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: **MC005**

DATE VERIFIED: **December 6, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

Date: March 28, 2012

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

From: Leah Hardenbergh

PO: 110426

Re: Files Approved for Scanning

General File ID or BMP ID:	**MC005**
PIN:	**4711300001**
Owner Name (if known):	**JOHN TYLER INVESTMENT GROUP**
Legal Property Description:	**L-1 JOHN TYLER COMM**
Site Address:	**4556 JOHN TYLER HGWY**

(For internal use only):

Box # 3

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

MC-005

Contents for Stormwater Management Facilities As-built Files

Each file is to contain:

1. As-built plan
2. Completed construction certification
3. Construction Plan
4. Design Calculations
5. Watershed Map
6. Maintenance Agreement
7. Correspondence with owners
8. Inspection Records
9. Enforcement Actions

LABEL	RADIUS	CENTRAL ANGLE	ARC LENGTH	CHORD LENGTH	CHORD BEARING	TAN. LENGTH
C1	1185.92	01° 17' 08"	26.61	26.61	N 89° 48' 24" W	13.31
C2	145.00	05° 08' 02"	12.99	12.99	S 01° 43' 50" E	6.50

RECORD NORTH

ROUTE 5

VENTURE LANE 50' R/W

T.B.M. COR. CONC. MD VA. POWER TRANSFORMER ☐ PAINTED PINK ELEV. = 66.95

BASIN "A"
A – 0.3 AC.
C – 0.7
I – 7.2 IN/HR
Q – 1.5 CFS

BASIN "B"
A – 1.1 AC.
C – 0.9
I – 7.2
Q – 7.1 CFS

BASIN "C"
A – 0.8 AC.
C – 0.3
I – 6.7
Q – 1.6 CFS

BASIN "D"
A – 0.3 AC.
C – 0.4
I – 7.2
Q – 0.9 CFS

BASIN "E"
A – 0.7 AC.
C – 0.3
I – 7.2 IN/HR
Q – 1.5 CFS

BASIN "F"
A – 0.3 AC
C – 0.95
I – 7.2
Q – 2.1 CFS

BASIN "G"
A – 0.2 AC.
C – 0.95
I – 7.2
Q – 1.4 CFS

9,000 S.F. WAREHOUSE EXPANSION
F.F. = 62.20
TYPE 2 C CONSTRUCTION
MAX. HEIGHT = 9'30" ABOVE GRADE

PLUG EXISTING PIPE

1-STD DI-1
RIM = 63.50±
INV. = 59.50
CONNECT EXISTING 6" ENC TO DI.

ALL INTERIOR LOT LINES TO BE EXTINGUISHED IN CONJUNCTION WITH THIS EXPANSION

REGRADE EXISTING STONE

30' BUILDING ADDITION F.F. = 67.00 RETAINING WALL

1-STD DI-7
RIM = 64.0
INV. = 54.0

250 LF 12" RCP S = 1.5%

94 LF 15" RCP S = 5.57%

72 LF 15" RCP S = 9.10%

24" SLUICE GATE

RETAINING WALL (DOUBLEHOLD)

EARTH SWALE

ABANDONED

EXISTING GRAVEL

6' CHAIN LINK FENCE (TYP.)

CEMETERY

CLEARING LIMIT

LIMITS OF 25% SLOPE

FOR REVIEW ONLY, NOT TO BE USED FOR CONSTRUCTION

COUNTY OF JAMES CITY
CASE SITE PLAN

NO.	REVISIONS	DATE
1	DWG.	
2	DWG.	
3	DWG.	
4	DWG.	
5	DWG.	
6	DWG.	
7	DWG.	
8	DWG.	

SHEET INDEX

GRAPHIC SCALE IN FEET

VICINITY MAP SCALE: 1"=2000'

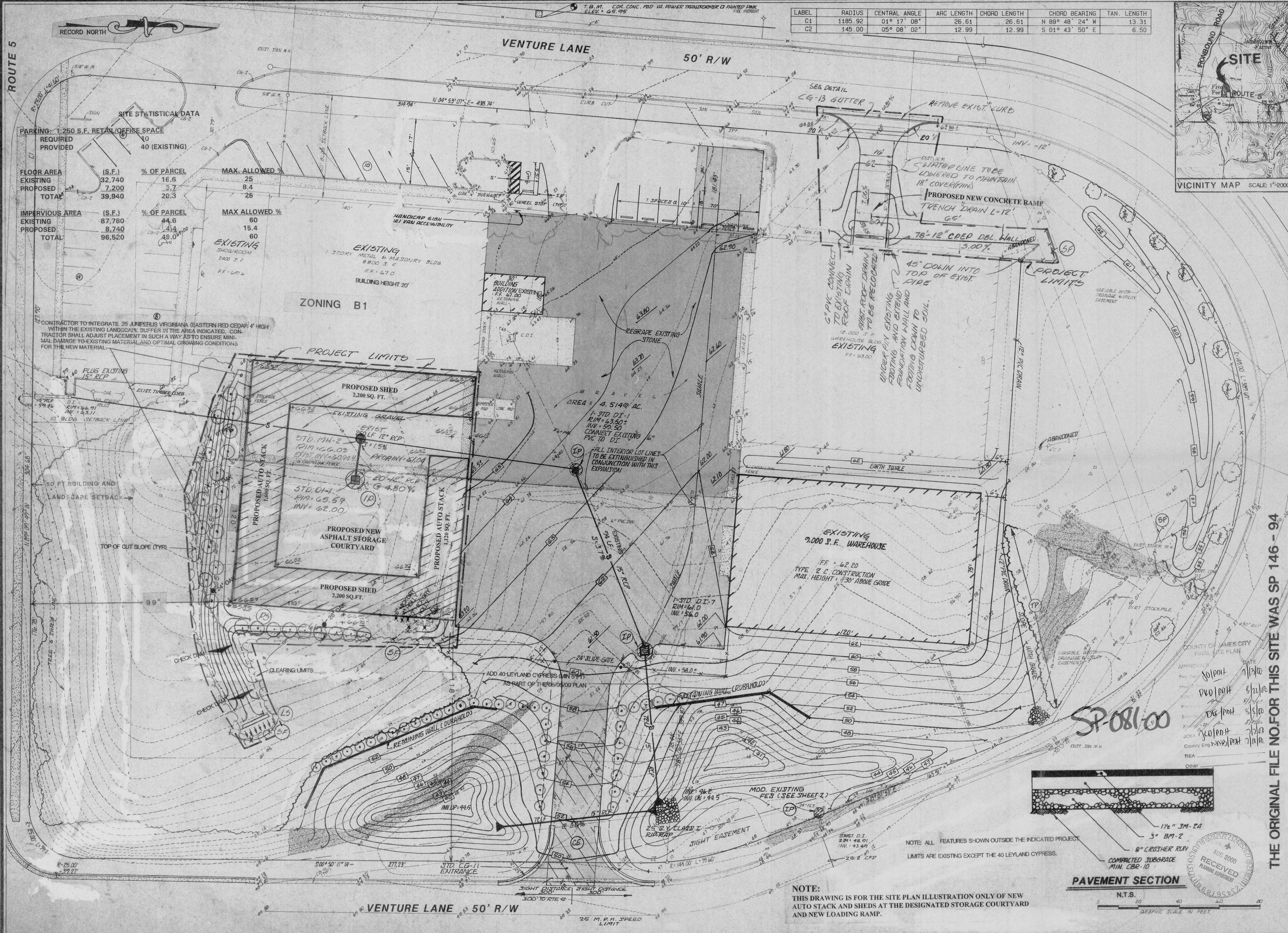
Langley and McDonald
A PROFESSIONAL CORPORATION
ENGINEERS · PLANNERS · SURVEYORS
VIRGINIA BEACH – WILLIAMSBURG, VIRGINIA

DES.	CRO	CHK.	
DWN.	HTB	DATE	3/30/94

CUSTOM BUILDER SUPPLY
DRAINAGE AREA MAP
FOR
JOHN TYLER INVESTMENT GROUP VIRGINIA
JAMES CITY COUNTY

PROJ. NO.	94021-3
SCALE	1"=20'
SHEET	1 OF 1
DWG.	5254W

SP-56-94



LABEL	RADIUS	CENTRAL ANGLE	ARC LENGTH	CHORD LENGTH	CHORD BEARING	TAN. LENGTH
C1	1185.92	01° 17' 08"	26.61	26.61	N 89° 48' 24" W	13.31
C2	145.00	05° 08' 02"	12.99	12.99	S 01° 43' 50" E	6.50

SITE STATISTICAL DATA

PARKING: 1:250 S.F. RETAIL/OFFICE SPACE

REQUIRED	10
PROVIDED	40 (EXISTING)

FLOOR AREA	(S.F.)	% OF PARCEL	MAX. ALLOWED %
EXISTING	32,740	16.6	25
PROPOSED	7,200	3.7	8.4
TOTAL	39,940	20.3	25

IMPERVIOUS AREA	(S.F.)	% OF PARCEL	MAX ALLOWED %
EXISTING	87,780	44.6	60
PROPOSED	8,740	4.4	15.4
TOTAL	96,520	49.0	60

CONTRACTOR TO INTEGRATE 25 JUNIPERUS VIRGINIANA (EASTERN RED CEDAR) 4' HIGH WITHIN THE EXISTING LANDSCAPE BUFFER IN THE AREA INDICATED. CONTRACTOR SHALL ADJUST PLACEMENT IN SUCH A WAY AS TO ENSURE MINIMAL DAMAGE TO EXISTING MATERIAL AND OPTIMAL GROWING CONDITIONS FOR THE NEW MATERIAL.

ADD 40 LEYLAND CYPRESS AS PART OF THE 06/05/00 PLAN

NOTE: ALL FEATURES SHOWN OUTSIDE THE INDICATED PROJECT LIMITS ARE EXISTING EXCEPT THE 40 LEYLAND CYPRESS.

NOTE:
THIS DRAWING IS FOR THE SITE PLAN ILLUSTRATION ONLY OF NEW AUTO STACK AND SHEDS AT THE DESIGNATED STORAGE COURTYARD AND NEW LOADING RAMP.

PAVEMENT SECTION

N.T.S.

- 1½" SM-2A
- 3" BM-2
- 8" CRUSHER RUN
- COMPACTED SUBGRADE MIN. CBR-10

THE ORIGINAL FILE NO. FOR THIS SITE WAS SP 146 - 94

COMMONWEALTH OF VIRGINIA — STEPHEN A. ROMEO — No. 1448-B — LAND SURVEYOR

LANDMARK DESIGN GROUP
Engineers • Planners • Surveyors
Landscape Architects • Environmental Consultants
4029 Ironbound Road, Suite 100, Williamsburg, VA 23188
5544 Greenwich Road, Suite 200, Virginia Beach, VA 23462

DES.	DEW
DWN.	DEW
CHK.	
DATE	06/05/00

REVISED 8-2-00

CUSTOM BUILDER SUPPLY

SITE PLAN FOR STORAGE RACKS, SHEDS AND LOADING RAMP

FOR

JOHN TYLER INVESTMENT GROUP

JAMES CITY COUNTY VIRGINIA

REVISED 8-22-00

PROJ. NO.	1940021-000.15
SCALE	1"-20'
SHEET	1 OF 2
DWG.	5257 BW

RECEIVED AUG 2000 PLANNING DEPARTMENT

MC005_CUSTOM_BUILDER_SUPPLY_JOHN_TYLER_COMM - 005

LABEL	RADIUS	CENTRAL ANGLE	ARC LENGTH	CHORD LENGTH	CHORD BEARING	TAN. LENGTH
C1	1185.92	01° 17' 08"	26.61	26.61	N 89° 48' 24" W	13.31
C2	145.00	05° 08' 02"	12.99	12.99	S 01° 43' 50" E	6.50

NOTE: NO BUSHES EXCEEDING 8" AND ALL TREES MUST BE TRIMMD AND LIMBED TO A MINIMUM HEIGHT O 6' WITHIN THE MEDIANS.

NOTE: ALL CURB CUTS WITHIN DOT RIGHT-OF-WAY WILL NED TO CONFORM TO CURRENT DA STANDARDS.

LIMITS OF 25% SLOPE

COUNTY OF JAMES CITY
FINAL SITE PLAN

Received

APPROVALS		DATE
Fire Dept.	HGO/MAF	5/16/94
Health Dept.	N/A	
Highwy. Dept.	RCB/MAF	7/21/94
Plan. Comm.	ABL	7/22/94
Pub. Wks. Dept.	DEC/MAF	6/20/94
Zoning Adm.	RJ	7/22/94
JCSA	MDV/MAF	6/21/94
Other		
Other		

SHEET INDEX

1. SITE PLAN
2. NOTES AND DETAILS
3. LANDSCAPE PLAN

0 20 40 60 80 GRAPHIC SCALE IN FEET

REVISED: 6/30/94 PER COUNTY COMMENTS

SP-57-94

VICINITY MAP SCALE: 1"=2000'

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

DES.	DWN.	CHK.	DATE
CRO	HTB		3/30/94

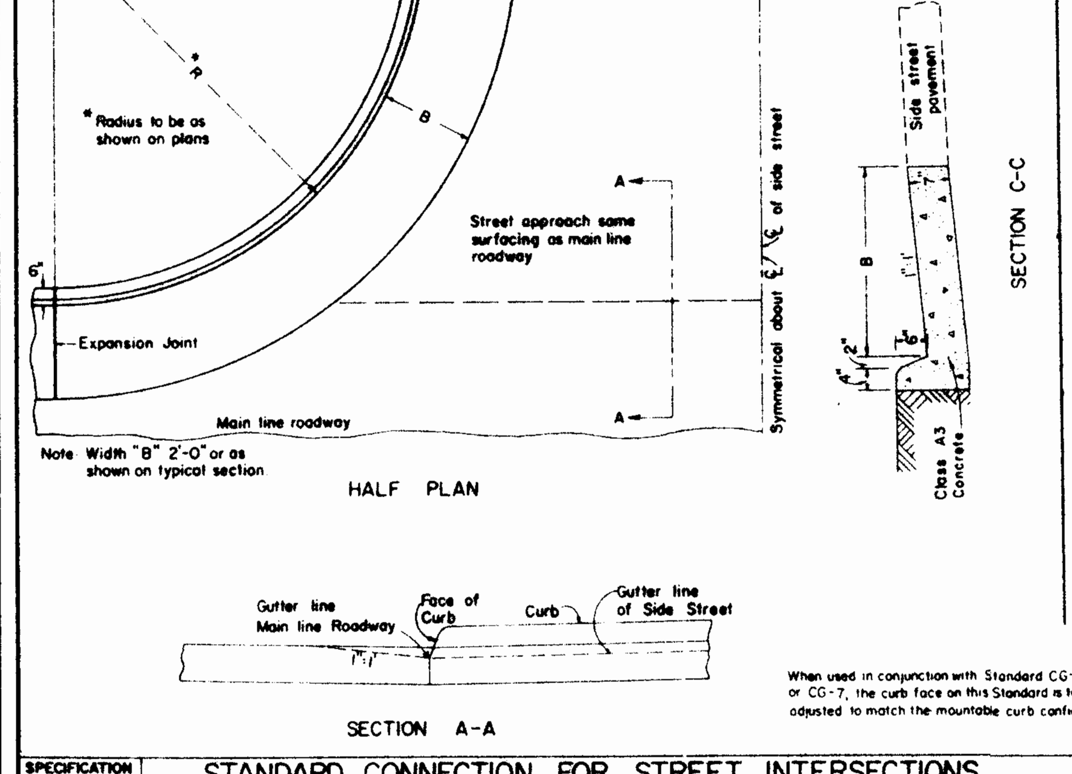
CUSTOM BUILDER SUPPLY
SITE PLAN
FOR
JOHN TYLER INVESTMENT GROUP
JAMES CITY COUNTY VIRGINIA

PROJ. NO.	94021-3
SCALE	1"=20'
SHEET	1 OF 3
DWG.	5257W

EROSION AND SEDIMENT CONTROL NOTES

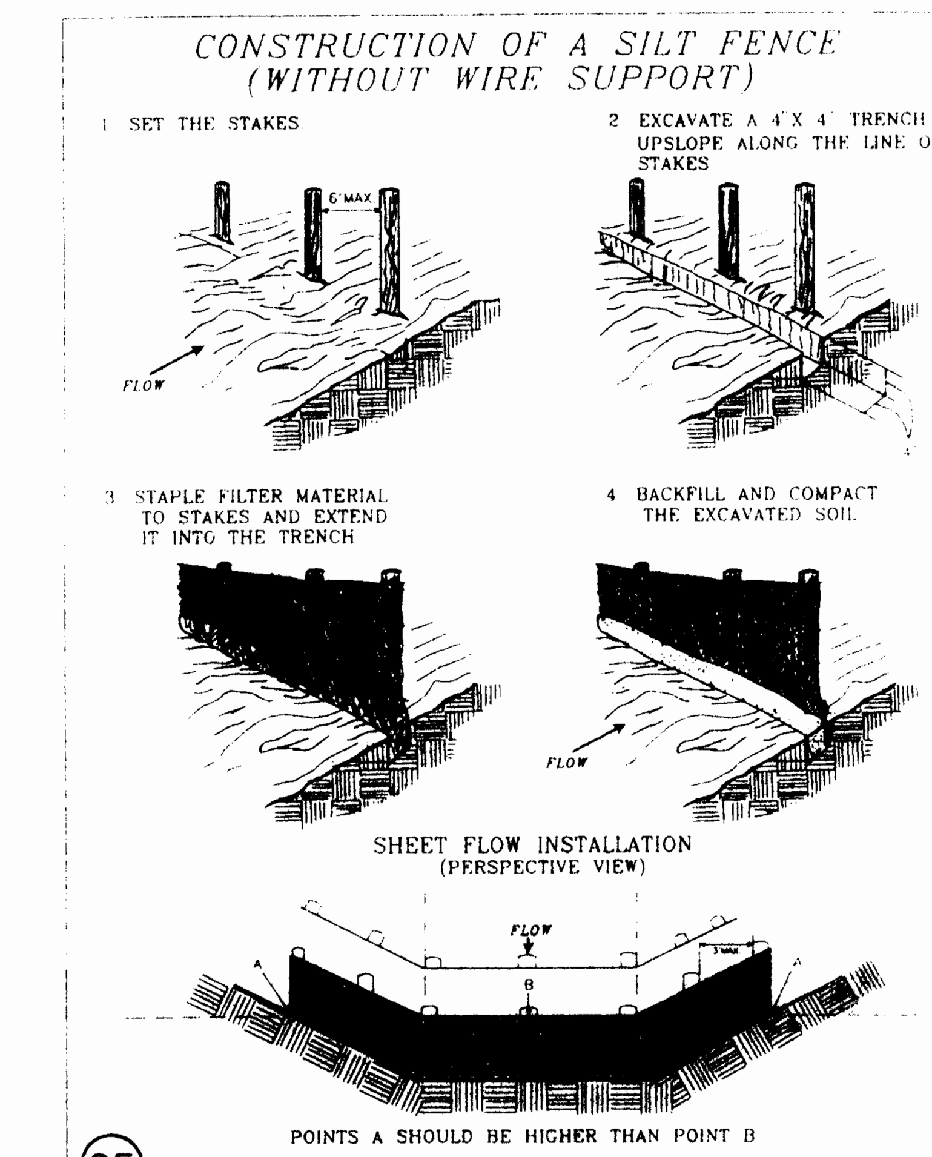
THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO 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", 3RD EDITION, 1992. 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 (STD. & SPEC. 3.02) TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM VDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS.
3. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON-SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION. AN ON-SITE PRE-CONSTRUCTION MEETING WILL BE HELD BETWEEN THE OFFICE OF CODE COMPLIANCE AND THE CONTRACTOR TO IDENTIFY THOSE MEASURES TO BE INITIALLY INSTALLED.
4. MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES. AT 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.
5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRAVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION. A TEMPORARY FILL DIVERSION (STD. & SPEC. 3.10) SHALL BE INSTALLED PRIOR TO THE END OF EACH WORKING DAY.
6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. OFFICE OF CODE COMPLIANCE APPROVAL WILL BE REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLANS.
7. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES.
8. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTFALL DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE WHERE REQUIRED. ANY DRAINAGE OUTFALLS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING BEGINS.
9. PERMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO ALL DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST ALSO BE APPLIED TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE VEGETATIVE ESTABLISHMENT, MULCHING AND THE EARLY APPLICATION OF GRAVEL BASE MATERIAL ON AREAS TO BE PAVED.
10. NO MORE THAN 300 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 STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER IN ACCORDANCE WITH SPECIFICATION 3.32, PERMANENT SEEDING. IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.
13. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.35, MULCHING AND MANUFACTURER'S INSTRUCTIONS.
14. INLET PROTECTION IN ACCORDANCE WITH SPECIFICATION 3.07 SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.
15. TEMPORARY LINERS, SUCH A 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. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE OFFICE OF CODE COMPLIANCE PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.
19. ALL PAVED AND/OR PIPED OUTFALLS WILL BE CONSTRUCTED BEFORE ROAD GRADING AND UTILITY INSTALLATION BEGINS.



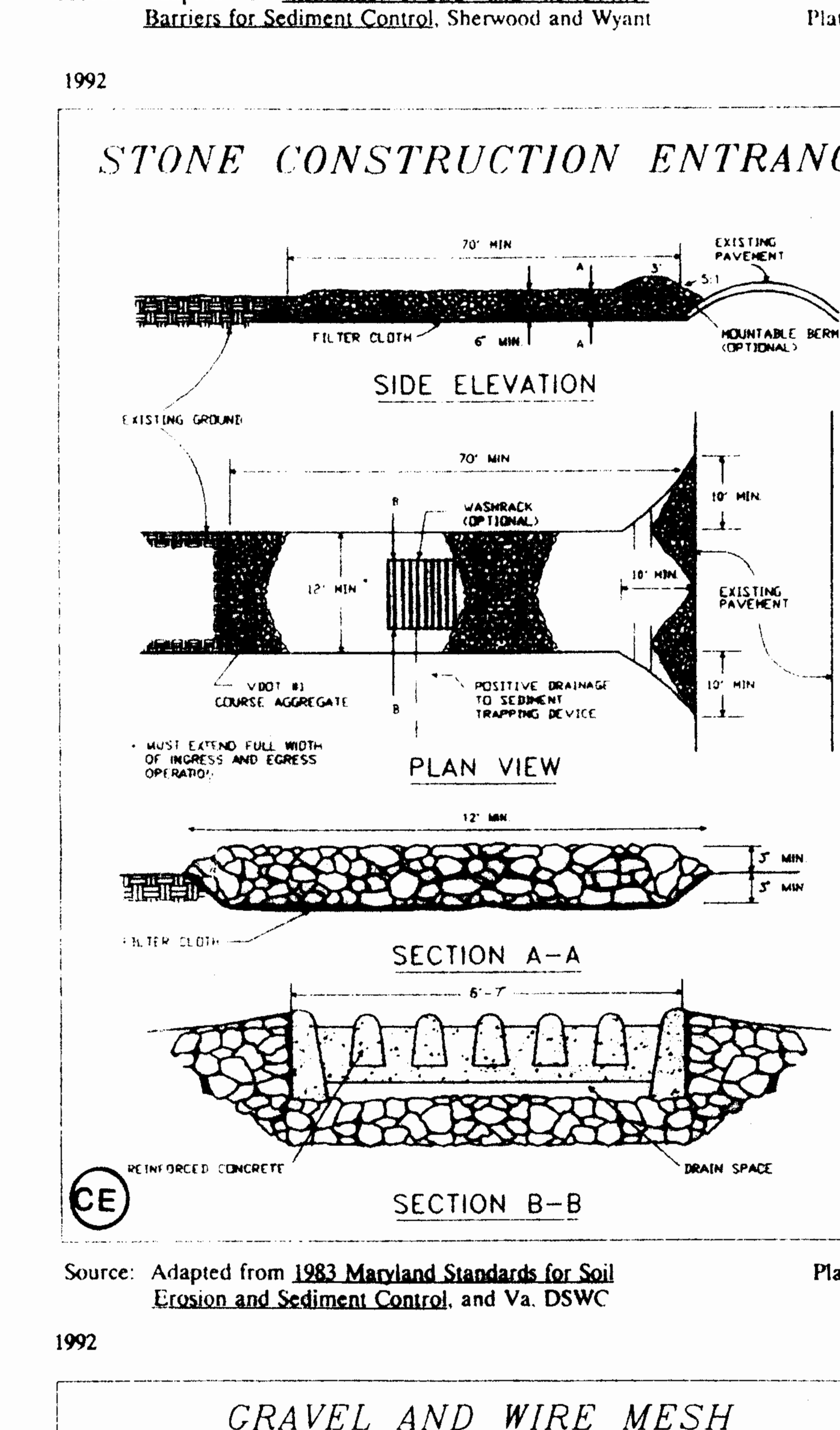
SPECIFICATION REFERENCE 502 — STANDARD CONNECTION FOR STREET INTERSECTIONS — VIRGINIA DEPARTMENT OF TRANSPORTATION — 203.06

1992 — 3.05



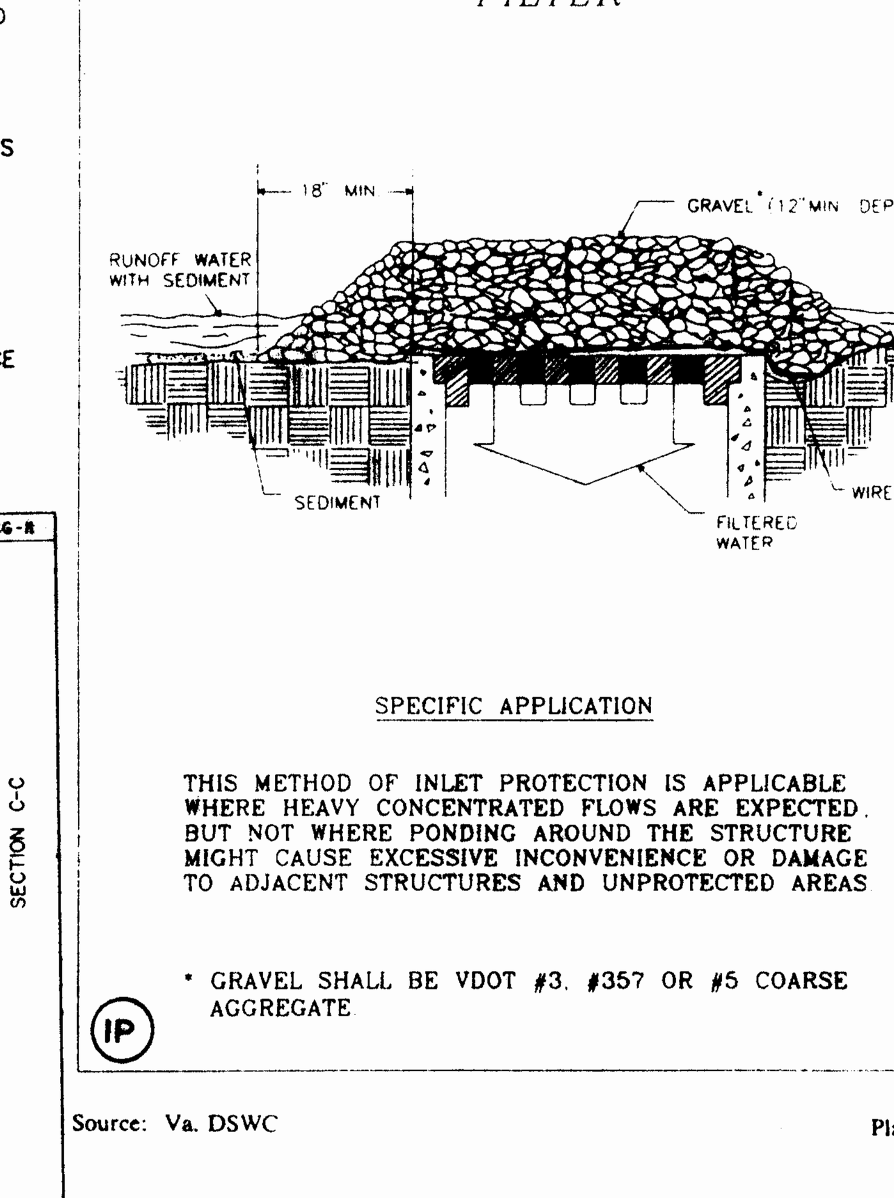
Source: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control, Sherwood and Wyant — Plate 3.05-2

1992 — 3.02



Source: Adapted from 1983 Maryland Standards for Soil Erosion and Sediment Control, and Va. DSWC — Plate 3.02-1

1992 — 3.07



SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE HEAVY CONCENTRATED FLOWS ARE EXPECTED, BUT NOT WHERE PONDING AROUND THE STRUCTURE MIGHT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREAS.

* GRAVEL SHALL BE VDOT #3, #357 OR #5 COARSE AGGREGATE

Source: Va. DSWC — Plate 3.07-2

LANDSCAPE 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) PROVIDING ALL PLANT MATERIAL AS INDICATED ON PLANS; (2) PROVIDING TOPSOIL AND ALL SOIL AMENDMENTS; (3) EXCAVATION OF TREE PITS; (4) FERTILIZING, GUYING, WRAPPING; (5) CHEMICAL APPLICATION; (6) MAINTENANCE AND GUARANTEE; (7) ALL OTHER ITEMS NECESSARY TO MAKE WORK COMPLETE.

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 PLANT MATERIALS LIST, THE PLANTING PLANS SHALL GOVERN. IF DISCREPANCIES OCCUR IN PLANT SIZE INDICATED, THE LARGER SIZE SHALL BE REQUIRED.

THE NAMES OF PLANTS REQUIRED UNDER THIS CONTRACT CONFORM TO THOSE GIVEN IN HORTUS THIRD, 1976 EDITION, L.H. BAILEY, AUTHOR. 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. ALL TAGS, STRINGS, OR ANY OTHER MATERIAL ATTACHED TO THE PLANTS SHALL BE REMOVED AT THE TIME OF THE PLANTING. BALLING, AND BURLAPPING OF PLANTS IN THE PLANT LIST GENERALLY FOLLOW THE CODE OF STANDARDS CURRENTLY RECOMMENDED BY THE AMERICAN STANDARD FOR NURSERY STOCK. SUBSTITUTIONS WILL BE PERMITTED ONLY UPON SUBMISSION OF PROOF THAT ANY PLANT IS NOT OBTAINABLE. ALL SUBSTITUTIONS MUST BE AUTHORIZED BY THE OWNER IN A CHANGE ORDER 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.

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. PLANTS NOTED "CONTAINER" ON THE PLANT LIST MUST BE CONTAINER GROWN WITH WELL-ESTABLISHED ROOT SYSTEMS. NO CANNED PLANT SHALL BE LOOSE IN THE ROOT BALL. ALL PLANTS INJURED AND PLANTS WITH ROOT BALLS BROKEN DURING PLANTING OPERATIONS WILL BE REJECTED. THE BALLED AND BURLAPPED (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. BARE-ROOTED PLANTS ("BR") SHALL BE PLANTED OR HEELED-IN IMMEDIATELY UPON DELIVERY. ALL PLANTS SHALL BE WATERED AS NECESSARY UNTIL PLANTED.

THE CONTRACTOR SHALL BE NOTIFIED BY THE OWNER 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 OR CONSTRUCTIONS, AND PROVISION OF DRAINAGE FOR PLANTING AREAS SHALL BE DONE ONLY AS DIRECTED BY THE OWNER.

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. 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 ELEMENTS OR TO PHYSICAL DAMAGE.

PRIOR TO EXCAVATION OF PLANT PITS, AN AREA 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 INCHES. FOR PLANTS HAVING ROOT BALLS OVER 12 INCHES DEEP, THE ROTO-TILLED AREA SHALL NOT EXCEED 12 INCHES IN DEPTH. UNDER NO CIRCUMSTANCES SHALL THE ROTO-TILLED AREA BE GREATER THAN THE DEPTH OF THE ROOT BALL. IN CONTINUOUS SHRUB BEDS THE ENTIRE SHRUB BED, PLUS AN AREA AROUND THE ENTIRE PERIMETER OF THE SHRUB BED EQUAL TO FIVE TIMES THE SPREAD OF THE PLANT ROOT BALL, SHALL BE ROTO-TILLED ACCORDING TO THE ABOVE SPECIFICATIONS. THE CONTRACTOR SHALL ENSURE THAT THE LOCATIONS OF ALL EXISTING UTILITIES HAVE BEEN ESTABLISHED AND CLEARLY MARKED PRIOR TO BEGINNING ROTO-TILLING OPERATIONS.

THE DIAMETER OF PITS FOR TREES AND SHRUBS SHALL BE AT LEAST TWICE THE DIAMETER OF THE BALL OR SPREAD OF ROOTS. SHRUB 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 A MINIMUM OF ONE INCH ABOVE FINISH GRADE. PLANT PIT WALLS SHALL BE SCARIFIED PRIOR TO PLANT INSTALLATION. 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 AND TO ELIMINATE AIR POCKETS. 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 TO THE TOPS OF THE ROOT BALLS OF PLANTS. GROUND COVERS SHALL BE PLANTED IN BEDS HAVING A MINIMUM DEPTH OF 4 INCHES BELOW THE PROPOSED ROOT DEPTH. PLANTS SHALL BE EVENLY SPACED AND SET 2 INCHES BELOW THE PROPOSED FINISHED GRADE SO AS TO MAINTAIN THE ORIGINAL GROWING DEPTH WHILE ALLOWING FOR A 2-INCH TOP DRESSING OF MULCH. ALL PLANTS OTHER THAN GROUND COVERS SHALL BE MULCHED WITH A 3-INCH (MAXIMUM) LAYER OF SHREDDED HARDWOOD OR BARK MULCH IMMEDIATELY AFTER PLANTING. THIS MULCH SHALL ENTIRELY COVER THE AREA OF THE PLANTING PIT, BED, OR SAUCER AROUND EACH PLANT WITH THE EXCEPTION OF THE AREA IMMEDIATELY ADJACENT TO THE PLANT TRUNK OR TRUNKS. MULCH SHALL NOT BE MOUNDED AROUND THE BASE OF THE PLANTS. THE AREA IMMEDIATELY ADJACENT TO THE PLANT TRUNK OR TRUNKS SHALL BE LEFT FREE OF ANY MULCH. LOW GROWING, SPREADING PLANTS SHALL NOT BE MULCHED DIRECTLY UNDER THE PLANT IN THE VICINITY OF THE TRUNK STRUCTURE, IN ORDER TO ENSURE THAT MULCH DOES NOT TOUCH THE TRUNK.

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.

NECESSARY QUANTITIES OF TOPSOIL SHALL BE SUPPLIED BY THE CONTRACTOR AND APPROVED BY THE OWNER. THE CONTRACTOR MAY USE TOPSOIL AFTER SECURING SOIL TEST (V.P.I.) AND APPLYING RECOMMENDED TREATMENT THEREOF. TOPSOIL SHALL BE AS FOLLOWS:

1. CLASS A TOPSOIL SHALL BE STOCKPILED TOPSOIL THAT HAS BEEN SALVAGED IN ACCORDANCE WITH SECTION 303.04 (A) OF THE VDOT 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 INCHES IN THEIR GREATEST DIMENSION.
2. CLASS B TOPSOIL 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, STONES, 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.

2.1 "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.

2.2 "A" HORIZON SUBDIVISIONS:

2.2.1 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.

2.2.2. 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.

2.3 "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%

3.0 TOPSOIL FOR PLANTING PLANTS 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 ENGINEER AT THE SOURCE OF SUPPLY AND IMMEDIATELY PRIOR TO USE IN THE PLANTING OPERATIONS.

WHENEVER POSSIBLE, EXISTING SOIL EXCAVATED FROM THE PLANTING PITS 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 PITS CONTAINING SOILS OF DIFFERENT TEXTURE. WHERE THE TEXTURE OF THE EXISTING SOIL IS UNDESIRABLE FOR THE 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 EXISTING SOIL SHALL BE BLENDED 66% EXISTING SOIL WITH 33% AMENDED SOIL IN ORDER TO MINIMIZE SOIL INTERFACE PROBLEMS. SEE BELOW FOR AMENDED SOIL.

WHERE IT IS DETERMINED THAT THE EXISTING SOIL EXCAVATED FROM A PLANTING PIT 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% PLANTING SOIL MIXTURE AS DESCRIBED BELOW WITH THE ADDITION OF 1/2 PART SAND.

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.

PLANTING SOIL FOR DECIDUOUS PLANTS SHALL HAVE A pH VALUE BETWEEN 6.0 AND 7.0. PLANTING SOIL 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.

FERTILIZER TYPE A (MIXED WITH PLANTING SOIL): SHALL BE A COMMERCIAL GRADE FERTILIZER. A MINIMUM OF 75% OF THE NITROGEN SHALL BE DERIVED FROM NATURAL ORGANIC SOURCES OF UREAFOAM. 40-50% OF THE NITROGEN SHALL BE WATER INSOLUBLE. AVAILABLE PHOSPHORIC ACID SHALL BE FROM SUPERPHOSPHATE BOND OR TANKAGE. POTASH SHALL BE DERIVED FROM MURIATE OF POTASH CONTAINING 60% POTASH. IT SHALL BE UNIFORM IN COMPOSITION, FREE FLOWING, AND SUITABLE FOR APPLICATION WITH APPROVED EQUIPMENT. FERTILIZER SHALL CONTAIN THE FOLLOWING PERCENTAGE BY WEIGHT:

10% NITROGEN
10% PHOSPHORIC ACID
5% POTASH

WITH WRITTEN APPROVAL OF THE ARCHITECT, THE CONTRACTOR MAY USE A COMPLETE COMMERCIAL FERTILIZER WITH A DIFFERENT N-P-K ANALYSIS, PROVIDED THE NITROGEN CONTENT MEETS THE SPECIFIED RATE FOR APPLICATION AND THE SOURCES FOR THE COMPONENT PARTS MEET THE ABOVE REQUIREMENTS.

TYPE B (PLACED AROUND ROOTBALL): SHALL BE "MAG-AMP" OR AN INORGANIC CONTROLLED RELEASE COGRANULATED MAGNESIUM AMMONIUM PHOSPHATE AND MAGNESIUM POTASSIUM PHOSPHATE COMPOUND. IT SHALL HAVE A GUARANTEED MINIMUM ANALYSIS OF THE FOLLOWING MATERIALS EXPRESSED IN PERCENT OF TOTAL WEIGHT:

NITROGEN (N)	7%
MAX. WATER SOLUBLE AMMONIACAL NITROGEN	2%
MAX. WATER INSOLUBLE AMMONIACAL NITROGEN	5%
PHOSPHORIC ACID (AVAILABLE) (PO)	40%
POTASH (K)	6%
MAGNESIUM (MG)	12%

MULCH SHALL BE CLEAN GROUND OR SHREDDED BARK OR HARDWOOD MULCH OF APPROVED KIND AS GENERALLY AVAILABLE AT LOCAL MARKETS, APPLIED 3 INCHES MAXIMUM IN DEPTH OVER ALL BEDS, SHRUBS, AND TREE PLANTINGS, EXCEPT AS NOTED ABOVE FOR GROUND COVER PLANTINGS. WHERE SLOPES INDICATE LIKELIHOOD OF WASH, CLEAN BALED PINE STRAW SHALL BE USED. AT DRAINAGE DISPERSION POINTS OR ALONG NATURAL WATER WAYS WHERE CONCENTRATIONS OF SURFACE WATER EMPTY FROM CULVERT OR PAVED DITCH, SOIL SAVER, OR OTHER HEAVY JUTE MESH SHALL BE INSTALLED IN APPROVED MANNER AND TO SUCH EXTENT AS WILL PREVENT EROSION. ALL AZALEA AND CAMELLIA PLANTING BEDS SHALL REQUIRE 1 INCH OF PINE STRAW MULCH UNDER 2 INCHES OF BARK OR SHREDDED HARDWOOD MULCH. SHREDDED HARDWOOD OR BARK MULCH SHALL HAVE BEEN COMPOSED FOR AT LEAST 2 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 PLANTS SHALL BE PLANTED UPRIGHT AND FACED TO GIVE THE BEST APPEARANCE OR RELATIONSHIP TO ADJACENT STRUCTURES. THE ONLY PRUNING THAT WILL BE ALLOWED WILL BE THE PRUNING OF BROKEN OR DAMAGED BRANCHES. UNDER NO CIRCUMSTANCES SHALL THE CENTRAL LEADER OF THE PLANT BE PRUNED WITHOUT THE APPROVAL OF THE LANDSCAPE ARCHITECT. ROOTS SHALL BE SPREAD IN THEIR NORMAL POSITION. ALL BROKEN OR FRAYED ROOTS SHALL BE CUT OFF CLEANLY. CIRCLING ROOTS WHICH HAVE CIRCLED MORE THAN 1/4 OF THE ROOT BALL CIRCUMFERENCE SHALL BE CUT THROUGH. THE BURLAP AND ALL TWINE AND/OR 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 TRY 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 INCHES BELOW THE TOP OF THE ROOT BALL.

TREES REQUIRING SUPPORT WILL BE INDICATED IN THE REMARKS SECTION OF THE PLANTING SCHEDULE. ALL TREES REQUIRING SUPPORT SHALL BE STAKED ACCORDING TO THE DETAILS PROVIDED. GALVANIZED WIRE SHALL BE ENCASED IN BLACK HOSE TO PREVENT DIRECT CONTACT WITH BARK OF THE TREE AND SHALL BE PLACED AROUND THE TRUNK AND ABOVE THE FIRST MAJOR BRANCH IN A SINGLE LOOP. WIRES SHALL BE MAINTAINED SNUG. ONLY 1 STAKE SHALL BE REQUIRED PER TREE AND SHALL BE DRIVEN VERTICALLY INTO THE GROUND TO A DEPTH OF 2-1/2 TO 3 FEET IN SUCH A MANNER AS NOT TO INJURE THE BALL OR ROOTS. STAKES FOR SUPPORTING TREES SHALL BE 2 INCHES, SQUARE OR ROUND, BY 8 FEET, SOUND WOOD, TREATED WITH CREOSOTE OR OTHER APPROVED WOOD PRESERVATIVE. WIRE FOR ANCHORING TREES TO STAKES SHALL BE NO. 12 GAUGE PLIABLE GALVANIZED. HOSE TO ENCASE GUY WIRES USED FOR ANCHORING TREES TO STAKES SHALL BE NO. 12 GAUGE PLIABLE GALVANIZED. HOSE TO ENCASE GUY WIRES USED FOR ANCHORING TREES TO STAKES SHALL BE NEW OR USED 2-PLY REINFORCED BLACK RUBBER GARDEN HOSE. ONLY TREES HAVING A THIN BARK SHALL BE WRAPPED. WRAPPING MATERIAL SHALL BE EITHER TUBE-X OR COBRA TREE WRAP. IF COBRA TREE WRAP IS USED, THE BANDAGE SHALL COVER THE ENTIRE SURFACE OF THE TRUNK TO THE HEIGHT OF THE FIRST BRANCHES. TREE WRAP SHALL BEGIN AT TREE BASE AND WRAP UPWARDS WITH A MIN. 1/4" OVERLAP. TUBE-X SHALL BE SPLIT AND APPLIED TO THE TRUNK FROM THE GROUND TO JUST BELOW THE FIRST BRANCHES. THE TUBE SHALL NOT BE ALLOWED TO RUB ON THE LOWEST BRANCHES AND THE TUBE SHALL NOT BE PHYSICALLY ATTACHED TO THE TRUNK.

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. HE SHALL ALSO FURNISH ALL NECESSARY HOSE, EQUIPMENT ATTACHMENTS, AND ACCESSORIES FOR THE ADEQUATE IRRIGATION OF LAWNS AND PLANTED AREAS AS MAY BE REQUIRED UNTIL ACCEPTED BY THE CLIENT.

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 ONLY. ANY DAMAGE INCURRED TO THE SITE, ADJACENT PROPERTIES, OR APPLICATOR DURING PESTICIDE APPLICATIONS WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING HIS WORK AFTER PLANTING. MAINTENANCE SHALL INCLUDE WATERING, WEEDING, CULTIVATING, MULCHING, REMOVAL OF DEAD MATERIALS, RESETTING OF PLANTS TO PROPER GRADES OR UPRIGHT POSITIONS, RESTORATION OF PLANTING SAUCERS, 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 COMPLETIONS OF THIS PROJECT. THE LANDSCAPE CONTRACTOR SHALL MAINTAIN HIS FINISHED WORK FOR A PERIOD OF 1 YEAR COMMENCING FROM THE TIME THE INSTALLATION IS ACCEPTED AS COMPLETE BY THE TENANT'S CONSTRUCTION REPRESENTATIVE.

INSPECTION OF THE WORK TO DETERMINE COMPLETION OF THE CONTRACT, EXCLUSIVE OF THE POSSIBLE REPLACEMENT OF PLANTINGS, WILL BE MADE BY THE OWNER AT THE CONCLUSION OF THE INSTALLATION PERIOD UPON WRITTEN NOTICE REQUESTING SUCH INSPECTION. REQUEST SHALL BE SUBMITTED BY CONTRACTOR AT LEAST 10 DAYS PRIOR TO THE ANTICIPATED DATE FOR INSPECTION. AFTER INSPECTION, THE CONTRACTOR WILL BE NOTIFIED IN WRITING BY THE OWNER OF ACCEPTANCE OF THE WORK, EXCLUSIVE OF THE POSSIBLE REPLACEMENT OF PLANTS SUBJECT TO GUARANTY; OR, IF THERE ARE ANY DEFICIENCIES, THE CONTRACTOR WILL BE NOTIFIED OF THE REQUIREMENTS NECESSARY FOR COMPLETION OF THE WORK.

NURSERY STOCK SHALL BE FULLY GUARANTEED FOR 1 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 GUARANTEES ARE PREDICATED ON THE ASSURANCE THAT THE OWNER HAS PROPERLY CARED FOR ALL PLANTS AFTER THE CONTRACTOR HAS BEEN RELEASED FROM HIS MAINTENANCE OBLIGATIONS. ALL COSTS OF REPLACEMENTS SHALL BE BORNE BY THE CONTRACTOR.

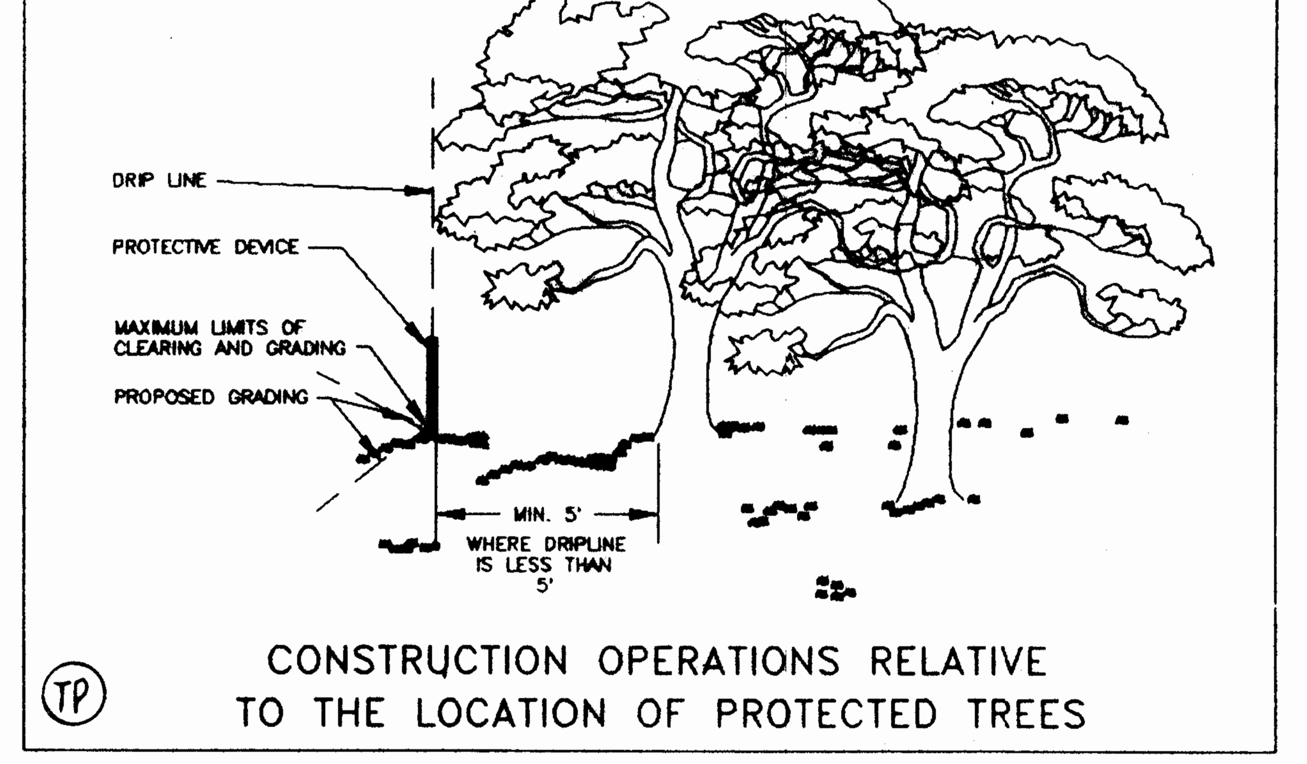
THIS PLAN DOES NOT GUARANTEE THE EXISTENCE OR NON-EXISTENCE OF ANY UTILITIES. PRIOR TO ANY CONSTRUCTION OR EXCAVATION, THE CONTRACTOR SHALL ASSUME THE RESPONSIBILITY OF LOCATING AND VERIFYING ALL UTILITIES, ABOVE AND/OR BELOW GROUND, PUBLIC AND/OR PRIVATE, THAT MAY EXIST AND CROSS THROUGH THE AREAS OF CONSTRUCTION.

LANDSCAPING WILL NOT BE MEASURED, BUT SHALL INCLUDE ALL STOCK, EXCAVATION, INSTALLATION, TOPSOIL, BACKFILLING, FERTILIZER, CHEMICALS, WRAPPING, GUYING, MULCH, TESTING, MAINTENANCE, AND GUARANTEES REQUIRED FOR THE COMPLETION OF CONSTRUCTION AS SHOWN. PAYMENT FOR THE WORK SPECIFIED HEREIN SHALL BE INCLUDED IN THE LUMP SUM PRICE BID FOR LANDSCAPE PLANTING UNLESS OTHERWISE SPECIFIED BY THE OWNER.

TREE PROTECTION NOTES

AREAS INDICATED ON THE PLANTING PLAN AS WITHIN TREE PROTECTION FENCING ARE AREAS WHERE ALL VEGETATION IS TO REMAIN UNDISTURBED. THESE AREAS SHALL BE SUBJECT TO THE FOLLOWING GUIDELINES AND SPECIFICATIONS:

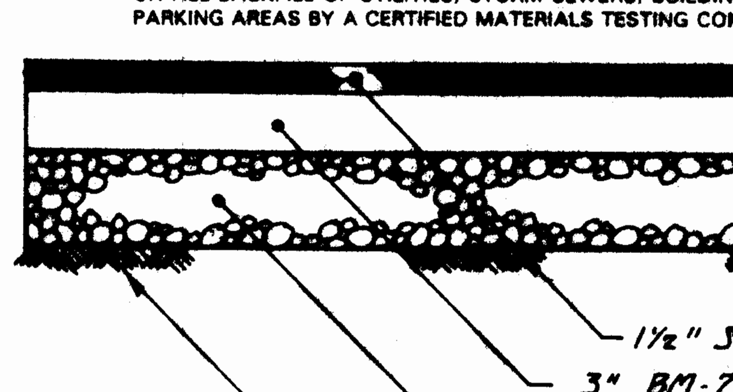
1. THE LIMITS OF CLEARING SHALL BE DETERMINED BY THE LOCATION AND PLACEMENT OF PROTECTIVE FENCING MARKING THE AREAS OF THE SITE TO BE UNDISTURBED.
2. PROTECTIVE FENCING: UNDISTURBED AREAS SHALL BE IDENTIFIED BY USING BRIGHT ORANGE FENCING. FENCING SHALL BE USED TO PROTECT THE ROOTS, TRUNK, AND TOP OF ALL TREES RETAINED ON THE SITE. "TREE SAVE AREA" SIGNS SHALL BE PLACED ALONG THE FENCE, VISIBLE FROM ALL DIRECTIONS, TO INFORM WORKERS OF THE PURPOSE OF THE BOUNDARY.
3. PROTECTIVE FENCING MATERIAL SHALL BE IN PLACE PRIOR TO THE COMMENCEMENT OF ANY WORK ON THE SITE, SHALL BE KEPT IN GOOD REPAIR FOR THE DURATION OF CONSTRUCTION ACTIVITY, AND SHALL BE THE LAST ITEM REMOVED DURING THE FINAL CLEAN-UP AFTER COMPLETION OF THE PROJECT.
4. EQUIPMENT OPERATION AND STORAGE: HEAVY EQUIPMENT, VEHICULAR TRAFFIC, OR STOCKPILES OF ANY CONSTRUCTION MATERIALS, INCLUDING TOPSOIL AND MULCH, SHALL NOT BE PERMITTED WITHIN THE DRIP LINE OF ANY TREE TO BE RETAINED. TREES BEING REMOVED SHALL NOT BE FELLED, PUSHED, OR PULLED INTO TREES BEING RETAINED. EQUIPMENT OPERATORS SHALL NOT CLEAN ANY PART OF THEIR EQUIPMENT AGAINST THE TRUNKS OF TREES TO BE RETAINED.
5. NO TOXIC MATERIALS SHALL BE STORED WITHIN 100' OF "TREE SAVE AREAS".
6. BOARDS OR WIRES SHALL NOT BE NAILED OR ATTACHED TO TREES DURING BUILDING OPERATIONS.
7. HEAVY EQUIPMENT OPERATORS SHALL BE CAUTIONED TO AVOID DAMAGE TO EXISTING TREE TRUNKS AND ROOTS DURING CLEARING AND GRADING OPERATIONS.
8. TREE TRUNKS AND EXPOSED ROOTS DAMAGED DURING EQUIPMENT OPERATIONS WILL BE TREATED ACCORDING TO STANDARD ARBORICULTURAL PRACTICES. CARE FOR SERIOUS INJURY SHALL BE PRESCRIBED BY A PROFESSIONAL ARBORIST.
9. ALL TREE LIMBS DAMAGED DURING BUILDING OR LAND LEVELING OR REMOVED FOR ANY OTHER REASON SHALL BE PRUNED AS SHOWN ON THE PRUNING DIAGRAM. CUTS MUST BE MADE PROPERLY TO PREVENT ADDITIONAL BARK FROM BEING TORN FROM THE TREE. FLUSH CUTS ARE UNACCEPTABLE. ALL FINAL CUTS SHALL BE MADE SUFFICIENTLY CLOSE TO THE TRUNK OR PARENT LIMB WITHOUT CUTTING INTO THE BRANCH COLLAR OR LEAVING A PROTRUDING STUB SO THAT WOUND CLOSURE CAN READILY START UNDER NORMAL CONDITIONS.



CONSTRUCTION OPERATIONS RELATIVE TO THE LOCATION OF PROTECTED TREES

GENERAL NOTES

1. ALL WORK TO BE IN ACCORDANCE WITH THE VIRGINIA DEPARTMENT OF TRANSPORTATION, "ROAD AND BRIDGE SPECIFICATIONS", DATED 1991, THE VIRGINIA DEPARTMENT OF TRANSPORTATION, "ROAD AND BRIDGE STANDARDS", 1993, AND THE "VIRGINIA WORK AREA PROTECTION MANUAL", LATEST EDITION UNLESS OTHERWISE NOTED.
2. SELECT CLEARING AND GRUBBING TO CONSIST OF REMOVAL OF ALL TREES, ROOTS, STUMPS, AND SNAGS EXCEPT THOSE TREES DESIGNATED BY THE OWNER TO REMAIN. ALL TREES SO DESIGNATED WILL BE PROTECTED FROM DAMAGE TO THE TRUNK AND ROOT SYSTEMS.
3. ALL LOCATIONS OF UNDERGROUND UTILITIES SHOWN ON THIS PLAN ARE APPROXIMATE ONLY. PRIOR TO COMMENCEMENT OF CONSTRUCTION, CONTRACTOR IS TO NOTIFY OWNERS OF ALL UTILITIES (VIRGINIA POWER, C & P, ETC.) OF PROPOSED CONSTRUCTION SO THAT THEY MAY LOCATE AND SAFEGUARD THEIR FACILITIES. ANY DAMAGES TO EXISTING UTILITIES AND/OR EXPENSE ACCRUED FROM SAID DAMAGES WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL REPAIRS WILL BE IMMEDIATELY MADE AT THE CONTRACTOR'S EXPENSE.
4. THE 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.
5. THE VIRGINIA DEPARTMENT OF TRANSPORTATION IS TO RECEIVE WRITTEN NOTIFICATION, BY THE CONTRACTOR, 48 HOURS PRIOR TO STARTING ANY WORK.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING SURE THAT TRUCKS LEAVING SITE ARE CLEANED SUFFICIENTLY SO AS NOT TO CREATE A ROADWAY NUISANCE AND/OR HAZARD.
7. THE CONTRACTOR SHALL STRIP TOPSOIL MATERIAL UNDER ROADWAY AND BUILDING LOCATIONS, STRIPPED TOPSOIL TO BE STOCKPILED ON SITE AT LOCATIONS DESIGNATED BY OWNER. STRIPPING SHALL NOT BE CARRIED OUT WHEN SOIL IS ABNORMALLY WET. REMOVE ALL TRASH AND OTHER EXTRANEOUS MATTER FROM TOPSOIL WHEN STOCKPILING. STRAW BALE BARRIERS OR SILT FENCE SHALL BE PLACED AT THE TOE OF THE STOCKPILE AFTER STRIPPING OF TOPSOIL IS COMPLETE.
8. ALL STOCKPILES (IMPORTED FILL MATERIAL, TOPSOIL, ETC.) TO BE LOCATED ON SITE AT THE DIRECTION OF THE OWNER. SILT FENCE, AND OTHER EROSION CONTROL MEASURES NECESSARY, SHALL BE PLACED AT THE TOE OF THE STOCKPILE.
9. ALL DIMENSIONS ARE TO BACK OF CURB, FACE OF BUILDING, EDGE OF PAVEMENT, UNLESS OTHERWISE INDICATED.
10. ALL STORM SEWER PIPES AND DROP INLETS TO BE CLEANED OF DEBRIS AND ERODED MATERIAL AT LAST STAGES OF CONSTRUCTION.
11. ALL DROP INLETS, WITHIN VIRGINIA DEPARTMENT OF TRANSPORTATION RIGHT-OF-WAYS OR EASEMENTS, SHALL BE CAST IN PLACE OR APPROVED PRE-CAST UNITS.
12. SURFACE DRAINAGE SHALL NOT BE ALLOWED TO ENTER SANITARY SEWER SYSTEM AT ANY TIME.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING, WITH MATCHING MATERIALS, ANY PAVEMENT, DRIVEWAYS, WALKS, CURBS, ETC. THAT MUST BE CUT OR THAT ARE DAMAGED DURING CONSTRUCTION.
14. ALL CONCRETE TO BE VDOT CLASS "A-3" (MIN.).
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING ALL PERMITS NECESSARY FOR CONSTRUCTION OF THIS PROJECT.
16. UNSUITABLE MATERIAL ENCOUNTERED DURING THE COURSE OF CONSTRUCTION SHALL BE REMOVED AND REPLACED WITH SUITABLE MATERIAL AT THE DIRECTION OF THE OWNER.
17. THE CONTRACTOR SHALL PROVIDE COMPACTION REPORTS TO THE OWNER ON ALL BACKFILL OF UTILITIES, STORM SEWERS, BUILDING SLABS, AND PARKING AREAS BY A CERTIFIED MATERIALS TESTING COMPANY.



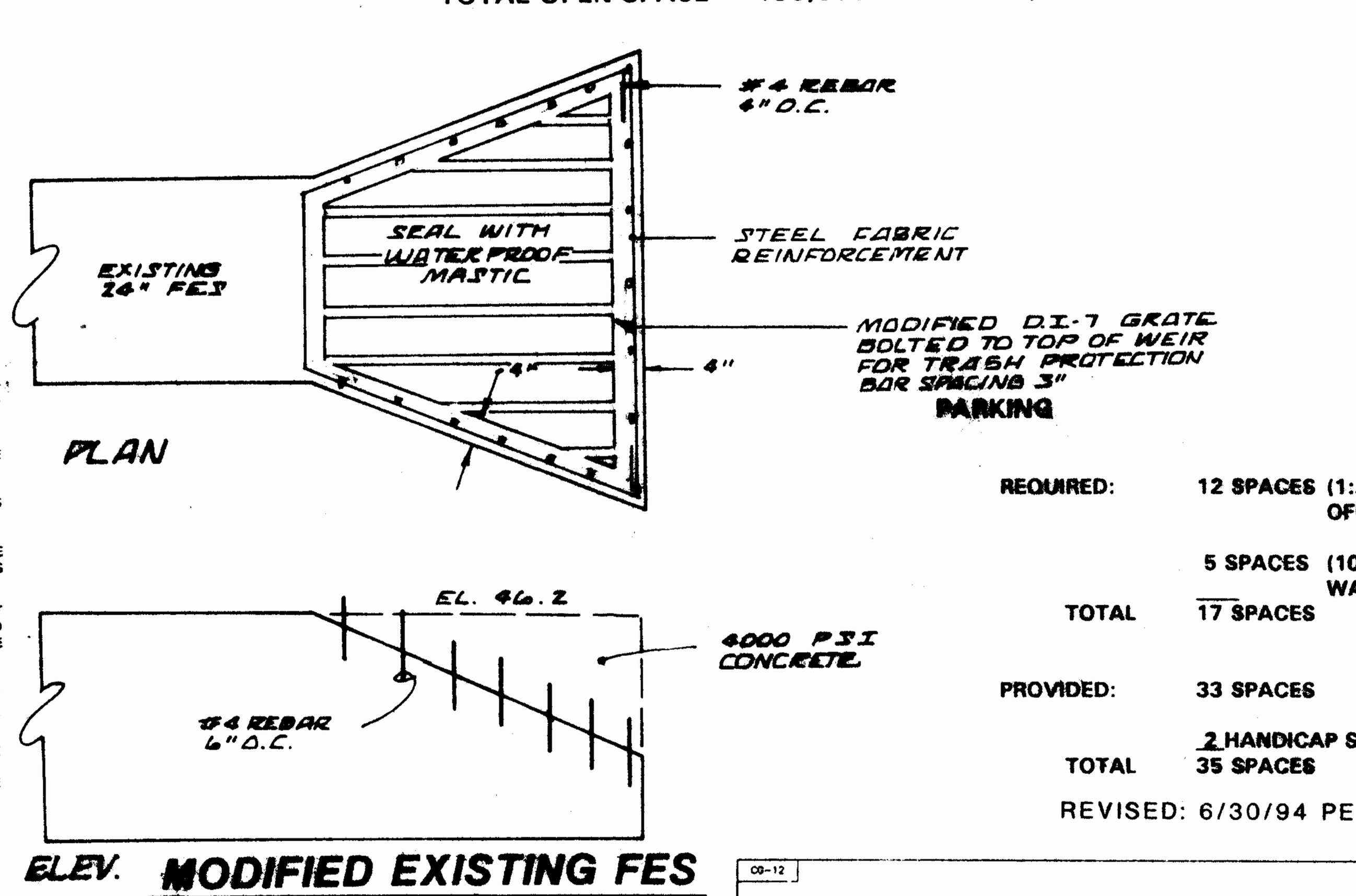
PAVEMENT SECTION

N.T.S.

ZONING - B-1

TOTAL LOT AREA	=	196,669 SQ.FT.	4.5149 AC.
EXISTING BLDG. AREA	=	23,200 SQ.FT.	OR 11.8 % OF LOT
PROPOSED WAREHOUSE	=	9,000 SQ.FT.	
PROPOSED INFO. BLDG.	=	540 SQ.FT.	
TOTAL BLDG. AREA	=	32,740 SQ.FT.	OR 16.6% OF LOT
ALLOWED BLDG. AREA	=	49,167 SQ.FT.	OR 25.0% OF LOT
EXISTING PAVED AREA	=	42,320 SQ.FT.	OR 21.5% OF LOT
PROPOSED PAVED AREA	=	13,350 SQ.FT.	OR 6.8% OF LOT
TOTAL PAVED AREA	=	55,670 SQ.FT.	OR 28.3% OF LOT
TOTAL IMPERVIOUS PRE EXPANSION	=	65,520 SQ.FT.	OR 33.3% OF LOT
TOTAL IMPERVIOUS POST EXPANSION	=	87,870 SQ.FT.	OR 44.7% OF LOT

TOTAL OPEN SPACE = 196,669 SQ.FT. - 87,870 SQ.FT. = 108,800 SQ.FT. OR 55.3% OF LOT



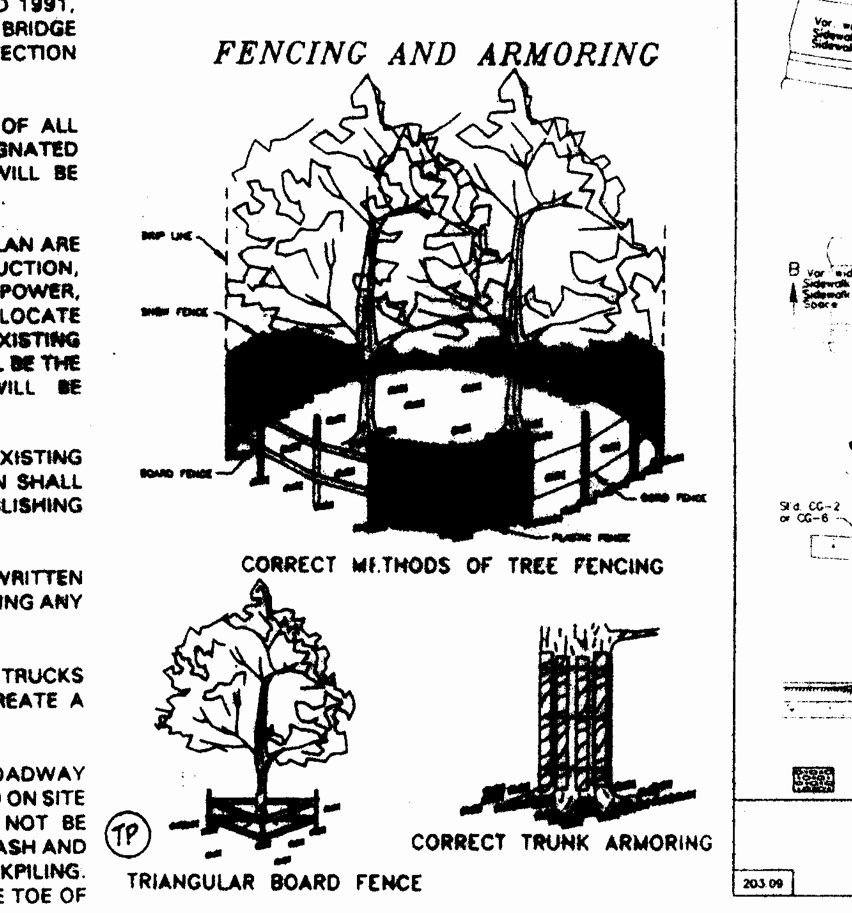
MODIFIED EXISTING FES

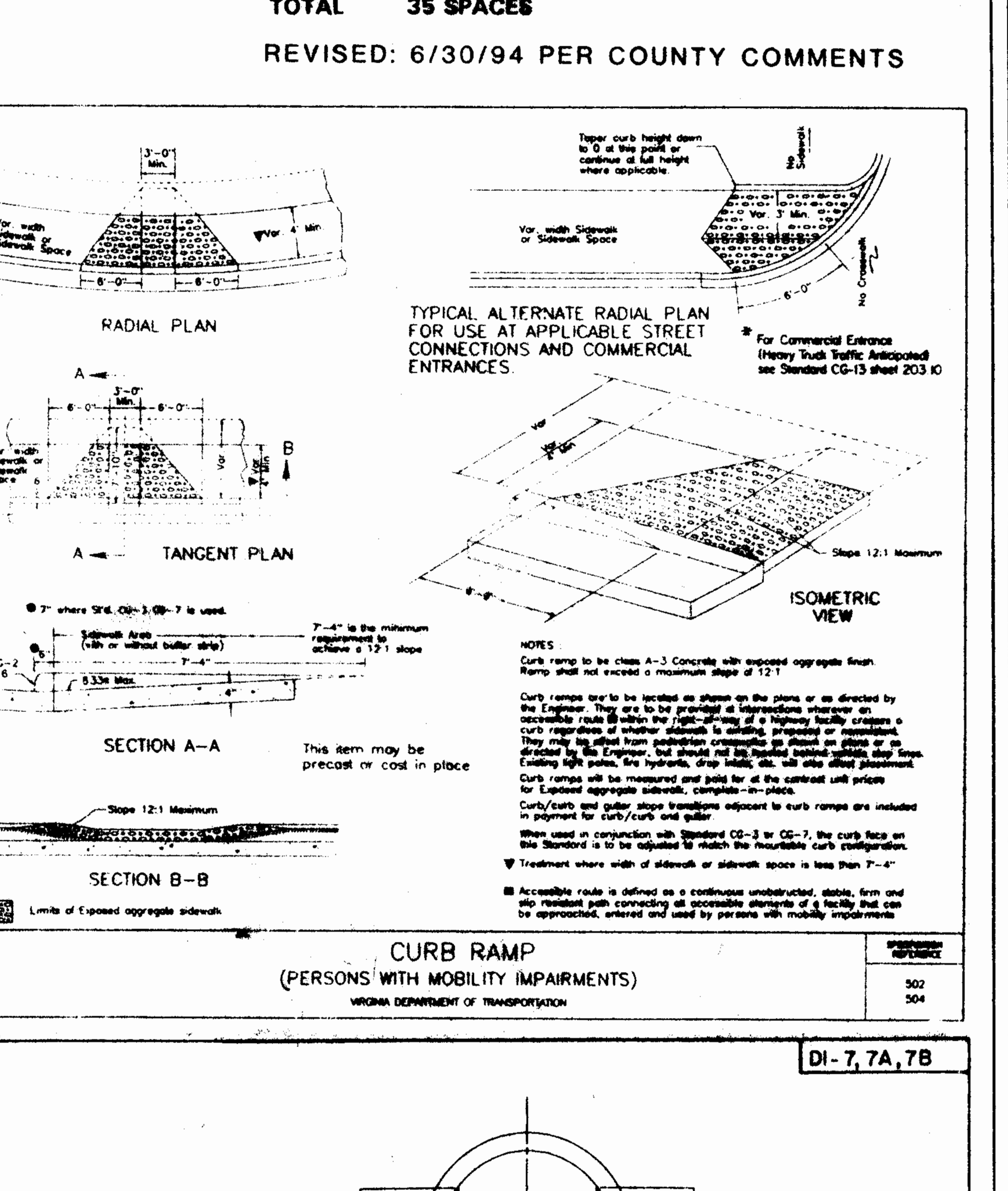
N.T.S.

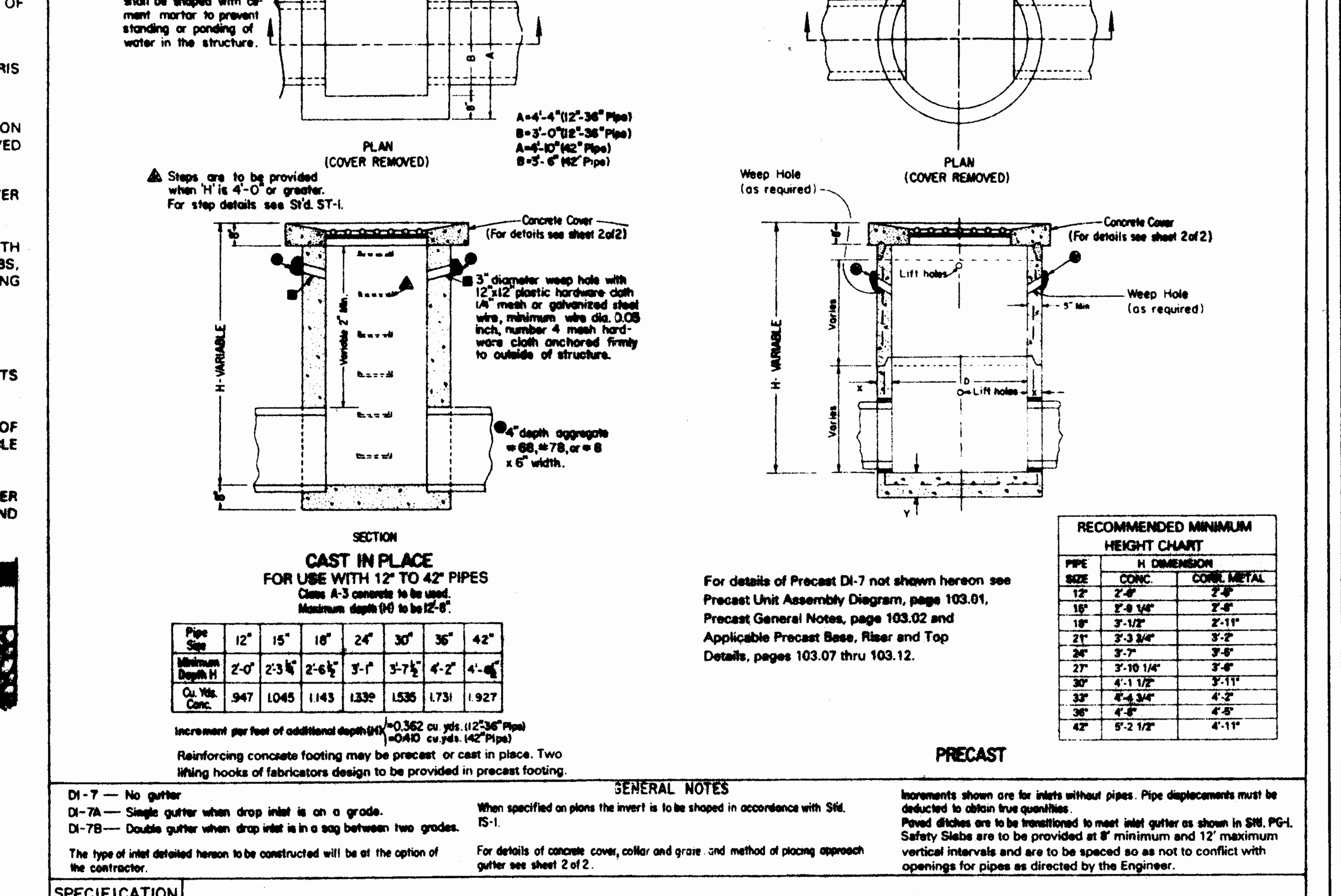
PARKING

REQUIRED:	12 SPACES	(1:250) 2,940 S.F. OFFICE/RETAIL FLOOR AREA
	5 SPACES	(10 EMPLOYEES MAX. SHIFT) WAREHOUSE BUILDINGS
TOTAL	17 SPACES	
PROVIDED:	33 SPACES	
	2	HANDICAP SPACE (1 VAN ACCESSIBLE SPACE)
TOTAL	35 SPACES	

REVISED: 6/30/94 PER COUNTY COMMENTS







CAST IN PLACE
FOR USE WITH 12" TO 42" PIPES
Class A-3 concrete to be used.
Maximum depth (H) to be 12'-8".

Pipe Size	12"	15"	18"	24"	30"	36"	42"
Minimum Depth H	2'-0"	2'-3⅛"	2'-6½"	3'-1"	3'-7½"	4'-2"	4'-6⅞"
Cu. Yds. Conc.	.947	1.045	1.143	1.339	1.535	1.731	1.927

Increment per foot of additional depth (H) =0.362 cu. yds. (12"-36" Pipe), =0.410 cu. yds. (42" Pipe)

Reinforcing concrete footing may be precast or cast in place. Two lifting hooks of fabricators design to be provided in precast footing.

For details of Precast DI-7 not shown hereon see Precast Unit Assembly Diagram, page 103.01, Precast General Notes, page 103.02 and Applicable Precast Base, Riser and Top Details, pages 103.07 thru 103.12.

RECOMMENDED MINIMUM HEIGHT CHART

PIPE SIZE	H DIMENSION CONC.	CORR. METAL
12"	2'-8"	2'-8"
15"	2'-9 1/4"	2'-8"
18"	3'-1/2"	2'-11"
21"	3'-3 3/4"	3'-2"
24"	3'-7"	3'-5"
27"	3'-10 1/4"	3'-8"
30"	4'-1 1/2"	3'-11"
33"	4'-4 3/4"	4'-2"
36"	4'-8"	4'-5"
42"	5'-2 1/2"	4'-11"

DI-7 — No gutter
DI-7A — Single gutter when drop inlet is on a grade.
DI-7B — Double gutter when drop inlet is in a sag between two grades.

The type of inlet detailed hereon to be constructed will be at the option of the contractor.

GENERAL NOTES

When specified on plans the invert is to be shaped in accordance with Std. IS-1.

For details of concrete cover, collar and grate and method of placing approach gutter see sheet 2 of 2.

Increments shown are for inlets without pipes. Pipe displacements must be deducted to obtain true quantities.
Paved ditches are to be transitioned to meet inlet gutter as shown in Std. PG-1.
Safety Slabs are to be provided at 8' minimum and 12' maximum vertical intervals and are to be spaced so as not to conflict with openings for pipes as directed by the Engineer.

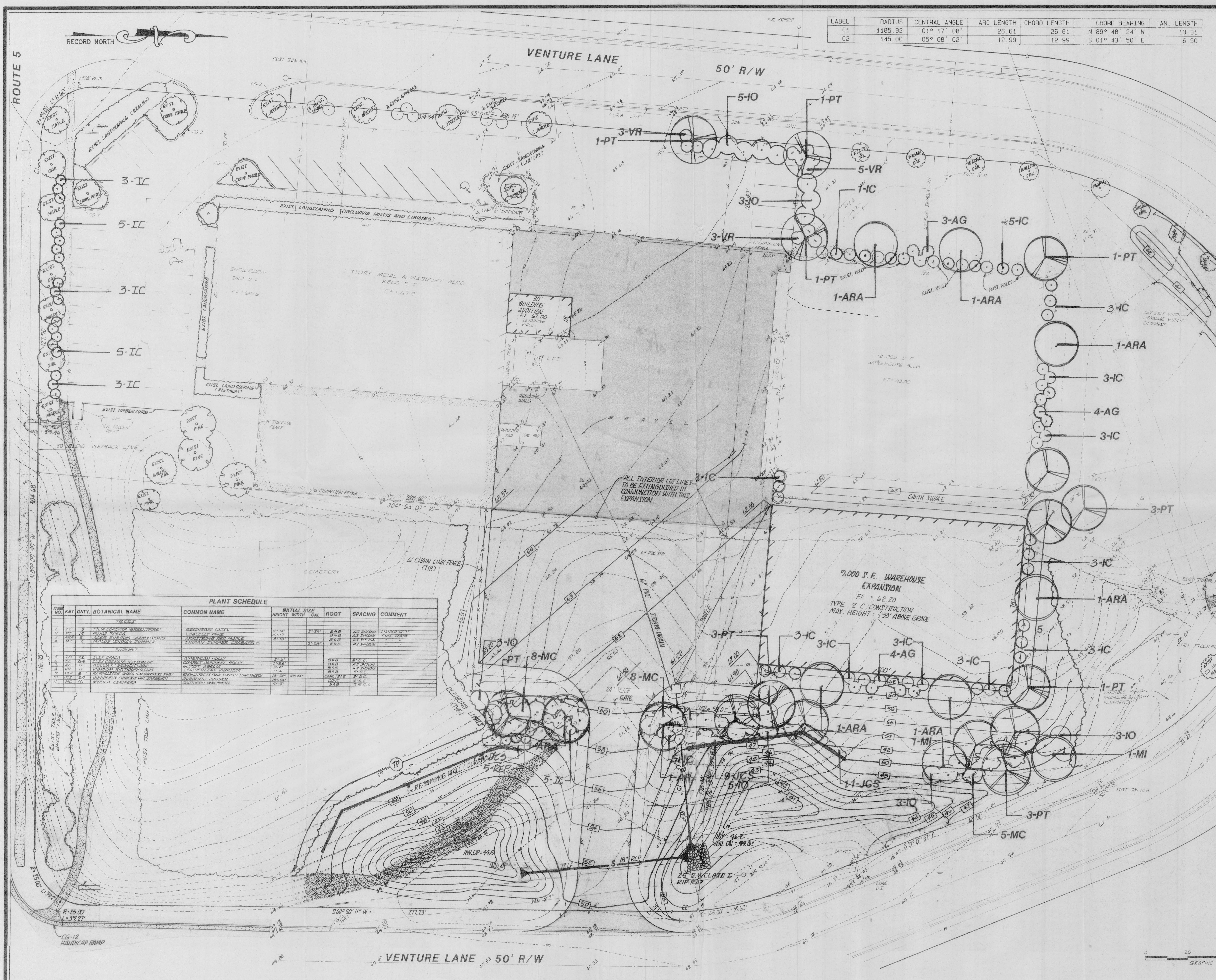
SPECIFICATION REFERENCE 241 503 — STANDARD MEDIAN DROP INLET — VIRGINIA DEPARTMENT OF TRANSPORTATION — Sheet 1 of 2 — 104.22

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

DES.	DWN.	CHK.	DATE
	HTB	CRO	3/30/94

CUSTOM BUILDER SUPPLY
NOTES AND DETAILS
FOR
JOHN TYLER INVESTMENT GROUP
JAMES CITY COUNTY — VIRGINIA

SHEET 2 OF 3
DISK
PROJ. NO. 94021-3
DWG. 5256W



LABEL	RADIUS	CENTRAL ANGLE	ARC LENGTH	CHORD LENGTH	CHORD BEARING	TAN. LENGTH
C1	1185.92	01° 17' 08"	26.61	26.61	N 89° 48' 24" W	13.31
C2	145.00	05° 08' 02"	12.99	12.99	S 01° 43' 50" E	6.50

PLANT SCHEDULE

ITEM NO.	KEY	QNTY.	BOTANICAL NAME	COMMON NAME	INITIAL SIZE HEIGHT	WIDTH	CAL	ROOT	SPACING	COMMENT
			TREES							
1.	TC	0	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LINDEN	12'-14'		2"-2½"	B&B	AS SHOWN	LIMBED 6'-7'
2.	PT	15	PINUS TAEDA	LOBLOLLY PINE	10'-12'			B&B	AS SHOWN	FULL FORM
3.	ARA	8	ACER RUBRUM 'ARMSTRONG'	ARMSTRONG RED MAPLE	8'-10'			B&B	AS SHOWN	" "
4.	MI	2	MALUS 'INDIAN SUMMER'	INDIAN SUMMER CRABAPPLE			2"-2½"	B&B	AS SHOWN	" "
			SHRUBS							
5	IO	22	ILEX OPACA	AMERICAN HOLLY	5'-6'			B&B	8' O.C.	
6.	IC	24	ILEX CRENATA 'COMPACTA'	COMPACT JAPANESE HOLLY	3'-3.5'			B&B	AS SHOWN	
7.	AG	11	ABELIA X 'GRANDIFLORA'	GLOSSY ABELIA	3'-4'			B&B	AS SHOWN	
8.	VR	11	VIBRNUM RHYTIDOPHYLLUM	LEATHERLEAF VIBRNUM	3'-4'			B&B	5' O.C.	
9.	REP	5	RAPHIOLEPSIS INDICA 'ENCHANTRESS PINK'	ENCHANTRESS PINK INDIAN HAWTHORN	18"-24"	18"-24"		CONT./B&B	3' O.C.	
10.	JCS	20	JUNIPERUS CHINESIS VAR. SARGENTII	SARGENTS JUNIPER	18"-24"			CONT.	4' O.C.	
11.	MC	16	MYRICA CERIFERA	SOUTHERN WAX MYRTLE	4'-5'			B&B	7.5 O.C.	

VICINITY MAP SCALE: 1"=2000'

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VIRGINIA BEACH — WILLIAMSBURG, VIRGINIA

DES	HTB
DWN	HTB
CHK	
DATE	3/30/94

CUSTOM BUILDER SUPPLY
LANDSCAPE PLAN
FOR
JOHN TYLER INVESTMENT GROUP
JAMES CITY COUNTY VIRGINIA

PROJ NO	94021-3
SCALE	1"=20'
SHEET	3 OF 3
DWG	5255W

MC005_CUSTOM_BUILDER_SUPPLY-JOHN_TYLER_COMM - 008

CHESAPEAKE BAY NARRATIVE
FOR
CUSTOM BUILDER SUPPLY
SITE PLAN SUBMITTAL

Due to the fact that existing development occurs on the site, the three step, ten point system is difficult to apply to the proposed additional development. Consequently, the Chesapeake Bay Compliance review is based upon an analysis of existing pollutant loading versus the pollutant loading after the new development occurs. The basis of that review is the loading equation set forth in the Chesapeake Bay Local Assistance Manual. Page 1 of the accompanying calculations indicates that the total impervious area, including the new building and pavement area and the existing building and pavement area, is 1.9 acres total. The total pervious area is calculated on Page 1 by adding up each of the drainage basin areas as shown on the accompanying drainage map and subtracting from the total area draining to the basin the impervious acreage. This calculation indicates that a total of 1.8 acres of the site will be pervious after development. The post-development impervious percentage is calculated at the bottom of Page 1 to be 51.3%.

Page 2 of the calculations presents the pre and post-development loading calculations. The pre-development impervious percentage is 33.3%. The pre-development pollutant loading is indicated to be 3.67 pounds per year, under current conditions. A second calculation is provided showing the current pollutant loading using the Chesapeake Bay default value of 16% impervious. That loading is indicated to be 2.04 pounds per year.

Page 2 shows that the post-development loading, based upon a 44.7% impervious value, after the new development, is equal to 4.75 pounds per year. The removal requirement, based upon the current 33.3% impervious value, is 1.08 pounds per year. Based upon the Chesapeake Bay 16% default value, the removal requirement is indicated to be 2.71 pounds per year.

1) ~~Sumlen~~ Submerge pipe min. of 0.45'
∴ 46.2 - 1.25 - .45 = inv = 44.5
recommend min slope of 0.5%

2) check outlet cond. ~~from~~ basin - 24" pipe maybe control

Page 3 of the calculations indicates that a 2.5 V_r wet pond will be used to meet the pollutant removal requirements. The Chesapeake Bay Local Assistance Manual indicates that such a facility removes 40% to 45% of the pollutant loading flowing to the facility. The runoff volume from the mean storm flowing to the BMP is shown in the middle of Page 3 to be 3,082 cubic feet. The required storage volume for a 2.5 V_r basin is shown to be 7,700 cubic feet. The calculation at the bottom of Page 3 shows that, based upon 3.7 acres flowing to the basin, a total of 4.41 pounds per year of pollutant loading occurs. Based upon a basin efficiency of 45%, 2 pounds per year are removed by the 2.5 V_r basin. The calculation at the bottom of Page 3 compares the 2 pound per year removal with the 1.08 pound per year removal requirement based upon the current site condition of 33.3% impervious.

Page 4 of the calculations provides the current, pre-development, and post-development runoff coefficients for determining flow attenuation requirements of the proposed BMP facility. The pre-development peak runoff rates, based upon the indicated parameters, are shown at the bottom of Page 4. These are as follows:

Pre-Development Q_2 = 12.8 cfs
Pre-Development Q_{10} = 15.8 cfs
Pre-Development Q_{25} = 18.0 cfs
Pre-Development Q_{100} = 21.4 cfs

The computer generated data following Page 4 provides the hydrograph and flood routing information for the proposed BMP. The flood routing is based upon the Modified Rational Hydrograph. The routing also assumes that a total of 4.51 acres flows to the basin in both the pre-development and post-development condition. Pages 5 through 8 show the allowable outflow from the basin, based upon the current "c" of 0.50. These pages also show the required storage based upon the post-development "c" of 0.56. The allowable basin outflows for the 2, 10, 25 and 100 year storms are 12.80 cfs, 15.80 cfs, 18.0 cfs and 21.40 cfs respectively. Page 9 of the calculations show a summary of the various storms modeled. These show the allowable outflows and the storage required

to meet those allowable outflows. This summary also shows the parameters used in calculating the peak discharges after the proposed site development.

