grade line (%)	= 0.603
Time of conc (min) =	7	Critical depth (in)	= 9.92
Inlet time (min) =	7	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr) =	6.57	Req'd grate area (sf)	= 0.0
Cumulative C*A =	0.6	Depth at inlet opening (in)	= 0
Flow contrib (cfs) =	3.7	Confluence angle (deg)	= 75
Default Q (cfs) =	0	Natural ground elev (ft)	= 97.5
Line capac. (cfs) =	9.3	Line storage (cuft)	= 96

LINE 5 / Q = 0.1 / HT = 8 / WID = 8 / N = .013 / L = 54 / JLC = .9

SS1-7 SS1-6 / DNLN = 4

8

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	95.56	6.67	95.00	0.38	95.56	5.69	1.83	0.32
UPSTRM	100.21	2.03	100.00	1.75	100.26	6.96	-.66	0.07

Drainage area (ac) =	.016	Slope of invert (%)	= 9.259
Runoff coefficient =	.9	Slope energy grade line (%)	= 8.706
Time of conc (min) =	1	Critical depth (in)	= 2.01
Inlet time (min) =	1	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr) =	8.44	Req'd grate area (sf)	= 0.0
Cumulative C*A =	0.0	Depth at inlet opening (in)	= 0
Flow contrib (cfs) =	.1	Confluence angle (deg)	= 0
Default Q (cfs) =	0	Natural ground elev (ft)	= 100
Line capac. (cfs) =	3.7	Line storage (cuft)	= 10

LINE 6 / Q = 0.8 / HT = 12 / WID = 12 / N = .013 / L = 16 / JLC = .9

SETTLING BASIN TO SS1-3 / DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	95.13	12.00	93.65	1.06	95.15	0.00	1.34	0.79
UPSTRM	95.15	12.00	94.00	1.06	95.17	0.00	2	0.79

94 is inv of pipe

Drainage area (ac) =	.11	Slope of invert (%)	= 2.187
Runoff coefficient =	.9	Slope energy grade line (%)	= 0.154
Time of conc (min) =	1	Critical depth (in)	= 4.98
Inlet time (min) =	1	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr) =	8.44	Req'd grate area (sf)	= 0.0
Cumulative C*A =	0.1	Depth at inlet opening (in)	= 0
Flow contrib (cfs) =	.8	Confluence angle (deg)	= 0
Default Q (cfs) =	0	Natural ground elev (ft)	= 97
Line capac. (cfs) =	5.3	Line storage (cuft)	= 13

LINE 7 / Q = 2.1 / HT = 12 / WID = 12 / N = .013 / L = 144 / JLC = 1

SS 1-~~8~~ TO SS1-1 9 / DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	94.04	12.00	92.44	2.63	94.15	0.00	3.4	0.79
UPSTRM	97.84	7.68	97.20	3.88	98.07	11.52	1.6	0.53

Drainage area (ac) =	.23	Slope of invert (%)	= 3.306
Runoff coefficient =	.6	Slope energy grade line (%)	= 2.728
Time of conc (min) =	5	Critical depth (in)	= 7.65
Inlet time (min) =	5	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr) =	7.09	Req'd grate area (sf)	= 0.0
Cumulative C*A =	0.3	Depth at inlet opening (in)	= 0
Flow contrib (cfs) =	.9	Confluence angle (deg)	= 95
Default Q (cfs) =	0	Natural ground elev (ft)	= 99.8
Line capac. (cfs) =	6.5	Line storage (cuft)	= 95

LINE 8 / Q = 1.2 / HT = 12 / WID = 12 / N = .013 / L = 95 / JLC = .9

EXISTING CULVERT TO SS 1-~~8~~ 9 / DNLN = 7

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	98.79	5.88	98.30	3.22	98.95	12.00	.5	0.38
UPSTRM	100.92	5.91	100.28	3.20	101.07	12.00	-1	0.38

Drainage area (ac) =	.17	Slope of invert (%)	= 2.084
Runoff coefficient =	.9	Slope energy grade line (%)	= 2.085
Time of conc (min) =	2	Critical depth (in)	= 5.88
Inlet time (min) =	2	Req'd length curb inlet (ft)	= 0.0
Intensity (in/hr) =	8.05	Req'd grate area (sf)	= 0.0
Cumulative C*A =	0.2	Depth at inlet opening (in)	= 0
Flow contrib (cfs) =	1.2	Confluence angle (deg)	= 0
Default Q (cfs) =	0	Natural ground elev (ft)	= 100.28
Line capac. (cfs) =	5.1	Line storage (cuft)	= 36

OUTLET PROTECTION FOR LINE #1

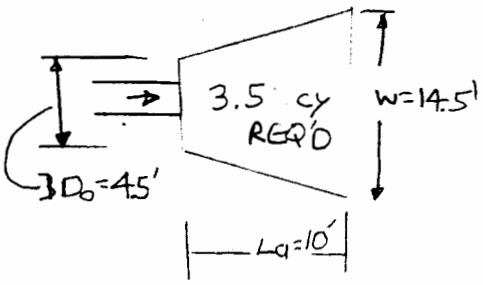
$Q_{10} = 11.7$ CFS

$\therefore L_a = 10'$ FROM PLATE 1.36C, VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK

$3D_o = 3(1.5) = 4.5'$

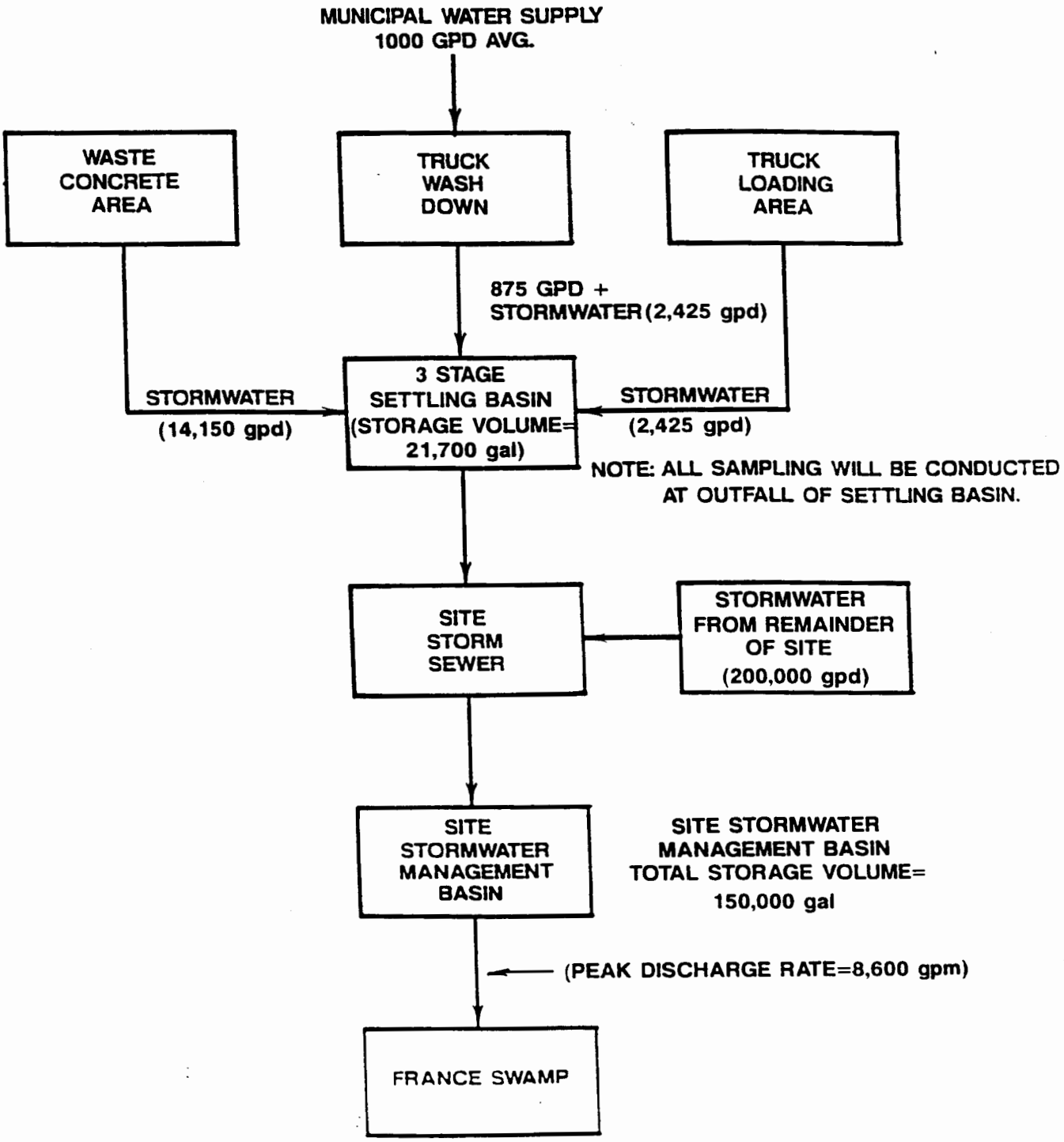
$W = D_o + L_a = 4.5' + 10' = 14.5'$

$V = \left(\frac{14.5 + 4.5}{2}\right)(10)(1) / 27 FT^3/YD^3 = 3.52 YD^3$



LINE DRAWING
SCHEMATIC OF WATER FLOW
BRANSCOME CONCRETE - TOANO PLANT

STONEHOUSE DISTRICT JAMES CITY COUNTY VIRGINIA



NOTE: STORMWATER FLOWS BASED ON DESIGN STORM EVENT

Branscome Concrete - Toano Plant
Settling Basin Sizing Calculations
AES Consulting Engineers
June 24, 1991
AES Project No. 7574

Design Settling Basin to hold 25 year 24 hour storm runoff plus 3 days average wash area discharge plus 1 foot of basin free board.

