# Stormwater Division

## MEMORANDUM

**DATE:** March 13, 2010

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

**FROM:** Jo Anna Ripley, Stormwater

**PO:** 270712

**RE:** Files Approved for Scanning

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**General File ID or BMP ID:** YC006

**PIN:** 2321100001E

**Subdivision, Tract, Business or Owner Name** (if known): Candle Development

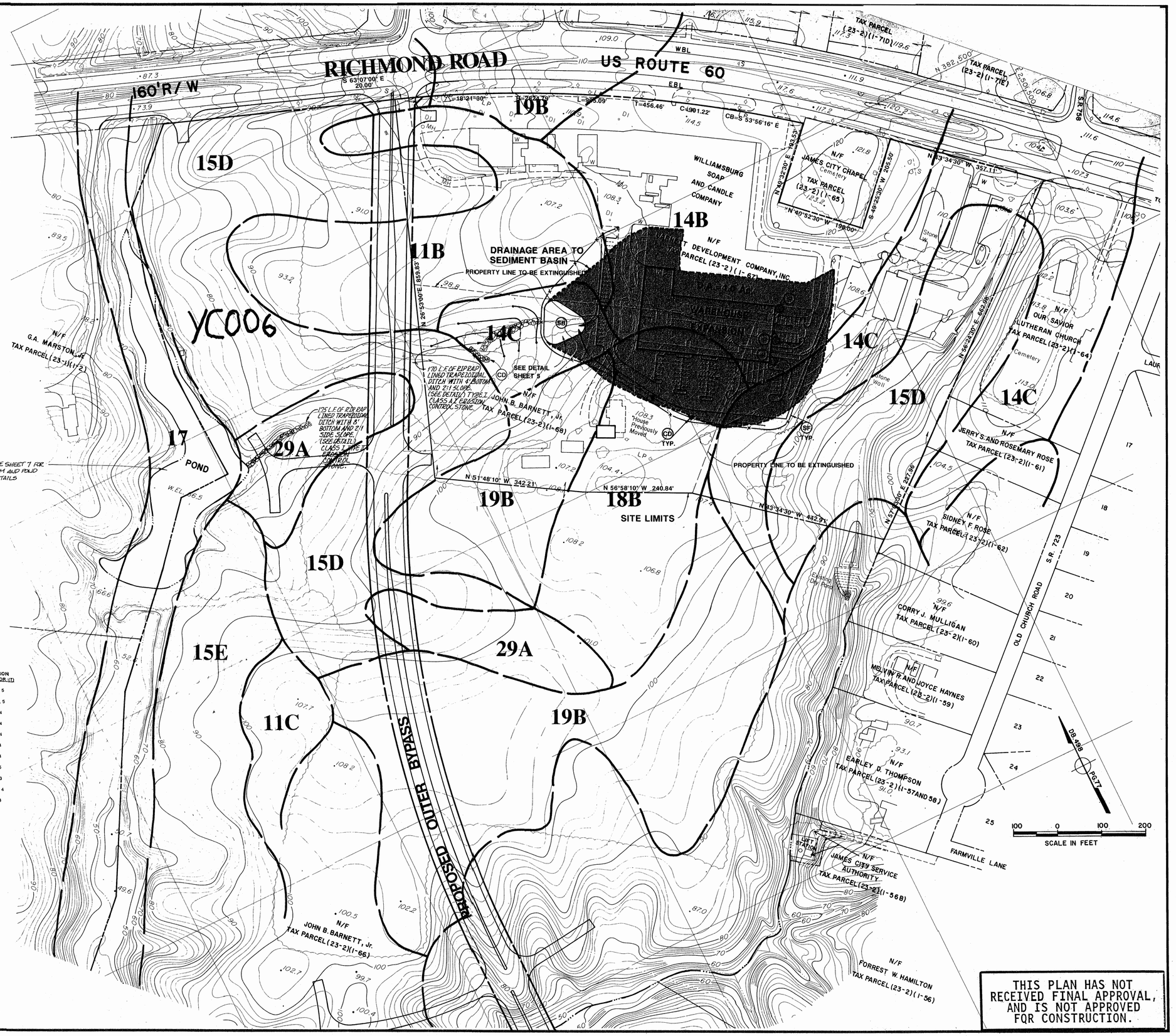
**Property Description:** Retail Unit

**Site Address:** 7567 Richmond Road

*(For internal use only)* **Box** 23 **Drawer:** 9

**Agreements:** (in file as of scan date) **N** **Book or Doc#:** **Page:**

Comments




SOIL CHARACTERISTICS

| SOIL NO. | SOIL NAME | TYPICAL SLOPE | EROSION FACTOR (K) | EROSION FACTOR (T) |
|---|---|---|---|---|
| 11B | CRAVEN-UCHEE COMPLEX | 2 - 6% | 28 - 37 | 3, 5 |
| 11C | CRAVEN-UCHEE COMPLEX | 6 - 10% | 28 - 37 | 3, 5 |
| 14B | EMPORIA FINE SANDY LOAM | 2 - 6% | 20 - 28 | 4 |
| 14C | EMPORIA FINE SANDY LOAM | 6 - 10% | 20 - 28 | 4 |
| 15D | EMPORIA COMPLEX | 10 - 15% | 20 - 28 | 4 |
| 15E | EMPORIA COMPLEX | 15 - 25% | 20 - 28 | 4 |
| 15F | EMPORIA COMPLEX | 15 - 25% | 20 - 28 | 4 |
| 17 | JOHNSTON COMPLEX | ---- | 17 - 20 | 5 |
| 18B | KEMPSVILLE FINE SANDY LOAM | 2 - 6% | 24 - 32 | 3 |
| 19B | KEMPSVILLE-EMPORIA FINE SANDY LOAM | 2 - 6% | 20 - 32 | 3, 4 |
| 29A | SLAGLE FINE SANDY LOAM | 0 - 2% | .24 | 3 |

INFORMATION TAKEN FROM "SOIL SURVEY OF JAMES CITY AND YORK COUNTIES AND THE CITY OF WILLIAMSBURG, VIRGINIA" ISSUED IN APRIL, 1985, BY THE UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE IN COOPERATION WITH VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY.

SOIL SUSCEPTIBILITY TO EROSION CLASSIFICATION (K)
0.23 AND LOWER - LOW ERODIBILITY
0.23 - 0.36 - MODERATE ERODIBILITY
0.36 - AND UP - HIGH ERODIBILITY

NOTE:
BEARINGS AND DISTANCES WERE TAKEN FROM P.B. 40, PG. 1, PREPARED BY SPEARMAN AND ASSOCIATES, DATED AUG. 6, 1984 AND P.B. 32, PG. 57, PREPARED BY STEPHEN STEVENS, DATED JULY, 1974.

THIS PLAN HAS NOT RECEIVED FINAL APPROVAL, AND IS NOT APPROVED FOR CONSTRUCTION.

| No. | DATE | REVISION / COMMENT / NOTE | BY |
|---|---|---|---|
| 1 | 7/14/94 | REVISED PER JCC COMMENTS | EMG |

COMMONWEALTH OF VIRGINIA
G. ARCHER MARSTON III
No. 016232
PROFESSIONAL ENGINEER
5/17/94


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

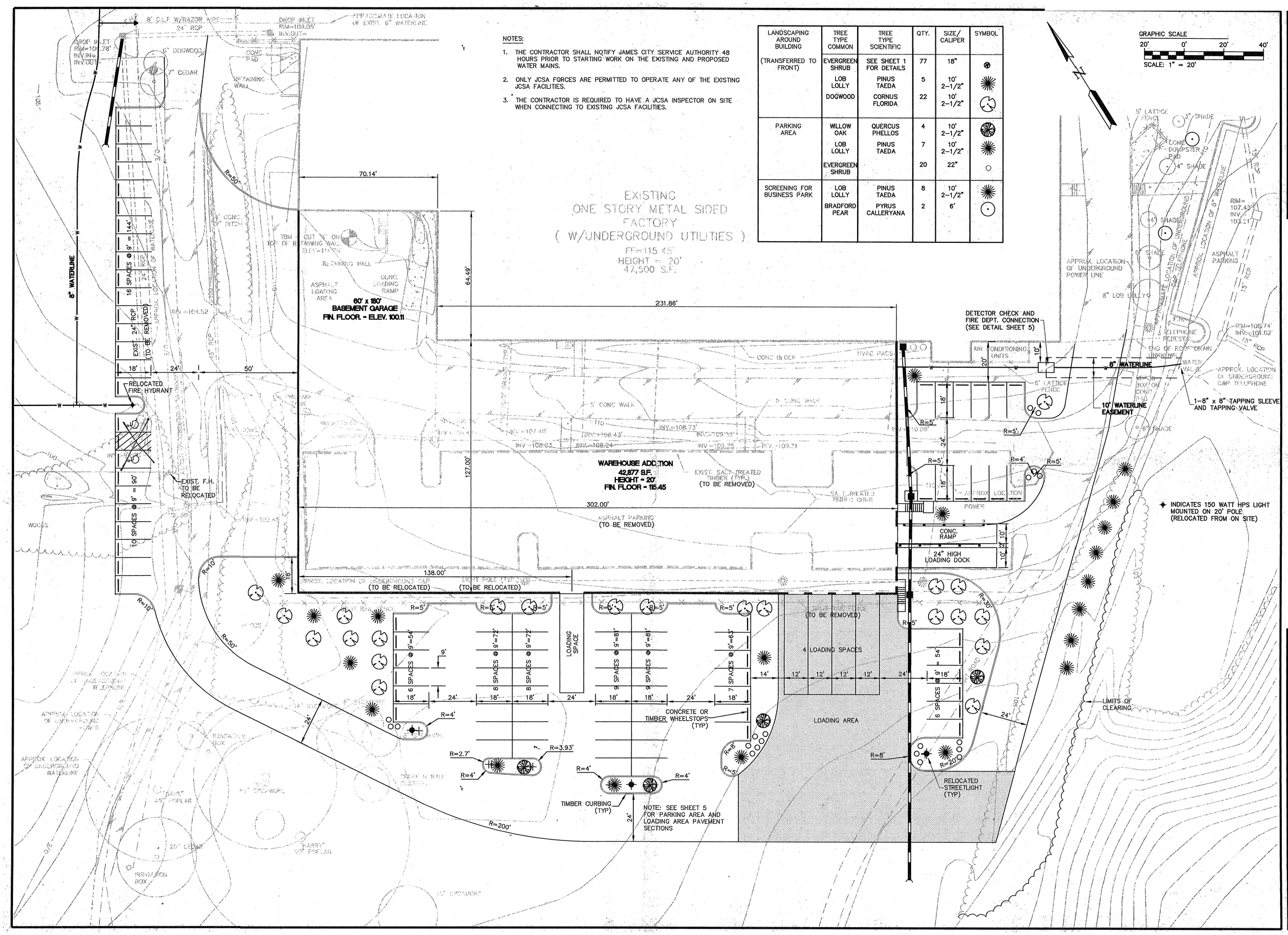

ENVIRONMENTAL INVENTORY
WAREHOUSE EXPANSION
# WILLIAMSBURG SOAP AND CANDLE FACTORY
POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

| Designed | Drawn |
|---|---|
| GAM/EMG | CLJ |
| Scale 1"= 100' | Date 5/4/94 |
| Project No. 6883 | |
| Drawing No. 2 of 8 | |

NOTES:

1. THE CONTRACTOR SHALL NOTIFY JAMES CITY SERVICE AUTHORITY 48 HOURS PRIOR TO STARTING WORK ON THE EXISTING AND PROPOSED WATER MAINS.
2. ONLY JCSA FORCES ARE PERMITTED TO OPERATE ANY OF THE EXISTING JCSA FACILITIES.
3. THE CONTRACTOR IS REQUIRED TO HAVE A JCSA INSPECTOR ON SITE WHEN CONNECTING TO EXISTING JCSA FACILITIES.

| LANDSCAPING AROUND BUILDING | TREE TYPE COMMON | TREE TYPE SCIENTIFIC | QTY. | SIZE/ CALIPER | SYMBOL |
|---|---|---|---|---|---|
| (TRANSFERRED TO FRONT) | EVERGREEN SHRUB | SEE SHEET 1 FOR DETAILS | 77 | 18" | |
| | LOB LOLLY | PINUS TAEDA | 5 | 10' 2-1/2" | |
| | DOGWOOD | CORNUS FLORIDA | 22 | 10' 2-1/2" | |
| PARKING AREA | WILLOW OAK | QUERCUS PHELLOS | 4 | 10' 2-1/2" | |
| | LOB LOLLY | PINUS TAEDA | 7 | 10' 2-1/2" | |
| | EVERGREEN SHRUB | | 20 | 22" | |
| SCREENING FOR BUSINESS PARK | LOB LOLLY | PINUS TAEDA | 8 | 10' 2-1/2" | |
| | BRADFORD PEAR | PYRUS CALLERYANA | 2 | 6' | |

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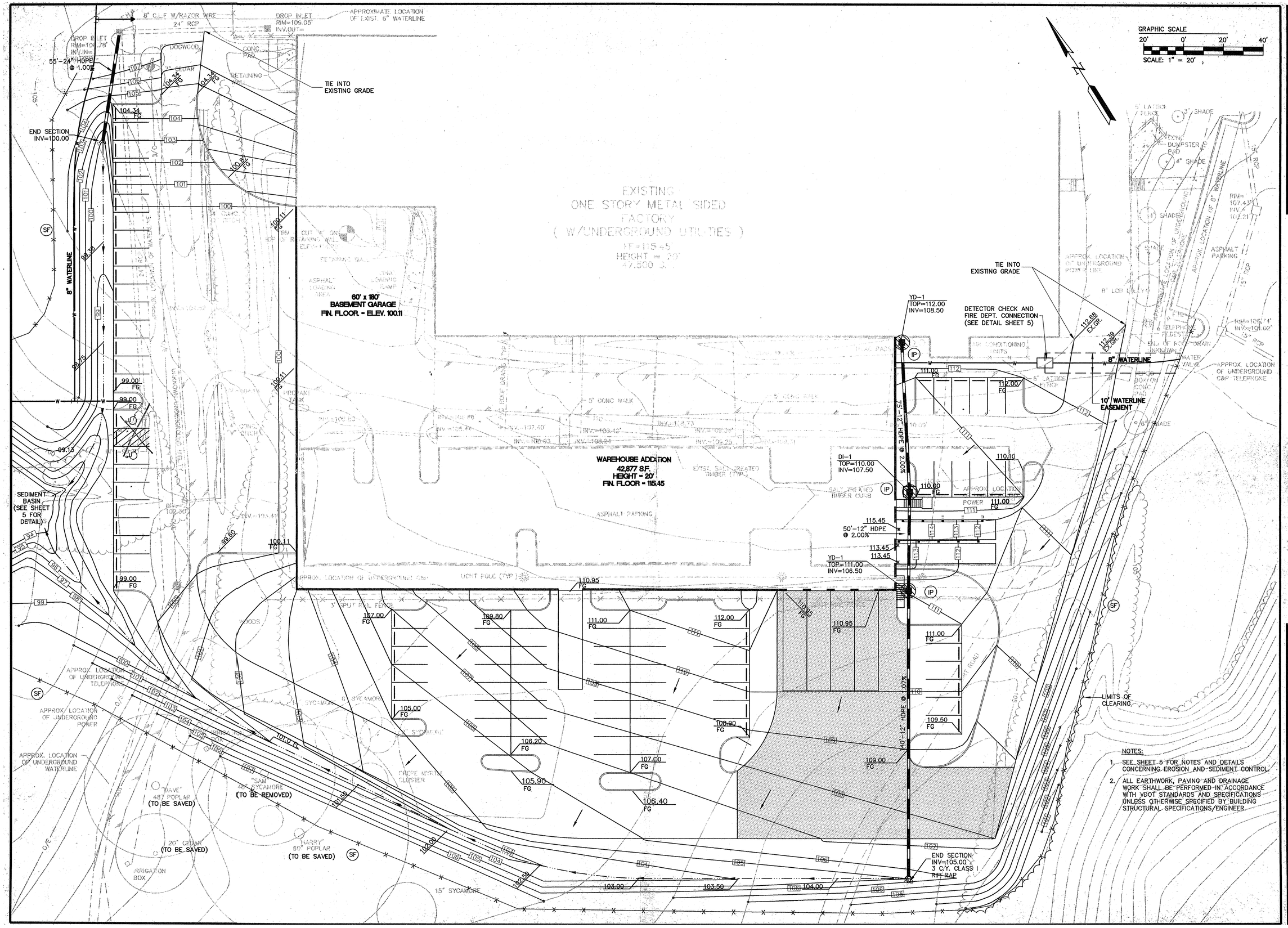
SITE PLAN

