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- STORMWATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HAVE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

BMP NUMBER: **PC039**

DATE VERIFIED: **July 12, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

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

General File ID or BMP ID: PC039

PIN: 3910100153

Subdivision, Tract, Business or Owner Name (if known): Williamsburg James City County

Property Description: Recreation/Community Center

Site Address: 5301 Longhill Road

(For internal use only) **Box** 2 **Drawer:** 2

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

Comments

NOTE: BOUNDARY SHOWN IS TAKEN FROM SITE PLAN BY DEYOUNG-JOHNSON GROUP, INC. DATED APRIL 8, 1985. NO FIELD VERIFICATION WAS PERFORMED BY LANGLEY AND McDONALD, P.C.

SITE DATA

OWNER: JAMES CITY COUNTY, DIVISION OF PARKS & RECREATION

LOT NO.: (39-1)(1-153)
ZONED: R2

BOND, COMET, WESTMORELAND & HINER, ARCHITECTS
LANGLEY AND McDONALD, P.C., SURVEYOR, LANDSCAPE ARCHITECT AND SITE ENGINEER

WATER SUPPLY: 12" WATER MAIN AT SOUTH SIDE OF LONGHILL RD.

SANITARY SEWER: 2" FORCE MAIN FROM ON-SITE PUMP STATION TO HRSD V.G. W-5018 OF NORTH TRUNK FORCE MAIN. (EXIST 2" FORCE MAIN WILL BE UTILIZED.)

ELECTRIC SERVICE: VIRGINIA POWER

USE GROUP - A3
BUILDING CONSTRUCTION TYPE - 2C

SITE STATISTICAL DATA
PLAT 39-1 (153)

ZONED R-2	EXISTING	ADDITION	NEW TOTAL
TOTAL SITE - 22.563 AC.		982,844 SF	
BUILDING SITE	248,262 SF INCLUDED IN 982,844 SF		
BUILDING COVERAGE EXISTING	40,672 SF		
BUILDING COVERAGE NEW		40,281 SF	80,953 SF
PARKING AND DRIVES TO EXISTING ACCESS DRIVES NORTH OF CURB OF BUILDING SITE	104,582 SF		
SIDE WALKS AND DRIVES ON BUILDING SITE	15,145 SF	1,388 SF	16,533 SF
TOTAL IMPERVIOUS SURFACE - TOTAL SITE	160,399 SF/16%	41,669 SF	202,068 SF/21%
TOTAL IMPERVIOUS - BUILDING SITE	55,145 SF	41,669 SF	96,814 SF
TOTAL LANDSCAPE OPEN SPACE - TOTAL SITE	822,445 SF		780,776 SF
TOTAL LANDSCAPE OPEN SPACE - BUILDING SITE	193,117 SF		151,448 SF
PARKING	235 INCLUDES 8 DISABLED		
PERIMETER LANDSCAPE REQUIRED FOR ADDITION, NUMBER OF PERIMETER SHRUBS REQUIRED, PROVIDED.		51 TREES OR 254 SHRUBS	

CIVIL DRAWING INDEX

C1.1 TOPOGRAPHIC AND DEMOLITION PLAN
C2.1 GRADING AND UTILITIES PLAN
C3.1 PUMP STATION
C3.2 SANITARY SEWER PROFILE
C4.1 NOTES AND DETAILS
C5.1 PLANTING PLAN
C5.2 PLANTING NOTES, DETAILS & SCHEDULE

PLAN SCALE: 1"=25'
GRAPHIC SCALE IN FEET
0 10 25 50 75

COMMONWEALTH OF VA. 1-3-96 STEPHEN A. ROMEO No. 1448-B LAND SURVEYOR

MAR 1996 RECEIVED PLANNING DEPARTMENT

BOND COMET WESTMORELAND + HINER

207 West Brood Street
Richmond, Virginia 23220
804 7 8 8 - 4 7 7 4

IN ASSOCIATION WITH:
BARKER RINKER SEACAT AND PARTNERS ARCHITECTS, P.C.
2546 FIFTEENTH STREET
DENVER, COLORADO 80211
303 455 7457

ARCHITECTS

JAMES CITY/ WILLIAMSBURG COMMUNITY CENTER

WILLIAMSBURG-JAMES CITY COUNTY, VA

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PROJECT NUMBER: 9445 (L&M # 95034-1)
PROJECT MANAGER: NHM
DRAWN BY: MRG
ISSUE DATE: DEC. 15, 1995
REVISIONS: 2/26/96 REV LGTH OF F.M. DEMO

REC CNTR

COUNTY OF JAMES CITY
FINAL SITE PLAN

APPROVALS		DATE
Fire Dept.		1/9/96
Health Dept.		11/3/95
Highway Dept.		11/9/95
Plan. Comm.		11/9/96
Pub. Wks. Dir.		1/9/96
Zoning Adm.		4/11/96
JCSA		11/2/96
Other		11/5/96
Other		

SHEET TITLE: TOPOGRAPHIC AND DEMOLITION PLAN

REC CNTR

SP-117-95

SHEET NUMBER: C1.1

Langley and McDonald, P.C.
Engineers – Surveyors – Planners
Landscape Architects – Environmental Consultants
VIRGINIA BEACH WILLIAMSBURG

DWG. 5882 AW

PC039_JCC_WILLIAMSBURG_REC_CENTER_EXPAND - 003

GENERAL NOTES

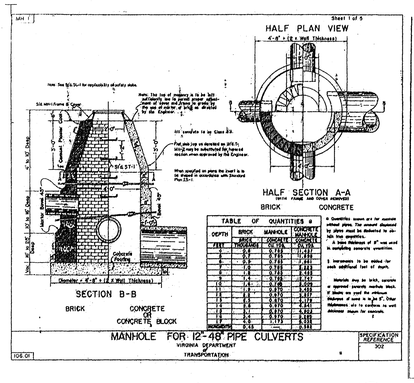
1. ALL WORK TO BE IN ACCORDANCE WITH THE VIRGINIA DEPARTMENT OF TRANSPORTATION, "ROAD AND BRIDGE SPECIFICATIONS", DATED 1994, AND THE VIRGINIA DEPARTMENT OF TRANSPORTATION, "ROAD AND BRIDGE STANDARDS", 1993, AND VIRGINIA DEPARTMENT OF TRANSPORTATION AGGREGATE COMPACTION MANUAL, 1993-4, UNLESS OTHERWISE NOTED.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS.
3. SELECT CLEARING AND GRUBBING TO CONSIST OF REMOVAL OF ALL TREES, ROOTS, STUMPS AND SNAGS EXCEPT THOSE TREES DESIGNATED BY OWNER TO REMAIN. ALL TREES SO DESIGNATED TO BE PROTECTED FROM DAMAGE TO THE TRUNK AND ROOT SYSTEM.
4. ALL DRAINAGE STRUCTURES TO CONFORM TO VIRGINIA DEPARTMENT OF TRANSPORTATION, "ROAD AND BRIDGE STANDARDS", 1993, UNLESS OTHERWISE INDICATED. ALL VDOT TYPE DRAINAGE STRUCTURES TO INCORPORATE INLET SHAPING.
5. ALL PIPE LENGTHS INCLUDE STANDARD ES-1 FLARED END SECTIONS WHERE NOTED.
6. ALL LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE. PRIOR TO COMMENCEMENT OF CONSTRUCTION, CONTRACTOR TO NOTIFY OWNERS OF ALL UTILITIES (VIRGINIA POWER, BELL ATLANTIC, ETC.) OF PROPOSED CONSTRUCTION SO THAT THEY MAY LOCATE AND SAFEGUARD THEIR FACILITIES. CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING EXCAVATION. VERIFICATION SHALL CONSIST OF EXPOSING THE UTILITY BY EXCAVATION AND ESTABLISHING THE EXACT HORIZONTAL AND VERTICAL LOCATION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. CONTRACTOR NOTIFY OWNER AND ENGINEER OF ALL CONDITIONS, CONFLICTS IN UTILITY LOCATIONS, OR INCONSISTENCIES WHICH ARE NOTED SO THAT RESOLUTION MAY BE RESOLVED COORDINATED AND RECORDED.
7. CONTRACTOR ENSURE THAT TRUCKS LEAVING SITE ARE CLEANED SUFFICIENTLY SO AS NOT TO CREATE A ROADWAY NUISANCE OR HAZARD.
8. CONTRACTOR PROVIDE THE ENGINEER ONE SET OF PLANS WITH THE AS-BUILT LOCATIONS OF THE STORM SEWER SYSTEM, SANITARY SYSTEM, AND WATER DISTRIBUTION SYSTEM.
9. BACKFILLING: BACKFILL IN ACCORDANCE WITH THE FOLLOWING:
   A. CONTRACTOR REFILL ALL EXCAVATIONS AS RAPIDLY AS PRACTICABLE AFTER INSPECTION AND APPROVAL OF PIPE WORK. CAREFULLY PLACE ALL BACKFILL AROUND AND OVER THE PIPE AND ASSOCIATED STRUCTURES SUCH THAT NO MATERIAL IS ALLOWED TO FALL ON THE PIPE FROM MORE THAN TWO (2) FEET ABOVE THE PIPE, OR CAUSE ANY DEVIATION, SHIFTING OR DAMAGE TO THE PIPE OR ASSOCIATED STRUCTURES.
   B. BACKFILL
      - AERATE ALL BACKFILL MATERIAL TO PLUS OR MINUS 20% OF OPTIMUM MOISTURE CONTENT PRIOR TO PLACEMENT.
      - PLACE ALL BACKFILL AND COMPACT IN 6-INCH LAYERS PRIOR TO PLACING SUCCESSIVE LAYERS.
      - USE MECHANICAL TAMPING OR MACHINE ROLLING TO COMPACT TO REQUIRED DENSITY.
      - COMPACT ALL BACKFILL EACH LAYER TO 95% MAXIMUM DENSITY AT OPTIMUM MOISTURE CONTENT IN ACCORDANCE WITH ASTM D-698 TO A TOLERANCE OF PLUS OR MINUS 20% OF OPTIMUM MOISTURE CONTENT.
      - PLACE AND COMPACT BACKFILL AROUND ALL PIPES SIMULTANEOUSLY IN UNIFORM LIFTS ON BOTH SIDE OF PIPE.
      - TAMP HAUNCHES OF PIPE WITH TAMPING DEVICE HAVING A FACE OF NOT MORE THAN 25 SQUARE INCHES.
      - DO NOT USE HEAVY ROADWAY TYPE SELF POWERED COMPACTION EQUIPMENT UNTIL TRENCH BACKFILL HAS A MINIMUM OF 2 FEET OF SATISFACTORILY COMPACTED MATERIAL ABOVE TOP OF ANY AND ALL PIPE HAS BEEN PLACED.
   C. DO NOT USE, ASHES, PUTRESCIBLE OR, ORGANIC MATERIALS, LARGE STONES OR OTHER UNSATISFACTORY MATERIAL AS EMBANKMENT OR OTHER BACKFILL. PREVENT ALL EXCAVATIONS FROM BEING USED AS A DUMPING GROUNDS FOR REFUSE.
   D. CONTRACTOR REMOVE FROM SITE ALL MATERIAL CONSIDERED UNSATISFACTORY FOR BACKFILL AND DISPOSE OF PROPERLY. CONTRACTOR CLEAN ALL ROADS, SIDEWALKS, EMBANKMENTS AND OTHER WORK SITE AREAS AND LEAVE SITE IN A CLEAN ORDERLY FINISHED CONDITION.
   E. CONTRACTOR FURNISH TO ENGINEER CBR TESTS BY A CERTIFIED MATERIALS TESTING COMPANY ON THE ROADWAY SUBGRADES AT INTERVALS NOT TO EXCEED 500 FEET AND FOR EACH LIFT AT THAT LOCATION. ALL TEST RESULTS MUST BE ACCOMPANIED BY AN ANNOTATED SITE PLAN SHOWING LOCATION OF EACH TEST.
10. CONTRACTOR FURNISH TO ENGINEER COMPACTION TEST RESULTS, BY A CERTIFIED MATERIALS TESTING COMPANY FOR EACH CLASS OF WORK AS FOLLOWS WITH ALL TESTS CLEARLY ANNOTATED AND CROSS REFERENCED ON A SITE PLAN, CLEARLY INDICATING THE LOCATION AT EACH TEST.
    - ON ROADWAYS WITHOUT PARKING PROVIDE CBR TESTS ON ROADWAY SUBGRADE AT INTERVALS NOT TO EXCEED 500 FEET.
    - IN PARKING LOTS PROVIDE TESTS AT THE RATE OF 1 TEST FOR EACH 30 SPACES, WITH 1/3 OF TEST LOCATED IN THE TRAVEL LANE AND 2/3 IN PARKING SPACES.
    - PROVIDE COMPACTION TESTS FOR UTILITY AND STORMDRAIN TRENCH FILLS EVERY 4 FEET VERTICALLY AND AT EVERY 100 FEET HORIZONTALLY.
    - PROVIDE COMPACTION TESTS FOR FILL EMBANKMENTS EVERY 4 FEET VERTICALLY AND AT HORIZONTAL INTERVALS NOT TO EXCEED 50 FEET.
    - ON ROADWAYS WITHOUT PARKING PROVIDE ROADWAY SUBGRADE AND AGGREGATE BASE COMPACTION TESTS EVERY 500 FEET HORIZONTALLY AT CENTER OF ALTERNATING LANES.
    - CONTRACTOR CERTIFY TO ENGINEER ON THE FINAL COMPOSITE TEST REPORT AND ANNOTATED SITE PLAN THAT THE COMPLETED WORK AS TESTED MEETS OR EXCEEDS ALL THE REQUIREMENTS AND SPECIFICATIONS.
    - ANY OFF-SITE FILL MATERIAL REQUIRED TO COMPLETE THE PROJECT MUST BE TESTED AND APPROVED BY THE OWNER OR ENGINEER PRIOR TO DELIVERY TO SITE.
11. THE CONTRACTOR IS INVITED TO WALK THE SITE, VERIFY ALL EXISTING CONDITIONS, TAKE SOIL BORING AND PERFORM GEOTECHNICAL EVALUATIONS AS HE IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH COMPLETING THE PROJECT, AS NO FUTURE ADJUSTMENT TO THE CONTRACT PRICE FOR UNFORESEEN CONDITIONS WILL BE MADE. CONTRACTOR IS RESPONSIBLE TO PROVIDE ANY AND ALL ADDITIONAL FILL MATERIAL AND PROPERLY DISPOSE OF ALL EXCESS CUT MATERIAL OFF-SITE AT HIS EXPENSE.
12. CONTRACTOR IS REQUIRED TO ANNOTATE CLEARLY ONE SET OF SEPIA DRAWINGS, PROVIDED BY THE ENGINEERS, SHOWING THE AS-BUILT LOCATIONS OF STORM AND SANITARY SEWER SYSTEMS, WATER AND OTHER INSTALLED UTILITY SYSTEMS, AND LOCATIONS WHERE UNSUITABLE MATERIALS OR CONDITIONS WERE ENCOUNTERED AND THE AMOUNT AND LIMITS OF THESE CONDITIONS AND ANY UNDERCUT OR BACKFILLING REQUIRED.
13. ~~A GEOTECHNICAL ENGINEERING REPORT HAS BEEN PREPARED FOR THIS PROJECT BY SOHNAGEL ENGINEERING ASSOCIATES. THIS REPORT IS FOR INFORMATION PURPOSES ONLY AND SHOULD NOT BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. THE OPINIONS EXPRESSED IN THIS REPORT ARE THOSE OF THE GEOTECHNICAL ENGINEER AND REPRESENT HIS INTERPRETATION OF THE SUBSURFACE CONDITIONS, TESTS, AND THE RESULTS OF THE ANALYSIS WHICH HE HAS CONDUCTED. SHOULD DATA CONTAINED IN THIS REPORT NOT BE ADEQUATE FOR THE CONTRACTOR'S PURPOSES, THE CONTRACTOR MAY MAKE, PRIOR TO BIDDING, HIS OWN EXPLORATION, TESTS AND ANALYSES. THIS REPORT MAY BE EXAMINED BY BIDDERS AT THE OFFICE OF THE OWNER OR COPIES MAY BE PROCURED FROM THE OWNER AT NOMINAL CHARGE.~~
14. THE CONTRACTOR SHALL CONTACT VDOT 24 HRS. BEFORE THE PLACEMENT OF ANY MATERIAL OR EXCAVATION IN THE RIGHT-OF-WAY.
15. ALL UNSUITABLE MATERIAL WILL BE REPLACED WITH SUITABLE MATERIAL.
16. ALL NECESSARY LANE CLOSURES SHALL BE RESTRICTED TO THE TIMES FROM 9:00 A.M. TO 4:00 P.M.

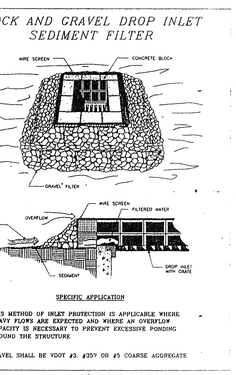
JAMES CITY COUNTY
EROSION AND SEDIMENT CONTROL NOTES

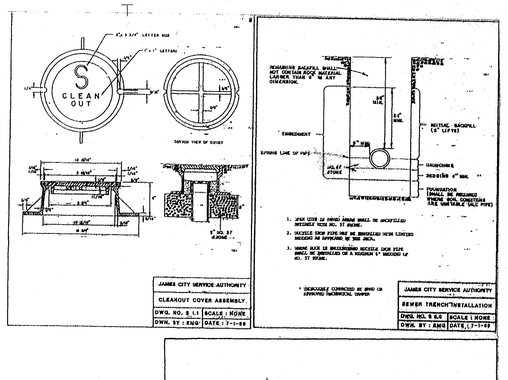
REVISED 2/3/95

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. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE THOROUGHLY CLEANED AT THE END OF EACH DAY.
3. A PRECONSTRUCTION MEETING SHALL BE HELD ON-SITE BETWEEN THE COUNTY, THE DEVELOPER, THE PROJECT ENGINEER, AND THE CONTRACTOR PRIOR TO ISSUANCE OF THE LAND DISTURBING PERMIT. THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF CONSTRUCTION TO THE COUNTY FOR APPROVAL PRIOR TO THE PRECONSTRUCTION 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.
4. 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. PERIODIC INSPECTIONS OF THE EROSION CONTROL MEASURES SHALL BE MADE TO ASSESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE ACCOMPLISHED IMMEDIATELY UPON NOTIFICATION BY THE COUNTY AND SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES.
5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY 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. DIVISION 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. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE DIVISION OF CODE COMPLIANCE PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.
8. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROADWAY 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 OR PAVED DITCHES WHERE REQUIRED. ANY DRAINAGE OUTFALLS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING OR UTILITY INSTALLATION 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 FEET 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 PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STAND OF GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER IN ACCORDANCE WITH SPECIFICATION 3.32. PERMANENT OR 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 3.36. SEEDING WILL THEN TAKE PLACE AS SOON AS THE MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2:1.
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 PERCENT.
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. AS-BUILT DRAWINGS MUST BE PROVIDED FOR ALL DETENTION/BMP FACILITIES. ALSO UPON COMPLETION, THE CONSTRUCTION OF ALL DETENTION/BMP FACILITIES SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHO INSPECTED THE STRUCTURE DURING CONSTRUCTION. THE CERTIFICATION SHALL STATE THAT TO THE BEST OF HIS/HER JUDGEMENT, KNOWLEDGE, AND BELIEF THE STRUCTURE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVAL PLANS AND SPECIFICATIONS.







BOND
COMET
WESTMORELAND
HINER

207 West Brood Street
Richmond, Virginia 23220
804 7 8 8 - 4 7 7 4

IN ASSOCIATION WITH:

BARKER RINKER SEACAT AND PARTNERS ARCHITECTS, P.C.
2546 FIFTEENTH STREET
DENVER, COLORADO 80211
303 455 7457

JAMES CITY/
WILLIAMSBURG
COMMUNITY
CENTER

WILLIAMSBURG-
JAMES CITY COUNTY, VA

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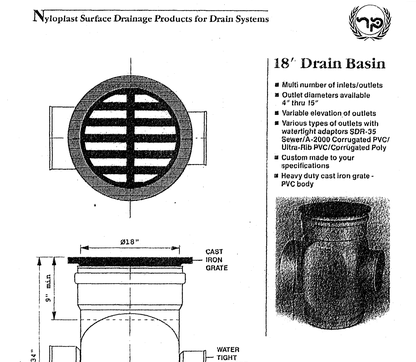
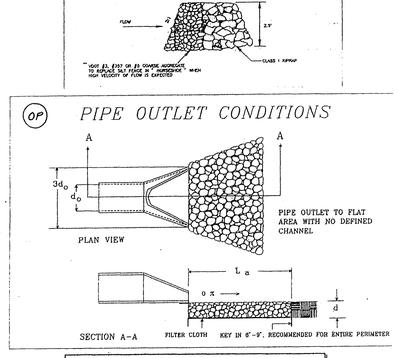
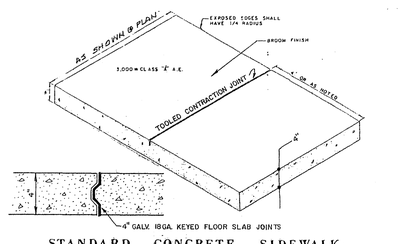
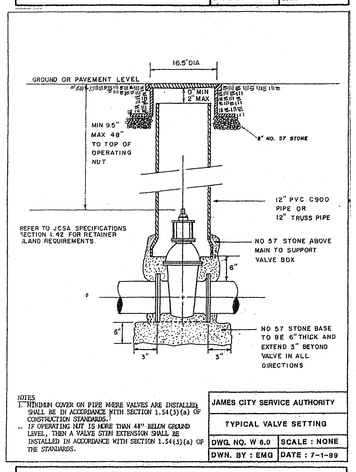
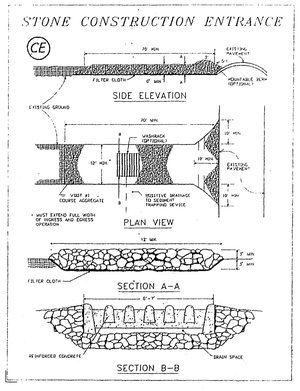
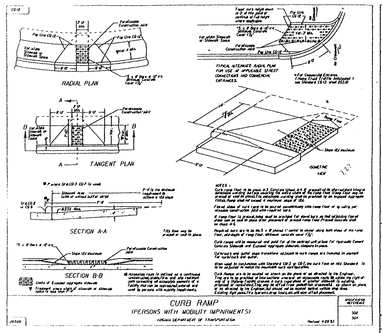


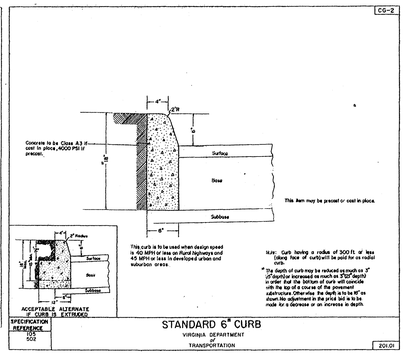


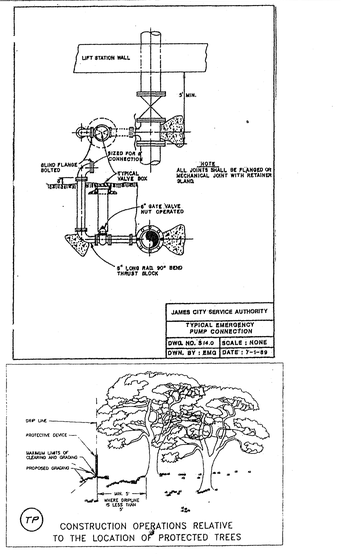


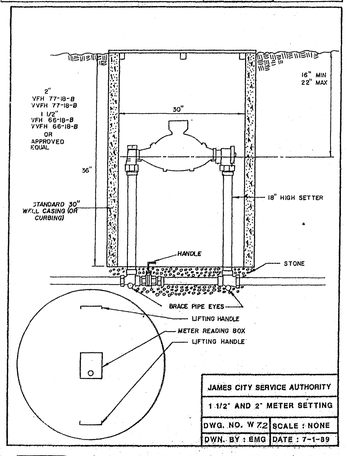












Langley and McDonald, P.C.
Engineers - Surveyors - Planners
Landscape Architects - Environmental Consultants
VIRGINIA BEACH WILLIAMSBURG

PROJECT NUMBER:
9445 (L&M # 95034-1)

PROJECT MANAGER:
NHM

DRAWN BY:
MRG

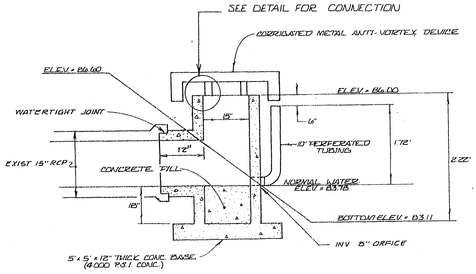
ISSUE DATE:
DEC. 15, 1995

REVISIONS:

SHEET TITLE:
NOTES AND DETAILS

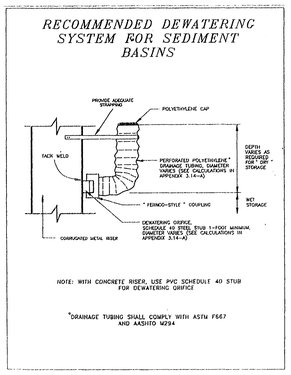
SHEET NUMBER:
C4.1
DWG. 5882 DW

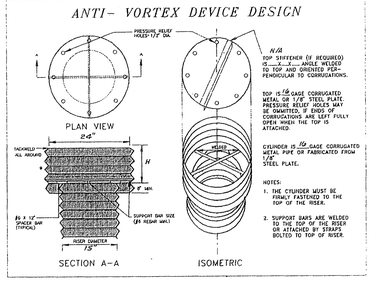
	IN	OUT	PEAK EL.
2 YEAR	17.62	1.36	84.79
10 YEAR	23.66	1.67	85.08
25 YEAR	26.58	2.01	85.53
100 YEAR	30.68	3.72	86.22

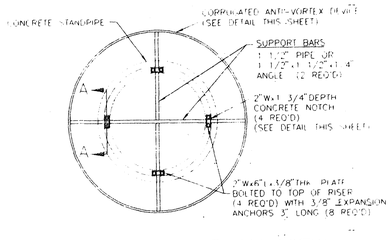


RISER DETAIL

N.T.S.

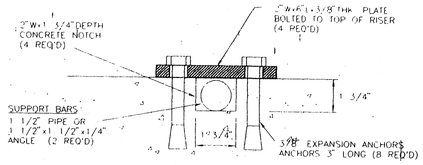






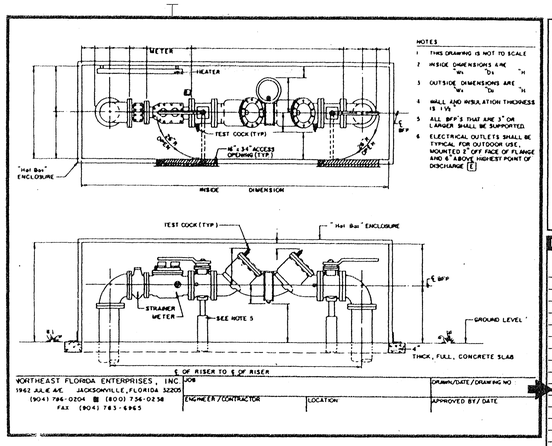
ANTI-VORTEX PLAN VIEW TOP REMOVED

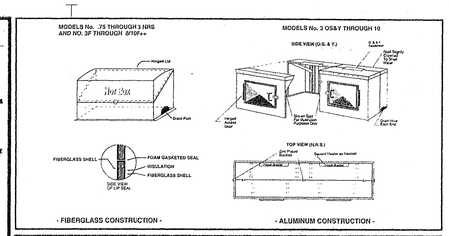
N.T.S.



SECTION A-A

N.T.S.





PHYSICAL PROPERTIES

MODEL No.	PIPE SIZE	INSIDE DEPTH	INSIDE WIDTH	INSIDE HEIGHT NRS	INSIDE HEIGHT OS&Y	ELECTRICAL REQUIREMENTS (120 V, 1Ø)	HEATING CABLES
FIBERGLASS							
~~.75~~	~~0/4"-1"~~	~~14"~~	~~10"~~	~~20"~~	~~28"~~	~~30W CABLE~~	UL Listed
~~1~~	~~0/4"-1"~~	~~19"~~	~~27"~~	~~28"~~	~~28"~~	~~60W CABLE~~	CSA Certified
~~1 NY*~~	~~0/4"-1"~~	~~18"~~	~~27"~~	~~35"~~	~~35"~~	~~60W CABLE~~	"
~~1.5~~	~~0/4"-1 1/2"~~	~~21"~~	~~33"~~	~~28"~~	~~28"~~	~~60W CABLE~~	"
~~2~~	~~1 1/4"-2"~~	~~16"~~	~~33"~~	~~35"~~	~~35"~~	~~90W CABLE~~	"
~~2 NRS~~	~~2 1/2"-3"~~	~~28"~~	~~60"~~	~~35"~~		~~1000W HEATER~~	Air Heaters
~~3 F++~~	~~2 1/2"-3"~~	~~33"~~	~~33"~~	~~37.5"~~	~~37.5"~~	~~1000W HEATER~~	
~~4 F++~~	~~4"~~	~~39"~~	~~36"~~	~~38.5"~~	~~38.5"~~	~~1000W HEATER~~	
6 F++	6"	35"	41"	43.5"	49.5"	1600W HEATER	
~~8 F0 F++~~	~~8" 10"~~	~~45"~~	~~51"~~	~~50.5"~~	~~50.5"~~	~~1500W HEATER~~	
ALUMINUM							
~~3 OS&Y~~	~~2 1/2"-3"~~	~~31"~~	~~60"~~		~~31.5"~~	~~1000W HEATER~~	
~~3 NY*~~	~~3"~~	~~24"~~	~~35"~~	~~44"~~	~~30"~~	~~1500W HEATER~~	
~~4~~	~~4"~~	~~27"~~	~~37"~~	~~39.5"~~	~~39.5"~~	~~1500W HEATER~~	
~~4 NY*~~	~~4"~~	~~27"~~	~~37"~~	~~48"~~	~~40"~~	~~1500W HEATER~~	
~~6~~	~~6"~~	~~31"~~	~~107"~~	~~42.5"~~	~~42.5"~~	~~2000W HEATER~~	
~~6 NY*~~	~~6"~~	~~31"~~	~~107"~~	~~52"~~	~~47"~~	~~2000W HEATER~~	
~~8~~	~~8"~~	~~37"~~	~~165"~~	~~52.5"~~	~~52.5"~~	~~2000W HEATER~~	
~~8 NY*~~	~~8"~~	~~37"~~	~~165"~~	~~59"~~	~~52.5"~~	~~2000W HEATER~~	
~~10~~	~~10"~~	~~39"~~	~~142"~~	~~56.5"~~	~~56.5"~~	~~2/1600W HEATERS~~	
~~10 NY*~~	~~10"~~	~~62"~~	~~147"~~	~~68"~~	~~68"~~	~~2/1600W HEATERS~~	

Factory modification to depth, width or height available upon request.
Electric service must be in accordance with N.E.C. and local ordinances.

* "NY" = "NEW YORK STANDARD" or - 30° centerline backflow prevention device mounting.
++ "F" = Enclosures designed for FEBCO 870/880 Series
*** All "F" Enclosures available in O'S & Y ***

HOT BOX ENCLOSURE DETAIL

N.T.S.

SPECIFICATION SHEET MODEL 876V

FEBCO Backflow Prevention — *DOUBLE CHECK DETECTOR ASSEMBLY*

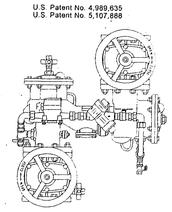
Physical Properties

Size of Mainline	~~2 1/2", 3, 4"~~ 6" ~~8, 10"~~
Max. Working Pressure	175 PSI (1200 KPa)
Hydrostatic Test Press.	350 PSI (2400 KPa)
Temperature Range	32°F to 140°F (0°C to 60°C)
End Connections	Flanged ANSI B16.1 Class 125

Materials

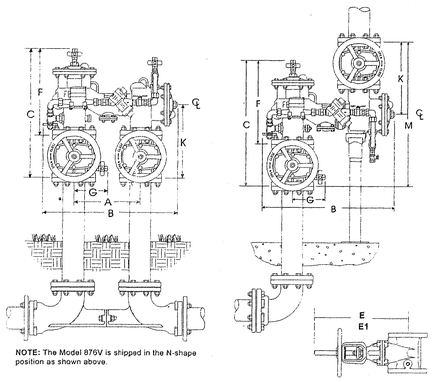
Main Valve Body	Ductile iron ASTM A536 Grade 65-45-12
Coating	Fusion epoxy coated internal and external AWWA C550-90
Shut Off Valves	OS&Y resilient wedge AWWA C509 gate valves
Trim	Bronze ASTM B584 Alloy C83600
Elastomers	EPDM
Spring	Stainless steel

U.S. Patent No. 4,989,635
U.S. Patent No. 5,107,888



MODEL 876V
DOUBLE CHECK DETECTOR ASSEMBLY
(Shown in vertical position.)

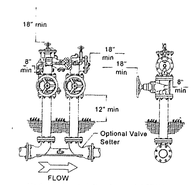
Model 876V N-Shape Position | **Model 876V Vertical Position**



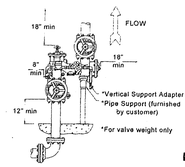
NOTE: The Model 876V is shipped in the N-shape position as shown above.

OS&Y Side View

Installation Views



Horizontal installation for model 876V
(Shown in N-shape position.)



Vertical installation for model 876V
(Shown in vertical position.)

Recommended minimum clearances from permanent structures for ease of testing and maintenance.

Dimensions

Size	A	B	C	E NRS	E1 OS&Y Full Open	F	G	K	*LL	M	NET **WT Approximate
~~2 1/2"~~	~~12 1/2~~	~~25 3/4~~	~~21 1/2~~	~~12 1/4~~	~~15 3/4~~	~~10 5/8~~	~~5 1/4~~	~~15 5/8~~	~~N/A~~	~~23 1/4~~	~~230~~
~~3~~	~~12 1/2~~	~~25 3/4~~	~~21 3/4~~	~~12 1/2~~	~~20 3/4~~	~~10 5/8~~	~~5 1/4~~	~~14 1/2~~	~~21 1/2~~	~~23 1/4~~	~~230~~
~~4~~	~~14~~	~~27 7/8~~	~~26 3/4~~	~~13 3/4~~	~~23 1/4~~	~~17 11/16~~	~~7~~	~~15 1/2~~	~~24~~	~~24~~	~~285~~
6"	16	32 3/16	32 1/4	17 3/4	30	21 9/16	8	18 5/8	29	37 1/4	520
~~8~~	~~16 1/2~~	~~38 11/16~~	~~36 5/16~~	~~21 1/2~~	~~37 3/4~~	~~21 5/8~~	~~9 1/4~~	~~20 3/4~~	~~35 1/2~~	~~41 1/2~~	~~550~~
~~10~~	~~21~~	~~41 1/2~~	~~46 7/16~~	~~27 1/2~~	~~40~~	~~29 7/16~~	~~10 1/2~~	~~23 3/4~~	~~40~~	~~47 1/2~~	~~1400~~

Weights do not include risers or optional valve setter.
* Lay length with optional MJ x FL valve setter.
** With OS&Y Gate Valves
Refer to Specification Sheet SS VS for details on valve setter.

MASTER series

COMMONWEALTH OF VIRGINIA
1-3-96
STEPHEN A. DIMEO
No. 1440-B
LAND SURVEYOR

BOND COMET WESTMORELAND + HINER

207 West Broad Street
Richmond, Virginia 23220
804 7 8 8 - 4 7 7 4

IN ASSOCIATION WITH:

BARKER RINKER SEACAT AND PARTNERS ARCHITECTS, P.C.
2546 FIFTEENTH STREET
DENVER, COLORADO 80211
303 455 7457

JAMES CITY/ WILLIAMSBURG COMMUNITY CENTER

WILLIAMSBURG– JAMES CITY COUNTY, VA

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PROJECT NUMBER:
9445 (L&M # 95034-1)

PROJECT MANAGER:
NHM

DRAWN BY:
MRG

ISSUE DATE:
DEC. 15, 1995

REVISIONS:

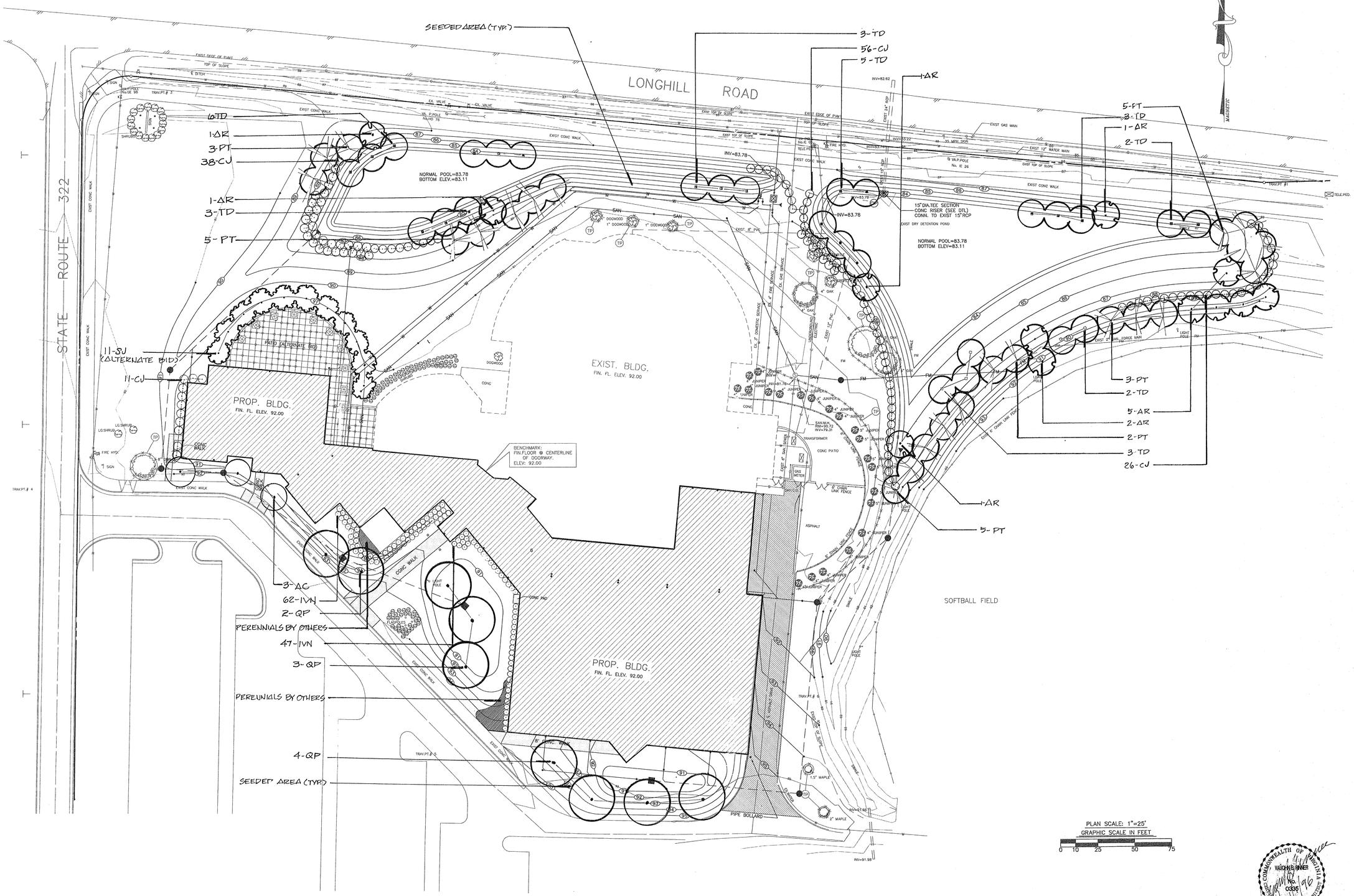
SHEET TITLE:
DETAILS

SHEET NUMBER:

Langley and McDonald, P.C.
Engineers – Surveyors – Planners
Landscape Architects – Environmental Consultants
VIRGINIA BEACH WILLIAMSBURG

C4.2
DWG. 5882 EW

PC039_JCC_WILLIAMSBURG_REC_CENTER_EXPAND - 005



PLAN SCALE: 1"=25'

GRAPHIC SCALE IN FEET

0 10 25 50 75

ALL AREAS NOT COVERED BY PLANTING BEDS, PAVING, OR STRUCTURE ARE TO BE SEEDED.

THIS SHEET FOR LANDSCAPING PURPOSES ONLY

COMMONWEALTH OF VIRGINIA
VAUGHN B. RINKER
No. 0336
LICENSED LANDSCAPE ARCHITECT

Langley and McDonald, P.C.
Engineers – Surveyors – Planners
Landscape Architects – Environmental Consultants
VIRGINIA BEACH WILLIAMSBURG

ARCHITECTS

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JAMES CITY/
WILLIAMSBURG
COMMUNITY
CENTER

WILLIAMSBURG–
JAMES CITY COUNTY, VA

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PROJECT NUMBER:
9445 (L&M # 95034-1)

PROJECT MANAGER:
VBR

DRAWN BY:
DRL/HTB

ISSUE DATE:
DEC. 15, 1995

REVISIONS:

SHEET TITLE:
PLANTING PLAN

SHEET NUMBER:
C 5.1

DWG. 5882 FW

PC039_JCC_WILLIAMSBURG_REC_CENTER_EXPAND - 006

PLANTING NOTES:

THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, ETC. NECESSARY TO COMPLETE ALL PLANTING AS SHOWN ON THIS DRAWING, AS SPECIFIED HEREIN OR IN SUPPLEMENTAL SPECIFICATIONS, AND/OR AS REQUIRED BY JOB CONDITIONS. THE WORK IN GENERAL INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

(1) SOIL PREPARATION;
(2) PROVIDING TOPSOIL AND ALL SOIL AMENDMENTS;
(3) EXCAVATION OF PLANT PITS;
(4) PROVIDING ALL PLANT MATERIAL AND MULCH AS INDICATED ON PLANS;
(5) FERTILIZING;
(6) STAKING;
(7) CHEMICAL APPLICATION;
(8) MAINTENANCE AND GUARANTEE;
(9) ALL OTHER ITEMS NECESSARY TO MAKE WORK COMPLETE.

THE PLANTING CONTRACTOR IS RESPONSIBLE FOR COORDINATING WORK WITH THE IRRIGATION CONTRACTOR AND OTHER CONTRACTORS. THIS PLAN DOES NOT GUARANTEE THE EXISTENCE OR NON-EXISTENCE OF ANY UTILITIES. PRIOR TO ANY CONSTRUCTION, EXCAVATION, OR ROTO-TILLING THE CONTRACTOR SHALL ASSUME THE RESPONSIBILITY OF VERIFYING THE LOCATIONS OF ALL UTILITIES, ABOVE AND/OR BELOW GROUND, PUBLIC AND/OR PRIVATE THAT MAY EXIST AND CROSS THROUGH THE AREAS OF CONSTRUCTION.

