See also DC005 and DC017

# 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:** **DC006**

**DATE VERIFIED:** **May 17, 2012**

**QUALITY ASSURANCE TECHNICIAN:** **Leah Hardenbergh**

Leah Hardenbergh

**LOCATION: WILLIAMSBURG, VIRGINIA**

# Stormwater Division

## MEMORANDUM

**DATE:** March 10, 2010

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

**FROM:** Jo Anna Ripley, Stormwater

**PO:** 270712

**RE:** Files Approved for Scanning

---

**General File ID or BMP ID:** DC006

**PIN:** 0940100002

**Subdivision, Tract, Business or Owner Name (if known):** Colonial Golf Course (The)

**Property Description:** Golf Course

**Site Address:** 8285 Diascund Road

*(For internal use only)* **Box** 10 **Drawer:** 6

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

Comments
This is a combined folder with DC005 and DC006

DC-005 + DC-006

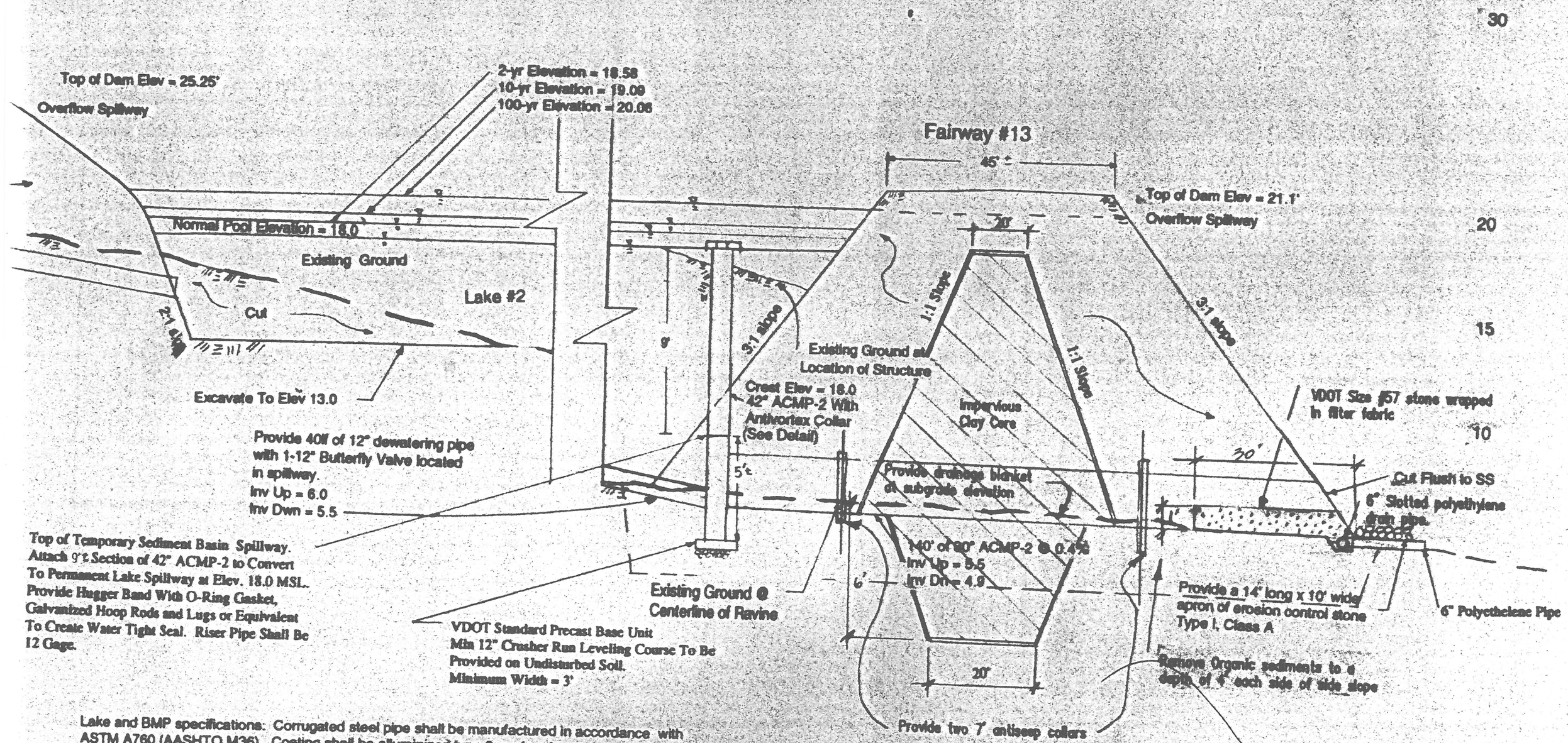
**Contents for Stormwater Management Facilities As-built Files**

Each file is to contain:

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

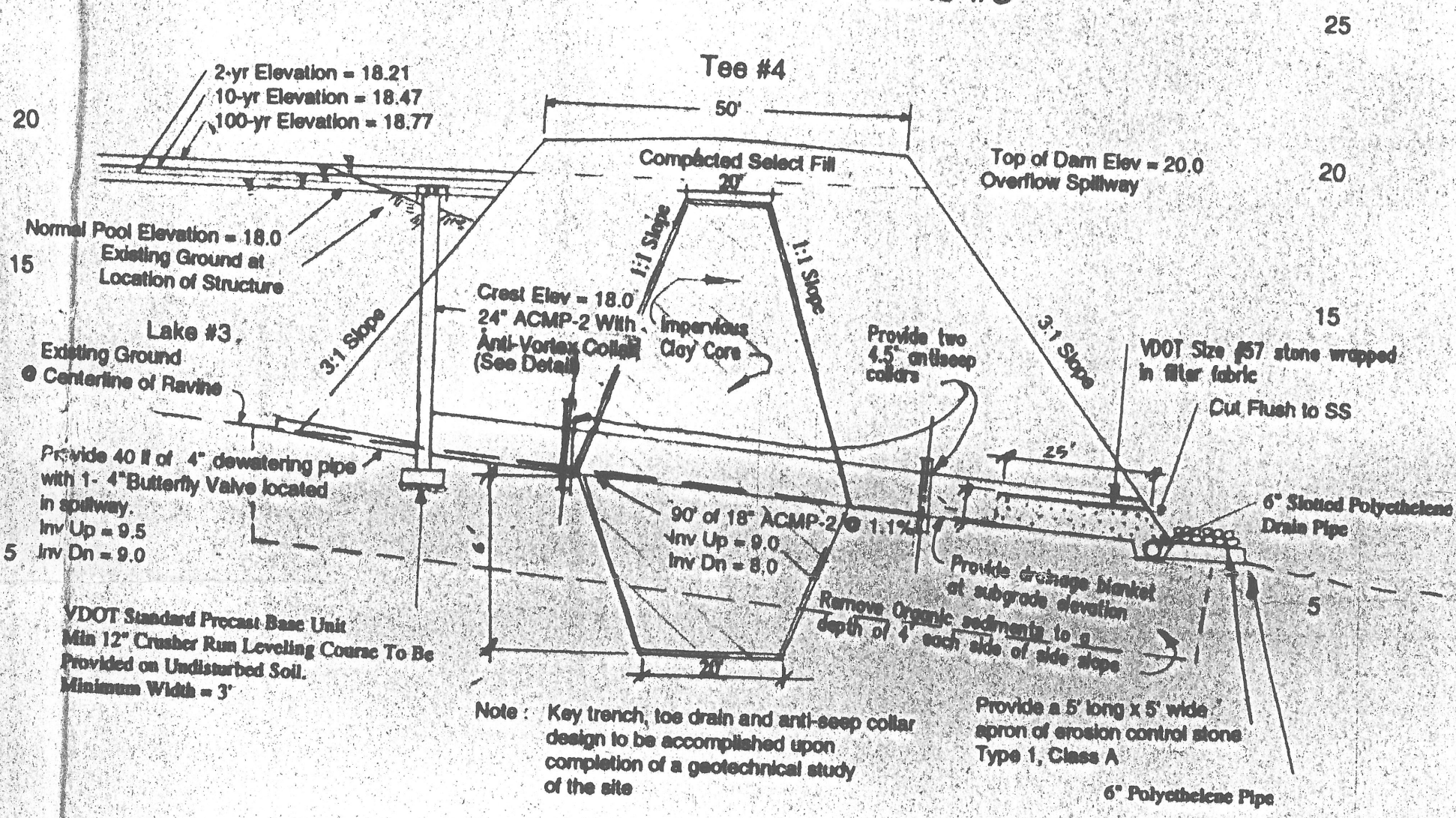
# Cross-Section Of Dams For Lake #1 and Lake #2

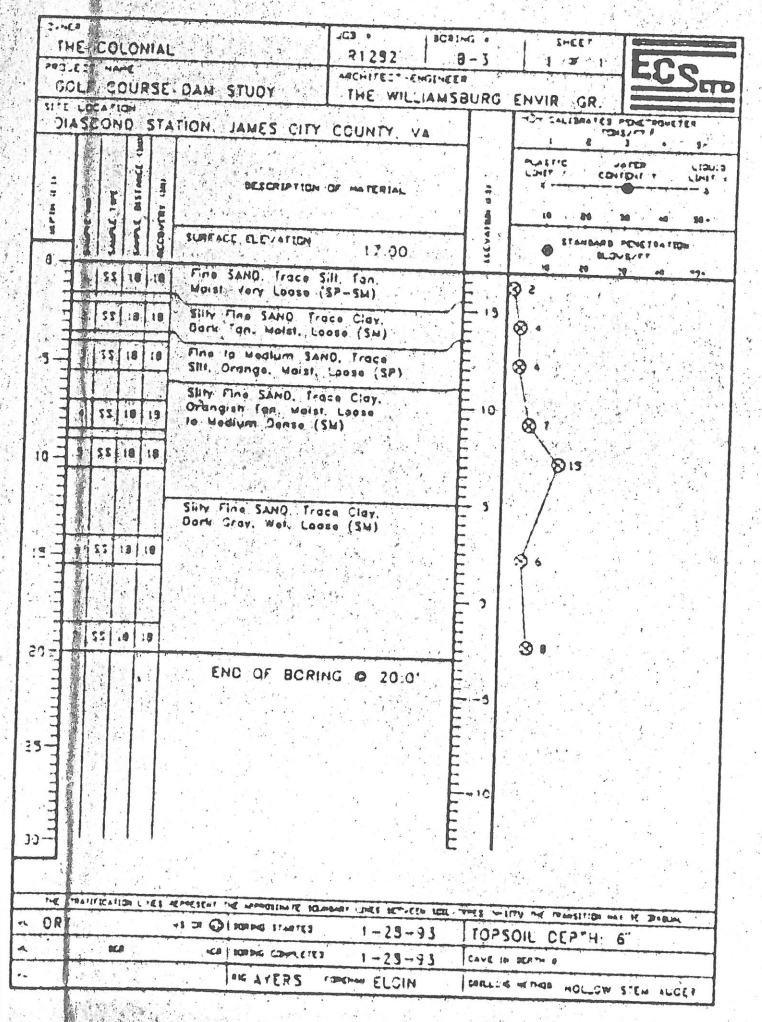
Scale:
1" = 20' Horizontal
1" = 5' Vertical

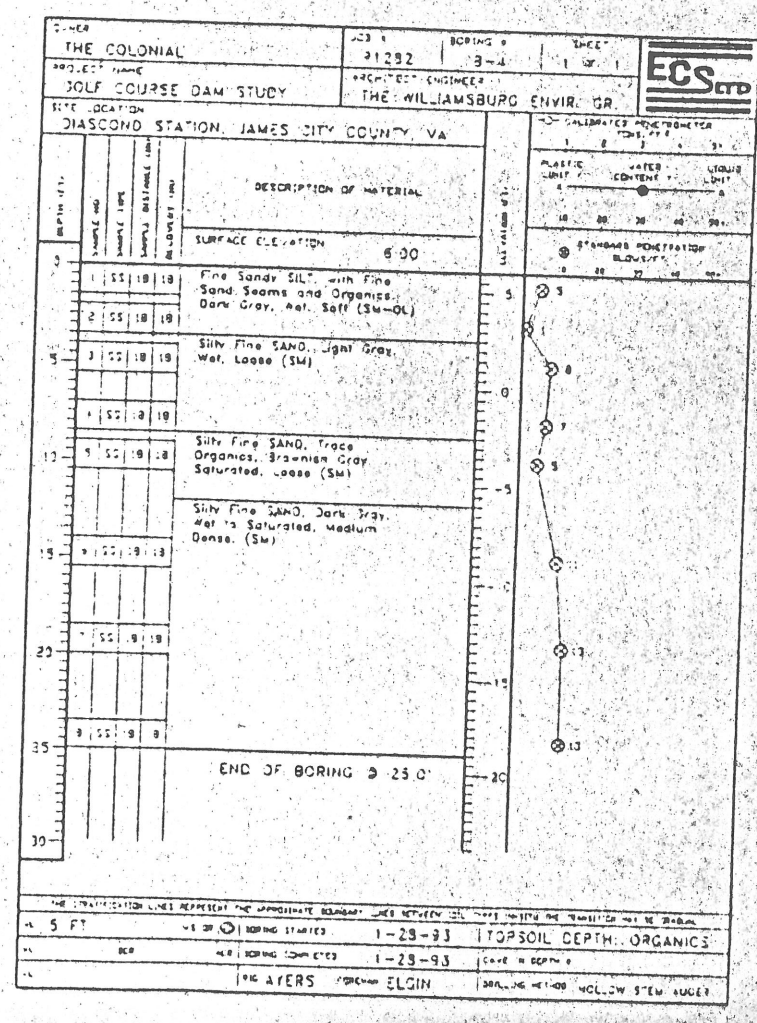


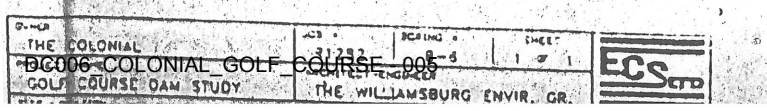

Lake and BMP specifications: Corrugated steel pipe shall be manufactured in accordance with ASTM A760 (AASHTO M36). Coating shall be alluminized type 2 conforming to astm A819 (AASHTO M274). Pipe shall have a minimum of two factory rolled annular corrugations at each end. Pipe is to be 12 guage. Pipe may be asphalt coated in accordance with AASHTO M190 or equivalent.