WAREHOUSE EXPANSION
# WILLIAMSBURG SOAP AND CANDLE FACTORY
JAMES CITY COUNTY, VIRGINIA

| Designed | Drawn |
|---|---|
| EMG/GAM | SCL/EAW/MLP |
| Scale | Date |
| 1"=20' | 6/20/94 |

Project No. 6883

Drawing No. 3 of 8




NOTES:

1. SEE SHEET 5 FOR NOTES AND DETAILS CONCERNING EROSION AND SEDIMENT CONTROL.
2. ALL EARTHWORK, PAVING AND DRAINAGE WORK SHALL BE PERFORMED IN ACCORDANCE WITH VDOT STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE SPECIFIED BY BUILDING STRUCTURAL SPECIFICATIONS/ENGINEER.

| No. | DATE | REVISION / COMMENT / NOTE | BY |
|---|---|---|---|
| 1 | 7/14/94 | REVISIONS PER JCC COMMENTS | |

COMMONWEALTH OF VIRGINIA
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GRADING, DRAINAGE, EROSION AND SEDIMENTATION CONTROL
WAREHOUSE EXPANSION
**WILLIAMSBURG SOAP AND CANDLE FACTORY**
JAMES CITY COUNTY, VIRGINIA

| Designed | Drawn |
|---|---|
| EMG/GAM | SCL/EAW/MLP |
| Scale | Date |
| 1"=20' | 6/20/94 |

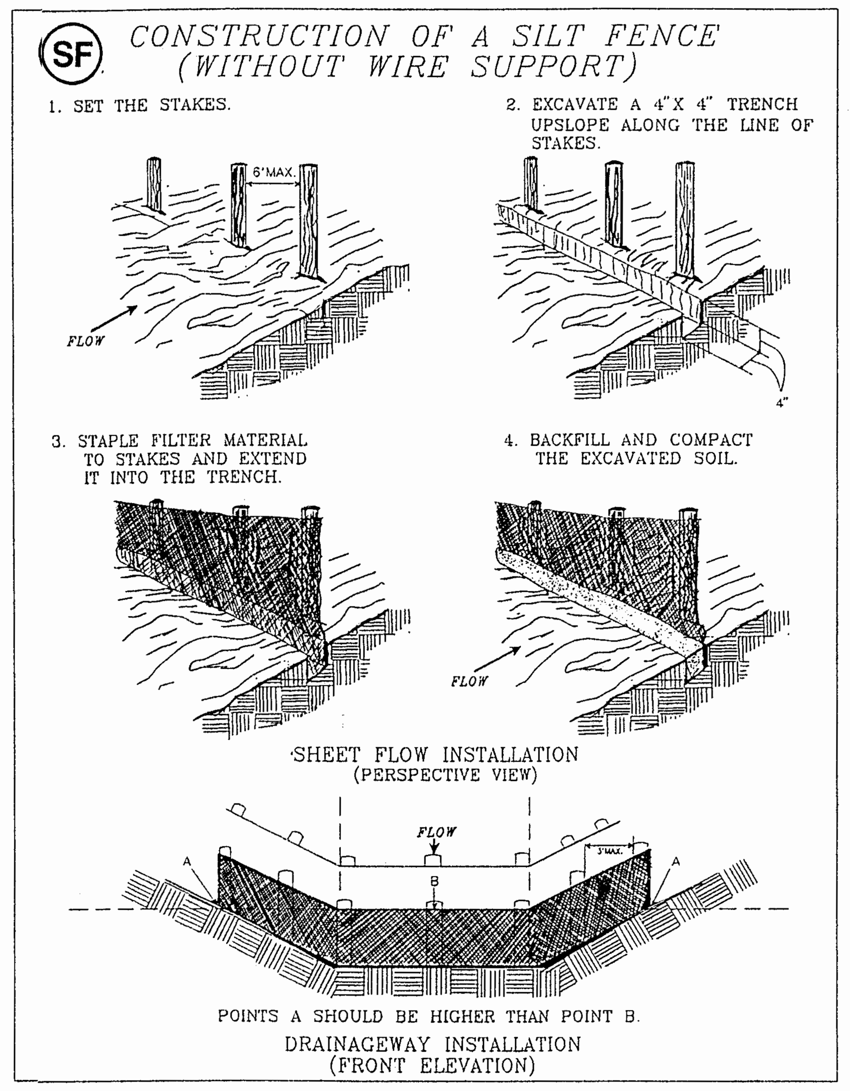
Project No. 6883

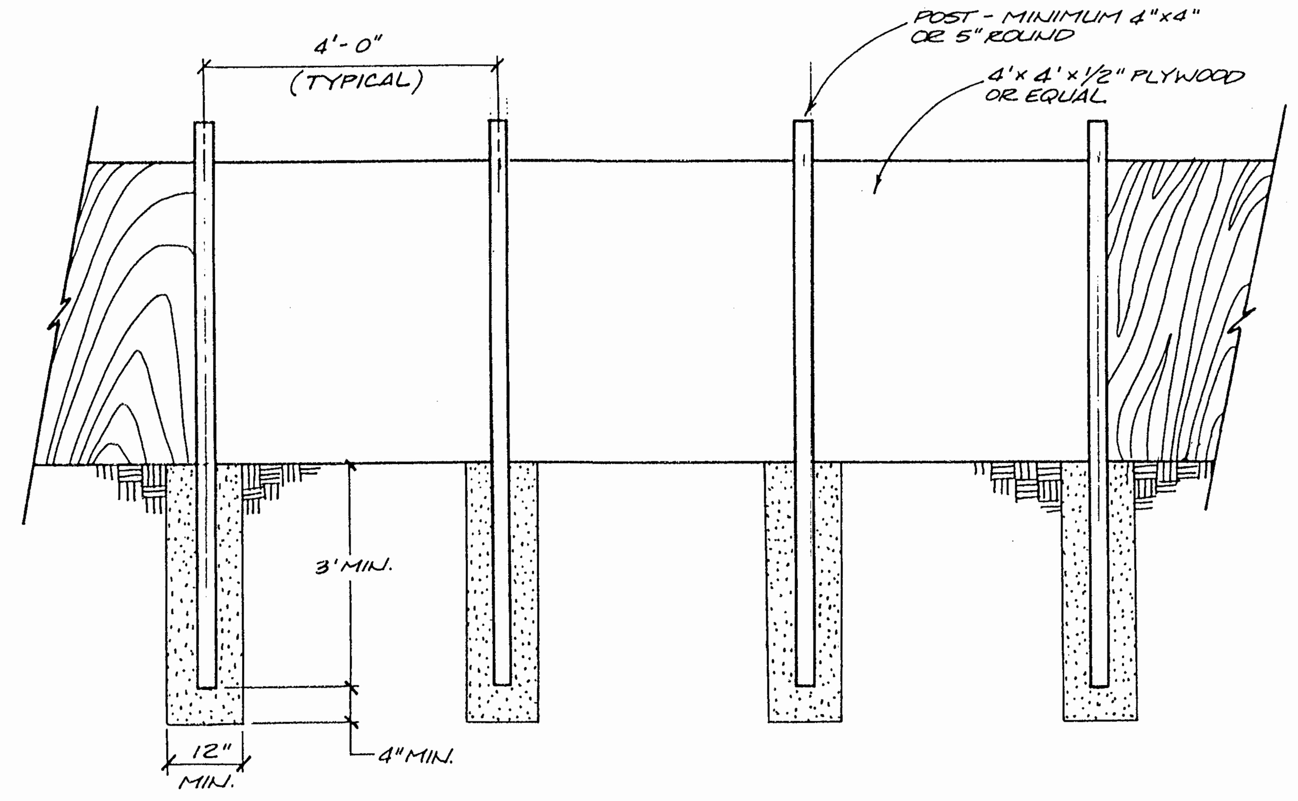
Drawing No. 4 of 8

**STANDARD**
**EROSION AND SEDIMENT CONTROL NOTES**
**for James City County, Virginia**

The purpose of the erosion control measures shown on these plans shall be to preclude the transport of all waterborne sediments resulting from construction activities from entering onto adjacent properties or State waters. If field inspection reveals the inadequacy of the plan to confine sediment to the project site, appropriate modifications will be made to correct any plan deficiencies. In addition to these notes, all provisions of the Virginia Erosion and Sediment Control Regulations shall apply to this project.

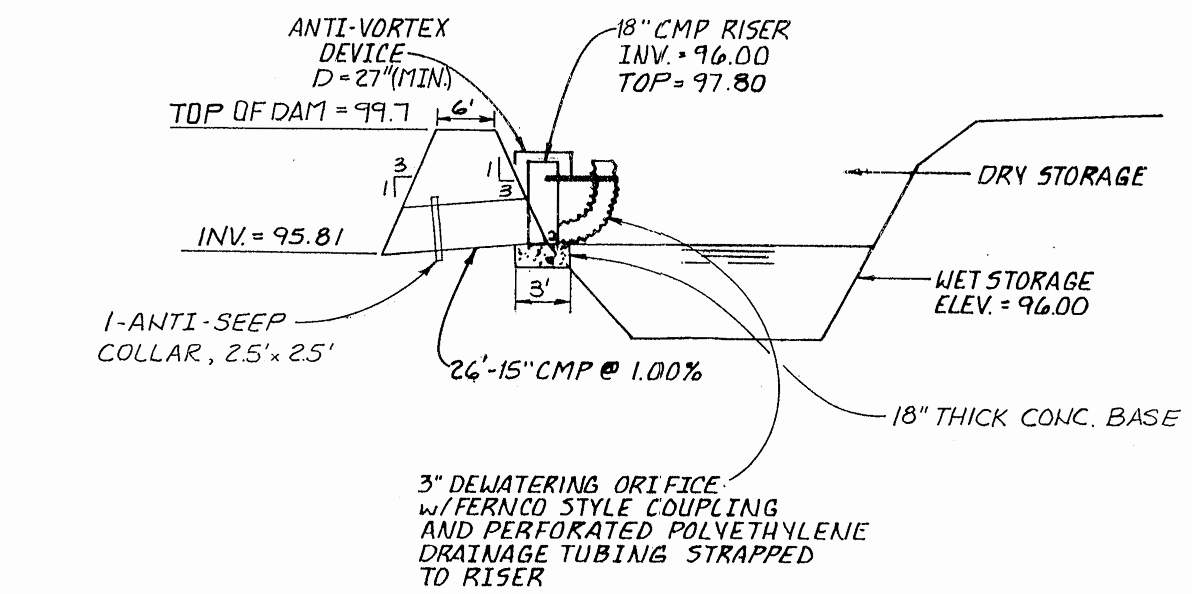
1. All erosion and sediment control measures shall be installed and maintained in accordance with the "Virginia Erosion and Sediment Control Handbook". The contractor shall be thoroughly familiar with all applicable measures contained therein which may be pertinent to this project.
2. All points of construction ingress and egress shall be protected by a temporary construction entrance to prevent tracking of mud onto public right-of-ways. An entrance permit from VDOT is required prior to any construction activities within State right-of-ways.
3. Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment on-site must be constructed as a first step in grading and be made functional before upslope land disturbance takes place. Earthen structures such as dams, dikes, and diversions must be seeded and mulched immediately after installation. An on-site pre-construction meeting will be held between the Office of Code Compliance and the contractor to identify those measures to be initially installed.
4. Maintenance of erosion and sediment control measures shall include the repair of measures damaged by any subcontractor including those of the public utility companies. At the pre-construction meeting, the contractor will supply Code Compliance with the name of the individual who will be responsible for ensuring maintenance of installed measures on a daily basis.
5. Surface flows over cut and fill slopes shall be controlled by either redirecting flows from transversing the slopes or by installing mechanical devices to safely lower water downslope without causing erosion. A temporary fill diversion (Std. & Spec. 3.10) shall be installed prior to the end of each working day.
6. Sediment control measures may require minor field adjustments at time of construction to insure their intended purpose is accomplished. Office of Code Compliance approval will be required for other deviations from the approved plans.
7. The contractor shall place soil stockpiles at the locations shown on this plan or as directed by the engineer. Soil stockpiles shall be stabilized or protected with sediment trapping measures.
8. The contractor shall complete drainage facilities within 30 days following completion of rough grading at any point within the project. The installation of drainage facilities shall take precedence over all underground utilities. Outfall ditches from drainage structures shall be stabilized immediately after construction of same. This includes installation of erosion control stone where required. Any drainage outfalls required for a street must be completed before street grading begins.
9. Permanent or temporary soil stabilization must be applied to all denuded areas within 7 days after final grade is reached on any portion of the site. Soil stabilization must also be applied to denuded areas which may not be at final grade but will remain dormant (undisturbed) for longer than 30 days. Soil stabilization measures include vegetative establishment, mulching and the early application of gravel base material on areas to be paved.
10. No more than 300' of sanitary sewer, storm sewer, waterlines, or underground utility lines are to be open at one time. Following installation of any portion of these items, all disturbed areas are to be immediately stabilized (i.e., the same day).
11. If disturbed area stabilization is to be accomplished during the months of December, January, or February, stabilization shall consist of mulching in accordance with Specification 3.35. Seeding will then take place as soon as the season permits.
12. The term Seeding, Final Vegetative Cover or Stabilization, on this site plan shall mean the successful germination and establishment of a stable grass cover from a properly prepared seedbed containing the specified amounts of seed, lime, and fertilizer in accordance with Specification 3.32, Permanent Seeding. Irrigation shall be required as necessary to ensure establishment of grass cover.
13. All slopes steeper than 3:1 shall require the use of erosion control blankets such as excelsior blankets to aid in the establishment of a vegetative cover. Installation shall be in accordance with Specification 3.35, Mulching and Manufacturer's Instructions.
14. Inlet protection in accordance with Specification 3.07 shall be provided for all storm drain inlets as soon as practical following construction of same.
15. Temporary liners, such as polyethylene sheets, shall be provided for all paved ditches until the permanent concrete liner is installed.
16. Paved ditches shall be required wherever erosion is evident. Particular attention shall be paid to those areas where grades exceed 3%.
17. Temporary erosion control measures are not to be removed until all disturbed areas are stabilized. After stabilization is complete, all measures shall be removed within 30 days. Trapped sediment shall be spread and seeded.
18. Off-site waste or borrow areas shall be approved by the Office of Code Compliance prior to the import of any borrow or export of any waste to or from the project site.
19. All paved and/or piped outfalls will be constructed before road grading and utility installation begins.
20. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.
21. 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. The Contractor shall submit a narrative plan to the County prior to the preconstruction conference detailing the sequence of construction for the project, including installation of erosion control measures.
22. All roadways and shoulders shall be stabilized with at least six inches of crusher run aggregate after grading. Crusher run aggregate shall be the material specified in Section 206 of the Virginia Department of Transportation, Road and Bridge Specifications.