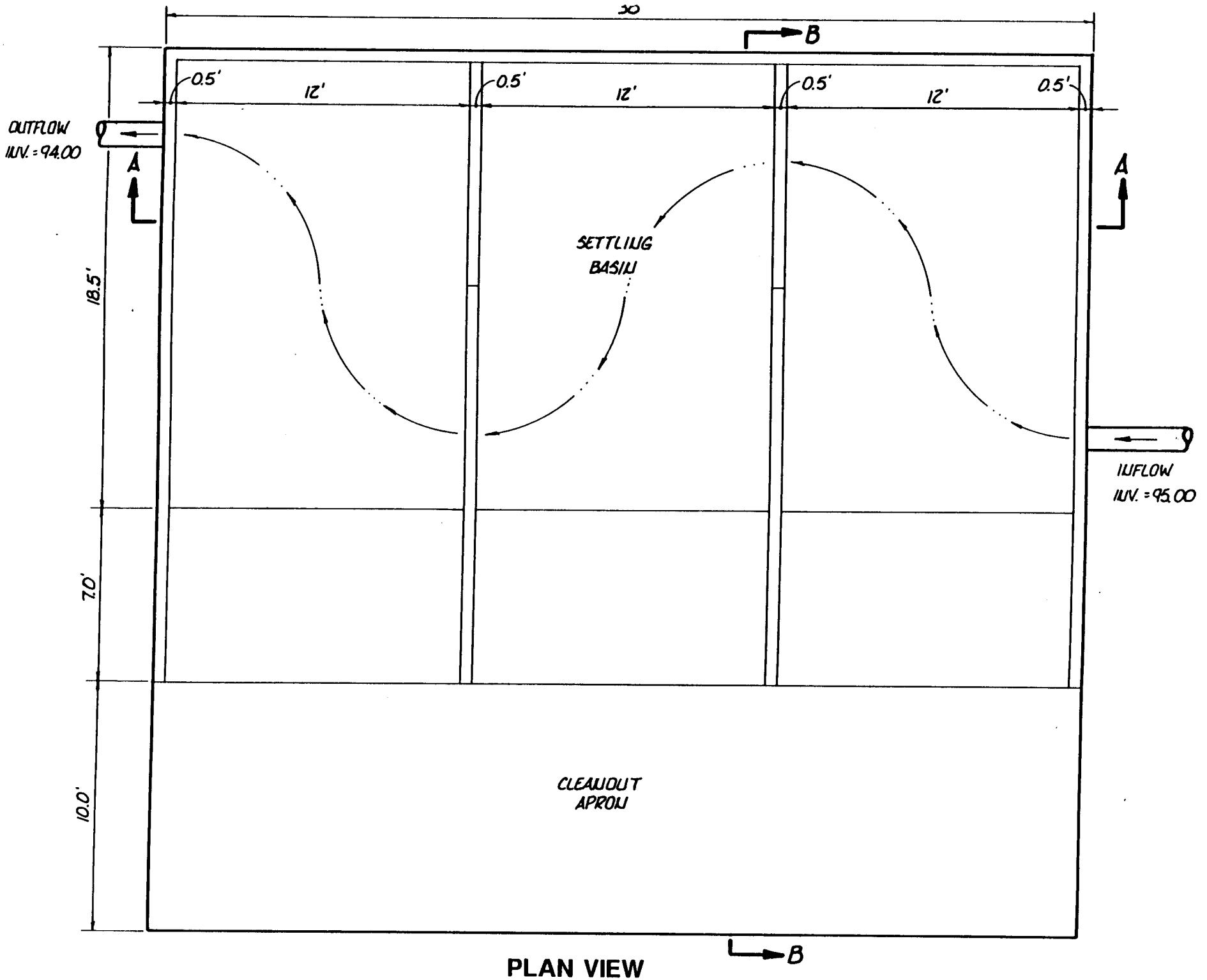
Drainage Areas for Runoff Calculations

Waste Concrete Area	=	3,500 s.f.
Loading Area	=	600 s.f.
Wash Rack Area	=	600 s.f.
TOTAL CONTROLLED AREA	=	4,700 s.f.

25 yr. 24 hr. Rainfall = 6.5 in = 0.54 ft.
Storm Runoff Volume = 0.54 ft. X 4,700 s.f. = 2,546 c.f.
3 Days Wash Water Volume = 875 gpd X 3 days/7.48 gal./c.f. = 351 c.f.

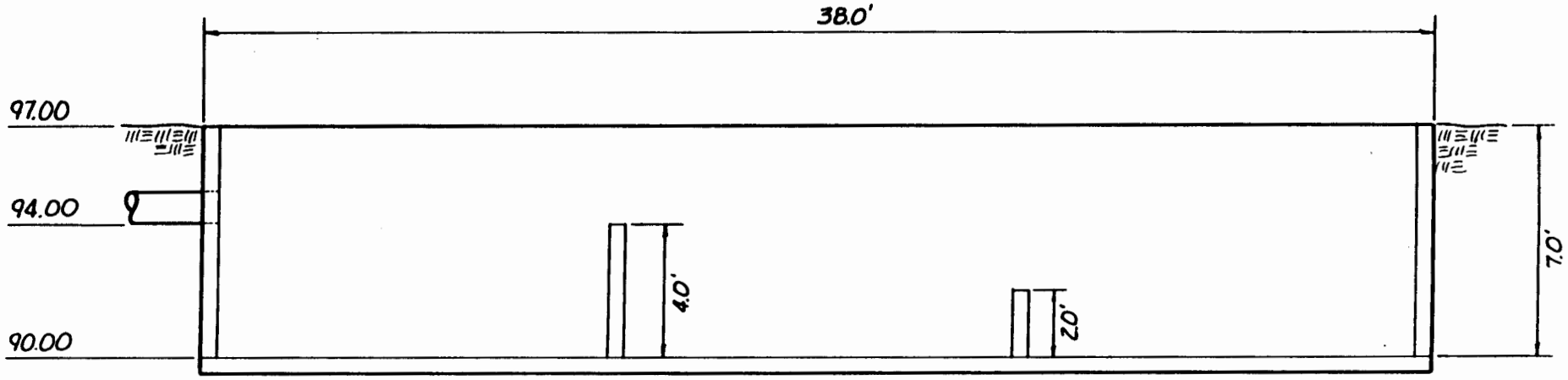
Total Basin Storage Volume = 2,897 c.f.
Plus 1' of Freeboard

