CERTIFICATE OF AUTHENTICITY

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

BMPNUMBER: **MC045**

DATE VERIFIED: **June 27, 2016**

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

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

Date: March 30, 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:	**MC045**
PIN:	**4710100029A**
Owner Name (if known):	**JAMES CITY COUNTY**
Legal Property Description:	**3.462 AC WOODBURY ASSOCIATES**
Site Address:	**4652 JOHN TYLER HGWY**

(For internal use only):

Box # 84

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

MC-045

ntents for Stormwater Management Facilities As-built Files

ch 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

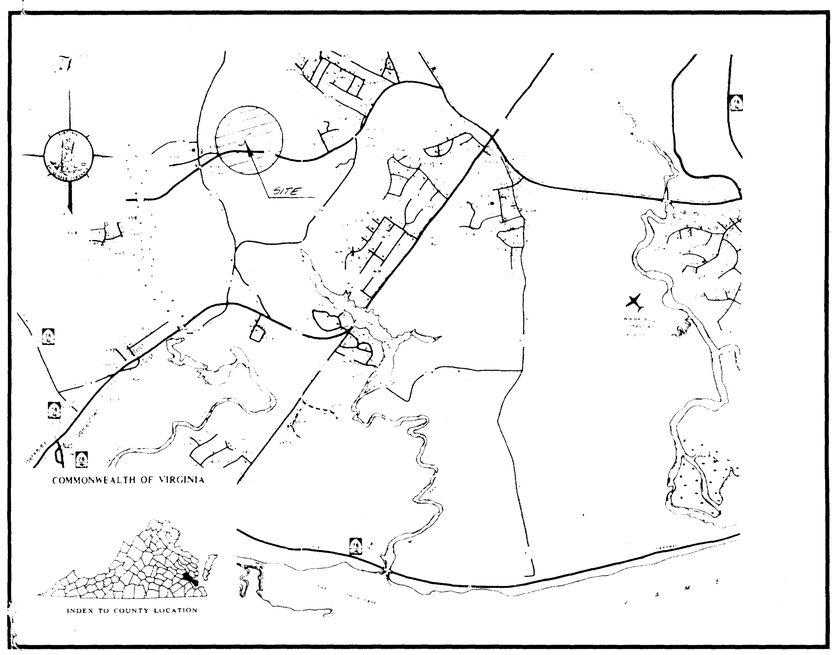
JAMES CITY COUNTY, VIRGINIA
DRAINAGE PROJECT NO. K95-069

MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORM WATER MANAGEMENT DETENTION BASIN CONSTRUCTION PLAN

RECEIVED
THE PLAN ROOM, INC.

LEGEND

- BENCH MARK ELEVATION
- EXISTING CURB & GUTTER
- EXISTING STORM MANHOLE
- EXISTING SANITARY SEWER MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER METER
- EXISTING VALVE
- EXISTING POWER POLE
- EXISTING SIGN
- EXISTING TREE/DECIDUOUS
- EXISTING TREE/EVERGREEN
- EXISTING CONTOUR
- HA-1 — HAND AUGER SOIL BORING
- GP(1.8') — GEOSTICK PENETRATION (DEPTH IN FEET)
- SF —X—X—X— SILT FENCE, VEC 3.05
- TO PS MU — TOPSOILING, PERMANENT SEEDING & MULCHING VEC 3.30, 3.32, 3.35
- CIP — CULVERT INLET PROTECTION, VEC 3.08
- —F—F—F— LIMIT OF FILL
- —C—C—C— LIMIT OF CUT
- CLEARING LIMIT
- 43 — PROPOSED CONTOUR
- 6 — PROPOSED STRUCTURE
- 56 — PROPOSED PIPE/CHANNEL
- ACMP — ALUMINIZED CORRUGATED STEEL PIPE, CONTECH HEL-COR ALUMINIZED STEEL TYPE 2 PIPE OR EQUIVALENT
- RR — RIP-RAP STONE, VEC 3.17 & VEC 3.19
- RIP-RAP STONE CHECK DAM, VEC 3.20



VICINITY MAP
SCALE: 1" = 1/2 MILE

SHEET INDEX

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SHEET 6	OF	7	DETAILS
SHEET 7	**OF**	**7**	**RISER ASSEMBLY DETAILS**

MC 045
COUNTY MILL CREEK
DETENTION BASIN

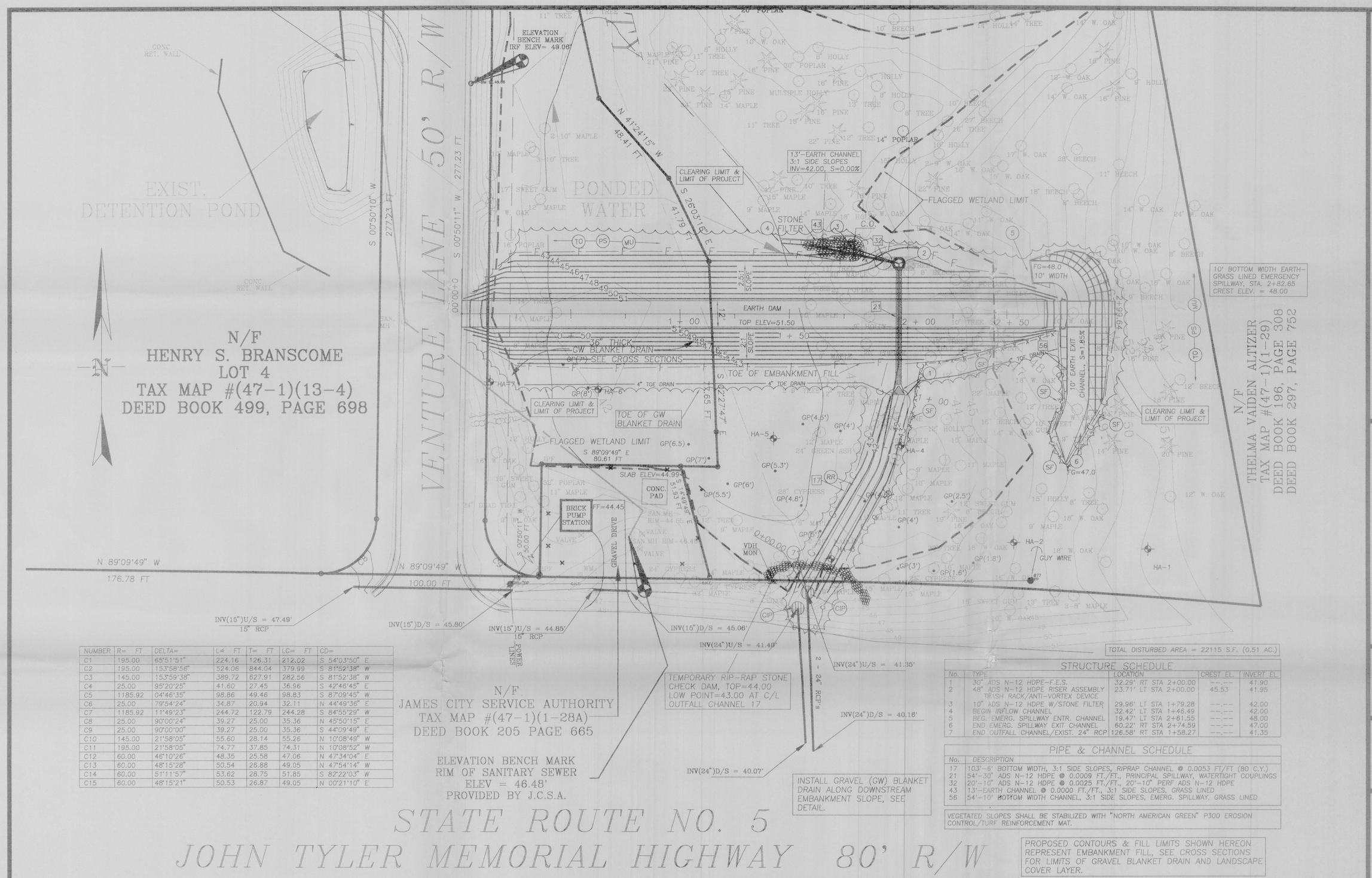
JAMESTOWN ROAD &
VENTURE LANE

GPIN 4710100029A
4652 JOHN TYLER HWY

MITCHELL-WILSON ASSOCIATES, P.C.
CIVIL ENGINEERS & LAND SURVEYORS
720 MAIN STREET, SUITE 112, 2nd FLOOR
P.O. BOX 1269
WEST POINT, VIRGINIA 23181
(804) 843-9744

JAMES CITY COUNTY
DRAINAGE PROJECT NO. K95-069
JOHN TYLER HIGHWAY
MILL CREEK/LAKE POWELL BASIN 730
JAMES CITY COUNTY, VIRGINIA

DESIGN: JBW | DRAWN: JBW
REVISIONS:
DATE: 01-22-97 | SCALE: AS SHOWN
SHEET 1 OF 7



NUMBER	R= FT	DELTA=	L= FT	T= FT	LC= FT	CD=
C1	195.00	65°51'51"	224.16	126.31	212.02	S 54°03'50" E
C2	195.00	153°58'56"	524.06	844.04	379.99	S 81°52'38" W
C3	145.00	153°59'38"	389.72	627.91	282.56	S 81°52'38" W
C4	25.00	95°20'25"	41.60	27.45	36.96	S 42°46'45" E
C5	1185.92	04°46'35"	98.86	49.46	98.83	S 87°09'45" W
C6	25.00	79°54'24"	34.87	20.94	32.11	N 44°49'36" E
C7	1185.92	11°49'23"	244.72	122.79	244.28	S 84°55'29" W
C8	25.00	90°00'24"	39.27	25.00	35.36	N 45°50'15" E
C9	25.00	90°00'00"	39.27	25.00	35.36	S 44°09'49" E
C10	145.00	21°58'05"	55.60	28.14	55.26	N 10°08'49" W
C11	195.00	21°58'05"	74.77	37.85	74.31	N 10°08'52" W
C12	60.00	46°10'26"	48.35	25.58	47.06	N 47°34'04" E
C13	60.00	48°15'28"	50.54	26.88	49.05	N 47°54'14" W
C14	60.00	51°11'57"	53.62	28.75	51.85	S 82°22'03" W
C15	60.00	48°15'21"	50.53	26.87	49.05	N 00°21'10" E

TOTAL DISTURBED AREA = 22115 S.F. (0.51 AC.)

STRUCTURE SCHEDULE

No.	TYPE	LOCATION	CREST EL.	INVERT EL.
1	30" ADS N-12 HDPE-F.E.S.	32.29' RT STA 2+00.00	--.--	41.90
2	48" ADS N-12 HDPE RISER ASSEMBLY TRASH RACK/ANTI-VORTEX DEVICE	23.71' LT STA 2+00.00	45.53	41.95
3	10" ADS N-12 HDPE W/STONE FILTER	29.96' LT STA 1+79.28	--.--	42.00
4	BEGIN INFLOW CHANNEL	32.42' LT STA 1+46.49	--.--	42.00
5	BEG. EMERG. SPILLWAY ENTR. CHANNEL	19.47' LT STA 2+61.55	--.--	48.00
6	END EMERG. SPILLWAY EXIT CHANNEL	60.22' RT STA 2+74.59	--.--	47.00
7	END OUTFALL CHANNEL/EXIST. 24" RCP	126.58' RT STA 1+58.27	--.--	41.35

PIPE & CHANNEL SCHEDULE

No.	DESCRIPTION
17	103'-6' BOTTOM WIDTH, 3:1 SIDE SLOPES, RIPRAP CHANNEL @ 0.0053 FT/FT (80 C.Y.)
21	54'-30" ADS N-12 HDPE @ 0.0009 FT./FT., PRINCIPAL SPILLWAY, WATERTIGHT COUPLINGS
32	20'-10" ADS N-12 HDPE @ 0.0025 FT./FT., 20'-10" PERF ADS N-12 HDPE
43	13'-EARTH CHANNEL @ 0.0000 FT./FT., 3:1 SIDE SLOPES, GRASS LINED
56	54'-10' BOTTOM WIDTH CHANNEL, 3:1 SIDE SLOPES, EMERG. SPILLWAY, GRASS LINED

VEGETATED SLOPES SHALL BE STABILIZED WITH "NORTH AMERICAN GREEN" P300 EROSION CONTROL/TURF REINFORCEMENT MAT.

PROPOSED CONTOURS & FILL LIMITS SHOWN HEREON REPRESENT EMBANKMENT FILL, SEE CROSS SECTIONS FOR LIMITS OF GRAVEL BLANKET DRAIN AND LANDSCAPE COVER LAYER.

EMBANKMENT SHALL BE CONSTRUCTED IN CONFORMANCE WITH RECOMMENDATIONS CONTAINED IN "GEOTECHNICAL ENGINEERING STUDY FOR PROPOSED MILL CREEK/LAKE POWELL DRAINAGE BASIN 730 JAMES CITY COUNTY, VIRGINIA DATED SEPTEMBER 10, 1996 PREPARED BY COMBINED TECHNOLOGIES, INC.

SCALES:
1" =20' HOR
1" =2' VER

CONSTRUCTION PLAN

MITCHELL-WILSON ASSOCIATES, P.C.
CIVIL ENGINEERS & LAND SURVEYORS
720 MAIN STREET, SUITE 112, 2nd FLOOR
P.O. BOX 1269
WEST POINT, VIRGINIA 23181
(804) 843-9744

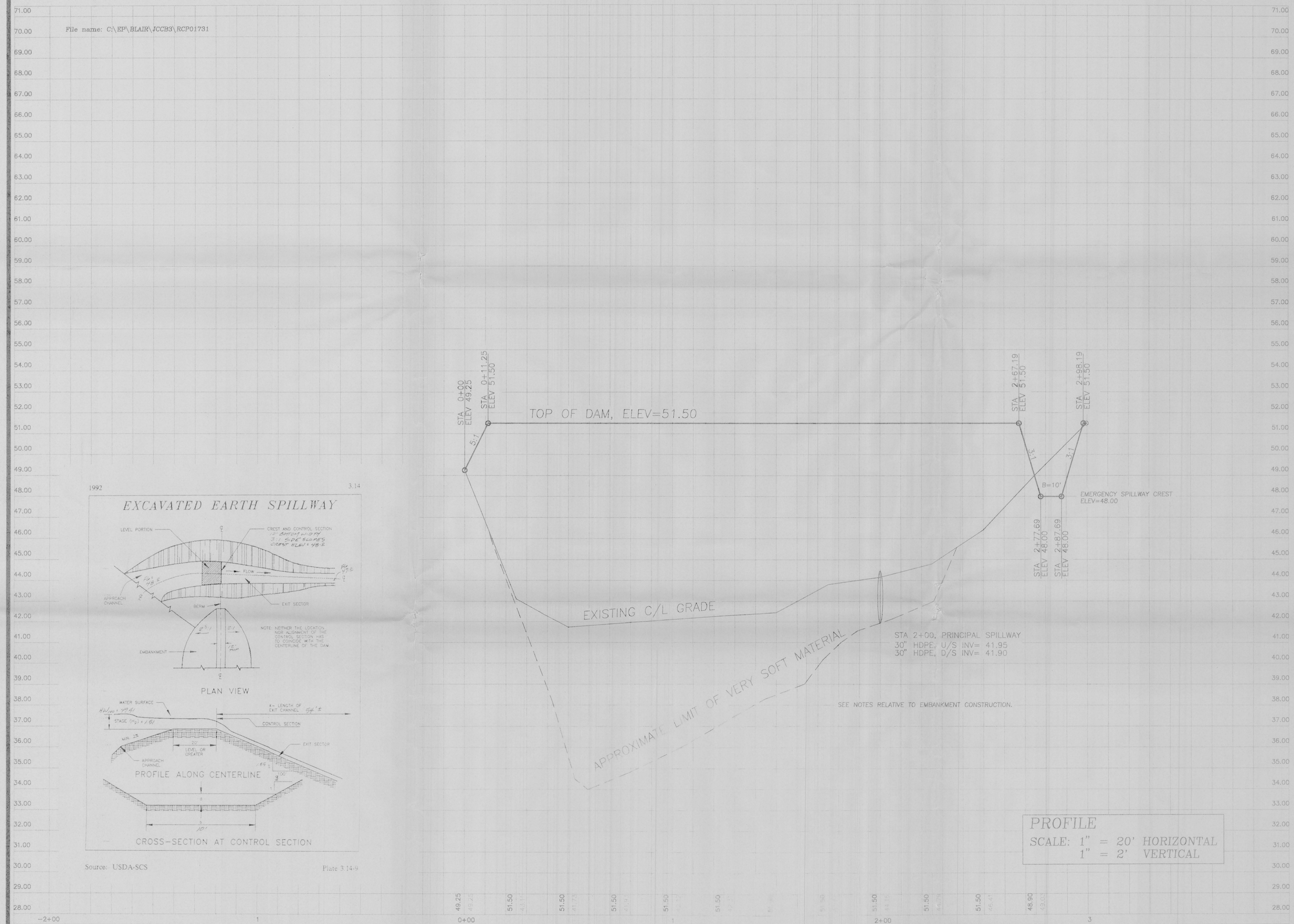
JAMES CITY COUNTY
DRAINAGE PROJECT NO. K95-069
JOHN TYLER HIGHWAY
MILL CREEK/LAKE POWELL BASIN 730
JAMES CITY COUNTY, VIRGINIA

DESIGN: JEW | DRAWN: JEW
REVISIONS: 1. PER JCC REQUEST 6-12-97
DATE: 01-22-97 | SCALE: 1" = 20'

SHEET 2 OF 7

COMMONWEALTH OF VIRGINIA
JAMES EDWARD WILSON
NO. 0[illegible]
6-12-97
PROFESSIONAL ENGINEER

File name: C:\EP\BLAIR\JCCB3\RCP01731



1992 3.14

EXCAVATED EARTH SPILLWAY

Source: USDA-SCS

Plate 3.14-9

MITCHELL-WILSON ASSOCIATES, P.C.
CIVIL ENGINEERS & LAND SURVEYORS
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JAMES CITY COUNTY
DRAINAGE PROJECT NO. K95-069
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JAMES CITY COUNTY, VIRGINIA

DESIGN: JEW
DRAWN: JEW
REVISIONS:
1. PER JCC REQUEST 6-12-97
DATE: 01-22-97
SCALE: 1" = 20'

SHEET 3 OF 7

COMMONWEALTH OF VIRGINIA
JOHN E. WILSON
No. 01 0001
REGISTERED PROFESSIONAL ENGINEER
6-12-97

NOTES:

1. EASTERN HALF OF EMBANKMENT TO BE CONSTRUCTED CONVENTIONALLY BY UNDERCUTTING SOFT OR LOOSE SOILS, AND REPLACING UNDERCUT WITH COMPACTED STRUCTURAL FILL. STRUCTURAL FILL SHALL CONSIST OF SC OF SM MATERIAL PER ASTM D-2487. PLACE IN LOOSE LIFTS 8" THICK OR LESS AND COMPACT TO 95-PERCENT OF MAXIMUM DRY DENSITY PER ASTM D-698 STANDARD PROCTOR.
2. WESTERN HALF OF EMBANKMENT MAY BE CONSTRUCTED BY REMOVAL OF SOME OR ALL OF THE SOFT ORGANIC SOILS, THEN HDYRAULICALLY FILLING BY PUSHING FILL INTO THE WATER. ONCE HYDRAULICALLY FILLED AREA HAS STABILIZED, THE REMAINDER OF THE FILL CAN BE PLACED CONVENTIONALLY. EXPECT THE CREATION OF "MUD WAVES" WHEN THE FILL MATERIAL IS HYDRAULICALLY PLACED. REMOVE MUD WAVE MATERIAL ALONG THE FRONTAGE OF THE FILL, AND REMOVE ANY MUD WAVE MATERIAL PARALLEL WITH EMBANKMENT TOE WHEN DIRECTED BY JAMES CITY COUNTY ENGINEER, OR THE PROJECT GEOTECHNICAL ENGINEER.
3. INITIAL FILL LIFT ALONG HYDRAULIC FILL AREAS SHOULD BE IN THE 3' TO 5' LIFT THICKNESS RANGE, AND SHOULD BE KEPT 3' ABOVE THE STANDING WATER LEVEL.
4. DEWATERING MAY BE REQUIRED DURING THE CONSTRUCTION OF THE EASTERN HALF OF THE EMBANKMENT.
5. INSTALL FILTER FABRIC TO SEPERATE THE GRAVEL DRAINAGE BLANKET AND THE COMPACTED EMBANKMENT FILL AND SUBGRADE SOIL. USE MIRAFI 140 OR AN APPROVED EQUIVALENT.

ESTIMATE OF VOLUMES

UNDERCUT/DISPLACEMENT	1525	C.Y. +/-
SM-[illegible] FILL ABOVE [illegible] GRADE	2300	C.Y. +/-
TOTAL [illegible] FILL ESTIMATE	3825	C.Y. +/-

VOLUMES AND AREAS SHOWN DO NOT REFLECT UNDERCUT, AND DO NOT INCLUDE COMPACTION OR EXPANSION FACTORS FOR CUT/FILL.

MITCHELL-WILSON ASSOCIATES, P.C.
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JAMES CITY COUNTY
DRAINAGE PROJECT NO. K95-069
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DESIGN: JBW
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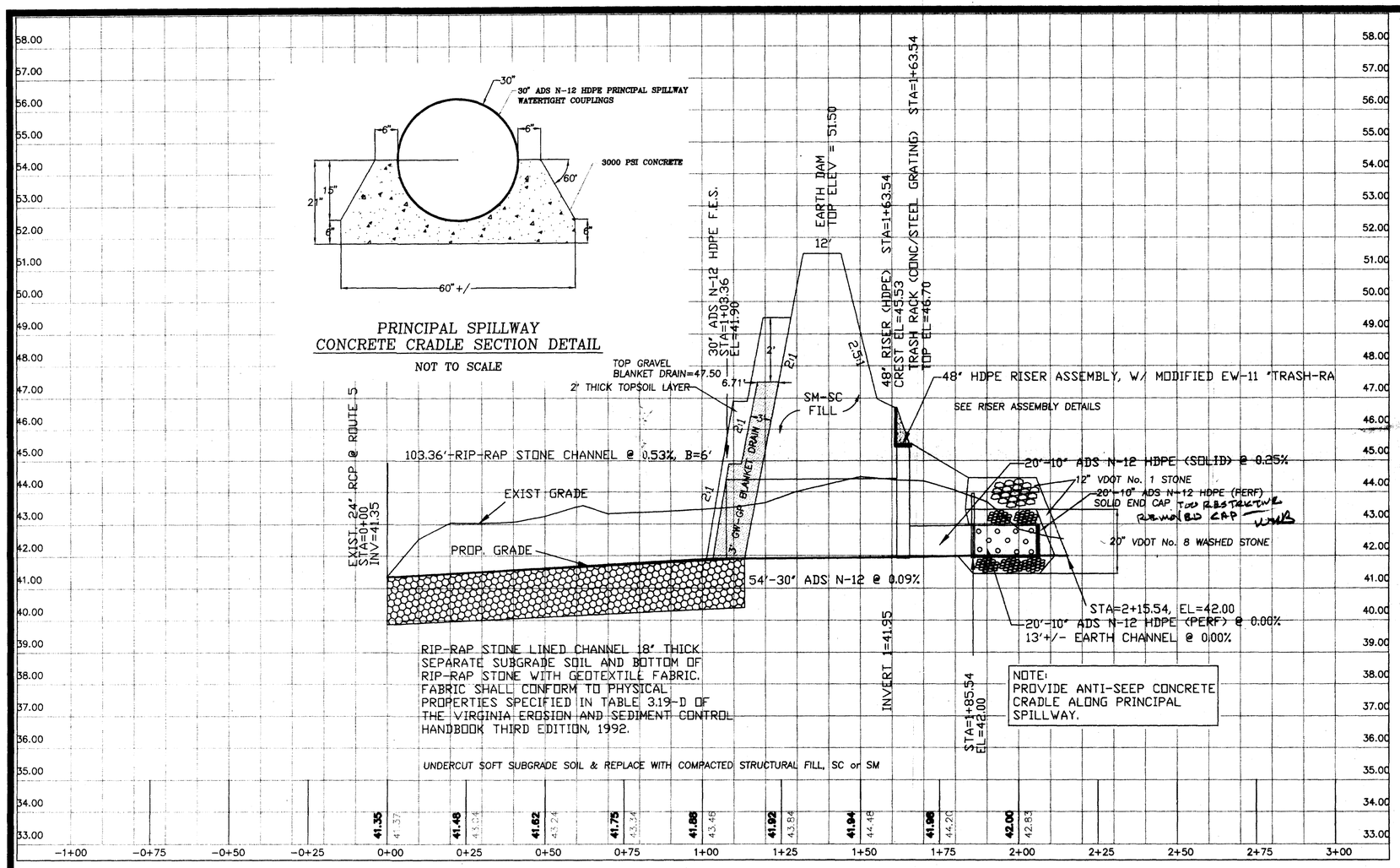
SCALE: 1" = 5'

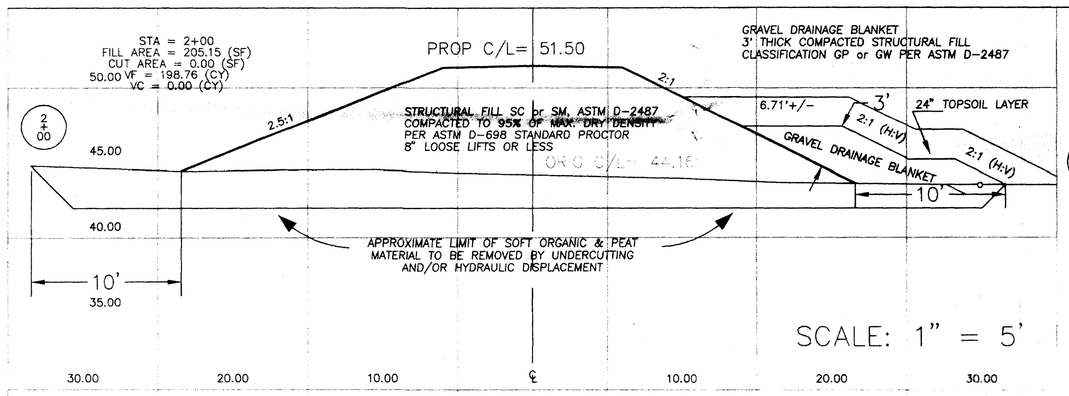
SHEET 4 OF 7

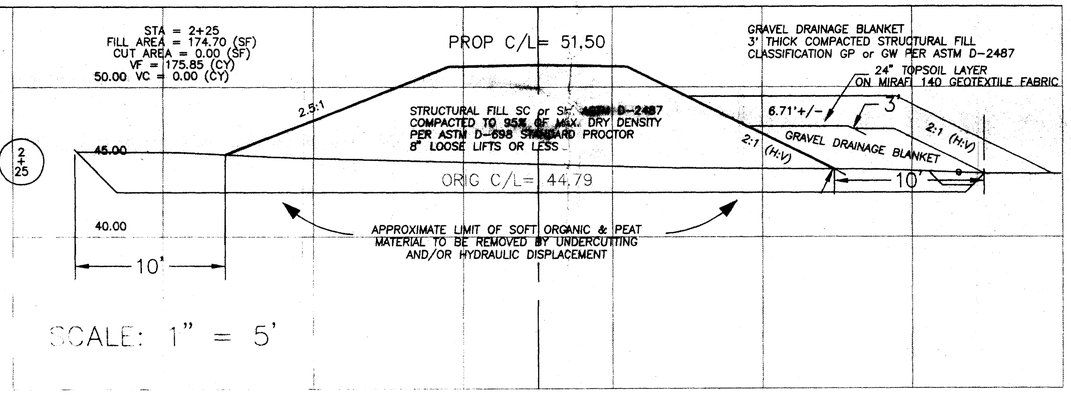


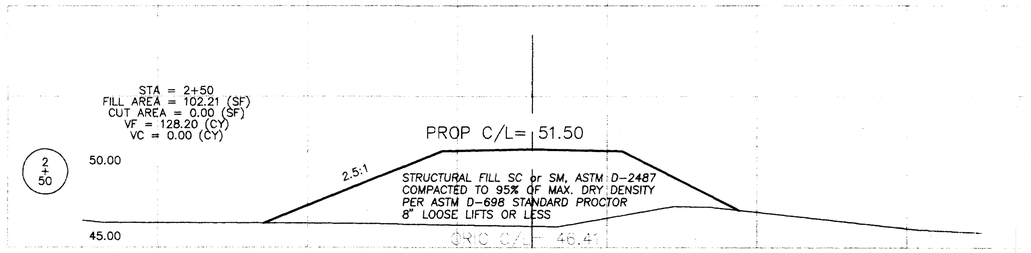
NOTES:

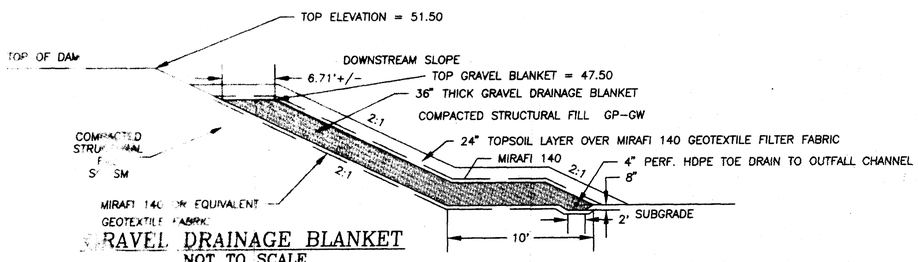
1. Location of construction entrance and construction staging area to be coordinated with the County Engineer.
2. Soft saturated soil exists along the proposed embankment footprint. Soft organic material may require removal to prevent excessive displacement (mud wave development) during embankment construction and to prevent rotational slope failure of the embankment fill. Rapid placement of the embankment fill is expected to create a "mud wave" and cause the existing soft organic material to be displaced (spoil). The contractor may be required to remove the displaced spoil material, depending on the extent of displacement. Removal and disposal of the spoil material shall be as directed by the County Engineer. The payment basis for removal and disposal of the spoil material shall be by the ( ) cubic yard, ( ) ton, ( ) other_____ unit price method.
3. Eastern half of the embankment (Station 1+60 to Station 2+99.64) should be constructed by undercutting the existing soft unsuitable material, and replacing the undercut material with compacted structural fill. Well point dewatering may be necessary for the construction of the eastern half of the embankment.
4. Western half of the embankment (Station 0+00 to Station 1+60) may be constructed by undercutting some or all of the soft unsuitable soil. Structural fill material can then be placed by a rapid hydraulic fill method, such as bulldozing material into the water, proceeding from west to east. Filling across the ponded area should proceed as rapidly as possible. The lift thickness during rapid filling should range between three (3) and five (5) feet, and should protrude above the standing water level by three (3) feet. Rapid filling will be limited to elevation 45 ft-msl (3 feet above the standing water). Conventional fill placement and compaction is required above elevation 45 ft-msl. Settlement of the embankment across rapidly filled areas is expected. Soft existing subgrade soil will be displaced by the rapid hydraulic fill loading. Displaced material must be removed from the "front" of the fill (eastern toe of fill). Displaced material located along the sides of the fill (northern and southern toes of fill) may be removed to the extent as directed by the County Engineer. Payment basis for removal and disposal of displaced material is included in item 2 above.
5. Embankment fill material, compacted structural fill, shall be SC or SM material per ASTM D-2487. Permeability of the compacted fill should range between 1.0EE-3 cm/sec and 1.0EE-6 cm/sec. Compacted structural fill shall be placed in 6 to 8-inch horizontal loose lifts, and compacted to a minimum of 95-percent of maximum dry density per ASTM D-698, Standard Proctor. The upper 2-inches of each proceeding compacted lift shall be scarified prior to placement of the successive lift.
6. Embankment fill slopes shall be 2.5:1 (H:V) upstream and 2:1 (H:V) downstream. The embankment fill top width shall be twelve (12) feet.
7. A gravel drainage blanket shall be installed along the downstream side of the embankment. The gravel blanket drain material shall be classified as GP or GW per ASTM D-2487. Blanket drain material shall be separated from the compacted structural fill embankment and from subgrade soil by a geotextile filter fabric such as Mirafi 140 or an approved equivalent. Blanket drain material shall be placed in 6 to 8-inch loose horizontal lifts and compacted to 95-percent of maximum dry density per ASTM D-698, Standard Proctor. The blanket drain shall extend a minimum of ten (10) feet horizontally from the toe of the embankment fill. Filter fabric shall be installed between the principal spillway barrel and the gravel blanket drain.
8. The primary spillway and low flow pipe shall be ADS N-12 high density polyethylene (HDPE) pipe. The principal spillway shall be installed on a concrete cradle. Compaction around the principal spillway barrel is critical. Structural fill within eight (8) feet of the principal spillway barrel shall be compacted in thin lifts with light weight walk behind compaction equipment. Backfill and compaction along both sides of the barrel must proceed simultaneously to prevent displacement of the pipe.
9. Recommendations contained in the Geotechnical Engineering Study for Proposed Mill Creek/Lake Powell Drainage Basin 730 James City County, Virginia Project No. GT003596 prepared by COMBINED TECHNOLOGIES, INC. dated September 10, 1996 shall take precedence over any conflicting specification or recommendation contained on these plans or specifications. The contractor is advised that copies of the aforementioned report are available for review in the office of the County Engineer.
10. Geotechnical inspection, observation and testing shall be provided by the contractor.

GRAVEL DRAINAGE BLANKET SHALL BE CONSTRUCTED AS INDICATED ON THESE PLANS; THE GEOTECHNICAL REPORT RECOMMENDATION TO EXTEND THE GW-GP BLANKET DRAIN TO THE TOP OF THE DAM HAS BEEN MODIFIED. ALL OTHER GEOTECHNICAL RECOMMENDATIONS SHALL REMAIN IN EFFECT PER THE REFERENCED GEOTECHNICAL REPORT. A 4" PERFORATED HDPE UNDERDRAIN SHALL BE INSTALLED ALONG THE TOE OF THE GRAVEL BLANKET DRAIN. THE TOE UNDERDRAIN SHALL BE INSTALLED TO DRAIN TO THE RIP-RAP STONE OUTFALL CHANNEL AT THE DOWNSTREAM END OF THE 30" HDPE FLARED END SECTION.









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JAMES CITY COUNTY
DRAINAGE PROJECT NO. K95-069
JOHN TYLER HIGHWAY
MILL CREEK/LAKE POWELL BASIN 730
JAMES CITY COUNTY, VIRGINIA

DESIGN: JEW | DRAWN: JEW
REVISIONS: 1. PER JCC REQUEST 6-12-97
DATE: 01-22-97 | SCALE: 1" = 20'

SHEET 5 OF 7

COMMONWEALTH OF VIRGINIA
JOHN EDWARD WILSON
No. 019991
PROFESSIONAL ENGINEER
6/18/97

MC045_JCC_BASIN_VENTURE_LANE_WOODBURY_ASSOC - 008

JAMES CITY COUNTY
EROSION AND SEDIMENT CONTROL NOTES

The purpose of the erosion and sediment 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 the 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 public utility companies.

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. 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 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 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 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., 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 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 approved plans and specifications.

GENERAL NOTES

1. Owner: James City County, Virginia
c/o Mr. Wayland N. Bass, P.E.
County Engineer
101-E Mounts Bay Road
P.O. Box 8784
Williamsburg, Virginia 23187-8784
(804) 253-6678

2. All construction shall conform with the specifications and standards of James City County, Virginia, the Virginia Department of Transportation (VDOT) and the Virginia Department of Environmental Quality, Division of Soil and Water Conservation (DEQ-DSWC).

3. Contract administration will be managed by the Owner.

4. Clearing and grubbing operations shall be limited to the areas approved and shown on the plan.

5. Elevations shown hereon are based on "PROJECT BENCHMARK (TBM) indicated as James City Service Authority sanitary sewer manhole rim. Elevation = 46.48 ft-msl (James City County elevation datum).

6. The contractor shall call "Miss Utility of Virginia" at 1-800-552-7001 48 hours prior to beginning any excavation.

7. This plan does not guarantee the existence or location of underground utilities. The underground utilities shown hereon were established using above ground structures (valves, meters, manholes, etc.) and utility plans provided by others for the underground lines as indicated on the plans. Prior to any excavation or construction, the contractor shall uncover all utilities which are shown on the plans or which have been marked by "Miss Utility" as being in the area of excavation or construction. The contractor shall take vertical and horizontal measurements adequate to determine if any conflict will occur. If any potential conflict is found, in addition to known conflicts as indicated on the plans where utility relocation has been specified, then the contractor shall notify the Engineer prior to beginning any excavation or construction. The contractor shall be responsible for removing and re-installing at his expense any utility which must be relocated because of a conflict which was not reported to the Engineer prior to the beginning of any excavation or construction. Utilities which are specified to be relocated on the plans are the contractor's responsibility. No additional payment will be made for any cost incurred due to utility relocation.

8. The contractor shall notify all utility companies 48 hours in advance of any excavation in the proximity of their utilities.

9. The contractor shall provide temporary drainage and erosion control during construction as directed by the Owner, the Virginia Department of Transportation, or the Engineer.

10. The contractor shall use only approved material in the backfill of utility trenches. Backfill material must be approved in advance of placement. Approval of the backfill material shall be made by the Owner and/or the Virginia Department of Transportation.

11. All utility trenches shall be compacted and backfilled to within 0.2' of final subgrade elevation and graded to drain. Excess material shall be removed at the contractor's expense. All finished slopes not subject to paving shall be topsoiled and seeded.

12. All fill material other than trench backfill in traffic loaded areas shall conform to the following:

Fill material shall be free from roots, stumps and other deleterious material. The maximum size for any singular stone, aggregate, cobble or other such particle shall be three inches (3") in average diameter. Fill material for areas other than areas designated for pavement or structural uses, now or in the future, shall be approved on-site or borrow material. All fills shall be constructed by placement of 6-inch to 8-inch loose lifts compacted to 95% maximum dry density. Compaction testing shall be the Owner's responsibility. Areas of fill which do not conform to required compaction criteria, shall be replaced, recompacted and/or restored at the contractor's expense.

13. All concrete to be class "A3" air entrained (3,000 P.S.I. compressive strength @ 28 days), except as noted.

14. A Virginia Department of Transportation CE-7 permit is required. The Owner shall be responsible for obtaining this and all other necessary permits prior to construction.

15. Existing mature and healthy trees shall be preserved and protected during construction.

16. All utilities shall be installed underground, unless otherwise noted on the plans.

17. Trees which are to be preserved on site shall be protected before, during and after the construction process by the installation of a temporary fence or barrier to be located and maintained five feet (5') outside of their dripline. Such a fence or barrier shall be installed prior to clearing or construction, shall be sufficient to prevent intrusion into the fenced area during construction and in no case shall materials, vehicles or equipment be stored or stockpiled within the enclosure.

18. Construction activities shall be limited to the hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, and 9:00 a.m. to 3:00 p.m. Saturdays and state or federal holidays. No construction activities shall take place on Sunday, including mobilization and construction material delivery, unless specifically authorized in advance by the Owner.

19. Any discrepancy between information specified on the plans and field conditions, including subsurface soil conditions shall be brought to the Engineer's attention prior to proceeding with any construction activity which may be affected by the discrepancy or changed condition. The Engineer may be contacted at (804) 843-9744 (office).

20. All piping, structures, controls, equipment and materials shall be as specified on the plans or in the construction specifications, unless otherwise approved, in advance and in writing by the Owner as an approved equivalent.

21. Excess spoil material from excavation activities shall be disposed of as directed by the Owner.

22. Public roadways must be swept clean at the end of each work day and as often as necessary to keep the public road clear of sediment.

23. Any sediment accumulation within storm drainage systems must be removed prior to final payment to the contractor.

24. The contractor shall verify all dimensions, grades and site conditions prior to commencing with any construction activity.

25. Existing topographic survey provided Mitchell-Wilson Associates, P.C.

26. Boundary information shown on these plans based on field survey performed by Mitchell-Wilson Associates, P.C.

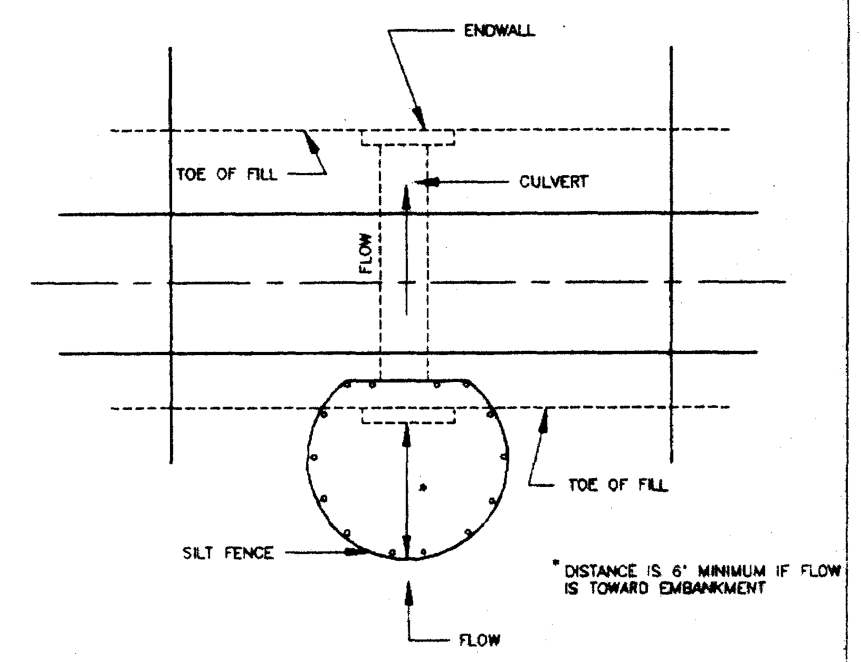
27. Contacts:

Engineer- Jonathan Blair Wilson, P.E.
Surveyor- James E. Mitchell, L.S.
Mitchell-Wilson Associates, P.C.
(804) 843-9744

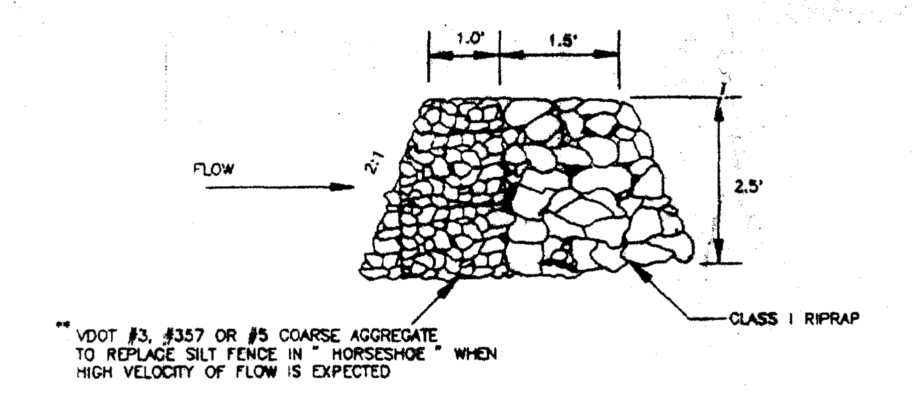
Owner- James City County, Virginia
c/o Mr. Wayland N. Bass, P.E.
County Engineer
101-E Mounts Bay Road
P.O. Box 8784
Williamsburg, Virginia 23187-8784
(804) 253-6678

Virginia Department of Transportation
Williamsburg Residency
Mr. Quintin D. Elliott
Resident Engineer
(804) 253-4832

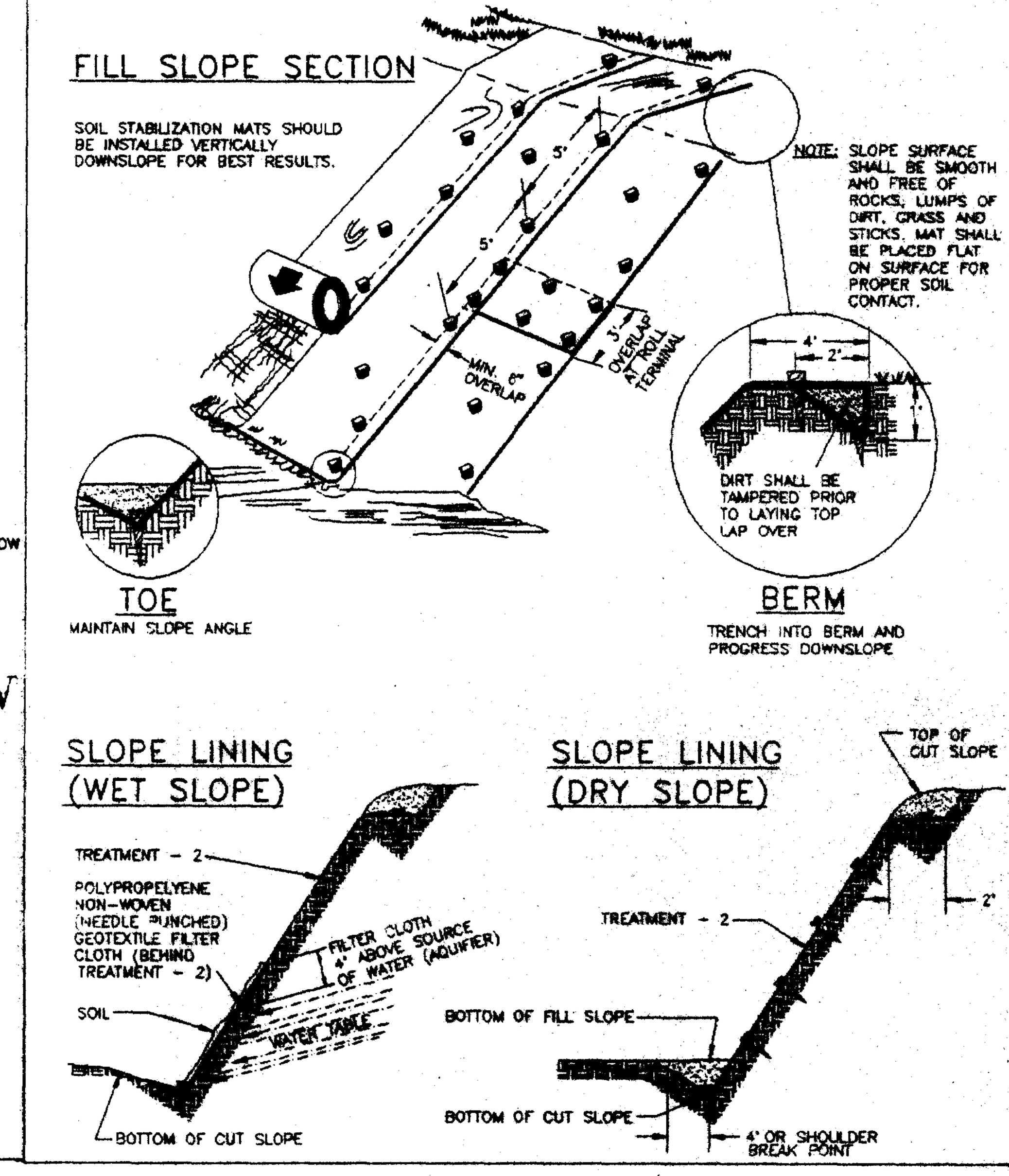
SILT FENCE CULVERT INLET PROTECTION



OPTIONAL STONE COMBINATION

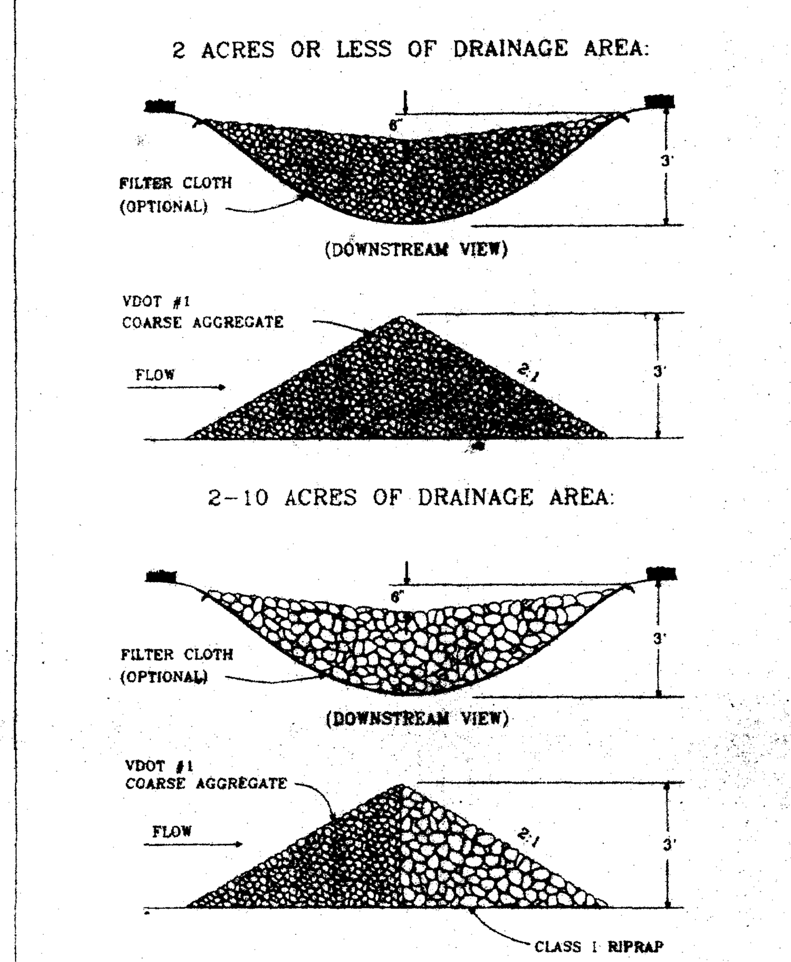


TYPICAL TREATMENT - 2 SOIL STABILIZATION MATTING SLOPE INSTALLATION



1992 3.20

ROCK CHECK DAM



Source: Va. DSWC Plate 3.20-1

TABLE 3.19-D

REQUIREMENTS FOR FILTER FABRIC USED WITH RIPRAP

Physical Property	Test Method	Requirements
Equivalent Opening Size	Corps of Engineers CWO 2215-77	Equal or greater than U.S. No. 50 sieve
Tensile Strength* @ 20% (maximum)	VTM-52	30 lbs./linear in. (minimum)
Puncture Strength	ASTM D751*	80 lbs. (minimum)

* Tension testing machine with ring clamp, steel ball replaced with 5/16 diameter solid steel cylinder with hemispherical tip centered within the ring clamp.

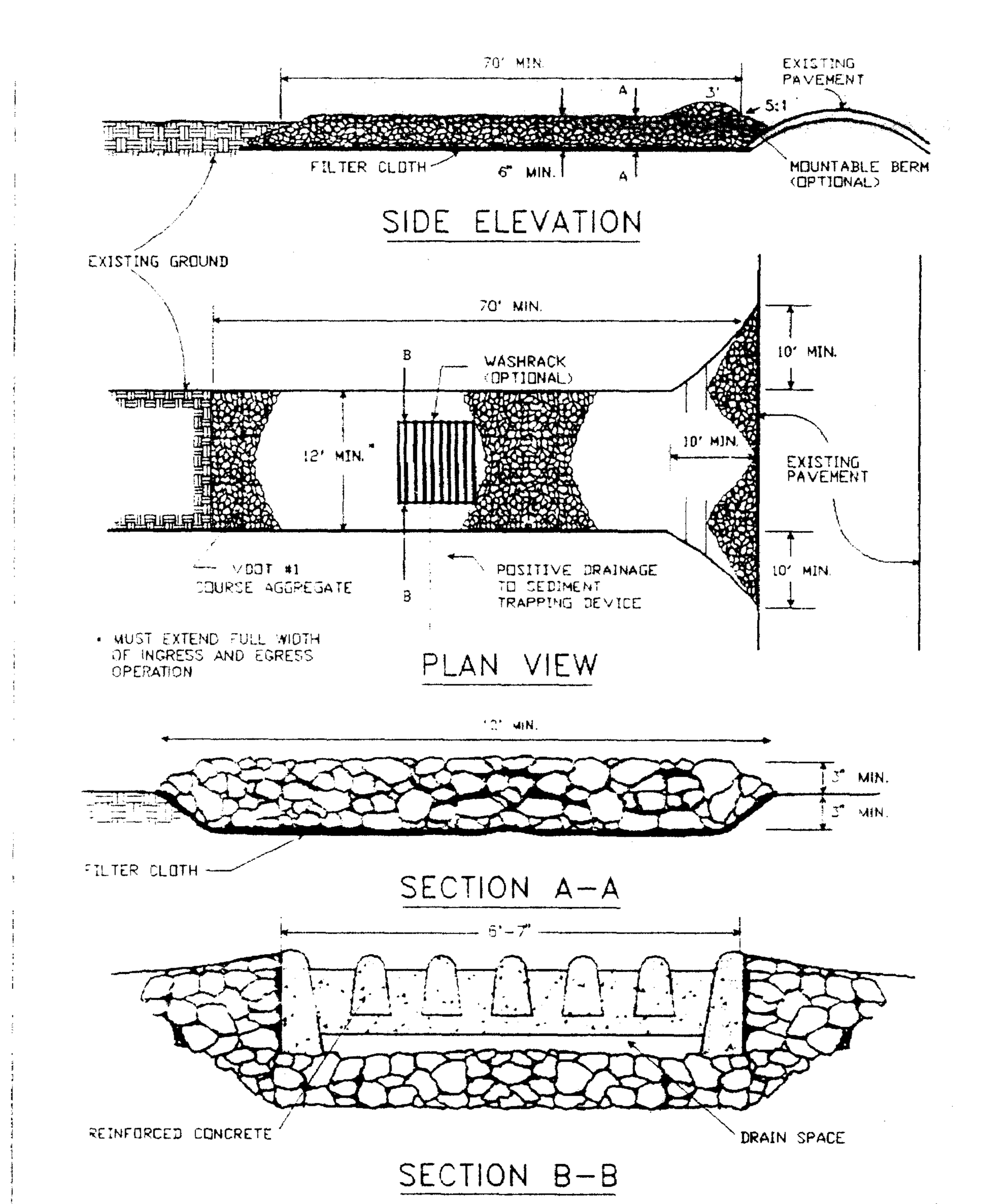
Seams shall be equal in strength to basic material.

Additional fabric material or non-corrosive steel wire may be incorporated into the fabric to increase overall strength.

Source: VDOT Road and Bridge Specifications

1992 3.02

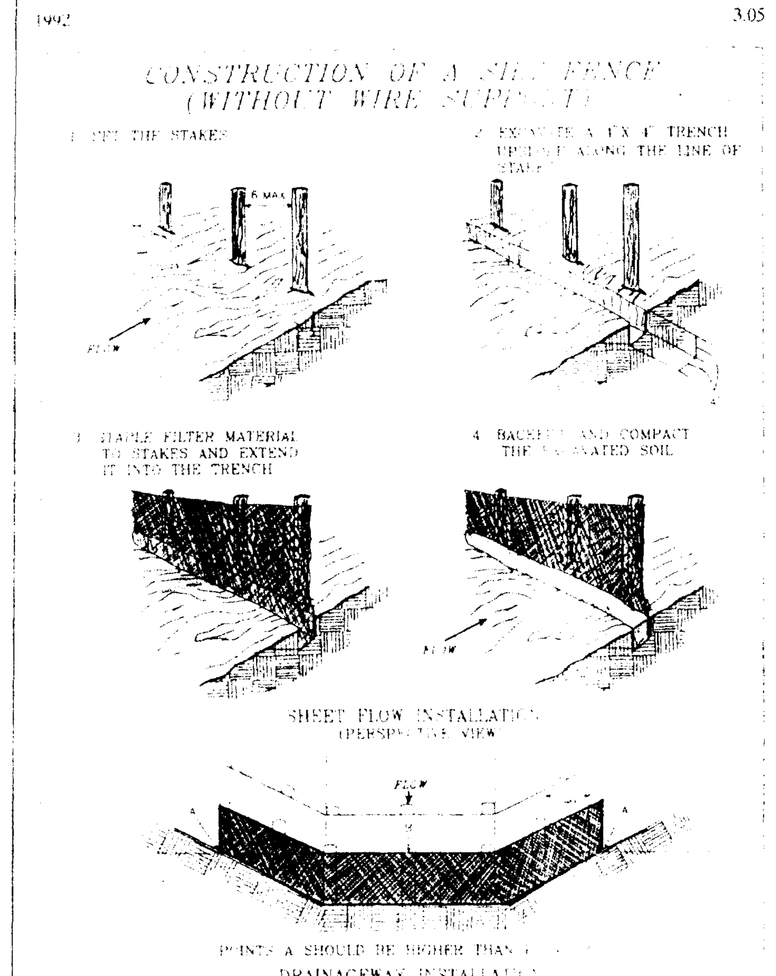
STONE CONSTRUCTION ENTRANCE



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

1992 3.05

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)



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

1992 3.38

FENCING AND ARMORING

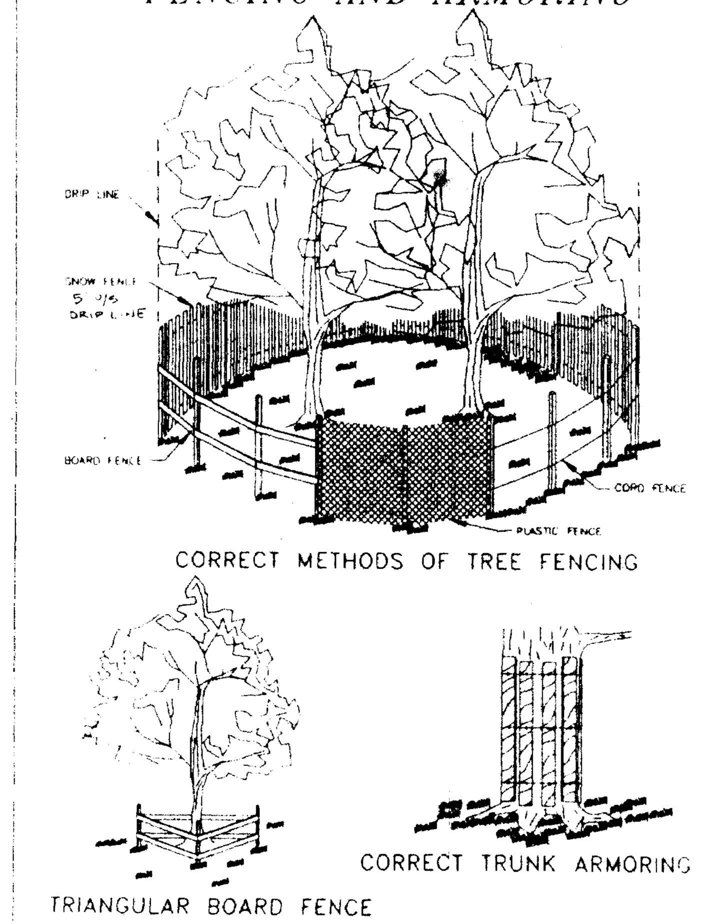
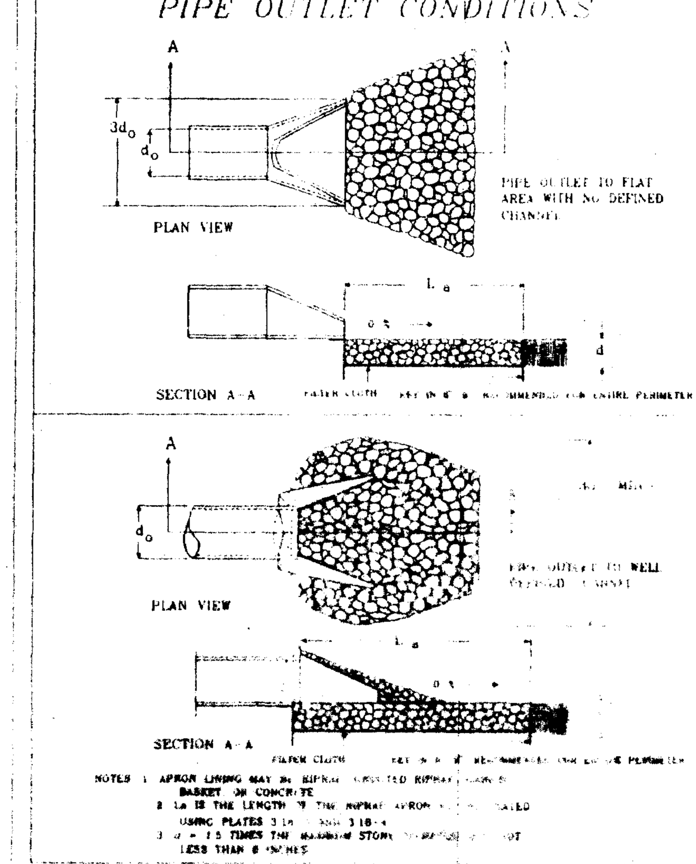


Plate 3.38-2 Source: Va. DSWC

1992 3.18

PIPE OUTLET CONDITIONS



1992 3.26

STRAW BALE/SILT FENCE PIT

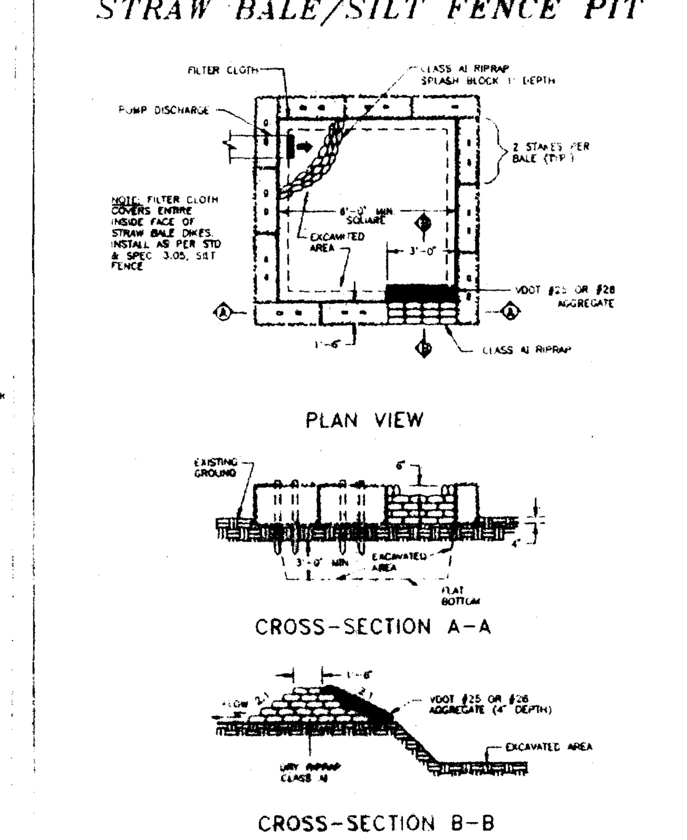


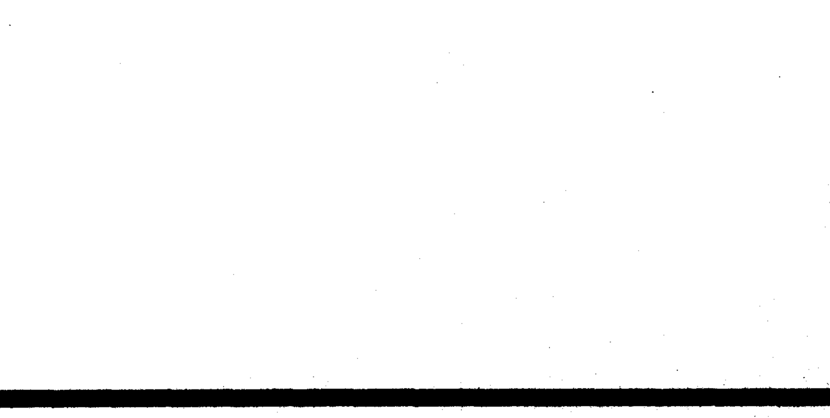
Plate Source Va. DSWC Plate 3.26-3

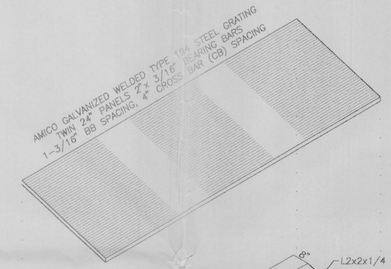
MITCHELL-WILSON ASSOCIATES, P.C.
CIVIL ENGINEERS & LAND SURVEYORS
720 MAIN STREET, SUITE 112, 2nd FLOOR
P.O. BOX 1269
WEST POINT, VIRGINIA 23181
(804) 843-9744

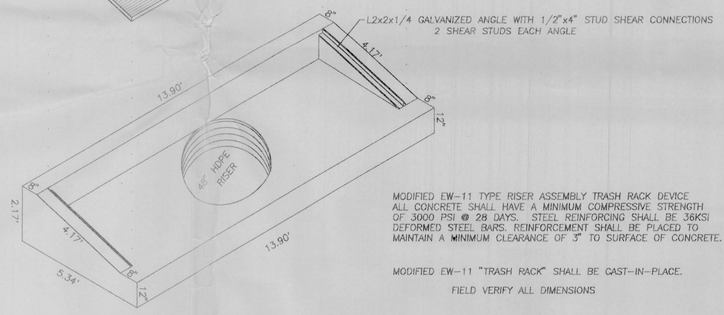
JAMES CITY COUNTY
DRAINAGE PROJECT NO. K95-069
JOHN TYLER HIGHWAY
MILL CREEK/LAKE POWELL BASIN 730
JAMES CITY COUNTY, VIRGINIA

DESIGN: JBW | DRAWN: JBW | REVISIONS: | DATE: 6-28-96 | SCALE: NONE

SHEET 6 OF 7





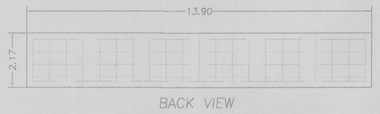


MODIFIED EW-11 TYPE RISER ASSEMBLY TRASH RACK DEVICE
ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI @ 28 DAYS. STEEL REINFORCING SHALL BE 36KSI DEFORMED STEEL BARS. REINFORCEMENT SHALL BE PLACED TO MAINTAIN A MINIMUM CLEARANCE OF 3" TO SURFACE OF CONCRETE.