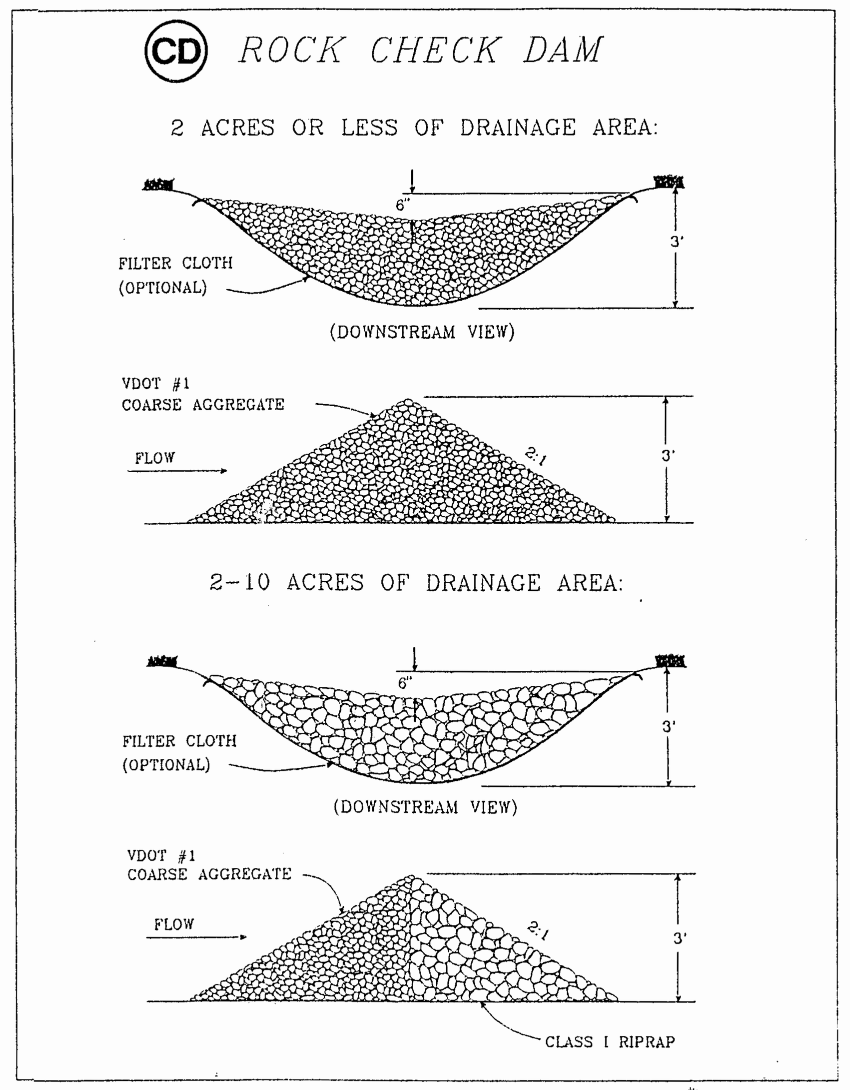

BAFFLE SECTION

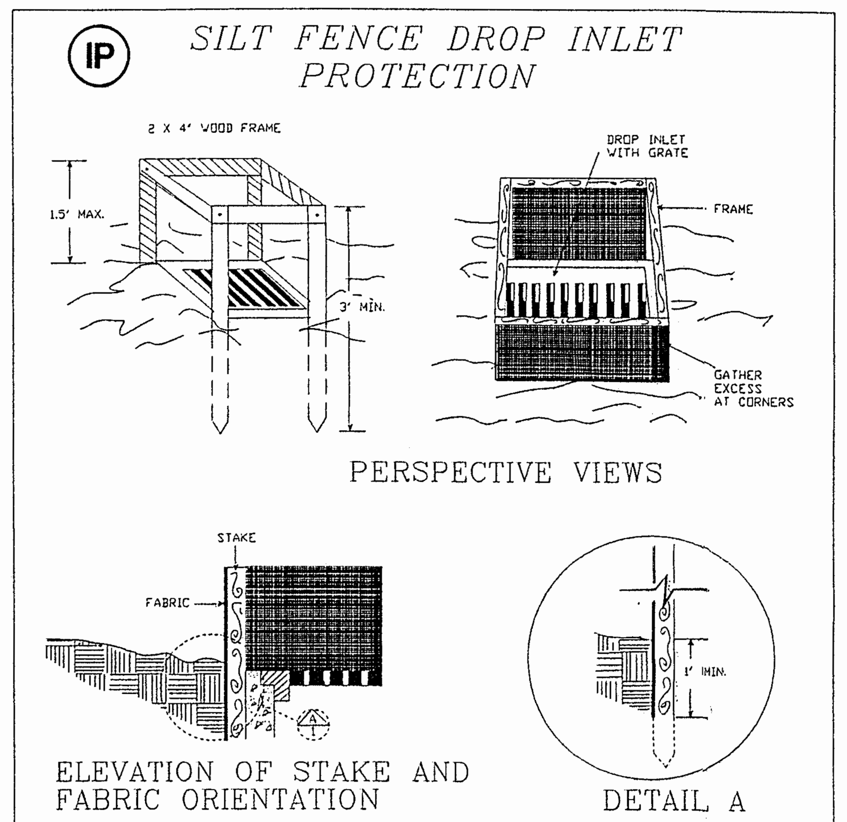
N.T.S.




**SECTION A-A**

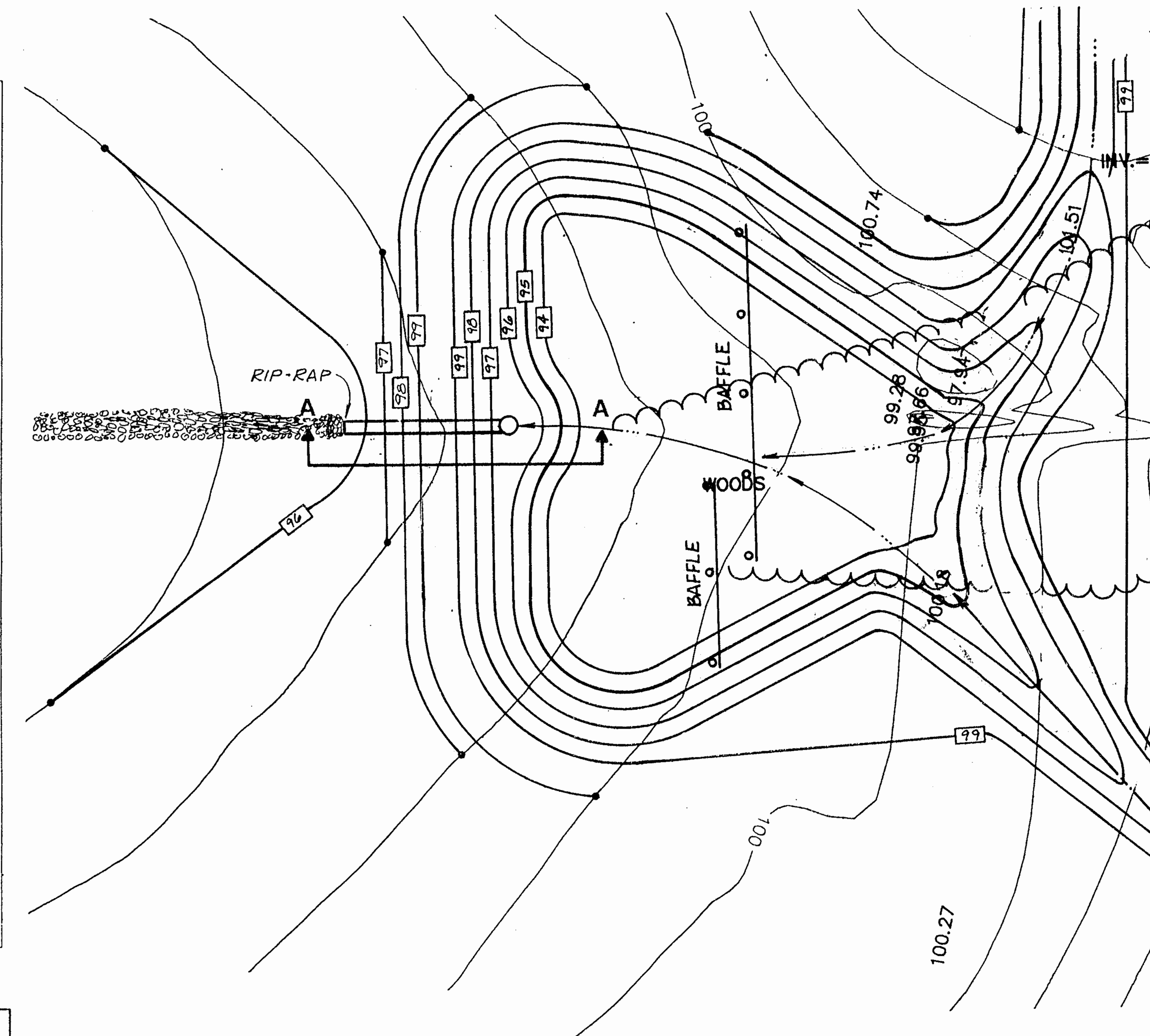
NOT TO SCALE




SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVERLAND FLOWS (NOT EXCEEDING 1 C.F.S.) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.

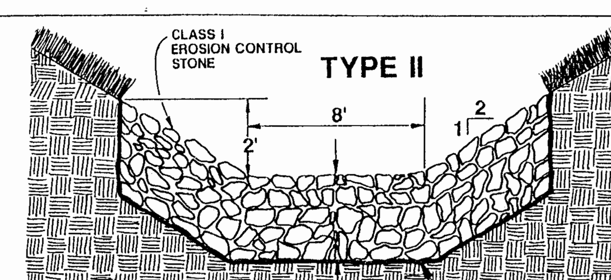



NOTE:
WHEN THE SEDIMENT BASIN IS REMOVED THE AREA SHALL BE RETURNED TO APPROXIMATE EXISTING GRADES WITH DRAINAGE SWALES TO MAINTAIN POSITIVE DRAINAGE.

**PLAN**

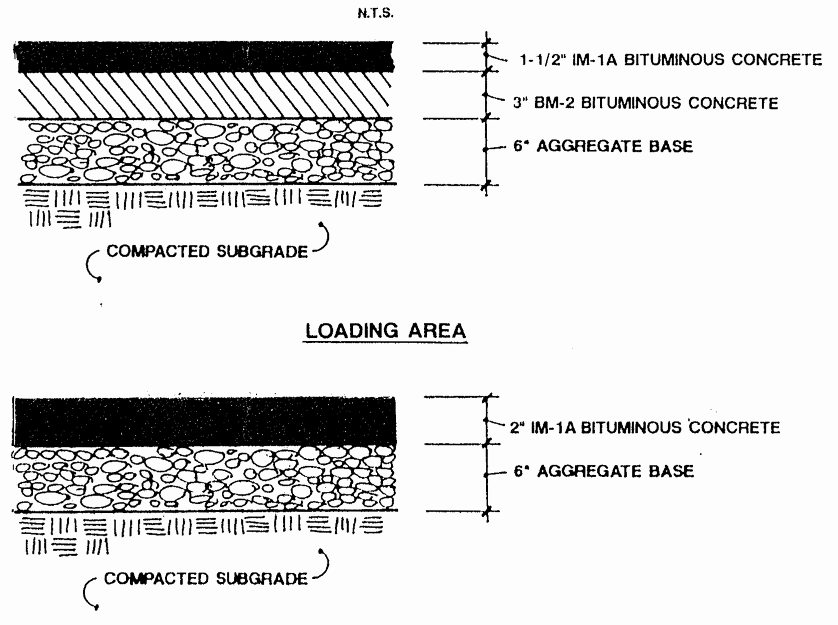
1" = 20'

## SEDIMENT BASIN DETAIL



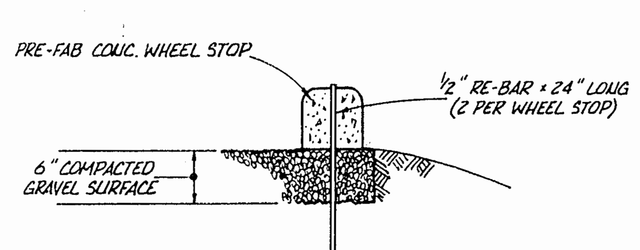

DITCH DETAIL

N.T.S.



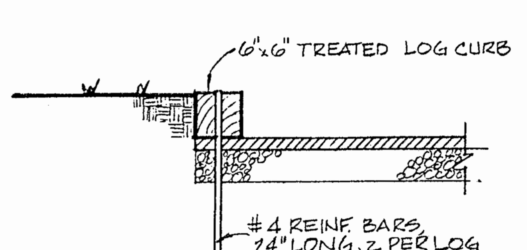

**TYPICAL PAVEMENT SECTIONS**

NOT TO SCALE



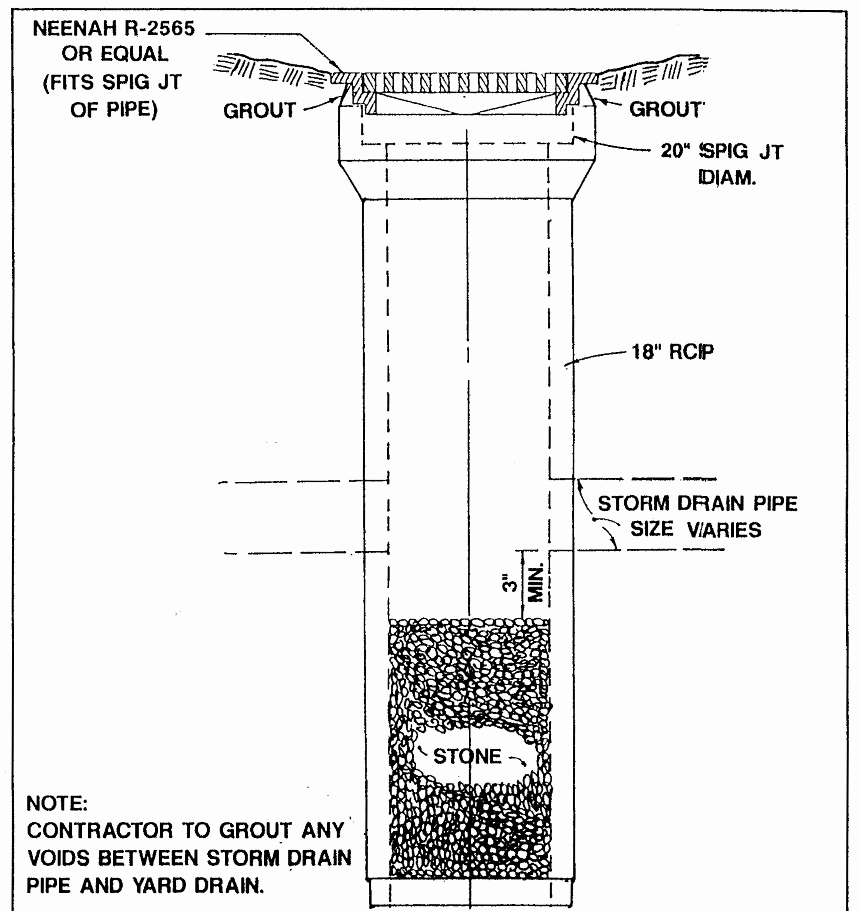

**CONC. WHEELSTOP DETAIL**

N.T.S.