Storage Volume Provided = 2,916 c.f. Plus 1' of Freeboard



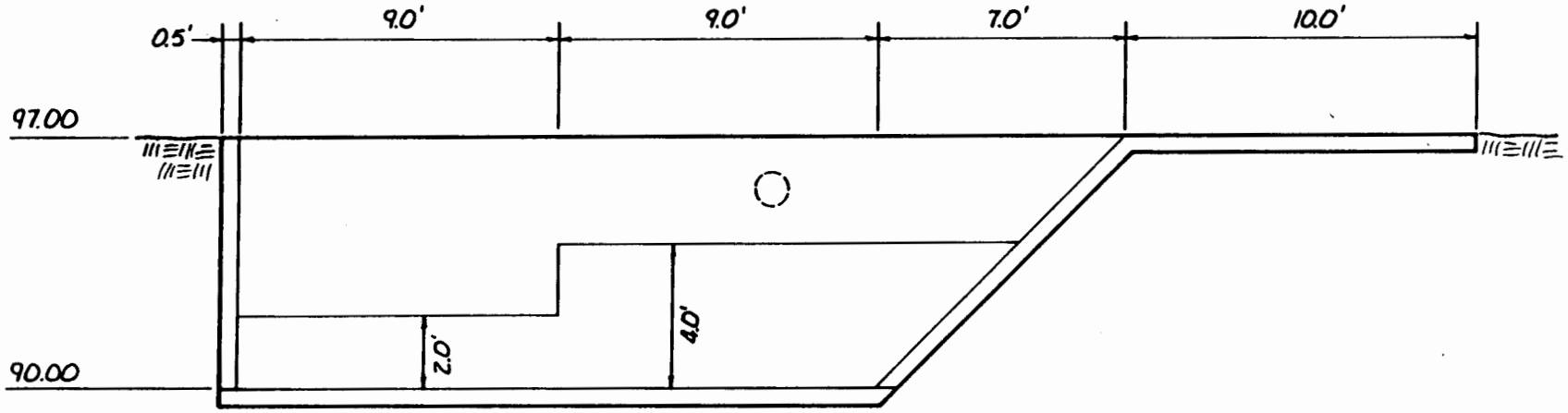
PLAN VIEW

SCALE: 1"=5'



SECTION A-A

SCALE: 1"=5'



SECTION B-B

SCALE: 1"=5'

INC.
Drawer 260
burg, Virginia 23187

WILLIAMSBURG: (757) 229-2504
NORFOLK: (757) 622-4200
FAX: (757) 220-0390

August 21, 2001

Steven J.E. Long, Compliance Inspector
Virginia Department of Environmental Quality
5636 Southern Boulevard
Virginia Beach, Virginia 23462

RE: Permit #VA0087131

Dear Mr. Long:

This is in response to your letter dated August 16, 2001, concerning a permit violation at our Toano Facility. During your inspection on August 8, 2001, you determined that the pH was 9.30, thus exceeding the permitted maximum pH by 0.30.

To eliminate this concern the valve to the outfall at the holding pond has been shut. Mr. Vernon Roane, our plant operator shut the valve on August 16, 2001, and noted his action in the maintenance log. I also notified Mr. Jerry Lewis, with James City County's Environmental Division of our action. While Mr. Lewis did not have a concern he did request that I copy him on any correspondence.

As of August 17, 2001, Branscome Inc. is no longer discharging water. Should you have any questions, please do not hesitate to contact me.

Sincerely,

J. H. Lipscomb, Jr.

Julian H. Lipscomb, Jr.
Safety Director

cc: Jerry Lewis
Vernon Roane
Kevin Jones

Registered Virginia Contractor No. 2705061347A Class A H/H

FILE -
Branscome Concrete Plant

HENRY S. BRANSCOME, INC.

Post Office Drawer 260
Williamsburg, Virginia 23187

WILLIAMSBURG: 229-2504
NORFOLK: 622-4200
FAX: 220-0390

June 15, 1998

County of James City
Darryl E. Cook
Post Office Box 8784
Williamsburg, Virginia 23187-8784

RE: Request for Bond Release

Dear Mr. Cook:

Enclosed for your review is an "as built" record drawing dated January 14, 1998, for our Toano concrete plant that was prepared by AES Consulting Engineers. Please review and provide me with the necessary letter that will allow James City County to release the Erosion and Sediment Control bond on this project.

Should you have any questions or I can be of further assistance, please do not hesitate to contact me.

Sincerely,

J.H. Lipscomb, Jr.
Sales

Attachment

"WE MOVE, SMOOTH, SELL & ASPHALT THE EARTH"
Registered Virginia Contractor No. 020550A Class A H/H

HENRY S. BRANSCOME, INC.

Post Office Drawer 260
Williamsburg, Virginia 23187

WILLIAMSBURG: 229-2504
NORFOLK: 622-4200
FAX: 220-0390

MEMORANDUM

TO: Scott J. Thomas, P.E.

FROM: Jay Lipscomb, Safety Director

SUBJECT: VPDES Permitted Facilities

DATE: February 9, 2001

This is a follow up to our field visit yesterday in which you requested the VPDES permit numbers for our facilities in James City County. They are as follows;

VAR550116 Lee Hall Asphalt
VAG113001 Lee Hall Concrete
VA0087131 Toano Concrete

Call me if you have any questions.

"WE MOVE, SMOOTH, SELL & ASPHALT THE EARTH"
Registered Virginia Contractor No. 020550A Class A H/H

TOTAL P.01

BRANSCOME INC.
Post Office Drawer 260
Williamsburg, Virginia 23187

WILLIAMSBURG: (757) 229-2504
NORFOLK: (757) 622-4200
FAX: (757) 220-0390

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Virginia Department of Environmental Quality
5636 Southern Boulevard
Virginia Beach, Virginia 23462

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Sincerely,

J.H. Lipscomb, Jr.

Julian H. Lipscomb, Jr.
Safety Director

cc: Jerry Lewis
Vernon Roane
Kevin Jones

WATERSHED	WC	MAINTENANCE PLAN	No	CTRL STRUC DESC	RCP Riser
BMP ID NO	028	SITE AREA acre	2.6	CTRL STRUC SIZE inches	48
PLAN NO	SP-72-91	LAND USE	Light Industrial	OTLT BARRL DESC	RCP Barrel
TAX PARCEL	(12-4)(1-30)	old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	18
PIN NO	12401000030	JCC BMP CODE			
CONSTRUCTION DATE	1/1/1992	POINT VALUE	9	EMERG SPILLWAY	No
PROJECT NAME	Branscome Concrete			DESIGN HW ELEV	88.85
FACILITY LOCATION	7816 Richmond Road			PERM POOL ELE	85.85
CITY-STATE	Toano, VA	SVC DRAIN AREA acres	3.65	2-YR OUTFLOW cfs	7.02
CURRENT OWNER	Sheldon Lumber Company			10-YR OUTFLOW cfs	9.18
OWNER ADDRESS	P. O. Box 159			REC DRAWING	No
OWNER ADDRESS 2		SERVICE AREA DESCRI	Agg/Cement Stor Fac & 1 ac offsite		
CITY-STATE-ZIP CODE	Toano, VA 23168	IMPERV AREA acres		CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Ware Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	No	LAST INSP DATE	12/7/2001
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	0.09	INTERNAL RATING	2
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0.43	Leased. VPDES VA 0087131. 8" DIP low flow orif w/valve. Outfall 30" at CSX.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