MODIFIED EW-11 "TRASH RACK" SHALL BE CAST-IN-PLACE.

FIELD VERIFY ALL DIMENSIONS

NOT TO SCALE

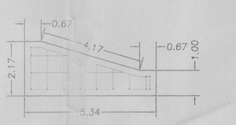


BACK VIEW

VERT. REINFORCMENT
BASE REINFORCEMENT
12" LAP

No. 4 REBAR @ 6" O.C. HORIZONTAL
No. 4 REBAR @ 8" O.C. VERTICAL
LAP VERTICAL BARS 12" INTO BASE

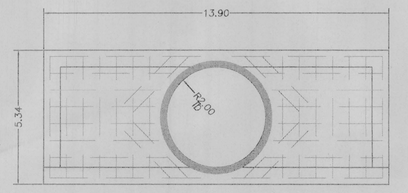
NOT TO SCALE
FIELD VERIFY ALL DIMENSIONS



No. 4 REBAR @ 8" O.C./E.W.

SIDE VIEW

NOT TO SCALE
FIELD VERIFY ALL DIMENSIONS



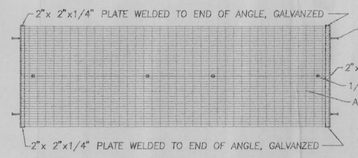
BASE

No. 4 REBAR @ 6" O.C./E.W., DIAGONAL BARS @ 6" O.C. AT RISER

NOT TO SCALE

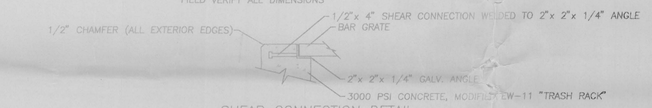
FIELD VERIFY ALL DIMENSIONS

CENTER BASE OVER 48" HDPE RISER



GRATING DETAIL

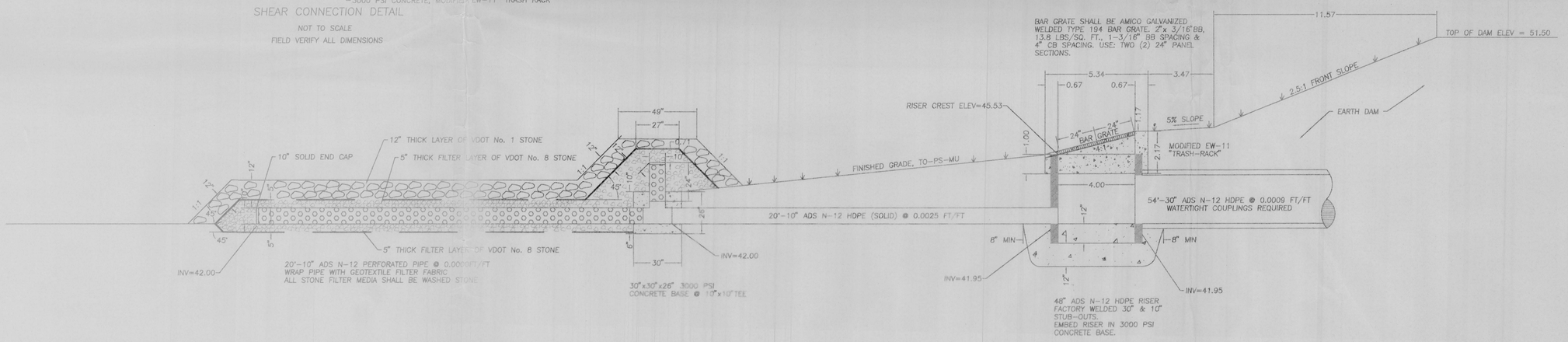
NOT TO SCALE



SHEAR CONNECTION DETAIL

NOT TO SCALE

FIELD VERIFY ALL DIMENSIONS



RISER & LOW FLOW PIPE CROSS SECTION
SCALE: 1" = 3'

RISER ASSEMBLY DETAILS

MITCHELL-WILSON ASSOCIATES, P.C.
CIVIL ENGINEERS & LAND SURVEYORS
720 MAIN STREET, SUITE 112, 2nd FLOOR
P.O. BOX 1269
WEST POINT, VIRGINIA 23181
(804) 843-9744

JAMES CITY COUNTY
DRAINAGE PROJECT NO. K95-069
JOHN TYLER HIGHWAY
MILL CREEK/LAKE POWELL BASIN 730
JAMES CITY COUNTY, VIRGINIA

DESIGN: JBW | DRAWN: JBW
REVISIONS:
DATE: 06-12-97 | SCALE: AS SHOWN

SHEET 7 OF 7

COMMONWEALTH OF VIRGINIA
JOHN BLAIR WILSON
NO. 012662
PROFESSIONAL ENGINEER

MC045_JCC_BASIN_VENTURE_LANE_WOODBURY_ASSOC - 010

POND MAINTENANCE RECORD DRAWING

OF

MC-045

LOCATED AT

VENTURE LANE

FOR

JCC STORMWATER DIVISION

VICINITY MAP

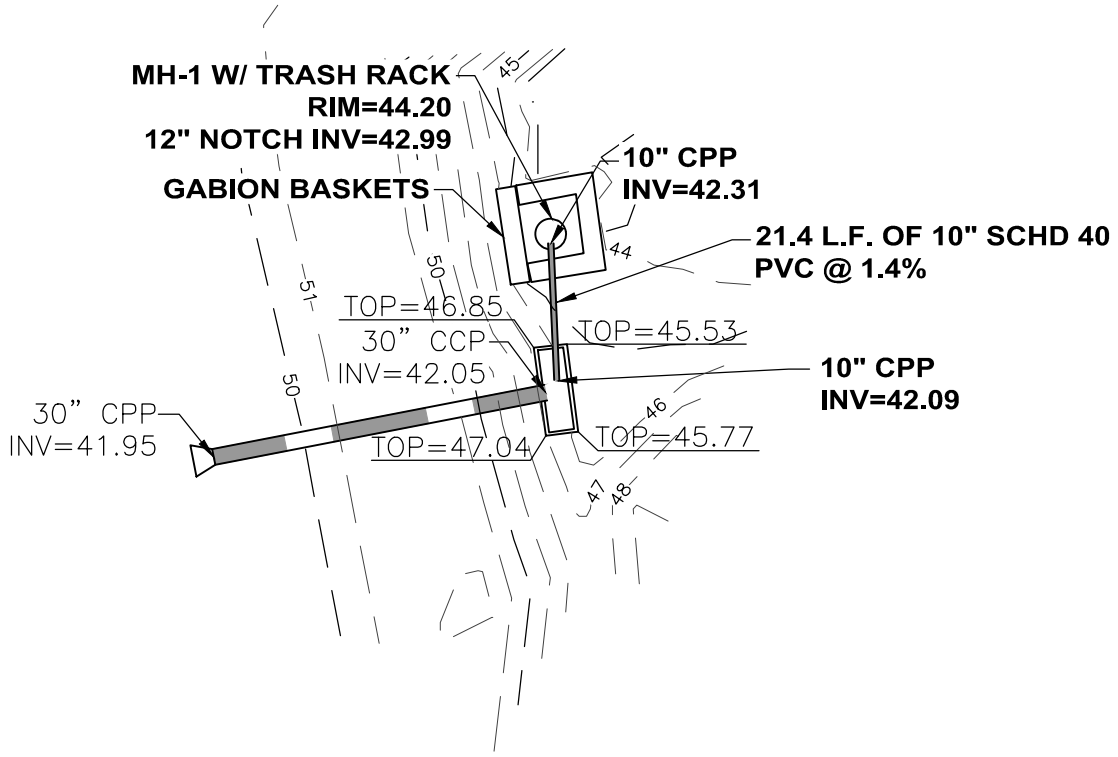
SCALE: 1" = 1 MILE

SHEET 1 OF 5

30 0 30 60

Scale: 1" = 30'

JCC GIS MAPPING



STORMWATER FACILITY CERTIFICATION:

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THE STORMWATER FACILITIES SHOWN ON THESE DRAWINGS HAVE BEEN CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS AND SPECIFICATIONS.

WILLIAM S FELTS	Will S Felts
NAME	NAME
LIC. NO. 3149	09/27/2016
VIRGINIA LICENSE	DATE

SHEET 2 OF 5

COMMONWEALTH OF VIRGINIA
WILLIAM S. FELTS
Lic. No. 3149
09/27/2016
LAND SURVEYOR

POND MAINTENANCE RECORD DRAWING FOR

MC-045 LOCATED AT VENTURE LANE

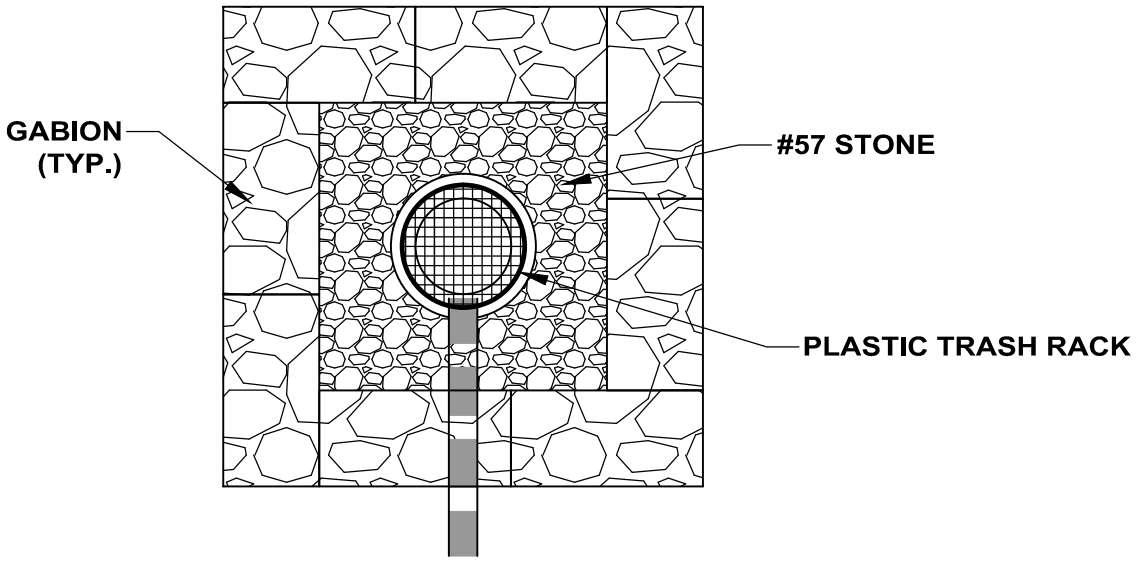
FOR

JCC STORMWATER DIVISION

JAMES CITY COUNTY **AS-BUILT CONDITIONS** VIRGINIA

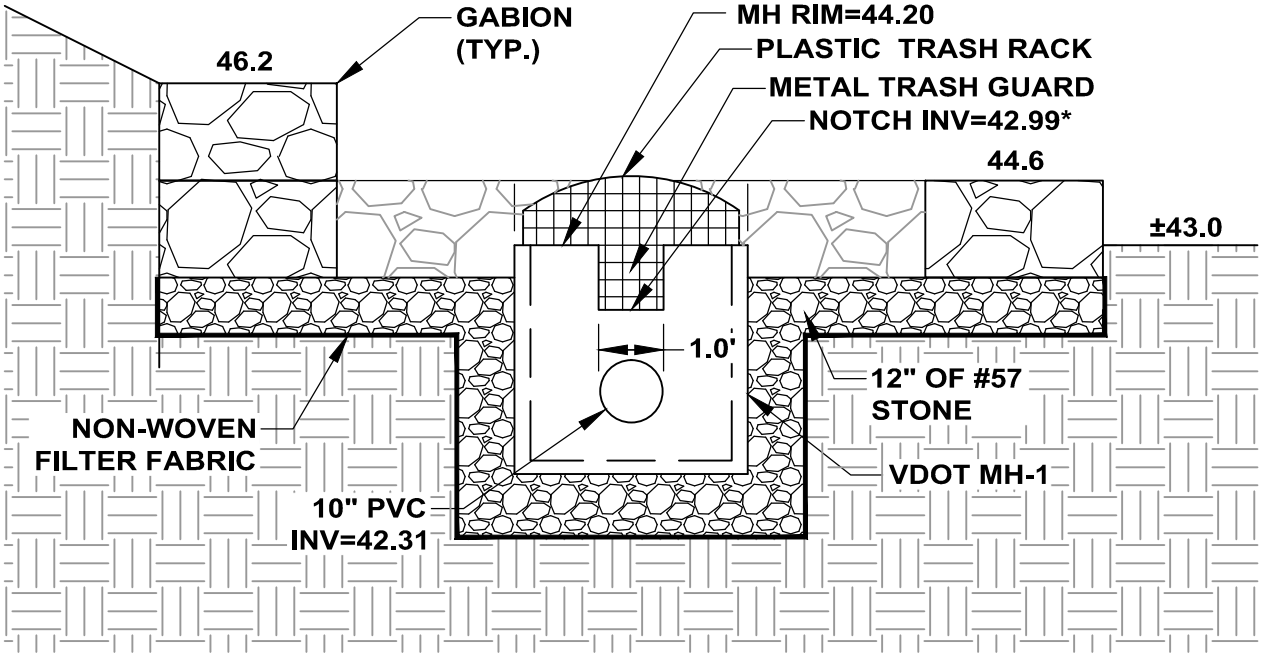
DATE: 09/27/16
SCALE: 1"=30'
JOB# 16-151
CAD File
16-151 - Design.dwg

LandTech Resources, Inc.
ENGINEERING & SURVEYING CONSULTANTS
3925 Midlands Road, Williamsburg, Virginia 23188
Telephone: 757-565-1677 Fax: 757-565-0782
Web: landtechresources.com



PLAN VIEW

N.T.S.



SECTION VIEW

N.T.S.

***AFTER DEWATERING OF POND, BOTTOM OF POND ELEVATION WAS FOUND TO BE LOWER THAN THE EXPECTED 44'. NOTCH CUT TO DRAIN REMAINDER OF POND**

SHEET 3 OF 5

COMMONWEALTH OF VIRGINIA
WILLIAM S. FELTS
Lic. No. 3149
09/27/2016
LAND SURVEYOR

POND MAINTENANCE RECORD DRAWING FOR

MC-045 LOCATED AT VENTURE LANE

FOR

JCC STORMWATER DIVISION

JAMES CITY COUNTY — DETAILS — VIRGINIA

DATE: 09/27/16
SCALE: N/A
JOB# 16-151
CAD File
16-151 - Design.dwg

LandTech Resources, Inc.
ENGINEERING & SURVEYING CONSULTANTS
3925 Midlands Road, Williamsburg, Virginia 23188
Telephone: 757-565-1677 Fax: 757-565-0782
Web: landtechresources.com

SHEET 4 OF 5

COMMONWEALTH OF VIRGINIA
WILLIAM S. FELTS
Lic. No. 3149
09/27/2016
LAND SURVEYOR

POND MAINTENANCE RECORD DRAWING FOR

MC-045 LOCATED AT VENTURE LANE

FOR

JCC STORMWATER DIVISION

JAMES CITY COUNTY **CONSTRUCTION PICTURES** VIRGINIA

DATE: 09/27/16
SCALE: N/A
JOB# 16-151
CAD File
16-151 - Design.dwg

LandTech Resources, Inc.
ENGINEERING & SURVEYING CONSULTANTS
3925 Midlands Road, Williamsburg, Virginia 23188
Telephone: 757-565-1677 Fax: 757-565-0782
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COMMONWEALTH OF VIRGINIA
WILLIAM S. FELTS
Lic. No. 3149
09/27/2016
LAND SURVEYOR

POND MAINTENANCE RECORD DRAWING FOR

MC-045 LOCATED AT VENTURE LANE

FOR

JCC STORMWATER DIVISION

JAMES CITY COUNTY — **AS-BUILT PICTURES** — VIRGINIA

DATE: 09/27/16
SCALE: N/A
JOB# 16-151
CAD File
16-151 - Design.dwg

LandTech Resources, Inc.
ENGINEERING & SURVEYING CONSULTANTS
3925 Midlands Road, Williamsburg, Virginia 23188
Telephone: 757-565-1677 Fax: 757-565-0782
Web: landtechresources.com

GEOTECHNICAL ENGINEERING STUDY
FOR
PROPOSED MILL CREEK/LAKE POWELL
DRAINAGE BASIN 730
JAMES CITY COUNTY, VIRGINIA
PROJECT NO. GT003596

COMBINED TECHNOLOGIES, INC.
2246-J DABNEY ROAD
P.O. BOX 11276
RICHMOND, VIRGINIA 23230-1276
PHONE: (804) 355-2492
FAX: (804) 353-7003

SEPTEMBER 10, 1996

COMBINED TECHNOLOGIES, INC.

Richmond, Virginia
John H. Brewer, Ph.D., P.E.
President
Paul W. Burch, B.S., P.E.
Vice President

Chapel Hill, North Carolina
Jan F. Sassaman, Ph.D.
Vice President

September 10, 1996

Mr. Jonathan Blair Wilson, P.E.
Mitchell-Wilson Associates, P.C.
P.O. Box 1269
720 Main Street
West Point, Virginia 23181

Re: Geotechnical Engineering Study
Proposed Mill Creek/Lake Powell Drainage Basin 730
James City County, Virginia
Project No. GT003596

Dear Mr. Wilson:

Combined Technologies, Inc. is pleased to submit four copies of our geotechnical engineering report for the above referenced project. These services were provided in accordance with our agreement dated December 4, 1995.

1.0 EXECUTIVE SUMMARY

The site for the proposed dam is underlain in part by a very soft, organic silt. This very soft layer varies in thickness from 0 to 9 feet, with the thicker areas under water to the north of the existing pump station. Accordingly, construction of about half of the dam will be conducted in standing water. These soils should be removed or displaced prior to the construction of the dam. In the vicinity of the primary spillway, these soils will need to be completely removed to minimize settlement under the structure. The soft, organic soils are anticipated to be about 2.5 feet thick under the primary spillway.

It is our understanding that off-site borrow soils will be required for the construction of the dam embankment. Slope stability and seepage analyses of a homogeneous earth dam using silty sand or clayey sand soils indicate that the downstream slope may be constructed at a 2H:1V and the upstream slope may be constructed at 2.5H:1V if all of the soft organic soils are removed from under the embankment.

P.O. Box 11276 • Richmond, VA 23230-1276 • (804) 355-2492 • Fax (804) 353-7003

MC045_JCC_BASIN_VENTURE_LANE_WOODBURY_ASSOC-012

Drainage features should be incorporated in the design of the dam around the downstream end of the primary spillway and on the downstream face of the dam. These features are described in more detail in the report.

2.0 SITE DESCRIPTION AND PROPOSED CONSTRUCTION

The site is located at the intersection of John Tyler Memorial Highway (State Route 5) and Venture Lane in James City County, Virginia. The site is being developed for a dry storm water detention pond which will include the construction of an earth embankment dam. Existing elevations at the site vary from El 42 to El 54. Standing water was present on the western half of the dam site at the time of our field work. The proposed dam will be about 350 feet long with a 12 foot wide crest at El 51.5, and side slopes ranging from 2H:1V to 2.5H:1V. The dam will be constructed with soils classified as silty sand (SM) or clayey sand (SC) per ASTM D-2487.

The primary spillway will consist of a 30-inch corrugated metal pipe with a 48-inch riser. The primary spillway is proposed to be constructed with anti-seep collars, and will be supported on a concrete cradle. A discussion of the primary spillway and the use of anti-seep collars is included in Section 5.4. An excavated earth emergency spillway will be constructed at the east side of the dam with a crest elevation at El 48.

Site information was obtained from the plans prepared by Mitchell-Wilson Associates, P.C. and through our site visits. Project details discussed above were provided by Blair Wilson of Mitchell-Wilson Associates, P.C.

This report has been prepared to aid in the evaluation of this site and to assist the design professionals in the design of the project. It is intended for use with regard to the specific project described above. Any substantial changes in locations or grades should be brought to our attention so we can modify our recommendations as needed.

3.0 OBJECTIVE AND SCOPE

The objective of this study was to evaluate the subsurface conditions at the project site and to provide recommendations regarding design and construction of the dam for this project.

Our services included subsurface exploration, field engineering, soil laboratory testing and a geotechnical engineering study. The geotechnical engineering study includes the evaluation of hand auger, geological, soil test and related data to develop the following:

- Estimated subsurface conditions and ground water levels in the areas explored.

- Recommended earthwork requirements for construction of dam including suitable material types, subgrade preparation, lift thickness and compaction requirements.
- Design recommendations for support of the primary spillway pipe including bedding or a concrete cradle and internal drainage requirements.
- Slope stability and seepage evaluations for the dam embankment.
- Recommendations for a downstream drainage blanket to control seepage through the dam.
- Recommendations for design of the emergency spillway.
- Recommendations for temporary dewatering during construction.
- Recommended construction considerations related to the implementation of our recommendations.

The following services were not provided: surveying for line and grade, cost or quantity estimates and preparation of detailed plans and specifications. These services are not typically provided by our firm.

The following services were also not included in our scope but can be provided upon request: attendance at client review meetings and progress meetings, review of geotechnical aspects of the project plans and specifications, geotechnical and materials observation and testing during construction, and geoenvironmental services.

The above services were used to develop this report, which is based on information available to us for the proposed construction. We would appreciate the opportunity to review the plans and specifications that pertain to the recommendations contained in this report, and to submit our comments based on this review.

4.0 SUBSURFACE EXPLORATION

4.1 EXPLORATION TECHNIQUES

Seven hand auger borings were drilled and geostick penetration readings were obtained along the original proposed location of the dam on March 15, 1996 by Combined Technologies personnel. Two additional hand auger borings were drilled and geostick penetration readings were obtained on August 30, 1996 by Combined Technologies personnel after the dam location was shifted about 40 feet to the north of the original dam location. Bulk samples of the surficial soils in the area

of the dam were collected from a shallow test pit (TP-1) which was drilled west of Hand Auger HA-8. Specific observations, remarks, and logs for the borings are included in Appendix A. Hand Auger locations and geostick penetration probe locations are shown on Figure A1 in Appendix A.

4.2 GENERALIZED SUBSURFACE STRATA AND GEOLOGY

The site is located within the Coastal Plain Physiographic Province of Virginia, a regional wedge of sedimentary deposits that thicken to the east. Sediments within this province are generally representative of multiple marine transgressive and regressive depositional sequences.

According to the Virginia Division of Mineral Resources Publication 87 Geology and Mineral Resources of the Brandon and Norge Quadrangles, Virginia, the site is underlain by both swamp sediments and the Windsor Formation of Pleistocene age. The Windsor Formation consists of a sequence of sand, silt and clay or a lagoonal-estuarine origin. The Windsor Formation overlies the Yorktown Formation of Pliocene age.

We have characterized the following generalized subsurface soil strata based on the test boring data presented in Appendix A.

Stratum 1

Stratum 1 consists of dark brown or black, highly organic, very soft organic silt and peat associated with the standing water in the lower areas of the site. These soils are not considered a suitable bearing stratum for the construction of the dam embankment.

Stratum 2

Stratum 2 consists of yellow-brown, orange-brown and light gray mottled, silty sand, clayey sand, poorly graded sand with silt or clay, with or without gravel. This stratum is relatively dense and is believed to be a suitable bearing stratum for the dam embankment.

Stratum 3

Stratum 3 consists of light green-gray, orange-brown and yellow-orange, clayey sand, with or without gravel and shells. This stratum was relatively dense.

The stratification lines on the boring logs represent the approximate boundaries between soil types; in-situ the transitions may be gradual. The symbol "GP" shown on the hand auger logs

represents geostick penetration readings in inches. This reading provides an estimate of the soils' relative density or consistency.

The group symbols indicated on the boring logs and in the generalized strata represent the Unified Soil Classification System Group Symbols based on visual observation of the samples. Criteria for visual classification of soil samples are included in Appendix A. Please recognize that some variation may be expected between samples visually classified and samples classified in the laboratory.

4.3 GROUND WATER

Water level readings which were obtained in the hand augers are noted on the logs. Ground water was observed during drilling in all of the hand augers at depths of 0.5 to 3.5 feet, El 41.5 to El 47. No long-term water level readings were obtained from the hand augers as all holes were backfilled upon completion for safety.

The ground water levels indicated on the logs show our estimate of the approximate location of the hydrostatic water table at the time the borings were performed. Fluctuations in the location of the hydrostatic water table should be anticipated, depending upon variations in precipitation, surface runoff, pumping, evaporation, pond level, stream levels and similar factors.

4.4 LABORATORY TESTING

Laboratory testing was performed on three bag samples collected from the site. Laboratory tests included natural moisture content, grain-size distribution and Atterberg Limits. The results of the these laboratory tests are presented in Appendix B.

5.0 GEOTECHNICAL ENGINEERING ANALYSIS AND RECOMMENDATIONS

5.1 DISCUSSION

The proposed dam will be constructed for storm water management, and will not retain a permanent pool of water. We have considered in our analysis that seepage through the dam will be acceptable as long as the dam is designed to avoid internal erosion of the dam materials.

Surface and subsurface conditions vary considerable in the area of the proposed dam. The western half of the dam (up to about Station 2+00) was covered by standing water at the times we drilled our hand augers, and up to about 5 to 9 feet of very soft organic silt and peat were present below the water. The eastern half of the site (where the primary and emergency spillways

are to be built) was not covered by standing water, and the soft soils extended to shallower depths of about 0 to 5 feet.

We recommend the eastern half of the embankment (including the two spillways) be constructed conventionally by undercutting and replacing the soft or loose, near-surface soils and replacing them with compacted structural fill. Dewatering with well points will likely be necessary to build a portion of the eastern half of the embankment.

The western half of the embankment can be constructed by removing some or all of the very soft organic soils (probably with a dragline or large backhoe) and pushing the fill into the water with bulldozers until the fill has stabilized enough to place the remainder of the fill conventionally. The decision to remove some or all of the very soft soil should be made by the Owner. If only a portion of the soft soils are removed, the underlying very soft soils will likely exhibit a shear (or bearing capacity) failure and mud waves will be created on both sides of the dam and along the front where the fill is pushed. These mud waves will likely result in the ground surface emerging from the water, which will need to be removed along the front of the fill but can possibly remain in place along the sides. Settlements of the embankment would also occur if all of the soft soils are not displaced. If all of the very soft soils are removed (by dragline or backhoe), then mud waving and potential settlement should be greatly reduced.

5.2 SEEPAGE AND SLOPE STABILITY ANALYSES

We analyzed the use of silty sands or clayey sands for construction of the dam embankment. For the seepage analysis we analyzed a range of permeability values ranging from 1.0×10^{-3} cm/sec to 1.0×10^{-6} cm/sec. Based on the results of the seepage analysis, we recommend that a drainage blanket be installed on the downstream side of the dam.

We have also analyzed the stability of the dam at its maximum section assuming that the crest is 12 feet wide and located at El 51.5, the maximum pool is at El 48, and the side slopes of the compacted embankment soils are constructed at 2H:1V. The resulting free water surface from the seepage analysis was incorporated into the slope stability analysis of the dam embankment. Assumed soil shear strength parameters were also used in the analysis for slope stability. The results of the stability analysis on the dam embankment indicate that the dam may be constructed with side slopes of 2H:1V if the foundation soils are replaced with compacted structural fill to a distance at least 10 feet beyond the toes of the dam as recommended in Section 5.3. The embankment with 2H:1V side slopes under steady state seepage and static conditions had a factor of safety against slope failure of 1.49. The factor of safety against slope failure under earthquake loadings was 1.11. The results of the stability analysis for rapid drawdown of the upstream slope indicated a factor of safety of 1.31. The Army Corps of Engineers recommends a minimum factor of safety of 1.5 for steady state seepage analysis, 1.0 for steady state seepage with earthquake

loading included, and 1.0 for rapid drawdown. The results of the stability analyses are included in Appendix C.

5.3 RECOMMENDATIONS FOR THE DAM EMBANKMENT

In the vicinity of the soft subgrade soils of Stratum 1 on the western half of the site, we recommend that the subgrade soils be failed during construction by rapid loading. Some settlement should be anticipated in the embankment soils hydraulically placed to displace the soft organic silt. After allowing the settlement to dissipate under the weight of the embankment, the embankment should be brought up to final grade conventionally. The eastern half of the site should be undercut and replaced with compacted structural fill as needed.

Based on the results of the seepage and slope stability analyses, the dam may be constructed using downstream slope of 2H:1V and an upstream slope of 2.5H:1V. These are the steepest slopes recommended by the U.S. Department of the Interior, Bureau of Reclamation, for small, homogeneous dams on stable foundations. We recommend that all of the existing soft organic soils within 10 feet of the dam be removed and replaced with compacted structural fill. In addition, we recommend that the dam be constructed with a blanket drain on the downstream face of the dam. A schematic diagram with our recommendations for the dam embankment is shown in Figure D1 in Appendix D.

Subgrades to receive compacted structural fill should be stripped of all topsoil, organic matter, debris, and other unsuitable materials. In the vicinity of the very soft and wet organic soils on the western half of the site, all trees, roots and other organic matter should be removed with a drag line or backhoe. We anticipate that this will include the upper 2 to 3 feet in the vicinity of the standing water. We believe that the soft, wet organic silt material can be displaced by creating a mud wave instead of removing it with a drag line or backhoe. However, the very soft and wet organic soils can be completely removed prior to filling if desired. The initial lift of fill should be between 3 and 5 feet thick, and should be kept about 3 feet above the surrounding water level.

The low lying areas of the proposed dam are anticipated to be saturated during construction. We anticipate that the subgrade soils will need to be dewatered during construction of the eastern half of the dam embankment.

Compacted structural fill for the embankment of the dam should consist of material classifying SC or SM per ASTM D-2487. Compacted structural fill for the blanket drain should consist of material classifying GP or GW per ASTM D-2487. Compacted structural fill should be placed in horizontal, loose lifts not exceeding 8 inches in thickness and should be compacted to at least 95 percent of maximum dry density per ASTM D-698, Standard Proctor.

The blanket drain should extend along the downstream side of the dam as shown in Figure D1 in Appendix D. A geotextile filter fabric should separate the well-graded gravel filter soils from the compacted fill of the embankment and the subgrade soils. The geotextile filter fabric should be Mirafi 140 or equivalent. Prior to construction, samples of the embankment fill and blanket drain soils should be submitted to our office for soil laboratory testing. Based on these test results, we will evaluate the suitability of the Mirafi 140N geotextile for filtering these materials. Depending on the test results, a different fabric could be needed.

5.4 PRIMARY AND EMERGENCY SPILLWAY

The primary spillway will consist of a 30-inch pipe with a 48-inch riser. The primary spillway is proposed to be constructed with seepage collars. The inclusion of seepage collars around the primary spillway increases the length of the seepage path which will reduce the potential for piping. However, the seepage collars are very difficult to compact around and the loose zones of soil can exacerbate the problem instead of improving the situation. If the seepage collars are included in the design, the lower portions of the collars should be backfilled with concrete.

The primary spillway pipe should be placed on a concrete cradle. The cradle should be poured on the foundation soils and the sides of the cradle should be formed with a slope to facilitate compaction around the cradle. If the primary spillway is to be constructed in a trench, the sides of the trench should be sloped no steeper than 2H:1V and sufficient clearance on either side of the pipe should be provided to allow space for the construction of the concrete cradle and hand-operated compaction equipment.

The blanket drain discussed in Section 5.3 should cover the lower 10 lineal feet of the pipe as shown on Figure D1 in Appendix D. The geotextile filter fabric should also extend between the pipe and the blanket drain.

The emergency spillway is proposed to be constructed on the left side of the dam embankment. The emergency spillway will be constructed as a 10 foot wide excavated earth, grass lined channel at El 48. Extra care should be taken to protect the embankment from erosion.

6.0 CONSTRUCTION CONSIDERATIONS

6.1 EARTHWORK

The contractor should be prepared to provide dewatering at the site during construction of the primary spillway, and the eastern half of the embankment. We also recommend that the project specifications indicate the contractor's responsibility for providing adequate site surface drainage

during construction. Inadequate surface drainage will most likely lead to disturbance of soils by construction traffic and increased volume of undercut.

Subgrade preparation is a trial and error procedure to evaluate the necessary combination of equipment and materials. The effectiveness of the subgrade preparation will depend upon the weather conditions prior to and at the time of compaction.

It is difficult to accurately predict the subgrade conditions which will be encountered during construction based on the amount of data typically obtained during a geotechnical engineering design phase study. Our recommendations are intended as guidelines, and modifications will probably be necessary at the time of construction. Unit prices and a contingency allowance should be provided to account for possible modifications.

The local soils are generally moisture sensitive and will be difficult to compact under wet weather conditions. Therefore, we strongly recommend that all of the earthwork for this project be performed during the warmer, drier times of the year.

The upper portions of compacted structural fills should be recompacted immediately prior to placing additional fill or to repair disturbance that may occur due to weather conditions and construction operations. After completion of each lift of fill, the upper 2 inches of the lift should be scarified prior to placement of the next lift to promote bonding of the layers.

When compacting the backfill soils around the 30-inch primary spillway pipe, the backfill should be carefully compacted around the pipe to minimize the potential for piping failure due to uncompacted soils along the sides of the pipe. The soils within 8 feet of the pipe should be compacted in thin lifts using light-weight, walk-behind equipment to minimize potential damage to the pipe. Both sides of the pipe should be backfilled simultaneously to avoid shifting of the pipe during backfilling.

6.2 OBSERVATION AND TESTING

Regardless of the thoroughness of a geotechnical engineering exploration, there is always a possibility that conditions will vary from those encountered in the borings, that conditions are not as anticipated by the designers, that the construction process has altered the soil conditions and that the borrow soils will vary from those observed during the geotechnical engineering exploration. In order to permit correlation between the subsurface exploration data and the actual subsurface conditions encountered during construction, Combined Technologies should be retained to perform professional observation, monitoring, and testing during construction of the earthwork phases of the project. These services will also assist in evaluating the contractor's conformance

with the plans and specifications. We welcome the opportunity to provide these construction phase services as an extension to our professional services.

7.0 GENERAL AND LIMITATIONS

The conclusions and recommendations of this report are based on the information revealed by this exploration. An attempt has been made to provide for normal contingencies, but the possibility remains that unexpected conditions may be encountered during construction. An allowance should be established to account for possible additional costs that may be required for earthwork as recommended herein. Additional costs may be incurred for various reasons including variation of soil between boring, zones of soft or loose natural soils, greater than anticipated existing recent alluvial soils, need for borrow fill material, additional dewatering, etc.

The analysis, conclusions and recommendations submitted in this report are based on the evaluation previously outlined and the data collected at the points shown on the attached location plan. This report does not reflect specific variations that may occur between test locations. The borings were located where site conditions permitted and where it is believed that representative conditions occur, but the full nature and extent of variations between borings and of subsurface conditions not encountered by any boring may not become evident until the course of construction. If variations become evident at any time before or during the course of construction, it will be necessary to reevaluate the conclusions and recommendations of this report, and further exploration, observation and/or testing may be required.

This report has been prepared in accordance with generally accepted geotechnical engineering practices and makes no other warranties, either express or implied, as to the professional advice provided under the terms of our agreement and included in this report.

Further, it is understood that any specific recommendations made in this report as to on-site construction review by this firm will be authorized and funds and facilities for such review will be provided at the times recommended if we are to be held responsible for the design recommendations.

Soil samples will be held for a period of 45 days and will be discarded of unless further disposition is requested.

We are pleased to be of service to you on this project. If you have any questions concerning this report, please do not hesitate to contact either of the undersigned.

Sincerely yours,

COMBINED TECHNOLOGIES, INC.

Marcia Prowell

Marcia Prowell, M.S., E.I.T.
Project Engineer

Edward G. Drahos

COMMONWEALTH OF VIRGINIA
EDWARD G. DRAHOS
No. 015605
PROFESSIONAL ENGINEER

Edward G. Drahos, M.S., P.E.
Principal Engineer

MVP:EGD:dg

Appendices: Appendix A: Subsurface Exploration Data
Appendix B: Soil Laboratory Test Results
Appendix C: Dam Evaluation Sections
Appendix D: Embankment Cross Section and Details

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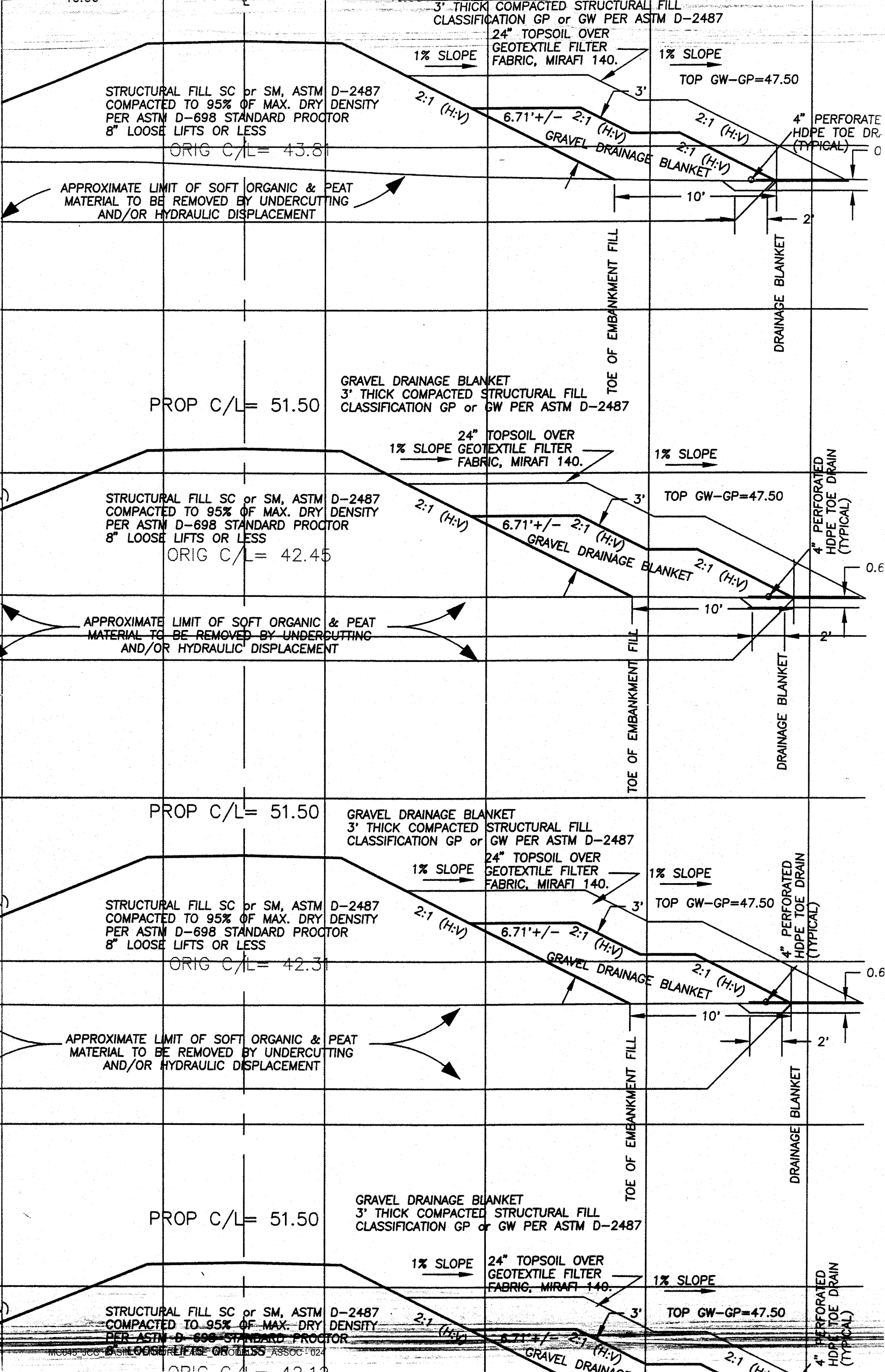
3' THICK COMPACTED STRUCTURAL FILL
CLASSIFICATION GP or GW PER ASTM D-2487
24" TOPSOIL OVER
GEOTEXTILE FILTER
FABRIC, MIRAFI 140.
1% SLOPE
1% SLOPE
TOP GW-GP=47.50
3'
STRUCTURAL FILL SC or SM, ASTM D-2487
COMPACTED TO 95% OF MAX. DRY DENSITY
PER ASTM D-698 STANDARD PROCTOR
8" LOOSE LIFTS OR LESS
2:1 (H:V)
6.71'+/- 2:1 (H:V)
2:1 (H:V)
2:1 (H:V)
GRAVEL DRAINAGE BLANKET
4" PERFORATE
HDPE TOE DR
(TYPICAL)
ORIG C/L= 43.81
APPROXIMATE LIMIT OF SOFT ORGANIC & PEAT
MATERIAL TO BE REMOVED BY UNDERCUTTING
AND/OR HYDRAULIC DISPLACEMENT
10'
2'
TOE OF EMBANKMENT FILL
DRAINAGE BLANKET
PROP C/L= 51.50
GRAVEL DRAINAGE BLANKET
3' THICK COMPACTED STRUCTURAL FILL
CLASSIFICATION GP or GW PER ASTM D-2487
24" TOPSOIL OVER
GEOTEXTILE FILTER
FABRIC, MIRAFI 140.
1% SLOPE
1% SLOPE
TOP GW-GP=47.50
3'
STRUCTURAL FILL SC or SM, ASTM D-2487
COMPACTED TO 95% OF MAX. DRY DENSITY
PER ASTM D-698 STANDARD PROCTOR
8" LOOSE LIFTS OR LESS
2:1 (H:V)
6.71'+/- 2:1 (H:V)
2:1 (H:V)
GRAVEL DRAINAGE BLANKET
4" PERFORATED
HDPE TOE DRAIN
(TYPICAL)
ORIG C/L= 42.45
APPROXIMATE LIMIT OF SOFT ORGANIC & PEAT
MATERIAL TO BE REMOVED BY UNDERCUTTING
AND/OR HYDRAULIC DISPLACEMENT
10'
2'
TOE OF EMBANKMENT FILL
DRAINAGE BLANKET
PROP C/L= 51.50
GRAVEL DRAINAGE BLANKET
3' THICK COMPACTED STRUCTURAL FILL
CLASSIFICATION GP or GW PER ASTM D-2487
24" TOPSOIL OVER
GEOTEXTILE FILTER
FABRIC, MIRAFI 140.
1% SLOPE
1% SLOPE
TOP GW-GP=47.50
3'
STRUCTURAL FILL SC or SM, ASTM D-2487
COMPACTED TO 95% OF MAX. DRY DENSITY
PER ASTM D-698 STANDARD PROCTOR
8" LOOSE LIFTS OR LESS
2:1 (H:V)
6.71'+/- 2:1 (H:V)
2:1 (H:V)
GRAVEL DRAINAGE BLANKET
4" PERFORATED
HDPE TOE DRAIN
(TYPICAL)
ORIG C/L= 42.31
APPROXIMATE LIMIT OF SOFT ORGANIC & PEAT
MATERIAL TO BE REMOVED BY UNDERCUTTING
AND/OR HYDRAULIC DISPLACEMENT
10'
2'
TOE OF EMBANKMENT FILL
DRAINAGE BLANKET
PROP C/L= 51.50
GRAVEL DRAINAGE BLANKET
3' THICK COMPACTED STRUCTURAL FILL
CLASSIFICATION GP or GW PER ASTM D-2487
24" TOPSOIL OVER
GEOTEXTILE FILTER
FABRIC, MIRAFI 140.
1% SLOPE
1% SLOPE
TOP GW-GP=47.50
3'
STRUCTURAL FILL SC or SM, ASTM D-2487
COMPACTED TO 95% OF MAX. DRY DENSITY
PER ASTM D-698 STANDARD PROCTOR
8" LOOSE LIFTS OR LESS
2:1 (H:V)
6.71'+/- 2:1 (H:V)
2:1 (H:V)
GRAVEL DRAINAGE BLANKET
4" PERFORATED
HDPE TOE DRAIN
(TYPICAL)
ORIG C/L= 42.12
APPROXIMATE LIMIT OF SOFT ORGANIC & PEAT
MATERIAL TO BE REMOVED BY UNDERCUTTING
AND/OR HYDRAULIC DISPLACEMENT
10'
2'
TOE OF EMBANKMENT FILL
DRAINAGE BLANKET

APPENDIX A

SUBSURFACE EXPLORATION DATA

- Boring Location Plan, Figure A1
- Notes for Boring/Test Pit Logs
- Soil Classification
- Hand Auger Logs, HA-1 through HA-9

HAND AUGERS

All hand augers were performed by our personnel with a 2-inch O.D. Hand Auger. Soils encountered were visually classified in accordance with ASTM D-2487. Geostick Penetrometer measurements were taken at approximate 1-foot intervals. Penetrometer readings give a general indication of the soils' in-place density or consistency.

HAND AUGER LOCATIONS

Hand augers were located using a 100-ft tape and measuring from the existing roads and woodlines. Approximate hand auger locations are indicated on Figure A1. Ground surface elevations at the hand auger locations were scaled from the topographic plan prepared by Mitchell-Wilson Associates dated June 28, 1996. These locations should be considered no more accurate than the methods and plans used to obtain them.

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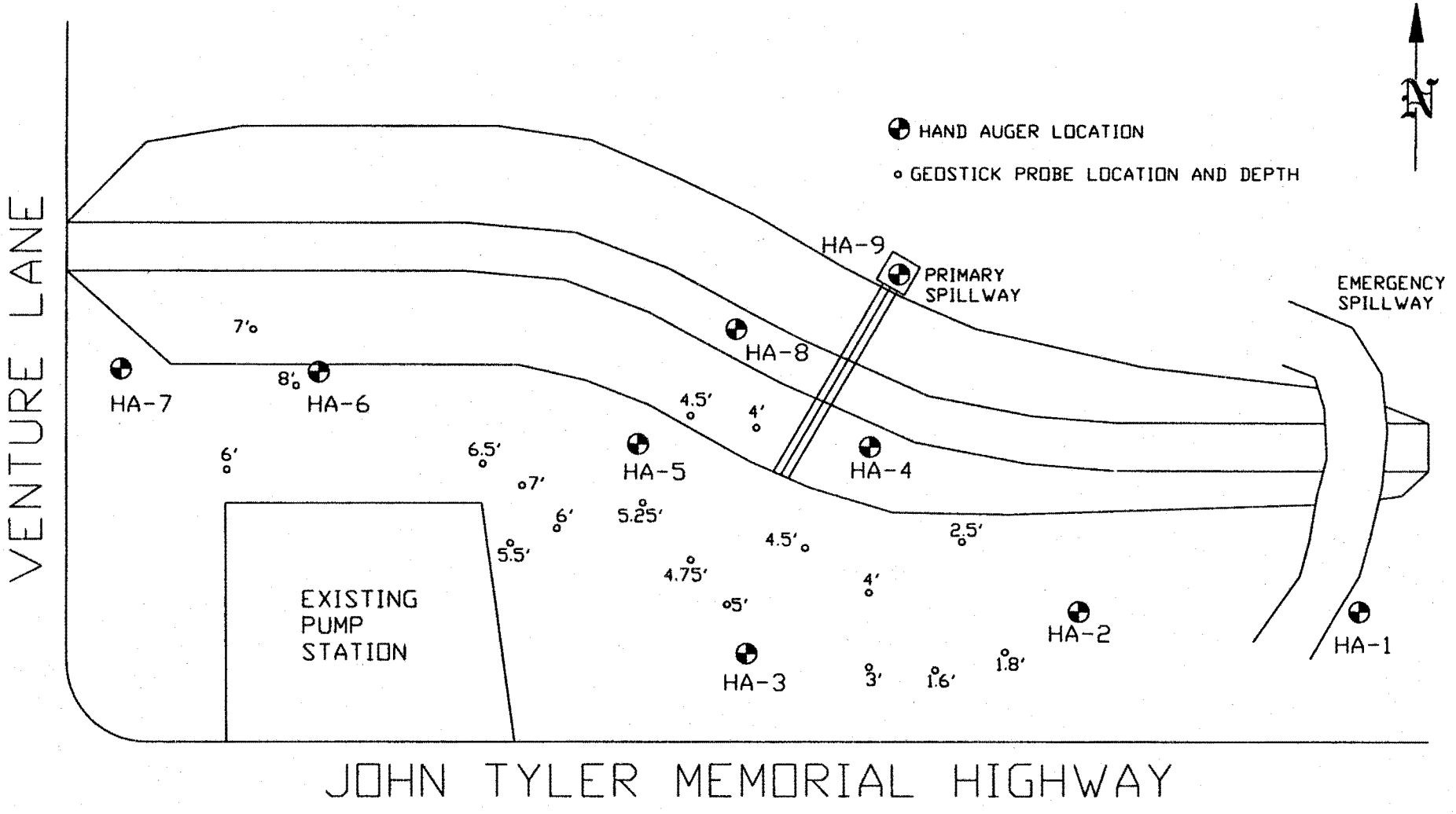

NOTE:
Drawing Not to Scale

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dsn: mvp	project #: GT003596	Mill Creek/Lake Powell Basin 730 James City Co., VA Location Plan	FIG
dwn: mvp	file #: gt003596.dwg		A1
appr: egd	date: September, 1996		

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NOTES FOR BORING/TEST PIT LOGS

CORRELATION OF PENETRATION RESISTANCE WITH RELATIVE DENSITY AND CONSISTENCY

SANDS

Number of Blows, N	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
Over 50	Very Dense

SILTS AND CLAYS

Number of Blows, N	Consistency
0 - 2	Very Soft
3 - 4	Soft
5 - 8	Medium Stiff
9 - 15	Stiff
16 - 30	Very Stiff
Over 30	Hard

CORRELATION OF UNCONFINED COMPRESSIVE STRENGTH AND CONSISTENCY

CLAYS

Unconfined Compressive Strength Qu, tsf	Consistency
0.00 - 0.24	Very Soft
0.25 - 0.49	Soft
0.50 - 0.99	Medium Stiff
1.00 - 1.99	Stiff
2.00 - 3.99	Very Stiff
Over 4.00	Hard

KEY TO SYMBOLS

▼	Water Level - 24 hours or longer
▽	Water Level - at time of drilling
...	Estimated Stratum Change
BG	Bag Sample (test pit samples)
—	Stratum Change in Sample or End of Boring
SS	Split-Spoon Sample
SH	Shelby Tube Sample
AS	Auger Sample
Blow Counts	Number of blows required to drive a 2-inch O.D. 1⅜ inch ID split spoon sampler 18 inches in 6 inch increments with a 140 lb hammer falling 30 inches (ASTM D 1586)
N	Standard Penetration test value (sum of blow counts for 6-inch to 12-inch and 12-inch to 18-inch intervals)
GP	Geostick Penetration (in inches) which provides an estimate of the soil's relative density or consistency
DCP	Dynamic cone penetration (in blows/foot) which provides an estimate of the soil's relative density or consistency
PP	Pocket Penetrometer reading (in tons/square foot) which provides an estimate of the soil's unconfined compressive strength

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SOIL CLASSIFICATION

MAJOR COMPONENT			GROUP SYMBOL	GROUP NAME
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines	GW	Well graded gravel
			GP	Poorly graded gravel
		Gravels with Fines More than 12% fines	GM	Silty gravel
			GC	Clayey gravel
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines	SW	Well graded sand
			SP	Poorly graded sand
		Sands with fines More than 12% fines	SM	Silty sand
			SC	Clayey sand
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	inorganic	CL	Lean Clay
			ML	Silt
		organic	OL	Organic clay
				Organic silt
	Silts and Clays Liquid Limit 50 or more	inorganic	CH	Fat clay
			MH	Elastic silt
		organic	OH	Organic clay
				Organic silt
Highly organic soils			PT	Peat

MINOR COMPONENTS	
Gravelly	More than 30% coarse-grained with more gravel than sand
Sandy	More than 30% coarse-grained with more sand than gravel
With (sand and/or gravel)	Between 15% and 30% sand and/or gravel
With (silt or clay)	Between 5% and 15% silt or clay
Trace	Less than 5% of a minor component

MISCELLANEOUS TERMS	
FILL	Manmade deposit containing soil, rock and often foreign matter.
PROBABLE FILL	Soils which contain no visually detected foreign matter but which are suspect with respect to origin.
DISINTEGRATED ROCK	Residual rock material with a standard penetration resistance (SPT) between 60 blows per foot and refusal.
SPLIT SPOON REFUSAL	SPT of 100 blows for 2 inches or less penetration.
ROCK FRAGMENTS	Angular pieces of rock, distinguished from transported gravel, which are present in a soil matrix.
QUARTZ	A hard silica mineral often found in residual soils.
MICA	A soft plate of silica mineral found in many rocks, and in residual or transported soils derived therefrom.
CEMENTED SAND	Localized rock-like deposits composed of sand grains cemented by calcium carbonate or other materials.
TOP SOIL	Surface soils that support plant life and which contain considerable amounts of organic matter.
ORGANIC MATTER	Soil containing organic colloids throughout its structure.
BOULDERS & COBBLES	Boulders are considered rounded pieces of rock larger than 6 inches, while cobbles range from 3 to 6 inches in size.
LENSES	0 to ½ inch seam of minor soil component.
LAYERS	½ to 12 inch seam of minor soil component.
POCKETS	Discontinuous body of minor soil components.
COLOR SHADES	Light or dark to indicate substantial differences in color.
MOISTURE CONDITIONS	Wet, moist, or dry to indicate visual appearance of sample.

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HAND AUGER LOG OF: HA-1

Project Number: GT003596

Client:	Mitchell-Wilson Associates, P.C.	Logged By:	M. Prowell
Project:	Mill Creek/Lake Powell Basin 730	Excavation Method:	3" Auger Bucket;
Location:	James City County, Virginia	Start Date:	March 15, 1996
North:	East:	Completion Date:	March 15, 1996
Total Depth: 5.0	Elevation GS: 50.0	H2O Encountered:	

Samp ID	PP (tsf)	GP (in)	DCP (blow/in)	Depth Scale	SOIL DESCRIPTION (USCS)	Stratum Elev	Moisture Content %	H_2O	Remarks
					4" Topsoil.	49.6			
					Yellow-brown, SILTY SAND, trace organic matter and plant roots; moist (SM).				Stratum 2
BAG1		1.3"			Same as above, trace plant roots and fine gravel.				
BAG2		0.8"		2	Same as above, no plant roots.				
BAG3		0.5"			Orange-brown and yellow-brown, SILTY SAND; wet (SM).			▽	
						46.0			
BAG4		1.3"		4	Orange-brown and yellow-brown, medium, POORLY GRADED SAND WITH SILT; wet (SP-SM).	45.5			
					Orange-brown, CLAYEY SAND WITH GRAVEL; wet (SC).	45.0			
BAG5		1"			Hand auger terminated at 5'. Backfilled with cuttings.				
				6					
				8					
				10					

COMBINED TECHNOLOGIES, INC.

HAND AUGER LOG OF: HA-2

Project Number: GT003596

Client:	Mitchell-Wilson Associates, P.C.	Logged By:	R. Jones
Project:	Mill Creek/Lake Powell Basin 730	Excavation Method:	3" Auger Bucket;
Location:	James City County, Virginia	Start Date:	March 15, 1996
North:	East:	Completion Date:	March 15, 1996
Total Depth: 6.5	Elevation GS: 46.0	H2O Encountered:	

Samp ID	PP (tsf)	GP (in)	DCP (blow/in)	Depth Scale	SOIL DESCRIPTION (USCS)	Stratum Elev	Moisture Content %	H_2O	Remarks
					4" Topsoil.	45.6			
					Light gray with orange-brown mottles, CLAYEY SAND; wet (SC).	44.0		▽	Stratum 2
BAG1		2.3"							
BAG2		1.5"		2	Light green-gray with orange-brown mottles, medium to coarse, CLAYEY SAND; wet (SC).	41.5			Stratum 3
		4"							
BAG3		0.5"		4					
					Orange-brown, CLAYEY SAND; wet (SC).	39.5			
BAG4		0.5"							
BAG5		1"		6	Orange-brown with light gray mottles, CLAYEY SAND; wet (SC).				
					Hand auger terminated at 6.5'. Backfilled with cuttings.				Auger refusal at 6.5' due to caving.
				8					
				10					

COMBINED TECHNOLOGIES, INC.

HAND AUGER LOG OF: HA-3

Project Number: GT003596

Client:	Mitchell-Wilson Associates, P.C.	Logged By:	R. Jones
Project:	Mill Creek/Lake Powell Basin 730	Excavation Method:	3" Auger Bucket;
Location:	James City County, Virginia	Start Date:	March 15, 1996
North:	East:	Completion Date:	March 15, 1996
Total Depth: 10.0	Elevation GS: 43.0	H2O Encountered:	

Samp ID	PP (tsf)	GP (in)	DCP (blow/in)	Depth Scale	SOIL DESCRIPTION (USCS)	Stratum Elev	Moisture Content %	H_2O	Remarks
					Yellow-brown, SILTY SAND; wet (SM).	42.0		▽	Stratum 1
		42"			Dark brown, ORGANIC SILT; wet (OL).	38.0			
				2					
				4					
BAG1		0"			Light gray, POORLY GRADED SAND WITH CLAY; wet (SP-SC).	37.0			Stratum 2
				6					
BAG2		0"			Light green-gray, CLAYEY SAND, trace fine gravel; wet (SC).	35.5			Stratum 3
		0"							
				8	Light green-gray, CLAYEY SAND WITH GRAVEL; wet (SC).	34.0			
BAG3		0"							
BAG4		0"			Light green-gray and tan, CLAYEY SAND WITH GRAVEL AND SHELLS; wet (SC).	33.0			
				10					
BAG5		0.3"			Hand auger terminated at 10'. Backfilled with cuttings.				

COMBINED TECHNOLOGIES, INC.

HAND AUGER LOG OF: HA-4

Project Number: GT003596

Client:	Mitchell-Wilson Associates, P.C.	Logged By:	R. Jones
Project:	Mill Creek/Lake Powell Basin 730	Excavation Method:	3" Auger Bucket;
Location:	James City County, Virginia	Start Date:	March 15, 1996
North:	East:	Completion Date:	March 15, 1996
Total Depth: 10.0	Elevation GS: 43.0	H2O Encountered:	

Samp ID	PP (tsf)	GP (in)	DCP (blow/in)	Depth Scale	SOIL DESCRIPTION (USCS)	Stratum Elev	Moisture Content %	H_2O	Remarks
		48"			Dark brown, ORGANIC SILT; wet (OL).				Stratum 1
				2					
				4		39.0			
BAG1		1.5"			Orange-brown and gray, coarse, POORLY GRADED SAND WITH CLAY; wet (SP-SC).				Stratum 2
						37.5			
BAG2		9"			Light green-gray with orange-brown mottles, medium, CLAYEY SAND; wet (SC).				Stratum 3
				6					
BAG3		30"							
				8					
						34.0			
BAG4					Orange-brown, CLAYEY SAND WITH GRAVEL AND SHELLS; wet (SC).				Medium dense based on resistance to augering
				10		33.0			
					Hand auger terminated at 10'. Backfilled with cuttings.				

COMBINED TECHNOLOGIES, INC.

HAND AUGER LOG OF: HA-5

Project Number: GT003596

Client:	Mitchell-Wilson Associates, P.C.	Logged By:	R. Jones
Project:	Mill Creek/Lake Powell Basin 730	Excavation Method:	3" Auger Bucket;
Location:	James City County, Virginia	Start Date:	March 15, 1996
North:	East:	Completion Date:	March 15, 1996
Total Depth: 8.0	Elevation GS: 42.5	H2O Encountered:	

Samp ID	PP (tsf)	GP (in)	DCP (blow/in)	Depth Scale	SOIL DESCRIPTION (USCS)	Stratum Elev	Moisture Content %	H_2O	Remarks
		66"			Dark brown, ORGANIC SILT; wet (OL).			▽	Stratum 1
				2					
				4					
						37.0			
					Light gray, CLAYEY SAND WITH GRAVEL; wet (SC).				Stratum 2
BAG1		2"		6					
						36.0			
					Light green-gray with orange-brown mottles, CLAYEY SAND WITH GRAVEL; wet (SC).				Stratum 3
BAG2		0.5"							
						34.5			
		0.3"		8	Hand auger terminated at 8'. Backfilled with cuttings.				Auger refusal at 8'
				10					

COMBINED TECHNOLOGIES, INC.

HAND AUGER LOG OF: HA-6

Project Number: GT003596

Client:	Mitchell-Wilson Associates, P.C.	Logged By:	R. Jones
Project:	Mill Creek/Lake Powell Basin 730	Excavation Method:	3" Auger Bucket;
Location:	James City County, Virginia	Start Date:	March 15, 1996
North:	East:	Completion Date:	March 15, 1996
Total Depth: 10.0	Elevation GS: 42.0	H2O Encountered:	

Samp ID	PP (tsf)	GP (in)	DCP (blow/in)	Depth Scale	SOIL DESCRIPTION (USCS)	Stratum Elev	Moisture Content %	H_2O	Remarks
		96"			Dark brown, ORGANIC SILT; wet (OL).			▽	Stratum 1
				2					
				4					
				6		36.0			
					Black, fine, CLAYEY SAND; wet (SC).				
BAG1		12"		8					
BAG2		0"				32.5			
					Light yellow-orange, CLAYEY SAND WITH GRAVEL AND SHELLS; wet (SC).	32.0			Stratum 3
BAG3		0"		10	Hand auger terminated at 10'. Backfilled with cuttings.				

COMBINED TECHNOLOGIES, INC.

HAND AUGER LOG OF: HA-7

Project Number: GT003596

Client:	Mitchell-Wilson Associates, P.C.	Logged By:	M. Prowell
Project:	Mill Creek/Lake Powell Basin 730	Excavation Method:	3" Auger Bucket;
Location:	James City County, Virginia	Start Date:	March 15, 1996
North:	East:	Completion Date:	March 15, 1996
Total Depth: 5.0	Elevation GS: 46.0	H2O Encountered:	

Samp ID	PP (tsf)	GP (in)	DCP (blow/in)	Depth Scale	SOIL DESCRIPTION (USCS)	Stratum Elev	Moisture Content %	H_2O	Remarks
					Yellow-brown, fine, SILTY SAND, trace crushed stone; moist (FILL).	45.3			
BAG1		0.3"			Yellow-brown with orange-brown mottles, fine, CLAYEY SAND; moist (SC).	44.5			Stratum 2
BAG2		0.5"		2	Yellow-brown and orange-brown with light gray mottles, SANDY LEAN CLAY; moist (CL).				
BAG3		1"				42.5		▽	
BAG4		1.3"		4	Orange-brown with light gray mottles, medium to coarse, CLAYEY SAND; wet (SC).	41.0			
BAG5		1"			Hand auger terminated at 5'. Backfilled with cuttings.				
				6					
				8					
				10					

COMBINED TECHNOLOGIES, INC.

HAND AUGER LOG OF: HA-8

Project Number: GT003596

Client:	Mitchell-Wilson Associates, P.C.	Logged By:	C. Poulson
Project:	Mill Creek/Lake Powell Basin 730	Excavation Method:	3" Auger Bucket;
Location:	James City County, Virginia	Start Date:	August 30, 1996
North:	East:	Completion Date:	August 30, 1996
Total Depth: 5.0	Elevation GS: 43.0	H2O Encountered:	

Samp ID	PP (tsf)	GP (in)	DCP (blow/in)	Depth Scale	SOIL DESCRIPTION (USCS)	Stratum Elev	Moisture Content %	H_2O	Remarks
		15"			Dark brown, PEAT; wet (PT).	41.9			Stratum 1
BAG1					Brown, medium, CLAYEY SAND, trace organic matter; wet (SC).	39.6		▽	Stratum 2
BAG2		2"		2					
BAG3		0.25"			Light gray, fine to coarse, WELL GRADED SAND WITH CLAY; wet (SW-SC).	38.8			
BAG4		0.5"		4	Light gray, coarse, POORLY GRADED SAND; wet (SP).	38.0			
BAG5		1.25"			Hand auger terminated at 5'. Backfilled with cuttings.				
				6					
				8					
				10					

COMBINED TECHNOLOGIES, INC.