TIMBER CURB DETAIL

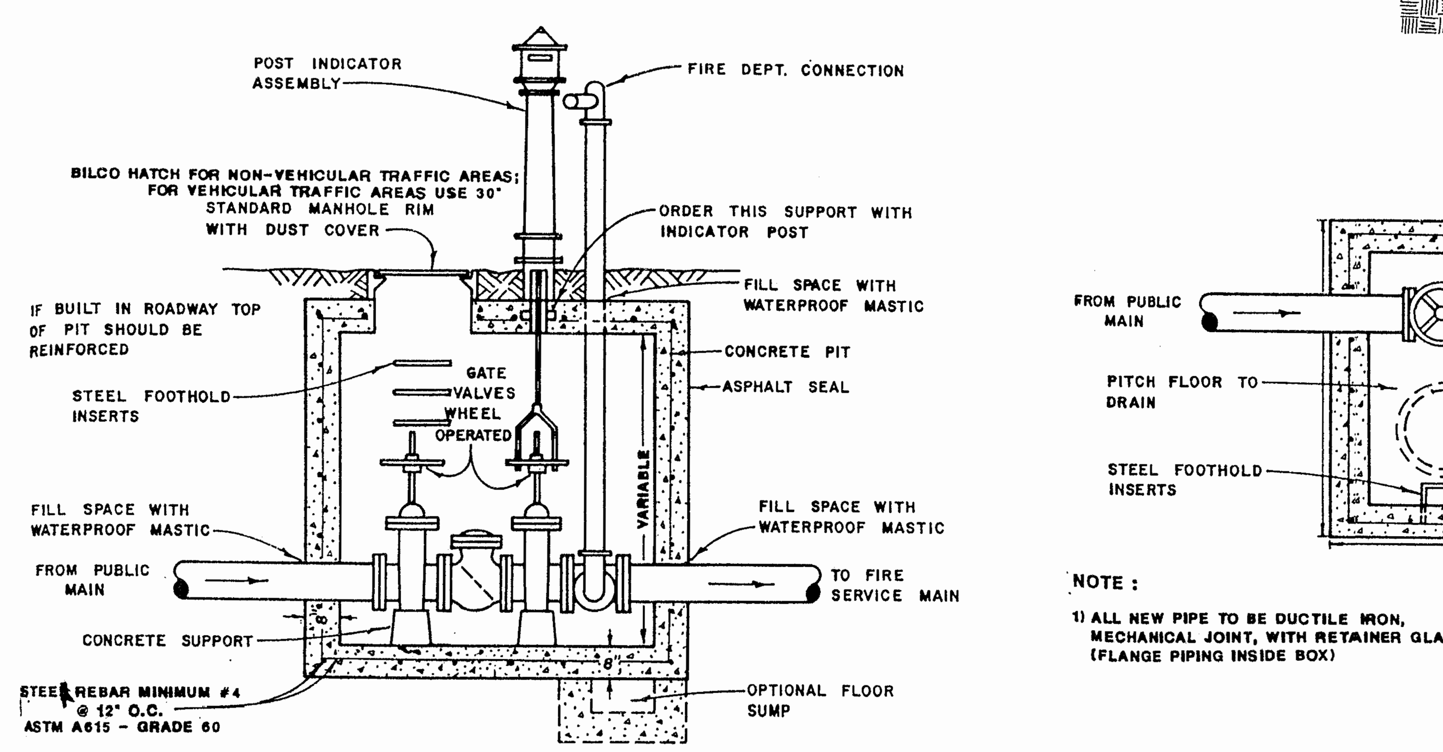
NOT TO SCALE




NOTE:
CONTRACTOR TO GROUT ANY VOIDS BETWEEN STORM DRAIN PIPE AND YARD DRAIN.

**YARD DRAIN**

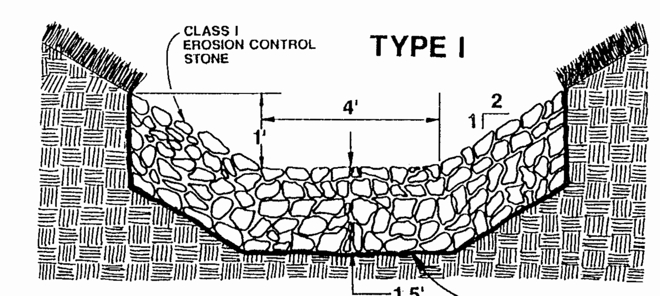
YI-1




NOTE :
1) ALL NEW PIPE TO BE DUCTILE IRON, MECHANICAL JOINT, WITH RETAINER GLANDS. (FLANGE PIPING INSIDE BOX)

**DETECTOR CHECK AND FIRE DEPT. CONNECTION**

NOT TO SCALE




DITCH DETAIL

N.T.S.

THIS PLAN HAS NOT RECEIVED FINAL APPROVAL, AND IS NOT APPROVED FOR CONSTRUCTION.

| No. | DATE | REVISION / COMMENT / NOTE | BY |
|---|---|---|---|
| 1 | 7/14/94 | REVISED PER JCC COMMENTS | EMG |

COMMONWEALTH OF VIRGINIA — G. ARCHER MARSTON, III — No. 018232 — 5/17/94 — PROFESSIONAL ENGINEER

CONSULTING ENGINEERS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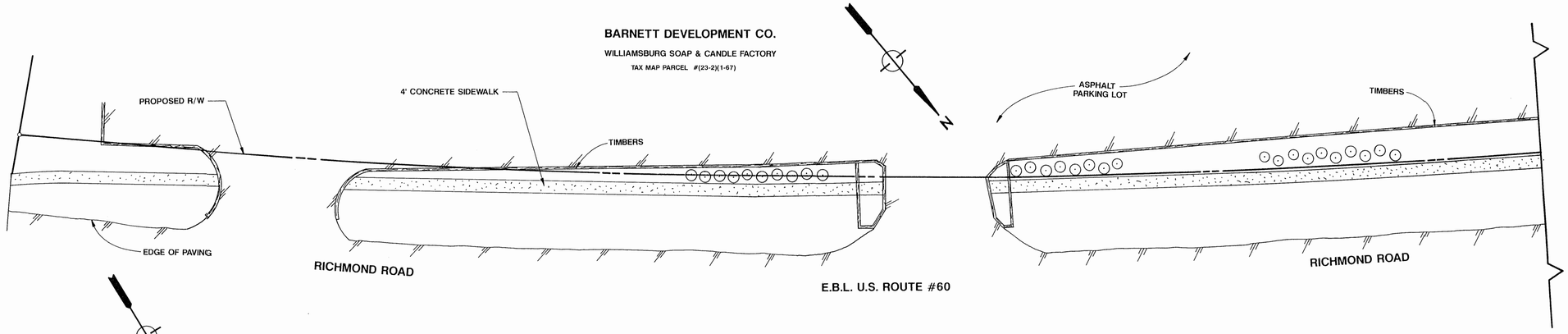
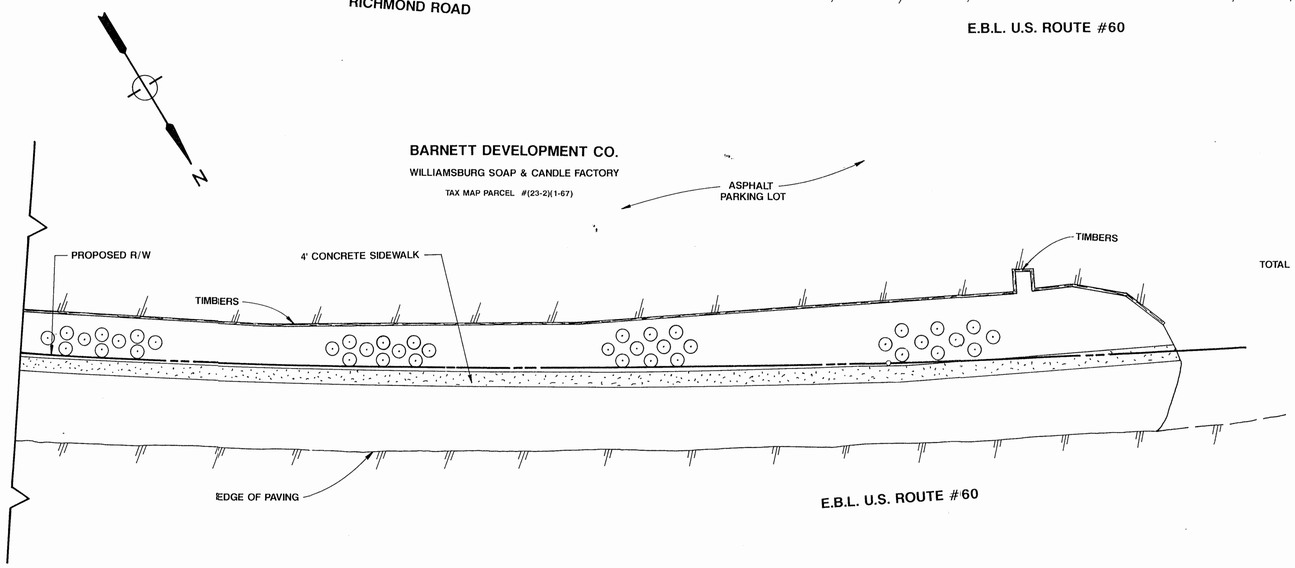
NOTES AND DETAILS
WAREHOUSE EXPANSION
**WILLIAMSBURG SOAP AND CANDLE FACTORY**
POWHATAN DISTRICT — JAMES CITY COUNTY — VIRGINIA

| Designed | Drawn |
|---|---|
| GAM/EMG | CLJ |
| Scale 1"= 100' | Date 5/4/94 |
| Project No. 6883 | |
| Drawing No. 5 of 8 | |

171364

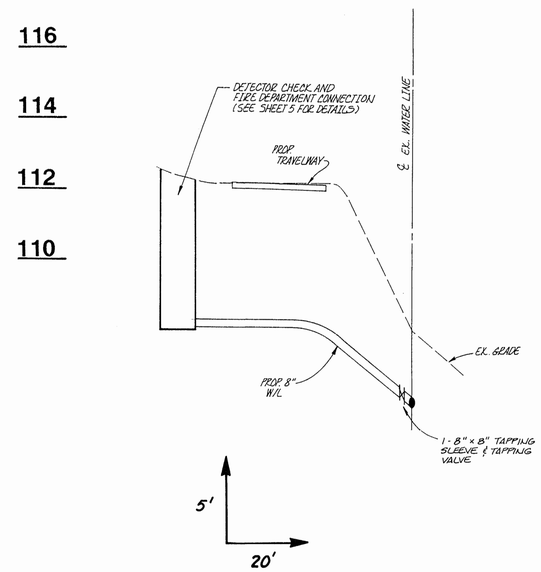



**SHRUBS** **SIZE**

| | QUANTITY | BOTANICAL NAME | COMMON NAME | COMMENTS | HEIGHT | SPREAD |
|---|---|---|---|---|---|---|
| | | CONFERTA | BLUE PACIFIC | | | 18" |
| | | HORIZONTALIS PLUMOSA | ANDORA | | | 18" |
| | | HORIZONTALIS WILITONI | BLUE RUG | | | 18" |
| TOTAL | 77 | | | | | |

NOTE: 77 SHRUBS WILL BE A MIXTURE OF THE THREE TYPES LISTED.

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7/17/96

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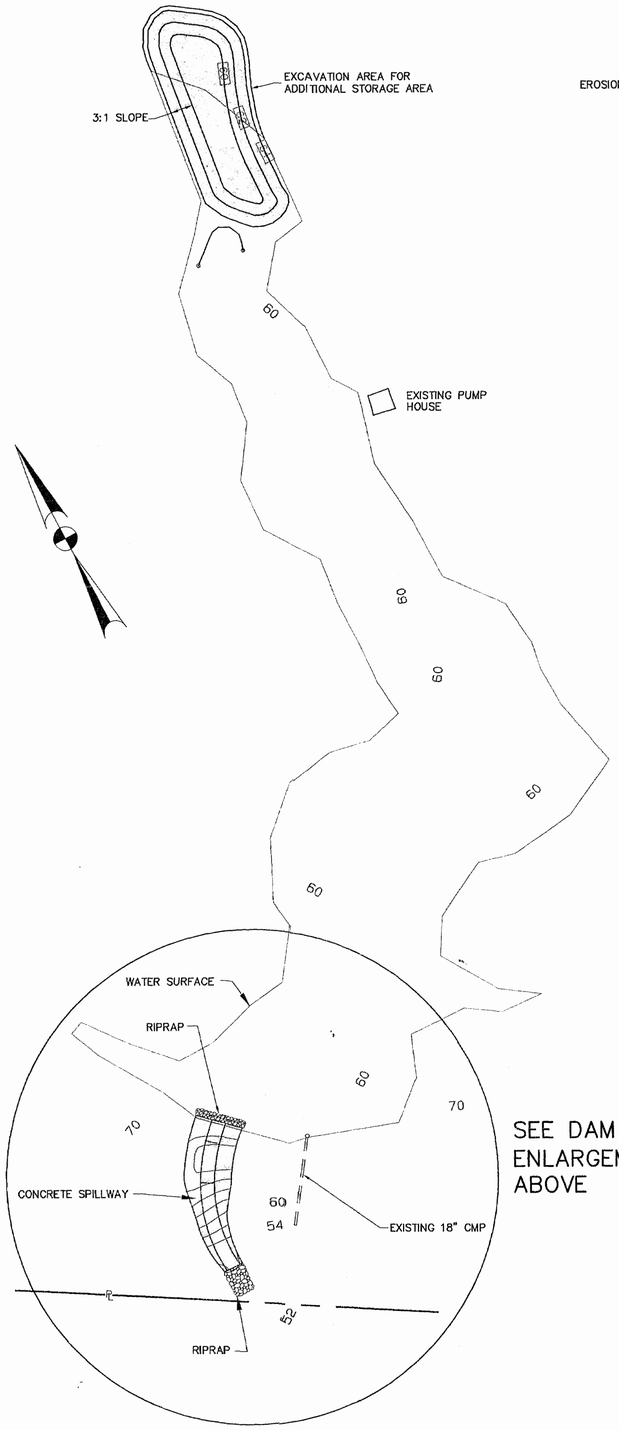
CONSULTING ENGINEERS

DETAILS & PROFILES
# WILLIAMSBURG SOAP AND CANDLE FACTORY
POWHATAN DISTRICT JAMES CITY COUNTY VIRGINIA

| | |
|---|---|
| Designed GAM/EMG | Drawn DEB |
| Scale AS NOTED | Date |
| Project No. 6883 | |
| Drawing No. 6 of 8 | |