7574
CONCRETE STORAGE FAC

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
EXTENDED DRY DETENTION WITH SHALLOW MARSH	9	x	97 %	=	8.73
		x		=	
		x		=	
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: _____

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
13 %	x	0.1 (0.1 per 1%)	=	1.3

C. TOTAL WEIGHTED POINTS

Structural BMP Points	+	Natural Open Space Points	=	TOTAL
8.73	+	1.3	=	10.03

1/4/91

To: File

From: Darryl Cook, Engineer

Re: SUP-55-90, Sheldon Lumber Co.

I discussed w/ Laura Sawyer (552-1840) of the VWCB the requirements for concrete batch plants to obtain permits. She stated that they could obtain either a discharge or no-discharge permit; but a permit would be needed. For our situation, she recommended a no-discharge permit as ~~these~~ there would be less chance for pollution to enter the proposed Ware Creek reservoir. The areas that would be controlled would be a) when the trucks are filled, b) when the trucks are washed, c) when waste concrete is dumped. These areas will drain to a holding area sized for a 25 Year-24 hour storm. The water in this facility will be reused (recycled) so that ~~more~~ withdrawals equal inflow.

The rest of the site will drain to a reservoir protection BMP.

SP-72-91 GPIN 12401 00030A
7816 Richmond Rd.

WC 028
Branscome Concrete Toano Plant
Agg + Cement Storage Facility

UT Frances Swamp - Ware Creek
13.586 Ac.

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER: F

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

JUL 1991 RECEIVED Tidewater Regional Office

GENERAL INSTRUCTIONS

If a preprinted label has been provided, aff it in the designated space. Review the infor stion carefully; if any of it is incorrect, cro through it and enter the correct data in th appropriate fill-in area below. Also, if any the preprinted data is absent *(the area to th left of the label space lists the informatio that should appear)*, please provide it in th proper fill-in area(s) below. If the label complete and correct, you need not comple Items I, III, V, and VI *(except VI-B whic must be completed regardless)*. Complete a Items if no label has been provided. Refer the instructions for detailed item descri tions and for the legal authorizations und which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold-faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X		B. Does or will this facility *(either existing or proposed)* include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X		D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)			X
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)		X		F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X		J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP BRANSCOME CONCRETE TOANO PLANT

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 HOCKADAY MARK VICE PRESIDENT	804 229 2504

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 PO DRAWER 260

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 WILLIAMSBURG	VA	23187

JUL 1991

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 7812 RICHMOND ROAD

B. COUNTY NAME

JAMES CITY COUNTY

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 TOANO	VA	23168	

EPA Form 3510-1 (6-80)

CONTINUE ON REVER

CONTINUED FROM THE FRONT	EPA ID Number *(copy from Item 1 of Form 1)*	Outfall Number 01

V. Effluent Characteristics

A, and B: These items require you to report estimated amounts *(both concentration and mass)* of the pollutants to be discharged from each of your outfalls. Each part of this item addresses a different set of pollutants and should be completed in accordance with the specific instructions for that part. Data for each outfall should be on a separate page. Attach additional sheets of paper if necessary.

General Instructions *(See table 2D-2 for Pollutants)*

Each part of this item requests you to provide an estimated daily maximum and average for certain pollutants and the source of information. Data for all pollutants in Group A, for all outfalls, must be submitted unless waived by the permitting authority. For all outfalls, data for pollutants in Group B should be reported only for pollutants which you believe will be present or are limited directly by an effluent limitations guideline or NSPS or indirectly through limitations on an indicator pollutant.

1. Pollutant	2. Maximum Daily Value *(include units)*	3. Average Daily Value *(include units)*	4. Source *(see instructions)*
BOD	22 mg/L	UNKNOWN	DATA FROM SIMILAR PLANT [TARMAC CAMPOSTELLA]
COD	38.78 mg/L	" "	" "
TOC	4.80 mg/L	" "	" "
TOTAL SUSPEND SOLIDS	28 mg/L	" "	" "
FLOW	2000 gal/day	875 gal/day	OWNER/OPERATORS ESTIMAT
AMMONIA (asN)	0.58 mg/L		DATA FROM SIMILAR PLANT [TARMAC DOMINION BLVD.]
TEMP. (WINTER)	AMBIENT	" "	DATA FROM SIMILAR PLANT [TARMAC CAMPOSTELLA]
TEMP. (SUMMER)	AMBIENT	" "	" "
PH	9	7	ENGINEERS ESTIMATE DUE TO DESIGN OF SETTLING BASI
NO OTHER POLLUTANTS IN TABLE 2D-2			BELIEVED TO BE PRESENT

WC028_BRANSCOME_PLANT - 072

CONTINUED FROM THE FRONT	EPA ID Number *(copy from Item 1 of Form 1)*	

C. Use the space below to list any of the pollutants listed in Table 2D-3 of the instructions which you know or have reason to believe will be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it will be present.

1. Pollutant	2. Reason for Discharge
NONE KNOWN	

VI. Engineering Report on Wastewater Treatment

A. If there is any technical evaluation concerning your wastewater treatment, including engineering reports or pilot plant studies, check the appropriate box below.

☐ Report Available ☒ No Report

B. Provide the name and location of any existing plant(s) which, to the best of your knowledge, resembles this production facility with respect to production processes, wastewater constituents, or wastewater treatments.

Name	Location
1) TARMAC CAMPOSTELLA	VIRGINIA BEACH, VIRGINIA
2) NUMEROUS OTHER FACILITIES	

WC028_BRANSCOME_PLANT - 073

EPA ID Number *(copy from item one of Form 1)*

VII. Other Information *(Optional)*

Use the space below to expand upon any of the above questions or to bring to the attention of the reviewer any other information you feel should be considered in establishing permit limitations for the proposed facility. Attach additional sheets if necessary.

VIII. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name and Official Title *(type or print)*	B. Phone No
MARK E. HOCKADAY EXECUTIVE VICE PRESIDENT	(804) 229-2504
C. Signature	**D. Date Signed**
Mark E. Hockaday	6/28/91

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST	B. SECOND
7 3273 (specify) READY MIX CONCRETE	7 (specify)
C. THIRD	**D. FOURTH**
7 (specify)	7 (specify)

VIII. OPERATOR INFORMATION

A. NAME: 8 BRANSCOME CONCRETE INC.

B. Is the name listed in Item VIII-A also the owner? ☒ YES ☐ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)
P (specify)

D. PHONE (area code & no.): A 804 229 2504

E. STREET OR P.O. BOX: P.O. DRAWER 260

F. CITY OR TOWN: 3 WILLIAMSBURG

G. STATE: VA

H. ZIP CODE: 23187

IX. INDIAN LAND
Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)
9 N	9 P 61114
B. UIC (Underground Injection of Fluids)	**E. OTHER (specify)**
9 U	9 (specify)
C. RCRA (Hazardous Wastes)	**E. OTHER (specify)**
9 R	9 (specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

AGGREGATE AND CEMENT STORAGE FACILITY FOR THE PURPOSE OF MANUFACTURING CONCRETE. THIS PARTICULAR PLANT IS A READY MIX PLANT. IN A READY MIX OPERATION THE DRY INGREDIENTS (SAND, STONE AND CEMENT) ARE PLACED IN THE MIXING TRUCK AND THEN THE WATER AND ANY LIQUID ADMIXTURES ARE ADDED. THE CONCRETE IS THEN MIXED OR MANUFACTURED AS THE TRUCK TRAVELS FROM THE PLANT TO THE CONSTRUCTION SITE.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
MARK E. HOCKADAY	Mark E. Hockaday	6/28/91

COMMENTS FOR OFFICIAL USE ONLY

C:

EPA Form 3510-1 (6-90) REVERSE

***DRAFT* James City County Perennial Stream Protocol**					
DRAFT					
Date:	Project:	DCR Grant			
Evaluator: DCook	Evaluation Point:				
	Indicator Type				
A. Geomorphology (Subtotal =)		Absent	Weak	Moderate	Strong
1. Continuous bed and bank *	Primary	0	1	2	3
2. Sinuosity	Secondary	0	0.5	1	1.5
3. In channel structure: riffle-pool sequence	Primary	0	1	2	3
4. Soil texture/depth of channel downcutting *	Secondary	0	0.5	1	1.5
5. Degree of valley development	Primary	0	1	2	3
6. Floodplain/in-channel bench	Secondary	0	0.5	1	1.5
7. Recent alluvial deposits *	Secondary	0	0.5	1	1.5
B. Hydrology (Subtotal =)					
8. Groundwater discharge	Secondary	0	0.5	1	1.5
9. Leaf litter (inverse relationship)	Secondary	1.5	1	0.5	0
10. Flowing water in channel	Primary	0	1	2	3
11. Yorktown Formation -exposed w/flow	Primary	0	1	2	3
C. Biology (Subtotal =)					
12. Fibrous roots in channel (inverse rel)	Secondary	1.5	N/A	0.75	0
13. Rooted plants in channel (inverse rel)	Secondary	1.5	1	0.5	0
14. Fish	Secondary	0	0.5	1	1.5
15. Gilled amphibians	Secondary	0	0.5	1	1.5
16. Macrobenthos	Primary	0	1	2	3
17. SAV present in streambed	Primary	0	1	2	3
* This metric must be evaluated with consideration of upstream conditions, primarily check for presence of					
an upstream stormwater discharge into the reach					
Total Points					
Is the Stream Perennial? **YES NO**					
Reason:					
Additional Factors on which Determination is Based:					
Soil mottling					
Channel geometry, manmade modifications					
Offsite stormflow inputs					
Periphyton					
Grade control					
Primary Indicator is scored from 0 to 3 points, Secondary Indicator is scored from 0 to 1.5 points unless inverse					
relationship. If inverse relationship, Secondary Indicator is scored at 1.5 for absent down to 0 points for strong.					

Please type or print in the unshaded areas only

EPA ID Number *(copy from Item 1 of Form 1)*

Form Approved
OMB No. 2040-0086
Approval expires 7-31-88

Form 2D NPDES

EPA New Sources and New Dischargers Application for Permit to Discharge Process Wastewater

I. Outfall Location

For each outfall, list the latitude and longitude, and the name of the receiving water.

Outfall Number *(list)*	Latitude Deg	Latitude Min	Latitude Sec	Longitude Deg	Longitude Min	Longitude Sec	Receiving Water *(name)*
01	37	22	50	76	47	58	FRANCE SWAMP - WARE CREEK - YORK RIVER

II. Discharge Date *(When do you expect to begin discharging?)*

MAY, 1992

III. Flows, Sources of Pollution, and Treatment Technologies

A. For each outfall, provide a description of (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and stormwater runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

Outfall Number	1. Operations Contributing Flow *(list)*	2. Average Flow *(include units)*	3. Treatment *(Description or List Codes from Table 2D-1)*
01	WASH RACK	3300 gpd	(I-U) 3 STAGE SETTLING BASIN. ACID NEUTRAL-
	CONCRETE LOADING AREA	2425 gpd	IZATION WILL BE ADDED TO SYSTEM IF
	WASTE CONCRETE AREA	14,150 gpd	INDICATED THROUGH THE SAMPLING
			PROGRAM. ACID NEUTRALIZATION IS
			NOT PROPOSED FOR INITIAL PLANT
			OPERATION.

EPA Form 3510-2D (9-86)

B. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item III-A. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (e.g., for certain mining activities), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

C. Except for storm runoff, leaks, or spills, will any of the discharges described in item III-A be intermittent or seasonal?

☐ Yes *(complete the following table)* ☒ No *(go to item IV)*

Outfall Number	1. Frequency		2. Flow		
	a. Days Per Week *(specify average)*	b. Months Per Year *(specify average)*	a. Maximum Daily Flow Rate *(in mgd)*	b. Maximum Total Volume *(specify with units)*	c. Duration *(in days)*

IV. Production

If there is an applicable production-based effluent guideline or NSPS, for each outfall list the estimated level of production (projection of actual production level, not design), expressed in the terms and units used in the applicable effluent guideline or NSPS, for each of the first 3 years of operation. If production is likely to vary, you may also submit alternative estimates (attach a separate sheet)

Year	a. Quantity Per Day	b. Units of Measure	c. Operation, Product, Material, etc *(specify)*
1992	200	CY	CONCRETE
1993	250	CY	CONCRETE
1994	300	CY	CONCRETE

CONTINUE ON NEXT PAGE

MASTER BUILDERS

252-6663

DELVO™ System

DESCRIPTION:

The manufacture and use of concrete has always produced waste: waste of a certain percentage of the concrete itself, of its components, of labor and equipment costs, of the cost of adhering to environmental regulations. Because plastic concrete is a perishable material whose useful life is only a few hours in length, delays in usage or rejection of a load frequently mean not only a loss of the investment in the concrete itself, but also additional losses involved in disposing or reclaiming the material.

The DELVO System is a unique two-component non-chloride chemical system that makes possible an unprecedented control of the dynamics of concrete setting time through the process known as pre-manufacturing concrete. Pre-manufacturing concrete is the process by which returned plastic concrete treated with the DELVO System can be kept in a plastic state in the drum of a ready-mix truck or in a central holding vessel for a few hours, overnight or over a weekend. The pre-manufactured concrete, when combined with freshly manufactured concrete—either the same day, the next day or after a weekend—will result in concrete performance equal or superior to reference concrete manufactured conventionally.

The efficiencies possible with this unique control of concrete's setting dynamics touch on virtually every aspect of concrete construction, and translate into higher profits for everyone involved in concrete manufacture and usage.

COMPONENTS:

One component of the DELVO System is DELVO Stabilizer. When dispensed into returned plastic concrete containing a Master Builders admixture or admixture system, DELVO Stabilizer stops cement hydration by forming a protective barrier around cementitious particles. This barrier prevents portland cement, fly ash, and granulated slag from achieving initial set.

The other component, DELVO Activator, when dispensed into stabilized concrete, overcomes the effect of the protective barrier around cementitious particles, and allows cement hydration to proceed as normal.

ADVANTAGES:

The use of the DELVO System provides many advantages in the manufacture and use of concrete, including the following applications

- Stabilization and reuse of concrete wash water overnight or over a weekend. The stabilized concrete wash water is reused as mix water in subsequently manufactured concrete, reducing both the labor costs incurred in washing out trucks and the maintenance costs of chipping out truck drums. With no concrete wash water to dispose of, the need for concrete wash water pits and disposal costs is eliminated.
- Returned plastic concrete can be held for a few hours, overnight or over a weekend. This eliminates the use of expensive reclaimer/recycler units and their continuous maintenance costs, and dumping returned concrete which can result in expensive labor costs, excessive wear and tear on front-end loaders and costly hauling charges.

continued

pertaining to pump line cleanout.
- Reduces/eliminates environmental concerns pertaining to the dis-

quantities equal or superior to reference concrete manufactured conventionally.

QUANTITY TO USE:

The recommended dosage range of DELVO Stabilizer for same day, overnight and weekend stabilization of concrete is 5 to 130 fl oz per 100 lb (325 to 8,460 ml per 100 kg) of cementitious material. Activation of such stabilized concrete is achieved by a dosage range of DELVO Activator from 10 to 150 fl oz per 100 lb (650 to 9,760 ml per 100 kg) of cementitious material. **Safety glasses or goggles and rubber gloves should be worn when handling both DELVO Stabilizer and DELVO Activator.**

The specific dosage for a given concrete mix will depend on the chemical admixtures, concrete materials and mix design used, elapsed time from initial batching, ambient temperature and/or the returned plastic concrete temperature, quantity of concrete being treated, and the stabilization time required.

For overnight stabilization of concrete wash water (normally 30 to 60 gallons (114 to 227 litres), the suggested dosage range of DELVO Stabilizer is 32 to 64 fl oz (1,000 to 2,000 ml) per truck. For weekend stabilization, the dosage range of DELVO Stabilizer is 64 to 96 fl oz (2,000 to 3,000 ml) per truck.

NOTE: Consult your local Master Builders representative for assistance in determining the dosage rate when using the DELVO System.

USE WITH OTHER ADMIXTURES:

In order to obtain maximum concrete stabilization and activation performance, the DELVO System is recommended for use with Master Builders air-entraining and chemical admixtures.

PACKAGING:

DELVO Stabilizer and DELVO Activator are supplied in 55 U.S. gallon (208 litre) drums and by bulk delivery.