HAND AUGER LOG OF: HA-9

Project Number: GT003596

Client:	Mitchell-Wilson Associates, P.C.	Logged By:	C. Poulson
Project:	Mill Creek/Lake Powell Basin 730	Excavation Method:	3" Auger Bucket;
Location:	James City County, Virginia	Start Date:	August 30, 1996
North:	East:	Completion Date:	August 30, 1996
Total Depth: 5.0	Elevation GS: 45.0	H2O Encountered:	

Samp ID	PP (tsf)	GP (in)	DCP (blow/in)	Depth Scale	SOIL DESCRIPTION (USCS)	Stratum Elev	Moisture Content %	H_2O	Remarks
		10"			Dark brown, SILTY SAND, with organic matter; moist (ML).	44.5			Stratum 1
BAG1					Yellow-brown, POORLY GRADED SAND WITH SILT, trace fine gravel; moist (SP-SM).				Stratum 2
BAG2		3.5"		2		42.3			
BAG3		4.5"			Orange-brown, yellow-brown and light gray mottled, CLAYEY SAND; moist (SC).				
BAG4		2"		4		40.5			
					Orange-brown, medium to coarse, CLAYEY SAND; wet (SC).	40.0		▽	
BAG5		0.75"			Hand auger terminated at 5'. Backfilled with cuttings.				
				6					
				8					
				10					

APPENDIX B

- GRADATION CURVES (3)

	Specimen ID / Depth		Classification	MC%	LL	PL	PI	Cc	Cu
●	HA8	2.0	SILTY SAND (SM)	27.0	NP	NP	NP		
⊠	TP-1	2.0	PEAT (PT)	820.0	380	140	240		
▲	TP-1	3.0	ORGANIC SILT (OH)	111.0	87	38	49		

	Specimen ID / Depth		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	HA8	2.0	9.50	0.21			0.5	66.0	33.5	
⊠	TP-1	2.0	4.75	0.49	0.089		0.0	73.0	27.0	
▲	TP-1	3.0	4.75				0.0	3.7	96.3	

COMBINED TECHNOLOGIES, INC.

GRADATION CURVES

PROJECT: Mill Creek/Lake Powell Basin 730

LOCATION: James City County, Virginia

JOB NO.: GT003596

DATE: September 1996

APPENDIX C

STABILITY AND SEEPAGE ANALYSES

- STEADY STATE SEEPAGE ANALYSIS
- STATIC AND EARTHQUAKE STABILITY ANALYSES UNDER STEADY STATE SEEPAGE
- RAPID DRAWDOWN STABILITY ANALYSIS

1 Mill Creek Dam

****

INPUT PROBLEM PARAMETERS

NUMBER OF NODES	127
NUMBER OF ELEMENTS	116
NUMBER OF DIFF MATERIALS	3
PROB OPTION (0=AXI-SYMM ,1=PLANE) ...	1
FIXED HEAD NODES (BC)	8
FIXED SEEPAGE NODES	0
FREE SURFACE SEEPAGE NODES	4
HR VALUE	.200D+01

****

INPUT MATERIAL PROPERTIES

MATL	K1S	K2S	ANG
1	.20D-02	.20D-02	.00D+00
2	.20D-05	.20D-05	.00D+00
3	.20D+03	.20D+03	.00D+00

INPUT NODAL DATA

NODE	X	Y
1	.0000D+00	.0000D+00
2	.0000D+00	.2000D+01
3	.0000D+00	.4000D+01
4	.0000D+00	.6000D+01
5	.0000D+00	.8000D+01
6	.1000D+02	.0000D+00
7	.1000D+02	.2000D+01
8	.1000D+02	.4000D+01
9	.1000D+02	.6000D+01
10	.1000D+02	.8000D+01
11	.1600D+02	.0000D+00
12	.1600D+02	.2000D+01
13	.1600D+02	.4000D+01
14	.1600D+02	.6000D+01
15	.1600D+02	.8000D+01
16	.1600D+02	.1000D+02
17	.2000D+02	.0000D+00
18	.2000D+02	.2000D+01
19	.2000D+02	.4000D+01
20	.2000D+02	.6000D+01
21	.2000D+02	.8000D+01
22	.2000D+02	.1000D+02
23	.2000D+02	.1133D+02
24	.2400D+02	.0000D+00
25	.2400D+02	.2000D+01
26	.2400D+02	.4000D+01
27	.2400D+02	.6000D+01
28	.2400D+02	.8000D+01
29	.2400D+02	.1000D+02
30	.2400D+02	.1133D+02
31	.2400D+02	.1267D+02
32	.2667D+02	.1133D+02
33	.2933D+02	.0000D+00
34	.2933D+02	.2000D+01
35	.2933D+02	.4000D+01
36	.2933D+02	.6000D+01
37	.2933D+02	.8000D+01
38	.2933D+02	.1000D+02
39	.2933D+02	.1133D+02
40	.2933D+02	.1267D+02
41	.2933D+02	.1444D+02
42	.3289D+02	.0000D+00
43	.3289D+02	.2000D+01
44	.3289D+02	.4000D+01
45	.3289D+02	.6000D+01
46	.3289D+02	.8000D+01
47	.3289D+02	.1000D+02
48	.3289D+02	.1133D+02
49	.3289D+02	.1267D+02

50	.3289D+02	.1444D+02
51	.4000D+02	.0000D+00
52	.4000D+02	.2000D+01
53	.4000D+02	.4000D+01
54	.4000D+02	.6000D+01
55	.4000D+02	.8000D+01
56	.4000D+02	.1000D+02
57	.4000D+02	.1133D+02
58	.4000D+02	.1267D+02
59	.4000D+02	.1444D+02
60	.4600D+02	.0000D+00
61	.4600D+02	.2000D+01
62	.4600D+02	.4000D+01
63	.4600D+02	.6000D+01
64	.4600D+02	.8000D+01
65	.4600D+02	.1000D+02
66	.4600D+02	.1133D+02
67	.4600D+02	.1267D+02
68	.4600D+02	.1444D+02
69	.5200D+02	.0000D+00
70	.5200D+02	.2000D+01
71	.5200D+02	.4000D+01
72	.5200D+02	.6000D+01
73	.5200D+02	.8000D+01
74	.5200D+02	.1000D+02
75	.5200D+02	.1133D+02
76	.5200D+02	.1267D+02
77	.5200D+02	.1444D+02
78	.5911D+02	.0000D+00
79	.5911D+02	.2000D+01
80	.5911D+02	.4000D+01
81	.5911D+02	.6000D+01
82	.5911D+02	.8000D+01
83	.5911D+02	.1000D+02
84	.5911D+02	.1133D+02
85	.5911D+02	.1267D+02
86	.5911D+02	.1444D+02
87	.6267D+02	.0000D+00
88	.6267D+02	.2000D+01
89	.6267D+02	.4000D+01
90	.6267D+02	.6000D+01
91	.6267D+02	.8000D+01
92	.6267D+02	.1000D+02
93	.6267D+02	.1133D+02
94	.6267D+02	.1267D+02
95	.6267D+02	.1444D+02
96	.6533D+02	.1133D+02
97	.6800D+02	.0000D+00
98	.6800D+02	.2000D+01
99	.6800D+02	.4000D+01
100	.6800D+02	.6000D+01
101	.6800D+02	.8000D+01
102	.6800D+02	.1000D+02
103	.6800D+02	.1133D+02
104	.6800D+02	.1267D+02
105	.7200D+02	.0000D+00
106	.7200D+02	.2000D+01
107	.7200D+02	.4000D+01
108	.7200D+02	.6000D+01
109	.7200D+02	.8000D+01
110	.7200D+02	.1000D+02
111	.7200D+02	.1133D+02
112	.7600D+02	.0000D+00
113	.7600D+02	.2000D+01
114	.7600D+02	.4000D+01
115	.7600D+02	.6000D+01
116	.7600D+02	.8000D+01
117	.7600D+02	.1000D+02
118	.8200D+02	.0000D+00
119	.8200D+02	.2000D+01
120	.8200D+02	.4000D+01
121	.8200D+02	.6000D+01
122	.8200D+02	.8000D+01
123	.8800D+02	.0000D+00
124	.8800D+02	.2000D+01
125	.8800D+02	.4000D+01
126	.8800D+02	.6000D+01
127	.8800D+02	.8000D+01

INPUT ELEMENT DATA

ELEMENT	CONNECTIVITY OF ELEMENT NODES #1	#2	#3	#4	MATERIAL
1	1	6	7	2	1
2	2	7	8	3	1
3	3	8	9	4	1
4	4	9	10	5	1
5	6	11	12	7	1
6	7	12	13	8	1
7	8	13	14	9	1
8	9	14	15	10	1
9	10	15	16	16	3
10	11	17	18	12	1
11	12	18	19	13	1
12	13	19	20	14	1
13	14	20	21	15	1
14	15	21	22	16	3
15	16	22	23	23	3
16	17	24	25	18	1
17	18	25	26	19	1
18	19	26	27	20	1
19	20	27	28	21	1
20	21	28	29	29	2
21	21	29	22	22	3
22	22	29	30	23	3
23	23	30	31	31	3
24	24	33	34	25	1
25	25	34	35	26	1
26	26	35	36	27	1
27	27	36	37	28	1
28	28	37	38	29	2
29	29	38	39	32	2
30	29	32	30	30	3
31	32	39	40	40	2
32	32	40	31	30	3
33	31	40	41	41	3
34	33	42	43	34	1
35	34	43	44	35	1
36	35	44	45	36	1
37	36	45	46	37	1
38	37	46	47	38	2
39	38	47	48	39	2
40	39	48	49	40	2
41	40	49	50	50	2
42	40	50	41	41	3
43	42	51	52	43	1
44	43	52	53	44	1
45	44	53	54	45	1
46	45	54	55	46	1
47	46	55	56	47	2
48	47	56	57	48	2
49	48	57	58	49	2
50	49	58	59	50	2
51	51	60	61	52	1
52	52	61	62	53	1
53	53	62	63	54	1
54	54	63	64	55	1
55	55	64	65	56	2
56	56	65	66	57	2
57	57	66	67	58	2
58	58	67	68	59	2
59	60	69	70	61	1
60	61	70	71	62	1
61	62	71	72	63	1
62	63	72	73	64	1
63	64	73	74	65	2
64	65	74	75	66	2
65	66	75	76	67	2
66	67	76	77	68	2
67	69	78	79	70	1
68	70	79	80	71	1
69	71	80	81	72	1
70	72	81	82	73	1
71	73	82	83	74	2
72	74	83	84	75	2
73	75	84	85	76	2
74	76	85	86	77	2
75	78	87	88	79	1

76	79	88	89	80	1
77	80	89	90	81	1
78	81	90	91	82	1
79	82	91	92	83	2
80	83	92	93	84	2
81	84	93	94	85	2
82	85	94	86	86	2
83	94	95	86	86	3
84	87	97	98	88	1
85	88	98	99	89	1
86	89	99	100	90	1
87	90	100	101	91	1
88	91	101	102	92	2
89	92	102	96	93	2
90	102	103	96	96	3
91	93	96	94	94	2
92	96	103	104	94	3
93	94	104	95	95	3
94	97	105	106	98	1
95	98	106	107	99	1
96	99	107	108	100	1
97	100	108	109	101	1
98	101	109	102	102	2
99	109	110	102	102	3
100	102	110	111	103	3
101	103	111	104	104	3
102	105	112	113	106	1
103	106	113	114	107	1
104	107	114	115	108	1
105	108	115	116	109	1
106	109	116	117	110	3
107	110	117	111	111	3
108	112	118	119	113	1
109	113	119	120	114	1
110	114	120	121	115	1
111	115	121	122	116	1
112	116	122	117	117	3
113	118	123	124	119	1
114	119	124	125	120	1
115	120	125	126	121	1
116	121	126	127	122	1

BOUNDARY CONDITIONS

NODE	PRESS HEAD	TOTAL HEAD
5	.644D+01	.144D+02
10	.644D+01	.144D+02
16	.444D+01	.144D+02
23	.311D+01	.144D+02
31	.178D+01	.144D+02
41	.000D+00	.144D+02
127	.000D+00	.800D+01
122	.000D+00	.800D+01

NODES ON THE FREE SURFACE OF SEEPAGE

117 111 104 95

****

NODAL HEADS

****

NODE	TOTAL HD	PRESS HD
1	.144D+02	.144D+02
2	.144D+02	.124D+02
3	.144D+02	.104D+02
4	.144D+02	.844D+01
5	.144D+02	.644D+01
6	.144D+02	.144D+02
7	.144D+02	.124D+02
8	.144D+02	.104D+02
9	.144D+02	.842D+01
10	.144D+02	.644D+01
11	.142D+02	.142D+02

12	.142D+02	.122D+02
13	.143D+02	.103D+02
14	.144D+02	.836D+01
15	.144D+02	.644D+01
16	.144D+02	.444D+01
17	.140D+02	.140D+02
18	.140D+02	.120D+02
19	.141D+02	.101D+02
20	.142D+02	.819D+01
21	.144D+02	.644D+01
22	.144D+02	.444D+01
23	.144D+02	.311D+01
24	.137D+02	.137D+02
25	.137D+02	.117D+02
26	.137D+02	.968D+01
27	.137D+02	.771D+01
28	.137D+02	.569D+01
29	.144D+02	.444D+01
30	.144D+02	.311D+01
31	.144D+02	.178D+01
32	.144D+02	.311D+01
33	.131D+02	.131D+02
34	.131D+02	.111D+02
35	.131D+02	.909D+01
36	.131D+02	.708D+01
37	.131D+02	.509D+01
38	.137D+02	.365D+01
39	.140D+02	.272D+01
40	.144D+02	.178D+01
41	.144D+02	.000D+00
42	.127D+02	.127D+02
43	.127D+02	.107D+02
44	.127D+02	.869D+01
45	.127D+02	.669D+01
46	.127D+02	.469D+01
47	.132D+02	.316D+01
48	.135D+02	.216D+01
49	.139D+02	.119D+01
50	.144D+02	-.606D-07
51	.119D+02	.119D+02
52	.119D+02	.990D+01
53	.119D+02	.790D+01
54	.119D+02	.590D+01
55	.119D+02	.390D+01
56	.120D+02	.202D+01
57	.121D+02	.758D+00
58	.121D+02	-.545D+00
59	.120D+02	-.242D+01
60	.112D+02	.112D+02
61	.112D+02	.923D+01
62	.112D+02	.723D+01
63	.112D+02	.523D+01
64	.112D+02	.323D+01
65	.113D+02	.126D+01
66	.113D+02	-.568D-01
67	.113D+02	-.137D+01
68	.113D+02	-.313D+01
69	.106D+02	.106D+02
70	.106D+02	.856D+01
71	.106D+02	.656D+01
72	.106D+02	.456D+01
73	.106D+02	.256D+01
74	.106D+02	.582D+00
75	.106D+02	-.728D+00
76	.106D+02	-.207D+01
77	.108D+02	-.361D+01
78	.976D+01	.976D+01
79	.976D+01	.776D+01
80	.976D+01	.576D+01
81	.976D+01	.376D+01
82	.976D+01	.176D+01
83	.978D+01	-.216D+00
84	.978D+01	-.155D+01
85	.991D+01	-.276D+01
86	.800D+01	-.644D+01
87	.937D+01	.937D+01
88	.937D+01	.737D+01
89	.936D+01	.536D+01
90	.937D+01	.337D+01
91	.936D+01	.136D+01

92	.936D+01	-.640D+00
93	.947D+01	-.186D+01
94	.800D+01	-.467D+01
95	.800D+01	-.644D+01
96	.800D+01	-.333D+01
97	.880D+01	.880D+01
98	.879D+01	.679D+01
99	.877D+01	.477D+01
100	.874D+01	.274D+01
101	.876D+01	.763D+00
102	.800D+01	-.200D+01
103	.800D+01	-.333D+01
104	.800D+01	-.467D+01
105	.845D+01	.845D+01
106	.843D+01	.643D+01
107	.838D+01	.438D+01
108	.826D+01	.226D+01
109	.800D+01	.692D-04
110	.800D+01	-.200D+01
111	.800D+01	-.333D+01
112	.822D+01	.822D+01
113	.820D+01	.620D+01
114	.816D+01	.416D+01
115	.808D+01	.208D+01
116	.800D+01	.541D-04
117	.800D+01	-.200D+01
118	.807D+01	.807D+01
119	.806D+01	.606D+01
120	.805D+01	.405D+01
121	.803D+01	.203D+01
122	.800D+01	.000D+00
123	.803D+01	.803D+01
124	.803D+01	.603D+01
125	.802D+01	.402D+01
126	.801D+01	.201D+01
127	.800D+01	.000D+00

****

VELOCITIES AT THE CENTER OF THE ELEMENTS

****

ELE	(X)-PERMEABILITY-	(Y)	VEL-X	VEL-Y	SATURATION
1	.200D-02	.200D-02	.956D-05	-.263D-05	.100D+01
2	.200D-02	.200D-02	.802D-05	-.737D-05	.100D+01
3	.200D-02	.200D-02	.541D-05	-.107D-04	.100D+01
4	.200D-02	.200D-02	.196D-05	-.130D-04	.100D+01
5	.200D-02	.200D-02	.500D-04	-.976D-05	.100D+01
6	.200D-02	.200D-02	.430D-04	-.290D-04	.100D+01
7	.200D-02	.200D-02	.283D-04	-.462D-04	.100D+01
8	.200D-02	.200D-02	.947D-05	-.512D-04	.100D+01
9	.200D+03	.200D+03	.312D-04	-.937D-04	.100D+01
10	.200D-02	.200D-02	.116D-03	-.157D-04	.100D+01
11	.200D-02	.200D-02	.113D-03	-.500D-04	.100D+01
12	.200D-02	.200D-02	.999D-04	-.948D-04	.100D+01
13	.200D-02	.200D-02	.448D-04	-.169D-03	.100D+01
14	.200D+03	.200D+03	.109D-03	-.174D-03	.100D+01
15	.200D+03	.200D+03	.687D-04	-.206D-03	.100D+01
16	.200D-02	.200D-02	.176D-03	-.125D-04	.100D+01
17	.200D-02	.200D-02	.186D-03	-.390D-04	.100D+01
18	.200D-02	.200D-02	.217D-03	-.710D-04	.100D+01
19	.200D-02	.200D-02	.309D-03	-.118D-03	.100D+01
20	.200D-05	.200D-05	.379D-06	-.759D-06	.100D+01
21	.200D+03	.200D+03	-.648D-04	-.254D-03	.100D+01
22	.200D+03	.200D+03	-.278D-04	-.950D-04	.100D+01
23	.200D+03	.200D+03	.922D-05	-.277D-04	.100D+01
24	.200D-02	.200D-02	.214D-03	-.447D-05	.100D+01
25	.200D-02	.200D-02	.219D-03	-.118D-04	.100D+01
26	.200D-02	.200D-02	.229D-03	-.126D-04	.100D+01
27	.200D-02	.200D-02	.228D-03	.715D-05	.100D+01
28	.200D-05	.200D-05	.260D-06	-.659D-06	.100D+01
29	.200D-05	.200D-05	.297D-06	-.596D-06	.100D+01
30	.200D+03	.200D+03	-.115D-04	.160D-04	.100D+01
31	.200D-05	.200D-05	.296D-06	-.593D-06	.100D+01
32	.200D+03	.200D+03	-.334D-05	-.114D-04	.100D+01
33	.200D+03	.200D+03	.738D-06	-.221D-05	.100D+01
34	.200D-02	.200D-02	.223D-03	-.331D-06	.100D+01

35	.200D-02	.200D-02	.223D-03	-.430D-06	.100D+01
36	.200D-02	.200D-02	.222D-03	.276D-06	.100D+01
37	.200D-02	.200D-02	.224D-03	-.392D-05	.100D+01
38	.200D-05	.200D-05	.251D-06	-.516D-06	.100D+01
39	.200D-05	.200D-05	.295D-06	-.546D-06	.100D+01
40	.200D-05	.200D-05	.323D-06	-.569D-06	.100D+01
41	.200D-05	.200D-05	.332D-06	-.663D-06	.100D+01
42	.200D+03	.200D+03	.341D-05	-.221D-05	.100D+01
43	.200D-02	.200D-02	.223D-03	-.418D-07	.100D+01
44	.200D-02	.200D-02	.223D-03	-.167D-06	.100D+01
45	.200D-02	.200D-02	.223D-03	-.445D-06	.100D+01
46	.200D-02	.200D-02	.223D-03	.461D-07	.100D+01
47	.200D-05	.200D-05	.272D-06	-.300D-06	.100D+01
48	.200D-05	.200D-05	.357D-06	-.297D-06	.100D+01
49	.200D-05	.200D-05	.440D-06	-.296D-06	.100D+01
50	.180D-05	.180D-05	.525D-06	-.251D-06	.000D+00
51	.200D-02	.200D-02	.223D-03	-.226D-07	.100D+01
52	.200D-02	.200D-02	.223D-03	-.516D-07	.100D+01
53	.200D-02	.200D-02	.223D-03	-.172D-08	.100D+01
54	.200D-02	.200D-02	.223D-03	-.192D-06	.100D+01
55	.200D-05	.200D-05	.239D-06	-.805D-07	.100D+01
56	.200D-05	.200D-05	.263D-06	-.638D-07	.100D+01
57	.186D-05	.186D-05	.254D-06	-.384D-07	.000D+00
58	.116D-05	.116D-05	.148D-06	.254D-07	.000D+00
59	.200D-02	.200D-02	.223D-03	.170D-08	.100D+01
60	.200D-02	.200D-02	.223D-03	-.876D-08	.100D+01
61	.200D-02	.200D-02	.223D-03	-.908D-07	.100D+01
62	.200D-02	.200D-02	.223D-03	.818D-07	.100D+01
63	.200D-05	.200D-05	.224D-06	-.296D-07	.100D+01
64	.200D-05	.200D-05	.225D-06	-.307D-07	.100D+01
65	.153D-05	.153D-05	.174D-06	-.106D-07	.000D+00
66	.200D-08	.200D-08	.197D-09	-.142D-09	.000D+00
67	.200D-02	.200D-02	.223D-03	.379D-08	.100D+01
68	.200D-02	.200D-02	.223D-03	.517D-07	.100D+01
69	.200D-02	.200D-02	.223D-03	.250D-06	.100D+01
70	.200D-02	.200D-02	.223D-03	-.330D-06	.100D+01
71	.200D-05	.200D-05	.224D-06	-.243D-07	.100D+01
72	.178D-05	.178D-05	.204D-06	-.134D-07	.000D+00
73	.120D-05	.120D-05	.128D-06	-.558D-07	.000D+00
74	.200D-08	.200D-08	.495D-09	.942D-09	.000D+00
75	.200D-02	.200D-02	.223D-03	.285D-06	.100D+01
76	.200D-02	.200D-02	.223D-03	.281D-06	.100D+01
77	.200D-02	.200D-02	.223D-03	-.546D-06	.100D+01
78	.200D-02	.200D-02	.224D-03	.352D-05	.100D+01
79	.200D-05	.200D-05	.233D-06	-.120D-07	.100D+01
80	.152D-05	.152D-05	.157D-06	-.606D-07	.000D+00
81	.200D-08	.200D-08	.625D-09	.100D-08	.000D+00
82	.200D-08	.200D-08	.107D-08	.215D-08	.000D+00
83	.200D+00	.200D+00	.103D-07	-.206D-08	.000D+00
84	.200D-02	.200D-02	.214D-03	.446D-05	.100D+01
85	.200D-02	.200D-02	.220D-03	.118D-04	.100D+01
86	.200D-02	.200D-02	.230D-03	.125D-04	.100D+01
87	.200D-02	.200D-02	.229D-03	-.747D-05	.100D+01
88	.194D-05	.194D-05	.356D-06	.369D-06	.000D+00
89	.112D-05	.112D-05	.396D-06	.350D-06	.000D+00
90	.200D+00	.200D+00	.316D-06	-.272D-06	.000D+00
91	.200D-08	.200D-08	.110D-08	.220D-08	.000D+00
92	.200D+00	.200D+00	.206D-06	.628D-07	.000D+00
93	.200D+00	.200D+00	.151D-06	-.206D-08	.000D+00
94	.200D-02	.200D-02	.177D-03	.126D-04	.100D+01
95	.200D-02	.200D-02	.187D-03	.392D-04	.100D+01
96	.200D-02	.200D-02	.217D-03	.714D-04	.100D+01
97	.200D-02	.200D-02	.311D-03	.119D-03	.100D+01
98	.164D-05	.164D-05	.312D-06	.624D-06	.000D+00
99	.133D+03	.133D+03	.335D-05	.143D-03	.000D+00
100	.200D+00	.200D+00	.537D-07	-.126D-06	.000D+00
101	.200D+00	.200D+00	.102D-06	-.157D-06	.000D+00
102	.200D-02	.200D-02	.116D-03	.159D-04	.100D+01
103	.200D-02	.200D-02	.113D-03	.505D-04	.100D+01
104	.200D-02	.200D-02	.100D-03	.957D-04	.100D+01
105	.200D-02	.200D-02	.449D-04	.171D-03	.100D+01
106	.155D+03	.155D+03	.513D-03	.231D-04	.000D+00
107	.200D+00	.200D+00	.570D-06	.200D-07	.000D+00
108	.200D-02	.200D-02	.486D-04	.102D-04	.100D+01
109	.200D-02	.200D-02	.418D-04	.302D-04	.100D+01
110	.200D-02	.200D-02	.275D-04	.478D-04	.100D+01
111	.200D-02	.200D-02	.918D-05	.532D-04	.100D+01
112	.155D+03	.155D+03	.140D-02	-.121D-03	.000D+00
113	.200D-02	.200D-02	.102D-04	.391D-05	.100D+01
114	.200D-02	.200D-02	.844D-05	.110D-04	.100D+01

115	.200D-02	.200D-02	.574D-05	.159D-04	.100D+01
116	.200D-02	.200D-02	.214D-05	.193D-04	.100D+01

****

SEEPAGE QUANTITIES

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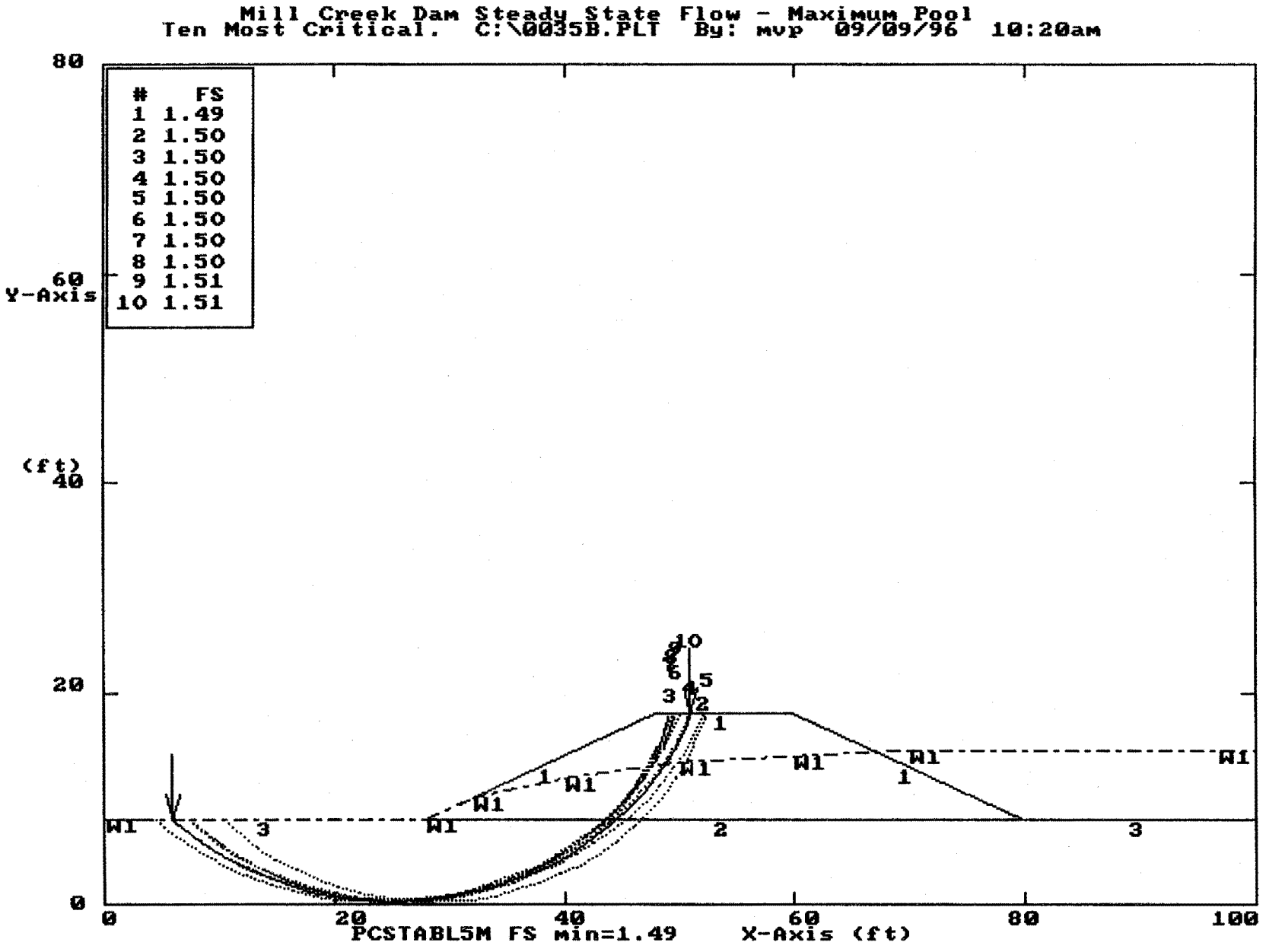
NODE	SEEPAGE
5	.499D-04
10	.243D-03
16	.717D-03
23	.672D-03
31	.933D-04
41	.129D-04
127	-.530D-04
122	-.173D-02

SEEPAGE IN= .179D-02 SEEPAGE OUT =-.179D-02


Mill Creek Dam Steady State Flow - Maximum Pool
Ten Most Critical. C:\0035B.PLT By: mvp 09/09/96 10:20am
FS
1 1.49
2 1.50
3 1.50
4 1.50
5 1.50
6 1.50
7 1.50
8 1.50
9 1.51
10 1.51
Y-Axis (ft)
80
60
40
20
0
0
20
40
60
80
100
W1
PCSTABL5M FS min=1.49
X-Axis (ft)

** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date: 09/09/96
Time of Run: 10:20am
Run By: mvp
Input Data Filename: 0035b.dat
Output Filename: 0035b.out
Plotted Output Filename: 0035b.plt

PROBLEM DESCRIPTION Mill Creek Dam
Steady State Flow - Maximum Pool

BOUNDARY COORDINATES

5 Top Boundaries
6 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	8.00	28.00	8.00	3
2	28.00	8.00	48.00	18.00	1
3	48.00	18.00	60.00	18.00	1
4	60.00	18.00	80.00	8.00	1
5	80.00	8.00	100.00	8.00	3
6	28.00	8.00	80.00	8.00	2

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Pie Surfa No.
1	120.0	130.0	200.0	30.0	.00	.0	0
2	115.0	125.0	.0	25.0	.00	.0	0
3	70.0	100.0	50.0	.0	.00	.0	0

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 8 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	8.00
2	28.00	8.00
3	32.00	10.00
4	40.00	12.00
5	50.00	13.50
6	60.00	14.00

7	70.00	14.50
8	100.00	14.50

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

400 Trial Surfaces Have Been Generated.

20 Surfaces Initiate From Each Of 20 Points Equally Spaced Along The Ground Surface Between X = .00 ft.
and X = 28.00 ft.

Each Surface Terminates Between X = 48.00 ft.
and X = 60.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .00 ft.

2.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

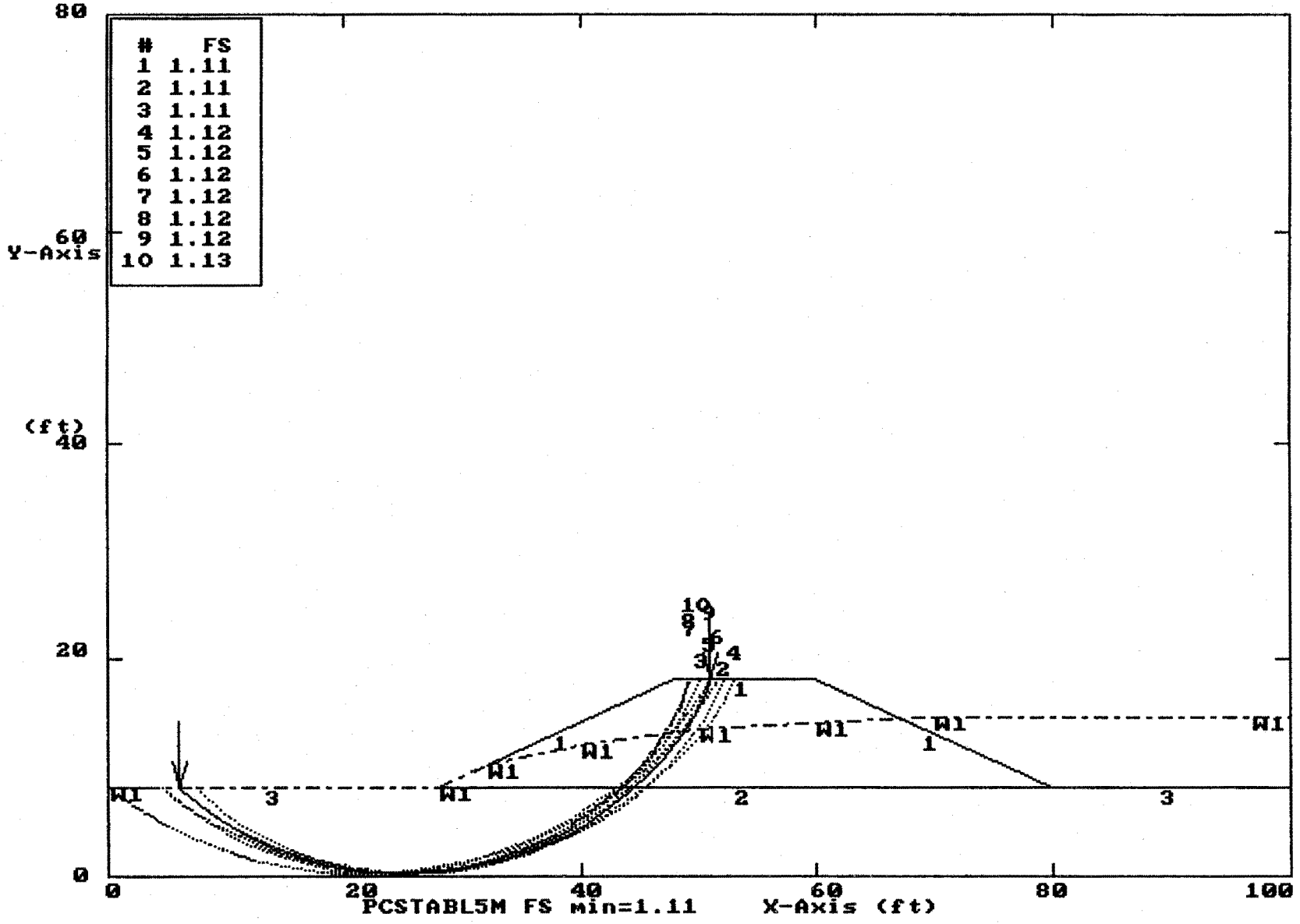
* * Safety Factors Are Calculated By The Modified Janbu Method *

Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	5.90	8.00
2	7.37	6.65
3	8.93	5.40
4	10.59	4.28
5	12.32	3.27
6	14.12	2.40
7	15.97	1.66
8	17.88	1.05
9	19.82	.59
10	21.80	.26
11	23.79	.09
12	25.79	.05
13	27.79	.17
14	29.77	.42
15	31.73	.82
16	33.66	1.36
17	35.54	2.04
18	37.36	2.86
19	39.13	3.80
20	40.81	4.88
21	42.42	6.07
22	43.94	7.37
23	45.35	8.78
24	46.67	10.29
25	47.86	11.89
26	48.94	13.58
27	49.90	15.34
28	50.72	17.16
29	51.03	18.00

*** 1.494 ***

Mill Creek Dam Steady State Flow - Maximum Pool
Ten Most Critical. C:\0035BEQ.PLT By: mvp 09/09/96 10:25am



** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer's Method of Slices

Run Date: 09/09/96
Time of Run: 10:25am
Run By: mvp
Input Data Filename: 0035beq.dat
Output Filename: 0035beq.out
Plotted Output Filename: 0035beq.plt

PROBLEM DESCRIPTION Mill Creek Dam
Steady State Flow - Maximum Pool

BOUNDARY COORDINATES

5 Top Boundaries
6 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	8.00	28.00	8.00	3
2	28.00	8.00	48.00	18.00	1
3	48.00	18.00	60.00	18.00	1
4	60.00	18.00	80.00	8.00	1
5	80.00	8.00	100.00	8.00	3
6	28.00	8.00	80.00	8.00	2

1

ISOTROPIC SOIL PARAMETERS

3 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Pie Surfa No.
1	120.0	130.0	200.0	30.0	.00	.0	0
2	115.0	125.0	.0	25.0	.00	.0	0
3	70.0	100.0	50.0	.0	.00	.0	0

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 8 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	8.00
2	28.00	8.00
3	32.00	10.00
4	40.00	12.00
5	50.00	13.50
6	60.00	14.00

7	70.00	14.50
8	100.00	14.50

A Horizontal Earthquake Loading Coefficient
Of .100 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of .100 Has Been Assigned

Cavitation Pressure = .0 psf

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

400 Trial Surfaces Have Been Generated.

20 Surfaces Initiate From Each Of 20 Points Equally Spaced
Along The Ground Surface Between X = .00 ft.
and X = 28.00 ft.

Each Surface Terminates Between X = 48.00 ft.
and X = 60.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

2.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method *

Failure Surface Specified By 29 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	5.90	8.00
2	7.37	6.65
3	8.93	5.40
4	10.59	4.28
5	12.32	3.27
6	14.12	2.40
7	15.97	1.66
8	17.88	1.05
9	19.82	.59
10	21.80	.26
11	23.79	.09
12	25.79	.05
13	27.79	.17
14	29.77	.42
15	31.73	.82
16	33.66	1.36
17	35.54	2.04
18	37.36	2.86
19	39.13	3.80
20	40.81	4.88
21	42.42	6.07
22	43.94	7.37
23	45.35	8.78
24	46.67	10.29
25	47.86	11.89

26	48.94	13.58
27	49.90	15.34
28	50.72	17.16
29	51.03	18.00

*** 1.110 ***

1Program STABRD - Version 2.84 (MS-DOS)

0STABRD - Mill Creek Dam

CONTROL DATA

NUMBER OF SPECIFIED CENTERS	0
NUMBER OF DEPTH LIMITING TANGENTS	3
NUMBER OF VERTICAL SECTIONS	9
NUMBER OF SOIL LAYER BOUNDARIES	4
SEISMIC COEFFICIENT	.00
UNIT WEIGHT OF WATER	62.40

SEARCH STARTS AT CENTER (80.0, 20.0),WITH FINAL GRID OF 2.0

SEARCH STARTS AT CENTER (80.0, 10.0),WITH FINAL GRID OF 2.0

SEARCH STARTS AT CENTER (75.0, 15.0),WITH FINAL GRID OF 2.0

ALL CIRCLES TANGENT TO DEPTH, 38.0, 34.0, 32.0,

SEARCH IS BASED ON BISHOP MODIFIED METHOD

GEOMETRY

SECTIONS	.0	18.0	20.0	40.0	52.0	62.0	72.0	74.0	100.0
T. CRACKS	30.0	30.0	30.0	20.0	20.0	25.0	30.0	30.0	30.0
W IN CRACK	30.0	30.0	30.0	20.0	20.0	25.0	30.0	30.0	30.0
BOUNDARY 1	30.0	30.0	30.0	20.0	20.0	25.0	30.0	30.0	30.0
BOUNDARY 2	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
BOUNDARY 3	38.0	38.0	30.0	30.0	30.0	30.0	30.0	38.0	38.0
BOUNDARY 4	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0

PORE PRESSURE DATA

COORDINATES OF PIEZOMETRIC SURFACE

SECTIONS	.0	18.0	20.0	40.0	52.0	62.0	72.0	74.0	100.0
LINE 1	30.0	30.0	30.0	26.0	24.0	23.5	30.0	30.0	30.0

0STRENGTH DATA
0
LAYER NO. 1
NO. OF KC ENVELOPES = 0
TOTAL UNIT WEIGHT = 130.00
COHESION INTERCEPT = 200.00
FRICTION ANGLE = 30.00
COHESION INTERCEPT(R) 200.00
FRICTION ANGLE (R) = 30.00
BREAK POINT STRESS = .00
UNIT WT. OPTION--XWT= 1.00
0
LAYER NO. 2
NO. OF KC ENVELOPES = 0
TOTAL UNIT WEIGHT = 100.00
COHESION INTERCEPT = .00
FRICTION ANGLE = 18.00
COHESION INTERCEPT(R) .00
FRICTION ANGLE (R) = 18.00
BREAK POINT STRESS = .00
UNIT WT. OPTION--XWT= 1.00
0
LAYER NO. 3
NO. OF KC ENVELOPES = 0
TOTAL UNIT WEIGHT = 125.00
COHESION INTERCEPT = 100.00
FRICTION ANGLE = 25.00
COHESION INTERCEPT(R) 100.00
FRICTION ANGLE (R) = 25.00
BREAK POINT STRESS = .00
UNIT WT. OPTION--XWT= 1.00
0STABRD - Mill Creek Dam

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	FS(BISHOP)	FS(OMS)

1	38.0	18.0	80.0	20.0	2.425	1.872
2	38.0	18.0	76.0	20.0	1.578	1.266
3	38.0	22.0	80.0	16.0	1.912	1.540
4	38.0	18.0	84.0	20.0	7.700	5.343
5	38.0	14.0	80.0	24.0	3.757	2.620
6	38.0	18.0	72.0	20.0	1.376	1.073
7	38.0	22.0	76.0	16.0	1.452	1.138
8	38.0	14.0	76.0	24.0	1.884	1.491
9	38.0	18.0	68.0	20.0	1.383	1.053
10	38.0	22.0	72.0	16.0	1.318	1.034
11	38.0	14.0	72.0	24.0	CENTER BELOW INTERPOLA	
12	38.0	22.0	70.0	16.0	1.323	1.048
13	38.0	24.0	72.0	14.0	1.310	1.051
14	38.0	22.0	74.0	16.0	1.362	1.063
15	38.0	20.0	72.0	18.0	1.343	1.045
16	38.0	24.0	70.0	14.0	1.327	1.076
17	38.0	26.0	72.0	12.0	1.314	1.076
18	38.0	24.0	74.0	14.0	1.335	1.058
19	38.0	26.0	70.0	12.0	1.340	1.108
20	38.0	26.0	74.0	12.0	1.324	1.071
21	38.0	22.0	74.0	16.0	1.362	1.063
22	38.0	22.0	70.0	16.0	1.323	1.048

F.S. MINIMUM= 1.310 FOR THE CIRCLE OF CENTER (72.0, 14.0)
0STABRD - Mill Creek Dam

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	FS(BISHOP)	FS(OMS)
1	34.0	24.0	80.0	10.0	2.489	2.443
2	34.0	24.0	76.0	10.0	1.573	1.456
3	34.0	28.0	80.0	6.0	2.132	2.032
4	34.0	24.0	84.0	10.0	16.580	15.094
5	34.0	20.0	80.0	14.0	3.369	3.198
6	34.0	24.0	72.0	10.0	1.354	1.255
7	34.0	28.0	76.0	6.0	1.529	1.441
8	34.0	20.0	76.0	14.0	1.653	1.576
9	34.0	24.0	68.0	10.0	1.390	1.277
10	34.0	28.0	72.0	6.0	1.381	1.295
11	34.0	20.0	72.0	14.0	1.366	1.252
12	34.0	24.0	70.0	10.0	1.348	1.244
13	34.0	26.0	72.0	8.0	1.363	1.270
14	34.0	24.0	74.0	10.0	1.434	1.339
15	34.0	22.0	72.0	12.0	1.359	1.255
16	34.0	24.0	68.0	10.0	1.390	1.277
17	34.0	26.0	70.0	8.0	1.371	1.275
18	34.0	22.0	70.0	12.0	1.332	1.219
19	34.0	22.0	68.0	12.0	1.365	1.242
20	34.0	22.0	72.0	12.0	1.359	1.255
21	34.0	20.0	70.0	14.0	1.328	1.207
22	34.0	20.0	68.0	14.0	1.348	1.212
23	34.0	20.0	72.0	14.0	1.366	1.252
24	34.0	18.0	70.0	16.0	1.338	1.208
25	34.0	22.0	68.0	12.0	1.365	1.242
26	34.0	22.0	72.0	12.0	1.359	1.255
27	34.0	18.0	72.0	16.0	1.373	1.239
28	34.0	18.0	68.0	16.0	1.344	1.195

F.S. MINIMUM= 1.328 FOR THE CIRCLE OF CENTER (70.0, 14.0)
0STABRD - Mill Creek Dam

NUMBER	TANGENT	RADIUS	(X) CENTER	(Y) CENTER	FS(BISHOP)	FS(OMS)
1	32.0	17.0	75.0	15.0	2.166	2.294
2	32.0	17.0	71.0	15.0	1.549	1.494
3	32.0	21.0	75.0	11.0	1.967	1.972
4	32.0	17.0	79.0	15.0	13.100	12.974
5	32.0	13.0	75.0	19.0	2.714	2.824
6	32.0	17.0	67.0	15.0	1.491	1.394
7	32.0	21.0	71.0	11.0	1.546	1.507
8	32.0	13.0	71.0	19.0	1.574	1.605
9	32.0	17.0	65.0	15.0	1.566	1.434
10	32.0	19.0	67.0	13.0	1.495	1.406
11	32.0	17.0	69.0	15.0	1.493	1.428
12	32.0	15.0	67.0	17.0	1.511	1.410
13	32.0	19.0	65.0	13.0	1.581	1.465

14	32.0	19.0	69.0	13.0	1.485	1.422
15	32.0	15.0	69.0	17.0	1.496	1.419
16	32.0	15.0	65.0	17.0	1.572	1.423
17	32.0	21.0	69.0	11.0	1.484	1.422
18	32.0	19.0	71.0	13.0	1.546	1.501
19	32.0	21.0	67.0	11.0	1.515	1.434
20	32.0	23.0	69.0	9.0	1.500	1.442
21	32.0	21.0	71.0	11.0	1.546	1.507
22	32.0	23.0	67.0	9.0	1.545	1.471
23	32.0	23.0	71.0	9.0	1.529	1.486
24	32.0	19.0	71.0	13.0	1.546	1.501
25	32.0	19.0	67.0	13.0	1.495	1.406

F.S. MINIMUM= 1.484 FOR THE CIRCLE OF CENTER (69.0, 11.0)

APPENDIX D

EMBANKMENT DETAILS

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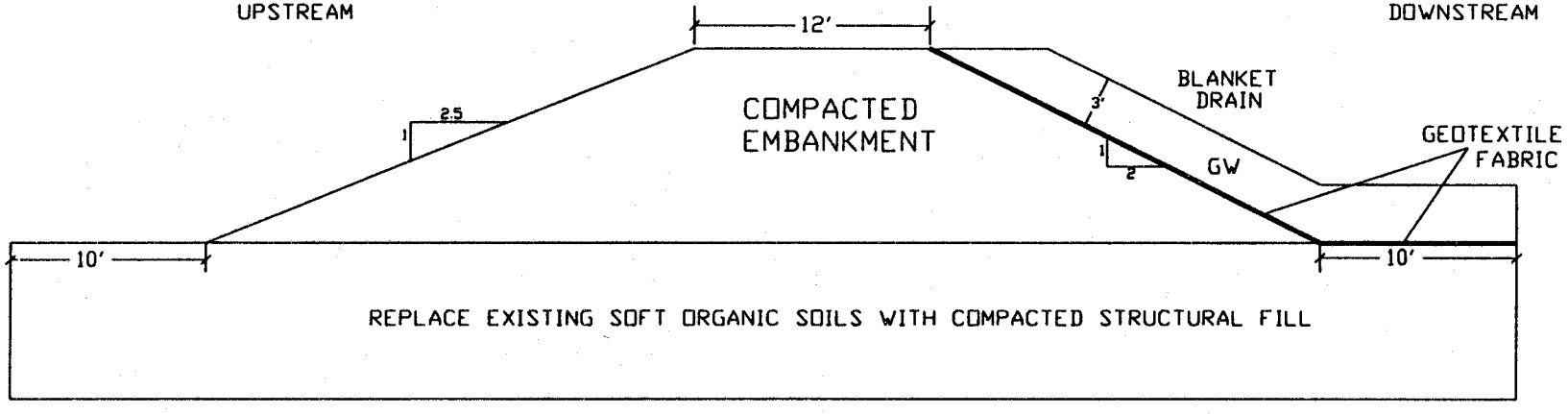
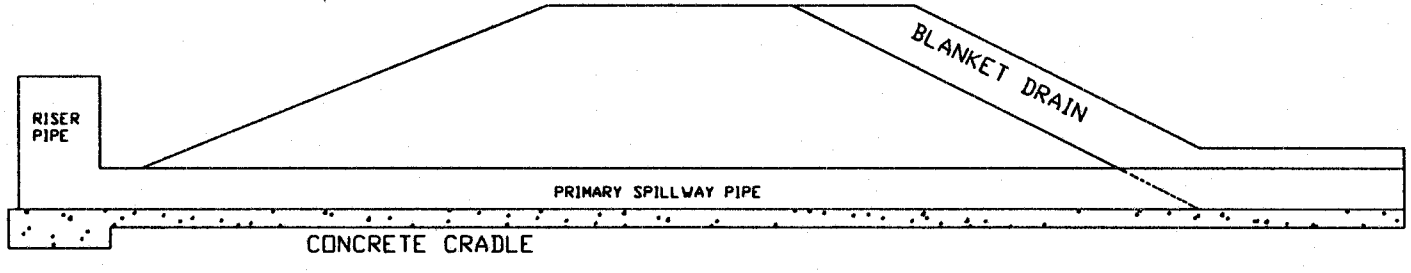
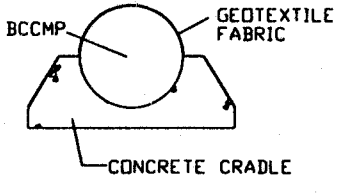


SUBGRADE IMPROVEMENT AND BLANKET DRAIN DETAILS



PRIMARY SPILLWAY DETAILS



PRIMARY SPILLWAY SECTION

COMBINED TECHNOLOGIES, INC.

CONSULTING ENGINEERS COUNCIL

dsn: mvp	project #: GT003596	Mill Creek /Lake Powell Basin 730 James City Co., VA Embankment Details	FIG
dwn: mvp	file #: 0035d1.dwg		D1
appr: egd	date: September, 1996		

MC045_JCC_BASIN_VENTURE_LANE_WOODBURY_ASSOC - 062

Joe,
These should
help when you
do the Gov. land
reductions.
Joan

MC045_JCC_BASIN_VENTURE_LANE_WOODBURY_ASSOC - 064

Larry Smith –

concerned about species –

rare Sedge – Juncus

Lily family –

Below 60 contour

Legal status –

Not listed by State or Fed

but Candidate

CONTRACT DOCUMENTS
AND
DETAILED SPECIFICATIONS

FOR

JAMES CITY COUNTY
P.O. BOX 8784
WILLIAMSBURG, VIRGINIA 23187-8784

INVITATION FOR BID
98-B-0005
STORMWATER MANAGEMENT DETENTION BASIN CONSTRUCTION
MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STATE ROUTE 5 JOHN TYLER HIGHWAY

MARCH 18, 1997

JAMES CITY COUNTY MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORMWATER MANAGEMENT DETENTION BASIN

DIVISION 1

SECTION 01000- GENERAL CONDITIONS

PART 1-INSTRUCTIONS TO BIDDERS

A. Project

Earth fill dam and stormwater management detention facility construction on the north side of John Tyler Highway, State Route 5, immediately east of Venture Lane, beginning at project centerline Station 0+00 and extending in an easterly direction to project centerline Station 2+99.64. This project consists of clearing, excavation, undercutting and hydraulic displacement of subgrade soils, preparation of subgrade, dewatering, backfill and compaction, principal spillway and emergency spillway construction, erosion and sediment control, spoil removal and disposal, final grading and site restoration in James City County, Virginia, as outlined in the detailed specifications and as shown on the plans. All required permits will be acquired by the County. The constructions shall be turnkey and shall be in accordance with the Virginia Department of Transportation Road and Bridge Specifications, latest edition, the Virginia Erosion and Sediment Control Handbook, third edition, 1992 and other pertinent Federal, State and local regulations, specifications and ordinances.

B. Pre-Bid Conference

In order to assist the bidders in the preparation of their Bids, a non-mandatory pre-bid conference will be held prior to the Bids. During the conference, the meaning and intent of the Contract Documents will be discussed. Request for interpretation of the Contract Documents at the pre-bid conference should be submitted in writing. All questions that may alter the intent of the Contract Documents will be answered by Addenda, mailed or delivered to all parties recorded as having received the Bidding Documents.

C. Definitions

1. Terms used in these Instructions to bidders are defined and have the same meanings assigned to them in the General Conditions.

2. The term "Owner as used in the Contract Documents refers to James City County, P.O. Box 8784, Williamsburg, Virginia 23187-8784.

3. The term "Engineer" refers also to James City County. All inquiries during the bidding period should be addressed to Wayland Bass, County Engineer (804) 253-6678.

4. The term "Contractor" refers to the person or firm to whom an award is made to perform the Work under this Contract.

5. The term " Successful Bidder" means the lowest responsive, qualified, responsible bidder to whom the Owner (on the basis of the Owner's evaluation as herein provided) makes an award.

MC045_JCC_BASIN_VENTURE_LANE_WOODBURY_ASSOC - 067

JAMES CITY COUNTY
INVITATION FOR BID
98B-0005
STORMWATER MANAGEMENT DETENTION BASIN CONSTRUCTION
MILL CREEK/LAKE POWELLL DRAINAGE BASIN 730
STATE ROUTE 5 JOHN TYLER HIGHWAY

SEALED bids for **construction of an earth fill dam stormwater management detention facility located east of John Tyler Commercial Center and Office Park and Venture Lane, and north of John Tyler Highway, State Route 5** will be received in the Purchasing Office, James City County Government Center, P.O. Box 8784, 101-A Mounts Bay Road, Williamsburg, Virginia 23187-8784, (757) 253-6646, on August 27, 1997, until 2:00 p.m., local prevailing time at which time they will be publicly opened and read aloud.

The project consists of all work necessary to construct the earth dam, spillways and associated items as shown on the project plans.

A Pre-Bid Conference will be held at 11:00 a.m., on August 7, 1997, at the James City County Government Center, 101-E Mounts Bay Road, at which time Prospective Bidders may discuss the project with representatives of the Owner.

All work associated with this contract shall be completed within **200** consecutive calendar days of the date fixed by the Notice to Proceed.

Liquidated damages in the amount of $100.00 per day will be assessed for work not substantially completed within the time limits specified.

Copies of the Contract Bid Documents may be obtained at the Purchasing Office, James City County Government Center at the above address for a non-refundable fee of $25.00. Checks shall be made payable to **Treasurer, James City County.** Neither the OWNER nor any of its representatives shall be responsible for full or partial sets of Contract Documents, including addenda, obtained from any other source.

Plans and Specifications may be examined also at the Doge Plan Rooms and/or Bidders Exchange in Newport News, Norfolk, and Richmond, Virginia.

BID SECURITY: All bids must be accompanied by a certified check or Bid Bond in the amount of 5 percent (5%) of the total base bid, payable to **Treasurer, James City County,** and the contractor's EVIDENCE OF REGISTRATION per Title 54.1-1100 et. seq., Chapter 11 Contractors, Code of Virginia.

NO BID shall be withdrawn for a period of 60 days after BID opening. Withdrawal of bid shall be in accordance with the Virginia Public Procurement Act, Chapter 7, 11-54(I).

THE OWNER reserves the right to waive informalities and to reject any/or all bids and to award any bid considered to be in the best advantage of the County. The **Owner** also reserves the right to negotiate with the lowest responsive, responsible bidder should bids exceed available funds.

Rose M. King, CPPB
Purchasing Director

D. Familiarity With Proposed Work

It is the responsibility of the Bidder, by careful personal examination of the site, to satisfy himself as to the nature and location of the Work, the conformation of the ground, the location of underground utilities of any nature, the soil and rock conditions, and the character, quality and quantity of the materials which will be required. The Bidder shall examine carefully the proposed Contract, Drawings, Specifications and all other documents and data pertaining to the Project. The Bidder shall not at any time after the execution of the Agreement, make any claims whatsoever alleging insufficient data or incorrectly assumed conditions, nor shall he claim any misunderstanding with regard to the nature, conditions or character of the Work to be done under the Contract, and he shall assume all risks resulting from any changes in the conditions which may occur during the progress of the Work. Contractor shall be responsible for securing the work site and shall assume all risks of vandalism or other damage that may occur during construction.

E. Bid Opening Procedure

Sealed bids will be received on the attached Bid Form by the Owner at the location and until the time and date as stated in the Advertisement for Bids, and then at said place publicly opened and read aloud.

F. Method For Submitting Bids

1. Vendors may submit their Bid for the project by submitting the appropriate Bid form(s).

2. No bid will be considered unless submitted upon the Bid Form supplied for the Project. The blank spaces in the Bid Form shall be filled in completely and correctly, where indicated, for each and every item for which a description is given, and the Bidder must state the price(s) for which he proposes to do each part of the work contemplated, and the total amount for all parts included in any or all of the combinations of the work. In case of discrepancy, the written words shall be considered as being the bid price.

3. To demonstrate his qualification for the Project, each Bidder must be prepared to submit further written satisfactory evidence that he has sufficient experience, necessary capital, materials, machinery and skilled workmen to complete the Contract. If financial statements are required, they shall be of such date as the Owner shall determine and shall be prepared on a form acceptable to the Owner. The Owner may make such investigations as he deems necessary to determine the ability of the Bidder to perform the Work. The Owner's decision or judgment on these matters shall be final, conclusive and binding.

4. In evaluating Bids, the Owner shall consider the qualifications of the Bidders whether or not Bids comply with the prescribed requirements, and alternates and unit prices if requested in the Bid Forms. The Owner may consider the qualifications and experience of subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the Work as to which the identity of subcontractors and other persons and organizations must be

submitted as specified herein. The Owner may conduct such investigations as deemed necessary to establish the responsibility, qualifications and financial ability of the Bidders, proposed subcontractors and other persons and organizations to perform the work in accordance with the Contract Documents to the Owner's satisfaction and within the prescribed time. The Owner reserves the right to reject the bid of any bidder who does not pass any such evaluation to the Owner's satisfaction

G. Bid Security

No bid for any contract shall be considered unless accompanied by a certified check, bank cashier's check or Bid Bond in the form attached, payable to the owner in the amount not less than five percent (5%) of the Bid. Except for the Bid Security of the three lowest responsible bidders, all checks or Bid Bonds will be returned to the bidders on or before the tenth day subsequent to bid opening. Unless otherwise forfeited, the Bid Security of the three lowest responsible bidders will be returned within ten days after: 1) the expiration of the period during which the bids may not be withdrawn, as set out in the advertisement for Bids; or 2) upon furnishing of the required Payment and Performance Bonds, the execution and delivery to the Owner of the Agreement, and compliance with the insurance requirements by the lowest responsible bidder, whichever event occurs first.

H. Surety

All bonds submitted as Bid Security, and Performance and Payment Bonds submitted by a bidder to whom notification of Intent to Award a contract has been given, shall be executed by surety companies legally authorized to do business in Virginia. Such surety companies shall also be named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Accounts, U.S. Treasury Department, Washington, D.C.

I. Power of Attorney

Attorneys-In-Fact who sign Bid, Performance and Payment Bonds must file with each Bond a certified copy of their Power of Attorney to sign said Bonds, bearing the same date as the Bonds.

J. Delivery of Bids

It is the responsibility of the Bidder to deliver his Bid to the Owner prior to the time of bid opening, regardless of what medium he uses to deliver it, whether by mail or otherwise. No Bid shall be considered if it arrives after the time set for bid opening. Each bid shall be submitted in a sealed envelope. If forwarded by mail, the above-mentioned envelope shall be addressed as stated in the Advertisement for Bids and marked "Stormwater Management Detention Basin 730 - Route 5, John Tyler Highway IFB 98-B-0005."

K. Rejection of Bids

The right is reserved by the Owner at his discretion to reject any or all bids or parts thereof. Bids may be rejected if they show any omission, alteration of form, additions or deductions not called for, conditional or uninvited alternate bids, or irregularities of any kind; however, the Owner also reserves the right to waive defects or informalities on bids.

L. Estimated Quantities

Any estimates of quantities herein furnished by the Engineer are approximate. They have been used by the Engineer as a basis for estimating the cost of work, and will also be used for the purpose of tabulating and comparing bids and awarding the Contract. The County has estimated these quantities; the information shown in the Bid Documents is for unit price comparison only. Such estimates shall not give rise to any responsibility of the Engineer hereinafter precluded in the General Conditions. The County does not guarantee the quantities shown in the bid documents, and reserves the right to award a contract for any portion of the total project.

M. Unit Prices

1. In the event there is a discrepancy between the unit prices and the extended totals, the unit prices shall govern. In the event there is a discrepancy between prices written in words and written figures, the prices written in words shall govern. In case of error in the Bidder's extended summation, the computed total of the Engineer shall govern. The total amount of the summation of Bid extension shall be the basis of awarding the contract to the lowest responsible bidder.

2. Should the lowest responsible bid exceed the funds budgeted for project construction, the Owner reserves the right to negotiate with the lowest responsible bidder in the best interest of the Owner.

N. Sham or Collusive Bids

The bids of any bidder or bidders who engage in collusive bidding shall be rejected. Any bidder who submits more than one bid in such manner as to make it appear that the bids submitted are on a competitive basis from different parties shall be considered a collusive bidder.

O. Addenda and Interpretations

No interpretation of the meaning of the Drawings, Specifications or other Contract Documents will be made to any bidder orally. Every request for such interpretation shall be in writing to the Engineer, and to be given consideration, must be received at least five (5) days prior to bid opening. Any and all such interpretation will be in the form of an Addenda to the Contract Documents, and will be mailed to the prospective bidders at the addresses furnished by them not later than three (3) days prior to the bid opening. Failure of any bidder to receive such addendum or interpretation shall not relieve any bidder from his obligation under the Bid as submitted.

P. Performance and Payment Bonds

The bidder to whom the Contract is to be awarded must, within ten (10) days after Notice of Award, provide Performance and Payment Bonds each in an amount equal to one hundred percent (100%) of the amount bid, for faithful performance of the Contract; to cover the payment in full of all materials furnished and labor supplied or performed; and also covering correction of defective workmanship and material during the guaranty period, and each executed by a surety company approved by the Owner and authorized to transact business in the state in which the Project is located.

Q. Award of Contract

If an award of Contract is made, it will be made to the lowest responsible bidder within sixty (60) days after bid opening.

R. Failure to Execute Contract

If the lowest responsible bidder to whom the Contract is awarded fails to give Bonds or execute the Contract within the time specified, the amount of the Bid Security shall be paid to the Owner as liquidated damages. In such case the Owner, at his discretion, may award the Contract to the next lowest responsible bidder, or reject all bids.

S. Notice to Proceed

Notice to Proceed (both verbal and written) shall be given by the Owner after execution of the Agreement, insurance policies, certificates and bonds. The Contractor shall begin the Work to be performed under this Contract on the date set by the Notice to Proceed. Failure to begin work within seven (7) days of such notification may be construed by the Owner as just cause for cancellation of the Contract. The project completion time shall be 200 consecutive calendar days from the date set by the Notice to Proceed.

T. Work by Owner

No work by forces of the Owner is presently anticipated. The Contractor shall provide all necessary labor, equipment, supplies and materials. The County will acquire all necessary permits and will pay all permit fees.

U. Progress Payments

The County may make monthly partial payments to the contractor on the basis of a duly certified and approved estimate of the work performed during the preceding calendar month as approved by the County. In making such payments, there shall be retained 5 percent (5%) of the amount of work completed until the project is complete.

V. Time of Essence

As the provisions hereof relating to the time for performance and completion of the Work are for the purpose of enabling the Owner to proceed with the construction of public improvements in accordance with preplanned programs, such provisions are of the essence.

W. Time for Completion

The number of days within which, or the date by which, the Work is to be completed (the Contract Time) is 200 consecutive calendar days.

X. Liquidated Damages

It is mutually understood and agreed by and between the parties to the contract that in the execution of the same, time is an essential element of the contract, and it is important that the work be pressed vigorously to completion.

2. If the Contractor shall neglect, fail or refuse to complete the work within the 200-day contract period, then for each calendar day that any work shall remain uncompleted after the end of the contract period, $100 will be assessed by James City County, not as a penalty, but as a predetermined and agreed liquidation damage.

3. The Owner has the right to deduct said liquidated damages from any money in the owner's hands, otherwise due, or to become due, to said Contractor, and to sue for and recover any additional compensation for damages for nonperformance of the Contract at the time stipulated and provided for in the Contract Documents.

4. The assessment of liquidated damages for failure to complete the work within the 200-day contract period shall not constitute a waiver of the owner's right to collect any additional damages which the owner may sustain by failure of the contractor to carry out the terms of the Contract.

Y. 'Or Equal' Materials and Equipment

1. Wherever in these Contract Documents a particular brand or make of material or equipment is named, such name is specified to establish a standard quality. Any other brand , make or material device or equipment which, in the opinion of the Engineer is the recognized equal of that specified, considering quality, workmanship and economy of operation and which will adequately perform the functions for which it was intended, will be accepted.

2. This acceptance will be given only when the successful contractor has shown to satisfaction of the Engineer that the proposed substitute is equal in materials, workmanship, finish and service to that called for in the specifications.

3. The determination as to whether or not a material , article or item of major equipment is acceptable and in the best interest of the Owner will rest solely with the Engineer.