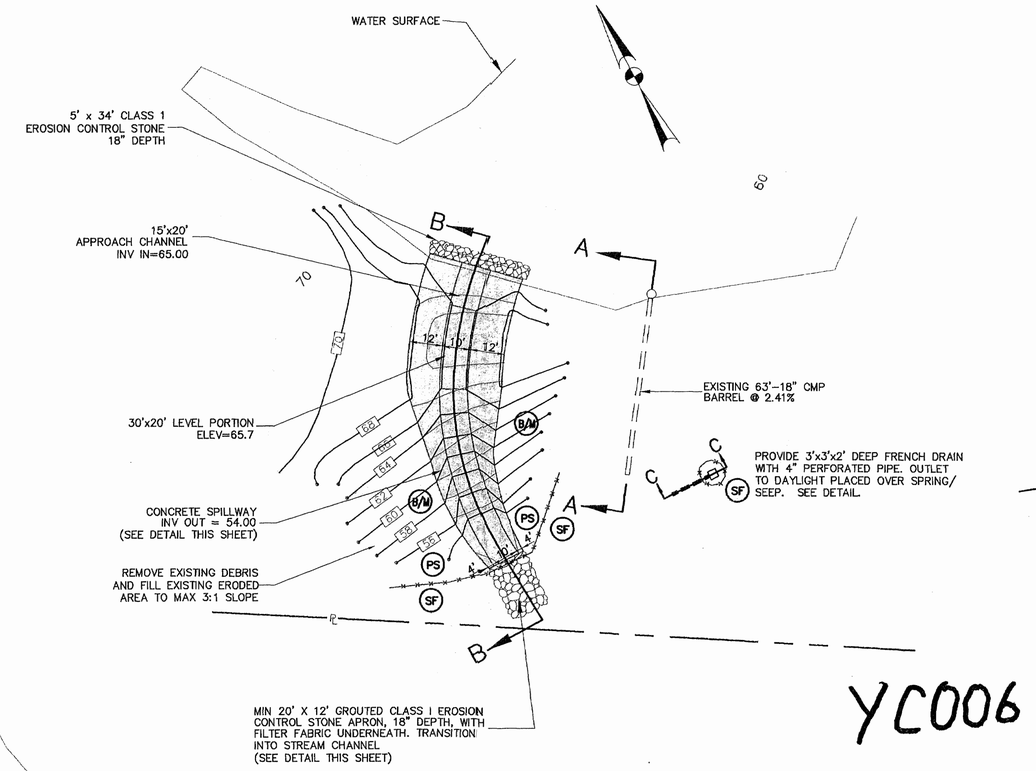
NOTES:

1. REMOVE ALL VEGETATION FROM THE AREAS OF THE DAM WHICH ARE TO BE FILLED.
2. REMOVE ALL TREES WHICH HAVE GROWN UP IN THE FILL SECTION.
3. DAM EMBANKMENT: THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED BORROW AREAS. IT SHALL BE CLEAN MINERAL SOIL, FREE OF ROOTS, WOODY VEGETATION, OVERSIZED STONES, ROCKS, OR OTHER OBJECTIONABLE MATERIAL. ALL FILL MATERIAL SHALL BE PLACED IN MAXIMUM 6" LOOSE LIFTS WHEN COMPACTED. FILL SHOULD BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY A STANDARD PROCTOR (ASTM D 698).
4. STABILIZE ALL DISTURBED AREAS AS SOON AS FINAL GRADING IS COMPLETE IN ACCORDANCE WITH EROSION AND SEDIMENT CONTROL NOTES.



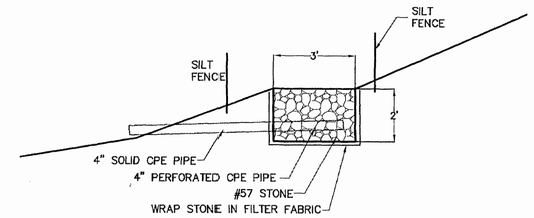

SEE DAM ENLARGEMENT ABOVE

POND DETAIL
SCALE: 1"=50'

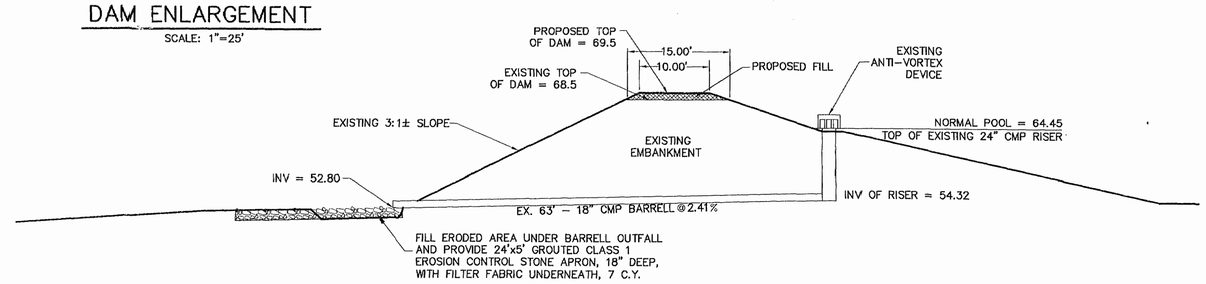



YC006

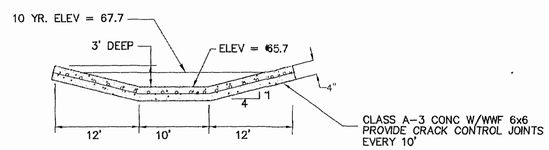
DAM ENLARGEMENT
SCALE: 1"=25'



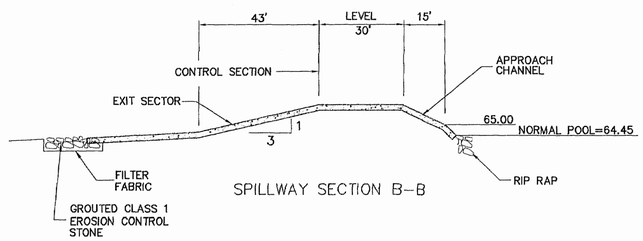

SECTION C-C
FRENCH DRAIN DETAIL
N.T.S.




DAM SECTION A-A
SCALE: 1"=10'

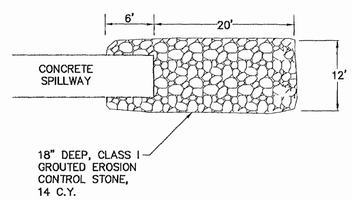



CROSS-SECTION AT CONTROL SECTION
SCALE: 1"=10'




SPILLWAY SECTION B-B

EXCAVATED CONCRETE SPILLWAY
SCALE: 1"=25'




RIP-RAP DETAIL
(EMERGENCY SPILLWAY)
SCALE: 1"=10'

| No. | DATE | REVISION / COMMENT / NOTE | BY |
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COMMONWEALTH OF VIRGINIA
G. ARCHER MARSHALL
LICENSED PROFESSIONAL ENGINEER
7/14/94


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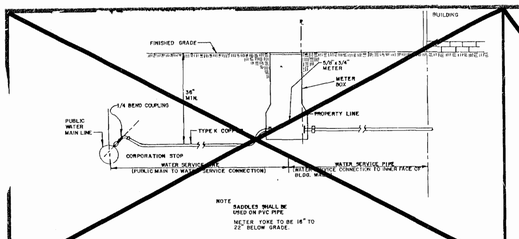
POND DETAIL
WAREHOUSE EXPANSION
**WILLIAMSBURG SOAP AND CANDLE FACTORY**
JAMES CITY COUNTY, VIRGINIA

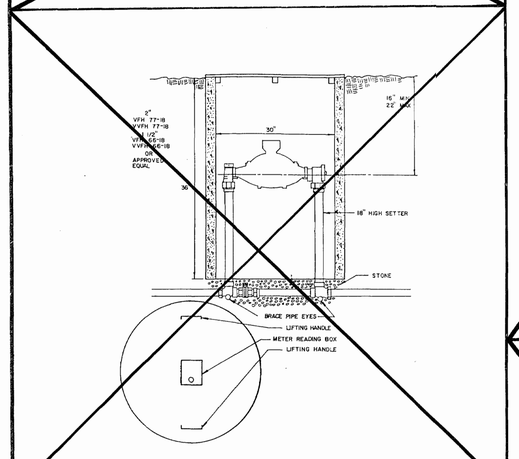
| Designed | Drawn |
|---|---|
| EMG | MLP/EAW |
| Scale | Date |
| NOTED | 6/20/94 |

Project No. 6883

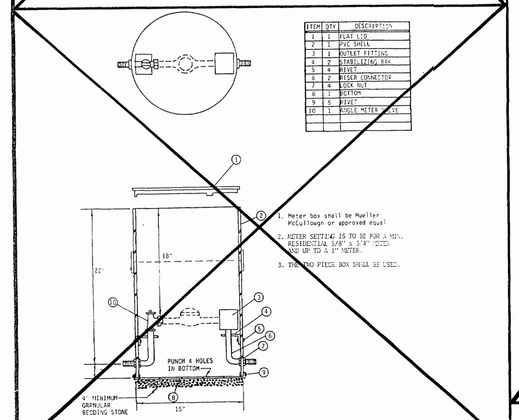
Drawing No. 7 of 8




TYPICAL WATER SERVICE

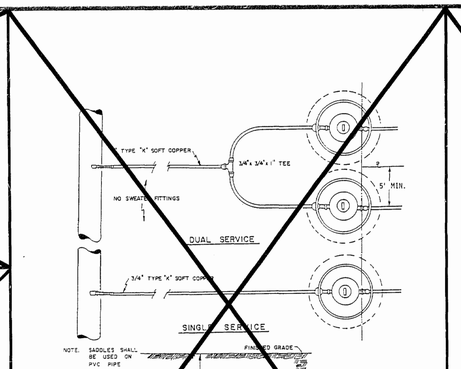



TYPICAL METER SETTING, 1-1/2" AND 2"

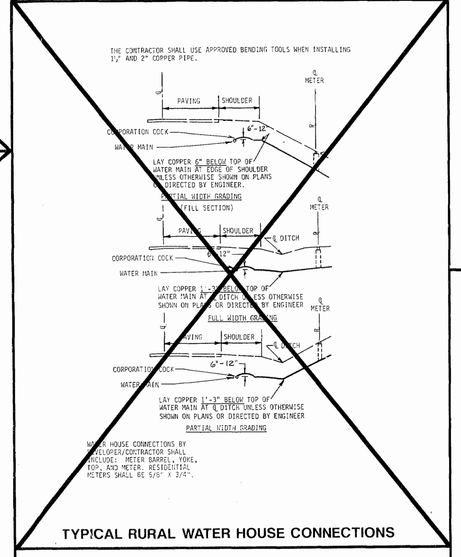



| ITEM | QTY. | DESCRIPTION |
|---|---|---|
| 1 | 1 | FLAT LID |
| 2 | 1 | PVC SHELL |
| 3 | 1 | OUTLET FITTING |
| 4 | 2 | STABILIZING BAR |
| 5 | 4 | WING |
| 6 | 2 | RISER CONNECTOR |
| 7 | 4 | LOCK NUT |
| 8 | 1 | BOTTOM |
| 9 | 5 | RIVET |
| 10 | 1 | NOZZLE METER |

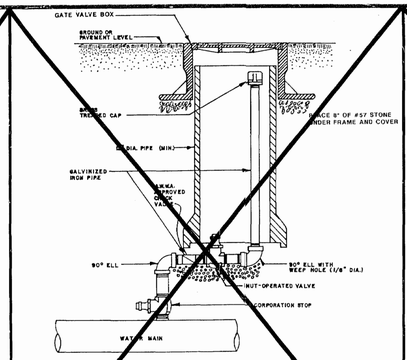
TYPICAL METER SETTING, 5/8", 3/4", 1"




DUAL AND SINGLE SERVICE INSTALLATION



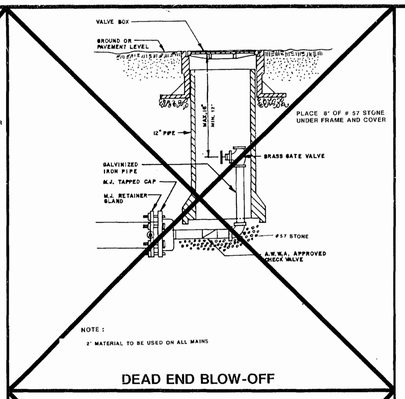

TYPICAL RURAL WATER HOUSE CONNECTIONS



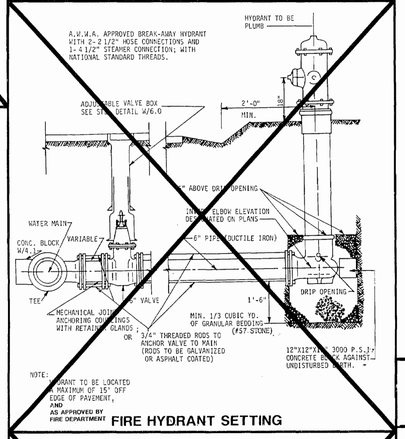

GENERAL NOTES

1. 2" MATERIAL TO BE USED ON ALL PIPES.
2. TAPPING SADDLES SHALL BE USED ON PVC; DUCTILE IRON MAY BE DIRECT TAPPING.

MANUAL AIR RELEASE VALVE




DEAD END BLOW-OFF




FIRE HYDRANT SETTING

## GENERAL NOTES - WATER DISTRIBUTION MAINS

1. All components of the water distribution system shall be installed and tested in accordance with the latest edition of the James City Service Authority Standards and Specifications for Water Distribution Systems and the Virginia Waterworks Regulations.
2. The developer's representative shall submit a list of materials for approval to the James City Service Authority prior to commencement of construction.
3. Water mains shall be installed after rough grading and prior to placement of base material.
4. All approved Erosion and Sediment Control requirements shall be observed during water main construction.
5. All water mains shall be disinfected and pressure tested, and satisfactory bacteriological samples obtained, in accordance with James City Service Authority standards.
6. After testing is complete and all components of the water system are acceptable to the James City Service Authority, as-built drawings shall be submitted to the Service Authority. No water meters will be installed until as-built drawings are received and checked for accuracy by the James City Service Authority. Any discrepancies noted during the as-built inspection shall be corrected by the developer's representatives within 30 days.
7. Routine periodic inspections during construction will be provided by the James City Service Authority. These inspections do not relieve the developer from his obligation and responsibility for constructing a water distribution system in strict accordance with the Standards and Specifications of the James City Service Authority.
8. Any changes to the final plans shall be approved by the James City Service Authority and shall be accurately indicated on the as-built drawings.
9. All lots shall be provided with water service connections. The connections shall be extended from the main to the property line or easement line, and shall terminate with a yoke in a meter box set at final finished grade. Meters for all lots (units) shall be furnished by the developer and installed by the JCSA.
10. The developer is required to submit water data sheets and shall acquire a certificate to construct prior to commencement of construction.
11. Any required easements, permits and approvals shall be acquired by the developer prior to commencement of water main construction.
12. The water main contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He shall erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. He shall also notify "Miss Utility" prior to performing any underground excavation.

**NOTE:**
**THE CONTRACTOR IS TO DISREGARD ALL DETAILS NOT APPLICABLE TO THIS CONTRACT.**

NOTE:THIS SHEET PRESENTS THE MOST COMMON STANDARD WATER DETAILS ENCOUNTERED FOR DESIGN AND CONSTRUCTION OF WATER DISTRIBUTION SYSTEMS. DETAILS OF OTHER LESS COMMON COMPONENTS AND TESTING PROCEDURES OF A WATER DISTRIBUTION SYSTEM CAN BE FOUND IN THE STANDARDS AND SPECIFICATIONS HANDBOOK FOR WATER DISTRIBUTION SYSTEMS AS PREPARED BY THE JAMES CITY SERVICE AUTHORITY.