Page 10 of the calculations shows the characteristics of the basin and show that at the proposed rim elevation of the outlet structure of 46.2, the storage provided is 12,583 cubic feet. This should be compared to the 7,700 cubic foot volume requirement for a 2.5 V_r basin, as shown on Page 3. The additional capacity is provided in the basin to accommodate uncertain future development. Page 11 shows the characteristics of the outlet structure. As shown on the plans, the outlet structure is in reality a modified 24-inch flared end section. The modification provides a weir that is equal in length to a 3.5 foot diameter circular standpipe. Page 12 shows the outflow summary for the structure at various elevations.

Page 13 through Page 16 shows the routing of the 10 year post-development flow. The peak outflow for the 10 year post-development storm is 9.29 cfs, with a peak elevation of 46.62 feet. This should be compared with the peak flow from the 10 year storm under existing conditions of 15.8 cfs, as shown on Page 4. Pages 17 through 20 show the routing of the 100 year post-development storm. Page 19 shows that the peak outflow for 100 post-development storm is 12.92 cfs with a peak elevation of 46.72 feet. This should be compared with the peak 100 year storm flow of 21.4 cfs under existing conditions, as shown on Sheet 4.

The peak 100 year flood elevation is shown to be elevation 46.72 feet. This still leaves 2.14 feet of differential between the peak 100 year flood elevation and the top of curb at the low point near the structure outlet.

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VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject CUSTOM BUILDER CHES. BAY
Computed By NHM Checked By

Project No. 94-21-3
Client
Date 4/28/94 Sheet No. 1

AREA TO PONDS

TOTAL AREA IMPERVIOUS

NEW BLDG. & PVMT. = 9000 S.F. + 13,350 S.F. = 22,350 S.F.
EXIST BLDG & PVMT. = 23,200 S.F. + 37,520 S.F. = 60,720 S.F.

$\frac{22,350 + 60,720}{43560} = 1.9$ Ac. IMPERVIOUS

TOTAL AREA PERVIOUS

TOTAL DRAINAGE BASINS TO PONDS

BASIN A = 0.3 Ac
B = 1.1 Ac
C = 0.8 Ac
D = 0.3 Ac.
E = 0.7 Ac
F = 0.3 Ac
G = 0.2 Ac
3.7 Ac. TOTAL

LESS ABOVE IMPERVIOUS AREA

3.7Ac − 1.9 = 1.8 Ac. PERVIOUS

IMPERVIOUS PERCENT OF POST-DEV. AREA DRAINING TO PONDS

$\frac{1.9 \text{ Ac IMPERVIOUS}}{1.9 \text{ Ac} + 1.8 \text{ Ac.}} = 51.3\%$ of drainage area ✓

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Subject CUSTOM BUILDER
CHES. BAY
Computed By NHM Checked By

Project No. 94-21-3
Client
Date 4/28/94 Sheet No. 2

PRE-DEV. LOAD

I_{PRE} = 33.3% ACTUAL IMPERVIOUS VALUE

(USING DEFAULT VALUE) LOAD = [0.05 + 0.009(16)] x (4.51 Ac. site area) x 2.33 = 2.04 #/YR.
(DEFAULT VALUE)

(USING ACTUAL VALUE = 33.3%) LOAD = [0.05 + 0.009(33.3)] x 4.51 x 2.33 = 3.67 #/YR.
(ACTUAL VALUE)

POST-DEV. LOAD

I_{POST} = 44.7%

LOAD = [0.05 + 0.009(44.7)] 4.51 x 2.33 = 4.75 #/YR.
(using not 44.7%) (5.48 #/YR)

REMOVAL REQMT. = 4.75 - 2.04 = 2.71 #/YR. USING 16% DEFAULT VALUE FOR PRE-DEV.
(5.48) (3.67)

4.75 - 3.67 = 1.08 #/YR. USING ACTUAL PRE-DEV. 33.3% IMPERVIOUS
(1.81)

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Subject CUSTOM BUILDER
CHES. BAY
Computed By NHM Checked By

Project No. 94-21-3
Client
Date 4/30/94 Sheet No. 3

VOLUME OF STORAGE REQ'D. FOR 45% POLLUTANT REDUCTION

USE 2.5 V_R WET POND

AREA TO POND = 3.7 Ac.

$R_v = 0.05 + 0.009\ I$

$R_v = 0.05 + 0.009\ (51.3)$ (SEE BOTTOM OF PG. 1)

$R_v = 0.51$

$$Vol. = \frac{(R_v)(R_m)}{12}(A_c)$$

$$Vol = \frac{(0.51)(0.45")}{12}\ 3.7\ Ac.$$

Vol = 0.07 Ac. Ft. = 3082 C.F.

STORAGE VOL. REQ'D. = 2.5 x 3082 = 7700 c.f.

4.51 ac → 44.7% I ⇒ ~~2 VR~~ = 2.5 VR = 8300 CF .19 Ac/Ft

ACTUAL REMOVAL WITH 3.7 Ac. DRAINING TO PONDS, WITH PERCENT IMPERVIOUS = 51.3%

$[0.05 + 0.009(51.3)]\ (3.7\ Ac.)(2.33) = 4.41$ LB./YR.

(COLLECTION OF OTHER TERMS IN LOADING EQUATION)

ACTUAL REMOVAL = 4.41 LB/YR x 45% REMOVAL = 2.0 LB./YR.

REMOVAL REQMT. W/DEFAULT VALUE = 2.71 LB/YR

REMOVAL REQMT. W/ACTUAL PRE-DEV. 33.3% IMPERV. = 1.08 LB/YR

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Subject CUSTOM BUILDER
CHES. BAY
Computed By HM Checked By

Project No. 94-21-3
Client
Date 4/29/94 Sheet No. 4

PRE-DEV

4.51 x 0.333 = 1.5 Ac. IMPERV
4.51 - 1.5 = 3.0 Ac. GRASS/WOODS

COMP. "C"

1.5 X 0.9 = 1.35
3.0 X 0.3 = 0.90
2.25 ÷ 4.51 = 0.50

POST-DEV

4.51 x 0.447 = 2.0 Ac. IMPERV.
4.51 - 2.0 = 2.5 Ac. GRASS/WOODS

COMP. "C"

2.0 X 0.9 = 1.8
2.5 X 0.3 = 0.75
2.55 ÷ 4.51 = 0.56

PRE-DEV. STORMS

C = 0.50
T_c = 5 MIN
A = 4.51 Ac.

$Q_2 = (4.51)(0.50)(5.7") = 12.8$ c.f.s.
$Q_{10} = (4.51)(0.50)(7") = 15.8$
$Q_{25} = (4.51)(0.50)(8") = 18.0$
$Q_{100} = (4.51)(0.50)(9.5") = 21.4$

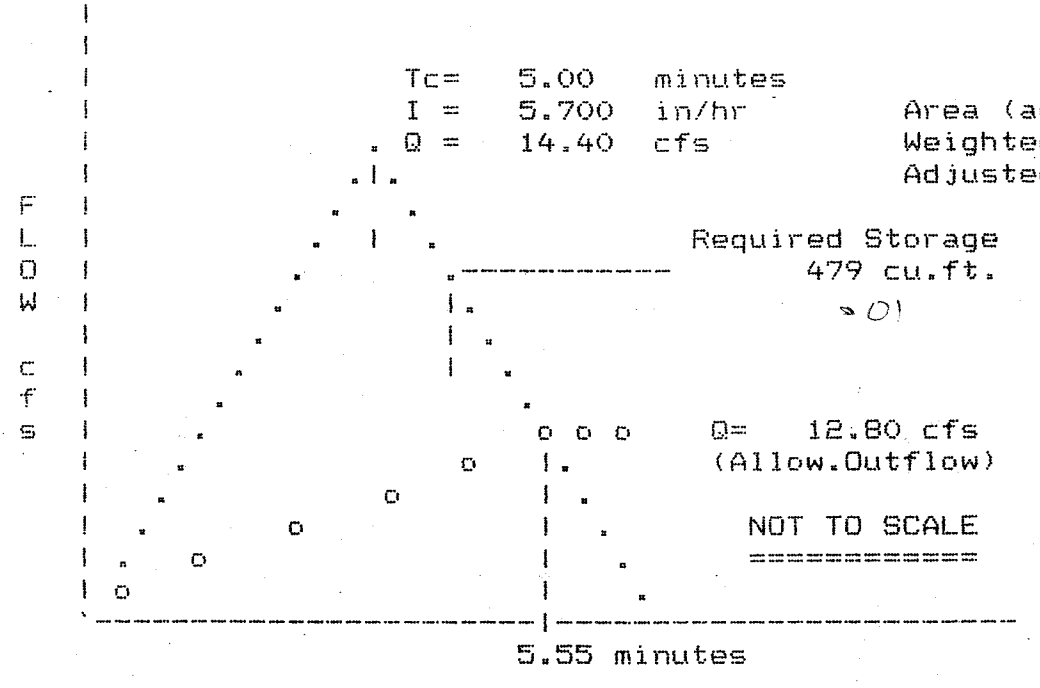
Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 10:37:55 05-03-1994

(5)

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

CUSTOM BUILDER SUPPLY

RETURN FREQUENCY: 2 yr	Allowable Outflow:	12.80 cfs
'C' Adjustment: 1.000	Required Storage:	479 cu.ft.
STORM DURATION = Tc for Max.Storage		
Peak Inflow: 14.40 cfs	Inflow .HYD stored: 20UT	.HYD



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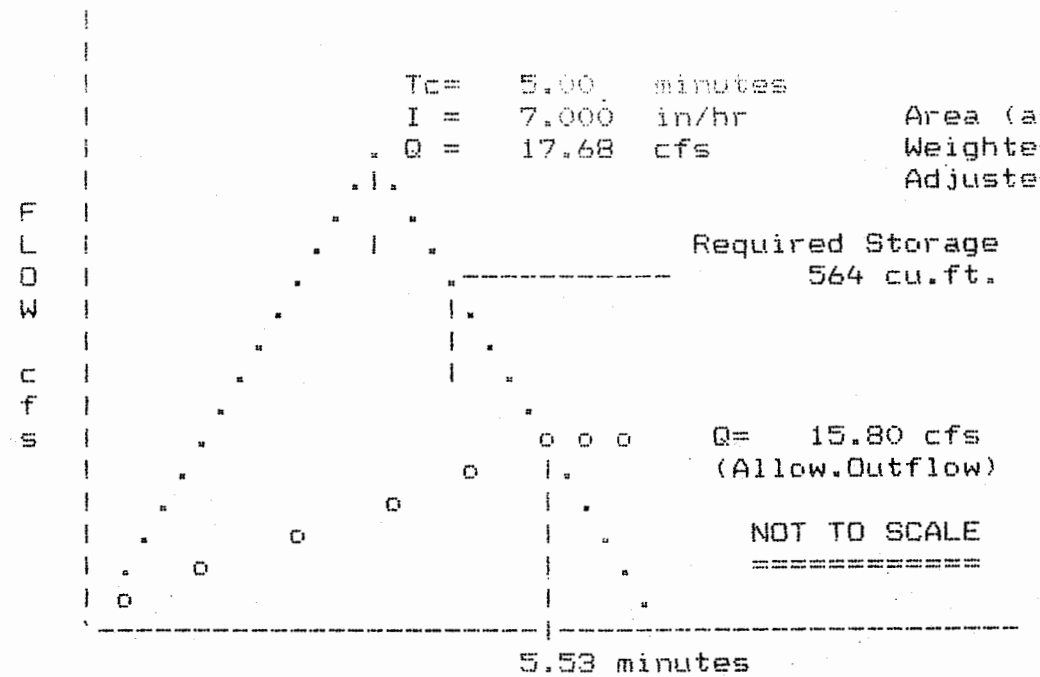
(6)

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

CUSTOM BUILDER SUPPLY

RETURN FREQUENCY: 10 yr	Allowable Outflow:	15.80 cfs
'C' Adjustment: 1.000	Required Storage:	564 cu.ft.
STORM DURATION = Tc for Max.Storage		
Peak Inflow: 17.68 cfs	Inflow .HYD stored: 10OUT	.HYD



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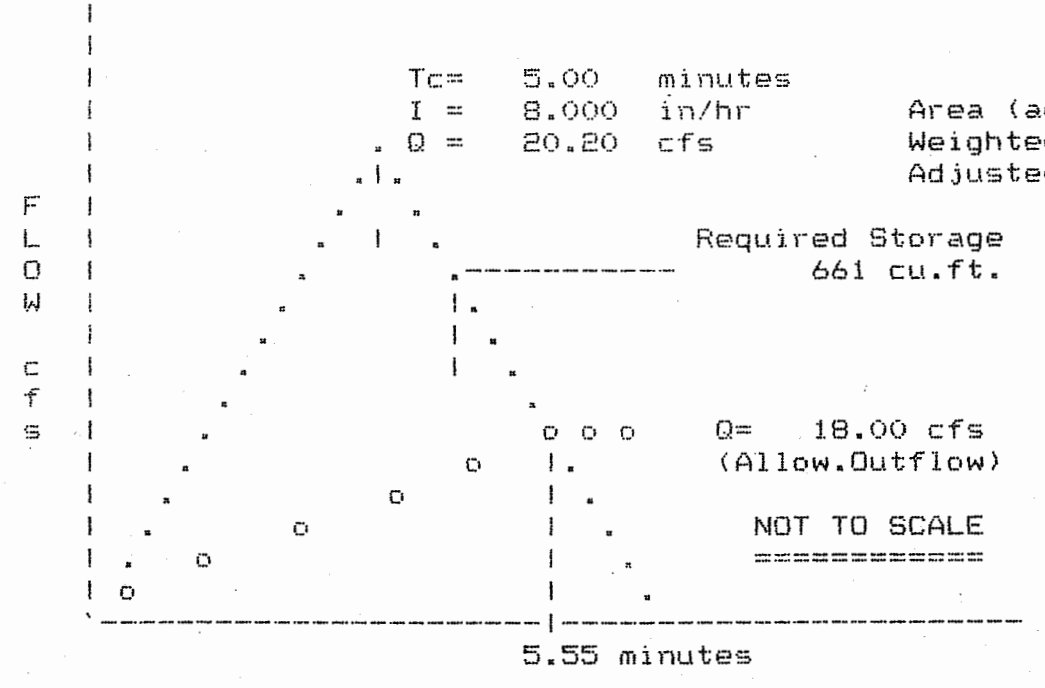
MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

CUSTOM BUILDER SUPPLY

RETURN FREQUENCY: 25 yr	Allowable Outflow:	18.00 cfs
'C' Adjustment: 1.000	Required Storage:	661 cu.ft.
STORM DURATION = Tc for Max.Storage		
Peak Inflow: 20.20 cfs	Inflow .HYD stored: 25OUT	.HYD



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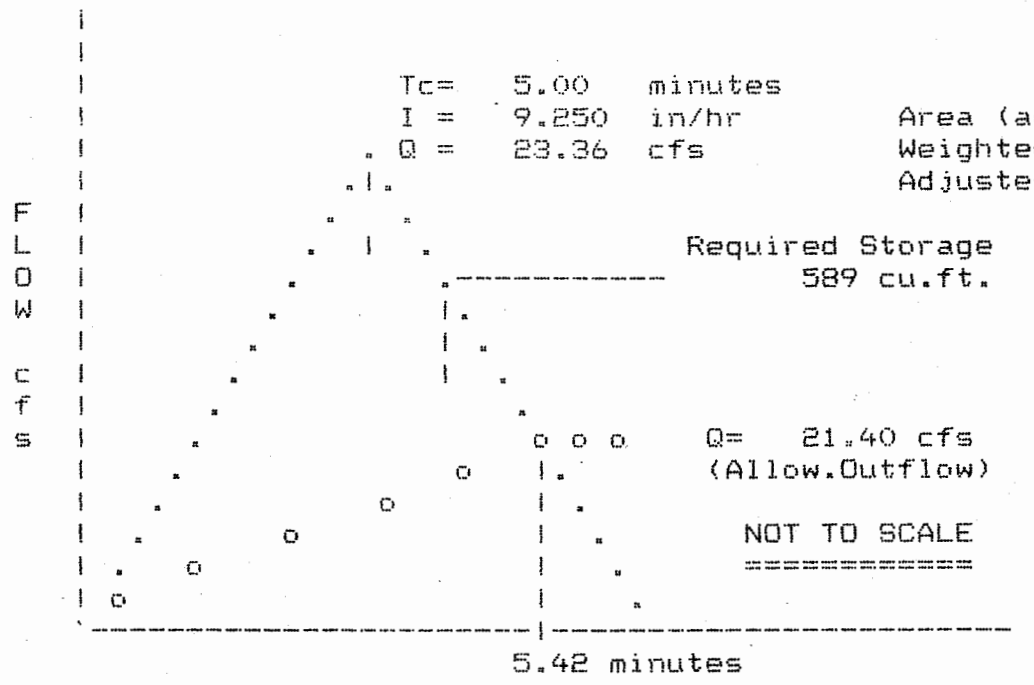
MODIFIED RATIONAL METHOD
---- Graphical Summary for Maximum Required Storage ----

B.