TEMPERATURE PRECAUTION:

Store DELVO Stabilizer and DELVO Activator at 34°F (1°C) or above, and 16°F (−9°C) or above, respectively. If DELVO Stabilizer or DELVO Activator has frozen, thaw at 34°F (1°C) or above and completely reconstitute by mild mechanical agitation. **Do not use pressurized air for agitation.**

SAFETY PRECAUTION:

Safety glasses or goggles and rubber gloves should be worn when handling DELVO Stabilizer and DELVO Activator. In case DELVO Stabilizer or DELVO Activator comes into contact with eyes, skin or clothing, *immediately flush with water (for skin, wash with soap and water)* for 15 minutes. Remove contaminated clothing and shoes, and wash clothing before reuse. Do not take internally. Keep product away from children at all times.

For additional information on the DELVO System or on its use in any of its applications, contact your local Master Builders representative

SUBJECT: Local and Areawide Planning Requirements

TO: Applicants For *VPDES* and *Virginia Pollution Abatement Permits*

JUL 1991 VWBC Regional Office

Article 2, §62.1-44.15:3 of the State Water Control Law states:

> "No application for a certificate to discharge sewage, industrial wastes and other wastes into or adjacent to state waters shall be considered complete unless the applicant has provided the Executive Director with notification from the governing body of the county, city or town in which the discharge is to take place that the location and operation of the discharging facility is consistent with all ordinances adopted pursuant to Chapter 11 (§15.1-427 et seq.) of Title 15.1 of the Code." (These are local zoning ordinances)

In accordance with this section, new applications for *Virginia Pollution Abatement Permits* or *VPDES* permits will not be considered complete until the information below is submitted to the SWCB Regional Office.

-----(County, City, or Town Administrator/Manager) To: Bernard M. Farmer, Jr.
Director of Code Compliance
James City County
P.O. Box JC
Williamsburg, Virginia 23187

I am in the process of completing a SWCB application form for a certificate. In accordance with Chapter 11 (§15.1-427 et seq.) of Title 15.1 of the Code, I request that you sign one of the two statements below certifying my application is consistent with your local ordinances. Please return this form to:

(Applicant's address) Return to: Mark E. Hockaday
Branscome Concrete, Inc.
P.O. Drawer 260
Williamsburg, Virginia 23187

1. I hereby certify,

   X (1) that the proposed location, and operation of the facility is consistent with all ordinances adopted pursuant to Chapter 11 (§15.1-427 et seq.) of Title 15.1 of the Code or

   ___ (2) That no local ordinances are in effect pursuant to Chapter 11 (§15.1-427 et seq.) of Title 15.1 of the Code.

Bernard M Farmer Jr
Signature

Director of Code Compliance
Title

Bernard M. Farmer, Jr.
Print Name

6/28/91
Date

APPENDIX IN-1 Page 2

Rev. 7/1/88

CODE COMPLIANCE PLAN REVIEW COMMENTS
HENRY BRANSCOME CONCRETE PLANT
PLAN NO. SP-72-91 DEC
August 19, 1991

1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.

2. As-built drawings shall be provided for the detention basin and the storm drain system including the settling basin upon completion.

3. A preconstruction conference shall be held on-site between the County, the Developer, the Project Engineer and the Contractor prior to issuance of a Land Disturbing Permit.

4. The Land Disturbing Permit when issued will require construction of the sediment basin prior to any other construction activities on the remainder of the project.

5. An Inspection and Maintenance Agreement shall be executed with the County for the BMP facilities prior to final site plan approval.

6. The natural open space claimed in the BMP calculations must be identified on the plan and included in conservation easements.

7. Provide silt fence along the northeast boundary of the site from the 96 contour line east to the lease line.

8. Provide a berm or some other means to ensure that all the drainage from the waste concrete storage area is directed to the settling basin.

9. Revise the minimum pipe size to 12 inches in diameter and use all concrete pipe, not PVC.

10. Identify all slopes steeper than 25 percent in the vicinity of the detention basin that will be disturbed and submit a request to the Director of Code Compliance to allow disturbance of these slopes.

11. The proposal for the settling basin required a storage volume equal to the 25-year, 24-hour storm plus 6 inches of direct rainfall with one foot of freeboards. Provide calculations that demonstrate this volume has been provided.

12. There is a gravel access road shown on the plan near the detention pond for access to the railroad spur. In order to preclude this gravel road and Depot Street from becoming the main route for delivery of stone aggregate to the site, a notation needs to be placed on this access road stating that it is to be used in conjunction with railroad deliveries only.

13. There are existing erosion problems on the 25 percent slopes along the northeast boundary of the project adjacent to the railroad tracks. These existing erosion problems need to be identified on the plan and eliminated by filling, regrading, seeding and covering with EC-2 matting as necessary to achieve stabilization.

0367C
5170c

Sheldon Lumber Co. - MTG 2/22/91

Arch M. Andy S, WNB, BF, Chris D.,

VPA - VA. POLL. ABATEMENT Permit - No DISCHARGE - 25 Yr 24 hr

VPDES - Need a 10-YEAR, 24 hour

Proposal - Lined HOLDING TANKS - 25 YR - 24 hr holding
outfall from ~~this~~ to ~~the~~ another basin

pH, Suspended SOLIDS are parameters for VPDES
↳ 6 to 9 pH limit - measured @ outfall of basin -
7/30/91 → measured from outfall of 1ST basin - add
SUS. SOLIDS - 30 mg/l avg, 50 mg/l max.

VOLUMES - 17,500 gal to control - 25 Yr storm
+ 6" rain + 1' freeboard.
INC. Basin length w/ baffles

TARMAC -

SERIES OF SETTLING POND - CONCRETE LINED
Primary Settling Ponds - to third pond where pH adjustment
Apply for discharge plants
pH too high or return water to washout side - 10-12 pH
Sludge drying area (pad)
Dry Sludge - Taken to crusher
DeWo - minimizes amt of wastewater
Reclaimer Systems -
20, - 40K ~~gal~~ gal/day - @ ~~[illegible]~~ 30 - 40 trucks
15 - 20K - small plant w/ out DeWo.