OK
7/22/94

# HYDROLOGIC REPORT FOR

MARSTON / BARNETT POND

WILLIAMSBURG

SOAP & CANDLE

FACTORY

JAMES CITY COUNTY

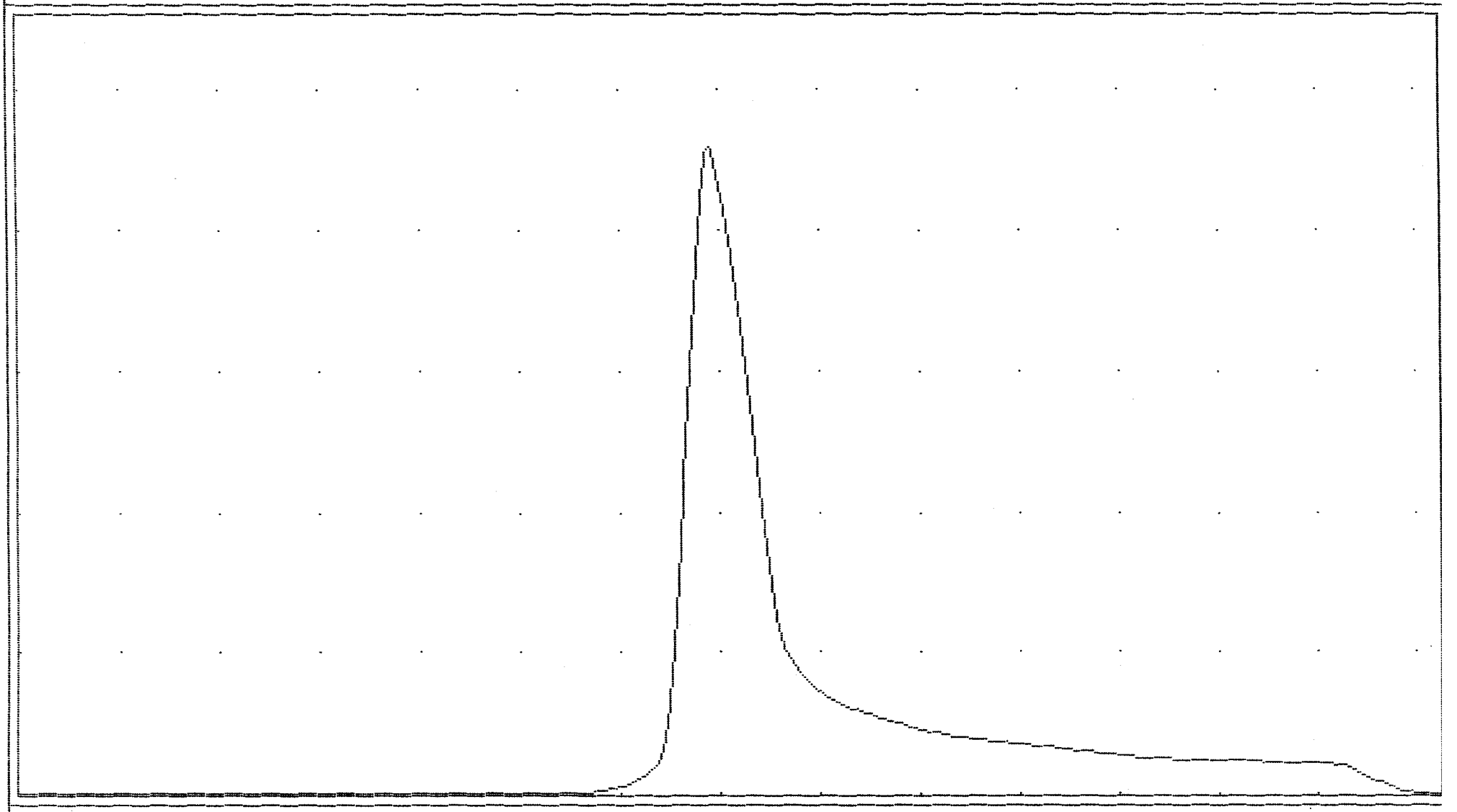
BMP # 157

6-16-94

AES CONSULTING ENGINEERS

SP-63-94

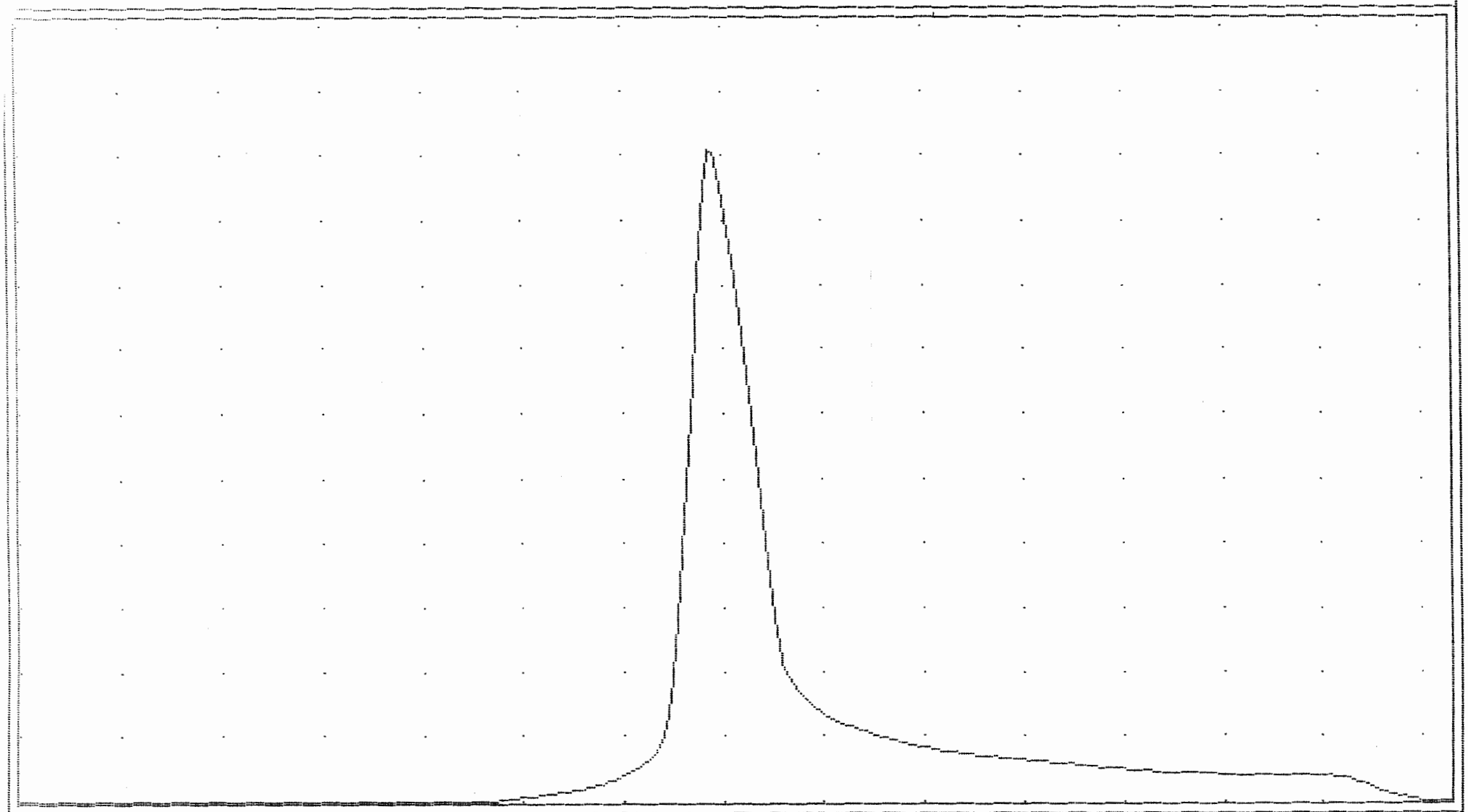
Qp = 91.9 S.C.S. RUNOFF PRE-DEVELOPMENT 2 Yr.



HGU = 110 min 20 VGU = 20.0 cfs

VOL = (cuft/acft) = 730947 / 16.780

Qp = 201.9 S.C.S. RUNOFF PRE-DEVELOPMENT 10 Yr



HGU = 110 min 1 VGU = 20.0 cfs

VOL = (cuft/acft) = 1543752 / 35.440

# HYDROLOGIC REPORT

2 YEAR POST DEV.....
ROUTED THRU WET POND..
.....

Hyd. No. 12

Hydrograph type = RESERVOIR ROUTE  Peak discharge = 84.13 cfs
Storm frequency = 2 yr  Time interval = 5 min
Inflow hyd. no. = 2  Reservoir no. = 1

## HYDROGRAPH DISCHARGE TABLE

| TIME hrs | INFLOW (i) cfs | INFLOW (j) cfs | 2S/dt-O (i) cfs | 2S/dt+O (j) cfs | OUTFLOW cfs |
|---|---|---|---|---|---|
| 10.67 | 1.15 | 1.36 | 8.76 | 9.01 | 0.12 |
| 10.75 | 1.36 | 1.59 | 10.95 | 11.27 | 0.16 |
| 10.83 | 1.59 | 1.86 | 13.52 | 13.90 | 0.19 |
| 10.92 | 1.86 | 2.15 | 16.50 | 16.97 | 0.23 |
| 11.00 | 2.15 | 2.47 | 19.95 | 20.52 | 0.28 |
| 11.08 | 2.47 | 2.83 | 23.90 | 24.58 | 0.34 |
| 11.17 | 2.83 | 3.25 | 28.39 | 29.20 | 0.40 |
| 11.25 | 3.25 | 3.73 | 33.52 | 34.48 | 0.48 |
| 11.33 | 3.73 | 4.28 | 39.38 | 40.50 | 0.56 |
| 11.42 | 4.28 | 4.92 | 46.08 | 47.38 | 0.65 |
| 11.50 | 4.92 | 5.84 | 53.75 | 55.27 | 0.76 |
| 11.58 | 5.84 | 7.42 | 62.72 | 64.50 | 0.89 |
| 11.67 | 7.42 | 10.26 | 73.89 | 75.98 | 1.05 |
| 11.75 | 10.26 | 15.59 | 88.77 | 91.57 | 1.40 |
| 11.83 | 15.59 | 25.57 | 110.67 | 114.62 | 1.98 |
| 11.92 | 25.57 | 38.36 | 146.01 | 151.82 | 2.91 |
| 12.00 | 38.36 | 51.66 | 200.51 | 209.95 | 4.72 |
| 12.08 | 51.66 | 65.35 | 275.35 | 290.53 | 7.59 |
| 12.17 | 65.35 | 79.05 | 368.79 | 392.35 | 11.78 |
| 12.25 | 79.05 | 92.06 | 478.16 | 513.19 | 17.52 |
| 12.33 | 92.06 | 103.35 | 599.83 | 649.27 | 24.72 |
| 12.42 | 103.35 | 110.82 | 723.04 | 795.23 | 36.10 |
| 12.50 | 110.82 | 110.85 | 842.52 | 937.21 | 47.34 |
| 12.58 | 110.85 | 106.39 | 946.14 | 1064.18 | 59.02 |
| 12.67 | 106.39 | 101.11 | 1025.11 | 1163.38 | 69.13 |

HYDROGRAPH DISCHARGE TABLE Cont'd

| TIME hrs | INFLOW (i) cfs | INFLOW (j) cfs | 2S/dt-O (i) cfs | 2S/dt+O (j) cfs | OUTFLOW cfs |
|---|---|---|---|---|---|
| 12.75 | 101.11 | 95.09 | 1079.33 | 1232.62 | 76.65 |
| 12.83 | 95.09 | 88.45 | 1112.69 | 1275.54 | 81.42 |
| 12.92 | 88.45 | 81.28 | 1128.44 | 1296.24 | 83.90 |
| 13.00 | 81.28 | 73.69 | 1129.91 | 1298.17 | 84.13 |
| 13.08 | 73.69 | 65.82 | 1119.80 | 1284.88 | 82.54 |
| 13.17 | 65.82 | 57.73 | 1100.24 | 1259.32 | 79.54 |
| 13.25 | 57.73 | 49.57 | 1072.41 | 1223.79 | 75.69 |
| 13.33 | 49.57 | 41.60 | 1037.91 | 1179.72 | 70.91 |
| 13.42 | 41.60 | 34.19 | 998.25 | 1129.08 | 65.41 |
| 13.50 | 34.19 | 28.15 | 954.12 | 1074.04 | 59.96 |
| 13.58 | 28.15 | 24.85 | 907.54 | 1016.46 | 54.46 |
| 13.67 | 24.85 | 23.18 | 862.14 | 960.54 | 49.20 |
| 13.75 | 23.18 | 21.75 | 819.79 | 910.17 | 45.19 |
| 13.83 | 21.75 | 20.53 | 781.57 | 864.72 | 41.58 |
| 13.92 | 20.53 | 19.48 | 747.20 | 823.85 | 38.33 |
| 14.00 | 19.48 | 18.57 | 716.26 | 787.22 | 35.48 |
| 14.08 | 18.57 | 17.77 | 688.46 | 754.32 | 32.93 |
| 14.17 | 17.77 | 17.05 | 663.55 | 724.81 | 30.63 |
| 14.25 | 17.05 | 16.38 | 641.25 | 698.37 | 28.56 |
| 14.33 | 16.38 | 15.77 | 621.29 | 674.68 | 26.70 |
| 14.42 | 15.77 | 15.21 | 603.38 | 653.44 | 25.03 |
| 14.50 | 15.21 | 14.71 | 586.53 | 634.36 | 23.91 |
| 14.58 | 14.71 | 14.25 | 570.57 | 616.45 | 22.94 |
| 14.67 | 14.25 | 13.84 | 555.50 | 599.53 | 22.02 |
| 14.75 | 13.84 | 13.47 | 541.29 | 583.59 | 21.15 |
| 14.83 | 13.47 | 13.14 | 527.93 | 568.61 | 20.34 |
| 14.92 | 13.14 | 12.83 | 515.31 | 554.55 | 19.62 |
| 15.00 | 12.83 | 12.56 | 503.40 | 541.28 | 18.94 |
| 15.08 | 12.56 | 12.30 | 492.17 | 528.78 | 18.31 |
| 15.17 | 12.30 | 12.06 | 481.60 | 517.02 | 17.71 |
| 15.25 | 12.06 | 11.84 | 471.66 | 505.96 | 17.15 |
| 15.33 | 11.84 | 11.62 | 462.32 | 495.56 | 16.62 |
| 15.42 | 11.62 | 11.42 | 453.53 | 485.77 | 16.12 |
| 15.50 | 11.42 | 11.22 | 445.19 | 476.57 | 15.69 |
| 15.58 | 11.22 | 11.02 | 437.27 | 467.83 | 15.28 |
| 15.67 | 11.02 | 10.83 | 429.74 | 459.51 | 14.89 |
| 15.75 | 10.83 | 10.63 | 422.56 | 451.59 | 14.52 |
| 15.83 | 10.63 | 10.43 | 415.69 | 444.01 | 14.16 |
| 15.92 | 10.43 | 10.24 | 409.12 | 436.76 | 13.82 |
| 16.00 | 10.24 | 10.04 | 402.81 | 429.79 | 13.49 |
| 16.08 | 10.04 | 9.84 | 396.73 | 423.09 | 13.18 |
| 16.17 | 9.84 | 9.65 | 390.86 | 416.61 | 12.87 |