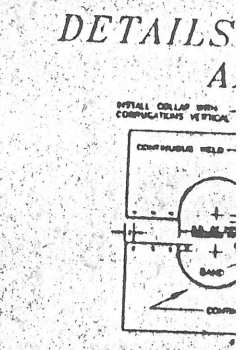
# Cross-Section Of Dam For Lake #3



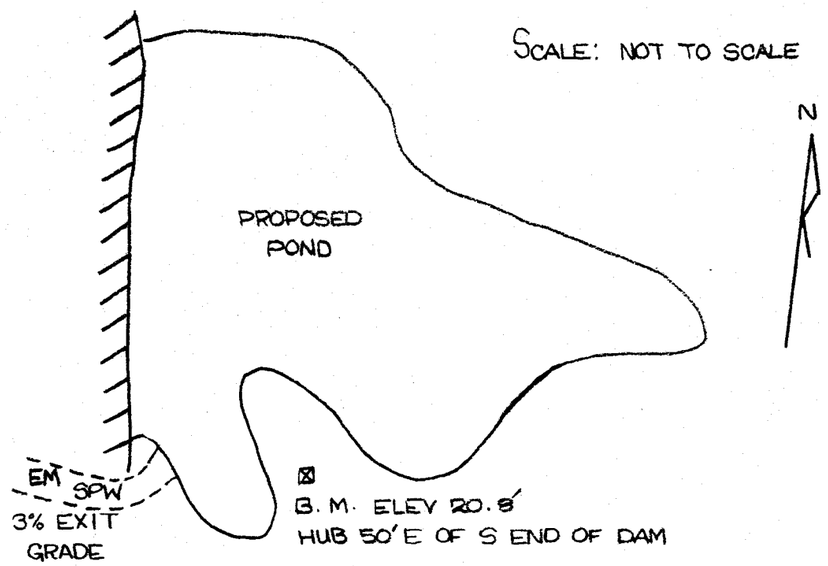





## SKETCH OF POND SITE

(LAKE NO. 2, PLAN NO. 2, EXTENDS DAM PAST SMALL COVE)




## MATERIAL REQUIRED TO CONSTRUCT DAM

EARTH MOVING

| | |
|---|---|
| TO CONSTRUCT DAM | 3,762 CU. YRDS. |
| TO EXCAVATE CORE | 453 CU. YRDS. |
| TOTAL | 4,215 CU. YRDS. |

PIPE & FITTINGS

| DIAM | LENGTH | NO. PIECES |
|---|---|---|
| 8" | 20' | 6 |

(RISER PIPE-FIELD CUT TO EXACT LENGTH)*

1 EACH 18" TRASH GUARD
1 EACH 6" SHEAR GATE VALVE
1 EACH 8"X8"X8" TEE
2 CU. YRDS. STONE RIRRAP

NOTE: ALL PIPE IS TO BE SCHEDULE 40 PVC PIPE OR OTHER OF EQUAL OR GREATER STRENGTH, CAPACITY & DURABILITY

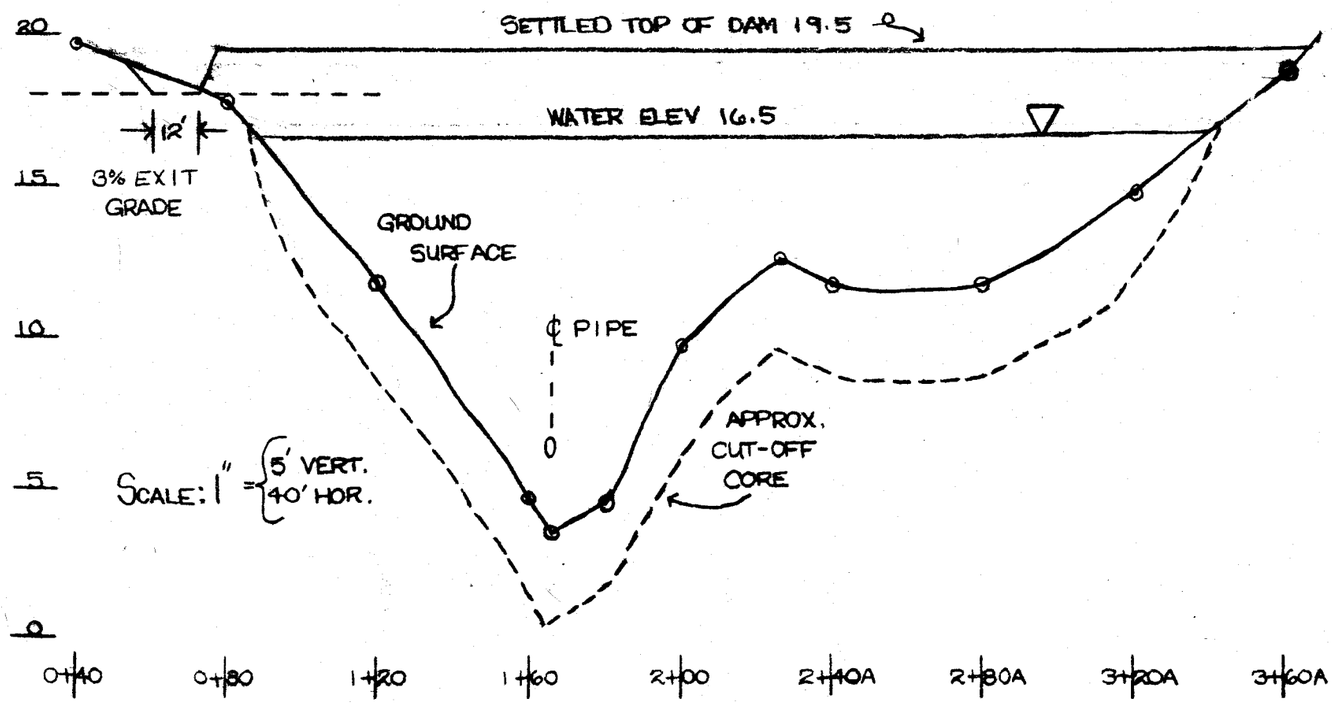
* CONNECT 12" DIAMETER RISER TO 8" RISER 2' BELOW WATER ELEV. WITH AN 8" TO 12" REDUCER

## DAM & POND PLAN

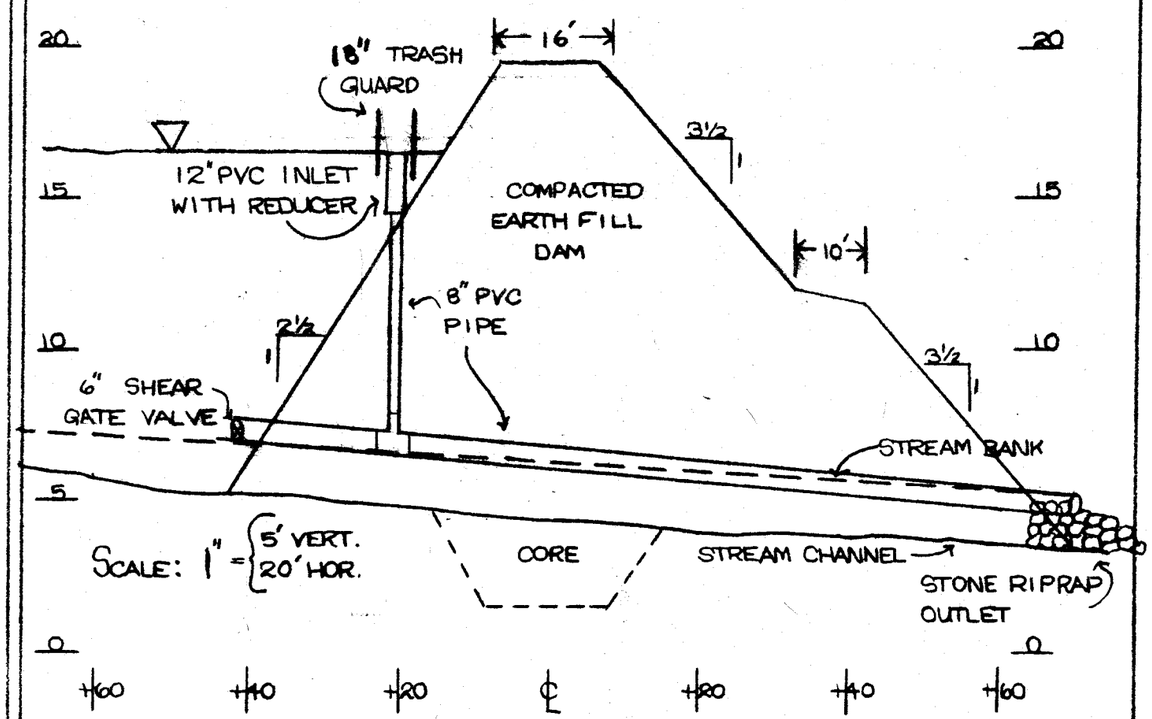
(LAKE NO. 2, PLAN NO. 2)
OWNER: COLONIAL GOLF COURSE
LOCATION: TOANA, VA., ON RT. 603, 2 MI N OF RT. 610
PLAN BY: JOSEPH H. SCALES & ASSOC.
Joseph H. Scales
TITLE: PROFESSIONAL CONSERVATIONIST
DESIGN BY: JHS
DRAWN BY: SWS
DATE: JANUARY 10, 1994
SHEET NO. 3 OF 3

COMMONWEALTH OF VIRGINIA
JOSEPH H. SCALES
NO. 000015
PROFESSIONAL SOIL SCIENTIST

## PROFILE OF DAM LOOKING DOWN-STREAM

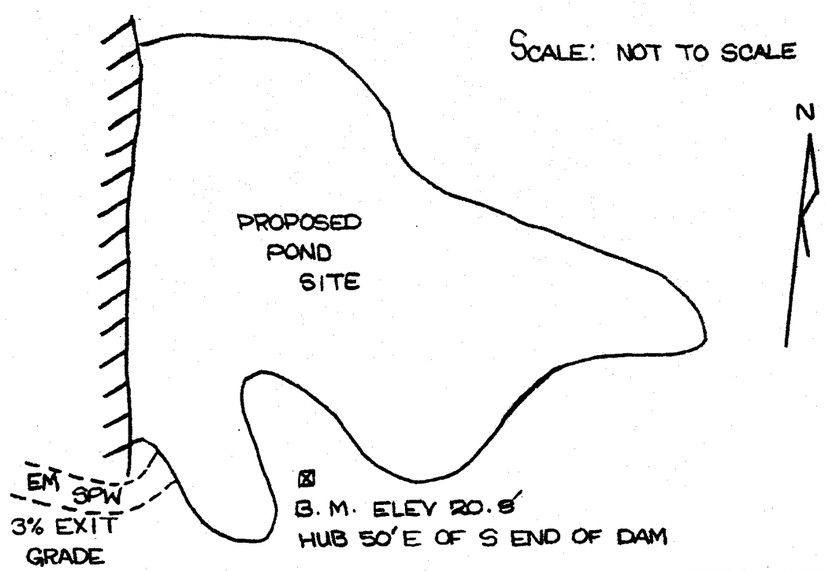



## CROSS SECTION OF DAM AT ℄ STA 1+65



## SKETCH OF POND SITE

(LAKE NO. 2, PLAN NO. 2, EXTENDS DAM PAST SMALL COVE)




## MATERIAL REQUIRED TO CONSTRUCT DAM

EARTH MOVING

| | |
|---|---|
| TO CONSTRUCT DAM | 3,762 CU. YRDS. |
| TO EXCAVATE CORE | 453 CU. YRDS. |
| TOTAL | 4,215 CU. YRDS. |

NOTE: ALL OTHER ITEMS REMAIN THE SAME. REFER TO ORIGINAL PLAN AND SPECIFICATIONS

## DAM & POND PLAN

(LAKE NO. 2, PLAN NO. 2)

OWNER: COLONIAL GOLF COURSE

LOCATION: TOANA, VA., ON RT. 603, 2 MI N OF RT. 610

PLAN BY: JOSEPH H. SCALES & ASSOC.

Joseph H. Scales

TITLE: PROFESSIONAL CONSERVATIONIST

DESIGN BY: JHS

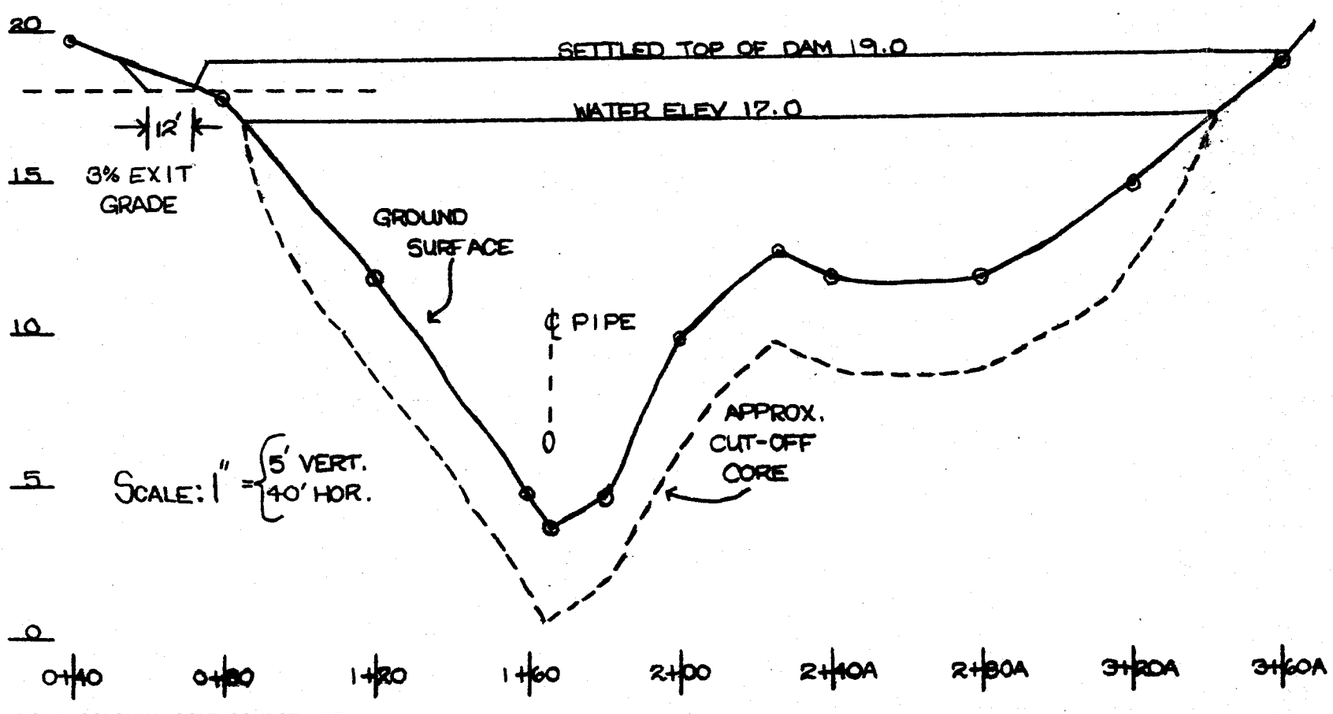
DRAWN BY: SWS

DATE: JANUARY 10, 1994

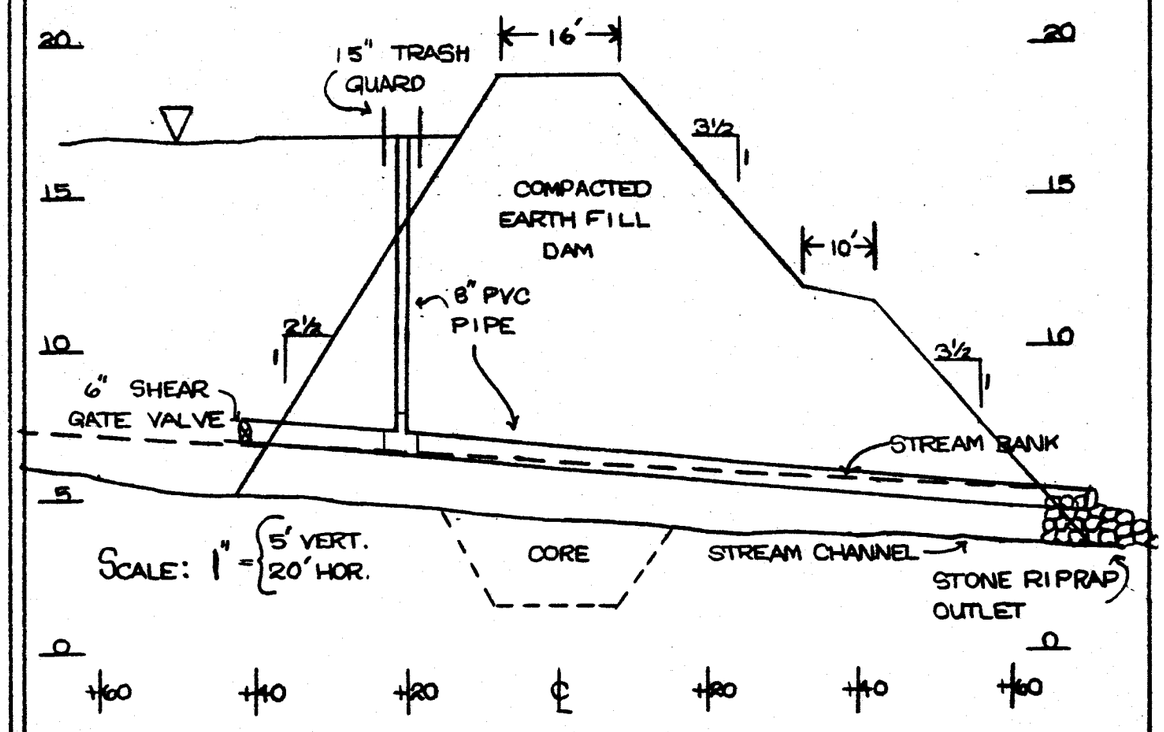
SHEET NO. 3 OF 3

COMMONWEALTH OF VIRGINIA
JOSEPH H. SCALES
NO. C00015
PROFESSIONAL SOIL SCIENTIST

## PROFILE OF DAM LOOKING DOWN-STREAM

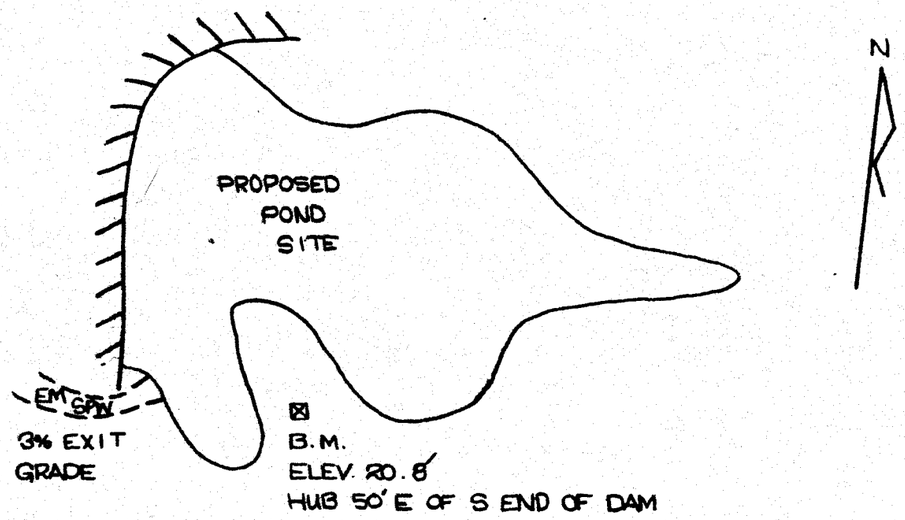



## CROSS SECTION OF DAM AT ℄ STA 1+65



## SKETCH OF POND SITE

(LAKE NO. 2, ORIG. PLAN) SCALE: NOT TO SCALE




## MATERIAL REQUIRED TO CONSTRUCT DAM

EARTH MOVING

TO CONSTRUCT DAM 2,920 CU. YRDS.
TO EXCAVATE CORE 293 CU. YRDS.
TOTAL 3,213 CU. YRDS.

PIPE & FITTINGS

| DIAM | LENGTH | NO. PIECES | |
|---|---|---|---|
| 8" | 20' | 6 | (RISER PIPE-FIELD CUT TO EXACT LENGTH) |

1 EACH 15" TRASH GUARD
1 EACH 6" SHEAR GATE
1 EACH 8" X 8" X 8" TEE
2 CU. YRD. STONE RIPRAP

NOTE: ALL PIPE IS TO BE SCHEDULE 40 PVC PIPE OR OTHER PIPE OF EQUAL OR GREATER STRENGTH, CAPACITY AND DURABILITY.

## DAM & POND PLAN

(LAKE NO. 2-ORIGINAL PLAN)

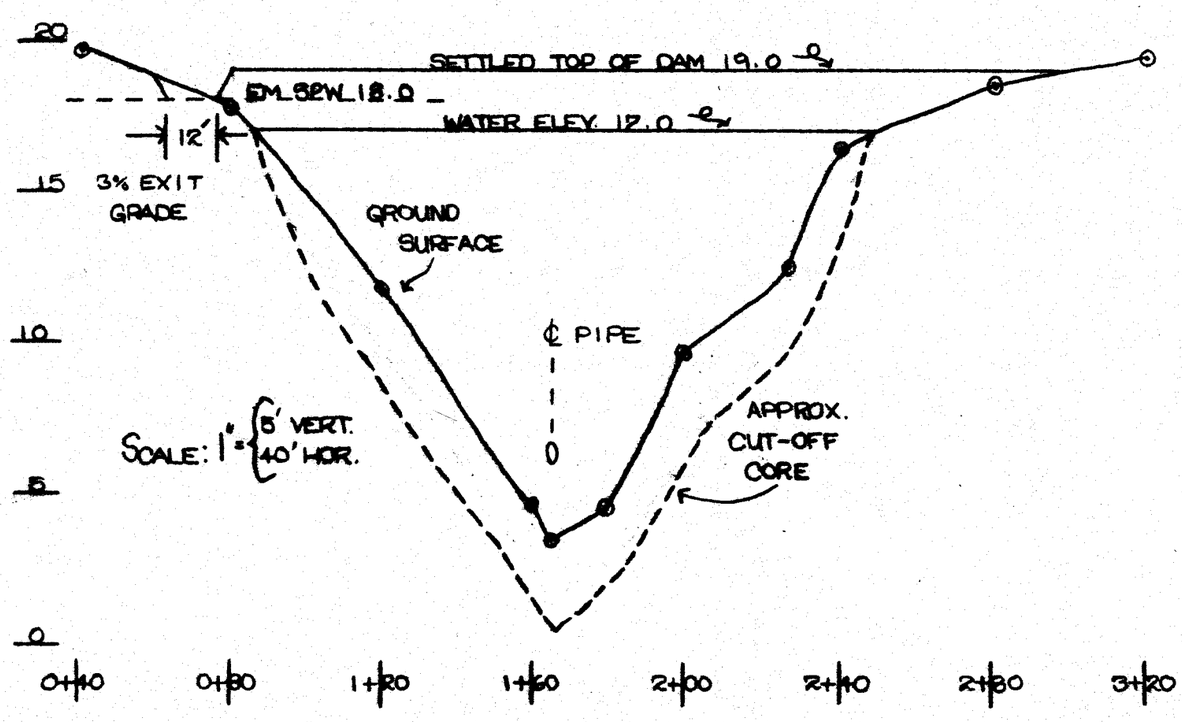
OWNER: COLONIAL GOLF COURSE
LOCATION: TOANA, VA, ON RT. 609, 2 MI. N OF RT. 610
PLAN BY: JOSEPH H. SCALES & ASSOC.

TITLE: PROFESSIONAL CONSERVATIONIST
DESIGN BY: JHS
DRAWN BY: SWS
DATE: JANUARY 10, 1994
SHEET NO. 2 OF 3

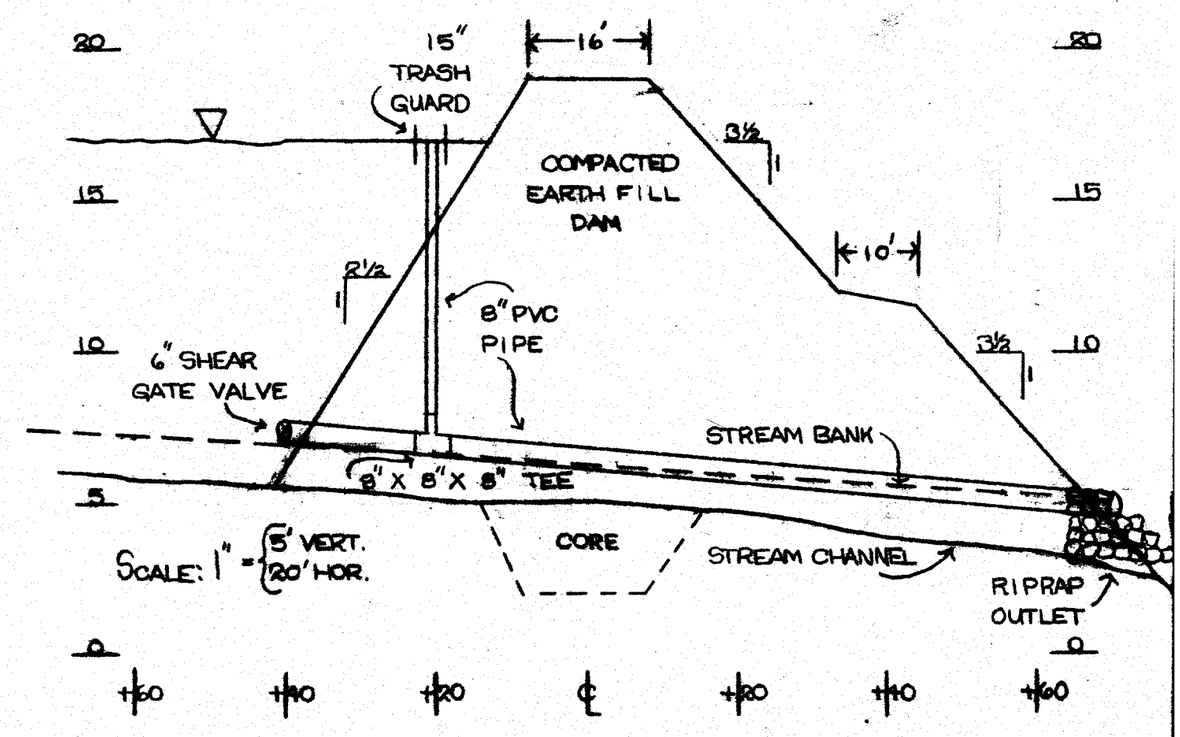
Joseph H. Scales

PROFESSIONAL SOIL SCIENTIST
JOSEPH H. SCALES
NO. 000016
COMMONWEALTH OF VIRGINIA

## PROFILE OF DAM LOOKING DOWNSTREAM



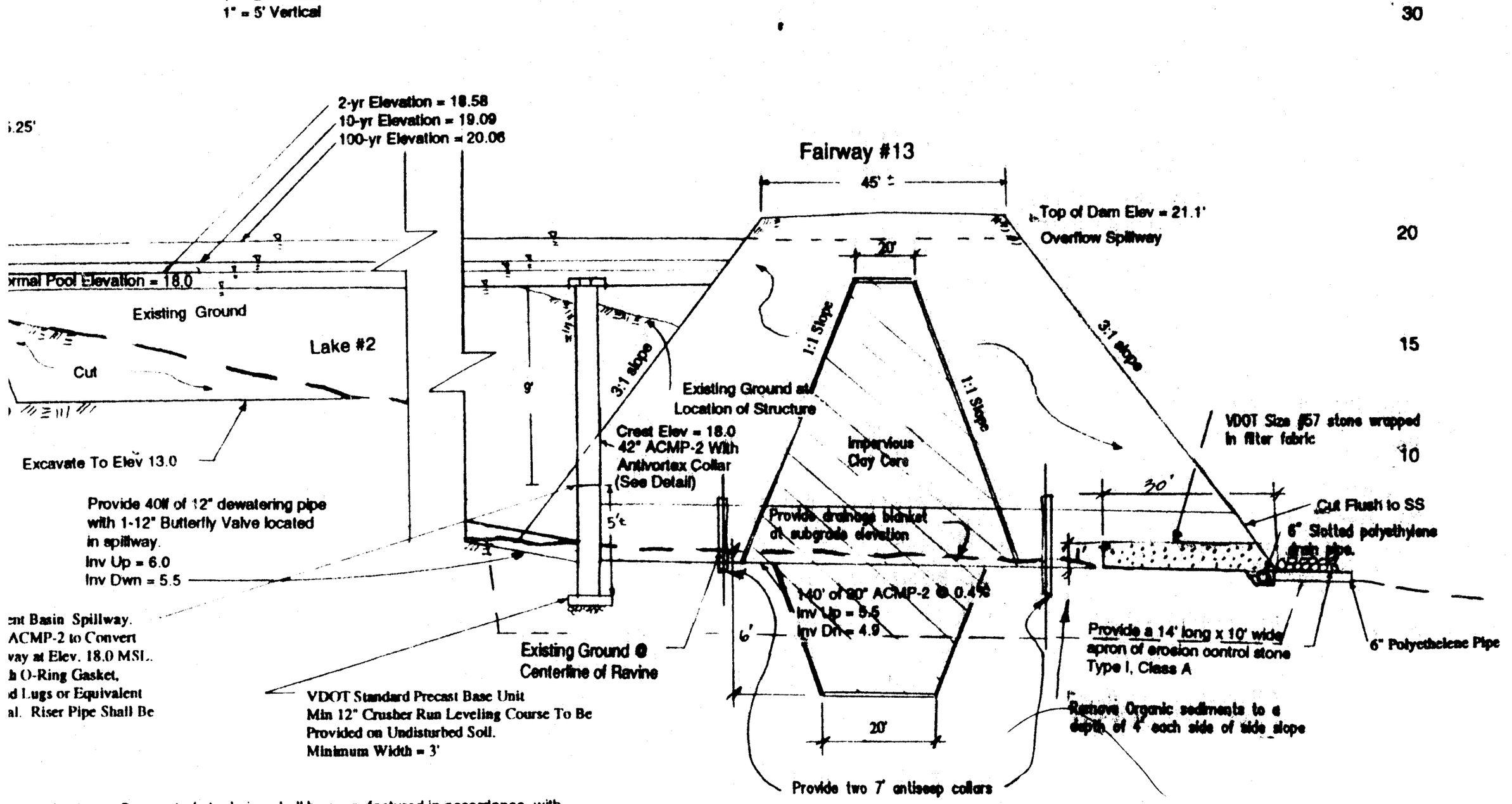

## CROSS SECTION OF DAM AT ℄ STA 1+65



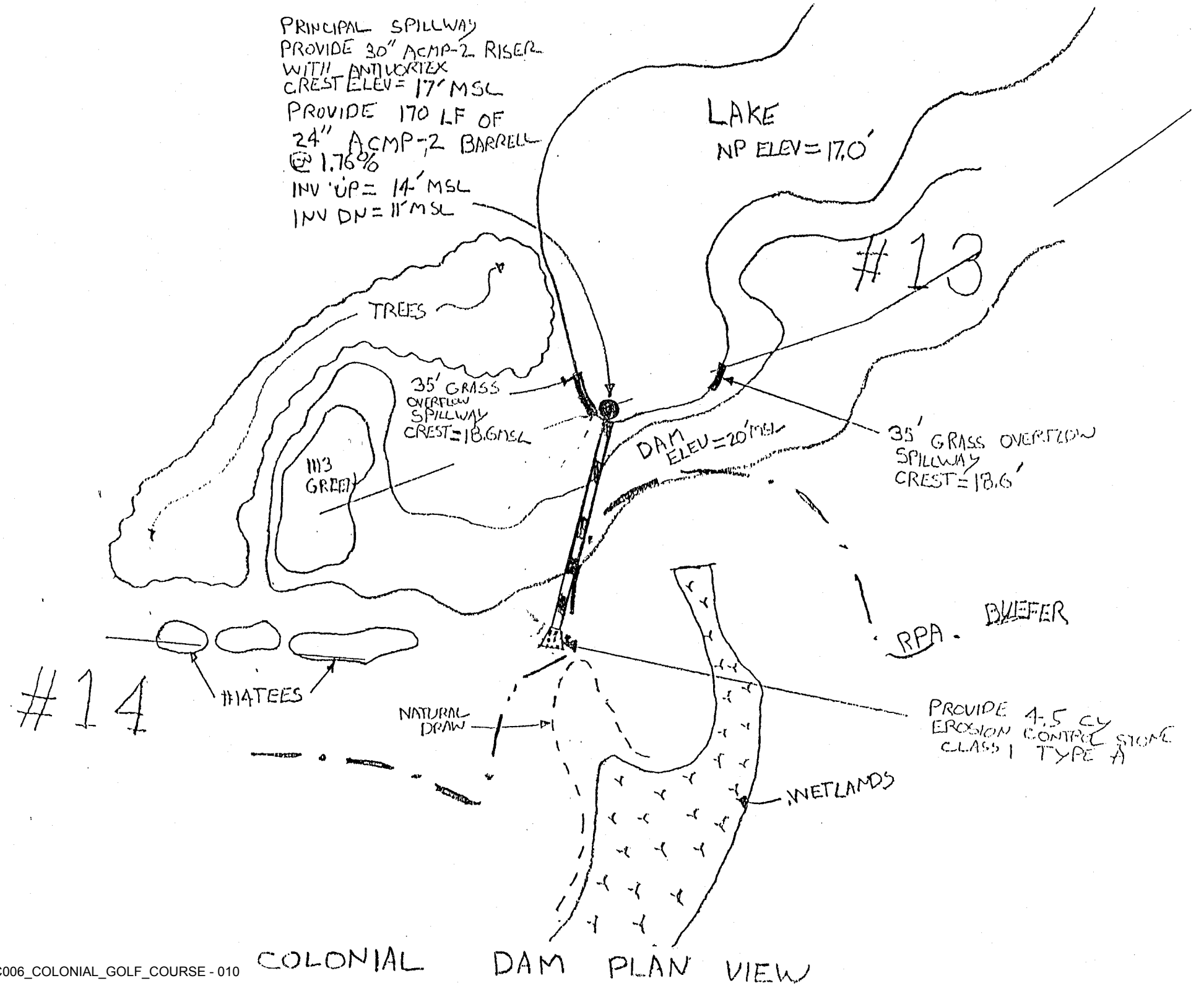



FIELD BOOK NO. 8, PAGE 56

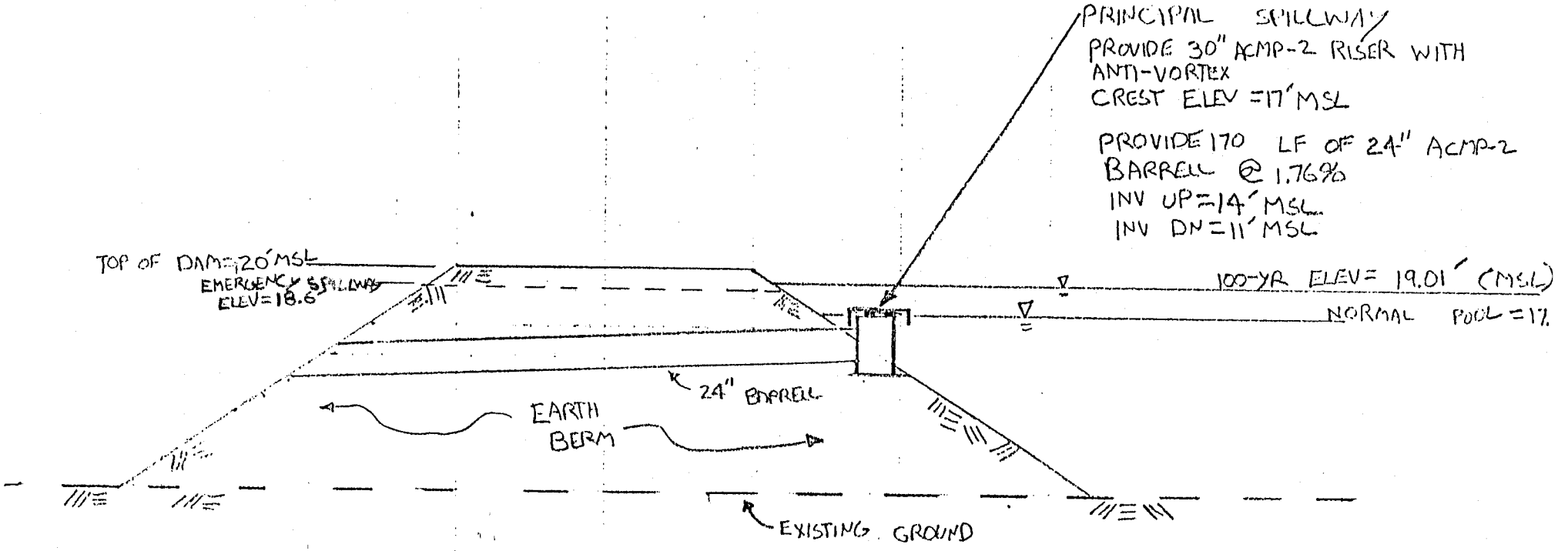
Scale:
1" = 20' Horizontal
1" = 5' Vertical




specifications: Corrugated steel pipe shall be manufactured in accordance with
(ASHTO M36). Coating shall be alluminized type 2 conforming to astm A819
'4). Pipe shall have a minimum of two factory rolled annulal corrugations at each




COLONIAL DAM PLAN VIEW




COLONIAL DAM
PROFILE

2-YR = 17.71
10-YR = 18.56
100-YR = 19.01

WILLIAMSBURG
ENVIRONMENTAL
GROUP, INC.

*Environmental Consultants*

# Colonial Golf Course
# Irrigation Lake
# Hydrologic/Hydraulic Evaluation
# 5/23/94

DC 006
LAKE 3
SP-112-92
SE Corn.