CUSTOM BUILDER SUPPLY

RETURN FREQUENCY: 100 yr	Allowable Outflow: 21.40 cfs
'C' Adjustment: 1.000	Required Storage: 589 cu.ft.
STORM DURATION = Tc for Max.Storage	
Peak Inflow: 23.36 cfs	Inflow .HYD stored: 100OUT .HYD



Quick TR-55 Ver.5.46 S/N:1315430271
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****
* *
* *
* MODIFIED RATIONAL METHOD *
* ----- Grand Summary For All Storm Frequencies ----- *
* *
* *
****
****

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

CUSTOM BUILDER SUPPLY

Area = 4.51 acres Tc = 5.00 minutes

Frequency (years)	Adjusted 'C'	Duration minutes	Intens. in/hr	Qpeak cfs	Allowable cfs	VOLUMES Inflow (cu.ft.)	VOLUMES Storage (cu.ft.)
10	0.560	5	7.000	17.68	15.80	5,304	564
25	0.560	5	8.000	20.20	18.00	6,061	661
100	0.560	5	9.250	23.36	21.40	7,009	589
2	0.560	5	5.700	14.40	12.80	4,319	479

(10.)

POND-2 Version: 5.17
S/N: 1295130250

CUSTOM BUILDER SUPPLY

CALCULATED 05-03-1994 11:55:02
DISK FILE: b:CBS1 .VOL

Planimeter scale: 1 inch = 20 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
41.00	0.60	240	0	0	0
42.00	1.50	600	1,219	406	406
43.00	3.20	1,280	2,756	919	1,325
44.00	6.20	2,480	5,542	1,847	3,173
45.00	10.50	4,200	9,907	3,302	6,475
45.80	*I*	5,366	14,314	3,817	10,292
46.00	14.20	5,680	14,764	4,921	11,396
46.20	*I*	6,188	17,797	1,186	12,583
47.00	21.10	8,440	21,044	7,015	18,411

I ---> Interpolated area from closest two planimeter readings.

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

Yes Does this include both sides of road - basin

Outlet Structure File: CBS1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

****
CUSTOM BUILDER SUPPLY

****

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

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)?	46.2
E2 elev.(ft)?	47.001
Crest elev.(ft)?	46.2
Diameter (ft)?	3.5
Weir coefficient?	3.1
Orifice coefficient?	0.6
Start transition elev.(ft) @ ?	
Transition height (ft)?	

Outlet Structure File: CBS1 .STR

POND-2 Version: 5.17 S/N: 1295130250
Date Executed: Time Executed:

****
CUSTOM BUILDER SUPPLY

****

Outflow Rating Table for Structure #1
STAND PIPE Stand Pipe with weir or orifice flow

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

Elevation (ft)	Q (cfs)	Computation	Messages
46.20	0.0	Weir:	H =0.0
46.30	1.1	Weir:	H =.1
46.40	3.0	Weir:	H =.2
46.50	5.6	Weir:	H =.3
46.60	8.6	Weir:	H =.4
46.70	12.1	Weir:	H =.5
46.80	15.8	Weir:	H =.6
46.90	20.0	Weir:	H =.7
47.00	24.4	Weir:	H =.8

Weir Cw = 3.1 Weir length = 10.99557 ft
Orifice Co = .6 Orifice area = 9.621128 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.= 47.55907 ft

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CUSTOM BUILDER SUPPLY 10 year post dev outflow

Inflow Hydrograph: b:10OUT .HYD
Rating Table file: b:CBS1 .PND

----INITIAL CONDITIONS----
Elevation = 46.20 ft
Outflow = 0.00 cfs
Storage = 12,583 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
46.20	0.0	12,583	419.3	419.3
46.30	1.1	13,215	440.4	441.5
46.40	3.0	13,873	462.4	465.4
46.50	5.6	14,559	485.2	490.8
46.60	8.6	15,272	509.0	517.6
46.70	12.1	16,013	533.7	545.8
46.80	15.8	16,783	559.3	575.1
46.90	20.0	17,582	586.0	606.0
47.00	24.4	18,411	613.6	638.0

Time increment (t) = 1.0 min.

check also 24" pipe
to see which controls

Pond File: b:CBS1 .PND
Inflow Hydrograph: b:10OUT .HYD
Outflow Hydrograph: b:OUT .HYD

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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	-----	419.3	419.3	0.00	46.20
1.0	3.54	3.5	422.5	422.9	0.18	46.22
2.0	7.07	10.6	431.8	433.1	0.68	46.26
3.0	10.61	17.7	446.0	449.4	1.73	46.33
4.0	14.14	24.8	463.6	470.7	3.55	46.42
5.0	17.68	31.8	483.2	495.5	6.12	46.52
6.0	14.14	31.8	498.4	515.0	8.32	46.59
7.0	10.61	24.8	504.6	523.1	9.29	46.62
8.0	7.07	17.7	503.9	522.2	9.18	46.62
9.0	3.54	10.6	498.0	514.5	8.26	46.59
10.0	0.00	3.5	487.9	501.5	6.80	46.54

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

Pond File: b:CBS1 .PND
Inflow Hydrograph: b:10OUT .HYD
Outflow Hydrograph: b:OUT .HYD

Starting Pond W.S. Elevation = 46.20 ft

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

Peak Inflow	=	17.68 cfs
Peak Outflow	=	9.29 cfs
Peak Elevation	=	46.62 ft

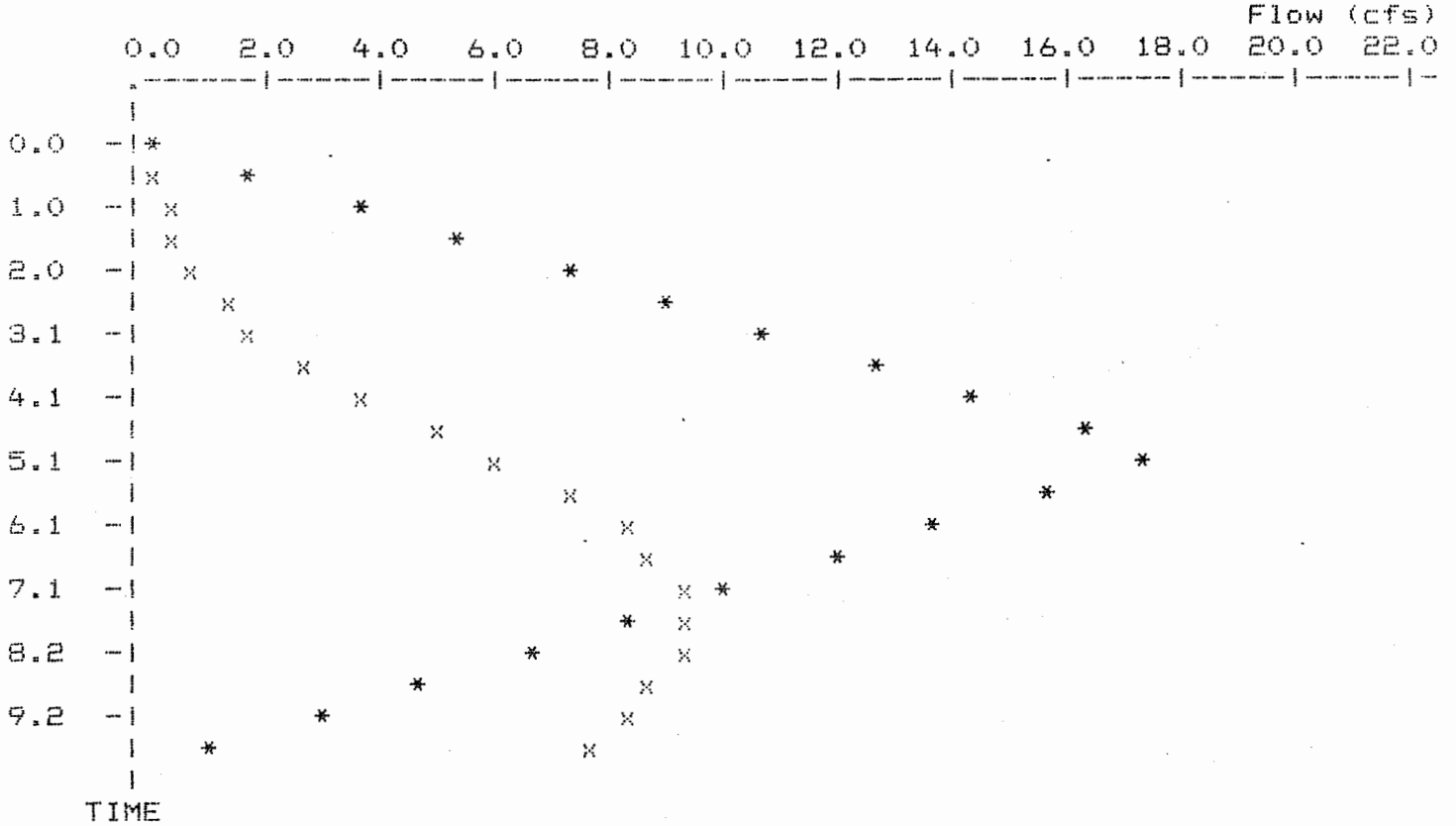
***** Summary of Approximate Peak Storage *****

Initial Storage	=	12,583 cu-ft
Peak Storage From Storm	=	2,836 cu-ft
Total Storage in Pond	=	15,419 cu-ft

Pond File: b:CBS1 .PND
Inflow Hydrograph: b:10OUT .HYD
Outflow Hydrograph: b:OUT .HYD

EXECUTED: 05-03-1994
12:16:59

Peak Inflow = 17.68 cfs
Peak Outflow = 9.29 cfs
Peak Elevation = 46.62 ft



x File: b:10OUT .HYD Qmax = 9.3 cfs
* File: b:OUT .HYD Qmax = 17.7 cfs

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CUSTOM BUILDER SUPPLY 100 yr post dev outflow

Inflow Hydrograph: b:100OUT .HYD
Rating Table file: b:CBS1 .PND

-----INITIAL CONDITIONS-----
Elevation = 46.20 ft
Outflow = 0.00 cfs
Storage = 12,583 cu-ft

GIVEN POND DATA

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)
46.20	0.0	12,583
46.30	1.1	13,215
46.40	3.0	13,873
46.50	5.6	14,559
46.60	8.6	15,272
46.70	12.1	16,013
46.80	15.8	16,783
46.90	20.0	17,582
47.00	24.4	18,411

INTERMEDIATE ROUTING COMPUTATIONS

2S/t (cfs)	2S/t + O (cfs)
419.3	419.3
440.4	441.5
462.4	465.4
485.2	490.8
509.0	517.6
533.7	545.8
559.3	575.1
586.0	606.0
613.6	638.0

Time increment (t) = 1.0 min.

Pond File: b:CBS1 .PND
Inflow Hydrograph: b:100OUT .HYD
Outflow Hydrograph: b:OUT .HYD

(18)

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	-----	419.3	419.3	0.00	46.20
1.0	4.67	4.7	423.5	424.0	0.23	46.22
2.0	9.34	14.0	435.7	437.6	0.90	46.28
3.0	14.02	23.4	454.1	459.1	2.50	46.37
4.0	18.69	32.7	476.4	486.8	5.19	46.48
5.0	23.36	42.1	501.0	518.5	8.71	46.60
6.0	18.69	42.1	519.6	543.1	11.77	46.69
7.0	14.02	32.7	526.4	552.3	12.92	46.72
8.0	9.34	23.4	524.6	549.8	12.61	46.71
9.0	4.67	14.0	516.2	538.6	11.21	46.67
10.0	0.00	4.7	502.8	520.8	9.01	46.61

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

Pond File: b:CBS1 .PND
Inflow Hydrograph: b:100OUT .HYD
Outflow Hydrograph: b:OUT .HYD

Starting Pond W.S. Elevation = 46.20 ft

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

Peak Inflow	=	23.36 cfs
Peak Outflow	=	12.92 cfs
Peak Elevation	=	46.72 ft

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

Initial Storage	=	12,583 cu-ft
Peak Storage From Storm	=	3,601 cu-ft
Total Storage in Pond	=	16,184 cu-ft

5/18/94

D Cook

Custom Builder Supply

Discharge for culvert between the 2 pond sections

$$Q = C a \sqrt{2gh}$$

$$C = \left(1.1 + \frac{0.026\,L}{d^{1.2}}\right)^{-1/2} = \left(1.1 + \frac{0.026\,(72)}{\quad}\right) = 0.63$$

$$Q = (0.63)(1.23)\sqrt{2 \cdot 32.2 \cdot 1} = 6.2 \text{ cfs}$$

Determine head losses

$Q = VA$ = $V = Q/A = 6.2/1.23 = 5$ ft/sec

$H_v = \frac{V^2}{2g} = \frac{25}{64.4} = 0.39'$

$H_e = .15 \times \frac{V^2}{2g} = .06$

$0.45'$

$46.2 - 1.25 - 0.45 = 44.5'$