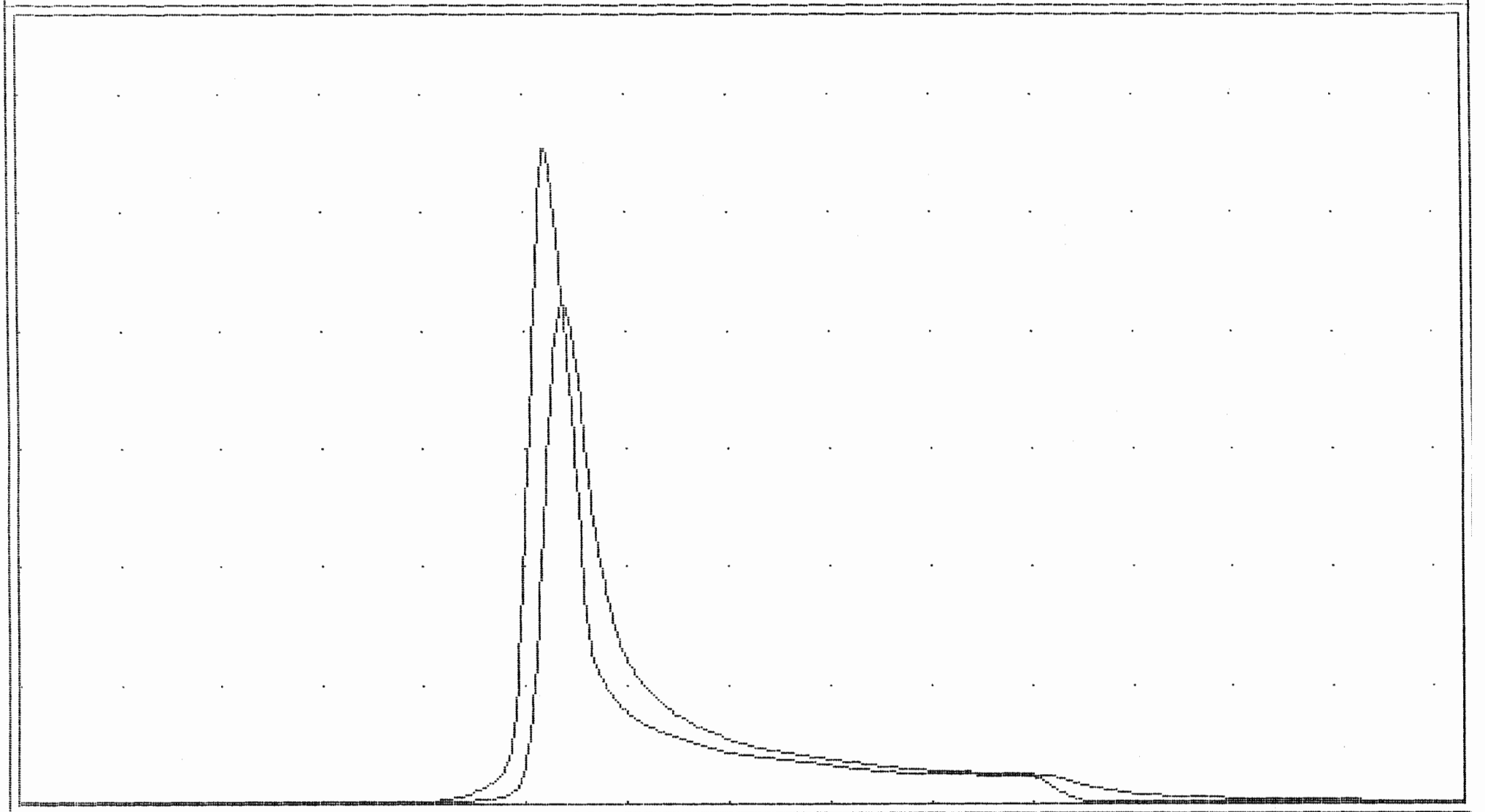
HYDROGRAPH DISCHARGE TABLE Cont'd

| TIME hrs | INFLOW (i) cfs | INFLOW (j) cfs | 2S/dt-O (i) cfs | 2S/dt+O (j) cfs | OUTFLOW cfs |
|---|---|---|---|---|---|
| 16.25 | 9.65 | 9.46 | 385.20 | 410.36 | 12.58 |
| 16.33 | 9.46 | 9.28 | 379.72 | 404.31 | 12.30 |
| 16.42 | 9.28 | 9.11 | 374.38 | 398.46 | 12.04 |
| 16.50 | 9.11 | 8.95 | 369.17 | 392.77 | 11.80 |
| 16.58 | 8.95 | 8.79 | 364.10 | 387.23 | 11.56 |
| 16.67 | 8.79 | 8.66 | 359.17 | 381.84 | 11.33 |
| 16.75 | 8.66 | 8.53 | 354.40 | 376.63 | 11.11 |
| 16.83 | 8.53 | 8.41 | 349.79 | 371.59 | 10.90 |
| 16.92 | 8.41 | 8.30 | 345.35 | 366.73 | 10.69 |
| 17.00 | 8.30 | 8.20 | 341.08 | 362.06 | 10.49 |
| 17.08 | 8.20 | 8.11 | 336.99 | 357.58 | 10.30 |
| 17.17 | 8.11 | 8.02 | 333.06 | 353.29 | 10.12 |
| 17.25 | 8.02 | 7.94 | 329.30 | 349.19 | 9.94 |
| 17.33 | 7.94 | 7.86 | 325.71 | 345.26 | 9.77 |
| 17.42 | 7.86 | 7.78 | 322.28 | 341.51 | 9.61 |
| 17.50 | 7.78 | 7.71 | 319.00 | 337.93 | 9.46 |
| 17.58 | 7.71 | 7.64 | 315.87 | 334.50 | 9.31 |
| 17.67 | 7.64 | 7.57 | 312.87 | 331.23 | 9.18 |
| 17.75 | 7.57 | 7.50 | 310.00 | 328.09 | 9.04 |
| 17.83 | 7.50 | 7.43 | 307.25 | 325.08 | 8.91 |
| 17.92 | 7.43 | 7.36 | 304.60 | 322.18 | 8.79 |
| 18.00 | 7.36 | 7.29 | 302.03 | 319.39 | 8.68 |
| 18.08 | 7.29 | 7.21 | 299.51 | 316.67 | 8.58 |
| 18.17 | 7.21 | 7.14 | 297.06 | 314.02 | 8.48 |
| 18.25 | 7.14 | 7.07 | 294.66 | 311.42 | 8.38 |
| 18.33 | 7.07 | 7.00 | 292.31 | 308.87 | 8.28 |
| 18.42 | 7.00 | 6.93 | 290.00 | 306.38 | 8.19 |
| 18.50 | 6.93 | 6.85 | 287.73 | 303.92 | 8.10 |
| 18.58 | 6.85 | 6.78 | 285.50 | 301.51 | 8.00 |
| 18.67 | 6.78 | 6.71 | 283.31 | 299.14 | 7.92 |
| 18.75 | 6.71 | 6.63 | 281.14 | 296.80 | 7.83 |
| 18.83 | 6.63 | 6.56 | 279.01 | 294.49 | 7.74 |
| 18.92 | 6.56 | 6.49 | 276.90 | 292.20 | 7.65 |
| 19.00 | 6.49 | 6.41 | 274.81 | 289.95 | 7.57 |
| 19.08 | 6.41 | 6.34 | 272.75 | 287.71 | 7.48 |
| 19.17 | 6.34 | 6.27 | 270.70 | 285.50 | 7.40 |
| 19.25 | 6.27 | 6.19 | 268.68 | 283.31 | 7.32 |
| 19.33 | 6.19 | 6.12 | 266.67 | 281.14 | 7.24 |
| 19.42 | 6.12 | 6.04 | 264.67 | 278.98 | 7.15 |
| 19.50 | 6.04 | 5.97 | 262.69 | 276.83 | 7.07 |
| 19.58 | 5.97 | 5.90 | 260.72 | 274.70 | 6.99 |
| 19.67 | 5.90 | 5.82 | 258.76 | 272.59 | 6.91 |

HYDROGRAPH DISCHARGE TABLE Cont'd

| TIME hrs | INFLOW (i) cfs | INFLOW (j) cfs | 2S/dt-O (i) cfs | 2S/dt+O (j) cfs | OUTFLOW cfs |
|---|---|---|---|---|---|
| 19.75 | 5.82 | 5.75 | 256.81 | 270.48 | 6.83 |
| 19.83 | 5.75 | 5.67 | 254.87 | 268.38 | 6.75 |
| 19.92 | 5.67 | 5.60 | 252.94 | 266.29 | 6.67 |
| 20.00 | 5.60 | 5.52 | 251.02 | 264.21 | 6.60 |
| 20.08 | 5.52 | 5.45 | 249.10 | 262.13 | 6.52 |
| 20.17 | 5.45 | 5.37 | 247.19 | 260.07 | 6.44 |
| 20.25 | 5.37 | 5.30 | 245.29 | 258.01 | 6.36 |
| 20.33 | 5.30 | 5.24 | 243.40 | 255.97 | 6.28 |
| 20.42 | 5.24 | 5.18 | 241.53 | 253.94 | 6.21 |
| 20.50 | 5.18 | 5.12 | 239.68 | 251.94 | 6.13 |
| 20.58 | 5.12 | 5.07 | 237.86 | 249.97 | 6.06 |
| 20.67 | 5.07 | 5.02 | 236.07 | 248.04 | 5.98 |
| 20.75 | 5.02 | 4.98 | 234.33 | 246.16 | 5.91 |
| 20.83 | 4.98 | 4.94 | 232.64 | 244.33 | 5.84 |
| 20.92 | 4.94 | 4.91 | 231.01 | 242.56 | 5.78 |
| 21.00 | 4.91 | 4.88 | 229.43 | 240.86 | 5.71 |
| 21.08 | 4.88 | 4.86 | 227.91 | 239.22 | 5.66 |
| 21.17 | 4.86 | 4.83 | 226.43 | 237.65 | 5.61 |
| 21.25 | 4.83 | 4.82 | 225.01 | 236.13 | 5.56 |
| 21.33 | 4.82 | 4.80 | 223.64 | 234.66 | 5.51 |
| 21.42 | 4.80 | 4.78 | 222.32 | 233.25 | 5.47 |
| 21.50 | 4.78 | 4.77 | 221.06 | 231.90 | 5.42 |
| 21.58 | 4.77 | 4.75 | 219.85 | 230.61 | 5.38 |
| 21.67 | 4.75 | 4.74 | 218.69 | 229.37 | 5.34 |
| 21.75 | 4.74 | 4.73 | 217.58 | 228.18 | 5.30 |
| 21.83 | 4.73 | 4.71 | 216.51 | 227.04 | 5.27 |
| 21.92 | 4.71 | 4.70 | 215.49 | 225.95 | 5.23 |
| 22.00 | 4.70 | 4.68 | 214.50 | 224.90 | 5.20 |
| 22.08 | 4.68 | 4.67 | 213.56 | 223.89 | 5.16 |
| 22.17 | 4.67 | 4.66 | 212.65 | 222.91 | 5.13 |
| 22.25 | 4.66 | 4.64 | 211.77 | 221.97 | 5.10 |
| 22.33 | 4.64 | 4.63 | 210.92 | 221.07 | 5.07 |
| 22.42 | 4.63 | 4.61 | 210.10 | 220.19 | 5.05 |
| 22.50 | 4.61 | 4.60 | 209.30 | 219.34 | 5.02 |
| 22.58 | 4.60 | 4.59 | 208.53 | 218.52 | 4.99 |
| 22.67 | 4.59 | 4.57 | 207.79 | 217.72 | 4.97 |
| 22.75 | 4.57 | 4.56 | 207.06 | 216.95 | 4.94 |
| 22.83 | 4.56 | 4.54 | 206.36 | 216.19 | 4.92 |
| 22.92 | 4.54 | 4.53 | 205.67 | 215.46 | 4.89 |
| 23.00 | 4.53 | 4.52 | 205.00 | 214.75 | 4.87 |
| 23.08 | 4.52 | 4.50 | 204.35 | 214.05 | 4.85 |
| 23.17 | 4.50 | 4.49 | 203.72 | 213.37 | 4.83 |

Qp = 84.1 RESERVOIR ROUTE 2 Yr.

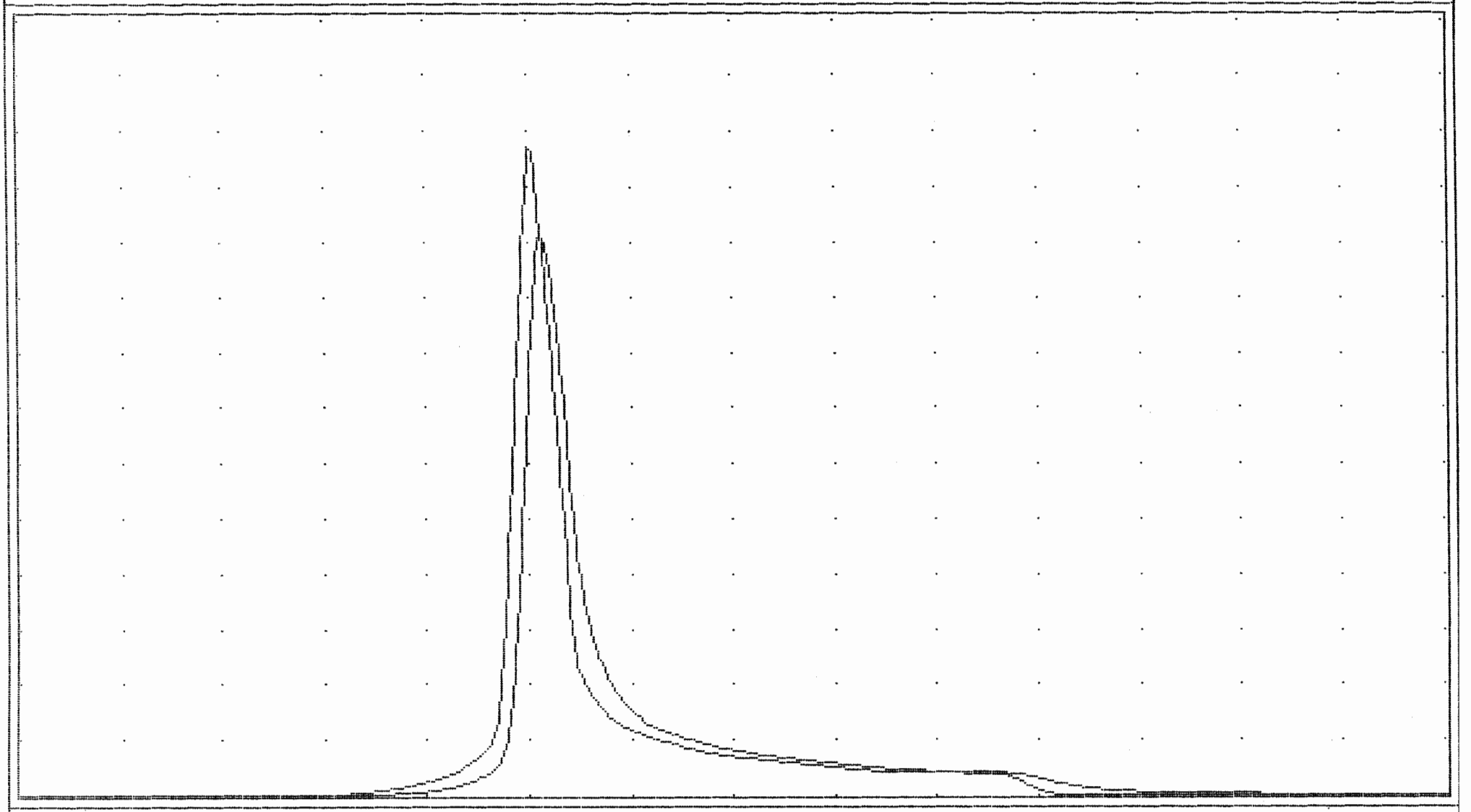


HGU = 145 min 12 VGU = 20.0 cfs

MAX STORAGE = 182106

MAX ELEVATION = 66.64

Qp = 201.8 RESERVOIR ROUTE 10 Yr.