Z. Prequalification of Materials

The Engineer will not pre-qualify any substitute materials or equipment submitted by the Bidders. Only substitute items submitted by the successful contractor or contractors after the date of the Contract Award will be considered by the Engineer.

AA. Safety and Health Regulations

The Contractor shall comply with the U.S. Department of Labor safety and health regulations for construction promulgated under the Occupational Safety and Health Act of 1970 as amended (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act as amended (PL 91-54).

BB. Copies of Documents Furnished Contractor

The Owner or his representative shall furnish to the successful Contractor five sets of Contract Documents, completely free of charge, for his use in executing the Work.

CC. Guaranty Period

The Contractor shall correct defective work performed under this Contract for a period of twelve months following date of Substantial Completion.

DD. Withdrawal of Bids

Except as otherwise permitted by law, bids shall remain irrevocable for the period stated in the Advertisement for Bids.

PART 2-SUPPLEMENTARY GENERAL CONDITIONS

A. Description

1. The " Standard General Conditions of the Construction Contract" prepared by the Engineer's Joint Contract Documents Committee," pages GC1 through GC33 inclusive, is a part of this Contract by reference. The following Supplementary General Conditions are also a part of the Contract.

2. In the event of conflict between the General Conditions and the Supplementary General Conditions, the provisions of the latter shall take precedence.

3. Where any article, paragraph or clause of the General Conditions is changed or deleted by these supplements, the unaltered provisions of that section, paragraph or clause shall remain in effect.

B. Specifications

The Specifications which are attached hereto contain bidding documents and technical provisions for all work. All work shall be in accordance with the Virginia Department of Transportation Road and Bridge Specifications, latest edition, the Virginia Erosion and Sediment Control Handbook, third edition, 1992 and other pertinent Federal, State and local regulations, specifications and ordinances.

C. Work Outside Regular Hours

The Contractor shall not work outside the regular hours of 7:00 AM to 5:00 PM, Monday through Saturday, or on Sundays or holidays without prior approval of the Engineer.

D. Availability of Contractor After Working Hours

The Contractor shall designate a representative and furnish a telephone number at which the representative may be contacted at any time after working hours. This representative shall be empowered and authorized to provide such personnel and equipment as may be required to remedy emergency situations which may develop after normal working hours or on weekends and holidays.

E. Unauthorized and Defective Work

1. Work done without lines and grades being given, work done beyond the limits authorized by the County, as given, except as herein provided, or any extra work done without authority will be considered as unauthorized, and work not done in conformity with the Specifications will be considered defective. Work considered by the Engineer to be defective will not be approved for payment until corrected.

2. All work which has been rejected or condemned shall be remedied, or if necessary, removed and replaced in a manner acceptable to the Engineer, by the Contractor, at the Contractor's expense. If the Contractor does not remedy, remove or replace as instructed by the Engineer after ten (10) days, such remedy, removal or replacement may be done by the Owner at the Contractor's expense.

F. Inspection

1. The Owner may appoint a Resident Engineer, together with such inspectors as he may deem necessary to inspect all materials and workmanship and to see that the work conforms with the Specifications and Drawings.

2. The failure of the Resident Engineer or inspectors to reject or condemn improper materials and workmanship shall not prevent the Owner from rejecting materials and workmanship found defective at any time prior to the final acceptance of the completed work, nor shall it be considered as a waiver of any defects which may be discovered later or as preventing the Owner at any time subsequently from recovering damages for work actually defective.

G. Electrical Power and Lighting

Temporary electrical power, if required during construction, shall be provided by each Contractor as required by him. This service shall be installed by a qualified electrical contractor. Lighting shall be provided by each Contractor where necessary for good and proper workmanship, for inspection or for safety.

H. Operations and Storage Areas

1. The Contractor shall hold and save the Owner free and harmless from liability of any nature or kind arising from any use, trespass or damage to property of persons occasioned by his operations during the construction of this project.

2. All items of equipment subject to the deleterious effects of weather or severity of conditions imposed by job storage shall be suitably packaged by the manufacturer of the equipment involved. Any materials damaged shall be removed from the site immediately.

I. Restoration

1. All private and public property disturbed in the process of construction shall be restored to the condition existing prior to construction. Proper notice shall be given to the owner and to the homeowners of any expected inconvenience or hazardous condition. Special care must be taken to prevent damage to trees and shrubs. Road surfaces adjacent to excavations shall be cleaned of soil with mechanical brooms at the end of the working day.

2. All surplus materials shall be disposed of in manner acceptable to the County, and the construction area shall be left in a neat condition. No machinery or equipment shall be left or stored on the job site after the project is completed.

J. Siltation and Erosion Control

Excavation, earthwork and construction shall be done in such a manner that there are no violations of the State of Virginia " Erosion and Sediment Control Handbook."

K. Progress Schedule

Not required for this contract.

L. Public Safeguards

The Contractor agrees to conduct the work at all times in such a manner that public travel shall not be inconvenienced needlessly, nor shall it be wholly obstructed at any point. He further agrees to be responsible for all legal notices and signal to the public of the state of the roads while the work is in progress, providing watchmen, barricades, red lights, danger and warning signs and other such precautions necessary to protect life and property. At least one lane shall

be open to vehicular traffic along traveled rights-of-way and shall be maintained at all times except as otherwise approved by the Engineer.

M. Safety

1. In accordance with generally accepted construction practices, and the requirements of OSHA, the Contractor will be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. The requirements will apply continuously and not be limited to normal working hours.

2. The duty of the Engineer to conduct construction review of the Contractor's performance is not intended to include review of the adequacy of the contractor's safety measures, in, on, or near the construction site.

N. Water

Water for construction and/or compaction activities shall be provided by the Contractor.

O. Release of Liens

The Owner, before making any payment, including the final payment, if he deems such procedure necessary to protect his interests, may require the Contractor to furnish a complete release of all liens arising out of this Contract, or receipts in full in lieu thereof and if required in either case, an affidavit that so far as he has knowledge or information, the releases and receipts include all the labor and material for which a lien could be filed. The Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner, to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all money that the latter may be compelled to pay in discharging such a lien. However, the Owner may make payments in part or in full to the Contractor without requiring the releases or receipts, and the payments so made shall not impair the obligations of any Surety or Sureties on any bond or bonds furnished under this Contract.

P. Liquidated Damages

See Division 1, Section 01000, Part 1, Paragraph X.

Q. Performance and Payment Bonds

The Contractor will furnish Performance and Payment Bonds as security for the faithful performance and payment of all his obligations under the contract documents. These Bonds shall be in amounts as shown in the Instructions to Bidders and in the form and with such sureties as are acceptable to the Owner. Prior to execution of the Contract Documents, the Owner may require the Contractor to furnish such other Bonds are required by written instructions given prior to opening of Bids, the premiums shall be paid by the Contractor, if subsequent thereto, they shall be paid by the Owner.

R. Contractor's Insurance

1. The Contractor shall purchase and maintain during the life of this contract such Comprehensive General Liability Insurance including product and completed operations liability insurance as will provide protection from Contractor's performance of the Work and Contractor's other obligations under the contract documents, whether such performance is by Contractor, or by subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. This coverage to include:

   Personal Injury Liability
   Broad Form Property Damage Liability, Including Completed Operations
   Blanket Contractual Liability on all Written Contracts
   Full XCU (Explosion, Collapse, and Underground Damage) Liability

2. Minimum combined single limit for both personal injury and property damage:

   $500,000.00 Each Occurance

3. The Contractor shall purchase and maintain during the life of this contract such comprehensive automobile liability insurance including employer's nonowner ship liability and hired car liability insurance to protect him and any subcontractors performing work covered by this Contract from claims for damages, whether such operations be by him or any subcontractor or by anyone directly or indirectly employed by either of them.

4. Minimum combined single limit for both bodily injury and property damage:

   $500,000.00

5. The Contractor shall purchase and maintain during the life of this Contract standard Worker's Compensation Insurance including employers liability coverage (Coverage B) with limits of at least $100,000 or as required by law, whichever is greater. A broad form all states endorsement should be attached.

6. The Contractor shall purchase and maintain during the life of this Contract such Umbrella Excess Third Party Liability, including personal injury, property damage, and advertising liability with umbrella coverage at least equal to that provided by the underlying liability insurance listed above.

   Limits of Liability: $1,000,000.00 Each Occupance
   $1,000,000.00 Aggregate
   $ 10,000.00 Self-Insured Retention

7. The Contractor shall file with the Owner and Engineer, as here in before required, satisfactory proof of acceptable insurance coverage. Such proof shall, unless otherwise required by the Owner, consist of the following:

a. Certificates of insurance on the insurance carrier's standard form indicating all policies required by law and the Contract documents. Certificates of insurance shall be furnished in a number of copies equal to the number of counterparts of the Contract documents executed. Each certificate shall carry the provision that the policy may not be canceled or materially changed except upon thirty (30) days written notice to the Owner and Engineer.

S. Equal Employment Opportunity

1. If the contract amount is $10,000 or less, the following conditions shall apply:

During the performance of this Contract, the Contractor agrees as follows:

a. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such actions shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Local Public Agency setting forth the provisions of this nondiscrimination clause.

b. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

c. The Contractor will cause the foregoing provisions to be inserted in all subcontracts for any work covered by this contract so that such provisions will be binding upon each subcontractor, provided that the foregoing provisions shall not apply to contracts or subcontracts for standard commercial supplies or raw materials.

2. If the contract amount exceeds $10,000, the following conditions shall apply:

During the performance of this Contract, the Contractor agrees as follows:

a. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin. Such actions shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of

compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this non discrimination clause.

b. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.

c. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or worker's representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

d. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and by rules, regulations, and relevant orders of the Secretary of Labor.

e. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations and orders of the Secretary, or pursuant thereto, and will permit access to his books, records, and accounts by the Treasury Department and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

f. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be concealed, terminated, or suspended in whole or in part and Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulations or order of the Secretary of Labor, or as otherwise provided by law.

g. The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such actions with respect to any subcontract or purchase order as the Treasury Department may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the

Treasury, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.

END OF SECTION

PART 3-DETAILED SPECIFICATIONS

A. Right-of-Way

1. Before beginning any work on this project, the contractor shall call Miss Utility of Virginia, 1-800-552-7001, to have any underground utilities located.

2. The Contractor shall coordinate the installation of the new work with each of the utility companies.

3. James City County will pay for and acquire the Virginia Department of Transportation permit and will make direct payment to VDOT for inspection costs. The contractor will be responsible for complying with the VDOT permit requirements and completing the work according to the terms of the contract.

4. All provisions set forth in the current Virginia Department of Transportation Road and Bridge Specifications are to be followed without exception.

5. No cleated equipment is to be allowed on the pavement at any time.

6. Signs shall be in accordance with the specifications of the Virginia Manual of Uniform Traffic Control Devices and erected prior to any work being performed on State right-of-way. The signs are to be located as directed by adequate lights, barricades, and construction signs at all times.

7. Traffic is not to be blocked or rerouted with out special written permission of the VDOT Engineer. Traffic shall at all times be properly protected by adequate lights, barricades, signs, and flagman.

8. No excavated or borrow material is to be placed on the pavement.

9. In the event that the roadway is damaged or marred in any respect, due to equipment working or hauling of material for the installation of the proposed work, the contractor will be required to restore the surface of the road in a manner suitable to the Virginia Department of Transportation without charge to the County.

B. Construction Stakeout

1. James City County will pay for and acquire one construction stakeout of the project at a time designated by the contractor. It is the responsibility of the contractor to preserve all construction stakeout points for the duration of the project. Replacing lost or destroyed stakeout points shall be the responsibility of the contractor.

END OF SECTION

JAMES CITY COUNTY MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORMWATER MANAGEMENT DETENTION BASIN

BID FORM

TO: Purchasing Director
James City County
P.O. Box 8784
101-A Mounts Bay Road
Williamsburg, Va 23187-8784

FROM: _____ (Name of Contractor)

_____ (Address of Contractor)

_____

FOR: Stormwater Management Detention Basin Mill Creek/Lake Powell Drainage Basin 730, State Route 5 - John Tyler Highway, James City County, Virginia 23185 IFB No. 98-B-0005

The undersigned, having visited the site of the above-referenced project, and having familiarized himself with local conditions affecting the cost of the work and with all requirements of the Contract Documents, and all Addenda to said Documents, hereby proposes to furnish all labor, equipment, materials and supervision necessary to perform and complete the following items of work in accordance with Specifications, Drawings and Contract Documents.

Bid Item		Estimated Quantity	Unit	Unit Cost	Total Amount
1.	Mobilization/Demobilization	1		$ LS	$ _____
2.	Clearing & Grubbing	0.51	AC	LS	_____
3.	Undercut excavation-hydraulic displacement	1,525	CY	LS	_____
4.	SM-SC Backfill & Compaction	3,825	CY	LS	_____
5.	Geotextile Filter Fabric	2,000	SY	_____	_____
6.	GP-GW Gravel Drainage Blanket	700	CY	_____	_____
7.	P300 Turf Reinforcement Mat	800	SY	_____	_____
8.	Topsoil-Permanent Seeding-Mulch	1		LS	_____
9.	Rip-Rap Stone Check Dam	27	CY	_____	_____
10.	Culvert Inlet Protection	2	EA	_____	_____
11.	Silt Fence	138	LF	_____	_____

JAMES CITY COUNTY MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORMWATER MANAGEMENT DETENTION BASIN

Bid Item		Estimated Quantity	Unit	Unit Cost	Total Amount
12.	Rip-Rap Stone Lined Channel incl. stone,excavation, bedding and filter fabric	103	LF	$_____	$ _____
13.	10' Wide Earth/Grass Lined Emergency Spillway Exit Channel	54	LF	_____	_____
14.	Triangular Principal Spillway Earth/Grass Lined Entrance Channel	13	LF	_____	_____
15.	10" ADS N-12 HDPE SOLID 10" ADS N-12 HDPE PERF 10" couplings and 10x 10 TEE	20 20	LF LF	_____	_____
16.	30" ADS N-12 HDPE Principal Spillway including watertight connection to riser assembly	54	LF	_____	_____
17.	30" ADS N-12 HDPE F.E.S.	1	EA	_____	_____
18.	48" ADS N-12 HDPE riser including stub outs and anti-floatation concrete	1	EA	_____	_____
19.	Trash Rack/Anti-Vortex Device, including grate	1	EA	_____	_____
20.	Concrete Cradle, 3000 psi	12	CY	_____	_____
21.	Dewatering/Well Pointing	1		LS	_____
22.	Geo-technical Engineering inspection, testing and certification services	1		LS	_____
	TOTAL BID				$ _____

In Words: _____

The Undersigned Agrees:

A. To hold bid open until 60 days after opening of bids.

B. To accept the stipulation of the Specifications regarding disposition of security, time for completion, liquidated damages and other provisions.

C. To enter into and execute a Contract, if awarded, on the basis of this bid and to furnish Guaranty Bonds and Insurance Documents as required.

D. To accomplish the work in accordance with the Contract Documents and Specifications.

E. To complete all work within 120 consecutive calendar days from the date of Notice to Proceed

The Bidder acknowledges receipt of the following addenda:

_____

_____

The undersigned certifies that he (they) are the only person (persons) interested in said bid and that it is made without connection with other persons submitting a bid on the same scope of services; that the bid is fair and made without collusion, fraud or reservation; that no official or employee of James City County or the James City Service Authority is directly or indirectly interested in said bid, or any portion thereof.

State Registration Number:

_____

_____

_____

Legal Name of Person, Persons or Corporation

By: _____

Titles: _____

Signature: _____

Business Address: _____

Telephone No.: _____ FAX: _____

Date: _____

Seal: _____

BIDDER'S EXPERIENCE

List of Completed projects ("COMPLETED" means accepted and final payment received from the Owner or authorized representative). List ALL projects completed by this bidder in excess of $100,000.00 during the last five years. This sheet may be copied if necessary.

Location & Type of Work	Owner's Name Address	Contact Person & Telephone	Date Complete	Contract Price
1				
2				
3				
4				
5				

BANK REFERENCE: _____

_____
(Authorized Signature)

_____
(Title)

_____
(Date)

Bid Bond

KNOW ALL MEN THESE PRESENTS, that we _____, hereinafter called Principal, as Principal, and the _____, a corporation duly organized under the laws of the State of _____ hereinafter called the Surety, as Surety, and are held and firmly bound unto _____ hereinafter called the Obligee, in the sum of _____ Dollars ($_____), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executor, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for _____
_____

THEREFORE, if the Obligee shall accept the bid of the Principal and Principal shall enter into a Contract with Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the bond or bonds, if the principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

SIGNED AND SEALED this _____ day of _____, 19_____.

In the presence of:

PRINCIPAL

_____ _____

WITNESS TITLE

_____ _____

WITNESS SURETY (SEALED)

IMPORTANT: Surety Companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

CONTRACT FORM
CONSTRUCTION CONTRACT
CONTRACT NUMBER: _____

This AGREEMENT, dated this___ day of _____, 19___ , by and between JAMES CITY COUNTY (a COUNTY organized and existing under the laws of the State of Virginia); and (a corporation organized and existing under the laws of the State of _____ ; or a partnership consisting of _____; or and individual trading under the above name), hereinafter called the CONTRACTOR.

WITNESSETH: The Owner and Contractor, for the consideration stated herein, agree as follows:

Scope of Work

The Contractor shall perform all required work and shall provide and furnish all labor, materials, necessary tools, expendable equipment and utility and transportation service required to complete the construction of:

_____

_____

all in strict accordance with the Plans and Specifications, including any and all Addenda, and in strict compliance with the Contract Documents hereinafter enumerated.

It is understood and agreed that said labor, materials, tools, equipment and service shall be furnished and said work performed and completed under the direction and supervision of the Contractor and subject to the approval of the Owner or its authorized representatives.

Guarantee:

All materials and equipment, furnished by this Contractor, and all construction involved in this Contract shall be and the same hereby guaranteed by the Contractor free from defects owing to faulty materials or workmanship for a period of one year after date of substantial completion of the work. All work which proves defective, by reason of faulty material or workmanship within said period of one year, shall be replaced by the Contractor free of cost to the Owner.

Contract Price:

The owner shall pay the Contractor as just compensation for the performance of this Contract, subject to any addition or deductions as provided in the Contract Documents, the lump sum price as contained in the Bid Schedule attached hereto.

THE BID SCHEDULE OF THE SUCCESSFUL BIDDER

SHALL BE CONFORMED AND INSERTED HEREIN

TO BECOME PART OF THE COMPLETED CONTRACT DOCUMENTS

The Contract Amount is _____
($_____) based upon lump sum price as herein contained.

Payments:

The Owner will pay to the Contractor in the manner and at such times as set forth in the General Conditions such amounts as required by the Contract Documents.

Time:

the undersigned Contractor agrees to commence work within ten (10) calendar days after the date of Notice to Proceed and further agrees to complete the Contract Work within the following specified time limits:

ALL CONTRACT WORK- _____CALENDAR DAYS FROM DATE OF NOTICE TO PROCEED

THIS AGREEMENT SHALL BE BINDING UPON ALL PARTIES HERETO AND THEIR RESPECTIVE HEIRS, EXECUTORS, ADMINISTRATORS, SUCCESSORS, AND ASSIGNS.

Component Parts of the Contract:

This Contract consists of the following component parts, all of which are hereby made a part hereof as if herein set out in full:

1. Advertisement for Bids
2. Request for Bids
3. Information for Bidders
4. Supplemental Information for Bidders
5. Bid Proposal
6. Bid Bond
7. Construction Contract
8. General Conditions
9. Supplemental General Conditions
10. Payment Bond
11. Performance Bond
12. Certificate of Insurance
13. Contractor's License (if required)
14. Notice of Award
15. Notice to Proceed
16. Corporate Resolution (for corporations only)
17. Change Orders (if any)
18. Other Documents as may be required by law or appended hereto
19. Plans and Drawings were prepared by: _____; and are Numbered: _____ through _____ and dated _____, 19___.
20. Specifications prepared or issued by : _____ and dated_____, 19___.

ADDENDA:

No.: _____, dated _____, 19_____

No.: _____, dated _____, 19_____

No.: _____, dated _____, 19_____

No.: _____, dated _____, 19_____

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the day and year first above written in (_____) counterparts each of which shall for all purposes be deemed an original.

ATTEST:

_____	_____
NAME	OWNER
_____	_____
TITLE	BY
_____	_____
TITLE	ATTEST
_____	_____
NAME	CONTRACTOR
_____	_____
TITLE	BY
	_____
	TITLE

CONTRACTOR'S ADDRESS:

_____

_____

_____

CONTRACTOR'S FEDERAL I.D. #_____ COUNTY ATTORNEY- APPROVAL _____
_____ OF CONTRACT AS TO FORM

CONTRACT FORM

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that

_____

(Name of Contractor)

_____

(Address of Contractor)

a _____, hereafter called the Principal, and (Corporation, Partnership, or Individual)

_____

(Name of Surety)

_____

(Address of Surety)

hereafter called Surety, are held and firmly bound unto

_____

(Name of Owner)

_____

(Address of Owner)

hereinafter called Owner, in the penal sum of _____ Dollars, ($_____), in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by the presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain Contract with the Owner, dated the ____ day of _____, 19 ____, a copy of which is hereto attached and made a part hereto for the Construction of:

_____

_____

_____

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such Contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment, tools, consumed or used in connection with the construction of such Work, and all insurance premiums on said work, and for all labor, performed in such Work whether by Subcontract or otherwise, then this obligation shall be void: otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no charge, extension of time, alteration or addition to the terms of the Contract or to Work to be performed thereunder or the Specifications accompanying the same shall in any way affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Work or the Specifications.

PROVIDED, FURTHER, that no default settlement between the Owner and the Contractor shall bridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts each one of which shall be deemed an original, this the _____ day of _____, 19_____.

ATTEST:

_____	_____
(PRINCIPAL SECRETARY)	PRINCIPAL
_____	_____
SEAL	BY
_____	_____
WITNESS TO PRINCIPAL	ADDRESS
_____	
ADDRESS	

ATTEST:

_____	_____
(SURETY) SECRETARY	SURETY
_____	_____
SEAL	BY (ATTORNEY-IN-FACT)
_____	_____
WITNESS TO SURETY	ADDRESS
_____	
ADDRESS	

NOTE: Date of Bond must be prior to date of Contract. If Contractor is Partnership, all partners should execute Bond.

IMPORTANT: Surety Companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the project is located.

JAMES CITY COUNTY MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORMWATER MANAGEMENT DETENTION BASIN

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS, that we as Principal, and as Surety, are held and firmly bound unto James City County, Virginia, in the Penal sum of _____ Dollars ($_____) for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents. The condition of this obligation is such, that whereas the principal entered into a certain contract with James City County, Virginia, dated _____ _____, 19_____, for _____.

NOW, THEREFORE, if the principal shall promptly make payment to all persons supplying labor and material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void, otherwise to remain in full and virtue.

IN WITNESS WHEREOF, the above abounded parties have executed this instrument under their several seals this _____ day of _____, 19_____, in the name and corporate seal of such corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

In the Presence of:

_____ (SEAL)
(Individual Principal)

_____
(Business Address)

_____
(Corporate Principal)

Affix Corporate Seal

_____
(Business Address)

BY _____

ATTEST:

_____
(Corporate Principal)

Affix Corporate Seal

_____
(Business Address)

BY _____

The rate of premium on this bond is $ _____ per thousand

Total amount of premium charges $_____
(The above must be filled in by the corporate surety)

JAMES CITY COUNTY MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORMWATER MANAGEMENT DETENTION BASIN

RESERVED FOR CERTIFICATE OF INSURANCE
OR OTHER SATISFACTORY EVIDENCE OR REQUIRED COVERAGE

JAMES CITY COUNTY MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORMWATER MANAGEMENT DETENTION BASIN

NOTICE OF AWARD

TO: _____
_____
_____

PROJECT DESCRIPTION: _____
_____
_____
_____

The Owner has considered the BID submitted by you for the above-described Work in response to its advertisement dated _____, 19 ____ , and Information for Bidders.

You are hereby notified that your BID has been accepted for work in the amount of _____ _____ Dollars ($_____). You are required by the information for Bidder to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and Certificates of Insurance with in ten (10) calendar days from the date of this Notice to you. If you fail to execute said Agreement and to furnish said Bonds within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of you BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 19___.

OWNER: _____

BY: _____

TITLE: _____

ACCEPTANCE OF NOTICE

RECEIPT OF THE ABOVE NOTICE OF AWARD IS HEREBY ACKNOWLEDGED:

BY: _____ _____
CONTRACTOR

TITLE: _____

THIS THE _____ DAY OF _____, 19 ___.

JAMES CITY COUNTY MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORMWATER MANAGEMENT DETENTION BASIN

NOTICE TO PROCEED

TO: _____ DATE: _____
_____ PROJECT: _____

_____
_____
_____

You are hereby notified to commence WORK in accordance with the Agreement dated _____ _____, 19 ___, on or before _____ , 19___ , and you are to complete the WORK within consecutive calendar days thereafter. The date of completion of all WORK is therefore _____ 19___.

Liquidated damages in the amount of $_____ will be assessed by the Owner for failure to substantially complete the work on or before the date of completion stated above or as may be modified by duly executed change orders.

OWNER: _____

BY: _____

TITLE: _____

ACCEPTANCE OF NOTICE:

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

this the _____ day of
_____ ,19_____.

_____
CONTRACTOR

_____
BY

_____
TITLE

NOTE TO CONTRACTOR:
Please prepare and submit progress schedule within 14 days following date of Notice to Proceed and prepare and submit you schedule of values for lump sum contracts at least 10 days prior to the date of your first partial payment estimate.

JAMES CITY COUNTY MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORMWATER MANAGEMENT DETENTION BASIN

CONTRACT FORM
CONTRACT CHANGE ORDER

PROJECT DESCRIPTION: _____ CONTRACT NO.: _____
CONTRACT FOR: _____ CHANGE ORDER NO.: _____
CONTRACT DATE: _____ DATE: _____
OWNER: _____ PROJECT NO. : _____
_____ OTHER : _____
LOCATION: _____

CONTRACTOR:

The following changes are hereby made to the Contract Documents:

Item No.	Description	Decrease in Contract Price	Increase in Contract Price
TOTALS		$_____	$_____
NET CHANGE IN CONTRACT PRICE:		$ _____	$ _____

JUSTIFICATION: _____

ATTACHMENTS: _____
CONTRACT PRICE PRIOR TO THIS CHANGE ORDER: _____ $ _____
CONTRACT PRICE BY THIS CHANGE ORDER WILL BE: _____ BY $ _____
NEW CONTRACT PRICE INCLUDING THIS CHANGE ORDER WILL BE: $ _____
COMPLETION DATE PRIOR TO THIS CHANGE ORDER: _____

NEW CONTRACT TIME WILL BE _____ BY _____ CALENDAR DAYS.
NEW DATE FOR COMPLETION OF ALL WORK WILL BE: _____

To be effective this Order must be approved by the applicable Government agency (if required). This document will become a supplement to the CONTRACT and all provisions will apply hereto.

REQUESTED BY: _____
Name By Title Date

RECOMMENDED BY: _____
Name By Title Date

ACCEPTED BY: _____
Name By Title Date

APPROVED BY: _____
Name By Title Date

JAMES CITY COUNTY MILL CREEK/LAKE POWELL DRAINAGE BASIN 730
STORMWATER MANAGEMENT DETENTION BASIN

STATEMENT OF SURETY COMPANY

IN ACCORDANCE with the provisions of the CONTRACT dated _____

19_____ BETWEEN _____
(OWNER)

AND _____
(CONTRACTOR)

THE _____
(SURETY)

SURETY on the Material and Labor Payment Bond of:

_____
(CONTRACTOR)

after a careful examination of the books and records of said CONTRACTOR or after receipt of an affidavit from CONTRACTOR, which examination of affidavit satisfies SURETY that all claims for labor and materials have been satisfactorily settled, hereby approved of the final payment of the said _____, CONTRACTOR, and by these present witnesseth that payment to the CONTRACTOR of the final estimates shall not relieve SURETY of any of its obligations to

_____
(OWNER)

as set forth in the said SURETY COMPANY'S BOND.

IN THE WITNESS WHEREOF, said SURETY has hereunto set its hand and seal this ____ day of _____ _____, 19___.

ATTEST:

(SEAL) _____ BY _____
PRESIDENT

NOTE: This statement, if executed by any person other than the President or Vice-President of the Company, must be accompanied by a certificate of even date showing authority conferred upon the person so signing to execute such instruments on behalf of the Company represented.

CONTRACT FORM

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project Description: _____ Project No.: _____

_____ Other: _____

Location: _____ Contract Date: _____

_____ Completion Date: _____

Contract For: _____ Contract or: _____

_____

_____

_____

This Certificate of Substantial Completion applies to all work under the Contract Documents or to the following specified parts thereof.

_____

_____

_____

_____

TO WITH: The Owner and Contractor are hereby advised that the Work to which this certificate applies has been inspected by authorized representatives of the Owner, Contractor, and Engineer, and that all work is hereby declared to be substantially complete in accordance with the Contract Documents on:

_____

Date of Substantial Completion

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive and the failure to include an item in it does not alter the responsibility of the CONTRACTOR to complete all items of the work in accordance with the Contract Documents. When this certificate applies to a specified part of the Work, the items in this tentative list shall be completed or corrected by the CONTRACTOR within _____ ___ days of the above date of substantial completion. The date of substantial completion is the date which all guarantees and warranties begin, except as follows:

_____

_____

The responsibilities between the OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, and insurance are attached hereto. The following documents are attached to and made a part of this certificate:

_____

_____

This certificate is issued, accepted, and acknowledged by:

Engineer _____ By _____ Title _____ Date _____
Contractor _____ By _____ Title _____ Date _____
Owner _____ By _____ Title _____ Date _____
Other _____ By _____ Title _____ Date _____

SECTION 02000-SITE WORK

PART I - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, of these Specifications, apply to work specified in this Section.

SUMMARY:

Work includes the construction of all site improvements, site modifications and site restoration as indicated in the Contract Documents. Work is located within the project limits, including but not limited to:

Section 02100 - Site Clearing;
Section 02200 - Earthwork;
Section 02300 - Portland Cement Concrete;
Section 02400 - Piping;
Section 02500 - Drainage Blanket;
Section 02600 - Erosion and Sediment Control.

SUBMITTALS:

Submit manufacturer's instructions for material and equipment handling, storage, and installation. Submit plant mix certifications for portland cement concrete, stone/aggregate/soil gradation, density, moisture content and material classification certifications from supplier. Submit weight tickets and material delivery receipts.

QUALITY ASSURANCE

Codes and Standards - Federal, State, and local laws and code requirements shall govern work contained in this Section. Specific regulations and codes pertinent to this Section include, but are not limited to:

Erosion and Sediment Controls - Virginia Erosion and Sediment Control Handbook, Third Edition, 1992 standards and guidelines shall be followed.

Job Site Safety and Health Standards - Virginia Occupational Safety and Health Standards For General Industry (29 CFR Part 1910) and amendments shall be followed.

Virginia Department of Transportation Road and Bridge Standards and Specifications, latest edition, shall be followed.

Inspections and Test Observations by the County

The Contractor shall provide a minimum 48 hours advance notice to the County for any inspection or test observation required for SITE WORK.

Inspections, Testing, and Certifications by the Contractor

The Contractor shall provide and pay for the services of a geo-technical engineering firm approved by the County. The professional services of this firm shall include inspecting construction of the dam and preparation of a report certifying that the dam was constructed in accordance with the plans and specifications. The County shall be provided two (2) copies of the report outline for review and approval before construction work begins, and shall be provided two (2) copies of the final report prepared by the geo-technical engineering firm.

PROJECT CONDITIONS AND REQUIREMENTS

Conformance with Standards:

All construction shall conform with the specifications and standards of the James City County, Virginia, the Virginia Department of Environmental Quality (DEQ), and the Virginia Department of Transportation (VDOT).

All construction shall be in accordance with the Contract Documents. Changes in materials, equipment, procedures, testing, methods of installation, and any other requirements stipulated in the Contract Documents shall not be permitted, unless advance written approval for requested changes are obtained from the County.

Deviation from the requirements of the Contract Documents shall not be permitted, unless approved otherwise by the County in writing. Failed testing, inappropriate materials or workmanship, and/or quality of construction or any other defect in the work, as determined by the County, shall require removal, replacement, reconstruction, and/or restoration deemed appropriate and as required by the County. Remove, repair, replace, reconstruct and/or restore any work, material, equipment, etc., determined to be defective.

Permits:

The following permits are required prior to proceeding with site work:

Virginia Department of Transportation CE-7 permit;
Virginia Department of Transportation Tree Trimming permit; and
James City County Land Disturbing Activity permit;

All permits required to commence site work shall be obtained by the Owner.

Compliance with all permit conditions, stipulations and requirements is mandatory.

Utilities:

Contact "Miss Utility of Virginia" at 1-800-552-7001 48 hours prior to beginning any excavation. Underground utilities shall be marked prior to any excavation.

The Engineer and County do not guarantee the existence or location of underground utilities. The underground utilities indicated were established using aboveground structures (valves, meters, manholes, etc.). Prior to any excavation or construction, uncover all utilities which are indicated in the Contract Documents or which have been marked by "Miss Utility of Virginia" as being in the area of excavation or construction. Take vertical and horizontal measurements adequate to determine if any conflict will occur between existing utilities and new construction or facility relocations indicated in the Contract Documents. Notify the County, in writing, of any potential conflict discovered prior to beginning any excavation or construction activity which may be impacted by such potential conflict. Remove, relocate, and reinstall utilities which conflict with construction as directed by the County.

Notify all utility companies 48 hours in advance of any excavation in the proximity of their utilities.

All utilities shall be installed underground.

The County shall be responsible for the relocation of existing underground utilities. Coordinate work such that interference, obstructions and delays will not be encountered.

Datum:

Elevations indicated in the Contract Documents are based on vertical datum information as provided to the Engineer by James City Service Authority (JCSA). The project benchmark, designated "Benchmark (TBM)," is the top of an existing sanitary sewer manhole rim located within the Pump Station site Tax Map Parcel No. (47-1)(1-28A). The Project Reference Elevation (TBM) is elevation 46.48 ft-msl.

Drainage:

Provide temporary drainage and erosion control during construction as indicated in the Contract Documents, or as directed by the County.

PART 2 - PRODUCTS

BACKFILL, FILL, TRENCHING AND EXCAVATION:

Use approved material in the backfill of trenches, undercuts, and excavations. Backfill and fill material must be approved by the Engineer in advance of placement.

All trenches and undercuts shall be compacted and backfilled to within 0.2 feet of final subgrade elevation and graded to drain. Excess trench spoil material shall be removed. All finished slopes not subject to structural stabilization shall be topsoiled, seeded, and mulched.

All SM-SC classified fill material shall conform to the following:

> Fill material shall be free from roots, stumps, and other deleterious material. The maximum size for any singular stone, aggregate, cobble, or other such particle shall be three inches (3") in average diameter. Fill material for all earth embankment areas, including undercuts, and basal area excavation backfills shall be inorganic soil material. Fill material shall be tested to determine grain size distribution, maximum theoretical dry density and optimum water content, and shall be evaluated for suitability for backfill of trenches, undercuts and excavations, and for suitability as structural fill for the earth embankment dam prior to placement. Specific geo-technical engineering recommendations provided by the Owner, as prepared by Combined Technologies, Inc., entitled "Geo-technical Engineering Study For Proposed Mill Creek/Lake Powell Drainage Basin 730 James City County, Virginia" dated September 10, 1996, for soil classifications, compaction requirements and compaction methods for fills shall be followed. In general, all fills shall be constructed by placement of 6-inch to 8-inch loose lifts and compacted to 95 percent maximum theoretical dry density at optimum water content, with a water content tolerance of plus or minus 2 percent. Fill material shall conform to ASTM D-2487 designations: SM or SC. Compaction testing, if required by the Owner, shall be the contractor's responsibility.

Excess spoil material from excavation and undercutting activities shall be disposed of by the contractor.

CONCRETE:

All concrete to be class "A3" air entrained (3,000 P.S.I. @ 28 days), except as otherwise indicated.

TREES AND VEGETATION:

Existing mature and healthy trees indicated to be preserved in the Contract Documents shall be protected during construction.

Trees which are to be preserved shall be protected before, during, and after the construction process by the installation of a temporary fence or barrier to be located and maintained five feet (5') outside of their drip line. Such a fence or barrier shall be installed prior to clearing or construction, shall be sufficient to prevent intrusion into the fenced area during construction and in no case shall materials, vehicles or equipment be stored or stockpiled within the enclosure.

PROJECT CONDITIONS AND DIMENSIONS:

Any discrepancy between information specified in the Contract Documents and field conditions, including subsurface soil conditions shall be brought to the Engineer's attention prior to proceeding with any construction activity which may be affected by the discrepancy or changed condition. No claim for damage made by the Contractor shall be considered valid, nor shall request for payment be authorized for work performed which must be reconstructed as a result of the Contractor's failure to inform the Engineer of any changed condition or project discrepancy.

Verify all dimensions, grades and site conditions prior to commencing with any construction activity.

MATERIALS:

All piping, structures and materials shall be as specified in the Contract Documents, unless otherwise approved, in advance and in writing by the Engineer as an approved equivalent.

RESTORATION AND RELOCATION:

Fences, driveways, and other existing facilities which must be removed or relocated temporarily to allow construction shall be reinstalled or rebuilt to their original condition or better.

PART 3 - EXECUTION

GENERAL

Site work shall be confined to those areas indicated in the Contract Documents. Damage to properties, structures or facilities located outside of indicated project limits shall be repaired.

Site work activities shall be coordinated with other construction activities to prevent delays and damage to other construction activities, minimize conflicts and obstructions which may impede or otherwise restrict other construction activities.

Site work shall be scheduled and performed to reduce or minimize obstruction of public rights-of-way. Provide appropriate traffic control signage, direction, and flagging operations to maintain safe traffic and vehicular operation conditions throughout construction and work areas which impact public roadways. Compliance with all conditions and requirements of the Virginia Department of Transportation CE-7 permit for the project shall be mandatory.

TESTING

Provide all equipment, materials and labor required to perform testing and inspection as stipulated in the Contract Documents. Test equipment shall be calibrated and shall conform to the specifications indicated. Materials, workmanship and/or installations which are found to be defective shall be repaired, replaced, restored and/or reconstructed.

ESTIMATE OF QUANTITIES

See Division 1 General Requirements, Section 01000-L-1

END OF SECTION 02000.

SECTION 02100 - SITE CLEARING

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, of these Specifications, apply to work specified in this Section.

SUMMARY:

Work includes site clearing and grubbing operations and related debris disposal, topsoil stripping and stockpiling, and the installation of temporary erosion and sediment controls to preclude sediment transport from areas of the project disturbed by the clearing and grubbing operations.

Clearing and Grubbing

Clearing and grubbing shall include the removal of all trees, roots, stumps and woody vegetation as indicated in the Contract Documents. Operations shall include stripping of topsoil, transporting such topsoil to a temporary topsoil stockpile area, stockpiling of such topsoil for redistribution and reuse on the project site with future grading and site stabilization operations. Clearing and grubbing operations shall include transportation and disposal of clearing debris to an approved construction debris disposal facility.

No clearing debris shall be retained or buried on-site.

Debris disposal fees are the Contractor's responsibility.

Acquisition of required permits for clearing and land disturbing activities required are the Owner's responsibility.

Related Work Specified Elsewhere

Section 02000 - Site work;
Section 02200 - Earthwork;
Section 02600 - Erosion and Sediment Control.

QUALITY ASSURANCE

Codes and Standards - State and local laws and code requirements shall govern the hauling and disposal of trees, shrubs, stumps, roots, rubbish, and other matter.

PROJECT CONDITIONS AND REQUIREMENTS

Remove all trees and woody vegetation indicated within the project limits.

Backfill excavations/stump holes with structural fill material in accordance with specifications contained in Section 02000.

Temporary seeding and soil stabilization shall be provided upon completion of clearing and grubbing operations for those areas which will remain undisturbed by construction for periods of 30 days or longer. Install a temporary silt fence along the perimeter of the topsoil stockpile area(s). Provide temporary seeding and mulching on the topsoil stockpile(s) to minimize erosion of the topsoil stockpile(s).

Permits/Submittals

VDOT Tree Trimming Permit - The Owner shall obtain a Tree Trimming Permit from the Virginia Department of Transportation and provide one copy of such permit to the Contractor, prior to the Contractor clearing or trimming any trees located within a Virginia Department of Transportation right-of-way.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

CLEARING AND GRUBBING

Clearing and grubbing shall be confined to those areas indicated in the Contract Documents and shall be within the project limits. Damage outside of indicated limits resulting from Contractor's operations shall be repaired.

Areas to be grubbed shall have roots or other objectionable materials and debris removed to a depth 12 inches below ground surface. All stumps shall be removed regardless of their depth from ground surface.

Disposal

All materials and debris resulting from the Contractor's operation shall be disposed of legally. Debris shall not be buried on the site. No burning or incineration of debris will be permitted.

Restoration/Replacement

Trees and shrubs damaged but to remain shall be repaired, with proper dressings, cutting, bracing, and painting using acceptable arboricultural practices and materials. Trees and shrubs intended to remain which are damaged beyond repair or have been removed shall be replaced.

Topsoil Removal and Restoration

Areas to have topsoil removed before construction and restored after completion of work shall proceed as follows:

Strip topsoil;
Stockpile topsoil offside for future restoration;
Install temporary erosion and sediment control measures to minimize erosion and sediment transport from topsoil stockpile.

END OF SECTION 02100

SECTION 02200 - EARTHWORK

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, of these Specifications, apply to work specified in this Section.

SUMMARY:

Work includes site grading operations for the project construction including excavation, undercutting, hydraulic displacement, backfilling and structural fill placement and compaction for the embankment dam.

Earthwork

Earthwork shall include rough grading of the project site, the establishment of working pads, subgrades and finish grading of the project site. Earthwork shall include required undercutting of soft unsuitable material beneath the embankment foundation or basal area. Ponded and/or swampy areas where conventional undercutting is not feasible to remove soft unsuitable material, material shall be "bridged" to create a suitable working pad by hydraulic fill-displacement methods. Soft material which is displaced by the hydraulic fill shall be removed from the advancing or leading edge of the working pad. Soft material which mounds or "mud-waves" along the sides of the earth fill dam as the working pad is constructed may require removal. The Engineer shall determine whether "mud-wave" development along the sides of the earth fill embankment is extensive enough to warrant the spoil material removal and disposal. Earthwork shall include incidentals such as shoring, bracing and sheeting to support any excavations or undercuts, and the dewatering of excavations and undercuts.

Related Work Specified Elsewhere:

Section 02100 - Site Clearing;
Section 02300 - Portland Cement Concrete Pavement;
Section 02400 - Piping;
Section 02500 - Drainage Blanket;
Section 02600 - Erosion and Sediment Control.

QUALITY ASSURANCE

Codes and Standards - State and local laws and code requirements shall govern the work in this Section.

Compaction testing, if required, shall be provided by the Owner.

PROJECT CONDITIONS AND REQUIREMENTS

Soft saturated soil exists along the proposed embankment footprint. Soft organic material may require removal to prevent excessive displacement (mud wave development) during embankment construction and to prevent rotational slope failure of the embankment fill. Rapid placement of the embankment fill is expected to create a "mud wave" and cause the existing soft organic material to be displaced (spoil). The contractor will be required to remove the displaced spoil material, depending on the extent of displacement. Removal of the spoil material shall be as directed by the County Engineer. Payment for this work shall be included in the lump sum bid price for the project as stipulated on the BID FORM.

Eastern half of the embankment (Station 1+60 to Station 2+99.64) should be constructed by undercutting the existing soft unsuitable material, and replacing the undercut material with compacted structural fill. Well point dewatering may be necessary for the construction of the eastern half of the embankment.

Western half of the embankment (Station 0+00 to Station 1+60) may be constructed by undercutting some or all of the soft unsuitable soil. Structural fill material can then be placed by a rapid hydraulic fill method, such as bulldozing material into the water, proceeding from west to east. Filling across the ponded area should proceed as rapidly as possible. The lift thickness during rapid filling should range between three (3) and five (5) feet, and should protrude above the standing water level by three (3) feet. Rapid filling will be limited to elevation 45 ft-msl (3 feet above the standing water). Conventional fill placement and compaction is required above elevation 45 ft-msl. Settlement of the embankment across rapidly filled areas is expected. Soft existing subgrade soil will be displaced by the rapid hydraulic fill loading. Displaced material must be removed from the "front" of the fill (eastern toe of fill). Displaced material located along the sides of the fill (northern and southern toes of fill) may be removed to the extent as directed by the County Engineer. Payment basis for removal and disposal of displaced material is included in deem two above.

Embankment fill material, compacted structural fill, shall be SC or SM material per ASTM D-2487. Permeability of the compacted fill should range between 1.0EE-3 cm/sec and 1.0EE-6 cm/sec. Compacted structural fill shall be placed in six to eight-inches horizontal loose lifts, and compacted to a minimum of 95 percent of maximum dry density per ASTM D-698, Standard Proctor. The upper two-inches of each proceeding compacted life shall be scarified prior to placement of the successive lift.

Embankment fill slopes shall be 2.5:1 (H:V) upstream and 2:1 (H:V) downstream. The embankment fill top width shall be twelve (12) feet.

Recommendations contained in the Geo-technical Engineering Study for Proposed Mill Creek/Lake Powell Drainage Basin 730 James City County, Virginia, Project No. GT003596 prepared by COMBINED TECHNOLOGIES, INC., dated September 10, 1996, shall take precedence over any conflicting specification or recommendation contained on these plans or specifications. The contractor is advised that copies of the aforementioned report are available for review in the office of the County Engineer.

Geo-technical inspection, observation and testing shall be provided by the Contractor.

Grade the project site to the elevations indicated. Provide surface drainage as necessary to minimize pending of surface water during construction. Install erosion and sediment control measures to prevent sedimentation to adjacent properties or areas beyond the project limits.

Excavation and undercut spoil material shall be disposed of by the Contractor.

Any utility, facility, or structure which is removed, damaged or otherwise altered by the Contractor shall be repaired, restored or replaced with equivalent materials, installation and workmanship.

Walkways, driveways and roadways shall not be blocked or otherwise obstructed during construction. Maintain walkways, driveways and roadways for pedestrian and vehicular traffic and use.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

EARTHWORK

Earthwork shall be confined to those areas indicated in the Contract Documents and shall be within the project limits. All damage outside of indicated limits resulting from Contractor's operations shall be repaired.

In areas where fill is required, and undercutting of soft material is not required, scarify surface to a depth of 0.33 foot, place structural fill in 6-inch to 8-inch loose lifts and compact. Fill material, placement of fill and compaction shall be in accordance with fill specifications, Section 02000;

Upon completion of grading operations, place topsoil on areas indicated for vegetation establishment, fine grade to finish grade elevations, permanent seed and mulch topsoiled areas.

END OF SECTION 02200

SECTION 02300 - PORTLAND CEMENT CONCRETE

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, of these Specifications, apply to work specified in this Section.

SUMMARY:

Work includes all materials, equipment and labor necessary to install the modified concrete EW-11 "trash-rack" assembly, the concrete cradle and the anti-flotation riser base as indicated. Work includes but is not limited to: subgrade fine grading and compaction; installation of structural base material, grading and compaction; installation of concrete forms to attain grades indicated for finished surfaces; installation of reinforcing steel; placement and manipulation of concrete; and concrete finishing.

Related Work Specified Elsewhere

Section 02200 - Earthwork;
Section 02400 - Piping;
Section 02500 - Erosion and Sediment Control.

QUALITY ASSURANCE

Codes and Standards - State and local laws and code requirements shall govern the work in this Section.

Specific Standards include:

Virginia Department of Transportation Road and Bridge Standards, Volumes I and II, latest edition;

Virginia Department of Transportation Road and Bridge Specifications, latest edition;

Virginia Erosion and Sediment Control Handbook, Third Edition, 1992.

SUBMITTALS:

Material and Plant Mix certifications for Portland Cement Concrete;

Weight tickets for all paving materials delivered to job site;

Material certifications for any reinforcement steel.

PROJECT CONDITIONS AND REQUIREMENTS

Undercutting shall not be permitted, except when authorized by the Engineer.

Facilities, structures, utilities, etc., which are damaged, removed or otherwise altered by construction activities shall be restored, replaced or repaired with equivalent materials, installation and workmanship.

Walkways, driveways and roadways shall not be blocked or otherwise obstructed in any manner which would limit pedestrian or vehicular traffic, or impede the thoroughfare's use. Maintain walkway, driveway and roadway traffic access and temporary detours. Install appropriate traffic signs, safety equipment and barricades. Provide appropriate traffic flagging personnel to maintain safe conditions for vehicular and pedestrian traffic in the vicinity of the project construction.

Concrete materials shall not be delivered to or installed on the project site unless the air temperature is above 40 degrees Fahrenheit.

Provide adequate surface drainage for the construction area to prevent surface pending during construction.

PART 2 - PRODUCTS

PORTLAND CEMENT CONCRETE

Concrete Trash Rack Assembly Cradle and Riser Base

Portland Cement Concrete Class A-3, 3000 p.s.i. compressive strength at 28 days. Portland Cement Concrete shall conform to Virginia Department of Transportation Road and Bridge Specifications Section 219.

PART 3 - EXECUTION

PORTLAND CEMENT CONCRETE

Construction operations shall be confined to those areas indicated in the Contract Documents and shall be within the project limits. Damage outside of indicated limits resulting from Contractor's operations shall be repaired.

Attain concrete subgrade elevation. Fine grade and compact subgrade.

Place and compact any required structural fill.

Install concrete forms to line and grade.

Pour concrete to line and grade as indicated. Concrete shall be placed to prevent segregation, spread to full depth indicated, screened with a straight edge. Spade and/or vibrate concrete to prevent

honeycombing. Float finish to remove surface irregularities and provide a final broom finish surface (where appropriate).

Concrete placement, reinforcing, finishing and curing shall conform to Virginia Department of Transportation Road and Bridge Specifications Section 321.

END OF SECTION 02300

SECTION 02400 - PIPING

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, of these Specifications, apply to work specified in this Section.

SUMMARY:

Work includes all materials, equipment and labor necessary to install the stormwater management detention facility principal spillway barrel, low flow pipe, riser assembly and trash rack/anti-vortex device as indicated. Work includes but is not limited to: bedding, backfill, pipeline installation, riser structure construction, fabrication and installation, installation of watertight connections, installation of flared end section, construction of anti-seepage concrete cradle and anti-flotation riser base, and the installation rip-rap stone outlet protection.

Related Work Specified Elsewhere

Section 02200 - Earthwork;
Section 02300 - Portland Cement Concrete;
Section 02500 - Drainage Blanket;
Section 02600 - Erosion and Sediment Control.

QUALITY ASSURANCE

Codes and Standards - State and local laws and code requirements shall govern the work in this Section.

Specific Standards include:

Virginia Department of Transportation Road and Bridge Standards, Volumes I and II, latest edition;

Virginia Department of Transportation Road and Bridge Specifications, latest edition;

Virginia Erosion and Sediment Control Handbook, Third Edition, 1992.

Testing - Compaction testing if required shall be provided by the Owner.

SUBMITTALS

Manufacturer's certifications for pipes, couplings, fittings, gaskets, and structures.

PROJECT CONDITIONS AND REQUIREMENTS

Undercutting shall not be permitted, except when authorized by the Engineer.

Facilities, structures, utilities, etc., which are damaged, removed or otherwise altered by construction activities shall be restored, replaced or repaired with equivalent materials, installation and workmanship.

Walkways, driveways and roadways shall not be blocked or otherwise obstructed in any manner which would limit pedestrian or vehicular traffic, or impede the thoroughfare's use. Maintain walkway, driveway and roadway traffic access and temporary detours. Install appropriate traffic signs, safety equipment and barricades. Provide appropriate traffic flagging personnel to maintain safe conditions for vehicular and pedestrian traffic in the vicinity of the project construction.
Dewater trenches to prevent the accumulation of groundwater within the trench during pipeline installation. Dewatering shall be accomplished in accordance with Section 02200.

PART 2 - PRODUCTS

PRINCIPAL SPILLWAY BARREL, RISER PIPE AND LOW FLOW PIPE

High Density Polyethylene Pipe (HDPE)

All pipe indicated shall be circular corrugated exterior smooth interior high density polyethylene pipe as manufactured by Advanced Drainage Systems (ADS) type N-12. All pipe shall conform to ASTM F405 and F667, AASHTO M252 and M294 and shall be installed in accordance with ASTM D2321.

Pipe joints and connections shall be watertight. Gaskets shall be required for all band couplings and field joints.

Structures

All structures shall be as indicated.

Detention facility riser assembly shall be fabricated by the manufacturer in order to minimize joint and pipe connection leakage.

PART 3 - EXECUTION

Construction shall be confined to those areas indicated in the Contract Documents and shall be within the project limits. Damage outside of indicated limits resulting from Contractor's operations shall be repaired.

Attain line and grade for the piping system as indicated. Fine grade trench excavations.

Construct riser assembly and base to grades indicated.

Install principal spillway and low flow pipelines, seal joints and connections.

Install concrete cradle along the entire length of the principal spillway. The concrete cradle shall be poured directly on the foundation soils. The sides of the cradle may be field adjusted to optimize compaction of backfill material around the cradle and pipeline.

Backfill trenches and excavations immediately following pipeline installation and structure installation.

Compaction around the principal spillway barrel is critical. Structural fill within eight (8) feet of the principal spillway barrel and riser assembly shall be compacted in thin lifts with light weight walk behind compaction equipment. Backfill and compaction along both sides of the barrel must proceed simultaneously to prevent displacement of the pipe.

Backfill shall be placed in three-(3) to six-(6) inch loose lifts and compacted. Pipeline trench backfill shall not contain any rock, stone, cobble or aggregate greater than one (1) inch in diameter. Each side of the trench shall be backfilled and compacted simultaneously.

Compaction shall be performed with mechanical tamps, pneumatic tamps or other approved compaction equipment capable of achieving the required density. Compaction shall be performed to prevent damage to the pipeline, dislocation of pipe joints or other disturbance to the installed pipeline and structures.

Compaction shall conform to modified AASHTO-99 and ASTM D-698. Compaction shall achieve a minimum 95 percent of the backfill material's theoretical maximum dry density. Water content should be maintained to within two percent of optimum.

Trench or excavation backfill settlement shall be repaired immediately.

Upon attaining finish grade elevations and the completion of backfilling operations, fine grade disturbed areas to furnish grades above facilities as indicated.

Topsoil, seed and mulch disturbed areas which will not be subject to permanent stabilization with blanket drain cover or other structural stabilization.

END OF SECTION 2400

SECTION 02500 - DRAINAGE BLANKET

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1, General Requirements, of these Specifications, apply to work specified in this Section.

SUMMARY:

Work includes all materials, equipment and labor necessary to install the 36-inch thick gravel drainage blanket over the downstream slope of the embankment dam. Work includes but is not limited to: installation of geo-textile fabric to prevent fine "rained material migration and contamination of the gravel drainage layer, placement of 36-inch thick layer of GW-GP gravel drainage blanket, and compaction to consolidate the GW-GP material to prevent slides or other forms of slope failure and material displacement.

Related Work Specified Elsewhere

Section 02000 - Site work;
Section 02100 - Site Clearing;
Section 02200 - Earthwork;
Section 02300 - Portland Cement Concrete;
Section 02400 - Piping;
Section 02600 - Erosion and Sediment Control.

QUALITY ASSURANCE

Codes and Standards - State and local laws and code requirements shall govern the work in this Section.

Specific Standards include:

Virginia Erosion and Sediment Control Handbook, Third Edition, 1992.

Permits

Land Disturbing Activity Permit, James City County

Permit to be obtained by the Owner. The Contractor shall be responsible for compliance with all permit conditions.

The Engineer will perform periodic inspections during the drainage blanket construction to insure measures are installed properly, adequately maintained and are functional.

SUBMITTALS:

Certifications and weight tickets for GW-GP material.

Manufacturer's certifications for filter fabrics and geo-textiles.

PROJECT CONDITIONS AND REQUIREMENTS

The gravel drainage blanket shall be installed immediately following the completion of grading operation on the embankment slopes, and after the completion of all other construction activity which could detrimentally affect the installation and eventual performance of the gravel drainage blanket.

PART 2 - PRODUCTS

GRAVEL DRAINAGE BLANKET

Materials:

Drainage blanket fill material, compacted structural fill, shall be GP or GW material per ASTM D-2487.

GEO-TEXTILE FILTER FABRIC

Materials:

Mirafi 140N or equivalent.

PART 3 - EXECUTION

Compacted structural fill shall be placed in 6-to 8-inch horizontal loose lifts, and compacted to a minimum of 95 percent of maximum dry density per ASTM D-698, Standard Proctor. The upper two-inches of each proceeding compacted lift shall be scarified prior to placement of the successive lift.

Drainage blanket fill slopes shall be 2:1 (H:V). The drainage blanket fill top width shall be 6.7 feet. The drainage blanket fill shall extend a minimum of ten (10) feet beyond the toe of the SC-SM earth fill dam. The drainage blanket shall be constructed to a minimum thickness of 36-inches.

Install Mirafi 140N or other approved geo-textile filter fabric in accordance with the manufacture's installation recommendation. Anticipated staple patterns, splices and overlaps of the fabric shall be submitted for approval by the Engineer prior to placement and installation of the fabric. Place fabric over properly prepared subgrade. The subgrade surface should be relatively smooth, contain no rills, ruts, gullies or other forms of imperfections which would expedite the development of rainfall runoff or groundwater seepage flow concentrations. Install fabric and provide adequate stapling, splices and overlaps to prevent the displacement of the fabric during gravel placement operations.

Upon installation of the filter fabric, place and compact GP-GW structural fill drainage layer. Install the four (4) inch diameter perforated corrugated high density polyethylene toe drain piping as shown on the plans. The toe drain shall be installed to drain from the eastern and western ends of the drainage blanket toes toward the principal spillway outfall channel. The toe drain(s) shall terminate at the rip rap stone lined outfall channel.

Recommendations contained in the Geo-technical Engineering Study for Proposed Mill Creek/Lake Powell Drainage Basin 730 James City County, Virginia Project No. GT003596 prepared by COMBINED TECHNOLOGIES, INC., dated September 10, 1996, shall take precedence over any conflicting specification or recommendation contained on these plans or specifications. The contractor is advised that copies of the aforementioned report are available for review in the office of the County Engineer.

END OF SECTION 02500

SECTION 02600 - EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and general provisions of the Contract. including General and Supplementary Conditions and Division 1, General Requirements, of these Specifications, apply to work specified in this Section.

SUMMARY:

Work includes all materials, equipment and labor necessary to install and maintain erosion and sediment control measures indicated. Work includes but is not limited to: installation of control measures, daily maintenance of such measures, establishment of temporary and permanent ground covers for soil stabilization, irrigation to promote germination and grass establishment, dewatering, and removal of temporary measures upon completion of site stabilization.

Related Work Specified Elsewhere

Section 02000 - Site work;
Section 02100 - Site Clearing;
Section 02200 - Earthwork;
Section 02300 - Portland Cement Concrete;
Section 02400 - Piping;
Section 02500 - Drainage Blanket.

QUALITY ASSURANCE

Codes and Standards - State and local laws and code requirements shall govern the work in this Section.

Specific Standards include:

Virginia Erosion and Sediment Control Handbook, Third Edition, 1992.

Permits

Land Disturbing Activity Permit, James City County

Permit to be obtained by the Owner. The Contractor shall be responsible for compliance with all permit conditions.

Inspection:

The Engineer will perform periodic inspections of the project site to insure erosion and sediment control measures are installed properly, adequately maintained and are functional.

SUBMITTALS:

Certifications and weight tickets for rip-rap stone (VDOT Class I rip-rap).

Manufacturer's certifications for filter fabrics and geo-textiles.

PROJECT CONDITIONS AND REQUIREMENTS

All erosion and sediment control practices shall be in accordance with the current James City County Erosion and Sediment Control Ordinance, the 1992 Virginia Erosion and Sediment Control Handbook and Virginia Regulation VR625-02, Erosion and Sediment Control Regulations.

Erosion and sediment control practices shall be installed and maintained throughout the duration of construction activities as necessary to preclude the transport of waterborne or airborne sediments from entering onto adjacent properties or into state waters. All sediments must be confined to the project site. Protection of existing natural vegetation from needless disturbance is essential.

PART 2 - PRODUCTS

EROSION AND SEDIMENT CONTROL MEASURES

Materials:

All erosion and sediment control measures shall be constructed of materials in conformance with the specifications and standards as contained in the Virginia Erosion and Sediment Control Handbook, Third Edition, 1992.

PART 3 - EXECUTION

The following sequence of events and erosion control practices shall be incorporated into the construction schedule for this project and shall apply to all construction activities associated with the project:

All temporary or permanent erosion and sediment control practices necessary for retaining sediments on the construction site shall be installed and tree protection fencing shall be erected at the locations indicated prior to any land clearing, grubbing, grading or earth moving activities.

Land clearing shall be limited to areas of workable size.

Critical erosion areas shall be given special attention prior to and during construction of the project and until such time as stabilization of the project has been established.

Periodic site inspections will be made of the erosion and sediment control measures to determine their condition and performance. Respond immediately in making necessary repairs, adjustments and/or replacement of erosion and sediment control measures as determined to be required by the Engineer

in order to prevent erosion and/or sedimentation from the project site. Any sediment which has been transported beyond the project limits shall be removed and/or stabilized as directed by the Engineer.

Clearing and grubbing debris shall be disposed of as directed by the Owner.

Topsoil stockpiles shall be placed in the location(s) indicated and/or as directed by the Owner. Silt fence or straw bale barriers shall be erected at the toe of the stockpile(s). Silt fence or straw bale barriers shall be maintained throughout the duration of the project. Stockpiles shall be seeded and stabilized with a firm stand of grass.

Construction entrance (CE) stone pad(s) shall be installed concurrently with the initiation of clearing and grubbing operations. Construction entrance(s) shall be field located by the Contractor, with approval by the Engineer. Where construction vehicle access routes intersect paved roads, provisions shall be made to minimize the transport of sediment by vehicular tracking onto the paved surface. Where sediment is transported onto a public road surface, the road shall be cleaned thoroughly at the end of each day. Sediment shall be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing shall be allowed only after sediment is removed as prescribed above.

The installation of storm drainage facilities shall take precedence over all other construction activities. Site drainage facilities shall be completed within 30 days following completion of the rough grading operations at any point on the project.

Outfall channels shall be constructed and stabilized prior to the initiation of pipeline construction. Erosion control stone (RR) shall be installed where indicated immediately after excavation of the outfall channel to subgrade, the installation of bedding material and geo-textile filter fabric.

Culvert inlet protection (CIP) practices are to be installed around the perimeter of the culvert inlets to prevent sediments from entering the structure

All areas designated for underground utilities shall be stabilized as soon as practical but not exceeding 15 days following their installation and backfiring. Excavated material shall be placed on the uphill side of trenches. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect flowing streams or off-site property.

All temporary or permanent earthen structures such as dams, dikes and diversion shall be stabilized (seeded) immediately after their construction.

Sediment basins and traps, perimeter dikes, sediment barriers, and other measures intended to trap sediment shall be constructed at the initiation of land disturbing activities, and shall be made functional before up slope land disturbance takes place. The basin(s) are to be kept clear of debris. Sediment accumulations shall be cleaned out periodically during and after construction activities.

Permanent or temporary soil stabilization shall be applied to denuded areas within seven days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within

seven days to denuded areas that may not be a fir al grade but will remain dormant (undisturbed) for longer than 30 days. Permanent stabilization shall be applied to areas that are to be left dormant for more than one year. Temporary vegetative cover shall consist of seeding with rye grass at the rate of 140 #/acre, limestone at 2,000#/acre, 10-20-10 fertilizer at 600#/acre, and mulch at 2,000#/acre. Temporary vegetative cover may be eliminated in favor of the permanent vegetative cover if site and climatic conditions permit.

A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized. Permanent vegetation shall not be considered established until a ground cover is achieved that, is uniform, mature enough to survive and will inhibit erosion. Permanent vegetative cover (stabilization) shall consist of topsoiling, liming, fertilizing, seeding, and mulching to assure a firm stand of grass. Sediment basins and other temporary erosion control measures are to be removed only when stabilization has been established. Final vegetal cover shall be provided in accordance with the minimums as outlined in the latest edition of the Virginia Department of Highways and Transportation Road and Bridge Specifications Handbook, or as indicated

Concentrated runoff shall not flow down cut or fill slopes unless contained within an adequate temporary or permanent channel, flume or slope drain structure.

Whenever water seeps from a slope face, adequate drainage or other protection shall be provided.

Maintenance of all erosion and sediment control practices shall be scheduled on a weekly basis and after each rainfall producing runoff. Necessary repair, adjustment and/or replacement shall be performed immediately.

Airborne sediments (dust) shall be controlled in accordance with Section 3.39 of the 1992 Edition of the Virginia Erosion and Sediment Control Handbook.

END OF SECTION 02600

RECORD DRAWING
Transmittal

DATE: 9/20/2012

To: James City County Stormwater Division

From: Greg Johnson -Engineering and Resource Protection

Subject: Record Drawing
John Tyler Commerce Center Parking Expansion- Storm Pipe Only

RECORD DRAWING
Transmittal

DATE: 9/20/2012

To: James City County Stormwater Division

From: Greg Johnson -Engineering and Resource Protection

Subject: Record Drawing
John Tyler Commerce Center Parking Expansion- Storm Pipe Only

James City County Engineering and Resource Protection Division
Stormwater Management/BMP Record Drawing and Construction Certification Review Tracking Form

Project Name: JOHN TYLER COMMUNITY COLLEGE PARKING VENTURE LANE
County Plan No. (List any amendments): SP-0045-2011 Amendment to SP-0111-1996
Stormwater Management Facility Type: PIPE
BMP Phase #: ☐ I ☐ II ☐ III

- ☐ Information Package Submittal Date: _____
- ☐ Completeness Check:
  - ☒ Record Drawing Date/By: 5/18/2012 - William S. Felps
  - ☒ Construction Certification Date/By: 5/14/2012 - Matthew Connolly
  - ☐ RD/CC Standard Forms (Ensure that all forms for the BMP type are included)
  - ☐ Insp/Maint Agreement # / Date: _____
  - ☐ BMP Maintenance Plan Location: _____
  - ☐ Special Considerations: _____
- ☐ Standard E&SC Notes on Approved Plan Requiring RD/CC or County comment in plan review
  Location (sheet #): _____
- ☒ **County BMP ID Code #:** ME.045
- ☐ Log into Division's "As-Built Tracking Log"
- ☒ Obtain basic site information (GPIN, Owner, Address, etc.)
- ☐ Log into Access Database (BMP ID #, Plan No., GPIN, Project Name, etc.)
- ☒ Copy from Active Project File (correspondence, H&H, design computations, etc.).
- ☒ Create As-Built File using Project File information (File label, folder, copy plan/details/design information, etc.).
- ☒ Inspector Review of RD/CC (consult with Chief Engineer prior to completion of comments).
- ☒ Record Drawing Review against Approved Plan prior to Field Inspection.
- ☒ Final Site Inspection (FI) Performed Date: 8/22/2012
- ☒ Record Drawing (RD) Review Date: 9/26/2012
- ☒ Construction Certification (CC) Review Date: 9/26/2012
- ☒ Actions:
  - ☐ No comments.
  - ☐ Comments. Letter Forwarded. Date:
  - ☐ Record Drawing (RD)
  - ☒ Construction Certification (CC)
  - ☒ Construction-Related (CR)
  - ☐ Site Issues (SI)
  - ☐ Other : * Change wording on RD/CC
- ☐ Resubmittal (# and date): _____
- ☐ Re-inspection (if necessary): _____
- ☒ Drainage System Information Acceptable (RD/CC/System Info). Ok for bond release.
- ☒ Complete "Surety Request Form".
- ☒ Final Inspection of active file copying any relevant information to "As-Built" file.
- ☐ On County BMP Inventory (Phase I, II or III).
- ☐ Copy Final Inspection Report into County BMP Inspection Program file.
- ☐ Provide Digital Photographs of BMP and save into County BMP Inventory.
- ☒ Request mylar/reproducible from As-Built plan preparer.
- ☒ Complete "As-built Tracking Log".
- ☐ Last check of BMP Access Database (County BMP Inventory).
- ☐ Add BMP to JCC Hydrology & Hydraulic database (optional).
- ☐ Add BMP to Municipal BMP list (if a County-owned facility)
- ☐ Add BMP to PRIDE BMP ratings database.

Final Sign-Off

Inspector: _____ Date: 9/26/12

Chief Engineer: _____ Date: _____

*** See separate checklist, if needed.

James City County, Virginia
Environmental Division

Environmental Division
MAY 18 2012
RECEIVED

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

(Note: In accordance with the requirements of the Chesapeake Bay Preservation Ordinance, Chapter 23, Section 23-10(4), BMP's shall be designed and constructed in accordance with the manual entitled James City County Guidelines for Design and Construction of Stormwater Management BMP's. Erosion and sediment control policy and approved plans generally require that at the completion of the project and prior to release of surety, an "as-built" plan prepared by a registered Professional Engineer or Certified Land Surveyor must be provided for the drainage system for the project, including any Best Management Practice (BMP) facilities. In addition, for BMP facilities involving the construction of an impounding structure or dam embankment, certification is required by a Professional Engineer who has inspected the structure during its construction. Currently there are over 20 water quality type BMP's accepted by the County.)

Section 1 - Site Information:

Project Name: JOHN TYLER COMMERCIAL CENTER PARKING VENTURE
Structure/BMP Name: STILLING BASIN A + B / STORM LANE.
Project Location: 3317 VENTURE LANE
BMP Location: EAST OF BLDS LOCATED @ ABOVE ADDRESS
County Plan No.: SP-0045-2011 AMENDMENT TO SP-0111-1996

Project Type: ☐ Residential ☐ Business
☒ Commercial ☐ Office
☐ Institutional ☐ Industrial
☐ Public ☐ Roadway
☐ Other

Tax Map/Parcel No.: 4711300003
BMP ID Code (if known): N/A
Zoning District:: B-1
Land Use:
Site Area (sf or acres): ±3 AC.

Brief Description of Stormwater Management/BMP Facility:
STORMWATER FACILITY IS ON SITE STORM SEWER AND TWO OFFSITE STILLING BASINS. ON LOCATE ON SITE AND ONE EAST OF SITE.

Nearest Visible Landmark to SWM/BMP Facility: IRONBOUND ROAD / VENTURE LN.

Nearest Vertical Ground Control (if known): N/A
☐ JCC Geodetic Ground Control ☐ USGS ☐ Temporary ☐ Arbitrary ☐ Other
Station Number or Name:
Datum or Reference Elevation:
Control Description:
Control Location from Subject Facility:

MC-0

Section 2 - Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: ☐ Yes ☐ No ☑ Unknown
Approx. Construction Start Date for SWM/BMP Facility: FALL / WINTER 2011
Facility Monitored by County Representative during Construction: ☐ Yes ☐ No ☑ Unknown
Name of Site Work Contractor Who Constructed Facility: HENRY S. BRANSCOME
Name of Professional Firm Who Routinely Monitored Construction: NOT KNOWN
Date of Completion for SWM/BMP Facility: APRIL / MAY 2012
Date of Record Drawing/Construction Certification Submittal: 05-14-2012

(Note: Record Drawing and Construction Certifications are required within thirty (30) days of the completion of Stormwater Management and/or BMP facility construction. Record Drawings and Construction Certifications must be reviewed and approved by the James City County Environmental Division prior to final inspection, acceptance and bond or surety release.)

Section 3 - Owner / Designer / Contractor Information:

Owner/Developer: *(Note: Site Owner or Applicant responsible for development of the project.)*

Name: HENRY S. BRANSCOME, LLC
Mailing Address: P.O. BOX 6478
WILLIAMSBURG, VA. 23187
Business Phone: 757-221-7221 Fax: 757-221-7220
Contact Person: H.S. BRANSCOME II Title: —

Design Professional: *(Note: Professional Engineer or Certified Land Surveyor responsible for the design and preparation of plans and specifications for the Stormwater Management / BMP facility.)*

Firm Name: AES CONSULTING ENGINEERS
Mailing Address: 5248 OLDE TOWNE RD, SUITE 1
WILLIAMSBURG VA. 23188
Business Phone: 757-253-0040
Fax: 757-220-8994
Responsible Plan Preparer: MATTHEW J. REMBOLD, P.E.
Title: —
Plan Name: JOHN TYLER COMMERCIAL CENTER PARKING VENTURE LANE
Firm's Project No. 7412-03
Plan Date: 08-19-2011
Sheet No.'s Applicable to SWM/BMP Facility: 4 / 8 / / /

BMP Contractor: *(Note: Site Work Contractor directly responsible for construction of the Stormwater Management / BMP facility.)*

Name: HENRY S. BRANSCOME, LLC
Mailing Address: P.O. BOX 6478
WILLIAMSBURG VA 23187
Business Phone: 757-221-7221
Fax: 757-221-7220
Contact Person: ROGER SPRIGG
Site Foreman/Supervisor: " "
Specialty Subcontractors & Purpose (for BMP Construction Only):

Fax: _____
Contact Person: _____
Site Foreman/Supervisor: _____
Specialty Subcontractors and Purpose (for BMP Construction Only): _____

Section 4 - Professional Certifications:

Certifying Professionals: *(Note: A Registered Professional Engineer or Certified Land Surveyor is responsible for preparation of a Record Drawing, sometimes referred to as an As-Built plan, for the drainage system for the project including any Stormwater Management/BMP Facilities. A Registered Professional Engineer is responsible for the inspection, monitoring and certification of Stormwater Management / BMP facilities during its construction.)*

Record Drawing and Construction Certifications for Stormwater Management/BMP Facilities

Record Drawing Certification

Firm Name: LandTech Resources, Inc.
Mailing Address: 205-E Bulifants Boulevard
Williamsburg, Va. 23188
Business Phone: 757-565-1677
Fax: 757-565-0782
Name: William S. Felts
Title: Vice President
Signature: Will S Felts
Date: 05-14-2012

I hereby certify to the best of my knowledge and belief that this record drawing represents the actual condition of the Stormwater Management/BMP facility. The facility appears to conform to the provisions of the approved design plan, specifications, design, and stormwater management plan, except as specifically noted.

COMMONWEALTH OF VIRGINIA
WILLIAM S. FELTS
Lic. No. 3149
5-14-12
LAND SURVEYOR

_____(Seal)
Virginia Registered Professional Engineer or Certified Land Surveyor

Construction Certification

Firm Name: Same
Mailing Address: Same
Business Phone: Same
Fax: Same
Name: Matthew H. Connolly
Title: President
Signature: Matthew H Connolly
Date: 05-14-2012

I hereby certify to the best of my knowledge and belief that this Stormwater Management/BMP facility was monitored and constructed in accordance with the provisions of the approved plan, specifications, and stormwater management plan, except as specifically noted. THIS CERTIFICATION IS BASED ON A POST CONSTRUCTION VISUAL INSPECTION.

COMMONWEALTH OF VIRGINIA
MATTHEW H. CONNOLLY
Lic. No. 48347
5-14-12
PROFESSIONAL ENGINEER

_____(Seal)
Virginia Registered Professional Engineer

Interim or final record drawing and construction certifications are not required for temporary sediment basins which are designed and constructed in accordance with current minimum standards and specifications for temporary sediment basins per the Virginia Erosion and Sediment Control Handbook (VESCH); have a temporary service life of less than eighteen (18) months; and will be removed completely once associated disturbed areas are stabilized, unless a distinct hazard to the public's health, safety and welfare is determined by the Environmental Division due to the size or presence of the structure or due to evidence of improper construction.

(*Note: Dam Height as referenced above is generally defined as the vertical distance from the natural bed of the stream or waterway at the downstream toe of the embankment to the top of the embankment structure in accordance with 4VAC50-20-30, Virginia Impoundment Structure Regulations and the Virginia Dam Safety Program.)

Record Drawings shall provide, at a minimum, all information as shown within these requirements and the attached **RECORD DRAWING CHECKLIST** specific to the type of SWM/BMP facility being constructed. Other additional record data may be formally requested by the James City County Environmental Division. *(Note: Refer to the current edition of the James City County Guidelines for Design and Construction of Stormwater Management BMP's manual for a complete list of acceptable BMP's. Currently there are over 20 acceptable water quality type BMP's accepted by the County.)*

Record Drawings shall consist of blue/black line prints and a reproducible (mylar, sepia, diazo, etc.) set of the approved stormwater management plan including applicable plan views, profiles, sections, details, maintenance plans, etc. as related to the subject SWM / BMP facility. The set shall indicate **"RECORD DRAWING "** in large text in the lower right hand corner of each sheet with record elevations, dimensions and data drawn in a clearly annotated format and/or boxed beside design values. ~~Approved design plan values, dimensions and data shall not be removed~~ or ~~erased~~. Drawing sheet revision blocks shall be modified as required to indicate record drawing status. Elevations to the nearest 0.1' are sufficiently accurate except where higher accuracy is needed to show positive drainage. Certification statements as shown in Section 4 of the Record Drawing and Construction Certification Form, ***or similar forms thereof***, and professional signatures and seals, with dates matching that of the record drawing status in the revision or title block, are also required on all associated record drawing plans, prints or reproducibles.

Submission Requirements. Initial and subsequent submissions for review shall consist of a minimum of one (1) blue/black line set for record drawings and one copy of the construction certification documents with appropriate transmittal. Under certain circumstances, it is understood that the record drawing and construction certification submissions may be performed by different professional firms. Therefore, record drawing submission may be in advance of construction certification or vice versa. Upon approval and prior to release of bond/surety, final submission shall include one (1) reproducible set of the record drawings, one (1) blue/black line set of the record drawings and one (1) copy of the construction certification. Also for current and/or future incorporation into the County BMP database and GIS system, it is requested that the record drawings also be submitted to the Environmental Division on a diskette or CD-ROM in an acceptable electronic file format such as *.dxf, *.dwg, etc. or in a standard scanned and readable format. The electronic file requirement can be discussed and coordinated with Environmental Division staff at the time of final submission.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

I. Methods and Presentation: *(Required for all Stormwater Management / BMP facilities.)*

XX 1. All constructed facilities meet approved design plans, unless otherwise shown. Record information or deviations from approved design plan shown in clearly annotated format and/or boxed beside design values.

XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.

XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).

N/A 4. All plan sheet revision blocks modified to indicate date and record drawing status.

XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

II. Minimum Standards: *(Required for all Stormwater Management / BMP facilities, as applicable.)*

XX 1. All requirements of Section I (Methods and Presentation) apply to this section.

XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.

N/A 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.

N/A 4. Top widths, berm widths and embankment side slopes.

N/A 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.

N/A 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.

N/A 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.

N/A 8. Elevation of the principal spillway crest or outlet crest of the structure.

N/A 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.

N/A 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.

N/A 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacings (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.

N/A 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**

N/A 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**

N/A 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.

N/A 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.

N/A 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.

N/A 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan.

N/A 18. Maintenance plan taken from approved design plan transposed onto record drawing set.

N/A 19. Fencing location and type, if applicable to facility.

N/A 20. BMP vicinity properly cleaned of stockpiles and construction debris.

N/A 21. No visual signs of erosion or channel degradation immediately downstream of facility.

XX 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

N/A

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

III. Group A - Wet Ponds *(Includes A-1 Small Wet Ponds; A-2 Wet Ponds; A-3 Wet Ext Det Ponds.)*

A1. All requirements of Section II, Minimum Standards, apply to Group A facilities.

A2. Principal spillway consists of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.

A3. Sediment forebays or pretreatment devices provided at inlets to pond. Generally 4 to 6 ft. deep.

A4. Access for maintenance and equipment is provided to the forebay(s). Access corridors are at least 12 ft. wide, have a maximum slope of 15 percent and are adequately stabilized to withstand heavy equipment or vehicle use.

A5. Adequate fixed vertical sediment depth markers installed in the forebay(s) for future sediment monitoring purposes.

A6. Pond liner (if required) provided. Either clay liners, polyliners, bentonite liners or use of chemical soil additives based on requirements of the approved plan.

A7. Minimum 6 percent slope safety bench extending a minimum of 15 feet outward from normal pool edge and/or an aquatic bench extending a minimum of 10 feet inward from the normal shoreline with a maximum depth of 12 inches below the normal pool elevation, if applicable, per the approved design plans. (Note: Safety benches may be waived if pond side slopes are no steeper than 4H:1V).

A8. No trees are present within a zone 15 feet around the embankment toe and 25 feet from the principal spillway structure.

A9. Wet permanent pool, typically 3 to 6 feet deep, is provided and maintains level within facility.

A10. Low flow orifice has a non-clogging mechanism.

A11. A pond drain pipe with valve was provided.

A12. Pond side slopes are not steeper than 3H:1V, unless approved plan allowed for steeper slope.

A13. End walls above barrels (outlet pipe) greater than 48 inch in diameter are fenced to prevent a fall hazard.

N/A

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

IV. Group B - Wetlands *(Includes B-1 Shallow Marsh; B-2 Ext Det Shallow Wetlands; B-3 Pond Wetland System and B-4 Pocket Wetland)*

_____ B1. Same requirements as Group A Wet Ponds.

_____ B2. Minimum 2:1 length to width flow path provided across the facility.

_____ B3. Micropool provided at or around outlet from BMP (generally 3 to 6 ft. deep).

_____ B4. Wetland type landscaping provided in accordance with approved plan. Includes correct pondscaping zones, plant species, planting arrangements, wetland beds, etc. Wetland plants include 5 to 7 emergent wetland species. Individual plants at 18 inches on center in clumps.

_____ B5. Adequate wetland buffer provided (Typically 25 ft. outward from maximum design water surface elevation and 15 ft. setback to structures).

_____ B6. No more than one-half (½) of the wetland surface area is planted.

_____ B7. Topsoil or wetland mulch provided to support vigorous growth of wetland plants.

_____ B8. Planting zones staked or flagged in field and locations subsequently established by appropriate field surveying methods for record drawing presentation.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

N/A

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

V. Group C - Infiltration Practices

(Includes C-1 Infiltration Trench; C-2 Infiltration Trench; C-3 Infiltration Basin; and C-4 Infiltration Basin)

___ C1. All requirements of Section II, Minimum Standards, apply to Group C facilities as applicable.

___ C2. Facility is not located on fill slopes or on natural ground in excess of six (6) percent.

___ C3. Pretreatment devices provided prior to entry into the infiltration facility. Acceptable pretreatment devices include sediment forebays, sediment basins, sediment traps, sump pits or inlets, grass channels, plunge pools or other acceptable measures.

___ C4. Three (3) or more of the following pretreatment devices provided to protect long term integrity of structure: grass channel; grass filter strip; bottom sand layer; upper filter fabric layer; use of washed bank run gravel aggregate.

___ C5. Sides of infiltration practice lined with filter fabric.

___ C6. Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.

___ C7. Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility.

___ C8. Minimum one hundred (100) foot separation horizontally from any known water supply well and minimum one hundred (100) foot separation upslope from any building.

___ C9. Minimum twenty-five (25) foot separation down gradient from any structure.

___ C10. Stormwater outfalls provided for overflow associated with larger design storms.

___ C11. No visual signs of erosion or channel degradation immediately downstream of facility.

___ C12. Facility does not currently cause any apparent surface or subsurface water problems to downgrade properties.

___ C13. Observation well provided.

___ C14. Adequate, direct access provided to the facility for future maintenance, operation and inspection.

N/A

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

VI. Group D - Filtering Systems *(Includes D-1 Bioretention Cells; D-2 Surface Sand Filters; D-3 Underground Sand Filters; D-4 Perimeter Sand Filters; D-5 Organic Filters; and D-6 Pocket Sand Filters)*

_____ D1. All requirements of Section II, Minimum Standards, apply to Group D facilities.

_____ D2. Sediment pretreatment devices provided.

_____ D3. For D-1 BMPs (Bioretention Cells), pretreatment consisting of a grass filter strip below level spreader (deflector); a gravel diaphragm; and mulch and planting soil layers were provided.

_____ D4. For D-1 BMPs (Bioretention Cells), plantings consist of native plant species; vegetation provided was based on zones of hydric tolerances; trees and understory of shrubs and herbaceous materials were provided; woody vegetation is absent from inflow locations; and trees are located around facility perimeter.

_____ D5. Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.

_____ D6. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed .

_____ D7. Filtering system is off-line from storm drainage conveyance system.

_____ D8. Overflow outlet has adequate erosion protection.

_____ D9. Deflector, diversion, flow splitter or regulator structure provided to divert the water quality volume to the filtering structure.

_____ D10. Minimum four (4) inch perforated underdrain provided in a clean aggregate envelope layer beneath the facility.

_____ D11. Minimum fifty (50) foot separation from any slope fifteen (15) percent or greater. Minimum one hundred (100) foot separation horizontally from any known water supply well. Minimum one hundred (100) foot separation upslope and twenty-five (25) foot separation downslope from any building.

_____ D12. Stabilization and acceptable vegetative cover established over contributing drainage area prior to conveyance of stormwater to the facility.

_____ D13. No visual signs of erosion or channel degradation immediately downstream of facility.

_____ D14. Adequate, direct access provided to the pretreatment area and/or filter bed for future maintenance.

N/A

STORMWATER MANAGEMENT / BMP FACILITIES
AS-BUILT PLAN CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

VII. Group E - Open Channel Systems *(Includes E-1 Wet Swales (Check Dams); E-2 Dry Swales; and E-3 Biofilters)*

E1. All requirements of Section II, Minimum Standards, apply to Group E facilities as applicable.

E2. Open channel system has constructed longitudinal slope of less than four (4) percent.

E3. No visual signs of erosion in the open channel system's soil and/or vegetative cover.

E4. Open channel side slopes are no steeper than 2H:1V at any location. Preferred channel sideslope is 3H:1V or flatter.

E5. No visual signs of ponding are present at any location in the open channel system, except at rock check dam locations for E-1 systems (Wet Swales).

E6. For E-2 BMPs (Dry Swales), an underdrain system was provided.

E7. Treated timber or rock check dams provided as pretreatment devices for the open channel system.

E8. Gravel diaphragm provided in areas where lateral sheet flow from impervious surfaces are directly connected to the open channel system.

E9. Grass cover/stabilization in the open channel system appears adaptable to the specific soils and hydric conditions for the site and along the channel system.

E10. Open channel system areas with grass covers higher than four (4) to six (6) inches were properly mowed.

E11. Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.

E12. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.

E13. For E-3 BMPs (Biofilters), the bottom width is six (6) feet maximum at any location.

E14. For E-3 BMPs (Biofilters), sideslopes are 3H:1V maximum at any location.

E15. For E-3 BMPs (Biofilters), the constructed channel slope is less than or equal to three (3) percent at any location.

E16. For E-3 BMPs (Biofilters), the constructed grass channel is approximately equivalent to the constructed roadway length.

N/A

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

VIII. Group F - Extended Dry Detention *(Includes F-1 Timber Walls; and F-2 Dry Extended Detention with Forebay)*

F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.

F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.

F3. Timber wall BMP used in intermittent stream only. (ie. Prohibited in perennial streams.)

F4. Forebay provided approximately 20 ft. upstream of the facility. Forebays generally 4 to 6 feet in depth.

F5. A reverse slope pipe, vertical stand pipe or mini-barrel and riser was provided to prevent clogging.

F6. Principal spillway and outlet barrel provided consisting of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.

F7. Mini-barrel and riser, if used, contains a removable trash rack to reduce clogging.

F8. Low flow orifice, if used, has a minimum diameter of three (3) inches or two (2) inches if internal orifice control was utilized and a small, cage type external trash rack.

F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.

F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.

F11. Protection against erosion and scour from the low flow orifice and weir-flow trajectory provided.

F12. Stilling basin or standard outlet protection provided at principal spillway outlet.

F13. Adequate, direct access provided to the facility. Access corridor to facility is at least ten (10) feet wide, slope is less than twenty (20) percent and appropriate stabilization provided for equipment and vehicle use. Access extends to forebay, standpipe and timber wall, as applicable.

F14. No visual signs of undercutting of timber walls or clogging of the low orifice were present.

F15. No visual signs of erosion or channel degradation immediately downstream of facility.

F16. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.

N/A

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

IX. Group G - Open Spaces *(Includes All Open Space Types G-1; G-2; and G-3)*

G1. All requirements of Section II, Minimum Standards, apply to Group G facilities as applicable.

G2. Constructed impervious areas appear to conform with locations indicated on the approved plan and appear less than sixty (60) percent impervious in accordance with the requirements of the James City County Chesapeake Bay Preservation Ordinance.

G3. Dedicated open space areas are in undisturbed common areas, conservation easements or are protected by other enforceable instruments that ensures perpetual protection.

G4. Provisions included to clearly specify how the natural vegetated areas utilized as dedicated open space will be managed and field identified (marked).

G5. Adequate protection measures were implemented during construction to protect the defined dedicated open space areas.

G6. Dedicated open space areas were not disturbed during construction (ie. cleared, grubbed or graded).

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

X. Storm Drainage Systems (Associated with BMP's Only)

(Includes all incidental stormwater drainage conveyance systems associated with SWM/BMP facilities such as onsite or offsite storm drains, open channels, inlets, manholes, junctions, outlet protections, deflectors, etc. These facilities are external to the treatment function of, but are directly associated with drainage to and/or from a constructed SWM/BMP facility. The intent of this portion of the certification is to accurately identify the type and quantity of inflow or outflow points associated with the facility for future reference. The Professional may use his/her own discretion to determine inclusive facilities to meet the intent of this section. As a general rule, storm drainage systems would include incidental facilities to the nearest access structure upslope or downslope from the normal physical limits of the facility or 800 feet of storm drainage conveyance system length, whichever is less.)

XX SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.

XX SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.

XX SD3. Type, top elevation and invert elevation of all access type structures (inlets, manholes, etc.).

XX SD4. Material type, size or diameter, class, invert elevations, lengths and slopes for all pipe segments.

XX SD5. Class, length, width and depth of riprap and outlet protections or dimensions of special energy dissipation structures.

XII. Other Systems

N/A

(Includes any non-typical, specialty, manufactured or innovative stormwater management/BMP practices or systems generally accepted for use as or in conjunction with other acceptable stormwater management / BMP practices. Requires evidence of prior satisfactory industry use and prior Environmental Division approval, waiver or exception .)

____ O1. All requirements of Section II, Minimum Standards, apply to this section.

____ O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.

XIII. References

(The James City County Record Drawing and Construction Certification Forms and Checklists for Stormwater Management / BMP facilities were developed using the following sources and references.)

- ☐ Baltimore County, Maryland Soil Conservation District, As-Built Stormwater Management Pond Checklist.
- ☐ James City County, Virginia, Guidelines for Design and Construction of Stormwater Management BMP's (October 1999).
- ☐ James City County, Virginia, Stormwater Detention/Retention Basin Design Checklist and Erosion and Sediment Control and Stormwater Management Design Plan Checklists.
- ☐ James City County Stormwater Policy Framework, Final Report of the James City County BMP Policy Project, October 1998, The Center for Watershed Protection.
- ☐ Prince Georges County, Maryland, As-Built Requirements Retention or Detention Pond/Basin.
- ☐ Prince William County, Virginia, Stormwater Management Fact Sheet.
- ☐ Stafford County, Virginia, As-Built Plan Checklist.
- ☐ Stormwater Management Design Manual, NRCS Maryland Code No. 378, Pond Standards and Specifications.
- ☐ USEPA/Watershed Management Institute, Stormwater Management Inspection Forms.
- ☐ Virginia Impounding Structure Regulations (Dam Safety), Department of Conservation & Recreation, 1997.
- ☐ Virginia Erosion and Sediment Control Handbook, Third Edition 1992, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.
- ☐ Virginia Stormwater Management Handbook, 1999 edition, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.

File: Shared\SWMProg\BMP\Certif\RDCC_fillable.wpd

COPY

COUNTY OF JAMES CITY, VIRGINIA

DECLARATION OF COVENANTS
INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

Please type or print legibly in black ink. Covenantor(s) should submit this form to the JCC Engineering and Resource Protection Division, 101-E Mounts Bay Road, Williamsburg, VA 23185.

THIS DECLARATION OF COVENANTS, made this 7 day of October, 2011, between Henry S. Branscome, LLC, and all successors in interest, ("COVENANTOR(S)"), owner(s) of the following property:

Parcel Identification Number(s): 4711300003
Legal Description(s): 3.222 acres, L-3 John Tyler Commercial Center, 3317 Venture Ln

Project or Subdivision Name: John Tyler Commercial Center Parking
Document/Instrument No(s): 010010878
or Deed Book _____, Page No. _____,
and the County of James City, Virginia ("COUNTY.")

WITNESSETH:

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

1. The COVENANTOR(S) shall provide maintenance for the drainage system including any runoff control facilities, conveyance systems and associated easements, hereinafter referred to as the "SYSTEM," located on and serving the above-described property to ensure that the SYSTEM is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations. The SYSTEM shall not include any elements located within any Virginia Department of Transportation rights-of-way.

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

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

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

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

Prepared by (Name, Address & Phone):
Henry S. Branscome LLC
P O Box 6478
Williamsburg, VA 23187
Attn: Roger Sprigg

Return to:
JCC Attorney's Office
101-C Mount's Bay Road
Williamsburg, VA 23185
(757) 253-6612

Instrument No. 110021070
Recorded on October 14, 2011

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

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

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

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

IN WITNESS WHEREOF, the COVENANTOR(S) has executed this DECLARATION OF COVENANTS as of the date first above written.

COVENANTOR(S)

Henry S. Branscome II

Signature

Henry S. Branscome II owner/Manager

Print Name and Title

ACKNOWLEDGMENT

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF James City, to wit:

I hereby certify that on this 7th day of October, 2011, before the subscribed, a Notary Public for the Commonwealth of Virginia, personally appeared Henry S. Branscome, II and did acknowledge the foregoing instrument to be his/her Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 7th day of October, 2011.

[SEAL] LEIGH ANNE ROBERTS
Notary Public
Commonwealth of Virginia
306384
My Commission Expires Sep 30, 2013

Notary Public

Notary Registration Number: 306384

My Commission expires: 9-30-13

Approved as to form:

County Attorney

Drainage1_pre_doc
(Revised 5-11)

Project Name: JOHN TYLER COMMERCIAL PARK'N
Location: VENTURE LANE
Project Number:
Date of Inspection: 11/9/2011
Inspector(s): G. Johnson
Date: 11/9/2011
Time: 1130

Closed Storm Drain System Construction Inspection Checklist

Development Status (Active, Inactive, Complete):

Stage of Construction (Pre-Construction, Installation, etc):

Key Questions		
Item	X	Comments
1. Type of closed pipe system		
a. Round	X	
b. Elliptical		
c. Other		
2. Type of pipe material		
a. Reinforced concrete pipe (RCP)	X	
b. HPDE		
c. Corrugated metal		
d. Other		

A. Pre-Construction S = Satisfactory U = Unsatisfactory N/A = Not Applicable				
Item	S	U	N/A	Comments
1. Pre-construction meeting			X	
a. Review of plan details, and sequence of construction			X	
b. Review of required inspections, geo-tech reports, checklists & certificates			X	

B. Site Preparation S = Satisfactory U = Unsatisfactory N/A = Not Applicable				
Item	S	U	N/A	Comments
1. Pipe and structures delivered and inspected prior to construction	X			
a. Inspect for material, diameter, dimensions and condition	X			

C. Excavation/Grading S = Satisfactory U = Unsatisfactory N/A = Not Applicable				
Item	S	U	N/A	Comments
1. Excavation and grading conform to plans				
a. Trench bottom shaped to permit barrel of pipe to be in direct contact with soil or bedding			X	
b. Areas excavated below established grade shall be backfilled with VDOT #25 or 26 aggregate (unless water is encountered - then #57 aggregate shall be used).				DID NOT OBSERVE BACK FILL GEOTECH ON SITE 95% COMP. VERIFIED

2. All earthwork shall be in conformance with VDOT Standard and Specification #303	X			

D. Installation S = Satisfactory, U = Unsatisfactory, N/A = Not Applicable				
Item	S	U	N/A	Comments
1. Bedding per VDOT 302.03(a)2(b)				
a. Material shall be VDOT #25 or #26 aggregate or as specificied on the approved plans (unless water is encountered - then #57 aggregate shall be used).				DID NOT OBSERVE BEDDING
b. Shall be lightly compacted and shaped so pipe is in full contact with bedding	X			
c. Shall be shaped to accommodate the bell when bell and spigot pipe is used	X			
2. Placing Pipe per VDOT 302.03(a)2c				
a. Pipe shall be placed beginning at downstream end with bell or groove ends of rigid pipe facing upstream	X			
b. Pipe shall be inspected before backfill is placed	X			
3. Joining Pipe per VDOT 302.03(a)2(d)				
a. Rigid pipe sections shall have ends fully entered and inner surfaces flush and even			X	
b. Joints shall be sealed to form a leak-resistant joint			X	
c. Flexible pipe sections shall be firmly joined by approved coupling bands to form a leak-resistant joint			X	
d. When pipes enter structure, the inside of the pipe/structure joint shall be flush and fully mortared			X	
e. Lift holes in rigid pipe shall be plugged with a lift hole plug furnished by the manufacturer (302.03)			X	
4. Backfill shall be compacted in horizontal layers not more that six inches in thickness, loose measurement. VDOT 303.04(g)	X			
5. Compaction of backfill shall be in accordance with VTM-1 to the following densities:	X			
a. 95% beneath pavement, walks and road shoulders	X			VERBAL FROM GEO TECH 95%
b. 90% in other unpaved areas			X	
6. Testing and Inspection				
a. Each lift shall be tested for compaction on alternating sides of the pipe at intervals not to exceed 300 feet	X			
b. Pipe shall be inspected before any backfill is placed. (VDOT 302.03(a)2c)	X			

E. Final Inspection S = Satisfactory; U = Unsatisfactory; N/A = Not Applicable				
Item	S	U	N/A	Comments
1. Pipes and structures shall be free of sediment and debris	X			
2. All inlet protection measures removed			X	
3. All joints sealed	X			FABRIC AND SEAL
4. Outlet protection installed and operational			X	
5. Configuration and dimensions of pipe system conforms with approved plans	X			

G. Permit Approval and Documentation S = Satisfactory; U = Unsatisfactory; N/A = Not Applicable				
Item	S	U	N/A	Comments
1. Construction certification submitted and				
2. As-built plans submitted and approved				
3. Performance bond status				
a. Not released				
b. Partial release				
c. Full release				
4. Certificate of completion issued				

Additional Comments:

Actions to be Taken:		X	
1. No action necessary; continue routine			
2. Correct noted deficiencies			Correct by:
a.	1st notice		
b.	2nd notice		
3. Submit modifications to project plans			Submit by:

rev 9/08

AES
CONSULTING ENGINEERS

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
Phone (757) 253-0040
Fax (757) 220-8994
aesva.com

RECEIVED
MAY 2011
Planning Department

Site Plan
For
Parking Lot Expansion
3317 Venture Lane

Environmental Division
MAY 05 2011
RECEIVED

Environmental Report & Support Calculations
April 29, 2011

COMMONWEALTH OF VIRGINIA
MATTHEW J. REMBOLD
Lic. No. 045773
4/29/11
PROFESSIONAL ENGINEER

Prepared by:
Matthew J. Rembold, P.E.

Table of Contents

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    a. Existing Concrete Channel Calculations
        i. Outlet Protection
    b. Storm Sewer #1 (SS)
        i. Outlet Protection

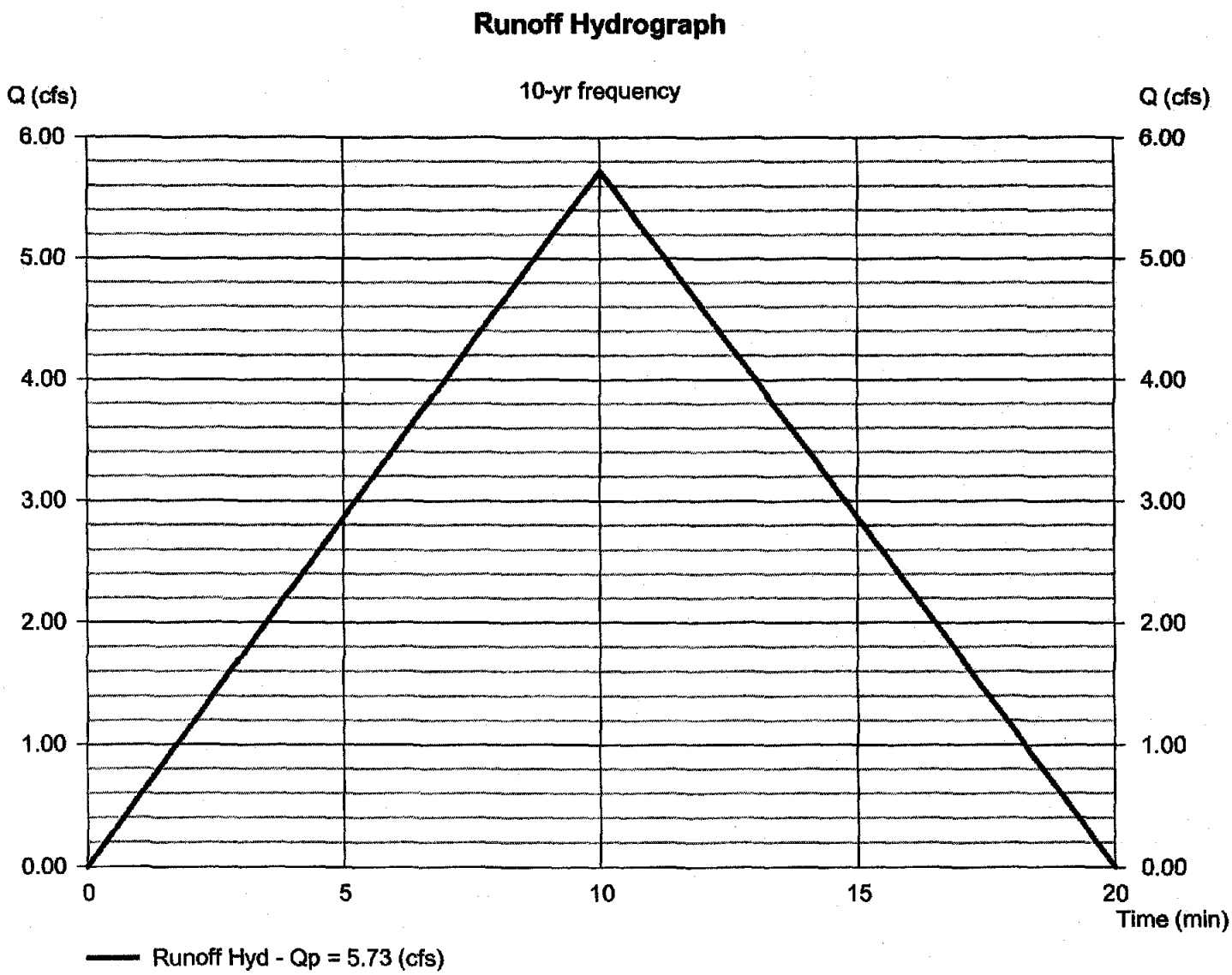
Hydrology Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Monday, May 2 2011

Runoff to Existing Concrete Channel

Hydrograph type	= Rational	Peak discharge (cfs)	= 5.726
Storm frequency (yrs)	= 10	Time interval (min)	= 1
Drainage area (ac)	= 1.260	Runoff coeff. (C)	= 0.75
Rainfall Inten (in/hr)	= 6.059	Tc by User (min)	= 10
IDF Curve	= JamesCity-NW-14.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 3,435 (cuft); 0.079 (acft)



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Monday, May 2 2011

Existing Concrete Channel

Triangular

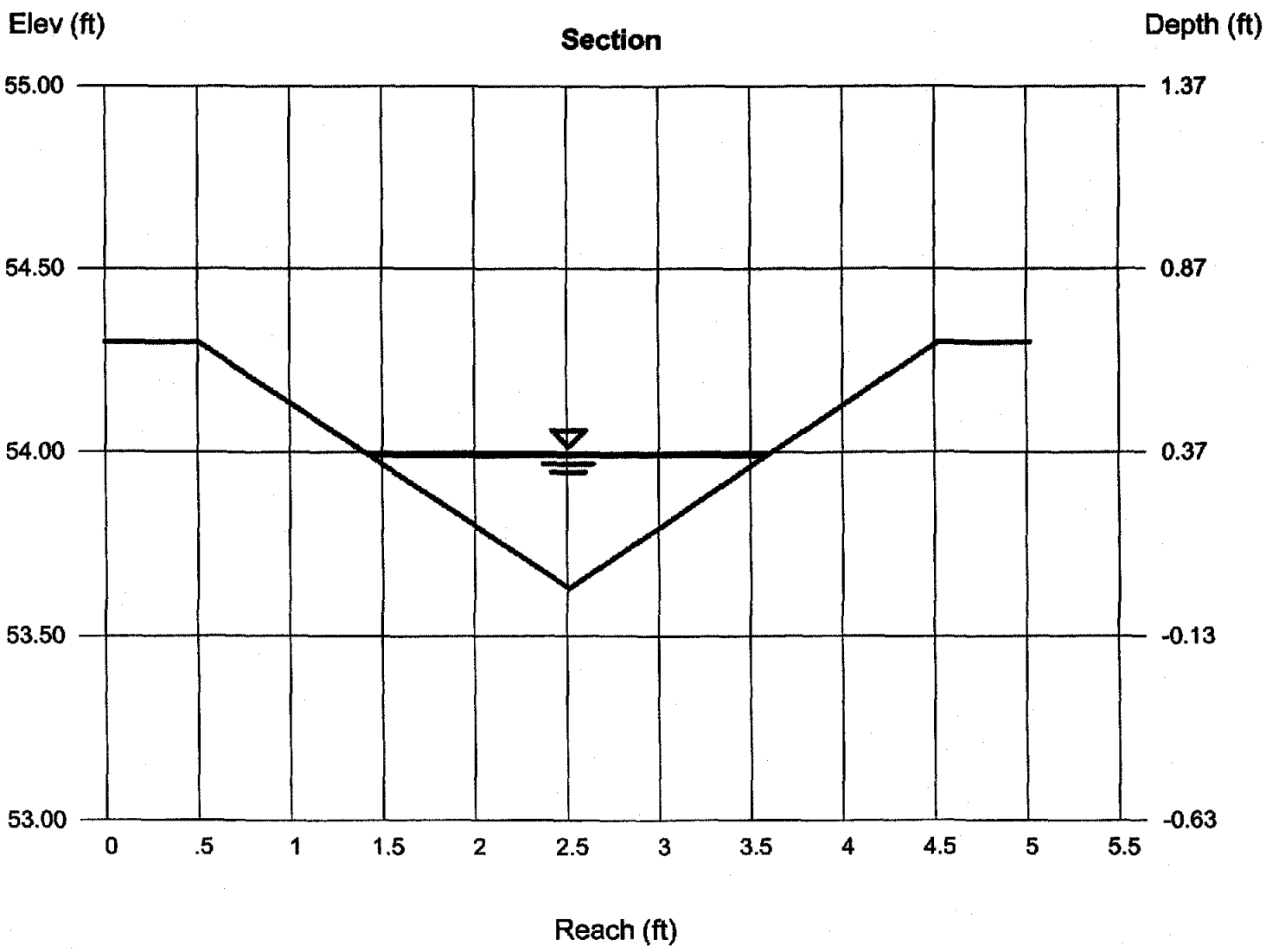
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 0.67
Invert Elev (ft)	= 53.63
Slope (%)	= 20.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.73

Highlighted

Depth (ft)	= 0.36
Q (cfs)	= 5.730
Area (sqft)	= 0.39
Velocity (ft/s)	= 14.74
Wetted Perim (ft)	= 2.28
Crit Depth, Yc (ft)	= 0.67
Top Width (ft)	= 2.16
EGL (ft)	= 3.74



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Monday, May 2 2011

Existing Concrete Channel

Triangular

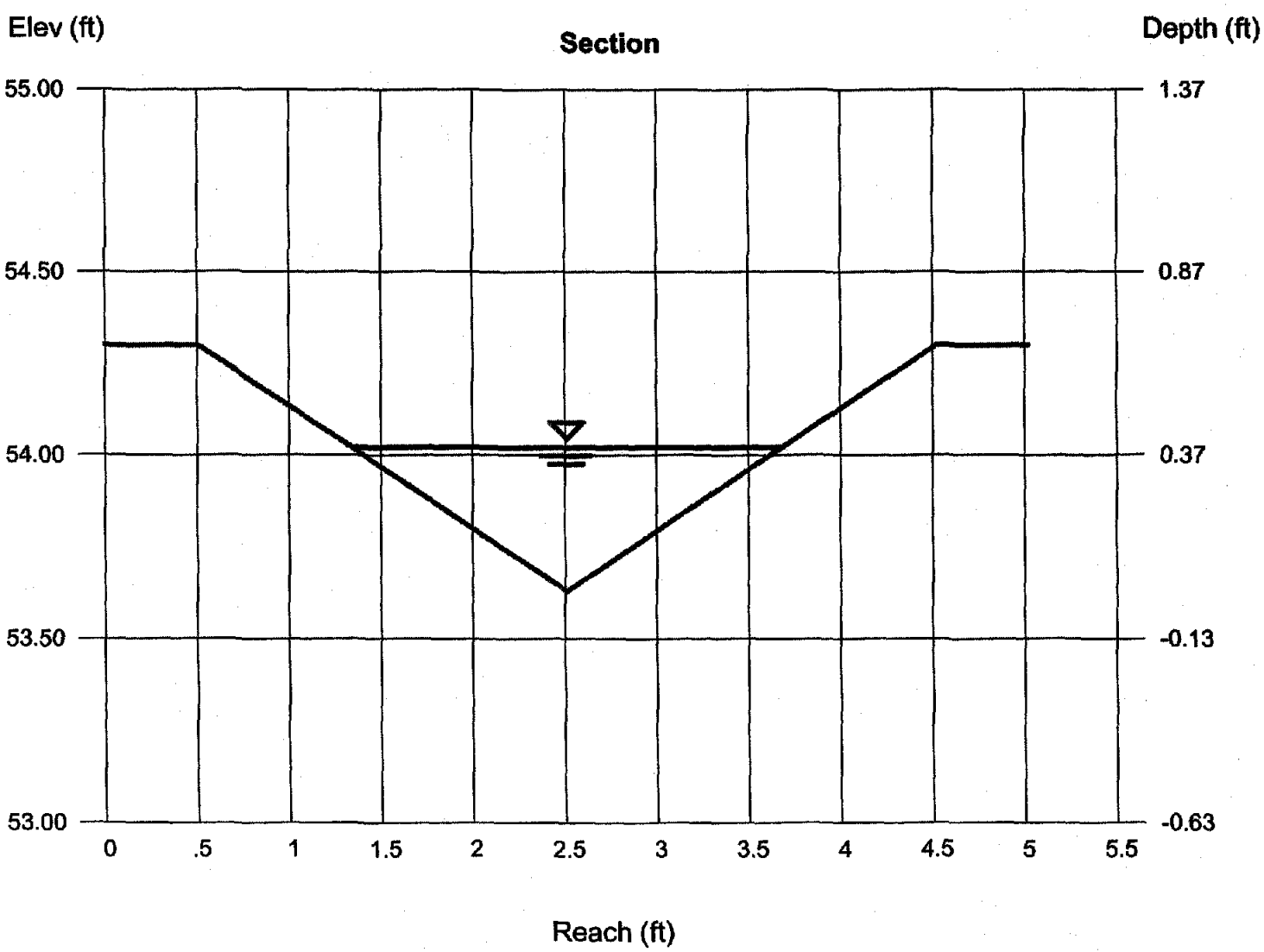
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 0.67
Invert Elev (ft)	= 53.63
Slope (%)	= 20.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 7.56

Highlighted

Depth (ft)	= 0.39
Q (cfs)	= 7.560
Area (sqft)	= 0.46
Velocity (ft/s)	= 16.57
Wetted Perim (ft)	= 2.47
Crit Depth, Yc (ft)	= 0.67
Top Width (ft)	= 2.34
EGL (ft)	= 4.66



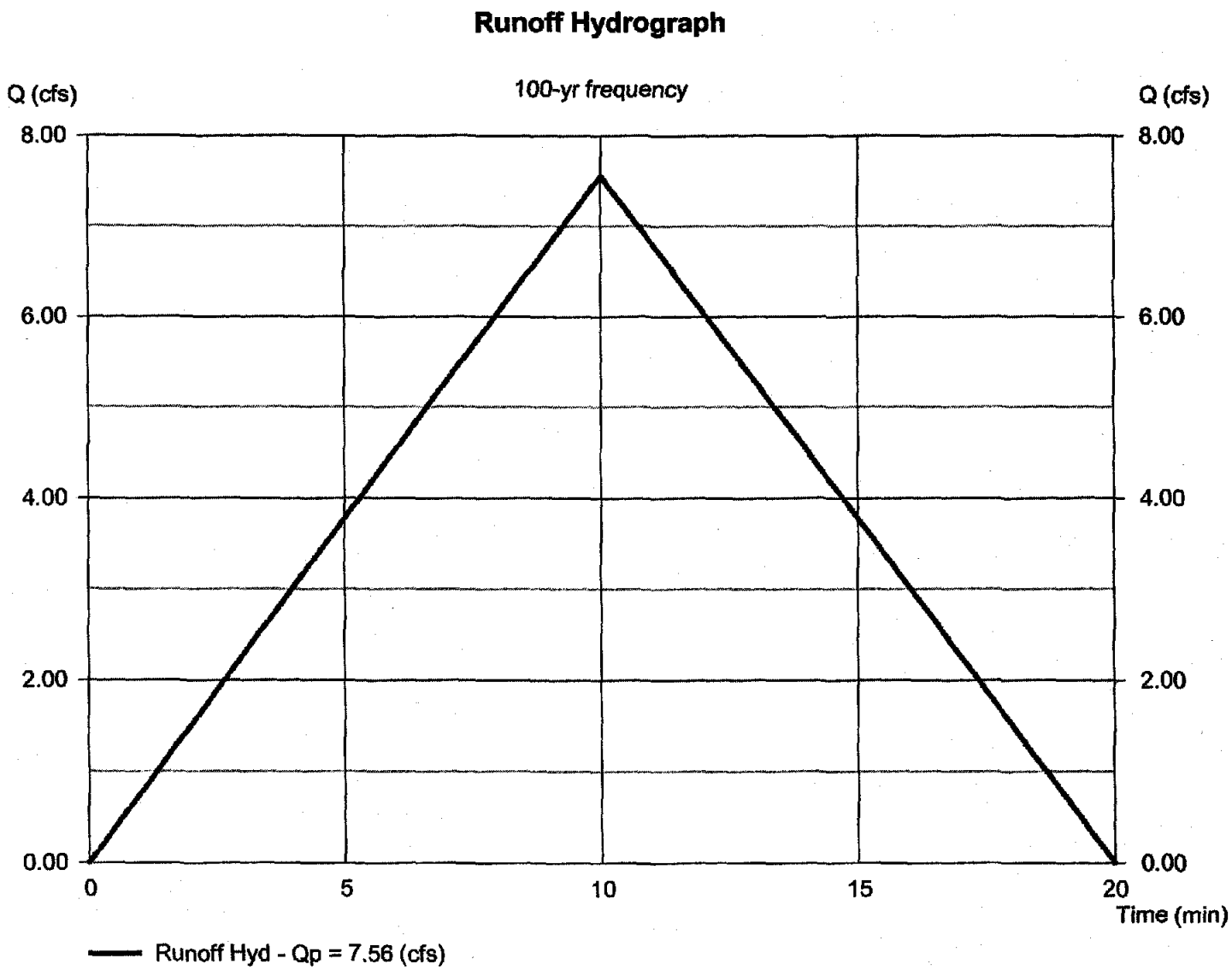
Hydrology Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. Monday, May 2 2011

Runoff to Existing Concrete Channel

Hydrograph type	= Rational	Peak discharge (cfs)	= 7.556
Storm frequency (yrs)	= 100	Time interval (min)	= 1
Drainage area (ac)	= 1.260	Runoff coeff. (C)	= 0.75
Rainfall Inten (in/hr)	= 7.996	Tc by User (min)	= 10
IDF Curve	= JamesCity-NW-14.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 4,534 (cuft); 0.104 (acft)



AES CONSULTING ENGINEERS

Project:	Parking Lot Expansion - Venture Lane
Project No.:	7412-03
Subject:	Riprap Basin
Date:	4/29/2011
Calculated By:	MJR

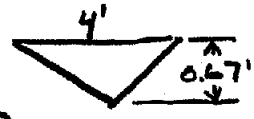
Hydraulic Design of Energy Dissipators for Culverts and Channels
Hydraulic Engineering Circular No. 14, Third Edition
U.S. Department of Transportation Federal Highway Administration - July 2006

Outfall Description: **Existing Storm Outfall**

Pipe Diameter (D) or (W_o) = **1.25** FT.

Flow (Q) = **7.56** CFS

Tailwater Depth (TW) = **0.39** FT.



100 YR EVENT

A= ½(4) x 0.67 = 1.34 SF

Approx. Pipe Equiv.

D= 15 in R=0.625'

A= 0.625² x π = 1.23 SF

Determine brink depth (y_o):

$$(K_u)\frac{Q}{D^{2.5}} = (1)\frac{7.56}{1.75} = 4.33$$

$$\frac{TW}{D} = \frac{0.39}{1.25} = 0.31$$

y_o / D = **0.69** From Figure 3.4

		y_o / D		D			
y_o	=	**0.69**	x	**1.25**	=	**0.86**	FT.

Determine culvert outlet velocity (V_o):

$$\frac{TW}{y_o} = \frac{0.39}{0.86} = 0.452$$

A / D^2 = **0.5780** From Table B.2 where y_o / D = d / D

A	=	A / D^2	x	D^2	=	**0.578**	x	**1.56**	=	**0.90**	SF
V_o	=	Q	÷	A	=	**7.6**	÷	**0.90**	=	**8.4**	FT/S

Determine Froude number (Fr):

y_e = $(A / 2)^{1/2}$ = **0.67** FT.

Fr = $V_o / [(32.2)(y_e)]^{1/2}$ = **1.80**

Try d_{50} / y_e = **0.47** d_{50} = **0.47** x **0.67** = **0.32** FT. or **3.8** IN.

Tailwater Parameter, C_o	Equation 10.2			
TW / y_e = **0.39** ÷ **0.67** = **0.58**				
$TW / y_e < 0.75$	C_o	=	1.4	
$0.75 < TW / y_e < 1.0$	C_o	=	$4.0 (TW/y_e) - 1.6$	
		=	4.0 (**0.58**) - 1.6 =	**0.72**
$1.0 < TW / y_e$	C_o	=	2.4	

h_s / y_e = 0.86 $(d_{50} / y_e)^{-0.55}$ (Fr) - C_o Equation 10.1

h_s / y_e = 0.86 (**0.47** $)^{-0.55}$ (**1.80**) - **1.40**

h_s / y_e = **0.9443**

h_s = **0.9443** x **0.67** = **0.63** FT.

Check

hs / d_{50} = **2.01** ≥ 2 OK

d_{50} / y_e = **0.47** ≥ 0.1 OK

Riprap Basin Size

Length of Dissipator Pool

L_s = 10 x h_s = **6.3** FT.

or L_s = 3 x W_o = **3.8** FT. Use Larger Value L_s = **6.3** FT.

Total Length

L_B = 15 x h_s = **9.5** FT.

or L_B = 4 x W_o = **5.0** FT. Use Larger Value L_B = **9.5** FT.

Width of Apron

W_B = W_o + 2 (L_B/3) = **7.6** FT.

Length of Apron

L_A = L_B - L_S

= **9.5** - **6.3** = **3.2** FT.

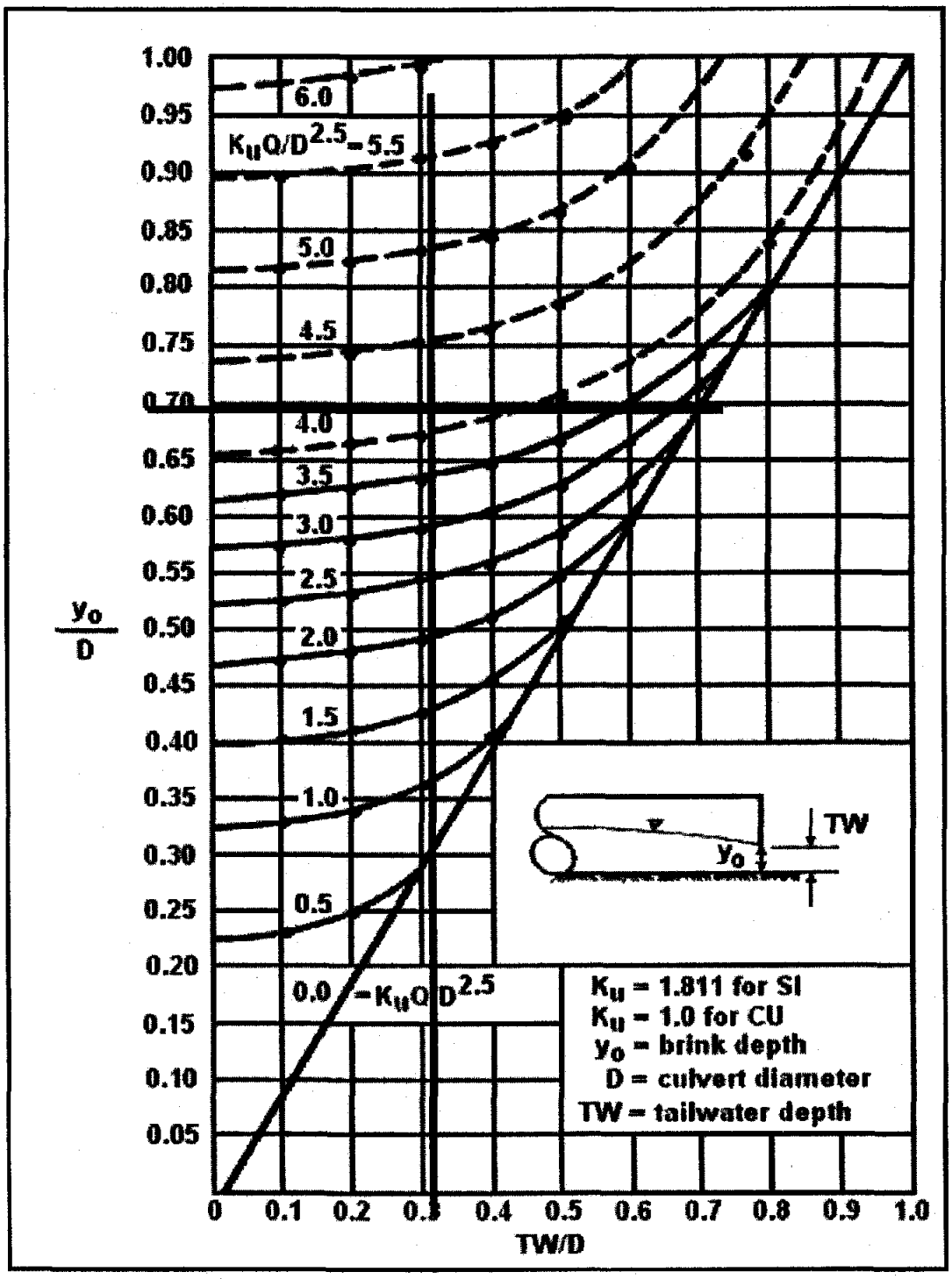


Figure 3.4. Dimensionless Rating Curves for the Outlets of Circular Culverts on Horizontal and Mild Slopes (Simons, 1970)

Table B.2. Uniform Flow in Circular Sections Flowing Partly Full

y/D	A/D^2	R/D	$\frac{(\alpha Qn)}{(D^{8/3} S^{1/2})}$	$\frac{(\alpha Qn)}{(y^{8/3} S^{1/2})}$	y/D	A/D^2	R/D	$\frac{(\alpha Qn)}{(D^{8/3} S^{1/2})}$	$\frac{(\alpha Qn)}{(y^{8/3} S^{1/2})}$
0.01	0.0013	0.0066	0.00007	15.04	0.51	0.4027	0.2531	0.239	1.442
0.02	0.0037	0.0132	0.00031	10.57	0.52	0.4127	0.2562	0.247	0.415
0.03	0.0069	0.0197	0.00074	8.56	0.53	0.4227	0.2592	0.255	1.388
0.04	0.0105	0.0262	0.00138	7.38	0.54	0.4327	0.2621	0.263	1.362
0.05	0.0147	0.0325	0.00222	6.55	0.55	0.4426	0.2649	0.271	1.336
0.06	0.0192	0.0389	0.00328	5.95	0.56	0.4526	0.2676	0.279	1.311
0.07	0.0294	0.0451	0.00455	5.47	0.57	0.1626	0.2703	0.287	1.286
0.08	0.0350	0.0513	0.00604	5.09	0.58	0.4724	0.2728	0.295	1.262
0.09	0.0378	0.0575	0.00775	4.76	0.59	0.4822	0.2753	0.303	1.238
0.10	0.0409	0.0635	0.0097	4.49	0.60	0.4920	0.2776	0.311	1.215
0.11	0.0470	0.0695	0.0118	4.25	0.61	0.5018	0.2799	0.319	1.192
0.12	0.0534	0.0755	0.0142	4.04	0.62	0.5115	0.2821	0.327	1.170
0.13	0.0600	0.0813	0.0167	3.86	0.63	0.5212	0.2842	0.335	1.148
0.14	0.0668	0.0871	0.0195	3.69	0.64	0.5308	0.2862	0.343	1.126
0.15	0.0739	0.0929	0.0225	3.54	0.65	0.5405	0.2988	0.350	1.105
0.16	0.0811	0.0985	0.0257	3.41	0.66	0.5499	0.2900	0.358	1.084
0.17	0.0885	0.1042	0.0291	3.28	0.67	0.5594	0.2917	0.366	1.064
0.18	0.0961	0.1097	0.0327	3.17	0.68	0.5687	0.2933	0.373	1.044
0.19	0.0139	0.1152	0.0365	3.06	0.69	0.5780	0.2948	0.380	1.024
0.20	0.1118	0.1206	0.0406	2.96	0.70	0.5872	0.2962	0.388	1.004
0.21	0.1199	0.1259	0.0448	2.87	0.71	0.5964	0.2975	0.395	0.985
0.22	0.1281	0.1312	0.0492	2.79	0.72	0.6054	0.2987	0.402	0.965
0.23	0.1365	0.1364	0.0537	2.71	0.73	0.6143	0.2998	0.409	0.947
0.24	0.1449	0.1416	0.0585	2.63	0.74	0.6231	0.3008	0.416	0.928
0.25	0.1535	0.1466	0.0634	2.56	0.75	0.6319	0.3042	0.422	0.910
0.26	0.1623	0.1516	0.0686	2.49	0.76	0.6405	0.3043	0.429	0.891
0.27	0.1711	0.1566	0.0739	2.42	0.77	0.6489	0.3043	0.435	0.873
0.28	0.1800	0.1614	0.0793	2.36	0.78	0.6573	0.3041	0.441	0.856
0.29	0.1890	0.1662	0.0849	2.30	0.79	0.6655	0.3039	0.447	0.838
0.30	0.1982	0.1709	0.0907	2.25	0.80	0.6736	0.3042	0.453	0.821
0.31	0.2074	0.1756	0.0966	2.20	0.81	0.6815	0.3043	0.458	0.804
0.32	0.2167	0.1802	0.1027	2.14	0.82	0.6893	0.3043	0.463	0.787
0.33	0.2260	0.1847	0.1089	2.09	0.83	0.6969	0.3041	0.468	0.770
0.34	0.2355	0.1891	0.1153	2.05	0.84	0.7043	0.3038	0.473	0.753
0.35	0.2450	0.1935	0.1218	2.00	0.85	0.7115	0.3033	0.453	0.736
0.36	0.2546	0.1978	0.1284	1.958	0.86	0.7186	0.3026	0.458	0.720
0.37	0.2642	0.2020	0.1351	1.915	0.87	0.7254	0.3018	0.485	0.703
0.38	0.2739	0.2062	0.1420	1.875	0.88	0.7320	0.3007	0.488	0.687
0.39	0.2836	0.2102	0.1490	1.835	0.89	0.7384	0.2995	0.491	0.670
0.40	0.2934	0.2142	0.1561	1.797	0.90	0.7445	0.2980	0.494	0.654
0.41	0.3032	0.2182	0.1633	1.760	0.91	0.7504	0.2963	0.496	0.637
0.42	0.3130	0.2220	0.1705	1.724	0.92	0.7560	0.2944	0.497	0.621
0.43	0.3229	0.2258	0.1779	1.689	0.93	0.7612	0.2921	0.498	0.604
0.44	0.3328	0.2295	0.1854	1.655	0.94	0.7662	0.2895	0.498	0.588
0.45	0.3428	0.2331	0.1929	1.622	0.95	0.7707	0.2865	0.498	0.571
0.46	0.3527	0.2366	0.201	1.590	0.96	0.7749	0.2829	0.496	0.553
0.47	0.3627	0.2401	0.208	1.559	0.97	0.7785	0.2787	0.494	0.535
0.48	0.3727	0.2435	0.216	1.530	0.98	0.7817	0.2735	0.489	0.517
0.49	0.3827	0.2468	0.224	1.500	0.99	0.7841	0.2666	0.483	0.496
0.50	0.3927	0.2500	0.232	1.471	1.00	0.7854	0.2500	0.463	0.463

y = depth of flow, m (ft)
D = diameter of pipe, m (ft)
A = area of flow, m^2 (ft^2)
R= hydraulic radius, m (ft)
Source: USBR (1974)

Q = discharge by Manning's Equation, m^3/s (ft^3/s)
n = Manning's coefficient
S = channel bottom and water surface slope
α = units conversion = 1.49 for SI, 1 for CU

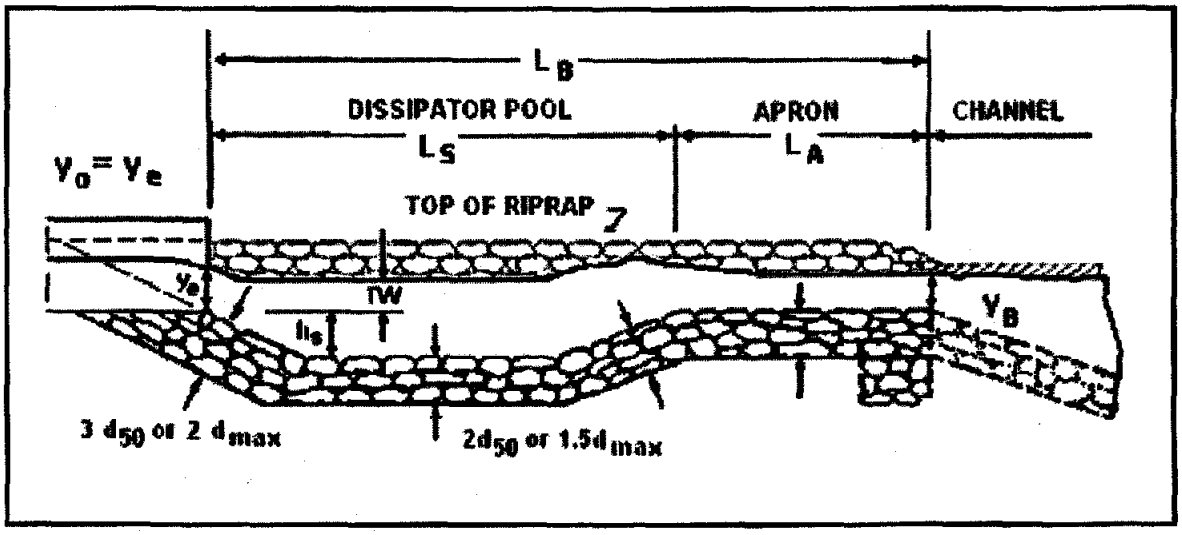


Figure 10.1. Profile of Riprap Basin

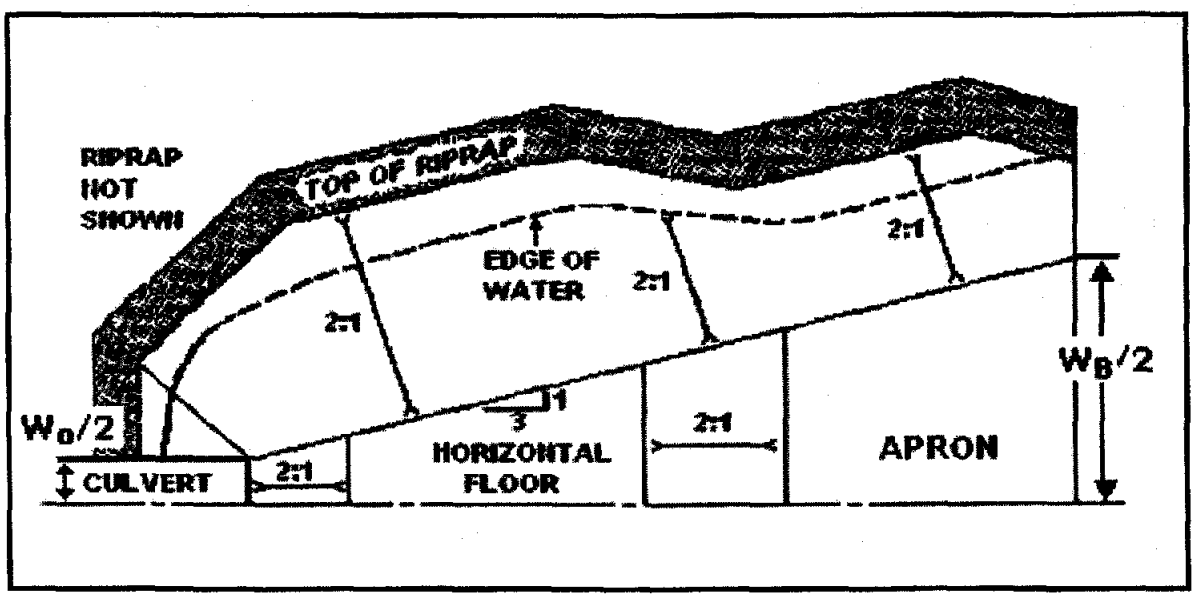
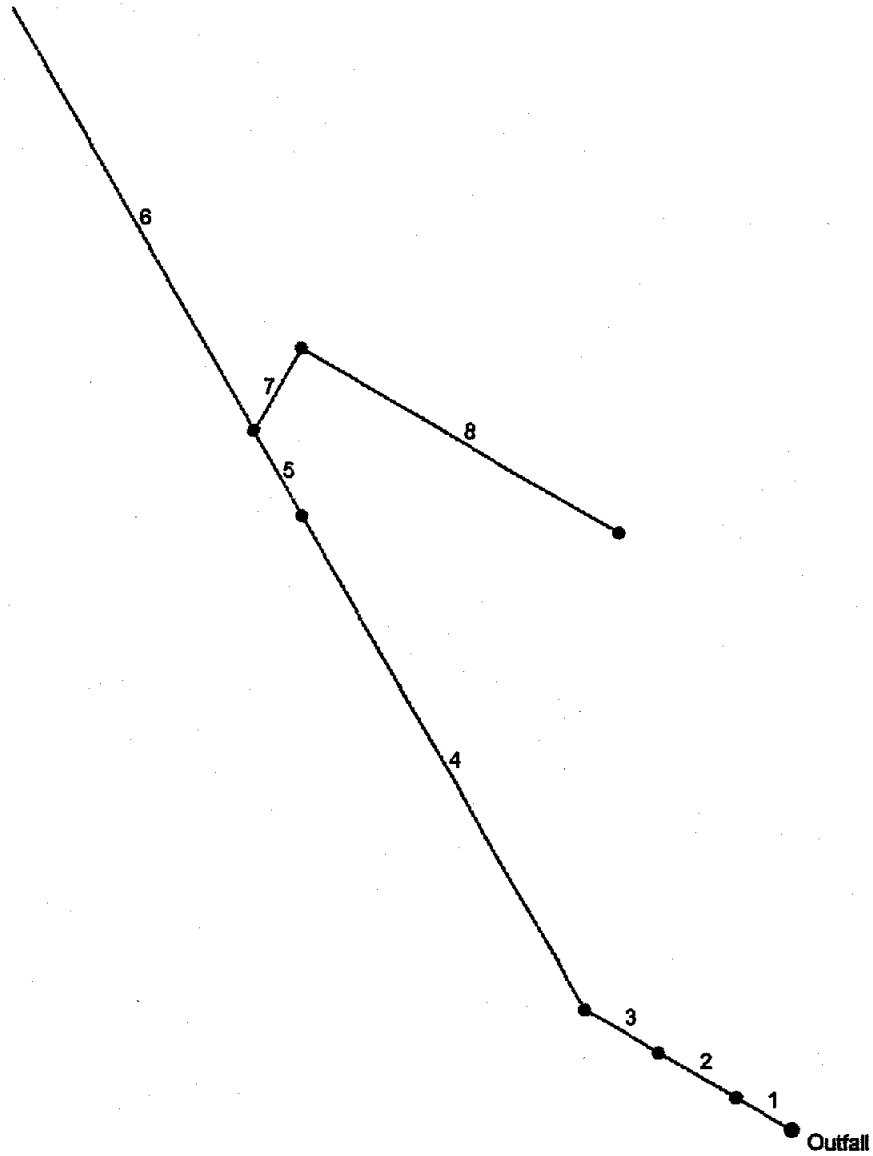


Figure 10.2. Half Plan of Riprap Basin

7412-03 Branscome



Project File: 7412-03 Storm.stm	Number of lines: 8	Date: 05-02-2011

Hydraflow Storm Sewers Extension v6.066

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	25.000	0.56	21.49	0.50	0.28	11.49	5.0	31.0	3.6	40.92	47.12	8.45	30	1.32	43.27	43.60	45.77	45.94	0.00	51.78	
2	1	35.000	0.42	20.93	0.70	0.29	11.21	10.0	31.0	3.6	39.98	62.39	8.59	30	2.31	43.60	44.41	46.11	46.52	51.78	51.67	
3	2	33.000	0.00	20.51	0.00	0.00	10.92	0.0	30.9	3.6	38.97	59.30	8.86	30	2.09	44.41	45.10	46.52	47.19	51.67	53.88	
4	3	223.000	0.46	20.51	0.70	0.32	10.92	10.0	30.5	3.6	39.27	61.10	8.96	30	2.22	45.10	50.05	47.19	52.14	53.88	61.45	
5	4	38.000	1.49	20.05	0.70	1.04	10.60	10.0	30.4	3.6	38.16	60.61	8.75	30	2.18	50.05	50.88	52.14	52.94	61.45	61.66	
6	5	190.000	17.68	17.68	0.50	8.84	8.84	30.0	30.0	3.6	32.07	63.81	7.72	30	2.42	50.88	55.48	52.94	57.37	61.66	55.48	
7	5	37.000	0.17	0.88	0.87	0.15	0.72	5.0	5.6	7.3	5.22	6.46	5.63	15	1.00	55.77	56.14	56.62	57.06	61.66	62.28	
8	7	144.000	0.71	0.71	0.80	0.57	0.57	5.0	5.0	7.5	4.26	6.46	4.21	15	1.00	56.14	57.58	57.51	58.41	62.28	61.50	

7412-03 Branscome | Number of lines: 8 | Run Date: 05-02-2011

NOTES: Intensity = 55.61 / (Inlet time + 10.00) ^ 0.74; Return period = 10 Yrs. ; c = cir e = ellip b = box

AES
CONSULTING ENGINEERS

Project:	Parking Lot Expansion - Venture Lane
Project No.:	7412-03
Subject:	Riprap Basin
Date:	3/16/2011
Calculated By:	MJR

Hydraulic Design of Energy Dissipators for Culverts and Channels
Hydraulic Engineering Circular No. 14, Third Edition
U.S. Department of Transportation Federal Highway Administration - July 2006

Outfall Description: **Existing Storm Outfall**

Pipe Diameter (D) or (W_o) = **2.50** FT.

Flow (Q) = **47.12** CFS

Tailwater Depth (TW) = **1.00** FT. ← 30" OUTFALL FLOWING FULL

Determine brink depth (y_o):

$$(K_u)\frac{Q}{D^{2.5}} = (1)\frac{47.12}{9.88} = 4.77$$

$$\frac{TW}{D} = \frac{1.00}{2.50} = 0.40$$

y_o / D = **0.82** From Figure 3.4

$$y_o = \underset{y_o/D}{0.82} \times \underset{D}{2.50} = 2.05 \text{ FT.}$$

Determine culvert outlet velocity (V_o):

$$\frac{TW}{y_o} = \frac{1.00}{2.05} = 0.488$$

A / D^2 = **0.6893** From Table B.2 where $y_o / D = d / D$

$$A = A/D^2 \times D^2 = 0.6893 \times 6.25 = 4.31 \text{ SF}$$

$$V_o = Q \div A = 47.1 \div 4.31 = 10.9 \text{ FT/S}$$

Determine Froude number (Fr):

$$y_e = (A/2)^{1/2} = 1.47 \text{ FT.}$$

$$Fr = V_o / [(32.2)(y_e)]^{1/2} = 1.59$$

Try d_{50} / y_e = **0.41** d_{50} = **0.41** x **1.47** = **0.60** FT. or **7.2** IN.

Tailwater Parameter, C_o	Equation 10.2		
TW / y_e = **1.00** ÷ **1.47** = **0.68**			
$TW / y_e < 0.75$	C_o	=	1.4
$0.75 < TW / y_e < 1.0$	C_o	=	$4.0 (TW/y_e) - 1.6$
		=	4.0 (**0.68**) - 1.6 = **1.13**
$1.0 < TW / y_e$	C_o	=	2.4

h_s / y_e = 0.86 $(d_{50} / y_e)^{-0.55}$ (Fr) - C_o Equation 10.1

h_s / y_e = 0.86 (**0.41** $)^{-0.55}$ (**1.59**) - **1.40**

h_s / y_e = **0.8343**

h_s = **0.8343** x **1.47** = **1.22** FT.

Check

hs / d_{50} = **2.03** ≥ 2 OK

d_{50} / y_e = **0.41** ≥ 0.1 OK

Riprap Basin Size

Length of Dissipator Pool

L_s = 10 x h_s = **12.2** FT.

or L_s = 3 x W_o = **7.5** FT. Use Larger Value L_s = **12.2** FT.

Total Length

L_B = 15 x h_s = **18.4** FT.

or L_B = 4 x W_o = **10.0** FT. Use Larger Value L_B = **18.4** FT.

Width of Apron

W_B = W_o + 2 (L_B/3) = **14.7** FT.

Length of Apron

L_A = L_B - L_S

= **18.4** - **12.2** = **6.1** FT.

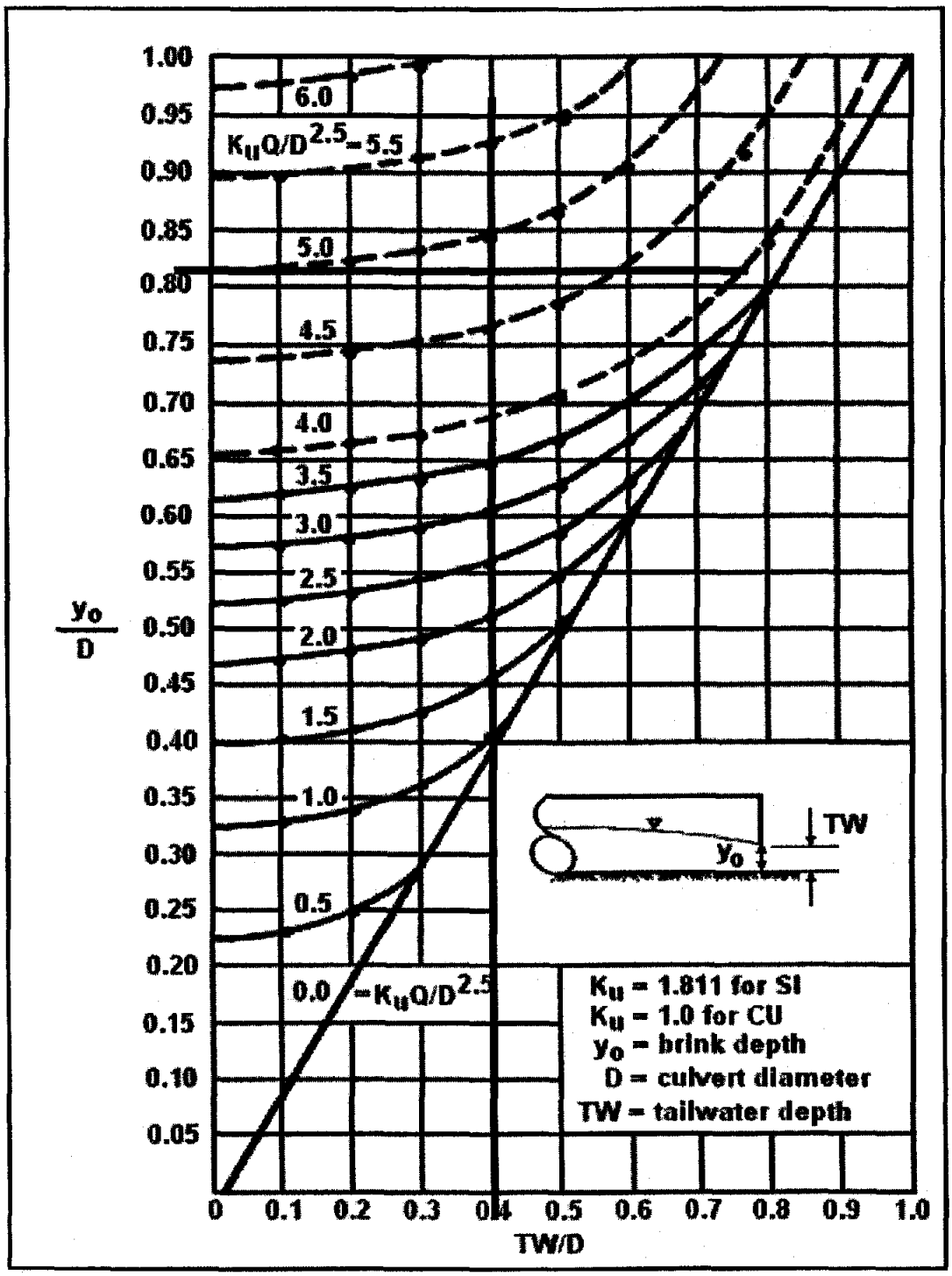


Figure 3.4. Dimensionless Rating Curves for the Outlets of Circular Culverts on Horizontal and Mild Slopes (Simons, 1970)

Table B.2. Uniform Flow in Circular Sections Flowing Partly Full

y/D	A/D^2	R/D	$\frac{(\alpha Qn)}{(D^{8/3} S^{1/2})}$	$\frac{(\alpha Qn)}{(y^{8/3} S^{1/2})}$	y/D	A/D^2	R/D	$\frac{(\alpha Qn)}{(D^{8/3} S^{1/2})}$	$\frac{(\alpha Qn)}{(y^{8/3} S^{1/2})}$
0.01	0.0013	0.0066	0.00007	15.04	0.51	0.4027	0.2531	0.239	1.442
0.02	0.0037	0.0132	0.00031	10.57	0.52	0.4127	0.2562	0.247	0.415
0.03	0.0069	0.0197	0.00074	8.56	0.53	0.4227	0.2592	0.255	1.388
0.04	0.0105	0.0262	0.00138	7.38	0.54	0.4327	0.2621	0.263	1.362
0.05	0.0147	0.0325	0.00222	6.55	0.55	0.4426	0.2649	0.271	1.336
0.06	0.0192	0.0389	0.00328	5.95	0.56	0.4526	0.2676	0.279	1.311
0.07	0.0294	0.0451	0.00455	5.47	0.57	0.1626	0.2703	0.287	1.286
0.08	0.0350	0.0513	0.00604	5.09	0.58	0.4724	0.2728	0.295	1.262
0.09	0.0378	0.0575	0.00775	4.76	0.59	0.4822	0.2753	0.303	1.238
0.10	0.0409	0.0635	0.0097	4.49	0.60	0.4920	0.2776	0.311	1.215
0.11	0.0470	0.0695	0.0118	4.25	0.61	0.5018	0.2799	0.319	1.192
0.12	0.0534	0.0755	0.0142	4.04	0.62	0.5115	0.2821	0.327	1.170
0.13	0.0600	0.0813	0.0167	3.86	0.63	0.5212	0.2842	0.335	1.148
0.14	0.0668	0.0871	0.0195	3.69	0.64	0.5308	0.2862	0.343	1.126
0.15	0.0739	0.0929	0.0225	3.54	0.65	0.5405	0.2988	0.350	1.105
0.16	0.0811	0.0985	0.0257	3.41	0.66	0.5499	0.2900	0.358	1.084
0.17	0.0885	0.1042	0.0291	3.28	0.67	0.5594	0.2917	0.366	1.064
0.18	0.0961	0.1097	0.0327	3.17	0.68	0.5687	0.2933	0.373	1.044
0.19	0.0139	0.1152	0.0365	3.06	0.69	0.5780	0.2948	0.380	1.024
0.20	0.1118	0.1206	0.0406	2.96	0.70	0.5872	0.2962	0.388	1.004
0.21	0.1199	0.1259	0.0448	2.87	0.71	0.5964	0.2975	0.395	0.985
0.22	0.1281	0.1312	0.0492	2.79	0.72	0.6054	0.2987	0.402	0.965
0.23	0.1365	0.1364	0.0537	2.71	0.73	0.6143	0.2998	0.409	0.947
0.24	0.1449	0.1416	0.0585	2.63	0.74	0.6231	0.3008	0.416	0.928
0.25	0.1535	0.1466	0.0634	2.56	0.75	0.6319	0.3042	0.422	0.910
0.26	0.1623	0.1516	0.0686	2.49	0.76	0.6405	0.3043	0.429	0.891
0.27	0.1711	0.1566	0.0739	2.42	0.77	0.6489	0.3043	0.435	0.873
0.28	0.1800	0.1614	0.0793	2.36	0.78	0.6573	0.3041	0.441	0.856
0.29	0.1890	0.1662	0.0849	2.30	0.79	0.6655	0.3039	0.447	0.838
0.30	0.1982	0.1709	0.0907	2.25	0.80	0.6736	0.3042	0.453	0.821
0.31	0.2074	0.1756	0.0966	2.20	0.81	0.6815	0.3043	0.458	0.804
0.32	0.2167	0.1802	0.1027	2.14	0.82	0.6893	0.3043	0.463	0.787
0.33	0.2260	0.1847	0.1089	2.09	0.83	0.6969	0.3041	0.468	0.770
0.34	0.2355	0.1891	0.1153	2.05	0.84	0.7043	0.3038	0.473	0.753
0.35	0.2450	0.1935	0.1218	2.00	0.85	0.7115	0.3033	0.453	0.736
0.36	0.2546	0.1978	0.1284	1.958	0.86	0.7186	0.3026	0.458	0.720
0.37	0.2642	0.2020	0.1351	1.915	0.87	0.7254	0.3018	0.485	0.703
0.38	0.2739	0.2062	0.1420	1.875	0.88	0.7320	0.3007	0.488	0.687
0.39	0.2836	0.2102	0.1490	1.835	0.89	0.7384	0.2995	0.491	0.670
0.40	0.2934	0.2142	0.1561	1.797	0.90	0.7445	0.2980	0.494	0.654
0.41	0.3032	0.2182	0.1633	1.760	0.91	0.7504	0.2963	0.496	0.637
0.42	0.3130	0.2220	0.1705	1.724	0.92	0.7560	0.2944	0.497	0.621
0.43	0.3229	0.2258	0.1779	1.689	0.93	0.7612	0.2921	0.498	0.604
0.44	0.3328	0.2295	0.1854	1.655	0.94	0.7662	0.2895	0.498	0.588
0.45	0.3428	0.2331	0.1929	1.622	0.95	0.7707	0.2865	0.498	0.571
0.46	0.3527	0.2366	0.201	1.590	0.96	0.7749	0.2829	0.496	0.553
0.47	0.3627	0.2401	0.208	1.559	0.97	0.7785	0.2787	0.494	0.535
0.48	0.3727	0.2435	0.216	1.530	0.98	0.7817	0.2735	0.489	0.517
0.49	0.3827	0.2468	0.224	1.500	0.99	0.7841	0.2666	0.483	0.496
0.50	0.3927	0.2500	0.232	1.471	1.00	0.7854	0.2500	0.463	0.463

y = depth of flow, m (ft)
D = diameter of pipe, m (ft)
A = area of flow, m^2 (ft^2)
R= hydraulic radius, m (ft)
Source: USBR (1974)

Q = discharge by Manning's Equation, m^3/s (ft^3/s)
n = Manning's coefficient
S = channel bottom and water surface slope
α = units conversion = 1.49 for SI, 1 for CU

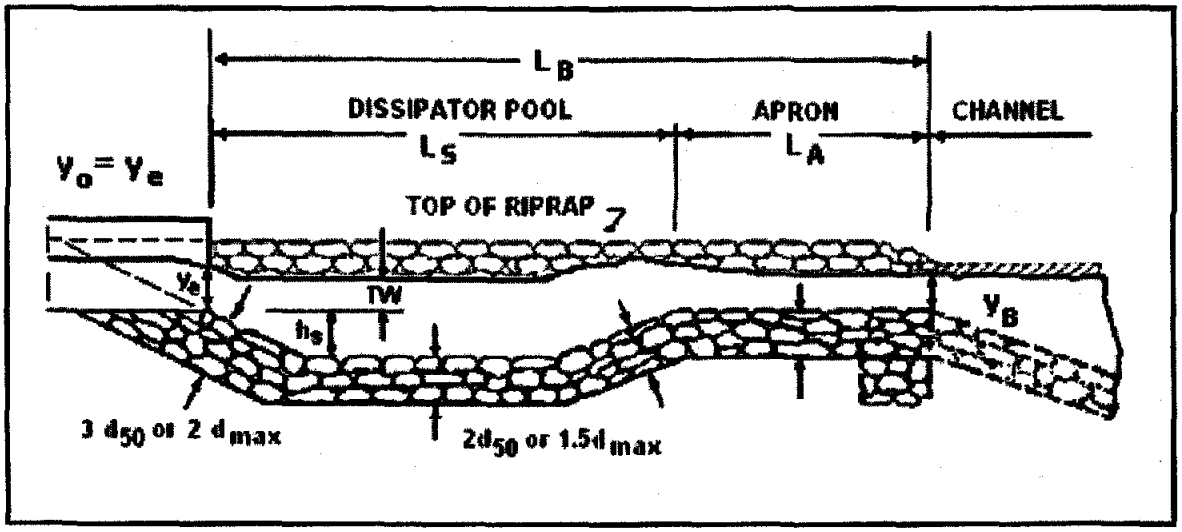


Figure 10.1. Profile of Riprap Basin

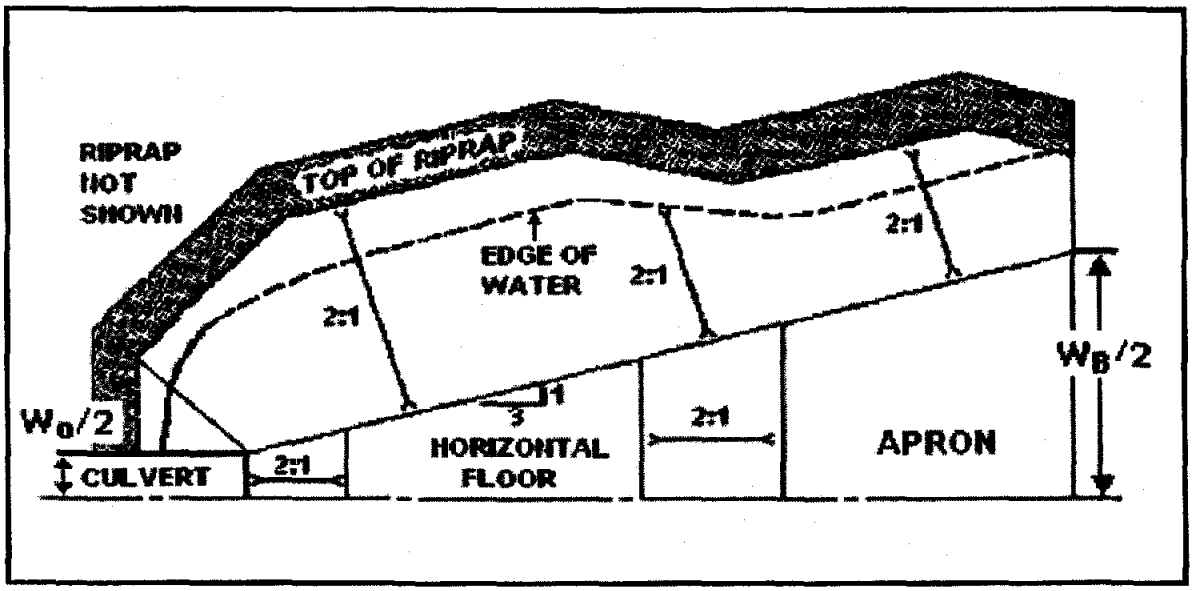


Figure 10.2. Half Plan of Riprap Basin

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Environmental Division

Erosion and Sediment Control and Stormwater Management Design Plan Checklists

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GENERAL INFORMATION

Project Name: PARKING LOT EXPANSION - 3317 VENTURE LN
Owner / Applicant: HENRY S. BRANSCOME, LLC
Plan Preparer: AES Email: matt.rembold@aesva.com
Project Location: 3317 VENTURE LN
Tax Map / Parcel: (47-11)(3-3) & (47-11)(3-3A)
County Plan No. (if known): N/A
County BMP Type: N/A (-)
Other information submitted in addition to this checklist (Check all that apply):

- [x] Design or Construction Drawings (Plans, Profiles, Details, etc.).
- [x] Erosion & Sediment Control Plan (Plan, Details, etc.).
- [ ] Erosion & Sediment Control Plan Design Report.
- [ ] Stormwater Management Design Plan (Plans, Profiles, Details, etc.).
- [ ] Stormwater Management Design Report.
- [x] Other, List: STORM CALCS

Issue Date
March 1, 2001

JAMES CITY COUNTY, VIRGINIA
ENVIRONMENTAL DIVISION

EROSION AND SEDIMENT CONTROL PLAN CHECKLIST

I. *GENERAL*:

Yes	No	N/A	
☑	☐	☐	*FAMILIARITY* with current versions of Chapter 8, Erosion and Sedimentation Control and Chapter 23, Chesapeake Bay Preservation ordinances of the Code of James City County, Virginia and the Virginia Erosion and Sediment Control Handbook (VESCH).
☑	☐	☐	*LAND DISTURBING PERMIT AND SILTATION AGREEMENT* with surety are required for the project.
☑	☐	☐	*VARIANCE* if necessary, requested in writing, for the plan approving authority to waive or modify any of the minimum standards and specifications of the VESCH deemed inappropriate based on site conditions specific to this review case only. Variances which are approved shall be properly documented in the plan and become part of the approved erosion and sediment control plan for the site.

II. *SITE PLAN*:

Yes	No	N/A	
☑	☐	☐	*VICINITY MAP* locating the site in relation to the surrounding area. Include any major landmarks which might assist in physically locating the site.
☑	☐	☐	*INDICATE NORTH* direction in relation to the site.
☑	☐	☐	*LIMITS OF CLEARING AND GRADING* for the site including that required for implementation of erosion and sediment controls, stockpile areas and utilities.
☑	☐	☐	*DISTURBED AREA ESTIMATES* in acres or square feet for the project.
☑	☐	☐	*EXISTING TOPOGRAPHY* or contours for the site at no more than 5 foot contour interval.
☑	☐	☐	*FINAL TOPOGRAPHY,* contours or proposed site grading in accordance with the design plan which indicates changes to existing topography and drainage patterns at no more than 2 foot contour interval (or 1 foot contours where required).
☑	☐	☐	*EXISTING AND PROPOSED SPOT ELEVATIONS* to supplement existing and proposed contours, topography or site grading information. Spot elevations may replace final contours in some instances, especially if terrain is in a low lying area or relatively flat.
☑	☐	☐	*EXISTING VEGETATION* including existing tree lines, grassed or unique vegetation areas.

Yes	No	N/A	
☑	☐	☐	*EXISTING SITE FEATURES* including roads, buildings, homes, utilities, streams, fences, structures and other important surface features of the site.
☑	☐	☐	*SOILS MAP* with soil symbols, boundaries and legend in accordance with the current Soil Survey of James City and York Counties and the City of Williamsburg, Virginia.
☑	☐	☐	*ENVIRONMENTAL INVENTORY* in accordance with Section 23-10(2) of the Chesapeake Bay Preservation Ordinance of James City County. Inventory generally includes: tidal shores and wetlands, non-tidal wetlands, resource protection area, hydric soils and slopes steeper than 25 percent. For wetlands, provide a copy of issued permits or satisfactory evidence that appropriate permits are being pursued for the entire project.
☑	☐	☐	*100-YEAR FLOODPLAIN LIMITS* or any special flood hazard areas or flood zones based on appropriate Federal Management Agency Flood Insurance Rate Maps (FIRMs) or Flood Hazard Boundary Maps (FHBMs) of James City County, Virginia.
☑	☐	☐	*DRAINAGE AREAS* for offsite and onsite areas, existing or proposed as applicable. Include drainage divides and directional labels for all subareas at points of interest and size (in acres), weighted runoff coefficient or curve number and times of concentration for each subarea.
☑	☐	☐	*CRITICAL EROSION AREAS* which require special consideration or unique erosion and sediment control measures. Refer to the VESCH, Chapter 6 for criteria.
☑	☐	☐	*DEVELOPMENT PLAN* for the site showing all improvements such as buildings, structures, parking areas, access roadways, above and below ground utilities, stormwater management and drainage facilities, trails or sidewalks, proposed vegetation and landscaping, amenities, etc.
☑	☐	☐	*LOCATION OF PRACTICES* proposed for erosion and sediment control, tree protection and temporary stormwater management due to land disturbance activities at the site. Use standard abbreviations, labels and symbols consistent for plan views based on minimum standards and specifications in Chapter 3 of the VESCH.
☑	☐	☐	*TEMPORARY STOCKPILE AREAS* or staging and equipment storage areas as required for onsite or offsite construction activities or indicate that none are anticipated for this project.
☑	☐	☐	*OFFSITE LAND DISTURBING AREAS* including borrow sites, waste areas, utility extensions, etc. and required erosion and sediment controls. If none are anticipated for the project, then indicate on the plans by general or erosion and sediment control notes.
☑	☐	☐	*DETAILS* or alternately, appropriate reference to current minimum standards and specifications of the VESCH for each measure proposed for the project. Non-modified, standard duplicated details (silt fence, diversion dikes, etc.) may be referenced to the current version of the VESCH. Specific dimensional or modified standards (basins, traps, outlet protections, check dams, etc.) require presentation on detail sheets. Schedules or tables may be used for multiple site measures such as sediment traps, basins, channels, slope drains, etc. Any modification to standard details should be clearly defined, explained and illustrated.

Yes	No	N/A	
☑	☐	☐	*MAINTENANCE PLAN* or alternately, appropriate reference to current minimum standards and specifications of the VESCH, outlining the inspection frequency and maintenance requirements for all erosion and sediment control measures proposed for the project.
☐	☐	☑	*TRENCH DEWATERING* methods and erosion and sediment controls, if anticipated for the project.
☑	☐	☐	*CONSTRUCTION SEQUENCE* outlining the anticipated sequence for installation of erosion and sediment controls and site, grading and utility work to be performed for the project by the site contractor.
☐	☐	☑	*PHASING PLAN* if required for larger project sites that are to be developed in stages or phases.
☑	☐	☐	*STANDARD COUNTY NOTES* are required to be placed on the erosion and sediment control plan. Refer to the standard James City County Erosion and Sediment Control Notes dated May 5, 1999.
☑	☐	☐	*PROFESSIONAL SEAL AND SIGNATURE* required on final and complete approved plans, drawings, technical reports and specifications.

III. ***NARRATIVE:***

Yes	No	N/A	
☑	☐	☐	*PROJECT DESCRIPTION* briefly describing the nature and purpose of the land disturbing activity and the acreage to be disturbed.
☑	☐	☐	*EXISTING SITE CONDITIONS* description of existing topography, land use, cover and drainage patterns at the site.
☑	☐	☐	*ADJACENT AREA* descriptions of neighboring onsite or offsite areas such as streams, lakes, property, roads, etc. and potential impacts due to concentrated flow or runoff from the land disturbing activity.
☑	☐	☐	*OFFSITE DISTURBED AREA* descriptions of proposed borrow sites, water or surplus areas, utility extensions and erosion and sediment controls to be implemented.
☑	☐	☐	*SOILS DESCRIPTION* briefly summarizing site, disturbed area and drainage basin soils including name, unit, hydrologic soil group (HSG) classification, surface runoff potential, erodibility, permeability, depth, texture, structure, erosion hazards, shrink-swell potential, limitations for use and anticipated depths to bedrock and the seasonal water table, as applicable.
☑	☐	☐	*CRITICAL AREAS* on the site which may have potentially serious erosion and sediment control problems and special considerations required (i.e. steep slopes, hydric soils, channels, springs, sinkholes, water supply reservoirs, groundwater recharge areas, etc.)

Yes	No	N/A	
☑	☐	☐	*PROPOSED EROSION & SEDIMENT CONTROL MEASURES* inclusive to the specific erosion and sediment control plan as proposed for the land disturbing activity. Measures should be consistent with those proposed on the site drawings. Address general use, installation, limitations, sequencing and maintenance requirements for each control measure.
☑	☐	☐	*STABILIZATION MEASURES* required for the site, either temporary or permanent, and during and following construction including temporary and permanent seeding and mulching, paving, stone, soil stabilization blankets and matting, sodding, landscaping or special stabilization techniques to be utilized at the site.
☑	☐	☐	*STORMWATER MANAGEMENT CONSIDERATIONS* for the site, either of temporary or permanent nature, and strategies, sequences and measures required for control. May reference the stormwater management plan for the site, if prepared, for permanent stormwater management facilities and control of drainage once the site is stabilized.

IV. ***CALCULATIONS:***

Yes	No	N/A	
☑	☐	☐	*CALCULATIONS AND COMPUTATIONS* associated with hydrology, hydraulics and design of proposed temporary and permanent erosion and sediment control measures including: sediment traps and basins, diversions, stormwater conveyance channels, culverts, slope drains, outlet protections, etc. Computations are not required on the construction plan and may be attached in a supplemental erosion and sediment control plan design report, if presented in a clear and organized format.
☐	☐	☑	*TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET* submitted for each basin along with schematic or sketch cross-section showing applicable design and construction data, storage volumes (wet-dry), dimensions and elevations. Peak design runoff to be based on the 2- or 25-year design storm event based on maximum disturbed site conditions (existing, interim or proposed conditions) in accordance with Minimum Standard 3.14 of the VESCH.

JAMES CITY COUNTY, VIRGINIA
ENVIRONMENTAL DIVISION

STORMWATER MANAGEMENT DESIGN PLAN CHECKLIST

I. *GENERAL*:

Yes	No	N/A	
☑	☐	☐	*FAMILIARITY* with current versions of the James City County Guidelines for Design and Construction of Stormwater Management BMPs manual; Chapter 8, Erosion and Sediment Control and Chapter 23, Chesapeake Bay Preservation ordinances of the Code of James City County, Virginia; the Virginia Erosion and Sediment Control Handbook (VESCH); and the Virginia Stormwater Management Handbook (VSMH).
☑	☐	☐	*WAIVER OR EXCEPTION* if necessary, requested in writing, for the plan approving authority to waive or except the requirements of Chapter 23, Chesapeake Bay Preservation ordinance in accordance with procedure established in Sections 23-14 through 23-17 of the ordinance. Applies to the review case only.
☑	☐	☐	*VARIANCE REQUEST* if necessary, requested in writing for the plan approving authority to waive or modify any of the minimum standards and specifications of the VESCH deemed inappropriate based on site conditions specific to this review case only. Variances which are approved shall be properly documented in the plan and become part of the approved erosion and sediment control plan for the site.
☑	☐	☐	*PROFESSIONAL SEAL AND SIGNATURE* required on final and complete approved stormwater management plans, drawings, technical reports and specifications.
☐	☐	☑	*WORKSHEET FOR BMP POINT SYSTEM* to ensure the stormwater management plan for the project attains at least 10 BMP points (New Development) or traditional pollutant load reduction computations per the Chesapeake Bay Local Assistance Manual (Redevelopment Only)
☐	☐	☑	*PROPOSED CONSERVATION EASEMENT AREAS* for any natural open space points claimed in the BMP worksheet.
☐	☐	☑	*INSPECTION/MAINTENANCE AGREEMENT* is required to be prepared and executed with the County for the project.
☑	☐	☐	*FEMA FIRM PANEL* reference with designated special flood hazard areas or zone designations associated with the site, as applicable.
☑	☐	☐	*DRAINAGE AREA MAP* at a maximum scale of 1"=200' scale showing drainage area boundaries for pre- and postdevelopment conditions and associated time of concentration flow paths. Labels to include drainage area size, runoff coefficient or curve number and time of concentration for each subarea shown on the map.

Yes	No	N/A	
☑	☐	☐	*SOILS MAP* with soil symbols, boundaries and legend in accordance with the current Soil Survey of James City and York Counties and the City of Williamsburg, Virginia with approximate locations of the project site, BMPs and applicable drainage basins.
☑	☐	☐	*STORMWATER MANAGEMENT NARRATIVE* in a brief and simple format which describes the project; location; site and drainage basin soil characteristics; receiving water or drainage facility; existing site and drainage basin conditions (topography, land use, cover, slopes, etc.); proposed site development; proposed stormwater management and drainage plan including County BMP type selected; summary of hydrology and hydraulics; maintenance program; and any special assumptions utilized for development of the stormwater management and drainage design plan or computations.
☐	☐	☑	*TEMPORARY STORMWATER MANAGEMENT* (if applicable) for control of stormwater runoff encountered during construction activities in addition to measures provided in the erosion and sediment control plan or stormwater management/drainage plan for the site. Adequate protection measures or sequencing provided.
☐	☐	☑	*MODIFICATION PLAN* clearly defined for temporary sediment control structures which will be converted to permanent SWM/BMP structures. Includes appropriate hydrologic and hydraulic computations, conversions, sequencing and cleanout information or details. Normally related to primary control structures associated with dry detention or wet retention ponds. Normally not permitted for Group C or D categories such as bioretention, infiltration and filtering system facilities.
☑	☐	☐	*STORMWATER MANAGEMENT and DRAINAGE DESIGN REPORT* in a bound 8-1/2 x 11 inch size format. Report shall generally include a title sheet, date, project identification, owner and preparer information, table of contents, narrative, summaries and computations as required. Computations may include: backwater, closed conduit, headwater, hydraulic, hydraulic grade line, hydrology, inlet, open channel, storm sewer, water quality, extended detention or stream channel protection and multi-stage storm routing calculations, as applicable, for the project. Computation data may include hand or computer generated computations, maps or schematics. All information should be presented in a clear, easy to follow format and should closely match construction plan information.
☑	☐	☐	*PLAN VIEW* at 1 inch = 50 ft. scale or less (1" = 40', 1" = 30', etc.)
☑	☐	☐	North arrow and plan legend.
☑	☐	☐	Property lines.
☑	☐	☐	Adjacent property information.
☑	☐	☐	Existing site features and existing impervious cover areas.
☑	☐	☐	Impervious cover tabulations.
☑	☐	☐	Existing drainage facilities (natural or manmade)
☑	☐	☐	Existing environmentally sensitive areas (RPA, wetlands, floodplain, steep slopes, critical soils, buffers, etc.)
☑	☐	☐	Existing and proposed contours (1' or 2' contour interval) and spot elevations as necessary to define high and low topography.
☑	☐	☐	Existing and proposed easement locations.

Yes	No	N/A	
☑	☐	☐	Proposed site improvements and proposed impervious cover areas.
☑	☐	☐	Proposed stormwater conveyance, drainage and management facilities with appropriate labeled construction data and information.
☑	☐	☐	Proposed landscaping and seeding plans (disturbed areas, pond interior, etc.)
☑	☐	☐	Proposed slope stabilization areas (riprap, blankets, mattings, walls, etc.)
☐	☐	☑	Delineation of permanent pools and the 1-, 2-, 10- and 100-year Design Water Surface Elevations.
☐	☐	☑	Delineation of ponding, headwater, surcharge or backwater areas which may affect adjacent existing or proposed buildings, structures or upstream adjacent properties.
☐	☐	☑	Test boring locations with reference surface elevations (if known).
☐	☐	☑	Risers, barrels, underdrains, overflows and outlet protections.
☐	☐	☑	Emergency spillway level section and outlet channel.
☑	☐	☐	Existing and proposed site utilities and protection measures.
☑	☐	☐	Erosion and sediment control measures (for site or BMP).
☐	☐	☑	Maintenance or access corridors to permanent stormwater management, BMP or drainage facilities.

II. ***STORMWATER CONVEYANCE SYSTEMS***:

Yes	No	N/A	
☑	☐	☐	*PLAN VIEWS*
☑	☐	☐	Storm drain lengths, sizes, types, classes and slopes for all segments. Label directly on plan or use structure/pipe schedule.
☑	☐	☐	Access structure (inlets, manholes, junctions, etc.) rim elevations, inverts, type and required grate or top unit and lengths labeled.
☑	☐	☐	All structure numbers labeled.
☑	☐	☐	Adequate horizontal clearance from other site utilities or structures.
☐	☐	☑	*PROFILES* generally are not required but are encouraged to expedite review. If not provided, ensure all pipe segments have adequate minimum cover, do not exceed maximum depths of cover for the type/class of pipe specified and do not conflict with other site utilities or excavation areas.
☑	☐	☐	*DETAILS*
☑	☐	☐	Typical storm drain bedding details or reference note.
☑	☐	☐	Standard details or reference note for all proposed access structure types (inlets, manholes, junctions, etc.).
☑	☐	☐	Inlet shaping detail or applicable reference note.
☑	☐	☐	Step detail or applicable reference note (if depth 4 ft. or more).
☑	☐	☐	Typical open channel details with designation, location, shape, type, bottom width, top width, lining, slope, length, side slope, and installation depth required for construction. Channel design data as necessary may also be included.
☑	☐	☐	Outlet protections at all pipe outfalls.

Yes	No	N/A	
☑	☐	☐	*STORMWATER CONVEYANCE SYSTEM COMPUTATIONS*
☑	☐	☐	Storm Sewer Design computations based on 10-year design event.
☑	☐	☐	Hydraulic Grade Line computations based on 10-year design event.
☑	☐	☐	Inlet computations based on current VDOT procedure for spread, ponding depth and grate size required.
☐	☐	☑	Culvert Headwater computations. Design based on 10-year design storm event and check only for 100-year storm event.
☑	☐	☐	Open Channel computations based on 2-year design event for velocity and 10-year design event for capacity.
☑	☐	☐	Standard outlet protection or special energy dissipators.
☑	☐	☐	Pipe thickness design computations, as required, for selected pipe type (live load, minimum cover, maximum height of cover, etc.).
☑	☐	☐	Adequate channel computations for receiving channels (based on field measured channel section data).

III. ***STORMWATER MANAGEMENT/BMP FACILITIES***:

Yes	No	N/A	
☐	☐	☑	*HYDROLOGY* – An SCS based methodology is required for the design of stormwater management/BMP facilities with watersheds exceeding 20 acres. Under 20 acres, other generally accepted methodologies such as the modified rational, critical storm are allowable. Refer to Chapter 5 of the VESCH or Chapter 5 of the VSMH.
☐	☐	☑	Runoff Curve Number or Coefficient determinations: predeveloped and ultimate development land use scenarios.
☐	☐	☑	Time of concentration: predeveloped and ultimate development indicating overland, shallow concentrated, and channel flow components (200 ft. maximum length for overland flow).
☐	☐	☑	Hydrograph generation (tabular or graphical): pre- and postdevelopment conditions for the 1-, 2-, 10- and 100-year design storm events.
☐	☐	☑	*FACILITY CONFIGURATION and MINIMUM SEPARATIONS*
☐	☐	☑	Screening and layout consistent with Section 24-98(d) of the Chapter 24 Zoning ordinance (landscaping, screening, visibility, etc.).
☐	☐	☑	Basic considerations for safety and unauthorized entry.
☐	☐	☑	Proper length to width ratio (Typically 2H:1V).
☐	☐	☑	Facilities with deep pools (4 feet or more in depth) provided with two benches. Fifteen (15) ft. safety bench outward from normal pool at maximum 6 percent slope and aquatic bench inward from normal shoreline below normal pool. Narrower widths may be considered on a case-by-case basis.
☐	☐	☑	Pond buffer minimum 25 feet outward from maximum design WSEL. Additional setbacks may be required to permanent structures.
☐	☐	☑	No trees, shrubs or woody plants within 15 feet of embankment toe or 25 feet from principal spillway structure.
☐	☐	☑	Infiltration and filtering system facilities generally located at least 100 feet horizontally from any water supply well; 100 feet from any downslope building; and 25 feet from any upslope buildings, unless site specific investigation allows for reduced separation.

Yes	No	N/A	
☐	☐	☑	*HYDRAULIC COMPUTATIONS*
☐	☐	☑	Elevation- or Stage-Storage curve and/or tabular data.
☐	☐	☑	Weir / Orifice Control – Extended Detention.
☐	☐	☑	Weir / Orifice Control – riser 1-year control for channel protection.
☐	☐	☑	Weir / Orifice Control – riser 2-year control for quantity (if required).
☐	☐	☑	Weir / Orifice Control – riser 10-year control for quantity (if required).
☐	☐	☑	Inlet / Outlet (barrel) control – (All Storms).
☐	☐	☑	Check for barrel control prior to riser orifice flow to prevent slug flow-water hammer conditions.
☐	☐	☑	Emergency spillway capacity and depth of flow.
☐	☐	☑	Elevation – Discharge (Outlet Rating) curve and/or table. Provide all supporting calculations and/or design assumptions.
☐	☐	☑	Adequate channel computations for receiving channel. May be waived if facility is designed based on current Stream Channel Protection criteria.
☐	☐	☑	*POND or RESERVOIR ROUTING*
☐	☐	☑	Storage-Indication Routing of postdeveloped inflow hydrographs for the 1-, 2-, 10-, and 100-year design storms. Preference is for structure to discharge up to the 10-year storm through the principal spillway and pass the 100-year storm with a minimum 1 foot of freeboard through a combination principal and emergency spillways. If no emergency spillway is provided, riser must be large enough to pass the design high water flow and trash without overtopping the facility, have 3 square feet or more of cross-sectional area, contain a hood type inlet and have a minimum freeboard of 2 feet. Token spillways with minimum 8 ft. width are also recommended at or above the design 100-year storm elevation.
☐	☐	☑	Downstream hydrographs at established study points, if conditions warrant (i.e. facility discharge combined with uncontrolled bypass).
☐	☐	☑	*MISCELLANEOUS COMPUTATIONS*
☐	☐	☑	Water quality volume for permanent pool based on selected BMP treatment volume (WQv).
☐	☐	☑	Water quality volume for extended detention base on selected BMP treatment volume (WQv) with drawdown computations.
☐	☐	☑	Drawdown computations for the 1-year, 24 hour detention for stream channel protection criteria.
☐	☐	☑	Pond drain computations (within 24 hours).
☐	☐	☑	Anti-seep collar design (concrete preferred) or match material type.
☐	☐	☑	Filter diaphragm design (or alternative method of controlling seepage).
☐	☐	☑	Riser / base structure flotation analyses. FS = 1.25 minimum.
☐	☐	☑	Downstream danger reach study and/or emergency action plan (if conditions warrant).
☐	☐	☑	Upstream backwater analyses onto offsite adjacent property (if conditions warrant).
☐	☐	☑	100 year floodplain impacts (if conditions warrant).

Yes	No	N/A	
☐	☐	☑	*GEOTECHNICAL REQUIREMENTS*
☐	☐	☑	Geotechnical Report with recommendations specific to BMP facility type selected. Report prepared by a registered professional engineer. Requires submission, review and approval prior to issuance of Land Disturbance Permit.
☐	☐	☑	Initial Feasibility Testing requirements satisfied as per Appendix E of the James City County Guidelines fro Design and Construction of Stormwater Management BMPs manual. (Infiltration, Bioretention and Filtering System BMP types only).
☐	☐	☑	Concept Design Testing requirements satisfied as per Appendix E of the James City County Guidelines for Design and Construction of Stormwater Management BMPs manual. . (Infiltration, Bioretention and Filtering System BMP types only).
☐	☐	☑	Minimum Boring locations: borrow area, pool area, principal control structure, top of facility near one abutment and emergency spillway if provided.
☐	☐	☑	Boring logs with Unified Soil Classification (ASTM D2487), soils descriptions and depths to bedrock and the seasonal water table indicated.
☐	☐	☑	Standard County Record Drawing/Construction Certification note provided on plan. *Note: It is understood that preparation of record drawings and construction certifications as required for project facilities may not necessarily be performed by the plan preparer. These components may be performed by others.*
☐	☐	☑	*PRINCIPAL SPILLWAY PROFILE AND ASSOCIATED DETAILS*
☐	☐	☑	*EXISTING GROUND AND PROPOSED GRADE*
☐	☐	☑	Embankment or excavation side slopes labeled (3H:1V maximum).
☐	☐	☑	Minimum top width labeled (per VESCH or VSMH requirements).
☐	☐	☑	Removal of unsuitable material under proposed facility (per Geotechnical Report requirements).

Yes	No	N/A	
☐	☐	☑	*CORE TRENCH*
☐	☐	☑	Material (per plan or Geotechnical Report).
☐	☐	☑	Bottom width (4' minimum or greater as dictated by Geotechnial Report recommendations).
☐	☐	☑	Side slopes (1:1 maximum steepness)
☐	☐	☑	Depth (4' minimum or greater as dictated by Geotechnical Report).
☐	☐	☑	*PRINCIPAL CONTROL STRUCTURE. RISER OR SIMILAR STRUCTURE (DETAILS REQUIRED FOR ALL ITEMS)*
☐	☐	☑	Durable, watertight, resistant material (concrete preferred).
☐	☐	☑	Riser diameter is at least 1.25 times larger than barrel diameter.
☐	☐	☑	All pertinent dimensions and elevations shown.
☐	☐	☑	Control orifice or weir dimensions and elevations shown.
☐	☐	☑	Trash rack – removable – for each release.
☐	☐	☑	Anti-vortex device, baffle or plate.
☐	☐	☑	Riser base structure with dimensions and embedment specifications (concrete preferred).
☐	☐	☑	Interior access (steps, ladders, etc.) for maintenance for structures over 4 feet in height. Excessively high risers may need some form of exterior access on top portion.
☐	☐	☑	Low flow orifice with trash rack device.
☐	☐	☑	*PRINCIPAL CONTROL STRUCTURE OUTLET BARREL*
☐	☐	☑	Material (ASTM C-361 reinforced concrete pipe) with watertight joints. Prior approval required for all other pipe material (other RCP types, CMP, CPP, PVC, etc.).
☐	☐	☑	Support and bedding requirements for barrel – concrete cradles, etc. or as recommended by the Geotechnical Report.
☐	☐	☑	Pipe inverts, length, size, class and slope shown.
☐	☐	☑	Flared end section or endwall provided on barrel outlet.
☐	☐	☑	*SEEPAGE CONTROL*
☐	☐	☑	Phreatic line shown (4:1 slope measured from the intersection of the embankment and the principal spillway design high water).
☐	☐	☑	*ANTI-SEEP COLLARS*
☐	☐	☑	Anti-seep collar, concrete preferred.
☐	☐	☑	Size – 15 percent increase in length of saturation using outside pipe diameter.
☐	☐	☑	Spacing and location on barrel (located at least 2 feet from a pipe joint).
☐	☐	☑	*FILTER DIAPHRAGMS*
☐	☐	☑	Design based on latest NRCS design methods and certified by a professional engineer.

Yes	No	N/A	
☐	☐	☑	*ELEVATION AND DIMENSIONAL DESIGN DATA*
☐	☐	☑	Top of facility – construction height and settled height (10 percent settlement).
☐	☐	☑	Crest of principal control structure spillway at least one (1) foot below crest of emergency spillway, if provided.
☐	☐	☑	Minimum freeboard of one (1) foot above the 100-year design high water elevation for facilities with an emergency spillway.
☐	☐	☑	Minimum freeboard of two (2) feet above the 100-year design high water elevation for facilities without an emergency spillway or in accordance with the SCS National Engineering Handbook (prior approval required).
☐	☐	☑	Basin Sediment Clean-Out elevation (permanent mode). Typically 10 to 25 percent of water quality volume.
☐	☐	☑	*CROSS SECTION THROUGH FACILITY*
☐	☐	☑	Existing Ground.
☐	☐	☑	Proposed grade.
☐	☐	☑	Top of facility – constructed and settled.
☐	☐	☑	Location of emergency spillway with side slopes labeled (emergency spillway in cut).
☐	☐	☑	Bottom of core trench (4' minimum).
☐	☐	☑	Location of each soil boring.
☐	☐	☑	Barrel location.
☐	☐	☑	Existing and proposed utility location/protection.
☐	☐	☑	*EMERGENCY SPILLWAY PROFILE*
☐	☐	☑	Existing ground.
☐	☐	☑	Inlet, level (control) and outlet sections per SCS.
☐	☐	☑	Spillway and crest elevations.
☐	☐	☑	*PRETREATMENT DEVICES* of adequate depth and properly designed using required pretreatment volumes for the selected County BMP facility type. Including, but not limited to: sediment forebays, sediment basins, sumps, grass channels, gravel diaphragms, plunge pools, chamber separators, manufactured systems or other acceptable methods.

Yes	No	N/A	
☐	☐	☑	*CONSTRUCTION SPECIFICATIONS and NOTES*
☐	☐	☑	Anticipated sequence of construction for BMP (consistent with erosion and sediment control plan).
☐	☐	☑	Provisions to control base stream or storm flow conditions encountered during construction.
☐	☐	☑	Site and subgrade preparation requirements.
☐	☐	☑	Embankment, fill and backfill material soil and placement (lift) thickness requirements.
☐	☐	☑	Compaction and soil moisture content requirements.
☐	☐	☑	Geosynthetics for drainage, filtration, moisture barrier, separation, and reinforcement purposes.
☐	☐	☑	Clay or synthetic (PVC or HDPE) pond liners.
☐	☐	☑	Storm drain, underdrain and pipe conduit requirements.
☐	☐	☑	Minimum depth of pipe cover for temporary (construction) and final cover conditions.
☐	☐	☑	Permanent shutoff valve and pond drain.
☐	☐	☑	Concrete requirements for structural components.
☐	☐	☑	Riprap and slope protection.
☐	☐	☑	Access or maintenance road surface, base, subbase.
☐	☐	☑	Temporary and permanent stabilization measures.
☐	☐	☑	Temporary or permanent safety fencing.
☐	☐	☑	BMP Landscaping (deep, shallow, fringe, perimeter, etc.)
☐	☐	☑	Dust and traffic control (if warranted).
☐	☐	☑	Construction monitoring and certification by professional.
☐	☐	☑	Other: _____
☐	☐	☑	Other: _____
☐	☐	☑	*MAINTENANCE PROVISIONS*
☐	☐	☑	Entity responsible for maintenance identified.
☐	☐	☑	Maintenance Plan which outlines the long-term schedule for inspection/maintenance of the facility and forebays.
☐	☐	☑	Maintenance access from public right-of-way or publicly traveled road.
☐	☐	☑	Maintenance easement provided encompassing high water pool and buffer, principal and emergency spillways, outlet structures, forebays, embankment area and possible sediment-removal stockpile areas.
☐	☐	☑	Minimum 6 foot wide public safety shelf (landing) or alternative fencing.

IV. *OUTLET PROTECTIONS*:

Yes	No	N/A	
☑	☐	☐	Sized for maximum design release (generally 10-year storm).
☑	☐	☐	Flared end section or endwall.
☑	☐	☐	Dimensions.
☑	☐	☐	Rock or riprap size, quantity and placement thickness.
☑	☐	☐	Slope at 0 percent (Level Grade).
☑	☐	☐	Geotextiles (nonwoven).
☑	☐	☐	Special energy dissipators are required for design discharge velocities that exceed eighteen (18) feet per second; or if use of standard outlet protection would result in velocities exceeding permissible channel velocities; or if space restricts or limits their use.

IV. *ADDITIONAL COMMENTS OR INFORMATION SPECIFIC TO THE PLAN:*

Plan Preparer: _____
Date: 7/29/11

Copy of JCC: SWMProg/BMP/Checklist/ChkList

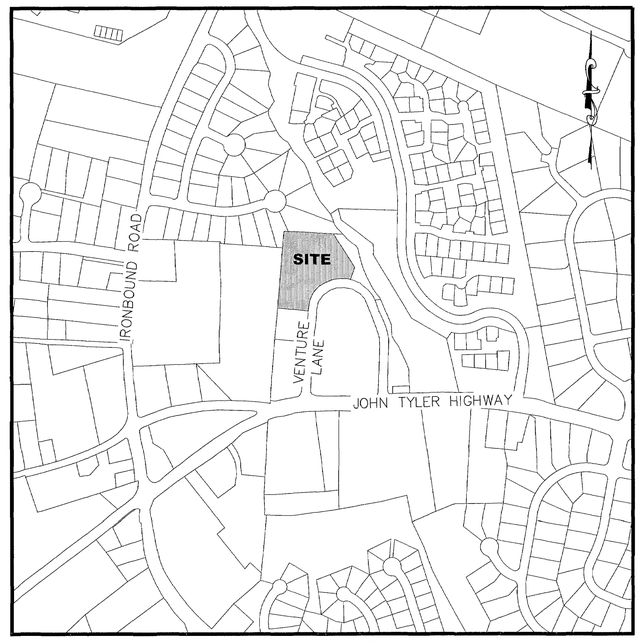
DRAINAGE AS-BUILTS

FOR

SITE PLAN AMENDMENT TO

JOHN TYLER COMMERCIAL CENTER PARKING

3317 VENTURE LANE



VICINITY MAP

SCALE: 1"=2000'

SITE INFORMATION:

PARCEL I.D. #4711300003
ZONING DISTRICT: B-1

EXISTING ADDRESS:

3317 VENTURE LANE
WILLIAMSBURG, VA. 23187

GENERAL NOTES:

1) A TITLE REPORT HAS NOT BEEN FURNISHED TO THIS FIRM.
2) THIS FIRM MADE NO ATTEMPT TO VERIFY UNDERGROUND UTILITIES EXCEPT THOSE SHOWN.
3) THE PURPOSE OF THIS DRAWING IS ONLY TO SHOW THE NEWLY INSTALLED STORM DRAINAGE SYSTEM.
4) ELEVATIONS SHOWN ARE RELATIVE TO THE APPROVED SITE PLAN.
5) PROPERTY LINES ARE SHOWN PER APPROVED SITE PLAN.
6) ALL CURB & OTHER IMPROVEMENTS SHOWN ARE PROPOSED OR UNDER CONSTRUCTION.
7) DETAILS SHOWN HEREON ARE SHOWN PER APPROVED SITE PLAN AND ARE ONLY FOR AS-BUILT PURPOSES.

RECORD DRAWING CERTIFICATION:

I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT THIS RECORD DRAWING REPRESENTS THE ACTUAL CONDITION OF THE STORMWATER MANAGEMENT / BMP FACILITY. THE FACILITY APPEARS TO CONFORM WITH THE PROVISIONS OF THE APPROVED DESIGN PLAN, SPECIFICATIONS AND STORMWATER MANAGEMENT PLAN, EXCEPT AS SPECIFICALLY NOTED.

WILLIAM S. FELTS, LIC NO. 3149 — 05-14-2012 DATE

Environmental Division
MAY 18 2012
RECEIVED

DRAINAGE AS-BUILTS
FOR
SITE PLAN AMENDMENT TO
JOHN TYLER COMMERCIAL CENTER PARKING
3317 VENTURE LANE
JAMES CITY COUNTY VIRGINIA

NO.	DATE	REVISION / COMMENT / NOTE

COMMONWEALTH OF VIRGINIA
WILLIAM S. FELTS
Lic. No. 3149
5-14-12
LAND SURVEYOR

LandTech Resources, Inc.
Surveying • GPS • Engineering
205 Bulifants Blvd., Ste. E, Williamsburg, VA 23188
Phone: (757) 565-1677 Fax: (757) 565-0782
web: landtechresources.com

SCALE: ---
DATE: 05-14-2012
JOB: 11-308
DRAWN BY: WSF
SHEET: 1 OF 2

RECORD DRAWING

JCC-SP-0045-2011

RECORD MERIDIAN

APPROVED SITE PLAN

N/F
INGRAM ROAD LLC, W H H TRICE & CO.
PARCEL I.D. #4710100007

N/F
SCOTT F. RAWLS
PARCEL I.D. #4710900023

S 01°24'03" W 470.98'

EXISTING TREELINE (SHOWN PER SITE PLAN)

N/F
JOHY TYLER COMMERCIAL CENTER, LLC
PARCEL I.D. #4711300002A

S 88°35'57" E 169.04'

N/F
TRACY A. ELLIOT
PARCEL I.D. #4710900022

N 85°20'32" W 271.94'

S 85°39'30" E 70.33'

S 38°02'30" E 226.14'

S 18°32'11" W 91.82'

N/F
JAMES CITY COUNTY
PARCEL I.D. #4710100003A

IRF

SBL

ASPHALT

CURB & GUTTER (TYPICAL)

EXISTING BUILDING

CONCRETE

GRAVEL

CDI
RIM=63.13
INV IN=56.12
INV OUT=56.08

EX. 30" RCP

EX. CDI
RIM=61.69
INV IN=50.88
INV IN=55.80
INV OUT=50.88

36 LF 15" RCP @ 0.78%

144 LF 15" RCP @ 1.06%

CDI
RIM=61.52
INV OUT=57.60

A=330.10'
R=195.00'

VENTURE LANE
(50' R/W)

TC 60.49

TC 59.99

℄ 59.33

℄ 57.90

℄ 56.64

℄ 53.44

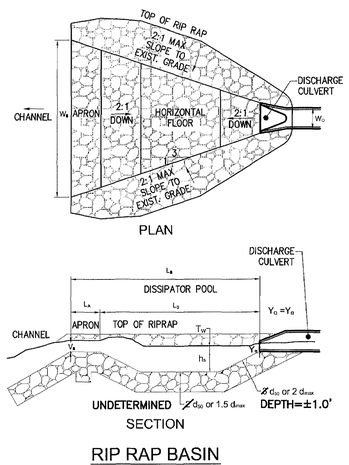
CONCRETE DITCH

RIPRAP STILLING BASIN "B" (SEE DETAIL)

RIPRAP STILLING BASIN "A" (SEE DETAIL)

EX. RCP

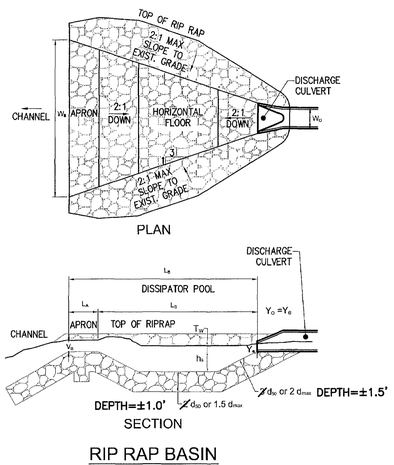
STILLING BASIN "A"



RIP RAP BASIN
N.T.S

STILLING BASIN "A"		ASBUILT	
L_B=18.4'	d_{50}=0.6'	±16.5'	±0.6'
L_A=12.2'	W_B=14.7'	±13.5'	±12.0'
L_K=6.1'	hs=1.22'	±3.0'	±-0.6'

STILLING BASIN "B"



RIP RAP BASIN
N.T.S

ASBUILT		STILLING BASIN "B"	
±8.5'	±0.3'	L_B=9.5'	d_{50}=0.32'
±6.0'	±6.3'	W_B=7.6'	
±2.5'	±1.0'	L_K=3.2'	hs=0.63'

30 0 30 60 90

Scale: 1" = 30'

RECORD DRAWING

JCC-SP-0045-2011

DRAINAGE AS-BUILTS
FOR
SITE PLAN AMENDMENT TO
JOHN TYLER COMMERCIAL CENTER PARKING
3317 VENTURE LANE

JAMES CITY COUNTY VIRGINIA

NO.	DATE	REVISION / COMMENT / NOTE

COMMONWEALTH OF VIRGINIA
WILLIAM S. FELIS
Lic. No. 3149
5-14-12
LAND SURVEYOR

LandTech Resources, Inc.
Surveying • GPS • Engineering
205 Bulifants Blvd., Ste. E, Williamsburg, VA 23188
Phone: (757) 565-1677 Fax: (757) 565-0782
web: landtechresources.com

SCALE: 1" = 30'

DATE: 05-14-2012

JOB: 11-308

DRAWN BY: WSF

SHEET: 2 OF 2

SP-0045-2011

Site Plan Amendment

For

John Tyler Commercial Center Parking

3317 Venture Lane

Berkeley District James City County Virginia

DEC 30 2011
RECEIVED

RECEIVED
AUG 2011
Planning Department

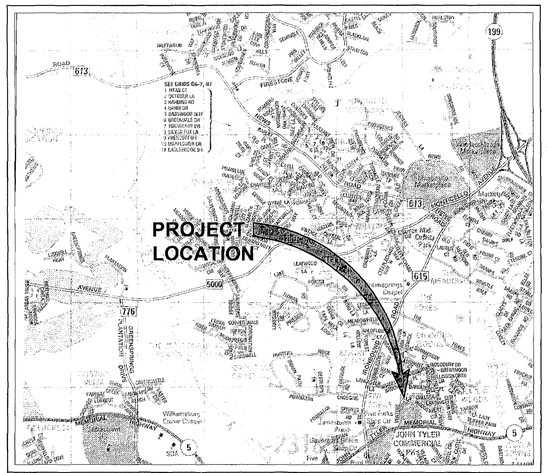
COUNTY OF JAMES CITY
FINAL SITE PLAN

APPROVALS	DATE
Fire Dept. 05/05/11	KB/JS
Health Dept.	
VDOT RCJ/JS	07/18/11
Planning CMS	9-15-11
Environ. MW/JS	06/29/11
Zoning Adm. MGB/CMS	9-15-11
JCSA CR/JS	9/15/11
County Eng. DC/JS	05/18/11
REA	
Other SW/JS landscape	06/27/11

Rev.	Date	Description	Revised By
2	8/19/11	Revised for County Comments	HWP
1	6/16/11	Revised for County Comments	MJR

GENERAL NOTES

1. ALL ERRORS OR DISCREPANCIES WITH THE PLANS OR EXISTING SITE CONDITIONS SHALL BE REPORTED TO THE ENGINEER OR SURVEYOR OF RECORD BEFORE PROCEEDING WITH THE WORK.
2. CONTOUR INTERVAL IS 1 FOOT. EXISTING GRADE IS FROM SURVEY PROVIDED BY AES DATED FEBRUARY, 2011.
3. ANY EXISTING, UNUSED WELLS SHALL BE ABANDONED IN ACCORDANCE WITH THE VIRGINIA PRIVATE WELL REGULATIONS AND JAMES CITY COUNTY CODE.
4. A VDOT LAND USE PERMIT IS REQUIRED FOR ALL WORK WITHIN THE VDOT RIGHT-OF-WAY. THE CONTRACTOR SHALL NOTIFY VDOT IN WRITING 48 HOURS PRIOR TO COMMENCEMENT OF ANY WORK WITHIN THE VDOT RIGHT-OF-WAY. THE GENERAL CONTRACTOR SHALL SECURE THIS PERMIT.
5. THE CONTRACTOR SHALL MAINTAIN A COMPLETE SET OF THE APPROVED PLANS AT THE PROJECT SITE AT ALL TIMES DURING CONSTRUCTION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING MISS UTILITY (1-800-552-7001) FOR EXISTING UTILITY LOCATIONS AT LEAST 3 WORKING DAYS PRIOR TO COMMENCING CONSTRUCTION, AND A PRIVATE UTILITY LOCATOR FOR THE LOCATING OF PRIVATE UTILITIES.
7. THE CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION TO ALL OWNERS AND RESIDENTS OF PROPERTY ADJACENT TO THE PROJECT 30 DAYS PRIOR TO THE COMMENCEMENT OF WORK, UNLESS OTHERWISE DIRECTED BY THE OWNER. CONSTRUCTION WITHIN EASEMENTS OR ON PUBLIC RIGHT-OF-WAY NECESSITATES NOTICE WHETHER ADJACENT TO OR LOCATED ON THE ADJOINING PROPERTY. FAILURE TO PROVIDE THE MINIMUM NOTIFICATION TIME WILL RESULT IN SUSPENSION OF WORK.
8. THE ABSENCE OF THE OWNER OR THE ENGINEER AT THE JOB SITE DOES NOT, IN ANY WAY, RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO PERFORM THE WORK IN ACCORDANCE WITH THE DRAWINGS, CONTRACT DOCUMENTS, ADDENDA, AND WRITTEN AUTHORIZED PLAN REVISIONS.
9. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS, AND ORDERS OF ANYBODY HAVING JURISDICTION. THE CONTRACTOR SHALL ERECT AND MAINTAIN, AS REQUIRED BY THE CONDITIONS AND PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR SAFETY AND PROTECTION.
10. ALL CONSTRUCTION METHODS AND MATERIALS SHALL CONFORM WITH THE CURRENT JAMES CITY COUNTY STANDARDS AND SPECIFICATIONS, VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE STANDARDS AND SPECIFICATIONS, VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS, AND ANY OTHER APPLICABLE CITY OR STATE ORDINANCES, CODES, AND LAWS PRIOR TO ANY CONSTRUCTION ACTIVITY.
11. THE CONTRACTOR SHALL USE ONLY NEW MATERIALS, PARTS AND PRODUCTS ON ALL PROJECTS. ALL MATERIALS SHALL BE STORED SO AS TO ASSURE THE PRESERVATION OF THEIR QUALITY AND FITNESS FOR THE WORK.
12. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS PRIOR TO COMMENCEMENT OF WORK INCLUDING, BUT NOT LIMITED TO, LAND DISTURBING, BUILDING, RIGHT-OF-WAY, AND UTILITY PERMITS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF CONSTRUCTION EFFORTS WITH THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT), LOCAL EMERGENCY SERVICES, AND ALL NECESSARY UTILITY COMPANIES INCLUDING, BUT NOT LIMITED TO, ELECTRICITY, NATURAL GAS, TELECOMMUNICATIONS, CABLE TELEVISION, WATER, SEWER, PRIVATE LIGHTING, AND OTHERS THAT MAY BE REQUIRED.
14. THE CONTRACTOR SHALL SATISFY HIMSELF AS TO ALL SITE CONDITIONS PRIOR TO CONSTRUCTION.
15. THE CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE OF ALL SITE IMPROVEMENTS, INCLUDING LANDSCAPING, AS SHOWN ON THE APPROVED PLAN.
16. THE CONTRACTOR SHALL REMOVE ALL EXCESS MATERIAL, INCLUDING SOIL AND DEBRIS, FROM THE SITE.
17. THE CONTRACTOR SHALL COMPLY WITH ALL PROVISIONS OF THE VIRGINIA UNDERGROUND UTILITY DAMAGE PREVENTION ACT (SECTION 56-265.14 ET. SEQ. CODE OF VIRGINIA, 1950, AS AMENDED) AND HEREBY AGREES TO HOLD THE DEVELOPER AND THE ENGINEER HARMLESS AGAINST ANY LOSS, DAMAGE, OR CLAIMS OF ANY NATURE WHATSOEVER ARISING OUT OF THE CONTRACTOR'S FAILURE TO COMPLY WITH THE REQUIREMENTS OF SAID ACT.
18. HORIZONTAL DATUM: NAD83 (1986) VERTICAL DATUM: NGVD29
19. THE PROFESSIONAL WHOSE SEAL IS AFFIXED HEREON SHALL ACT AS THE "RESPONSIBLE LAND DISTURBER" FOR PURPOSES OF PLAN APPROVAL ONLY. PRIOR TO ISSUANCE OF THE LAND DISTURBING PERMIT, THE CONTRACTOR SHALL PROVIDE THE NAME OF A "RESPONSIBLE LAND DISTURBER" WHO SHALL ASSUME RESPONSIBILITY AS THE "RESPONSIBLE LAND DISTURBER" FOR THE CONSTRUCTION PHASE OF THE PROJECT. THE CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION SHOULD THE "RESPONSIBLE LAND DISTURBER" CHANGE DURING CONSTRUCTION.
20. STORM STRUCTURES SHALL CONFORM TO THE VDOT ROAD AND BRIDGE STANDARDS AND VDOT SPECIFICATIONS. ALL MANHOLES SHALL INCLUDE INLET SHAPING (IS-1) AND MANHOLES DEEPER THAN 4 FEET SHALL HAVE STEPS (ST-1). PIPE BEDDING SHALL BE IN ACCORDANCE WITH VDOT PB-1 AND MANUFACTURER'S SPECIFICATIONS AND GUIDELINES.
21. ALL PROPOSED STORM PIPE TO BE CLASS III RCP (ASTM C76 WITH C443 GASKETS) UNLESS OTHERWISE NOTED.



VICINITY MAP
(Approximate Scale: 1"=2,000')
Copyright ADC The Map People permitted use number 21004223

County Project No.: SP-0045-2011
Original Submittal Date: 4/29/11

This plan amends approved site plan JCC SP-0111-1996

Index of Sheets

Sheet Number	Sheet Title
1	Cover Sheet
2	Environmental Inventory
3	Site Plan
4	Grading & Drainage Plan
5	Overall Drainage Plan
6	Phase I Erosion & Sediment Control & Demolition Plan
7	Phase II Erosion & Sediment Control Plan
8	Erosion & Sediment Control Notes & Details
9	Notes & Details
10	Lanscape Plan
11	Lighting Plan

OWNER/DEVELOPER INFORMATION:

HENRY S. BRANSCOME, LLC
CONTACT: HENRY S. BRANSCOME II
P.O. BOX 6478
WILLIAMSBURG, VIRGINIA 23187
PHONE NO.: (757) 221-7221
FAX NO.: (757) 221-7220

CERTIFIED RESPONSIBLE LAND DISTURBER:

MATTHEW J. REMBOLD, P.E.
AES CONSULTING ENGINEERS
5248 OLDE TOWNE ROAD, SUITE 1
WILLIAMSBURG, VIRGINIA, 23188
TELEPHONE: 757-253-0040

* FOR SITE PLAN REVIEW PROCESS ONLY. OWNER OR CONTRACTOR SHALL NAME RESPONSIBLE LAND DISTURBER FOR CONSTRUCTION PROCESS.

SITE DATA:

SITE ADDRESS:	3317 VENTURE LANE, WILLIAMSBURG, VA 23187
TAX MAP PARCEL ID:	4711300003
ZONING:	B-1, GENERAL BUSINESS
PARCEL AREA:	140,368 S.F.±, 3.22 AC.±
TOTAL DISTURBED AREA:	61,240 S.F.±, 1.41 AC.±
EXISTING IMPERVIOUS AREA:	62,108 S.F.±, 1.42 AC.± (44.2%)
PROPOSED IMPERVIOUS AREA:	82,720 S.F.±, 1.90 AC.± (59.0%)
OPEN SPACE:	N/A
FLOOD HAZARD MAP:	THIS PROPERTY IS IN FLOOD ZONE "X" AS SHOWN ON MAP NUMBERS 51095C0120C, PANEL 00120, FOR COMMUNITY NUMBER 510201, DATED 09/28/2007 OF THE FLOOD INSURANCE RATE MAPS FOR JAMES CITY COUNTY, VIRGINIA. ZONE "X" IS DEFINED AS AREAS OUTSIDE THE 500 YEAR FLOOD PLAIN.
PARKING PROVIDED:	SEE "PARKING CALCULATIONS" SECTION
WATERSHED INFORMATION:	THIS SITE IS SITUATED IN THE MILL CREEK WATERSHED.

PARKING CALCULATIONS

EXISTING PARKING: 25 SPACES (1 HANDICAP)

PROPOSED PARKING:

20,357 SF BUILDING -
10,179 SF OF "CATEGORY B-MODERATE DEMAND" INDUSTRIAL SALES AND SERVICE
(1 SPACE/250 SF) = 41 SPACE REQUIRED
10,179 SF OF "INDUSTRIAL USES"
(1 SPACE/2 EMPLOYEES) - 20 EMPLOYEES = 10 SPACES REQUIRED

4,064 SF BUILDING -
4,064 SF OF "INDUSTRIAL USES"
(1 SPACE/2 EMPLOYEES) - 8 EMPLOYEES = 4 SPACES REQUIRED

TOTAL PARKING SPACES REQUIRED = 55 SPACES
TOTAL PARKING SPACES PROVIDED = 67 SPACES (3 HANDICAP)

*THE 12 SURPLUS SPACES ARE LOCATED ALONG THE SOUTHERN MOST PROPERTY LINE AND ARE TO BE MADE AVAILABLE AS SHARED PARKING FOR THE ADJACENT PARCELS TO REDUCE PARKING ON VENTURE LANE AND INCREASE DELIVERY TRUCK ACCESSIBILITY.

STATE OF VIRGINIA
MATTHEW J. REMBOLD
Lic. No. 045773
8/19/11
LICENSED PROFESSIONAL ENGINEER

AES CONSULTING ENGINEERS
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
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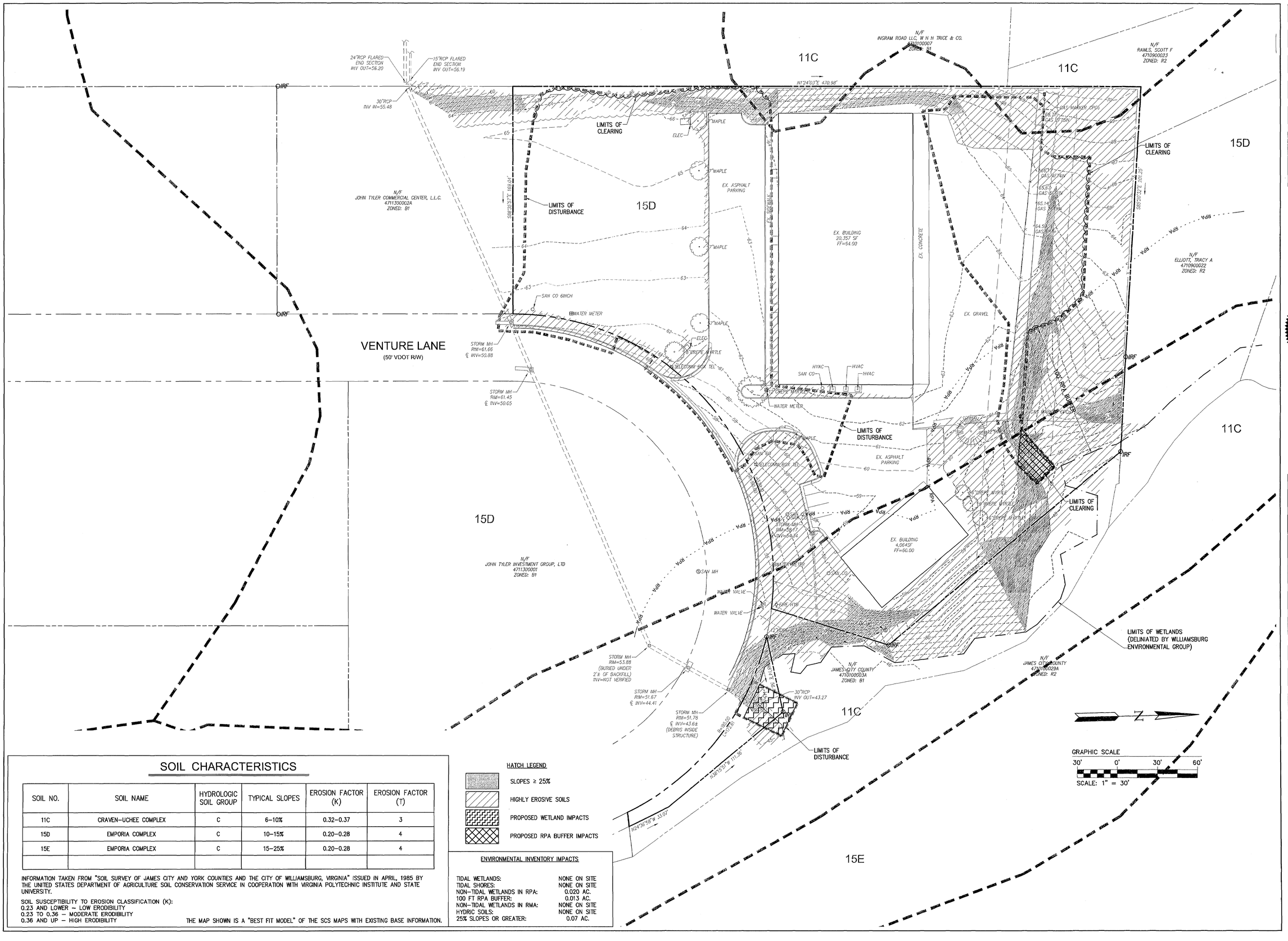
3317 Venture Lane
Berkeley District James City County Virginia

Project Contacts:	MJR
Project Number:	7412-03
Scale: NOTED	Date: 4/29/11
Sheet Title: Cover Sheet	

Sheet Number
1



SOIL CHARACTERISTICS

SOIL NO.	SOIL NAME	HYDROLOGIC SOIL GROUP	TYPICAL SLOPES	EROSION FACTOR (K)	EROSION FACTOR (T)
11C	CRAVEN-UCHEE COMPLEX	C	6-10%	0.32-0.37	3
15D	EMPORIA COMPLEX	C	10-15%	0.20-0.28	4
15E	EMPORIA COMPLEX	C	15-25%	0.20-0.28	4

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

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

THE MAP SHOWN IS A "BEST FIT MODEL" OF THE SCS MAPS WITH EXISTING BASE INFORMATION.

HATCH LEGEND

- SLOPES ≥ 25%
- HIGHLY EROSIVE SOILS
- PROPOSED WETLAND IMPACTS
- PROPOSED RPA BUFFER IMPACTS

ENVIRONMENTAL INVENTORY IMPACTS

TIDAL WETLANDS:	NONE ON SITE
TIDAL SHORES:	NONE ON SITE
NON-TIDAL WETLANDS IN RPA:	0.020 AC.
100 FT RPA BUFFER:	0.013 AC.
NON-TIDAL WETLANDS IN RMA:	NONE ON SITE
HYDRIC SOILS:	NONE ON SITE
25% SLOPES OR GREATER:	0.07 AC.

Rev.	Date	Description	Revised By
2	9/19/11	Revised for County Comments	HWF
1	6/16/11	Revised for County Comments	MJR

STATE OF VIRGINIA
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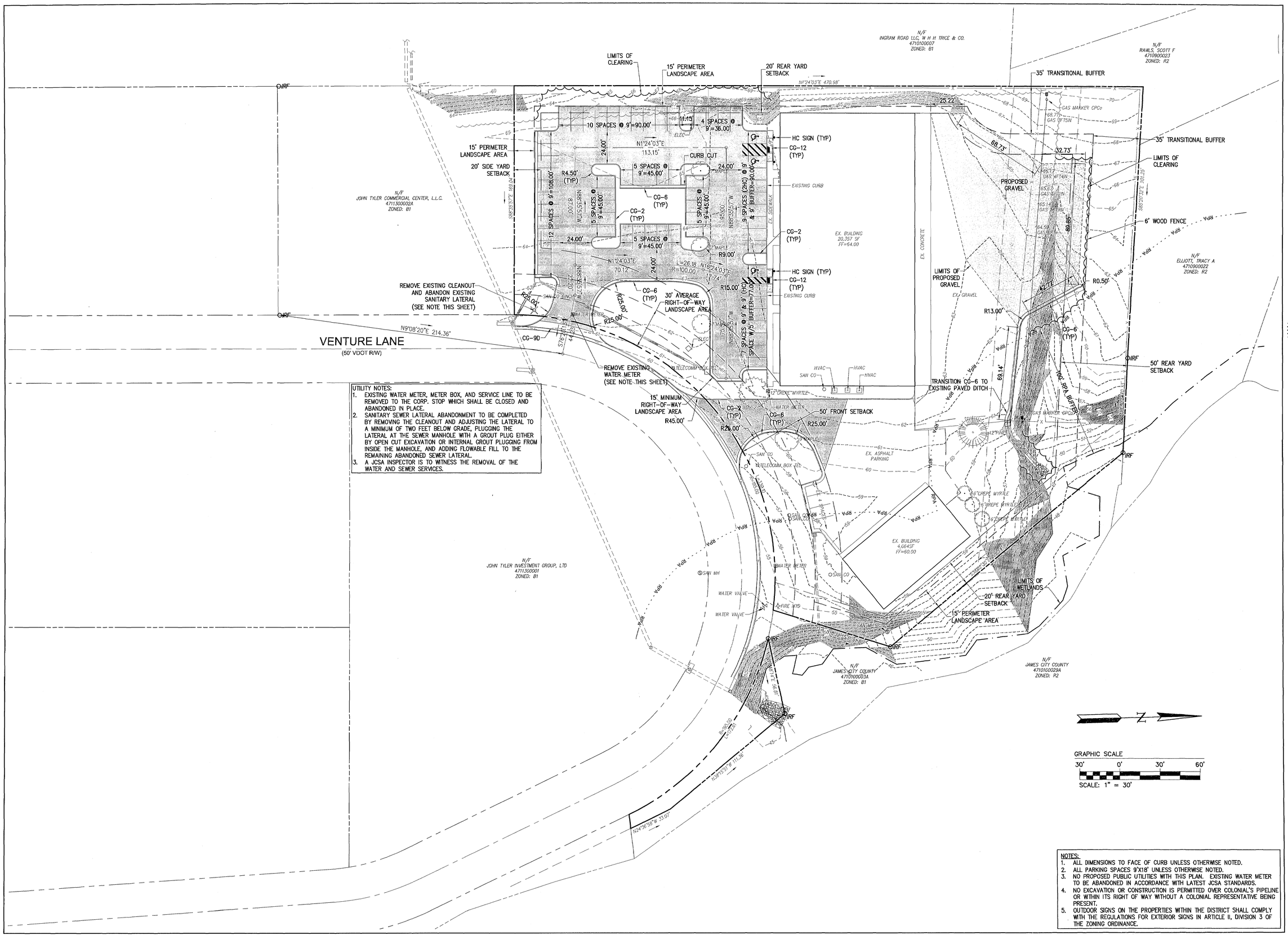
Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11

Sheet Title: Environmental Inventory

Sheet Number 2



UTILITY NOTES:
1. EXISTING WATER METER, METER BOX, AND SERVICE LINE TO BE REMOVED TO THE CORP. STOP WHICH SHALL BE CLOSED AND ABANDONED IN PLACE.
2. SANITARY SEWER LATERAL ABANDONMENT TO BE COMPLETED BY REMOVING THE CLEANOUT AND ADJUSTING THE LATERAL TO A MINIMUM OF TWO FEET BELOW GRADE, PLUGGING THE LATERAL AT THE SEWER MANHOLE WITH A GROUT PLUG EITHER BY OPEN CUT EXCAVATION OR INTERNAL GROUT PLUGGING FROM INSIDE THE MANHOLE, AND ADDING FLOWABLE FILL TO THE REMAINING ABANDONED SEWER LATERAL.
3. A JCSA INSPECTOR IS TO WITNESS THE REMOVAL OF THE WATER AND SEWER SERVICES.

NOTES:
1. ALL DIMENSIONS TO FACE OF CURB UNLESS OTHERWISE NOTED.
2. ALL PARKING SPACES 9'X18' UNLESS OTHERWISE NOTED.
3. NO PROPOSED PUBLIC UTILITIES WITH THIS PLAN. EXISTING WATER METER TO BE ABANDONED IN ACCORDANCE WITH LATEST JCSA STANDARDS.
4. NO EXCAVATION OR CONSTRUCTION IS PERMITTED OVER COLONIAL'S PIPELINE OR WITHIN ITS RIGHT OF WAY WITHOUT A COLONIAL REPRESENTATIVE BEING PRESENT.
5. OUTDOOR SIGNS ON THE PROPERTIES WITHIN THE DISTRICT SHALL COMPLY WITH THE REGULATIONS FOR EXTERIOR SIGNS IN ARTICLE II, DIVISION 3 OF THE ZONING ORDINANCE.

Rev.	Date	Description	Revised by
2	8/18/11	Revised for County Comments	KWP
1	6/16/11	Revised for County Comments	MJR

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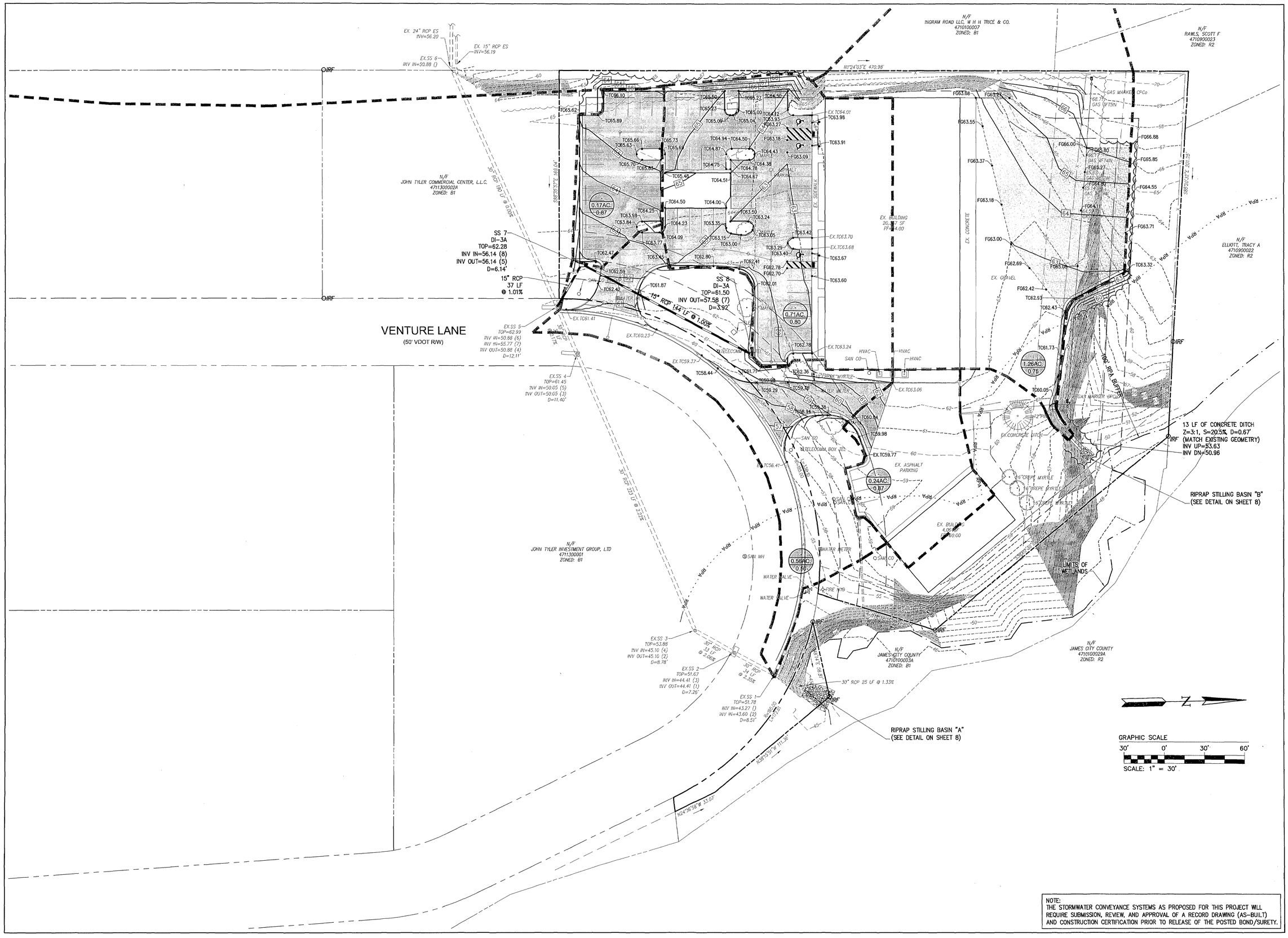
Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11
Sheet Title: Site Plan	
Sheet Number	3



NOTE:
THE STORMWATER CONVEYANCE SYSTEMS AS PROPOSED FOR THIS PROJECT WILL REQUIRE SUBMISSION, REVIEW, AND APPROVAL OF A RECORD DRAWING (AS-BUILT) AND CONSTRUCTION CERTIFICATION PRIOR TO RELEASE OF THE POSTED BOND/SURETY.

Rev.	Date	Description	Revised By
2	8/18/11	Revised for County Comments	HWP
1	6/15/11	Revised for County Comments	MJR

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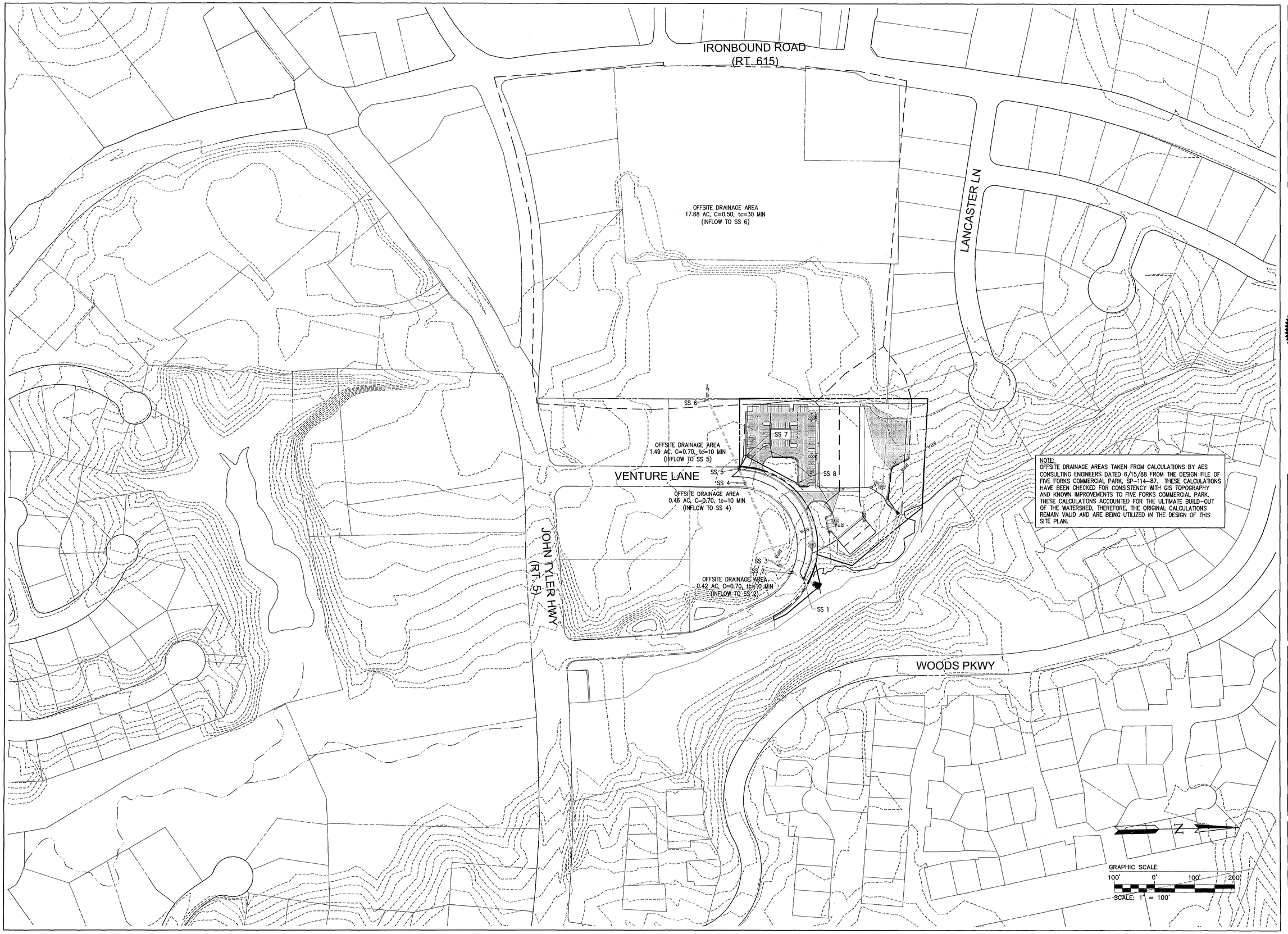
Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11

Sheet Title:
Grading & Drainage Plan

Sheet Number
4



NOTE:
OFFSITE DRAINAGE AREAS TAKEN FROM CALCULATIONS BY AES CONSULTING ENGINEERS DATED 6/15/88 FROM THE DESIGN FILE OF FIVE FORKS COMMERCIAL PARK, SP-114-87. THESE CALCULATIONS HAVE BEEN CHECKED FOR CONSISTENCY WITH GIS TOPOGRAPHY AND KNOWN IMPROVEMENTS TO FIVE FORKS COMMERCIAL PARK. THESE CALCULATIONS ACCOUNTED FOR THE ULTIMATE BUILD-OUT OF THE WATERSHED, THEREFORE, THE ORIGINAL CALCULATIONS REMAIN VALID AND ARE BEING UTILIZED IN THE DESIGN OF THIS SITE PLAN.

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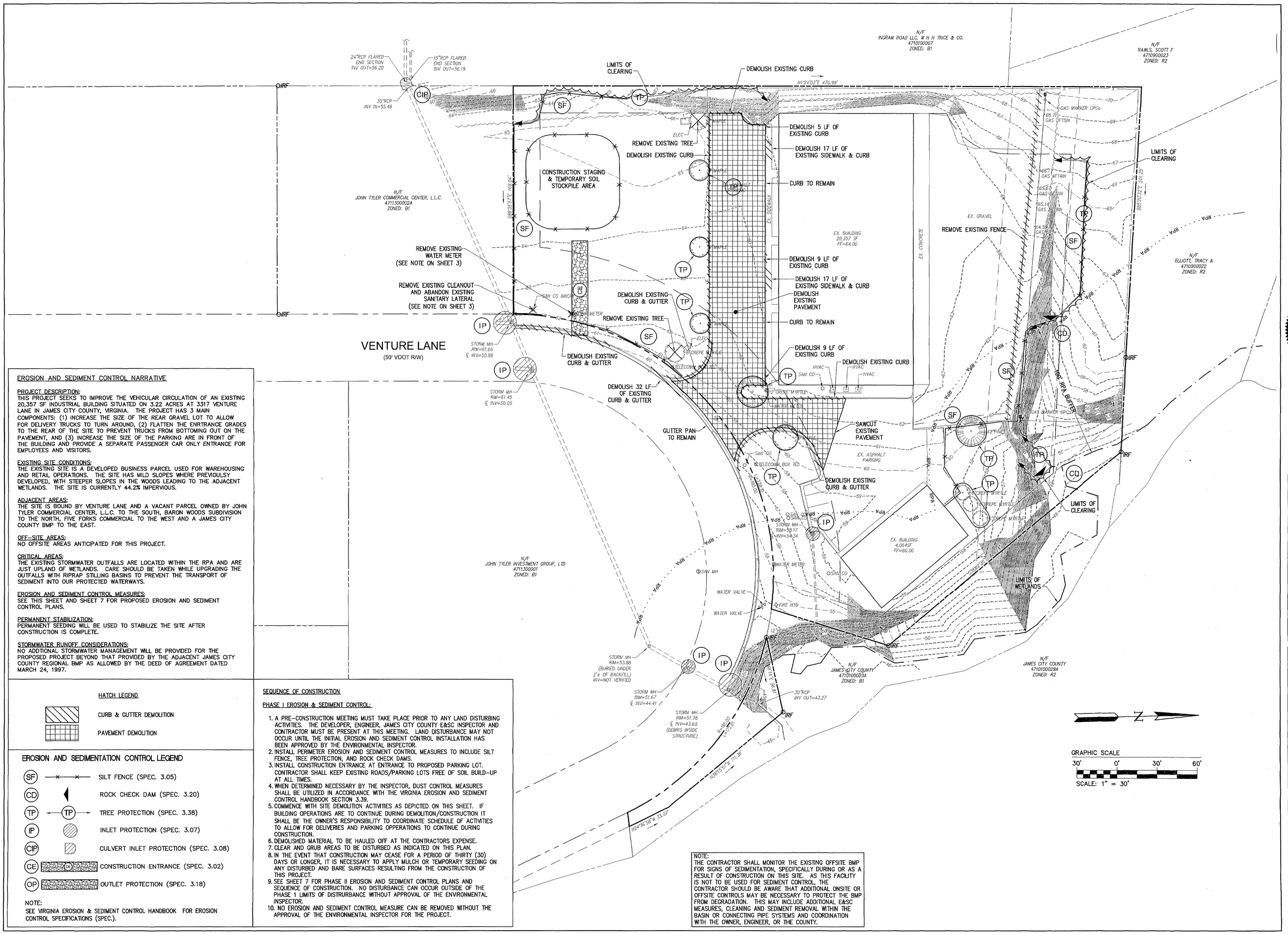
Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11

Sheet Title:
Overall Drainage Plan

Sheet Number
5



EROSION AND SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION:
THIS PROJECT SEEKS TO IMPROVE THE VEHICULAR CIRCULATION OF AN EXISTING 20,357 SF INDUSTRIAL BUILDING SITUATED ON 3.22 ACRES AT 3317 VENTURE LANE IN JAMES CITY COUNTY, VIRGINIA. THE PROJECT HAS 3 MAIN COMPONENTS: (1) INCREASE THE SIZE OF THE REAR GRAVEL LOT TO ALLOW FOR DELIVERY TRUCKS TO TURN AROUND, (2) FLATTEN THE ENRTRANCE GRADES TO THE REAR OF THE SITE TO PREVENT TRUCKS FROM BOTTOMING OUT ON THE PAVEMENT, AND (3) INCREASE THE SIZE OF THE PARKING ARE IN FRONT OF THE BUILDING AND PROVIDE A SEPARATE PASSENGER CAR ONLY ENTRANCE FOR EMPLOYEES AND VISITORS.

EXISTING SITE CONDITIONS:
THE EXISTING SITE IS A DEVELOPED BUSINESS PARCEL USED FOR WAREHOUSING AND RETAIL OPERATIONS. THE SITE HAS MILD SLOPES WHERE PREVIOULSY DEVELOPED, WITH STEEPER SLOPES IN THE WOODS LEADING TO THE ADJACENT WETLANDS. THE SITE IS CURRENTLY 44.2% IMPERVIOUS.

ADJACENT AREAS:
THE SITE IS BOUND BY VENTURE LANE AND A VACANT PARCEL OWNED BY JOHN TYLER COMMERCIAL CENTER, L.L.C. TO THE SOUTH, BARON WOODS SUBDIVISION TO THE NORTH, FIVE FORKS COMMERCIAL TO THE WEST AND A JAMES CITY COUNTY BMP TO THE EAST.

OFF-SITE AREAS:
NO OFFSITE AREAS ANTICIPATED FOR THIS PROJECT.

CRITICAL AREAS:
THE EXISTING STORMWATER OUTFALLS ARE LOCATED WITHIN THE RPA AND ARE JUST UPLAND OF WETLANDS. CARE SHOULD BE TAKEN WHILE UPGRADING THE OUTFALLS WITH RIPRAP STILLING BASINS TO PREVENT THE TRANSPORT OF SEDIMENT INTO OUR PROTECTED WATERWAYS.

EROSION AND SEDIMENT CONTROL MEASURES:
SEE THIS SHEET AND SHEET 7 FOR PROPOSED EROSION AND SEDIMENT CONTROL PLANS.

PERMANENT STABILIZATION:
PERMANENT SEEDING WILL BE USED TO STABILIZE THE SITE AFTER CONSTRUCTION IS COMPLETE.

STORMWATER RUNOFF CONSIDERATIONS:
NO ADDITIONAL STORMWATER MANAGEMENT WILL BE PROVIDED FOR THE PROPOSED PROJECT BEYOND THAT PROVIDED BY THE ADJACENT JAMES CITY COUNTY REGIONAL BMP AS ALLOWED BY THE DEED OF AGREEMENT DATED MARCH 24, 1997.

HATCH LEGEND

- CURB & GUTTER DEMOLITION
- PAVEMENT DEMOLITION

EROSION AND SEDIMENTATION CONTROL LEGEND

- (SF) SILT FENCE (SPEC. 3.05)
- (CD) ROCK CHECK DAM (SPEC. 3.20)
- (TP) TREE PROTECTION (SPEC. 3.38)
- (IP) INLET PROTECTION (SPEC. 3.07)
- (CIP) CULVERT INLET PROTECTION (SPEC. 3.08)
- (CE) CONSTRUCTION ENTRANCE (SPEC. 3.02)
- (OP) OUTLET PROTECTION (SPEC. 3.18)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.).

SEQUENCE OF CONSTRUCTION

PHASE I EROSION & SEDIMENT CONTROL:

1. A PRE-CONSTRUCTION MEETING MUST TAKE PLACE PRIOR TO ANY LAND DISTURBING ACTIVITIES. THE DEVELOPER, ENGINEER, JAMES CITY COUNTY E&SC INSPECTOR AND CONTRACTOR MUST BE PRESENT AT THIS MEETING. LAND DISTURBANCE MAY NOT OCCUR UNTIL THE INITIAL EROSION AND SEDIMENT CONTROL INSTALLATION HAS BEEN APPROVED BY THE ENVIRONMENTAL INSPECTOR.
2. INSTALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES TO INCLUDE SILT FENCE, TREE PROTECTION, AND ROCK CHECK DAMS.
3. INSTALL CONSTRUCTION ENTRANCE AT ENTRANCE TO PROPOSED PARKING LOT. CONTRACTOR SHALL KEEP EXISTING ROADS/PARKING LOTS FREE OF SOIL BUILD-UP AT ALL TIMES.
4. WHEN DETERMINED NECESSARY BY THE INSPECTOR, DUST CONTROL MEASURES SHALL BE UTILIZED IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK SECTION 3.39.
5. COMMENCE WITH SITE DEMOLITION ACTIVITIES AS DEPICTED ON THIS SHEET. IF BUILDING OPERATIONS ARE TO CONTINUE DURING DEMOLITION/CONSTRUCTION IT SHALL BE THE OWNER'S RESPONSIBILITY TO COORDINATE SCHEDULE OF ACTIVITIES TO ALLOW FOR DELIVERIES AND PARKING OPPERATIONS TO CONTINUE DURING CONSTRUCTION.
6. DEMOLISHED MATERIAL TO BE HAULED OFF AT THE CONTRACTORS EXPENSE.
7. CLEAR AND GRUB AREAS TO BE DISTURBED AS INDICATED ON THIS PLAN.
8. IN THE EVENT THAT CONSTRUCTION MAY CEASE FOR A PERIOD OF THIRTY (30) DAYS OR LONGER, IT IS NECESSARY TO APPLY MULCH OR TEMPORARY SEEDING ON ANY DISTURBED AND BARE SURFACES RESULTING FROM THE CONSTRUCTION OF THIS PROJECT.
9. SEE SHEET 7 FOR PHASE II EROSION AND SEDIMENT CONTROL PLANS AND SEQUENCE OF CONSTRUCTION. NO DISTURBANCE CAN OCCUR OUTSIDE OF THE PHASE 1 LIMITS OF DISTRURBANCE WITHOUT APPROVAL OF THE ENVIRONMENTAL INSPECTOR.
10. NO EROSION AND SEDIMENT CONTROL MEASURE CAN BE REMOVED WITHOUT THE APPROVAL OF THE ENVIRONMENTAL INSPECTOR FOR THE PROJECT.

NOTE:
THE CONTRACTOR SHALL MONITOR THE EXISTING OFFSITE BMP FOR SIGNS OF SEDIMENTATION, SPECIFICALLY DURING OR AS A RESULT OF CONSTRUCTION ON THIS SITE. AS THIS FACILITY IS NOT TO BE USED FOR SEDIMENT CONTROL, THE CONTRACTOR SHOULD BE AWARE THAT ADDITIONAL ONSITE OR OFFSITE CONTROLS MAY BE NECESSARY TO PROTECT THE BMP FROM DEGRADATION. THIS MAY INCLUDE ADDITIONAL E&SC MEASURES, CLEANING AND SEDIMENT REMOVAL WITHIN THE BASIN OR CONNECTING PIPE SYSTEMS AND COORDINATION WITH THE OWNER, ENGINEER, OR THE COUNTY.

Rev.	Date	Description	Revised By
2	8/19/11	Revised for County Comments	HWP
1	6/16/11	Revised for County Comments	MJR

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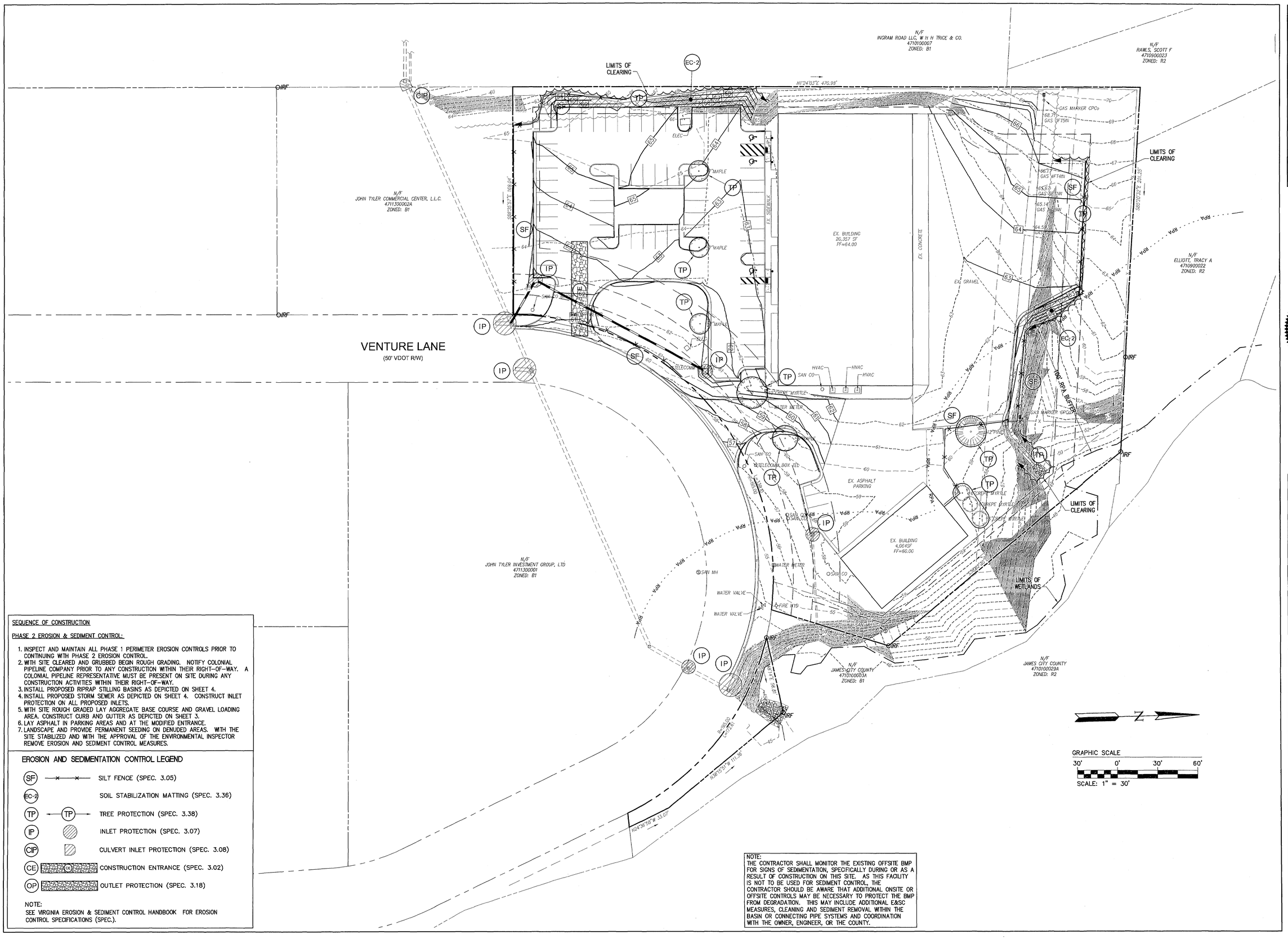
Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11

Sheet Title:
Phase I Erosion & Sediment Control & Demolition Plan

Sheet Number
6



SEQUENCE OF CONSTRUCTION

PHASE 2 EROSION & SEDIMENT CONTROL:

1. INSPECT AND MAINTAIN ALL PHASE 1 PERIMETER EROSION CONTROLS PRIOR TO CONTINUING WITH PHASE 2 EROSION CONTROL.
2. WITH SITE CLEARED AND GRUBBED BEGIN ROUGH GRADING. NOTIFY COLONIAL PIPELINE COMPANY PRIOR TO ANY CONSTRUCTION WITHIN THEIR RIGHT-OF-WAY. A COLONIAL PIPELINE REPRESENTATIVE MUST BE PRESENT ON SITE DURING ANY CONSTRUCTION ACTIVITIES WITHIN THEIR RIGHT-OF-WAY.
3. INSTALL PROPOSED RIPRAP STILLING BASINS AS DEPICTED ON SHEET 4.
4. INSTALL PROPOSED STORM SEWER AS DEPICTED ON SHEET 4. CONSTRUCT INLET PROTECTION ON ALL PROPOSED INLETS.
5. WITH SITE ROUGH GRADED LAY AGGREGATE BASE COURSE AND GRAVEL LOADING AREA. CONSTRUCT CURB AND GUTTER AS DEPICTED ON SHEET 3.
6. LAY ASPHALT IN PARKING AREAS AND AT THE MODIFIED ENTRANCE.
7. LANDSCAPE AND PROVIDE PERMANENT SEEDING ON DENUDED AREAS. WITH THE SITE STABILIZED AND WITH THE APPROVAL OF THE ENVIRONMENTAL INSPECTOR REMOVE EROSION AND SEDIMENT CONTROL MEASURES.

EROSION AND SEDIMENTATION CONTROL LEGEND

SF	SILT FENCE (SPEC. 3.05)
EC-2	SOIL STABILIZATION MATTING (SPEC. 3.36)
TP	TREE PROTECTION (SPEC. 3.38)
IP	INLET PROTECTION (SPEC. 3.07)
CIP	CULVERT INLET PROTECTION (SPEC. 3.08)
CE	CONSTRUCTION ENTRANCE (SPEC. 3.02)
OP	OUTLET PROTECTION (SPEC. 3.18)

NOTE:
SEE VIRGINIA EROSION & SEDIMENT CONTROL HANDBOOK FOR EROSION CONTROL SPECIFICATIONS (SPEC.).

NOTE:
THE CONTRACTOR SHALL MONITOR THE EXISTING OFFSITE BMP FOR SIGNS OF SEDIMENTATION, SPECIFICALLY DURING OR AS A RESULT OF CONSTRUCTION ON THIS SITE. AS THIS FACILITY IS NOT TO BE USED FOR SEDIMENT CONTROL, THE CONTRACTOR SHOULD BE AWARE THAT ADDITIONAL ONSITE OR OFFSITE CONTROLS MAY BE NECESSARY TO PROTECT THE BMP FROM DEGRADATION. THIS MAY INCLUDE ADDITIONAL E&SC MEASURES, CLEANING AND SEDIMENT REMOVAL WITHIN THE BASIN OR CONNECTING PIPE SYSTEMS AND COORDINATION WITH THE OWNER, ENGINEER, OR THE COUNTY.

Rev.	Date	Description	Revised By
2	6/18/11	Revised for County Comments	HWR
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Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11

Sheet Title:
Phase II Erosion & Sediment Control Plan

Sheet Number
7

JAMES CITY COUNTY ENVIRONMENTAL DIVISION
EROSION AND SEDIMENT CONTROL NOTES
REVISED 7/6/01

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, ALL 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 THAT MAY BE PERTINENT TO THIS PROJECT, INCLUDING MINIMUM STANDARDS 1 THROUGH 19. IF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS FOUND TO BE INADEQUATE IN THE FIELD, THE MINIMUM STANDARDS WILL APPLY IN ADDITION TO THE PROVISIONS OF THE APPROVED PLAN.

2. AS A PREREQUISITE TO APPROVAL OF AN EROSION AND SEDIMENT CONTROL PLAN FOR LAND-DISTURBING ACTIVITIES, THE NAME OF A RESPONSIBLE LAND-DISTURBER SHALL BE PROVIDED. THE RESPONSIBLE LAND-DISTURBER SHALL BE AN INDIVIDUAL WHO HOLDS A VALID CERTIFICATE OF COMPETENCE ISSUED BY THE VIRGINIA DEPARTMENT OF CONSERVATION AND IS DEFINED AS THE PERSON IN CHARGE OF AND RESPONSIBLE FOR CARRYING OUT THE LAND-DISTURBING ACTIVITY. PERMITS OR PLANS WITHOUT THIS INFORMATION ARE DEEMED INCOMPLETE AND WILL NOT BE APPROVED UNTIL PROPER NOTIFICATION IS RECEIVED. ALSO, IF THE PERSON DESIGNATED AS RESPONSIBLE LAND-DISTURBER CHANGES BETWEEN THE TIME OF PLAN APPROVAL AND THE SCHEDULED PRECONSTRUCTION MEETING, THE ENVIRONMENTAL DIVISION SHALL BE INFORMED OF THE CHANGE, IN WRITING, 24-HOURS IN ADVANCE OF THE PRECONSTRUCTION MEETING.

3. A PRECONSTRUCTION MEETING SHALL BE HELD ON SITE BETWEEN THE COUNTY, THE DEVELOPER, THE PROJECT ENGINEER, THE RESPONSIBLE LAND-DISTURBER 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 DESIGNATED RESPONSIBLE LAND-DISTURBER IS REQUIRED TO ATTEND THE PRECONSTRUCTION MEETING FOR THE PROJECT.

4. 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 (STD & SPEC 3.02).

5. SEDIMENT BASINS AND TRAPS (STD & SPEC 3.13 AND 3.14), PERIMETER DIKES (STD & SPEC 3.09 AND 3.12), SEDIMENT FILTER BARRIERS (STD. & AND SPEC 3.05) AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON-SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND MUST BE MADE FUNCTIONAL PRIOR TO ANY UPSLOPE LAND DISTURBANCE TAKING PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION.
PERIODIC INSPECTIONS OF THE EROSION CONTROL MEASURES BY THE OWNER OR OWNER'S REPRESENTATIVE SHALL BE MADE TO ASSESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE ACCOMPLISHED IMMEDIATELY AND SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES.

6. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION. A TEMPORARY FILL DIVERSION (STD. & SPEC. 3.10) AND SLOPE DRAIN (STD. & SPEC. 3.15) SHALL BE INSTALLED PRIOR TO THE END OF EACH WORKING DAY.

7. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. ENVIRONMENTAL DIVISION APPROVAL WILL BE REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLAN.

8. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THE PLAN. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE ENVIRONMENTAL DIVISION PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.

9. 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 THE SAME (STD & SPEC 3.18). 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.

10. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAT 30 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.

11. NO MORE THAN 300 FEET OF SANITARY SEWER, STORM DRAIN, WATER 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).

12. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING (STD & SPEC 3.35). SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.

13. 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 (STD & SPEC 3.32). IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.

14. ALL SLOPES STEEPER THAN 3H:1V SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS AND MATTINGS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH STD. & SPEC. 3.35, MULCHING, STD. & SPEC. 3.36, SOIL STABILIZATION BLANKETS AND MATTING AND MANUFACTURER=S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2H:1V.

15. INLET PROTECTION (STD & SPEC 3.07 AND 3.08) SHALL BE PROVIDED FOR ALL STORM DRAIN AND CULVERT INLETS FOLLOWING CONSTRUCTION OF THE SAME.

16. TEMPORARY LINERS, SUCH AS POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES UNTIL THE PERMANENT CONCRETE LINER IS INSTALLED.

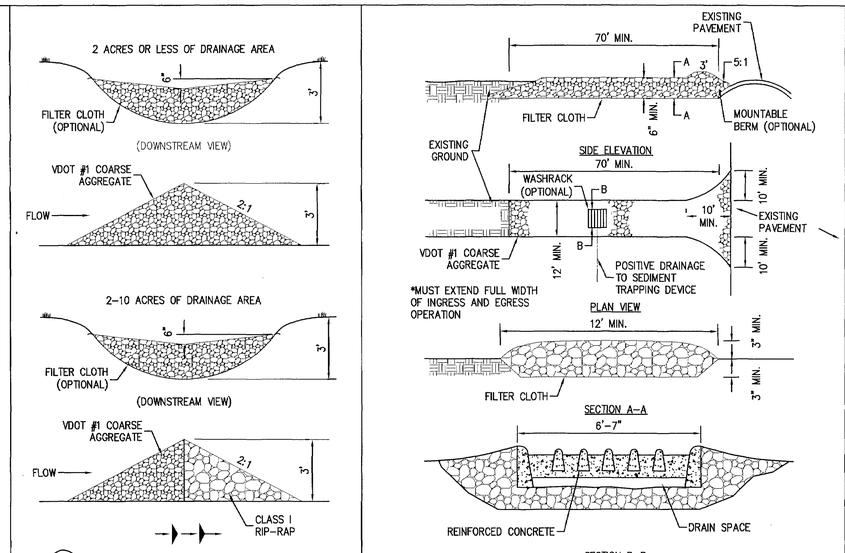
17. PAVED DITCHES SHALL BE REQUIRED WHEREVER ACCELERATED EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL BE PAID TO THOSE AREAS WHERE GRADES EXCEED 3 PERCENT.

18. TEMPORARY EROSION CONTROL MEASURES SUCH AS SILT FENCE ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. TRAPPED SEDIMENT SHALL BE SPREAD, SEEDED AND MULCHED. AFTER THE PROJECT AND STABILIZATION IS COMPLETE, ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS.

19. NO SEDIMENT TRAP OR SEDIMENT BASIN SHALL BE REMOVED UNTIL A) AT LEAST 75 PERCENT OF THE LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN HAVE BEEN SOLD TO A THIRD PARTY (UNRELATED TO THE DEVELOPER) FOR THE CONSTRUCTION OF HOMES AND/OR B) 60 PERCENT OF THE SINGLE FAMILY LOTS WITHIN THE DRAINAGE AREA TO THE TRAP OR BASIN HAVE BEEN COMPLETED AND THE SOIL STABILIZED. A BULK SALE OF THE LOTS TO ANOTHER BUILDER DOES NOT SATISFY THIS PROVISION. SEDIMENT TRAPS AND SEDIMENT BASINS SHALL NOT BE REMOVED WITHOUT THE EXPRESS AUTHORIZATION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION.

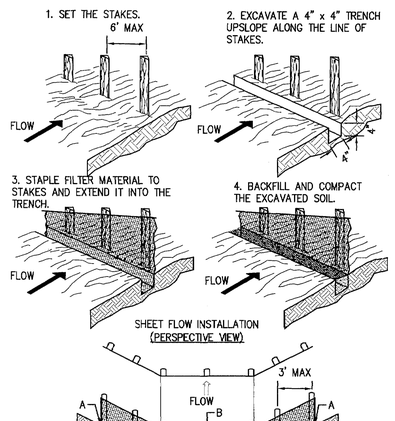
20. RECORD DRAWINGS (AS-BUILTS) AND CONSTRUCTION CERTIFICATIONS ARE BOTH REQUIRED FOR NEWLY CONSTRUCTED OR MODIFIED STORMWATER MANAGEMENT/BMP FACILITIES. CERTIFICATION ACTIVITIES SHALL BE ADEQUATELY COORDINATED AND PERFORMED BEFORE, DURING AND FOLLOWING CONSTRUCTION IN ACCORDANCE WITH THE CURRENT VERSION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION, STORMWATER MANAGEMENT/BMP FACILITIES, RECORD DRAWING AND CONSTRUCTION CERTIFICATION, STANDARD FORMS & INSTRUCTIONS.

21. DESIGN AND CONSTRUCTION OF PRIVATE-TYPE SITE DRAINAGE SYSTEMS OUTSIDE VDOT RIGHTS-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT VERSION OF THE JAMES CITY COUNTY ENVIRONMENTAL DIVISION, STORMWATER DRAINAGE CONVEYANCE SYSTEMS (NON-BMP RELATED), GENERAL DESIGN AND CONSTRUCTION GUIDELINES.



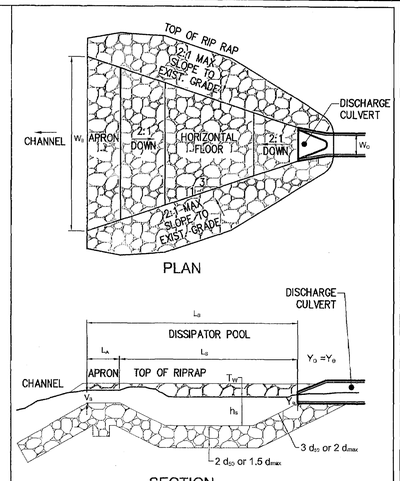
(CD) ROCK CHECK DAM
SOURCE: VA. DSWC PLATE. 3.20-1 N.T.S.

(CE) STONE CONSTRUCTION ENTRANCE
SOURCE: VA. DSWC PLATE. 3.02-1 N.T.S.



(SF) SOURCE: VA. DSWC PLATE. 3.05-2

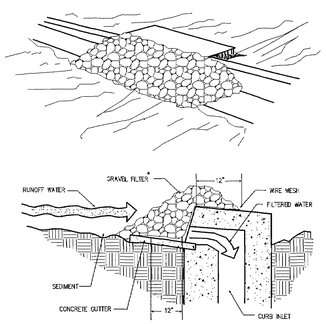
CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)
N.T.S.



RIP RAP BASIN
N.T.S

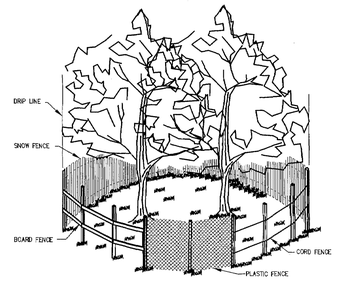
STILLING BASIN "A"		STILLING BASIN "B"	
L_B=18.4'	d_{50}=0.6'	L_B=9.5'	d_{50}=0.32'
L_S=12.2'	W_B=14.7'	L_S=6.3'	W_B=7.6'
L_A=6.1'	hs=1.22'	L_A=3.2'	hs=0.63'

GRAVEL CURB INLET SEDIMENT FILTER

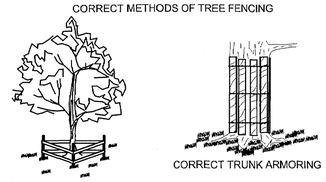


(IP) Plate 3.07-6

FENCING AND ARMORING



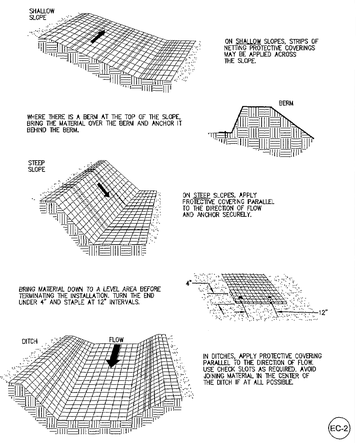
CORRECT METHODS OF TREE FENCING



TRIANGULAR BOARD FENCE — CORRECT TRUNK ARMORING

(TP) Plate 3.38-2

TYPICAL ORIENTATION OF TREATMENT – 1 (SOIL STABILIZATION BLANKET)



(EC-2) Plate 3.36-1

MINIMUM CARE LAWN	TOTAL LBS. PER ACRE
COMMERCIAL OR RESIDENTIAL	
-KENTUCKY 31 OR TURF-TYPE TALL FESCUE	175-200 LBS.
OR	
-COMMON BERMUDA GRASS **	75 LBS.
HIGH-MAINTENANCE LAWN	
-KENTUCKY 31 OR TURF-TYPE TALL FESCUE	200-250 LBS.
OR	
-HYBRID BERMUDAGRASS (SEED)**	40 LBS. (UNHALLED)
OR	
-HYBRID BERMUDAGRASS (BY OTHER VEGETATIVE ESTABLISHMENT METHOD, SEE STD. & SPEC. 3.34)	30 LBS. (HULLED)
GENERAL SLOPE (3:1 OR LESS)	
-KENTUCKY 31 FESCUE	128 LBS.
-RED TOP GRASS	2 LBS.
-SEASONAL NURSE CROP *	20 LBS.
	150 LBS.
LOW MAINTENANCE SLOPE (STEEPER THAN 3:1)	
-KENTUCKY 31 TALL FESCUE	93-108 LBS.
-COMMON BERMUDAGRASS **	0-15 LBS.
-RED TOP GRASS	2 LBS.
-SEASONAL NURSE CROP *	20 LBS.
-SERICEA LESPEDEZA **	20 LBS.
	150 LBS.

(PS) VA DSWC PG. III – 304

* USE SEASONAL CROP IN ACCORDANCE WITH SEEDING DATES AS STATED BELOW:
FEBRUARY, MARCH THROUGH APRIL.....ANNUAL RYE
MAY 1ST THROUGH AUGUST.....FOXTAIL MILLET
SEPTEMBER, OCTOBER THROUGH NOVEMBER 15TH.....ANNUAL RYE
NOVEMBER 16TH THROUGH JANUARY.....WINTER RYE

** MAY THROUGH OCTOBER, USE HULLED SEED. ALL OTHER SEEDING PERIODS, USE UNHULLED SEED. WEEPING LOVEGRASS MAY BE ADDED TO ANY SLOPE OR LOW-MAINTENANCE MIX DURING WARMER SEEDING PERIODS; ADD 10-20 LBS./ACRE IN MIXES.

SITE SPECIFIC SEEDING MIXTURES FOR COASTAL PLAIN AREA

Rev.	Date	Description	Revised by
2	8/19/11	Revised for County Comments	HWP
1	6/16/11	Revised for County Comments	MJR

AES CONSULTING ENGINEERS
5248 Olde Towne Road, Suite 1
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Fax: (757) 220-8994
www.aesva.com
Hampton Roads | Central Virginia | Middle Peninsula

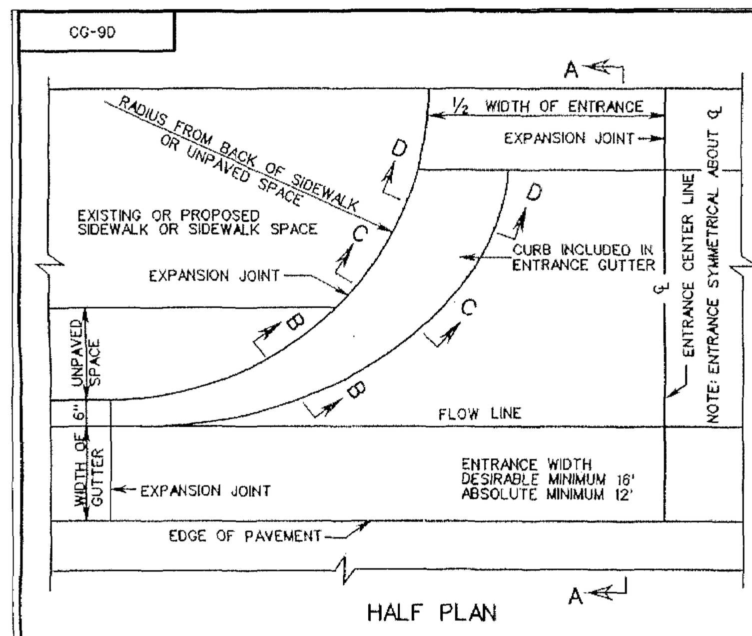
John Tyler Commercial Center Parking
3317 Venture Lane
Berkeley District | James City County | Virginia

Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11

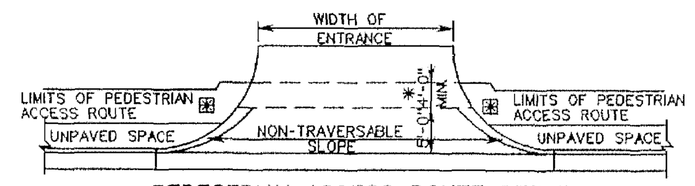
Sheet Title:
Erosion & Sediment Control Notes & Details

Sheet Number
8

CG-9D



HALF PLAN



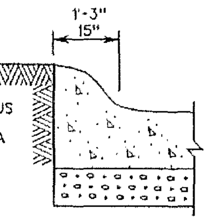
PEDESTRIAN ACCESS ROUTE DETAIL

ADDITIONAL RIGHT-OF-WAY IS REQUIRED IF THE LIMITS OF PEDESTRIAN ACCESS ROUTE ⊠ EXTEND BEYOND EXISTING OR PROPOSED VDOT RIGHT-OF WAY.

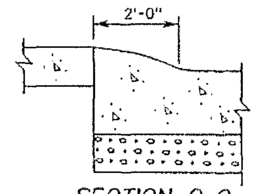
⊠ PEDESTRIAN ACCESS ROUTES PROVIDE A CONTINUOUS UNOBSTRUCTED, STABLE, FIRM AND SLIP RESISTANT PATH CONNECTING ALL ACCESSIBLE ELEMENTS OF A FACILITY THAT CAN BE APPROACHED, ENTERED AND USED BY PEDESTRIANS.

* IF PEDESTRIAN ACCESS ROUTES ⊠ ARE BEING PROVIDED, A MINIMUM 4' TRAVERSABLE WIDTH IS REQUIRED WITH A MAX. 2% CROSS SLOPE.

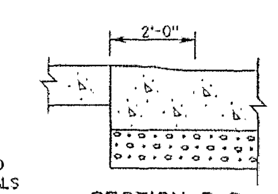
WHEN USED IN CONJUNCTION WITH STANDARD CG-3 OR CG-7, THE CURB FACE ON THIS STANDARD IS TO BE ADJUSTED TO MATCH THE MOUNTABLE CURB CONFIGURATION.



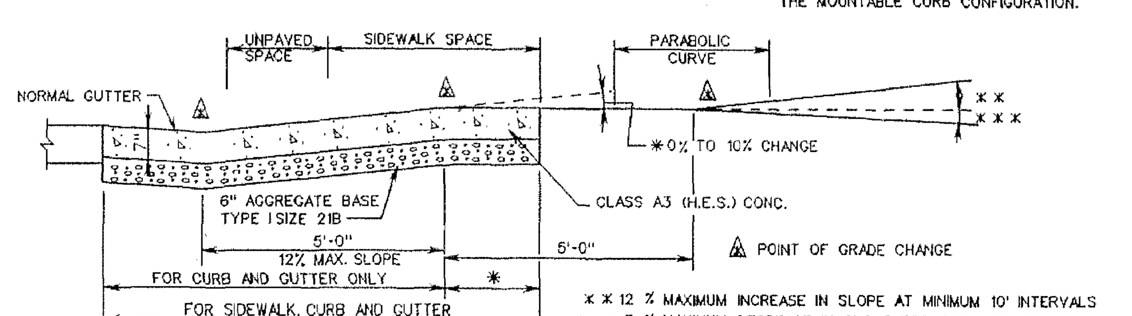
SECTION B-B



SECTION C-C



SECTION D-D



SECTION A-A

△ POINT OF GRADE CHANGE

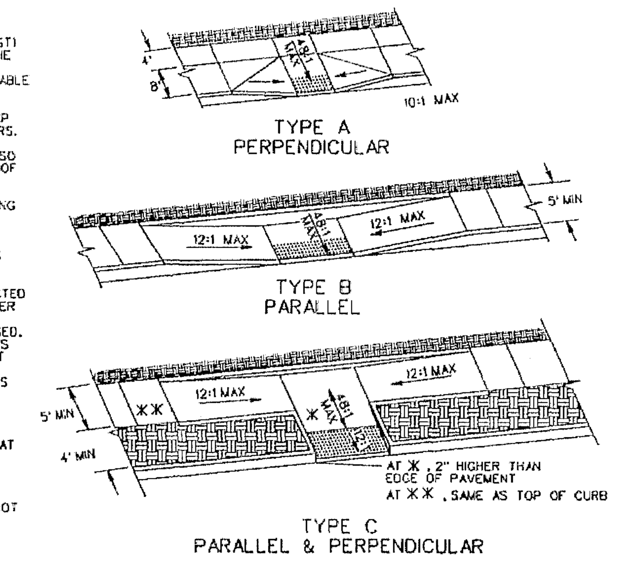
* * 12 % MAXIMUM INCREASE IN SLOPE AT MINIMUM 10' INTERVALS
* * * 3 % MAXIMUM DECREASE IN SLOPE FOR FIRST 10' INTERVAL AND 8 % MAXIMUM DECREASE FOR SUCCEEDING MINIMUM 10' INTERVALS

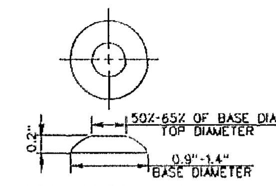
VDOT ROAD AND BRIDGE STANDARDS		STANDARD ENTRANCE GUTTER	SPECIFICATION REFERENCE
SHEET 1 OF 1	REVISION DATE	VIRGINIA DEPARTMENT OF TRANSPORTATION	502
203.03			

CG-12

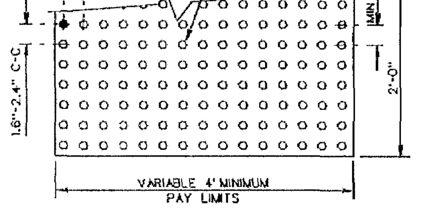
GENERAL NOTES:

1. THE DETECTABLE WARNING SHALL BE PROVIDED BY TRUNCATED DOMES.
2. DETECTABLE WARNING TO BE CLASS A-3 CONCRETE (CLASS A-4 IF PRECAST) WITH SLIP RESISTANT INTEGRAL SURFACE COVERING THE FULL WIDTH OF THE RAMP FLOOR BY 2 FOOT IN LENGTH IN THE DIRECTION OF PEDESTRIAN TRAVEL. OTHER TYPES OF MATERIAL WITH THE TRUNCATED DOMES DETECTABLE WARNING MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
3. SLOPING SIDES OF CURB RAMP MAY BE POURED MONOLITHICALLY WITH RAMP FLOOR OR BY USING PERMISSIBLE CONSTRUCTION JOINT WITH REQUIRED BARS.
4. IF RAMP FLOOR IS PRECAST, HOLES MUST BE PROVIDED FOR DOWEL BARS SO THAT ADJOINING FLARED SIDES CAN BE CAST IN PLACE AFTER PLACEMENT OF PRECAST RAMP FLOOR. PRECAST CONCRETE SHALL BE CLASS A-4.
5. REQUIRED BARS ARE TO BE NO. 5 X 8" PLACED 1' CENTER TO CENTER ALONG BOTH SIDES OF THE RAMP FLOOR, MID-DEPTH OF RAMP FLOOR. MINIMUM CONCRETE COVER 1½".
6. CURB / CURB AND GUTTER SLOPE TRANSITIONS ADJACENT TO CURB RAMPS ARE INCLUDED IN PAYMENT FOR CURB / CURB AND GUTTER.
7. CURB RAMPS ARE TO BE LOCATED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THEY ARE TO BE PROVIDED AT INTERSECTIONS WHEREVER AN ACCESSIBLE ROUTE WITHIN THE RIGHT OF WAY OF A HIGHWAY FACILITY CROSSES A CURB REGARDLESS OF WHETHER SIDEWALK IS EXISTING, PROPOSED, OR NONEXISTENT. THEY MUST BE LOCATED WITHIN PEDESTRIAN CROSSWALKS AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER, AND SHOULD NOT BE LOCATED BEHIND VEHICLE STOP LINES, EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC. ACCESSIBLE ROUTES PROVIDE A CONTINUOUS UNOBSTRUCTED, STABLE, FIRM AND SLIP RESISTANT PATH CONNECTING ALL ACCESSIBLE ELEMENTS OF A FACILITY THAT CAN BE APPROACHED, ENTERED AND USED BY PEDESTRIANS.
8. RAMPS MAY BE PLACED ON RADIAL OR TANGENTIAL SECTIONS PROVIDED THAT THE CURB OPENING IS PLACED WITHIN THE LIMITS OF THE CROSSWALK AND THAT THE SLOPE AT THE CONNECTION OF THE CURB OPENING IS PERPENDICULAR TO THE CURB.
9. TYPICAL CONCRETE SIDEWALK IS 4" THICK. WHEN THE ENTRANCE RADII CANNOT ACCOMMODATE THE TURNING REQUIREMENTS OF ANTICIPATED HEAVY TRUCK TRAFFIC, REFER TO STANDARD CG-13, COMMERCIAL ENTRANCE (HEAVY TRUCK TRAFFIC) FOR CONCRETE DEPTH.
10. WHEN CURB RAMPS ARE USED IN CONJUNCTION WITH A SHARED USE PATH, THE MINIMUM WIDTH SHALL BE THE WIDTH OF THE SHARED USE PATH
11. WHEN ONLY ONE CURB RAMP IS PROVIDED FOR TWO CROSSINGS (DIAGONAL), A 4' x 4' LANDING AREA SHALL BE PROVIDED TO MANEUVER A WHEELCHAIR INTO THE CROSSWALK WITHOUT GOING INTO THE TRAVELWAY. THIS 4' x 4' LANDING AREA MAY INCLUDE THE GUTTER PAN.



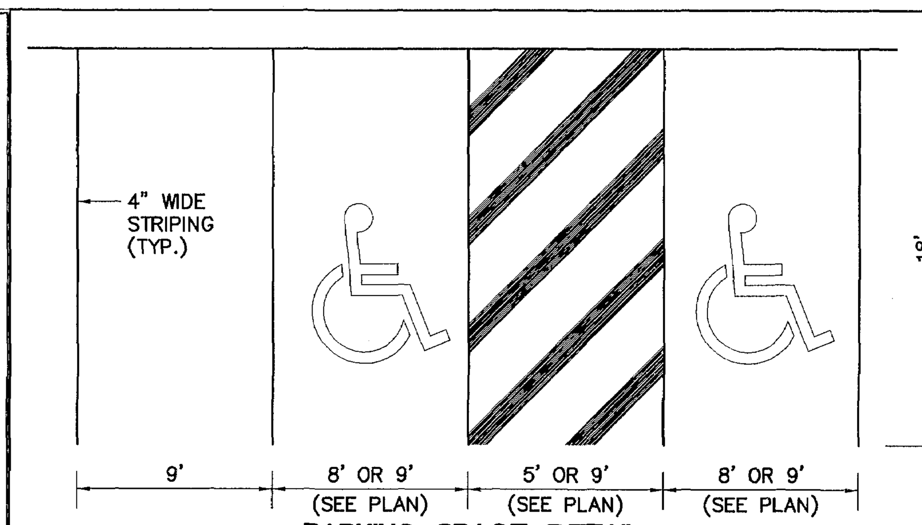


TRUNCATED DOME DETAIL



DETECTABLE WARNING DETAIL

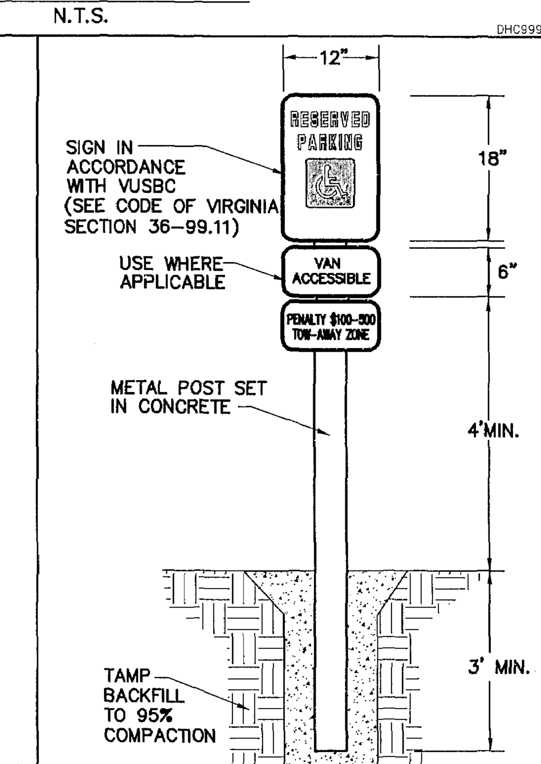
VDOT ROAD AND BRIDGE STANDARDS		CG-12 DETECTABLE WARNING SURFACE (GENERAL NOTES)	SPECIFICATION REFERENCE
SHEET 1 OF 5	REVISION DATE	VIRGINIA DEPARTMENT OF TRANSPORTATION	105 502
203.05	10/09		



PARKING SPACE DETAIL

N.T.S.

DHC999W



NOTE

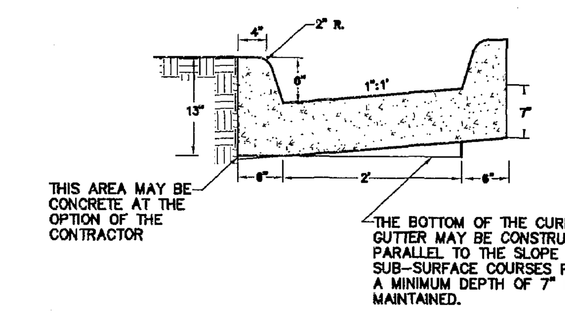
THE SIGN SHALL BE FABRICATED IN ACCORDANCE WITH SECTION 701 AND INSTALLED PER INSTALLATION DETAIL WSP-1 TYPE C OF THE VDOT ROAD AND BRIDGE STANDARDS AND SPECIFICATIONS.

HANDICAP SIGN DETAIL

N.T.S.

D-HCSIGN-1

WHERE APPLICABLE GUTTER SLOPES AWAY FROM PARKING ISLAND.



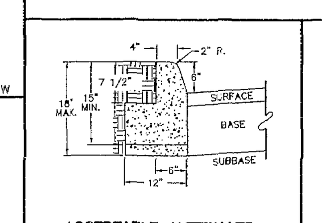
THIS ITEM MAY BE PRECAST OR CAST IN PLACE.

CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.

CURB CUT THROUGH

N.T.S.

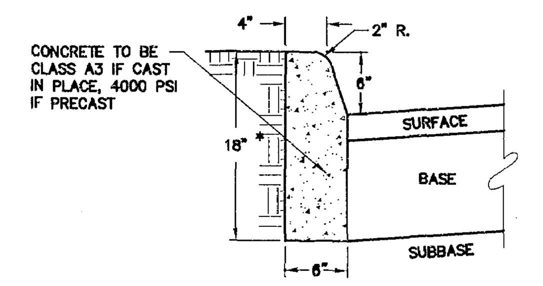
CG-2



ACCEPTABLE ALTERNATE IF CURB IS EXTRUDED

NOTE: CURB HAVING A RADIUS OF 300' OR LESS (ALONG FACE OF CURB) WILL BE PAID FOR AS RADIAL CURB

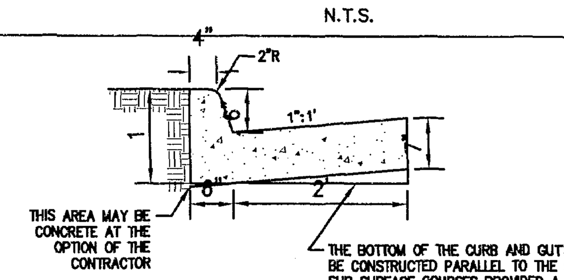
* THE DEPTH OF CURB MAY BE REDUCED AS MUCH AS 3" (15" DEPTH) OR INCREASED AS MUCH AS 3" (21" DEPTH) IN ORDER THAT THE BOTTOM OF THE CURB WILL COINCIDE WITH THE TOP OF A COURSE OF THE PAVEMENT SUBSTRUCTURE. OTHERWISE, THE DEPTH IS TO BE 18" AS SHOWN. NO ADJUSTMENT IN THE PRICE BID IS TO BE MADE FOR A DECREASE OR AN INCREASE IN DEPTH.



STANDARD 6" CURB

N.T.S.

CG-6



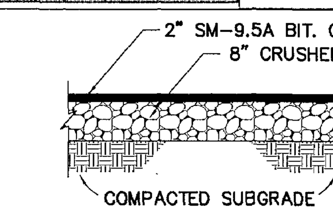
COMBINATION CURB AND GUTTER HAVING A RADIUS OF 300' OR LESS (ALONG FACE OF CURB) SHALL BE PAID FOR AS A RADIAL COMBINATION CURB AND GUTTER.

THIS ITEM MAY BE PRECAST OR CAST IN PLACE.

CONCRETE TO BE CLASS A3 IF CAST IN PLACE, 4000 PSI IF PRECAST.

COMBINATION CURB AND GUTTER

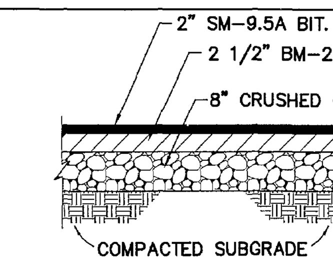
N.T.S.



PAVEMENT SECTION IS BASED UPON GEOTECHNICAL RECOMMENDATIONS

ON SITE-LIGHT DUTY PAVEMENT SECTION

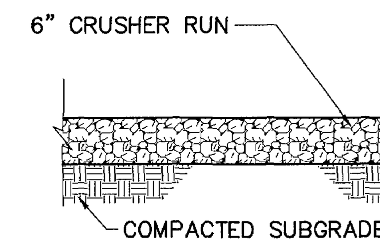
N.T.S.



PAVEMENT SECTION IS BASED UPON GEOTECHNICAL RECOMMENDATIONS

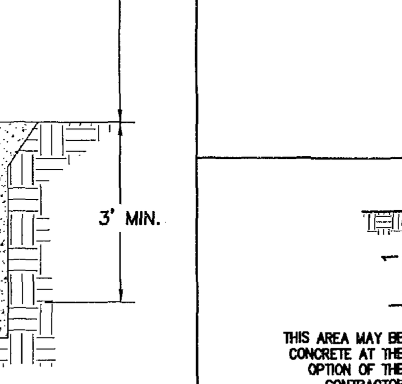
ON-SITE HEAVY DUTY PAVEMENT SECTION

N.T.S.

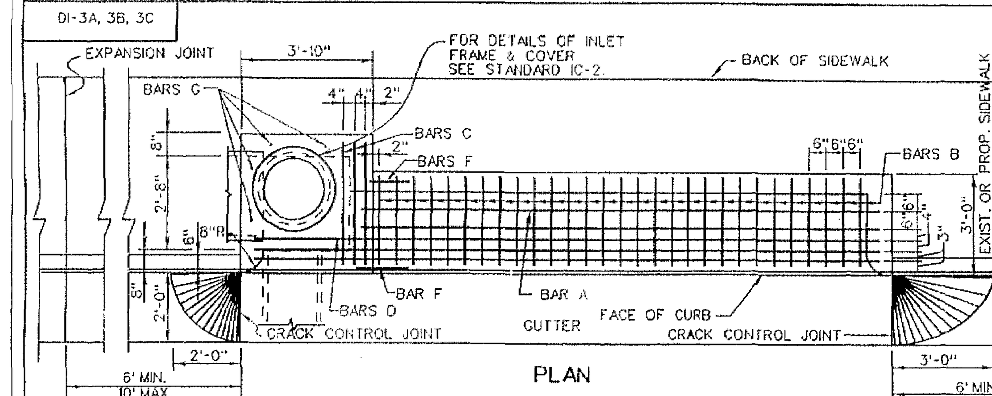


TYPICAL GRAVEL ROAD SECTION

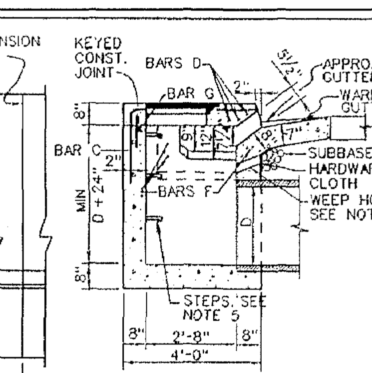
N.T.S.



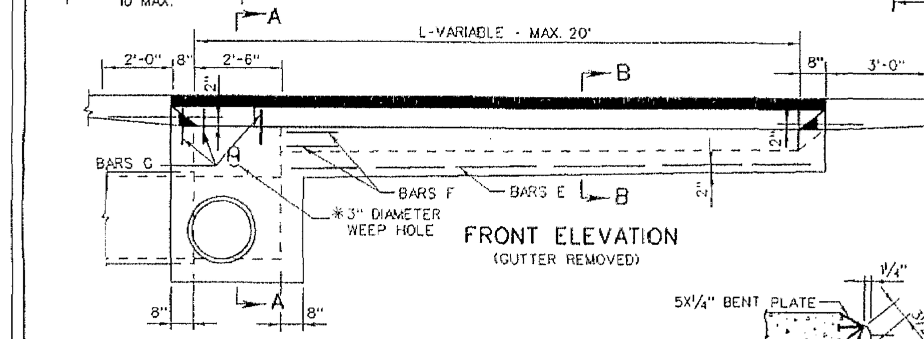
DI-3A, 3B, 3C



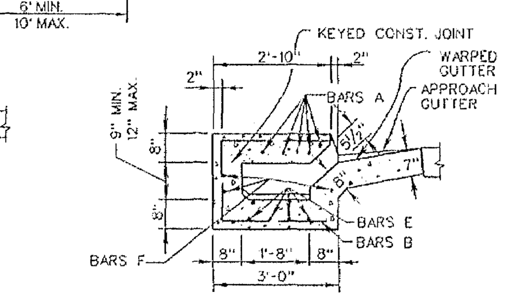
PLAN



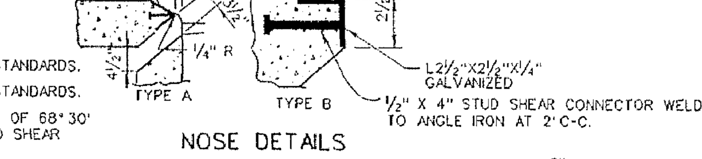
SECTION A-A



FRONT ELEVATION
(GUTTER REMOVED)



SECTION B-B

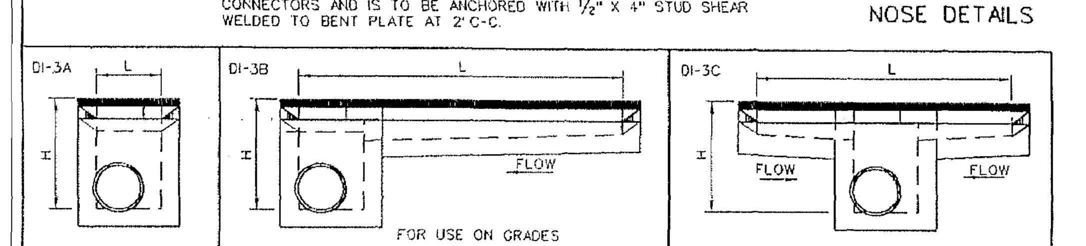


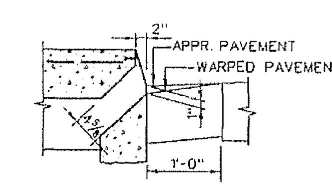
NOSE DETAILS

TYPE A NOSE DETAIL SHALL BE USED WITH CG-3 & CG-7 STANDARDS.

TYPE B NOSE DETAIL SHALL BE USED WITH CG-2 & CG-6 STANDARDS.

GALVANIZED PLATE FOR TYPE A TO BE BENT ON AN ANGLE OF 68°30' CONNECTORS AND IS TO BE ANCHORED WITH ½" X 4" STUD SHEAR WELDED TO BENT PLATE AT 2' C-C.



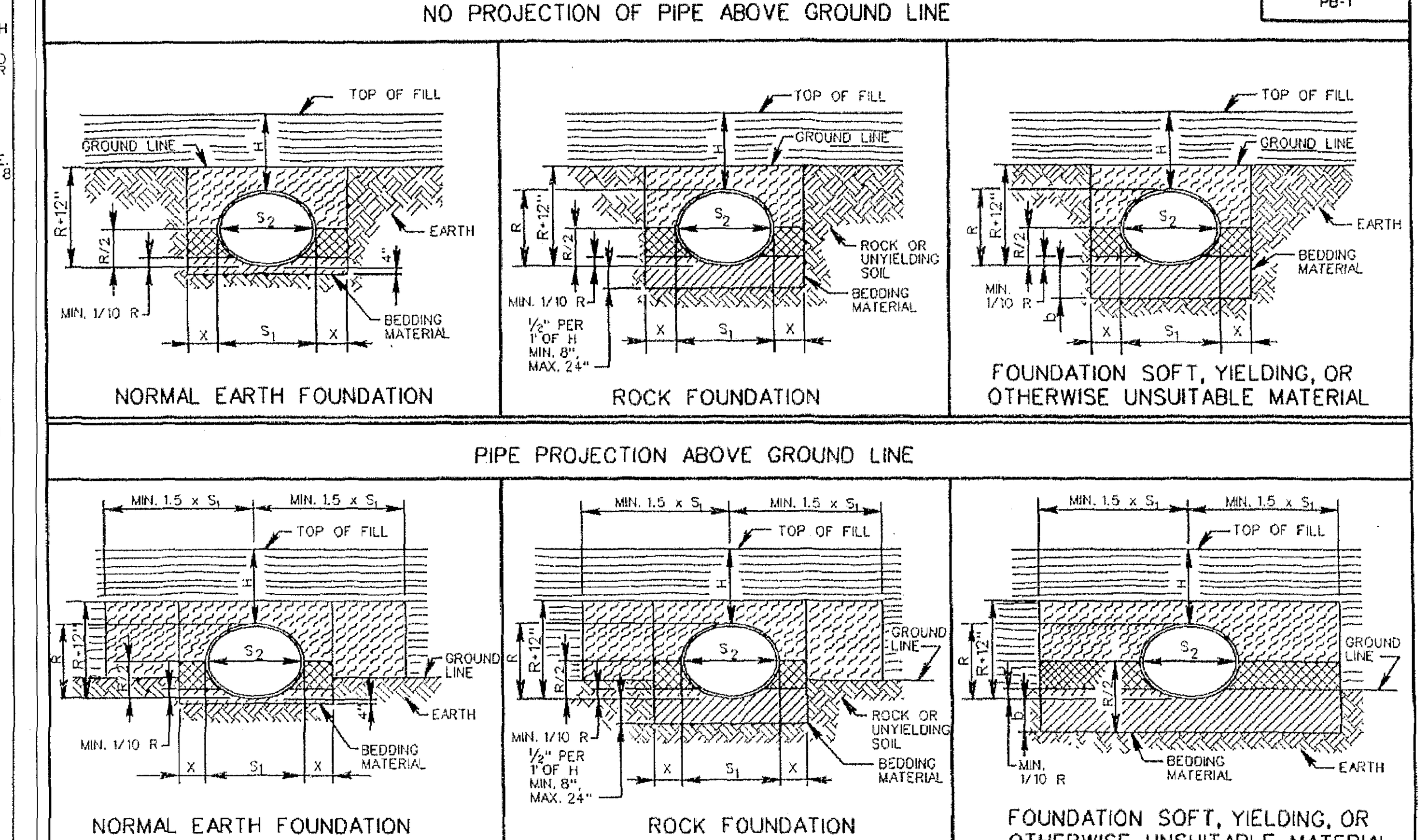


DETAIL WHEN USED ADJACENT TO CURB WITHOUT GUTTER

VDOT ROAD AND BRIDGE STANDARDS		STANDARD CURB DROP INLET 12" - 30" PIPE: MAXIMUM DEPTH (H) = 8'	SPECIFICATION REFERENCE
SHEET 1 OF 2	REVISION DATE	VIRGINIA DEPARTMENT OF TRANSPORTATION	233 302
104.09	08/10		

PB-1

NO PROJECTION OF PIPE ABOVE GROUND LINE



BEDDING MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

CLASS I BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

REGULAR BACKFILL MATERIAL IN ACCORDANCE WITH SECTION 302 OF THE ROAD AND BRIDGE SPECIFICATIONS.

EMBANKMENT

NOTES:

FOR GENERAL NOTES ON PIPE BEDDING, SEE INSTALLATION OF PIPE CULVERTS AND STORM SEWERS GENERAL NOTES ON SHEET 107.00.

CRUSHED GLASS CONFORMING TO THE SIZE REQUIREMENTS FOR CRUSHER RUN AGGREGATE SIZE 25 AND 26 MAY BE USED IN PLACE OF CLASS I BACKFILL.

SPECIFICATION REFERENCE	INSTAL. OF PIPE CULVERTS AND STORM SEWERS ELLIP. PIPE BEDDING AND BACKFILL - METHOD "A"	VDOT ROAD AND BRIDGE STANDARDS	
302 303	VIRGINIA DEPARTMENT OF TRANSPORTATION	REVISION DATE 10/09	SHEET 2 OF 4 107.02

Rev.	Date	Description	Revised By
2	8/19/11	Revised for County Comments	HWP
1	6/16/11	Revised for County Comments	MJR

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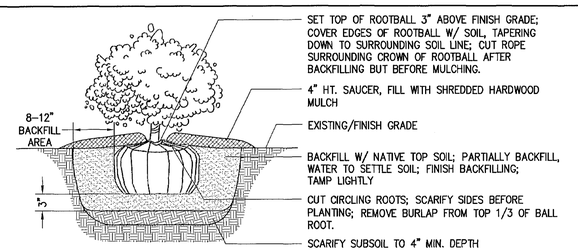
John Tyler Commercial Center Parking

3317 Venture Lane

Berkeley District | James City County | Virginia

Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11
Sheet Title:	Notes & Details
Sheet Number	9

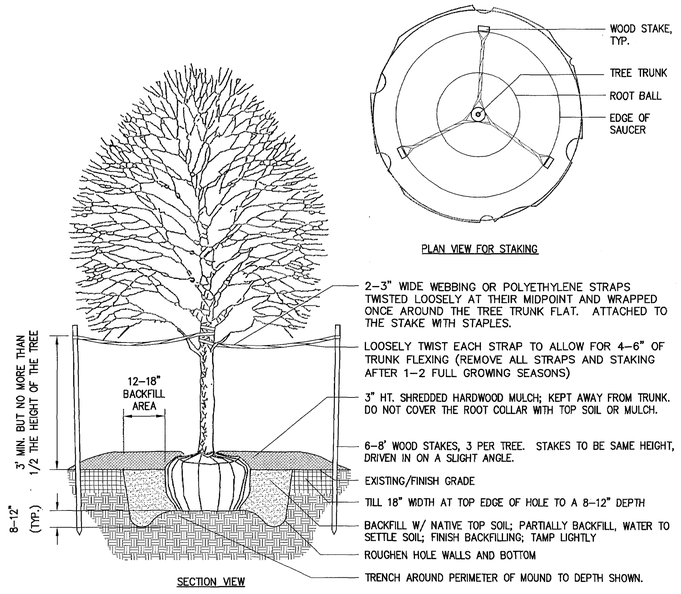


SECTION VIEW

NOTES:
1. SPACE AS SHOWN ON PLAN OR AS INDICATED ON PLANT CHART.
2. WATER IMMEDIATELY AFTER PLANTING.

SHRUB PLANTING

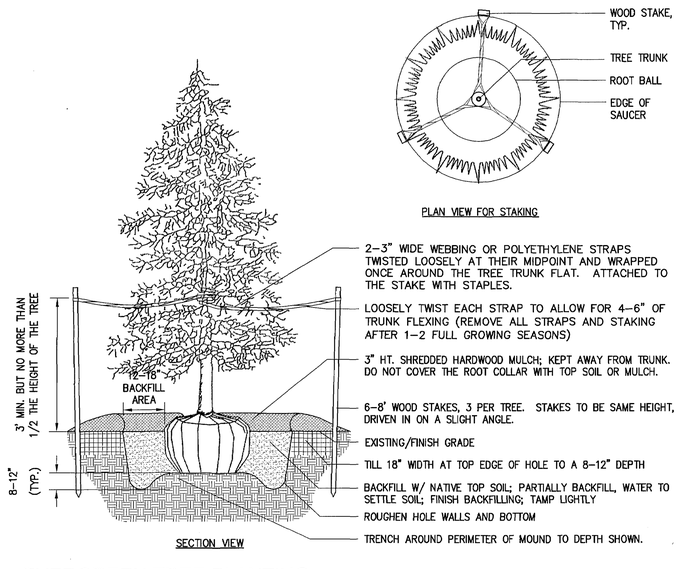
NOT TO SCALE



SECTION VIEW

DECIDUOUS TREE PLANTING

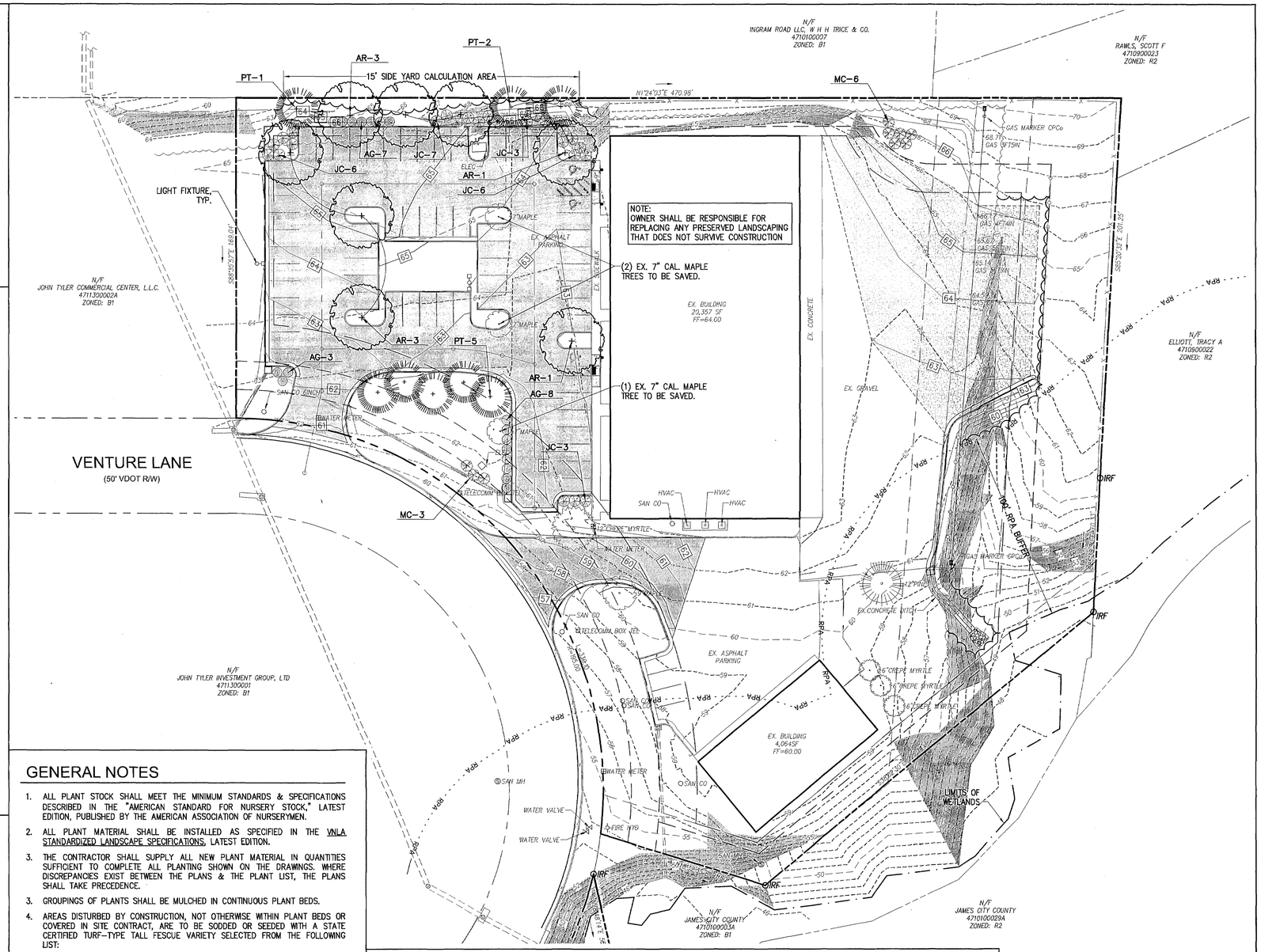
NOT TO SCALE



SECTION VIEW

EVERGREEN TREE PLANTING

NOT TO SCALE



GENERAL NOTES

1. ALL PLANT STOCK SHALL MEET THE MINIMUM STANDARDS & SPECIFICATIONS DESCRIBED IN THE "AMERICAN STANDARD FOR NURSERY STOCK," LATEST EDITION, PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN.
2. ALL PLANT MATERIAL SHALL BE INSTALLED AS SPECIFIED IN THE VNLA STANDARDIZED LANDSCAPE SPECIFICATIONS, LATEST EDITION.
3. THE CONTRACTOR SHALL SUPPLY ALL NEW PLANT MATERIAL IN QUANTITIES SUFFICIENT TO COMPLETE ALL PLANTING SHOWN ON THE DRAWINGS. WHERE DISCREPANCIES EXIST BETWEEN THE PLANS & THE PLANT LIST, THE PLANS SHALL TAKE PRECEDENCE.
3. GROUPINGS OF PLANTS SHALL BE MULCHED IN CONTINUOUS PLANT BEDS.
4. AREAS DISTURBED BY CONSTRUCTION, NOT OTHERWISE WITHIN PLANT BEDS OR COVERED IN SITE CONTRACT, ARE TO BE SODDED OR SEEDED WITH A STATE CERTIFIED TURF–TYPE TALL FESCUE VARIETY SELECTED FROM THE FOLLOWING LIST:

   Biltmore, Bingo, Cochise III, Constitution, Coyote II, Crossfire II, Endeavor, Fidelity, Good–en, Grande, Greenkeeper WAF, Inferno, Kalahari, Magellan, Masterpiece, Onyx, Padre, Picasso, Penn 1901, Quest, Raptor, Rebel Exeda, Rembrandt, Rendition, SR 8250, SR 8300, Tarheel, Titanium, Watchdog, Wolfpack, WPEZE.
5. TREES SUPPORT STAKING IS OPTIONAL FOR TREES THAT ARE 1" CAL. OR 6' HT. OR LESS. ALL TREE STAKING SHALL BE REMOVED AFTER 1–2 GROWING SEASONS.
9. ALL TREES ARE TO BE PLANTED SO TOP OF ROOT BALL IS 3" ABOVE FINISH GRADE.
10. TREE SHALL BE INSTALLED PLUMB & STRAIGHT.
11. PRUNE ALL SUCKERS, RUBBING OR CROSSED BRANCHES, CODOMINANT LEADERS, NARROW CROTCH ANGLES, WATER SPROUTS, BROKEN BRANCHES.
12. DO NOT PRUNE CENTRAL LEADER OR BRANCH TIPS.
13. REMOVE TAGS, LABELS & PLASTIC SLEEVING.
14. DO NOT WRAP TRUNK.
15. IF PLANT MATERIAL IS CONTAINER–GROWN, REMOVE TOP OF WIRE BASKET, OR REMOVE CONTAINER & CUT CIRCLING ROOT; IF FIELD–GROWN, CUT ROPE SURROUNDING BOTTOM OF TREE TRUNK AFTER BACKFILLING BUT BEFORE MULCHING & REMOVE BURLAP FROM TOP 1/3 OF BALL ROOT.
16. REMOVE ALL STAKES, STRAPS, WIRES, RUBBER HOSES, ETC. AFTER 1–2 GROWING SEASONS.
17. PLANT SUBSTITUTIONS WILL NOT BE MADE WITHOUT THE WRITTEN CONSENT OF THE OWNER OR THE OWNER'S DESIGNATED REPRESENTATIVE PRIOR TO INSTALLATION.
18. ALL INSTALLED PLANT MATERIAL SHALL BE SUBJECT TO REGULAR MAINTENANCE, INCLUDING FERTILIZATION, PRUNING, REPLACEMENT, INSECT AND DISEASE CONTROL, WATERING, MULCHING, AND WEED CONTROL.
19. CONTRACTORS ARE RESPONSIBLE FOR LOCATING ALL UTILITIES PRIOR TO THE BEGINNING OF WORK AND AVOIDING THEM DURING LANDSCAPING OPERATIONS.

PLANT SCHEDULE

DECIDUOUS TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	REMARKS
AR	8	ACER RUBRUM 'RED SUNSET'	RED SUNSET MAPLE	2–1/2" CAL.	B & B	SINGLE STEM
EVERGREEN TREES	QTY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	REMARKS
PT	8	PINUS TAEDA	LOBLOLLY PINE	8'–10' HT.	B & B	DENSE, FULL
SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	REMARKS
AG	11	ABELIA X GRANDIFLORA	GLOSSY ABELIA	18"–24" HT./W.	CONT.	DENSE, FULL
JC	18	JUNIPERUS CHINENSIS 'PARSONII'	PARSONI JUNIPER	18"–24" HT./W.	CONT.	DENSE, FULL
MC	9	MYRICA CERIFERA	WAX MYRTLE	18"–24" HT./W.	CONT.	DENSE, FULL

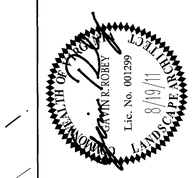
JAMES CITY COUNTY LANDSCAPE REQUIREMENTS

AREAS		TREES AND SHRUBS							
LANDSCAPE YARD	COUNTY REQ.	PLANTING RATIO	PLANTS REQUIRED			EXISTING PLANTS TO REMAIN*		NEW PLANTS PROVIDED	
PARKING LOT	63 SPACES	1 TREE AND 2 SHRUBS: 5 PARKING SPACES	13 TREES	50% 35%	7 LG DECIDUOUS 5 EVERGREEN	3 TREES	3 LG DECIDUOUS – EVERGREEN	10 TREES	5 LG DECIDUOUS 5 EVERGREEN
			26 SHRUBS	35%	10 EVERGREEN	-- SHRUBS	– EVERGREEN	26 SHRUBS	26 EVERGREEN
WEST SIDE YARD	1 TREE & 3 SHRUBS/400 SF	1 TREE & 3 SHRUBS /400 SF (1,800 SF)	5 TREES	50% 35%	3 LG DECIDUOUS 2 EVERGREEN	SEE CALC AREA		5 TREES	3 LG DECIDUOUS 2 EVERGREEN
			14 SHRUBS	35%	5 EVERGREEN			14 SHRUBS	14 EVERGREEN

*THE QUANTITIES OF EXISTING PLANTS TO REMAIN WITHIN THIS CHART ARE CALCULATED BASED ON EXISTING TREE SIZE CREDITS, PER SECTION 24–93 TREE CREDITS.

GRAPHIC SCALE
30' 0' 30' 60'
SCALE: 1" = 30'

Rev.	Date	Description	Revised By
2	8/18/11	Revised for County Comments	HWP
1	6/16/11	Revised for County Comments	MJR



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Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11
Sheet Title: Landscape Plan	
Sheet Number	10

LITHONIA LIGHTING

Catalog Number | Notes | Type

FEATURES & SPECIFICATIONS

INTENDED USE — Small for carlots, street lighting or parking area.

CONSTRUCTION — Rugged, .067 thick, aluminum seamless housing. Powder finish weather-tight gasket and housing. Hot-rolled, annealed, precision aluminum door frame with mitered corners, machined hinges. .118" thick tempered glass and secured with one quarter-turn, quick-release latches. Weatherproof seal between housing and door frame is accomplished with a non-sag, compressed, extruded silicone gasket that stays seated in the door frame, and will not gasket spread or displace.

Finish: Standard finish is black acrylic. DDT polyester powder finish with ultraviolet resistant finish is available.

OPTICS — Reflectors are anodized acrylic specular for maximum efficiency and optical performance which with heat-lens fasteners and are removable and interchangeable. Four cutoff distributions available: Type II Moderate, Type III Intermediate, Type IV Forward Throw, Type V Square Distribution. Reflectors: Type V Square Cutoff, Type IV Forward Throw, .125" thick heavy-gauge aluminum two-piece glass with thermally applied anti-corrosive finish.

ELECTRICAL — Pre-fabricated wiring assembly harness for 250-1000W Super CWA pulse start ballast, requires for 1000W and 833W HCDM options. Super CWA pulse start ballast, ratio efficient and HCDM. Regular arc gap pulse, required for 250-400W HCDM optional for HCL, or pressure only. Cable: 105°, required. Any color wire alignment connectors for H.C.S.

Ballasts are 100% factory-tested.

Socket: Porcelain, horizontally mounted medium base socket with copper alloy nickel-plated screw shell and center contact. UL Listed 1000W-1500W.

INSTALLATION — Fixtures shall be mounted on a pole or wall mounting, with provision for lower canopy. Optional mounting available.

LISTING — UL Listed (standard). CSA Certified (see Options). NOM Certified (see Options). UL Listed for 25°C ambient temperature and wet locations. IP65 rated.

Note: Specifications subject to change without notice.

Area Lighting

KSF2

METAL HALIDE: 250-400W
HIGH PRESSURE SODIUM: 200-400W
15' to 25' Mounting

Specifications

EPA: 2.0 ft² (0.19 m²) (includes arm)
Length: 24 IN (610 MM)
Width: 14 3/4 IN (375 MM)
Depth: 8 5/16 (211 MM)
Arm: 4 IN (102 MM)
Weight: 32 lbs (12.2 kg)

Mounting Options

	Cutting Increase
Shoe, Bi-Pole, DM32P	5
Trunnion, DM32PTU	6
Yoke	7

Example: KSF2 400M R4TB SCWA SPA8 LPI

ORDERING INFORMATION — Fill in the blanks to build a valid, orderable product using bolded options.

KSF2

Series	Wattage	Distribution	Voltage	Ballast	Mounting
KSF2	250 M5 Clear/Pulse 250M[1] 250M[1,2] 320M[1,2] 400M[1,2] Replace above with: 320HO 400S 250S	R2 Type II Horizontal R3 Type III Horizontal R4SC Type IV Forward Throw Short R4M Type IV Forward Throw Medium R5S Type V Square	120 347 208* 480* 240 HV 277 2380208*	(Blank) Magnetic CWI Constant wattage isolated Reflector[3] SCWA Super CWA pulse-start isolated NOTE: For lampheads with HCL reactors, SCWA must be specified for lamp/ballast replacement.	Rem Single[4] Rem Dual[4] DM32P Drop-in (post top) DM32PU Drop-in (post top, wall mounting) WSB Wall Bracket WBL Wall Bracket WBL Wall Bracket WBL Wall Bracket

Mounting	
Type	
SP___ Square pole	04 4" dia
RP___ Round pole	06 6" dia
WB Wall bracket	09 9" dia
WBL Wall bracket	12 12" dia

Options			
Shipped installed fixtures PE7R NEMA twist-lock receptacle only (no photocontrol) SF Single fuse (120, 277, 347V) 10" CSA[1] DF Double fuse (208, 240, 480V) 10" CSA[1] QS5 Quasar remote system[5] QPS7P QPS Remote[5,6]	EC Emergency circuit[7] CSA CSA Certified NOM NOM Certified[1] DMB Available for MS pulse-start 39 gauge inside the box[8,9] AVI1 Alltemp™ 120V external ballast[10] AVI7 Alltemp™ 277V external ballast[10] HCCI Cold weather HID ignitor 10V rated	Shipped separately[11] PE7 NEMA twist-lock PE7(120, 208, 240, 277) PE7R NEMA twist-lock PE7(347V) PE7H NEMA twist-lock PE7(480V) PE7D NEMA twist-lock PE7(347/277) SC Shorting cap for PER option PE Photocell - Dusk to Dawn[12] HG Hand grip[13]	Finish[14] (Blank) Dark bronze DWH White DBL Black DMD Medium bronze DNA Natural aluminum CR Chromium metallic finish CUS Non-stock polyester coating[15]

Lens[16]
LPI Lens included
LCP Less lamp

Notes

1. Not available in conjunction with HCDM or Pulse Start Ballast
2. Not available in conjunction with HCDM or Pulse Start Ballast
3. Not available in conjunction with Pulse Start Ballast
4. Not available in conjunction with Pulse Start Ballast
5. Not available in conjunction with Pulse Start Ballast
6. Not available in conjunction with Pulse Start Ballast
7. Not available in conjunction with Pulse Start Ballast
8. Not available in conjunction with Pulse Start Ballast
9. Not available in conjunction with Pulse Start Ballast
10. Not available in conjunction with Pulse Start Ballast
11. Not available in conjunction with Pulse Start Ballast
12. Not available in conjunction with Pulse Start Ballast
13. Not available in conjunction with Pulse Start Ballast
14. Not available in conjunction with Pulse Start Ballast
15. Not available in conjunction with Pulse Start Ballast
16. Not available in conjunction with Pulse Start Ballast

Ordering notes

10. Must specify voltage that is available in HID
11. Minimum ship order in cases/lamps included
12. Available with photocell in one mounting hole (Type V)
13. Not available in quartz mercury
14. Finish is standard for all mounting, unless otherwise specified
15. Available with Alltemp™ HID ballasts only
16. Consult factory for available lens options
17. Lens is standard on all fixtures with a clear lens
18. Not available in quartz
19. Not available in quartz
20. Not available in HPS/MH

Hazardous Locations Mounting Selection

Fixture O.D.	Qty	Range 1 (IN)[1]	Range 2 (IN)[1,2]	Range 3 (IN)[1,2]	Range 4 (IN)[1,2]
3-1/2" (8.9 cm)	1 (Pt. Mt.)	1.25-1.66	1.66-2.00	2.00-2.66	2.66-4.00
4-1/4" (10.8 cm)	1 (Pt. Mt.)	1.25-1.66	1.66-2.00	2.00-2.66	2.66-4.00
11" (28 cm)	1 (Pt. Mt.)	1.25-1.66	1.66-2.00	2.00-2.66	2.66-4.00

GATEWAY, IN

KSF2 W-B

LITHONIA LIGHTING

Catalog Number | Notes | Type

FEATURES & SPECIFICATIONS

CONSTRUCTION — Weldable-grade, hot-rolled, commercial-quality carbon steel tubing with a minimum yield of 55,000 psi (11-gauge), or 50,000 psi (7-gauge). Uniform wall thickness of .105" or .188". Shaft is one-piece with a full-length longitudinal, high-frequency electric resistance weld. Uniformly square in cross-section with flat sides, small corner radii, and excellent nominal squareness. Available shaft widths are 4, 5 and 6 inches.

Anchor base is fabricated from hot-rolled carbon steel plate conforming to ASTM A36, that meets or exceeds a minimum yield strength of 36,000 psi. Base plate and shaft are continuous-fully welded top and bottom. Base cover is finished to match pole.

A handhole having nominal dimensions of 3" x 5" for all shafts. handhole is a cover with attachment screws.

Tap cap provided with all grade-mount poles.

Fasteners are high-strength galvanized, zinc-plated or stainless steel.

Finish: Must specify finish.

Grounding: Provision located immediately inside handhole rim. Grounding hardware is not included (provided by others).

Anchor Bolts: Top portion of anchor bolt is galvanized per: ASTM A-153. Made of steel rod having a minimum yield strength of 55,000 psi.

Anchor Base Poles

SSS

SQUARE STRAIGHT STEEL

ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.
Example: SSS 20 5C DM19 DDB

SSS

Series	Nominal Fixture mounting height	Nominal shaft base plate wall thickness	Mounting[1]	Options	Finish[7]
SSS	10 - 30 feet (see back page)	(See back page)			

Typical mounting
P1 Open top
T20 2-3/8" O.D. (2" IPS)
T25 2-1/2" O.D. (2-1/2" IPS)
T30 3-1/2" O.D. (3" IPS)
T35 4" O.D. (3-1/2" IPS)

Drill mounting[2]
DM19 1 at 19"
DM28 2 at 180°
DM28PL 2 at 180° with one hole plugged[3]
DM29 2 at 90°
DM39 3 at 90°
DM49 4 at 90°

DM19QSM[2,4] (Pole supplied)
DM19AS 1 at 19"
DM28AS 2 at 180°
DM29AS 2 at 90°
DM39AS 3 at 90°
DM49AS 4 at 90°

DM19QS[2,4] (Shipped separately)
DM19ASST 1 at 19"
DM28ASST 2 at 180°
DM29ASST 2 at 90°
DM39ASST 3 at 90°
DM49ASST 4 at 90°

DA19QS[2,4] (Shipped separately)
DA19AS 1 at 19"
DA29AS 2 at 90°
DA39AS 3 at 90°
DA49AS 4 at 90°

Options[1]
EHW Extra handhole[5,6]

Finish[7]
DDB Dark bronze
DWH White
DBL Black
DMB Medium bronze
DNA Natural aluminum
CRT Textured black
DDT Dark bronze
DGY Dove gray
DTG Textured green
DNG Bright red
DDB Dark blue
Custom colors available (specify finish)

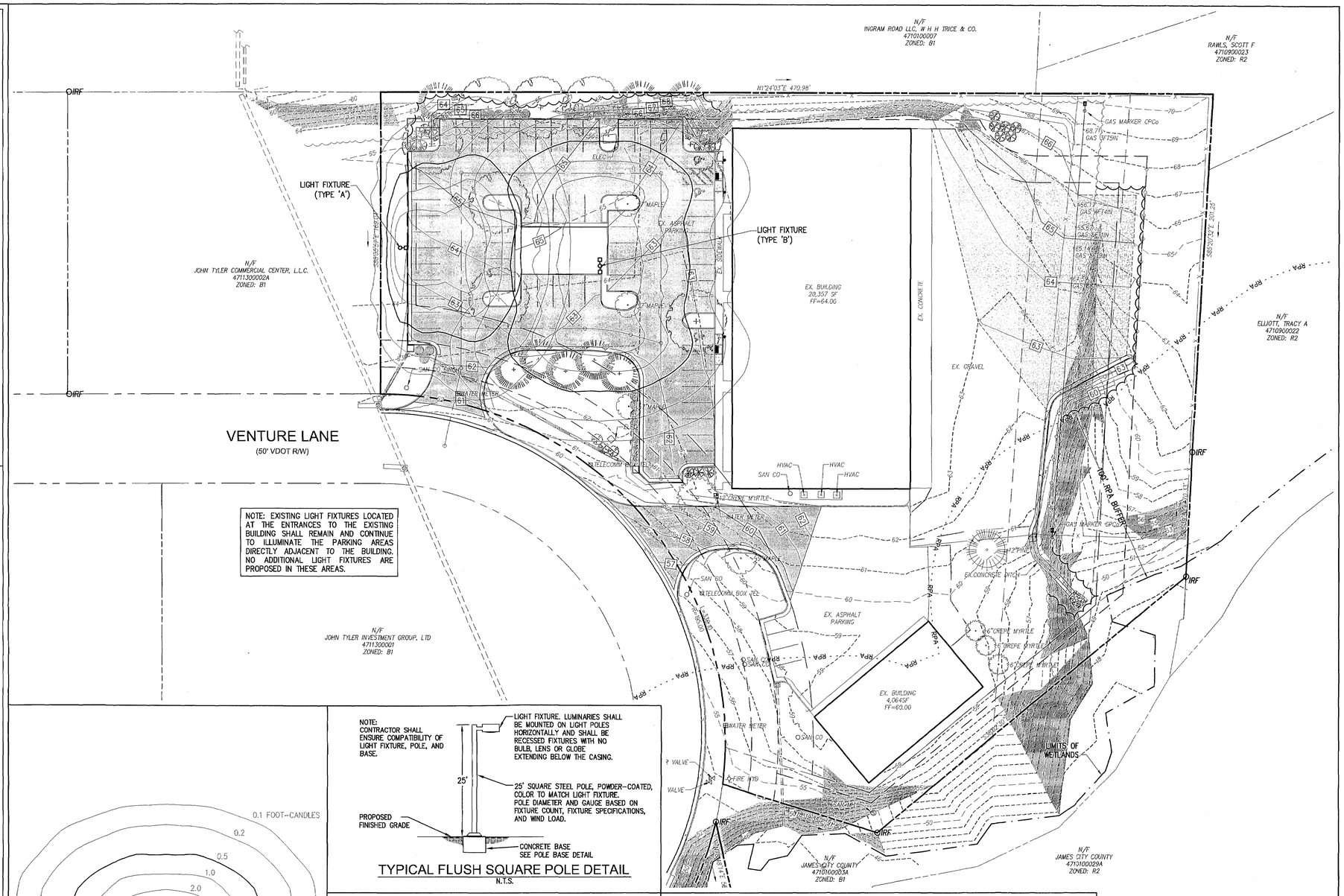
HANDHOLE ORIENTATION

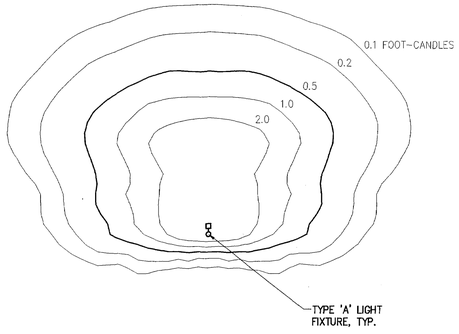
Handhole

NOTES

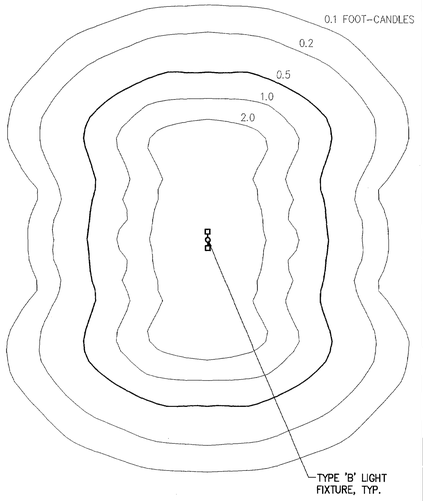
1. When ordering twin mounting and drill mounting for the same pole, follow the example: DM28/T20. The combination includes a required extra handhole.
2. For drilling template to be used for a particular luminaire depends on the luminaire that is used. Refer to the Technical Data Section of the Outdoor Binder for Drilling Templates.
3. Insert "1" or "2" in drill mounting fields e.g. DM19AS1T2.
4. Specify location and orientation when ordering option.
   For Dim1 x°: Specify the height in feet above base of pole. Example: 30 = 5 and 20 = 20
   For Dim2 x°: Specify orientation from handhole (A, B, C, D). Refer to the Handhole Orientation diagram above.
5. Horizontal arm is 11" x 2-3/8" O.D. (mm standard).
6. Combination of tenon top and drill mount including extra handhole.
7. Additional colors available; you may select from manufacturer's or Architectural Colors brochure (Form No. 794.3). Powder finish standard.

Outdoor | Sheet #: Pole-SSS | PL-320



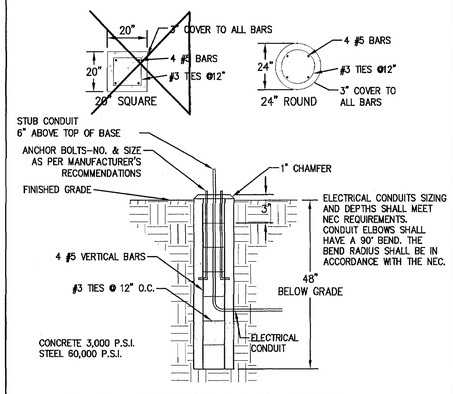


TYPE 'A' ISO FOOT-CANDLE DIAGRAM
N.T.S.



TYPE 'B' ISO FOOT-CANDLE DIAGRAM
N.T.S.

TYPICAL FLUSH SQUARE POLE DETAIL
N.T.S.



FLUSH 16-25' POLE BASE DETAIL
N.T.S.

LIGHTING SCHEDULE

KEY	FIXTURE TYPE	MOUNTING HEIGHT	POLE TYPE/ MOUNTING INSTRUCTIONS	FIXTURES PER POLE	TOTAL FIXTURES
A	LITHONIA LIGHTING KSF2-400M-R4SC-SP-DBL KSF2 FIXTURE, 400 WATT METAL HALIDE, TYPE IV SHARP CUTOFF REFLECTOR; COLOR: BLACK	25'	LITHONIA LIGHTING SSS-25-DBL 25' SQUARE STRAIGHT STEEL POLE (SINGLE FIXTURE)	1	1
B	LITHONIA LIGHTING KSF2-400M-R4SC-SP-DBL KSF2 FIXTURE, 400 WATT METAL HALIDE, TYPE IV SHARP CUTOFF REFLECTOR; COLOR: BLACK	25'	LITHONIA LIGHTING SSS-25-DBL 25' SQUARE STRAIGHT STEEL POLE (DOUBLE FIXTURE)	2	2

LIGHTING NOTES

1. THIS DRAWING IS INTENDED SOLELY FOR THE PURPOSE OF FIXTURE SELECTION & PLACEMENT AND DEPICTING ASSOCIATED ILLUMINANCE LEVELS.
2. THE CONTRACTOR AND/OR ELECTRICAL ENGINEER SHALL BE RESPONSIBLE FOR: SOURCE OF ELECTRICAL POWER; CIRCUITRY; WIRE SIZE; CONDUIT LAYOUT; AND ANY OTHER ELECTRICAL REQUIREMENTS.
3. CONTRACTOR SHALL ENSURE THE LIGHT FIXTURE, POLE, POLE BASE, AND CONCRETE BASE ARE COMPATIBLE.
4. INSTALLATION OF POLES AND LIGHTING FIXTURES SHALL BE IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
5. THE CONTRACTOR SHALL ENSURE THAT THE POLE DIAMETER, GAUGE, AND CONCRETE BASE MEET OR EXCEED THE MINIMUM LOAD REQUIREMENTS BASED ON FIXTURE COUNT, REGIONAL WIND LOAD STATISTICS, ADDITIONAL BANNERS / POLE ARMS, AND THE FIXTURE SPECIFICATIONS.

GRAPHIC SCALE
30' 0' 30' 60'
SCALE: 1" = 30'

Rev.	Date	Description	By
2	8/19/11	Revised for County Comments	MWP
1	6/16/11	Revised for County Comments	MJR

COMMONWEALTH OF VIRGINIA
GAVIN K. ROBEY
Lic. No. 001299
LANDSCAPE ARCHITECT
8/19/11

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Project Contacts:	MJR
Project Number:	7412-03
Scale: 1"=30'	Date: 4/29/11

Sheet Title: Lighting Plan

Sheet Number
11