(1) SOIL PREPARATION

(1.1) BECAUSE OF SOIL COMPACTION DURING CONSTRUCTION, ALL PLANTING AREAS SHALL BE EXCAVATED TO A DEPTH OF 18" OR AS SHOWN IN DETAILS OR DIRECTED BY THE OWNER. A PLANTING AREA IS ANY AREA IN WHICH NEW PLANTING OCCURS. EXCAVATE THE ENTIRE AREA BOUND BY WALKS, WALLS, FENCES, ETC. REMOVE SPOIL MATERIAL AS DIRECTED BY OWNER OR THE OWNER'S REPRESENTATIVE.

(1.2) WHENEVER POSSIBLE, THE EXCAVATED SOIL SHOULD BE USED AS BACKFILL MATERIAL IN ORDER TO ELIMINATE OR MINIMIZE THE OCCURRENCE OF HYDROLOGIC DISCONTINUITIES, AND/OR SOIL INTERFACE PROBLEMS COMMON TO PLANTING BEDS CONTAINING SOILS OF DIFFERENT TEXTURE. WHERE THE TEXTURE OF THE EXISTING SOIL IS UNDESIRABLE FOR THE PLANT SPECIES BEING PLANTED (i.e. HEAVY CLAY, PURE SAND) AND WHERE THE pH OF THE EXISTING SOIL IS SUITABLE FOR THE SPECIES BEING PLANTED, THE SOIL SHALL BE BLENDED 66% EXISTING SOIL WITH 33% AMENDED SOIL. SEE BELOW FOR AMENDED SOIL.

(1.3) WHERE IT IS DETERMINED THAT THE EXISTING SOIL EXCAVATED IS TOTALLY UNSUITABLE FOR USE AS BACKFILL MATERIAL BECAUSE OF IMPROPER pH OR THE PRESENCE OF DEBRIS OR OTHER DELETERIOUS MATTER, THE BACKFILL MATERIAL SHALL BE 100% AMENDED SOIL MIXTURE AS DESCRIBED BELOW WITH THE ADDITION OF 1/2 PART SAND.

AMENDED SOIL: PLANTING SOIL FOR AMENDING BACKFILL SHALL BE 100 % TOPSOIL WITH AMENDMENTS ADDED ACCORDING TO THE RECOMMENDATIONS OF THE SOILS TEST REPORT TO BRING THE pH VALUE OF THE PLANTING BACKFILL MIXTURE WITHIN THE RANGES DESCRIBED BELOW. THE TOPSOIL AND AMENDMENTS SHALL BE MIXED AT AN ON-SITE LOCATION. PLANTING SOIL SHALL NOT BE MIXED AT INDIVIDUAL PLANT LOCATIONS.

(2) TOPSOIL AND ALL SOIL AMENDMENTS

(2.1) NECESSARY QUANTITIES OF TOPSOIL SHALL BE SUPPLIED BY THE CONTRACTOR AND APPROVED BY THE OWNER OR HIS REPRESENTATIVE. THE CONTRACTOR SHALL APPLY TOPSOIL ONLY AFTER SECURING SOIL TEST (V.P.I.), APPLYING RECOMMENDED TREATMENT THEREOF, AND SUBMITTING FOR APPROVAL.

(2.2) ON-SITE TOPSOIL MEETING THE CONDITIONS FOR THESE NOTES MAY BE USED, OR IF INSUFFICIENT QUANTITIES ARE AVAILABLE, OUTSIDE TOPSOIL MEETING THE FOLLOWING CRITERIA SHALL BE PROVIDED.

(2.3) ON-SITE TOPSOIL SHALL BE STOCKPILED TOPSOIL THAT HAS BEEN SALVAGED IN ACCORDANCE WITH SECTION 303.04(A) OF THE V.D.O.T. SPECIFICATIONS. IT SHALL BE FREE FROM REFUSE, OR ANY MATERIAL TOXIC TO PLANT GROWTH, AND REASONABLY FREE FROM SUBSOIL, STUMPS, ROOTS, BRUSH, STONES, CLAY, LUMPS, OR SIMILAR OBJECTS LARGER THAN 3" IN THEIR GREATEST DIMENSION.

(2.4) OFF-SITE TOPSOIL, IF NEEDED, SHALL BE TOPSOIL FURNISHED FROM SOURCES OUTSIDE THE PROJECT LIMITS AND SHALL BE THE ORIGINAL TOP LAYER OF A SOIL PROFILE FORMED UNDER NATURAL CONDITIONS, TECHNICALLY DEFINED AS THE "A" HORIZON BY THE SOIL SOCIETY OF AMERICA. IT SHALL CONSIST OF NATURAL, FRIABLE, LOAMY SOIL WITHOUT ADMIXTURES OF SUBSOIL. OR OTHER FOREIGN MATERIALS, AND SHALL BE REASONABLY FREE FROM STUMPS, ROOTS, HARD LUMPS, STIFF CLAY, STONE, NOXIOUS WEEDS, BRUSH, OR OTHER LITTER. IT SHALL HAVE DEMONSTRATED BY EVIDENCE OF HEALTHY VEGETATION GROWING, OR HAVING GROWN ON IT PRIOR TO STRIPPING, THAT IT IS REASONABLY WELL DRAINED AND DOES NOT CONTAIN SUBSTANCES TOXIC TO PLANTS.

(2.4.1) "A" HORIZON: "A" HORIZONS SHALL BE MINERAL HORIZONS CONSISTING OF (1) HORIZONS OR ORGANIC MATTER ACCUMULATION FORMED OR FORMING AT OR ADJACENT TO THE SURFACE; (2) HORIZONS THAT HAVE LOST CLAY, IRON, OR ALUMINUM, WITH RESULTANT CONCENTRATIONS OF QUARTZ OR OTHER RESISTANT MINERALS OF SAND OR SILT SIZE; OR (3) HORIZONS DOMINATED BY 1 OR 2 ABOVE BUT TRANSITIONAL TO AN UNDERLYING B OR C.

(2.4.2) "A" HORIZON SUBDIVISIONS: A1 HORIZONS SHALL BE MINERAL HORIZONS, FORMED OR FORMING AT OR ADJACENT TO THE SURFACE, IN WHICH THE FEATURE EMPHASIZED IS AN ACCUMULATION OF HUMIDIFIED ORGANIC MATTER INTIMATELY ASSOCIATED WITH THE MINERAL FRACTION. THE SOIL IS A DARK OR DARKER THAN UNDERLYING HORIZONS BECAUSE OF THE PRESENCE OF ORGANIC MATTER. THE ORGANIC MATERIAL IS ASSUMED TO BE DERIVED FROM PLANT AND ANIMAL REMAINS DEPOSITED ON THE SURFACE OF THE SOIL OR DEPOSITED WITHIN THE HORIZON WITHOUT APPRECIABLE TRANSLOCATION.

A2 HORIZONS SHALL BE MINERAL HORIZONS IN WHICH THE FEATURE EMPHASIZED IS LOSS OF CLAY, IRON OR ALUMINUM, WITH RESULTANT CONCENTRATION OF QUARTZ OR OTHER RESISTANT MINERALS IN SAND AND SILT SIZES.

(2.4.3) "A" HORIZON TOPSOIL CONTENT: "A" HORIZON TOPSOIL SHALL BE IN ACCORDANCE WITH THE FOLLOWING MATERIALS BY PERCENTAGE OF VOLUME:

SILT	42–58%
SAND	15–20%
CLAY	15–20%
ORGANIC MATERIAL	12–18%

(2.5) TOPSOIL SHALL HAVE A pH IN THE RANGE OF 6.0 TO 7.0 PRIOR TO MIXING WITH AMENDMENTS. IF THE pH IS NOT WITHIN THIS RANGE, THE pH SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE OR A DIFFERENT SOURCE OF SUPPLY SHALL BE SELECTED. TOPSOIL SHALL BE SUBJECT TO INSPECTION BY THE OWNER OR THE OWNER'S REPRESENTATIVE AT THE SOURCE OF SUPPLY AND IMMEDIATELY PRIOR TO USE IN THE PLANTING OPERATIONS.

(2.6) PLANTING SOIL AFTER AMENDING FOR DECIDUOUS PLANTS SHALL HAVE A pH VALUE BETWEEN 6.0 AND 7.0, AND FOR EVERGREEN OR SEMI-EVERGREEN PLANTS SHALL HAVE A pH VALUE BETWEEN 5.0 AND 6.0. A REPRESENTATIVE SAMPLE FROM THE EXCAVATED SOIL SHALL BE FIELD TESTED FOR pH UTILIZING A RELIABLE SOIL pH METER OR SOIL pH TEST KIT. THE pH VALUE OF THE NATURAL SOIL BACKFILL MIXTURE MAY BE AMENDED BY ADDING LIMESTONE OR ALUMINUM SULFATE AS NEEDED.

(3) EXCAVATION OF PLANT PITS

(3.1) PRIOR TO EXCAVATION OF PLANT PITS, A DIAMETER EQUAL TO TEN TIMES THE DIAMETER OF THE ROOT BALL SHALL BE ROTO-TILLED TO A DEPTH EQUAL TO THE DEPTH OF THE ROOT BALL FOR PLANTS HAVING ROOT BALLS NO DEEPER THAN 12". FOR PLANTS HAVING ROOT BALLS OVER 12" DEEP, THE ROTO-TILLED AREA SHALL TAPER FROM THE DEPTH OF THE ROOTBALL TO 12". UNDER NO CIRCUMSTANCES SHALL THE ROTO-TILLED DEPTH BE GREATER THAN THE DEPTH OF THE ROOT BALL.

(3.2) IN CONTINUOUS SHRUB AND GROUND COVER BEDS, THE ROTO-TILLED PERIMETER SHOULD EXTEND TO A DISTANCE OF 5 TIMES THE DIAMETER OF A SINGLE ROOTBALL FROM THE PLANTED AREA. THE BED SHALL BE TILLED TO A DEPTH OF 18".

(3.3) PLANT PITS FOR WELL DRAINED SOILS SHALL BE DUG SO THAT THE BOTTOM OF THE ROOT BALL WILL REST ON UNDISTURBED SOIL AND THE TOP OF THE ROOT BALL WILL BE FLUSH WITH FINISH GRADE. IN POORLY DRAINED SOILS THE PLANT PIT SHALL BE DUG SO THAT THE ROOT BALL RESTS ON UNDISTURBED SOIL AND THE TOP OF THE ROOT BALL IS 1" ABOVE FINISH GRADE. PLANT PIT WALLS SHALL BE SCARIFIED PRIOR TO PLANT INSTALLATION.

(3.4) INDIVIDUAL TREE PITS SHALL CONTAIN TWO GRAVEL SUMPS. THE GRAVEL SUMPS SHALL BE PLACED OPPOSITE ONE ANOTHER IN THE LAYER OF UNDISTURBED SOIL AT A DISTANCE OF 3 TIMES THE DIAMETER OF THE ROOT BALL. A VERTICAL PIPE SHALL BE INSTALLED AT EACH OF SUMP AND SHALL BE FILLED WITH GRAVEL. THE PIPE SHALL EXTEND TO A LEVEL EQUAL TO THE TOP OF THE MULCH.

(3.5) ALL AIR POCKETS SHALL BE REMOVED FROM PLANT PIT UPON BACK FILLING WITH PLANTING SOIL BY FILLING APPROXIMATELY 1/2 TO 2/3 OF THE PIT WITH PLANTING BACKFILL MATERIAL AND THEN WATERING THE BACKFILL MATERIAL TO ENSURE SETTLEMENT OF THE MATERIAL. BACKFILL MATERIAL SHALL THEN BE PLACED WITHIN THE REMAINING CAVITIES OF THE PLANT PIT AND WATERED AGAIN TO ENSURE SETTLEMENT OF THE BACKFILL MATERIAL. UNDER NO CIRCUMSTANCES SHALL ANY SOIL OR BACKFILL MATERIAL BE APPLIED ABOVE THE ROOT COLLAR OF THE PLANTS.

(3.6) GROUND COVERS SHALL BE PLANTED IN BEDS HAVING A MINIMUM DEPTH OF 4" BELOW THE PROPOSED ROOT DEPTH. PLANTS SHALL BE EVENLY SPACED AND SET TO MAINTAIN THE ORIGINAL GROWING DEPTH WHILE ALLOWING FOR A 2" TOP DRESSING OF MULCH.

(4) PLANT MATERIAL AND MULCH

(4.1) THE NAMES OF PLANTS REQUIRED UNDER THIS CONTRACT CONFORM TO THOSE GIVEN IN L.H. BAILEY'S HORTUS THIRD, 1976 EDITION. NAMES OF VARIETIES NOT INCLUDED THEREIN CONFORM GENERALLY WITH NAMES ACCEPTED IN THE NURSERY TRADE. ALL PLANTS SHALL HAVE A HABIT OF GROWTH THAT IS NORMAL FOR THEIR SPECIES AND THEY SHALL BE SOUND, HEALTHY AND VIGOROUS, WITH WELL DEVELOPED ROOT SYSTEMS. ALL PLANT MATERIAL SHALL BE FREE FROM INSECT PESTS, PLANT DISEASES, AND INJURIES. ALL PLANTS SHALL EQUAL OR EXCEED THE MEASUREMENTS SPECIFIED IN THE PLANT LIST, WHICH ARE MINIMUM ACCEPTABLE SIZES. TREES SHALL HAVE SINGLE TRUNKS EXCEPT AS NOTED. ALL SHRUBS SHALL BE HEALTHY, VIGOROUS, AND OF GOOD COLOR. ONLY DAMAGED OR BROKEN BRANCHES OF PLANT MATERIAL MAY BE PRUNED AND ANY NECESSARY PRUNING SHALL BE DONE AT THE TIME OF PLANTING. HOWEVER, UNDER NO CIRCUMSTANCES SHALL THE CENTRAL LEADER OF A PLANT BE PRUNED. BALLING AND BURLAPPING OF PLANTS SHALL FOLLOW THE CODE OF STANDARDS CURRENTLY RECOMMENDED BY THE AMERICAN STANDARD FOR NURSERY STOCK.

(4.2) ALL TAGS, STRINGS OR ANY OTHER MATERIAL ATTACHED TO THE PLANTS SHALL BE REMOVED AT THE TIME OF THE PLANTING. LABEL AT LEAST ONE TREE, SHRUB AND GROUNDCOVER OF EACH VARIETY WITH A SECURELY ATTACHED WATERPROOF TAG BEARING LEGIBLE DESIGNATION OF BOTANICAL NAME AND THE SIZE AS SPECIFIED IN THE PLANT LIST OF REQUIRED PLANTS. LABELS SHALL BE SECURELY ATTACHED TO PLANTS AND SHALL BE LEGIBLE FOR 60 DAYS AFTER DELIVERY TO THE PLANTING SITE. WIRE IDENTIFICATION TAGS SHALL NOT BE USED.

(4.3) SUBSTITUTIONS WILL BE PERMITTED ONLY UPON SUBMISSION OF PROOF THAT ANY PLANT IS NOT OBTAINABLE. ALL SUBSTITUTIONS MUST BE AUTHORIZED BY THE OWNER OR THE OWNER'S REPRESENTATIVE IN WRITING PROVIDING FOR USE OF THE NEAREST EQUIVALENT OBTAINABLE SIZE OR VARIETY OF PLANT HAVING THE SAME ESSENTIAL CHARACTERISTICS AS THE ORIGINAL VARIETY WITH AN EQUITABLE ADJUSTMENT OF CONTRACT PRICE.

(4.4) BALLED AND BURLAPPED PLANTS (B&B) SHALL BE DUG WITH FIRM, NATURAL BALLS OF EARTH OF SUFFICIENT DIAMETER AND DEPTH TO ENCOMPASS THE FIBROUS AND FEEDING ROOT SYSTEM NECESSARY FOR FULL RECOVERY OF THE PLANT. BALLS SHALL BE FIRMLY WRAPPED WITH BURLAP OR SIMILAR MATERIAL AND BOUND WITH TWINE OR CORD. BURLAP SHALL NOT BE PULLED OUT FROM UNDER BALLS DURING PLANTING OPERATIONS. B&B PLANTS WHICH CANNOT BE PLANTED IMMEDIATELY ON DELIVERY SHALL BE COVERED WITH MOIST SOIL, MULCH, OR OTHER MATERIAL TO PROVIDE PROTECTION FROM DRYING WINDS AND SUN.

(4.5) PLANTS NOTED "CONTAINER" ON THE PLANT LIST MUST BE CONTAINER GROWN WITH WELL ESTABLISHED ROOT SYSTEMS. LOOSE CONTAINERIZED PLANT MATERIAL WILL NOT BE ACCEPTED. ALL PLANTS INJURED AND PLANTS WITH ROOT BALLS BROKEN DURING TRANSPORT OR PLANTING OPERATIONS WILL BE REJECTED. BARE-ROOTED PLANTS (BR) SHALL BE PLANTED OR HEELED-IN IMMEDIATELY UPON DELIVERY. ALL PLANTS SHALL BE WATERED AS NECESSARY UNTIL PLANTED.

(4.6) NEW PLANTINGS SHALL BE LOCATED WHERE SHOWN ON THE PLAN EXCEPT WHERE OBSTRUCTIONS BELOW GROUND ARE ENCOUNTERED OR WHERE CHANGES HAVE BEEN MADE IN THE PROPOSED CONSTRUCTION. NECESSARY ADJUSTMENTS SHALL BE MADE ONLY AFTER APPROVAL BY THE OWNER OR THE OWNER'S REPRESENTATIVE. REASONABLE CARE SHALL BE EXERCISED TO HAVE PLANTING PITS DUG AND SOIL PREPARED PRIOR TO MOVING PLANTS TO THEIR RESPECTIVE LOCATIONS TO ENSURE THAT THEY WILL NOT BE UNNECESSARILY EXPOSED TO DRYING OR PHYSICAL DAMAGE.

(4.7) A LIST OF PLANTS, INCLUDING SIZES, QUANTITIES AND OTHER REQUIREMENTS, IS SHOWN ON THE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE QUANTITIES AS SHOWN ON THE DRAWINGS. IF DISCREPANCIES OCCUR IN THE QUANTITIES SHOWN, THE PLANTING PLANS SHALL GOVERN.

(4.8) THE PLANTING CONTRACTOR WILL BE NOTIFIED BY THE GENERAL CONTRACTOR WHEN OTHER DIVISIONS OF THE WORK HAVE PROGRESSED SUFFICIENTLY TO COMMENCE WORK ON THE PLANTING OPERATION. THEREAFTER, PLANTING OPERATIONS SHALL BE CONDUCTED UNDER FAVORABLE WEATHER CONDITIONS DURING THE NEXT SEASON OR SEASONS WHICH ARE NORMAL FOR SUCH WORK. REMOVAL OF ROCK OR OTHER UNDERGROUND OBSTRUCTIONS, RELOCATIONS TO AVOID OBSTRUCTIONS, AND PROVISION OF DRAINAGE FOR PLANTING AREAS SHALL BE DONE ONLY AS APPROVED BY THE OWNER OR THE OWNER'S REPRESENTATIVE.

(4.9) ALL PLANTS SHALL BE PLANTED UPRIGHT AND FACED TO GIVE THE BEST APPEARANCE OR RELATIONSHIP TO ADJACENT STRUCTURES. ROOTS SHALL BE SPREAD IN THEIR NORMAL POSITION. ALL BROKEN OR FRAYED ROOTS SHALL BE CUT OFF CLEANLY. PLANTS WITH CIRCLING ROOTS SHALL NOT BE ACCEPTED. BURLAP TWINE AND OTHER FASTENING MATERIAL SHALL BE CUT AND PUSHED TO THE BOTTOM OF THE PLANT PIT PRIOR TO BACKFILL MATERIAL BEING PLACED. THE PLANT SHALL NOT BE ROCKED BACK AND FOURTH TO ENTIRELY REMOVE THE WRAPPING MATERIAL NOR SHALL ANY OTHER PRACTICE BE PERFORMED WHICH COULD CAUSE THE ROOT BALL TO BREAK APART. WHEN WIRE BASKETS ARE USED ON THE ROOT BALL OF PLANTS THE WIRE SHALL BE REMOVED TO AT LEAST 12" BELOW THE TOP OF THE ROOT BALL.

(4.10) AT THE TIME OF PLANTING, AND AS MANY TIMES LATER AS SEASONAL CONDITIONS REQUIRE, EACH PLANT AND THE SOIL AROUND IT SHALL BE THOROUGHLY WATERED. CARE SHOULD BE EXERCISED WHEN WATERING TO AVOID FLOODING OF PLANTS AND BEDS, DISPLACEMENT OF MULCH MATERIAL AND EROSION OF SOIL. AVOID USE OF HIGH PRESSURE HOSES. THE CONTRACTOR SHALL MAKE, AT HIS EXPENSE, WHATEVER ARRANGEMENTS MAY BE NECESSARY TO ENSURE AN ADEQUATE SUPPLY OF WATER TO MEET THE NEEDS OF THIS CONTRACT DURING INSTALLATION. THE CONTRACTOR SHALL ALSO FURNISH ALL NECESSARY HOSE, EQUIPMENT ATTACHMENTS AND ACCESSORIES FOR THE ADEQUATE WATERING OF PLANTED AREAS AS MAY BE REQUIRED UNTIL ACCEPTANCE BY THE OWNER OR THE OWNER'S REPRESENTATIVE.

(4.11) MULCH SHALL BE CLEAN, GROUND OR SHREDDED BARK OR HARDWOOD MULCH. IN PLANTING AREAS WHERE SLOPES EXCEED 3:1 AND AT DRAINAGE DISPERSION POINTS OR ALONG NATURAL WATER WAYS WHERE CONCENTRATIONS OF SURFACE WATER EMPTY FROM CULVERTS OR PAVED DITCHES, HEAVY JUTE MESH SHALL BE INSTALLED. SHREDDED HARDWOOD OR BARK MULCH SHALL HAVE BEEN COMPOSTED FOR AT LEAST TWO MONTHS PRIOR TO APPLICATION. FRESHLY GROUND MULCH WILL NOT BE ACCEPTED. FINELY GROUND MULCH WHICH INHIBITS DRAINAGE, ENCOURAGES WEED GROWTH OR BECOMES WATERLOGGED WILL NOT BE ACCEPTED. MULCH SHALL BE COMPOSED OF SIMILAR SIZED FRAGMENTS AND SHALL NOT CONTAIN STICKS, CONES, LEAVES, UNSHREDDED PIECES, OR OTHER DELETERIOUS MATTER. ALL AZALEA AND CAMELLIA PLANTING BEDS SHALL HAVE 1" OF PINE STRAW MULCH UNDER 2" OF BARK OR SHREDDED HARDWOOD MULCH.

(4.12) ALL PLANTS SHALL BE MULCHED IMMEDIATELY AFTER PLANTING. GROUND COVERS SHALL BE MULCHED WITH A 2" LAYER OF SHREDDED HARDWOOD OR BARK MULCH. ALL OTHER PLANTING BEDS, SHRUBS AND TREE PLANTINGS SHALL BE MULCHED WITH A 3" MINIMUM LAYER OF MULCH. THIS MULCH SHALL ENTIRELY COVER THE AREA OF THE PLANTING PIT, BED, OR EARTH BERM AROUND EACH PLANT WITH THE EXCEPTION OF THE AREA IMMEDIATELY ADJACENT TO THE PLANT TRUNK OR TRUNKS. THE AREA IMMEDIATELY ADJACENT TO THE PLANT TRUNK OR TRUNKS SHALL BE LEFT FREE OF ANY MULCH.

(5) FERTILIZING

(5.1) THE FERTILIZER SHOULD BE A DRY SLOW RELEASE FORM OF FERTILIZER. IT SHOULD CONTAIN AT LEAST 25–50% WATER INSOLUBLE NITROGEN. THE FERTILIZER SELECTED SHOULD ALSO HAVE A LOW ADJUSTED SALT INDEX TO PREVENT BURNING. THE N-P-K RATIO SHOULD NOT EXCEED 3-1-2 UNLESS THE SOIL TEST REVEALS THAT ADDITIONAL LEVELS OF P AND K ARE NECESSARY.

(5.2) FOR DECIDUOUS TREES, USE OSMOCOTE (18-6-12) AT THE RATE EQUIVALENT TO 4 LBS ACTUAL N/1000 SQ FT OF ROOT ZONE AREA/YEAR. FOR EVERGREEN TREES USE 2 LBS ACTUAL N/1000 SQ FT OF ROOT ZONE AREA/YEAR.

(5.3) MIX THE FERTILIZER INTO THE BACKFILL SOIL OF THE TREE PITS. FOR SHRUB BEDS, MIX THE FERTILIZER INTO THE AREA THAT HAS BEEN ROTO-TILLED FOR THE PLANTS.

(5.4) THE FERTILIZER RATE FOR CONTINUOUS GROUND COVER AND SHRUB BEDS SHOULD BE DERIVED BY CALCULATING THE ENTIRE ROOT ZONE AREA. THE ROOT ZONE AREA IS FOUND BY MEASURING THE AREA CONTAINING THE MULTIPLE PLANT ROOTS. USE OSMOCOTE (18-6-12) AT A RATE EQUIVALENT TO 2 LBS OF N /1000 SQ FT OF ROOT ZONE AREA. THE FERTILIZER SHOULD BE EVENLY DISTRIBUTED WITHIN THE SHRUB BED SOIL.

(5.5) ALWAYS BE SURE THAT ADEQUATE MOISTURE IS AVAILABLE WHEN FERTILIZING SO THAT THE FERTILIZER WILL BE DISSOLVED INTO THE SOIL SOLUTION FOR ROOT UPTAKE AND TO AVOID BURNING THE ROOTS.

SHADE TREES			FERTILIZER RATE		SMALL UPRIGHT & SMALL SPREADING TREES			FERTILIZER RATE	
CALIPER	MIN. DIAM. OF ROOT BALL	AVG. ROOT ZONE AREA	EVER.	DECD.	CALIPER	MIN. DIAM. OF ROOT BALL	AVG. ROOT ZONE AREA	EVER.	DECD.
INCHES	IN.	SQ.FT.	IN.	IN.	INCHES	IN.	SQ.FT.	IN.	IN.
1 1/2	20	8.7	1.6	1.6	1 1/2	16	7.1	0.9	1.9
1 3/4	22	10.5	1.9	1.9	1 3/4	18	8.7	1.3	2.6
2	24	12.6	2.2	2.2	2	20	10.5	1.6	3.2
2 1/2	28	17.1	3.0	3.0	2 1/2	22	12.6	1.9	3.7
3	32	22.3	4.0	4.0	3	24	17.1	2.2	4.5
3 1/2	38	31.5	5.6	5.6	3 1/2	28	22.3	3.0	6.0
4	42	38.5	6.9	6.9	4	32	31.5	4.0	8.0
4 1/2	48	50.2	9.0	9.0	4 1/2	38	38.5	5.6	11.2
5	54	63.6	11.2	11.2	5	42	50.2	6.9	13.8
5 1/2	57	70.8	12.5	12.5	5 1/2	48	63.6	9.0	17.9
6	60	78.5	13.9	13.9	6	54	63.6	11.3	22.7

(6) STAKING

(6.1) TREES REQUIRING SUPPORT WILL BE INDICATED IN THE COMMENTS SECTION OF THE OF THE PLANTING SCHEDULE. ALL TREES REQUIRING SUPPORT SHALL BE STAKED ACCORDING TO THE DETAILS PROVIDED.

(6.2) TWO STAKES SHALL BE REQUIRED PER TREE. THE STAKES SHALL BE DRIVEN VERTICALLY INTO THE GROUND TO A DEPTH OF 2 1/2' TO 3', ON OPPOSITE SIDES OF THE TREE, IN SUCH A MANNER AS NOT TO INJURE THE ROOT BALL OR ROOTS. STAKES FOR SUPPORTING TREES SHALL BE 2" SQUARE OR ROUND, BY 8'. THE STAKES SHOULD BE SOUND WOOD TREATED WITH A SUITABLE WOOD PRESERVATIVE. A SINGLE BURLAP LOOP SHALL BE PLACED AROUND THE TRUNK, ABOVE THE FIRST MAJOR BRANCH, AND TACKED TO ONE OF THE WOODEN STAKES. ANOTHER SINGLE BURLAP LOOP SHALL ALSO BE PLACED AROUND THE TRUNK, ABOVE THE FIRST MAJOR BRANCH, AND TACKED TO THE OTHER WOODEN STAKE. THE BURLAP SHOULD BE TAUGHT.

(6.3) WOODEN STAKES AND BURLAP TIES SHOULD BE REMOVED AFTER ONE YEAR.

(7) CHEMICAL APPLICATION

(7.1) ALL PESTICIDES SHALL BE PRODUCTS OF RECOGNIZED COMMERCIAL MANUFACTURERS, AND SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL PESTICIDE LAWS. PESTICIDES SHALL BE APPLIED WITH CALIBRATED EQUIPMENT ACCORDING TO EPA LABEL RESTRICTIONS AND REGULATIONS BY A CERTIFIED APPLICATOR. ANY DAMAGE INCURRED TO THE SITE, ADJACENT PROPERTIES, OR APPLICATOR DURING PESTICIDE APPLICATIONS WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

(7.2) PESTICIDES SHOULD BE USED ONLY WHEN NECESSARY TO TREAT AN OUTBREAK OF A HARMFUL PEST OR DISEASE PROBLEM. THE OWNER OR THE OWNER'S REPRESENTATIVE SHALL BE NOTIFIED 24 HOURS PRIOR TO THE APPLICATION OF ANY PESTICIDE.

(8) MAINTENANCE AND GUARANTEE

(8.1) THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING HIS WORK FOR THE PERIOD OF ONE YEAR AFTER ACCEPTANCE BY THE OWNER OR THE OWNER'S REPRESENTATIVE. MAINTENANCE SHALL INCLUDE WATERING, WEEDING, CULTIVATING, MULCHING, REMOVAL OF DEAD MATERIALS, RESETTING OF PLANTS TO PROPER GRADES OR UPRIGHT POSITIONS, RESTORATION OF EARTH BERMS, AND OTHER NECESSARY OPERATIONS. ADEQUATE PROTECTION FOR LAWN AREAS AGAINST TRESPASSING DURING PLANTING OPERATIONS AND AGAINST DAMAGE OF ANY KIND SHALL BE PROVIDED. NOTHING IN THESE NOTES IS INTENDED TO RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO REPAIR EXISTING LAWN AREAS DAMAGED BY WORKMEN ENGAGED IN THE COMPLETION OF THIS PROJECT.

(8.2) INSPECTION OF THE WORK TO DETERMINE COMPLETION OF THE CONTRACT EXCLUSIVE OF THE POSSIBLE REPLACEMENT OF PLANTINGS, WILL BE MADE BY THE OWNER OR THE OWNER'S REPRESENTATIVE AT THE CONCLUSION OF THE INSTALLATION PERIOD UPON WRITTEN NOTICE REQUESTING SUCH INSPECTION. REQUEST SHALL BE SUBMITTED BY CONTRACTOR AT LEAST TEN DAYS PRIOR TO THE ANTICIPATED DATE FOR INSPECTION. AFTER INSPECTION, THE CONTRACTOR WILL BE NOTIFIED IN WRITING BY THE OWNER OR THE OWNER'S REPRESENTATIVE OF ACCEPTANCE OF THE WORK, EXCLUSIVE OF THE POSSIBLE REPLACEMENT OF PLANTS SUBJECT TO GUARANTEE; OR, IF THERE ARE ANY DEFICIENCIES, THE CONTRACTOR WILL BE NOTIFIED OF THE REQUIREMENTS NECESSARY FOR COMPLETION OF THE WORK. PLANTINGS SHALL NOT BE CONSIDERED ACCEPTED UNTIL ALL DEFICIENCIES HAVE BEEN CORRECTED AND APPROVED IN WRITING.

(8.3) NURSERY STOCK SHALL BE FULLY GUARANTEED FOR ONE FULL YEAR. ALL PLANTS THAT FAIL TO MAKE NEW GROWTH FROM A DORMANT CONDITION OR THAT DIE DURING THE FIRST YEAR AFTER PLANTING SHALL BE REPLACED. ALL REPLACEMENTS SHALL CONFORM WITH THE ORIGINAL SPECIFICATIONS AS TO SIZE AND TYPE. ALL COSTS OF REPLACEMENTS SHALL BE BORNE BY THE CONTRACTOR.

(9) ALL OTHER ITEMS NECESSARY TO MAKE WORK COMPLETE

(9.1) ANY PLANT MATERIAL NOT PLANTED SHALL BE REMOVED FROM THE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL UNUSED RUBBISH AND DEBRIS FROM THE SITE UPON COMPLETION OF HIS WORK.

(10) PERMANENT SEEDING

(10.1) TOPSOILING: WHERE TOPSOIIL IS REQUIRED ON REVERSE SOIL CONDITIONS, A MINIMUM OF FOUR INCHES OF TOPSOIL SHOULD BE USED. THE TOPSOIL SHOULD CONTAIN A MINIMUM OF 35% FINE GRAINED MATERIAL (SILT AND CLAY AND 1.5% + ORGANIC MATTER).

(10.2) LIME AND FERTILIZER: A. LIME – APPLY GROUND LIMESTONE OR

A. LIME – APPLY GROUND LIMESTONE OR EQUIVALENT AT THE RATE OF 2 TONS PRE ACRE.
B. FERTILIZER – 700 POUNDS PER ACRE OF 10-20-10 FERTILIZER OR EQUIVALENT.

IF SOILS ARE UNIFORM, IT IS DESIRABLE TO HAVE LIME AND FERTILIZER RECOMMENDATIONS BASED ON SOIL TESTS. THE LIME AND FERTILIZER SHOULD BE DISKED OR WORKED INTO A GOOD SEEDBED TO A DEPTH OF THREE TO FOUR INCHES.

(10.3) SEEDING: SEED ONE OF THE FOLLOWING MIXTURES AT THE SPECIFIED RATES PER ACRE FOR AREAS WITHOUT TURF REQUIREMENTS:

A. 170–200 LBS. TALL FESCUE (KY-31)
2 LBS. OF LADINO CLOVER
8 LBS. OF RED CLOVER
B. 80–100 LBS. TALL FESCUE (KY-31)
25 LBS. SERICEA LESPEDEZA FOR SPRING SEEDING

SEEDING DATES – FALL SEEDING DATES FROM AUGUST 1 TO NOVEMBER 1 ARE GENERALLY PREFERRED FOR THE ABOVE MIXTURES. SPRING SEEDING DATES WOULD BE FROM FEBRUARY 28, TO MAY 15.

(10.4) SEED ONE OF THE FOLLOWING MIXTURES FOR AREA WITH TURF REQUIREMENTS:

TYPE OF GRASS	SEEDING RATE	SEEDING DATE
TALL FESCUE KENTUCKY 31	8 – 10 LBS. PER 1,000 SQ. FT.	FEB. – MARCH SEPT. – OCT.
COMMON BERMUDA	SPRING SEEDING: 2 LBS./1000 SQ. FT. (HULLED SEED) FALL SEEDING: 7 LBS./1000 SQ. FT. (UNHULLED SEED)	MAY – JUNE ALL OTHERS
TUFCOTE (BERMUDA)	SOD PLUGS ON 1 FT. CENTERS SPRIGS AT 7 BU./1000 SQ.FT. BROADCAST	MARCH – JULY MARCH – JULY

(10.5) MULCH

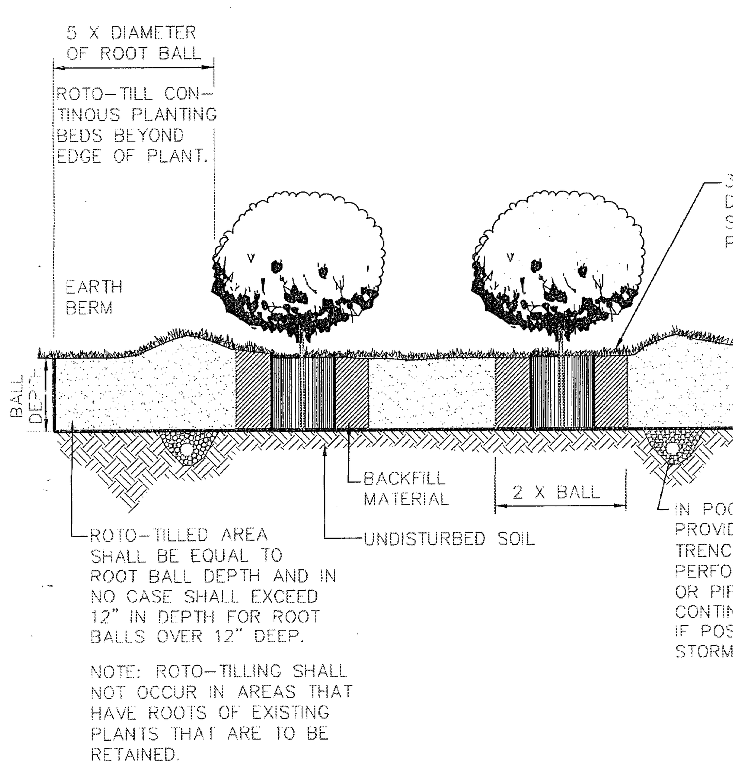
A. MULCH – MULCH WITH ANY OF THE MATERIALS LISTED BELOW AND AT THE RATE INDICATED. SPREADING SHOULD BE UNIFORM AND AT A RATE THAT PERMITS NO MORE THAN 25–50% OF THE GROUND SHOWING THROUGH THE MULCH.
B. MULCHING IS SPECIFICALLY REQUIRED ON ALL SOILS EXCEEDING 25% SLOPE.
1. STRAW – 1 TO 2 TONS/ACRE DEPENDING ON SEASON AND METHOD OF APPLICATION.
2. WOOD FIBER MATERIALS – 1,000 LBS. PER ACRE.

(10.6) MAINTENANCE

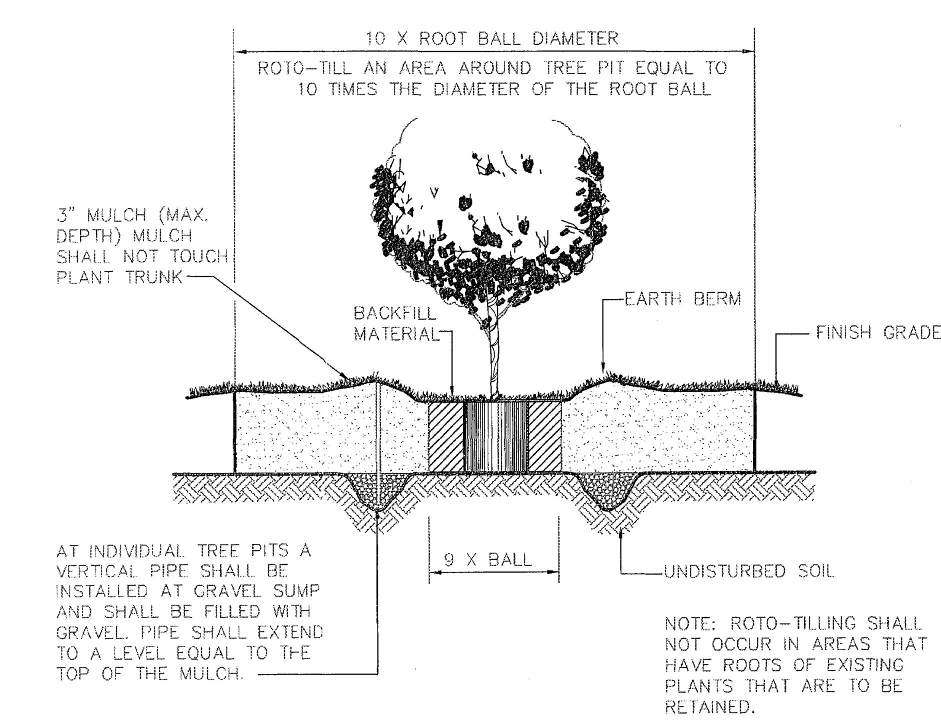
A. IRRIGATION – IF SOIL MOISTURE IS DEFICIENT, SUPPLY NEW SEEDINGS AND PLANTINGS WITH ADEQUATE WATER FOR PLANT GROWTH UNTIL THEY ARE FIRMLY ESTABLISHED.
B. REPAIR – INSPECT ALL AREAS FOR PLANTING FAILURES AND MAKE NECESSARY REPAIRS, REPLACEMENTS, AND RESEEDING WITH THE PLANTING SEASON IF POSSIBLE.
C. LIME AND FERTILIZER – SHALL BE APPLIED UNDER A REGULAR PROGRAM THAT IS BASED ON SOIL FERTILITY TESTS AND ON THE USE AND GENERAL APPEARANCE OF THE VEGETATIVE COVER DURING SUBSEQUENT GROWING SEASONS.

PLANT SCHEDULE

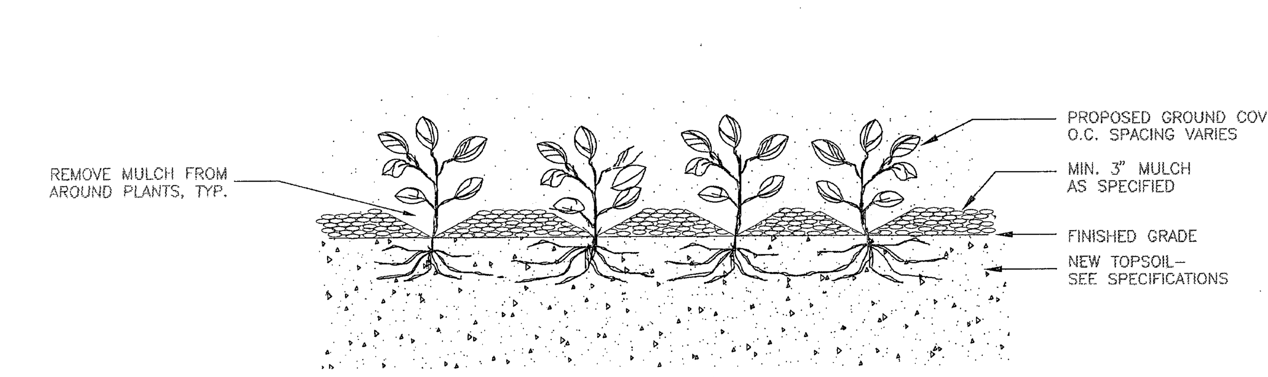
ITEM NO.	KEY	QNTY.	BOTANICAL NAME	COMMON NAME	INITIAL SIZE HEIGHT	INITIAL SIZE WIDTH	INITIAL SIZE CALIPER	ROOT	SPACING	COMMENTS
			TREES:							
1	AR	12	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE			1.5"	B&B	AS SHOWN	
2	PT	23	PINUS TAEDA	LOBLOLLY PINE	6'–8'			B&B	AS SHOWN	
3	QP	9	QUERCUS PHILLOS	WILLOW OAK			2"–2.5"	B&B	AS SHOWN	
4	TD	27	TAXODIUM DISTICHUM	BALD CYPRESS	8'–10'			B&B	AS SHOWN	
5	AC	3	AMELANCHIER CANADENSIS	SERVICEBERRY	8'–10'			B&B	AS SHOWN	
			SHRUBS:							
6	CJ	131	CALLICARPA JAPONICA	JAPANESE BEAUTYBERRY	3'–4'			CONT.	5' O.C.	
7	INV	109	ILEX VOMITORIA 'NANA'	DWARF YAUPON HOLLY	15"–18"			CONT.	3' O.C.	
			ALTERNATE BID:							
8	SJ	11	STYRAX JAPONICUS	JAPANESE SNOWBELL	4'–5'			CONT.	AS SHOWN	



SHRUB PLANTING
NOT TO SCALE



TREE PLANTING
NOT TO SCALE



GROUND COVER PLANTING DETAIL
NOT TO SCALE

COMMONWEALTH OF VIRGINIA
VAUGHN B. RINNER
No. 0335
LANDSCAPE ARCHITECT

Langley and McDonald, P.C.
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JAMES CITY/ WILLIAMSBURG COMMUNITY CENTER

WILLIAMSBURG– JAMES CITY COUNTY, VA

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PROJECT NUMBER: 9445 (L&M # 95034-1)

PROJECT MANAGER: VBR

DRAWN BY: DRL/HTB

ISSUE DATE: DEC. 15, 1995

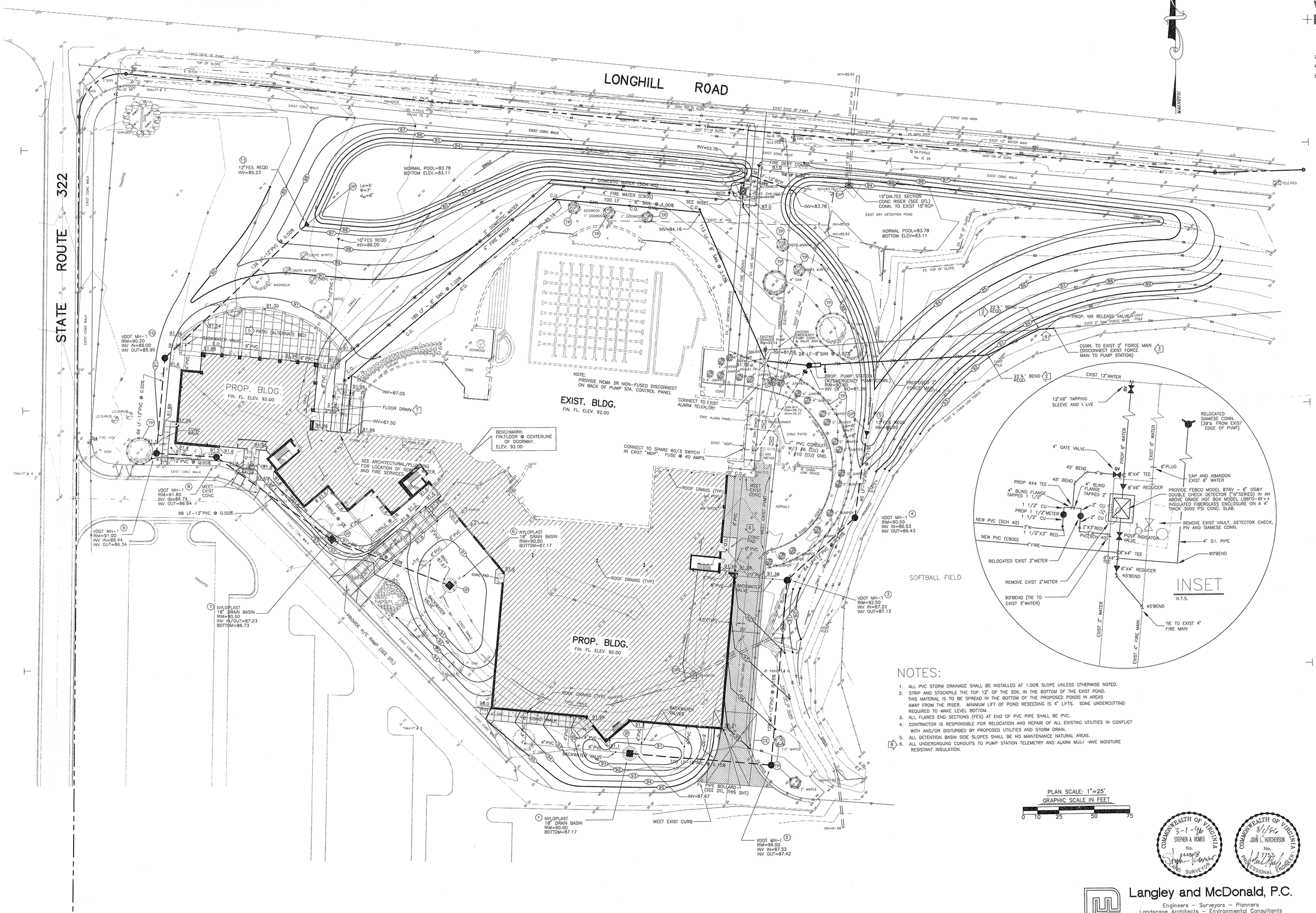
REVISIONS:

SHEET TITLE: PLANTING NOTES, DETAILS & SCHEDULE

SHEET NUMBER: C 5.2

DWG. 5882 GW

NOTE: BOUNDARY SHOWN IS TAKEN FROM SITE PLAN BY DeYOUNT–JOHNSON GROUP, INC. DATED APRIL 8, 1985. NO FIELD VERIFICATION WAS PERFORMED BY LANGLEY AND McDONALD, P.C.



NOTES:

1. ALL PVC STORM DRAINAGE SHALL BE INSTALLED AT 1.00% SLOPE UNLESS OTHERWISE NOTED.
2. STRIP AND STOCKPILE THE TOP 12" OF THE SOIL IN THE BOTTOM OF THE EXIST POND. THIS MATERIAL IS TO BE SPREAD IN THE BOTTOM OF THE PROPOSED PONDS IN AREAS AWAY FROM THE RISER. MINIMUM LIFT OF POND RESEEDING IS 4" LIFTS. SOME UNDERCUTTING REQUIRED TO MAKE LEVEL BOTTOM.
3. ALL FLARED END SECTIONS (FES) AT END OF PVC PIPE SHALL BE PVC.
4. CONTRACTOR IS RESPONSIBLE FOR RELOCATION AND REPAIR OF ALL EXISTING UTILITIES IN CONFLICT WITH AND/OR DISTURBED BY PROPOSED UTILITIES AND STORM DRAIN.
5. ALL DETENTION BASIN SIDE SLOPES SHALL BE NO MAINTENANCE NATURAL AREAS.
6. ALL UNDERGROUND CONDUITS TO PUMP STATION TELEMETRY AND ALARM MUST HAVE MOISTURE RESISTANT INSULATION.

COMMONWEALTH OF VIRGINIA
3-1-96
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LAND SURVEYOR

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PROJECT NUMBER:
9445 (L&M # 95034–1)

PROJECT MANAGER:
NHM

DRAWN BY:
MRG

ISSUE DATE:
FEB. 28, 1996

REVISIONS:

2	2/28/96	REV BENDS TO 22 1/2°
3	2/28/96	REV CONN. LOCATION
4	2/28/96	ADD AIR RELEASE VALVE
5	2/28/96	REV PATIO PER ARCHITECT
6	2/28/96	ADD CONC PAD PER ARCHITECT
7	2/28/96	ADD FLOOR DRAIN & 4"PVC
8	2/28/96	ADD NOTE PER HEALTH DEPT.

SHEET TITLE:
GRADING AND UTILITIES PLAN

SHEET NUMBER:
C2.1

DWG. 5882 BW

PC039_JCC_WILLIAMSBURG_REC_CENTER_EXPAND - 008

SITE DATA

LOT NO.: (39-1) (153)
ZONED: R2

BOND, COMET, WESTMORELAND & HINER, ARCHITECTS
LANGLEY AND MCDONALD, P.C., SURVEYOR, LANDSCAPE ARCHITECT AND SITE ENGINEER

WATER SUPPLY: 12" WATER MAIN AT SOUTH SIDE OF LONGHILL RD.

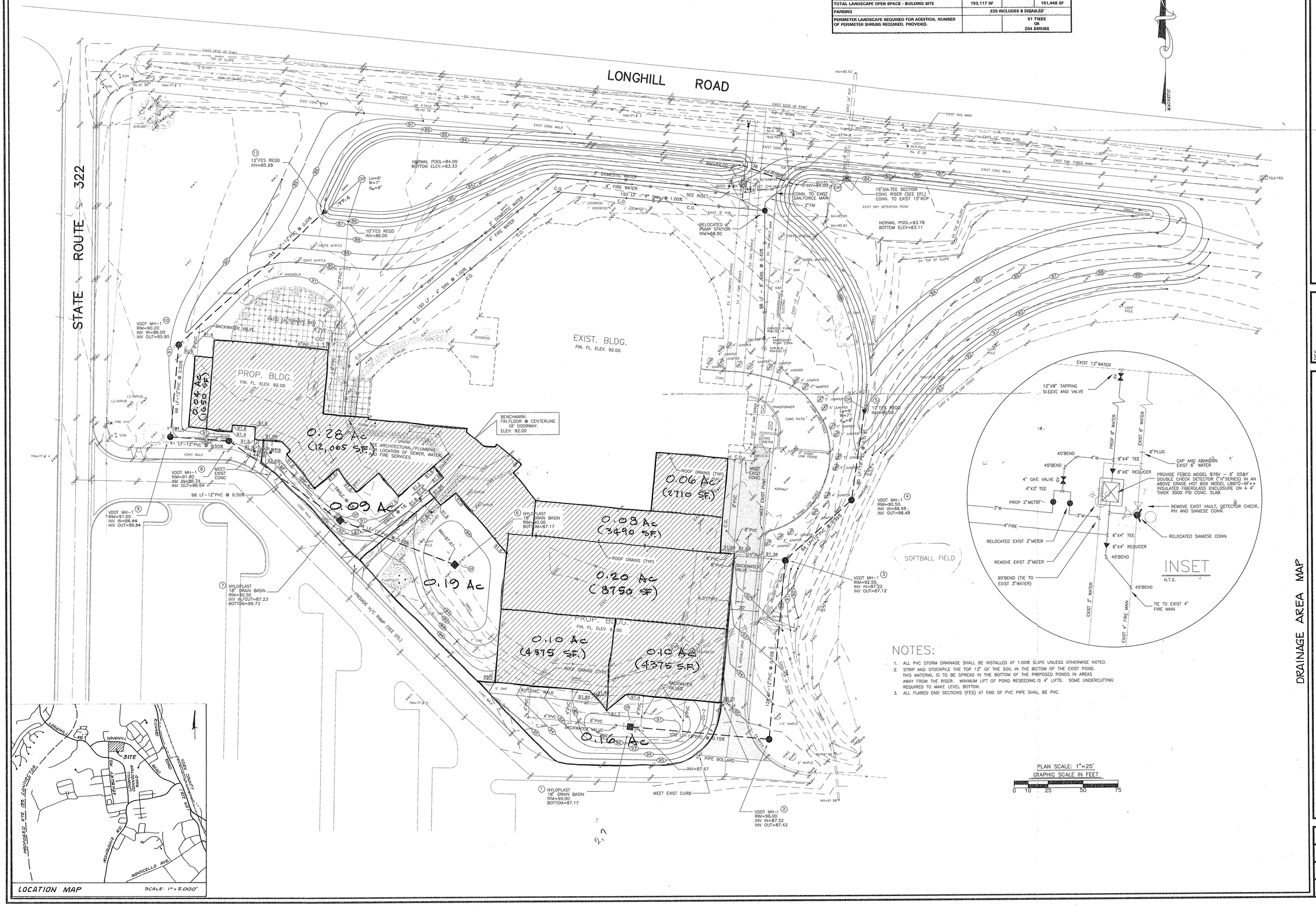
SANITARY SEWER: 2" FORCE MAIN FROM ON-SITE PUMP STATION TO JCSA GRAVITY MANHOLE AT LONGHILL ROAD.

ELECTRIC SERVICE: VIRGINIA POWER

USE GROUP - A3
BUILDING CONSTRUCTION TYPE - 2C

SITE STATISTICAL DATA
PLAT 39-1 (153)

ZONED R-2	EXISTING	ADDITION	NEW TOTAL
TOTAL SITE - 22.563 AC.	982,644 SF		
BUILDING SITE	248,262 SF INCLUDED IN 982,644 SF		
BUILDING COVERAGE EXISTING	40,672 SF		
BUILDING COVERAGE NEW		40,281 SF	80,953 SF
PARKING AND DRIVES TO EXISTING ACCESS DRIVES NORTH OF CURB OF BUILDING SITE	104,582 SF		
SIDE WALKS AND DRIVES ON BUILDING SITE	15,145 SF	1,388 SF	16,533 SF
TOTAL IMPERVIOUS SURFACE - TOTAL SITE	160,399 SF/16%	41,669 SF	202,068 SF/21%
TOTAL IMPERVIOUS - BUILDING SITE	55,145 SF	41,669 SF	96,814 SF
TOTAL LANDSCAPE OPEN SPACE - TOTAL SITE	822,445 SF		780,776 SF
TOTAL LANDSCAPE OPEN SPACE - BUILDING SITE	193,117 SF		151,448 SF
PARKING	235 INCLUDES 8 DISABLED		
PERIMETER LANDSCAPE REQUIRED FOR ADDITION, NUMBER OF PERIMETER SHRUBS REQUIRED, PROVIDED.		51 TREES OR 254 SHRUBS	



NOTES:

1. ALL PVC STORM DRAINAGE SHALL BE INSTALLED AT 1.00% SLOPE UNLESS OTHERWISE NOTED.
2. STRIP AND STOCKPILE THE TOP 12" OF THE SOIL IN THE BOTTOM OF THE EXIST POND. THIS MATERIAL IS TO BE SPREAD IN THE BOTTOM OF THE PROPOSED PONDS IN AREAS AWAY FROM THE RISER. MINIMUM LIFT OF POND RESEEDING IS 4" LIFTS. SOME UNDERCUTTING REQUIRED TO MAKE LEVEL BOTTOM.
3. ALL FLARED END SECTIONS (FES) AT END OF PVC PIPE SHALL BE PVC.

LOCATION MAP SCALE: 1"=2,000'

COMMONWEALTH OF VIRGINIA
11-1-95
STEPHEN A. ROMEO
No. 1449-B
LAND SURVEYOR

Langley and McDonald, P.C.
Engineers · Surveyors · Planners
Landscape Architects · Environmental Consultants
WILLIAMSBURG
VIRGINIA BEACH

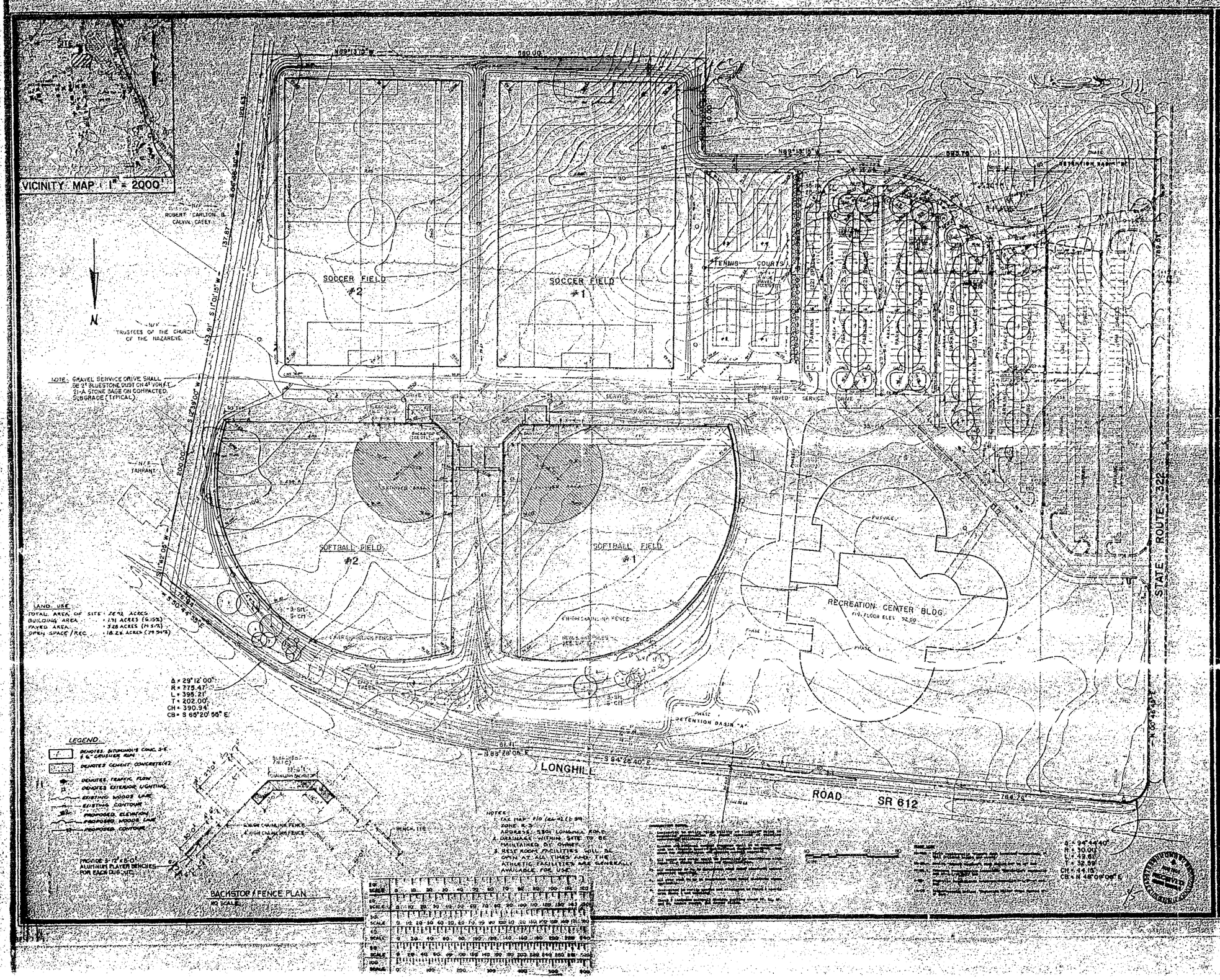
DES.	MRG
DWN.	MRG
CHK.	SAR
DATE	31 OCT 95

DRAINAGE AREA MAP

GRADING & UTILITIES PLAN
JAMES CITY COUNTY
REGIONAL RECREATION CENTER
JAMES CITY COUNTY VIRGINIA

SHEET	1 OF 6
DISK	
PROJ. NO.	95034-1
DWG.	5882 AW

PC039_JCC_WILLIAMSBURG_REC_CENTER_EXPAND - 009



33 SPACES PER THIS PLAN.

FILE: LONGHIL1.MRG
Project: JCC RECREATIONH CENTER
Location: James City County, Va.
Design: M. Gordon
Date: Oct. 31, 1995
Revision:
Yr. Storm: 10
N Value: 0.011 (PVC)

LANGLEY and McDONALD, P.C.
201 Packets Court
Williamsburg, Virginia 23185

STORM SEWER DESIGN COMPUTATIONS

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV. UP	INVERT ELEV. LOW	LENGTH	SLOPE	PIPE DIAM.
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches
		[E]	[E]			[E]				[E]		[E]		[E]
1	2	0.36	0.65	0.23	0.23	5.00	6.96	1.62	1.62	87.67	87.52	100	0.0015	12
2	3	MH-1	0.00	0.00	0.23	5.81	6.77	0.00	1.58	87.42	87.22	128	0.0015	12
3	4	0.34	0.90	0.31	0.54	6.70	6.57	2.03	3.56	87.12	86.53	64	0.0093	12
4	5	MH-1	0.00	0.00	0.54	6.88	6.53	0.00	3.54	86.43	86.00	60	0.0071	12
6	7	0.19	0.30	0.06	0.06	5.00	6.96	0.39	0.39	87.67	87.23	88	0.0050	12
7	8	0.09	0.30	0.03	0.08	5.61	6.81	0.18	0.57	87.23	86.74	98	0.0050	12
8	9	MH-1	0.00	0.00	0.08	6.21	6.68	0.00	0.55	86.64	86.44	41	0.0050	12
9	10	MH-1	0.00	0.00	0.08	6.46	6.62	0.00	0.55	86.34	86.00	66	0.0050	12
10	11	0.04	0.90	0.03	0.12	6.87	6.53	0.22	0.77	85.90	85.23	136	0.0050	12

FILE: LONGHIL1.MRG
Date: Oct. 31, 1995
Revision:

FROM PT.	TO PT.	VELOCITY	CAPACITY	FLOW TIME	FLOW RATIO	VELOCITY RATIO	REMARKS
		ft./sec.	cfs	min.	Qp/Qf	Vp/Vf	
1	2	2.07	1.62	0.81	1.00	1.00	
2	3	2.39	1.62	0.89	0.97	1.16	
3	4	5.86	4.04	0.18	0.88	1.14	
4	5	4.51	3.54	0.22	1.00	1.00	
6	7	2.42	2.95	0.61	0.13	0.64	
7	8	2.72	2.95	0.60	0.19	0.72	
8	9	2.68	2.95	0.26	0.19	0.71	
9	10	2.68	2.95	0.41	0.19	0.71	
10	11	3.04	2.95	0.75	0.26	0.81	

FILE: LONGHIL2.MRG
01-Nov-95

LANGLEY and McDONALD, P.C.
201 Packets Court
Williamsburg, Virginia 23185

Project: JCC RECREATION CENTER
Location: James City County, Virginia

HYDRAULIC GRADE LINE CALCULATIONS

1. Enter Tailwater Elevation 85.08

2. Enter "N" value for pipe? 0.011 (PVC)

3. Enter the following data: [E]

FROM PT.	TO PT.	Q OUT (cfs)	PIPE DIA.	L OUT (ft.)	FRICTION SLOPE	DNSTREAM INVERT	V OUT (FPS)	M.H.	INLET SHAPE	Q IN (cfs)	PIPE DIA.	ANGLE "K"	V IN (fps)	F.L.E.	H.G.E.
[E]	[E]	[E]	[E]	[E]		[E]		[E]	[E]			[E]		[E]	
1	2	1.62	12	100	0.0015	87.52	2.06	N	N	0.00	0	0.00	0.00	90.00	88.49
2	3	1.58	12	128	0.0014	87.22	2.01	Y	Y	1.62	12	0.70	2.06	96.00	88.24
3	4	3.56	12	64	0.0072	86.53	4.53	Y	Y	1.58	12	0.43	2.01	92.50	87.92
4	5	3.54	12	60	0.0071	86.00	4.51	Y	Y	3.56	12	0.43	4.53	90.50	87.39
6	7	0.39	12	88	0.0001	87.23	0.50	N	N	0.00	0	0.00	0.00	90.00	88.04
7	8	0.57	12	98	0.0002	86.74	0.73	N	N	0.39	12	0.10	0.50	90.50	87.56
8	9	0.55	12	41	0.0002	86.44	0.70	Y	Y	0.57	12	0.38	0.73	91.80	87.25
9	10	0.55	12	66	0.0002	86.00	0.70	Y	Y	0.55	12	0.70	0.70	91.00	86.82
10	11	0.77	12	136	0.0003	85.23	0.98	Y	Y	0.55	12	0.43	0.70	90.20	86.08

90 deg K=0.70 40 deg K=0.38
80 deg K=0.66 30 deg K=0.28
70 deg K=0.61 25 deg K=0.22
60 deg K=0.55 20 deg K=0.16
50 deg K=0.47 15 deg K=0.10

HF	HO	HI	HD	HT	.3HT	.5HT	H
0.15	0.02	0.00	0.00	0.02	0.00	0.00	0.02
0.18	0.02	0.02	0.05	0.09	0.00	0.04	0.04
0.46	0.08	0.02	0.03	0.13	0.00	0.06	0.06
0.43	0.08	0.11	0.14	0.33	0.00	0.16	0.16
0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00
0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00

File: JCCREC4.MRG
Project: JCC RECREATION CENTER @ Longhill Rd.
Location: James City County, Virginia
Design: M.Gordon
Date: Oct. 19, 1995
Rev.:

LANGLEY and McDONALD, P.C.
201 Packets Court
Williamsburg, Virginia 23185

ORFICE SIZE = 8 in.
STAGE INCREMENT = 0.11 ft.
INVERT ELEV. = 83.78
UPPER RANGE = 86.00
COEFFICIENT = 0.6
CONSTANT = 0.04375
TOTAL VOLUME = 53,750 cf

ELEV.	HEAD	FLOW
83.78	0.00	0.00
83.89	0.11	0.56
84.00	0.22	0.79
84.11	0.33	0.97
84.22	0.44	1.12
84.34	0.56	1.25
84.45	0.67	1.37
84.56	0.78	1.48
84.67	0.89	1.58
84.78	1.00	1.68
84.89	1.11	1.77
85.00	1.22	1.86
85.11	1.33	1.94
85.22	1.44	2.02
85.33	1.55	2.09
85.45	1.67	2.17
85.56	1.78	2.24
85.67	1.89	2.31
85.78	2.00	2.37
85.89	2.11	2.44
86.00	2.22	2.50

		34.52 cfs

AVG. FLOW RATE = 1.73 cfs

DETENTION TIME = 8.65 hrs.

File: JCCREC3.MRG
Project: JCC RECREATION CENTER
Location: James City County, Virginia
Design: MRG
Date: Oct. 19, 1995
Rev.:

LANGLEY and McDONALD, P.C.
201 Packets Court
Williamsburg, Virginia 23185

ORFICE SIZE = 8 in.
STAGE INCREMENT = 0.04 ft.
INVERT ELEV. = 83.78
UPPER RANGE = 84.45
COEFFICIENT = 0.6
CONSTANT = 0.04375

ELEV.	HEAD	FLOW
83.78	0.00	0.00
83.82	0.04	0.36
83.87	0.09	0.50
83.91	0.13	0.61
83.96	0.18	0.71
84.00	0.22	0.79
84.05	0.27	0.87
84.09	0.31	0.94
84.14	0.36	1.00
84.18	0.40	1.07
84.23	0.45	1.12
84.27	0.49	1.18
84.32	0.54	1.23
84.36	0.58	1.28
84.41	0.63	1.33
84.45	0.67	1.38
		14.37 cfs

AVG. FLOW RATE = 0.96 cfs

Phase 2 - Rec Center

I. Tennis Court

$115' \times 230' = 26,450\ ft^2$

$1'' \times 26,450\ ft^2 / 12 = 2200\ ft^3 = 45' \times 25' \times 2'$ deep

a) $\frac{2200}{.4} = 5500\ ft^3 = 45' \times 25' \times 4.9'$ - Infiltration trench

b) Dry basin - 4 PT

$0.61\ ac \times \frac{10\ PTS}{4\ PTS} = 1.52\ ac$ controlled

$1.52\ ac \times \frac{1}{2}'' \times \frac{43560}{12} = 2750\ ft^3$ - for 6-12 hrs.

$= \underline{45' \times 25' \times 2.5'}$ deep

II. Rec Center Bldg -

Area = $(120' \times 170) + 50' \times 120' = 26,400\ ft^2$

- same soln. as above

c) could use 6 PT BMP

$\frac{10}{6} \times .6\ ac = 1.0\ ac$ controlled

$1\ ac \times 1'' \times \frac{43560}{12} = 3630\ ft^3$ for 24 hrs.

Ex basin - $95' \times 50' \times 3/4'$ deep - for 24 hrs.

WORKSHEET A : NEW DEVELOPMENT

Option Two: VA. Chesapeake Bay Default

1 **Compile site-specific data and determine site imperviousness (I_{site}).**

		POST-DEVELOPMENT	PRE-DEVELOPMENT
A*		= 11.92 acres	11.92
I_a**	structures	= 1.85 acres	0.93
	parking lot	= ____ acres	____
	roadway (& WALKS)	= 0.21 acres	0.21
	other	= 0.37 acres	0.34
		= ____ acres	
		= ____ acres	
	total I_a	= 2.43 acres	1.48

I_{pre} = 12% (USE 16% DEFAULT)

I_{site} = (total I_a/A) × 100 = 0.21 (percent expressed in whole numbers)

* Although the area subject to regulations may be only the area actually in a CBPA, some localities may require all of the site to comply with criteria.

** I_a represents the actual amount of impervious area.

2 **Determine the average land cover conditions ($I_{watershed}$).**

Use $I_{watershed}$ = I_{VA}=16 because $F_{average}$ = 0.45 lbs/ac/yr for Virginia's Chesapeake Bay Watershed. Use C_{pre} = 0.26 mg/l.

3 **Determine need to continue.**

I_{site} = ____ % (from Step 1)
$I_{watershed}$ = 16 % (from Step 2)

If $I_{site} \leq I_{watershed}$, STOP and submit analysis to this point.
If $I_{site} > I_{watershed}$, CONTINUE.

4 **Set constants.**

P_j = unitless rainfall correction factor
= 0.9 for all of Tidewater Virginia

C = flow weighted mean concentration of total phosphorus
= 0.26 mg/l for all I_{site}

P = annual rainfall depth in inches
= 40 inches for Northern Virginia area
= 43 inches for Richmond Metropolian area
= 45 inches for Hampton Roads area

12 and 2.72 are used in the equation as unit conversion factors.

PC039_JCC_WILLIAMSBURG_REC_CENTER_EXPAND - 018

WORKSHEET A : NEW DEVELOPMENT

OPTION TWO: VA. CHESAPEAKE BAY DEFAULT

5 **Calculate the pre-development load (L_{pre}).**

L_{pre} = $P \times P_j \times [0.05 + (0.009 \times I_{watershed})] \times C_{pre} \times A \times 2.72 / 12$

= 45 × 0.9 × [0.05 + (0.009 × 16)] × 0.26 × 11.92 × 2.72 / 12 = 40.5 (0.194)(0.70)

= 5.50 pounds per year

6 **Calculate the post-development load (L_{post}).**

L_{post} = $P \times P_j \times [0.05 + (0.009 \times I_{site})] \times C \times A \times 2.72 / 12$

= 45 × 0.9 × [0.05 + (0.009 × 21)] × 0.26 × 11.92 × 2.72 / 12 = 40.5 (0.239)(0.70)

= 6.77 pounds per year

7 **Calculate the pollutant removal requirement (RR).**

RR = $L_{post} - L_{pre}$

= 6.77 - 5.50

= 1.27 pounds per year

To determine the overall BMP efficiency required (%RR) when selecting BMP options:

%RR = $RR / L_{post} \times 100$

= (1.27 / 6.77) × 100

= 19 %

WORKSHEET C: COMPLIANCE

Select BMP options using screening tools and list them below. Then calculate the load removed for each option. DO NOT LIST BMPs IN SERIES HERE.

1

Selected Option	Removal Efficiency (%/100)	×	Fraction of CBPA Drainage Area Served (expressed in decimal form)	×	L_{post} (lbs/yr)	=	Load Removed (lbs/yr)
* DRY POND DESIGN 2	.20		1.00		6.77		1.35 *
DRY POND DESIGN 3	.30		1.00		6.77		2.03
WET POND DESIGN 5	.35		1.00		6.77		2.36
WET POND DESIGN 6	.40		1.00		6.77		2.70

2a **Estimate parameters for non-CBPA drainage areas on the project site (if the locality does not require complete compliance for the whole site). If the locality requires compliance for the whole site, omit this step.**

A (on site, non-CBPA) = _____ acres

I_a: structures = _____ acres
parking lot = _____ acres
roadway = _____ acres
other = _____ acres
= _____ acres
= _____ acres

total I_a = _____ acres

$I = (\text{total } I_a / A) \times 100$ = _____ %

$R_v = 0.05 + (0.009 \times I)$ = _____

C: $I \geq 20 = 1.08$ mg/l = _____ mg/l
$I < 20 = 0.26$ mg/l

When using VIRGINIA CHESAPEAKE BAY DEFAULT (F_{V_a} = 0.45 lbs/ac/yr), C=0.26 mg/l for all I_{site}.

2b **Calculate post-development load for on-site non-CBPAs.**

$L_{post(outside)} = P \times P_j \times R_v \times C \times A \times 2.72 / 12$

= ____ × 0.9 × ____ × ____ × ____ × 2.72 / 12

= _____ pounds per year

Revised 7/90

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject JCC RECREATION CENTER
Computed By MRG Checked By

Project No. 95034-1
Client JCC
Date 10-19-95 Sheet No.

DESIGN 5 WET POND VOLUME REQD

IMPERV. AREA = 2.43 AC = 105,850.8 SF

DESIGN 5 ⇒ 0.5 in runoff/imp. acre
= 0.5(105,850.8)
= 52,925 C.F.

* DESIGN HAS 53,750 C.F OF DRY STORAGE.

DEWATERING ORFICE SIZE

83.78
86.00 - lowest elev for site side of cone walk
2.22 /2 = 1.11 (avg. driving head)

$Q = A(2gh)^{1/2}(c)$

Q = Storage Vol / 21,600
= 53,750 / 21,600
= 2.49 cfs

$A = Q/(2gh)^{1/2}(0.6)$

$= 2.49/(71.39)^{1/2}(0.6)$
$= 2.49/5.0697$
$= 0.4911$ ☐

64,596 CF @ EL 86.00
10,846 CF @ EL 83.
53,750 CF

$d = 2\left(\frac{A}{\pi}\right)^{1/2} = 2\left(\frac{0.4911}{3.14159}\right)^{1/2}$

$= 2(0.1563)^{1/2}$
$= 2(0.395) = 0.7908 = 9.48$ in ⇒ use 8" orfice

$A = \pi r^2 = \pi(0.1736) = 0.349$ S.F.

$Q = 0.349 \cdot (5.0697) = 1.76$ cfs

DETENTION TIME $= \frac{53,750}{1.76} = 30,373$ sec ⇒ 8.43 HRS DRAWDOWN.

Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS • PLANNERS • SURVEYORS
VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject JCC REGIONAL RECREATION CENTER
Computed By MRG Checked By

Project No. 95034-1
Client JCC
Date 10-31-95 Sheet No.

RUNOFF CALCS.

PRE-DEVELOPMENT CONDITION

$A = 11.92$ Ac
$C = 0.20$ Ac
$T_c = 30$ min

$I_2 = 2.8$ $\quad Q_2 = 6.68$ cfs
$I_{10} = 3.7$ $\quad Q_{10} = 8.82$ cfs
$I_{25} = 4.3$ $\quad Q_{25} = 10.25$ cfs
$I_{100} = 5.3$ $\quad Q_{100} = 12.63$ cfs

PRE-ADDITION CONDITION

$A = 11.92$
$C = 0.37$
$T_c = 20$ min

1.48 @ 0.9 = 1.3320
10.44 @ 0.3 = 3.1320
4.4640 / 11.92 = 0.37

$I_2 = 3.5$ $\quad Q_2 = 15.44$ cfs
$I_{10} = 4.6$ $\quad Q_{10} = 20.28$ cfs
$I_{25} = 5.4$ $\quad Q_{25} = 23.82$ cfs
$I_{100} = 6.5$ $\quad Q_{100} = 28.67$ cfs

POST-ADDITION CONDITION

$A = 11.92$
$C = 0.42$
$T_c = 20$ min

$I_2 = 3.5$ $\quad Q_2 = 17.52$ cfs
$I_{10} = 4.6$ $\quad Q_{10} = 23.03$ cfs
$I_{25} = 5.4$ $\quad Q_{25} = 27.03$ cfs
$I_{100} = 6.5$ $\quad Q_{100} = 32.54$ cfs

Conservation Areas found in Powhatan Creek

Existing RPA Area in segment? 35% of the mainstem segment is protected by RPA within this segment (1.21 sm)

Presence of RTE species? Potential for bald eagle. Probable habitat of Least Trillium. Large Blue Heron rookery found in upper portion of segment.

Contiguous Forest Areas? Yes, the forests surrounding the Powhatan Creek constitute the largest contiguous tract within the watershed.

Wetland Areas? Much of the segment contains wetlands of exceptional quality and diversity. Wetland types include mature forested wetlands, successional forest wetlands, standing snags, open water wetlands, emergent wetlands, submergent wetlands, mixed wetlands, and extensive floodplain wetlands. These contiguous wetlands support a diverse biological community including wood ducks, teal, black ducks, pileated woodpeckers and herons.

Five wetland areas within the segment were evaluated for functional value in relation to water quality and wildlife habitat. The average wetland score was 84% out of a possible 100%, which is an exceptionally high score for any non-tidal wetland.

Beaver dam complexes? About 1.5 miles of the mainstem of Powhatan Creek is influenced by beaver activity, which constitutes nearly 25% of its total length. Beaver continue to play a strong role in shaping the character and structure of this wetland complex.

General Creek Condition

According to RSAT scores, the condition of the mainstem creek was generally excellent, with average scores in excess of 165. Both the stream channel and the adjoining floodplain were in good shape, with somewhat higher scores further upstream the mainstem of the creek. A representative field sheet for this section has been included in Appendix D. As noted above, about a fourth of the mainstem segment is inundated by beaver activity, and could not be assessed by the RSAT techniques.

In addition, several small first and second order creeks directly drain into the segment, and these are also in good/excellent condition.

Water Quality Conditions: Water quality conditions in this segment have been conducted by VA DEQ downstream of the bridge at Highway 613. A complete analysis of water quality data will be provided in final baseline report. More detailed longitudinal monitoring is being conducted within

PC039_JCC_WILLIAMSBURG_REC_CENTER_EXPAND - 023

6/13/01

James City Comm. Center

Site Area - 22.56 ac.

Current Imp Area = 21%

No Open Space Easements

BMP - Volume of Marsh - adequate for 9 Pt BMP

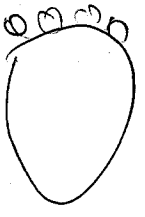
- ½" / imp acre for entire 11.92 ac drainage area
- Drawdown could be ~~reduced~~ increased but not practical
- Constrained by existing pipe under Longhill Rd.

Pow Ck Study

Catchment 207-102-1

- Current SW criteria would be all that is req'd.

Expansion would need to result in a 10% red. in pollutant loadings.



JCC Rec Center Exp.

Analysis - 4/13/01

1" Rv for 24 hrs - 9 Pt wet marsh

1" × 11.92 ac × 0.21 × $\frac{1}{12}$ = 0.21 ac ft

½" marsh = 0.105 ac ft = 4543 ft³

wet storage prov = 6744 ft³ - ok

surf. area = 18,643

41,670 ft² add'l imp.

1" × 41,670 ft² = 3473 ft³

Total DA = 11.92 ac

@ 21% Imp.

Marsh would need to be 0.23 ac surface area @ 6" deep → 10,000 ft²

total volume of marsh = .107 ac ft → 4660 ft³

To treat storm - 1" V_R = 0.237 ac ft or 10,300 ft³

Check design submitted

Total
~~East~~ basin

NP - 83.78

Bottom - 83.11

V_S = 6744 ft³ - wet storage

Surface area @ 83.78 = 18,400 SF = 0.42 ac

~~West basin~~

Volume of Dry Storage = 10,300 - 4660 = 5640 ft³

release rate = 0.07 cfs

Elev 84.22 Q_{out} = 1 cfs

100 yr flow - 3.72 cfs

Peak elev = 86.22 - .22' head on riser

riser flow = 1.1 cfs

orifice flow = 2.5 cfs

Anti - Vortex

- DD of 15" Pipe = 19.5"

15" Riser Area = 1.227 ft^2

19½ Area = 2.074

21" Area = 2.405

24" Area = 3.142

27" " = 3.976

24 - 19½ = 1.07 ft^2

27 - 19½ = 1.97 ft^2

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*   JCC RECREATION CENTER @ LONGHILL ROAD *
*       James City County, Virginia     *
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Inflow Hydrograph: c:\pondpack\95034\JCC2 .HYD
Rating Table file: c:\pondpack\95034\JCCREC .PND

----INITIAL CONDITIONS----
Elevation = 83.78 ft
Outflow = 0.21 cfs
Storage = 6,744 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
83.11	0.0	0	0.0	0.0
83.31	0.0	2,683	89.4	89.4
83.51	0.0	5,273	175.7	175.7
83.71	0.0	6,439	214.6	214.6
83.91	0.6	7,311	243.6	244.2
84.11	1.0	10,725	357.4	358.4
84.31	1.2	14,771	492.3	493.5
84.51	1.1	19,037	634.5	635.6
84.71	1.3	23,530	784.2	785.5
84.91	1.5	28,256	941.7	943.2
85.11	1.7	33,218	1107.0	1108.7
85.31	1.9	38,416	1280.3	1282.2
85.51	2.0	43,855	1461.6	1463.6
85.71	2.1	49,541	1651.0	1653.1
85.91	2.3	55,478	1848.9	1851.2
86.11	2.8	61,672	2055.3	2058.1
86.31	4.5	68,122	2270.3	2274.8
86.51	6.8	74,834	2494.0	2500.8
86.71	7.7	81,813	2726.6	2734.3
86.91	8.5	89,064	2968.2	2976.7

Time increment (t) = 1.0 min.

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC2 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT2 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	224.6	225.0	0.21	83.78
1.0	0.88	0.9	225.0	225.4	0.22	83.78
2.0	1.76	2.6	227.1	227.6	0.26	83.80
3.0	2.64	4.4	230.8	231.5	0.34	83.82
4.0	3.52	6.2	236.1	237.0	0.45	83.86
5.0	4.40	7.9	242.8	244.0	0.60	83.91
6.0	5.29	9.7	251.2	252.5	0.63	83.92
7.0	6.17	11.5	261.4	262.7	0.66	83.94
8.0	7.05	13.2	273.2	274.6	0.71	83.96
9.0	7.93	15.0	286.7	288.2	0.75	83.99
10.0	8.81	16.7	301.8	303.4	0.81	84.01
11.0	9.69	18.5	318.5	320.3	0.87	84.04
12.0	10.57	20.3	336.9	338.8	0.93	84.08
13.0	11.45	22.0	357.0	359.0	1.00	84.11
14.0	12.33	23.8	378.7	380.7	1.03	84.14
15.0	13.21	25.5	402.1	404.2	1.07	84.18
16.0	14.10	27.3	427.2	429.4	1.11	84.22
17.0	14.98	29.1	454.0	456.3	1.14	84.25
18.0	15.86	30.8	482.4	484.8	1.19	84.30
19.0	16.74	32.6	512.7	515.0	1.18	84.34
20.0	17.62	34.4	544.7	547.0	1.16	84.39
21.0	16.74	34.4	576.8	579.1	1.14	84.43
22.0	15.86	32.6	607.1	609.4	1.12	84.47
23.0	14.98	30.8	635.8	638.0	1.10	84.51
24.0	14.10	29.1	662.6	664.9	1.14	84.55
25.0	13.21	27.3	687.5	689.9	1.17	84.58
26.0	12.33	25.5	710.7	713.1	1.20	84.61
27.0	11.45	23.8	732.0	734.5	1.23	84.64
28.0	10.57	22.0	751.5	754.0	1.26	84.67
29.0	9.69	20.3	769.2	771.8	1.28	84.69
30.0	8.81	18.5	785.1	787.7	1.30	84.71
31.0	7.93	16.7	799.2	801.8	1.32	84.73
32.0	7.05	15.0	811.5	814.2	1.34	84.75
33.0	6.17	13.2	822.0	824.7	1.35	84.76
34.0	5.29	11.5	830.8	833.5	1.36	84.77
35.0	4.40	9.7	837.7	840.4	1.37	84.78
36.0	3.52	7.9	842.9	845.6	1.38	84.79
37.0	2.64	6.2	846.3	849.0	1.38	84.79
38.0	1.76	4.4	847.9	850.7	1.38	84.79
39.0	0.88	2.6	847.8	850.5	1.38	84.79
40.0	0.00	0.9	845.9	848.7	1.38	84.79

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC2 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT2 .HYD

Starting Pond W.S. Elevation = 83.78 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 17.62 cfs
Peak Outflow = 1.38 cfs
Peak Elevation = 84.79 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 6,744 cu-ft → 0.15 ac-ft
Peak Storage From Storm = 18,739 cu-ft → 0.43

Total Storage in Pond = 25,484 cu-ft

>>>>> Warning, initial pond outflow > 1st inflow ordinate. <<<<<

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*   JCC RECREATION CENTER @ LONGHILL ROAD *
*       James City County, Virginia     *
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Inflow Hydrograph: c:\pondpack\95034\JCC10 .HYD
Rating Table file: c:\pondpack\95034\JCCREC .PND

----INITIAL CONDITIONS----
Elevation = 83.78 ft
Outflow = 0.21 cfs
Storage = 6,744 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
83.11	0.0	0	0.0	0.0
83.31	0.0	2,683	89.4	89.4
83.51	0.0	5,273	175.7	175.7
83.71	0.0	6,439	214.6	214.6
83.91	0.6	7,311	243.6	244.2
84.11	1.0	10,725	357.4	358.4
84.31	1.2	14,771	492.3	493.5
84.51	1.1	19,037	634.5	635.6
84.71	1.3	23,530	784.2	785.5
84.91	1.5	28,256	941.7	943.2
85.11	1.7	33,218	1107.0	1108.7
85.31	1.9	38,416	1280.3	1282.2
85.51	2.0	43,855	1461.6	1463.6
85.71	2.1	49,541	1651.0	1653.1
85.91	2.3	55,478	1848.9	1851.2
86.11	2.8	61,672	2055.3	2058.1
86.31	4.5	68,122	2270.3	2274.8
86.51	6.8	74,834	2494.0	2500.8
86.71	7.7	81,813	2726.6	2734.3
86.91	8.5	89,064	2968.2	2976.7

Time increment (t) = 1.0 min.

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC10 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT10 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	224.6	225.0	0.21	83.78
1.0	1.18	1.2	225.3	225.7	0.23	83.79
2.0	2.37	3.6	228.3	228.8	0.29	83.81
3.0	3.55	5.9	233.4	234.2	0.40	83.84
4.0	4.73	8.3	240.6	241.7	0.55	83.89
5.0	5.91	10.6	250.0	251.2	0.62	83.92
6.0	7.10	13.0	261.6	263.0	0.67	83.94
7.0	8.28	15.4	275.6	277.0	0.71	83.97
8.0	9.46	17.7	291.8	293.3	0.77	84.00
9.0	10.65	20.1	310.2	311.9	0.84	84.03
10.0	11.83	22.5	330.9	332.7	0.91	84.06
11.0	13.01	24.8	353.7	355.7	0.99	84.11
12.0	14.20	27.2	378.9	381.0	1.03	84.14
13.0	15.38	29.6	406.3	408.5	1.07	84.18
14.0	16.56	31.9	436.0	438.3	1.12	84.23
15.0	17.74	34.3	468.0	470.3	1.17	84.28
16.0	18.93	36.7	502.3	504.7	1.19	84.33
17.0	20.11	39.0	539.0	541.3	1.17	84.38
18.0	21.29	41.4	578.1	580.4	1.14	84.43
19.0	22.48	43.8	619.7	621.9	1.11	84.49
20.0	23.66	46.1	663.5	665.8	1.14	84.55
21.0	22.48	46.1	707.3	709.7	1.20	84.61
22.0	21.29	43.8	748.5	751.0	1.25	84.66
23.0	20.11	41.4	787.3	789.9	1.31	84.72
24.0	18.93	39.0	823.6	826.3	1.35	84.76
25.0	17.74	36.7	857.5	860.3	1.39	84.80
26.0	16.56	34.3	889.0	891.8	1.43	84.84
27.0	15.38	31.9	918.0	920.9	1.47	84.88
28.0	14.20	29.6	944.5	947.5	1.51	84.92
29.0	13.01	27.2	968.7	971.7	1.53	84.94
30.0	11.83	24.8	990.4	993.5	1.56	84.97
31.0	10.65	22.5	1009.7	1012.9	1.58	84.99
32.0	9.46	20.1	1026.6	1029.8	1.60	85.01
33.0	8.28	17.7	1041.1	1044.3	1.62	85.03
34.0	7.10	15.4	1053.2	1056.5	1.64	85.05
35.0	5.91	13.0	1062.9	1066.2	1.65	85.06
36.0	4.73	10.6	1070.2	1073.5	1.66	85.07
37.0	3.55	8.3	1075.2	1078.5	1.66	85.07
38.0	2.37	5.9	1077.8	1081.1	1.67	85.08
39.0	1.18	3.6	1078.0	1081.3	1.67	85.08
40.0	0.00	1.2	1075.8	1079.2	1.66	85.07

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC10 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT10 .HYD

Starting Pond W.S. Elevation = 83.78 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 23.66 cfs
Peak Outflow = 1.67 cfs
Peak Elevation = 85.08 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 6,744 cu-ft
Peak Storage From Storm = 25,652 cu-ft

Total Storage in Pond = 32,396 cu-ft

>>>>> Warning, initial pond outflow > 1st inflow ordinate. <<<<<

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*   JCC RECREATION CENTER @ LONGHILL ROAD *
*       James City County, Virginia     *
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Inflow Hydrograph: c:\pondpack\95034\JCC25 .HYD
Rating Table file: c:\pondpack\95034\JCCREC .PND

----INITIAL CONDITIONS----
Elevation = 83.78 ft
Outflow = 0.21 cfs
Storage = 6,744 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
83.11	0.0	0	0.0	0.0
83.31	0.0	2,683	89.4	89.4
83.51	0.0	5,273	175.7	175.7
83.71	0.0	6,439	214.6	214.6
83.91	0.6	7,311	243.6	244.2
84.11	1.0	10,725	357.4	358.4
84.31	1.2	14,771	492.3	493.5
84.51	1.1	19,037	634.5	635.6
84.71	1.3	23,530	784.2	785.5
84.91	1.5	28,256	941.7	943.2
85.11	1.7	33,218	1107.0	1108.7
85.31	1.9	38,416	1280.3	1282.2
85.51	2.0	43,855	1461.6	1463.6
85.71	2.1	49,541	1651.0	1653.1
85.91	2.3	55,478	1848.9	1851.2
86.11	2.8	61,672	2055.3	2058.1
86.31	4.5	68,122	2270.3	2274.8
86.51	6.8	74,834	2494.0	2500.8
86.71	7.7	81,813	2726.6	2734.3
86.91	8.5	89,064	2968.2	2976.7

Time increment (t) = 1.0 min.

EXECUTED: 10-19-1995 11:24:59 Return Freq: 25 years

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC25 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT25 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	224.6	225.0	0.21	83.78
1.0	1.33	1.3	225.4	225.9	0.23	83.79
2.0	2.66	4.0	228.8	229.4	0.30	83.81
3.0	3.99	6.7	234.6	235.5	0.42	83.85
4.0	5.32	9.3	242.7	243.9	0.59	83.91
5.0	6.64	12.0	253.4	254.7	0.64	83.93
6.0	7.97	14.6	266.7	268.0	0.68	83.95
7.0	9.30	17.3	282.5	283.9	0.74	83.98
8.0	10.63	19.9	300.8	302.4	0.80	84.01
9.0	11.96	22.6	321.6	323.4	0.88	84.05
10.0	13.29	25.3	345.0	346.9	0.96	84.09
11.0	14.62	27.9	370.8	372.9	1.02	84.13
12.0	15.95	30.6	399.3	401.4	1.06	84.17
13.0	17.28	33.2	430.3	432.5	1.11	84.22
14.0	18.61	35.9	463.9	466.2	1.16	84.27
15.0	19.93	38.5	500.0	502.4	1.19	84.32
16.0	21.26	41.2	538.9	541.2	1.17	84.38
17.0	22.59	43.9	580.4	582.7	1.14	84.44
18.0	23.92	46.5	624.7	626.9	1.11	84.50
19.0	25.25	49.2	671.6	673.9	1.15	84.56
20.0	26.58	51.8	721.0	723.4	1.22	84.63
21.0	26.58	53.2	771.6	774.2	1.28	84.69
22.0	26.58	53.2	822.0	824.7	1.35	84.76
23.0	26.58	53.2	872.4	875.2	1.41	84.82
24.0	26.58	53.2	922.6	925.5	1.48	84.89
25.0	26.58	53.2	972.7	975.7	1.54	84.95
26.0	26.58	53.2	1022.6	1025.8	1.60	85.01
27.0	25.25	51.8	1071.1	1074.5	1.66	85.07
28.0	23.92	49.2	1116.9	1120.3	1.71	85.12
29.0	22.59	46.5	1159.9	1163.4	1.76	85.17
30.0	21.26	43.9	1200.1	1203.7	1.81	85.22
31.0	19.93	41.2	1237.6	1241.3	1.85	85.26
32.0	18.61	38.5	1272.3	1276.1	1.89	85.30
33.0	17.28	35.9	1304.4	1308.2	1.91	85.34
34.0	15.95	33.2	1333.8	1337.6	1.93	85.37
35.0	14.62	30.6	1360.4	1364.3	1.95	85.40
36.0	13.29	27.9	1384.4	1388.4	1.96	85.43
37.0	11.96	25.3	1405.7	1409.7	1.97	85.45
38.0	10.63	22.6	1424.4	1428.3	1.98	85.47
39.0	9.30	19.9	1440.3	1444.3	1.99	85.49
40.0	7.97	17.3	1453.6	1457.6	2.00	85.50
41.0	6.64	14.6	1464.2	1468.2	2.00	85.51
42.0	5.32	12.0	1472.2	1476.2	2.01	85.52
43.0	3.99	9.3	1477.4	1481.5	2.01	85.53
44.0	2.66	6.7	1480.1	1484.1	2.01	85.53

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC25 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT25 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	1.33	4.0	1480.0	1484.1	2.01	85.53
46.0	0.00	1.3	1477.4	1481.4	2.01	85.53

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC25 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT25 .HYD

Starting Pond W.S. Elevation = 83.78 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 26.58 cfs
Peak Outflow = 2.01 cfs
Peak Elevation = 85.53 ft

***** Summary of Approximate Peak Storage *****

Initial Storage = 6,744 cu-ft
Peak Storage From Storm = 37,727 cu-ft

Total Storage in Pond = 44,471 cu-ft

>>>>> Warning, initial pond outflow > 1st inflow ordinate. <<<<<

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*   JCC RECREATION CENTER @ LONGHILL ROAD *
*       James City County, Virginia     *
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Inflow Hydrograph: c:\pondpack\95034\JCC100 .HYD
Rating Table file: c:\pondpack\95034\JCCREC .PND

----INITIAL CONDITIONS----
Elevation = 83.78 ft
Outflow = 0.21 cfs
Storage = 6,744 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
83.11	0.0	0	0.0	0.0
83.31	0.0	2,683	89.4	89.4
83.51	0.0	5,273	175.7	175.7
83.71	0.0	6,439	214.6	214.6
83.91	0.6	7,311	243.6	244.2
84.11	1.0	10,725	357.4	358.4
84.31	1.2	14,771	492.3	493.5
84.51	1.1	19,037	634.5	635.6
84.71	1.3	23,530	784.2	785.5
84.91	1.5	28,256	941.7	943.2
85.11	1.7	33,218	1107.0	1108.7
85.31	1.9	38,416	1280.3	1282.2
85.51	2.0	43,855	1461.6	1463.6
85.71	2.1	49,541	1651.0	1653.1
85.91	2.3	55,478	1848.9	1851.2
86.11	2.8	61,672	2055.3	2058.1
86.31	4.5	68,122	2270.3	2274.8
86.51	6.8	74,834	2494.0	2500.8
86.71	7.7	81,813	2726.6	2734.3
86.91	8.5	89,064	2968.2	2976.7

Time increment (t) = 1.0 min.

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC100 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT100 .HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	224.6	225.0	0.21	83.78
1.0	1.53	1.5	225.6	226.1	0.23	83.79
2.0	3.07	4.6	229.6	230.2	0.32	83.82
3.0	4.60	7.7	236.3	237.3	0.46	83.86
4.0	6.14	10.7	245.9	247.1	0.61	83.91
5.0	7.67	13.8	258.4	259.7	0.65	83.94
6.0	9.20	16.9	273.8	275.2	0.71	83.96
7.0	10.74	19.9	292.2	293.8	0.77	84.00
8.0	12.27	23.0	313.5	315.2	0.85	84.03
9.0	13.80	26.1	337.7	339.6	0.93	84.08
10.0	15.34	29.1	364.8	366.9	1.01	84.12
11.0	16.87	32.2	394.9	397.1	1.06	84.17
12.0	18.41	35.3	428.0	430.2	1.11	84.22
13.0	19.94	38.4	464.0	466.4	1.16	84.27
14.0	21.47	41.4	503.1	505.4	1.19	84.33
15.0	23.01	44.5	545.2	547.5	1.16	84.39
16.0	24.54	47.6	590.5	592.8	1.13	84.45
17.0	26.07	50.6	638.9	641.1	1.11	84.52
18.0	27.61	53.7	690.2	692.6	1.18	84.59
19.0	29.14	56.8	744.5	747.0	1.25	84.66
20.0	30.68	59.8	801.7	804.3	1.32	84.73
21.0	30.68	61.4	860.2	863.0	1.40	84.81
22.0	30.68	61.4	918.6	921.6	1.47	84.88
23.0	30.68	61.4	976.9	980.0	1.54	84.95
24.0	30.68	61.4	1035.0	1038.3	1.61	85.02
25.0	30.68	61.4	1093.0	1096.4	1.69	85.10
26.0	30.68	61.4	1150.9	1154.4	1.75	85.16
27.0	30.68	61.4	1208.6	1212.2	1.82	85.23
28.0	30.68	61.4	1266.2	1270.0	1.89	85.30
29.0	30.68	61.4	1323.7	1327.5	1.93	85.36
30.0	30.68	61.4	1381.1	1385.1	1.96	85.42
31.0	30.68	61.4	1438.5	1442.5	1.99	85.49
32.0	30.68	61.4	1495.8	1499.9	2.02	85.55
33.0	30.68	61.4	1553.1	1557.2	2.05	85.61
34.0	30.68	61.4	1610.3	1614.5	2.08	85.67
35.0	30.68	61.4	1667.4	1671.7	2.12	85.73
36.0	29.14	59.8	1722.9	1727.3	2.17	85.78
37.0	27.61	56.8	1775.2	1779.7	2.23	85.84
38.0	26.07	53.7	1824.3	1828.9	2.28	85.89
39.0	24.54	50.6	1870.2	1874.9	2.36	85.93
40.0	23.01	47.6	1912.8	1917.8	2.46	85.97
41.0	21.47	44.5	1952.2	1957.3	2.56	86.01
42.0	19.94	41.4	1988.3	1993.6	2.64	86.05
43.0	18.41	38.4	2021.2	2026.7	2.72	86.08
44.0	16.87	35.3	2050.9	2056.5	2.80	86.11

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC100 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT100 .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	15.34	32.2	2077.1	2083.1	3.00	86.13
46.0	13.80	29.1	2099.9	2106.3	3.18	86.15
47.0	12.27	26.1	2119.3	2126.0	3.33	86.17
48.0	10.74	23.0	2135.4	2142.3	3.46	86.19
49.0	9.20	19.9	2148.2	2155.4	3.56	86.20
50.0	7.67	16.9	2157.8	2165.1	3.64	86.21
51.0	6.14	13.8	2164.3	2171.6	3.69	86.21
52.0	4.60	10.7	2167.6	2175.0	3.72	86.22
53.0	3.07	7.7	2167.8	2175.2	3.72	86.22
54.0	1.53	4.6	2165.0	2172.4	3.70	86.22
55.0	0.00	1.5	2159.2	2166.5	3.65	86.21

********** SUMMARY OF ROUTING COMPUTATIONS **********

Pond File: c:\pondpack\95034\JCCREC .PND
Inflow Hydrograph: c:\pondpack\95034\JCC100 .HYD
Outflow Hydrograph: c:\pondpack\95034\OUT100 .HYD

Starting Pond W.S. Elevation = 83.78 ft

***** Summary of Peak Outflow and Peak Elevation *****

Peak Inflow = 30.68 cfs
Peak Outflow = 3.72 cfs
Peak Elevation = **86.22 ft** D.H.W.

***** Summary of Approximate Peak Storage *****

Initial Storage = 6,744 cu-ft
Peak Storage From Storm = 58,414 cu-ft

Total Storage in Pond = 65,158 cu-ft

>>>>> Warning, initial pond outflow > 1st inflow ordinate. <<<<<

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

CBPA & Storm Attenuation
****

***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
83.11	0.0	
83.31	0.0	
83.51	0.0	
83.71	0.0	
83.91	0.6	1
84.11	1.0	1
84.31	1.2	1
84.51	1.1	2
84.71	1.3	2
84.91	1.5	2
85.11	1.7	2
85.31	1.9	2
85.51	2.0	2
85.71	2.1	2
85.91	2.3	2
86.11	2.8	2 +3
86.31	4.5	2 +3
86.51	6.8	2 +3
86.71	7.7	2 +3
86.91	8.5	2 +3
87.00	0.0	

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

```
**************************************
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    James City County, Virginia

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```

Outlet Structure File: c:\pondpack\95034\JCCREC .STR
Planimeter Input File: c:\pondpack\95034\JCCREC .VOL
Rating Table Output File: c:\pondpack\95034\JCCREC .PND

Min. Elev.(ft) = 83.11 Max. Elev.(ft) = 87 Incr.(ft) = .2

Additional elevations (ft) to be included in table:
* *

```
**********************************************
              SYSTEM CONNECTIVITY
**********************************************
```

Structure	No.	Q Table		Q Table
TABLE	1		->	1
ORIFICE-VC	2		->	2
STAND PIPE	3		->	3
CULVERT-CR	4	? 3	->	5

Outflow rating table summary was stored in file:
c:\pondpack\95034\JCCREC .PND

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

```
*************************************
JCC RECREATION CENTER @ LONGHILL ROAD
    James City County, Virginia

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*************************************
```

>>>>>> Structure No. 1 <<<<<<
(Input Data)

TABLE
Input your own rating table.
E1 (ft) =83.78 E2 (ft) =84.45

Constant (ft) added to each elevation was:

Elev. (ft)	Q (cfs)
83.78	0
83.81999999999999	.36
83.87	.5
83.91	.61
83.95999999999999	.71
84	.79
84.05	.87
84.09	.94
84.14	1
84.18000000000001	1.07
84.23	1.12
84.27	1.18
84.31999999999999	1.23
84.36	1.28
84.41	1.33
84.45	1.38

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

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>>>>>> Structure No. 2 <<<<<<
(Input Data)

ORIFICE-VC
Orifice - Vertical Circular

E1 elev.(ft)?	84.45
E2 elev.(ft)?	87.00
Orifice coeff.?	.6
Invert elev.(ft)?	83.78
Datum elev.(ft)?	84.12
Diameter (ft)?	.67 (8")

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

```
*************************************
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    James City County, Virginia

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  >>>>>> Structure No. 3 <<<<<<
           (Input Data)

   STAND PIPE
   Stand Pipe with weir or orifice flow


   E1 elev.(ft)?          86.00
   E2 elev.(ft)?          87.00
   Crest elev.(ft)?       86.00
   Diameter (ft)?         1.25
   Weir coefficient?      3.0
   Orifice coefficient?   .6
   Start transition elev.(ft) @ ?
   Transition height (ft)?
```

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

```
*************************************
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    James City County, Virginia

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*************************************


   >>>>>> Structure No. 4 <<<<<<
           (Input Data)

    CULVERT-CR
    Circular Culvert (With Inlet Control)


    E1 elev.(ft)?          86.00
    E2 elev.(ft)?          87.00
    Diam. (ft)?            1.25
    Inv. el.(ft)?          83.78
    Slope (ft/ft)?         .0013
    T1 ratio?
    T2 ratio?
    K Coeff.?              .0045
    M Coeff.?              2.0
    c Coeff.?              .0317
    Y Coeff.?              .69
    Form 1 or 2?           1
    Slope factor?          -0.5
```

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
JCC RECREATION CENTER @ LONGHILL ROAD
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Outflow Rating Table for Structure #1
TABLE Input your own rating table.

Elevation (ft)	Q (cfs)	Computation Messages
83.11	0.0	E < E1=83.78
83.31	0.0	E < E1=83.78
83.51	0.0	E < E1=83.78
83.71	0.0	E < E1=83.78
83.91	0.6	
84.11	1.0	Interpolated from input table
84.31	1.2	Interpolated from input table
84.51	0.0	E = or > E2=84.45
84.71	0.0	E = or > E2=84.45
84.91	0.0	E = or > E2=84.45
85.11	0.0	E = or > E2=84.45
85.31	0.0	E = or > E2=84.45
85.51	0.0	E = or > E2=84.45
85.71	0.0	E = or > E2=84.45
85.91	0.0	E = or > E2=84.45
86.11	0.0	E = or > E2=84.45
86.31	0.0	E = or > E2=84.45
86.51	0.0	E = or > E2=84.45
86.71	0.0	E = or > E2=84.45
86.91	0.0	E = or > E2=84.45
87.00	0.0	E = or > E2=84.45

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

CBPA & Storm Attenuation
****

Outflow Rating Table for Structure #2
ORIFICE-VC Orifice - Vertical Circular

Elevation (ft)	Q (cfs)	Computation Messages
83.11	0.0	E < E1=84.45
83.31	0.0	E < E1=84.45
83.51	0.0	E < E1=84.45
83.71	0.0	E < E1=84.45
83.91	0.0	E < E1=84.45
84.11	0.0	E < E1=84.45
84.31	0.0	E < E1=84.45
84.51	1.1	H =.39
84.71	1.3	H =.59
84.91	1.5	H =.79
85.11	1.7	H =.990
85.31	1.9	H =1.19
85.51	2.0	H =1.39
85.71	2.1	H =1.59
85.91	2.3	H =1.79
86.11	2.4	H =1.99
86.31	2.5	H =2.19
86.51	2.6	H =2.39
86.71	2.7	H =2.59
86.91	2.8	H =2.79
87.00	0.0	E = or > E2=87.00

C = .6 A = .3525653 sq.ft.
H (ft) = Table elev. - Datum elev. (84.12 ft)
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

CBPA & Storm Attenuation
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Outflow Rating Table for Structure #3
STAND PIPE Stand Pipe with weir or orifice flow

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
83.11	0.0	E < Inv.El.= 86
83.31	0.0	E < E1=86.00
83.51	0.0	E < E1=86.00
83.71	0.0	E < E1=86.00
83.91	0.0	E < E1=86.00
84.11	0.0	E < E1=86.00
84.31	0.0	E < E1=86.00
84.51	0.0	E < E1=86.00
84.71	0.0	E < E1=86.00
84.91	0.0	E < E1=86.00
85.11	0.0	E < E1=86.00
85.31	0.0	E < E1=86.00
85.51	0.0	E < E1=86.00
85.71	0.0	E < E1=86.00
85.91	0.0	E < E1=86.00
86.11	0.4	Weir: H =.11
86.31	2.0	Weir: H =.31
86.51	4.2	Orifice: H =.510
86.71	5.0	Orifice: H =.71
86.91	5.6	Orifice: H =.91
87.00	0.0	E = or > E2=87.00

Weir Cw = 3 Weir length = 3.926991 ft
Orifice Co = .6 Orifice area = 1.227185 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 86.50156 ft

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

CBPA & Storm Attenuation
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Outflow Rating Table for Structure #4
CULVERT-CR Circular Culvert (With Inlet Control)

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
83.11	0.0	E < Inv.El.= 83.78
83.31	0.0	E < Inv.El.= 83.78
83.51	0.0	E < Inv.El.= 83.78
83.71	0.0	E < Inv.El.= 83.78
83.91	0.0	E < E1=86.00
84.11	0.0	E < E1=86.00
84.31	0.0	E < E1=86.00
84.51	0.0	E < E1=86.00
84.71	0.0	E < E1=86.00
84.91	0.0	E < E1=86.00
85.11	0.0	E < E1=86.00
85.31	0.0	E < E1=86.00
85.51	0.0	E < E1=86.00
85.71	0.0	E < E1=86.00
85.91	0.0	E < E1=86.00
86.11	8.3	Submerged: HW =2.33
86.31	8.9	Submerged: HW =2.53
86.51	9.4	Submerged: HW =2.73
86.71	9.9	Submerged: HW =2.93
86.91	10.4	Submerged: HW =3.13
87.00	0.0	E = or > E2=87.00

Used Unsubmerged Equ. Form (1) for elev. less than 85.15 ft
Used Submerged Equation for elevations greater than 85.28 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=85.15 ft; Q1=4.8 cfs; Dc=.89 ft; E2=85.28 ft; Q2=5.49 cfs

Outlet Structure File: JCCREC .STR

POND-2 Version: 5.17 S/N:
Date Executed: Time Executed:

****
JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

CBPA & Storm Attenuation
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Outflow Rating Table 5
Table 5 = 3 ? 4

Elevation (ft)	Q (cfs)	Contributing Structures
83.11	0.0	-
83.31	0.0	-
83.51	0.0	-
83.71	0.0	-
83.91	0.0	-
84.11	0.0	-
84.31	0.0	-
84.51	0.0	-
84.71	0.0	-
84.91	0.0	-
85.11	0.0	-
85.31	0.0	-
85.51	0.0	-
85.71	0.0	-
85.91	0.0	-
86.11	0.4	3
86.31	2.0	3
86.51	4.2	3
86.71	5.0	3
86.91	5.6	3
87.00	0.0	-

POND-2 Version: 5.17
S/N:

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

CBPA & Storm Attenuation

CALCULATED 10-19-1995 11:49:14
DISK FILE: c:\pondpack\95034\JCCREC .VOL

Planimeter scale: 1 inch = 25 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
83.11	17.54	10,963	0	0	0
83.33	26.54	16,588	41,035	3,009	3,009
83.78	3.00	1,875 ?	24,039	3,606	6,615
84.00	30.56	19,100	26,959	1,977	8,592
85.00	39.61	24,756	65,601	21,867	30,459
86.00	49.45	30,906	83,323	27,774	58,234
87.00	60.11	37,569	102,550	34,183	92,417

2

IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

POND-2 Version: 5.17
S/N:

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

CBPA & Storm Attenuation

CALCULATED 10-19-1995 11:50:48
DISK FILE: c:\pondpack\95034\JCCREC .VOL

Planimeter scale: 1 inch = 25 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
83.11	17.54	10,963	0	0	0
83.33	26.54	16,588	41,035	3,009	3,009
84.00	30.56	19,100	53,487	11,945	14,955
85.00	39.61	24,756	65,601	21,867	36,822
86.00	49.45	30,906	83,323	27,774	64,596
87.00	60.11	37,569	102,550	34,183	98,780
Elevations With Areas Interpolated From The Closest Two Planimeter Readings					
83.78	-----	18,255	52,244	7,837	10,846

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2 = Closest two elevations with planimeter data
Ei = Elevation at which to interpolate area
Area1,Area2 = Areas computed for E1, E2, respectively
IA = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

```
*************************************************************************
*                                |                                      *
*  RETURN FREQUENCY:   2 yr      |  Allowable Outflow:    15.44 cfs     *
*  'C' Adjustment: 1.000         |  Required Storage:     2,615 cu.ft. *
*                                |                                      *
*              STORM DURATION = Tc for Max.Storage                      *
*-----------------------------------------------------------------------*
*  Peak Inflow:   17.62 cfs      Inflow .HYD stored: JCC2    .HYD       *
*************************************************************************
```

```
     |
     |
     |              Tc=  20.00   minutes
     |              I =   3.500  in/hr        Area (ac):      11.92
     |            . Q =   17.62  cfs          Weighted C:      0.42
     |           .|.                          Adjusted C:      0.42
  F  |          .   .
  L  |         .  |  .            Required Storage
  O  |        .      .-----------     2,615 cu.ft.
  W  |       .       |.
     |      .        | .
  c  |     .         |  .
  f  |    .              .
  s  |   .               o o o    Q=   15.44 cfs
     |  .            o   |.       (Allow.Outflow)
     | .          o      | .
     |  .      o         |  .       NOT TO SCALE
     | .  o              |   .      ===========
     | o                 |    .
     `-----------------------|-----------------------
                        22.47 minutes
```

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

```
*********************************************************************
*                            |                                      *
*  RETURN FREQUENCY:  10 yr  |  Allowable Outflow:    20.28 cfs     *
*  'C' Adjustment: 1.000     |  Required Storage:     4,056 cu.ft. *
*                            |                                      *
*              STORM DURATION = Tc for Max.Storage                  *
*-------------------------------------------------------------------*
*  Peak Inflow:   23.66 cfs      Inflow .HYD stored: JCC10   .HYD   *
*********************************************************************
```

```
     |
     |
     |              Tc=  20.00   minutes
     |              I =   4.700  in/hr       Area (ac):      11.92
     |            . Q =   23.66  cfs         Weighted C:      0.42
     |           .|.                        Adjusted C:      0.42
  F  |          .   .
  L  |         .  |  .            Required Storage
  O  |        .      .-----------     4,056 cu.ft.
  W  |       .       |.
     |      .        | .
  c  |     .         |  .
  f  |    .               .
  s  |   .                o o o   Q=   20.28 cfs
     |  .            o    |.      (Allow.Outflow)
     | .         o        | .
     |.      o            |  .      NOT TO SCALE
     | .  o               |   .     ============
     | o                  |    .
     `----------------------|-----------------------
                          22.86 minutes
```

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

```
*********************************************************************
*  RETURN FREQUENCY:  25 yr     |  Allowable Outflow:    23.82 cfs    *
*  'C' Adjustment: 1.100        |  Required Storage:     8,592 cu.ft. *
*-------------------------------------------------------------------*
*  Peak Inflow:   26.58 cfs       Inflow .HYD stored: JCC25   .HYD   *
*********************************************************************
```

```
   |              Td =  26 minutes                 |  Return Freq:    25 yr
   /------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.10
   |                                               |
   |                                               |
   |               Tc=   20.00  minutes            |
   |               I =   5.400  in/hr              |  Area (ac):    11.92
   |             . Q =   29.90  cfs                |  Weighted C:    0.42
   |            .|.                                |  Adjusted C:    0.46
F  |           .   .                               |
L  |          .  |  .            Required Storage |
O  |         .      .        .--     8,592 cu.ft. |  Td=      26 minutes
W  |        .    |    .      |                    |  I =   4.800 in/hr
   |       .     x x x x x x x|x x x x x x x x x x x  Q =   26.58 cfs
c  |      .                   |
f  |     .    x                                    x
s  |    .                                            o  Q=   23.82 cfs
   |   .   x                             o          |x  (Allow.Outflow)
   |  .  x                  .     o                 |
   | .  x              o    .       NOT TO SCALE     |   x
   | . x       o              .      ============    |
   | o                        .                      |      x
   `-------------------------------------------------|------------
                                                    28.08 minutes
```

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

First peak outflow point assumed to occur at inflow recession leg.

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

```
*********************************************************************
*  RETURN FREQUENCY: 100 yr     |  Allowable Outflow:    28.67 cfs    *
*  'C' Adjustment: 1.250        |  Required Storage:    17,114 cu.ft. *
*-------------------------------------------------------------------*
*  Peak Inflow:   30.68 cfs       Inflow .HYD stored: JCC100  .HYD   *
*********************************************************************
```

```
   |              Td =  35 minutes                 |  Return Freq:   100 yr
   /------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.25
   |                                               |
   |                                               |
   |                                               |
   |               Tc=   20.00  minutes            |
   |               I =   6.500  in/hr              |  Area (ac):    11.92
   |             . Q =   40.90  cfs                |  Weighted C:    0.42
   |            .|.                                |  Adjusted C:    0.53
F  |           .   .                               |
L  |          .  |  .            Required Storage |
O  |         .      .        .--    17,114 cu.ft. |  Td=      35 minutes
W  |        .    |    .      |                   |  I =   4.875 in/hr
   |       .    x x x x x x x|x x x x x x x x x x x  Q =   30.68 cfs
c  |      .                  |
f  |     .    x                                    x
s  |    .                                            o   Q=   28.67 cfs
   |   .   x                             o          |x  (Allow.Outflow)
   |  .  x                 .     o                  |
   | .  x              o    .       NOT TO SCALE     |   x
   | . x       o              .      ============    |
   | o                        .                      |      x
   `-------------------------------------------------|------------
                                                     36.31 minutes
```

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

**** Modified Rational Hydrograph *****

Weighted C = 0.422 Area= 11.920 acres Tc = 20.00 minutes

Adjusted C = 0.422 Td= 20.00 min. I= 3.50 in/hr Qp= 17.62 cfs

RETURN FREQUENCY: 2 year storm Adj.factor = 1.00
Output file: JCC2 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
for the 2 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	0.88	1.76	2.64	3.52	4.40	5.29
7.00	6.17	7.05	7.93	8.81	9.69	10.57	11.45
14.00	12.33	13.21	14.10	14.98	15.86	16.74	17.62
21.00	16.74	15.86	14.98	14.10	13.21	12.33	11.45
28.00	10.57	9.69	8.81	7.93	7.05	6.17	5.29
35.00	4.40	3.52	2.64	1.76	0.88	0.00	

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

**** Modified Rational Hydrograph *****

Weighted C = 0.422 Area= 11.920 acres Tc = 20.00 minutes

Adjusted C = 0.422 Td= 20.00 min. I= 4.70 in/hr Qp= 23.66 cfs

RETURN FREQUENCY: 10 year storm Adj.factor = 1.00
Output file: JCC10 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 10 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	1.18	2.37	3.55	4.73	5.91	7.10
7.00	8.28	9.46	10.65	11.83	13.01	14.20	15.38
14.00	16.56	17.74	18.93	20.11	21.29	22.48	23.66
21.00	22.48	21.29	20.11	18.93	17.74	16.56	15.38
28.00	14.20	13.01	11.83	10.65	9.46	8.28	7.10
35.00	5.91	4.73	3.55	2.37	1.18	0.00	

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

**** Modified Rational Hydrograph *****

Weighted C = 0.422 Area= 11.920 acres Tc = 20.00 minutes

Adjusted C = 0.465 Td= 26.00 min. I= 4.80 in/hr Qp= 26.58 cfs

RETURN FREQUENCY: 25 year storm Adj.factor = 1.10
Output file: JCC25 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
for the 25 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	1.33	2.66	3.99	5.32	6.64	7.97
7.00	9.30	10.63	11.96	13.29	14.62	15.95	17.28
14.00	18.61	19.93	21.26	22.59	23.92	25.25	26.58
21.00	26.58	26.58	26.58	26.58	26.58	26.58	25.25
28.00	23.92	22.59	21.26	19.93	18.61	17.28	15.95
35.00	14.62	13.29	11.96	10.63	9.30	7.97	6.64
42.00	5.32	3.99	2.66	1.33	0.00		

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

**** Modified Rational Hydrograph *****

Weighted C = 0.422 Area= 11.920 acres Tc = 20.00 minutes

Adjusted C = 0.528 Td= 35.00 min. I= 4.88 in/hr Qp= 30.68 cfs

RETURN FREQUENCY: 100 year storm Adj.factor = 1.25
Output file: JCC100 .HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 100 Year Storm

Time increment = 1.00 Minutes
Time on left represents time for first Q in each row.

Time Minutes							
0.00	0.00	1.53	3.07	4.60	6.14	7.67	9.20
7.00	10.74	12.27	13.80	15.34	16.87	18.41	19.94
14.00	21.47	23.01	24.54	26.07	27.61	29.14	30.68
21.00	30.68	30.68	30.68	30.68	30.68	30.68	30.68
28.00	30.68	30.68	30.68	30.68	30.68	30.68	30.68
35.00	30.68	29.14	27.61	26.07	24.54	23.01	21.47
42.00	19.94	18.41	16.87	15.34	13.80	12.27	10.74
49.00	9.20	7.67	6.14	4.60	3.07	1.53	0.00

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 2 years
`C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
Paved	0.900	2.43						
Grassed	0.300	9.49						
			20.00	0.422	0.422	3.500	11.92	17.62

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 10 years
`C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
Paved	0.900	2.43						
Grassed	0.300	9.49						
			20.00	0.422	0.422	4.700	11.92	23.66

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 25 years
`C' adjustment, k = 1.1
Adj. 'C' = Wtd.'C' x 1.1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
Paved	0.900	2.43						
Grassed	0.300	9.49						
			20.00	0.422	0.465	5.400	11.92	29.90

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

* * * * * * SUMMARY OF RATIONAL METHOD PEAK DISCHARGES * * * * * *

Q = adj * C * I * A
Where: Q=cfs, C=Weighted Runoff Coefficient, I=in/hour, A=acres
adj = 'C' adjustment factor for each return frequency

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1.25
Adj. 'C' = Wtd.'C' x 1.25

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
Paved	0.900	2.43						
Grassed	0.300	9.49						
			20.00	0.422	0.528	6.500	11.92	40.90

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

```
*************************************************************************
*************************************************************************
*                                                                       *
*                                                                       *
*                       MODIFIED RATIONAL METHOD                        *
*          ---- Grand Summary For All Storm Frequencies ----            *
*                                                                       *
*                                                                       *
*************************************************************************
*************************************************************************
```

First peak outflow point assumed to occur at inflow recession leg.

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

Area = 11.92 acres Tc = 20.00 minutes

Frequency (years)	Adjusted 'C'	Duration minutes	Intens. in/hr	Qpeak cfs	Allowable cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
2	0.422	20	3.500	17.62	15.44	21,143	2,615
10	0.422	20	4.700	23.66	20.28	28,392	4,056
25	0.465	26	4.800	26.58	23.82	41,464	8,592
100	0.528	35	4.875	30.68	28.67	64,419	17,114

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

RETURN FREQUENCY: 2 yr `C' Adjustment = 1.000 Allowable Q = 15.44 cfs

Hydrograph file duration= 20.00 minutes
Hydrograph file: JCC2 .HYD Tc = 20.00 minutes

Weighted `C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
**********	**********	**********	**********	**********	**********	Storage Maximum	
0.422	0.422	20	3.500	11.92	17.62	21,143	2,615
**********	**********	**********	**********	**********	**********	**********	**********
0.422	0.422	30	2.750	11.92	13.84	Qpeak < Qallow	

0.06 ac/ft

0.50 ac/ft

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

RETURN FREQUENCY: 10 yr `C' Adjustment = 1.000 Allowable Q = 20.28 cfs

Hydrograph file duration= 20.00 minutes
Hydrograph file: JCC10 .HYD Tc = 20.00 minutes

Weighted `C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.422	0.422	20	4.700	11.92	23.66	28,392	4,056
0.422	0.422	30	3.750	11.92	18.88	Qpeak < Qallow	

Storage Maximum

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

first peak outflow point assumed to occur at inflow recession leg.

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

RETURN FREQUENCY: 25 yr `C' Adjustment = 1.100 Allowable Q = 23.82 cfs

Hydrograph file duration= 26.00 minutes
Hydrograph file: JCC25 .HYD Tc = 20.00 minutes

Weighted `C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.422	0.465	20	5.400	11.92	29.90	35,882	7,298
********** Storage Maximum							
0.422	0.465	26	4.800	11.92	26.58	41,464	8,592
**********							
0.422	0.465	30	4.400	11.92	24.36	43,856	8,126
0.422	0.465	40	3.600	11.92	19.93	Qpeak < Qallow	

Quick TR-55 Ver.5.46 S/N:
Executed: 11:52:15 10-19-1995

MODIFIED RATIONAL METHOD
---- Summary for Single Storm Frequency ----

First peak outflow point assumed to occur at inflow recession leg.

JCC RECREATION CENTER @ LONGHILL ROAD
James City County, Virginia

RETURN FREQUENCY: 100 yr `C' Adjustment = 1.250 Allowable Q = 28.67 cfs

Hydrograph file duration= 35.00 minutes
Hydrograph file: JCC100 .HYD Tc = 20.00 minutes

Weighted `C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.422	0.528	20	6.500	11.92	40.90	49,082	14,678
0.422	0.528	30	5.250	11.92	33.04	59,464	16,459
********** Storage Maximum							
0.422	0.528	35	4.875	11.92	30.68	64,419	17,114
**********							
0.422	0.528	40	4.500	11.92	28.32	Qpeak < Qallow	

87.42
87.22
.20
128

(1) GRATE 55 Sq in

$Q = 0.67 \times A (64 \times d)^{\frac{1}{2}}$

$Q = 0.67 \times \frac{55}{144} (64 \times \frac{1}{2})^{\frac{1}{2}}$

$Q = 0.67 \times \frac{1}{3} \times 4 \approx$

1.5 cfs

(1) DRAINAGE AREA

$0.16 + 0.10 + 0.10 \approx 0.36$ Ac

$Q = AIR = 0.4 \times 1 \times 4 \approx 2$ cfs

87.67
87.54
.17

12" PIPE @ 0.15%

$Q \approx 1.2$ cfs

HYDRAULIC
GRADE LINE
3/352 = 0.85%
Q = 3.2 cfs

Q = AIR
0.3 × 1 × 4 = 1.2 cfs

12" @ 0.5%
2-5 cfs

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	CMP Riser
BMP ID NO	039	SITE AREA acre	22.56	CTRL STRUC SIZE inches	15
PLAN NO	SP-117-95	LAND USE	Recreation Center	OTLT BARRL DESC	CMP Barrel
TAX PARCEL	(39-01)(01-153)	old BMP TYP	Dry Pond w/ SM	OTLT BARRL SIZE inch	15
PIN NO	3910100153	JCC BMP CODE			
CONSTRUCTION DATE	4/1/1996	POINT VALUE	9	EMERG SPILLWAY	No
PROJECT NAME	JCC/Williamsburg Rec Center			DESIGN HW ELEV	86.22
FACILITY LOCATION	5301 Longhill Road			PERM POOL ELE	83.78
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres	11.92	2-YR OUTFLOW cfs	15.44
CURRENT OWNER	JCC and City of Williamsburg			10-YR OUTFLOW cfs	20.28
OWNER ADDRESS	P.O. Box 8784			REC DRAWING	No
OWNER ADDRESS 2		SERVICE AREA DESCRI	Building, Parking & Grassed areas		
CITY-STATE-ZIP CODE	Williamsburg, Va. 23187	IMPERV AREA acres	2.50	CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Chisel Run		
MAINT AGREEMENT	No	EXT DET-WQ-CTRL	Yes	LAST INSP DATE	8/10/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	0.21	INTERNAL RATING	4
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0	County owned. 1" RV detained for 24 hr. 8" low flow orif. Dual interconn ponds	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

A.D. Mallory
5298 Longhill Road
229-2929

Photos from heavy rain a few years ago. VDOT sent him to us. Will County clean this out near Rec. Center?

RECEIVED
DEC 02 2003
DEVELOPMENT MANAGEMENT