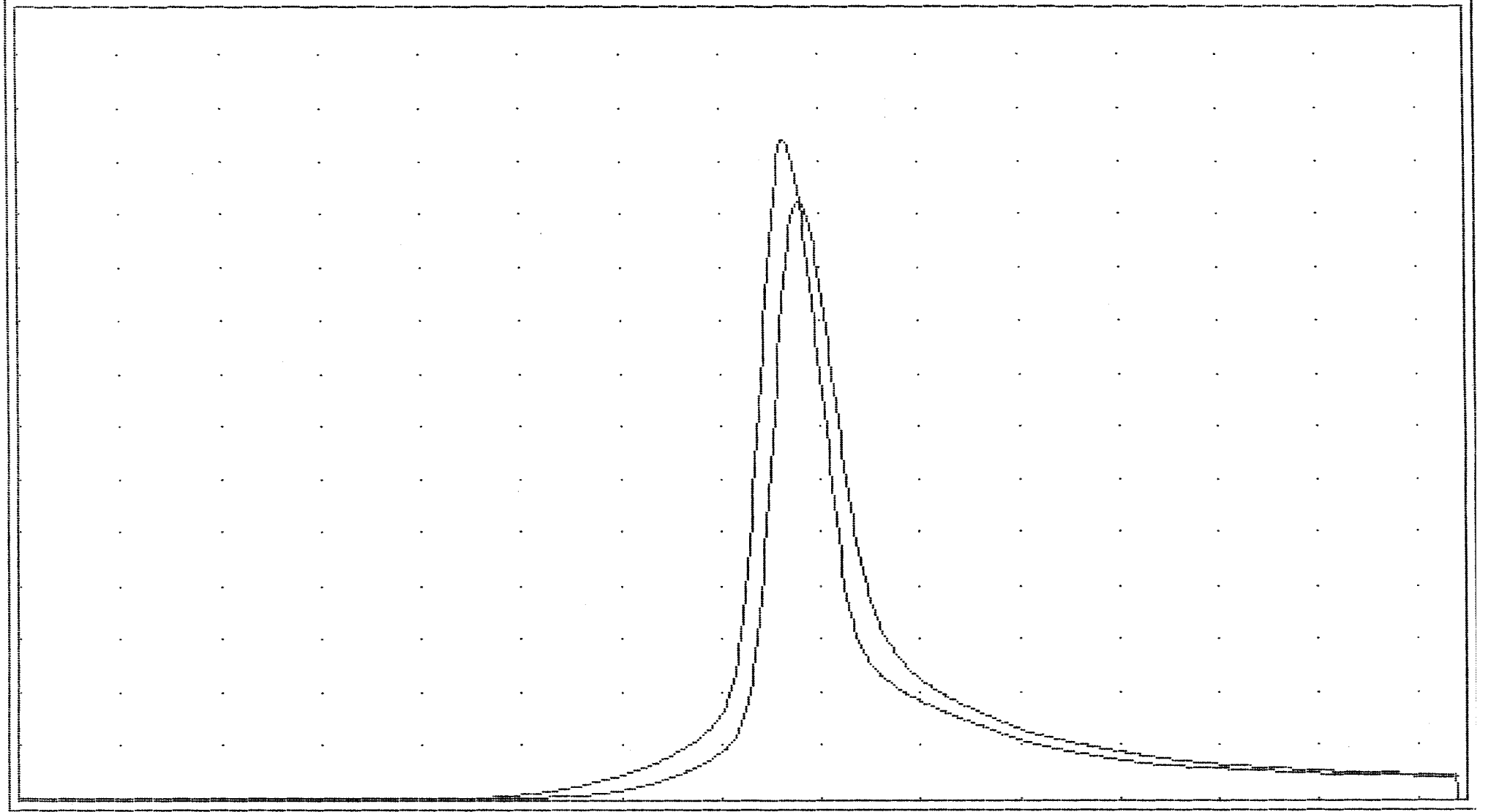


HGU = 150 min 13 VGU = 20.0 cfs

MAX STORAGE = 289791

MAX ELEVATION = 67.71

Qp = 224.8 RESERVOIR ROUTE 25 Yr

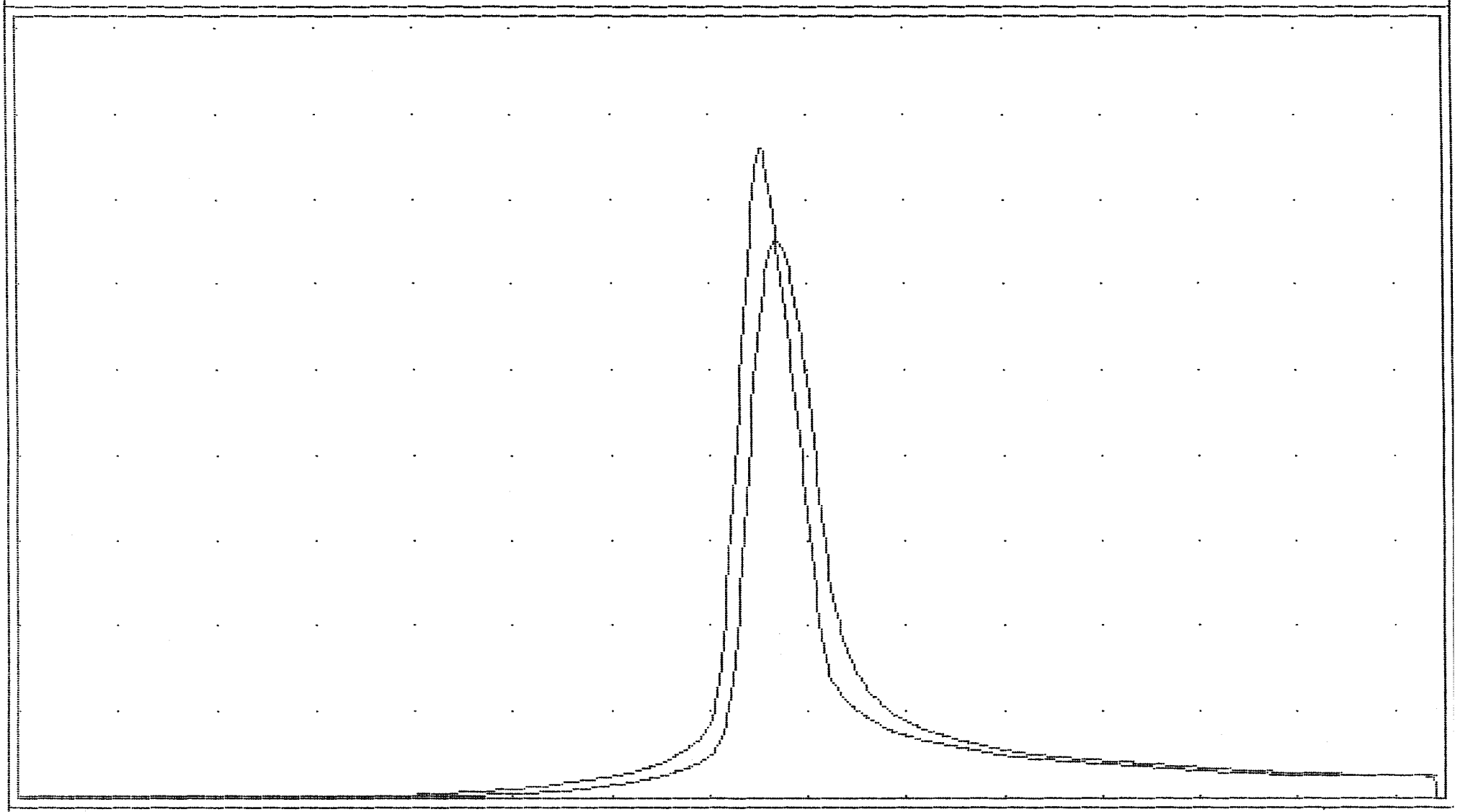


HGU = 100 min 14 VGU = 20.0 cfs

MAX STORAGE = 307433

MAX ELEVATION = 67.89

Qp = 325.7 RESERVOIR ROUTE 100 Yr



HGU = 100 min 15 VGU = 50.0 cfs

MAX STORAGE = 411864

MAX ELEVATION = 68.59

# HYDROLOGIC REPORT

## STAGE / STORAGE / DISCHARGE

RESERVOIR NUMBER = 1

RESERVOIR NAME = wet pond.... (* Controlled by Culv Structure A)
STORAGE VALUES WERE INPUT MANUALLY

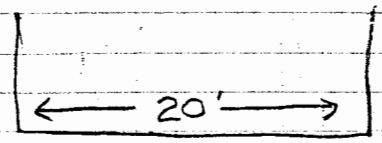
DISCHARGE VALUES: CULVERT STRUCT A. Q = .6 *A*[2gh/k]^.5 * 1
CULVERT STRUCT B. Q = .6 *A*[2gh/k]^.5 * 0
* WEIR STRUCT A. Q = 3 * 6.28 * H ^ 1.5
WEIR STRUCT B. Q = 3 * 20 * H ^ 1.5

| ELEVATION | DISCHARGE (cfs) | | | |
|---|---|---|---|---|
| | CULVERT A | CULVERT B | WEIR A | WEIR B |
| 64.50 | 26.13 | 0.00 | 0.00 | 0.00 |
| 66.00 | 28.13 | 0.00 | 34.61 | 9.86 |
| 68.00 | 30.59 | 0.00 | 123.36 | 209.29 |
| 70.00 | 32.87 | 0.00 | 243.01 | 535.00 |
| 72.00 | 35.01 | 0.00 | 386.97 | 948.77 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

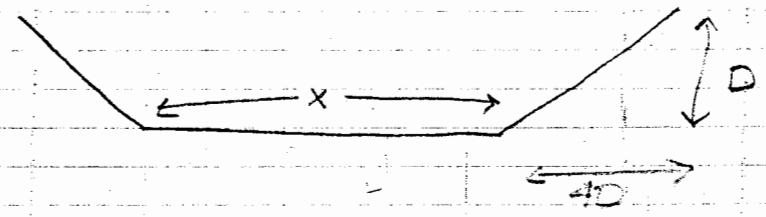
| STAGE | ELEVATION | INC STOR cu ft | TOT STOR cu ft | OUTFLOW cfs |
|---|---|---|---|---|
| 0.00 | 64.50 | 0 | 0 | 0.00 |
| 1.50 | 66.00 | 117241 | 117241 | 37.99 |
| 3.50 | 68.00 | 201452 | 318693 | 239.88 |
| 5.50 | 70.00 | 317074 | 635767 | 567.87 |
| 7.50 | 72.00 | 498222 | 1133989 | 983.78 |
| 0.00 | 0.00 | 0 | 0 | 0.00 |
| 0.00 | 0.00 | 0 | 0 | 0.00 |
| 0.00 | 0.00 | 0 | 0 | 0.00 |
| 0.00 | 0.00 | 0 | 0 | 0.00 |
| 0.00 | 0.00 | 0 | 0 | 0.00 |
| 0.00 | 0.00 | 0 | 0 | 0.00 |

```
 Option 1                          STAGE / STORAGE TABLE                          R to reset
IMMM
```

POND HYDROGRAPH CALCULATES SPILLWAY AS 20' RECTANGULAR SLOT




20' RECTANGULAR SLOT EQUATES TO 9' BOTTOM TRAPEZOIDAL WITH 4' TO 1' SIDE SLOPES USING MANNINGS EQN.




$$Q = \frac{1.486}{n} A \, H_R^{2/3} \cdot S^{1/2}$$

$Q_{P10}$ THRU SPILLWAY = 296 cfs

$$Q = \frac{1.486}{0.015} \left( x \cdot 3 + 4 \cdot 3^2 \right) \left( \frac{x \cdot 3 + 4 \cdot 3^2}{x + 2\left(\sqrt{17 \cdot 3^2}\right)} \right)^{\frac{2}{3}} (.001)^{\frac{1}{2}}$$

SUBSTITUTING AN "X" OF 9' GIVES A Q = 299 CFS

∴ USE 10" BOTTOM

# SOAP & CANDLE FACTORY

## MARSTON'S POND

TOTAL D.A. TO POND = 140 AC.

ONSITE AREA (INCLUDING MARSTON PROPERTY) = 50 AC − 15 = 35 ac

Barrett

% IMPERVIOUS (50 x .70) + (90 x 20.9) = 53.8%

16% - 35

38%

$V_r = .05 + (.009 \times 53.8) = .534$

$R_m$

$(140\ AC)\left(\frac{43560\ SF.}{1\ AC}\right)(.5\ in)\left(\frac{1\ ft}{12\ in}\right) = 254{,}100\ C.F.$

$(.534)(254{,}100\ CF) = 135{,}689\ C.F.$

$R_v$

EX. STORAGE IN POND AT ELEV 64.45
645,784 C.F.

∴ 4.76 TIMES AMOUNT REQ'D

35% Imp
4 $V_R$ = 7.66 acft 333,670 $ft^3$

50% Imp = 16.5 ac ft = 457,400

available = 14.3 acft - Good for ~~the~~ 72%

1.7 ac surface x 10 x .4 = 6.8 ac ft

Date Record Created:

Created By:

WS_BMPNO: YC006

Print Form

**PRINTED ON:**
**Saturday, March 13, 2010**
**2:24:25 PM**

| | |
|---|---|
| WATERSHED | YC |
| BMP ID NO | 006 |
| PLAN NO | SP-63-94 |
| TAX PARCEL | (23-2)(1-67) |
| PIN NO | 23201000067 |
| CONSTRUCTION DATE | 8/3/1994 |
| PROJECT NAME | Williamsburg Soap & Candle Factory |
| FACILITY LOCATION | 7521 Richmond Road |
| CITY-STATE | Williamsburg, VA |
| CURRENT OWNER | Barnett Development Company Inc. |
| OWNER ADDRESS | 7521 Richmond Road |
| OWNER ADDRESS 2 | |
| CITY-STATE-ZIP CODE | Williamsburg, VA 23188 |
| OWNER PHONE | |
| MAINT AGREEMENT | Yes |
| EMERG ACTION PLAN | No |

Get Last BMP No

Return to Menu

| | |
|---|---|
| MAINTENANCE PLAN | No |
| SITE AREA acre | 24.4 |
| LAND USE | COMM |
| old BMP TYP | Wet Pond |
| JCC BMP CODE | A2 Wet Pond |
| POINT VALUE | 9 |
| SVC DRAIN AREA acres | 140 |
| SERVICE AREA DESCRI | |
| IMPERV AREA acres | |
| RECV STREAM | YARMOUTH TRIB. |
| EXT DET-WQ-CTRL | No |
| WTR QUAL VOL acre-ft | 6.8 |
| CHAN PROT CTRL | No |
| CHAN PROT VOL acre-ft | 14.8 |
| SW/FLOOD CONTROL | No |
| GEOTECH REPORT | No |

| | |
|---|---|
| CTRL STRUC DESC | CMP Riser |
| CTRL STRUC SIZE inches | 24 |
| OTLT BARRL DESC | CMP |
| OTLT BARRL SIZE inch | 18 |
| EMERG SPILLWAY | No |
| DESIGN HW ELEV | 67.7 |
| PERM POOL ELEV | 64.45 |
| 2-YR OUTFLOW cfs | 84.13 |
| 10-YR OUTFLOW cfs | |
| REC DRAWING | No |
| CONSTR CERTIF | No |

LAST INSP DATE 11/27/2000 Inspected by:

INTERNAL RATING 3

MISC/COMMENTS

Marstons Pond; I/M agreement held

Additional Comments: