CERTIFICATE OF AUTHENTICITY

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

BMP NUMBER: **PC064**

DATE VERIFIED: **May 22, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: February 24, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

BMP ID or General File ID PC064

PIN: 3640100018

Subdivision, Tract, Business or Owner Name (if known): Greensprings General: Greenpsrings Apartments & Condos; Greensprings Plantation; Greensprings West; Legacy Golf Links; Williamsburg National Golf Course; Greensprings Office Park

Property Description: Parcel F Legacy Golf Links @ Greenprings

Site Address: 3700 Centerville Road

(For internal use only) **Box:** GP001 **Drawer:** 1

Agreements: (in file as of scan date) **Y** **Book or Doc#:** 701 **Page:** 659-663

Comments:

013624

DECLARATION OF COVENANTS

COPY

INSPECTION/MAINTENANCE OF RUNOFF CONTROL FACILITY

THIS DECLARATION, made this 8th day of July, 1997, between Greensprings Plantation, Inc. & Legacy (Greensprings Limited Partnership), and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the BMP #1 (As shown in Yellow on Exhibit "A") following property: Legacy Golf Links at Greensprings (Plat Book 58, Pages 96-102), and James City County, Virginia, hereinafter referred to as the "COUNTY."

WITNESSETH:

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

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

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

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

Wayland

1-5

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

5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the FACILITY in accordance with the approved design standards and with the law and applicable executive regulations, 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 FACILITY for the cost of the work and any applicable penalties.

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

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

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

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

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this 8TH day of July, 1994.

COVENANTOR(S)
GREENSPRINGS PLANTATION, INC.

Marc B. Sharp
MARC B. SHARP, President

ATTEST:

Michele Z. Ball

COVENANTOR(S)
LEGACY (GREENSPRINGS) LIMITED PARTNERSHIP

By: Club Development Associates, In
i/e: Managing General Partner
By: Michael W. Sanders
i/e: President

ATTEST:

Barry Embley

STATE OF VIRGINIA
~~CITY~~/COUNTY OF James City

I hereby certify that on this 8th day of July 1994, before the subscribed, a Notary Public of the State of Virginia, and for the ~~City~~/County of James City, aforesaid personally appeared before me Marc B. Sharp
(Name of Acknowledging Party)
and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 8th day of July, 1994.

Lisa N. Stroud
Notary Public

My commission expires: 10-31-97

3-5

STATE OF North Carolina
CITY/COUNTY OF Moore

I hereby certify that on this 11th day of July 1994, before the subscribed, a Notary Public of the State of Virginia, and for the City/County of Moore, aforesaid personally appeared before me Michael W Sanders
(Name of Acknowledging Party)
and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 11th day of July, 1994.

Bonnie P Bates
Notary Public

My commission expires: November 6, 1994

Approved as to form:

Les P. Rogers

0621U
Revised 3/91

VIRGINIA: City of Williamsburg and County of James City, to Wit:
In the Clerk's office of the Circuit Court of the City of Williamsburg and County of James City, the 23 day of Aug 1994. This Dec. 4 (Amended) was presented with certificate annexed and admitted to record at 3:42 o'clock
Teste: Helene S. Ward, Clerk
by
Depty. Clerk

PLAT RECORDED IN
DB 701 PAGE 663

EXHIBIT "A"

LEGACY GOLF LINKS
AT GREENSPRINGS

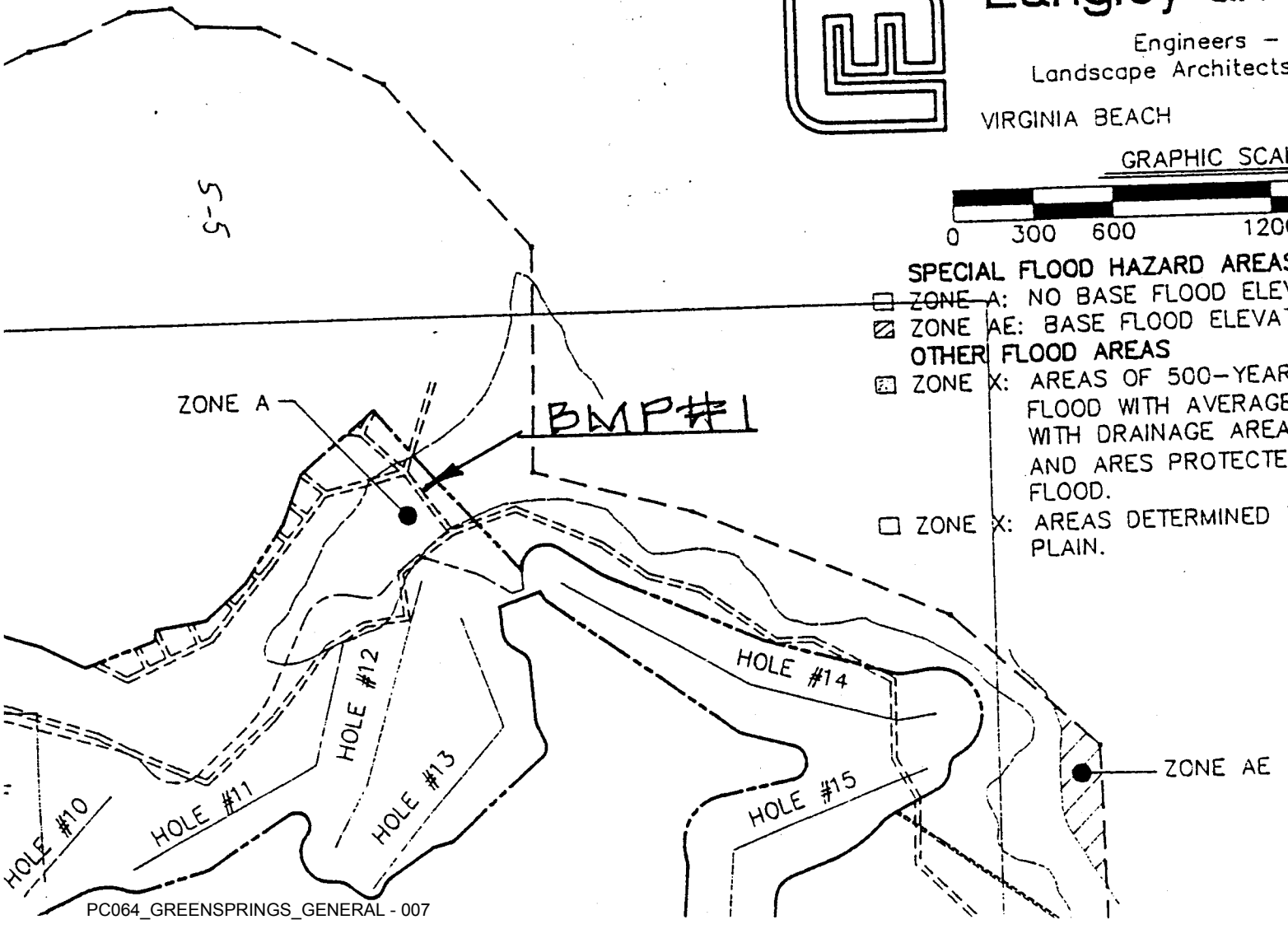
BEING A
SUBDIVISION OF PROPERTY OF
GREENSPRINGS PLANTATION, INC.
BERKELEY DISTRICT
JAMES CITY COUNTY, VIRGINIA
FEBRUARY 18, 1994
SCALE: 1"=600'
SHEET 1 OF 7

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

GRAPHIC SCALE IN FEET
0 300 600 1200 1800 2400

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100–YEAR FLOOD
- ZONE A: NO BASE FLOOD ELEVATIONS DETERMINED
- ZONE AE: BASE FLOOD ELEVATIONS DETERMINED

OTHER FLOOD AREAS
- ZONE X: AREAS OF 500–YEAR FLOOD, AREAS OF 100–YEAR FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT (WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND ARES PROTECTED BY LEVEES FROM 100–YEAR FLOOD.
- ZONE X: AREAS DETERMINED TO BE OUTSIDE 500–YEAR FLOOD-PLAIN.



5-5

BOOK 701 PAGE 663

From First Amendment to Amended and Restated Proffers September 29, 1993

without data recovery. The plan shall be approved by the County prior to implementation. Work in the affected area shall not proceed until either (a) the development and implementation of appropriate data recovery or other recommended mitigation procedures, or (b) the determination is made that the located remains are not eligible for inclusion on the National Register.

4. Conditions 11 of the Restated Proffers is hereby deleted and the following is inserted in lieu thereof:

11. Realigned Route 614 and Future Right-of-Way Greenbelt. The Owner shall designate a greenbelt buffer along realigned Route 614 and along the right-of-way shown on the Amended Master Plan as "Future Right-of-Way" measured from a line 60 feet from the center line of realigned Route 614 and the "Future Right of Way". Such line shall hereinafter be called the "Greenbelt Line". No structure except the road and related improvements in Land Bay S-3 shown on the Amended Master Plan shall be located within 150 feet of the Greenbelt Line. Where the road in Land Bay S-3 parallels realigned Route 614, the greenbelt buffer shall be no less than 115 feet from the Greenbelt Line of realigned Route 614. Where golf course fairways abut relocated Route 614 or the "Future Right-of-Way", the greenbelt buffer shall have a minimum width of 75 feet. Where tee boxes or the putting surface of greens are located within 100 feet of the Greenbelt Line, enhanced landscaping approved by the Development Review Committee in the golf course site plan review process shall be provided between the tee or green and the 75

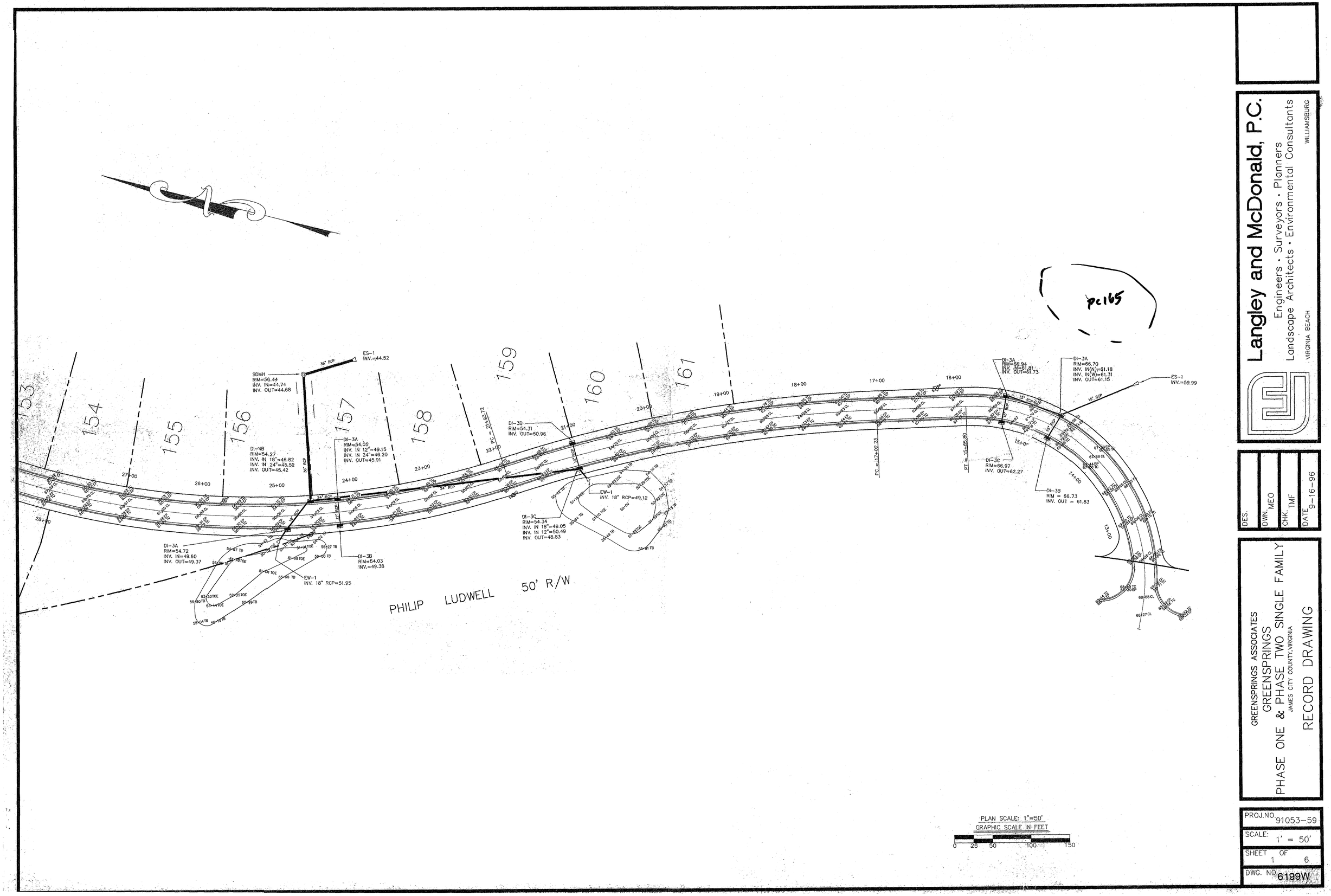
foot greenbelt buffer. In all other areas, a minimum 150 foot buffer shall be maintained. Where golf course fairways abut realigned Route 614 or the "Future Right-of-Way", selective hand thinning of trees (but no removal of stumps) shall be permitted as a part of a landscaping plan approved by the Development Review Committee. Within this greenbelt the land shall be exclusive of any lots and undisturbed except for approved utilities, stormwater management improvements, entrance roads to Land Bays as shown generally on the Amended Master Plan, pedestrian/bicycle trails, golf cart path crossings and tunnels and project signs as approved by the Development Review Committee. No signs other than project signs and those requested by VDOT and/or the County shall be allowed.

5. Paragraph 1 under the heading Proffers Improvements in Condition 15(f) of the Restated Proffers is hereby amended by deleting the second sentence thereof and inserting in lieu thereof the following:

A 120 foot right-of-way (or such wider right-of-way as may be necessary to accommodate required drainage structures) shall be dedicated to allow for future improvements.

6. The following conditions are hereby added to the Restated Proffers:

20. Turn Lanes into Land Bay M-10. Prior to the issuance of a certificate of occupancy for any structure on Land Bay M-10, a right turn lane from westbound Route 5 and a left turn lane from eastbound Route 5 into the entrance to Land Bay M-



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

DES.	
DWN.	MEO
CHK.	TMF
DATE	9-16-96

GREENSPRINGS ASSOCIATES
GREENSPRINGS
JAMES CITY COUNTY, VIRGINIA
PHASE ONE & PHASE TWO SINGLE FAMILY
RECORD DRAWING

PROJ.NO.	91053-59
SCALE:	1' = 50'
SHEET	1 OF 6
DWG. NO.	6199W

PC064_GREENSPRINGS_GENERAL - 010

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

DES.	
DWN.	JSR
CHK.	MEO
DATE	8-5-96

GREENSPRINGS ASSOCIATES
GREENSPRINGS
PHASE ONE SINGLE FAMILY
JAMES CITY COUNTY, VA
RECORD DRAWING

PROJ.NO. 91053-59
SCALE: 1" = 50'
SHEET 2 OF 6
DWG. NO. 6200W

PC064_GREENSPRINGS_GENERAL - 011

FRANCES BERKELEY 50' R/W

CAPTAIN DREW 40' R/W

JOHN SHROPSHIRE 40' R/W

WILLIAM HODGSON 40' R/W

MAJOR OPEN SPACE (NOT OWNED BY GOLF COURSE) (PROFFER SECTION 14)

OPEN SPACE

GRID NORTH

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

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

DES.	
DWN.	MEO
CHK.	TMF
DATE	9-18-96

GREENSPRINGS ASSOCIATES
GREENSPRINGS
PHASE ONE & PHASE 2 SINGLE FAMILY
JAMES CITY COUNTY, VIRGINIA
RECORD DRAWING

PROJ.NO.	91053-59
SCALE:	1" = 50'
SHEET	3 OF 6
DWG. NO.	6201W

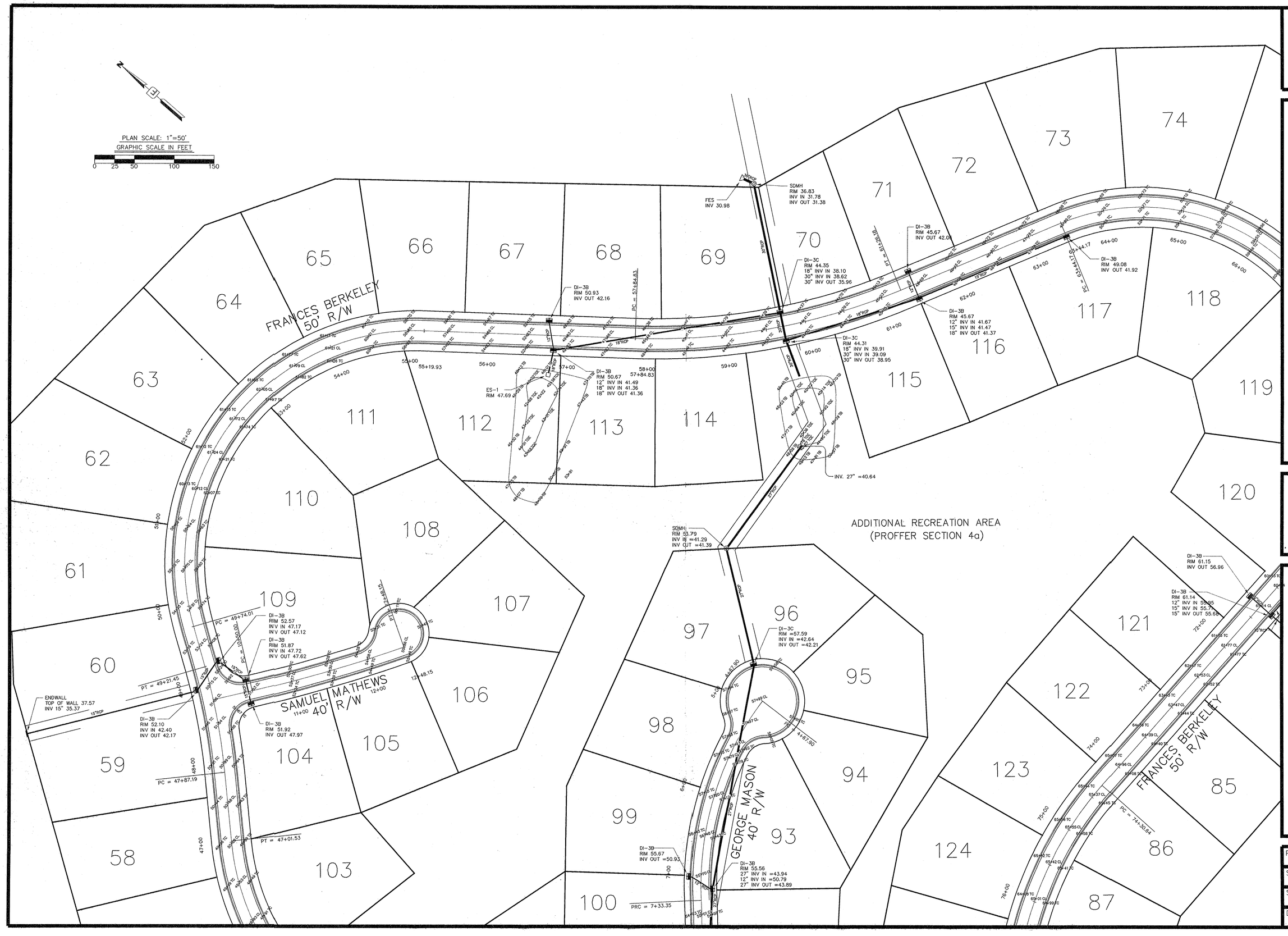
Langley and McDonald, P.C.
Engineers · Surveyors · Planners
Landscape Architects · Environmental Consultants
WILLIAMSBURG VIRGINIA BEACH

DES.
DWN. MEO.
CHK. TMF
DATE 9-16-96

GREENSPRINGS ASSOCIATES
GREENSPRINGS
JAMES CITY COUNTY, VIRGINIA
PHASE ONE & PHASE TWO SINGLE FAMILY
RECORD DRAWING

PROJ.NO. 91053-59
SCALE: 1" = 50'
SHEET 4 OF 6
DWG. NO. 6202W

PC064_GREENSPRINGS_GENERAL - 013



Langley and McDonald, P.C.
Engineers • Surveyors • Planners
Landscape Architects • Environmental Consultants

DWN.	JSR
CHK.	MEO
DATE	8-12-96

GREENSPRINGS ASSOCIATES
GREENSPRINGS
JAMES CITY COUNTY, VA
PHASE ONE & PHASE TWO SINGLE FAMILY
RECORD DRAWING

PROJ.NO.	91053-59
SCALE:	1" = 50'
SHEET	5 OF 6
DWG. NO.	6203W

PC064_GREENSPRINGS_GENERAL - 014

"MAJOR" OPEN SPACE
(PROFFER SECTION 14)

OPEN SPACE
(PROFFER SECTION 14)

WILLIAM LEE 40' R/W

FRANCES BERKELEY 50' R/W

GILES BLAND 40' R/W

GOLF COURSE

GRID NORTH

DI-3C
RIM=80.94
INV.OUT=77.40

DI-3C
RIM=80.98
INV.IN=77.20
INV.OUT=76.76

SDMH
RIM=79.53
INV.IN=69.94
INV.OUT=69.84

DI-3B
RIM=69.07
INV.IN=64.32
INV.OUT=64.27

DI-3B
RIM=67.49
INV.IN=62.78
INV.OUT=62.67

DI-3B
RIM=63.42
INV.IN=59.18
INV.OUT=58.92

DI-3B
RIM=61.30
INV.IN=56.90
INV.OUT=56.60

DI-3C
RIM=61.15
INV.IN(18")=56.47
INV.IN(12")=56.70
INV.OUT=56.22

DI-3B
RIM=61.40
INV.IN=55.48
INV.OUT=55.38

DI-3C
RIM=61.11
INV.OUT=56.71

DI-3C
RIM=60.80
INV.OUT=54.80

EW-1
INV.=52.68

EW-1
INV.=50.85

DI-3A
RIM=58.68
INV.OUT=54.25

INV.=43.74

21" CMP

20" CMP RISER
TOP ELEV.=48.49

PC = 10+83.00

PT = 95+10.02

PC = 92+53.72

PT = 89+18.72

PC = 88+33.15

PT = 98+22.71

11+68.61

11+51.79

15" RCP

15" OPEP

18" RCP

21" RCP

24" RCP

42" RCP

48" RCP

DI-4C
RIM=56.71
INV.IN(42"W)=49.91
INV.IN(15"N)=52.96
INV.IN(15"E)=51.96
INV.OUT(48")=49.59

DI-1
RIM=55.92
INV.OUT=53.52

DI-3B
RIM=57.19
INV.IN=52.84
INV.OUT=52.77

DI-3B
RIM=61.30
INV.OUT=56.65

DI-4B
RIM=58.82
INV.IN(42")=51.70
INV.IN(15")=54.36
INV. OUT=51.66

DI-1
RIM=57.24
INV.OUT=54.98

DI-4C
RIM=56.70
INV.IN=49.52
INV.OUT=49.42

EW-1
INV.=49.13

PC = 22+28.37

PT = 25+03.31

SEE SHEET 3 OF 6

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

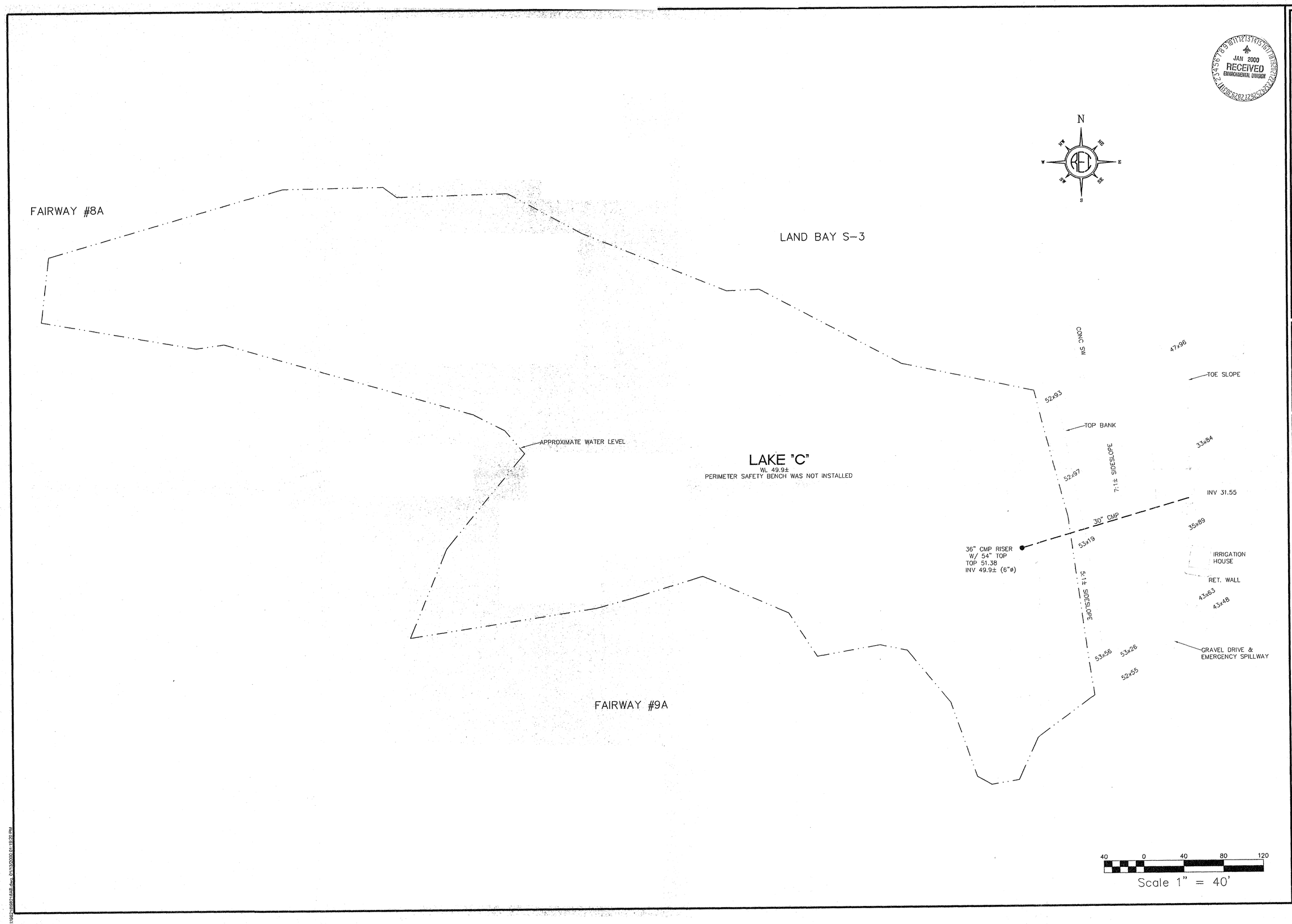
Langley and McDonald, P.C.
Engineers · Surveyors · Planners
Landscape Architects · Environmental Consultants
VIRGINIA BEACH WILLIAMSBURG

DES.	
DWN.	MEO
CHK.	TMF
DATE	9-17-96

GREENSPRINGS ASSOCIATES
GREENSPRINGS
JAMES CITY COUNTY, VIRGINIA
PHASE ONE & PHASE TWO SINGLE FAMILY
RECORD DRAWING

PROJ.NO.	91053-59
SCALE:	1" = 50'
SHEET	6 OF 6
DWG. NO.	6204W

PC064_GREENSPRINGS_GENERAL - 015



JAN 2000
RECEIVED
ENVIRONMENTAL DIVISION

Rickmond Engineering, Inc.

Engineering
Surveying
Land Planning
www.rickmond.com

1643 Merrimac Trail
Williamsburg VA 23185
Voice: (757)229-1776
Fax No. (757) 229-4683

Designed By:	Drawn By:	Scale:	Date:	Job No.:
KMJ	KMJ	1" = 40'	12/8/98	98218

COMMONWEALTH OF VIRGINIA
KIM MARIE JENKINS II
No. 022872
PROFESSIONAL ENGINEER

No.	By	Revision	Date	App.
1	KMJ	REV PER COUNTY COMMENTS TELECON 1/4/00	1/6/00	KMJ

GREENSPRINGS PLANTATION RETENTION PONDS

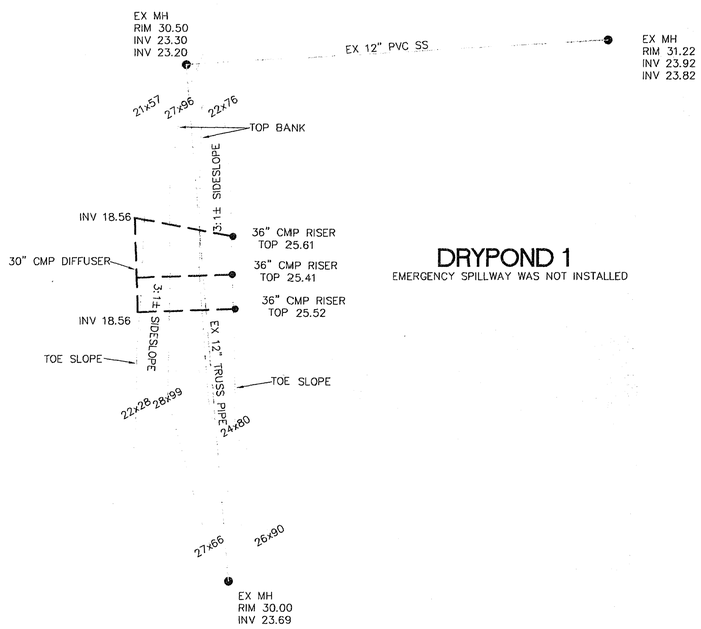
RECORD DRAWINGS

JAMES CITY COUNTY VIRGINIA

Job Number	Sheet No.
98218	C1

I:\98218\98218JE.dwg, 01/13/2000 01:15:20 PM

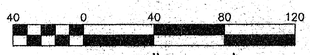
GREENSPRINGS PLANTATION RESORT TIMESHARES



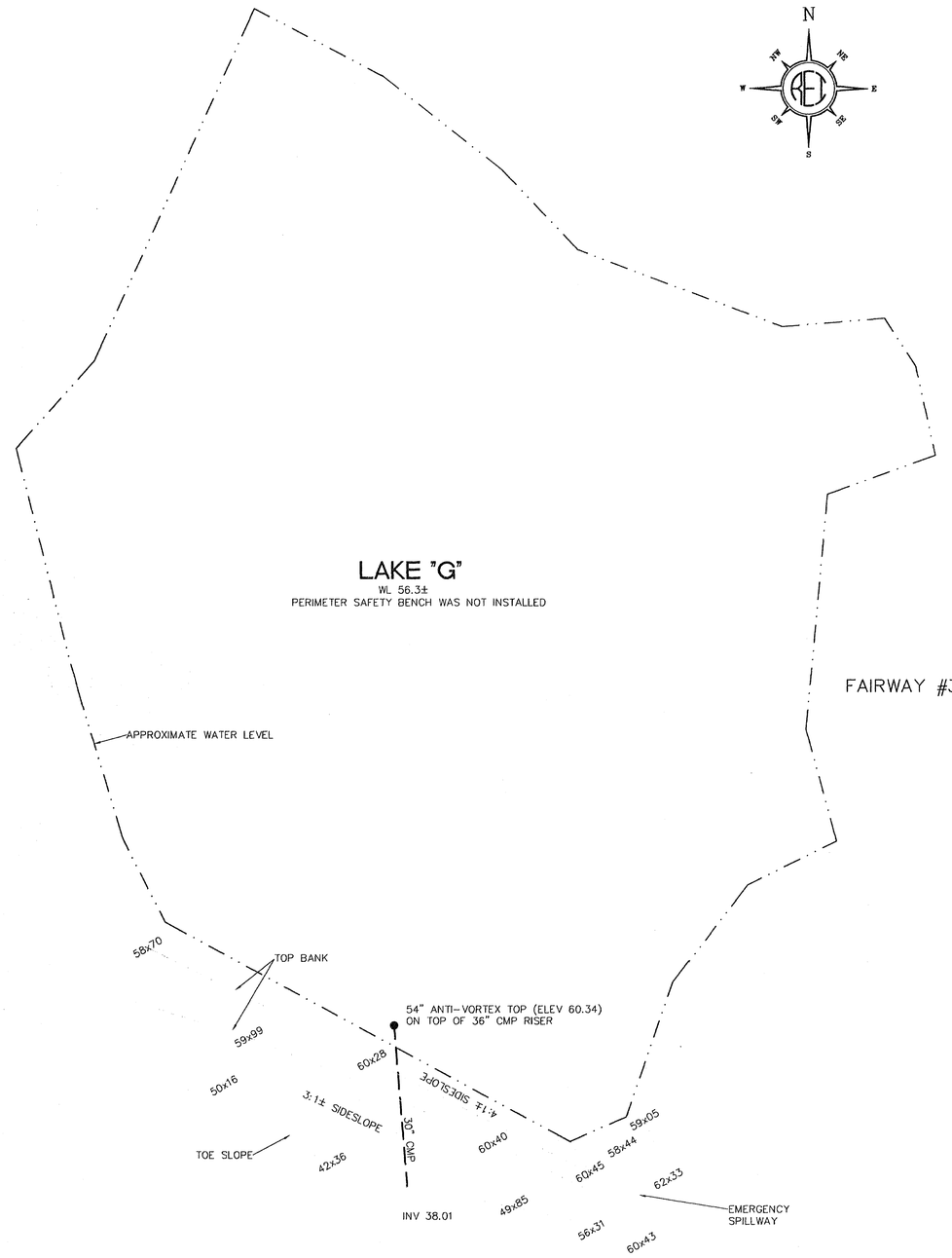
DRYPOND 1

EMERGENCY SPILLWAY WAS NOT INSTALLED

LAND BAY S-3



Scale 1" = 40'

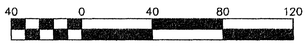


LAKE "G"

WL 56.3±

PERIMETER SAFETY BENCH WAS NOT INSTALLED

FAIRWAY #3A



Scale 1" = 40'

Rickmond Engineering, Inc.

1643 Merrimac Trail
Williamsburg, VA 23185
Voice: (757)229-1776
Fax No. (757) 229-4683

Engineering
Surveying
Land Planning
www.rickmond.com

Designed By:	Drawn By:	Scale:	Date:	Job No.:
KMJ	KMJ	1" = 40'	12/8/98	98218

COMMONWEALTH OF VIRGINIA
K.M. JENKINS II
No. 022872
PROFESSIONAL ENGINEER

No.	By	Revision	App.	Date
1	KMJ	REV PER COUNTY COMMENTS TELECON 1/4/00	KMJ	1/6/00

GREENSPRINGS PLANTATION RETENTION PONDS

RECORD DRAWINGS

JAMES CITY COUNTY VIRGINIA

Job Number	Sheet No.
98218	C2

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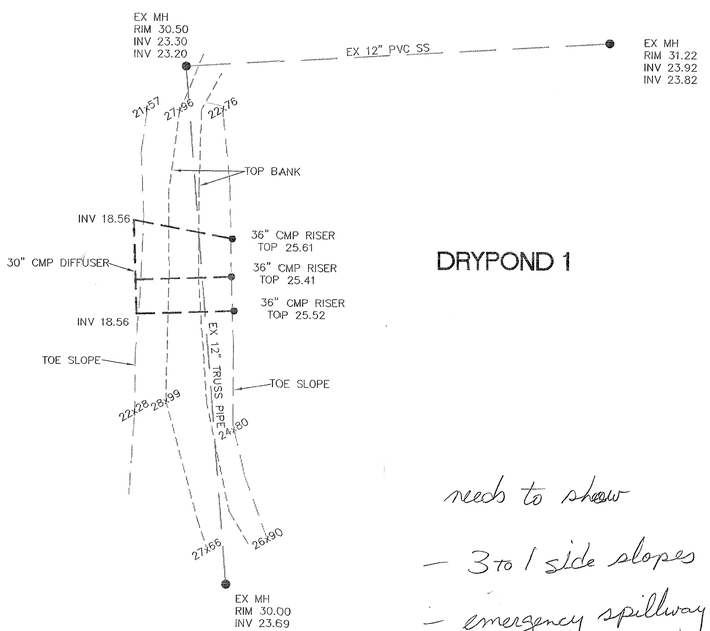
GREENSPRINGS PLANTATION RESORT TIMESHARES



DRYPOND 1

LAND BAY S-3

needs to show

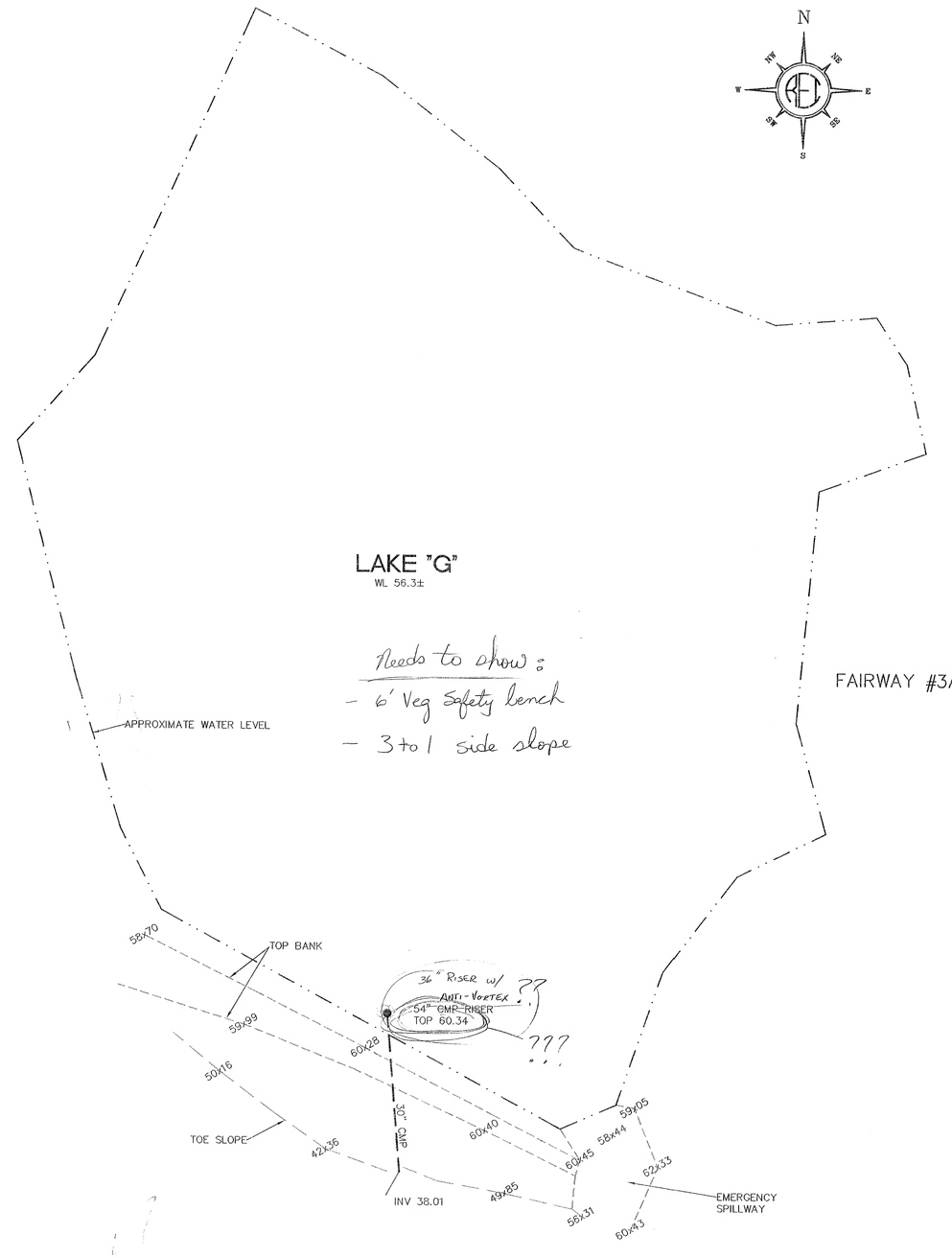
- 3 to 1 side slopes
- emergency spillway 1 ft below & 20' wide

{ dam is ≈1' low & pipes ≈1' high }

inv out is 2.5' low

40 0 40 80 120

Scale 1" = 40'



Needs to show:

- 6' Veg Safety bench
- 3 to 1 side slope

40 0 40 80 120

Scale 1" = 40'

Rickmond Engineering, Inc.

1643 Merrimac Trail
Williamsburg, VA 23185
Voice: (757) 229-1776
Fax No. (757) 229-4683

Engineering
Surveying
Land Planning
www.rickmond.com

Designed By:	Drawn By:	Scale:	Date:	Job No.:
KMJ	KMJ	1" = 40'	12/8/98	98218

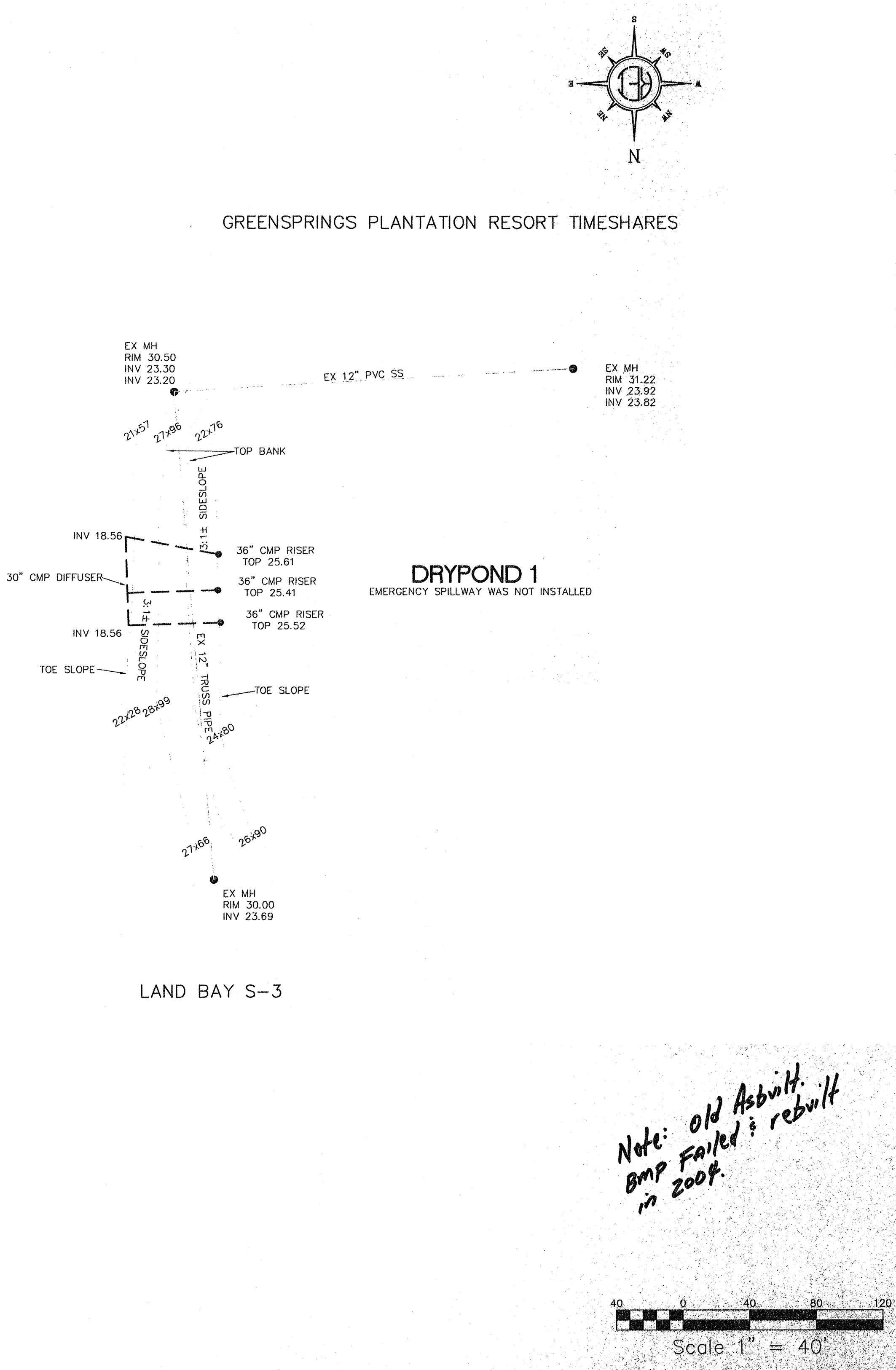
No.	By	Revision	App.	Date

GREENSPRINGS PLANTATION
RETENTION PONDS
RECORD DRAWINGS
JAMES CITY COUNTY VIRGINIA

Job Number	Sheet No.
98218	C2

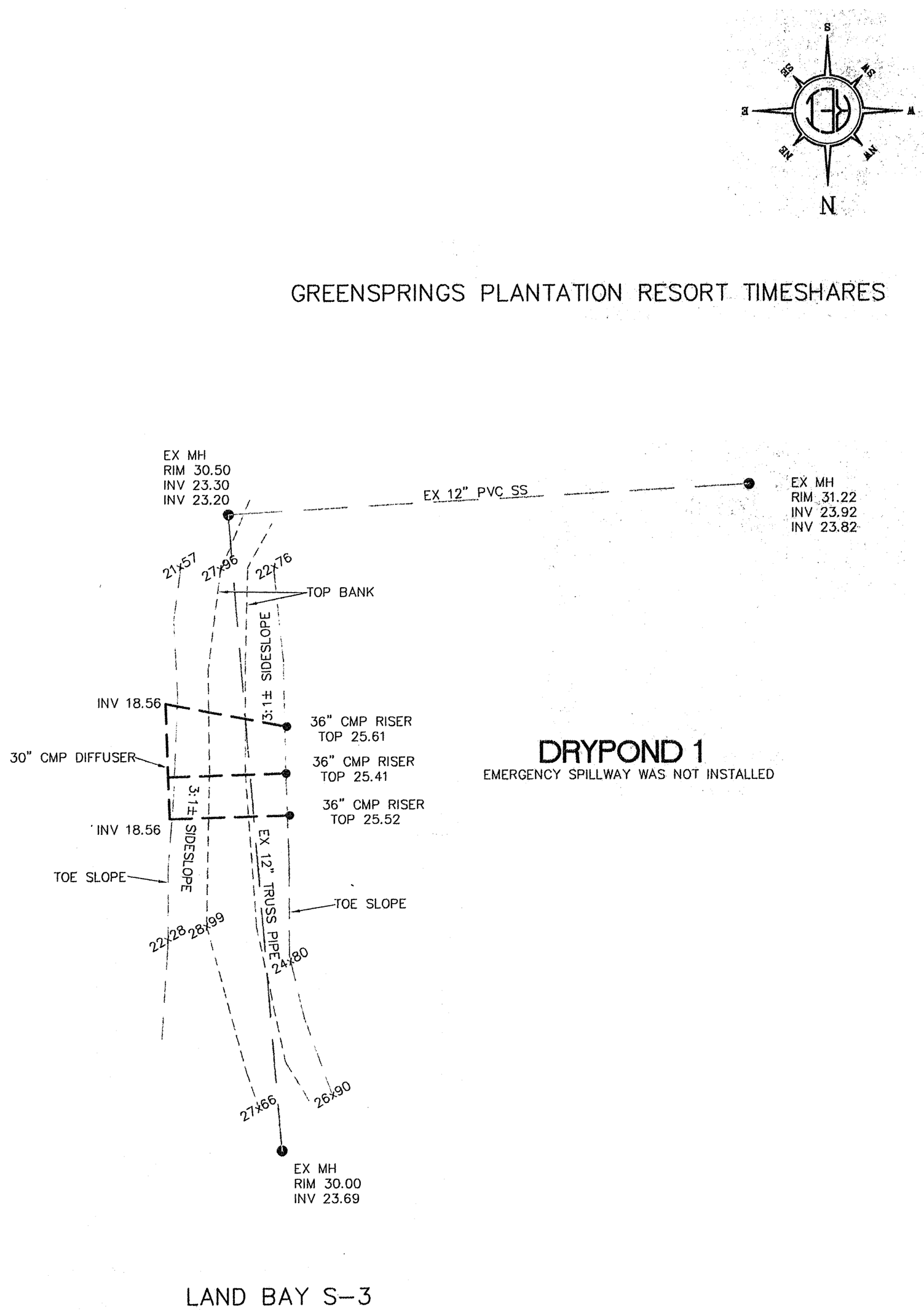
I:\98218\98218\98 Tue Dec 08 12:34:21 1998

PC064_GREENSPRINGS_GENERAL - 018



Note: Old Asbuilt. BMP Failed & rebuilt in 2004.

PC064



As-Built by Richmond Engineering
Sheet C2 dated 2/4/01
Job No. 98218
"Greenspring Plantation Retention Ponds
Record Drawings"

40 0 40 80 120

Scale 1" = 40'

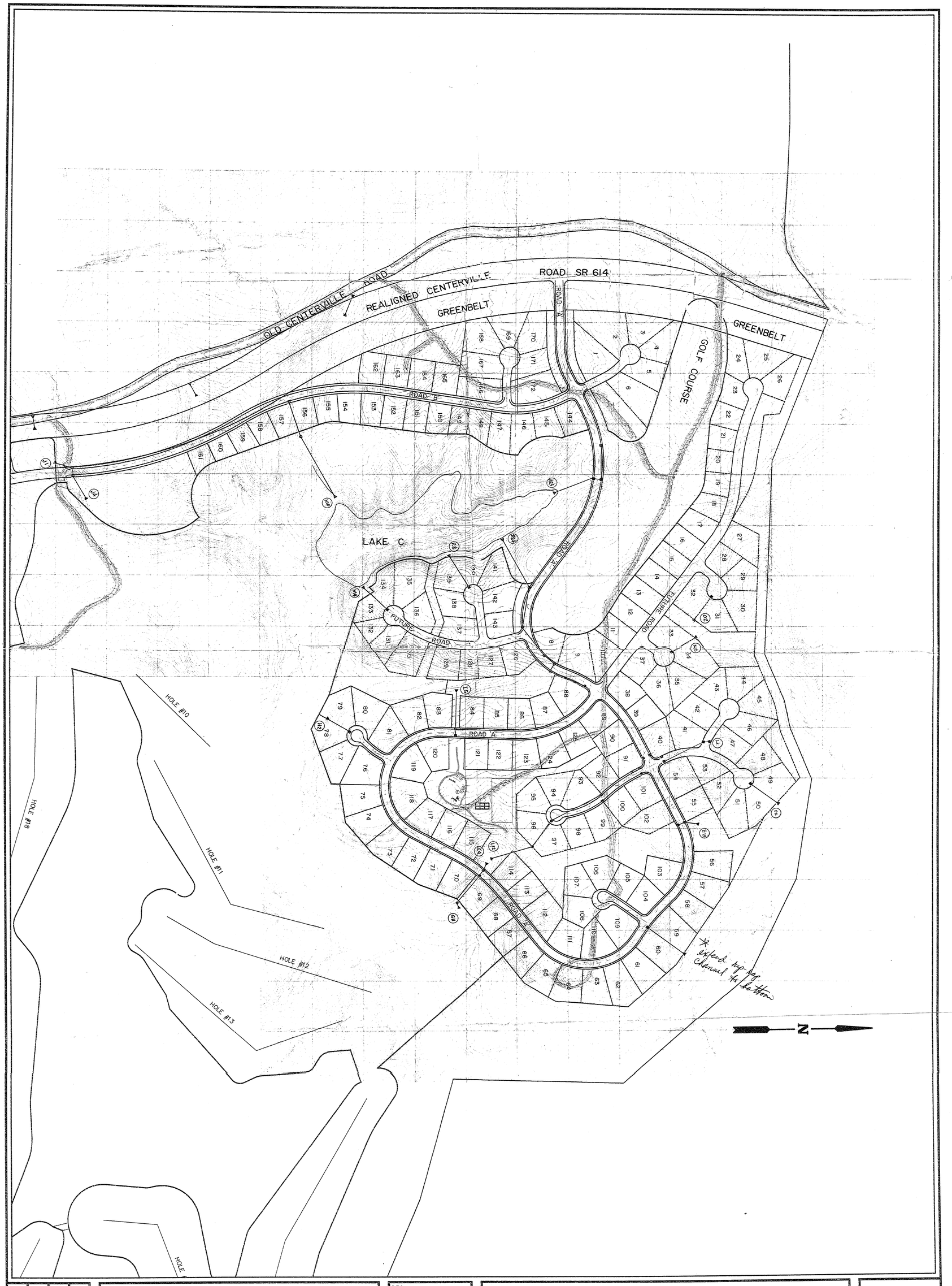
GREENSPRINGS PLANTATION
PHASE ONE

BEING A SUBDIVISION OF PROPERTY OF
GREENSPRINGS PLANTATION INC.
BERKELEY DISTRICT
JAMES CITY COUNTY, VIRGINIA
SCALE:1"=100' 6/29/95

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

SHEET 1 OF 1

PC064_GREENSPRINGS_GENERAL - 021



SHEET OF		DES.	Langley and McDonald, P.C.
DISK		DWN.	Engineers • Surveyors • Planners
PROJ. NO.		CHK.	Landscape Architects • Environmental Consultants
DWG.		DATE	VIRGINIA BEACH WILLIAMSBURG

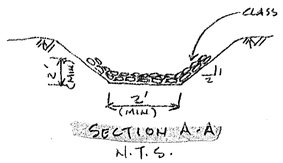
P:\DWG_GREENSPRINGS_GENERAL .102

STORM DRAINAGE CALCULATIONS
DESIGN FORMULA: Q=ACI
FREQUENCY: 10 YEAR
CONC PIPE n=0.013

PROJECT: GREENSPRINGS
JOB NO: 91053.00
DATE: APRIL 24, 1995

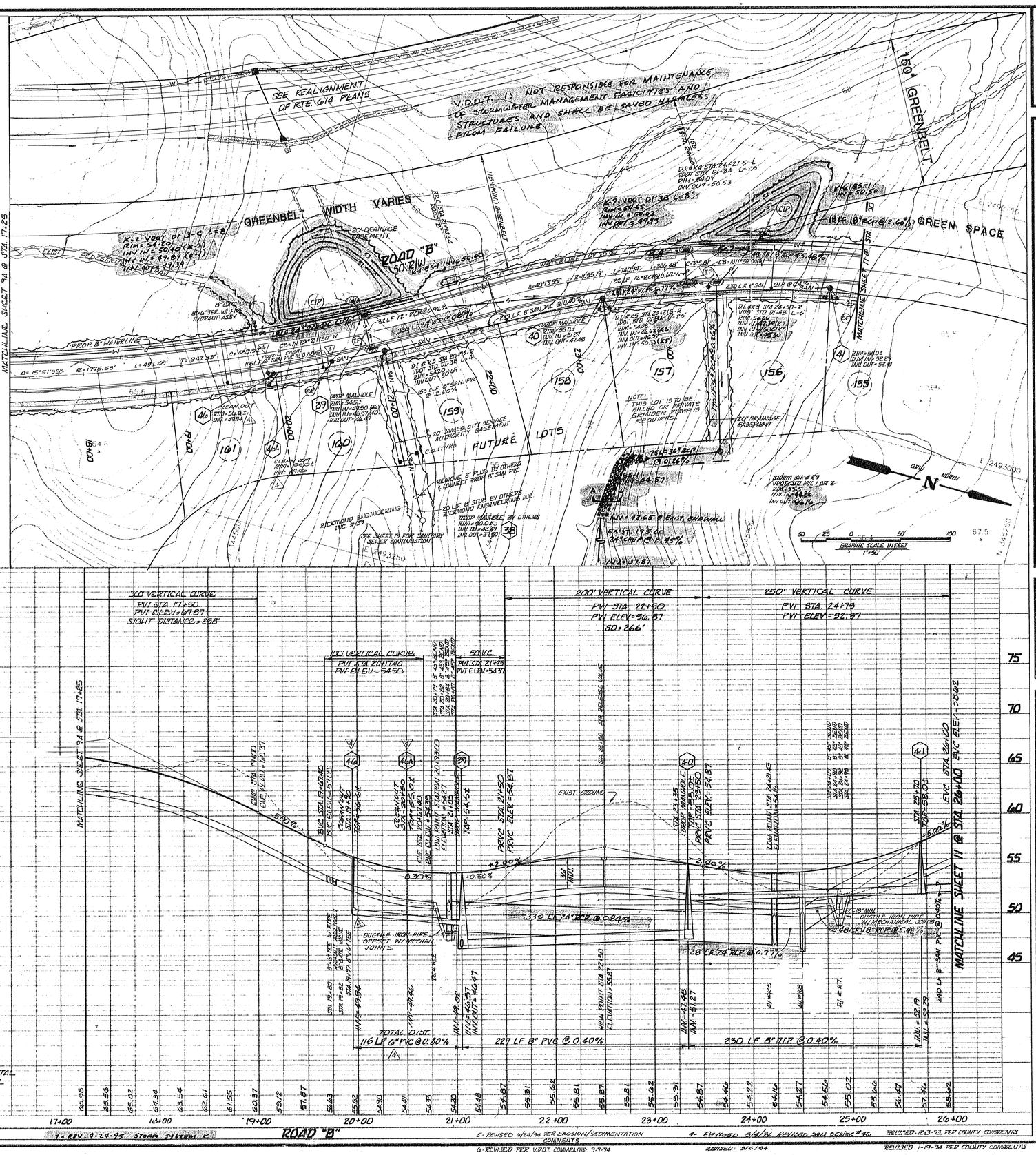
PREPARED BY LANGLEY & McDONALD P.C.
COMPUTED
SHEET I

FROM PT	TO PT	AREA ACRE A*	RUNOFF COEF "C"	INCR A X C	BASIN TIME MIN.	BASIN INTEN IN	BASIN "Q" CFS	ACCUM A X C	SYSTEM TIME MIN.	SYSTEM INTEN IN.	SYSTEM "Q" CFS	PIPE SIZE IN.	CAPA-CITY CFS	VELOC FT/ SEC	LENGTH FEET	SLOPE FT/FT	FALL FT	INVERT ELEV UP	INVERT ELEV DOWN	PIPE TIME MIN.
K1	K2	18.90	0.42	7.94	85.00	2.20	17.5	7.94	85.00	2.20	17.5	24	17.5	5.58	18	0.0060	0.11	50.00	49.89	0.05
K3	K2	0.34	0.80	0.27	5.00	7.10	1.9	0.27	5.00	7.10	1.9	12	3.4	4.35	32	0.0092	0.29	50.69	50.40	0.12
K2	K5	1.19	0.35	0.42	5.00	7.10	3.0	8.63	85.05	2.20	19.0	24	20.7	6.60	330	0.0084	2.77	49.39	46.62	0.83
K4	K5	0.62	0.35	0.22	5.00	7.10	1.5	0.22	5.00	7.10	1.6	12	2.8	5.57	32	0.0062	0.20	50.53	50.33	0.15
K5	K8	0.11	0.90	0.10	5.00	7.10	0.7	9.95	85.88	2.20	19.7	24	19.9	6.32	28	0.0077	0.22	46.52	46.30	0.07
K6	K7	16.50	0.33	5.45	38.00	3.10	16.9	5.45	38.00	3.10	16.9	18	16.7	6.58	18	0.0260	0.47	50.50	50.03	0.03
K7	K8	0.76	0.65	0.49	5.00	7.10	3.5	5.94	38.03	3.10	18.4	18	24.6	13.91	48	0.0548	2.63	49.93	47.30	0.06
K8	K9	0.66	0.65	0.43	5.00	7.10	3.0	15.32	85.95	2.20	33.7	36	34.0	4.81	170	0.0026	0.44	45.30	44.86	0.59
K9	K10	0.00	0.00	0.00	0.00	0.00	0.0	15.32	86.54	2.20	33.7	36	34.0	4.81	75	0.0026	0.20	44.76	44.57	0.26



SECTION A-A
N.T.S.

NOTES:
1. WATER AND SANITARY SEWER CONNECTIONS FOR EACH LOT SHALL HAVE A MINIMUM HORIZONTAL SEPARATION OF 10 FEET.
2. ALL WATER AND SANITARY CONNECTIONS SHALL BE LOCATED 5 FEET OFF PROPERTY LINES UNLESS DIMENSIONED OTHERWISE.



1- REV 9-24-95 STORM SYSTEM K
5- REVISED 6/24/94 PER EROSION/SEDIMENTATION COMMENTS
4- REVISED 5/6/94 REVISED SAN SEWER #46
REVISED 12-13-93 PER COUNTY COMMENTS
ROAD "B"
6-REVISED PER VDOT COMMENTS 9-7-94
REVISED 3/2/94
REVISED 1-19-94 PER COUNTY COMMENTS

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

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

DES.	JLH/DSL
DWN.	GSW/JLW
CHK.	SAR
DATE	AUG. 3, 1993

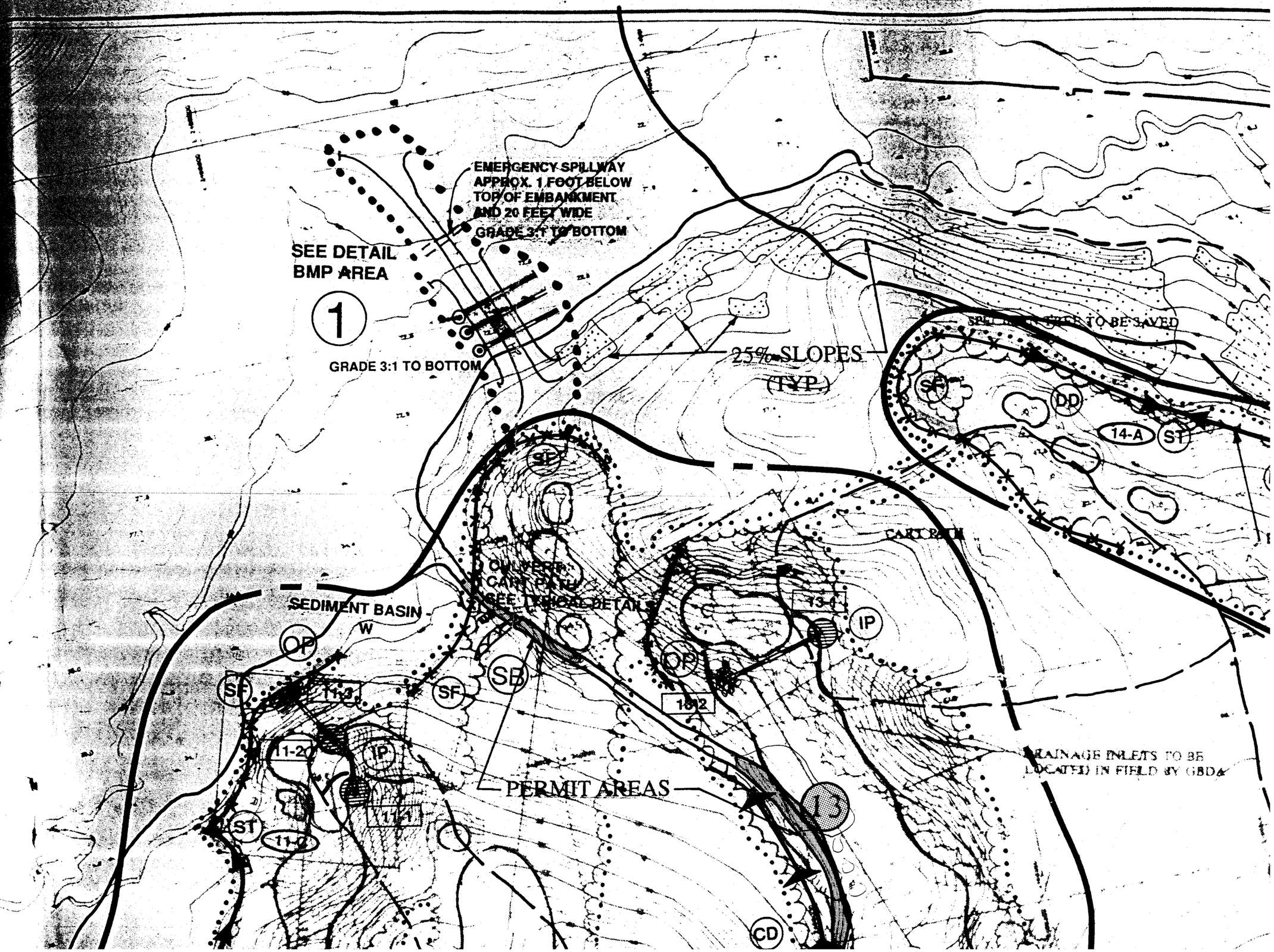
GREENSPRINGS ASSOCIATES
GREENSPRINGS
PHASE ONE, SINGLE FAMILY
JAMES CITY COUNTY, VIRGINIA
PLAN & PROFILE SHEETS - ROADS

RECEIVED APR 1995

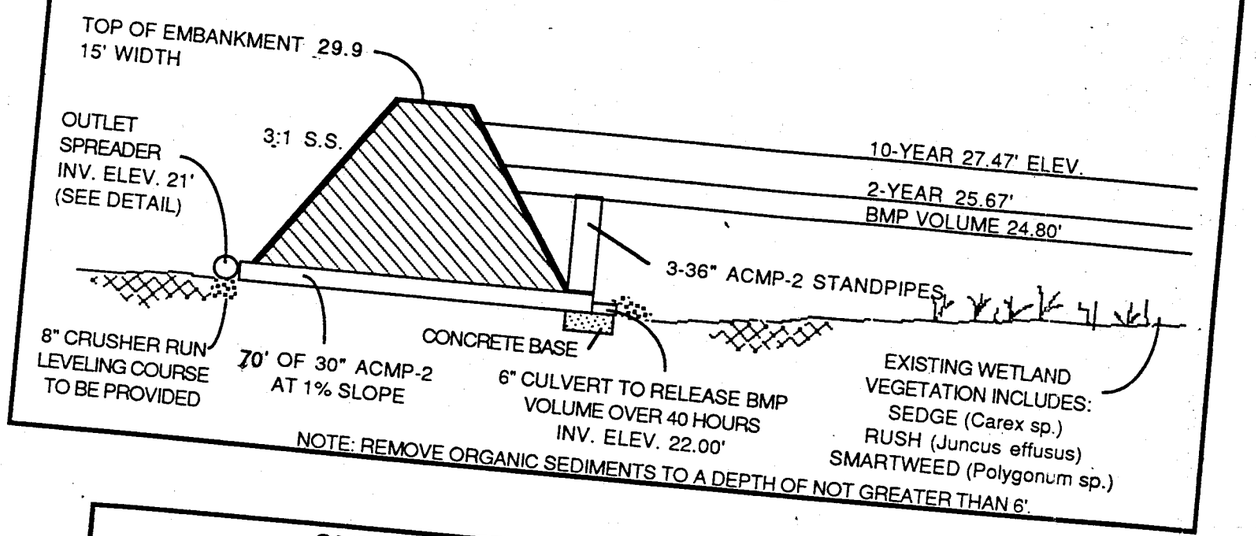
S-61-93

SHEET	10 OF 26
DISK	
PROJ. NO.	91053-29
DWG.	4963W-I

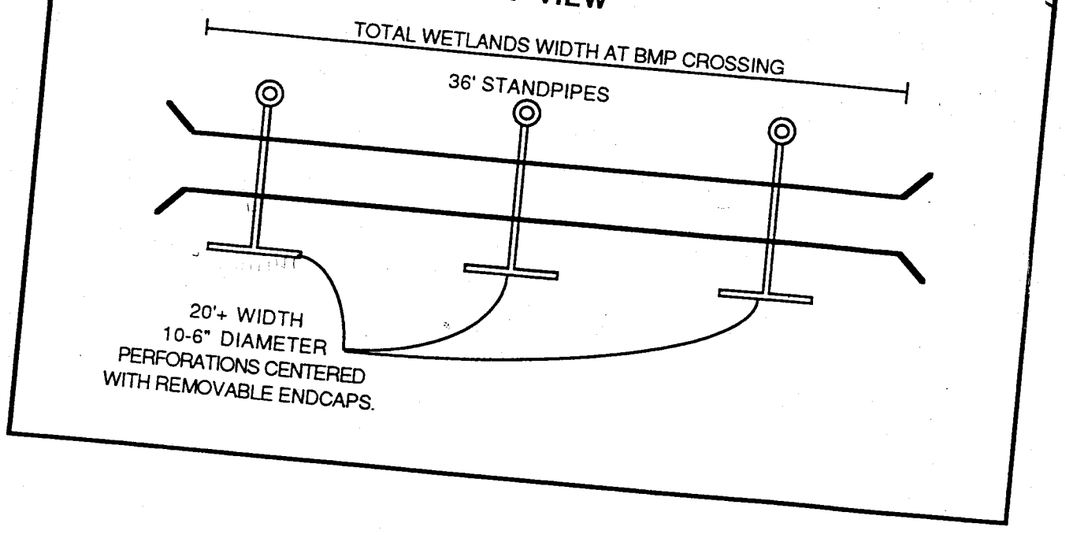
PC064_GREENSPRINGS_GENERAL - 023


EMERGENCY SPILLWAY
APPROX. 1 FOOT BELOW
TOP OF EMBANKMENT
AND 20 FEET WIDE
GRADE 3:1 TO BOTTOM
SEE DETAIL
BMP AREA
1
GRADE 3:1 TO BOTTOM
25% SLOPES
(TYP.)
TO BE SAVED
SF
DD
14-A
ST
SP
CART PATH
CULVERT
CART PATH
SEE TYPICAL DETAIL
SEDIMENT BASIN
W
OP
SF
11-3
SF
SB
13-1
IP
OP
10-2
11-2
IP
PERMIT AREAS
13
ST
11-1
11-0
DRAINAGE INLETS TO BE
LOCATED IN FIELD BY GBDA
CD

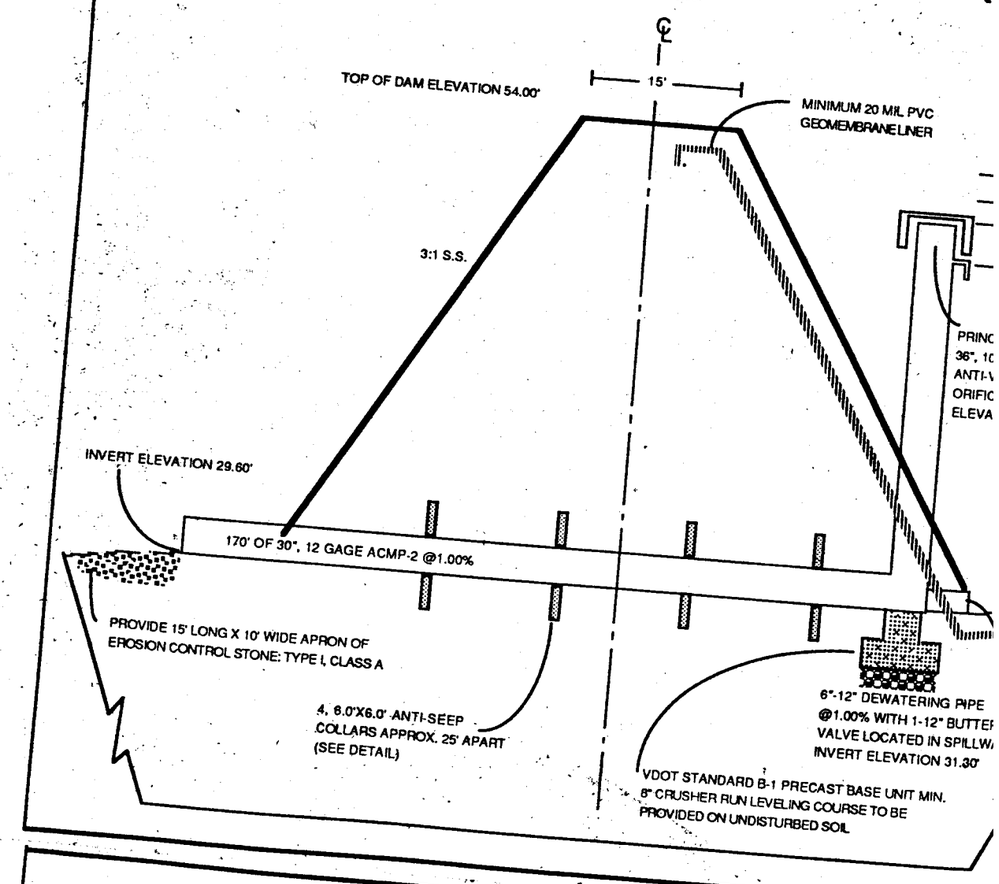
DRYPOND 1 PROFILE



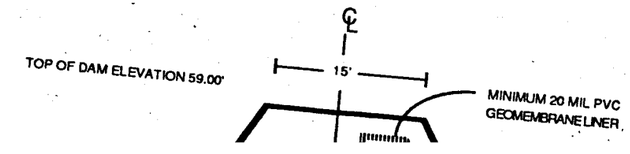
OUTLET SPREADER FOR DRYPONDS
PLAN VIEW



DAM CROSS-SECTION
LAKE C
1"=15' HORIZ.
1"=5' VERT.

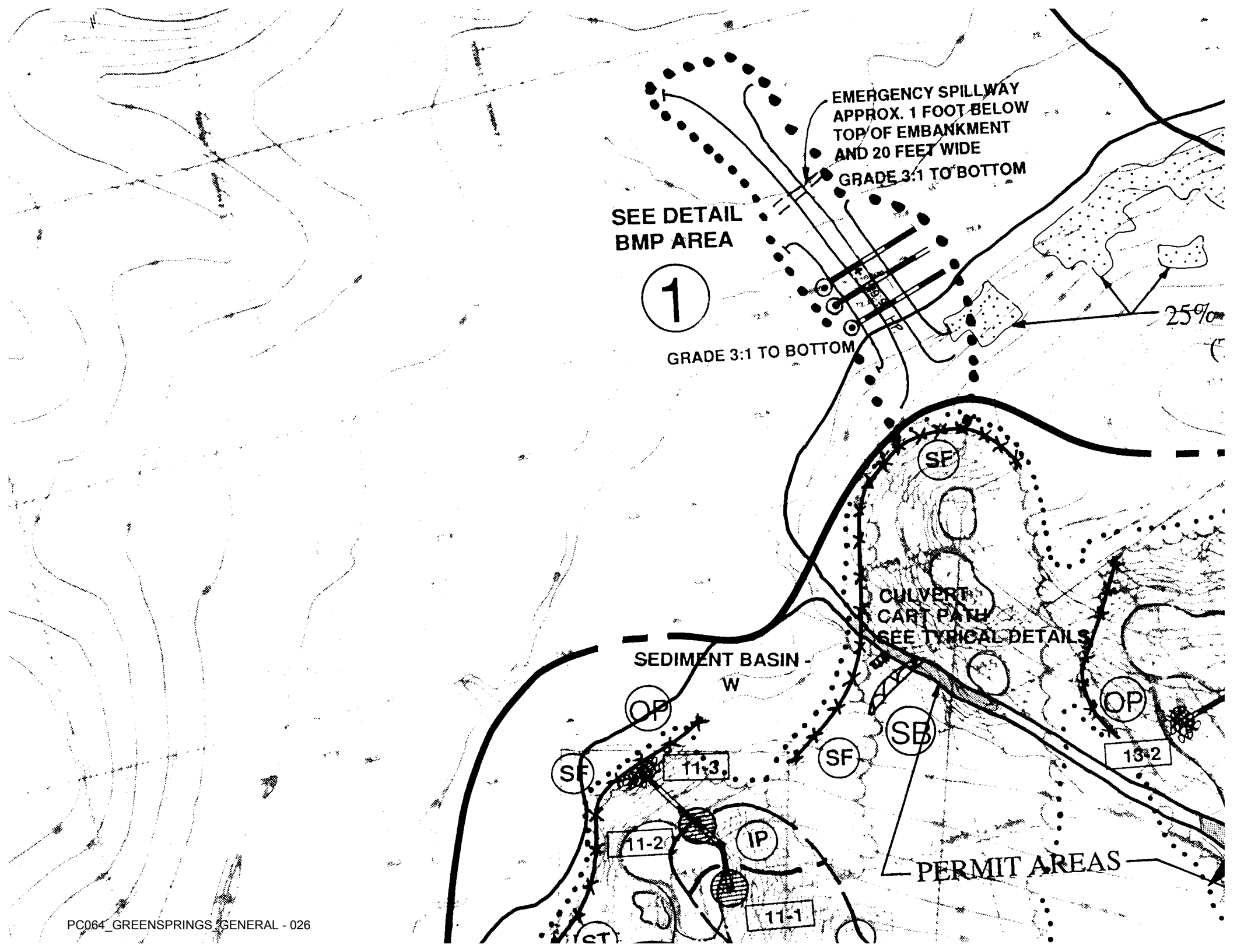


DAM CROSS-SECTION
LAKE G
1"=15' HORIZ.
1"=5' VERT.

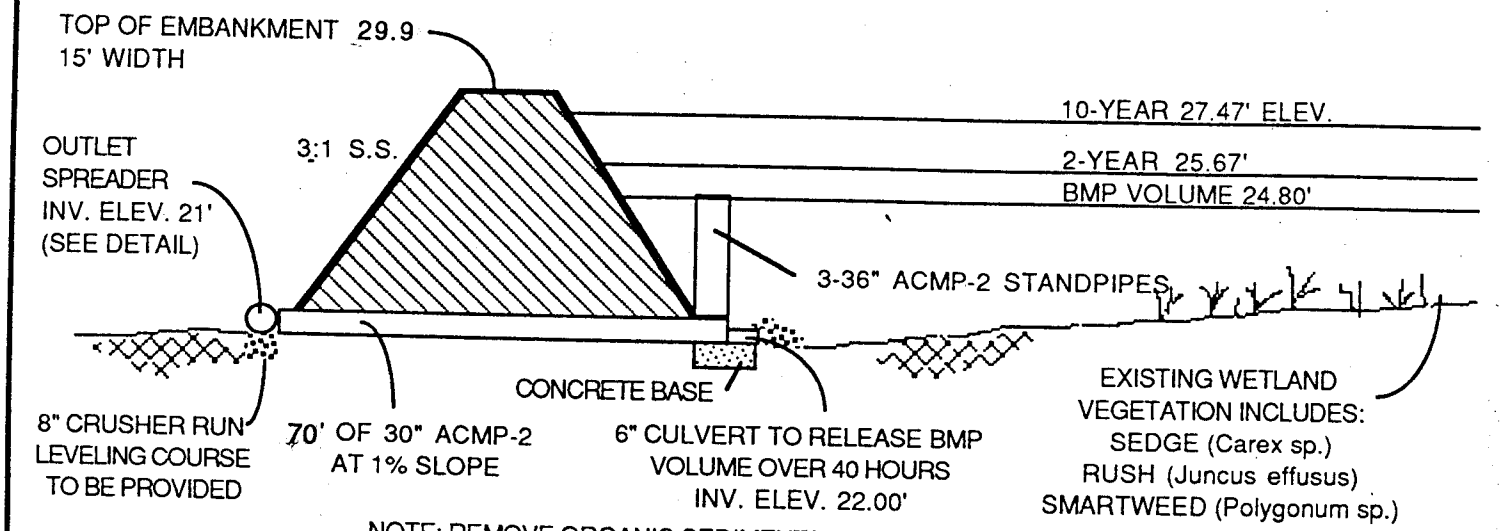


STORM SEWER DESIGN

FROM	TO	RUNOFF	INVERT ELEVATIONS

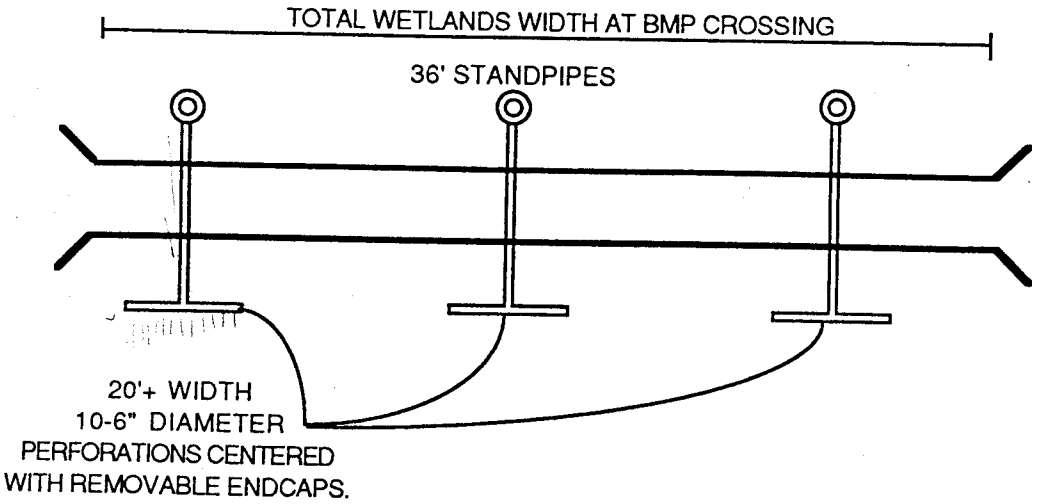

EMERGENCY SPILLWAY
APPROX. 1 FOOT BELOW
TOP OF EMBANKMENT
AND 20 FEET WIDE
GRADE 3:1 TO BOTTOM
SEE DETAIL
BMP AREA
1
GRADE 3:1 TO BOTTOM
25%
SF
CULVERT
CART PATH
SEE TYPICAL DETAILS
SEDIMENT BASIN -
W
OP
SB
SF
OP
13-2
SF
11-3
11-2
IP
11-1
PERMIT AREAS

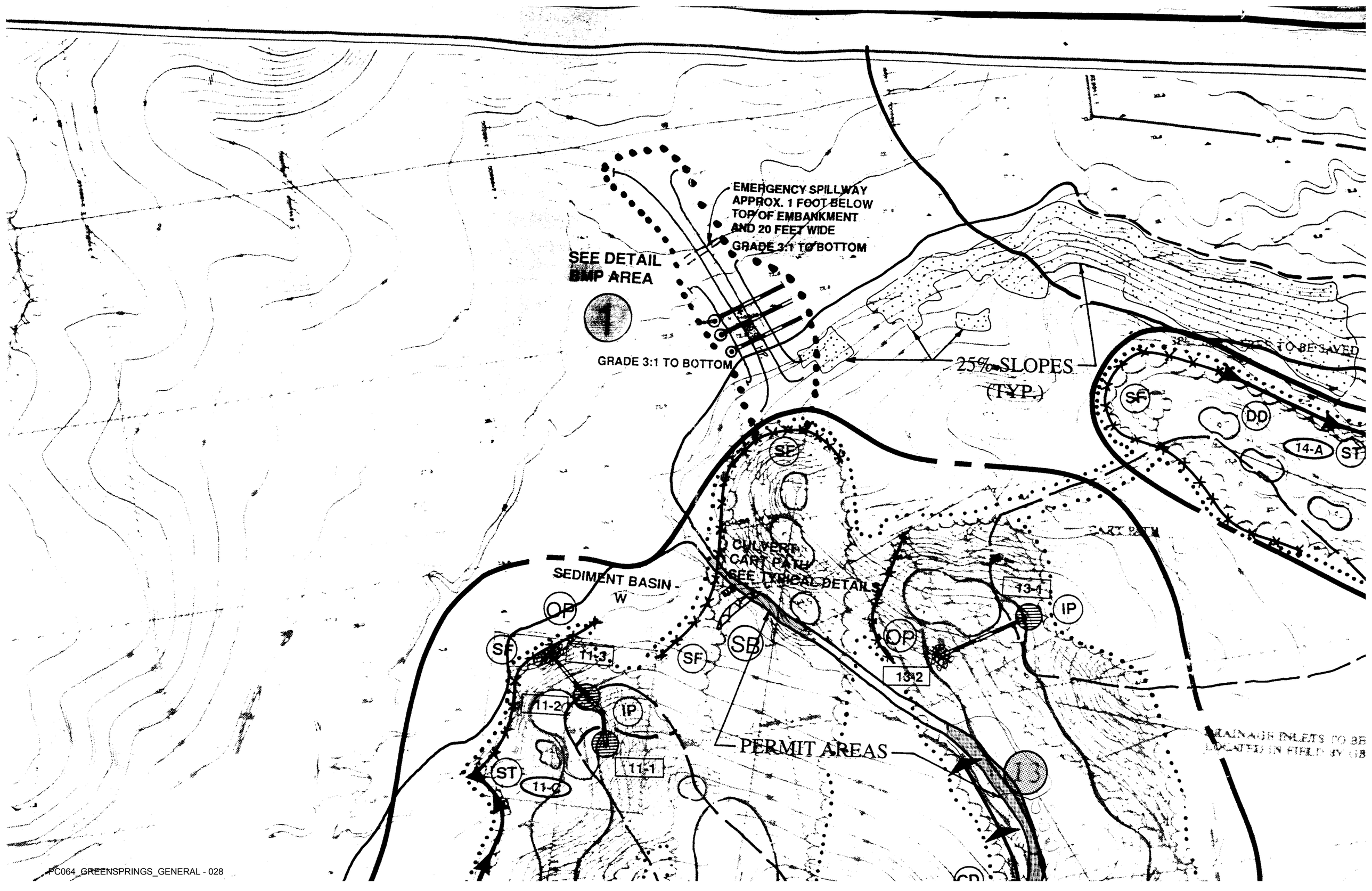
DRYPOND 1 PROFILE



NOTE: REMOVE ORGANIC SEDIMENTS TO A DEPTH OF NOT GREATER THAN 6'.

OUTLET SPREADER FOR DRYPONDS
PLAN VIEW




EMERGENCY SPILLWAY
APPROX. 1 FOOT BELOW
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GRADE 3:1 TO BOTTOM
SEE DETAIL
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W
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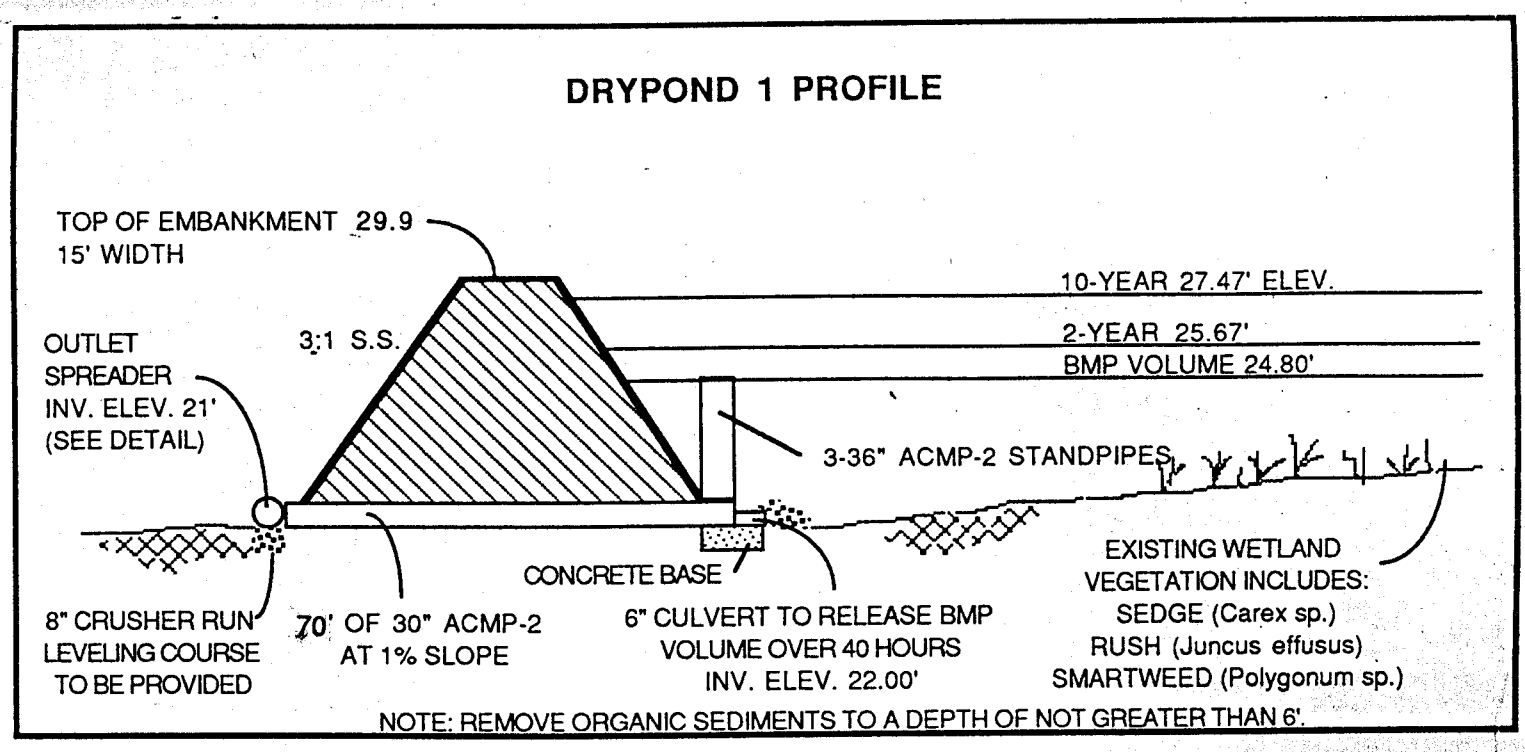
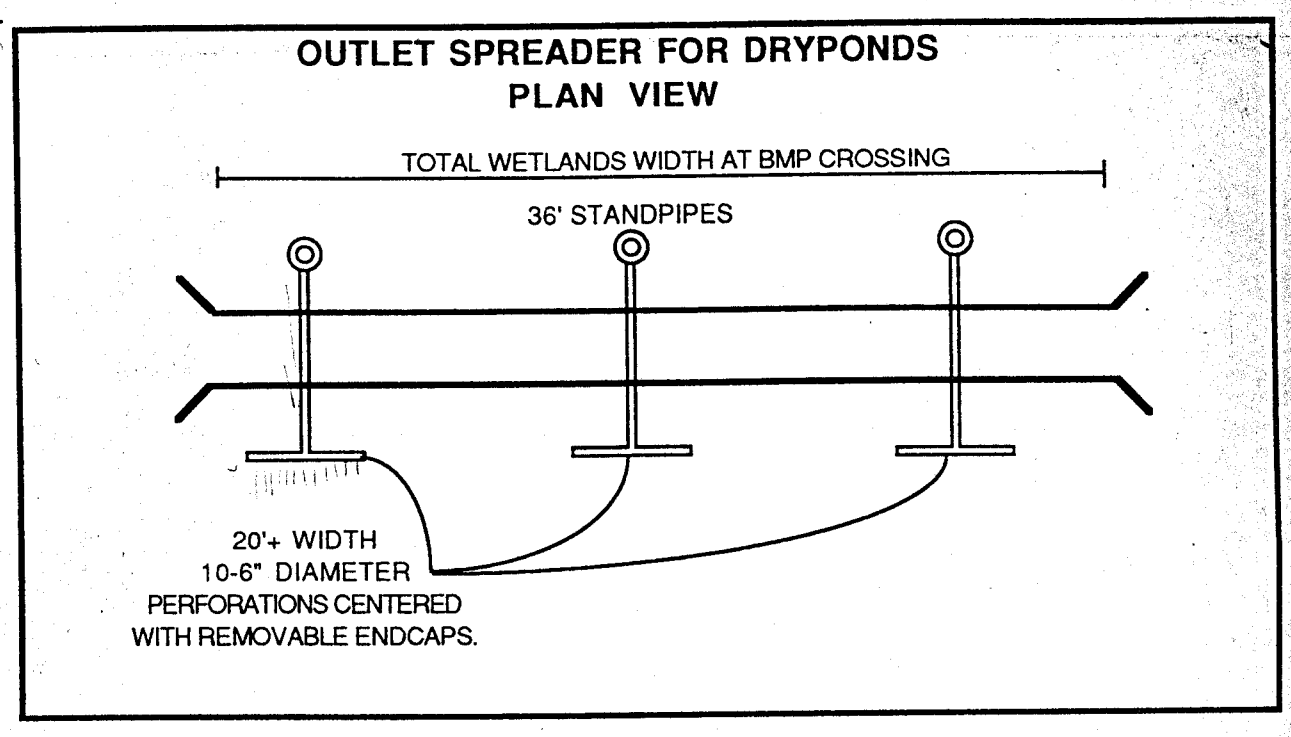
SF
11-3
SF
SB
OP
13-1
IP
13-2
11-2
IP
11-1
ST
11-C
PERMIT AREAS
13
DRAINAGE INLETS TO BE
LOCATED IN FIELD BY GB





STORM SEWER DESIGN

FROM POINT	TO POINT	RUNOFF Q10 (CFS)	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH (FT)	SLOPE (FT/FT)	DIAMETER (IN)	TYPE	VELOCITY (FPS)	OUTLET PROTECTION
1-1	1-2	0.2	61.0	56.4	410	0.01	4	CPEP	3.0	
1-2	1-6	1.0	56.4	55.5	290	0.003	10	CPEP	3.2	
1-3	1-4	0.1	57.6	56.8	120	0.01	4	CPEP	3.2	
1-4	1-5	0.6	56.8	56.4	60	0.01	8	CPEP	2.8	
1-6	1-7	1.1	55.5	53.7	90	0.02	10	CPEP	5.9	TYPE 1 CLASS A
2-1	2-2	0.2	65.8	65.4	45	0.01	8	CPEP	2.9	TYPE 1 CLASS A
3-1	3-2	11.0	58.0	51.0	110	0.06	18	CPEP	15.9	
3-3	3-4	0.1	56.8	56.4	30	0.01	4	CPEP	3.2	
3-5	3-6	0.2	71.7	71.0	70	0.01	4	CPEP	2.9	
3-6	3-7	0.4	71.0	70.2	80	0.01	8	CPEP	3.5	
3-7	3-9	0.6	70.2	69.7	130	0.004	8	CPEP	3.9	
3-8	3-9	0.1	70.0	69.7	60	0.005	4	CPEP	1.9	
3-9	3-10	3.0	70.4	67.7	310	0.01	12	CPEP	5.8	
3-10	3-11	10.8	67.7	61.5	570	0.01	15	CPEP	10.0	
3-11	3-12	13.8	61.5	55.0	90	0.07	18	CPEP	11.0	
3-12	3-13	14.5	55.0	53.5	60	0.03	18	CPEP	13.1	
3-13	3-14	14.7	53.5	53.0	20	0.03	18	CPEP	13.1	
3-15	3-16	3.0	57.9	53.0	40	0.12	8	CPEP	14.9	
4-1	4-2	47.3	62.0	57.0	630	0.01	36	CPEP	10.7	TYPE 1 CLASS A
4-3	4-4	3.2	62.0	57.9	150	0.03	10	CPEP	8.4	
4-4	4-5	5.1	57.9	57.0	85	0.01	15	CPEP	6.9	TYPE 1 CLASS A
4-6	4-7	30.9	60.5	57.0	200	0.02	30	CPEP	13.6	TYPE 1 CLASS A
4-8	4-9	0.2	60.0	59.0	100	0.01	4	CPEP	2.9	
4-9	4-10	4.5	59.0	58.5	50	0.01	15	CPEP	5.6	
5-1	5-3	7.6	69.5	61.4	110	0.07	18	CPEP	10.1	
5-2	5-3	7.7	72.8	65.8	120	0.06	12	CPEP	14.2	
5-3	4-6	7.9	65.8	61.4	250	0.02	15	CPEP	9.0	

Legacy Golf Course
Site Plan Support Documentation
for Outlet Structures and Routings
for Lakes C and G and Drypond 1

Prepared by:

Williamsburg Environmental Group, Inc.
P.O. Box 3584
5248 Olde Towne Road
Williamsburg, Virginia

The following support documentation was prepared as part of the revised site plan submittal as per County comments (dated May 14, 1992) to the preliminary site plan submittal.

The following print-outs include outlet structure information and storm routing computations for Drypond 1 as well as outlet structure information for Lake C and Lake G.

June 30, 1992

DRYPOND 1
Outlet Structure File

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

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

Elevation (ft)	Q (cfs)	Contributing Structures
22.00	0.0	1
22.50	0.5	1
23.00	1.3	1
23.50	2.0	1
24.00	2.5	1
24.50	2.9	1
25.00	11.1	4 +3 +2 +1
25.50	54.9	4 +3 +2 +1
26.00	115.7	4 +3 +2 +1
26.50	137.2	4 +3 +2 +1
27.00	155.8	4 +3 +2 +1
27.50	172.4	5 +4 +3 +2 +1
28.00	224.5	5 +4 +3 +2 +1
28.50	305.7	5 +4 +3 +2 +1
29.00	405.5	5 +4 +3 +2 +1

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

Outlet Structure File: c:\pondfile\DRYPOND1.STR
Planimeter Input File: c:\pondfile\DRYPOND1.VOL
Rating Table Output File: c:\pondfile\DRYPOND1.PND

Min. Elev.(ft) = 22 Max. Elev.(ft) = 29 Incr.(ft) = .5

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

****
SYSTEM CONNECTIVITY
****

Structure	No.	Q Table		Q Table
WEIR-VR	5		->	5
STAND PIPE	4		->	4
STAND PIPE	3		->	3
STAND PIPE	2		->	2
CULVERT-CR	1		->	1

Outflow rating table summary was stored in file:
c:\pondfile\DRYPOND1.PND

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

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

CULVERT-CR
Circular Culvert (With Inlet Control)

E1 elev.(ft)?	22
E2 elev.(ft)?	29.001
Diam. (ft)?	.67
Inv. el.(ft)?	22
Slope (ft/ft)?	.01
T1 ratio?	
T2 ratio?	
K Coeff.?	.519
M Coeff.?	.64
c Coeff.?	.0289
Y Coeff.?	.9
Form 1 or 2?	2
Slope factor?	-0.5

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

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

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)? 24.8
E2 elev.(ft)? 29.001
Crest elev.(ft)? 24.8
Diameter (ft)? 3
Weir coefficient? 3.1
Orifice coefficient? .6
Start transition elev.(ft) @ ? 24.8
Transition height (ft)? 1

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

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

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)? 24.8
E2 elev.(ft)? 29.001
Crest elev.(ft)? 24.8
Diameter (ft)? 3
Weir coefficient? 3.1
Orifice coefficient? .6
Start transition elev.(ft) @ ? 24.8
Transition height (ft)? 1

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

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

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)? 24.8
E2 elev.(ft)? 29.001
Crest elev.(ft)? 24.8
Diameter (ft)? 3
Weir coefficient? 3.1
Orifice coefficient? .6
Start transition elev.(ft) @ ? 24.8
Transition height (ft)? 1

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

>>>>>> Structure No. 5 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)? 27.5
E2 elev.(ft)? 29.001
Weir coefficient? 3.5
Weir elev.(ft)? 27.50
Length (ft)? 30
Contracted/Suppressed (C/S)? C

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

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

Elevation (ft)	Q (cfs)	Computation Messages
22.00	0.0	No headwater
22.50	0.5	Equ.2: HW =.5
23.00	1.3	Submerged: HW =1.0
23.50	2.0	Submerged: HW =1.5
24.00	2.5	Submerged: HW =2.0
24.50	2.9	Submerged: HW =2.5
25.00	3.2	Submerged: HW =3.0
25.50	3.5	Submerged: HW =3.5
26.00	3.8	Submerged: HW =4.0
26.50	4.1	Submerged: HW =4.5
27.00	4.4	Submerged: HW =5.0
27.50	4.6	Submerged: HW =5.5
28.00	4.8	Submerged: HW =6.0
28.50	5.0	Submerged: HW =6.5
29.00	5.2	Submerged: HW =7.0

Used Unsubmerged Equ. Form (2) for elev. less than 22.78 ft
Used Submerged Equation for elevations greater than 22.91 ft
HW=Headwater (ft)

Transition flows interpolated from the following values:
E1=22.78 ft; Q1=1.01 cfs; E2=22.91 ft; Q2=1.15 cfs

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

Outflow Rating Table for Structure #2
STAND PIPE Stand Pipe with weir or orifice flow

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

Elevation (ft)	Q (cfs)	Computation Messages
22.00	0.0	E < Inv.El.= 24.8
22.50	0.0	E < E1= 24.8
23.00	0.0	E < E1= 24.8
23.50	0.0	E < E1= 24.8
24.00	0.0	E < E1= 24.8
24.50	0.0	E < E1= 24.8
25.00	2.6	Weir: H =.2
25.50	17.1	Weir: H =.7
26.00	37.3	Orifice: H =1.2
26.50	44.4	Orifice: H =1.7
27.00	50.5	Orifice: H =2.2
27.50	55.9	Orifice: H =2.7
28.00	60.9	Orifice: H =3.2
28.50	65.5	Orifice: H =3.7
29.00	69.8	Orifice: H =4.2

Weir Cw = 3.1 Weir length = 9.424779 ft
Orifice Co = .6 Orifice area = 7.068584 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition zone ends below 25.96491 ft
Weir equation = Orifice equation @ elev.= 25.96491 ft

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

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

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

Elevation (ft)	Q (cfs)	Computation Messages
22.00	0.0	E < Inv.El.= 24.8
22.50	0.0	E < E1= 24.8
23.00	0.0	E < E1= 24.8
23.50	0.0	E < E1= 24.8
24.00	0.0	E < E1= 24.8
24.50	0.0	E < E1= 24.8
25.00	2.6	Weir: H =.2
25.50	17.1	Weir: H =.7
26.00	37.3	Orifice: H =1.2
26.50	44.4	Orifice: H =1.7
27.00	50.5	Orifice: H =2.2
27.50	55.9	Orifice: H =2.7
28.00	60.9	Orifice: H =3.2
28.50	65.5	Orifice: H =3.7
29.00	69.8	Orifice: H =4.2

Weir Cw = 3.1 Weir length = 9.424779 ft
Orifice Co = .6 Orifice area = 7.068584 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition zone ends below 25.96491 ft
Weir equation = Orifice equation @ elev.= 25.96491 ft

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

Outflow Rating Table for Structure #4
STAND PIPE Stand Pipe with weir or orifice flow

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

Elevation (ft)	Q (cfs)	Computation Messages
22.00	0.0	E < Inv.El.= 24.8
22.50	0.0	E < El= 24.8
23.00	0.0	E < El= 24.8
23.50	0.0	E < El= 24.8
24.00	0.0	E < El= 24.8
24.50	0.0	E < El= 24.8
25.00	2.6	Weir: H =.2
25.50	17.1	Weir: H =.7
26.00	37.3	Orifice: H =1.2
26.50	44.4	Orifice: H =1.7
27.00	50.5	Orifice: H =2.2
27.50	55.9	Orifice: H =2.7
28.00	60.9	Orifice: H =3.2
28.50	65.5	Orifice: H =3.7
29.00	69.8	Orifice: H =4.2

Weir Cw = 3.1 Weir length = 9.424779 ft
Orifice Co = .6 Orifice area = 7.068584 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition zone ends below 25.96491 ft
Weir equation = Orifice equation @ elev.= 25.96491 ft

Outlet Structure File: DRYPOND1.STR

POND-2 Version: 5.15 S/N: 1295100016
Date Executed: Time Executed:

Outflow Rating Table for Structure #5
WEIR-VR Weir - Vertical Rectangular

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

Elevation (ft)	Q (cfs)	Computation Messages
22.00	0.0	E < Inv.El.= 27.5
22.50	0.0	E < Inv.El.= 27.5
23.00	0.0	E < Inv.El.= 27.5
23.50	0.0	E < Inv.El.= 27.5
24.00	0.0	E < Inv.El.= 27.5
24.50	0.0	E < Inv.El.= 27.5
25.00	0.0	E < Inv.El.= 27.5
25.50	0.0	E < Inv.El.= 27.5
26.00	0.0	E < Inv.El.= 27.5
26.50	0.0	E < Inv.El.= 27.5
27.00	0.0	E < Inv.El.= 27.5
27.50	0.0	H =0.0
28.00	37.0	H =.5
28.50	104.3	H =1.0
29.00	191.0	H =1.5

C = 3.5 L (ft) = 30
H (ft) = Table elev. - Invert elev. (27.5 ft)
Q (cfs) = C * (L-.2H) * (H**1.5) -- Contracted Weir

DRYPOND 1
Routing Computations

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY11 .HYD
Outflow Hydrograph: c:\pondfile\DP11OUT .HYD

INFLOW HYDROGRAPH

TIME (hrs)	INFLOW (cfs)
10.000	0.00
10.100	0.00
10.200	0.00
10.300	0.00
10.400	0.00
10.500	0.00
10.600	0.00
10.700	0.00
10.800	0.00
10.900	0.00
11.000	1.00
11.100	1.00
11.200	2.00
11.300	2.00
11.400	2.00
11.500	2.00
11.600	2.01
11.700	2.01
11.800	3.01
11.900	3.01
12.000	3.01
12.100	4.02
12.200	5.03
12.300	8.06
12.400	12.09
12.500	16.13
12.600	22.16
12.700	29.18
12.800	38.20
12.900	46.21
13.000	54.21
13.100	60.22
13.200	66.22
13.300	70.23
13.400	74.23

ROUTING COMPUTATIONS

I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
-----	0.0	0.0	0.00	22.00
0.0	0.0	0.0	0.00	22.00
0.0	0.0	0.0	0.00	22.00
0.0	0.0	0.0	0.00	22.00
0.0	0.0	0.0	0.00	22.00
0.0	0.0	0.0	0.00	22.00
0.0	0.0	0.0	0.00	22.00
0.0	0.0	0.0	0.00	22.00
0.0	0.0	0.0	0.00	22.00
0.0	0.0	0.0	0.00	22.00
1.0	0.9	1.0	0.03	22.03
2.0	2.8	2.9	0.08	22.10
3.0	5.5	5.8	0.15	22.19
4.0	9.0	9.5	0.25	22.31
4.0	12.3	13.0	0.34	22.43
4.0	15.5	16.3	0.41	22.51
4.0	18.7	19.5	0.42	22.52
4.0	21.8	22.7	0.44	22.54
5.0	25.9	26.8	0.46	22.56
6.0	31.0	31.9	0.48	22.58
6.0	36.0	37.0	0.50	22.60
7.0	42.0	43.0	0.53	22.63
9.1	49.9	51.0	0.57	22.67
13.1	61.7	63.0	0.63	22.73
20.2	80.4	81.8	0.72	22.82
28.2	106.9	108.6	0.85	22.95
38.3	143.3	145.2	0.94	23.07
51.3	192.6	194.7	1.02	23.20
67.4	257.8	260.0	1.12	23.37
84.4	339.7	342.2	1.23	23.57
100.4	437.5	440.2	1.32	23.80
114.4	549.1	551.9	1.42	24.04
126.4	672.4	675.5	1.55	24.25
136.5	805.5	808.9	1.68	24.47
144.5	942.2	950.0	3.91	24.64

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY11 .HYD
Outflow Hydrograph: c:\pondfile\DP11OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
13.500	74.23	148.5	1077.8	1090.6	6.42	24.79
13.600	75.24	149.5	1209.5	1227.3	8.86	24.95
13.700	72.24	147.5	1326.0	1357.0	15.50	25.07
13.800	69.24	141.5	1420.9	1467.5	23.27	25.16
13.900	66.24	135.5	1497.4	1556.4	29.53	25.23
14.000	63.24	129.5	1557.9	1626.9	34.48	25.28
14.100	59.25	122.5	1603.9	1680.4	38.25	25.33
14.200	54.25	113.5	1635.7	1717.4	40.85	25.36
14.300	50.25	104.5	1655.3	1740.2	42.45	25.38
14.400	47.25	97.5	1666.1	1752.8	43.34	25.39
14.500	44.25	91.5	1670.3	1757.6	43.68	25.39
14.600	41.25	85.5	1668.7	1755.8	43.55	25.39
14.700	39.25	80.5	1663.0	1749.2	43.08	25.38
14.800	36.26	75.5	1653.8	1738.5	42.33	25.37
14.900	34.26	70.5	1641.7	1724.4	41.34	25.36
15.000	32.26	66.5	1627.8	1708.2	40.20	25.35
15.100	31.26	63.5	1613.3	1691.3	39.01	25.34
15.200	29.26	60.5	1598.2	1673.8	37.78	25.32
15.300	28.26	57.5	1582.7	1655.8	36.51	25.31
15.400	26.26	54.5	1566.8	1637.3	35.21	25.29
15.500	25.26	51.5	1550.6	1618.4	33.88	25.28
15.600	24.27	49.5	1534.9	1600.1	32.60	25.26
15.700	23.27	47.5	1519.7	1582.5	31.36	25.25
15.800	22.27	45.5	1505.0	1565.3	30.15	25.23
15.900	21.27	43.5	1490.6	1548.5	28.97	25.22
16.000	20.27	41.5	1476.5	1532.1	27.82	25.21
16.100	19.27	39.5	1462.6	1516.0	26.69	25.19
16.200	19.27	38.5	1449.9	1501.2	25.64	25.18
16.300	18.27	37.5	1438.1	1487.4	24.68	25.17
16.400	18.27	36.5	1427.1	1474.6	23.78	25.16
16.500	17.28	35.6	1416.8	1462.6	22.93	25.15
16.600	16.28	33.6	1406.2	1450.3	22.07	25.14
16.700	16.28	32.6	1396.3	1438.8	21.25	25.13
16.800	15.28	31.6	1386.8	1427.8	20.48	25.12
16.900	15.28	30.6	1377.9	1417.4	19.75	25.12
17.000	14.28	29.6	1369.4	1407.5	19.05	25.11
17.100	14.28	28.6	1361.2	1397.9	18.38	25.10
17.200	14.28	28.6	1354.1	1389.7	17.80	25.09
17.300	13.28	27.6	1347.2	1381.7	17.24	25.09
17.400	13.28	26.6	1340.4	1373.8	16.68	25.08
17.500	13.28	26.6	1334.5	1367.0	16.20	25.07
17.600	13.28	26.6	1329.5	1361.1	15.79	25.07
17.700	12.29	25.6	1324.4	1355.1	15.37	25.07
17.800	12.29	24.6	1319.1	1348.9	14.94	25.06
17.900	11.29	23.6	1313.7	1342.6	14.49	25.05
18.000	11.29	22.6	1308.2	1336.2	14.04	25.05

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY11 .HYD
Outflow Hydrograph: c:\pondfile\DP11OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
18.100	11.29	22.6	1303.4	1330.7	13.66	25.05
18.200	11.29	22.6	1299.4	1326.0	13.32	25.04
18.300	11.29	22.6	1295.9	1321.9	13.04	25.04
18.400	11.29	22.6	1292.9	1318.4	12.79	25.04
18.500	10.29	21.6	1289.4	1314.4	12.51	25.03
18.600	10.29	20.6	1285.6	1310.0	12.20	25.03
18.700	10.29	20.6	1282.3	1306.2	11.93	25.03
18.800	10.29	20.6	1279.5	1302.9	11.70	25.02
18.900	10.29	20.6	1277.1	1300.1	11.50	25.02
19.000	10.29	20.6	1275.0	1297.7	11.33	25.02
19.100	10.29	20.6	1273.2	1295.6	11.18	25.02
19.200	10.30	20.6	1271.7	1293.8	11.06	25.02
19.300	9.30	19.6	1269.5	1291.3	10.88	25.01
19.400	9.30	18.6	1266.8	1288.1	10.66	25.01
19.500	9.30	18.6	1264.5	1285.4	10.47	25.01
19.600	9.30	18.6	1262.5	1283.1	10.30	25.01
19.700	9.30	18.6	1260.7	1281.1	10.16	25.01
19.800	8.30	17.6	1258.4	1278.3	9.97	25.00
19.900	8.30	16.6	1255.5	1275.0	9.74	25.00
20.000	8.34	16.6	1252.9	1272.2	9.66	25.00
20.100	8.41	16.8	1250.4	1269.6	9.61	24.99
20.200	8.46	16.9	1248.1	1267.2	9.57	24.99
20.300	8.52	17.0	1246.0	1265.1	9.53	24.99
20.400	8.58	17.1	1244.1	1263.1	9.50	24.99
20.500	8.63	17.2	1242.4	1261.3	9.47	24.99
20.600	7.69	16.3	1239.9	1258.7	9.42	24.98
20.700	7.74	15.4	1236.6	1255.3	9.36	24.98
20.800	7.79	15.5	1233.5	1252.1	9.30	24.98
20.900	7.84	15.6	1230.7	1249.2	9.25	24.97
21.000	7.88	15.7	1228.0	1246.4	9.20	24.97
21.100	7.91	15.8	1225.5	1243.8	9.15	24.97
21.200	7.93	15.8	1223.1	1241.3	9.11	24.96
21.300	7.96	15.9	1220.9	1239.0	9.07	24.96
21.400	7.98	15.9	1218.7	1236.8	9.03	24.96
21.500	7.00	15.0	1215.8	1233.7	8.97	24.95
21.600	7.03	14.0	1212.0	1229.8	8.90	24.95
21.700	7.05	14.1	1208.4	1226.1	8.84	24.95
21.800	7.07	14.1	1205.0	1222.5	8.77	24.94
21.900	7.09	14.2	1201.7	1219.1	8.71	24.94
22.000	7.11	14.2	1198.6	1215.9	8.65	24.93
22.100	7.13	14.2	1195.6	1212.8	8.60	24.93
22.200	7.15	14.3	1192.8	1209.9	8.55	24.93
22.300	7.17	14.3	1190.2	1207.1	8.50	24.92
22.400	7.19	14.4	1187.6	1204.5	8.45	24.92
22.500	7.21	14.4	1185.2	1202.0	8.41	24.92
22.600	6.23	13.4	1181.9	1198.6	8.35	24.92

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY11 .HYD
Outflow Hydrograph: c:\pondfile\DP11OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
22.700	6.25	12.5	1177.9	1194.4	8.27	24.91
22.800	6.26	12.5	1174.0	1190.4	8.20	24.91
22.900	6.28	12.5	1170.3	1186.5	8.13	24.90
23.000	6.30	12.6	1166.7	1182.8	8.07	24.90
23.100	6.30	12.6	1163.3	1179.3	8.00	24.89
23.200	6.29	12.6	1160.0	1175.9	7.94	24.89
23.300	6.29	12.6	1156.8	1172.6	7.88	24.89
23.400	6.28	12.6	1153.8	1169.4	7.83	24.88
23.500	5.27	11.6	1149.8	1165.3	7.75	24.88
23.600	5.27	10.5	1145.0	1160.3	7.66	24.87
23.700	5.26	10.5	1140.4	1155.5	7.58	24.87
23.800	5.26	10.5	1135.9	1150.9	7.50	24.86
23.900	5.25	10.5	1131.6	1146.4	7.42	24.86
24.000	5.24	10.5	1127.4	1142.1	7.34	24.85
24.100	5.24	10.5	1123.4	1137.9	7.26	24.85
24.200	5.23	10.5	1119.5	1133.8	7.19	24.84
24.300	5.23	10.5	1115.7	1129.9	7.12	24.84
24.400	5.22	10.5	1112.0	1126.1	7.05	24.83
24.500	5.22	10.4	1108.5	1122.5	6.99	24.83
24.600	4.21	9.4	1104.1	1117.9	6.91	24.83
24.700	4.21	8.4	1098.9	1112.5	6.81	24.82
24.800	4.20	8.4	1093.9	1107.3	6.72	24.81
24.900	4.20	8.4	1089.0	1102.3	6.63	24.81
25.000	4.18	8.4	1084.3	1097.4	6.54	24.80
25.100	4.16	8.3	1079.7	1092.7	6.46	24.80
25.200	4.13	8.3	1075.3	1088.0	6.37	24.79
25.300	4.10	8.2	1070.9	1083.5	6.29	24.79
25.400	4.08	8.2	1066.7	1079.1	6.21	24.78
25.500	3.05	7.1	1061.6	1073.8	6.12	24.78
25.600	3.03	6.1	1055.6	1067.7	6.01	24.77
25.700	3.01	6.0	1049.9	1061.7	5.90	24.76
25.800	2.98	6.0	1044.3	1055.9	5.80	24.76
25.900	2.96	5.9	1038.8	1050.2	5.70	24.75
26.000	0.00	3.0	1030.7	1041.8	5.55	24.74
26.100	0.00	0.0	1020.0	1030.7	5.35	24.73
26.200	0.00	0.0	1009.6	1020.0	5.16	24.72
26.300	0.00	0.0	999.7	1009.6	4.98	24.70
26.400	0.00	0.0	990.1	999.7	4.80	24.69
26.500	0.00	0.0	980.8	990.1	4.63	24.68
26.600	0.00	0.0	971.9	980.8	4.46	24.67
26.700	0.00	0.0	963.3	971.9	4.30	24.66
26.800	0.00	0.0	955.0	963.3	4.15	24.65
26.900	0.00	0.0	947.0	955.0	4.00	24.64
27.000	0.00	0.0	939.3	947.0	3.86	24.63
27.100	0.00	0.0	931.9	939.3	3.72	24.63
27.200	0.00	0.0	924.7	931.9	3.59	24.62

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY11 .HYD
Outflow Hydrograph: c:\pondfile\DP11OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
27.300	0.00	0.0	917.8	924.7	3.46	24.61
27.400	0.00	0.0	911.1	917.8	3.34	24.60
27.500	0.00	0.0	904.7	911.1	3.22	24.59
27.600	0.00	0.0	898.5	904.7	3.10	24.59
27.700	0.00	0.0	892.5	898.5	2.99	24.58
27.800	0.00	0.0	886.7	892.5	2.88	24.57
27.900	0.00	0.0	881.1	886.7	2.78	24.57
28.000	0.00	0.0	875.8	881.1	2.68	24.56

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

Pond File:           c:\pondfile\DRYPOND1.PND
Inflow Hydrograph:   c:\pondfile\DRY11   .HYD
Outflow Hydrograph:  c:\pondfile\DP11OUT .HYD

Starting Pond W.S. Elevation =    22.00 ft

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

                    Peak Inflow    =    75.24 cfs
                    Peak Outflow   =    43.68 cfs
                    Peak Elevation =    25.39 ft

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

               Initial Storage          =     0.00 ac-ft
               Peak Storage From Storm  =     7.08 ac-ft
                                         ---------------
               Total Storage in Pond    =     7.08 ac-ft
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POND-2 Version: 5.15 S/N: 1295100016 Page 1
EXECUTED: 06-30-1992 18:17:25 Return Freq: 2 years

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY12 .HYD
Outflow Hydrograph: c:\pondfile\DP12OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
10.000	0.00	-----	0.0	0.0	0.00	22.00
10.100	0.00	0.0	0.0	0.0	0.00	22.00
10.200	0.00	0.0	0.0	0.0	0.00	22.00
10.300	0.00	0.0	0.0	0.0	0.00	22.00
10.400	0.00	0.0	0.0	0.0	0.00	22.00
10.500	0.00	0.0	0.0	0.0	0.00	22.00
10.600	0.00	0.0	0.0	0.0	0.00	22.00
10.700	0.00	0.0	0.0	0.0	0.00	22.00
10.800	0.00	0.0	0.0	0.0	0.00	22.00
10.900	0.00	0.0	0.0	0.0	0.00	22.00
11.000	2.00	2.0	1.9	2.0	0.05	22.07
11.100	2.00	4.0	5.6	5.9	0.15	22.19
11.200	3.00	5.0	10.0	10.6	0.28	22.35
11.300	3.00	6.0	15.2	16.0	0.40	22.50
11.400	3.01	6.0	20.4	21.2	0.43	22.53
11.500	4.01	7.0	26.5	27.4	0.46	22.56
11.600	4.01	8.0	33.5	34.5	0.49	22.59
11.700	5.01	9.0	41.5	42.5	0.53	22.63
11.800	5.02	10.0	50.4	51.5	0.57	22.67
11.900	6.02	11.0	60.1	61.4	0.62	22.72
12.000	6.03	12.1	70.9	72.2	0.67	22.77
12.100	8.04	14.1	83.5	84.9	0.73	22.83
12.200	10.06	18.1	99.9	101.6	0.81	22.91
12.300	14.09	24.2	122.3	124.1	0.91	23.01
12.400	20.14	34.2	154.6	156.5	0.96	23.10
12.500	28.19	48.3	200.8	202.9	1.03	23.22
12.600	37.22	65.4	264.0	266.3	1.13	23.38
12.700	47.24	84.5	346.0	348.5	1.23	23.59
12.800	59.25	106.5	449.8	452.5	1.33	23.82
12.900	71.26	130.5	577.4	580.3	1.45	24.09
13.000	83.27	154.5	728.7	732.0	1.60	24.34
13.100	92.27	175.5	898.1	904.3	3.10	24.59
13.200	100.28	192.6	1077.8	1090.6	6.42	24.80
13.300	106.29	206.6	1263.6	1284.4	10.39	25.01
13.400	113.29	219.6	1434.4	1483.2	24.38	25.17

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY12 .HYD
Outflow Hydrograph: c:\pondfile\DP12OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
13.500	112.29	225.6	1586.4	1660.0	36.81	25.31
13.600	110.30	222.6	1714.4	1809.0	47.29	25.43
13.700	106.30	216.6	1818.5	1931.0	56.25	25.52
13.800	101.57	207.9	1898.5	2026.4	63.94	25.59
13.900	96.83	198.4	1957.6	2096.9	69.63	25.63
14.000	92.07	188.9	1999.2	2146.5	73.64	25.67
14.100	86.30	178.4	2025.3	2177.6	76.15	25.69
14.200	79.51	165.8	2036.7	2191.1	77.24	25.70
14.300	73.70	153.2	2035.6	2189.9	77.13	25.70
14.400	69.89	143.6	2026.6	2179.2	76.27	25.69
14.500	65.07	135.0	2011.9	2161.6	74.85	25.68
14.600	61.23	126.3	1992.3	2138.2	72.97	25.66
14.700	58.38	119.6	1970.2	2111.9	70.84	25.64
14.800	54.52	112.9	1946.0	2083.1	68.52	25.63
14.900	50.65	105.2	1919.3	2051.2	65.95	25.60
15.000	47.77	98.4	1891.2	2017.7	63.25	25.58
15.100	45.89	93.7	1863.7	1984.9	60.60	25.56
15.200	44.01	89.9	1837.5	1953.6	58.07	25.54
15.300	41.11	85.1	1811.4	1922.6	55.57	25.52
15.400	39.20	80.3	1785.5	1891.8	53.11	25.50
15.500	37.29	76.5	1760.0	1862.0	51.02	25.47
15.600	36.37	73.7	1735.6	1833.6	49.02	25.45
15.700	34.45	70.8	1712.2	1806.4	47.11	25.43
15.800	33.52	68.0	1689.6	1780.2	45.26	25.41
15.900	31.58	65.1	1667.8	1754.7	43.47	25.39
16.000	30.64	62.2	1646.5	1730.0	41.74	25.37
16.100	29.69	60.3	1626.7	1706.9	40.11	25.35
16.200	28.74	58.4	1607.9	1685.1	38.58	25.33
16.300	27.79	56.5	1590.2	1664.5	37.13	25.31
16.400	26.84	54.6	1573.4	1644.8	35.75	25.30
16.500	25.89	52.7	1557.2	1626.1	34.43	25.28
16.600	24.94	50.8	1541.7	1608.1	33.16	25.27
16.700	24.99	49.9	1527.7	1591.7	32.01	25.26
16.800	24.02	49.0	1514.8	1576.7	30.95	25.24
16.900	24.05	48.1	1502.9	1562.8	29.98	25.23
17.000	23.07	47.1	1491.8	1550.0	29.08	25.22
17.100	23.09	46.2	1481.5	1538.0	28.23	25.21
17.200	22.11	45.2	1471.9	1526.7	27.44	25.20
17.300	22.13	44.2	1462.7	1516.1	26.69	25.19
17.400	21.15	43.3	1454.0	1506.0	25.98	25.19
17.500	21.17	42.3	1445.7	1496.4	25.30	25.18
17.600	21.19	42.4	1438.7	1488.1	24.72	25.17
17.700	20.21	41.4	1431.7	1480.1	24.16	25.17
17.800	20.23	40.4	1425.0	1472.2	23.60	25.16
17.900	19.24	39.5	1418.3	1464.5	23.06	25.15
18.000	19.26	38.5	1411.8	1456.8	22.52	25.15

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY12 .HYD
Outflow Hydrograph: c:\pondfile\DP12OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
18.100	19.28	38.5	1406.2	1450.3	22.07	25.14
18.200	19.29	38.6	1401.4	1444.8	21.67	25.14
18.300	18.31	37.6	1396.5	1439.0	21.27	25.13
18.400	18.33	36.6	1391.4	1433.1	20.86	25.13
18.500	18.33	36.7	1387.1	1428.1	20.50	25.12
18.600	18.32	36.7	1383.3	1423.7	20.19	25.12
18.700	18.32	36.6	1380.1	1420.0	19.93	25.12
18.800	17.31	35.6	1376.5	1415.7	19.63	25.11
18.900	17.30	34.6	1372.5	1411.1	19.31	25.11
19.000	17.29	34.6	1369.0	1407.1	19.02	25.11
19.100	17.29	34.6	1366.0	1403.6	18.78	25.10
19.200	17.28	34.6	1363.5	1400.6	18.57	25.10
19.300	16.27	33.6	1360.4	1397.0	18.32	25.10
19.400	16.27	32.5	1356.9	1392.9	18.03	25.10
19.500	16.26	32.5	1353.8	1389.4	17.78	25.09
19.600	16.26	32.5	1351.2	1386.4	17.57	25.09
19.700	16.25	32.5	1349.0	1383.7	17.38	25.09
19.800	15.24	31.5	1346.1	1380.5	17.15	25.09
19.900	15.24	30.5	1342.9	1376.6	16.88	25.08
20.000	15.23	30.5	1340.0	1373.3	16.65	25.08
20.100	15.23	30.5	1337.6	1370.5	16.45	25.08
20.200	15.22	30.5	1335.5	1368.0	16.28	25.08
20.300	15.22	30.4	1333.7	1365.9	16.13	25.07
20.400	14.21	29.4	1331.2	1363.1	15.93	25.07
20.500	14.21	28.4	1328.3	1359.6	15.69	25.07
20.600	14.20	28.4	1325.7	1356.7	15.48	25.07
20.700	14.20	28.4	1323.5	1354.1	15.30	25.06
20.800	14.19	28.4	1321.6	1351.9	15.14	25.06
20.900	14.19	28.4	1320.0	1350.0	15.01	25.06
21.000	14.18	28.4	1318.6	1348.4	14.89	25.06
21.100	13.17	27.4	1316.5	1345.9	14.72	25.06
21.200	13.14	26.3	1313.8	1342.8	14.50	25.06
21.300	13.12	26.3	1311.4	1340.0	14.31	25.05
21.400	13.09	26.2	1309.3	1337.6	14.14	25.05
21.500	13.07	26.2	1307.5	1335.5	13.99	25.05
21.600	13.04	26.1	1305.9	1333.6	13.86	25.05
21.700	12.02	25.1	1303.6	1331.0	13.67	25.05
21.800	11.99	24.0	1300.8	1327.6	13.44	25.04
21.900	11.97	24.0	1298.3	1324.7	13.23	25.04
22.000	11.95	23.9	1296.1	1322.2	13.05	25.04
22.100	11.93	23.9	1294.2	1320.0	12.90	25.04
22.200	11.91	23.8	1292.5	1318.0	12.76	25.04
22.300	11.89	23.8	1291.0	1316.3	12.64	25.03
22.400	10.87	22.8	1288.8	1313.8	12.46	25.03
22.500	10.85	21.7	1286.1	1310.6	12.24	25.03
22.600	10.83	21.7	1283.7	1307.8	12.04	25.03

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY12 .HYD
Outflow Hydrograph: c:\pondfile\DP12OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
22.700	10.80	21.6	1281.6	1305.3	11.87	25.02
22.800	10.75	21.6	1279.7	1303.1	11.71	25.02
22.900	10.71	21.5	1278.0	1301.2	11.58	25.02
23.000	9.68	20.4	1275.6	1298.4	11.38	25.02
23.100	9.64	19.3	1272.7	1295.0	11.14	25.02
23.200	9.60	19.2	1270.1	1291.9	10.93	25.01
23.300	9.56	19.2	1267.8	1289.2	10.74	25.01
23.400	9.53	19.1	1265.7	1286.8	10.57	25.01
23.500	9.49	19.0	1263.9	1284.7	10.42	25.01
23.600	9.46	19.0	1262.3	1282.8	10.29	25.01
23.700	8.42	17.9	1259.9	1280.1	10.10	25.00
23.800	8.39	16.8	1257.0	1276.8	9.86	25.00
23.900	8.36	16.8	1254.4	1273.8	9.69	25.00
24.000	8.33	16.7	1251.8	1271.1	9.64	25.00
24.100	8.29	16.6	1249.3	1268.4	9.59	24.99
24.200	8.23	16.5	1246.7	1265.8	9.54	24.99
24.300	8.18	16.4	1244.1	1263.1	9.50	24.99
24.400	7.13	15.3	1240.6	1259.4	9.43	24.98
24.500	7.08	14.2	1236.1	1254.8	9.35	24.98
24.600	7.04	14.1	1231.7	1250.2	9.27	24.97
24.700	6.99	14.0	1227.3	1245.7	9.19	24.97
24.800	6.94	13.9	1223.0	1241.2	9.11	24.96
24.900	6.90	13.8	1218.8	1236.9	9.03	24.96
25.000	6.86	13.8	1214.7	1232.6	8.95	24.95
25.100	5.81	12.7	1209.6	1227.3	8.86	24.95
25.200	5.77	11.6	1203.7	1221.2	8.75	24.94
25.300	5.73	11.5	1197.9	1215.2	8.64	24.93
25.400	5.68	11.4	1192.3	1209.3	8.54	24.93
25.500	5.62	11.3	1186.7	1203.6	8.43	24.92
25.600	5.56	11.2	1181.2	1197.9	8.33	24.91
25.700	4.50	10.1	1174.8	1191.3	8.22	24.91
25.800	4.44	8.9	1167.6	1183.8	8.08	24.90
25.900	4.39	8.8	1160.5	1176.4	7.95	24.89
26.000	0.00	4.4	1149.4	1164.9	7.75	24.88
26.100	0.00	0.0	1134.5	1149.4	7.47	24.86
26.200	0.00	0.0	1120.1	1134.5	7.20	24.84
26.300	0.00	0.0	1106.2	1120.1	6.95	24.83
26.400	0.00	0.0	1092.8	1106.2	6.70	24.81
26.500	0.00	0.0	1079.9	1092.8	6.46	24.80
26.600	0.00	0.0	1067.4	1079.9	6.23	24.78
26.700	0.00	0.0	1055.4	1067.4	6.01	24.77
26.800	0.00	0.0	1043.8	1055.4	5.79	24.76
26.900	0.00	0.0	1032.7	1043.8	5.59	24.74
27.000	0.00	0.0	1021.9	1032.7	5.39	24.73
27.100	0.00	0.0	1011.5	1021.9	5.19	24.72
27.200	0.00	0.0	1001.5	1011.5	5.01	24.71

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY12 .HYD
Outflow Hydrograph: c:\pondfile\DP12OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
27.300	0.00	0.0	991.8	1001.5	4.83	24.70
27.400	0.00	0.0	982.5	991.8	4.66	24.68
27.500	0.00	0.0	973.5	982.5	4.49	24.67
27.600	0.00	0.0	964.9	973.5	4.33	24.66
27.700	0.00	0.0	956.5	964.9	4.18	24.65
27.800	0.00	0.0	948.5	956.5	4.03	24.65
27.900	0.00	0.0	940.7	948.5	3.88	24.64
28.000	0.00	0.0	933.2	940.7	3.75	24.63

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

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY12 .HYD
Outflow Hydrograph: c:\pondfile\DP12OUT .HYD

Starting Pond W.S. Elevation = 22.00 ft

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

Peak Inflow = 113.29 cfs
Peak Outflow = 77.24 cfs
Peak Elevation = 25.70 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 8.74 ac-ft

Total Storage in Pond = 8.74 ac-ft

POND-2 Version: 5.15 S/N: 1295100016
EXECUTED: 06-30-1992 18:18:23 Return Freq: 10 years

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY110 .HYD
Outflow Hydrograph: c:\pondfile\DP110OUT.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
10.000	0.00	-----	0.0	0.0	0.00	22.00
10.100	0.00	0.0	0.0	0.0	0.00	22.00
10.200	0.00	0.0	0.0	0.0	0.00	22.00
10.300	0.00	0.0	0.0	0.0	0.00	22.00
10.400	0.00	0.0	0.0	0.0	0.00	22.00
10.500	0.00	0.0	0.0	0.0	0.00	22.00
10.600	0.00	0.0	0.0	0.0	0.00	22.00
10.700	0.00	0.0	0.0	0.0	0.00	22.00
10.800	0.00	0.0	0.0	0.0	0.00	22.00
10.900	0.00	0.0	0.0	0.0	0.00	22.00
11.000	9.00	9.0	8.5	9.0	0.24	22.30
11.100	10.00	19.0	26.6	27.5	0.46	22.56
11.200	10.01	20.0	45.5	46.6	0.55	22.65
11.300	11.01	21.0	65.2	66.5	0.65	22.75
11.400	12.02	23.0	86.8	88.3	0.75	22.85
11.500	14.03	26.1	111.1	112.8	0.87	22.97
11.600	15.03	29.1	138.3	140.1	0.93	23.05
11.700	17.04	32.1	168.4	170.4	0.98	23.13
11.800	18.05	35.1	201.4	203.5	1.03	23.22
11.900	20.07	38.1	237.4	239.5	1.09	23.31
12.000	23.08	43.2	278.2	280.5	1.15	23.42
12.100	27.12	50.2	326.0	328.4	1.22	23.54
12.200	34.17	61.3	384.7	387.3	1.27	23.67
12.300	46.23	80.4	462.4	465.1	1.34	23.85
12.400	62.29	108.5	568.1	571.0	1.44	24.07
12.500	85.81	148.1	713.0	716.2	1.59	24.31
12.600	113.74	199.6	906.1	912.6	3.24	24.60
12.700	147.31	261.1	1151.5	1167.1	7.78	24.88
12.800	180.68	328.0	1431.3	1479.5	24.12	25.17
12.900	211.80	392.5	1727.1	1823.8	48.33	25.44
13.000	241.98	453.8	2028.1	2180.9	76.41	25.69
13.100	262.45	504.4	2322.9	2532.5	104.78	25.92
13.200	282.45	544.9	2628.6	2867.8	119.64	26.13
13.300	299.12	581.6	2953.4	3210.1	128.39	26.33
13.400	315.54	614.7	3294.0	3568.0	136.99	26.54

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY110 .HYD
Outflow Hydrograph: c:\pondfile\DP110OUT.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
13.500	304.77	620.3	3627.4	3914.4	143.48	26.72
13.600	292.88	597.7	3926.5	4225.1	149.30	26.87
13.700	282.89	575.8	4193.5	4502.2	154.35	27.01
13.800	273.81	556.7	4434.4	4750.2	157.93	27.12
13.900	259.66	533.5	4645.7	4967.8	161.07	27.22
14.000	245.46	505.1	4823.4	5150.8	163.71	27.30
14.100	229.23	474.7	4966.4	5298.1	165.83	27.36
14.200	211.96	441.2	5072.8	5407.6	167.41	27.41
14.300	195.67	407.6	5143.5	5480.4	168.46	27.44
14.400	183.35	379.0	5184.4	5522.5	169.07	27.46
14.500	172.01	355.4	5201.1	5539.8	169.31	27.47
14.600	159.63	331.6	5194.3	5532.8	169.21	27.46
14.700	151.26	310.9	5167.6	5505.2	168.82	27.45
14.800	141.88	293.1	5124.4	5460.7	168.18	27.43
14.900	133.49	275.4	5065.2	5399.8	167.30	27.41
15.000	125.12	258.6	4991.4	5323.8	166.20	27.37
15.100	119.76	244.9	4906.4	5236.3	164.94	27.33
15.200	114.40	234.2	4813.4	5140.5	163.56	27.29
15.300	108.03	222.4	4711.8	5035.8	162.05	27.25
15.400	102.66	210.7	4601.6	4922.4	160.41	27.20
15.500	97.28	199.9	4484.2	4801.6	158.67	27.14
15.600	93.92	191.2	4361.7	4675.4	156.85	27.09
15.700	89.57	183.5	4235.2	4545.2	154.97	27.03
15.800	86.22	175.8	4105.5	4411.0	152.78	26.97
15.900	81.85	168.1	3973.1	4273.5	150.21	26.90
16.000	78.51	160.4	3838.3	4133.5	147.58	26.83
16.100	76.18	154.7	3703.1	3993.0	144.95	26.76
16.200	73.84	150.0	3568.5	3853.1	142.33	26.69
16.300	70.49	144.3	3433.4	3712.8	139.70	26.61
16.400	68.14	138.6	3297.9	3572.0	137.06	26.54
16.500	65.78	133.9	3163.8	3431.8	134.05	26.47
16.600	63.44	129.2	3032.0	3293.0	130.50	26.38
16.700	62.11	125.6	2903.4	3157.5	127.04	26.30
16.800	59.77	121.9	2778.0	3025.3	123.67	26.22
16.900	58.43	118.2	2655.5	2896.2	120.37	26.15
17.000	56.10	114.5	2535.7	2770.0	117.15	26.07
17.100	54.78	110.9	2418.6	2646.6	113.98	26.00
17.200	53.48	108.3	2318.2	2526.9	104.32	25.92
17.300	52.19	105.7	2231.9	2423.9	96.02	25.85
17.400	50.90	103.1	2157.3	2334.9	88.84	25.79
17.500	49.63	100.5	2092.6	2257.8	82.62	25.74
17.600	48.38	98.0	2036.2	2190.6	77.19	25.70
17.700	47.13	95.5	1986.8	2131.7	72.44	25.66
17.800	46.87	94.0	1944.1	2080.8	68.34	25.62
17.900	45.60	92.5	1907.1	2036.6	64.77	25.59
18.000	44.34	89.9	1873.9	1997.0	61.57	25.57

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY110 .HYD
Outflow Hydrograph: c:\pondfile\DP110OUT.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
18.100	44.09	88.4	1844.7	1962.3	58.77	25.55
18.200	42.85	86.9	1819.1	1931.7	56.30	25.52
18.300	42.62	85.5	1796.3	1904.5	54.11	25.51
18.400	41.40	84.0	1775.7	1880.3	52.31	25.49
18.500	41.17	82.6	1756.8	1858.3	50.76	25.47
18.600	40.93	82.1	1740.1	1838.9	49.39	25.46
18.700	39.70	80.6	1724.5	1820.7	48.12	25.44
18.800	39.48	79.2	1709.8	1803.7	46.92	25.43
18.900	38.26	77.7	1696.0	1787.6	45.78	25.41
19.000	38.06	76.3	1682.9	1772.3	44.71	25.40
19.100	37.86	75.9	1671.3	1758.8	43.76	25.39
19.200	36.67	74.5	1660.1	1745.8	42.85	25.38
19.300	36.49	73.2	1649.4	1733.3	41.97	25.37
19.400	36.31	72.8	1639.8	1722.2	41.18	25.36
19.500	36.14	72.5	1631.3	1712.2	40.49	25.35
19.600	34.96	71.1	1622.8	1702.4	39.79	25.35
19.700	34.77	69.7	1614.3	1692.5	39.10	25.34
19.800	34.58	69.3	1606.7	1683.7	38.48	25.33
19.900	33.40	68.0	1599.0	1674.7	37.85	25.32
20.000	33.23	66.6	1591.2	1665.6	37.21	25.32
20.100	33.06	66.3	1584.2	1657.5	36.64	25.31
20.200	32.91	66.0	1578.0	1650.2	36.12	25.30
20.300	31.75	64.7	1571.4	1642.6	35.59	25.30
20.400	31.64	63.4	1564.7	1634.8	35.04	25.29
20.500	31.56	63.2	1558.8	1627.9	34.56	25.29
20.600	30.48	62.0	1552.8	1620.9	34.06	25.28
20.700	30.40	60.9	1546.5	1613.6	33.55	25.27
20.800	30.32	60.7	1541.0	1607.3	33.10	25.27
20.900	30.25	60.6	1536.2	1601.6	32.71	25.26
21.000	30.16	60.4	1531.9	1596.6	32.35	25.26
21.100	29.07	59.2	1527.2	1591.1	31.97	25.26
21.200	28.97	58.0	1522.1	1585.2	31.55	25.25
21.300	28.88	57.8	1517.6	1580.0	31.18	25.25
21.400	27.79	56.7	1512.7	1574.3	30.78	25.24
21.500	27.71	55.5	1507.5	1568.2	30.36	25.24
21.600	27.62	55.3	1502.9	1562.8	29.98	25.23
21.700	27.54	55.2	1498.8	1558.0	29.64	25.23
21.800	27.46	55.0	1495.1	1553.8	29.34	25.23
21.900	26.38	53.8	1490.9	1548.9	29.00	25.22
22.000	26.30	52.7	1486.3	1543.6	28.63	25.22
22.100	26.22	52.5	1482.3	1538.9	28.29	25.21
22.200	25.15	51.4	1477.8	1533.6	27.93	25.21
22.300	25.08	50.2	1473.0	1528.0	27.53	25.20
22.400	25.00	50.1	1468.7	1523.0	27.18	25.20
22.500	23.91	48.9	1464.0	1517.6	26.80	25.20
22.600	23.82	47.7	1459.0	1511.7	26.38	25.19

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY110 .HYD
Outflow Hydrograph: c:\pondfile\DP110OUT.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
22.700	23.73	47.6	1454.5	1506.5	26.02	25.19
22.800	22.64	46.4	1449.6	1500.8	25.62	25.18
22.900	22.56	45.2	1444.4	1494.8	25.19	25.18
23.000	22.47	45.0	1439.8	1489.5	24.82	25.17
23.100	21.36	43.8	1434.8	1483.6	24.41	25.17
23.200	21.26	42.6	1429.5	1477.4	23.97	25.16
23.300	21.17	42.4	1424.8	1471.9	23.59	25.16
23.400	20.07	41.2	1419.7	1466.0	23.17	25.15
23.500	19.98	40.1	1414.3	1459.7	22.73	25.15
23.600	19.89	39.9	1409.5	1454.1	22.33	25.14
23.700	18.79	38.7	1404.3	1448.1	21.91	25.14
23.800	18.68	37.5	1398.9	1441.8	21.47	25.13
23.900	18.57	37.3	1394.0	1436.1	21.07	25.13
24.000	17.47	36.0	1388.7	1430.0	20.64	25.13
24.100	17.36	34.8	1383.2	1423.6	20.18	25.12
24.200	17.26	34.6	1378.3	1417.8	19.78	25.12
24.300	17.17	34.4	1373.9	1412.7	19.42	25.11
24.400	16.06	33.2	1369.0	1407.1	19.02	25.11
24.500	15.94	32.0	1363.8	1401.0	18.60	25.10
24.600	15.83	31.8	1359.2	1395.6	18.22	25.10
24.700	14.72	30.6	1354.1	1389.7	17.80	25.09
24.800	14.61	29.3	1348.7	1383.4	17.36	25.09
24.900	14.51	29.1	1343.9	1377.8	16.97	25.08
25.000	13.40	27.9	1338.7	1371.8	16.54	25.08
25.100	13.29	26.7	1333.2	1365.4	16.09	25.07
25.200	13.17	26.5	1328.3	1359.7	15.69	25.07
25.300	12.05	25.2	1323.0	1353.5	15.26	25.06
25.400	11.94	24.0	1317.4	1347.0	14.80	25.06
25.500	11.82	23.8	1312.4	1341.2	14.39	25.05
25.600	10.71	22.5	1307.0	1334.9	13.95	25.05
25.700	10.59	21.3	1301.3	1328.3	13.49	25.04
25.800	10.46	21.1	1296.3	1322.4	13.07	25.04
25.900	9.34	19.8	1290.8	1316.1	12.62	25.03
26.000	0.00	9.3	1277.1	1300.1	11.50	25.02
26.100	0.00	0.0	1257.4	1277.1	9.89	25.00
26.200	0.00	0.0	1238.6	1257.4	9.39	24.98
26.300	0.00	0.0	1220.5	1238.6	9.06	24.96
26.400	0.00	0.0	1203.0	1220.5	8.74	24.94
26.500	0.00	0.0	1186.1	1203.0	8.42	24.92
26.600	0.00	0.0	1169.9	1186.1	8.12	24.90
26.700	0.00	0.0	1154.2	1169.9	7.83	24.88
26.800	0.00	0.0	1139.1	1154.2	7.55	24.87
26.900	0.00	0.0	1124.5	1139.1	7.28	24.85
27.000	0.00	0.0	1110.5	1124.5	7.02	24.83
27.100	0.00	0.0	1096.9	1110.5	6.77	24.82
27.200	0.00	0.0	1083.9	1096.9	6.53	24.80

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY110 .HYD
Outflow Hydrograph: c:\pondfile\DP110OUT.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
27.300	0.00	0.0	1071.3	1083.9	6.30	24.79
27.400	0.00	0.0	1059.1	1071.3	6.07	24.77
27.500	0.00	0.0	1047.4	1059.1	5.86	24.76
27.600	0.00	0.0	1036.1	1047.4	5.65	24.75
27.700	0.00	0.0	1025.2	1036.1	5.45	24.73
27.800	0.00	0.0	1014.7	1025.2	5.25	24.72
27.900	0.00	0.0	1004.6	1014.7	5.07	24.71
28.000	0.00	0.0	994.8	1004.6	4.88	24.70

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

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY110 .HYD
Outflow Hydrograph: c:\pondfile\DP110OUT.HYD

Starting Pond W.S. Elevation = 22.00 ft

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

Peak Inflow = 315.54 cfs
Peak Outflow = 169.31 cfs
Peak Elevation = 27.47 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 22.19 ac-ft

Total Storage in Pond = 22.19 ac-ft

POND-2 Version: 5.15 S/N: 1295100016 Page 1
EXECUTED: 06-30-1992 18:19:20 Return Freq: 100 years

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY1100 .HYD
Outflow Hydrograph: c:\pondfile\DP100OUT.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
11.000	15.00	-----	0.0	0.0	0.00	22.00
11.100	17.01	32.0	31.0	32.0	0.48	22.58
11.200	18.02	35.0	64.8	66.1	0.64	22.74
11.300	20.02	38.0	101.2	102.8	0.82	22.92
11.400	22.03	42.1	141.4	143.2	0.94	23.06
11.500	24.05	46.1	185.4	187.4	1.01	23.18
11.600	26.06	50.1	233.4	235.5	1.08	23.30
11.700	29.07	55.1	286.2	288.5	1.17	23.44
11.800	32.09	61.2	344.9	347.3	1.23	23.58
11.900	35.11	67.2	409.5	412.1	1.29	23.73
12.000	40.14	75.3	482.0	484.7	1.36	23.90
12.100	46.20	86.3	565.5	568.4	1.44	24.07
12.200	59.25	105.5	667.8	670.9	1.54	24.24
12.300	81.38	140.6	805.1	808.5	1.68	24.47
12.400	120.65	202.0	997.3	1007.1	4.93	24.70
12.500	170.05	290.7	1266.7	1288.0	10.65	25.01
12.600	217.99	388.0	1581.8	1654.7	36.44	25.31
12.700	272.27	490.3	1936.8	2072.1	67.63	25.62
12.800	324.50	596.8	2323.9	2533.6	104.87	25.92
12.900	375.10	699.6	2776.2	3023.5	123.62	26.22
13.000	424.21	799.3	3301.3	3575.5	137.13	26.54
13.100	457.93	882.1	3886.4	4183.4	148.52	26.85
13.200	491.37	949.3	4517.4	4835.7	159.16	27.16
13.300	519.65	1011.0	5190.1	5528.4	169.15	27.46
13.400	546.84	1066.5	5878.3	6256.6	189.15	27.74
13.500	526.94	1073.8	6533.1	6952.1	209.48	27.99
13.600	506.99	1033.9	7101.3	7567.0	232.84	28.20
13.700	489.98	997.0	7592.0	8098.3	253.17	28.37
13.800	473.94	963.9	8014.1	8555.9	270.91	28.52
13.900	449.86	923.8	8363.8	8937.9	287.04	28.63
14.000	425.76	875.6	8639.9	9239.4	299.77	28.72
14.100	396.63	822.4	8843.9	9462.3	309.18	28.79
14.200	368.49	765.1	8978.3	9609.0	315.38	28.83
14.300	339.33	707.8	9048.8	9686.1	318.63	28.86
14.400	319.16	658.5	9068.3	9707.3	319.53	28.86

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY1100 .HYD
Outflow Hydrograph: c:\pondfile\DP100OUT.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
14.500	299.97	619.1	9050.0	9687.4	318.69	28.86
14.600	279.77	579.7	8997.2	9629.8	316.25	28.84
14.700	265.53	545.3	8917.4	9542.5	312.57	28.81
14.800	250.28	515.8	8817.3	9433.2	307.95	28.78
14.900	236.02	486.3	8698.6	9303.6	302.48	28.74
15.000	221.76	457.8	8563.9	9156.4	296.27	28.70
15.100	212.49	434.3	8419.0	8998.1	289.58	28.65
15.200	202.22	414.7	8268.4	8833.7	282.64	28.60
15.300	192.94	395.2	8112.7	8663.6	275.45	28.55
15.400	182.66	375.6	7952.1	8488.3	268.09	28.50
15.500	173.38	356.0	7785.7	8308.1	261.20	28.44
15.600	167.10	340.5	7617.7	8126.2	254.24	28.38
15.700	161.81	328.9	7451.9	7946.6	247.37	28.32
15.800	155.52	317.3	7288.1	7769.2	240.58	28.26
15.900	150.23	305.8	7126.1	7593.8	233.87	28.20
16.000	143.93	294.2	6965.8	7420.2	227.23	28.15
16.100	139.63	283.6	6808.0	7249.3	220.69	28.09
16.200	135.33	275.0	6654.3	7082.9	214.32	28.04
16.300	131.03	266.4	6503.5	6920.6	208.56	27.98
16.400	126.72	257.8	6353.5	6761.3	203.90	27.92
16.500	122.42	249.1	6204.1	6602.6	199.26	27.86
16.600	119.11	241.5	6056.3	6445.6	194.68	27.81
16.700	116.80	235.9	5911.8	6292.2	190.19	27.75
16.800	113.49	230.3	5770.5	6142.1	185.80	27.69
16.900	111.16	224.7	5632.1	5995.1	181.51	27.64
17.000	107.56	218.7	5496.2	5850.8	177.29	27.59
17.100	104.97	212.5	5362.5	5708.8	173.14	27.53
17.200	102.40	207.4	5230.4	5569.9	169.75	27.48
17.300	100.83	203.2	5098.0	5433.6	167.78	27.42
17.400	98.26	199.1	4965.5	5297.1	165.82	27.36
17.500	95.71	194.0	4831.8	5159.5	163.83	27.30
17.600	94.17	189.9	4698.0	5021.7	161.84	27.24
17.700	92.64	186.8	4565.0	4884.8	159.87	27.18
17.800	90.12	182.8	4432.0	4747.8	157.90	27.12
17.900	88.59	178.7	4298.9	4610.7	155.92	27.06
18.000	87.08	175.7	4166.6	4474.6	153.96	27.00
18.100	85.58	172.7	4036.4	4339.3	151.44	26.93
18.200	85.08	170.7	3909.2	4207.1	148.96	26.87
18.300	83.58	168.7	3784.8	4077.8	146.54	26.80
18.400	82.09	165.7	3662.1	3950.4	144.15	26.74
18.500	81.60	163.7	3542.2	3825.8	141.82	26.67
18.600	80.12	161.7	3424.8	3703.9	139.53	26.61
18.700	78.64	158.8	3309.0	3583.6	137.28	26.55
18.800	77.18	155.8	3195.1	3464.9	134.89	26.49
18.900	76.71	153.9	3085.1	3349.0	131.93	26.42
19.000	75.25	152.0	2978.9	3237.1	129.07	26.35

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY1100 .HYD
Outflow Hydrograph: c:\pondfile\DP100OUT.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
19.100	73.79	149.0	2875.4	3128.0	126.29	26.29
19.200	73.35	147.1	2775.3	3022.5	123.59	26.22
19.300	71.92	145.3	2678.6	2920.6	120.99	26.16
19.400	70.38	142.3	2584.0	2820.9	118.45	26.10
19.500	68.72	139.1	2491.2	2723.1	115.95	26.05
19.600	68.07	136.8	2403.1	2628.0	112.49	25.99
19.700	66.44	134.5	2327.2	2537.6	105.19	25.93
19.800	64.83	131.3	2260.8	2458.5	98.81	25.87
19.900	64.25	129.1	2203.4	2389.9	93.28	25.83
20.000	62.70	127.0	2153.4	2330.3	88.47	25.79
20.100	62.16	124.9	2109.7	2278.2	84.27	25.76
20.200	60.65	122.8	2071.4	2232.5	80.58	25.72
20.300	60.15	120.8	2037.5	2192.2	77.32	25.70
20.400	58.68	118.8	2007.5	2156.4	74.43	25.67
20.500	58.22	116.9	1980.7	2124.4	71.85	25.65
20.600	57.76	116.0	1957.4	2096.7	69.62	25.63
20.700	56.30	114.1	1936.3	2071.5	67.58	25.62
20.800	55.86	112.2	1917.0	2048.5	65.73	25.60
20.900	54.43	110.3	1899.3	2027.3	64.02	25.59
21.000	54.03	108.5	1882.9	2007.7	62.44	25.58
21.100	53.63	107.7	1868.4	1990.5	61.05	25.56
21.200	52.26	105.9	1854.8	1974.3	59.74	25.55
21.300	51.90	104.2	1842.0	1959.0	58.51	25.54
21.400	50.55	102.5	1829.8	1944.4	57.33	25.53
21.500	50.19	100.7	1818.1	1930.5	56.21	25.52
21.600	49.83	100.0	1807.7	1918.1	55.21	25.52
21.700	48.49	98.3	1797.5	1906.0	54.23	25.51
21.800	48.16	96.7	1787.6	1894.2	53.28	25.50
21.900	46.84	95.0	1777.7	1882.6	52.47	25.49
22.000	46.53	93.4	1767.7	1871.1	51.65	25.48
22.100	45.24	91.8	1757.8	1859.5	50.84	25.47
22.200	44.95	90.2	1748.0	1848.0	50.03	25.46
22.300	43.66	88.6	1738.1	1836.6	49.23	25.45
22.400	43.36	87.0	1728.3	1825.1	48.42	25.44
22.500	42.07	85.4	1718.5	1813.7	47.62	25.43
22.600	41.78	83.8	1708.7	1802.3	46.82	25.43
22.700	40.47	82.3	1698.9	1790.9	46.02	25.42
22.800	40.18	80.7	1689.1	1779.5	45.22	25.41
22.900	38.90	79.1	1679.3	1768.2	44.42	25.40
23.000	38.63	77.5	1669.6	1756.9	43.62	25.39
23.100	37.35	76.0	1659.9	1745.6	42.83	25.38
23.200	36.06	73.4	1649.4	1733.3	41.97	25.37
23.300	35.79	71.8	1639.0	1721.3	41.12	25.36
23.400	34.50	70.3	1628.7	1709.3	40.28	25.35
23.500	34.21	68.7	1618.6	1697.5	39.45	25.34
23.600	32.93	67.1	1608.5	1685.7	38.62	25.33

Pond File: c:\pondfile\DRYPOND1.PND
Inflow Hydrograph: c:\pondfile\DRY1100 .HYD
Outflow Hydrograph: c:\pondfile\DP100OUT.HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hrs)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
23.700	32.66	65.6	1598.5	1674.1	37.80	25.32
23.800	31.40	64.1	1588.5	1662.5	36.99	25.31
23.900	31.13	62.5	1578.7	1651.1	36.18	25.30
24.000	29.85	61.0	1568.9	1639.7	35.38	25.29
24.100	28.58	58.4	1558.3	1627.3	34.52	25.28
24.200	28.30	56.9	1547.9	1615.2	33.66	25.27
24.300	27.02	55.3	1537.6	1603.2	32.82	25.27
24.400	26.74	53.8	1527.4	1591.3	31.98	25.26
24.500	25.57	52.3	1517.3	1579.7	31.16	25.25
24.600	25.42	51.0	1507.6	1568.3	30.37	25.24
24.700	24.26	49.7	1498.1	1557.3	29.59	25.23
24.800	24.10	48.4	1488.8	1546.5	28.83	25.22
24.900	22.93	47.0	1479.7	1535.8	28.08	25.21
25.000	21.76	44.7	1469.8	1524.4	27.27	25.20

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

Pond File:            c:\pondfile\DRYPOND1.PND
Inflow Hydrograph:    c:\pondfile\DRY1100 .HYD
Outflow Hydrograph:   c:\pondfile\DP100OUT.HYD

Starting Pond W.S. Elevation =    22.00 ft

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

                    Peak Inflow    =   546.84 cfs
                    Peak Outflow   =   319.53 cfs
                    Peak Elevation =    28.86 ft

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

               Initial Storage          =     0.00 ac-ft
               Peak Storage From Storm  =    38.79 ac-ft
                                          ---------------
               Total Storage in Pond    =    38.79 ac-ft

        Warning: Inflow hydrograph truncated on left side.
        Warning: Inflow hydrograph truncated on right side.
```

LAKE C
Outlet Structure File

s13H FILE: GREENSP1.MRG
Project: GREENSPRINGS - Phase I
Location: James City County, Virginia
Design: M. Gordon
Date: October 6, 1994
Revision: December 12, 1994
Yr. Storm: 10
N Value: 0.013

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

STORM SEWER DESIGN COMPUTATIONS

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV. UP	INVERT ELEV. LOW	LENGTH	SLOPE	PIPE DIAM.
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches
		[E]	[E]			[E]				[E]		[E]		[E]
System "J"														
2	3	0.48	0.29	0.14	0.14	18.00	4.80	0.67	0.67	61.70	61.40	32	0.0094	15
3	5	0.11	0.77	0.08	0.22	18.18	4.78	0.40	1.07	61.30	60.83	75	0.0063	15
4	5	0.48	0.29	0.14	0.14	18.00	4.80	0.67	0.67	62.23	61.93	32	0.0094	15
5	6	0.12	0.77	0.09	0.46	18.18	4.78	0.44	2.18	60.73	59.00	110	0.0157	15

SLOPE	PIPE DIAM.	FROM PT.	TO PT.	VELOCITY	CAPACITY	FLOW TIME	FLOW RATIO	VELOCITY RATIO	REMARKS
ft./ft.	inches			ft./sec.	cfs	min.	Qp/Qf	Vp/Vf	
	[E]								
0.0094	15	2	3	3.00	6.25	0.18	0.11	0.59	
0.0063	15	3	5	3.11	5.09	0.40	0.21	0.75	
0.0094	15	4	5	3.00	6.25	0.18	0.11	0.59	
0.0157	15	5	6	5.38	8.06	0.34	0.27	0.82	

==========

INLET NUMBER J4 LENGTH 4.0 STATION 14+65.29

DRAINAGE AREA = 0.480 ACRES C VALUE = .400 CA = 0.192
SUM CA= 0.192 INT= 3.50 CFS= 0.672 CO= 0.000 GUTTER FLOW= 0.672

GUTTER SLOPE = 0.0132 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.38	2.0	0.59	0.0833	4.0	0.98	3.5	0.146	0.163

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 5.1 EFFICIENCY= 0.94
CFS INTERCEPTED= 0.63 CFS CARRYOVER= 0.04

==========

INLET NUMBER J5 LENGTH 2.5 STATION 14+65.29

DRAINAGE AREA = 0.120 ACRES C VALUE = .400 CA = 0.048
SUM CA= 0.048 INT= 3.50 CFS= 0.168 CO= 0.000 GUTTER FLOW= 0.168

GUTTER SLOPE = 0.0132 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
1.41	2.0	1.42	0.0833	4.0	1.00	3.5	0.146	0.167

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 2.8 EFFICIENCY= 0.98
CFS INTERCEPTED= 0.16 CFS CARRYOVER= 0.00

```
==============================================================================
INLET NUMBER J3              LENGTH   2.5        STATION  15+35.57

DRAINAGE AREA =  0.040 ACRES       C VALUE = .400       CA =  0.016
DRAINAGE AREA =  0.070 ACRES       C VALUE = .400       CA =  0.028

FOR THE FIRST SIDE
SUM CA=   0.016 INT=  3.50  CFS=   0.056  CO=  0.000 GUTTER FLOW=   0.056
FOR THE OTHER SIDE
SUM CA=   0.028 INT=  3.50  CFS=   0.098  CO=  0.000 GUTTER FLOW=   0.098
AT THE INLET

SUM CA=   0.044 INT=  3.50  CFS=   0.154  CO=  0.000 GUTTER FLOW=   0.154

GUTTER SLOPE = 0.0010 FT/FT       PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.10 (cfs) IS  1.86 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  6.10                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.05          SPREAD (ft)  =  2.37
```

```
==============================================================================
INLET NUMBER J2                LENGTH   6.0          STATION  15+35.57

DRAINAGE AREA =  0.180 ACRES        C VALUE = .400        CA =  0.072
DRAINAGE AREA =  0.300 ACRES        C VALUE = .400        CA =  0.120

FOR THE FIRST SIDE
SUM CA=   0.072 INT=  3.50  CFS=   0.252  CO=  0.040 GUTTER FLOW=   0.292
FOR THE OTHER SIDE
SUM CA=   0.120 INT=  3.50  CFS=   0.420  CO=  0.000 GUTTER FLOW=   0.420
AT THE INLET

SUM CA=   0.192 INT=  3.50  CFS=   0.672  CO=  0.040 GUTTER FLOW=   0.712

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.42 (cfs) IS  6.12 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.10          SPREAD (ft)  =  4.87
```

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

Subject POST DEVELOPMENT RUN OFF CONTROL
Computed By DSL Checked By

Project No. 91053-29 35
Client BUSH COMP
Date 12-7-93 Sheet No.

GOAL - KEEP POST DEV $Q_2 \leq$ PRE DEV Q_2 THROUGH DIVERSION TO MAJOR BMP'S
SEDIMENT TRAP 'B'

PRE-DEVELOPMENT

DRAINAGE AREA = 13.18 AC
C = 0.25 T_c = 25 min ⇒ i_2 = 3.0 in/hr
prove this

Q_{2pre} = (0.25)(3.0)(13.18) = 9.89 cfs

POST DEVELOPMENT
DRAINAGE AREA 6.06 AC
C = 0.40 T_c = 15 min ⇒ i_2 = 3.9 in/hr

Q_{2post} = (0.4)(3.9)(6.06) = 9.45 < 9.89 cfs ok

No permanent flow attenuation req'd
Sediment Basin req'd during construction

NORTH END ROAD 'A' & 'ROAD'
PRE-DEVELOPMENT
DRAINAGE AREA = 17.68 AC
C = 0.25 T_c = 20 min ⇒ i_2 = 3.4 in/hr ∴ Q_{2pre} = 15.03 cfs
prove this
POST DEVELOPMENT
DRAINAGE AREA = 15.53 AC
C' = (0.30)(2.16 AC)/15.53 + (0.25)(15.53 - 2.16)/15.53
C = 0.04 + 0.22 = 0.26

Q_{post} = (0.26)(3.4)(15.53) = 13.73 < 15.03 cfs ok

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Subject _____

Computed By _____ Checked By _____

Project No. _____

Client _____

Date 12-7-93 Sheet No. _____

RAVINE BETWEEN ROADS G&H

PRE DEVELOPMENT

DRAINAGE AREA = 10.17 AC

$C = 0.25$ $T_c = 15$ min $i_2 = 3.9$ in/hr

$Q_{2pre} = (0.25)(3.9)(10.17) = 19.92$ cfs

POST DEVELOPMENT

DRAINAGE AREA = 5.2 AC

$C = 0.40$ $T_c = 10$ min $i_2 = 4.6$ in/hr

$Q_{2post} = (0.40)(4.6)(5.2) = 9.57$ cfs < 9.92 ok

NORTH PL @ LOT #57

PRE DEVELOPMENT

DRAINAGE AREA = 36.53 AC

$C = 0.25$ $T_c = 25$ min $\Rightarrow i_2 = 3.0$ in/hr

$Q_{2pre} = (0.25)(3.0)(36.53 AC) = 27.4$ cfs

POST DEVELOPMENT

DRAINAGE AREA = 29.70 AC

$C' = (0.30)(10.40)/29.70 + (0.25)(29.70 - 10.40)/29.70 = 0.27$

$T_c = 25$ min $\Rightarrow i_2 = 3.0$ in/hr

$Q_{2post} = (0.27)(3.0)(29.7) = 23.8 < 27.4$ cfs ok

PROJECT PHASE II - LB 53 GREENSPRINGS
JOB NO. 91053-35
DATE 1-22-94 SHEET 1 OF 4
DESIGN FORMULA Q=CIA FREQ. 10YR

STORM SEWER DESIGN COMPUTATIONS

ROAD'A

COMPUTED BY DSL CHECKED BY SAR

LANGLEY AND McDONALD
ENGINEERS·PLANNERS·SURVEYORS
VIRGINIA BEACH, VIRGINIA

LOCATION STREET	LOCATION POINT	AREA ACRES "A"	RUNOFF COEF. "C"	"A" x "C" INCRE.	"A" x "C" ACCUM.	INLET TIME MIN.	RAIN INTEN. INCH	RUNOFF Q CFS	PIPE (DITCH) SIZE	CAPA-CITY CFS	VELO. FT./SEC.	LENGTH FEET	SLOPE FT/FT	FALL FT.	INVERT ELEV. UP	INVERT ELEV. DOWN	REMARKS
ROAD'A'																	
LOTS	AHEAD D10	0.20	0.4	0.08													
R/W		0.14	0.8	0.11													
R/W	BACK D10	0.08	0.8	0.06	0.25	5	7.2	1.80	12	2.5	3.0	26	0.004	0.10			
LOTS	AHEAD D11	0.51	0.4	0.20													
GC	D11	0.10	0.25	0.03													
R/W	D11	0.15	0.8	0.12	0.35	5	7.2										
GC		0.15	0.25	0.04													
LOTS		0.43	0.4	0.17													
R/W	D11 BACK	0.08	0.8	0.06	0.27												
D11	D12				0.87	6	7.0	6.09	15	10.5	8.0	300	0.0226	6.80			T_P=1.4
MHD12	D13				0.87	6"	7.0	6.09	15	10.5	8.0	240	0.0226	5.42			T_P=1.7min
R/W	D13	0.23	0.8	0.18	1.05	7	6.8	7.14	15	13	10	44	0.034	1.5			
LOTS																	

PROJECT PHASE II-LBS-3 GREENSPRINGS
JOB NO. 91053-35
DATE 1-22-94 SHEET 2 OF 4
DESIGN FORMULA _____ FREQ. 10

STORM SEWER DESIGN COMPUTATIONS

COMPUTED BY _____ CHECKED BY _____

LANGLEY AND McDONALD
ENGINEERS·PLANNERS·SURVEYORS
VIRGINIA BEACH, VIRGINIA

LOCATION STREET	LOCATION POINT	AREA ACRES "A"	RUNOFF COEF. "C"	"A" x "C" INCRE.	"A" x "C" ACCUM.	INLET TIME MIN.	RAIN INTEN. INCH	RUNOFF Q CFS	PIPE (DITCH) SIZE	CAPA-CITY CFS	VELO. FT./SEC.	LENGTH FEET	SLOPE FT/FT	FALL FT.	INVERT ELEV. UP	INVERT ELEV. DOWN	REMARKS
R/W	D14	0.25	0.80	0.20													
					1.25	7	6.8	8.5	15	8.6	7.0	236	0.015	3.55			
GC	D15	0.16	0.25	0.04													
LOTS	D15	0.94	0.40	0.37													
R/W	D15	0.13	0.80	0.10	1.76	25	4.0	7.04									
							4x	8.5	18	11	6.4	220	0.0097	2.13			
GC	D16	0.23	0.25	0.06													
LOTS	D16	0.92	0.40	0.36													
R/W	D16	0.13	0.80	0.10	2.28	25	4.0	9.12	18	11	6.4	44	0.0097	0.43			
R/W	ALTED D17	0.14	0.8	0.11													
R/W	D17 BACK	0.10	0.8	0.08	0.19	5	7.2	1.34	12	2.5	3.0	26	0.004	0.10			
GC	ADDED D18	0.04	0.25	0.015													
LOTS	D18	0.21	0.40	0.08													
R/W	D18	0.03	0.80	0.02													
GC	BACK D18	0.03	0.25	0.01													
LOTS	BACK D18	0.21	0.40	0.08													
R/W	BACK D18	0.04	0.80	0.03	0.24												
					2.71	26	3.9	10.5	21	11	4.5	66	0.0038	0.25			

PROJECT GREENSPRINGS PHASE II LB 5-3
JOB NO. 9105-35
DATE 1-24-94 SHEET 3 OF 4
DESIGN FORMULA Q=CIA FREQ. 10

STORM SEWER DESIGN COMPUTATIONS

COMPUTED BY _____ CHECKED BY _____

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VIRGINIA BEACH, VIRGINIA

LOCATION STREET	LOCATION POINT	AREA ACRES "A"	RUNOFF COEF. "C"	"A" x "C" INCRE.	"A" x "C" ACCUM.	INLET TIME MIN.	RAIN INTEN. INCH	RUNOFF Q CFS	PIPE (DITCH) SIZE	CAPA-CITY CFS	VELO. FT./SEC.	LENGTH FEET	SLOPE FT/FT	FALL FT.	INVERT ELEV. UP	INVERT ELEV. DOWN	REMARKS
GC	D19	0		0													
LOTS	D19	0.74	0.40	0.30													
R/W	D19	0.11	0.80	0.09	3.10	26	3.9	12	24	12	3.7	350	0.0023	0.81			
	D20						3.9	12	24	12	3.7	54	0.0023				MH
																	Tp = 1.8 MIN
R/W	D21	0.15	0.80	0.12		5	7.2	0.84	12	2.5	3.0	26	0.004	0.10			
R/W	D22	0.15	0.80	0.12													EXIST DI-1
					3.34	28	3.7	12.4	24	14	4.4	100	0.003	0.30			EXIST PIPE
			check against Phase I calcs.														

PROJECT _____
JOB NO. _____
DATE _____ SHEET 4 OF 4
DESIGN FORMULA _____ FREQ. _____

STORM SEWER DESIGN COMPUTATIONS

COMPUTED BY _____ CHECKED BY _____

LANGLEY AND McDONALD
ENGINEERS·PLANNERS·SURVEYORS
VIRGINIA BEACH, VIRGINIA

LOCATION STREET	LOCATION POINT	AREA ACRES "A"	RUNOFF COEF. "C"	"A" x "C" INCRE.	"A" x "C" ACCUM.	INLET TIME MIN.	RAIN INTEN. INCH	RUNOFF Q CFS	PIPE (DITCH) SIZE	CAPA-CITY CFS	VELO. FT./SEC.	LENGTH FEET	SLOPE FT/FT	FALL FT.	INVERT ELEV. UP	INVERT ELEV. DOWN	REMARKS
Road J																	
R/W	L-1	0.14	0.8	0.11		5	7.2	0.83	12	2.5	3.0	30	0.004	0.12			
LOTS	L-2	0.66	0.40	0.26													
R/W	L-2	0.14	0.8	0.11	0.48	10	6.0	2.91	15	3.2	2.5	196	0.002	0.39			
R/W	L-3	0.13	0.8	0.10	0.58	10	6.0	3.48	15	3.8	3.0	26	0.0028	0.07			
LOTS	L-4	1.75	0.4	0.70													
R/W	L-4	0.13	0.8	0.10	1.38	10	6.0	8.28	21"	9.0	3.6	62	0.0026				

check cap. of existing sys.

Need Road I calcs, Road G calcs, 9A calcs, Road H calcs
Road F calcs

```
==========================================================================
INLET NUMBER                    LENGTH   6.0        STATION  13+42 F LT

DRAINAGE AREA =  0.200 ACRES        C VALUE = .700        CA =  0.140
DRAINAGE AREA =  0.200 ACRES        C VALUE = .700        CA =  0.140

FOR THE FIRST SIDE
SUM CA=   0.140 INT=  3.50  CFS=   0.490  CO=  0.000 GUTTER FLOW=   0.490
FOR THE OTHER SIDE
SUM CA=   0.140 INT=  3.50  CFS=   0.490  CO=  0.000 GUTTER FLOW=   0.490
AT THE INLET

SUM CA=   0.280 INT=  3.50  CFS=   0.980  CO=  0.000 GUTTER FLOW=   0.980

GUTTER SLOPE = 0.0109 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .011 (ft./ft.) AND   0.49 (cfs) IS  2.24 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  9.60                    H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.13            SPREAD (ft)  =  6.02


==========================================================================
INLET NUMBER                    LENGTH  12.0       STATION  13+42 F RT

DRAINAGE AREA =  0.900 ACRES        C VALUE = .300        CA =  0.270
DRAINAGE AREA =  0.700 ACRES        C VALUE = .300        CA =  0.210

FOR THE FIRST SIDE
SUM CA=   0.270 INT=  3.50  CFS=   0.945  CO=  0.000 GUTTER FLOW=   0.945
FOR THE OTHER SIDE
SUM CA=   0.210 INT=  3.50  CFS=   0.735  CO=  0.000 GUTTER FLOW=   0.735
AT THE INLET

SUM CA=   0.480 INT=  3.50  CFS=   1.680  CO=  0.000 GUTTER FLOW=   1.680

GUTTER SLOPE = 0.0109 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .011 (ft./ft.) AND   0.95 (cfs) IS  4.33 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) = 15.60                    H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.13            SPREAD (ft)  =  6.24
```

PROJECT 915335
HEC12 Version: V2.91

Run Date: 01-25-1994

==========

INLET NUMBER L7 LENGTH 2.3 STATION

DRAINAGE AREA = ~~0.150 ACRES~~ 0.070 C VALUE = .800 CA = 0.120
DRAINAGE AREA = 0.050 ACRES C VALUE = .800 CA = 0.040

FOR THE FIRST SIDE
SUM CA= 0.120 INT= 3.50 CFS= 0.420 CO= 0.000 GUTTER FLOW= 0.420
FOR THE OTHER SIDE
SUM CA= 0.040 INT= 3.50 CFS= 0.140 CO= 0.000 GUTTER FLOW= 0.140
AT THE INLET

SUM CA= 0.160 INT= 3.50 CFS= 0.560 CO= 0.000 GUTTER FLOW= 0.560

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.42 (cfs) IS 6.21 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 5.93 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.12 SPREAD (ft) = 5.72

==========

INLET NUMBER L9A LENGTH 4.0 STATION

DRAINAGE AREA = 0.150 ACRES C VALUE = .800 CA = 0.120
SUM CA= 0.120 INT= 3.50 CFS= 0.420 CO= 0.000 GUTTER FLOW= 0.420

GUTTER SLOPE = 0.0166 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
1.95	2.0	1.03	0.0800	3.8	1.00	3.4	0.143	0.163

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 4.5 EFFICIENCY= 0.98
CFS INTERCEPTED= 0.41 CFS CARRYOVER= 0.01

```
==============================================================================
INLET NUMBER L7                LENGTH   2.3        STATION

DRAINAGE AREA =  0.160 ACRES        C VALUE = .800        CA =  0.128
DRAINAGE AREA =  0.010 ACRES        C VALUE = .800        CA =  0.008

FOR THE FIRST SIDE
SUM CA=   0.128 INT=  3.50  CFS=   0.448  CO=  0.000 GUTTER FLOW=   0.448
FOR THE OTHER SIDE
SUM CA=   0.008 INT=  3.50  CFS=   0.028  CO=  0.000 GUTTER FLOW=   0.028
AT THE INLET

SUM CA=   0.136 INT=  3.50  CFS=   0.476  CO=  0.000 GUTTER FLOW=   0.476

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.45 (cfs) IS  6.44 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  5.93                  H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.11          SPREAD (ft)  =  5.13
```

```
==============================================================================
INLET NUMBER L9                LENGTH  12.0          STATION  2.04

DRAINAGE AREA =  2.040 ACRES        C VALUE = .400        CA =  0.816
DRAINAGE AREA =  0.140 ACRES        C VALUE = .800        CA =  0.112
SUM CA=   0.928 INT=  3.50  CFS=   3.248  CO=  0.000 GUTTER FLOW=   3.248

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX      Eo      a      S'W     SE
  8.63     2.0    0.23   0.0800      3.8       0.60    3.4    0.143  0.107

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) = 13.7                EFFICIENCY= 0.98
    CFS INTERCEPTED=  3.17                 CFS CARRYOVER=  0.07


==============================================================================
INLET NUMBER L8                LENGTH  10.0          STATION

DRAINAGE AREA =  1.610 ACRES        C VALUE = .400        CA =  0.644
DRAINAGE AREA =  0.040 ACRES        C VALUE = .800        CA =  0.032
DRAINAGE AREA =  0.100 ACRES        C VALUE = .800        CA =  0.080

FOR THE FIRST SIDE
SUM CA=   0.676 INT=  3.50  CFS=   2.366  CO=  0.070 GUTTER FLOW=   2.436
FOR THE OTHER SIDE
SUM CA=   0.080 INT=  3.50  CFS=   0.280  CO=  0.000 GUTTER FLOW=   0.280
AT THE INLET

SUM CA=   0.756 INT=  3.50  CFS=   2.646  CO=  0.070 GUTTER FLOW=   2.716

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .017 (ft./ft.) AND   2.44 (cfs) IS  7.50 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 13.60                H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.20          SPREAD (ft)  =  9.42
```

```
==============================================================================
INLET NUMBER L10              LENGTH   2.3        STATION

DRAINAGE AREA =  0.640 ACRES        C VALUE = .400        CA =  0.256
DRAINAGE AREA =  0.110 ACRES        C VALUE = .800        CA =  0.088

FOR THE FIRST SIDE
SUM CA=   0.256 INT=  3.50  CFS=   0.896  CO=  0.000 GUTTER FLOW=   0.896
FOR THE OTHER SIDE
SUM CA=   0.088 INT=  3.50  CFS=   0.308  CO=  0.000 GUTTER FLOW=   0.308
AT THE INLET

SUM CA=   0.344 INT=  3.50  CFS=   1.204  CO=  0.000 GUTTER FLOW=   1.204

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.90 (cfs) IS  9.12 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  5.93                  H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.20           SPREAD (ft)  =  9.52
```

Revised 6/1/94 Phases 1+2

FILE: GREEN2.MRG
19-May-94

LANGLEY and McDONALD
201 Packets Court
Williamsburg, Virginia 23185

Project: GREENSPRINGS - Phase 1 & 2
Location: James City County, Virginia

HYDRAULIC GRADE LINE CALCULATIONS

1. Enter Tailwater Elevation 51.98

2. Enter "N" value for pipe? 0.013

3. Enter the following data: [E]

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

FROM PT.	TO PT.	Q OUT (cfs)	PIPE DIA.	L OUT (ft.)	FRICTION SLOPE	DNSTREAM INVERT	V OUT (FPS)	M.H.	INLET SHAPE	Q IN (cfs)	PIPE DIA.	ANGLE "K"	V IN (fps)	F.L.E.	H.G.E.	HF	HO	HI	HD	HT	.3HT	.5HT	H
[E]	[E]	[E]	[E]	[E]		[E]		[E]	[E]	[E]	[E]	[E]		[E]									
System "D"																							
10	11	1.31	12	28	0.0014	77.43	1.67	N	Y	0.00	0	0.70	0.00	80.89	78.28	0.04	0.01	0.00	0.00	0.01	0.00	0.01	0.01
11	12	3.53	15	300	0.0030	70.39	2.88	N	Y	1.31	12	0.10	0.00	80.89	72.32	0.90	0.03	0.00	0.00	0.03	0.01	0.02	0.03
12	13	3.47	15	240	0.0029	64.86	2.83	N	Y	3.53	15	0.47	1.67	80.00	66.61	0.70	0.03	0.02	0.02	0.07	0.02	0.03	0.05
13	14	4.12	15	44	0.0041	63.27	3.36	N	Y	3.47	15	0.26	2.88	68.47	64.55	0.18	0.04	0.04	0.03	0.12	0.04	0.06	0.10
14	15	5.36	15	236	0.0069	59.62	4.37	N	Y	4.12	15	0.10	2.83	66.87	62.36	1.64	0.07	0.04	0.01	0.13	0.04	0.06	0.10
15	16	6.17	18	220	0.0035	57.24	3.49	N	Y	5.36	15	0.00	3.36	63.22	60.61	0.76	0.05	0.06	0.00	0.11	0.03	0.05	0.09
16	18	8.73	18	44	0.0070	56.71	4.94	N	Y	6.17	18	0.00	4.37	61.09	59.76	0.31	0.09	0.10	0.00	0.20	0.06	0.10	0.16
18	19	11.75	21	66	0.0055	56.10	4.89	N	Y	8.73	18	0.00	3.49	60.96	59.29	0.36	0.09	0.07	0.00	0.16	0.05	0.08	0.13
19	20	13.75	24	350	0.0037	54.55	4.38	N	Y	11.75	21	0.00	4.94	61.15	58.80	1.30	0.07	0.13	0.00	0.21	0.06	0.10	0.17
20	2	13.39	24	56	0.0035	54.25	4.26	Y	Y	13.75	24	0.00	4.87	62.00	57.34	0.20	0.07	0.13	0.00	0.20	0.00	0.10	0.10
2	25	14.61	24	82	0.0042	53.81	4.65	N	Y	13.39	24	0.00	4.38	60.28	57.04	0.34	0.08	0.10	0.00	0.19	0.06	0.09	0.15
25	5	16.07	24	160	0.0051	52.90	5.12	Y	Y	14.61	24	0.16	4.26	60.58	56.54	0.81	0.10	0.10	0.05	0.25	0.00	0.12	0.12
5	7	16.63	24	41	0.0054	52.57	5.29	N	Y	16.07	24	0.65	4.65	58.52	55.61	0.22	0.11	0.12	0.22	0.44	0.13	0.22	0.36
7	8	19.64	30	100	0.0023	51.84	4.00	N	Y	16.63	24	0.65	5.12	58.52	55.03	0.23	0.06	0.14	0.26	0.47	0.14	0.23	0.37
8	9	21.47	30	188	0.0027	51.23	4.37	N	Y	19.64	30	0.13	5.29	59.25	54.43	0.52	0.07	0.15	0.06	0.28	0.08	0.14	0.23
9	23	21.64	30	218	0.0028	50.52	4.41	N	Y	21.47	30	0.47	4.00	62.43	53.68	0.61	0.08	0.09	0.12	0.28	0.08	0.14	0.22
23	24	21.31	30	258	0.0027	49.70	4.34	Y	Y	21.64	30	0.57	4.27	66.03	52.85	0.70	0.07	0.10	0.17	0.35	0.00	0.17	0.17
1	2	0.88	12	28	0.0006	56.79	1.12	N	Y	0.00	0	0.00	0.00	60.28	57.61	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	4	1.45	12	34	0.0017	56.47	1.85	N	Y	0.00	0	0.00	0.00	59.94	57.34	0.06	0.01	0.00	0.00	0.01	0.00	0.01	0.01
4	25	2.33	15	39	0.0013	56.10	1.90	N	Y	0.88	12	0.40	1.12	59.94	57.17	0.05	0.01	0.01	0.01	0.03	0.01	0.01	0.02
6	7	1.95	15	60	0.0009	54.96	1.59	N	Y	0.00	0	0.00	0.00	58.74	56.02	0.06	0.01	0.00	0.00	0.01	0.00	0.00	0.01
17	18	1.16	12	28	0.0011	57.49	1.48	N	Y	0.00	0	0.00	0.00	60.96	59.33	0.03	0.01	0.00	0.00	0.01	0.00	0.00	0.01

PROJECT 91053-29
HEC12 Version: V2.91

Run Date: 04-27-1994

INLET NUMBER D1-Rd A LENGTH 6.0 STATION 7948

DRAINAGE AREA = 0.100 ACRES C VALUE = .400 CA = 0.040
DRAINAGE AREA = 0.270 ACRES C VALUE = .400 CA = 0.108

FOR THE FIRST SIDE
SUM CA= 0.040 INT= 3.50 CFS= 0.140 CO= 0.000 GUTTER FLOW= 0.140
FOR THE OTHER SIDE
SUM CA= 0.108 INT= 3.50 CFS= 0.378 CO= 0.000 GUTTER FLOW= 0.378
AT THE INLET

SUM CA= 0.148 INT= 3.50 CFS= 0.518 CO= 0.000 GUTTER FLOW= 0.518

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.38 (cfs) IS 5.25 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.08 SPREAD (ft) = 3.94

INLET NUMBER D3-Rd A LENGTH 4.0 STATION 7852

DRAINAGE AREA = 0.080 ACRES C VALUE = .400 CA = 0.032
DRAINAGE AREA = 0.530 ACRES C VALUE = .400 CA = 0.212

FOR THE FIRST SIDE
SUM CA= 0.032 INT= 3.50 CFS= 0.112 CO= 0.000 GUTTER FLOW= 0.112
FOR THE OTHER SIDE
SUM CA= 0.212 INT= 3.50 CFS= 0.742 CO= 0.000 GUTTER FLOW= 0.742
AT THE INLET

SUM CA= 0.244 INT= 3.50 CFS= 0.854 CO= 0.000 GUTTER FLOW= 0.854

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.74 (cfs) IS 7.70 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 7.60 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.13 SPREAD (ft) = 6.42

INLET NUMBER D2-Rd A LENGTH 2.5 STATION 7948

DRAINAGE AREA = 0.510 ACRES C VALUE = .350 CA = 0.178
SUM CA= 0.178 INT= 3.50 CFS= 0.625 CO= 0.000 GUTTER FLOW= 0.625

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
7.04	2.0	0.28	0.0833	4.0	0.74	3.5	0.146	0.129

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 2.9 EFFICIENCY= 0.98
CFS INTERCEPTED= 0.61 CFS CARRYOVER= 0.02

INLET NUMBER D4-Rd A LENGTH 2.5 STATION 7852

DRAINAGE AREA = 0.380 ACRES C VALUE = .400 CA = 0.152
SUM CA= 0.152 INT= 3.50 CFS= 0.532 CO= 0.000 GUTTER FLOW= 0.532

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
6.45	2.0	0.31	0.0833	4.0	0.78	3.5	0.146	0.135

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 2.6 EFFICIENCY= 1.00
CFS INTERCEPTED= 0.53 CFS CARRYOVER= 0.00

INLET NUMBER D6-Rd A LENGTH 6.0 STATION 3392

DRAINAGE AREA = 0.940 ACRES C VALUE = .350 CA = 0.329
SUM CA= 0.329 INT= 3.50 CFS= 1.151 CO= 0.000 GUTTER FLOW= 1.151

GUTTER SLOPE = 0.0100 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
5.13	2.0	0.39	0.0833	4.0	0.88	3.5	0.146	0.149

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 6.8 EFFICIENCY= 0.98
CFS INTERCEPTED= 1.13 CFS CARRYOVER= 0.02

```
==========================================================================
INLET NUMBER D5-Rd A          LENGTH   6.0          STATION  3332

DRAINAGE AREA =  0.235 ACRES        C VALUE = .400        CA =  0.094
DRAINAGE AREA =  0.235 ACRES        C VALUE = .400        CA =  0.094

FOR THE FIRST SIDE
SUM CA=   0.094 INT=  3.50  CFS=   0.329  CO=  0.000 GUTTER FLOW=   0.329
FOR THE OTHER SIDE
SUM CA=   0.094 INT=  3.50  CFS=   0.329  CO=  0.000 GUTTER FLOW=   0.329
AT THE INLET

SUM CA=   0.188 INT=  3.50  CFS=   0.658  CO=  0.000 GUTTER FLOW=   0.658

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.33 (cfs) IS  4.79 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  9.60                 H (ft) = 0.458
   DEPTH OF WATER (ft) =   0.10          SPREAD (ft)  =  4.62
```

INLET NUMBER D8-Rd A LENGTH 8.0 STATION 3224

DRAINAGE AREA = 1.490 ACRES C VALUE = .350 CA = 0.521
SUM CA= 0.521 INT= 3.50 CFS= 1.825 CO= 0.000 GUTTER FLOW= 1.825

GUTTER SLOPE = 0.0152 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
5.99	2.0	0.33	0.0833	4.0	0.82	3.5	0.146	0.140

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 9.7 EFFICIENCY= 0.96
CFS INTERCEPTED= 1.75 CFS CARRYOVER= 0.08

INLET NUMBER D9-Rd A LENGTH 6.0 STATION 3070

DRAINAGE AREA = 0.300 ACRES C VALUE = .400 CA = 0.120
SUM CA= 0.120 INT= 3.50 CFS= 0.420 CO= 0.000 GUTTER FLOW= 0.420

GUTTER SLOPE = 0.0216 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
1.71	2.0	1.17	0.0833	4.0	1.00	3.5	0.146	0.167

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 5.2 EFFICIENCY= 1.00
CFS INTERCEPTED= 0.42 CFS CARRYOVER= 0.00

```
==========================================================================
INLET NUMBER D7-Rd A          LENGTH   8.0          STATION  3332

DRAINAGE AREA =  0.700 ACRES        C VALUE = .350        CA =  0.245
DRAINAGE AREA =  0.630 ACRES        C VALUE = .350        CA =  0.220

FOR THE FIRST SIDE
SUM CA=   0.245 INT=  3.50  CFS=   0.857  CD=  0.030 GUTTER FLOW=   0.887
FOR THE OTHER SIDE
SUM CA=   0.220 INT=  3.50  CFS=   0.772  CD=  0.110 GUTTER FLOW=   0.882
AT THE INLET

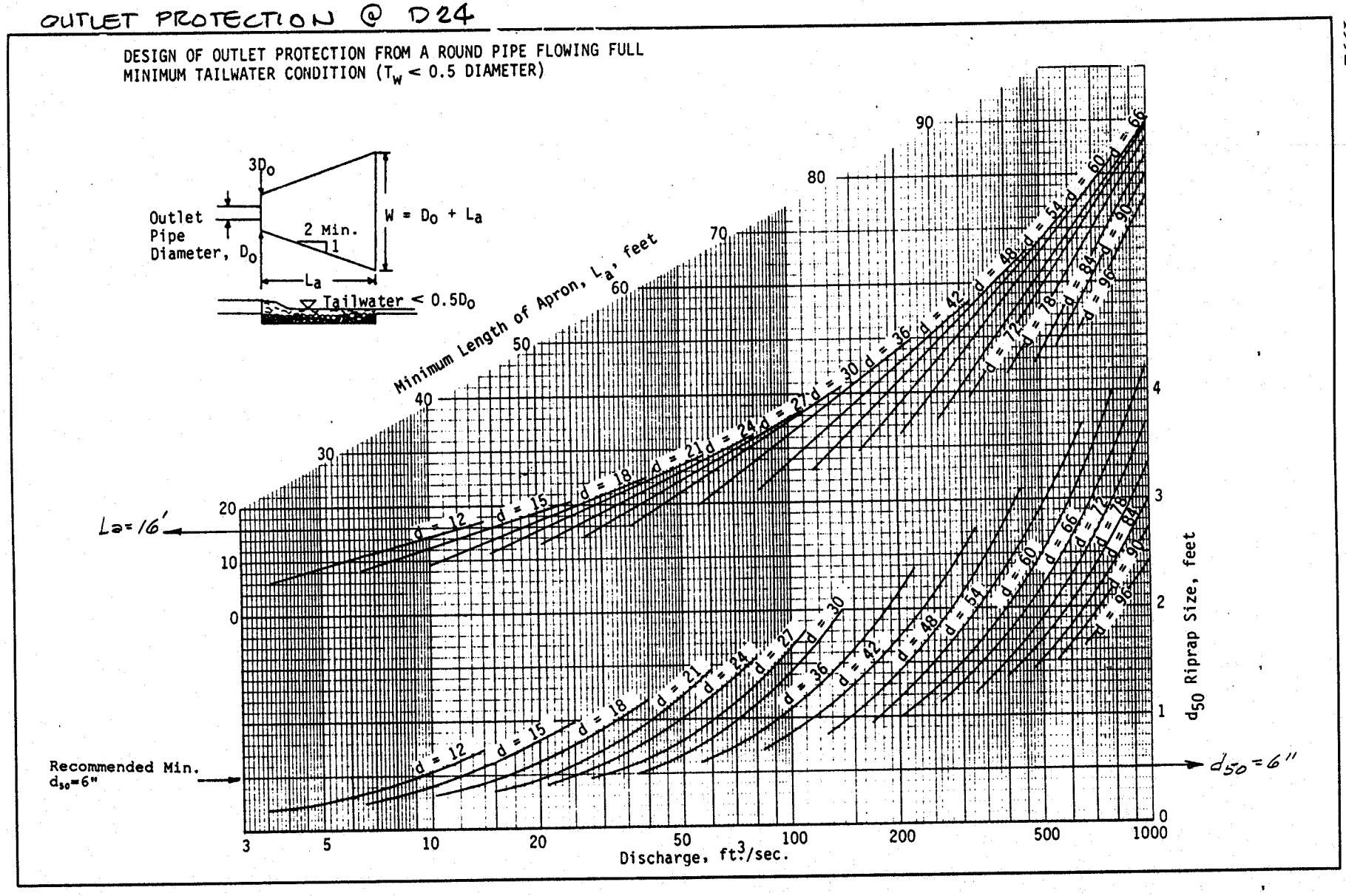
SUM CA=   0.465 INT=  3.50  CFS=   1.629  CD=  0.140 GUTTER FLOW=   1.769

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.89 (cfs) IS  8.42 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) = 11.60                H (ft) = 0.458
   DEPTH OF WATER (ft) =   0.16          SPREAD (ft)  =  7.87
```

OUTLET PROTECTION @ D24



Source: USDA-SCS

Plate 3.18-3

Rs13H FILE: GREEN11.NRG
Project: GREENSPRINGS - Phase 1 & 2
Location: James City Co., Virginia
Design: M. Gordon
Date: May 13, 1994
Revision: May 16, 1994
Yr. Storm: 10
N Value: 0.013

LANGLEY and McDONALD
201 Packets Court
Williamsburg, Virginia 23185

STORM SEWER DESIGN COMPUTATIONS

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV. UP	INVERT ELEV. LOW	LENGTH	SLOPE	PIPE DIAM.	VELOCITY	CAPACITY	FLOW TIME	FLOW RATIO	VELOCITY RATIO	REMARKS
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches	ft./sec.	cfs	min.	Qp/Qf	Vp/Vf	
[E]	[E]	[E]	[E]							[E]		[E]		[E]		[E]			[E]	
System "D"																				
10	11	0.81	0.32	0.26	0.26	16.00	5.04	1.31	1.31	77.55	77.43	28	0.0042	12	3.00	2.30	0.16	0.57	1.02	Phase 2 - Future
11	12	1.38	0.32	0.44	0.70	16.16	5.02	2.22	3.53	77.18	70.39	300	0.0226	15	7.23	9.68	0.69	0.36	0.92	Phase 2 - Future
12	13	MH-1	0.00	0.00	0.70	16.85	4.93	0.00	3.47	70.29	64.86	240	0.0226	15	7.18	9.68	0.56	0.36	0.91	Phase 2 - Future
13	14	0.45	0.32	0.14	0.85	17.40	4.87	0.70	4.12	64.76	63.27	44	0.0340	15	8.72	11.86	0.08	0.35	0.90	Phase 2 - Future
14	15	0.80	0.32	0.26	1.10	17.49	4.86	1.25	5.36	63.17	59.62	236	0.0150	15	6.87	7.89	0.57	0.68	1.07	Phase 2 - Future
15	16	1.24	0.32	0.40	1.50	25.00	4.11	1.64	6.17	59.37	57.24	220	0.0097	18	6.04	10.30	0.61	0.60	1.04	Phase 2 - Future
16	18	2.02	0.32	0.65	2.15	25.61	4.06	2.63	8.73	57.14	56.71	44	0.0098	18	6.57	10.34	0.11	0.84	1.12	Phase 2 - Future
17	18	0.46	0.32	0.15	0.15	8.00	6.30	0.93	0.93	57.23	57.14	28	0.0032	12	2.49	2.00	0.19	0.46	0.98	Phase 2 - Future
18	19	1.42	0.32	0.45	2.75	25.72	4.05	1.84	11.14	56.46	56.10	66	0.0055	21	5.57	11.70	0.20	0.95	1.15	Phase 2 - Future
19	20	1.27	0.32	0.41	3.16	25.92	4.03	1.64	12.74	55.85	54.55	350	0.0037	24	4.99	13.75	1.17	0.93	1.14	Phase 2 - Future
20	2	MH-1	0.32	0.00	3.16	27.09	3.94	0.00	12.45	54.45	54.25	56	0.0035	24	4.86	13.40	0.19	0.93	1.14	Ph.1 - 8 ft stub only
1	2	0.37	0.40	0.15	0.15	10.00	5.93	0.88	0.88	56.66	56.51	28	0.0055	12	3.00	2.64	0.16	0.33	0.89	Ph.1 - 8 ft stub only
2	25	0.51	0.35	0.18	3.48	27.28	3.93	0.70	13.68	54.15	53.81	82	0.0042	24	5.29	14.55	0.26	0.94	1.14	Use RCP
3	4	0.61	0.40	0.24	0.24	10.00	5.93	1.45	1.45	56.60	56.47	34	0.0039	15	3.00	2.22	0.19	0.65	1.06	Use RCP
4	25	0.38	0.40	0.15	0.40	10.19	5.90	0.90	2.33	56.22	56.10	39	0.0029	15	3.00	3.45	0.22	0.68	1.07	Use RCP
25	5	MH-1	0.00	0.00	3.88	27.54	3.91	0.00	15.16	53.71	52.90	160	0.0051	24	5.86	16.10	0.46	0.94	1.14	Use RCP
5	7	0.47	0.40	0.19	4.07	27.99	3.87	0.73	15.76	52.80	52.57	41	0.0054	24	6.06	16.65	0.11	0.95	1.14	Use RCP
6	7	0.94	0.35	0.33	0.33	10.00	5.93	1.95	1.95	55.15	54.96	60	0.0032	15	3.00	3.64	0.33	0.54	1.01	Use RCP
7	8	1.33	0.35	0.47	4.86	28.10	3.87	1.80	18.79	52.07	51.84	100	0.0023	30	4.60	19.70	0.36	0.95	1.15	Use RCP
8	9	1.49	0.35	0.52	5.38	28.47	3.84	2.00	20.66	51.74	51.23	188	0.0027	30	5.00	21.40	0.63	0.97	1.15	Use RCP
9	23	0.30	0.40	0.12	5.50	29.09	3.79	0.46	20.88	51.13	50.52	218	0.0028	30	5.05	21.64	0.72	0.96	1.15	Use RCP
23	24	MH-1	0.00	0.00	5.50	29.81	3.74	0.00	20.60	50.42	49.70	258	0.0028	30	5.05	21.64	0.85	0.95	1.15	Install EW-1

NOTE: The calculations have been revised per Phase 2 design. Systems are same as submitted in Phase 1.

Reviewed
6/1/94
Phase 1+2

FILE: GREEN11.MRG
Project: GREENSPRINGS - Phase 2
Location: James City Co., Virginia
Design: M. Gordon
Date: May 13, 1994
Revision:

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV. UP	INVERT ELEV. LOW	LENGTH	SLOPE	PIPE DIAM.	FROM PT.	TO PT.	VELOCITY	CAPACITY	FLOW TIME	FLO RAT	VELOCITY RATIO	REMARKS
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches			ft./sec.	cfs	min.	Qp/	Vp/Vf	
System "A"																						
5	7	4.76	0.31	1.48	1.48	21.50	4.43	6.53	6.53	66.40	64.17	26	0.0857	15	13.85	18.84	0.03	0.35	0.90			Use RCP
6	7	0.23	0.80	0.18	0.18	10.00	5.93	1.09	1.09	64.74	64.42	32	0.0100	12	3.93	3.55	0.14	0.31	0.87			Use RCP
7	9A	0.46	0.60	0.28	1.94	21.53	4.42	1.22	8.56	64.07	60.99	174	0.0177	15	6.98	8.56	0.42	1.00	1.00			Use RCP
8	9	0.63	0.60	0.38	0.38	17.40	4.87	1.84	1.84	64.25	64.05	30	0.0067	12	3.88	2.90	0.13	0.63	1.05			Use RCP
9	9A	0.36	0.75	0.27	0.65	17.53	4.85	1.31	3.14	63.80	63.58	32	0.0068	15	4.47	5.30	0.12	0.59	1.04			Use RCP
9A	10	MH-1	0.00	0.00	2.58	21.95	4.38	0.00	11.33	60.74	57.78	253	0.0117	18	6.41	11.33	0.66	1.00	1.00			Use RCP
10A	10	1.16	0.35	0.41	0.41	18.10	4.79	1.94	1.94	60.25	58.74	18	0.0840	15	10.33	18.65	0.03	0.10	0.68			Use RCP
10	11	0.58	0.65	0.38	3.37	22.60	4.32	1.63	14.55	57.53	57.26	32	0.0085	21	6.05	14.55	0.09	1.00	1.00			Use RCP
11	15	0.22	0.80	0.18	3.54	22.69	4.31	0.76	15.28	54.69	53.94	80	0.0094	21	6.35	15.28	0.21	1.00	1.00			Use RCP
Exist	1				2.92	13.00	5.45		15.91	71.93	66.87	200	0.0253	24	11.03	35.90	0.30	0.44	0.77			Exist CPEP
1	3	0.69	0.25	0.17	3.09	13.30	5.40	0.93	16.71	66.77	61.76	215	0.0233	24	10.83	34.44	0.33	0.49	0.99			Use CPEP
2	3	1.61	0.35	0.56	0.56	17.00	4.91	2.77	2.77	64.19	63.80	39	0.0100	15	5.02	6.42	0.13	0.43	0.96			Use RCP
3	3A	0.33	0.80	0.26	3.92	17.13	4.90	1.29	19.20	61.66	59.33	98	0.0238	24	11.30	34.80	0.14	0.55	1.02			Use CPEP
3A	4	2.89	0.35	1.01	4.93	17.27	4.88	4.94	24.07	59.23	57.53	93	0.0183	24	10.74	30.55	0.14	0.79	1.10			Use CPEP
4	14	0.62	0.75	0.47	5.40	17.42	4.86	2.26	26.25	57.43	56.95	26	0.0183	24	10.94	30.55	0.04	0.86	1.13			Use RCP
12	13	4.09	0.30	1.23	1.23	22.00	4.38	5.37	5.37	73.25	60.67	230	0.0547	15	11.16	15.05	0.34	0.36	0.91			Phase 2 - not in this contract
13	14	0.78	0.55	0.43	1.66	22.34	4.35	1.86	7.20	60.57	57.92	91	0.0291	15	9.48	10.98	0.16	0.66	1.06			Phase 2 - not in this contract
14	15	0.18	0.75	0.14	7.19	22.50	4.33	0.58	31.13	54.08	53.84	43	0.0058	30	6.34	31.13	0.11	1.00	1.00			Use RCP
15	16	MH-1	0.00	0.00	10.73	22.90	4.29	0.00	46.08	52.84	52.58	120	0.0021	42	4.79	46.08	0.42	1.00	1.00			Use RCP
16	18	2.11	0.35	0.74	11.47	23.32	4.26	3.14	48.82	52.48	52.19	125	0.0024	42	5.07	48.82	0.41	1.00	1.00			Use RCP
					12.44																	
17	18	3.89	0.25	0.97	0.97	23.00	4.29	4.17	4.17	54.80	54.72	20	0.0042	15	3.40	4.17	0.10	1.00	1.00			Use RCP
18	21	0.55	0.32	0.18	12.62	23.73	4.22	0.74	53.24	52.09	50.31	166	0.0107	42	10.85	104.00	0.25	0.51	1.00			Use RCP
19	20	1.10	0.29	0.32	0.32	16.00	5.04	1.61	1.61	57.00	53.02	170	0.0234	15	5.87	9.85	0.48	0.16	0.73			Use RCP
20	21	0.96	0.29	0.28	0.60	16.48	4.98	1.39	2.97	52.92	52.79	60	0.0021	15	2.42	2.97	0.41	1.00	1.00			Use RCP
					13.22																	
24	21	1.24	0.25	0.31	0.91	18.50	4.74	1.47	4.30	53.58	53.45	28	0.0045	15	3.51	4.30	0.13	1.00	1.00			Use RCP
21	22	0.73	0.34	0.25	14.37	23.99	4.20	1.04	60.32	49.81	49.74	41	0.0018	48	4.80	60.32	0.14	1.00	1.00			Use RCP
22	23	1.01	0.51	0.52	14.89	24.13	4.19	2.16	62.30	49.64	49.31	175	0.0019	48	4.96	62.30	0.59	1.00	1.00			Install EW-2

FILE: GREEN2.MRG
19-May-94

LANGLEY and McDONALD
201 Packets Court
Williamsburg, Virginia 23185

Project: GREENSPRINGS - Phase 1 & 2
Location: James City County, Virginia

HYDRAULIC GRADE LINE CALCULATIONS

1. Enter Tailwater Elevation (51.98) - what is this in Pond C design? Q10 flow?

2. Enter "N" value for pipe? 0.013

3. Enter the following data: [E]

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

FROM PT.	TO PT.	Q OUT (cfs)	PIPE DIA.	L OUT (ft.)	FRICTION SLOPE	DNSTREAM INVERT	V OUT (FPS)	M.H.	INLET SHAPE	Q IN (cfs)	PIPE DIA.	ANGLE "K"	V IN (fps)	F.L.E.	H.G.E.	HF	HO	HI	HD	HT	.3HT	.5HT	H
[E]	[E]	[E]	[E]	[E]		[E]		[E]	[E]	[E]	[E]	[E]		[E]									
System "A"																							
6	7	1.09	12	32	0.0009	64.42	1.39	N	Y	0.00	0	0.00	0.00	68.08	66.05	0.03	0.01	0.00	0.00	0.01	0.00	0.00	0.01
7	9A	8.56	15	174	0.0177	60.99	6.98	N	Y	1.09	12	0.70	1.39	68.08	66.01	3.08	0.19	0.01	0.02	0.22	0.07	0.11	0.18
9A	10	11.33	18	253	0.0117	57.78	6.41	Y	Y	8.56	15	0.00	6.98	68.15	62.76	2.96	0.16	0.26	0.00	0.42	0.00	0.21	0.21
10	11	14.55	21	32	0.0085	57.26	6.05	N	Y	11.33	18	0.70	6.41	61.52	59.58	0.27	0.14	0.22	0.45	0.81	0.24	0.41	0.65
11	15	15.28	21	80	0.0094	53.94	6.35	N	Y	14.55	21	0.63	6.05	61.52	57.42	0.75	0.16	0.20	0.36	0.71	0.21	0.36	0.57
15	16	46.08	42	120	0.0021	52.58	4.79	Y	Y	15.28	21	0.64	6.35	62.14	56.10	0.25	0.09	0.22	0.40	0.71	0.00	0.35	0.35
16	18	48.82	42	125	0.0024	52.19	5.07	N	Y	46.08	42	0.10	4.79	59.94	55.49	0.29	0.10	0.12	0.04	0.26	0.08	0.13	0.21
18	21	53.24	42	166	0.0028	50.31	5.53	N	Y	48.82	42	0.10	5.07	58.28	54.34	0.47	0.12	0.14	0.04	0.30	0.09	0.15	0.24
21	22	60.32	48	41	0.0018	49.74	4.80	N	Y	53.24	42	0.70	5.53	56.15	53.64	0.07	0.09	0.17	0.33	0.59	0.18	0.29	0.47
22	23	62.30	48	175	0.0019	49.31	4.96	N	Y	60.32	48	0.28	4.80	56.15	53.10	0.33	0.10	0.13	0.10	0.32	0.10	0.16	0.26
Ex	1	15.91	24	200	0.0050	66.87	5.06	N	Y	2.23	24	0.00	4.96	77.00	69.65	0.99	0.10	0.13	0.00	0.23	0.07	0.12	0.19
1	3	16.71	24	215	0.0055	61.76	5.32	N	Y	15.91	24	0.10	5.06	70.67	64.77	1.18	0.11	0.14	0.04	0.29	0.09	0.14	0.23
3	3A	19.20	24	98	0.0072	59.33	6.11	N	Y	16.71	24	0.00	5.32	67.78	61.96	0.71	0.14	0.15	0.00	0.30	0.09	0.15	0.24
3A	4	24.07	24	93	0.0114	57.53	7.66	N	Y	19.20	24	0.36	6.11	63.50	61.02	1.06	0.23	0.20	0.21	0.64	0.19	0.32	0.51
4	14	26.25	24	26	0.0135	56.95	8.36	N	Y	24.07	24	0.10	7.66	61.77	59.45	0.35	0.27	0.32	0.09	0.68	0.20	0.34	0.54
14	15	31.13	30	43	0.0058	53.84	6.34	N	Y	26.25	24	0.10	8.36	61.77	56.86	0.25	0.16	0.38	0.11	0.64	0.19	0.32	0.52
2	3	2.77	15	39	0.0019	63.80	2.26	N	Y	0.00	0	0.00	0.00	67.78	64.89	0.07	0.02	0.00	0.00	0.02	0.01	0.01	0.02
5	7	6.53	15	26	0.0103	64.17	5.32	N	Y	0.00	0	0.00	0.00	68.07	66.37	0.27	0.11	0.00	0.00	0.11	0.03	0.05	0.09
10A	10	1.94	15	18	0.0009	58.74	1.58	N	Y	0.00	0	0.00	0.00	63.75	59.76	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.01

PROJECT 91053-29
HEC12 Version: V2.91 Run Date: 04-28-1994

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INLET NUMBER A-6 LENGTH 2.5 STATION 33+87

DRAINAGE AREA = 0.180 ACRES C VALUE = .800 CA = 0.144
DRAINAGE AREA = 0.050 ACRES C VALUE = .800 CA = 0.040

FOR THE FIRST SIDE
SUM CA= 0.144 INT= 3.50 CFS= 0.504 CO= 0.000 GUTTER FLOW= 0.504
FOR THE OTHER SIDE
SUM CA= 0.040 INT= 3.50 CFS= 0.140 CO= 0.000 GUTTER FLOW= 0.140
AT THE INLET

SUM CA= 0.184 INT= 3.50 CFS= 0.644 CO= 0.000 GUTTER FLOW= 0.644

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.50 (cfs) IS 6.77 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 6.10 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.13 SPREAD (ft) = 6.16

==========

INLET NUMBER A-7 LENGTH 6.0 STATION 33+86.94

DRAINAGE AREA = 0.310 ACRES C VALUE = .500 CA = 0.155
DRAINAGE AREA = 0.150 ACRES C VALUE = .700 CA = 0.105

FOR THE FIRST SIDE
SUM CA= 0.155 INT= 3.50 CFS= 0.543 CO= 0.000 GUTTER FLOW= 0.543
FOR THE OTHER SIDE
SUM CA= 0.105 INT= 3.50 CFS= 0.368 CO= 0.000 GUTTER FLOW= 0.368
AT THE INLET

SUM CA= 0.260 INT= 3.50 CFS= 0.910 CO= 0.000 GUTTER FLOW= 0.910

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.54 (cfs) IS 7.05 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.12 SPREAD (ft) = 5.73

==========

INLET NUMBER A10 LENGTH 6.0 STATION 33+29.27

DRAINAGE AREA = 0.350 ACRES C VALUE = .500 CA = 0.175
DRAINAGE AREA = 0.230 ACRES C VALUE = .600 CA = 0.138

FOR THE FIRST SIDE
SUM CA= 0.175 INT= 3.50 CFS= 0.613 CO= 0.000 GUTTER FLOW= 0.613
FOR THE OTHER SIDE
SUM CA= 0.138 INT= 3.50 CFS= 0.483 CO= 0.000 GUTTER FLOW= 0.483
AT THE INLET

SUM CA= 0.313 INT= 3.50 CFS= 1.096 CO= 0.000 GUTTER FLOW= 1.096

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.61 (cfs) IS 7.51 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.13 SPREAD (ft) = 6.49

==========

INLET NUMBER ~~A 12~~ A13 LENGTH 10.0 STATION 40+25

DRAINAGE AREA = 0.780 ACRES C VALUE = .550 CA = 0.429
SUM CA= 0.429 INT= 3.50 CFS= 1.502 CO= 0.000 GUTTER FLOW= 1.502

GUTTER SLOPE = 0.0450 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.99	2.0	0.50	0.0833	4.0	0.95	3.5	0.146	0.159

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 10.5 EFFICIENCY= 1.00
CFS INTERCEPTED= 1.49 CFS CARRYOVER= 0.01

==========

INLET NUMBER A2 LENGTH 10.0 STATION ~~15+00~~ 15+45

DRAINAGE AREA = 1.620 ACRES C VALUE = .350 CA = 0.567
SUM CA= 0.567 INT= 3.50 CFS= 1.984 CO= 0.000 GUTTER FLOW= 1.984

GUTTER SLOPE = 0.0220 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
6.14	2.0	0.33	0.0833	4.0	0.81	3.5	0.146	0.138

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 10.4 EFFICIENCY= 1.00
CFS INTERCEPTED= 1.98 CFS CARRYOVER= 0.00

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INLET NUMBER A4 LENGTH 6.0 STATION 39+37

DRAINAGE AREA = 0.250 ACRES C VALUE = .450 CA = 0.112
DRAINAGE AREA = 0.370 ACRES C VALUE = .450 CA = 0.167

FOR THE FIRST SIDE
SUM CA= 0.112 INT= 3.50 CFS= 0.394 CO= 0.000 GUTTER FLOW= 0.394
FOR THE OTHER SIDE
SUM CA= 0.167 INT= 3.50 CFS= 0.583 CO= 0.000 GUTTER FLOW= 0.583
AT THE INLET

SUM CA= 0.279 INT= 3.50 CFS= 0.976 CO= 0.000 GUTTER FLOW= 0.976

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.58 (cfs) IS 7.32 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.12 SPREAD (ft) = 6.01

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==============================================================================
INLET NUMBER A14              LENGTH   2.5          STATION  39+34

DRAINAGE AREA =  0.050 ACRES        C VALUE = .700        CA =  0.035
DRAINAGE AREA =  0.130 ACRES        C VALUE = .700        CA =  0.091

FOR THE FIRST SIDE
SUM CA=   0.035 INT=  3.50  CFS=   0.123  CO=  0.000 GUTTER FLOW=   0.123
FOR THE OTHER SIDE
SUM CA=   0.091 INT=  3.50  CFS=   0.318  CO=  0.000 GUTTER FLOW=   0.318
AT THE INLET

SUM CA=   0.126 INT=  3.50  CFS=   0.441  CO=  0.000 GUTTER FLOW=   0.441

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.32 (cfs) IS  5.16 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  6.10                    H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.10            SPREAD (ft)  =  4.78
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PROJECT 91053-29
HEC12 Version: V2.91

Run Date: 04-30-1994

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INLET NUMBER A16-Rd A LENGTH 10.0 STATION 19+25

DRAINAGE AREA = 2.112 ACRES C VALUE = .350 CA = 0.739
SUM CA= 0.739 INT= 3.50 CFS= 2.587 CO= 0.000 GUTTER FLOW= 2.587

GUTTER SLOPE = 0.0132 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
8.10	2.0	0.25	0.0833	4.0	0.68	3.5	0.146	0.119

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 10.9 EFFICIENCY= 0.99
CFS INTERCEPTED= 2.56 CFS CARRYOVER= 0.03

==========

INLET NUMBER A18-Rd A LENGTH 4.0 STATION 20+44

DRAINAGE AREA = 0.551 ACRES C VALUE = .290 CA = 0.160
SUM CA= 0.160 INT= 3.50 CFS= 0.559 CO= 0.030 GUTTER FLOW= 0.589

GUTTER SLOPE = 0.0159 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
2.67	2.0	0.75	0.0833	4.0	1.00	3.5	0.146	0.166

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 5.1 EFFICIENCY= 0.94
CFS INTERCEPTED= 0.55 CFS CARRYOVER= 0.04

==========

INLET NUMBER A19-Rd A LENGTH 6.0 STATION 24+23

DRAINAGE AREA = 1.102 ACRES C VALUE = .290 CA = 0.320
SUM CA= 0.320 INT= 3.50 CFS= 1.118 CO= 0.000 GUTTER FLOW= 1.118

GUTTER SLOPE = 0.0282 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.80	2.0	0.53	0.0833	4.0	0.96	3.5	0.146	0.160

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 8.0 EFFICIENCY= 0.92
CFS INTERCEPTED= 1.02 CFS CARRYOVER= 0.09

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==========================================================================
INLET NUMBER A20-Rd A        LENGTH   6.0        STATION  22+60

DRAINAGE AREA =  0.964 ACRES        C VALUE = .290        CA =  0.280
SUM CA=   0.280 INT=  3.50  CFS=   0.979  CO=  0.090 GUTTER FLOW=   1.069

GUTTER SLOPE = 0.0136 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW       SW/SX      Eo      a      S'W     SE
  4.84     2.0     0.41   0.0833     4.0      0.90    3.5    0.146  0.152

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =  6.6                EFFICIENCY= 0.99
    CFS INTERCEPTED=  1.06                 CFS CARRYOVER=  0.01


==========================================================================
INLET NUMBER A21-Rd A        LENGTH   6.0        STATION  22+04

DRAINAGE AREA =  0.542 ACRES        C VALUE = .290        CA =  0.157
DRAINAGE AREA =  0.184 ACRES        C VALUE = .290        CA =  0.053

FOR THE FIRST SIDE
SUM CA=   0.157 INT=  3.50  CFS=   0.550  CO=  0.040 GUTTER FLOW=   0.590
FOR THE OTHER SIDE
SUM CA=   0.053 INT=  3.50  CFS=   0.186  CO=  0.010 GUTTER FLOW=   0.196
AT THE INLET

SUM CA=   0.210 INT=  3.50  CFS=   0.736  CO=  0.050 GUTTER FLOW=   0.786

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.59 (cfs) IS  7.37 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.11            SPREAD (ft)  =  5.20
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INLET NUMBER A22-Rd.A        LENGTH   6.0        STATION  22+04

DRAINAGE AREA =  0.510 ACRES        C VALUE = .290        CA =  0.148
DRAINAGE AREA =  0.500 ACRES        C VALUE = .290        CA =  0.145

FOR THE FIRST SIDE
SUM CA=   0.148 INT=  3.50  CFS=   0.518  CO=  0.000 GUTTER FLOW=   0.518
FOR THE OTHER SIDE
SUM CA=   0.145 INT=  3.50  CFS=   0.507  CO=  0.000 GUTTER FLOW=   0.507
AT THE INLET

SUM CA=   0.293 INT=  3.50  CFS=   1.025  CO=  0.000 GUTTER FLOW=   1.025

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.52 (cfs) IS  6.87 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
   DEPTH OF WATER (ft) =   0.13          SPREAD (ft)  =  6.20
```
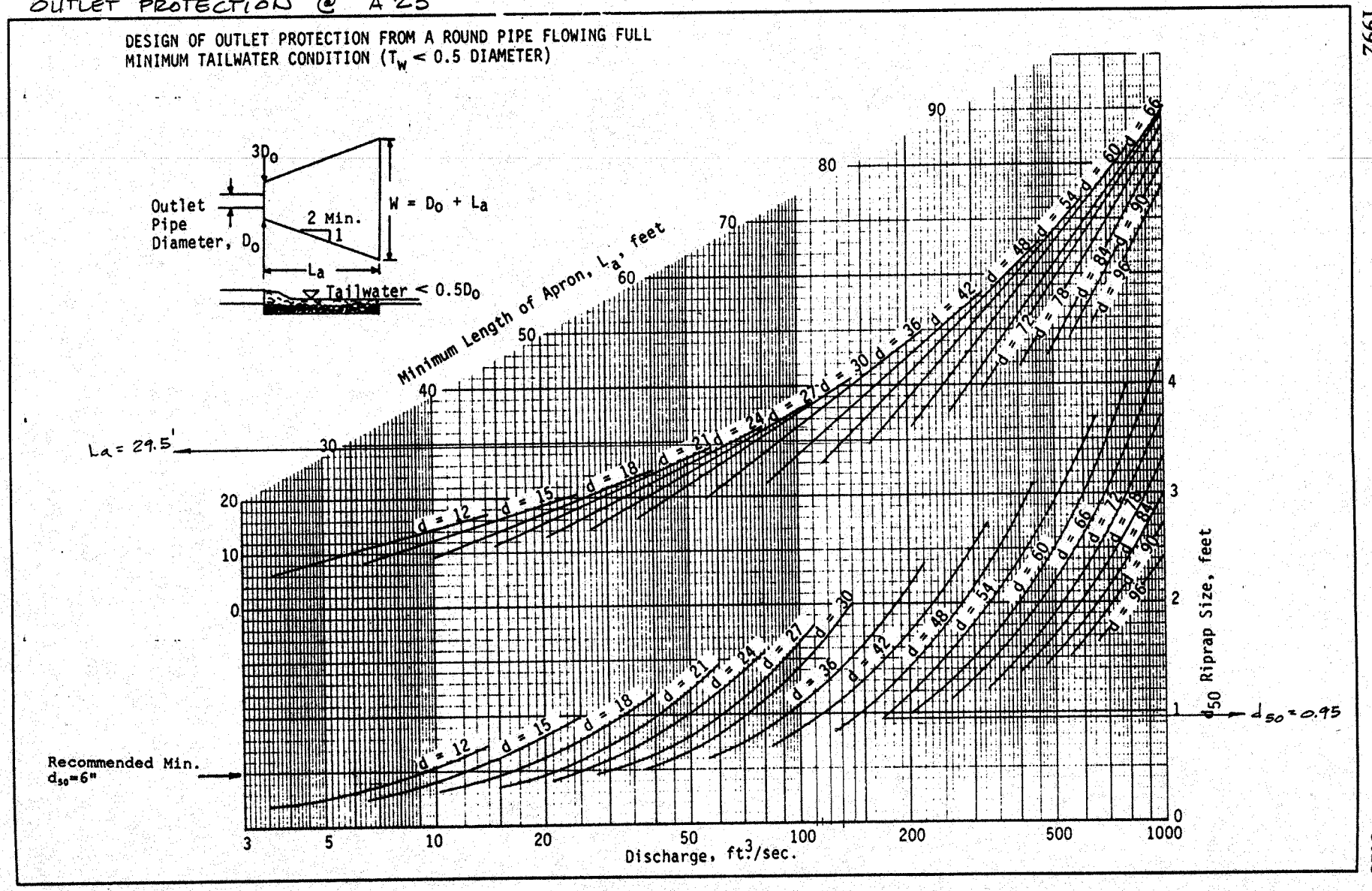

OUTLET PROTECTION @ A 23



Source: USDA-SCS

Plate 3.18-3

Rs13H

FILE: GREEN11.MRG
Project: GREENSPRINGS - Phase 2
Location: James City Co., Virginia
Design: M. Gordon
Date: May 13, 1994
Revision:

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV. UP	INVERT ELEV. LOW	LENGTH	SLOPE	PIPE DIAM.	VELOCITY	CAPACITY	FLOW TIME	FLOW RATIO	VELOCITY RATIO	REMARKS
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches	ft./sec.	cfs	min.	Qp/Qf	Vp/Vf	
System "A"																				
5	7	4.76	0.31	1.48	1.48	21.50	4.43	6.53	6.53	66.40	64.17	26	0.0857	15	13.85	18.84	0.03	0.35	0.90	Use RCP
6	7	0.23	0.80	0.18	0.18	10.00	5.93	1.09	1.09	64.74	64.42	32	0.0100	12	3.93	3.55	0.14	0.31	0.87	Use RCP
7	9A	0.46	0.60	0.28	1.94	21.53	4.42	1.22	8.56	64.07	60.39	174	0.0177	15	6.98	9.56	0.42	1.00	1.00	Use RCP
8	9	0.63	0.60	0.38	0.38	17.40	4.87	1.84	1.84	64.25	64.05	30	0.0067	12	3.88	2.90	0.13	0.63	1.05	Use RCP
9	9A	0.36	0.75	0.27	0.65	17.53	4.85	1.31	3.14	63.80	63.58	32	0.0066	15	4.47	5.30	0.12	0.59	1.04	Use RCP
9A	10	MH-1	0.00	0.00	2.58	21.95	4.38	0.00	11.33	60.74	57.78	253	0.0117	18	6.41	11.33	0.66	1.00	1.00	Use RCP
10A	10	1.16	0.35	0.41	0.41	18.10	4.79	1.94	1.94	60.25	58.74	18	0.0840	15	10.33	18.65	0.03	0.10	0.68	Use RCP
10	11	0.58	0.65	0.38	3.37	22.60	4.32	1.63	14.55	57.53	57.26	32	0.0085	21	6.05	14.55	0.09	1.00	1.00	Use RCP
11	15	0.22	0.80	0.18	3.54	22.69	4.31	0.76	15.28	54.69	53.94	80	0.0094	21	6.35	15.28	0.21	1.00	1.00	Use RCP
Exist	1				2.92	13.00	5.45		15.91	71.93	66.87	200	0.0253	24	11.03	35.90	0.30	0.44	0.97	Exist CPEP
1	3	0.69	0.25	0.17	3.09	13.30	5.40	0.93	16.71	66.77	61.76	215	0.0233	24	10.83	34.44	0.33	0.49	0.99	Use CPEP
2	3	1.61	0.35	0.56	0.56	17.00	4.91	2.77	2.77	64.19	63.80	39	0.0100	15	5.02	6.42	0.13	0.43	0.96	Use RCP
3	3A	0.33	0.80	0.26	3.92	17.13	4.90	1.29	19.20	61.66	59.33	98	0.0238	24	11.30	34.80	0.14	0.55	1.02	Use CPEP
3A	4	2.89	0.35	1.01	4.93	17.27	4.88	4.94	24.07	59.23	57.53	93	0.0183	24	10.74	30.55	0.14	0.79	1.10	Use CPEP
4	14	0.62	0.75	0.47	5.40	17.42	4.86	2.26	26.25	57.43	56.95	26	0.0183	24	10.94	30.55	0.04	0.86	1.13	Use RCP
12	13	4.09	0.30	1.23	1.23	22.00	4.38	5.37	5.37	73.25	60.67	226	0.0557	15	11.26	15.18	0.33	0.35	0.91	Phase 2 - not in this contract
13	14	0.78	0.55	0.43	1.66	22.33	4.35	1.87	7.20	60.57	57.92	91	0.0291	15	9.48	10.98	0.16	0.66	1.06	Phase 2 - not in this contract
14	15	0.18	0.75	0.14	7.19	22.49	4.33	0.58	31.14	54.08	53.84	43	0.0058	30	6.34	31.14	0.11	1.00	1.00	Use RCP
15	16	MH-1	0.00	0.00	10.73	22.90	4.29	0.00	46.08	52.84	52.58	120	0.0021	42	4.79	46.08	0.42	1.00	1.00	Use RCP
16	18	2.11	0.35	0.74	11.47	23.32	4.26	3.14	48.82	52.48	52.19	125	0.0024	42	5.07	48.82	0.41	1.00	1.00	Use RCP
17	18	3.89	0.25	0.97	0.97	23.00	4.29	4.17	4.17	54.80	54.72	20	0.0042	15	3.40	4.17	0.10	1.00	1.00	Use RCP
18	21	0.55	0.32	0.18	12.62	23.73	4.22	0.74	53.24	52.09	50.31	166	0.0107	42	10.85	104.00	0.25	0.51	1.00	Use RCP
19	20	1.10	0.29	0.32	0.32	16.00	5.04	1.61	1.61	57.00	53.02	170	0.0234	15	5.87	9.85	0.48	0.16	0.73	Use RCP
20	21	0.96	0.29	0.28	0.60	16.48	4.98	1.39	2.97	52.92	52.79	60	0.0021	15	2.42	2.97	0.41	1.00	1.00	Use RCP
24	21	1.24	0.25	0.31	0.91	18.50	4.74	1.47	4.30	53.58	53.45	28	0.0045	15	3.51	4.30	0.13	1.00	1.00	Use RCP
21	22	0.73	0.34	0.25	14.37	23.99	4.20	1.04	60.32	49.81	49.74	41	0.0018	48	4.80	60.32	0.14	1.00	1.00	Use RCP
22	23	1.01	0.51	0.52	14.89	24.13	4.19	2.16	62.30	49.64	49.31	175	0.0019	48	4.96	62.30	0.59	1.00	1.00	Install EW-2

NOTE: The calculations have been revised per Phase 2 design. Systems are same as submitted in Phase 1.

Rs13H FILE: GREEN21.MRG
Project: GREENSPRINGS - Phase 1 & 2
Location: James City Co., Virginia
Design: M. Gordon
Date: May 20, 1994
Revision: May 24, 1994
Yr. Storm: 10
N Value: 0.013

LANGLEY and McDONALD
201 Packets Court
Williamsburg, Virginia 23185

STORM SEWER DESIGN COMPUTATIONS

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV. UP	INVERT ELEV. LOW	LENGTH	SLOPE	PIPE DIAM.	VELOCITY	CAPACITY	FLOW TIME	FLOW RATIO	VELOCITY RATIO	REMARKS
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches	ft./sec.	cfs	min.	Qp/Qf	Vp/Vf	
[E]	[E]	[E]	[E]							[E]		[E]		[E]		[E]			[E]	
System "R"																				
1	2	0.64	0.32	0.20	0.20	17.00	4.91	1.00	1.00	57.37	57.24	26	0.0050	12	3.00	2.51	0.14	0.40	0.94	Use RCP
2	3	0.19	0.48	0.09	0.29	17.14	4.90	0.45	1.44	56.99	56.62	95	0.0039	15	3.00	4.04	0.53	0.36	0.91	Use RCP
3	4	MH-1	0.00	0.00	0.29	17.67	4.83	0.00	1.42	56.52	56.28	60	0.0039	15	3.00	4.04	0.33	0.35	0.91	Use RCP
4	5	0.16	0.52	0.08	0.38	18.01	4.80	0.41	1.82	56.18	56.09	26	0.0033	15	3.00	3.70	0.14	0.49	0.99	Use RCP
5	6	0.22	0.45	0.10	0.48	18.15	4.78	0.47	2.29	55.99	55.55	153	0.0029	15	3.00	3.46	0.85	0.66	1.06	Use RCP
6	7	MH-1	3.00	0.00	0.48	19.00	4.69	0.00	2.25	55.45	55.20	85	0.0029	15	3.00	3.49	0.47	0.64	1.06	Use RCP
7	8	0.34	0.45	0.15	0.63	19.47	4.63	0.71	2.93	55.10	50.00	215	0.0237	15	6.95	9.91	0.52	0.30	0.86	Use CPEP
System "M"																				
1	2	1.07	0.32	0.34	0.34	15.50	5.10	1.74	1.74	54.51	54.42	26	0.0035	12	3.00	2.11	0.14	0.83	1.12	Use RCP
2	3	0.40	0.46	0.18	0.52	15.64	5.08	0.94	2.67	54.17	53.43	276	0.0027	15	3.00	3.32	1.53	0.81	1.11	Use RCP
3	4	0.36	0.43	0.15	0.68	17.18	4.89	0.76	3.34	53.33	50.00	175	0.0190	15	6.69	8.88	0.44	0.38	0.92	Use CPEP
Revised Portion of System "A"																				
8A	8	0.19	0.49	0.09	0.09	16.00	5.04	0.47	0.47	64.89	63.89	50	0.0200	12	3.96	5.02	0.21	0.09	0.62	
8	9	0.44	0.36	0.16	0.25	17.40	4.87	0.78	1.23	63.64	63.52	26	0.0045	15	3.00	4.32	0.14	0.29	0.85	
9	9A	0.36	0.46	0.17	0.42	17.54	4.85	0.81	2.04	63.42	63.27	48	0.0031	15	3.00	3.60	0.27	0.57	1.02	

Revised 7/1/94

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE I
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCREMENT	CA ACCUMULATED	INLET TIME MINUTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPACITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
L1	L2	0.23	0.8	0.18	–	7	6.6	1.21	47.68	47.48	30'	0.0067	12"	2.92	3.5	8.6	
L2A	L2	0.92	0.4	0.37	–	12	5.8	2.15	49.15	47.48	58'	0.0288	12"	6.05	7.1	8.1	
L2	L3	0.27	0.8	0.22	0.77	12.1	5.8	4.46	47.23	46.68	196	0.0028	18"	5.56	3.5	56.0	
L3	L4	0.13	0.8	0.10	0.87	13.0	5.6	4.87	46.58	46.51	26'	0.0028	18"	5.56	3.6	7.2	
L4	L4A	0.48	0.6	0.29	1.16	13.1	5.6	6.50	46.41	46.32	23'	0.0040	18"	6.64	4.3	5.3	
L4A	L5	1.12	0.3	0.34	1.50	13.2	5.6	8.40	46.07	45.95	39'	0.0030	21"	8.68	4.1	9.5	
L5	L6	0.66	0.6	0.40	1.90	13.4	5.5	10.45	45.70	45.59	40'	0.0028	24"	11.97	4.3	9.1	
L6	L8	0.72	0.6	0.43	2.33	13.6	5.5	12.81	45.49	45.34	43'	0.0034	24"	13.19	4.8	9.0	
L7	L8	0.27	0.8	0.21	—	7	6.6	1.39	47.77	47.51	26'	0.01	12"	3.56	4.3	6.0	
L8	L8A	0.12	0.7	0.08	2.62	13.8	5.4	14.14	45.09	44.92	65'	0.0026	27"	15.79	4.5	14	
L8A	L9	1.55	0.4	0.62	3.24	14.0	5.4	17.50	44.82	44.26	166'	0.0034	27"	18.06	5.2	31.9	
L9A	L9	0.19	0.8	0.15	—	7	6.6	1.00	51.83 ~~52.29~~	51.53 ~~51.99~~	30'	0.01	12"	3.56	3.9		
L9	L10	1.59	0.4	0.64	4.03	14.5	5.2	20.96	44.16	42.68	275'	0.0054	27"	22.76	6.5	42.3	
L10	L11	1.22	0.4	0.49	4.52	15.2	5.2	23.50	42.58	41.61	162'	0.0060	27"	23.99	6.9	23.5	
L11	L12	–	-			15.6	5.1	23.50	41.51	40.53	164'	0.0060	27"	23.99	6.9	23.8	
		DITCH												DEPTH			
L12	C4	4.44	.30	1.00	5.92	16.0	5.0	29.6	40.53	39.44	110	0.01	2' Bott	1.17	2.78		

PROJECT 91053-29
HEC12 Version: V2.91 Run Date: 05-16-1994

==========

INLET NUMBER L1 LENGTH 2.5 STATION 10+60 RD "J"

DRAINAGE AREA = 0.080 ACRES C VALUE = .800 CA = 0.064
DRAINAGE AREA = 0.130 ACRES C VALUE = .800 CA = 0.104

FOR THE FIRST SIDE
SUM CA= 0.064 INT= 3.50 CFS= 0.224 CO= 0.000 GUTTER FLOW= 0.224
FOR THE OTHER SIDE
SUM CA= 0.104 INT= 3.50 CFS= 0.364 CO= 0.000 GUTTER FLOW= 0.364
AT THE INLET

SUM CA= 0.168 INT= 3.50 CFS= 0.588 CO= 0.000 GUTTER FLOW= 0.588

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.36 (cfs) IS 5.61 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 6.10 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.12 SPREAD (ft) = 5.79

==========

INLET NUMBER L2A LENGTH 8.0 STATION 11+00 RD "J"

DRAINAGE AREA = 0.920 ACRES C VALUE = .400 CA = 0.368
SUM CA= 0.368 INT= 3.50 CFS= 1.288 CO= 0.000 GUTTER FLOW= 1.288

GUTTER SLOPE = 0.0400 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.69	2.0	0.54	0.0833	4.0	0.96	3.5	0.146	0.161

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 9.4 EFFICIENCY= 0.97
CFS INTERCEPTED= 1.24 CFS CARRYOVER= 0.04

```
==============================================================================
INLET NUMBER L2                LENGTH   2.5          STATION  10+42 RD "J"

DRAINAGE AREA =  0.090 ACRES        C VALUE = .800        CA =  0.072
DRAINAGE AREA =  0.180 ACRES        C VALUE = .800        CA =  0.144

FOR THE FIRST SIDE
SUM CA=   0.072 INT=  3.50  CFS=   0.252  CO=  0.000 GUTTER FLOW=   0.252
FOR THE OTHER SIDE
SUM CA=   0.144 INT=  3.50  CFS=   0.504  CO=  0.040 GUTTER FLOW=   0.544
AT THE INLET

SUM CA=   0.216 INT=  3.50  CFS=   0.756  CO=  0.040 GUTTER FLOW=   0.796

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.54 (cfs) IS  7.06 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  6.10                  H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.15           SPREAD (ft)  =  7.09


==============================================================================
INLET NUMBER L4                LENGTH   4.0          STATION  10+78 RD "I"

DRAINAGE AREA =  0.350 ACRES        C VALUE = .550        CA =  0.192
DRAINAGE AREA =  0.130 ACRES        C VALUE = .800        CA =  0.104

FOR THE FIRST SIDE
SUM CA=   0.192 INT=  3.50  CFS=   0.674  CO=  0.000 GUTTER FLOW=   0.674
FOR THE OTHER SIDE
SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.000 GUTTER FLOW=   0.364
AT THE INLET

SUM CA=   0.296 INT=  3.50  CFS=   1.038  CO=  0.000 GUTTER FLOW=   1.038

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.67 (cfs) IS  7.88 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  7.60                  H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.15           SPREAD (ft)  =  7.31
```

```
==============================================================================
INLET NUMBER L3              LENGTH   2.5        STATION  10+78 RD "J"

DRAINAGE AREA =  0.080 ACRES       C VALUE = .800       CA =  0.064
DRAINAGE AREA =  0.050 ACRES       C VALUE = .800       CA =  0.040

FOR THE FIRST SIDE
SUM CA=   0.064 INT=  3.50  CFS=   0.224  CO=  0.000 GUTTER FLOW=   0.224
FOR THE OTHER SIDE
SUM CA=   0.040 INT=  3.50  CFS=   0.140  CO=  0.000 GUTTER FLOW=   0.140
AT THE INLET

SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.000 GUTTER FLOW=   0.364

GUTTER SLOPE = 0.0010 FT/FT       PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.22 (cfs) IS  3.99 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  6.10                H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.09          SPREAD (ft)  =  4.21
```

```
==========================================================================
INLET NUMBER L4A              LENGTH   0.0        STATION

DRAINAGE AREA =  0.560 ACRES        C VALUE = .300        CA =  0.168
DRAINAGE AREA =  0.560 ACRES        C VALUE = .300        CA =  0.168

FOR THE FIRST SIDE
SUM CA=   0.168 INT=  3.50  CFS=   0.588  CO=  0.000 GUTTER FLOW=   0.588
FOR THE OTHER SIDE
SUM CA=   0.168 INT=  3.50  CFS=   0.588  CO=  0.000 GUTTER FLOW=   0.588
AT THE INLET

SUM CA=   0.336 INT=  3.50  CFS=   1.176  CO=  0.000 GUTTER FLOW=   1.176

     XXXXXXXXXX GRATE INLET IN A TRAPEZOIDAL CHANNEL XXXXXXXXXX
DEPTH OF WATER (ft)= 0.12  PERIMETER OF GRATE (ft)=  9.00  AREA (sq ft)=  2.33


==========================================================================
INLET NUMBER L5               LENGTH   8.0        STATION  39+49 RD "A"

DRAINAGE AREA =  0.660 ACRES        C VALUE = .600        CA =  0.396
SUM CA=   0.396 INT=  3.50  CFS=   1.386  CO=  0.000 GUTTER FLOW=   1.386

GUTTER SLOPE = 0.0392 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX      Eo      a      S'W     SE
  3.95     2.0     0.51   0.0833      4.0       0.95    3.5    0.146  0.159

       XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =  9.7                EFFICIENCY= 0.95
    CFS INTERCEPTED=  1.32                CFS CARRYOVER=  0.06


==========================================================================
INLET NUMBER L4               LENGTH   4.0        STATION  10+78 RD "I"

DRAINAGE AREA =  0.350 ACRES        C VALUE = .550        CA =  0.192
DRAINAGE AREA =  0.130 ACRES        C VALUE = .800        CA =  0.104

FOR THE FIRST SIDE
SUM CA=   0.192 INT=  3.50  CFS=   0.674  CO=  0.000 GUTTER FLOW=   0.674
FOR THE OTHER SIDE
SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.060 GUTTER FLOW=   0.424
AT THE INLET

SUM CA=   0.296 INT=  3.50  CFS=   1.038  CO=  0.060 GUTTER FLOW=   1.098

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.67 (cfs) IS  7.88 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  7.60                H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.16           SPREAD (ft)  =  7.59
```

```
==============================================================================
INLET NUMBER L6                LENGTH   8.0        STATION  39+49 RD "A"

DRAINAGE AREA =  0.720 ACRES        C VALUE = .600        CA =  0.432
SUM CA=   0.432 INT=  3.50  CFS=   1.512  CO=  0.000 GUTTER FLOW=   1.512

GUTTER SLOPE = 0.0392 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  4.24     2.0     0.47   0.0833      4.0        0.93    3.5    0.146   0.157

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) = 10.2                EFFICIENCY= 0.94
   CFS INTERCEPTED=  1.42                 CFS CARRYOVER=  0.10
```

```
==============================================================================
INLET NUMBER L9                LENGTH   8.0        STATION  7+21 RD "I"

DRAINAGE AREA =  1.590 ACRES        C VALUE = .400        CA =  0.636
SUM CA=   0.636 INT=  3.50  CFS=   2.226  CO=  0.000 GUTTER FLOW=   2.226

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  7.07     2.0     0.28   0.0833      4.0        0.74    3.5    0.146   0.129

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) = 10.4                EFFICIENCY= 0.93
   CFS INTERCEPTED=  2.06                 CFS CARRYOVER=  0.16
```

```
==============================================================================
INLET NUMBER L8A               LENGTH   8.0        STATION  8+87.5 RD "I"

DRAINAGE AREA =  1.550 ACRES        C VALUE = .400        CA =  0.620
SUM CA=   0.620 INT=  3.50  CFS=   2.170  CO=  0.160 GUTTER FLOW=   2.330

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  7.25     2.0     0.28   0.0833      4.0        0.73    3.5    0.146   0.127

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) = 10.7                EFFICIENCY= 0.92
   CFS INTERCEPTED=  2.13                 CFS CARRYOVER=  0.20
```

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==============================================================================
INLET NUMBER L9A                LENGTH   4.0        STATION  7+03 RD "I"

DRAINAGE AREA =  0.190 ACRES        C VALUE = .800        CA =  0.152
SUM CA=   0.152 INT=  3.50  CFS=   0.532  CO=  0.000 GUTTER FLOW=   0.532

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  2.28     2.0     0.88   0.0833      4.0        1.00    3.5    0.146   0.167

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =  4.9                EFFICIENCY= 0.95
    CFS INTERCEPTED=  0.51                 CFS CARRYOVER=  0.03


==============================================================================
INLET NUMBER L7                 LENGTH   4.0        STATION  9+45 RD "I"

DRAINAGE AREA =  0.180 ACRES        C VALUE = .800        CA =  0.144
DRAINAGE AREA =  0.090 ACRES        C VALUE = .800        CA =  0.072

FOR THE FIRST SIDE
SUM CA=   0.144 INT=  3.50  CFS=   0.504  CO=  0.030 GUTTER FLOW=   0.534
FOR THE OTHER SIDE
SUM CA=   0.072 INT=  3.50  CFS=   0.252  CO=  0.000 GUTTER FLOW=   0.252
AT THE INLET

SUM CA=   0.216 INT=  3.50  CFS=   0.756  CO=  0.030 GUTTER FLOW=   0.786

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.53 (cfs) IS  6.99 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  7.60                H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.13           SPREAD (ft)  =  6.07
```

```
==============================================================================
INLET NUMBER L8                LENGTH   2.5          STATION  9+52 RD "I"

DRAINAGE AREA =  0.060 ACRES        C VALUE = .800        CA =  0.048
DRAINAGE AREA =  0.060 ACRES        C VALUE = .800        CA =  0.048

FOR THE FIRST SIDE
SUM CA=   0.048 INT=  3.50  CFS=   0.168  CO=  0.200 GUTTER FLOW=   0.368
FOR THE OTHER SIDE
SUM CA=   0.048 INT=  3.50  CFS=   0.168  CO=  0.100 GUTTER FLOW=   0.268
AT THE INLET

SUM CA=   0.096 INT=  3.50  CFS=   0.336  CO=  0.300 GUTTER FLOW=   0.636

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.37 (cfs) IS  5.65 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  6.10                    H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.13            SPREAD (ft)  =  6.11


==============================================================================
INLET NUMBER L10               LENGTH   6.0          STATION  4+67 RD "I"

DRAINAGE AREA =  0.040 ACRES        C VALUE = .800        CA =  0.032
DRAINAGE AREA =  1.180 ACRES        C VALUE = .400        CA =  0.472

FOR THE FIRST SIDE
SUM CA=   0.032 INT=  3.50  CFS=   0.112  CO=  0.000 GUTTER FLOW=   0.112
FOR THE OTHER SIDE
SUM CA=   0.472 INT=  3.50  CFS=   1.652  CO=  0.000 GUTTER FLOW=   1.652
AT THE INLET

SUM CA=   0.504 INT=  3.50  CFS=   1.764  CO=  0.000 GUTTER FLOW=   1.764

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   1.65 (cfs) IS  9.32 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                    H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.19            SPREAD (ft)  =  8.91
```

Revised 6/1/94

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE I
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
G1	G3	0.27	0.8	0.22	—	7	6.6	1.45	47.22	46.62	32'	0.0186	12"	4.86	5.4	5.9	
G2	G3	4.87	0.35	1.70	—	15	5.2	8.84	43.00	42.58	32'	0.013	18"	11.98	7.4	4.3	HW/D10 = 1.2 = 1.8'
G3	G9	0.27	0.8	0.22	2.14	15.1	5.2	11.13	42.48	38.09	294	0.0115	18"	11.26	7.3	40.3	
G5	G7	1.27	0.40	0.51	—	13	5.6	2.85	42.11	41.61	200'	0.0025	15"	3.23	2.97	67.3	
G6	G7	0.28	0.8	0.22	—	7	6.6	1.45	41.96	41.86	32'	0.003	12"	1.95	2.7	11.8	
G7	G8	1.73	0.35	0.61	1.34	14.1	5.4	7.24	41.36	40.39	168'	0.006	18"	7.43	4.8	35.1	
G4	G8	4.66 @ 0.30 + 1.12		5.92	—	16.7	5.0	29.60	39.44	39.25	32'	0.006	30"	31.77	7.4	4.3	HW/D10 = 1.1 = 2.75
G8	G9	0.78	0.55	0.43	7.69	16.7	5.0	38.45	39.15	38.85	32'	0.01	30"	41.02	9.5	3.4	
G9	G10	0.27	0.8	0.22	10.05	16.8	5.0	50.25	36.01	31.08	164	0.0301	30"	71.16	15.7	10.4	
G10	G11	—						50.25	30.58	30.50	14	0.0058	36	50.8	8.2	1.7	
H1	H2	0.71	0.55	0.39	—	7	6.6	2.57	45.00	33.00	160'	0.075	15"	17.62	10.22	15.7	

PROJECT 91053-29
HEC12 Version: V2.91 Run Date: 05-19-1994

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INLET NUMBER H1-Rd D LENGTH 6.0 STATION 12+38

DRAINAGE AREA = 0.230 ACRES C VALUE = .550 CA = 0.127
DRAINAGE AREA = 0.480 ACRES C VALUE = .550 CA = 0.264

FOR THE FIRST SIDE
SUM CA= 0.127 INT= 3.50 CFS= 0.443 CO= 0.000 GUTTER FLOW= 0.443
FOR THE OTHER SIDE
SUM CA= 0.264 INT= 3.50 CFS= 0.924 CO= 0.000 GUTTER FLOW= 0.924
AT THE INLET

SUM CA= 0.391 INT= 3.50 CFS= 1.367 CO= 0.000 GUTTER FLOW= 1.367

GUTTER SLOPE = 0.0300 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .030 (ft./ft.) AND 0.92 (cfs) IS 3.09 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.385
DEPTH OF WATER (ft) = 0.16 SPREAD (ft) = 7.52

PROJECT 91053-29
HEC12 Version: V2.30 User S/N: 77010147 Run Date: 05-17-1994

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INLET NUMBER G1 LENGTH 6.0 STATION 56+75 RD "A"

DRAINAGE AREA = 0.320 ACRES C VALUE = .800 CA = 0.256
SUM CA= 0.256 INT= 3.50 CFS= 0.896 CO= 0.000 GUTTER FLOW= 0.896

GUTTER SLOPE = 0.0453 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
2.34	2.0	0.85	0.0833	4.0	1.00	3.5	0.146	0.167

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 8.2 EFFICIENCY= 0.90
CFS INTERCEPTED= 0.81 CFS CARRYOVER= 0.09

==========

INLET NUMBER G3 LENGTH 8.0 STATION 56+82 RD "A"

DRAINAGE AREA = 0.410 ACRES C VALUE = .800 CA = 0.328
SUM CA= 0.328 INT= 3.50 CFS= 1.148 CO= 0.000 GUTTER FLOW= 1.148

GUTTER SLOPE = 0.0442 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.16	2.0	0.63	0.0833	4.0	0.98	3.5	0.146	0.164

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 9.2 EFFICIENCY= 0.98
CFS INTERCEPTED= 1.12 CFS CARRYOVER= 0.03

==========

INLET NUMBER G5 LENGTH 8.0 STATION 63+43 RD "A"

DRAINAGE AREA = 1.270 ACRES C VALUE = .400 CA = 0.508
SUM CA= 0.508 INT= 3.50 CFS= 1.778 CO= 0.000 GUTTER FLOW= 1.778

GUTTER SLOPE = 0.0301 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
5.22	2.0	0.38	0.0833	4.0	0.87	3.5	0.146	0.148

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 10.5 EFFICIENCY= 0.93
CFS INTERCEPTED= 1.65 CFS CARRYOVER= 0.13

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==============================================================================
INLET NUMBER G6                LENGTH   6.0        STATION  61+46 RD"A"

DRAINAGE AREA =  0.280 ACRES        C VALUE = .800        CA =  0.224
SUM CA=   0.224 INT=  3.50  CFS=   0.784  CO=  0.000 GUTTER FLOW=   0.784

GUTTER SLOPE = 0.0301 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  2.56     2.0     0.78   0.0833      4.0        1.00    3.5    0.146   0.166

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  6.9                EFFICIENCY= 0.97
   CFS INTERCEPTED=  0.76                 CFS CARRYOVER=  0.02


==============================================================================
INLET NUMBER G7                LENGTH   8.0        STATION  61+46 RD "A"

DRAINAGE AREA =  1.730 ACRES        C VALUE = .350        CA =  0.605
SUM CA=   0.605 INT=  3.50  CFS=   2.119  CO=  0.130 GUTTER FLOW=   2.249

GUTTER SLOPE = 0.0100 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  8.10     2.0     0.25   0.0833      4.0        0.68    3.5    0.146   0.119

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  9.4                EFFICIENCY= 0.97
   CFS INTERCEPTED=  2.17                 CFS CARRYOVER=  0.07


==============================================================================
INLET NUMBER G8                LENGTH   8.0        STATION  59+75 RD "A"

DRAINAGE AREA =  0.350 ACRES        C VALUE = .550        CA =  0.192
DRAINAGE AREA =  0.430 ACRES        C VALUE = .550        CA =  0.237
RAINFALL INTENSITY FOR THE FIRST SIDE   3.50
RAINFALL INTENSITY FOR THE OTHER SIDE   3.50
SUM CA=   0.429 INT=  3.50  CFS=   1.502  CO=  0.100 GUTTER FLOW=   1.602

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


    SPREAD AT A SLOPE OF .003 (ft./ft.) IS  6.71 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) = 11.60                H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.15           SPREAD (ft)  =  7.05
```

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==============================================================================
INLET NUMBER G9                LENGTH   6.0          STATION  59+75 RD "A"

DRAINAGE AREA =  0.160 ACRES        C VALUE = .800        CA =  0.128
DRAINAGE AREA =  0.110 ACRES        C VALUE = .800        CA =  0.088
RAINFALL INTENSITY FOR THE FIRST SIDE   3.50
RAINFALL INTENSITY FOR THE OTHER SIDE   3.50
SUM CA=   0.216 INT=  3.50  CFS=   0.756  CO=  0.110 GUTTER FLOW=   0.866

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


     SPREAD AT A SLOPE OF .003 (ft./ft.) IS  5.07 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                    H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.11            SPREAD (ft)  =  5.06
```

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name:

Comment:

Solve For Depth

Given Input Data:

Bottom Width.....	2.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.050
Channel Slope....	0.0100 ft/ft
Discharge.....	30.75 cfs

Computed Results:

Depth.....	1.62 ft
Velocity.....	2.78 fps
Flow Area.....	11.06 sf
Flow Top Width...	11.69 ft
Wetted Perimeter.	12.22 ft
Critical Depth...	1.17 ft
Critical Slope...	0.0431 ft/ft
Froude Number....	0.50 (flow is Subcritical)

Open Channel Flow Module, Version 3.09 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE I
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
E7	E11	0.36	0.45	0.16	–	8	6.4	1.02	42.10	39.59	144'	0.0174	15"	8.52	4.68	30.8	
E8	E11	2.55	0.35	0.89	–	12	5.8	5.16	40.33	40.23	8'	0.0125	15"	7.22	6.40	1.3	
E9	E10	0.35	0.75	0.26	–	5	7.0	1.82	44.47	43.57	42	0.0214	12"	5.21	6.04	7.0	.06 CRAN
E10	E11	1.19	0.45	0.54	0.80	5	7.0	5.60	43.32	39.59	186	0.0200	15"	9.14	7.82	23.8	
E11	E12	0.22	0.8	0.18	2.03	12	5.8	11.77	39.34	38.89	32'	0.014	18"	12.43	8.0	4.0	
E12	E13	0.38	0.8	0.30	2.33	12.1	5.8	13.51	38.79	38.18	36'	0.0168	18"	13.62	8.7	4.1	
F1	F2	0.46	0.45	0.21	–	10	6.0	1.26	47.58	47.42	26'	0.006	15"	5.00	3.4	7.6	
F2	F3	0.60	0.40	0.24	0.45	10.12	6.0	2.70	47.32	47.15	42	0.004	15"	4.09	3.6	11.7	
F3	F4	0.91	0.45	0.41	0.86	10.32	6.0	5.16	47.05	46.36	46	0.015	15"	7.91	6.8	6.8	
F4	F5	0.27	0.8	0.22	1.08	10.43	6.0	6.48	46.26	42.89	75'	0.045	15"	13.7	10.4	7.2	

PROJECT 91053-29
HEC12 Version: V2.91 Run Date: 05-18-1994

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INLET NUMBER E7 LENGTH 6.0 STATION 41+50 RD "A"

DRAINAGE AREA = 0.360 ACRES C VALUE = .450 CA = 0.162
SUM CA= 0.162 INT= 3.50 CFS= 0.567 CO= 0.000 GUTTER FLOW= 0.567

GUTTER SLOPE = 0.0300 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
1.90	2.0	1.05	0.0833	4.0	1.00	3.5	0.146	0.167

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 6.0 EFFICIENCY= 1.00
CFS INTERCEPTED= 0.57 CFS CARRYOVER= 0.00

==========

INLET NUMBER E10 LENGTH 8.0 STATION 45+18 RD "A"

DRAINAGE AREA = 1.190 ACRES C VALUE = .450 CA = 0.535
SUM CA= 0.535 INT= 3.50 CFS= 1.874 CO= 0.000 GUTTER FLOW= 1.874

GUTTER SLOPE = 0.0183 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
6.27	2.0	0.32	0.0833	4.0	0.80	3.5	0.146	0.137

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 9.6 EFFICIENCY= 0.96
CFS INTERCEPTED= 1.80 CFS CARRYOVER= 0.08

==========

INLET NUMBER E11 LENGTH 6.0 STATION 43+14 RD "A"

DRAINAGE AREA = 0.110 ACRES C VALUE = .800 CA = 0.088
DRAINAGE AREA = 0.110 ACRES C VALUE = .800 CA = 0.088

FOR THE FIRST SIDE
SUM CA= 0.088 INT= 3.50 CFS= 0.308 CO= 0.080 GUTTER FLOW= 0.388
FOR THE OTHER SIDE
SUM CA= 0.088 INT= 3.50 CFS= 0.308 CO= 0.000 GUTTER FLOW= 0.308
AT THE INLET

SUM CA= 0.176 INT= 3.50 CFS= 0.616 CO= 0.080 GUTTER FLOW= 0.696

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.39 (cfs) IS 5.84 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.10 SPREAD (ft) = 4.79

```
==============================================================================
INLET NUMBER E8                LENGTH    0.0          STATION  43+14 RD "A"

DRAINAGE AREA =  1.275 ACRES        C VALUE = .350        CA =  0.446
DRAINAGE AREA =  1.275 ACRES        C VALUE = .350        CA =  0.446

FOR THE FIRST SIDE
SUM CA=   0.446 INT=  3.50  CFS=   1.562  CO=  0.000 GUTTER FLOW=   1.562
FOR THE OTHER SIDE
SUM CA=   0.446 INT=  3.50  CFS=   1.562  CO=  0.000 GUTTER FLOW=   1.562
AT THE INLET

SUM CA=   0.892 INT=  3.50  CFS=   3.124  CO=  0.000 GUTTER FLOW=   3.124

     XXXXXXXXXX GRATE INLET IN A TRAPEZOIDAL CHANNEL XXXXXXXXXX
DEPTH OF WATER (ft)= 0.24  PERIMETER OF GRATE (ft)=  9.00  AREA (sq ft)=  2.33


==============================================================================
INLET NUMBER E9                LENGTH    6.0          STATION  45+50 RD "A"

DRAINAGE AREA =  0.350 ACRES        C VALUE = .800        CA =  0.280
SUM CA=   0.280 INT=  3.50  CFS=   0.980  CO=  0.060 GUTTER FLOW=   1.040

GUTTER SLOPE = 0.0230 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW       SW/SX      Eo      a      S'W     SE
  3.89     2.0     0.51   0.0833     4.0      0.95    3.5    0.146  0.160

       XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =  7.3                EFFICIENCY= 0.95
    CFS INTERCEPTED=  0.99                 CFS CARRYOVER=  0.05


==============================================================================
INLET NUMBER E12               LENGTH    6.0          STATION  43+14 RD "A"

DRAINAGE AREA =  0.230 ACRES        C VALUE = .800        CA =  0.184
DRAINAGE AREA =  0.150 ACRES        C VALUE = .800        CA =  0.120

FOR THE FIRST SIDE
SUM CA=   0.184 INT=  3.50  CFS=   0.644  CO=  0.000 GUTTER FLOW=   0.644
FOR THE OTHER SIDE
SUM CA=   0.120 INT=  3.50  CFS=   0.420  CO=  0.050 GUTTER FLOW=   0.470
AT THE INLET

SUM CA=   0.304 INT=  3.50  CFS=   1.064  CO=  0.050 GUTTER FLOW=   1.114

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.64 (cfs) IS  7.70 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.14            SPREAD (ft)  =  6.56
```

PROJECT 91053-29
HEC12 Version: V2.91 Run Date: 05-15-1994

==========

INLET NUMBER F2 LENGTH 8.0 STATION 10+45 RD "C"

DRAINAGE AREA = 0.520 ACRES C VALUE = .400 CA = 0.208
DRAINAGE AREA = 0.080 ACRES C VALUE = .800 CA = 0.064

FOR THE FIRST SIDE
SUM CA= 0.208 INT= 3.50 CFS= 0.728 CO= 0.000 GUTTER FLOW= 0.728
FOR THE OTHER SIDE
SUM CA= 0.064 INT= 3.50 CFS= 0.224 CO= 0.010 GUTTER FLOW= 0.234
AT THE INLET

SUM CA= 0.272 INT= 3.50 CFS= 0.952 CO= 0.010 GUTTER FLOW= 0.962

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.73 (cfs) IS 8.19 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 11.60 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.11 SPREAD (ft) = 5.24

PROJECT 91053-29
HEC12 Version: V2.91 Run Date: 05-15-1994

==========

INLET NUMBER F1 LENGTH 4.0 STATION 10+45 RD "C"

DRAINAGE AREA = 0.380 ACRES C VALUE = .450 CA = 0.171
DRAINAGE AREA = 0.080 ACRES C VALUE = .800 CA = 0.064

FOR THE FIRST SIDE
SUM CA= 0.171 INT= 3.50 CFS= 0.598 CO= 0.000 GUTTER FLOW= 0.598
FOR THE OTHER SIDE
SUM CA= 0.064 INT= 3.50 CFS= 0.224 CO= 0.000 GUTTER FLOW= 0.224
AT THE INLET

SUM CA= 0.235 INT= 3.50 CFS= 0.822 CO= 0.000 GUTTER FLOW= 0.822

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.60 (cfs) IS 7.42 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 7.60 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.13 SPREAD (ft) = 6.26

```
==============================================================================
INLET NUMBER F3                LENGTH   8.0          STATION  49+25 RD "A"

DRAINAGE AREA =  0.910 ACRES        C VALUE = .450        CA =  0.410
SUM CA=   0.410 INT=  3.50  CFS=   1.433  CO=  0.000 GUTTER FLOW=   1.433

GUTTER SLOPE = 0.0217 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  5.04     2.0     0.40    0.0833     4.0        0.88     3.5    0.146   0.150

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  8.6                EFFICIENCY= 0.99
   CFS INTERCEPTED=  1.42                 CFS CARRYOVER=  0.01
```

```
==============================================================================
INLET NUMBER F4                LENGTH   4.0          STATION  48+91 RD "A"

DRAINAGE AREA =  0.270 ACRES        C VALUE = .800        CA =  0.216
SUM CA=   0.216 INT=  3.50  CFS=   0.756  CO=  0.000 GUTTER FLOW=   0.756

GUTTER SLOPE = 0.0127 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  3.81     2.0     0.52    0.0833     4.0        0.96     3.5    0.146   0.160

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  5.4                EFFICIENCY= 0.91
   CFS INTERCEPTED=  0.69                 CFS CARRYOVER=  0.06
```

STORM SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE 1
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
I1	I4	0.71	0.5	0.36	-	7	6.6	2.38	57.52	56.82	32'	0.017	12"	4.65	5.95	5.4	
I2	I3	0.81	0.5	0.41	-	7	6.6	2.71	57.23	57.02	32'	0.0065	12"	2.87	4.2	7.6	
I3	I4	0.17	0.8	0.14	0.55	7.1	6.6	3.63	56.77	56.57	56'	0.0036	15"	3.88	3.6	15.6	
I4	I5	0.21	0.8	0.17	1.15	7.36	6.5	7.48	56.47	48.60	220'	0.0358	15"	11.48	10.0	22.0	

L-79

PROJECT 91053-29
HEC12 Version: V2.30 User S/N: 77010147 Run Date: 05-17-1994

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INLET NUMBER I1 LENGTH 6.0 STATION 71+29

DRAINAGE AREA = 0.710 ACRES C VALUE = .550 CA = 0.391
SUM CA= 0.391 INT= 3.50 CFS= 1.367 CO= 0.000 GUTTER FLOW= 1.367

GUTTER SLOPE = 0.0075 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
6.74	2.0	0.30	0.0833	4.0	0.76	3.5	0.146	0.132

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 6.6 EFFICIENCY= 0.99
CFS INTERCEPTED= 1.35 CFS CARRYOVER= 0.02

==========

INLET NUMBER I4 LENGTH 4.0 STATION 71+30 RD "A"

DRAINAGE AREA = 0.210 ACRES C VALUE = .800 CA = 0.168
SUM CA= 0.168 INT= 3.50 CFS= 0.588 CO= 0.000 GUTTER FLOW= 0.588

GUTTER SLOPE = 0.0075 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.86	2.0	0.52	0.0833	4.0	0.95	3.5	0.146	0.160

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 4.1 EFFICIENCY= 1.00
CFS INTERCEPTED= 0.59 CFS CARRYOVER= 0.00

==========

INLET NUMBER I3 LENGTH 2.5 STATION 70+75 RD "A"

DRAINAGE AREA = 0.030 ACRES C VALUE = .800 CA = 0.024
DRAINAGE AREA = 0.140 ACRES C VALUE = .800 CA = 0.112
RAINFALL INTENSITY FOR THE FIRST SIDE 3.50
RAINFALL INTENSITY FOR THE OTHER SIDE 3.50
SUM CA= 0.136 INT= 3.50 CFS= 0.476 CO= 0.000 GUTTER FLOW= 0.476

GUTTER SLOPE = 0.0030 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .003 (ft./ft.) IS 4.03 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 6.10 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.10 SPREAD (ft) = 5.03

```
==============================================================================
INLET NUMBER i2                LENGTH   8.0        STATION  70+75 RD "A"

DRAINAGE AREA =  0.220 ACRES        C VALUE = .550        CA =  0.121
DRAINAGE AREA =  0.590 ACRES        C VALUE = .550        CA =  0.324
RAINFALL INTENSITY FOR THE FIRST SIDE   3.50
RAINFALL INTENSITY FOR THE OTHER SIDE   3.50
SUM CA=   0.445 INT=  3.50  CFS=   1.559  CO=  0.020 GUTTER FLOW=   1.579

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


     SPREAD AT A SLOPE OF .003 (ft./ft.) IS  7.78 (ft.)

        XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 11.60                    H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.15            SPREAD (ft)  =  7.23
```

Analysis & Design
Uniform Flow

For Depth

Input Data:

Bottom Width.....	2.00 ft
Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.050
Channel Slope....	0.0088 ft/ft
Discharge.....	50.25 cfs

Computed Results:

Depth.....	2.05 ft
Velocity.....	3.00 fps
Flow Area.....	16.74 sf
Flow Top Width...	14.31 ft
Wetted Perimeter.	14.98 ft
Critical Depth...	1.47 ft
Critical Slope...	0.0404 ft/ft
Froude Number....	0.49 (flow is Subcritical)

Open Channel Flow Module, Version 3.09 (c) 1990
Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE I
COUNTY _____ DISTRICT _____
DESCRIPTION _____
SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
FROM 30" UNDER RTE 614 STA 17+40					4.10												
		13.66															
J1	J2	5.88	0.52	3.06	7.16	22.6	4.3	30.79	54.42	53.92	86'	0.0058	30"	31.24	7.25	11.9	
J2A	J2	0.98	0.30	0.29	—	12	5.8	1.68	58.61	55.17	85'	0.0405	15				
J2	J3	0.71	0.40	0.28	7.73	22.8	4.3	33.23	53.42	53.33	32'	0.0028	36"	35.29	5.7	5.6	
J3	J4	0.24	0.80	0.19	7.92	22.9	4.3	34.06	53.23	52.89	120'	0.0028	36"	35.29	5.7	5.7	

PROJECT 91053-29
HEC12 Version: V2.91 Run Date: 05-12-1994

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INLET NUMBER J1 LENGTH 0.0 STATION 12+15 RD "B"

DRAINAGE AREA = 2.940 ACRES C VALUE = .550 CA = 1.617
DRAINAGE AREA = 16.600 ACRES C VALUE = .300 CA = 4.980

FOR THE FIRST SIDE
SUM CA= 1.617 INT= 4.50 CFS= 7.277 CO= 0.000 GUTTER FLOW= 7.277
FOR THE OTHER SIDE
SUM CA= 4.980 INT= 4.50 CFS= 22.410 CO= 0.000 GUTTER FLOW= 22.410
AT THE INLET

SUM CA= 6.597 INT= 4.50 CFS= 29.687 CO= 0.000 GUTTER FLOW= 29.687

XXXXXXXXXX GRATE INLET IN A TRAPEZOIDAL CHANNEL XXXXXXXXXX
DEPTH OF WATER (ft)= 0.84 PERIMETER OF GRATE (ft)= 12.80 AREA (sq ft)= 4.00

==========

INLET NUMBER J2A LENGTH 6.0 STATION 14+00 RD "B"

DRAINAGE AREA = 0.980 ACRES C VALUE = .300 CA = 0.294
SUM CA= 0.294 INT= 3.50 CFS= 1.029 CO= 0.000 GUTTER FLOW= 1.029

GUTTER SLOPE = 0.0186 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
4.20	2.0	0.48	0.0833	4.0	0.94	3.5	0.146	0.157

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 6.9 EFFICIENCY= 0.97
CFS INTERCEPTED= 1.00 CFS CARRYOVER= 0.03

```
==============================================================================
INLET NUMBER J2                LENGTH   4.0          STATION  13+10 RD "B"

DRAINAGE AREA =  0.250 ACRES        C VALUE = .400        CA =  0.100
DRAINAGE AREA =  0.460 ACRES        C VALUE = .300        CA =  0.138

FOR THE FIRST SIDE
SUM CA=   0.100 INT=  3.50  CFS=   0.350  CO=  0.000 GUTTER FLOW=   0.350
FOR THE OTHER SIDE
SUM CA=   0.138 INT=  3.50  CFS=   0.483  CO=  0.030 GUTTER FLOW=   0.513
AT THE INLET

SUM CA=   0.238 INT=  3.50  CFS=   0.833  CO=  0.030 GUTTER FLOW=   0.863

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.51 (cfs) IS  6.84 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  7.60                  H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.13           SPREAD (ft)  =  6.46



==============================================================================
INLET NUMBER J3                LENGTH   2.5          STATION  13+10 RD "B"

DRAINAGE AREA =  0.030 ACRES        C VALUE = .900        CA =  0.027
DRAINAGE AREA =  0.160 ACRES        C VALUE = .800        CA =  0.128

FOR THE FIRST SIDE
SUM CA=   0.027 INT=  3.50  CFS=   0.094  CO=  0.000 GUTTER FLOW=   0.094
FOR THE OTHER SIDE
SUM CA=   0.128 INT=  3.50  CFS=   0.448  CO=  0.000 GUTTER FLOW=   0.448
AT THE INLET

SUM CA=   0.155 INT=  3.50  CFS=   0.543  CO=  0.000 GUTTER FLOW=   0.543

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.45 (cfs) IS  6.35 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  6.10                  H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.11           SPREAD (ft)  =  5.49
```

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. _____
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
FROM RTE 612	30" UNDER STA 25+00				6.96												
K1	K2	3.40	0.30	1.02	7.98	19.3	4.8	38.30	50.0	48.90	18'	0.061	30"	101.30	19.2	0.9	HW/D = 1.4 = 3.5
K3	K2	0.34	0.80	0.27	—	7	6.6	1.78	50.69	50.40	32'	0.0092	12"	2.98	3.96	8.1	
K2	K5	1.19	0.35	0.42	8.67	19.3	4.8	41.62	48.40	46.62	328	0.0054	36"	47.16	7.53	43.6	
K4	K5	0.62	0.35	0.22	—	7	6.6	1.45	50.53	50.33	32'	0.0062	12"	2.8	3.57	7.4	
K5	K8	0.11	0.9	0.10	8.99	20.1	4.7	42.25	46.52	46.33	36'	0.0054	36"	44.24	7.13	5.0	
FROM RTE 612	18" UNDER STA 34+25	9.6	0.35		3.36												
K6	K7	6.92	0.30	2.08	5.44	17.2	5.0	27.20	49.50	48.25	18'	0.0694	24"	59.60	18.5	1.0	HW/D = 1.8 = 3.6'
K7	K8	0.76	0.65	0.49	5.93	17.2	5.0	29.65	48.15	47.32	48'	0.0172	24"	29.65	9.44	5.1	
K8	K9	0.66	0.65	0.43	15.35	20.2	4.7	72.15	45.33	44.77	200'	0.0028	48"	76.01	6.88	29.1	
K9	K10								44.67	43.80	310'	0.0028	48"	76.01	6.88	45.1	

```
==============================================================================
INLET NUMBER K2                LENGTH   8.0          STATION  20+93 RD "B"

DRAINAGE AREA =  1.010 ACRES        C VALUE = .300        CA =  0.303
DRAINAGE AREA =  0.180 ACRES        C VALUE = .800        CA =  0.144

FOR THE FIRST SIDE
SUM CA=   0.303 INT=  3.50  CFS=   1.061  CO=  0.000 GUTTER FLOW=   1.061
FOR THE OTHER SIDE
SUM CA=   0.144 INT=  3.50  CFS=   0.504  CO=  0.000 GUTTER FLOW=   0.504
AT THE INLET

SUM CA=   0.447 INT=  3.50  CFS=   1.565  CO=  0.000 GUTTER FLOW=   1.565

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   1.06 (cfs) IS  7.51 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) = 11.60                  H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.15            SPREAD (ft)  =  7.25


==============================================================================
INLET NUMBER K3                LENGTH   4.0          STATION  20+93 RD"B"

DRAINAGE AREA =  0.250 ACRES        C VALUE = .800        CA =  0.200
DRAINAGE AREA =  0.090 ACRES        C VALUE = .800        CA =  0.072

FOR THE FIRST SIDE
SUM CA=   0.200 INT=  3.50  CFS=   0.700  CO=  0.000 GUTTER FLOW=   0.700
FOR THE OTHER SIDE
SUM CA=   0.072 INT=  3.50  CFS=   0.252  CO=  0.000 GUTTER FLOW=   0.252
AT THE INLET

SUM CA=   0.272 INT=  3.50  CFS=   0.952  CO=  0.000 GUTTER FLOW=   0.952

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   0.70 (cfs) IS  5.98 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  7.60                  H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.14            SPREAD (ft)  =  6.90
```

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==============================================================================
INLET NUMBER K4                LENGTH   2.5          STATION  24+21

DRAINAGE AREA =  0.240 ACRES        C VALUE = .350        CA =  0.084
DRAINAGE AREA =  0.370 ACRES        C VALUE = .350        CA =  0.130

FOR THE FIRST SIDE
SUM CA=   0.084 INT=  3.50  CFS=   0.294  CO=  0.040 GUTTER FLOW=   0.334
FOR THE OTHER SIDE
SUM CA=   0.130 INT=  3.50  CFS=   0.453  CO=  0.000 GUTTER FLOW=   0.453
AT THE INLET

SUM CA=   0.213 INT=  3.50  CFS=   0.747  CO=  0.040 GUTTER FLOW=   0.787

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.45 (cfs) IS  6.39 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  6.10                    H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.15            SPREAD (ft)  =  7.04


==============================================================================
INLET NUMBER K5                LENGTH   2.5          STATION  24+21

DRAINAGE AREA =  0.100 ACRES        C VALUE = .800        CA =  0.080
DRAINAGE AREA =  0.010 ACRES        C VALUE = .900        CA =  0.009

FOR THE FIRST SIDE
SUM CA=   0.080 INT=  3.50  CFS=   0.280  CO=  0.000 GUTTER FLOW=   0.280
FOR THE OTHER SIDE
SUM CA=   0.009 INT=  3.50  CFS=   0.031  CO=  0.050 GUTTER FLOW=   0.082
AT THE INLET

SUM CA=   0.089 INT=  3.50  CFS=   0.312  CO=  0.050 GUTTER FLOW=   0.362

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.28 (cfs) IS  4.73 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  6.10                    H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.09            SPREAD (ft)  =  4.19
```

```
==============================================================================
INLET NUMBER K7                LENGTH   8.0          STATION  24+85 RD"B"

DRAINAGE AREA =  0.760 ACRES          C VALUE = .650          CA =  0.494
SUM CA=   0.494 INT=  3.50  CFS=   1.729  CO=  0.000 GUTTER FLOW=   1.729

GUTTER SLOPE = 0.0170 FT/FT          PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  6.11     2.0     0.33   0.0833      4.0        0.81    3.5    0.146   0.139

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  9.0                EFFICIENCY= 0.98
   CFS INTERCEPTED=  1.69                 CFS CARRYOVER=  0.04
```

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==============================================================================
INLET NUMBER K8                LENGTH   6.0          STATION  24+50

DRAINAGE AREA =  0.660 ACRES          C VALUE = .650          CA =  0.429
SUM CA=   0.429 INT=  3.50  CFS=   1.502  CO=  0.000 GUTTER FLOW=   1.502

GUTTER SLOPE = 0.0080 FT/FT          PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  6.97     2.0     0.29   0.0833      4.0        0.75    3.5    0.146   0.130

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  7.1                EFFICIENCY= 0.97
   CFS INTERCEPTED=  1.45                 CFS CARRYOVER=  0.05
```

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

Subject NATURAL CHANNEL CAPACITIES
Computed By DSL Checked By

Project No. 91053-29
Client BUSH COMP
Date 8/2/93 Sheet No.

CHANNEL THAT CROSSES STA ROAD 'A'

ANALYZE 700 FEET DOWNSTREAM OF ROAD CROSSING ELEVATION

(THIS IS POINT WHERE CHANNEL FLATTENS & BEGINS TO WIDEN)

NATURAL DRAINAGE AREA = 15.84 AC

STORM SEWER COLLECTS PART OF THIS DRAINAGE AREA AND ROUTES STORM WATER TO LAKE 'C'

POST DEVELOPMENT DRAINAGE AREA = 7.42 C

TWO YEAR STORM ANALYSIS

PREDEVELOPMENT Q_{PRE}

$C = 0.25$, $T_C = 15$ MIN $\Rightarrow i_2 = 4.0$ in/hr

$Q_{PRE_2} = CIA = (0.25)(4.0)(15.84) = 15.84$ cfs

POST DEVELOPMENT Q_{POST}

$C = 0.40$, $T_C = 10$ MIN $\Rightarrow i = 4.6$ in/hr

$Q_{POST_2} = CIA = (0.40)(4.6)(\quad) = 13.65$ cfs

13.65 $Q_{POST} < Q_{PRE} = 15.84$

THEREFORE - EROSION POTENTIAL IN NATURAL CHANNEL IS REDUCED & NO STREAM STABILIZATION IS REQUIRED.

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

Subject _____

Computed By _____ Checked By _____

Project No. _____

Client _____

Date _____ Sheet No. _____

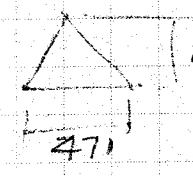
SEDIMENT BASIN FOR 'E' DRAINAGE SYSTEM

DRAINAGE AREA 13.65 AC

WET VOLUME REQUIRED = 13.65 AC × 67 CY/AC = 915 CY
= 24,693 CF

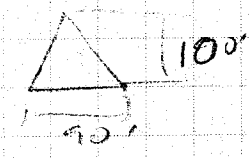
DRY STORAGE REQ'D = 24,692 CF

EXCAVATE WET STORAGE → TRIANGULAR AREA
WITH BOTTOM AT



⇒ 1340 SF

AND TOP OF



4500 SF

10' DEEP, 2:1 SIDE SLOPES

⇒ VOLUME = 29,198 CF, USE EXTRA TOWARDS DRY STORAGE REQUIREMENTS ⇒ SET DEWATERING DEVICE AT 9.5' ABOVE BOTTOM ⇒ VOLUME = 24,757 CF

DRY VOLUME PROVIDED = $(29,198 - 24,757) + \frac{20,000 + 24,000}{2}$
= 4441 + 22,000 = 24,441

SHOULD BE CLOSE ENOUGH

OUTFALL NEEDS TO BE DESIGNED FOR PERMANENT RETENTION

Q MAX OUT = 2 YEAR PRE DEVELOPMENT PEAK
= 13.65 AC · 0.25 · 4.0 IN/hr = 13.65 cfs

USE BARREL WITH $HW/D < 1.5$

MAN-MADE CHANNELS

VARIABLES LIST:

Y - FLOW DEPTH	B - CHANNEL BOTTOM WIDTH	S - CHANNEL SLOPE
Q - FLOWRATE	M - CHANNEL SIDE SLOPE	N - CHANNEL ROUGHNES

VARIABLE TO BE SOLVED (Y,Q,B,M,S OR N) ? Y

Q (CFS) ? 84
B (FT) ? 0
M (FT/FT) ? .5
S (FT/FT) ? .006
N (FT^1/6) ? .05

RESULTS
==========

Y=	4.54	FT
A=	10.32	SF
P=	10.16	FT
V=	8.38	FPS
F=	0.27	SUB-CRITICAL FLOW

<Shift> <Prt Sc> print <Return> repeat <Space Bar> back to men

LO-269
Rev 3-83

22(5-18)

Project _____

Plan Sheet No. ____ Designer _____
Rev. Date _____ Date _____

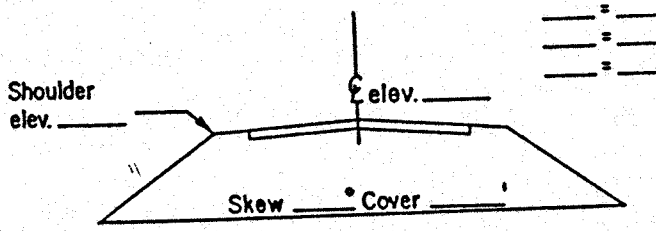
Sheet ____ of ____

HYDROLOGICAL DATA:
D.A. = _____ AC.

AHW Controls
100 yr. Flood plain _____ elev. _____
Design AHW depth _____ elev. _____
Structures _____ elev. _____

STATION: _____

freq. TWelev.
____ = _____
____ = _____
____ = _____
____ = _____
____ = _____



Inv. El. 48.89 — So = 0.07% — Inv. El. 47.77
Orig. Gr. Elev. _____ — L = 160'± — Orig. Gr. Elev. _____

DISCHARGES USED
Q ____ = _____ CFS
Q ____ = _____ CFS
Q ____ = _____ CFS
Q ____ = _____ CFS
Q ____ = _____ CFS

RISK ASSESSMENT — ADT _____
Detours Available _____ ; Length _____
Overtopping Stage _____
Flood Plain Management _____
Criteria and Significant Impact _____

CULVERT TYPE & SIZE	Q	Q/B	HEADWATER COMPUTATIONS: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL Ke	dc	(dc+D)/2	ho	H	LSo	HW	CONT. HW. ELEV.	OUTLET VELOCITY C.M.	OUTLET VELOCITY Smooth	End Treat.	COMMENTS
DIC 6WX3H	213	110	1.35	4.05	0.5											
DIB 6WX4H	213	110	0.95	3.8	0.5											
5 - 36" R.C.P.	213	42.6	1.1	3.3	0.5	2.1	2.55	4.62	1.13	1.12	4.6	4.6'				
5 - 42 R.C.P.	213	42.6	.87	3.05	0.5	2.0	2.75	5.12	0.7	1.12	4.7	4.7'				

Design Flood Exceed. Prob. _____ Elev. _____
Overtop Flood Exceed. Prob. _____ Elev. _____
Base Flood 1% Exceed. Prob. _____ Elev. _____

SUMMARY RECOMMENDATIONS:

(Rev. 1/85)

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 23:42:48 08-02-1993

GREENSPRINGS SINGLE FAMILY
'E'SYSTEM DENTION BASIN

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

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

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

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
E1	0.500	3.17						
E2	0.800	0.13						
E3	0.510	0.50						
E4	0.400	1.61						
E4RW	0.800	0.14						
FUTURE CDS E3 AND E4RW	0.400	1.36						
	0.800	0.30						
E6LOTS	0.400	0.92						
GREENSPACE	0.250	0.83						
MISCLOTS	0.400	4.75						
			14.00	0.435	0.435	4.120	13.71	24.55

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 23:42:48 08-02-1993

GREENSPRINGS SINGLE FAMILY
'E'SYSTEM DENTION BASIN

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

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

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

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
E1	0.500	3.17						
E2	0.800	0.13						
E3	0.510	0.50						
E4	0.400	1.61						
E4RW	0.800	0.14						
FUTURE CDS	0.400	1.36						
E5 AND E6RW	0.800	0.30						
E6LOTS	0.400	0.92						
GREENSPACE	0.250	0.83						
MISCLOTS	0.400	4.75						
			14.00	0.435	0.435	5.400	13.71	22.15

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 23:42:48 08-02-1993

GREENSPRINGS SINGLE FAMILY
'E'SYSTEM DENTION BASIN

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

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

RETURN FREQUENCY = 100 years
'C' adjustment, k = 1
Adj. 'C' = Wtd.'C' x 1

Subares Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
E1	0.500	3.17						
E2	0.800	0.13						
E3	0.510	0.50						
E4	0.400	1.61						
E4RW	0.800	0.14						
FUTURE CDS	0.400	1.36						
E5 AND E6RW	0.800	0.30						
E6LOTS	0.400	0.92						
GREENSPACE	0.250	0.83						
MIXOLOTS	0.400	4.75						
			14.00	0.435	0.435	7.360	13.71	43.8

Quick TR-55 Ver.5.46 S/N:1315430271
Executed: 23:42:48 08-02-1993

GREENSPRINGS SINGLE FAMILY
'E'SYSTEM DENTION BASIN

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

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

RETURN FREQUENCY = 25 years
'C' adjustment, f = 1
Adj. 'C' = Wtd. 'C' x 1

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
E1	0.500	3.17						
E2	0.800	0.13						
E3	0.510	0.50						
E4	0.400	1.61						
E4PW	0.800	0.14						
FUTURE CDS	0.400	1.36						
E5 AND E5RW	0.800	0.30						
E6LOTS	0.400	0.92						
GREENSPACE	0.250	0.89						
MISCLOTS	0.400	4.75						
			14.00	0.425	0.435	6.140	13.71	36.71

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 4.5 EFFICIENCY= 0.98
CFS INTERCEPTED= 0.58 CFS CARRYOVER= 0.01

==========

INLET NUMBER H1 LENGTH 6.0 STATION 1230

DRAINAGE AREA = 0.370 ACRES C VALUE = .500 CA = 0.185
DRAINAGE AREA = 0.640 ACRES C VALUE = .500 CA = 0.320

FOR THE FIRST SIDE
SUM CA= 0.185 INT= 3.50 CFS= 0.648 CO= 0.000 GUTTER FLOW= 0.648

FOR THE OTHER SIDE
SUM CA= 0.320 INT= 3.50 CFS= 1.120 CO= 0.000 GUTTER FLOW= 1.120
AT THE INLET

SUM CA= 0.505 INT= 3.50 CFS= 1.767 CO= 0.000 GUTTER FLOW= 1.767

GUTTER SLOPE = 0.0200 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .020 (ft./ft.) AND 1.12 (cfs) IS 4.49 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.19 SPREAD (ft) = 8.92

```
==========================================================================
INLET NUMBER I1                    LENGTH   6.0          STATION  7133R

DRAINAGE AREA =  0.840 ACRES          C VALUE = .500          CA =  0.420
SUM CA=   0.420 INT=  3.50  CFS=   1.470  CO=  0.000 GUTTER FLOW=   1.470

GUTTER SLOPE = 0.0060 FT/FT          PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T     SW        SW/SX      Eo      a      S'W     SE
  7.51     2.0    0.27   0.0800      3.8      0.67    3.4    0.143  0.116

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  6.9                EFFICIENCY= 0.98
   CFS INTERCEPTED=  1.43                  CFS CARRYOVER=  0.04
```

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==========================================================================
INLET NUMBER I2                    LENGTH   6.0          STATION  7073

DRAINAGE AREA =  0.600 ACRES          C VALUE = .500          CA =  0.300
DRAINAGE AREA =  0.160 ACRES          C VALUE = .500          CA =  0.080

FOR THE FIRST SIDE
SUM CA=   0.300 INT=  3.50  CFS=   1.050  CO=  0.000 GUTTER FLOW=   1.050
FOR THE OTHER SIDE
SUM CA=   0.080 INT=  3.50  CFS=   0.280  CO=  0.040 GUTTER FLOW=   0.320
AT THE INLET

SUM CA=   0.380 INT=  3.50  CFS=   1.330  CO=  0.040 GUTTER FLOW=   1.370

GUTTER SLOPE = 0.0010 FT/FT          PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND   1.05 (cfs) IS  9.81 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.458
   DEPTH OF WATER (ft) =   0.16             SPREAD (ft)  =  7.53
```

```
==========================================================================
INLET NUMBER I4                    LENGTH   4.0          STATION  7133L
```



```
DRAINAGE AREA =  0.210 ACRES          C VALUE = .800          CA =  0.168
```

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 1.05 (cfs) IS 9.81 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.16 SPREAD (ft) = 7.53

==========

INLET NUMBER I4 LENGTH 4.0 STATION 7133L

DRAINAGE AREA = 0.210 ACRES C VALUE = .800 CA = 0.168
SUM CA= 0.168 INT= 3.50 CFS= 0.588 CO= 0.000 GUTTER FLOW= 0.588

GUTTER SLOPE = 0.0060 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
4.35	2.0	0.46	0.0800	3.8	0.90	3.4	0.143	0.150

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 4.0 EFFICIENCY= 1.00
CFS INTERCEPTED= 0.59 CFS CARRYOVER= 0.00

==========

INLET NUMBER I3 LENGTH 2.5 STATION 7073

DRAINAGE AREA = 0.170 ACRES C VALUE = .800 CA = 0.136
DRAINAGE AREA = 0.030 ACRES C VALUE = .800 CA = 0.024

FOR THE FIRST SIDE
SUM CA= 0.136 INT= 3.50 CFS= 0.476 CO= 0.000 GUTTER FLOW= 0.476
FOR THE OTHER SIDE
SUM CA= 0.024 INT= 3.50 CFS= 0.084 CO= 0.000 GUTTER FLOW= 0.084
AT THE INLET

SUM CA= 0.160 INT= 3.50 CFS= 0.560 CO= 0.000 GUTTER FLOW= 0.560

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.48 (cfs) IS 6.66 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 6.10 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.12 SPREAD (ft) = 5.61

PROJECT 9153.29
HEC12 Version: V2.91 Run Date: 08-03-1993

==========

INLET NUMBER K2 LENGTH 10.0 STATION 20+92R

DRAINAGE AREA = 0.250 ACRES C VALUE = .800 CA = 0.200
DRAINAGE AREA = 0.090 ACRES C VALUE = .800 CA = 0.072

FOR THE FIRST SIDE
SUM CA= 0.200 INT= 3.50 CFS= 0.700 CO= 0.000 GUTTER FLOW= 0.700
FOR THE OTHER SIDE
SUM CA= 0.072 INT= 3.50 CFS= 0.252 CO= 0.000 GUTTER FLOW= 0.252
AT THE INLET

SUM CA= 0.272 INT= 3.50 CFS= 0.952 CO= 0.000 GUTTER FLOW= 0.952

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.70 (cfs) IS 8.11 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 13.60 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.10 SPREAD (ft) = 4.68

==========

INLET NUMBER K7 LENGTH 6.0 STATION 24+85L

DRAINAGE AREA = 0.310 ACRES C VALUE = .800 CA = 0.248
SUM CA= 0.248 INT= 3.50 CFS= 0.868 CO= 0.000 GUTTER FLOW= 0.868

GUTTER SLOPE = 0.0200 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.68	2.0	0.54	0.0800	3.8	0.95	3.4	0.143	0.156

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 6.6 EFFICIENCY= 0.99
CFS INTERCEPTED= 0.86 CFS CARRYOVER= 0.01

```
==========================================================================
INLET NUMBER A2                LENGTH  10.0          STATION  14001

DRAINAGE AREA =  0.260 ACRES        C VALUE = .800        CA =  0.208
DRAINAGE AREA =  1.330 ACRES        C VALUE = .250        CA =  0.333
SUM CA=   0.540 INT=  3.50  CFS=   1.892  CO=  0.000 GUTTER FLOW=   1.892

GUTTER SLOPE = 0.0205 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T     SW        SW/SX      Eo      a      S'W     SE
  6.19     2.0     0.32   0.0800     3.8       0.76    3.4    0.143  0.130

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) = 10.3                EFFICIENCY= 1.00
   CFS INTERCEPTED=  1.89                  CFS CARRYOVER=  0.00


==========================================================================
INLET NUMBER A3                LENGTH   6.0          STATION  14001

DRAINAGE AREA =  0.260 ACRES        C VALUE = .800        CA =  0.208
SUM CA=   0.208 INT=  3.50  CFS=   0.728  CO=  0.000 GUTTER FLOW=   0.728

GUTTER SLOPE = 0.0205 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T     SW        SW/SX      Eo      a      S'W     SE
  3.10     2.0     0.64   0.0800     3.8       0.98    3.4    0.143  0.160

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  6.1                EFFICIENCY= 1.00
   CFS INTERCEPTED=  0.73                  CFS CARRYOVER=  0.00
```

PROJECT 91053-35
HEC12 Version: V2.91 Run Date: 05-27-1994

==========

INLET NUMBER A13-Rd B LENGTH 10.0 STATION 40+25

DRAINAGE AREA = 0.780 ACRES C VALUE = .550 CA = 0.429
SUM CA= 0.429 INT= 3.50 CFS= 1.502 CO= 0.000 GUTTER FLOW= 1.502

GUTTER SLOPE = 0.0450 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.99	2.0	0.50	0.0833	4.0	0.95	3.5	0.146	0.159

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 10.5 EFFICIENCY= 1.00
CFS INTERCEPTED= 1.49 CFS CARRYOVER= 0.01

PROJECT 91053-35
HEC12 Version: V2.91 Run Date: 05-25-1994

==========

INLET NUMBER A8a-Rd E LENGTH 4.0 STATION 11+13

DRAINAGE AREA = 0.190 ACRES C VALUE = .490 CA = 0.093
SUM CA= 0.093 INT= 3.50 CFS= 0.326 CO= 0.000 GUTTER FLOW= 0.326

GUTTER SLOPE = 0.0286 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
1.56	2.0	1.28	0.0833	4.0	1.00	3.5	0.146	0.167

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 4.7 EFFICIENCY= 0.97
CFS INTERCEPTED= 0.32 CFS CARRYOVER= 0.01

==========

INLET NUMBER A8-Rd E LENGTH 6.0 STATION 10+63

DRAINAGE AREA = 0.370 ACRES C VALUE = .290 CA = 0.107
DRAINAGE AREA = 0.070 ACRES C VALUE = .710 CA = 0.050

FOR THE FIRST SIDE
SUM CA= 0.107 INT= 3.50 CFS= 0.376 CO= 0.010 GUTTER FLOW= 0.386
FOR THE OTHER SIDE
SUM CA= 0.050 INT= 3.50 CFS= 0.174 CO= 0.000 GUTTER FLOW= 0.174
AT THE INLET

SUM CA= 0.157 INT= 3.50 CFS= 0.549 CO= 0.010 GUTTER FLOW= 0.559

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.39 (cfs) IS 5.81 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.385
DEPTH OF WATER (ft) = 0.09 SPREAD (ft) = 4.14

PROJECT 91053-35
HEC12 Version: V2.91 Run Date: 05-27-1994

==========

INLET NUMBER A9-Rd E LENGTH 6.0 STATION 10+63

DRAINAGE AREA = 0.280 ACRES C VALUE = .430 CA = 0.120
DRAINAGE AREA = 0.080 ACRES C VALUE = .570 CA = 0.046

FOR THE FIRST SIDE
SUM CA= 0.120 INT= 3.50 CFS= 0.421 CO= 0.000 GUTTER FLOW= 0.421
FOR THE OTHER SIDE
SUM CA= 0.046 INT= 3.50 CFS= 0.160 CO= 0.000 GUTTER FLOW= 0.160
AT THE INLET

SUM CA= 0.166 INT= 3.50 CFS= 0.581 CO= 0.000 GUTTER FLOW= 0.581

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.42 (cfs) IS 6.13 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.385
DEPTH OF WATER (ft) = 0.09 SPREAD (ft) = 4.25

```
==========================================================================
INLET NUMBER D10-Rd A        LENGTH   6.0        STATION  94+99

DRAINAGE AREA =  0.500 ACRES        C VALUE = .320        CA =  0.160
DRAINAGE AREA =  0.310 ACRES        C VALUE = .320        CA =  0.099

FOR THE FIRST SIDE
SUM CA=   0.160 INT=  3.50  CFS=   0.560  CO=  0.000 GUTTER FLOW=   0.560
FOR THE OTHER SIDE
SUM CA=   0.099 INT=  3.50  CFS=   0.347  CO=  0.000 GUTTER FLOW=   0.347
AT THE INLET

SUM CA=   0.259 INT=  3.50  CFS=   0.907  CO=  0.000 GUTTER FLOW=   0.907

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   0.56 (cfs) IS  5.21 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.12          SPREAD (ft)  =  5.72


==========================================================================
INLET NUMBER D11-Rd A        LENGTH  10.0        STATION  94+99

DRAINAGE AREA =  0.620 ACRES        C VALUE = .320        CA =  0.198
DRAINAGE AREA =  0.550 ACRES        C VALUE = .320        CA =  0.176

FOR THE FIRST SIDE
SUM CA=   0.198 INT=  3.50  CFS=   0.694  CO=  0.000 GUTTER FLOW=   0.694
FOR THE OTHER SIDE
SUM CA=   0.176 INT=  3.50  CFS=   0.616  CO=  0.000 GUTTER FLOW=   0.616
AT THE INLET

SUM CA=   0.374 INT=  3.50  CFS=   1.310  CO=  0.000 GUTTER FLOW=   1.310

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   0.69 (cfs) IS  5.95 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 13.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.12          SPREAD (ft)  =  5.79
```

```
==========================================================================
INLET NUMBER D13-Rd A        LENGTH   6.0        STATION  89+66

DRAINAGE AREA =  0.450 ACRES        C VALUE = .320       CA =  0.144
SUM CA=   0.144 INT=  3.50  CFS=   0.504  CO=  0.000 GUTTER FLOW=   0.504

GUTTER SLOPE = 0.0436 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T     SW        SW/SX      Eo      a      S'W     SE
  1.70     2.0     1.18   0.0833     4.0       1.00   3.5    0.146  0.167

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =  6.4                EFFICIENCY= 0.99
    CFS INTERCEPTED=  0.50                 CFS CARRYOVER=  0.00


==========================================================================
INLET NUMBER D14-Rd A        LENGTH   6.0        STATION  89+30

DRAINAGE AREA =  0.800 ACRES        C VALUE = .320       CA =  0.256
SUM CA=   0.256 INT=  3.50  CFS=   0.896  CO=  0.000 GUTTER FLOW=   0.896

GUTTER SLOPE = 0.0376 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T     SW        SW/SX      Eo      a      S'W     SE
  2.63     2.0     0.76   0.0833     4.0       1.00   3.5    0.146  0.166

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =  7.8                EFFICIENCY= 0.93
    CFS INTERCEPTED=  0.83                 CFS CARRYOVER=  0.06
```

```
==========================================================================
INLET NUMBER D15-Rd A        LENGTH   6.0        STATION  86+88

DRAINAGE AREA =  1.240 ACRES        C VALUE = .320        CA =  0.397
SUM CA=   0.397 INT=  3.50  CFS=   1.389  CO=  0.060 GUTTER FLOW=   1.449

GUTTER SLOPE = 0.0107 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  6.31     2.0     0.32   0.0833      4.0       0.79    3.5    0.146   0.137

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =  7.4                EFFICIENCY= 0.95
    CFS INTERCEPTED=  1.38                CFS CARRYOVER=  0.07


==========================================================================
INLET NUMBER D16-Rd A        LENGTH   8.0        STATION  84+70

DRAINAGE AREA =  2.020 ACRES        C VALUE = .320        CA =  0.646
SUM CA=   0.646 INT=  3.50  CFS=   2.262  CO=  0.070 GUTTER FLOW=   2.332

GUTTER SLOPE = 0.0056 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  9.47     2.0     0.21   0.0833      4.0       0.60    3.5    0.146   0.108

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =  8.5                EFFICIENCY= 0.99
    CFS INTERCEPTED=  2.32                CFS CARRYOVER=  0.02
```

```
==============================================================================
INLET NUMBER D17-Rd A        LENGTH   6.0        STATION  84+25

DRAINAGE AREA =  0.260 ACRES        C VALUE = .450        CA =  0.117
DRAINAGE AREA =  0.200 ACRES        C VALUE = .410        CA =  0.082

FOR THE FIRST SIDE
SUM CA=   0.117 INT=  3.50  CFS=   0.409  CO=  0.000 GUTTER FLOW=   0.409
FOR THE OTHER SIDE
SUM CA=   0.082 INT=  3.50  CFS=   0.287  CO=  0.000 GUTTER FLOW=   0.287
AT THE INLET

SUM CA=   0.199 INT=  3.50  CFS=   0.697  CO=  0.000 GUTTER FLOW=   0.697

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   0.41 (cfs) IS  4.17 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.10          SPREAD (ft)  =  4.79
```

```
==========================================================================
INLET NUMBER D19-Rd A        LENGTH   6.0        STATION  83+59

DRAINAGE AREA =  1.270 ACRES        C VALUE = .320        CA =  0.406
SUM CA=   0.406 INT=  3.50  CFS=   1.422  CO=  0.000 GUTTER FLOW=   1.422

GUTTER SLOPE = 0.0120 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W     W/T     SW        SW/SX      Eo      a     S'W     SE
  6.04     2.0    0.33   0.0833     4.0       0.81   3.5    0.146  0.139

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =  7.5                EFFICIENCY= 0.95
    CFS INTERCEPTED=  1.35                 CFS CARRYOVER=  0.08


==========================================================================
INLET NUMBER D18-Rd A        LENGTH  10.0        STATION  84+25

DRAINAGE AREA =  0.540 ACRES        C VALUE = .260        CA =  0.140
DRAINAGE AREA =  0.880 ACRES        C VALUE = .260        CA =  0.229

FOR THE FIRST SIDE
SUM CA=   0.140 INT=  3.50  CFS=   0.491  CO=  0.020 GUTTER FLOW=   0.511
FOR THE OTHER SIDE
SUM CA=   0.229 INT=  3.50  CFS=   0.801  CO=  0.080 GUTTER FLOW=   0.881
AT THE INLET

SUM CA=   0.369 INT=  3.50  CFS=   1.292  CO=  0.100 GUTTER FLOW=   1.392

GUTTER SLOPE = 0.0040 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .004 (ft./ft.) AND   0.88 (cfs) IS  6.28 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 13.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.13           SPREAD (ft)  =  6.03
```

GREENSPRINGS

LAND BAY S-3

PHASE I & II

DRAINAGE CALCULATIONS

Langley and McDonald, P.C.

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GREENSPRINGS LANDBAY S-3
PHASE II
EROSION AND SEDIMENT CONTROL

The stormwater management and collection system for Greensprings utilizes large regional detention ponds to collect sediment and reduce peak runoff rates to pre-development levels. Stormwater from the Phase II portion of Road "A" will be piped across a natural drainage divide to Lake "C". The remainder of the drainage basin downstream from Road "A" and in the Greensprings Plantation property, will be developed on a limited basis so that runoff rates will not exceed pre-development levels. Likewise, stormwater from Road "J" and most of Road "I" will be piped to Drypond Number 1. Roads "B", "E", and "F" are within the natural drainage basin for Lake "C". Lake "C" and Drypond Number 1 are being built as part of Legacy Golf Links.

Temporary sediment traps and one temporary sediment basin will be constructed to contain sediment during the road construction period and until disturbed areas are stabilized. After this period, the sediment basin will be filled and seeded for use as an open play area required by the recreation proffers. The sediment traps will be left in place. - need to be removed

Greensprings Plantation- Summary Table for 10-Point BMP Plan
4/26/93

BMPs Coincide With Those Shown on SWMP for Greenspring Plantation

Total site area= 1402 acres

				BMP Points		
BMP/DA	Total Area (ac)	% of site	Open Space (ac)	Structural	Open Space	Total
Lake C	91	7%	9	11	1.0	12.0
Lake F	119	8%	6	11	0.5	11.5
Lake G	64	5%	5	11	0.8	11.8
Lake E	79	6%	2	10	0.3	10.3
Lake H	22	2%	0	9	0.0	9.0
Lake A	31	2%	4	9	1.3	10.3
Wetpond 1	22	2%	2	9	1.0	10.0
Drypond 1	246	18%	56	9	2.3	11.3
Drypond 2	124	9%	28	9	2.3	11.3
Drypond 4	47	3%	3	9	0.6	9.6
Drypond 5	16	1%	2	6	1.3	7.3
Drypond 6	32	2%	6	9	1.9	10.9
Subtotal	892	64%	123	9.6	1.4	11.0
Default*	510	36%	393	0.0	7.7	7.7
TOTAL	**1402**	**100%**	**516**	**6.1**	**3.7**	**9.8**

*Area not treated by a structure in conceptual stormwater management plan

W/O GOLF COURSE (40AC)

TABLE 3

WORKSHEET FOR BMP POINT SYSTEM
LAND BAY S-3, PHASES I & II
GREENSPRINGS

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP Points		Fraction of Site Served by BMP		Weighted BMP Points
LAKE "C"[1]	11	x	39/157	=	2.73
BMP#1	~~11~~ 9	x	91/157	=	~~6.38~~ 5.2
		x		=	
		x		=	

TOTAL WEIGHTED STRUCTURAL BMP POINTS: ~~9.11~~ 7.95

B. NATURAL OPEN SPACE CREDIT

Fraction of Site		Natural Open Space Credit		Points for Natural Open Space
25.4/157	x	10 (0.1 per 1%)	=	1.6

C. TOTAL WEIGHTED POINTS

9.1	+	1.6	=	~~10.7~~ 9.55 ok
Structural BMP Points		Natural Open Space Points		TOTAL

Does not meet 10 pt criteria

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Subject NATURAL CHANNEL CAPACITIES
Computed By DSL Checked By

Project No. 91053-29
Client BUSH COMP
Date 8/2/93 Sheet No. 1

CHANNEL THAT CROSSES STA 33+00 ROAD 'A' (5)?

ANALYZE 700 FEET DOWNSTREAM OF ROAD CROSSING ELEVATION

(THIS IS POINT WHERE CHANNEL FLATTENS & BEGINS TO WIDEN)

NATURAL DRAINAGE AREA = 15.84 AC

STORM SEWER COLLECTS PART OF THIS DRAINAGE AREA AND ROUTES STORM WATER TO LAKE 'C'

POST DEVELOPMENT DRAINAGE AREA = 7.42 C

TWO YEAR STORM ANALYSIS

PREDEVELOPMENT Q_{PRE}

$C = 0.25$, $T_C = 15$ MIN $\Rightarrow i_2 = 4.0$ in/hr

$Q_{PRE_2} = CIA = (0.25)(4.0)(15.84) = 15.84$ cfs

POST DEVELOPMENT Q_{POST}

$C = 0.40$, $T_C = 10$ MIN $\Rightarrow i = 4.6$ in/hr

$Q_{POST_2} = CIA = (0.40)(4.6)(7.42) = 13.65$ cfs

$13.65 \; Q_{POST} < Q_{PRE} = 15.84$

THEREFORE - EROSION POTENTIAL IN NATURAL CHANNEL IS REDUCED & NO STREAM STABILIZATION IS REQUIRED.

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Subject POST DEVELOPMENT RUN OFF CONTROL
Computed By DSL Checked By

Project No. 91053-29d
Client BUSH COMP
Date 12-7-93 Sheet No. 2

GOAL - KEEP POST DEV $Q_2 \leq$ PRE DEV Q_2 THROUGH DIVERSION TO MAJOR BMP'S
SEDIMENT TRAP 'E'

PRE-DEVELOPMENT ?

DRAINAGE AREA = 13.18 AC
$C = 0.25$ $T_c = 25$ min $\Rightarrow i_2 = 3.0$ in/hr

$Q_{2pre} = (0.25)(3.0)(13.18) = 9.89$ cfs

POST DEVELOPMENT
DRAINAGE AREA 6.06 AC
$C = 0.40$ $T_c = 15$ min $\Rightarrow i_2 = 3.9$ in/hr

$Q_{2post} = (0.4)(3.9)(6.06) = 9.45 < 9.89$ cfs ok

No permanent flow attenuation req'd
Sediment Basin req'd during construction

CHANNEL ALONG NORTH PROPERTY LINE ?
NORTH END ROAD 'A' & ROAD 'H'
PRE-DEVELOPMENT
DRAINAGE AREA = 17.68 AC
$C = 0.25$ $T_c = 20$ min $\Rightarrow i_2 = 3.4$ in/hr $\Rightarrow Q_{2pre} = 15.03$ cfs
POST DEVELOPMENT
DRAINAGE AREA = 15.53 AC
$C' = (0.30)(2.16\,AC)/15.53 + (0.25)(15.53 - 2.16)/15.53$
$= 0.04 + 0.22 = 0.26$

$Q_{post} = (0.26)(3.4)(15.53) = 13.73 < 15.03$ cfs ok

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Subject _____

Computed By _____ Checked By _____

Project No. _____

Client _____

Date 2-7-93 Sheet No. 3

RAVINE BETWEEN ROADS G&H (6) Justify pre/Tc's

PRE DEVELOPMENT

DRAINAGE AREA = 10.17 AC

$C = 0.25$ $T_c = 15$ min $i_2 = 3.9$ in/hr

$Q_{2pre} = (0.25)(3.9)(10.17) = 9.92$ cfs

POST DEVELOPMENT

DRAINAGE AREA = 5.2 AC

$C = 0.40$ $T_c = 10$ min $i_2 = 4.6$ in/hr

$Q_{2post} = (0.40)(4.6)(5.2) = 9.57$ cfs < 9.92 ok

NORTH ℄ @ LOT #57 ?

PRE DEVELOPMENT

DRAINAGE AREA = 36.53 AC

$C = 0.25$ $T_c = 25$ min $\Rightarrow i_2 = 3.0$ in/hr

$Q_{2pre} = (0.25)(3.0)(36.53 AC) = 27.4$ cfs

POST DEVELOPMENT

DRAINAGE AREA = 29.70 AC

$C' = (0.30)(10.40)/29.70 + (0.25)(29.70 - 10.40)/29.70 = 0.27$

$T_c = 25$ min $\Rightarrow i_2 = 3.0$ in/hr

$Q_{2post} = (0.27)(3.0)(29.7) = 23.8 < 27.4$ cfs ok

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Subject _____

Computed By _____ Checked By _____

Project No. 91053-29

Client _____

Date _____ Sheet No. _____

RAVINE AT 'J' OUTFALL (7)

PRE DEVELOPMENT DRAINAGE AREA 21.1 AC
PRE DEVELOPMENT IMPERVIOUS AREA = 0.28AC = 1.3%
(600LF 20' WIDE ROAD)

17.2 ACRES WEST OF ROUTE 614 ARE RETAINED IN WETLANDS EXCEPT IN EXTREME STORM EVENTS CULVERT UNDER RTE 614 SIZED FOR THESE STORMS. THIS LEAVES 3.9 ACRES TO DRAIN THROUGH RAVINE DURING 2 YEAR STORM EVENTS.
7.2% IMPERVIOUS, PRE DEVELOPMENT

PROPOSED CONSTRUCTION ADDS 0.30 ACRES (13,300SF) OF IMPERVIOUS AREA FOR A 15% POST DEVELOPMENT IMPERVIOUS AREA DOWNSTREAM OF WETLANDS AND 2.7% TOTAL FOR BASIN

AREA IN RTE 614 R/W TO BE TREATED IN ST'S
UNTREATED AREA = 2.58AC - AREA EAST OF R/W

PERM. TREATMENT IN BMP#1

ADDITIONAL PERMANENT STRUCTURES REQ'D WITH ADD. DEV. TO AVOID SCOUR IN RAVINE
WITH ST DETENTION
PRE-DEV. 2YR Q = 3.9AC x 0.25 x i = 0.98 i
POST DEV 2YR Q = 2.58AC x 0.25 x i = 0.65 i

Plan step
future BMP Pond

PROJECT GREENSPRINGS LB-53
JOB NO.
DATE 1-94 SHEET 14 OF
DESIGN FORMULA Q=CiA FREQ. 10

STORM SEWER DESIGN COMPUTATIONS

COMPUTED BY _____ CHECKED BY _____

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LOCATION		AREA ACRES	RUNOFF COEF.	"A" x "C"		INLET TIME	RAIN INTEN.	RUNOFF	PIPE (DITCH)	CAPA-CITY	VELO. FT./	LENGTH	SLOPE	FALL	INVERT ELEV.		REMARKS
STREET	POINT	"A"	"C"	INCRE.	ACCUM.	MIN.	INCH	Q CFS	SIZE	CFS	SEC.	FEET	FT/FT	FT.	UP	DOWN	
R/W	L-1	0.14	0.8	0.11		5	7.2	0.83	12	2.5	3.0	30	0.004	0.12			L=2.33 DI 3A
LOTS	L-2	0.66	0.40	0.26													
R/W	L-2	0.14	0.8	0.11	0.48	10	6.0	2.91	15	3.2	2.5	196	0.002	0.39			L=2.33 DI 3A
R/W	L-3	0.13	0.8	0.10	0.58	10	6.0	3.48	15	3.8	3.0	26	0.0028	0.07			DI 3A
LOTS	L-4	1.75	0.4	0.70													
R/W	L-4	0.13	0.8	0.10	1.38	10	6.0	8.28	21"	9.0	3.6	62	0.0026				

GREENSPRINGS

PROJECT LBS-3, PHASE I
JOB NO. 91053-29
DATE 1/7/93 SHEET 15 OF
DESIGN FORMULA FREQ.

STORM SEWER DESIGN COMPUTATIONS

COMPUTED BY DSL CHECKED BY

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LOCATION STREET	LOCATION POINT	AREA ACRES "A"	RUNOFF COEF. "C"	"A" x "C" INCRE.	"A" x "C" ACCUM.	INLET TIME MIN.	RAIN INTEN. INCH	RUNOFF Q CFS	PIPE (DITCH) SIZE	CAPA-CITY CFS	VELO. FT./SEC.	LENGTH FEET	SLOPE FT/FT	FALL FT.	INVERT ELEV. UP	INVERT ELEV. DOWN	REMARKS
~~LOTS 9 RW~~	~~FUTURE L4~~	~~3.17~~	~~0.5~~	~~1.59~~ →		10	6.0	9.54	24"	11	3.4	STUB 8	0.0022				FUTURE CONNECT.
~~L4~~	~~L5~~																
R/W	L5	0.13	0.80	0.10	1.69	10	6.0	10.14	24"	11.7	3.5	40	0.0024				L=6
L5	L6																
LOTS 9 RW	L6	0.51	0.50	0.26													
L6	L8				1.95	10	6.0	11.7	24"	13	4.0	38	0.0027				
R/W	L7	0.17	0.80	0.14													
L7	L8				0.14	5	7.0	0.98	12"	2.4	3.0	24	0.0038				FUTURE
LOTS	L8	1.61	0.4	0.64													
R/W	L8	0.14	0.8	0.11					27				0.0032				
L8	L9			0.75	2.84	10	6.0	17.0	24"	19	6.0	232	0.0060				Tp=0.6 min
LOTS	L9	2.04	0.4	0.82													
R/W	L9	0.14	0.8	0.11					30"								
				0.93	3.77	10	6.0	22.6	27"	25	6.2	294	0.0054				Tp=0.8
LOTS	L10	0.64	0.4	0.26													
R/W	L10	0.11	0.8	0.09													
L10	L11			0.35	4.12	11	5.83	24.0	27"	26	6.5	160	0.0060				Tp=0.4

~~8.00~~
8.44

PROJECT GREENSPRINGS LBS-3
JOB NO. 91053-35
DATE _____ SHEET 16 OF _____
DESIGN FORMULA _____ FREQ. _____

STORM SEWER DESIGN COMPUTATIONS

COMPUTED BY DSL CHECKED BY SAR

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LOCATION		AREA ACRES	RUNOFF COEF.	"A" x "C"		INLET TIME	RAIN INTEN.	RUNOFF	PIPE (DITCH)	CAPA-CITY	VELO. FT./	LENGTH	SLOPE	FALL	INVERT ELEV.		REMARKS
STREET	POINT	"A"	"C"	INCRE.	ACCUM.	MIN.	INCH	Q CFS	SIZE	CFS	SEC.	FEET	FT/FT	FT.	UP	DOWN	
R/W & LOTS AHEAD	M-1	0.20	0.70	0.14		5											
R/W & LOTS BACK	M-1	0.20	0.70	0.14		5											
M-1	M-2				0.28	5	7.2	2.02	12"	2.3	2.8		0.004				
LOTS	M-2	0.90	0.30	0.27													
LOTS	M-2	0.70	0.30	0.21	0.48												
M-2	M-3				0.76	5	7.2	5.47	15" CPEP n=0.012	6.0	4.7		0.007				
LOTS	N-1	0.45	0.4	0.18													
R/W	N-1	0.21	0.8	0.17													
N1	N2				0.35	13	5.7	2.0	15" CPEP n=0.012	10.5	8.5		0.0227				DI 3A
R/W LEFT	O-1	0.23	0.8	0.18													
R/W RIGHT	O-1	0.25	0.8	0.20													
O-1	O-2				0.38	5	7.2	2.7	15" CPEP n=0.012	8.0	6.4		0.0125				DI 3A
LOTS	P-1	0.70	0.4	0.28													
R/W	P-1	0.34	0.8	0.28	0.56												
P-1	P-2				0.56	12	5.8	3.2	15" CPEP n=0.012	5.4	4.4		0.0057				DI 3B L=4

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Subject TIME OF CONCENTRATION

Computed By DEL Checked By

Project No. 9105329435
Client BUSH CO.
Date 3/19/94 Sheet No. 1/4

INLET A-1 - FROM REALIGNED ROUTE 614 CALCS

INLET A-12 -

150 LF OVERLAND FLOW @ <1% THROUGH WOODE GREENBELT ⇒ 10 MIN

300 LF CHANNELIZED FLOW AROUND GOLF COURSE @ 2 fps ⇒ 2.5 MIN

200 LF CHANNELIZED FLOW BETWEEN LOTS @ 2.5 fps ⇒ 1.3 MIN

300 LF GUTTER FLOW @ ~4% or 5 fps = 1.0 MIN

14.8 MIN
SAY 15

INLET A5

200 LF OVERLAND FLOW @ 2% THROUGH WOODED GREENBELT 5 MIN

150 LF NATURAL CHANNEL @ 4 fps 0.6 MIN

450 LF CHANNELIZED FLOW THROUGH LOTS @ 2.5 fps 3.0 MIN

8.6 MIN
SAY 8 MIN

INLETS B1, B2, C1 & C2 MINIMUM TC ⇒ USE 5 MIN

INLET D10 - MINIMUM TC ⇒ 5 MIN

INLET D11 -

50 LF OVERLAND FLOW @ 1% THROUGH WOODS 4 MIN

200 LF CHANNELIZE FLOW THROUGH LOTS ~ 2.5 fps 1.3 MIN

150 LF GUTTER FLOW @ 1% ⇒ 2 fps 1.25 MIN

6.5 M
SAY 6

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Subject TIME OF CONCENTRATION

Computed By DSL Checked By

Project No. 91053.29935
Client BUSH CO
Date 3-14-94 Sheet No. 2/4

D15 200 LF OVERLAND FLOW THROUGH WOODS @ 2% WITH MEANDORS (PER SEELYE CHART) 20 MIN

200 LF CHANNELIZED FLOW THROUGH LOTS @ 2.5 fps 1.3 MIN

300 LF GUTTER FLOW @ 1% ⇒ 2 fps 2.5

23.8 MIN
SAY 25

D16 400 LF OVERLAND FLOW THROUGH WOOD @ 2% STRAIGHT (PER SEELYE CHART) 23 MIN

200 LF CHANNELIZED FLOW THROUGH LOTS @ 2.5 fps 1.3 MIN

100 LF GUTTER FLOW @ 2 fps 0.8 MIN

25.1 MIN
USE 25

E7 MINIMAL TC USE 5 MIN

E8 200 LF OVERLAND FLOW IN LOTS S = 1.5% 5+ MIN

300 LF NATURAL CHANNEL @ 2 fps 2.5 MIN

7.5 MIN
USE 8 MIN

E9 MINIMAL TC

F SYSTEM & H SYSTEM MINIMAL TC

G1 MINIMAL TC

Langley and McDonald
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VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject TIMES OF CONCENTRATION

Computed By DSN Checked By

Project No. 91053
Client BUSH C
Date 3-18-94 Sheet No. 3/4

G2 300 LF OVERLAND THROUGH WOODS @ 1% — 15 MIN
300 LF STEEP NATURAL CHANNEL — 1 MIN
16 -
USE 15 MIN

G5 150 LF OVERLAND THROUGH LOTS @ 4% — 12 MIN
100 LF STEEP CHANNEL — 1 MIN
13 MIN

G6 MINIMAL TC

G7 150 LF OVERLAND FLOW THROUGH LOTS & REC AREA @ 2% — 13 MIN

200 LF FLAT NATURAL CHANNEL - 2fps — 1.7 MIN
200 LF STEEP CHANNEL BETWEEN LOTS — 0.5 MIN
100 LF GUTTER FLOW @ 1% — 0.8 MIN
16 MIN

G4 200 LF OVERLAND FLOW THROUGH LOTS & REC AREA @ 2% — 17 MIN

400 LF NATURAL CHANNEL @ 4fps — 1 MIN
18 MIN

VS TIC @ L11 — 11 MIN
164 LF pipe @ 6.5fps — 0.5 MIN
80 LF STEEP ROCK CHANNEL @ 4fps — 0.5 MIN
12 MIN
USE 15 MIN AS AVG.

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VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject TIMES OF CONCENTRATION

Computed By DSL Checked By

Project No. 91053 29935
Client BUSH CO
Date 3/21/94 Sheet No. 4/4

INLET I1

100 LF OVERLAND FLOW THROUGH LOTS @ 1% — 5 MIN
350 LF GUTTER FLOW @ 1% ⇒ 2fps = 3 MIN
8 MIN

I2

150 LF OVERLAND FLOW THROUGH LOTS @ 2% — 5 MIN
250 LF GUTTER FLOW @ 1% ⇒ 2fps — 2 MIN
7 MIN

J1 FROM RTE 614 CALCS

K1 FROM RTE 614 CALCS — 8 MIN
200 LF STONE CHANNEL @ 2fps — 1.5 M
9.5
USE 10 MIN

K6 FROM RTE 614 CALCS

L1 MINIMAL Tc

L2 250 LF OVERLAND THROUGH LOTS @ 1.5% PER SEELYE — 15 MIN

M1, M2 MINIMAL TC

N1 200 LF OVER LAND FLOW THROUGH LOTS @ 3% — 13 MIN

O-1 MINIMAL TC

P-1 300 LF OVERLAND THROUGH LOTS @ 5% — 12 MIN

```
==========================================================================
INLET NUMBER L1                LENGTH   2.3        STATION

DRAINAGE AREA =  0.130 ACRES        C VALUE = .800        CA =  0.104
DRAINAGE AREA =  0.010 ACRES        C VALUE = .800        CA =  0.008

FOR THE FIRST SIDE
SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.000 GUTTER FLOW=   0.364
FOR THE OTHER SIDE
SUM CA=   0.008 INT=  3.50  CFS=   0.028  CO=  0.000 GUTTER FLOW=   0.028
AT THE INLET

SUM CA=   0.112 INT=  3.50  CFS=   0.392  CO=  0.000 GUTTER FLOW=   0.392

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.36 (cfs) IS  5.72 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  5.93                  H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.09           SPREAD (ft)  =  4.51


==========================================================================
INLET NUMBER L2                LENGTH   2.3        STATION

DRAINAGE AREA =  0.660 ACRES        C VALUE = .400        CA =  0.264
DRAINAGE AREA =  0.140 ACRES        C VALUE = .800        CA =  0.112

FOR THE FIRST SIDE
SUM CA=   0.264 INT=  3.50  CFS=   0.924  CO=  0.000 GUTTER FLOW=   0.924
FOR THE OTHER SIDE
SUM CA=   0.112 INT=  3.50  CFS=   0.392  CO=  0.000 GUTTER FLOW=   0.392
AT THE INLET

SUM CA=   0.376 INT=  3.50  CFS=   1.316  CO=  0.000 GUTTER FLOW=   1.316

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.92 (cfs) IS  9.25 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  5.93                  H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.21           SPREAD (ft)  = 10.11
```

```
==========================================================================
INLET NUMBER L3                LENGTH   2.3        STATION

DRAINAGE AREA =  0.120 ACRES        C VALUE = .800        CA =  0.096
DRAINAGE AREA =  0.010 ACRES        C VALUE = .800        CA =  0.008

FOR THE FIRST SIDE
SUM CA=   0.096 INT=  3.50  CFS=   0.336  CO=  0.000 GUTTER FLOW=   0.336
FOR THE OTHER SIDE
SUM CA=   0.008 INT=  3.50  CFS=   0.028  CO=  0.000 GUTTER FLOW=   0.028
AT THE INLET

SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.000 GUTTER FLOW=   0.364

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.34 (cfs) IS  5.45 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  5.93                  H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.09          SPREAD (ft)  =  4.29
```

```
==============================================================================
INLET NUMBER L4                LENGTH   6.0        STATION

DRAINAGE AREA =  1.750 ACRES       C VALUE = .400       CA =  0.700
DRAINAGE AREA =  0.130 ACRES       C VALUE = .800       CA =  0.104

FOR THE FIRST SIDE
SUM CA=   0.700 INT=  3.50  CFS=   2.450  CO=  0.000 GUTTER FLOW=   2.450
FOR THE OTHER SIDE
SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.000 GUTTER FLOW=   0.364
AT THE INLET

SUM CA=   0.804 INT=  3.50  CFS=   2.814  CO=  0.000 GUTTER FLOW=   2.814

GUTTER SLOPE = 0.0010 FT/FT       PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   2.45 (cfs) IS 14.12 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.25          SPREAD (ft)  = 12.17
```

```
==========================================================================
INLET NUMBER L5                LENGTH   6.0        STATION

DRAINAGE AREA =  0.130 ACRES        C VALUE = .800        CA =  0.104
SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.000 GUTTER FLOW=   0.364

GUTTER SLOPE = 0.0392 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T     SW        SW/SX      Eo      a     S'W     SE
 1.57     2.0     1.27   0.0800     3.8       1.00    3.4    0.143  0.163

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  5.5                EFFICIENCY= 1.00
   CFS INTERCEPTED=  0.36                 CFS CARRYOVER=  0.00


==========================================================================
INLET NUMBER L6                LENGTH   8.0        STATION

DRAINAGE AREA =  0.510 ACRES        C VALUE = .500        CA =  0.255
SUM CA=   0.255 INT=  3.50  CFS=   0.892  CO=  0.000 GUTTER FLOW=   0.892

GUTTER SLOPE = 0.0392 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T     SW        SW/SX      Eo      a     S'W     SE
 2.74     2.0     0.73   0.0800     3.8       0.99    3.4    0.143  0.162

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  8.0                EFFICIENCY= 1.00
   CFS INTERCEPTED=  0.89                 CFS CARRYOVER=  0.00
```

```
==========================================================================
INLET NUMBER L7                LENGTH   2.3        STATION

DRAINAGE AREA =  0.160 ACRES        C VALUE = .800        CA =  0.128
DRAINAGE AREA =  0.010 ACRES        C VALUE = .800        CA =  0.008

FOR THE FIRST SIDE
SUM CA=   0.128 INT=  3.50  CFS=   0.448  CO=  0.000 GUTTER FLOW=   0.448
FOR THE OTHER SIDE
SUM CA=   0.008 INT=  3.50  CFS=   0.028  CO=  0.000 GUTTER FLOW=   0.028
AT THE INLET

SUM CA=   0.136 INT=  3.50  CFS=   0.476  CO=  0.000 GUTTER FLOW=   0.476

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.45 (cfs) IS  6.44 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  5.93                    H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.11            SPREAD (ft)  =  5.13
```

```
==========================================================================
INLET NUMBER L9                LENGTH  12.0        STATION  2.04

DRAINAGE AREA =  2.040 ACRES        C VALUE = .400        CA =  0.816
DRAINAGE AREA =  0.140 ACRES        C VALUE = .800        CA =  0.112
SUM CA=   0.928 INT=  3.50  CFS=   3.248  CO=  0.000 GUTTER FLOW=   3.248

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX      Eo      a      S'W     SE
  8.63     2.0    0.23   0.0800      3.8       0.60   3.4    0.143  0.107

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) = 13.7                EFFICIENCY= 0.98
    CFS INTERCEPTED=  3.17                 CFS CARRYOVER=  0.07


==========================================================================
INLET NUMBER L8                LENGTH  10.0        STATION

DRAINAGE AREA =  1.610 ACRES        C VALUE = .400        CA =  0.644
DRAINAGE AREA =  0.040 ACRES        C VALUE = .800        CA =  0.032
DRAINAGE AREA =  0.100 ACRES        C VALUE = .800        CA =  0.080

FOR THE FIRST SIDE
SUM CA=   0.676 INT=  3.50  CFS=   2.366  CO=  0.070 GUTTER FLOW=   2.436
FOR THE OTHER SIDE
SUM CA=   0.080 INT=  3.50  CFS=   0.280  CO=  0.000 GUTTER FLOW=   0.280
AT THE INLET

SUM CA=   0.756 INT=  3.50  CFS=   2.646  CO=  0.070 GUTTER FLOW=   2.716

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .017 (ft./ft.) AND   2.44 (cfs) IS  7.50 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 13.60                H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.20           SPREAD (ft)  =  9.42
```

PROJECT 915335
HEC12 Version: V2.91 Run Date: 01-25-1994

==========

INLET NUMBER L7 LENGTH 2.3 STATION

DRAINAGE AREA = ~~0.150 ACRES~~ 0.010 C VALUE = .800 CA = 0.120
DRAINAGE AREA = 0.050 ACRES C VALUE = .800 CA = 0.040

FOR THE FIRST SIDE
SUM CA= 0.120 INT= 3.50 CFS= 0.420 CO= 0.000 GUTTER FLOW= 0.420
FOR THE OTHER SIDE
SUM CA= 0.040 INT= 3.50 CFS= 0.140 CO= 0.000 GUTTER FLOW= 0.140
AT THE INLET

SUM CA= 0.160 INT= 3.50 CFS= 0.560 CO= 0.000 GUTTER FLOW= 0.560

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.42 (cfs) IS 6.21 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 5.93 H (ft) = 0.458
DEPTH OF WATER (ft) = 0.12 SPREAD (ft) = 5.72

==========

INLET NUMBER L9A LENGTH 4.0 STATION

DRAINAGE AREA = 0.150 ACRES C VALUE = .800 CA = 0.120
SUM CA= 0.120 INT= 3.50 CFS= 0.420 CO= 0.000 GUTTER FLOW= 0.420

GUTTER SLOPE = 0.0166 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
1.95	2.0	1.03	0.0800	3.8	1.00	3.4	0.143	0.163

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 4.5 EFFICIENCY= 0.98
CFS INTERCEPTED= 0.41 CFS CARRYOVER= 0.01

```
==========================================================================
INLET NUMBER L10                LENGTH   2.3        STATION

DRAINAGE AREA =  0.640 ACRES        C VALUE = .400        CA =  0.256
DRAINAGE AREA =  0.110 ACRES        C VALUE = .800        CA =  0.088

FOR THE FIRST SIDE
SUM CA=   0.256 INT=  3.50  CFS=   0.896  CO=  0.000 GUTTER FLOW=   0.896
FOR THE OTHER SIDE
SUM CA=   0.088 INT=  3.50  CFS=   0.308  CO=  0.000 GUTTER FLOW=   0.308
AT THE INLET

SUM CA=   0.344 INT=  3.50  CFS=   1.204  CO=  0.000 GUTTER FLOW=   1.204

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.90 (cfs) IS  9.12 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  5.93                  H (ft) = 0.458
   DEPTH OF WATER (ft) =   0.20          SPREAD (ft)  =  9.52
```

```
==========================================================================
INLET NUMBER M1                LENGTH    6.0          STATION  13+42 F LT

DRAINAGE AREA =  0.200 ACRES        C VALUE = .700        CA =  0.140
DRAINAGE AREA =  0.200 ACRES        C VALUE = .700        CA =  0.140

FOR THE FIRST SIDE
SUM CA=   0.140 INT=  3.50  CFS=   0.490  CO=  0.000 GUTTER FLOW=   0.490
FOR THE OTHER SIDE
SUM CA=   0.140 INT=  3.50  CFS=   0.490  CO=  0.000 GUTTER FLOW=   0.490
AT THE INLET

SUM CA=   0.280 INT=  3.50  CFS=   0.980  CO=  0.000 GUTTER FLOW=   0.980

GUTTER SLOPE = 0.0109 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD AT A SLOPE OF .011 (ft./ft.) AND   0.49 (cfs) IS  2.24 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.13          SPREAD (ft)  =  6.02


==========================================================================
INLET NUMBER M2                LENGTH   12.0         STATION  13+42 F RT

DRAINAGE AREA =  0.900 ACRES        C VALUE = .300        CA =  0.270
DRAINAGE AREA =  0.700 ACRES        C VALUE = .300        CA =  0.210

FOR THE FIRST SIDE
SUM CA=   0.270 INT=  3.50  CFS=   0.945  CO=  0.000 GUTTER FLOW=   0.945
FOR THE OTHER SIDE
SUM CA=   0.210 INT=  3.50  CFS=   0.735  CO=  0.000 GUTTER FLOW=   0.735
AT THE INLET

SUM CA=   0.480 INT=  3.50  CFS=   1.680  CO=  0.000 GUTTER FLOW=   1.680

GUTTER SLOPE = 0.0109 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD AT A SLOPE OF .011 (ft./ft.) AND   0.95 (cfs) IS  4.33 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 15.60                H (ft) = 0.375
    DEPTH OF WATER (ft) =   0.13          SPREAD (ft)  =  6.24
```

```
==========================================================================
INLET NUMBER N1                LENGTH   2.3        STATION

DRAINAGE AREA =  0.450 ACRES        C VALUE = .400        CA =  0.180
DRAINAGE AREA =  0.210 ACRES        C VALUE = .800        CA =  0.168

FOR THE FIRST SIDE
SUM CA=   0.180 INT=  3.50  CFS=   0.630  CO=  0.000 GUTTER FLOW=   0.630
FOR THE OTHER SIDE
SUM CA=   0.168 INT=  3.50  CFS=   0.588  CO=  0.000 GUTTER FLOW=   0.588
AT THE INLET

SUM CA=   0.348 INT=  3.50  CFS=   1.218  CO=  0.000 GUTTER FLOW=   1.218

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.63 (cfs) IS  7.70 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  5.93                  H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.20           SPREAD (ft)  =  9.60


==========================================================================
INLET NUMBER O1                LENGTH   2.3        STATION

DRAINAGE AREA =  0.230 ACRES        C VALUE = .800        CA =  0.184
DRAINAGE AREA =  0.250 ACRES        C VALUE = .800        CA =  0.200

FOR THE FIRST SIDE
SUM CA=   0.184 INT=  3.50  CFS=   0.644  CO=  0.000 GUTTER FLOW=   0.644
FOR THE OTHER SIDE
SUM CA=   0.200 INT=  3.50  CFS=   0.700  CO=  0.000 GUTTER FLOW=   0.700
AT THE INLET

SUM CA=   0.384 INT=  3.50  CFS=   1.344  CO=  0.000 GUTTER FLOW=   1.344

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.70 (cfs) IS  8.11 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  5.93                  H (ft) = 0.458
    DEPTH OF WATER (ft) =   0.21           SPREAD (ft)  = 10.25
```

```
==========================================================================
INLET NUMBER P1                LENGTH    4.0          STATION

DRAINAGE AREA =   0.700 ACRES        C VALUE = .400        CA =   0.280
DRAINAGE AREA =   0.340 ACRES        C VALUE = .800        CA =   0.272

FOR THE FIRST SIDE
SUM CA=    0.280 INT=   3.50   CFS=    0.980   CO=   0.000 GUTTER FLOW=    0.980
FOR THE OTHER SIDE
SUM CA=    0.272 INT=   3.50   CFS=    0.952   CO=   0.000 GUTTER FLOW=    0.952
AT THE INLET

SUM CA=    0.552 INT=   3.50   CFS=    1.932   CO=   0.000 GUTTER FLOW=    1.932

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =   0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.98 (cfs) IS  9.50 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =   7.60                    H (ft) = 0.458
    DEPTH OF WATER (ft) =    0.23            SPREAD (ft)   = 11.06
```

LD-347

HYDRAULIC GRADE LINE 'L' SYSTEM

PROJECT GREENSPRINGS LBS-3 91053-29835

INLET STATION	Outlet Water Surface Elev.	D_o	Q_o	L_o	S_{f_o} %	H_f	JUNCTION LOSS												Final H	Inlet Water Surface Elev.	Rim Elev.
							V_o	H_o	Q_i	V_i	Q_iV_i	$\frac{V_i^2}{2g}$	H_i	Angle	H_Δ	H_t	$1.3\ H_t$	$0.5\ H_t$			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
L12 FES	INV 41.68	27	24.0						24												
L11 MH	43.48	27	24.0	164	0.49	0.80	6.0	0.14	24	6.0		0.56	0.20	50°	0.26	0.60	—	—	1.40	44.88	55
L10 DI-3		27	24.0	164	0.49	0.80	6.0	0.14	22.6	5.6		0.49	0.17	25°	0.11	0.42	0.54	—	1.34		
L9 DI-3		27	22.6	274	0.43	1.18	5.6	0.12	0.86	1.2		0.013	0.004	110°	0.013	0.13	0.17	—			
									17.0	4.2		0.27	0.096	10°	0.02	0.24	0.32	—	1.50		
L-9A DI-3		12	0.86	30	0.047	0.01	1.2	0.003	—							0.013	0.02		.005		
L-8 DI-3		27	17.0	224	0.25	0.56	4.2	0.07	0.98	1.21		0.013	0.004	90°	0.009						
									11.7	3.7		0.21	0.07	45°	0.090	0.23	0.30		0.86		
L-7 DI-3		12	0.98	26	0.064	0.017	1.21	0.003	—							0.003	0.004		0.021		
L-6 DI-3		24	11.7	38	0.22	0.08	3.7	0.05	10.14	3.3		0.17	0.06	45°	0.07	0.18	0.23		0.31		
L-5 DI-3		24	10.14	40	0.17	0.07	3.3	0.04	8.28	3.4		0.18	0.06	30°	0.05	0.15	0.20		0.27		
L-4 DI-3		21	8.28	62	0.22	0.14	3.4	0.04	3.48	1.9		0.06	0.02	90°	0.04	0.14	0.18		0.32		
L-3 DI-3		18	3.48	26	0.09	0.02	1.9	0.01	2.91	2.4		0.09	0.03	90°	0.06	0.26	0.34		0.36		
L-2 DI 3		15	2.91	196	0.17	0.33	2.4	0.02	0.83	1.0		0.015	0.005	10°	0	0.025	0.03		0.36		
L-1 DI 3		12"	0.83	30	0.04	0.012	1.0	0.004	—							0.004	0.005		0.02		

$H_i = 0.35 \frac{V_i^2}{2g}$ $H_o = 0.25 \frac{V_o^2}{2g}$ $H_\Delta = K \frac{V_i^2}{2g}$

FINAL $H = H_f + H_t$

$H_t = H_o + H_i + H_\Delta$

SEE LD-72(D)67

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

Langley and McDonald
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VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject _____

Computed By _____ Checked By _____

Project No. 91053-29

Client _____

Date _____ Sheet No. 1

SEDIMENT TRAP 'E'

POST DEVELOPMENT DRAINAGE AREA = 6.06 AC
Q_{2post} = 9.45 cfs

VOLUMES REQ'D
'WET' STORAGE = 67 CY/AC × 6.06 AC = 406 CY = 10,962 CF
DRY STORAGE = 67 CY/AC × 6.06 AC = 406 CY

PROVIDE FOR ALL STORAGE IN EXCAVATED PIT

$V_1 + V_2$ = 21,924 CF min

VOL PROVIDED = 1/2 (BOTTOM AREA + AREA @ TOP OF RISER) · D

= 1/2 [(1/2 · 75 · 40) + (1/2 · 140 × 85)] · 6

= 1/2 (1500 + 5950) · 6 = 22,350 > 21,924 ok

Size Riser
Q_{2post} = 9.45 < Q_{2pre} = 9.89 cfs ∴ No Detention Required

Max. Head = H = 1.0' - use plate 3.14-8

48" riser passes 9.5 cfs @ h = 0.40'
36" riser passes 9.5 cfs @ h = 0.48'

Outlet Pipe (per Table 3.14A, n = 0.025 - CMP) L = 70'
24" pipe passes 11.0 cfs @ h = 1.0 - use w/ 48" riser for stability

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VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject _____

Computed By _____ Checked By _____

Project No. _____

Client _____

Date _____ Sheet No. 2

EMERGENY OVERFLOW CHANNEL

DESIGN FLOW = $Q_E = Q_{25} - Q_2$

$= (0.40)(6.00\ in/hr)(6.06\ Ac) = 9.45\ cfs$

$= 14.5\ cfs - 9.45\ cfs = 5.05\ cfs$

USE PG-5 CHANNEL FOR OVERFLOW FLUME

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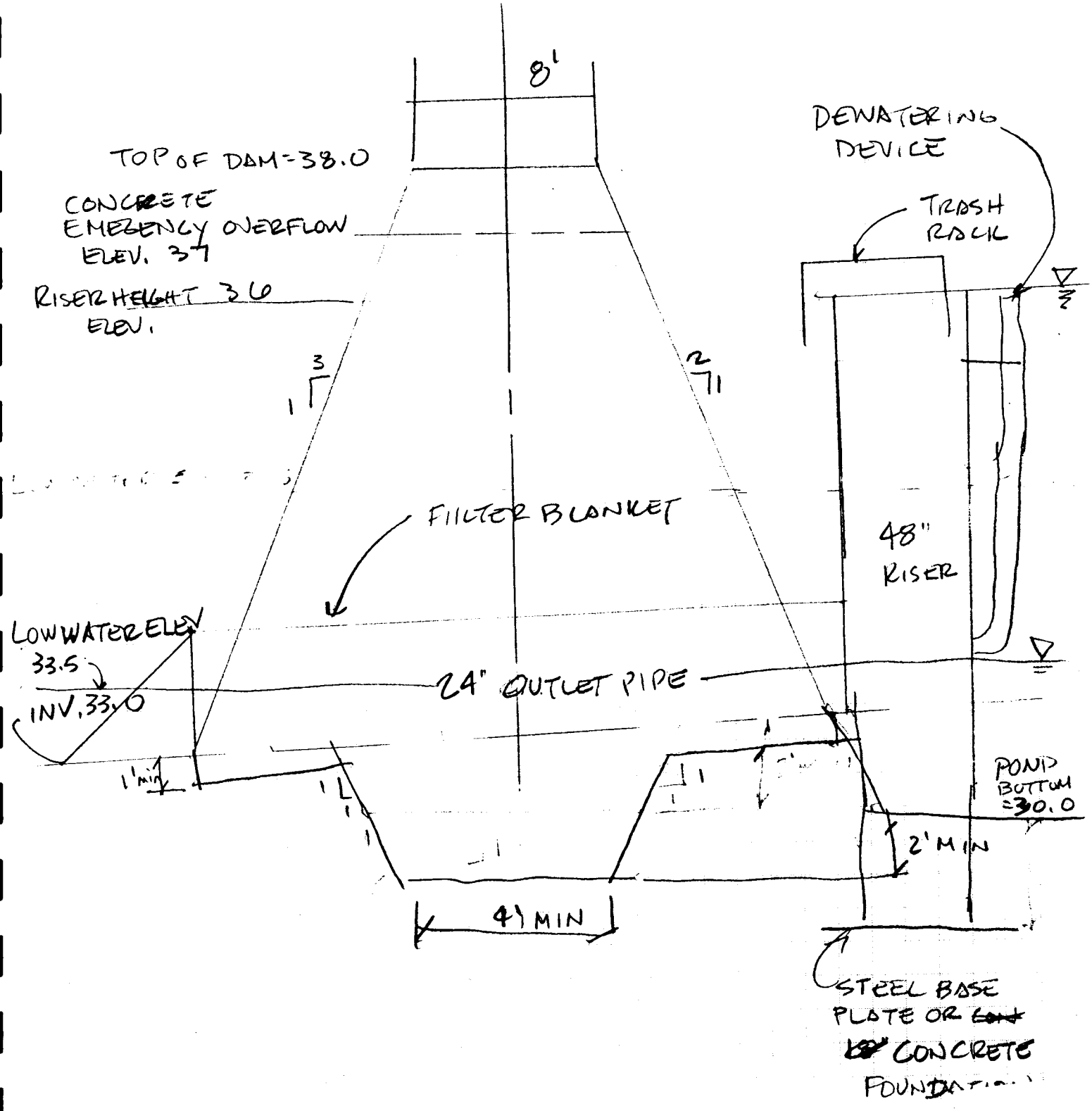
Subject _____

Computed By _____ Checked By _____

Project No. 91053-29

Client _____

Date 1-20-94 Sheet No. 3



4

MAN-MADE CHANNELS

VARIABLES LIST:

Y - FLOW DEPTH	B - CHANNEL BOTTOM WIDTH	S - CHANNEL SLOPE
Q - FLOWRATE	M - CHANNEL SIDE SLOPE	N - CHANNEL ROUGHNESS

VARIABLE TO BE SOLVED (Y,Q,B,M,S OR N) ? Y

Q (CFS) ? 5.05
B (FT) ? 2
M (FT/FT) ? 1
S (FT/FT) ? .001
N (FT^1/6) ? .015

RESULTS
==========

Y=	0.85 FT	
A=	2.41 SF	
P=	4.39 FT	
V=	2.10 FPS	
F=	0.46	SUB-CRITICAL FLOW

<Shift> <Prt Sc> print <Return> repeat <Space Bar> back to menu

---

MAN-MADE CHANNELS

VARIABLES LIST:

Y - FLOW DEPTH	B - CHANNEL BOTTOM WIDTH	S - CHANNEL SLOPE
Q - FLOWRATE	M - CHANNEL SIDE SLOPE	N - CHANNEL ROUGHNESS

VARIABLE TO BE SOLVED (Y,Q,B,M,S OR N) ? Y

Q (CFS) ? 5.05
B (FT) ? 2
M (FT/FT) ? 1
S (FT/FT) ? .5
N (FT^1/6) ? .015

RESULTS
==========

Y=	0.14 FT	
A=	0.29 SF	
P=	2.39 FT	
V=	17.27 FPS	
F=	8.49	SUPER-CRITICAL FLOW

<Shift> <Prt Sc> print <Return> repeat <Space Bar> back to menu

---

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Subject _____

Computed By _____ Checked By _____

Project No. _____
Client _____
Date _____ Sheet No. 5

SEDIMENT TRAP 'F'

DRAINAGE AREA = 2.55 AC ✓ INTO POWHATAN CREEK

TOTAL VOLUME REQ'D = 134 CY/AC × 2.55 AC = 342 CY

WET = 1/2 × 342 CY = 171 CY = 4613 CF

V = 0.85 × SURFACE AREA × D_1

SURFACE AREA = $\frac{V}{0.85 D_1} = \frac{4613}{0.85(4)}$ = 1357 SF

USE 70 × 20 ✓

IF H_D = 2.5' W/ 2:1 SIDES V_{DRY} = 4696 CF > 4613 ok

L = 6 × AREA = 6 × 2.55 = 15 FEET ✓

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Subject _____

Computed By _____ Checked By _____

Project No. _____

Client _____

Date _____ Sheet No. 6

SEDIMENT TRAP 'H'

DRAINAGE AREA = 1.01 AC
TOTAL VOL REQ'D = 135 CY = 1.01 AC × 134 CY/AC
WET STORAGE REQ'D = 1/2 × 135 CY = 1827 CF

$$V = 0.85 \times \text{SURFACE AREA} \times D_1$$

$$\text{SURFACE AREA} = \frac{V}{0.85 \times D_1} = \frac{1827}{0.85 \times 4} = 537\,SF$$

USE 16 × 35' = 560 SF

DRY STORAGE REQ'D = 1827 CF

$$VOL = \frac{A_1 + A_2}{2} \times D_2$$

WITH 2:1 SIDE SLOPES $\Rightarrow VOL = \dfrac{560\,SF + [(16+4D_2)\times(35+4D_2)]}{2} \times D_2$

TRY $D_2 = 4'$ = VOL = 4384 CF → TOO BIG

$D_2 = 2.5'$ = 2162.5 CF ok = H_0

L = 6 × AREA = 6 × 1.01 = 6'

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VIRGINIA BEACH - WILLIAMSBURG, VIRGINIA

Subject _____

Computed By DSL Checked By _____

Project No. 91053-29

Client _____

Date 7-30-93 Sheet No. 7

SEDIMENT TRAP 'I'

DRAINAGE AREA = 2.46 AC
TOTAL VOLUME REQUIRED = 2.46 × 134 CY/AC = 330 CY
WET STORAGE REQUIRED = 1/2 × 330 × 27 = 4455 CF

$V = 0.85 \times \text{SURFACE AREA} \times D_1$

$\text{WATER SURFACE AREA} = \frac{V}{0.85 \times D} = \frac{4455}{0.85 \times 4} = 1310 \text{ SF}$

USE 25 × 52' ✓

DRY STORAGE REQ'D = 4455 CF

$VOL = \frac{A_1 + A_2}{2} \times D_2$

WITH 2:1 SIDE SLOPES ⇒ $VOL = \frac{1310 \text{ SF} + [(25+4D) \times (52+4D)]}{2} \times$

TRY $D_2 = 4'$ ⇒ VOL = 8196 TOO BIG
$D_2 = 3'$ ⇒ VOL = 7356 "
$D_2 = 2.5$ ⇒ VOL = 4350 TOO SMALL
HAVE TO USE $D_2 = 3'$ = Ho
H = 4'
W = 3
L = 6 × 2.46 AC = 14.76
USE 15

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Subject SEDIMENT TRAPS

Computed By DSL Checked By

Project No. 91053-35
Client BUSH CO
Date 3/94 Sheet No.

TRAP BETWEEN ROADS G&H
DRAINAGE SYSTEMS N&O

DRAINAGE AREA ⇒ 1.52 AC BETWEEN LOTS
0.66 AC N SYSTEM
+ 0.48 AC O SYSTEM
2.66 AC

WET VOLUME = 134 CY/AC × 2.66 AC = 356 CY = 9,624 CF

SHOULD BE EXCAVATED
TOP AREA = 35 × 70 = 2450 SF
TRY 4' DEEP ⇒ BOTTOM AREA = 19 × 54 = 1026 SF
VOL = 6952 CF, NG
TRY 40 × 100 TOP = TOP AREA = 4000 SF
3' DEEP → BOTTOM AREA = 28 × 88 = 2464
VOL = 9696 CF > 9,624 CF
OK

DRY VOL REQ'D = 356 CY

IF H_0 = 1.5', VOL = 6657 CF
IF H_0 = 2', VOL = 9184 CF, CLOSE
IF H_0 = 2.5, VOL = 11,875 CF > 9624 CF, OK

THEN H = 3.5
W = 30
L = 6 × 2.66 = 16 LF

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Subject _____

Computed By _____ Checked By _____

Project No. _____

Client _____

Date _____ Sheet No. _____

SEDIMENT TRAP @ P SYSTEM

AREA = 1.04 Ac to inlet + 0.24 Ac below inlet
+ 0.32 into DD = 1.60 AC

WET VOL REQ'D = 134 CY/AC X 1.60 AC = 214 CY = 5789 CF

TRY TOP AREA = 60x30 = 1800 F
D = 4' W 1:1 sides ⇒ BOTTOM = 52x22
VOL = 5888 CF > 5789 ok

DRY VOL W/ 2:1 SIDES & H_D = 2.5
= 5750 CF < 5789 ok

Greensprings/Legacy Golf Links
Lake C and Drypond #1 Hydrologic Information
9-Jul-93

	Lake C			Drypond 1		
Drainage Area (ac)		91.3			245.5	
CN		78			77	
TC		0.48			1.92	
	2-yr	10-yr	100-yr	2-yr	10-yr	100-yr
Elevation (ft msl)	51.19	51.98	52.89	25.7	27.47	28.86
Q in (cfs)	107.00	257.00	407.00	113.29	315.54	546.84
Q out (cfs)	4.33	28.89	47.29	77.24	169.31	319.53

Refer to Sheets #2 and 3 of Legacy Golf Links plans for drainage divides and land use information.

File 91053-29

GOLF COURSE

LAKE C

LAND BAY M-5

BMP #1

APPROX. LOCATION OF DAM

TO LAKE "C"

WETLANDS (SEE MASTER PLANS)

MINIMUM 50' BUFFER

MINIMUM 150' GREENBELT BUFFER

RELOCATED SR. 614 PROPOSED 120' R/W SP-94-92 (COUNTY SITE PLAN #)

DRAINAGE AREA ADJUSTMENTS FOR STORMWATER MANAGEMENT

NATURAL DRAINAGE DIVIDE

LIMITS OF AREA PIPED TO ADJOINING BASIN AND DIRECTION OF PIPED FLOW

NATURAL DRAINAGE CHANNEL

REFER TO LANGLEY AND MCDONALD DRAWINGS 4963W SHEETS 1-26 GREENSPRINGS LAND BAY S-3 PHASE ONE DEVELOPMENT PLANS FOR CONNECTION TO AND EXTENSION OF ROADS AND UTILITIES FOR THIS PHASE.

SCALE IN FEET

200 120 40 0 200 400 600 800 1000

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

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

DES.	JLH/DSL
DWN.	JAM
CHK.	SAR
DATE	1/26/94

GREENSPRINGS ASSOCIATES
GREENSPRINGS
PHASE TWO, SINGLE FAMILY
JAMES CITY COUNTY, VIRGINIA
OVERALL STORM DRAINAGE

SHEET	3 OF 28
DISK	
PROJ. NO.	91053-35
DWG.	5161W

Greensprings Plantation- Summary Table for 10-Point BMP Plan
4/24/95

BMPs for Greenspring Plantation
for NE Quadrant
Updated with 39 acres from Lake C to BMP 1

Total site area= 481 acres

				BMP Points		
BMP/DA	Total Area (ac)	% of site	Open Space (ac)	Structural	Open Space	Total
Lake C	**83**	17%	9	11	1.1	12.1
Lake A	**28**	6%	**6**	9	2.0	11.0
Wetpond 1	**15**	3%	**4**	9	2.7	11.7
Drypond 1	**259**	54%	56	9	2.2	11.2
Subtotal	385	80%	75	9.4	1.9	11.4
Default*	96	20%	53	0.0	5.5	5.5
TOTAL	**481**	**100%**	**128**	**7.5**	**2.7**	**10.2**

*Area not treated by a structure

Quick TR-55 Ver.5.4e S:\A11G1\5420071
Executed: 09:35:50 04-24-1995

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

First peak outflow point assumed to occur at Td hydrograph recession leg.

GREENSPRINGS LAND BAY 3-3
DRAINAGE AREA ABOVE STRUCTURE K-6

```
*********************************************************************
* RETURN FREQUENCY:  10 yr     | Allowable Outflow:     7.50 cfs    *
* "C" Adjustment: 1.000        | Required Storage:    34,071 cu.ft. *
*-------------------------------------------------------------------*
* Peak Inflow:   18.73 cfs       Inflow .HYD stored: G5K610IN.HYD   *
*********************************************************************
```

```
|              Td =  35 minutes                  |  Return Freq:    10 yr
|------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.00
|                                                 |
|                                                 |
|                Tc=   17.00  minutes             |
|                I =   5.030  in/hr               |  Area (ac):    16.50
|              . Q =   27.31  cfs                 |  Weighted C:    0.33
|            . .                                  |  Adjusted C:    0.33
|          .   .                                  |
|        .     .              Required Storage    |
|      .       .         .--    34,071 cu.ft.    |  Td=      35 minutes
|    .         .         |                       |  I =   3.450 in/hr
|   .     x x x x x x x x x x x x x x x x x x x  |  Q =   18.73 cfs
|  .                     |
|  .    x                                         x
|  .                 o o o o o o o o o o o o o o o o o  |  Q=    7.50 cfs
|  .   x          o   |.                          |x  (Allow.Outflow)
|  .            o     | .                         |
|  .  x    o           |  .       NOT TO SCALE     |   x
|   .   o              |   .      ============     |
|    .                 |    .                      |      x
|----------------------|---------------------------|------------
                      39.33 minutes              -5.19 minutes
```

Quick TR-55 Ver.5.46 S/N:1315430671
Executed: 09:25:53 04-24-1995

GREENSPRINGS LAND DAY 6-3
DRAINAGE AREA ABOVE STRUCTURE K-1

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

Weighted C = 0.389 Area= 16.200 acres Tc = 17.00 minutes

Adjusted C = 0.389 Tg= 35.00 min. I= 3.45 in/hr Qp= 18.73 cfs

RETURN FREQUENCY: 10 year storm Adj.factor = 1.00
Output file: GSK610IN.HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 10 Year Storm

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

Time Minutes							
0.00	0.00	1.10	2.20	3.31	4.41	5.51	6.61
7.00	7.71	8.82	9.92	11.02	12.12	13.22	14.33
14.00	15.43	16.53	17.63	18.73	18.73	18.73	18.73
21.00	18.73	18.73	18.73	18.73	18.73	18.73	18.73
28.00	18.73	18.73	18.73	18.73	18.73	18.73	18.73
35.00	18.73	17.63	16.53	15.43	14.33	13.22	12.12
42.00	11.02	9.92	8.82	7.71	6.61	5.51	4.41
49.00	3.31	2.20	1.10	0.00			

System 75-EE Ver.2.1-2 S/N:1315-3427
Executed: 09:25:53 04-24-1993

GREENSPRINGS LAND BAY 3-3
DRAINAGE AREA ABOVE STRUCTURE 1-6

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

Q = adj * C * I * A

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

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

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
	0.350	7.60						
	0.300	8.70						
			17.00	0.329	0.329	5.030	16.50	27.31

Quick TR-55 ver.5.4c S/N:1315430671
Executed: 09:25:50 04-24-1995

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

First peak outflow point assumed to occur at Tc hydrograph recession leg.

GREENSPRINGS LAND BAY 9-3
DRAINAGE AREA ABOVE STRUCTURE K-6

Area = 16.50 acres Tc = 17.00 minutes

Frequency (years)	Adjusted 'C'	Duration minutes	Intens. in/hr	Qpeak cfs	Allowable cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
10	0.329	85	2.450	13.73	7.50	39,340	24,071

Quick TR-55 Ver.5.4: S.N:1318-80271
Executed: 07:25:53 14-04-1995

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

First peak outflow point assumed to occur at Tc hydrograph recession leg.

GREENSPRINGS LAND DAY 8-3
DRAINAGE AREA ABOVE STRUCTURE K-6

RETURN FREQUENCY: 10 yr 'C' Adjustment = 1.000 Allowable Q = 7.50 cfs

---

Hydrograph file duration= 35.00 minutes
Hydrograph file: GSK610IN.HYD Tc = 17.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
0.329	0.329	17	5.030	16.50	27.31	27,859	20,209
0.329	0.329	20	4.700	16.50	25.52	30,625	21,699
0.329	0.329	30	3.750	16.50	20.36	36,653	23,511
********** Storage Maximum							
0.329	0.329	35	3.450	16.50	18.73	39,340	24,071
**********							
0.329	0.329	40	3.150	16.50	17.10	41,051	23,678
0.329	0.329	50	2.750	16.50	14.93	44,798	22,168
0.329	0.329	60	2.450	16.50	13.30	47,873	21,999
0.329	0.329	120	1.600	16.50	8.69	62,554	10,805
0.329	0.329	180	1.150	16.50	6.24	Qpeak < Qallow	

POND-2 Version: 3.17
S.No 1873190850

GREENSPRINGS LAND BAY 3-3
DRAINAGE AREA ABOVE STRUCTURE K6

CALCULATED 04-24-1995 09:28:24
DISK FILE: b:GSLS33K6.VOL

Planimeter scale: 1 inch = 50 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
51.50	0.00	0	0	0	0
51.00	0.50	1,250	1,250	208	208
52.00	1.00	2,500	5,518	1,839	2,048
53.00	1.60	4,000	9,662	3,221	5,268
54.00	2.40	6,000	14,899	4,966	10,235

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

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

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

Outlet Structure File: GSLBSSK6.STT

FLOW-2 Version: 6.17 D/M: 1398131250
Date Executed: Time Executed:

****
GREENSPRINGS LAND BAY 3-3
DRAINAGE AREA ABOVE STRUCTURE K6

****

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

Elevation (ft)	Q (cfs)	Contributing Structures
50.50	0.0	1
51.00	1.0	1
51.50	3.4	1
52.00	6.3	1
52.50	9.7	1
53.00	12.2	1
53.50	14.2	1
54.00	16.0	1

Outlet Structure File: GSLBS3K6.STR

POND-2 Version: 5.17 S/N: 1275130850
Date Executed: Time Executed:

```
*******************************
   GREENSPRINGS LAND BAY 9-9
DRAINAGE AREA ABOVE STRUCTURE K6

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

Outlet Structure File: b:GSLBS3K6.STR
Planimeter Input File: b:GSLBS3K6.VOL
Rating Table Output File: b:GSLBS3K6.PND

Min. Elev.(ft) = 50.5 Max. Elev.(ft) = 54 Incr.(ft) = .5

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

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

     Structure     No.   @ Table   @ Table
     ----------    ---   ------    -------
     CULVERT-CR     1          ->    1
```

Outflow rating table summary was stored in file:
b:GSLBS3K6.PND

Outlet Structure File: GSLBGSK6.STR

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

```
*******************************
   GREENSPRINGS LAND BAY G-3
DRAINAGE AREA ABOVE STRUCTURE K6


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


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

 CULVERT-CR
 Circular Culvert (With Inlet Control)


 E1 elev.(ft)?          50.5
 E2 elev.(ft)?          54.001
 Diam. (ft)?           1.5
 Inv. el.(ft)?         50.5
 Slope (ft/ft)?        .02
 T1 ratio?
 T2 ratio?
 K Coeff.?             .0078
 M Coeff.?             2
 c Coeff.?             .0292
 Y Coeff.?             .74
 Form 1 or 2?          1
 Slope factor?
```

Outlet Structure File: GSLBBBK6.STR

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

****
GREENSPRINGS LAND BAY B-2
DRAINAGE AREA ABOVE STRUCTURE K6

****

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

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

Elevation (ft)	Q (cfs)	Computation Messages		
50.50	0.0	No headwater		
51.00	1.0	Equ.1: HW =.5	dc=.364	Ac=.332
51.50	3.4	Equ.1: HW =1.0	dc=.706	Ac=.818
52.00	6.3	Equ.1: HW =1.5	dc=.97	Ac=1.209
52.50	9.7	Submerged: HW =2.0		
53.00	12.2	Submerged: HW =2.5		
53.50	14.2	Submerged: HW =3.0		
54.00	16.0	Submerged: HW =3.5		

Used Unsubmerged Equ. Form (1) for elev. less than 52.2 ft
Used Submerged Equation for elevations greater than 52.31 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=52.2 ft; Q1=7.58 cfs; Dc=1.07 ft; E2=52.31 ft; Q2=8.66 cfs

```
*************************************
*                                   *
*     GREENSPRINGS LAND BAY 6-3     *
*  DRAINAGE AREA ABOVE STRUCTURE K6 *
*                                   *
*                                   *
*                                   *
*************************************
```

Inflow Hydrograph: b:GSK610IN.HYD
Rating Table file: b:GSLBS3K6.PND

----INITIAL CONDITIONS----
Elevation = 50.50 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
50.50	0.0	0	0.0	0.0
51.00	1.0	208	6.9	7.9
51.50	3.4	972	32.4	35.8
52.00	6.3	2,048	68.2	74.5
52.50	9.7	3,470	115.7	125.4
53.00	12.2	5,268	175.6	187.8
53.50	14.2	7,501	250.0	264.2
54.00	16.0	10,235	341.1	357.1

Time increment (t) = 1.0 min.

Pond File: c:GSL3B3K6.PND
Inflow Hydrograph: c:GSK610IN.HYD
Outflow Hydrograph: c:OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	50.50
1.0	1.10	1.1	0.6	1.1	0.14	50.57
2.0	2.20	3.3	3.1	4.1	0.52	50.76
3.0	3.31	5.5	6.5	8.6	1.06	51.01
4.0	4.41	7.7	11.1	14.2	1.54	51.11
5.0	5.51	9.9	16.8	21.0	2.13	51.24
6.0	6.61	12.1	23.3	29.9	2.81	51.38
7.0	7.71	14.3	30.5	37.6	3.54	51.52
8.0	8.82	16.5	38.6	47.1	4.24	51.65
9.0	9.92	18.7	47.3	57.3	5.01	51.78
10.0	11.02	20.9	56.6	68.2	5.83	51.92
11.0	12.12	23.1	66.4	79.7	6.65	52.05
12.0	13.22	25.3	76.9	91.8	7.45	52.17
13.0	14.33	27.6	87.8	104.4	8.30	52.29
14.0	15.43	29.8	99.2	117.6	9.18	52.42
15.0	16.53	32.0	111.3	131.2	9.93	52.55
16.0	17.63	34.2	124.5	145.5	10.51	52.66
17.0	18.73	36.4	138.6	160.8	11.12	52.78
18.0	19.73	37.5	152.6	176.0	11.73	52.91
19.0	18.73	37.5	165.5	190.0	12.26	53.01
20.0	18.73	37.5	177.8	203.0	12.60	53.10
21.0	18.73	37.5	189.4	215.2	12.92	53.18
22.0	18.73	37.5	200.4	226.7	13.22	53.26
23.0	18.73	37.5	210.9	237.9	13.51	53.33
24.0	18.73	37.5	220.7	248.3	13.78	53.40
25.0	18.73	37.5	230.1	258.2	14.04	53.46
26.0	18.73	37.5	239.1	267.6	14.27	53.52
27.0	18.73	37.5	247.6	276.5	14.44	53.57
28.0	18.73	37.5	255.9	285.1	14.60	53.61
29.0	18.73	37.5	263.8	293.3	14.76	53.66
30.0	18.73	37.5	271.4	301.3	14.92	53.70
31.0	18.73	37.5	278.8	308.9	15.07	53.74
32.0	18.73	37.5	285.8	316.2	15.21	53.78
33.0	18.73	37.5	292.6	323.3	15.34	53.82
34.0	18.73	37.5	299.1	330.0	15.48	53.85
35.0	16.73	37.5	305.3	336.5	15.60	53.89
36.0	17.63	36.4	310.3	341.7	15.70	53.92
37.0	16.53	34.2	313.0	344.5	15.76	53.93
38.0	15.43	32.0	313.4	344.9	15.76	53.93
39.0	14.33	29.8	311.7	343.1	15.73	53.92
40.0	13.22	27.6	307.9	339.2	15.65	53.90
41.0	12.12	25.3	302.2	333.3	15.54	53.87
42.0	11.02	23.1	294.6	325.3	15.38	53.83
43.0	9.92	20.9	285.1	315.5	15.19	53.78
44.0	8.82	18.7	273.9	303.9	14.97	53.71

Pond File: b:GSLB53K6.PND
Inflow Hydrograph: b:GSK610IN.HYD
Outflow Hydrograph: a:OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	7.71	16.5	261.0	290.4	14.71	53.64
46.0	6.61	14.3	246.5	275.3	14.42	53.56
47.0	5.51	12.1	230.5	258.6	14.05	53.46
48.0	4.41	9.9	213.9	240.4	13.58	53.34
49.0	3.31	7.7	194.9	221.0	13.07	53.22
50.0	2.20	5.5	175.3	200.4	12.53	53.08
51.0	1.10	3.3	155.0	178.6	11.83	52.93
52.0	0.00	1.1	134.2	156.1	10.93	52.75
53.0	0.00	0.0	114.1	134.2	10.05	52.57
54.0	0.00	0.0	96.2	114.1	8.95	52.39
55.0	0.00	0.0	80.7	96.2	7.75	52.21
56.0	0.00	0.0	67.3	80.7	6.71	52.06
57.0	0.00	0.0	55.8	67.3	5.76	51.91
58.0	0.00	0.0	46.0	55.8	4.89	51.76
59.0	0.00	0.0	37.6	46.0	4.16	51.63
60.0	0.00	0.0	30.6	37.6	3.54	51.52
61.0	0.00	0.0	24.7	30.6	2.95	51.41
62.0	0.00	0.0	19.8	24.7	2.44	51.30
63.0	0.00	0.0	15.7	19.8	2.02	51.21
64.0	0.00	0.0	12.4	15.7	1.67	51.14
65.0	0.00	0.0	9.6	12.4	1.38	51.08
66.0	0.00	0.0	7.3	9.6	1.15	51.03
67.0	0.00	0.0	5.5	7.3	0.92	50.96
68.0	0.00	0.0	4.1	5.5	0.69	50.85
69.0	0.00	0.0	3.1	4.1	0.52	50.76
70.0	0.00	0.0	2.3	3.1	0.39	50.69
71.0	0.00	0.0	1.7	2.3	0.29	50.64
72.0	0.00	0.0	1.3	1.7	0.22	50.61
73.0	0.00	0.0	1.0	1.3	0.16	50.58
74.0	0.00	0.0	0.7	1.0	0.12	50.56
75.0	0.00	0.0	0.5	0.7	0.09	50.55
76.0	0.00	0.0	0.4	0.5	0.07	50.53
77.0	0.00	0.0	0.3	0.4	0.05	50.53
78.0	0.00	0.0	0.2	0.3	0.04	50.52
79.0	0.00	0.0	0.2	0.2	0.03	50.51
80.0	0.00	0.0	0.1	0.2	0.02	50.51
81.0	0.00	0.0	0.1	0.1	0.02	50.51
82.0	0.00	0.0	0.1	0.1	0.01	50.51
83.0	0.00	0.0	0.1	0.1	0.01	50.50
84.0	0.00	0.0	0.0	0.1	0.01	50.50
85.0	0.00	0.0	0.0	0.0	0.00	50.50
86.0	0.00	0.0	0.0	0.0	0.00	50.50
87.0	0.00	0.0	0.0	0.0	0.00	50.50
88.0	0.00	0.0	0.0	0.0	0.00	50.50
89.0	0.00	0.0	0.0	0.0	0.00	50.50
90.0	0.00	0.0	0.0	0.0	0.00	50.50

Pond File: b:GSLBS3K6.PND
Inflow Hydrograph: b:GSK610IN.HYD
Outflow Hydrograph: b:OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
91.0	0.001	0.0	0.0	0.01	0.00	50.50
92.0	0.001	0.0	0.0	0.01	0.00	50.50
93.0	0.001	0.0	0.0	0.01	0.00	50.50
94.0	0.001	0.0	0.0	0.01	0.00	50.50
95.0	0.001	0.0	0.0	0.01	0.00	50.50
96.0	0.001	0.0	0.0	0.01	0.00	50.50
97.0	0.001	0.0	0.0	0.01	0.00	50.50
98.0	0.001	0.0	0.0	0.01	0.00	50.50
99.0	0.001	0.0	0.0	0.01	0.00	50.50
100.0	0.001	0.0	0.0	0.01	0.00	50.50
101.0	0.001	0.0	0.0	0.01	0.00	50.50
102.0	0.001	0.0	0.0	0.01	0.00	50.50
103.0	0.001	0.0	0.0	0.01	0.00	50.50
104.0	0.001	0.0	0.0	0.01	0.00	50.50
105.0	0.001	0.0	0.0	0.01	0.00	50.50
106.0	0.001	0.0	0.0	0.01	0.00	50.50
107.0	0.001	0.0	0.0	0.01	0.00	50.50
108.0	0.001	0.0	0.0	0.01	0.00	50.50
109.0	0.001	0.0	0.0	0.01	0.00	50.50
110.0	0.001	0.0	0.0	0.01	0.00	50.50
111.0	0.001	0.0	0.0	0.01	0.00	50.50
112.0	0.001	0.0	0.0	0.01	0.00	50.50
113.0	0.001	0.0	0.0	0.01	0.00	50.50
114.0	0.001	0.0	0.0	0.01	0.00	50.50
115.0	0.001	0.0	0.0	0.01	0.00	50.50
116.0	0.001	0.0	0.0	0.01	0.00	50.50
117.0	0.001	0.0	0.0	0.01	0.00	50.50
118.0	0.001	0.0	0.0	0.01	0.00	50.50
119.0	0.001	0.0	0.0	0.01	0.00	50.50
120.0	0.001	0.0	0.0	0.01	0.00	50.50
121.0	0.001	0.0	0.0	0.01	0.00	50.50
122.0	0.001	0.0	0.0	0.01	0.00	50.50
123.0	0.001	0.0	0.0	0.01	0.00	50.50
124.0	0.001	0.0	0.0	0.01	0.00	50.50
125.0	0.001	0.0	0.0	0.01	0.00	50.50
126.0	0.001	0.0	0.0	0.01	0.00	50.50
127.0	0.001	0.0	0.0	0.01	0.00	50.50
128.0	0.001	0.0	0.0	0.01	0.00	50.50
129.0	0.001	0.0	0.0	0.01	0.00	50.50
130.0	0.001	0.0	0.0	0.01	0.00	50.50
131.0	0.001	0.0	0.0	0.01	0.00	50.50
132.0	0.001	0.0	0.0	0.01	0.00	50.50
133.0	0.001	0.0	0.0	0.01	0.00	50.50
134.0	0.001	0.0	0.0	0.01	0.00	50.50
135.0	0.001	0.0	0.0	0.01	0.00	50.50
136.0	0.001	0.0	0.0	0.01	0.00	50.50

EXECUTED: 04-24-1995 09:33:14

Pond File: b:GSLBS3K6.PND
Inflow Hydrograph: b:GSK610IN.HYD
Outflow Hydrograph: b:OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
137.0	0.001	0.0	0.0	0.01	0.00	50.50
138.0	0.001	0.0	0.0	0.01	0.00	50.50
139.0	0.001	0.0	0.0	0.01	0.00	50.50
140.0	0.001	0.0	0.0	0.01	0.00	50.50
141.0	0.001	0.0	0.0	0.01	0.00	50.50
142.0	0.001	0.0	0.0	0.01	0.00	50.50
143.0	0.001	0.0	0.0	0.01	0.00	50.50
144.0	0.001	0.0	0.0	0.01	0.00	50.50
145.0	0.001	0.0	0.0	0.01	0.00	50.50
146.0	0.001	0.0	0.0	0.01	0.00	50.50
147.0	0.001	0.0	0.0	0.01	0.00	50.50
148.0	0.001	0.0	0.0	0.01	0.00	50.50
149.0	0.001	0.0	0.0	0.01	0.00	50.50
150.0	0.001	0.0	0.0	0.01	0.00	50.50
151.0	0.001	0.0	0.0	0.01	0.00	50.50
152.0	0.001	0.0	0.0	0.01	0.00	50.50
153.0	0.001	0.0	0.0	0.01	0.00	50.50
154.0	0.001	0.0	0.0	0.01	0.00	50.50
155.0	0.001	0.0	0.0	0.01	0.00	50.50
156.0	0.001	0.0	0.0	0.01	0.00	50.50
157.0	0.001	0.0	0.0	0.01	0.00	50.50
158.0	0.001	0.0	0.0	0.01	0.00	50.50
159.0	0.001	0.0	0.0	0.01	0.00	50.50
160.0	0.001	0.0	0.0	0.01	0.00	50.50
161.0	0.001	0.0	0.0	0.01	0.00	50.50
162.0	0.001	0.0	0.0	0.01	0.00	50.50
163.0	0.001	0.0	0.0	0.01	0.00	50.50
164.0	0.001	0.0	0.0	0.01	0.00	50.50
165.0	0.001	0.0	0.0	0.01	0.00	50.50
166.0	0.001	0.0	0.0	0.01	0.00	50.50
167.0	0.001	0.0	0.0	0.01	0.00	50.50
168.0	0.001	0.0	0.0	0.01	0.00	50.50
169.0	0.001	0.0	0.0	0.01	0.00	50.50
170.0	0.001	0.0	0.0	0.01	0.00	50.50
171.0	0.001	0.0	0.0	0.01	0.00	50.50
172.0	0.001	0.0	0.0	0.01	0.00	50.50
173.0	0.001	0.0	0.0	0.01	0.00	50.50
174.0	0.001	0.0	0.0	0.01	0.00	50.50
175.0	0.001	0.0	0.0	0.01	0.00	50.50
176.0	0.001	0.0	0.0	0.01	0.00	50.50
177.0	0.001	0.0	0.0	0.01	0.00	50.50
178.0	0.001	0.0	0.0	0.01	0.00	50.50
179.0	0.001	0.0	0.0	0.01	0.00	50.50
180.0	0.001	0.0	0.0	0.01	0.00	50.50

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

Pond File: b:GSLBS3K6.PND
Inflow Hydrograph: b:GSK610IN.HYD
Outflow Hydrograph: b:OUT .HYD

Starting Pond W.S. Elevation = 50.50 ft

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

Peak Inflow = 18.73 cfs
Peak Outflow = 15.76 cfs
Peak Elevation = 53.93 ft

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

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	9,876 cu-ft
Total Storage in Pond	=	9,876 cu-ft

Rational MR-TR Ver.6.4a S/N:1015-3087:
Executed: 08:17:22 04-04-1995

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

Peak peak outflow point assumed to occur at Tc hydrograph recession leg.

GREENSPRINGS LAND BAY G-3
DRAINAGE AREA ABOVE STRUCTURE K-1

```
*********************************************************************
*  RETURN FREQUENCY:  10 yr     |  Allowable Outflow:     7.50 cfs    *
*  'C' Adjustment: 1.000        |  Required Storage:    48,287 cu.ft. *
+-------------------------------------------------------------------*
*  Peak Inflow:   16.87 cfs       Inflow .HYD stored: GSK110IN.HYD    *
*********************************************************************

|              Td =  84 minutes                  |  Return Freq:    10 yr
|------- Approx. Duration for Max. Storage ------/  C adj.factor: 1.00
|                                                |
|                                                |
|                                                |
|              Tc=   19.00  minutes              |
|              I =   4.810  in/hr                |  Area (ac):    18.90
|              Q =   38.46  cfs                  |  Weighted C:    0.42
|                                                |  Adjusted C:    0.42
|                                                |
|                                                |
|                                Required Storage |
|                                 48,287 cu.ft. |  Td=      84 minutes
|                                                |  I =   2.110 in/hr
|                                                |  Q =   16.87 cfs
|                                                |
|                                                |
|                                                |  Q=    7.50 cfs
|                                                |  (Allow.Outflow)
|                                                |
|                                NOT TO SCALE    |
|                                ============    |
|                                                |
-------------------------------------------------------------------
                    34.29 minutes               94.55 minutes
```

Dwick TR-55 Ver.5.4a S/N:1315430871
Executed 08:17:32 04-24-1995

GREENSPRINGS LAND BAY 8-2
DRAINAGE AREA ABOVE STRUCTURE 4-1

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

Weighted C = 0.423 Area= 18.900 acres Tc = 19.00 minutes

Adjusted C = 0.423 Td= 84.00 min. I= 2.11 in/hr Qp= 16.87 cfs

RETURN FREQUENCY: 10 year storm Adj.factor = 1.00
Output file: GSK110IN.HYD

HYDROGRAPH FOR MAXIMUM STORAGE
For the 10 Year Storm

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

Time Minutes:							
0.00	0.00	0.89	1.78	2.66	3.55	4.44	5.33
7.00	6.22	7.10	7.99	8.88	9.77	10.65	11.54
14.00	12.43	13.32	14.21	15.09	15.98	16.87	16.87
21.00	16.87	16.87	16.87	16.87	16.87	16.87	16.87
28.00	16.87	16.87	16.87	16.87	16.87	16.87	16.87
35.00	16.87	16.87	16.87	16.87	16.87	16.87	16.87
42.00	16.87	16.87	16.87	16.87	16.87	16.87	16.87
49.00	16.87	16.87	16.87	16.87	16.87	16.87	16.87
56.00	16.87	16.87	16.87	16.87	16.87	16.87	16.87
63.00	16.87	16.87	16.87	16.87	16.87	16.87	16.87
70.00	16.87	16.87	16.87	16.87	16.87	16.87	16.87
77.00	16.87	16.87	16.87	16.87	16.87	16.87	16.87
84.00	16.87	15.98	15.09	14.21	13.32	12.43	11.54
91.00	10.65	9.77	8.88	7.99	7.10	6.22	5.33
98.00	4.44	3.55	2.66	1.78	0.89	0.00	

Rational TR-55 Ver.5.45 S:\WATSLIB\RATIONAL
Executed: 06:17:52 04-24-1995

GREENSPRINGS LAND BAY 8-4
DRAINAGE AREA ABOVE STRUCTURE 4-1

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

Q = adj * C * I * A

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

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

Subarea Descr.	Runoff 'C'	Area acres	Tc (min)	Wtd. 'C'	Adj. 'C'	I in/hr	Total acres	Peak Q (cfs)
	0.450	15.50						
	0.300	3.40						
			19.00	0.423	0.423	4.810	18.90	38.46

[illegible]

[illegible]

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

First peak outflow point assumed to occur at Tc hydrograph recession leg.

GREENSPRINGS LAND BAY B-2
DRAINAGE AREA ABOVE STRUCTURE K-1

Area = 10.90 acres Tc = 15.00 minutes

Frequency (years)	Adjusted C'	Duration minutes	Intens. in/hr	Peak cfs	Allowable cfs	VOLUMES Inflow (cu.ft.)	Storage (cu.ft.)
10	0.483	84	2.110	16.87	7.50	85,028	48,287

[illegible] Version 5.4 [illegible]
Calculated [illegible]

MODIFIED RATIONAL METHOD
-- Runoff for Single Point Flowrate --

Final peak outflow point assumed to occur at Tc hydrograph recession leg.

GREENSPRINGS LAND BAY 9-3
DRAINAGE AREA ABOVE STRUCTURE 9-1

RETURN FREQUENCY: 10 yr 'C' Adjustment = 1.000 Allowable Q = 7.30 cfs

Hydrograph file duration= 24.00 minutes
Precipitation file: IDF11DIN.HYD Tc = 19.00 minutes

Weighted 'C'	Adjusted 'C'	Duration minutes	Intens. in/hr	Areas acres	Qpeak cfs	VOLUMES Inflow cu.ft.	Storage cu.ft.
0.423	0.423	19	4.810	18.90	38.46	45,640	37,270
0.423	0.423	20	4.700	18.90	37.58	45,092	38,111
0.423	0.423	30	3.750	18.90	29.98	38,966	40,702
0.423	0.423	40	3.150	18.90	25.18	33,442	42,882
0.423	0.423	50	2.750	18.90	21.97	28,757	44,083
0.423	0.423	60	2.450	18.90	19.59	70,516	44,317

Storage Maximum

0.423	0.423	24	2.110	18.90	16.87	65,622	45,289

0.423	0.423	121	1.200	18.90	12.77	55,102	37,775
0.423	0.423	180	1.151	18.90	9.19	47,879	30,951
0.423	0.423	240	0.870	18.90	6.96	Break	Yellow

[illegible] Version 5.17
File: [illegible]

GREENSPRINGS LAKE DAM 1-1
[illegible] AREA ABOVE [illegible]

[illegible]-CALCULATED [illegible]-24-1999 [illegible]:17
DISK FILE: [illegible]

Planimeter scale: 1 inch = 50 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
[illegible]	0.00	0	0	0	0
51.00	1.70	4,250	4,250	1,417	1,417
52.00	5.50	5,750	14,943	4,781	6,378
53.00	2.30	7,000	19,094	6,365	12,763
54.00	3.10	9,000	33,937	7,979	20,742

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

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

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

Input Structure File: TELESCN.STR

TR20-E Version 5.07 [illegible]
Date Executed: Time Executed:

****
GREENSFIDGE LAKE DAM B-1
DRAINAGE AREA ABOVE STRUCTURE #1

****

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

Elevation (ft)	Q (cfs)	Contributing Structures
50.00	1.0	1
50.50	1.4	1
51.00	3.4	1
51.50	6.8	1
52.00	11.7	1
52.50	16.8	1
53.00	14.2	1
53.50	16.0	1
54.00	17.6	1

Outlet Structure File: GGLBGGK1.STR

FOND-2 Version: 5.17 S/N: 1997130250
Date Executed: Time Executed:

```
*********************************
    GREENSPRINGS LAND BAY G-2
DRAINAGE AREA ABOVE STRUCTURE K1

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

Outlet Structure File: b:GGLBGGK1.STR
Planimeter Input File: b:GGLBGGK1.VOL
Rating Table Output File: b:GGLBGGK1.FND

Min. Elev.(ft) = 50 Max. Elev.(ft) = 54 Incr.(ft) = .5

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

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

Structure	No.	D Table	D Table
CULVERT-CR	1	-1	1

Outflow rating table summary was stored in file:
b:GGLBGGK1.FND

Outlet Structure File: GSLSSSK1.STR

FIND-2 Version: 2.17 S/N: 1295130ED
Date Executed: Time Executed:

```
*******************************
   GREENSPRINGS LAND BAY S-3
DRAINAGE AREA ABOVE STRUCTURE K1


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


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

  CULVERT-CR
  Circular Culvert (With Inlet Control)


  E1 elev.(ft)?          50
  E2 elev.(ft)?          54.001
  Diam. (ft)?            1.5
  Inv. el.(ft)?          50
  Slope (ft/ft)?         .06
  T1 ratio?
  T2 ratio?
  K Coeff.?              .0078
  M Coeff.?              2
  c Coeff.?              .0292
  Y Coeff.?              .74
  Form 1 or 2?           1
  Slope factor?
```

Outlet Structure File: GSLBSSK1.STR

POND-2 Version: 5.17 S/N: 1E7S1SVE50
Date Executed: Time Executed:

****
GREENSPRINGS LAND BAY 9-3
DRAINAGE AREA ABOVE STRUCTURE K1

****

Outflow Rating Table for Structure #1
CULVERT-CR Circular Culvert (With Inlet Control)

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

Elevation (ft)	Q (cfs)	Computation Messages		
50.00	0.0	No headwater		
50.50	1.0	Equ.1: HW =.5	dc=.364	Ac=.332
51.00	3.4	Equ.1: HW =1.0	dc=.706	Ac=.818
51.50	6.3	Equ.1: HW =1.5	dc=.97	Ac=1.209
52.00	9.7	Submerged: HW =2.0		
52.50	12.2	Submerged: HW =2.5		
53.00	14.2	Submerged: HW =3.0		
53.50	16.0	Submerged: HW =3.5		
54.00	17.6	Submerged: HW =4.0		

Used Unsubmerged Equ. Form (1) for elev. less than 51.7 ft
Used Submerged Equation for elevations greater than 51.81 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=51.7 ft; Q1=7.58 cfs; Dc=1.07 ft; E2=51.81 ft; Q2=8.66 cfs

```
*************************************
*                                   *
*      GREENSPRINGS LAND BAY G-3    *
*  DRAINAGE AREA ABOVE STRUCTURE K1 *
*                                   *
*                                   *
*                                   *
*************************************
```

Inflow Hydrograph: b:GSK110IN.HYD
Rating Table file: b:GGLBSSK1.PND

----INITIAL CONDITIONS----
Elevation = 50.00 ft
Outflow = 0.00 cfs
Storage = 0 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + O (cfs)
50.00	0.0	0	0.0	0.0
50.50	1.0	177	5.9	6.9
51.00	3.4	1,417	47.2	50.6
51.50	6.3	3,720	124.0	130.3
52.00	9.7	6,398	213.2	222.9
52.50	12.2	9,424	314.1	326.3
53.00	14.2	12,763	425.3	439.5
53.50	16.0	16,502	550.0	566.0
54.00	17.6	20,742	691.2	708.8

Time increment (t) = 1.0 min.

Pond File: b:GSLBS3K1.POND
Inflow Hydrograph: b:GSK110IN.HYD
Outflow Hydrograph: b:OUT .HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
0.0	0.00	-----	0.0	0.0	0.00	50.00
1.0	0.89	0.9	0.6	0.9	0.13	50.06
2.0	1.78	2.7	2.3	5.3	0.48	50.24
3.0	2.66	4.4	4.8	6.8	0.98	50.49
4.0	3.55	6.2	8.6	11.0	1.23	50.55
5.0	4.44	8.0	13.5	16.6	1.53	50.61
6.0	5.33	9.8	19.5	23.3	1.90	50.67
7.0	6.22	11.6	26.4	31.0	2.32	50.78
8.0	7.10	13.3	34.1	39.7	2.80	50.88
9.0	7.99	15.1	42.5	49.2	3.32	50.98
10.0	8.88	16.9	52.0	59.4	3.72	51.06
11.0	9.77	18.7	62.4	70.6	4.13	51.13
12.0	10.65	20.4	73.6	82.8	4.57	51.20
13.0	11.54	22.2	85.7	95.8	5.05	51.28
14.0	12.43	24.0	98.6	109.7	5.55	51.37
15.0	13.32	25.8	112.2	124.4	6.09	51.46
16.0	14.21	27.5	126.4	139.7	6.65	51.55
17.0	15.09	29.3	141.3	155.7	7.23	51.64
18.0	15.98	31.1	156.6	172.3	7.84	51.73
19.0	16.87	32.9	172.5	189.5	8.47	51.82
20.0	16.87	33.7	188.1	206.3	9.09	51.91
21.0	16.87	33.7	202.5	221.8	9.66	51.99
22.0	16.87	33.7	216.2	236.3	10.02	52.06
23.0	16.87	33.7	229.2	250.0	10.35	52.13
24.0	16.87	33.7	241.6	263.0	10.67	52.19
25.0	16.87	33.7	253.4	275.4	10.97	52.25
26.0	16.87	33.7	264.7	287.2	11.25	52.31
27.0	16.87	33.7	275.4	298.4	11.53	52.37
28.0	16.87	33.7	285.5	309.1	11.78	52.42
29.0	16.87	33.7	295.2	319.3	12.03	52.47
30.0	16.87	33.7	304.5	329.0	12.25	52.51
31.0	16.87	33.7	313.4	338.2	12.41	52.55
32.0	16.87	33.7	322.0	347.1	12.57	52.59
33.0	16.87	33.7	330.3	355.7	12.72	52.63
34.0	16.87	33.7	338.3	364.0	12.87	52.67
35.0	16.87	33.7	346.0	372.0	13.01	52.70
36.0	16.87	33.7	353.5	379.8	13.14	52.74
37.0	16.87	33.7	360.7	387.2	13.28	52.77
38.0	16.87	33.7	367.6	394.4	13.40	52.80
39.0	16.87	33.7	374.3	401.3	13.53	52.83
40.0	16.87	33.7	380.7	408.0	13.64	52.86
41.0	16.87	33.7	387.0	414.5	13.76	52.89
42.0	16.87	33.7	393.0	420.7	13.87	52.92
43.0	16.87	33.7	398.8	426.7	13.97	52.94
44.0	16.87	33.7	404.3	432.5	14.08	52.97

Pond File: C:GSLBGGK1.PND
Inflow Hydrograph: C:GGK110IN.HYD
Outflow Hydrograph: C:OUT .HYD

INFLOW HYDROGRAPH — ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
45.0	16.87	33.7	409.7	438.1	14.17	52.99
46.0	16.87	33.7	415.0	443.5	14.26	53.02
47.0	16.87	33.7	420.0	448.7	14.33	53.04
48.0	16.87	33.7	425.0	453.8	14.40	53.06
49.0	16.87	33.7	429.8	458.7	14.47	53.08
50.0	16.87	33.7	434.4	463.5	14.54	53.09
51.0	16.87	33.7	438.9	468.2	14.61	53.11
52.0	16.87	33.7	443.3	472.7	14.67	53.13
53.0	16.87	33.7	447.6	477.1	14.73	53.15
54.0	16.37	33.7	451.8	481.4	14.80	53.17
55.0	16.87	33.7	455.8	485.5	14.85	53.18
56.0	16.87	33.7	459.7	489.5	14.91	53.20
57.0	16.87	33.7	463.5	493.5	14.97	53.21
58.0	16.87	33.7	467.2	497.3	15.02	53.23
59.0	16.87	33.7	470.8	501.0	15.07	53.24
60.0	16.87	33.7	474.3	504.5	15.13	53.26
61.0	16.87	33.7	477.7	508.0	15.18	53.27
62.0	16.87	33.7	481.0	511.4	15.22	53.28
63.0	16.87	33.7	484.2	514.7	15.27	53.30
64.0	16.87	33.7	487.3	517.9	15.32	53.31
65.0	16.87	33.7	490.3	521.0	15.36	53.32
66.0	16.87	33.7	493.2	524.0	15.40	53.33
67.0	16.87	33.7	496.1	527.0	15.44	53.35
68.0	16.87	33.7	498.9	529.8	15.49	53.36
69.0	16.87	33.7	501.5	532.6	15.52	53.37
70.0	16.87	33.7	504.2	535.3	15.56	53.38
71.0	16.87	33.7	506.7	537.9	15.60	53.39
72.0	16.87	33.7	509.2	540.4	15.64	53.40
73.0	16.87	33.7	511.6	542.9	15.67	53.41
74.0	16.87	33.7	513.9	545.3	15.71	53.42
75.0	16.87	33.7	516.2	547.6	15.74	53.43
76.0	16.37	33.7	518.4	549.9	15.77	53.44
77.0	16.87	33.7	520.5	552.1	15.80	53.45
78.0	16.87	33.7	522.6	554.2	15.83	53.45
79.0	16.87	33.7	524.6	556.3	15.86	53.46
80.0	16.87	33.7	526.5	558.3	15.89	53.47
81.0	16.87	33.7	528.4	560.3	15.92	53.48
82.0	16.87	33.7	530.3	562.2	15.95	53.49
83.0	16.87	33.7	532.1	564.0	15.97	53.49
84.0	16.87	33.7	533.8	565.8	16.00	53.50
85.0	15.98	32.9	534.7	566.7	16.01	53.50
86.0	15.09	31.1	533.7	565.7	16.00	53.50
87.0	14.21	29.3	531.1	563.0	15.96	53.49
88.0	13.32	27.5	526.9	558.6	15.90	53.47
89.0	12.43	25.8	521.0	552.6	15.81	53.45
90.0	11.54	24.0	513.6	545.0	15.70	53.42

EXECUTED: 04-24-1995 08:23:23

Pond File: b:GSLBSSK1.PND
Inflow Hydrograph: b:GSK110IN.HYD
Outflow Hydrograph: b:OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
91.0	10.65	22.2	504.6	535.7	15.57	53.38
92.0	9.77	20.4	494.2	525.0	15.42	53.34
93.0	8.88	18.7	482.4	512.8	15.24	53.29
94.0	7.99	16.9	469.1	499.2	15.05	53.24
95.0	7.10	15.1	454.5	484.2	14.84	53.18
96.0	6.22	13.3	438.7	467.9	14.60	53.11
97.0	5.33	11.6	421.5	450.2	14.35	53.04
98.0	4.44	9.8	403.2	431.3	14.05	52.96
99.0	3.55	8.0	383.8	411.2	13.70	52.87
100.0	2.66	6.2	363.3	390.0	13.32	52.78
101.0	1.78	4.4	341.9	367.8	12.93	52.68
102.0	0.89	2.7	319.5	344.6	12.52	52.58
103.0	0.00	0.9	296.3	320.4	12.06	52.47
104.0	0.00	0.0	273.3	296.3	11.47	52.35
105.0	0.00	0.0	251.5	273.3	10.92	52.24
106.0	0.00	0.0	230.7	251.5	10.39	52.14
107.0	0.00	0.0	210.9	230.7	9.89	52.04
108.0	0.00	0.0	192.4	210.9	9.26	51.94
109.0	0.00	0.0	175.3	192.4	8.58	51.84
110.0	0.00	0.0	159.4	175.3	7.95	51.74
111.0	0.00	0.0	144.6	159.4	7.37	51.66
112.0	0.00	0.0	131.0	144.6	6.83	51.58
113.0	0.00	0.0	118.3	131.0	6.33	51.50
114.0	0.00	0.0	106.6	118.3	5.86	51.42
115.0	0.00	0.0	95.7	106.6	5.44	51.35
116.0	0.00	0.0	85.6	95.7	5.04	51.28
117.0	0.00	0.0	76.3	85.6	4.67	51.22
118.0	0.00	0.0	67.6	76.3	4.33	51.16
119.0	0.00	0.0	59.6	67.6	4.02	51.11
120.0	0.00	0.0	52.1	59.6	3.73	51.06
121.0	0.00	0.0	45.2	52.1	3.45	51.01
122.0	0.00	0.0	39.0	45.2	3.10	50.94
123.0	0.00	0.0	33.5	39.0	2.76	50.87
124.0	0.00	0.0	28.6	33.5	2.46	50.80
125.0	0.00	0.0	24.2	28.6	2.19	50.75
126.0	0.00	0.0	20.3	24.2	1.95	50.70
127.0	0.00	0.0	16.8	20.3	1.73	50.65
128.0	0.00	0.0	13.7	16.8	1.54	50.61
129.0	0.00	0.0	11.0	13.7	1.37	50.58
130.0	0.00	0.0	8.5	11.0	1.22	50.55
131.0	0.00	0.0	6.4	8.5	1.09	50.52
132.0	0.00	0.0	4.5	6.4	0.92	50.46
133.0	0.00	0.0	3.2	4.5	0.65	50.33
134.0	0.00	0.0	2.3	3.2	0.46	50.23
135.0	0.00	0.0	1.6	2.3	0.33	50.16
136.0	0.00	0.0	1.1	1.6	0.23	50.12

Pond File: b:SSLB53K1.PND
Inflow Hydrograph: b:SSK110IN.HYD
Outflow Hydrograph: n:OUT .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
137.0	0.001	0.0	0.8	1.1	0.17	50.08
138.0	0.001	0.0	0.6	0.8	0.12	50.06
139.0	0.001	0.0	0.4	0.6	0.08	50.04
140.0	0.001	0.0	0.3	0.4	0.06	50.03
141.0	0.001	0.0	0.2	0.3	0.04	50.02
142.0	0.001	0.0	0.1	0.2	0.03	50.02
143.0	0.001	0.0	0.1	0.1	0.02	50.01
144.0	0.001	0.0	0.1	0.1	0.02	50.01
145.0	0.001	0.0	0.1	0.1	0.01	50.01
146.0	0.001	0.0	0.0	0.1	0.01	50.00
147.0	0.001	0.0	0.0	0.0	0.01	50.00
148.0	0.001	0.0	0.0	0.0	0.00	50.00
149.0	0.001	0.0	0.0	0.0	0.00	50.00
150.0	0.001	0.0	0.0	0.0	0.00	50.00
151.0	0.001	0.0	0.0	0.0	0.00	50.00
152.0	0.001	0.0	0.0	0.0	0.00	50.00
153.0	0.001	0.0	0.0	0.0	0.00	50.00
154.0	0.001	0.0	0.0	0.0	0.00	50.00
155.0	0.001	0.0	0.0	0.0	0.00	50.00
156.0	0.001	0.0	0.0	0.0	0.00	50.00
157.0	0.001	0.0	0.0	0.0	0.00	50.00
158.0	0.001	0.0	0.0	0.0	0.00	50.00
159.0	0.001	0.0	0.0	0.0	0.00	50.00
160.0	0.001	0.0	0.0	0.0	0.00	50.00
161.0	0.001	0.0	0.0	0.0	0.00	50.00
162.0	0.001	0.0	0.0	0.0	0.00	50.00
163.0	0.001	0.0	0.0	0.0	0.00	50.00
164.0	0.001	0.0	0.0	0.0	0.00	50.00
165.0	0.001	0.0	0.0	0.0	0.00	50.00
166.0	0.001	0.0	0.0	0.0	0.00	50.00
167.0	0.001	0.0	0.0	0.0	0.00	50.00
168.0	0.001	0.0	0.0	0.0	0.00	50.00
169.0	0.001	0.0	0.0	0.0	0.00	50.00
170.0	0.001	0.0	0.0	0.0	0.00	50.00
171.0	0.001	0.0	0.0	0.0	0.00	50.00
172.0	0.001	0.0	0.0	0.0	0.00	50.00
173.0	0.001	0.0	0.0	0.0	0.00	50.00
174.0	0.001	0.0	0.0	0.0	0.00	50.00
175.0	0.001	0.0	0.0	0.0	0.00	50.00
176.0	0.001	0.0	0.0	0.0	0.00	50.00
177.0	0.001	0.0	0.0	0.0	0.00	50.00
178.0	0.001	0.0	0.0	0.0	0.00	50.00
179.0	0.001	0.0	0.0	0.0	0.00	50.00
180.0	0.001	0.0	0.0	0.0	0.00	50.00

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

Pond File: b:GSLBS3K1.PND
Inflow Hydrograph: b:GSK110IN.HYD
Outflow Hydrograph: b:OUT .HYD

Starting Pond W.S. Elevation = 50.00 ft

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

Peak Inflow = 16.87 cfs
Peak Outflow = 16.01 cfs
Peak Elevation = 53.50 ft

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

Initial Storage	=	0 cu-ft
Peak Storage From Storm	=	16,523 cu-ft
Total Storage in Pond	=	16,523 cu-ft

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE I
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
L1	L2	0.23	0.8	0.18	–	7	6.6	1.21	47.68	47.48	30'	0.0067	12"	2.92	3.5	8.6	
L2A	L2	0.92	0.4	0.37	–	12	5.8	2.15	49.15	47.48	58'	0.0288	12"	6.05	7.1	8.1	
L2	L3	0.27	0.8	0.22	0.77	12.1	5.8	4.46	47.23	46.68	196	0.0028	18"	5.56	3.5	56.0	
L3	L4	0.13	0.8	0.10	0.87	13.0	5.6	4.87	46.58	46.51	26'	0.0028	18"	5.56	3.6	7.2	
L4	L4A	0.48	0.6	0.29	1.16	13.1	5.6	6.50	46.41	46.32	23'	0.0040	18"	6.64	4.3	5.3	
L4A	L5	1.12	0.3	0.34	1.50	13.2	5.6	8.40	46.07	45.95	39'	0.0030	21"	8.68	4.1	9.5	
L5	L6	0.66	0.6	0.40	1.90	13.4	5.5	10.45	45.70	45.59	40'	0.0028	24"	11.97	4.3	9.1	
L6	L8	0.72	0.6	0.43	2.33	13.6	5.5	12.81	45.49	45.34	43'	0.0034	24"	13.19	4.8	9.0	
L7	L8	0.27	0.8	0.21	—	7	6.6	1.39	47.77	47.51	26'	0.01	12"	3.56	4.3	6.0	
L8	L8A	0.12	0.7	0.08	2.62	13.8	5.4	14.14	45.09	44.92	65'	0.0026	27"	15.79	4.5	14	
L8A	L9	1.55	0.4	0.62	3.24	14.0	5.4	17.50	44.82	44.26	166'	0.0034	27"	18.06	5.2	31.9	
L9A	L9	0.19	0.8	0.15	—	7	6.6	1.00	~~52.29~~ 51.83	~~51.99~~ 51.53	30'	0.01	12"	3.56	3.9		
L9	L10	1.59	0.4	0.64	4.03	14.5	5.2	20.96	44.16	42.68	275'	0.0054	27"	22.76	6.5	42.3	
L10	L11	1.22	0.4	0.49	4.52	15.2	5.2	23.50	42.58	41.61	162'	0.0060	27"	23.99	6.9	23.5	
~~L11~~	~~L12~~	~~–~~	~~–~~			~~15.6~~	~~5.1~~	~~23.50~~	~~41.51~~	~~40.53~~	~~164'~~	~~0.0060~~	~~27"~~	~~23.99~~	~~6.9~~	~~23.8~~	
* (SEE	REV.	DATED		7/1/94)													
		DITCH												DEPTH			
L12	C4	4.44	.30	1.40	5.92	16.0	5.0	29.6	40.53	39.44	110	0.01	2' bott	1.17	2.78		

4-72

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE I
COUNTY _____ DISTRICT _____
DESCRIPTION _____ SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCREMENT	CA ACCUMULATED	INLET TIME MINUTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPACITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
G1	G3	0.27	0.8	0.22	—	7	6.6	1.45	47.22	46.62	32'	0.0186	12"	4.86	5.4	5.9	
G2	G3	4.87	0.35	1.70	—	15	5.2	8.84	43.00	42.58	32'	0.013	18"	11.98	7.4	4.3	$H_w/D_{10} = 1.2 = 1.8$
G3	G9	0.27	0.8	0.22	2.14	15.1	5.2	11.13	42.48	38.09	294	0.0115	18"	11.26	7.3	40.3	
G5	G7	1.27	0.40	0.51	—	13	5.6	2.85	42.11	41.61	200'	0.0025	15"	3.23	2.97	67.3	
G6	G7	0.28	0.8	0.22	—	7	6.6	1.45	41.96	41.86	32'	0.003	12"	1.95	2.7	11.8	
G7	G8	1.73	0.35	0.61	1.34	14.1	5.4	7.24	41.36	40.35	168'	0.006	18"	7.43	4.8	35.1	
~~G4~~	~~G8~~	~~4.66~~	~~0.30~~	~~5.42~~		~~16.7~~	~~5.0~~	~~29.00~~	~~39.44~~	~~39.25~~	~~32'~~	~~0.006~~	~~30"~~	~~31.77~~	~~7.4~~	~~4.3~~	$H_w/D_{10} = 1.1 = 2.7$
* (SEE REV. DATED 7/1/94)																	
~~G8~~	~~G9~~	~~0.78~~	~~0.55~~	~~0.43~~	~~7.69~~	~~10.7~~	~~5.0~~	~~38.43~~	~~39.15~~	~~38.85~~	~~32'~~	~~0.01~~	~~30"~~	~~41.02~~	~~9.5~~	~~3.4~~	
~~G9~~	~~G10~~	~~0.27~~	~~0.8~~	~~0.22~~	~~10.05~~	~~16.8~~	~~5.0~~	~~38.85~~	~~36.01~~	~~31.08~~	~~164~~	~~0.0301~~	~~30"~~	~~71.16~~	~~13.7~~	~~10.4~~	
~~G10~~	~~G11~~							~~30.23~~	~~30.38~~	~~30.30~~	~~14~~	~~0.0058~~	~~36~~	~~50.8~~	~~8.2~~	~~1.7~~	
H1	H2	0.71	0.55	0.39	—	7	6.6	2.57	45.00	33.00	160'	0.075	15"	17.62	10.22	15.7	

4-72

Rs13H FILE: GREEN21.MRG
Project: GREENSPRINGS - Phase 1 & 2
Location: James City Co., Virginia
Design: M. Gordon
Date: May 20, 1994
Revision: May 24, 1994
Yr. Storm: 10
N Value: 0.013

LANGLEY and McDONALD
201 Packets Court
Williamsburg, Virginia 23185

STORM SEWER DESIGN COMPUTATIONS

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV. UP	INVERT ELEV. LOW	LENGTH	SLOPE	PIPE DIAM.	VELOCITY	CAPACITY	FLOW TIME	FLOW RATIO	VELOCITY RATIO	REMARKS
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches	ft./sec.	cfs	min.	Qp/Qf	Vp/Vf	
[E]	[E]	[E]	[E]							[E]		[E]		[E]		[E]			[E]	
System "R"																				
1	2	0.64	0.32	0.20	0.20	17.00	4.91	1.00	1.00	57.37	57.24	26	0.0050	12	3.00	2.51	0.14	0.40	0.94	Use RCP
2	3	0.19	0.48	0.09	0.29	17.14	4.90	0.45	1.44	56.99	56.62	95	0.0039	15	3.00	4.04	0.53	0.36	0.91	Use RCP
3	4	MH-1	0.00	0.00	0.29	17.67	4.83	0.00	1.42	56.52	56.28	60	0.0039	15	3.00	4.04	0.33	0.35	0.91	Use RCP
4	5	0.16	0.52	0.08	0.38	18.01	4.80	0.41	1.82	56.18	56.09	26	0.0033	15	3.00	3.70	0.14	0.49	0.99	Use RCP
5	6	0.22	0.45	0.10	0.48	18.15	4.78	0.47	2.29	55.99	55.55	153	0.0029	15	3.00	3.46	0.85	0.66	1.06	Use RCP
6	7	MH-1	3.00	0.00	0.48	19.00	4.69	0.00	2.25	55.45	55.20	85	0.0029	15	3.00	3.49	0.47	0.64	1.06	Use RCP
7	8	0.34	0.45	0.15	0.63	19.47	4.63	0.71	2.93	55.10	50.00	215	0.0237	15	6.95	9.91	0.52	0.30	0.86	Use CPEP
System "M"																				
1	2	1.07	0.32	0.34	0.34	15.50	5.10	1.74	1.74	54.51	54.42	26	0.0035	12	3.00	2.11	0.14	0.83	1.12	Use RCP
2	3	0.40	0.46	0.18	0.52	15.64	5.08	0.94	2.67	54.17	53.43	276	0.0027	15	3.00	3.32	1.53	0.81	1.11	Use RCP
3	4	0.36	0.43	0.15	0.68	17.18	4.89	0.76	3.34	53.33	50.00	175	0.0190	15	6.69	8.88	0.44	0.38	0.92	Use CPEP
Revised Portion of System "A"																				
8A	8	0.19	0.49	0.09	0.09	16.00	5.04	0.47	0.47	64.89	63.89	50	0.0200	12	3.96	5.02	0.21	0.09	0.68	
8	9	0.44	0.36	0.16	0.25	17.40	4.87	0.78	1.22	63.64	63.52	26	0.0045	15	3.00	4.32	0.14	0.29	0.85	
9	9A	0.36	0.46	0.17	0.42	17.54	4.85	0.81	2.04	63.42	63.27	48	0.0031	15	3.00	3.60	0.27	0.57	1.02	

For
Darryl Cook

Drain Calcs for
all of Phase
I & II
GREENSPRINGS

FILE: GREEN11.MRG
Project: GREENSPRINGS - Phase 2
Location: James City Co., Virginia
Design: M. Gordon
Date: May 13, 1994
Revision:

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV. UP	INVERT ELEV. LOW	LENGTH	SLOPE	PIPE DIAM.	VELOCITY	CAPACITY	FLOW TIME	FLOW RATIO	VELOCITY RATIO	REMARKS
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches	ft./sec.	cfs	min.	Qp/Qf	Vp/Vf	
System "A"																				
5	7	4.76	0.31	1.48	1.48	21.50	4.43	6.53	6.53	66.40	64.17	26	0.0857	15	13.85	18.84	0.03	0.35	0.90	Use RCP
6	7	0.23	0.80	0.18	0.18	10.00	5.93	1.09	1.09	64.74	64.42	32	0.0100	12	3.93	3.55	0.14	0.31	0.87	Use RCP
7	9A	0.46	0.60	0.28	1.94	21.53	4.42	1.22	8.56	64.07	60.99	174	0.0177	15	6.98	8.56	0.42	1.00	1.00	Use RCP
8	9	0.63	0.60	0.38	0.38	17.40	4.87	1.84	1.84	64.25	64.05	30	0.0067	12	3.68	2.90	0.13	0.63	1.05	Use RCP
9	9A	0.36	0.75	0.27	0.65	17.53	4.85	1.31	3.14	63.80	63.58	32	0.0068	15	4.47	5.30	0.12	0.59	1.04	Use RCP
9A	10	MH-1	0.00	0.00	2.58	21.95	4.38	0.00	11.33	60.74	57.78	252	0.0117	18	6.41	11.33	0.66	1.00	1.00	Use RCP
10A	10	1.16	0.35	0.41	0.41	18.10	4.79	1.94	1.94	60.25	58.74	18	0.0840	15	10.33	18.65	0.03	0.10	0.68	Use RCP
10	11	0.58	0.65	0.38	3.37	22.60	4.32	1.63	14.55	57.53	57.28	32	0.0085	21	6.05	14.55	0.09	1.00	1.00	Use RCP
11	15	0.22	0.80	0.18	3.54	22.69	4.31	0.76	15.28	54.69	53.94	80	0.0094	21	6.35	15.28	0.21	1.00	1.00	Use RCP
Exist	1				2.92	13.00	5.45		15.91	71.93	66.87	200	0.0253	24	11.03	35.90	0.30	0.44	0.97	Exist CPEP
1	3	0.69	0.25	0.17	3.09	13.30	5.40	0.93	16.71	66.77	61.76	215	0.0233	24	10.83	34.44	0.33	0.49	0.99	Use CPEP
2	3	1.61	0.35	0.56	0.56	17.00	4.91	2.77	2.77	64.19	63.80	39	0.0100	15	5.02	6.42	0.13	0.43	0.96	Use RCP
3	3A	0.33	0.80	0.26	3.92	17.13	4.90	1.29	19.20	61.66	59.33	98	0.0238	24	11.30	34.80	0.14	0.55	1.02	Use CPEP
3A	4	2.89	0.35	1.01	4.93	17.27	4.88	4.94	24.07	59.23	57.53	93	0.0183	24	10.74	30.55	0.14	0.79	1.10	Use CPEP
4	14	0.62	0.75	0.47	5.40	17.42	4.86	2.26	26.25	57.43	56.95	26	0.0183	24	10.94	30.55	0.04	0.86	1.13	Use RCP
12	13	4.09	0.30	1.23	1.23	22.00	4.38	5.37	5.37	73.25	60.67	226	0.0557	15	11.26	15.18	0.33	0.35	0.91	Phase 2 - not in this contract
13	14	0.78	0.55	0.43	1.66	22.33	4.35	1.87	7.20	60.57	57.92	91	0.0291	15	9.48	10.98	0.16	0.66	1.06	Phase 2 - not in this contract
14	15	0.18	0.75	0.14	7.19	22.49	4.33	0.58	31.14	54.08	53.84	43	0.0058	30	6.34	31.14	0.11	1.00	1.00	Use RCP
15	16	MH-1	0.00	0.00	10.73	22.90	4.29	0.00	46.08	52.84	52.58	120	0.0021	42	4.79	46.08	0.42	1.00	1.00	Use RCP
16	18	2.11	0.35	0.74	11.47	23.32	4.26	3.14	48.82	52.48	52.19	125	0.0024	42	5.07	48.82	0.41	1.00	1.00	Use RCP
17	18	3.89	0.25	0.97	0.97	23.00	4.29	4.17	4.17	54.80	54.72	20	0.0042	15	3.40	4.17	0.10	1.00	1.00	Use RCP
18	21	0.55	0.32	0.18	12.62	23.73	4.22	0.74	53.24	52.09	50.31	166	0.0107	42	10.85	104.00	0.25	0.51	1.00	Use RCP
19	20	1.10	0.29	0.32	0.32	16.00	5.04	1.61	1.61	57.00	53.02	170	0.0234	15	5.87	9.85	0.48	0.16	0.73	Use RCP
20	21	0.96	0.29	0.28	0.60	16.48	4.98	1.39	2.97	52.92	52.79	60	0.0021	15	2.42	2.97	0.41	1.00	1.00	Use RCP
24	21	1.24	0.25	0.31	0.91	18.50	4.74	1.47	4.30	53.58	53.45	28	0.0045	15	3.51	4.30	0.13	1.00	1.00	Use RCP
21	22	0.73	0.34	0.25	14.37	23.99	4.20	1.04	60.32	49.81	49.74	41	0.0018	48	4.80	60.32	0.14	1.00	1.00	Use RCP
22	23	1.01	0.51	0.52	14.89	24.13	4.19	2.16	62.30	49.64	49.31	175	0.0019	48	4.96	62.30	0.59	1.00	1.00	Install EW-2

NOTE: The calculations have been revised per Phase 2 design. Systems are same as submitted in Phase 1.

Rs13H FILE: GREEN11.MRG
Project: GREENSPRINGS - Phase 1 & 2
Location: James City Co., Virginia
Design: M. Gordon
Date: May 13, 1994
Revision: May 16, 1994
Yr. Storm: 10
N Value: 0.013

LANGLEY and McDONALD
201 Packets Court
Williamsburg, Virginia 23185

STORM SEWER DESIGN COMPUTATIONS

FROM PT.	TO PT.	DRAIN. AREA	RUN-OFF COEFF.	C x A INCR.	C x A ACCUM.	INLET TIME	RAIN FALL	RUNOFF "Q" INCR.	RUNOFF "Q" ACCUM.	INVERT ELEV. UP	INVERT ELEV. LOW	LENGTH	SLOPE	PIPE DIAM.	VELOCITY	CAPACITY	FLOW TIME	FLOW RATIO	VELOCITY RATIO	REMARKS
		acres	"C"			min.	in/hr	cfs	cfs			ft.	ft./ft.	inches	ft./sec.	cfs	min.	Qp/Qf	Vp/Vf	
[E]	[E]	[E]	[E]							[E]		[E]		[E]		[E]			[E]	
System "D"																				
10	11	0.81	0.32	0.26	0.26	16.00	5.04	1.31	1.31	77.55	77.43	28	0.0042	12	3.00	2.30	0.16	0.57	1.02	Phase 2 - Future
11	12	1.38	0.32	0.44	0.70	16.16	5.02	2.22	3.53	77.18	70.39	300	0.0226	15	7.23	9.68	0.69	0.36	0.92	Phase 2 - Future
12	13	MH-1	0.00	0.00	0.70	16.85	4.93	0.00	3.47	70.29	64.86	240	0.0226	15	7.18	9.68	0.56	0.36	0.91	Phase 2 - Future
13	14	0.45	0.32	0.14	0.85	17.40	4.87	0.70	4.12	64.76	63.27	44	0.0340	15	8.72	11.86	0.08	0.35	0.90	Phase 2 - Future
14	15	0.80	0.32	0.26	1.10	17.49	4.86	1.25	5.36	63.17	59.62	236	0.0150	15	6.87	7.89	0.57	0.68	1.07	Phase 2 - Future
15	16	1.24	0.32	0.40	1.50	25.00	4.11	1.64	6.17	59.37	57.24	220	0.0097	18	6.04	10.30	0.61	0.60	1.04	Phase 2 - Future
16	18	2.02	0.32	0.65	2.15	25.61	4.06	2.63	8.73	57.14	56.71	44	0.0098	18	6.57	10.34	0.11	0.84	1.12	Phase 2 - Future
17	18	0.46	0.32	0.15	0.15	8.00	6.30	0.93	0.93	57.23	57.14	28	0.0032	12	2.49	2.00	0.19	0.46	0.98	Phase 2 - Future
18	19	1.42	0.32	0.45	2.75	25.72	4.05	1.84	11.14	56.46	56.10	66	0.0055	21	5.57	11.70	0.20	0.95	1.15	Phase 2 - Future
19	20	1.27	0.32	0.41	3.16	25.92	4.03	1.64	12.74	55.85	54.55	350	0.0037	24	4.99	13.75	1.17	0.93	1.14	Phase 2 - Future
20	2	MH-1	0.32	0.00	3.16	27.09	3.94	0.00	12.45	54.45	54.25	56	0.0035	24	4.86	13.40	0.19	0.93	1.14	Ph.1 - 8 ft stub only
1	2	0.37	0.40	0.15	0.15	10.00	5.93	0.88	0.88	56.66	56.51	28	0.0055	12	3.00	2.64	0.16	0.33	0.89	Ph.1 - 8 ft stub only
2	25	0.51	0.35	0.18	3.48	27.28	3.93	0.70	13.68	54.15	53.81	82	0.0042	24	5.29	14.55	0.26	0.94	1.14	Use RCP
3	4	0.61	0.40	0.24	0.24	10.00	5.93	1.45	1.45	56.60	56.47	34	0.0039	12	3.00	2.22	0.19	0.65	1.06	Use RCP
4	25	0.38	0.40	0.15	0.40	10.19	5.90	0.90	2.33	56.22	56.10	39	0.0029	15	3.00	3.45	0.22	0.68	1.07	Use RCP
25	5	MH-1	0.00	0.00	3.88	27.54	3.91	0.00	15.16	53.71	52.90	160	0.0051	24	5.86	16.10	0.46	0.94	1.14	Use RCP
5	7	0.47	0.40	0.19	4.07	27.99	3.87	0.73	15.76	52.80	52.57	41	0.0054	24	6.06	16.65	0.11	0.95	1.14	Use RCP
6	7	0.94	0.35	0.33	0.33	10.00	5.93	1.95	1.95	55.15	54.96	60	0.0032	15	3.00	3.64	0.33	0.54	1.01	Use RCP
7	8	1.33	0.35	0.47	4.86	28.10	3.87	1.80	18.79	52.07	51.84	100	0.0023	30	4.60	19.70	0.36	0.95	1.15	Use RCP
8	9	1.49	0.35	0.52	5.38	28.47	3.84	2.00	20.66	51.74	51.23	188	0.0027	30	5.00	21.40	0.63	0.97	1.15	Use RCP
9	23	0.30	0.40	0.12	5.50	29.09	3.79	0.46	20.88	51.13	50.52	218	0.0028	30	5.05	21.64	0.72	0.96	1.15	Use RCP
23	24	MH-1	0.00	0.00	5.50	29.81	3.74	0.00	20.60	50.42	49.70	258	0.0028	30	5.05	21.64	0.85	0.95	1.15	Install EW-1

NOTE: The calculations have been revised per Phase 2 design. Systems are same as submitted in Phase 1.

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE II
COUNTY _____ DISTRICT _____
DESCRIPTION _____
SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCREMENT	CA ACCUMULATED	INLET TIME MINUTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPACITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
L1	L2	0.23	0.8	0.18	–	7	6.6	1.21	47.68	47.48	30'	0.0067	12"	2.92	3.5	8.6	
L2A	L2	0.92	0.4	0.37	–	12	5.8	2.15	49.15	47.48	58'	0.0288	12"	6.05	7.1	8.1	
L2	L3	0.27	0.8	0.22	0.77	12.1	5.8	4.46	47.23	46.68	196	0.0028	18"	5.56	3.5	56.0	
L3	L4	0.13	0.8	0.10	0.87	13.0	5.6	4.87	46.58	46.51	26'	0.0028	18"	5.56	3.6	7.2	
L4	L4A	0.48	0.6	0.29	1.16	13.1	5.6	6.50	46.41	46.32	23'	0.0040	18"	6.64	4.3	5.3	
L4A	L5	1.12	0.3	0.34	1.50	13.2	5.6	8.40	46.07	45.95	39'	0.0030	21"	8.68	4.1	9.5	
L5	L6	0.66	0.6	0.40	1.90	13.4	5.5	10.45	45.70	45.59	40'	0.0028	24"	11.97	4.3	9.1	
L6	L8	0.72	0.6	0.43	2.33	13.6	5.5	12.81	45.49	45.34	43'	0.0034	24"	13.19	4.8	9.0	
L7	L8	0.27	0.8	0.21	–	7	6.6	1.39	47.77	47.51	26'	0.01	12"	3.56	4.3	6.0	
L8	L8A	0.12	0.7	0.08	2.62	13.8	5.4	14.14	45.09	44.92	65'	0.0026	27"	15.79	4.5	14	
L8A	L9	1.55	0.4	0.62	3.24	14.0	5.4	17.50	44.82	44.26	166'	0.0034	27"	18.06	5.2	31.9	
L9A	L9	0.19	0.8	0.15	–	7	6.6	1.00	51.83 ~~52.29~~	51.53 ~~51.44~~	30'	0.01	12"	3.56	3.9		
L9	L10	1.59	0.4	0.64	4.03	14.5	5.2	20.96	44.16	42.68	273'	0.0054	27"	22.76	6.5	42.3	
L10	L11	1.22	0.4	0.49	4.52	15.2	5.2	23.50	42.58	41.61	162'	0.0060	27"	23.99	6.9	23.5	
L11	L12	–	–			15.6	5.1	23.50	41.51	40.53	164'	0.0060	27"	23.99	6.9	23.8	
		DITCH												DEPTH			
L12	C4	4.44	.30	1.40	5.92	16.0	5.0	29.6	40.53	39.44	110	0.01	2' bott	1.17	2.78		

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE I
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
FROM 30" UNDER RTE 614 STA 17+40					4.10												
J1	J2	5.88	0.52	3.06	7.16	22.6	4.3	30.79	54.42	53.92	86'	0.0058	30"	31.24	7.25	11.9	
J2A	J2	0.98	0.30	0.29	—	12	5.8	1.68	58.61	55.17	85'	0.0405	15				
J2	J3	0.71	0.40	0.28	7.73	22.8	4.3	33.23	53.42	53.33	32'	0.0028	36"	35.29	5.7	5.6	
J3	J4	0.24	0.80	0.19	7.92	22.9	4.3	34.06	53.23	52.89	120'	0.0028	36"	35.29	5.7	5.7	

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. _____
COUNTY _____ DISTRICT _____
DESCRIPTION _____
SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
FROM 30" UNDER RTE 612 STA 25+00					6.96												
K1	K2	3.40	0.30	1.02	7.98	19.3	4.8	38.30	50.0	48.90	18'	0.061	30"	101.30	19.2	0.9	HW/D = 1.4 = 3.5
K3	K2	0.34	0.80	0.27	—	7	6.6	1.78	50.69	50.40	32'	0.0092	12"	2.98	3.96	8.1	
K2	K5	1.19	0.35	0.42	8.67	19.3	4.8	41.62	48.40	46.62	328	0.0054	36"	47.16	7.53	43.6	
K4	K5	0.62	0.35	0.22	—	7	6.6	1.45	50.53	50.33	32'	0.0062	12"	2.8	3.57	7.4	
K5	K8	0.11	0.9	0.10	8.99	20.1	4.7	42.25	46.52	46.33	36'	0.0054	36"	44.24	7.13	5.0	
FROM 18" UNDER RTE 612 STA 34+25					3.36												
K6	K7	6.92	0.30	2.08	5.44	17.2	5.0	27.20	49.50	48.25	18'	0.0694	24"	59.60	18.5	1.0	HW/D = 1.8 = 3.6'
K7	K8	0.76	0.65	0.49	5.93	17.2	5.0	29.65	48.15	47.32	48'	0.0172	24"	29.65	9.44	5.1	
K8	K9	0.66	0.65	0.43	15.35	20.2	4.7	72.15	45.33	44.77	200'	0.0028	48"	76.01	6.88	29.1	
K9	K10								44.67	43.80	310'	0.0028	48"	76.01	6.88	45.1	

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE I
COUNTY _____ DISTRICT _____
DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
E7	E11	0.36	0.45	0.16	–	8	6.4	1.02	42.10	39.59	144'	0.0174	15"	8.52	4.68	30.8	
E8	E11	2.55	0.35	0.89	–	12	5.8	5.16	40.33	40.23	8'	0.0125	15"	7.22	6.40	1.3	
E9	E10	0.35	0.75	0.26	–	5	7.0	1.82	44.47	43.57	42	0.0214	12"	5.21	6.04	7.0	1.06 CHK
E10	E11	1.19	0.45	0.54	0.80	5	7.0	5.60	43.32	39.59	186	0.0200	15"	9.14	7.82	23.8	
E11	E12	0.22	0.8	0.18	2.03	12	5.8	11.77	39.34	38.89	32'	0.014	18"	12.43	8.0	4.0	
E12	E13	0.38	0.8	0.30	2.33	12.1	5.8	13.51	38.79	38.18	36'	0.0168	18"	13.62	8.7	4.1	
F1	F2	0.46	0.45	0.21	–	10	6.0	1.26	47.58	47.42	26'	0.006	15"	5.00	3.4	7.6	
F2	F3	0.60	0.40	0.24	0.45	10.12	6.0	2.70	47.32	47.15	42	0.004	15"	4.09	3.6	11.7	
F3	F4	0.91	0.45	0.41	0.86	10.32	6.0	5.16	47.05	46.36	46	0.015	15"	7.91	6.8	6.8	
F4	F5	0.27	0.8	0.22	1.08	10.43	6.0	6.48	46.26	42.89	75'	0.045	15"	13.7	10.4	7.2	

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE I
COUNTY _____ DISTRICT _____
DESCRIPTION _____
SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
G1	G3	0.27	0.8	0.22	–	7	6.6	1.45	47.22	46.62	32'	0.0186	12"	4.86	5.4	5.9	
G2	G3	4.87	0.35	1.70	–	15	5.2	8.84	43.00	42.58	32'	0.013	18"	11.98	7.4	4.3	H_w/D_{ID} = 1.2 = 1.8
G3	G9	0.27	0.8	0.22	2.14	15.1	5.2	11.13	42.48	38.09	294	0.0115	18"	11.26	7.3	40.3	
G5	G7	1.27	0.40	0.51	–	13	5.6	2.85	42.11	41.61	200'	0.0025	15"	3.23	2.97	67.3	
G6	G7	0.28	0.8	0.22	–	7	6.6	1.45	41.96	41.86	32'	0.003	12"	1.95	2.7	11.8	
G7	G8	1.73	0.35	0.61	1.34	14.1	5.4	7.24	41.36	40.35	1.68'	0.006	18"	7.43	4.8	35.1	
G4	G8	4.66 + L12	0.30	5.92	–	16.7	5.0	29.60	39.44	39.25	32'	0.006	30"	31.77	7.4	4.3	H_w/D_{ID} = 1.1 = 2.75
G8	G9	0.78	0.55	0.43	7.69	16.7	5.0	38.45	39.15	38.83	32'	0.01	30"	41.02	9.5	3.4	
G9	G10	0.27	0.8	0.22	10.05	16.8	5.0	50.25	36.01	31.08	164	0.0301	30"	71.16	15.7	10.4	
G10	G11	—						50.25	30.58	30.50	14	0.0058	36	50.8	8.2	1.7	
H1	H2	0.71	0.55	0.39	–	7	6.6	2.57	45.00	33.00	160'	0.075	15"	17.62	10.22	15.7	

STORM - SEWER DESIGN COMPUTATIONS

L & D 229

ROUTE _____ PROJ. GREENSPRINGS PHASE 1
COUNTY _____ DISTRICT _____
DESCRIPTION _____
SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
I1	I4	0.71	0.5	0.36	-	7	6.6	2.38	57.52	56.82	32'	0.017	12"	4.65	5.95	5.4	
I2	I3	0.81	0.5	0.41	-	7	6.6	2.71	57.23	57.02	32'	0.0065	12"	2.87	4.2	7.6	
I3	I4	0.17	0.8	0.14	0.55	7.1	6.6	3.63	56.77	56.57	56'	0.0036	15"	3.88	3.6	15.6	
I4	I5	0.21	0.8	0.17	1.15	7.36	6.5	7.48	56.47	48.60	220'	0.0358	15"	11.48	10.0	22.0	

FILE: GREEN23.MRG
Project: GREENSPRINGS - Phase 1 & 2
Location: James City Co., Virginia
Design: M. Gordon
Date: 27-May-94

STD. METHOD

Area		Coeff.		C x A
0.6192	@	0.25	=	0.1548
0.8375	@	0.9	=	0.7538
				0.90855
0.90855	/	1.4567	=	0.623704 (weighted coefficient.)

INLET No.	TOTAL AREA	PAVED AREA	PERVIOUS AREA	WEIGHTED "C"VALUE
System "R"				
1	0.6370	0.0651	0.5719	0.3164
2	0.1880	0.0674	0.1206	0.4830
4	0.1640	0.0671	0.0969	0.5159
5	0.2170	0.0680	0.1490	0.4537
7	0.3390	0.1046	0.2344	0.4506
System "M"				
1	1.0650	0.1119	0.9531	0.3183
2	0.3980	0.1283	0.2697	0.4595
3	0.3610	0.0986	0.2624	0.4275

PROJECT 91053-29
HEC12 Version: V2.91

Run Date: 05-16-1994

==========

INLET NUMBER L1 LENGTH 2.5 STATION 10+60 RD "J"

DRAINAGE AREA = 0.080 ACRES C VALUE = .800 CA = 0.064
DRAINAGE AREA = 0.130 ACRES C VALUE = .800 CA = 0.104

FOR THE FIRST SIDE
SUM CA= 0.064 INT= 3.50 CFS= 0.224 CO= 0.000 GUTTER FLOW= 0.224
FOR THE OTHER SIDE
SUM CA= 0.104 INT= 3.50 CFS= 0.364 CO= 0.000 GUTTER FLOW= 0.364
AT THE INLET

SUM CA= 0.168 INT= 3.50 CFS= 0.588 CO= 0.000 GUTTER FLOW= 0.588

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.36 (cfs) IS 5.61 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 6.10 H (ft) = 0.375
DEPTH OF WATER (ft) = 0.12 SPREAD (ft) = 5.79

==========

INLET NUMBER L2A LENGTH 8.0 STATION 11+00 RD "J"

DRAINAGE AREA = 0.920 ACRES C VALUE = .400 CA = 0.368
SUM CA= 0.368 INT= 3.50 CFS= 1.288 CO= 0.000 GUTTER FLOW= 1.288

GUTTER SLOPE = 0.0400 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.69	2.0	0.54	0.0833	4.0	0.96	3.5	0.146	0.161

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 9.4 EFFICIENCY= 0.97
CFS INTERCEPTED= 1.24 CFS CARRYOVER= 0.04

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==============================================================================
INLET NUMBER L2                LENGTH   2.5        STATION  10+42 RD "J"

DRAINAGE AREA =  0.090 ACRES        C VALUE = .800        CA =  0.072
DRAINAGE AREA =  0.180 ACRES        C VALUE = .800        CA =  0.144

FOR THE FIRST SIDE
SUM CA=   0.072 INT=  3.50  CFS=   0.252  CO=  0.000 GUTTER FLOW=   0.252
FOR THE OTHER SIDE
SUM CA=   0.144 INT=  3.50  CFS=   0.504  CO=  0.040 GUTTER FLOW=   0.544
AT THE INLET

SUM CA=   0.216 INT=  3.50  CFS=   0.756  CO=  0.040 GUTTER FLOW=   0.796

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.54 (cfs) IS  7.06 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  6.10                  H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.15            SPREAD (ft)  =  7.09


==============================================================================
INLET NUMBER L4                LENGTH   4.0        STATION  10+78 RD "I"

DRAINAGE AREA =  0.350 ACRES        C VALUE = .550        CA =  0.192
DRAINAGE AREA =  0.130 ACRES        C VALUE = .800        CA =  0.104

FOR THE FIRST SIDE
SUM CA=   0.192 INT=  3.50  CFS=   0.674  CO=  0.000 GUTTER FLOW=   0.674
FOR THE OTHER SIDE
SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.000 GUTTER FLOW=   0.364
AT THE INLET

SUM CA=   0.296 INT=  3.50  CFS=   1.038  CO=  0.000 GUTTER FLOW=   1.038

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.67 (cfs) IS  7.88 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  7.60                  H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.15            SPREAD (ft)  =  7.31
```

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==============================================================================
INLET NUMBER L3              LENGTH   2.5        STATION  10+78 RD "J"

DRAINAGE AREA =  0.080 ACRES       C VALUE = .800       CA =  0.064
DRAINAGE AREA =  0.050 ACRES       C VALUE = .800       CA =  0.040

FOR THE FIRST SIDE
SUM CA=   0.064 INT=  3.50  CFS=   0.224  CO=  0.000 GUTTER FLOW=   0.224
FOR THE OTHER SIDE
SUM CA=   0.040 INT=  3.50  CFS=   0.140  CO=  0.000 GUTTER FLOW=   0.140
AT THE INLET

SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.000 GUTTER FLOW=   0.364

GUTTER SLOPE = 0.0010 FT/FT       PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.22 (cfs) IS  3.99 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  6.10                H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.09          SPREAD (ft)  =  4.21
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==============================================================================
INLET NUMBER L4A                LENGTH    0.0          STATION

DRAINAGE AREA =   0.560 ACRES        C VALUE = .300        CA =   0.168
DRAINAGE AREA =   0.560 ACRES        C VALUE = .300        CA =   0.168

FOR THE FIRST SIDE
SUM CA=    0.168 INT=   3.50   CFS=    0.588   CO=   0.000 GUTTER FLOW=    0.588
FOR THE OTHER SIDE
SUM CA=    0.168 INT=   3.50   CFS=    0.588   CO=   0.000 GUTTER FLOW=    0.588
AT THE INLET

SUM CA=    0.336 INT=   3.50   CFS=    1.176   CO=   0.000 GUTTER FLOW=    1.176

     XXXXXXXXXX GRATE INLET IN A TRAPEZOIDAL CHANNEL XXXXXXXXXX
DEPTH OF WATER (ft)= 0.12  PERIMETER OF GRATE (ft)=  9.00  AREA (sq ft)=  2.33


==============================================================================
INLET NUMBER L5                 LENGTH    8.0          STATION  39+49 RD "A"

DRAINAGE AREA =   0.660 ACRES        C VALUE = .600        CA =   0.396
SUM CA=    0.396 INT=   3.50   CFS=    1.386   CO=   0.000 GUTTER FLOW=    1.386

GUTTER SLOPE = 0.0392 FT/FT        PAVEMENT CROSS SLOPE =   0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
  3.95     2.0     0.51   0.0833      4.0       0.95     3.5    0.146   0.159

       XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
    REQUIRED LENGTH (ft) =   9.7                EFFICIENCY= 0.95
    CFS INTERCEPTED=   1.32                 CFS CARRYOVER=  0.06


==============================================================================
INLET NUMBER L4                 LENGTH    4.0          STATION  10+78 RD "I"

DRAINAGE AREA =   0.350 ACRES        C VALUE = .550        CA =   0.192
DRAINAGE AREA =   0.130 ACRES        C VALUE = .800        CA =   0.104

FOR THE FIRST SIDE
SUM CA=    0.192 INT=   3.50   CFS=    0.674   CO=   0.000 GUTTER FLOW=    0.674
FOR THE OTHER SIDE
SUM CA=    0.104 INT=   3.50   CFS=    0.364   CO=   0.060 GUTTER FLOW=    0.424
AT THE INLET

SUM CA=    0.296 INT=   3.50   CFS=    1.038   CO=   0.060 GUTTER FLOW=    1.098

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =   0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND    0.67 (cfs) IS  7.88 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =   7.60                H (ft) = 0.375
    DEPTH OF WATER (ft) =    0.16            SPREAD (ft)  =  7.59
```

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==============================================================================
INLET NUMBER L6                LENGTH   8.0          STATION  39+49 RD "A"

DRAINAGE AREA =  0.720 ACRES        C VALUE = .600        CA =  0.432
SUM CA=   0.432 INT=  3.50  CFS=   1.512  CO=  0.000 GUTTER FLOW=   1.512

GUTTER SLOPE = 0.0392 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX      Eo      a      S'W     SE
  4.24     2.0     0.47   0.0833      4.0       0.93    3.5    0.146  0.157

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) = 10.2                EFFICIENCY= 0.94
   CFS INTERCEPTED=  1.42                 CFS CARRYOVER=  0.10
```

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==============================================================================
INLET NUMBER L9                LENGTH   8.0          STATION  7+21 RD "I"

DRAINAGE AREA =  1.590 ACRES        C VALUE = .400        CA =  0.636
SUM CA=   0.636 INT=  3.50  CFS=   2.226  CO=  0.000 GUTTER FLOW=   2.226

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX      Eo      a      S'W     SE
  7.07     2.0     0.28   0.0833      4.0       0.74    3.5    0.146  0.129

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) = 10.4                EFFICIENCY= 0.93
   CFS INTERCEPTED=  2.06                 CFS CARRYOVER=  0.16
```

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==============================================================================
INLET NUMBER L8A               LENGTH   8.0          STATION  8+87.5 RD "I"

DRAINAGE AREA =  1.550 ACRES        C VALUE = .400        CA =  0.620
SUM CA=   0.620 INT=  3.50  CFS=   2.170  CO=  0.160 GUTTER FLOW=   2.330

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX      Eo      a      S'W     SE
  7.25     2.0     0.28   0.0833      4.0       0.73    3.5    0.146  0.127

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) = 10.7                EFFICIENCY= 0.92
   CFS INTERCEPTED=  2.13                 CFS CARRYOVER=  0.20
```

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==========================================================================
INLET NUMBER L9A              LENGTH   4.0        STATION  7+03 RD "I"

DRAINAGE AREA =  0.190 ACRES        C VALUE = .800        CA =  0.152
SUM CA=   0.152 INT=  3.50  CFS=   0.532  CO=  0.000 GUTTER FLOW=   0.532

GUTTER SLOPE = 0.0166 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX      Eo      a      S'W     SE
  2.28     2.0     0.88   0.0833      4.0       1.00    3.5    0.146  0.167

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  4.9                EFFICIENCY= 0.95
   CFS INTERCEPTED=  0.51                 CFS CARRYOVER=  0.03


==========================================================================
INLET NUMBER L7               LENGTH   4.0        STATION  9+45 RD "I"

DRAINAGE AREA =  0.180 ACRES        C VALUE = .800        CA =  0.144
DRAINAGE AREA =  0.090 ACRES        C VALUE = .800        CA =  0.072

FOR THE FIRST SIDE
SUM CA=   0.144 INT=  3.50  CFS=   0.504  CO=  0.030 GUTTER FLOW=   0.534
FOR THE OTHER SIDE
SUM CA=   0.072 INT=  3.50  CFS=   0.252  CO=  0.000 GUTTER FLOW=   0.252
AT THE INLET

SUM CA=   0.216 INT=  3.50  CFS=   0.756  CO=  0.030 GUTTER FLOW=   0.786

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.53 (cfs) IS  6.99 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  7.60                H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.13            SPREAD (ft)  =  6.07
```

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==========================================================================
INLET NUMBER L8                LENGTH   2.5          STATION  9+52 RD "I"

DRAINAGE AREA =  0.060 ACRES        C VALUE = .800        CA =  0.048
DRAINAGE AREA =  0.060 ACRES        C VALUE = .800        CA =  0.048

FOR THE FIRST SIDE
SUM CA=   0.048 INT=  3.50  CFS=   0.168  CO=  0.200 GUTTER FLOW=   0.368
FOR THE OTHER SIDE
SUM CA=   0.048 INT=  3.50  CFS=   0.168  CO=  0.100 GUTTER FLOW=   0.268
AT THE INLET

SUM CA=   0.096 INT=  3.50  CFS=   0.336  CO=  0.300 GUTTER FLOW=   0.636

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.37 (cfs) IS  5.65 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  6.10                H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.13          SPREAD (ft)  =  6.11
```

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==========================================================================
INLET NUMBER L10               LENGTH   6.0          STATION  4+67 RD "I"

DRAINAGE AREA =  0.040 ACRES        C VALUE = .800        CA =  0.032
DRAINAGE AREA =  1.180 ACRES        C VALUE = .400        CA =  0.472

FOR THE FIRST SIDE
SUM CA=   0.032 INT=  3.50  CFS=   0.112  CO=  0.000 GUTTER FLOW=   0.112
FOR THE OTHER SIDE
SUM CA=   0.472 INT=  3.50  CFS=   1.652  CO=  0.000 GUTTER FLOW=   1.652
AT THE INLET

SUM CA=   0.504 INT=  3.50  CFS=   1.764  CO=  0.000 GUTTER FLOW=   1.764

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   1.65 (cfs) IS  9.32 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.19          SPREAD (ft)  =  8.91
```

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INLET NUMBER A13-Rd B LENGTH 10.0 STATION 40+25

DRAINAGE AREA = 0.780 ACRES C VALUE = .550 CA = 0.429
SUM CA= 0.429 INT= 3.50 CFS= 1.502 CO= 0.000 GUTTER FLOW= 1.502

GUTTER SLOPE = 0.0450 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
3.99	2.0	0.50	0.0833	4.0	0.95	3.5	0.146	0.159

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 10.5 EFFICIENCY= 1.00
CFS INTERCEPTED= 1.49 CFS CARRYOVER= 0.01

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==============================================================================
INLET NUMBER R1-Rd F        LENGTH   6.0        STATION  11+13

DRAINAGE AREA =  0.320 ACRES       C VALUE = .316       CA =  0.101
DRAINAGE AREA =  0.317 ACRES       C VALUE = .316       CA =  0.100

FOR THE FIRST SIDE
SUM CA=   0.101 INT=  3.50  CFS=   0.354  CO=  0.000 GUTTER FLOW=   0.354
FOR THE OTHER SIDE
SUM CA=   0.100 INT=  3.50  CFS=   0.351  CO=  0.000 GUTTER FLOW=   0.351
AT THE INLET

SUM CA=   0.202 INT=  3.50  CFS=   0.705  CO=  0.000 GUTTER FLOW=   0.705

GUTTER SLOPE = 0.0010 FT/FT       PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.35 (cfs) IS  5.52 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.10          SPREAD (ft)  =  4.84


==============================================================================
INLET NUMBER R2-Rd F        LENGTH   2.5        STATION  11+13

DRAINAGE AREA =  0.086 ACRES       C VALUE = .483       CA =  0.042
DRAINAGE AREA =  0.102 ACRES       C VALUE = .483       CA =  0.049

FOR THE FIRST SIDE
SUM CA=   0.042 INT=  3.50  CFS=   0.145  CO=  0.000 GUTTER FLOW=   0.145
FOR THE OTHER SIDE
SUM CA=   0.049 INT=  3.50  CFS=   0.172  CO=  0.000 GUTTER FLOW=   0.172
AT THE INLET

SUM CA=   0.091 INT=  3.50  CFS=   0.318  CO=  0.000 GUTTER FLOW=   0.318

GUTTER SLOPE = 0.0010 FT/FT       PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.17 (cfs) IS  3.16 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  6.10                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.08          SPREAD (ft)  =  3.84
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==============================================================================
INLET NUMBER R4-Rd F          LENGTH   2.5          STATION  10+45

DRAINAGE AREA =  0.120 ACRES        C VALUE = .516        CA =  0.062
DRAINAGE AREA =  0.044 ACRES        C VALUE = .516        CA =  0.023

FOR THE FIRST SIDE
SUM CA=   0.062 INT=  3.50  CFS=   0.217  CO=  0.000 GUTTER FLOW=   0.217
FOR THE OTHER SIDE
SUM CA=   0.023 INT=  3.50  CFS=   0.079  CO=  0.000 GUTTER FLOW=   0.079
AT THE INLET

SUM CA=   0.085 INT=  3.50  CFS=   0.296  CO=  0.000 GUTTER FLOW=   0.296

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.22 (cfs) IS  3.89 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  6.10                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.08          SPREAD (ft)  =  3.67


==============================================================================
INLET NUMBER R5-Rd F          LENGTH   2.5          STATION  10+45

DRAINAGE AREA =  0.171 ACRES        C VALUE = .454        CA =  0.078
DRAINAGE AREA =  0.046 ACRES        C VALUE = .454        CA =  0.021

FOR THE FIRST SIDE
SUM CA=   0.078 INT=  3.50  CFS=   0.272  CO=  0.000 GUTTER FLOW=   0.272
FOR THE OTHER SIDE
SUM CA=   0.021 INT=  3.50  CFS=   0.073  CO=  0.000 GUTTER FLOW=   0.073
AT THE INLET

SUM CA=   0.098 INT=  3.50  CFS=   0.345  CO=  0.000 GUTTER FLOW=   0.345

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.27 (cfs) IS  4.62 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  6.10                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.08          SPREAD (ft)  =  4.06
```

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==============================================================================
INLET NUMBER R7-Rd F        LENGTH   6.0        STATION  12+86

DRAINAGE AREA =  0.182 ACRES       C VALUE = .451       CA =  0.082
DRAINAGE AREA =  0.157 ACRES       C VALUE = .451       CA =  0.071

FOR THE FIRST SIDE
SUM CA=   0.082 INT=  3.50  CFS=   0.287  CO=  0.000 GUTTER FLOW=   0.287
FOR THE OTHER SIDE
SUM CA=   0.071 INT=  3.50  CFS=   0.248  CO=  0.000 GUTTER FLOW=   0.248
AT THE INLET

SUM CA=   0.153 INT=  3.50  CFS=   0.535  CO=  0.000 GUTTER FLOW=   0.535

GUTTER SLOPE = 0.0052 FT/FT       PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .005 (ft./ft.) AND   0.29 (cfs) IS  2.17 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =  0.08          SPREAD (ft)  =  4.02
```

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==============================================================================
INLET NUMBER P1-Rd I          LENGTH   2.5          STATION  15+40

DRAINAGE AREA =  0.290 ACRES        C VALUE = .540        CA =  0.157
DRAINAGE AREA =  0.750 ACRES        C VALUE = .310        CA =  0.233

FOR THE FIRST SIDE
SUM CA=   0.157 INT=  3.50  CFS=   0.548  CO=  0.000 GUTTER FLOW=   0.548
FOR THE OTHER SIDE
SUM CA=   0.233 INT=  3.50  CFS=   0.814  CO=  0.000 GUTTER FLOW=   0.814
AT THE INLET

SUM CA=   0.389 INT=  3.50  CFS=   1.362  CO=  0.000 GUTTER FLOW=   1.362

GUTTER SLOPE = 0.0123 FT/FT        PAVEMENT CROSS SLOPE =  0.0320 FT/FT


SPREAD AT A SLOPE OF .012 (ft./ft.) AND   0.81 (cfs) IS  3.42 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  6.10                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.21          SPREAD (ft)  = 6.60
```

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==============================================================================
INLET NUMBER M1-Rd F          LENGTH   8.0          STATION  14+66

DRAINAGE AREA =  0.664 ACRES        C VALUE = .318        CA =  0.211
DRAINAGE AREA =  0.401 ACRES        C VALUE = .318        CA =  0.128

FOR THE FIRST SIDE
SUM CA=   0.211 INT=  3.50  CFS=   0.740  CO=  0.000 GUTTER FLOW=   0.740
FOR THE OTHER SIDE
SUM CA=   0.128 INT=  3.50  CFS=   0.447  CO=  0.000 GUTTER FLOW=   0.447
AT THE INLET

SUM CA=   0.339 INT=  3.50  CFS=   1.186  CO=  0.000 GUTTER FLOW=   1.186

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   0.74 (cfs) IS  6.18 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 11.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.13          SPREAD (ft)  =  6.03


==============================================================================
INLET NUMBER M2-Rd F          LENGTH   6.0          STATION  14+66

DRAINAGE AREA =  0.230 ACRES        C VALUE = .460        CA =  0.106
DRAINAGE AREA =  0.168 ACRES        C VALUE = .460        CA =  0.077

FOR THE FIRST SIDE
SUM CA=   0.106 INT=  3.50  CFS=   0.370  CO=  0.000 GUTTER FLOW=   0.370
FOR THE OTHER SIDE
SUM CA=   0.077 INT=  3.50  CFS=   0.270  CO=  0.000 GUTTER FLOW=   0.270
AT THE INLET

SUM CA=   0.183 INT=  3.50  CFS=   0.640  CO=  0.000 GUTTER FLOW=   0.640

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   0.37 (cfs) IS  3.84 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.09          SPREAD (ft)  =  4.53
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==============================================================================
INLET NUMBER M3-Rd F        LENGTH   6.0        STATION  17+36

DRAINAGE AREA =  0.226 ACRES       C VALUE = .428       CA =  0.097
DRAINAGE AREA =  0.135 ACRES       C VALUE = .428       CA =  0.058

FOR THE FIRST SIDE
SUM CA=   0.097 INT=  3.50  CFS=   0.338  CO=  0.000 GUTTER FLOW=   0.338
FOR THE OTHER SIDE
SUM CA=   0.058 INT=  3.50  CFS=   0.202  CO=  0.000 GUTTER FLOW=   0.202
AT THE INLET

SUM CA=   0.154 INT=  3.50  CFS=   0.540  CO=  0.000 GUTTER FLOW=   0.540

GUTTER SLOPE = 0.0132 FT/FT       PAVEMENT CROSS SLOPE =  0.0320 FT/FT


SPREAD AT A SLOPE OF .013 (ft./ft.) AND   0.34 (cfs) IS  1.83 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.08          SPREAD (ft)  =  2.63
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INLET NUMBER A8a-Rd E LENGTH 4.0 STATION 11+13

DRAINAGE AREA = 0.190 ACRES C VALUE = .490 CA = 0.093
SUM CA= 0.093 INT= 3.50 CFS= 0.326 CO= 0.000 GUTTER FLOW= 0.326

GUTTER SLOPE = 0.0286 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
1.56	2.0	1.28	0.0833	4.0	1.00	3.5	0.146	0.167

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 4.7 EFFICIENCY= 0.97
CFS INTERCEPTED= 0.32 CFS CARRYOVER= 0.01

==========

INLET NUMBER A8-Rd E LENGTH 6.0 STATION 10+63

DRAINAGE AREA = 0.370 ACRES C VALUE = .290 CA = 0.107
DRAINAGE AREA = 0.070 ACRES C VALUE = .710 CA = 0.050

FOR THE FIRST SIDE
SUM CA= 0.107 INT= 3.50 CFS= 0.376 CO= 0.010 GUTTER FLOW= 0.386
FOR THE OTHER SIDE
SUM CA= 0.050 INT= 3.50 CFS= 0.174 CO= 0.000 GUTTER FLOW= 0.174
AT THE INLET

SUM CA= 0.157 INT= 3.50 CFS= 0.549 CO= 0.010 GUTTER FLOW= 0.559

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.39 (cfs) IS 5.81 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.385
DEPTH OF WATER (ft) = 0.09 SPREAD (ft) = 4.14

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INLET NUMBER A9-Rd E LENGTH 6.0 STATION 10+63

DRAINAGE AREA = 0.280 ACRES C VALUE = .430 CA = 0.120
DRAINAGE AREA = 0.080 ACRES C VALUE = .570 CA = 0.046

FOR THE FIRST SIDE
SUM CA= 0.120 INT= 3.50 CFS= 0.421 CO= 0.000 GUTTER FLOW= 0.421
FOR THE OTHER SIDE
SUM CA= 0.046 INT= 3.50 CFS= 0.160 CO= 0.000 GUTTER FLOW= 0.160
AT THE INLET

SUM CA= 0.166 INT= 3.50 CFS= 0.581 CO= 0.000 GUTTER FLOW= 0.581

GUTTER SLOPE = 0.0010 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .001 (ft./ft.) AND 0.42 (cfs) IS 6.13 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 9.60 H (ft) = 0.385
DEPTH OF WATER (ft) = 0.09 SPREAD (ft) = 4.25

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==============================================================================
INLET NUMBER N1-Rd G        LENGTH  10.0        STATION  11+63.5

DRAINAGE AREA =  0.180 ACRES       C VALUE = .470       CA =  0.085
DRAINAGE AREA =  0.740 ACRES       C VALUE = .330       CA =  0.244

FOR THE FIRST SIDE
SUM CA=   0.085 INT=  3.50  CFS=   0.296  CO=  0.000 GUTTER FLOW=   0.296
FOR THE OTHER SIDE
SUM CA=   0.244 INT=  3.50  CFS=   0.855  CO=  0.000 GUTTER FLOW=   0.855
AT THE INLET

SUM CA=   0.329 INT=  3.50  CFS=   1.151  CO=  0.000 GUTTER FLOW=   1.151

GUTTER SLOPE = 0.0115 FT/FT       PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .012 (ft./ft.) AND   0.85 (cfs) IS  4.38 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 13.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.11          SPREAD (ft)  =  5.31
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==============================================================================
INLET NUMBER 01-Rd H          LENGTH   6.0          STATION  11+71.5

DRAINAGE AREA =  0.500 ACRES        C VALUE = .470        CA =  0.235
DRAINAGE AREA =  0.230 ACRES        C VALUE = .520        CA =  0.120

FOR THE FIRST SIDE
SUM CA=   0.235 INT=  3.50  CFS=   0.822  CO=  0.000 GUTTER FLOW=   0.822
FOR THE OTHER SIDE
SUM CA=   0.120 INT=  3.50  CFS=   0.419  CO=  0.000 GUTTER FLOW=   0.419
AT THE INLET

SUM CA=   0.355 INT=  3.50  CFS=   1.241  CO=  0.000 GUTTER FLOW=   1.241

GUTTER SLOPE = 0.0050 FT/FT        PAVEMENT CROSS SLOPE =  0.0346 FT/FT


SPREAD AT A SLOPE OF .005 (ft./ft.) AND   0.82 (cfs) IS  4.35 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  9.60                  H (ft) = 0.385
   DEPTH OF WATER (ft) =   0.15           SPREAD (ft)  =  4.24


==============================================================================
INLET NUMBER L3               LENGTH   2.5          STATION  10+78 RD "J"

DRAINAGE AREA =  0.080 ACRES        C VALUE = .800        CA =  0.064
DRAINAGE AREA =  0.050 ACRES        C VALUE = .800        CA =  0.040

FOR THE FIRST SIDE
SUM CA=   0.064 INT=  3.50  CFS=   0.224  CO=  0.000 GUTTER FLOW=   0.224
FOR THE OTHER SIDE
SUM CA=   0.040 INT=  3.50  CFS=   0.140  CO=  0.000 GUTTER FLOW=   0.140
AT THE INLET

SUM CA=   0.104 INT=  3.50  CFS=   0.364  CO=  0.000 GUTTER FLOW=   0.364

GUTTER SLOPE = 0.0010 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .001 (ft./ft.) AND   0.22 (cfs) IS  3.99 (ft.)

      XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
   P EFFEC. LENGTH (ft) =  6.10                  H (ft) = 0.375
   DEPTH OF WATER (ft) =   0.09           SPREAD (ft)  =  4.21
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==============================================================================
INLET NUMBER D10-Rd A        LENGTH   6.0        STATION  94+99

DRAINAGE AREA =  0.500 ACRES        C VALUE = .320        CA =  0.160
DRAINAGE AREA =  0.310 ACRES        C VALUE = .320        CA =  0.099

FOR THE FIRST SIDE
SUM CA=   0.160 INT=  3.50  CFS=   0.560  CO=  0.000 GUTTER FLOW=   0.560
FOR THE OTHER SIDE
SUM CA=   0.099 INT=  3.50  CFS=   0.347  CO=  0.000 GUTTER FLOW=   0.347
AT THE INLET

SUM CA=   0.259 INT=  3.50  CFS=   0.907  CO=  0.000 GUTTER FLOW=   0.907

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   0.56 (cfs) IS  5.21 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.12           SPREAD (ft)  =  5.72


==============================================================================
INLET NUMBER D11-Rd A        LENGTH  10.0        STATION  94+99

DRAINAGE AREA =  0.620 ACRES        C VALUE = .320        CA =  0.198
DRAINAGE AREA =  0.550 ACRES        C VALUE = .320        CA =  0.176

FOR THE FIRST SIDE
SUM CA=   0.198 INT=  3.50  CFS=   0.694  CO=  0.000 GUTTER FLOW=   0.694
FOR THE OTHER SIDE
SUM CA=   0.176 INT=  3.50  CFS=   0.616  CO=  0.000 GUTTER FLOW=   0.616
AT THE INLET

SUM CA=   0.374 INT=  3.50  CFS=   1.310  CO=  0.000 GUTTER FLOW=   1.310

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   0.69 (cfs) IS  5.95 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) = 13.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.12           SPREAD (ft)  =  5.79
```

```
==========================================================================
INLET NUMBER D13-Rd A        LENGTH   6.0        STATION  89+66

DRAINAGE AREA =  0.450 ACRES        C VALUE = .320        CA =  0.144
SUM CA=   0.144 INT=  3.50  CFS=   0.504  CO=  0.000 GUTTER FLOW=   0.504

GUTTER SLOPE = 0.0436 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
 1.70      2.0     1.18   0.0833     4.0        1.00    3.5    0.146   0.167

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  6.4                EFFICIENCY= 0.99
   CFS INTERCEPTED=  0.50                 CFS CARRYOVER=  0.00


==========================================================================
INLET NUMBER D14-Rd A        LENGTH   6.0        STATION  89+30

DRAINAGE AREA =  0.800 ACRES        C VALUE = .320        CA =  0.256
SUM CA=   0.256 INT=  3.50  CFS=   0.896  CO=  0.000 GUTTER FLOW=   0.896

GUTTER SLOPE = 0.0376 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W      W/T      SW        SW/SX       Eo       a      S'W      SE
 2.63      2.0     0.76   0.0833     4.0        1.00    3.5    0.146   0.166

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  7.8                EFFICIENCY= 0.93
   CFS INTERCEPTED=  0.83                 CFS CARRYOVER=  0.06
```

```
==========================================================================
INLET NUMBER D15-Rd A        LENGTH   6.0        STATION  86+88

DRAINAGE AREA =  1.240 ACRES        C VALUE = .320        CA =  0.397
SUM CA=   0.397 INT=  3.50  CFS=   1.389  CO=  0.060 GUTTER FLOW=   1.449

GUTTER SLOPE = 0.0107 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W     W/T     SW        SW/SX      Eo      a     S'W     SE
  6.31     2.0    0.32   0.0833     4.0       0.79   3.5    0.146  0.137

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  7.4                EFFICIENCY= 0.95
   CFS INTERCEPTED=  1.38                 CFS CARRYOVER=  0.07


==========================================================================
INLET NUMBER D16-Rd A        LENGTH   8.0        STATION  84+70

DRAINAGE AREA =  2.020 ACRES        C VALUE = .320        CA =  0.646
SUM CA=   0.646 INT=  3.50  CFS=   2.262  CO=  0.070 GUTTER FLOW=   2.332

GUTTER SLOPE = 0.0056 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT

SPREAD      W     W/T     SW        SW/SX      Eo      a     S'W     SE
  9.47     2.0    0.21   0.0833     4.0       0.60   3.5    0.146  0.108

      XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
   REQUIRED LENGTH (ft) =  8.5                EFFICIENCY= 0.99
   CFS INTERCEPTED=  2.32                 CFS CARRYOVER=  0.02
```

```
==============================================================================
INLET NUMBER D17-Rd A        LENGTH   6.0        STATION  84+25

DRAINAGE AREA =  0.260 ACRES        C VALUE = .450        CA =  0.117
DRAINAGE AREA =  0.200 ACRES        C VALUE = .410        CA =  0.082

FOR THE FIRST SIDE
SUM CA=   0.117 INT=  3.50  CFS=   0.409  CO=  0.000 GUTTER FLOW=   0.409
FOR THE OTHER SIDE
SUM CA=   0.082 INT=  3.50  CFS=   0.287  CO=  0.000 GUTTER FLOW=   0.287
AT THE INLET

SUM CA=   0.199 INT=  3.50  CFS=   0.697  CO=  0.000 GUTTER FLOW=   0.697

GUTTER SLOPE = 0.0030 FT/FT        PAVEMENT CROSS SLOPE =  0.0208 FT/FT


SPREAD AT A SLOPE OF .003 (ft./ft.) AND   0.41 (cfs) IS  4.17 (ft.)

       XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
    P EFFEC. LENGTH (ft) =  9.60                H (ft) = 0.385
    DEPTH OF WATER (ft) =   0.10          SPREAD (ft)  =  4.79
```

INLET NUMBER D19-Rd A LENGTH 6.0 STATION 83+59

DRAINAGE AREA = 1.270 ACRES C VALUE = .320 CA = 0.406
SUM CA= 0.406 INT= 3.50 CFS= 1.422 CO= 0.000 GUTTER FLOW= 1.422

GUTTER SLOPE = 0.0120 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD	W	W/T	SW	SW/SX	Eo	a	S'W	SE
6.04	2.0	0.33	0.0833	4.0	0.81	3.5	0.146	0.139

XXXXXXXXXX CURB INLET ON A CONTINUOUS GRADE XXXXXXXXXX
REQUIRED LENGTH (ft) = 7.5 EFFICIENCY= 0.95
CFS INTERCEPTED= 1.35 CFS CARRYOVER= 0.08

==========

INLET NUMBER D18-Rd A LENGTH 10.0 STATION 84+25

DRAINAGE AREA = 0.540 ACRES C VALUE = .260 CA = 0.140
DRAINAGE AREA = 0.880 ACRES C VALUE = .260 CA = 0.229

FOR THE FIRST SIDE
SUM CA= 0.140 INT= 3.50 CFS= 0.491 CO= 0.020 GUTTER FLOW= 0.511
FOR THE OTHER SIDE
SUM CA= 0.229 INT= 3.50 CFS= 0.801 CO= 0.080 GUTTER FLOW= 0.881
AT THE INLET

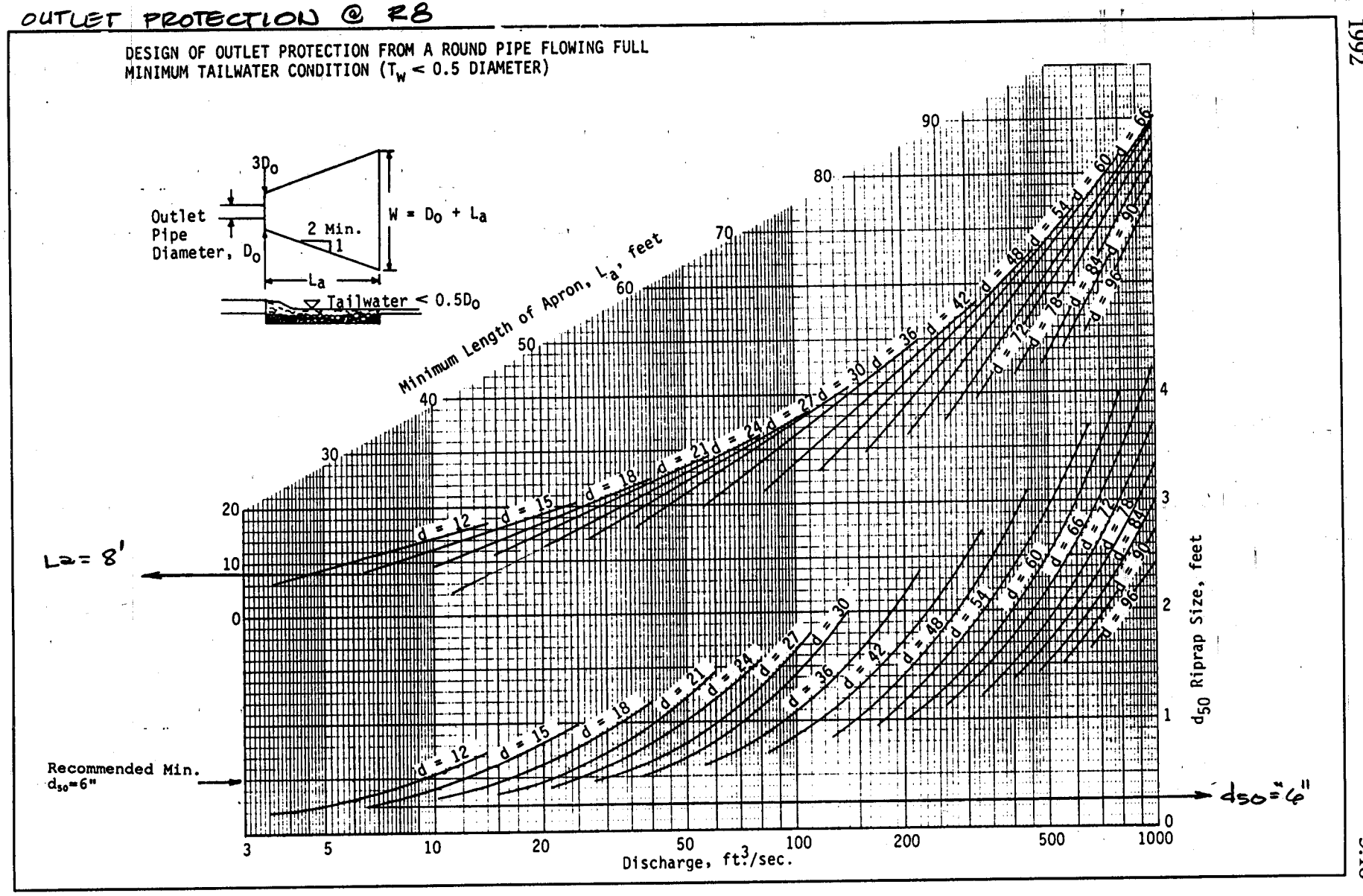
SUM CA= 0.369 INT= 3.50 CFS= 1.292 CO= 0.100 GUTTER FLOW= 1.392

GUTTER SLOPE = 0.0040 FT/FT PAVEMENT CROSS SLOPE = 0.0208 FT/FT

SPREAD AT A SLOPE OF .004 (ft./ft.) AND 0.88 (cfs) IS 6.28 (ft.)

XXXXXXXXXX CURB INLET IN A SUMP XXXXXXXXXX
P EFFEC. LENGTH (ft) = 13.60 H (ft) = 0.385
DEPTH OF WATER (ft) = 0.13 SPREAD (ft) = 6.03

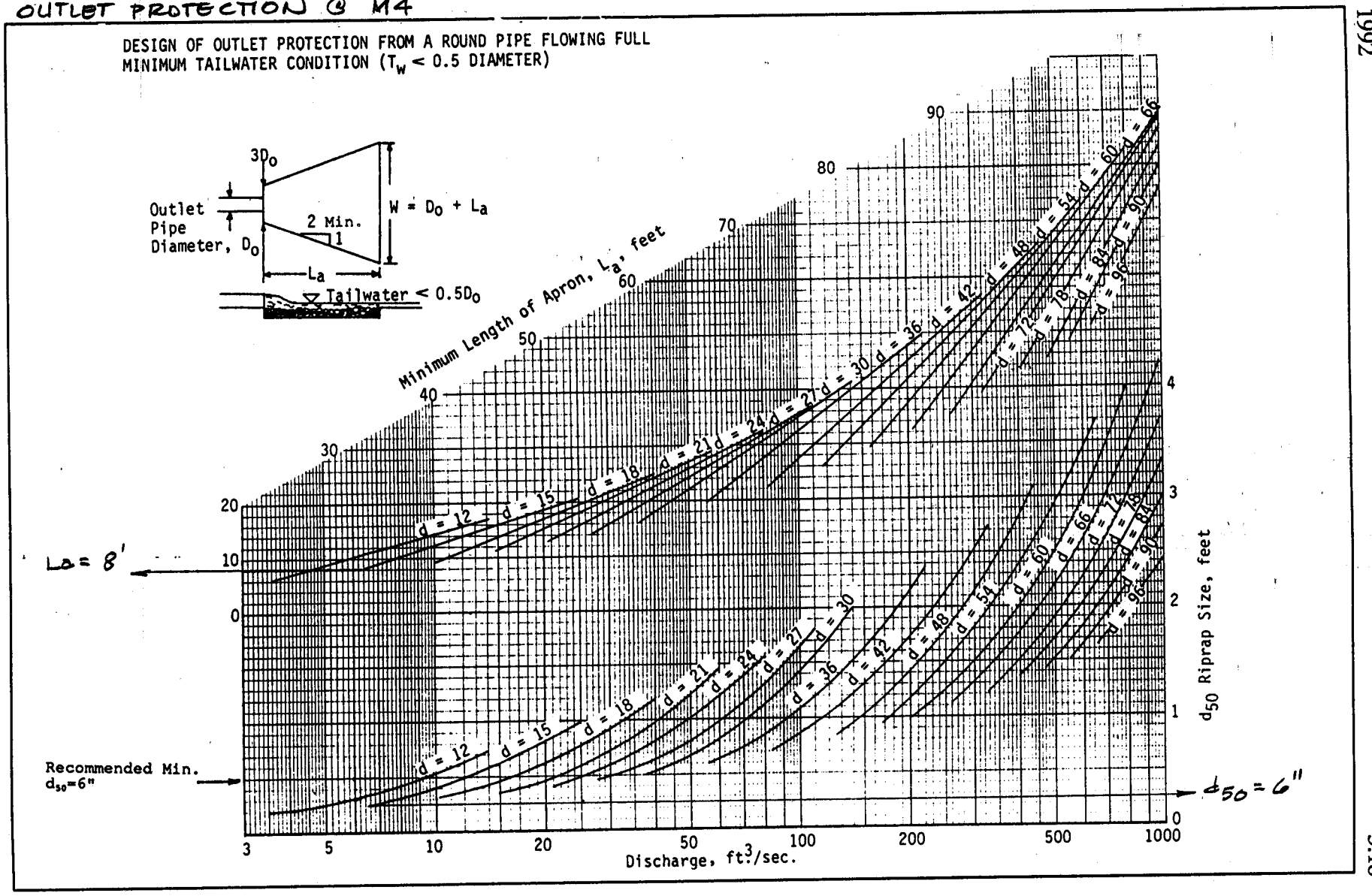
OUTLET PROTECTION @ R8



Source: USDA-SCS

Plate 3.18-3

OUTLET PROTECTION @ M4



Source: USDA-SCS

Plate 3.18-3

STORM SEWER DESIGN COMPUTATIONS

L & D 229

Rev. 7/1/94

ROUTE _____ PROJ. GREENSPRINGS – Phase I

COUNTY _____ DISTRICT _____

DESCRIPTION _____

SHEET ____ OF ____

FROM POINT	TO POINT	AREA DRAIN. "A" ACRES	RUN-OFF COEF. C	CA INCRE-MENT	CA ACCUM-ULATED	INLET TIME MIN-UTES	RAIN FALL IN./HR.	RUNOFF Q C.F.S.	INVERT ELEVATIONS UPPER END	INVERT ELEVATIONS LOWER END	LENGTH FT.	SLOPE FT./FT.	DIA. IN.	CAPA-CITY C.F.S.	VEL. F.P.S.	FLOW TIME SEC.	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
L9	L10	1.59	0.4	0.64	4.03	14.5	5.23	21.08	44.16	42.68	275	0.0054	27	22.76	6.5	42.3	RCP
L10	L11	1.22	0.4	0.49	4.52	15.2	5.14	23.23	42.58	41.61	162	0.0060	27	23.99	6.9	23.5	CPEP
L11	L12	MH-1	—	—	4.52	15.6	5.09	23.01	41.51	40.16	194	0.0070	27	25.91	7.4	26.2	CPEP
L12	G8	4.66	0.30	1.40	5.92	16.0	5.04	29.82	39.91	39.25	110	0.0060	30	31.77	7.4	14.8	CPEP
G8	G9	0.78	0.55	0.43	7.69	16.7	5.00	38.45	39.15	38.83	32	0.0100	30	41.02	9.5	3.4	RCP
G9	G10	0.27	0.80	0.22	10.05	16.8	4.95	49.75	36.01	31.08	164	0.0301	30	71.16	15.7	10.4	CPEP
G10	G11	MH-1	—	—	10.05	17.0	4.90	49.24	30.58	30.50	14	0.0058	36	50.80	8.2	1.7	CPEP

STORM DRAINAGE CALCULATIONS
DESIGN FORMULA: Q=AC1
FREQUENCY: 10 YEAR
CONC PIPE n=0.013

PROJECT: GREENSPRINGS
JOB NO: 91053.00
DATE: APRIL 24, 1995

PREPARED BY LANGLEY & McDONALD
COMPUTED
SHEET 1

FROM PT	TO PT	AREA ACRE A'	RUNOFF COEF 'C'	INCR A X C	BASIN TIME MIN.	BASIN INTEN IN	BASIN "Q" CFS	ACCUM A X C	SYSTEM TIME MIN.	SYSTEM INTEN IN.	SYSTEM "Q" CFS	PIPE SIZE IN.	CAPA-CITY CFS	VELOC FT/ SEC	LENGTH FEET	SLOPE FT/FT	FALL FT	INVERT ELEV UP
K1	K2	13.90	0.42	7.94	~~85.00~~ *	~~2.20~~	~~17.5~~	~~7.94~~	~~85.00~~	~~2.20~~	~~17.5~~ 16.0?	24	17.5	5.58	18	0.0060	0.11	50.00
K3	K2	0.34	0.80	0.27	5.00	7.10	1.9	0.27	5.00	7.10	1.9	12	3.4	4.35	32	0.0092	0.29	50.69
K2	K5	1.19	0.35	0.42	5.00	7.10	3.0	0.69 ~~16.63~~	~~85.95~~	~~2.20~~	~~13.0~~	24	20.7	6.60	330	0.0084	2.77	49.39
K4	K5	0.62	0.35	0.22	5.00	7.10	1.5	0.22	5.00	7.10	1.6	12	2.8	3.57	32	0.0062	0.20	50.53
K5	K8	0.11	0.90	0.10	5.00	7.10	0.7	1.01 ~~6.95~~	~~85.28~~	~~2.20~~	19.7	24	19.9	6.32	28	0.0077	0.22	46.52
K6	K7	16.50	0.33	5.45	~~38.00~~ *	~~3.10~~	~~16.9~~	~~5.45~~	~~38.00~~	~~3.10~~	~~16.9~~ 16.0	18	16.9	9.58	18	0.0260	0.47	50.50
K7	K8	0.76	0.65	0.49	5.00	7.10	3.5	5.94	38.03	3.10	18.4	18	24.6	13.91	48	0.0548	2.63	49.93
K8	K9	0.66	0.65	0.43	5.00	7.10	3.0	1.03 ~~15.32~~	85.95	2.20	33.7	36	34.0	4.81	170	0.0026	0.44	45.30
K9	K10	0.00	0.00	0.00	0.00	0.00	0.0	15.32	86.54	2.20	33.7	36	34.0	4.81	75	0.0026	0.20	44.76

29.2 cfs combined peak of ponds ~~both~~ @ 38 min
+ 3.6 in/hr x 1.93 ac = 35.18 cfs

* PEAK FLOW DETERMINED FROM OUTFLOW HYDROGRAPH

Post-it™ Fax Note 7671 | Date 5/18 | # of pages ▶ 1
To D. COOK | From D. LENCESKI
Co./Dept. | Co.
Phone # 253 6673 | Phone # 253 2975
Fax # 253 6850 | Fax #

757-499-6161
474-2400
Banda 24816
telephone 12/7

Jamestown Management Company, LLC
213 Ingram Road • Williamsburg, Virginia 23188
Telephone: (757) 220-0856 • *Facsimile:* (757) 220-0916

FAX Transmittal

To: Marc Sharp	Org./Firm: Bush
Fax Number: 279 2542	Date: 12/3/04
From: Bob O	Pages Including Cover Page: 14
cc:	cc Fax Number:
Subject: Dam #1 Repairs	

☐ *Urgent* ☐ *For Approval* ☐ *For Review* ☐ *Please Comment* x *Please Reply*

Comments:

Susan Ryan For info
220-1200
Ceiling tile mess Ext 24059
Mens Toilet handle missing

Confidentiality Note: The documents accompanying this fax may contain confidential information. This information is intended only for the use of the individual or entity named on the transmission sheet. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, or the taking of any action in reliance on the contents of this faxed information is strictly prohibited, and that the documents should be returned to Jamestown Management Company, LLC. If you have received this fax in error, please notify us by telephone immediately at the number above so that we can arrange for the return of the original document at no cost to you.

3-30 INCH CONCRETE OR HDPE CULVERTS; INVERTS OUT @ ELEV 21; INVERTS IN @ ELEV 21.5;

3-60 INCH DIAM PCRC RISERS; RIM ELEVATIONS @ 25.50; 3 CONCRETE RISER FOUNDATIONS;

3-6 INCH LOW FLOW HDPE PIPES INVERTS @ ELEVATION 22;

3 GALVANIZED STEEL TRASH RACKS;

REMOVE EXISTING OUTFALL MANIFOLD; INSTALL RIP-RAP 18 INCHES THICK ON FABRIC;

I COPY STRUCTURAL SOIL BACKFILL COMPACTION (95%) REPORT;

1 COPY AS-BUILT DRAWINGS;

START ON-SITE CONSTRUCTION BY SEPT 1, 2004; COMPLETE BY 10/31/04;

FAX Memorandum

Jamestown Management Company, LLC

DATE: December 3, 2004

TO: Marc Sharp

CC: C. Lewis Waltrip, II

FROM: Bob Oliver

SUBJECT: Dam #1, Williamsburg National

Marc,
The attached are quotes for materials and labor for the repair on the dam at Pond #1. The quotes are for concrete risers and HDPE barrel piping. Lane and NPCC have the best prices, they total and breakout as follows:

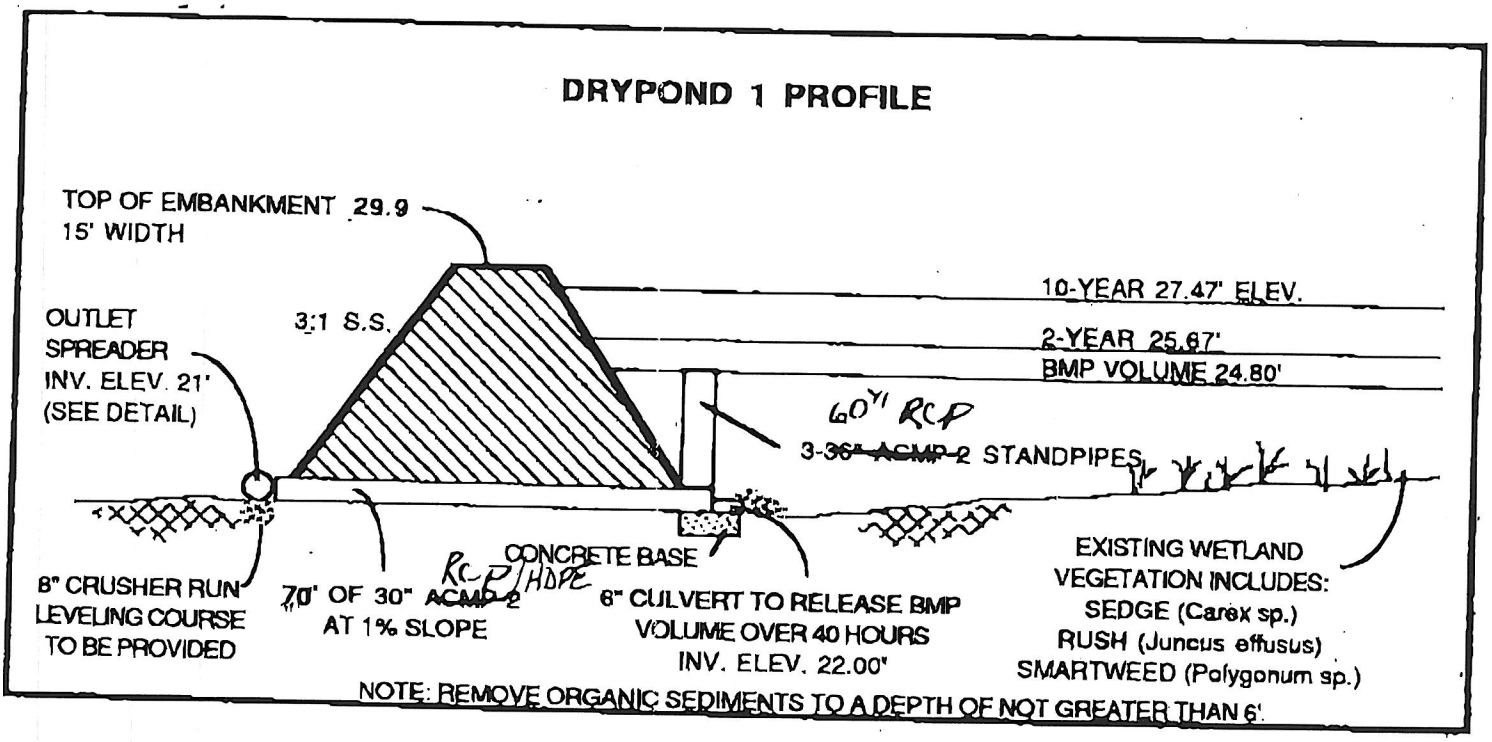
HDPE (Lane)	Unit	Total	
220 LF 30" HDPE	$17.95/lf	$3,949.00	
20 LF 6" HDPE	$1.95/lf	$ 39.00	
3 ea. 6" dia end caps	$9.40/ea.	$ 28.20	
			$4,016.20
Concrete Risers (NPCC)			
3 ea. 60" Dia manholes	$1,855.00	$5,565.00	
Subtotal			$ 9,581.20
Tax		$ 431.15	
Total materials			$10,012.35
Labor			$11,000.00
Total			**$19,012.35**

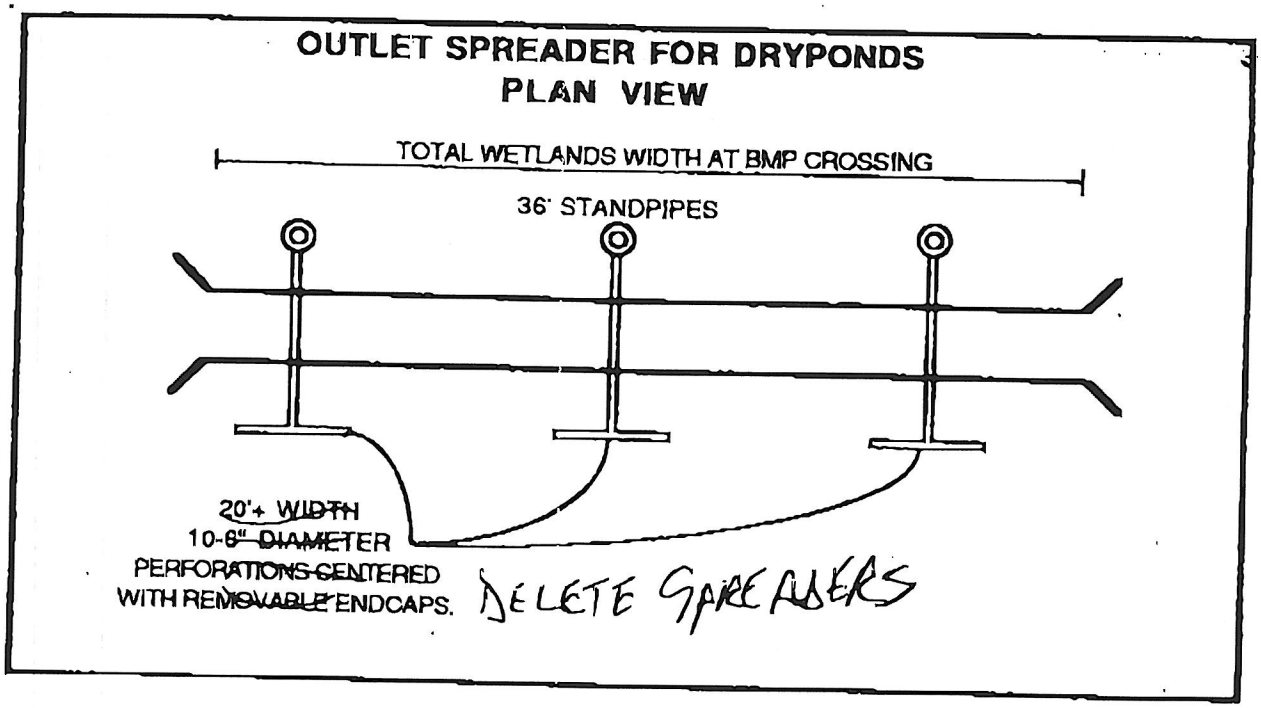
Per our discussions, you agreed to pay for materials and we would cover labor and equipment costs. Please contact me to discuss questions or details. We can get start as soon as materials arrive.

AGREED

_____
Marc Sharp, Greenspring

213 Ingram Road • Williamsburg, Virginia 23185
• (757) 220-0856 • Fax (757) 220-0916 • boliver@jamestownllc.hrcoxmail.net


DRYPOND 1 PROFILE
TOP OF EMBANKMENT 29.9
15' WIDTH
3:1 S.S.
10-YEAR 27.47' ELEV.
2-YEAR 25.67'
BMP VOLUME 24.80'
OUTLET
SPREADER
INV. ELEV. 21'
(SEE DETAIL)
60" RCP
3-~~36" ACMP-2~~ STANDPIPES
CONCRETE BASE
8" CRUSHER RUN
LEVELING COURSE
TO BE PROVIDED
70' OF 30" ~~ACMP-2~~ RCP/HDPE
AT 1% SLOPE
6" CULVERT TO RELEASE BMP
VOLUME OVER 40 HOURS
INV. ELEV. 22.00'
EXISTING WETLAND
VEGETATION INCLUDES:
SEDGE (Carex sp.)
RUSH (Juncus effusus)
SMARTWEED (Polygonum sp.)
NOTE: REMOVE ORGANIC SEDIMENTS TO A DEPTH OF NOT GREATER THAN 6'.


OUTLET SPREADER FOR DRYPONDS
PLAN VIEW
TOTAL WETLANDS WIDTH AT BMP CROSSING
36" STANDPIPES
~~20'+ WIDTH~~
10-~~6" DIAMETER~~
PERFORATIONS ~~CENTERED~~
WITH REM~~OVABLE~~ ENDCAPS.
DELETE SPREADERS

LANE QUOTATION SHEET

To: Bob Oliver
Company: Jamestown Management Co., LLC
Phone: 757-220-0856
Fax: 757-220-0916

From: John P. Saintsing
Company: Lane Enterprises, Inc.
Phone: 757-482-2974
Fax: 757-482-7762

Date: 19-Oct 2004
Pages: 1

Job: Greensprings Dam repair
Location: Williamsburg, VA

220 LF	30" DIA	HDPE - DOUBLE WALL W/ BELL END (with 10.8 PSI gasket)	$ 17.95 / LF
3 EA		WATERSTOP GASKETS	
	CALL: A-LOK Products @ 800-822-2565		
~~60~~ 20 LF	6" DIA	HDPE - DOUBLE WALL W/ BELL END (with standard perforations)	$ 1.95 / LF
3 EA	6" DIA	HDPE - END CAPS	$ 9.40 / EA
3 EA	102" DIA	TRASH RACKS W/ ANTI-VORTEX DEVICE	$ 1,373.00 / EA

$ 150.00 DROP CHARGE TO ALL ORDERS UNDER $ 2,000.00
FOB JOBSITE - LANE TRUCKS - SINGLE SHIPMENT – PLUS TAX.
ALL QUANTITIES ARE ESTIMATES. CONTRACTOR IS RESPONSIBLE FOR ACTUAL QUANTITIES.
CONNECTING BANDS ARE EXTRA & PRICED AS ONE FOOT OF PIPE UNLESS OTHERWISE STATED.
PRICES STATED ARE FIRM FOR ORDERS PLACED WITHIN 30 DAYS OF THE BID/QUOTE DATE.

ACF Environmental
2831 Cardwell Road
Richmond, VA 23234
Tel: 1-800-449-3936
Fax: 804-743-7779
www.acfenvironmental.com

QUOTE: A 30886
DATE: 11/19/2004

QUOTATION FOR

Jamestown Contracting
Bob Oliver
Tel: (757) 220-0855 Fax: (757) 220-0916

Project: DRYPOND 1 PROFILE

Quote Valid Through: 12/19/2004

Bid Date: 11/19/2004

Quantity	Unit Type	Item #	Item Name	Unit Price	Unit Type	Line Total
220	FT	30PROLNK2	30" PROLINK ULTRA CPE PIPE 20' STICK / SOLID	$21.6000	FT	$4,752.00
			***** PLUS A $60.00 DROP OFF CHARGE TO THE SITE ***** ********** 2-WEEK DELIVERY FROM THE RECIEPT OF ORDER **********			
3	EA	MISC EA		$1,881.0000	EA	$5,643.00
			PYD-60 PYRAMID TRASH RACK FOR STANDARD 60" CONCRETE PIPE ****** PLUS $300.00 FREIGHT CHARGE TO THE SITE ****** ********** 4-WEEK DELIVERY FROM RECIEPT OF ORDER **********			
				Total for Quote		$10,395.00

Prices do not include freight.

Prices are for materials loaded in a single shipment. Multiple shipments will incur additional charges.

Changes in quantity will require creation of a new quote.

We appreciate the opportunity to quote you.

If you need more information, technical support, or to place your order, please call us at 1-800-449-3936.

Terms: Net 30 Days.

Price does not include sales tax.

Customer is responsible for final quantities.

Carl Jones
Carl Jones

Quoted By: Robert Ferguson
Robert Ferguson

Accepted By: _____

PO#: _____

Water Works, Inc.
8338 Old Richfood Road
Mechanicsville, VA 23116
Phone:(804)730-9050 Fax:(804)730-4520

Bid to:	JAMESTOWN CONTRACTING	Job:	DRY POND OUTLET PIPES
Attention:	BOB OLIVER	Location:	JAMES CITY COUNTY, VA
	757-220-0856	757-220-0916	

	Quantity:	Size:	Description:	Unit Price:	Ext. Price:
1				$ -	$ -
2				$ -	$ -
3	220	30	HANCOR 'BLUE SEAL' WATERTIGHT HDPE PIPE	$ 24.05	$ 5,291.00
4				$ -	$ -
5			BOB - THE ABOVE IS A TRUE WATERTIGHT PIPE	$ -	$ -
6			CAPABLE OF 10 PSI PRESSURE/VACUMN TEST.	$ -	$ -
7				$ -	$ -
8	3	30	HANCOR 'BLUE SEAL' WATERTIGHT ADAPTER	$ 257.70	$ 773.10
9				$ -	$ -
10				$ -	$ -
11				$ -	$ -
12				$ -	$ -
13				$ -	$ -
14				$ -	$ -
15				$ -	$ -
16				$ -	$ -
17				$ -	$ -
18				$ -	$ -
19				$ -	$ -
20				$ -	$ -
21				$ -	$ -
22				$ -	$ -
23				$ -	$ -
24				$ -	$ -
25				$ -	$ -
26				$ -	$ -
27				$ -	$ -
28				$ -	$ -
29				$ -	$ -
30				$ -	$ -
31				$ -	$ -
32				$ -	$ -
33				$ -	$ -
34				$ -	$ -
35				$ -	$ -
36				$ -	$ -
37				$ -	$ -
38				$ -	$ -
39				$ -	$ -
40				$ -	$ -

MIKE BAMBER 804-467-9901

18-Oct-04

Subtotal:	$ 6,064.10
Tax:	$ 303.21
Total:	$ 6,367.31

Pricing is good for acceptance and delivery for 30 days only. PVC products should be ordered ASAP to reserve pricing.

NPCC
NANSEMOND PRE-CAST CONCRETE CO., INC.
3737 NANSEMOND PARKWAY - SUFFOLK, VA 23435
(757) 538-2761 - FAX (757) 538-8342

NATIONAL PRECAST CONCRETE ASSOCIATION

Fax Cover Sheet

Date: 10/27/04

Time: 525 AM (PM)

Attention: Bob Oliver

Company: JMC

Fax: 220 0916

From: John McConnell

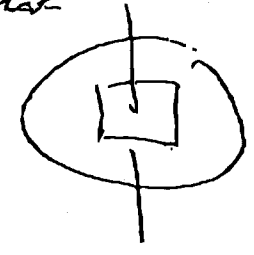
Notes: 3 - 5'ϕ Manholes with SWM frame & grate 5,565 ± Top
120 del.
Rim 25.50'
30" INV 21.50'
6" INV 22.00'
FLOOR ELEV 21.09'

We are sending 6 pages, including the cover sheet.

Call (757) 538-2761 if problems arise with this transmission.

No water Line
No debris Rack
No orifice plate with Top

± 12" ϕ Rough hole 9" above Floor

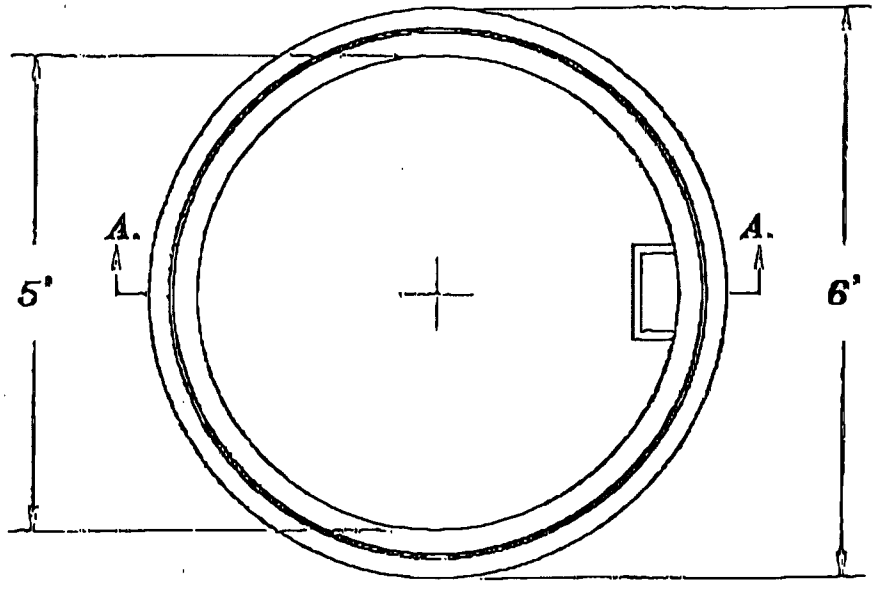


± 40" ϕ Rough hole on Floor

NANSEMOND PRE-CAST CONCRETE

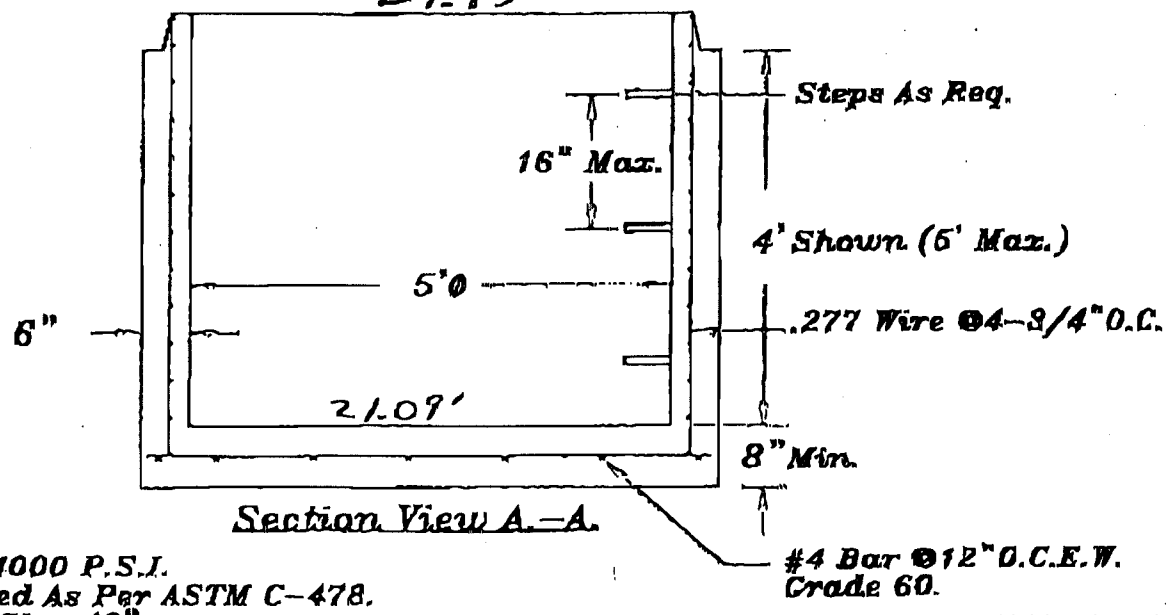
3707 Nansemond Parkway Suffolk, Virginia 23435 Telephone (757) 484-1111
Fax 686-8542

Strd. 60" Monolithic Non Extended Base Bottom



Plan View

24.83



Section View A.-A.

Notes:

1. Concrete 4000 P.S.I.
2. Constructed As Per ASTM C-478.
3. Max Pipe Size 42".
4. M.A. PS1-PF & American ML-10 Steps.
5. ASTM C-990 Butyl Joints.
6. VDOT Approved.

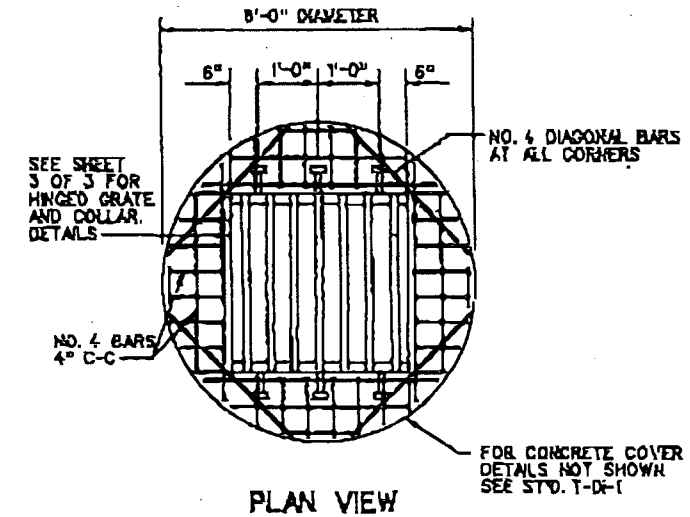
Apprx. Wall Weight Per V.F.: 1295#
Apprx. Base Weight: 2900#
Lift Pins: 3-2 Ton

Job:	Dr.By: Brendan McConnell	
Contractor's Name:	No Scale	2/18/02

SWM-1

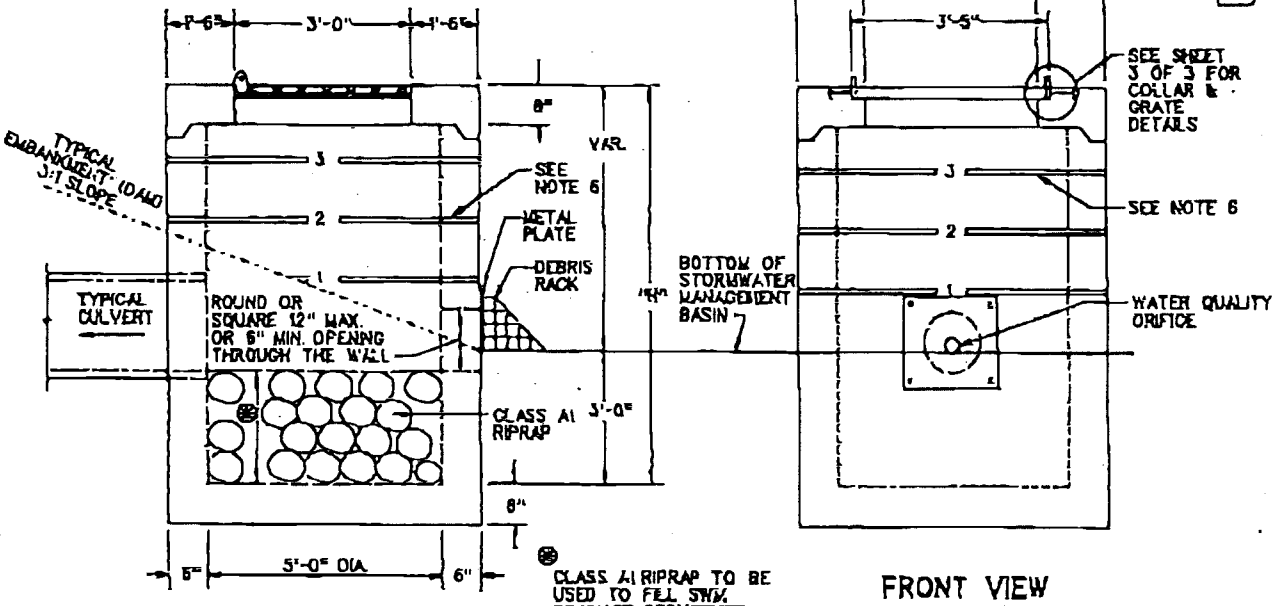
NOTES:

1. GRATE AND COLLAR ARE TO BE GALVANIZED AFTER FABRICATION. COST OF THIS GRATE AND COLLAR ARE TO BE INCLUDED IN THE PRICE BID FOR STORMWATER MANAGEMENT DRAINAGE STRUCTURE.
2. STRUCTURE MAY BE PRECAST OR CAST IN PLACE. SEE SHEET 1 OF 3 FOR DETAILS ON CAST IN PLACE STRUCTURE.
3. WEEP HOLES SHALL NOT BE PROVIDED. ANY LIFT HOLES SHALL BE PLUGGED.
4. STEPS ARE TO BE PROVIDED WHEN HEIGHT OF STRUCTURE IS 4'-0" OR GREATER ABOVE INVERT OF OUTLET PIPE. FOR STEP DETAILS SEE STANDARD ST-1.
5. FOR DETAILS ON METAL PLATE AND DEBRIS RACK SEE STANDARD SWM-DR.
6. MARK HEIGHT OF STRUCTURE IN BLACK WITH 4" HIGH NUMERALS AND 1" WIDE HORIZONTAL STRIPES AT 1' INTERVALS FROM INVERT OF WATER QUALITY ORIFICE (ALL VISIBLE SIDES).
7. STORMWATER MANAGEMENT DRAINAGE STRUCTURE, STANDARD SWM-1, MAY BE USED AS TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION. SEE STANDARD SWM-DR, SHEET 1 OF 3, FOR TEMPORARY SEDIMENT BASIN DETAILS.



PLAN VIEW

PRECAST COVER DETAIL



SIDE VIEW
SWM DRAINAGE STRUCTURE

CLASS A1 RIPRAP TO BE USED TO FILL SWM DRAINAGE STRUCTURE TO INVERT OF OUTLET PIPE.

FRONT VIEW
(DEBRIS RACK NOT SHOWN)

SHEET 2 OF 3

PRECAST STORMWATER MANAGEMENT DRAINAGE STRUCTURE

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE

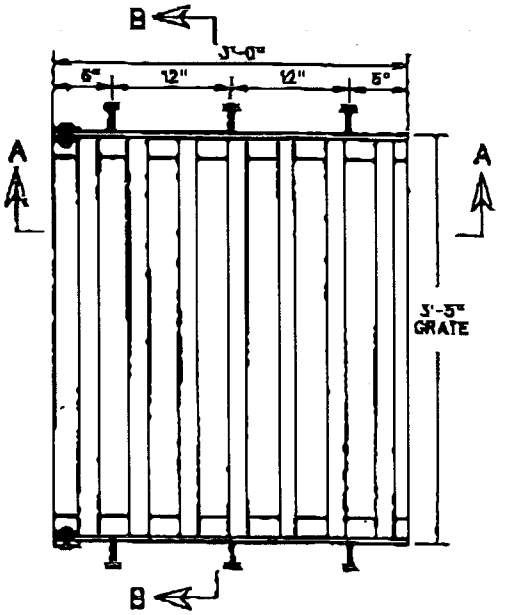
105
302

116.02

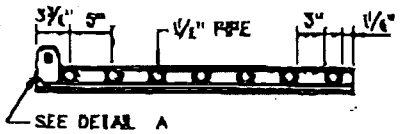
SWM-1

NOTE:

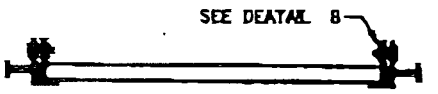
GRATE AND COLLAR ARE TO BE GALVANIZED AFTER FABRICATION. COST OF THIS GRATE AND COLLAR ARE TO BE INCLUDED IN THE PRICE BID FOR STORMWATER MANAGEMENT DRAINAGE STRUCTURE.



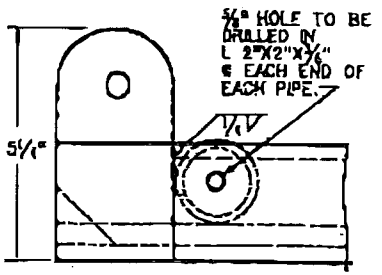
PLAN VIEW



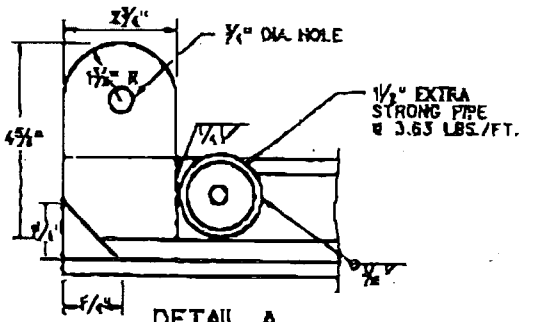
SECTION A-A



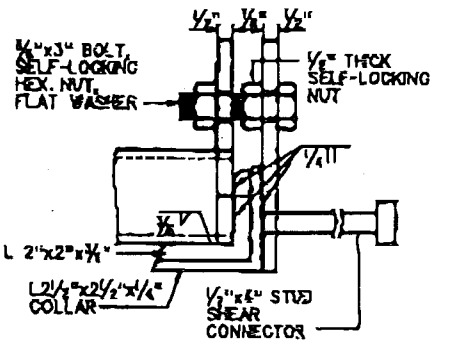
SECTION B-B



DETAIL A INSIDE



DETAIL A OUTSIDE



DETAIL B

SHEET 3 OF 3

SPECIFICATION REFERENCE
302

STORMWATER MANAGEMENT DRAINAGE STRUCTURE GRATE DETAILS

VIRGINIA DEPARTMENT OF TRANSPORTATION

116.03

CONCRETE SEALANTS INC.

ConSeal™

SOLVING CONCRETE SEALING PROBLEMS.

SEAL OF SECURITY

BOND OF TRUST

ConSeal

BUTYL SEALANT FOR PRECAST STRUCTURES

CS-102
CS-202

APPLICATIONS

- For self-sealing joints in:
  - Manholes
  - Concrete Vaults
  - Box Culverts
  - Septic Tanks
  - Concrete Pipe
  - Utility Vaults
  - Vertical Panel Structures
  - Burial Vaults

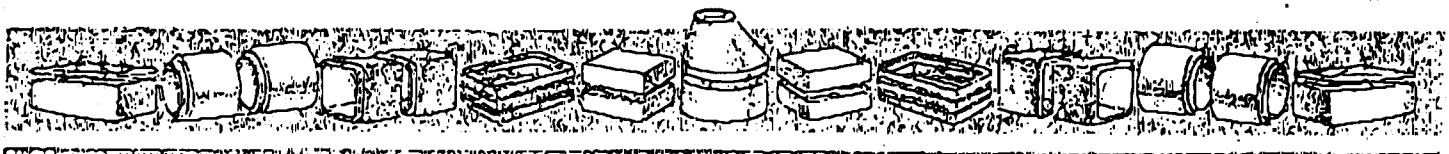
SEALING PROPERTIES

- Provides permanently flexible watertight joints.
- Low to high temperature workability:
  - CS-102 . . . 30°F to 120°F (-1°C to 48°C)
  - CS-202 . . . 0°F to 120°F (-12°C to 48°C)
- Rugged service temperature: -30°F to +200°F (-34°C to +93°C)
- Excellent chemical and mechanical adhesion to clean, dry surfaces.
- Sealed joints will not shrink, harden or oxidize upon aging.
- No priming normally necessary. When confronted with difficult installation conditions, such as wet concrete or temperatures below 40°F (4°C), priming the concrete will improve the bonding action. Consult Concrete Sealants for the proper primer to meet your application.

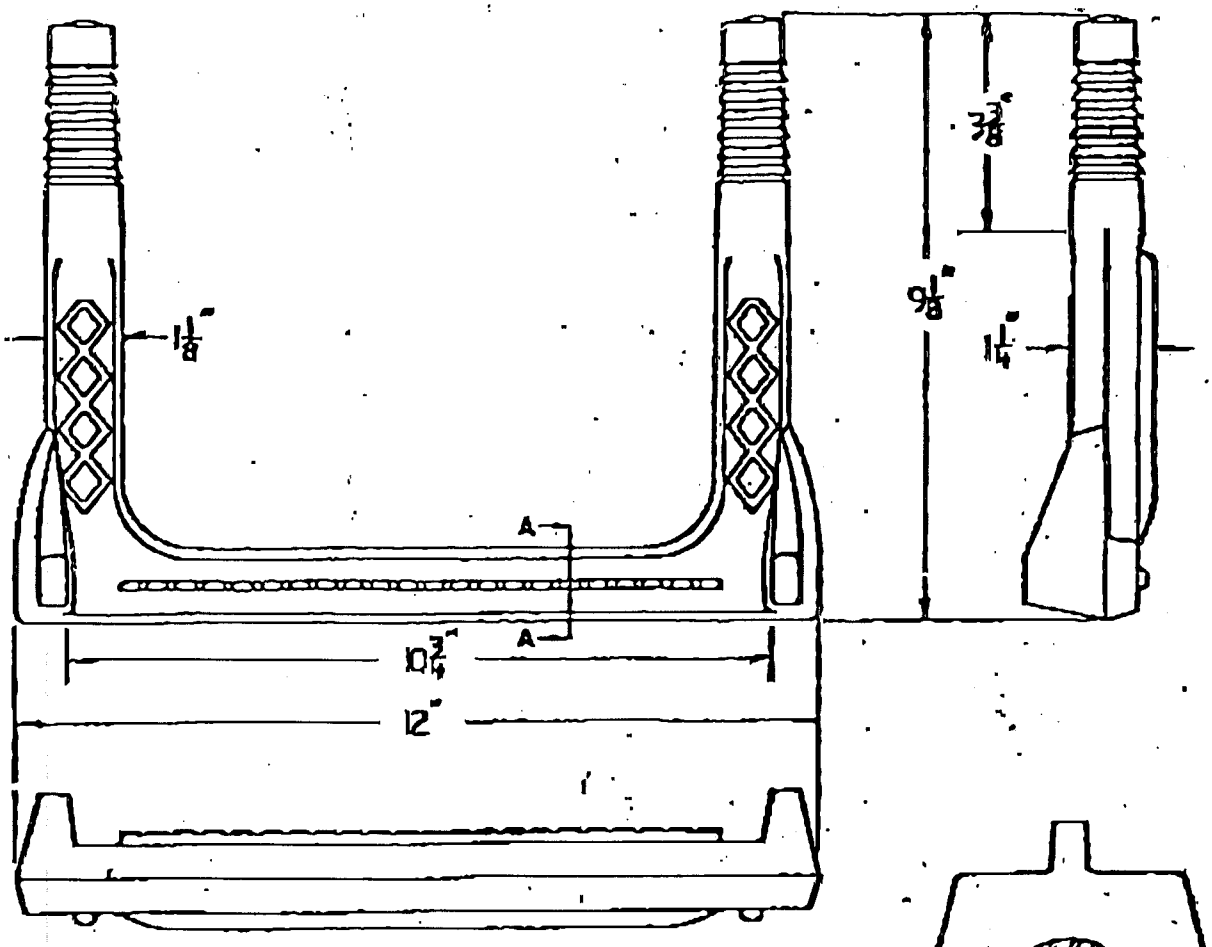
HYDROSTATIC STRENGTH

- Both ConSeal CS-102 and CS-202 meet the hydrostatic performance requirement as set forth in ASTM C-990 section 10.1. (Performance requirement: 10psi for 10 minutes in straight alignment — in plant, quality control test for joint materials.)

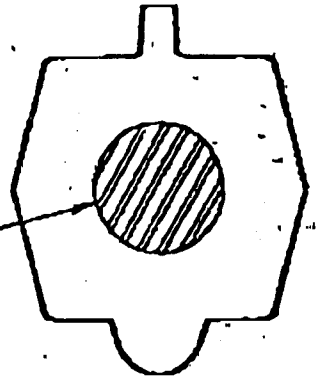
Any Size, Shape, Length, or Material to meet specified requirements.



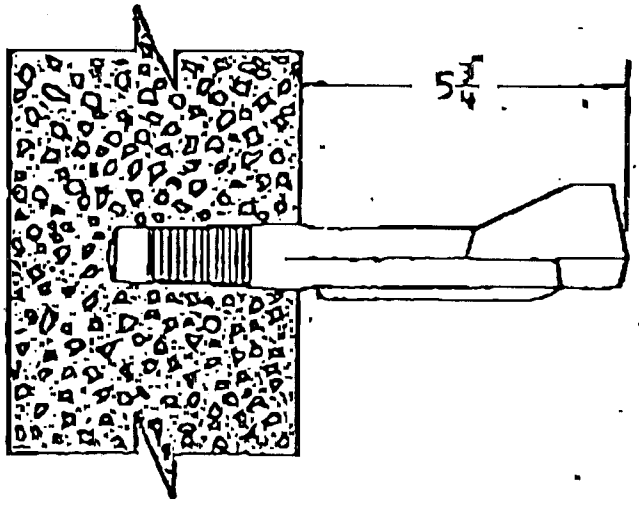
CONCRETE SEALANTS



Copolymer Polypropylene Plastic
1/2" GRADE 60 STEEL REINFORCEMENT



SECTION-A



PS1-PF
Manhole Step

M.A. Industries Inc.
kelly & dividend dr.
peachtree city ga.
30269

AMERICAST

Ashland Plant
1352 Virginia Precast Road
Ashland, VA 23005
(800) 999-2278
(804) 798-6068
FAX (804) 798-3428

Halltown Plant
P.O. Box 120
Halltown, WV 25423
(800) 648-4580
(304) 725-4025
FAX (304) 798-3428

Harrisonburg Plant
210 Stone Spring Road
Harrisonburg, VA 22801
(800) 645-2278
(540) 434-6979
FAX (540) 434-3364

DATE: 09/28/04 COUNTY: JAMES CITY D.O.P.: FAX

JOB: GREENSPRINGS DAM REPAIR

TO:

We are pleased to quote the following prices for storm structures and/or sanitary manholes delivered to the referenced project:

3	TOTAL STRUCTURES
$6,249.00	TOTAL AMOUNT
$6,249.00	NET AMOUNT

NOTES:

1. All modified and special design structures and prices are contingent upon approval of our design and specifications.
2. FRAMES AND COVERS NOT INCLUDED.
3. QUOTED WITH EXTENDED BASES

210' 30" CL 3 RCP T/G $33.77/FT

The above prices are subject to change after 90 days if notification or purchase order has not been received by us. We suggest confirmation of prices after this period of time has elapsed. Prices do not include sales tax.

TERMS:

2 % discount if paid by 15th day following invoice date. Net 30 days.
All past due accounts will be subject to a service charge of 2%.

We thank you for the opportunity to quote and hope to have the pleasure of serving you.
Please visit our web site at www.AmericastUSA.com for additional information on our products and services.

Sincerely,

R KELLY HAYES
Sales Representative

Hanover Pipe Plant
10354 Design Road
Hanover, VA 23005
(804) 752-1311
FAX (804) 752-7483

Money Point Pipe Plant
3800 Shannon Street
Chesapeake, VA 23324
(757) 494-7473
FAX (757) 494-0846

Charleston Pipe Plant
P.O. Box 70005
Charleston, SC 29415
(843) 744-5376
FAX (843) 588-7956

AMERICAST.

DATE: September 28, 2004
JOB: GREENSPRINGS DAM REPAIR

Structure #	Structure Type	Height	Diameter	Price Per Unit	Net Price
D1	DI-7 I	3.50	60	$2,083.00	$2,083.00
D2	DI-7 I	3.50	60	$2,083.00	$2,083.00
D3	DI-7 I	3.50	60	$2,083.00	$2,083.00

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
J. JOSEPH McDONALD
1906-1982

April 27, 1994

Mrs. Elizabeth R. Friel
Senior Planner
Department of Development Management
James City County
P. O. Box 8784
Williamsburg, VA 23187-8784

Re: Case No. S-6-94 Greensprings, Land Bay S-3 Phase II

Dear Mrs. Friel:

The following are enclosed for your review and approval:

10	Sets of Revised Construction Plans
1	Binder of Drainage Calculations for Phases I and II, including Drainage Maps
1	Letter to VDOT (with copy for your files)
1	Copy of VDOT "redline" markup to be returned to VDOT

Additional copies of the drainage calculations are being submitted simultaneously with revised Phase I documents. As we discussed earlier, we would appreciate coordination of distribution of the two sets of plans to reviewing agents. We believe that contemporaneous reviews of the two sets of plans should alleviate some of the confusion that occurred during the initial review of Phase II.

The following responses are offered to your letter of March 10, 1993.

CODE COMPLIANCE

1-4. The developer has been notified of the requirements for these agreements, fees, and surety postings.

5. Drainage area maps of pre and post-development conditions are included in the drainage calculation binder. Code Compliance's copy was submitted with Phase I.

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(804) 473-2000
FAX: (804) 497-7933

201 Packets Court
Williamsburg, VA 23185
(804) 253-2975
FAX: (804) 229-0049

Mrs. Elizabeth R. Friel
Senior Planner
Department of Development Management
James City County
P. O. Box 8784
Williamsburg, VA

April 27, 1994

6. Time of concentration calculations are in the drainage calculation binder.

7. The "I" outfall is shown on the revised Phase I drawings.

8. Silt fence has been provided along this sewer line.

9. The calculations are included in the drainage calculation binder

10. This silt fence has been added.

11. This silt fence has been added.

12. These BMP's are under construction. BMP calculation worksheets are included in the drainage calculation binder. The conservation easements will be dedicated with recordation of the subdivision plats.

13. Street lights are shown.

14. Revised Phase I plans are being submitted simultaneously with these plans.

FIRE DEPARTMENT

1. Street names will be shown on the subdivision plats. The developer has been notified of this requirement.

2. Additional fire hydrants and relocations are now shown as discussed with the fire department.

VIRGINIA DEPARTMENT OF TRANSPORTATION

Their comments are addressed in the enclosed letter.

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

May 10, 1994

Mr. Trenton L. Funkhouser
Senior Planner
James City County
Department of Development Management
P. O. Box 8784
Williamsburg, VA 23187-8784

Re: Greensprings Land Bay S-3

Dear Trent:

Accompanying this letter are eleven (11) sets of construction plans for Phase I of the referenced development. Please note that there has been a change to Hole #8 that has resulted in a significant revision to the road and lot configuration. We are also submitting to you, two (2) sets of drainage calculations with drainage area maps. In addition, we are enclosing a print of the Sheet Index that shows the relative location of the new and old road alignments. Please contact me at your earliest convenience in order to discuss this.

Best regards,

LANGLEY AND McDONALD

Stephen Romeo

Stephen A. Romeo, L.S.
Principal

SAR/dhm
Enclosure
cc: File 91053-29

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(804) 473-2000
FAX: (804) 497-7933

201 Packets Court
Williamsburg, VA 23185
(804) 253-2975
FAX: (804) 229-0049

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

July 6, 1994

Mr. Darryl Cook
Code Compliance
James City County
P.O. Box 8784
Williamsburg, Virginia 23187-8784

Re: GREENSPRINGS - Phase 1 and 2
L & M File No. 91053-29 (Phase 1)
L & M File No. 91053-35 (Phase 2)

Dear Mr. Cook:

Enclosed please find two (2) sets of the sheets for Phase 1 and two (2) copies of the revised sheet for Phase 2 of the above referenced project, revised in accordance with your fax dated June 30, 1994. The items have been addressed as follows:

PHASE 1

1. A Inspection/Maintenance Agreement will be signed by the client. It is my understanding that you are currently figuring the bond amount for the BMP facilities.

2. The limits of clearing for the outfall pipe at the "I" system has been shown on sheet 9 as requested.

3. The outfall for system "F" has been revised so that Sheets 7 and 13 reflect the same information.

4. The length of the rip-rap projection below the "J" system outfall is 80 feet and has been specified on Sheet 10.

5. We are currently waiting on information from Williamsburg Environmental to enable us to address the BMP points for this project.

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(804) 473-2000
FAX: (804) 497-7933

201 Packets Court
Williamsburg, VA 23185
(804) 253-2975
FAX: (804) 229-0049

Mr. Darryl Cook
Code Compliance
James City County
P.O. Box 8784
Williamsburg, Virginia

July 6, 1994

6. A revised copy of the Erosion and Sediment Control Narrative is included in this package. This reflects the deletion of the phrase "sediment traps are to remain in place."

7. As discussed on the phone, the outfall channel between systems "L" and "G" has been deleted. We have extended the pipes, added a VDOT DI-7, and redesigned the grading for the area once the sediment basin is not needed at the end of construction of Phase 2. Please be aware that this basin needs to stay in place until the completion of Phase 2. We feel that this is a better alternative to the concrete channel you requested.

PHASE 2

1. Same as Phase 1 above.

2. Same as Phase 1 above.

3. The riser/barrel combination for sediment basin # 4 has been revised to 27/21 in accordance with your comment.

I appreciate your assistance in the approval of this project. Should you have further questions, please do not hesitate to contact our office.

Very truly yours,

LANGLEY AND McDONALD, P.C.

M. Gordon

Michael R. Gordon

MRG/jlvr
Enclosure

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

December 12, 1994

12-14-94

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia 23187-8784

Re: GREENSPRINGS LAND BAY S3 - Phase One
Case No. S-61-93
L & M File No. 91053-29

Dear Mr. Funkhouser:

Enclosed please find twelve (12) sets of the above referenced project revised in accordance with your review letter dated August 25, 1994 and the review comments from the Virginia Department of Transportation (VDOT) dated July 6, 1994. Please be aware that these plans also reflect a realignment of the intersection of Road "B" and Route 614 as requested by Mr. Michael Taylor of VDOT. Also included you will find revised calculations for the "J" storm drainage system as a result of the road realignment. The review comments have been addressed as follows.

Code Compliance

1. Our client is aware that an Inspection/Maintenance Agreement must be executed with the county for the BMP facilities for this project.

2. Calculations for Sediment Basin B, where system E outfalls, are included in this submittal. Details for this basin are shown on Sheet 21.

3. Inlet protection and limits of clearing are shown as requested.

4. The amount and configuration of riprap at each outfall is provided as requested.

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Virginia Beach, VA 23462
(804) 473-2000
FAX: (804) 497-7933

201 Packets Court
Williamsburg, VA 23185
(804) 253-2975
FAX: (804) 229-0049

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia

December 12, 1994

5. A note has been added to Sheet 4 stating that "construction vehicles shall access Roads "A" and "B" by existing construction entrances for realigned Route 614. If realigned Route 614 is complete, construction entrances must be moved to the east side of realigned Route 614." This note should be adequate for whatever timing this construction occurs in relation to improvements to Route 614.

6. A field trip with Mr. Darryl Cook determined which outfalls needed further calculations. These calculations have previously been submitted to Mr. Darryl Cook.

7. Silt fence has been provided at the location requested.

8. In the field trip referenced above and the calculations that were submitted, it was determined that the improvements to Road B did not require a Sediment Basin. However, it was determined that the runoff from the Clubhouse site would require the design and installation of a Sediment Basin at the outfall of system J on Road B. The engineers for the Clubhouse site have been notified of this and are currently designing this sediment basin.

   A sediment basin has been designed for the end of system L and is shown on Sheet 8. The detail for Basins 2 and 3 are on Sheet 17A and the ultimate drainage and grading at this location is shown on Sheet 11. This basin, and one at approximately station 57+00 along Road A, substitute for the one requested at the end of system G. The fill condition of the proposed roadway made these location a natural for installing sediment basins to trap sediments during construction. At the end of system G, riprap lining for the channel is shown to a point downstream of the concrete cap over the sanitary sewer. This alternate design has been discussed and conceptually approved by Mr. Darryl Cook.

9. Silt fence has been shown on the downslope side of all sewer construction as requested.

10. The BMP facility BMP#1 is in place and substantially complete. Darryl Cook has informed me that the anti-vortex device is possibly the only remaining item to complete the construction of this facility. I have also previously provided Mr. Darryl Cook a

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia

December 12, 1994

copy of Williamsburg Environmental's revised calculation worksheet for BMP#1 showing it to meet the 10-point criteria.

11. A streetlight pole is shown at the intersection of Road A and Centerville Road. The light at lot 151/152 is moved to 150/151.

12. The narrative for this project has been revised and submitted to Mr. Darryl Cook.

James City Service Authority

General

1. All utility easements to be dedicated to James City Service Authority are labeled as James City Service Authority Utility Easements (or JCSA Utility Easement). All other utilities within these easements have been shown in profile as requested.

2. All of these easements will be shown on the final plat for this subdivision.

3. All issues have been addressed and we hope that no other comments will be forthcoming.

4. We are currently working with Mr. Chris Dawson on the water model. Should any changes be required, a plan revision will be submitted.

Sheet 3

1. Water and sewer line sizes have been shown on this plan to satisfy the title "OVERALL WATER & SAN. SEWER".

Sheet 4

1. A utility easement is provided for the water main along Road "A".

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia

December 12, 1994

Sheet 5

1. A blow off at Sta. 30+57 along Road "A" is provided as requested.

2. A utility easement is provided for the water main along Road "A".

3. The sewer laterals to serve lots 8 and 9 have been combined.

Sheet 6

1. The water line at Sta 34+00 has been adjusted to match Sheet 5.

2. A utility easement is provided for the water main from Sta 34+00 to Sta 40+00 has been shown.

3. The cross at Sta 40+11 in the water main has been shown in profile.

4. The vertical offset in the water line has been specified as ductile iron pipe with restrained mechanical joints.

Sheet 7

1. An air release valve has been added at Sta 48+00 on Road "A".

2. An easement for the water main has been provided across lots 104 and 105.

3. An easement has also been provided across lot 76 along Road "D".

Sheet 9

1. An inline valve has been added as requested.

2. The fire hydrant at Sta 71+13 has been revised closer to the curb.

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia

December 12, 1994

Sheet 10

1. The vertical offsets at Sta 21+05 and Sta 24+91 have been called out to be ductile iron pipe with restrained mechanical joints.

2. A note has been added at lot 159 stating that this lot must be filled or a private grinder pump must be provided.

Sheet 11A

1. The sewer laterals for lots 166 through 172 have been added to this sheet as requested.

2. The discrepancy in the manhole numbering has been corrected.

Sheet 13

1. The slope on the sewer line between manhole 8A and manhole 8 has been reduced.

2. The storm sewer downstream of manhole 9 has been shown in profile.

3. The slope on the sewer line coming into manhole 10 from manhole 53 in Phase II has been reduced and coordinated with Phase II plans.

Sheet 14

1. The concrete cap over the sewer line between manhole 11 and manhole E has been revised to have a curtain wall on the upstream side and the channel has been designed for riprap to prevent an erosion problem.

2. The invert in from manhole 12 is 25.44 and the invert in from manhole 24 is 26.53. This has been clarified on these plans.

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia

December 12, 1994

Sheet 16

1. This sewer line needs to be as deep as shown to provide the minimum cover for laterals to lots on the other side of the ravine. The profile for the centerline of the ravine has been plotted to clarify this matter.

Sheet 17

1. It does not seem feasible to provide this service through the future roads. This line serves two rows of lots. Service in the roads would double the amount of pipe and result in conflicts. Due to the accuracy of aerial topo and the minimum cover desired, we feel that the design should stand as shown.

Sheet 18

1. This revision for the sewer line between 32A and 32 has been made as requested.

2. We have four (4) feet of cover where this line crosses the ravine. We need this depth to compensate for the possible variation in topography between computer generated contour lines and aerial topo information.

County Engineer

1. When final plats are submitted for approval, a deed for the natural open space/conservation easements for this section and the sewer lines within the RPA areas will also be submitted.

Virginia Department of Transportation

1. Stop signs have been shown at all intersections.

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia

December 12, 1994

2. The regulations call for 25 to 35 foot radii at intersections. We have provided 25 at the R/W and 29 foot at the back of curb. A detail of the typical intersection has been added to Sheet 17A.

3. A note has been added to the sheets stating that all valves must be located behind the curb.

4. Does not apply to this phase.

5. "No Parking" signs have been added to all streets which are 26' B/C to B/C.

6. This intersection is located in a superelevated curve. The landing grade is the same as the superelevation and accommodates ultimate lanes at this intersection without a hump between northbound and southbound lanes. This also makes for better traffic flow when Road "A" is extended to the west of relocated Route 614.

7. I have discussed this item with Mr. Michael Taylor of the local residency. He has approved the reduction of the centerline radius as shown.

8. The plans have been checked and centerline data for all horizontal curves has been added.

9. Does not apply.

10. The pavement section has been revised as requested, and CG-6 has been specified from Sta 10+00 to Sta 39+50.

11. Does not apply.

12. The section for the roll curb has been revised to show a 9 1/2" radius at the flow line.

13. The drop inlet at K8 has been revised from a DI-3B to a DI-4B.

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia

December 12, 1994

14. The storm sewer from K1 to K2 has been revised to show a 30" RCP pipe.

15. This does not apply since the alignment of Road "B" has been revised and the J system does not have to carry flows from the other side of realigned Route 614. Calculations for the revised system have been included in this submittal.

16. The throat length for drop inlet L6 has been revised to 8 foot.

17. As stated in item 15, this no longer applies.

18. A 20 foot drainage easement has been provided from the culvert under realigned Route 614 to the future entrance to the Clubhouse. From there, all flows will be in a natural channel which does not require an easement.

Planning Division

1. Street names will be provided prior to recordation of plat and application for building permits.

Should you have further comments and/or questions, please do not hesitate to contact our office. Thank you for your assistance.

Very truly yours,

LANGLEY and McDONALD, P.C.

M. Gordon

Michael R. Gordon

MRG/amh
cc. File

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

December 15, 1994

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia 23187-8784

Re: GREENSPRINGS LAND BAY S3 - Phase ~~One~~ Two
Case No. ~~S-61-93~~ S-6-94
L & M File No. 91053-29

Dear Mr. Funkhouser,

Enclosed please find ten (10) sets of the above referenced project revised in accordance with your review letter dated August 25, 1994 and the review comments from the Virginia Department of Transportation (VDOT) dated July 6, 1994. The review comments have been addressed as follows.

Code Compliance

1. Our client is aware that an Inspection/Maintenance Agreement must be executed with the county for the BMP facilities for this project. We will notify our client that you suggest one agreement be executed for the entire Greensprings project.

2. Calculations for systems M through R have been previously submitted to Mr. Darryl Cook.

3. Silt fence has been added from sewer manhole #61 to manhole #60.

4. The amount and configuration of riprap at each outfall is provided as requested.

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(804) 473-2000
FAX: (804) 497-7933

201 Packets Court
Williamsburg, VA 23185
(804) 253-2975
FAX: (804) 229-0049

Mr. Trenton L. Funkhouser
Senior Planner
Department of Development Management
P.O. Box 8784
Williamsburg, Virginia

December 15, 1994

5. The BMP facility BMP#1 is in place and substantially complete. Darryl Cook has informed me that the anti-vortex device is possibly the only remaining item to complete the construction of this facility. I have also previously provided Mr. Darryl Cook a copy of Williamsburg Environmental's revised calculation worksheet for BMP#1 showing it to meet the 10-point criteria.

6. A streetlight has been shown at the intersection of Road K, F, I and J as requested.

7. Silt fence and a brush barrier have been added to control erosion during the construction of the recreational area.

Fire Department

1. The lot numbers have been checked to all plan sheets match Sheet 4.

County Engineer

1. When final plat are submitted for approval, a deed for the natural open space/conservation easements for this section and the sewer lines within the RPA areas will also be submitted.

James City Service Authority

General

1. All utility easements to be dedicated to James City Service Authority are labeled as James City Service Authority Utility Easements (or JCSA Utility Easement). All other utilities within these easements have been shown in profile as requested.

TRANSMITTAL

DATE: 4/27/95

TO: JCSA
CODES COMPLIANCE
WAYLAND BASS, COUNTY ENGINEER
VDOT

FROM: Matthew W. Maxwell, Planner

RE: **S-61-93 Greensprings - Phase I Residential**
Revision to Sheet # 10 of 26

ATTACHED: Cover Letter dated 4/25/95
BMP Summary Table
Proffers
Stormwater Computations

INSTRUCTIONS: Please review and comment on the revised sheet.

RETURN BY: 5/15/95

AGENCY COMMENTS:

1. Provide additional information to support the times of concentration for systems K1 to K2 and K6 to K7. These tcs seem long for the drainage areas involved, especially K1 to K2. These need to be determined on developed not existing conditions.
2. Lots 157 and 160 need to be filled to ensure that any overflow of water from the 2 proposed detention areas does not impact future houses.
3. Provide for landscaping of the two detention areas after construction as they are in the greenbelt.

DEC 5/10/95

S-61-93 cook

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

April 25, 1995

Mr. Matthew W. Maxwell
Planner
Department of Development Management
P.O. Box 8784
Williamsburg, VA 23187-8784

Re: Greensprings Land Bay S-3

Dear Matt:

Accompanying this letter are four prints showing a proposed revision to Storm System K at the referenced project. The purpose of this revision is to avoid cutting across the existing golf fairway east of lots 156 and 157 in order to construct the storm drainage system outfall pipe as shown on the initial plans for this project. By creating two small detention areas above the upper reaches of the major areas draining to this proposed system, we are able to control the storm water runoff such that utilization of an existing 24" corrugated polyethylene pipe under the golf fairway east of lots 157 and 158 is possible. This existing pipe can handle approximately 40 cfs. Included with this package to you are copies of the supporting data for both pond routings, revised Chesapeake Bay Compliance Worksheet, and an excerpt from the latest approved proffers allowing storm water management within the greenbelt buffer. Please contact me at your earliest convenience in order that we may discuss how to proceed with securing approval of this revision as soon as possible.

Best regards,

LANGLEY AND McDONALD, P.C.

Stephen A. Romeo, L.S.
Principal

SAR/amh
Enclosures
cc: Marc Sharp
Danny Johnson
91053-29

MAIN OFFICE
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WINSBG NATIONAL LLC

James City County Stormwater Division Stormwater Management Facility (SWMF)Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

BMP ID # PC064 PIN 3640100018 Responsible Party: GREENSPRINGS PLANTATION 3

Site Address: 3700 CENTERVILLE RD District: 3

Location (other): BMP 1 - DRY POND

Date: 9/23/2009 Inspector: RH

Structure Type: **Retention**

(3 or 4 requires attention):

Total Score **2**

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
1. Forebay Score:	0	
2. Inlet(s):	0	
*3. Outlet:	1	
*4. Principal Spillway:	1	
5. Emergency Spillway:	0	
6. Basin Bottom and Side Slopes:	1	
7. Safety Devices:	0	
*8. Embankments:	2	**Woody vegetation within 10 feet of embankment** **Ground cover too short/bare spots**
*9. Structural Components:	1	
*10. Media:	0	

James City County Stormwater Division Stormwater Management Facility (SWMF)Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
11. Routine Maintenance:	2	**Embankment access right of ways or forebay needs mowing to a minimum grass height of**
12. Condition of Aquatic Environment:	1	
13. Vegetation:	1	
*14. Storage Volume:	1	
15. Debris/Sediment Accumulation:	2	
16. Standing Water:	1	
17. Safety and Aquatic Bench:	0	
18. Side Slope Vegetation:	1	
19. Other:	0	

Checked below identify corrective work required on your stormwater management facility.

- ☐ Remove all trees and other woody vegetation from the embankment (earthen dam) and also within 10' of the toe of the embankment slope.
- ☐ Remove all trees and other woody vegetation from within 10' of the principal spillway, any principal inlet devices, and the principal outfall.
- ☐ Remove all trees and other woody vegetation from within 10' of any inlet structures, such as: pipes, end sections, concrete channels, flumes, rip rap channels, etc.
- ☐ Remove all trees and other woody vegetation from within the emergency spillway and also from within 10' of the spillway.
- ☐ Investigate the cause of any settlement, sink holes, subsidence, or erosion, noted on the report and develop and implement an appropriate plan to correct the deficiencies noted permanently.
- ☐ Remove all accumulated sediment, leaves and debris from within any pipes, end sections, concrete channels, emergency spillways, flumes, rip rap channels, etc. and dispose of the material in an appropriate method and location.
- ☐ Stabilize any disturbed, unstable, denuded or bare soil areas, by installing top soil and planting a permanent grass seed to establish an effective grass ground cover over these areas.
- ☐ All grassed areas of the BMP such as: access roads, emergency spillways, embankments (earthen dam), or other non-treed areas, shall be maintained at a minimum grass height of 8", and should not be subjected to low mowing.
- ☐ Trees and woody vegetation should be cut flush with the ground, and smaller trees and limbs (less than 4" dia) may be processed with a wood chipper and dispersed in natural areas.

James City County Stormwater Division Stormwater Management Facility (SWMF)Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

BMP ID # PC064 PIN 3640100018 Responsible Party: GREENSPRINGS PLANTATION 3

Site Address: 3700 CENTERVILLE RD District: 3

Location (other): BMP 1 - DRY POND

Date: 2/5/2009 Inspector: MM

Structure Type: **Extended Detention**

(3 or 4 requires attention):

Total Score **3**

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
1. Forebay Score:	0	
2. Inlet(s):	0	
*3. Outlet:	2	**Erosion at the outlet discharge point**
*4. Principal Spillway:	1	
5. Emergency Spillway:	0	
6. Basin Bottom and Side Slopes:	1	
7. Safety Devices:	0	
*8. Embankments:	3	**Woody vegetation within 10 feet of embankment** **Ground cover too tall >8 inches** **Erosion settlement or burrowing**
*9. Structural Components:	1	
*10. Media:	0	

James City County Stormwater Division Stormwater Management Facility (SWMF)Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
11. Routine Maintenance:	3	**Remove trash and debris**
12. Condition of Aquatic Environment:	1	
13. Vegetation:	1	
*14. Storage Volume:	1	
15. Debris/Sediment Accumulation:	4	**Excessive debris sediment or floatable material**
16. Standing Water:	2	**The wet pond has leaked dry or a dry pond is retaining water**
17. Safety and Aquatic Bench:	0	
18. Side Slope Vegetation:	1	
19. Other:		

Checked below identify corrective work required on your stormwater management facility.

- ☐ Remove all trees and other woody vegetation from the embankment (earthen dam) and also within 10' of the toe of the embankment slope.
- ☐ Remove all trees and other woody vegetation from within 10' of the principal spillway, any principal inlet devices, and the principal outfall.
- ☐ Remove all trees and other woody vegetation from within 10' of any inlet structures, such as: pipes, end sections, concrete channels, flumes, rip rap channels, etc.
- ☐ Remove all trees and other woody vegetation from within the emergency spillway and also from within 10' of the spillway.
- ☐ Investigate the cause of any settlement, sink holes, subsidence, or erosion, noted on the report and develop and implement an appropriate plan to correct the deficiencies noted permanently.
- ☐ Remove all accumulated sediment, leaves and debris from within any pipes, end sections, concrete channels, emergency spillways, flumes, rip rap channels, etc. and dispose of the material in an appropriate method and location.
- ☐ Stabilize any disturbed, unstable, denuded or bare soil areas, by installing top soil and planting a permanent grass seed to establish an effective grass ground cover over these areas.
- ☐ All grassed areas of the BMP such as: access roads, emergency spillways, embankments (earthen dam), or other non-treed areas, shall be maintained at a minimum grass height of 8", and should not be subjected to low mowing.
- ☐ Trees and woody vegetation should be cut flush with the ground, and smaller trees and limbs (less than 4" dia) may be processed with a wood chipper and dispersed in natural areas.

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	Triple CMP
BMP ID NO	064	SITE AREA acre	1402	CTRL STRUC SIZE inches	36
PLAN NO	SP-85-94	LAND USE	SF Residential	OTLT BARRL DESC	Triple CMP
TAX PARCEL	(36-4)(01-18)	old BMP TYP	Dry Pond	OTLT BARRL SIZE inch	30
PIN NO	3640100018	JCC BMP CODE			
CONSTRUCTION DATE	6/1/1994	POINT VALUE	9	EMERG SPILLWAY	Yes
PROJECT NAME	Greensprings Legacy Golf Course			DESIGN HW ELEV	28.86
FACILITY LOCATION	BMP 1 Dry Pond			PERM POOL ELE	na
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres	252	2-YR OUTFLOW cfs	77.24
CURRENT OWNER	Williamsburg National LLC			10-YR OUTFLOW cfs	169.31
OWNER ADDRESS	213 Ingram Road			REC DRAWING	Yes
OWNER ADDRESS 2		SERVICE AREA DESCRI	GREENSPRINGS MASTER PLAN		
CITY-STATE-ZIP CODE	Williamsburg, VA 23188	IMPERV AREA acres		CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	Yes	LAST INSP DATE	3/13/2001
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	8.74	INTERNAL RATING	3
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0	Between Resort Timeshares & Land Bay S-3.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

CODE COMPLIANCE REVIEW COMMENTS
GREENSPRINGS, LAND BAY 3
PLAN NO. S-61-93
August 24, 1993 DEC

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

2. A Subdivision Agreement, with surety, shall be executed with the County prior to recordation of lots.

3. Water and sewer inspection fees must be paid prior to the issuance of a Land Disturbing Permit.

4. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facility for this project.

5. Provide a drainage area map to verify the design calculations for the storm drain system.

6. Drainage calculations were not provided for the storm drain system D9 to the outfall.

7. The outfall is not shown on the plan for the F and I drainage systems. Structures maybe required at these outfalls to control erosion and water quality.

8. Storm drain system G layout on the plan does not match the calculations. For example, G5 ties into G7 not G8, and G6 flow is not included in flow calculations for G7.

9. Some calculations have been provided for the detention-sediment basin for system E but no details have been provided on the plans. Provide plan and cross-sections for this structure. Also, provide more detailed calculations regarding the design and purpose of this structure. The calculations state that it will provide permanent retention.

10. Provide inlet protection for all storm drain inlets.

11. At each storm drain outfall, provide riprap specifying the amount and its configuration.

12. Provide a construction entrance for the project where it ties into Centerville Road.

13. Provide a channel adequacy calculation for the outfall channels below all storm drain outfalls.

14. Provide silt fence from station 42+00 to 45+00, and 67+75 to 68+50 of Road A, and from station 33+25 to 34+25.

15. Provide a sediment basin at the outfall of system J on Road B. Also, provide a sediment trap or basin at the end of

system G.

16. Provide erosion control for all sewer construction. Also, provide the sewer plans by Rickmond Engineers to show the complete sewer line needed for this section.

17. This project is dependent on the BMP facilities, Lake C and BMP 1 being in place. Either these structure must be constructed prior to the start of this project or their installation must be guaranteed by this plan. Please submit a BMP calculation worksheet that demonstrates that this project meets the county's criteria and provide conservation easements for all natural areas claimed in the worksheet.

18. Provide a streetlight plan with lights at all intersections, cul-de-sacs and at 300-400 foot intervals between these points.

19. Provide a rock check dam at the end of the ditch shown on sheet 4 to provide a trapping device before entering Lake C.

20. Identify areas of 25% and steeper slopes, and RPA areas on the construction plans so that it can be determined if any exceptions are needed to construct the subdivision or sewer lines.

CODE COMPLIANCE REVIEW COMMENTS
GREENSPRINGS, LAND BAY 3, PHASE II
PLAN NO. ~~S-61-93~~ DEC 5-6-94
February 17, 1994

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

2. A Subdivision Agreement, with surety, shall be executed with the County prior to recordation of lots.

3. Water and sewer inspection fees must be paid prior to the issuance of a Land Disturbing Permit.

4. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facilities for this project. To simplify this requirement, suggest that one agreement be executed for the entire Greensprings project.

5. Provide a drainage area map to verify the design calculations for the storm drain systems and to determine how much of the project drains to BMP facilities. Include pre-development areas as necessary to verify pre- flow conditions.

6. Supporting documentation must be provided for the times of concentration assumed in the stormwater management calculations. All calculations for pre- and post- development are dependant on this assumption.

7. The outfall is not shown on the plan for the I drainage system. A structure maybe required at this outfall to control erosion and water quality.

8. Provide silt fence along the sewer line from the rear lot line of lot 138 east to the existing manhole behind lot 88.

9. Provide design information for all sediment traps and basins. Also, provide dimensions/details on the plans for all sediment basins/traps. Include drainage maps for these facilities.

10. Provide silt fence around the Road G cul-de-sac from the drainage easement around to the lot 43/44 lot line.

11. Provide silt fence on the right side of Road A from station 89+00 to 90+00, and from 93+00 to lot line 33/34.

12. This project is dependent on the BMP facilities, Lake C and BMP 1 being in place. Either these structure must be constructed prior to the start of this project or their installation must be guaranteed by this plan. Please submit a BMP calculation worksheet that demonstrates that this project meets the county's criteria and provide conservation easements for all natural areas claimed in the worksheet.

13. Provide a streetlight plan with lights at all intersections, cul-de-sacs and at 300-400 foot intervals between these points.

14. This plan was difficult to review because of its dependance on the Phase I plan which is yet unapproved with numerous comments. Therefore, additional comments maybe generated on the next review after the Phase I plan has been resubmitted.

CODE COMPLIANCE REVIEW COMMENTS
GREENSPRINGS, LAND BAY 3, PHASE 1
PLAN NO. S-61-93
June 2, 1994 DEC

1. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facilities for this project.

2. Calculations need to be provided for Sediment Basin B, where system E outfalls, to ensure that it meets the sediment basin criteria. Also, the detail on sheet 26 needs to provide all necessary information for construction such as size of anti-vortex device, size of the riser base, etc.

3. ~~Provide inlet protection for all storm drain inlets.~~ Sheet 9 lacks ~~inlet protection as well as~~ limits of clearing lines.

4. At each storm drain outfall, provide riprap specifying the amount and its configuration. This information has not been provided for all outfalls. RR for system F, Sed basin for sys F pg 7
Length of ditch - below J

5. Provide a construction entrance for the project where it ties into Centerville Road. The timing of the construction of this section in relation to Centerville Road is unknown at this time.

6. Provide channel adequacy calculations for the outfall channels below all storm drain outfalls. This needs to be done to assess the need for channel linings and it must be clearly presented so that a proper determination can be made. - fix Sheet 7 outlet F
change to paved ditch bet sys L + G.

7. Provide silt fence from station 68+75 to 69+50 of Road A.

8. ~~Provide a sediment basin at the outfall of system J on Road B.~~ Also, provide a sediment trap or basin at the end of system G.

9. Provide erosion control for all sewer construction. This is to address the construction within this section, not the sections designed by Rickmond Engineers.

10. This project is dependent on the BMP facility BMP#1 being in place. Either this structure must be constructed prior to the start of this project or its installation must be guaranteed by this plan. The BMP calculation worksheet incorrectly classifies BMP#1 as an 11 point BMP. It is only a 9 point structure making the overall point count for this section 9.55 rather than 10.7. The section needs to meet the 10-point criteria and identify the natural areas claimed in the worksheet.

11. Provide a streetlight plan at the intersection of Road A and Centerville Road, and move the light at lot 151/152 to 150/151.

12. The narrative for the project states that the sediment traps will be left in place after construction is complete. This needs to be removed from the text as the traps and trapped sediment must be removed in accordance with the E&S notes and regulations.

6/14/94

- NOS Easement document to Marc Sharp
- RR channel - bet G + L - RR - cancel the ditch

TRANSMITTAL

RECEIVED 5-26-94

DATE: May 26, 1994

TO: Darryl Cook, Code Compliance*
Fire Department
JCSA*
Wayland Bass, County Engineer
Real Estate Assessments
VDOT(2)*

FROM: Trenton L. Funkhouser, Senior Planner

SUBJECT: S-61-93. Phase I, Greensprings Land Bay S-3 (Resubmittal following preliminary approval)

Please note attached letter noting changes to plans previously sent to you

Please coordinate comments with review of Phase II (which you should have received by this time).

ITEMS ATTACHED: Revised Plans
* Revised Drainage Calculations and maps

INSTRUCTIONS: Please review and comment.

RETURN REQUIRED BY: June 10, 1994

AGENCY'S COMMENTS:

f:\home\tlf\s6193.tr5

CODE COMPLIANCE REVIEW COMMENTS
GREENSPRINGS, LAND BAY 3, PHASE 1
PLAN NO. S-61-93
June 30, 1994 DEC

1. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facilities for this project.

2. Sheet 9 lacks limits of clearing lines.

3. Revise the storm drain outfall for system F shown on sheet 7 so it does not conflict with sheet 13 information for the same outfall.

4. Specify the length of the riprap protection below the system J outfall.

5. This project is dependent on the BMP facility BMP#1 being in place. Either this structure must be constructed prior to the start of this project or its installation must be guaranteed by this plan. The BMP calculation worksheet incorrectly classifies BMP#1 as an 11 point BMP. It is only a 9 point structure making the overall point count for this section 9.55 rather than 10.7. The section needs to meet the 10-point criteria and identify the natural areas claimed in the worksheet.

6. The narrative for the project states that the sediment traps will be left in place after construction is complete. This needs to be removed from the text as the traps and trapped sediment must be removed in accordance with the E&S notes and regulations.

7. The outfall channel between systems L and G is currently shown as a riprap ditch. It is located between 2 lots and is also going to be located on fill after sediment basin #3 is removed. For these reasons, the ditch liner needs to be changed to a concrete ditch to minimize maintenance concerns as ditches are no longer going to be maintained by VDOT.

CODE COMPLIANCE REVIEW COMMENTS
GREENSPRINGS, LAND BAY 3, PHASE II
PLAN NO. S-~~4~~6-94 DEC
June 30, 1994

1. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facilities for this project. To simplify this requirement, I suggest that one agreement be executed for the entire Greensprings project.

2. This project is dependent on the BMP facility BMP#1 being in place. Either this structure must be constructed prior to the start of this project or its installation must be guaranteed by this plan. The BMP calculation worksheet incorrectly classifies BMP#1 as an 11 point BMP. It is only a 9 point structure making the overall point count for this section 9.55 rather than 10.7. The section needs to meet the 10-point criteria and identify the natural areas claimed in the worksheet.

3. Revise to riser/barrel combination on sediment basin #4 to either 27/21 inches or 30/24 inches.

D Cooke

GREENSPRINGS LANDBAY S-3
PHASE II
EROSION AND SEDIMENT CONTROL

The stormwater management and collection system for Greensprings utilizes large regional detention ponds to collect sediment and reduce peak runoff rates to pre-development levels. Stormwater from the Phase II portion of Road "A" will be piped across a natural drainage divide to Lake "C". The remainder of the drainage basin downstream from Road "A" and in the Greensprings Plantation property, will be developed on a limited basis so that runoff rates will not exceed pre-development levels. Likewise, stormwater from Road "J" and most of Road "I" will be piped to Drypond Number 1. Roads "B", "E", and "F" are within the natural drainage basin for Lake "C". Lake "C" and Drypond Number 1 are being built as part of Legacy Golf Links.

Temporary sediment traps and one temporary sediment basin will be constructed to contain sediment during the road construction period and until disturbed areas are stabilized. After this period, the sediment basin will be filled and seeded for use as an open play area required by the recreation proffers. The sediment traps will be left in place.

PH 1 & 2
FILE
DRAINS TO
LAKE C &
BMP #1

Note: Greensprings West
Single-Family PH 1 & 2
Drainage computations are
in this file. Dry Pond BMP #1
and Lake C, required for PH 1+2
were built as part of Legacy
Golf Course plans.