*516-B South Henry Street Williamsburg, Virginia 23185 (804) 220-6869 FAX (804) 229-4507*

| Basin Characteristics | DA (ac) | CN | Tc (hr) |
|---|---|---|---|
| Pre-development | 35.64 | 72 | 0.75 |
| Post-development Subarea #1 | 13.46 | 74 | 0.75 |
| Post-development Subarea #2 | 3.11 | 98 | 0.1 |
| Post-development Subarea #3 | 17.26 | 74 | 0.75 |
| Post-deveolpment Subarea #4 | 1.81 | 100 | 0.1 |
| | | | |
| Top of Dam | 20 | | |
| Normal Pool Elevation | 17 | | |
| | | | |
| Hydrologic Summary | 2-yr (cfs) | 10-yr (cfs) | 100-yr (cfs) |
| Existing Conditions | 25 | 62 | 113 |
| Post-development Unrouted | 29 | 64 | 108 |
| Post-development Routed | 16 | 28 | 91 |
| | | | |
| Routed Elevations | | | |
| 2-yr Elevation | 17.71 | | |
| 10-yr Elevation | 18.56 | | |
| 100-yr Elevation | 19.01 | | |

# Pre-development Hydrology Computations

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB2PR.HYD

Colonial As-built

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input | Ia/p used |
|---|---|---|---|---|---|---|---|---|
| Upper grass | 35.64 | 72.0 | 0.75 | 0.00 | 3.60 | 1.19 | I.22 | .22 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 35.64 acres or 0.05569 sq.mi
Peak discharge = 25 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Upper grass | 0.75 | 0.00 | ** | ** | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.
* Tc & Tt are available in the hydrograph tables.

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB2PR.HYD

Colonial As-built

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| Upper grass | 25 | 12.7 |
| Composite Watershed | 25 | 12.7 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB2PR.HYD

Colonial As-built

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 0 | 0 | 1 | 1 | 1 | 2 | 4 | 9 | 15 |
| Total (cfs) | 0 | 0 | 1 | 1 | 1 | 2 | 4 | 9 | 15 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 21 | 24 | 25 | 23 | 16 | 12 | 9 | 7 | 6 |
| Total (cfs) | 21 | 24 | 25 | 23 | 16 | 12 | 9 | 7 | 6 |

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 5 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 |
| Total (cfs) | 5 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| Upper grass | 2 | 1 | 1 | 1 | 0 |
| Total (cfs) | 2 | 1 | 1 | 1 | 0 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB2PR.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 0 | 14.8 | 3 |
| 11.1 | 0 | 14.9 | 3 |
| 11.2 | 0 | 15.0 | 3 |
| 11.3 | 0 | 15.1 | 3 |
| 11.4 | 0 | 15.2 | 3 |
| 11.5 | 1 | 15.3 | 3 |
| 11.6 | 1 | 15.4 | 3 |
| 11.7 | 1 | 15.5 | 3 |
| 11.8 | 1 | 15.6 | 3 |
| 11.9 | 1 | 15.7 | 3 |
| 12.0 | 1 | 15.8 | 2 |
| 12.1 | 2 | 15.9 | 2 |
| 12.2 | 4 | 16.0 | 2 |
| 12.3 | 9 | 16.1 | 2 |
| 12.4 | 15 | 16.2 | 2 |
| 12.5 | 21 | 16.3 | 2 |
| 12.6 | 24 | 16.4 | 2 |
| 12.7 | 25 | 16.5 | 2 |
| 12.8 | 23 | 16.6 | 2 |
| 12.9 | 19 | 16.7 | 2 |
| 13.0 | 16 | 16.8 | 2 |
| 13.1 | 14 | 16.9 | 2 |
| 13.2 | 12 | 17.0 | 2 |
| 13.3 | 10 | 17.1 | 2 |
| 13.4 | 9 | 17.2 | 2 |
| 13.5 | 8 | 17.3 | 2 |
| 13.6 | 7 | 17.4 | 2 |
| 13.7 | 6 | 17.5 | 2 |
| 13.8 | 6 | 17.6 | 2 |
| 13.9 | 5 | 17.7 | 2 |
| 14.0 | 5 | 17.8 | 2 |
| 14.1 | 5 | 17.9 | 2 |
| 14.2 | 4 | 18.0 | 2 |
| 14.3 | 4 | 18.1 | 2 |
| 14.4 | 4 | 18.2 | 2 |
| 14.5 | 3 | 18.3 | 2 |

| | | | |
|---|---|---|---|
| 14.6 | 3 | 18.4 | 2 |
| 14.7 | 3 | 18.5 | 2 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB2PR.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 1 | 22.4 | 1 |
| 18.7 | 1 | 22.5 | 1 |
| 18.8 | 1 | 22.6 | 1 |
| 18.9 | 1 | 22.7 | 1 |
| 19.0 | 1 | 22.8 | 1 |
| 19.1 | 1 | 22.9 | 1 |
| 19.2 | 1 | 23.0 | 1 |
| 19.3 | 1 | 23.1 | 1 |
| 19.4 | 1 | 23.2 | 1 |
| 19.5 | 1 | 23.3 | 1 |
| 19.6 | 1 | 23.4 | 1 |
| 19.7 | 1 | 23.5 | 1 |
| 19.8 | 1 | 23.6 | 1 |
| 19.9 | 1 | 23.7 | 1 |
| 20.0 | 1 | 23.8 | 1 |
| 20.1 | 1 | 23.9 | 1 |
| 20.2 | 1 | 24.0 | 1 |
| 20.3 | 1 | 24.1 | 0 |
| 20.4 | 1 | 24.2 | 0 |
| 20.5 | 1 | 24.3 | 0 |
| 20.6 | 1 | 24.4 | 0 |
| 20.7 | 1 | 24.5 | 0 |
| 20.8 | 1 | 24.6 | 0 |
| 20.9 | 1 | 24.7 | 0 |
| 21.0 | 1 | 24.8 | 0 |
| 21.1 | 1 | 24.9 | 0 |
| 21.2 | 1 | 25.0 | 0 |
| 21.3 | 1 | 25.1 | 0 |
| 21.4 | 1 | 25.2 | 0 |
| 21.5 | 1 | 25.3 | 0 |
| 21.6 | 1 | 25.4 | 0 |
| 21.7 | 1 | 25.5 | 0 |
| 21.8 | 1 | 25.6 | 0 |
| 21.9 | 1 | 25.7 | 0 |
| 22.0 | 1 | 25.8 | 0 |
| 22.1 | 1 | 25.9 | 0 |
| 22.2 | 1 | | |
| 22.3 | 1 | | |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB10PR.HYD

Colonial As-built

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| Upper grass | 35.64 | 72.0 | 0.75 | 0.00 | 5.70 | 2.75 | I.14 | .14 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 35.64 acres or 0.05569 sq.mi
Peak discharge = 62 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Upper grass | 0.75 | 0.00 | ** | ** | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB10PR.HYD

Colonial As-built

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| Upper grass | 62 | 12.6 |
| Composite Watershed | 62 | 12.6 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB10PR.HYD

Colonial As-built

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 2 | 2 | 3 | 4 | 6 | 9 | 15 | 26 | 41 |
| Total (cfs) | 2 | 2 | 3 | 4 | 6 | 9 | 15 | 26 | 41 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 55 | 62 | 61 | 55 | 38 | 27 | 19 | 15 | 12 |
| Total (cfs) | 55 | 62 | 61 | 55 | 38 | 27 | 19 | 15 | 12 |

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 10 | 8 | 7 | 6 | 5 | 5 | 4 | 4 | 3 |
| Total (cfs) | 10 | 8 | 7 | 6 | 5 | 5 | 4 | 4 | 3 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| Upper grass | 3 | 3 | 3 | 2 | 0 |
| Total (cfs) | 3 | 3 | 3 | 2 | 0 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB10PR.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 2 | 14.8 | 6 |
| 11.1 | 2 | 14.9 | 6 |
| 11.2 | 2 | 15.0 | 6 |
| 11.3 | 2 | 15.1 | 6 |
| 11.4 | 2 | 15.2 | 6 |
| 11.5 | 3 | 15.3 | 5 |
| 11.6 | 3 | 15.4 | 5 |
| 11.7 | 3 | 15.5 | 5 |
| 11.8 | 4 | 15.6 | 5 |
| 11.9 | 4 | 15.7 | 5 |
| 12.0 | 6 | 15.8 | 5 |
| 12.1 | 9 | 15.9 | 5 |
| 12.2 | 15 | 16.0 | 5 |
| 12.3 | 26 | 16.1 | 5 |
| 12.4 | 41 | 16.2 | 5 |
| 12.5 | 55 | 16.3 | 4 |
| 12.6 | 62 | 16.4 | 4 |
| 12.7 | 61 | 16.5 | 4 |
| 12.8 | 55 | 16.6 | 4 |
| 12.9 | 46 | 16.7 | 4 |
| 13.0 | 38 | 16.8 | 4 |
| 13.1 | 32 | 16.9 | 4 |
| 13.2 | 27 | 17.0 | 4 |
| 13.3 | 23 | 17.1 | 4 |
| 13.4 | 19 | 17.2 | 4 |
| 13.5 | 17 | 17.3 | 3 |
| 13.6 | 15 | 17.4 | 3 |
| 13.7 | 13 | 17.5 | 3 |
| 13.8 | 12 | 17.6 | 3 |
| 13.9 | 11 | 17.7 | 3 |
| 14.0 | 10 | 17.8 | 3 |
| 14.1 | 9 | 17.9 | 3 |
| 14.2 | 9 | 18.0 | 3 |
| 14.3 | 8 | 18.1 | 3 |
| 14.4 | 8 | 18.2 | 3 |
| 14.5 | 7 | 18.3 | 3 |

| | | | |
|---|---|---|---|
| 14.6 | 7 | 18.4 | 3 |
| 14.7 | 7 | 18.5 | 3 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB10PR.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 3 | 22.4 | 2 |
| 18.7 | 3 | 22.5 | 2 |
| 18.8 | 3 | 22.6 | 2 |
| 18.9 | 3 | 22.7 | 2 |
| 19.0 | 3 | 22.8 | 2 |
| 19.1 | 3 | 22.9 | 2 |
| 19.2 | 3 | 23.0 | 2 |
| 19.3 | 3 | 23.1 | 1 |
| 19.4 | 3 | 23.2 | 1 |
| 19.5 | 3 | 23.3 | 1 |
| 19.6 | 3 | 23.4 | 1 |
| 19.7 | 3 | 23.5 | 1 |
| 19.8 | 3 | 23.6 | 1 |
| 19.9 | 3 | 23.7 | 1 |
| 20.0 | 3 | 23.8 | 1 |
| 20.1 | 3 | 23.9 | 1 |
| 20.2 | 3 | 24.0 | 1 |
| 20.3 | 3 | 24.1 | 1 |
| 20.4 | 3 | 24.2 | 1 |
| 20.5 | 3 | 24.3 | 1 |
| 20.6 | 3 | 24.4 | 1 |
| 20.7 | 3 | 24.5 | 1 |
| 20.8 | 3 | 24.6 | 1 |
| 20.9 | 3 | 24.7 | 1 |
| 21.0 | 3 | 24.8 | 1 |
| 21.1 | 2 | 24.9 | 1 |
| 21.2 | 2 | 25.0 | 1 |
| 21.3 | 2 | 25.1 | 0 |
| 21.4 | 2 | 25.2 | 0 |
| 21.5 | 2 | 25.3 | 0 |
| 21.6 | 2 | 25.4 | 0 |
| 21.7 | 2 | 25.5 | 0 |
| 21.8 | 2 | 25.6 | 0 |
| 21.9 | 2 | 25.7 | 0 |
| 22.0 | 2 | 25.8 | 0 |
| 22.1 | 2 | 25.9 | 0 |
| 22.2 | 2 | | |
| 22.3 | 2 | | |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB100PR.HYD

Colonial As-built

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| Upper grass | 35.64 | 72.0 | 0.75 | 0.00 | 8.10 | 4.78 | I.1 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
-- Subarea where user specified interpolation between Ia/p tables.

Total area = 35.64 acres or 0.05569 sq.mi
Peak discharge = 113 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | * Tt (hr) | Rounded Values Tc (hr) | * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Upper grass | 0.75 | 0.00 | ** | ** | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB100PR.HYD

Colonial As-built

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| Upper grass | 113 | 12.6 |
| Composite Watershed | 113 | 12.6 |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB100PR.HYD

Colonial As-built

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 3 | 5 | 6 | 10 | 12 | 18 | 31 | 52 | 78 |
| Total (cfs) | 3 | 5 | 6 | 10 | 12 | 18 | 31 | 52 | 78 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 101 | 113 | 109 | 98 | 67 | 46 | 33 | 25 | 20 |
| Total (cfs) | 101 | 113 | 109 | 98 | 67 | 46 | 33 | 25 | 20 |

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 16 | 13 | 11 | 9 | 8 | 7 | 6 | 6 | 5 |
| Total (cfs) | 16 | 13 | 11 | 9 | 8 | 7 | 6 | 6 | 5 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| Upper grass | 5 | 5 | 4 | 3 | 0 |
| Total (cfs) | 5 | 5 | 4 | 3 | 0 |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB100PR.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 3 | 14.8 | 10 |
| 11.1 | 4 | 14.9 | 9 |
| 11.2 | 4 | 15.0 | 9 |
| 11.3 | 5 | 15.1 | 9 |
| 11.4 | 5 | 15.2 | 9 |
| 11.5 | 6 | 15.3 | 8 |
| 11.6 | 6 | 15.4 | 8 |
| 11.7 | 7 | 15.5 | 8 |
| 11.8 | 9 | 15.6 | 8 |
| 11.9 | 10 | 15.7 | 8 |
| 12.0 | 12 | 15.8 | 7 |
| 12.1 | 18 | 15.9 | 7 |
| 12.2 | 31 | 16.0 | 7 |
| 12.3 | 52 | 16.1 | 7 |
| 12.4 | 78 | 16.2 | 7 |
| 12.5 | 101 | 16.3 | 6 |
| 12.6 | 113 | 16.4 | 6 |
| 12.7 | 109 | 16.5 | 6 |
| 12.8 | 98 | 16.6 | 6 |
| 12.9 | 82 | 16.7 | 6 |
| 13.0 | 67 | 16.8 | 6 |
| 13.1 | 56 | 16.9 | 6 |
| 13.2 | 46 | 17.0 | 6 |
| 13.3 | 39 | 17.1 | 6 |
| 13.4 | 33 | 17.2 | 6 |
| 13.5 | 29 | 17.3 | 5 |
| 13.6 | 25 | 17.4 | 5 |
| 13.7 | 22 | 17.5 | 5 |
| 13.8 | 20 | 17.6 | 5 |
| 13.9 | 18 | 17.7 | 5 |
| 14.0 | 16 | 17.8 | 5 |
| 14.1 | 15 | 17.9 | 5 |
| 14.2 | 14 | 18.0 | 5 |
| 14.3 | 13 | 18.1 | 5 |
| 14.4 | 12 | 18.2 | 5 |
| 14.5 | 12 | 18.3 | 5 |

| | | | |
|---|---|---|---|
| 14.6 | 11 | 18.4 | 5 |
| 14.7 | 10 | 18.5 | 5 |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:43:06
Watershed file: --> COLABPR .MOP
Hydrograph file: --> CAB100PR.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 5 | 22.4 | 3 |
| 18.7 | 5 | 22.5 | 3 |
| 18.8 | 5 | 22.6 | 3 |
| 18.9 | 5 | 22.7 | 2 |
| 19.0 | 5 | 22.8 | 2 |
| 19.1 | 5 | 22.9 | 2 |
| 19.2 | 5 | 23.0 | 2 |
| 19.3 | 5 | 23.1 | 2 |
| 19.4 | 5 | 23.2 | 2 |
| 19.5 | 5 | 23.3 | 2 |
| 19.6 | 4 | 23.4 | 2 |
| 19.7 | 4 | 23.5 | 2 |
| 19.8 | 4 | 23.6 | 2 |
| 19.9 | 4 | 23.7 | 2 |
| 20.0 | 4 | 23.8 | 2 |
| 20.1 | 4 | 23.9 | 2 |
| 20.2 | 4 | 24.0 | 2 |
| 20.3 | 4 | 24.1 | 1 |
| 20.4 | 4 | 24.2 | 1 |
| 20.5 | 4 | 24.3 | 1 |
| 20.6 | 4 | 24.4 | 1 |
| 20.7 | 4 | 24.5 | 1 |
| 20.8 | 4 | 24.6 | 1 |
| 20.9 | 4 | 24.7 | 1 |
| 21.0 | 4 | 24.8 | 1 |
| 21.1 | 3 | 24.9 | 1 |
| 21.2 | 3 | 25.0 | 1 |
| 21.3 | 3 | 25.1 | 1 |
| 21.4 | 3 | 25.2 | 1 |
| 21.5 | 3 | 25.3 | 1 |
| 21.6 | 3 | 25.4 | 0 |
| 21.7 | 3 | 25.5 | 0 |
| 21.8 | 3 | 25.6 | 0 |
| 21.9 | 3 | 25.7 | 0 |
| 22.0 | 3 | 25.8 | 0 |
| 22.1 | 3 | 25.9 | 0 |
| 22.2 | 3 | | |
| 22.3 | 3 | | |

# Post-development Hydrology Computations

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB2.HYD

Colonial As-built

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| Upper grass | 13.46 | 74.0 | 0.75 | 0.00 | 3.60 | 1.31 | I.2 | .20 |
| Pavement | 3.11 | 98.0 | 0.10 | 0.00 | 3.60 | 3.37 | I.01 | .10 |
| Lower grass | 17.26 | 74.0 | 0.75 | 0.00 | 3.60 | 1.31 | I.2 | .20 |
| Lake | 1.81 | %100.0 | 0.10 | 0.00 | 3.60 | 3.60 | I0 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 35.64 acres or 0.05569 sq.mi
Peak discharge = 29 cfs

WARNING: Drainage areas of two or more subareas differ by a factor of 5 or greater.

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Upper grass | 0.75 | 0.00 | ** | ** | Yes | -- |
| Pavement | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |
| Lower grass | 0.75 | 0.00 | ** | ** | Yes | -- |
| Lake | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.
* Tc & Tt are available in the hydrograph tables.

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB2.HYD

Colonial As-built

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| Upper grass | 10 | 12.6 |
| Pavement | 17 | 12.1 |
| Lower grass | 13 | 12.6 |
| Lake | 10 | 12.1 |
| Composite Watershed | 29 | 12.1 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB2.HYD

Colonial As-built

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 4 | 6 |
| Pavement | 0 | 1 | 1 | 5 | 11 | 17 | 10 | 4 | 2 |
| Lower grass | 0 | 0 | 0 | 1 | 1 | 1 | 3 | 5 | 8 |
| Lake | 0 | 0 | 1 | 3 | 7 | 10 | 6 | 2 | 1 |
| Total (cfs) | 0 | 1 | 2 | 9 | 20 | 29 | 21 | 15 | 17 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 9 | 10 | 10 | 10 | 7 | 5 | 4 | 3 | 2 |
| Pavement | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Lower grass | 11 | 13 | 13 | 12 | 9 | 6 | 5 | 4 | 3 |
| Lake | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| Total (cfs) | 23 | 26 | 25 | 24 | 18 | 13 | 11 | 8 | 6 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB2.HYD

Colonial As-built

Composite Hydrograph Summary (cfs)

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Pavement | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lower grass | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Lake | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total (cfs) | 5 | 5 | 4 | 2 | 2 | 2 | 2 | 2 | 2 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| Upper grass | 1 | 1 | 1 | 0 | 0 |
| Pavement | 0 | 0 | 0 | 0 | 0 |
| Lower grass | 1 | 1 | 1 | 1 | 0 |
| Lake | 0 | 0 | 0 | 0 | 0 |
| Total (cfs) | 2 | 2 | 2 | 1 | 0 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB2.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 0 | 14.8 | 3 |
| 11.1 | 0 | 14.9 | 2 |
| 11.2 | 1 | 15.0 | 2 |
| 11.3 | 1 | 15.1 | 2 |
| 11.4 | 1 | 15.2 | 2 |
| 11.5 | 2 | 15.3 | 2 |
| 11.6 | 2 | 15.4 | 2 |
| 11.7 | 4 | 15.5 | 2 |
| 11.8 | 7 | 15.6 | 2 |
| 11.9 | 9 | 15.7 | 2 |
| 12.0 | 20 | 15.8 | 2 |
| 12.1 | 29 | 15.9 | 2 |
| 12.2 | 21 | 16.0 | 2 |
| 12.3 | 15 | 16.1 | 2 |
| 12.4 | 17 | 16.2 | 2 |
| 12.5 | 23 | 16.3 | 2 |
| 12.6 | 26 | 16.4 | 2 |
| 12.7 | 25 | 16.5 | 2 |
| 12.8 | 24 | 16.6 | 2 |
| 12.9 | 21 | 16.7 | 2 |
| 13.0 | 18 | 16.8 | 2 |
| 13.1 | 15 | 16.9 | 2 |
| 13.2 | 13 | 17.0 | 2 |
| 13.3 | 12 | 17.1 | 2 |
| 13.4 | 11 | 17.2 | 2 |
| 13.5 | 10 | 17.3 | 2 |
| 13.6 | 8 | 17.4 | 2 |
| 13.7 | 7 | 17.5 | 2 |
| 13.8 | 6 | 17.6 | 2 |
| 13.9 | 5 | 17.7 | 2 |
| 14.0 | 5 | 17.8 | 2 |
| 14.1 | 5 | 17.9 | 2 |
| 14.2 | 5 | 18.0 | 2 |
| 14.3 | 5 | 18.1 | 2 |
| 14.4 | 5 | 18.2 | 2 |
| 14.5 | 4 | 18.3 | 2 |

| | | | |
|---|---|---|---|
| 14.6 | 4 | 18.4 | 2 |
| 14.7 | 3 | 18.5 | 2 |

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB2.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 2 | 22.4 | 1 |
| 18.7 | 2 | 22.5 | 1 |
| 18.8 | 2 | 22.6 | 1 |
| 18.9 | 2 | 22.7 | 1 |
| 19.0 | 2 | 22.8 | 1 |
| 19.1 | 2 | 22.9 | 1 |
| 19.2 | 2 | 23.0 | 1 |
| 19.3 | 2 | 23.1 | 1 |
| 19.4 | 2 | 23.2 | 1 |
| 19.5 | 2 | 23.3 | 1 |
| 19.6 | 2 | 23.4 | 1 |
| 19.7 | 2 | 23.5 | 1 |
| 19.8 | 2 | 23.6 | 1 |
| 19.9 | 2 | 23.7 | 1 |
| 20.0 | 2 | 23.8 | 1 |
| 20.1 | 2 | 23.9 | 1 |
| 20.2 | 2 | 24.0 | 1 |
| 20.3 | 2 | 24.1 | 0 |
| 20.4 | 2 | 24.2 | 0 |
| 20.5 | 2 | 24.3 | 0 |
| 20.6 | 2 | 24.4 | 0 |
| 20.7 | 2 | 24.5 | 0 |
| 20.8 | 2 | 24.6 | 0 |
| 20.9 | 2 | 24.7 | 0 |
| 21.0 | 2 | 24.8 | 0 |
| 21.1 | 1 | 24.9 | 0 |
| 21.2 | 1 | 25.0 | 0 |
| 21.3 | 1 | 25.1 | 0 |
| 21.4 | 1 | 25.2 | 0 |
| 21.5 | 1 | 25.3 | 0 |
| 21.6 | 1 | 25.4 | 0 |
| 21.7 | 1 | 25.5 | 0 |
| 21.8 | 1 | 25.6 | 0 |
| 21.9 | 1 | 25.7 | 0 |
| 22.0 | 1 | 25.8 | 0 |
| 22.1 | 1 | 25.9 | 0 |
| 22.2 | 1 | | |
| 22.3 | 1 | | |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB10.HYD

Colonial As-built

>>>> Input Parameters Used to Compute Hydrograph <<<<.

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used |
|---|---|---|---|---|---|---|---|
| pper grass | 13.46 | 74.0 | 0.75 | 0.00 | 5.70 | 2.93 | I.12 .12 |
| avement | 3.11 | 98.0 | 0.10 | 0.00 | 5.70 | 5.46 | I.01 .10 |
| Lower grass | 17.26 | 74.0 | 0.75 | 0.00 | 5.70 | 2.93 | I.12 .12 |
| ake | 1.81 | %100.0 | 0.10 | 0.00 | 5.70 | 5.70 | I0 .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 35.64 acres or 0.05569 sq.mi
Peak discharge = 64 cfs

WARNING: Drainage areas of two or more subareas differ by a factor of 5 or greater.

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea escription | Input Values Tc (hr) | * Tt (hr) | Rounded Values Tc (hr) | * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Upper grass | 0.75 | 0.00 | ** | ** | Yes | -- |
| Pavement | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |
| Lower grass | 0.75 | 0.00 | ** | ** | Yes | -- |
| Lake | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |

Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB10.HYD

Colonial As-built

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| Upper grass | 26 | 12.6 |
| Pavement | 27 | 12.1 |
| Lower grass | 33 | 12.6 |
| Lake | 16 | 12.1 |
| Composite Watershed | 64 | 12.6 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB10.HYD

Colonial As-built

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 1 | 1 | 1 | 2 | 3 | 4 | 7 | 11 | 17 |
| Pavement | 1 | 1 | 1 | 9 | 17 | 27 | 17 | 6 | 4 |
| Lower grass | 1 | 1 | 2 | 3 | 3 | 5 | 8 | 14 | 22 |
| Lake | 0 | 1 | 1 | 5 | 10 | 16 | 10 | 3 | 2 |
| Total (cfs) | 3 | 4 | 5 | 19 | 33 | 52 | 42 | 34 | 45 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 23 | 26 | 25 | 22 | 15 | 11 | 8 | 6 | 5 |
| Pavement | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 |
| Lower grass | 29 | 33 | 32 | 29 | 20 | 14 | 10 | 7 | 6 |
| Lake | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Total (cfs) | 57 | 64 | 60 | 54 | 38 | 28 | 20 | 15 | 13 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB10.HYD

Colonial As-built

Composite Hydrograph Summary (cfs)

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 4 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1 |
| Pavement | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Lower grass | 5 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 |
| Lake | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total (cfs) | 11 | 9 | 8 | 6 | 6 | 5 | 5 | 4 | 4 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| Upper grass | 1 | 1 | 1 | 1 | 0 |
| Pavement | 0 | 0 | 0 | 0 | 0 |
| Lower grass | 2 | 1 | 1 | 1 | 0 |
| Lake | 0 | 0 | 0 | 0 | 0 |
| Total (cfs) | 3 | 2 | 2 | 2 | 0 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB10.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 3 | 14.8 | 7 |
| 11.1 | 3 | 14.9 | 6 |
| 11.2 | 4 | 15.0 | 6 |
| 11.3 | 4 | 15.1 | 6 |
| 11.4 | 4 | 15.2 | 6 |
| 11.5 | 5 | 15.3 | 6 |
| 11.6 | 5 | 15.4 | 6 |
| 11.7 | 10 | 15.5 | 6 |
| 11.8 | 14 | 15.6 | 6 |
| 11.9 | 19 | 15.7 | 6 |
| 12.0 | 33 | 15.8 | 5 |
| 12.1 | 52 | 15.9 | 5 |
| 12.2 | 42 | 16.0 | 5 |
| 12.3 | 34 | 16.1 | 5 |
| 12.4 | 45 | 16.2 | 5 |
| 12.5 | 57 | 16.3 | 5 |
| 12.6 | 64 | 16.4 | 5 |
| 12.7 | 60 | 16.5 | 5 |
| 12.8 | 54 | 16.6 | 5 |
| 12.9 | 46 | 16.7 | 5 |
| 13.0 | 38 | 16.8 | 4 |
| 13.1 | 33 | 16.9 | 4 |
| 13.2 | 28 | 17.0 | 4 |
| 13.3 | 24 | 17.1 | 4 |
| 13.4 | 20 | 17.2 | 4 |
| 13.5 | 18 | 17.3 | 4 |
| 13.6 | 15 | 17.4 | 4 |
| 13.7 | 14 | 17.5 | 4 |
| 13.8 | 13 | 17.6 | 4 |
| 13.9 | 12 | 17.7 | 4 |
| 14.0 | 11 | 17.8 | 3 |
| 14.1 | 10 | 17.9 | 3 |
| 14.2 | 10 | 18.0 | 3 |
| 14.3 | 9 | 18.1 | 3 |
| 14.4 | 9 | 18.2 | 3 |
| 14.5 | 8 | 18.3 | 3 |

| | | | |
|---|---|---|---|
| 14.6 | 8 | 18.4 | 3 |
| 14.7 | 7 | 18.5 | 3 |

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB10.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 2 | 22.4 | 2 |
| 18.7 | 2 | 22.5 | 2 |
| 18.8 | 2 | 22.6 | 2 |
| 18.9 | 2 | 22.7 | 2 |
| 19.0 | 2 | 22.8 | 2 |
| 19.1 | 2 | 22.9 | 2 |
| 19.2 | 2 | 23.0 | 2 |
| 19.3 | 2 | 23.1 | 1 |
| 19.4 | 2 | 23.2 | 1 |
| 19.5 | 2 | 23.3 | 1 |
| 19.6 | 2 | 23.4 | 1 |
| 19.7 | 2 | 23.5 | 1 |
| 19.8 | 2 | 23.6 | 1 |
| 19.9 | 2 | 23.7 | 1 |
| 20.0 | 2 | 23.8 | 1 |
| 20.1 | 2 | 23.9 | 1 |
| 20.2 | 2 | 24.0 | 1 |
| 20.3 | 2 | 24.1 | 1 |
| 20.4 | 2 | 24.2 | 1 |
| 20.5 | 2 | 24.3 | 1 |
| 20.6 | 2 | 24.4 | 1 |
| 20.7 | 2 | 24.5 | 1 |
| 20.8 | 2 | 24.6 | 1 |
| 20.9 | 2 | 24.7 | 1 |
| 21.0 | 2 | 24.8 | 1 |
| 21.1 | 2 | 24.9 | 1 |
| 21.2 | 2 | 25.0 | 1 |
| 21.3 | 2 | 25.1 | 0 |
| 21.4 | 2 | 25.2 | 0 |
| 21.5 | 2 | 25.3 | 0 |
| 21.6 | 2 | 25.4 | 0 |
| 21.7 | 2 | 25.5 | 0 |
| 21.8 | 2 | 25.6 | 0 |
| 21.9 | 2 | 25.7 | 0 |
| 22.0 | 2 | 25.8 | 0 |
| 22.1 | 2 | 25.9 | 0 |
| 22.2 | 2 | | |
| 22.3 | 2 | | |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB100.HYD

Colonial As-built

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| Upper grass | 13.46 | 74.0 | 0.75 | 0.00 | 8.10 | 5.02 | I.09 | .10 |
| Pavement | 3.11 | 98.0 | 0.10 | 0.00 | 8.10 | 7.86 | I.01 | .10 |
| Lower grass | 17.26 | 74.0 | 0.75 | 0.00 | 8.10 | 5.02 | I.09 | .10 |
| Lake | 1.81 | %100.0 | 0.10 | 0.00 | 8.10 | 8.10 | I0 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 35.64 acres or 0.05569 sq.mi
Peak discharge = 108 cfs

WARNING: Drainage areas of two or more subareas differ by a factor of 5 or greater.

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Upper grass | 0.75 | 0.00 | ** | ** | No | Computed Ia/p < .1 |
| Pavement | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |
| Lower grass | 0.75 | 0.00 | ** | ** | No | Computed Ia/p < .1 |
| Lake | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB100.HYD

Colonial As-built

>>>> Summary of Subarea Times to Peak <<<<

| Subarea | Peak Discharge at Composite Outfall (cfs) | Time to Peak at Composite Outfall (hrs) |
|---|---|---|
| Upper grass | 45 | 12.6 |
| Pavement | 39 | 12.1 |
| Lower grass | 57 | 12.6 |
| Lake | 23 | 12.1 |
| Composite Watershed | 108 | 12.6 |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB100.HYD

Colonial As-built

Composite Hydrograph Summary (cfs)

| Subarea Description | 11.0 hr | 11.3 hr | 11.6 hr | 11.9 hr | 12.0 hr | 12.1 hr | 12.2 hr | 12.3 hr | 12.4 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 1 | 2 | 3 | 4 | 5 | 7 | 12 | 20 | 31 |
| Pavement | 1 | 1 | 2 | 13 | 25 | 39 | 24 | 8 | 6 |
| Lower grass | 2 | 2 | 3 | 5 | 6 | 9 | 16 | 26 | 40 |
| Lake | 1 | 1 | 1 | 8 | 15 | 23 | 14 | 5 | 3 |
| Total (cfs) | 5 | 6 | 9 | 30 | 51 | 78 | 66 | 59 | 80 |

| Subarea Description | 12.5 hr | 12.6 hr | 12.7 hr | 12.8 hr | 13.0 hr | 13.2 hr | 13.4 hr | 13.6 hr | 13.8 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 40 | 45 | 43 | 39 | 27 | 18 | 13 | 10 | 8 |
| Pavement | 5 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 2 |
| Lower grass | 51 | 57 | 56 | 50 | 34 | 23 | 17 | 13 | 10 |
| Lake | 3 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| Total (cfs) | 99 | 108 | 104 | 94 | 66 | 44 | 33 | 26 | 21 |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB100.HYD

Colonial As-built

Composite Hydrograph Summary (cfs)

| Subarea Description | 14.0 hr | 14.3 hr | 14.6 hr | 15.0 hr | 15.5 hr | 16.0 hr | 16.5 hr | 17.0 hr | 17.5 hr |
|---|---|---|---|---|---|---|---|---|---|
| Upper grass | 6 | 5 | 4 | 4 | 3 | 3 | 3 | 2 | 2 |
| Pavement | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Lower grass | 8 | 7 | 6 | 5 | 4 | 4 | 3 | 3 | 3 |
| Lake | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| Total (cfs) | 16 | 14 | 12 | 11 | 9 | 9 | 7 | 6 | 6 |

| Subarea Description | 18.0 hr | 19.0 hr | 20.0 hr | 22.0 hr | 26.0 hr |
|---|---|---|---|---|---|
| Upper grass | 2 | 2 | 2 | 1 | 0 |
| Pavement | 1 | 1 | 0 | 0 | 0 |
| Lower grass | 3 | 2 | 2 | 2 | 0 |
| Lake | 0 | 0 | 0 | 0 | 0 |
| Total (cfs) | 6 | 5 | 4 | 3 | 0 |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB100.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 11.0 | 5 | 14.8 | 11 |
| 11.1 | 5 | 14.9 | 11 |
| 11.2 | 6 | 15.0 | 11 |
| 11.3 | 6 | 15.1 | 11 |
| 11.4 | 7 | 15.2 | 10 |
| 11.5 | 8 | 15.3 | 10 |
| 11.6 | 9 | 15.4 | 9 |
| 11.7 | 16 | 15.5 | 9 |
| 11.8 | 23 | 15.6 | 9 |
| 11.9 | 30 | 15.7 | 9 |
| 12.0 | 51 | 15.8 | 9 |
| 12.1 | 78 | 15.9 | 9 |
| 12.2 | 66 | 16.0 | 9 |
| 12.3 | 59 | 16.1 | 9 |
| 12.4 | 80 | 16.2 | 8 |
| 12.5 | 99 | 16.3 | 8 |
| 12.6 | 108 | 16.4 | 7 |
| 12.7 | 104 | 16.5 | 7 |
| 12.8 | 94 | 16.6 | 7 |
| 12.9 | 80 | 16.7 | 7 |
| 13.0 | 66 | 16.8 | 6 |
| 13.1 | 55 | 16.9 | 6 |
| 13.2 | 44 | 17.0 | 6 |
| 13.3 | 38 | 17.1 | 6 |
| 13.4 | 33 | 17.2 | 6 |
| 13.5 | 30 | 17.3 | 6 |
| 13.6 | 26 | 17.4 | 6 |
| 13.7 | 23 | 17.5 | 6 |
| 13.8 | 21 | 17.6 | 6 |
| 13.9 | 18 | 17.7 | 6 |
| 14.0 | 16 | 17.8 | 6 |
| 14.1 | 15 | 17.9 | 6 |
| 14.2 | 15 | 18.0 | 6 |
| 14.3 | 14 | 18.1 | 6 |
| 14.4 | 13 | 18.2 | 6 |
| 14.5 | 13 | 18.3 | 6 |

| | | | |
|---|---|---|---|
| 14.6 | 12 | 18.4 | 6 |
| 14.7 | 12 | 18.5 | 6 |

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 05-22-1994 15:12:40
Watershed file: --> COLAB .MOP
Hydrograph file: --> CAB100.HYD

Colonial As-built

| Time (hrs) | Flow (cfs) | Time (hrs) | Flow (cfs) |
|---|---|---|---|
| 18.6 | 5 | 22.4 | 3 |
| 18.7 | 5 | 22.5 | 3 |
| 18.8 | 5 | 22.6 | 3 |
| 18.9 | 5 | 22.7 | 2 |
| 19.0 | 5 | 22.8 | 2 |
| 19.1 | 5 | 22.9 | 2 |
| 19.2 | 5 | 23.0 | 2 |
| 19.3 | 5 | 23.1 | 2 |
| 19.4 | 5 | 23.2 | 2 |
| 19.5 | 5 | 23.3 | 2 |
| 19.6 | 4 | 23.4 | 2 |
| 19.7 | 4 | 23.5 | 2 |
| 19.8 | 4 | 23.6 | 2 |
| 19.9 | 4 | 23.7 | 2 |
| 20.0 | 4 | 23.8 | 2 |
| 20.1 | 4 | 23.9 | 2 |
| 20.2 | 4 | 24.0 | 2 |
| 20.3 | 4 | 24.1 | 1 |
| 20.4 | 4 | 24.2 | 1 |
| 20.5 | 4 | 24.3 | 1 |
| 20.6 | 4 | 24.4 | 1 |
| 20.7 | 4 | 24.5 | 1 |
| 20.8 | 4 | 24.6 | 1 |
| 20.9 | 4 | 24.7 | 1 |
| 21.0 | 4 | 24.8 | 1 |
| 21.1 | 3 | 24.9 | 1 |
| 21.2 | 3 | 25.0 | 1 |
| 21.3 | 3 | 25.1 | 1 |
| 21.4 | 3 | 25.2 | 1 |
| 21.5 | 3 | 25.3 | 1 |
| 21.6 | 3 | 25.4 | 0 |
| 21.7 | 3 | 25.5 | 0 |
| 21.8 | 3 | 25.6 | 0 |
| 21.9 | 3 | 25.7 | 0 |
| 22.0 | 3 | 25.8 | 0 |
| 22.1 | 3 | 25.9 | 0 |
| 22.2 | 3 | | |
| 22.3 | 3 | | |

# Post-development Outlet Structure Computations

POND-2 Version: 5.15
S/N: 1295100016

Colonial
Pond Asbuilts

CALCULATED 05-22-1994 15:28:46
DISK FILE: COLAB .VOL

Planimeter scale: 1 inch = 1 ft.

| Elevation (ft) | Planimeter (sq.in.) | Area (acres) | A1+A2+sqr(A1*A2) (acres) | * Volume (acre-ft) | Volume Sum (acre-ft) |
|---|---|---|---|---|---|
| 17.00 | 78,843.00 | 1.81 | 0.00 | 0.00 | 0.00 |
| 20.00 | 101,930.00 | 2.34 | 6.21 | 6.21 | 6.21 |

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

Outlet Structure File: COLAB .STR

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

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

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 17.00 | 0.0 | 1 |
| 17.20 | 0.6 | 1 |
| 17.40 | 1.0 | 1 |
| 17.60 | 1.3 | 1 |
| 17.80 | 1.5 | 1 |
| 18.00 | 1.6 | 1 +4 |
| 18.20 | 22.6 | 1 +4 |
| 18.40 | 60.9 | 1 +4 |
| 18.60 | 110.2 | 1 +4 |
| 18.80 | 168.6 | 1 +4 |
| 19.00 | 234.8 | 1 +4 |
| 19.20 | 307.8 | 1 +4 |
| 19.40 | 387.1 | 1 +4 |
| 19.60 | 472.3 | 1 +4 |
| 19.80 | 562.8 | 1 +4 |
| 20.00 | 658.4 | 1 +4 |

Outlet Structure File: COLAB .STR

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

Outlet Structure File: COLAB .STR
Planimeter Input File: COLAB .VOL
Rating Table Output File: COLAB .PND

Min. Elev.(ft) = 17 Max. Elev.(ft) = 20 Incr.(ft) = .2

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

**********
SYSTEM CONNECTIVITY
**********

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

Outflow rating table summary was stored in file:
COLAB .PND

Outlet Structure File: COLAB .STR

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

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

STAND PIPE
Stand Pipe with weir or orifice flow

E1 elev.(ft)? 17
E2 elev.(ft)? 20.001
Crest elev.(ft)? 17
Diameter (ft)? .66 - 8" pipe (riser)
Weir coefficient? 3.33
Orifice coefficient? .6
Start transition elev.(ft) @ ?
Transition height (ft)?

Outlet Structure File: COLAB .STR

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

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

CULVERT-CR
Circular Culvert (With Inlet Control)

| | |
|---|---|
| E1 elev.(ft)? | 5 |
| E2 elev.(ft)? | 20.001 |
| Diam. (ft)? | .66 - 8" barrel |
| Inv. el.(ft)? | 5 |
| Slope (ft/ft)? | .01 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | -.5 |

VOID

Outlet Structure File: COLAB .STR

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

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

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)? 18
E2 elev.(ft)? 20.001 Rect weir
Weir coefficient? 3.33
Weir elev.(ft)? 18
Length (ft)? 70
Contracted/Suppressed (C/S)? C

VOID

Outlet Structure File: COLAB .STR

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

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

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

| Elevation (ft) | Q (cfs) | Computation | Messages |
|---|---|---|---|
| 17.00 | 0.0 | Weir: | H =0.0 |
| 17.20 | 0.6 | Weir: | H =.2 |
| 17.40 | 1.0 | Orifice: | H =.4 |
| 17.60 | 1.3 | Orifice: | H =.6 |
| 17.80 | 1.5 | Orifice: | H =.8 |
| 18.00 | 1.6 | Orifice: | H =1.0 |
| 18.20 | 1.8 | Orifice: | H =1.2 |
| 18.40 | 1.9 | Orifice: | H =1.4 |
| 18.60 | 2.1 | Orifice: | H =1.6 |
| 18.80 | 2.2 | Orifice: | H =1.8 |
| 19.00 | 2.3 | Orifice: | H =2.0 |
| 19.20 | 2.4 | Orifice: | H =2.2 |
| 19.40 | 2.6 | Orifice: | H =2.4 |
| 19.60 | 2.7 | Orifice: | H =2.6 |
| 19.80 | 2.8 | Orifice: | H =2.8 |
| 20.00 | 2.9 | Orifice: | H =3.0 |

Weir Cw = 3.33 Weir length = 2.073452 ft
Orifice Co = .6 Orifice area = .3421195 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 17.23858 ft

VOID

Outlet Structure File: COLAB .STR

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

Outflow Rating Table for Structure #2
CULVERT-CR Circular Culvert (With Inlet Control)

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 17.00 | 5.8 | Submerged: HW =12.0 |
| 17.20 | 5.9 | Submerged: HW =12.2 |
| 17.40 | 5.9 | Submerged: HW =12.4 |
| 17.60 | 6.0 | Submerged: HW =12.6 |
| 17.80 | 6.0 | Submerged: HW =12.8 |
| 18.00 | 6.1 | Submerged: HW =13.0 |
| 18.20 | 6.1 | Submerged: HW =13.2 |
| 18.40 | 6.2 | Submerged: HW =13.4 |
| 18.60 | 6.2 | Submerged: HW =13.6 |
| 18.80 | 6.3 | Submerged: HW =13.8 |
| 19.00 | 6.3 | Submerged: HW =14.0 |
| 19.20 | 6.4 | Submerged: HW =14.2 |
| 19.40 | 6.4 | Submerged: HW =14.4 |
| 19.60 | 6.5 | Submerged: HW =14.6 |
| 19.80 | 6.5 | Submerged: HW =14.8 |
| 20.00 | 6.5 | Submerged: HW =15.0 |

Used Unsubmerged Equ. Form (1) for elev. less than 5.77 ft
Used Submerged Equation for elevations greater than 5.86 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=5.77 ft; Q1=.97 cfs; Dc=.47 ft; E2=5.86 ft; Q2=1.11 cfs

VOID

Outlet Structure File: COLAB .STR

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

Outflow Rating Table for Structure #4
WEIR-VR Weir - Vertical Rectangular

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 17.00 | 0.0 | E < Inv.El.= 18 |
| 17.20 | 0.0 | E < Inv.El.= 18 |
| 17.40 | 0.0 | E < Inv.El.= 18 |
| 17.60 | 0.0 | E < Inv.El.= 18 |
| 17.80 | 0.0 | E < Inv.El.= 18 |
| 18.00 | 0.0 | H =0.0 |
| 18.20 | 20.8 | H =.2 |
| 18.40 | 58.9 | H =.4 |
| 18.60 | 108.1 | H =.6 |
| 18.80 | 166.4 | H =.8 |
| 19.00 | 232.4 | H =1.0 |
| 19.20 | 305.4 | H =1.2 |
| 19.40 | 384.6 | H =1.4 |
| 19.60 | 469.6 | H =1.6 |
| 19.80 | 560.0 | H =1.8 |
| 20.00 | 655.5 | H =2.0 |

C = 3.33 L (ft) = 70
H (ft) = Table elev. - Invert elev. ( 18 ft )
Q (cfs) = C * (L-.2H) * (H**1.5) -- Contracted Weir

VOID

Outlet Structure File: COLAB .STR

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

Outflow Rating Table 3
Table 3 = 1 ? 2

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 17.00 | 0.0 | 1 |
| 17.20 | 0.6 | 1 |
| 17.40 | 1.0 | 1 |
| 17.60 | 1.3 | 1 |
| 17.80 | 1.5 | 1 |
| 18.00 | 1.6 | 1 |
| 18.20 | 1.8 | 1 |
| 18.40 | 1.9 | 1 |
| 18.60 | 2.1 | 1 |
| 18.80 | 2.2 | 1 |
| 19.00 | 2.3 | 1 |
| 19.20 | 2.4 | 1 |
| 19.40 | 2.6 | 1 |
| 19.60 | 2.7 | 1 |
| 19.80 | 2.8 | 1 |
| 20.00 | 2.9 | 1 |

# Post-development Stormwater Routings

Inflow Hydrograph: CAB2 .HYD
Rating Table file: COLAB3 .PND

----INITIAL CONDITIONS----
Elevation = 17.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 17.00 | 0.0 | 0.000 |
| 17.20 | 2.3 | 0.365 |
| 17.40 | 6.6 | 0.737 |
| 17.60 | 12.2 | 1.116 |
| 17.80 | 18.7 | 1.502 |
| 18.00 | 23.6 | 1.894 |
| 18.20 | 25.9 | 2.293 |
| 18.40 | 27.6 | 2.699 |
| 18.60 | 28.5 | 3.113 |
| 18.80 | 50.2 | 3.533 |
| 19.00 | 89.0 | 3.961 |
| 19.20 | 139.1 | 4.396 |
| 19.40 | 198.2 | 4.838 |
| 19.60 | 265.0 | 5.287 |
| 19.80 | 338.7 | 5.744 |
| 20.00 | 384.6 | 6.208 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 0.0 | 0.0 |
| 88.4 | 90.7 |
| 178.4 | 185.0 |
| 270.1 | 282.3 |
| 363.4 | 382.1 |
| 458.3 | 481.9 |
| 555.0 | 580.9 |
| 653.3 | 680.9 |
| 753.3 | 781.8 |
| 855.0 | 905.2 |
| 958.5 | 1047.5 |
| 1063.7 | 1202.8 |
| 1170.7 | 1368.9 |
| 1279.4 | 1544.4 |
| 1390.0 | 1728.7 |
| 1502.3 | 1886.9 |

Time increment (t) = 0.100 hrs.

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

Pond File: COLAB3 .PND
Inflow Hydrograph: CAB2 .HYD
Outflow Hydrograph: CAB20 .HYD

Starting Pond W.S. Elevation = 17.00 ft

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

Peak Inflow = 29.00 cfs
Peak Outflow = 15.89 cfs
Peak Elevation = 17.71 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 1.34 ac-ft
---
Total Storage in Pond = 1.34 ac-ft

Inflow Hydrograph: CAB10 .HYD
Rating Table file: COLAB3 .PND

----INITIAL CONDITIONS----
Elevation = 17.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 17.00 | 0.0 | 0.000 | 0.0 | 0.0 |
| 17.20 | 2.3 | 0.365 | 88.4 | 90.7 |
| 17.40 | 6.6 | 0.737 | 178.4 | 185.0 |
| 17.60 | 12.2 | 1.116 | 270.1 | 282.3 |
| 17.80 | 18.7 | 1.502 | 363.4 | 382.1 |
| 18.00 | 23.6 | 1.894 | 458.3 | 481.9 |
| 18.20 | 25.9 | 2.293 | 555.0 | 580.9 |
| 18.40 | 27.6 | 2.699 | 653.3 | 680.9 |
| 18.60 | 28.5 | 3.113 | 753.3 | 781.8 |
| 18.80 | 50.2 | 3.533 | 855.0 | 905.2 |
| 19.00 | 89.0 | 3.961 | 958.5 | 1047.5 |
| 19.20 | 139.1 | 4.396 | 1063.7 | 1202.8 |
| 19.40 | 198.2 | 4.838 | 1170.7 | 1368.9 |
| 19.60 | 265.0 | 5.287 | 1279.4 | 1544.4 |
| 19.80 | 338.7 | 5.744 | 1390.0 | 1728.7 |
| 20.00 | 384.6 | 6.208 | 1502.3 | 1886.9 |

Time increment (t) = 0.100 hrs.

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

Pond File: COLAB3 .PND
Inflow Hydrograph: CAB10 .HYD
Outflow Hydrograph: CAB10O .HYD

Starting Pond W.S. Elevation = 17.00 ft

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

Peak Inflow = 64.00 cfs
Peak Outflow = 28.34 cfs
Peak Elevation = 18.56 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 3.04 ac-ft
---
Total Storage in Pond = 3.04 ac-ft

Warning: Inflow hydrograph truncated on left side.

Inflow Hydrograph: CAB100 .HYD
Rating Table file: COLAB3 .PND

----INITIAL CONDITIONS----
Elevation = 17.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

| GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
|---|---|---|---|---|
| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) | 2S/t (cfs) | 2S/t + O (cfs) |
| 17.00 | 0.0 | 0.000 | 0.0 | 0.0 |
| 17.20 | 2.3 | 0.365 | 88.4 | 90.7 |
| 17.40 | 6.6 | 0.737 | 178.4 | 185.0 |
| 17.60 | 12.2 | 1.116 | 270.1 | 282.3 |
| 17.80 | 18.7 | 1.502 | 363.4 | 382.1 |
| 18.00 | 23.6 | 1.894 | 458.3 | 481.9 |
| 18.20 | 25.9 | 2.293 | 555.0 | 580.9 |
| 18.40 | 27.6 | 2.699 | 653.3 | 680.9 |
| 18.60 | 28.5 | 3.113 | 753.3 | 781.8 |
| 18.80 | 50.2 | 3.533 | 855.0 | 905.2 |
| 19.00 | 89.0 | 3.961 | 958.5 | 1047.5 |
| 19.20 | 139.1 | 4.396 | 1063.7 | 1202.8 |
| 19.40 | 198.2 | 4.838 | 1170.7 | 1368.9 |
| 19.60 | 265.0 | 5.287 | 1279.4 | 1544.4 |
| 19.80 | 338.7 | 5.744 | 1390.0 | 1728.7 |
| 20.00 | 384.6 | 6.208 | 1502.3 | 1886.9 |

Time increment (t) = 0.100 hrs.

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

Pond File: COLAB3 .PND
Inflow Hydrograph: CAB100 .HYD
Outflow Hydrograph: CAB100O .HYD

Starting Pond W.S. Elevation = 17.00 ft

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

| | | |
|---|---|---|
| Peak Inflow | = | 108.00 cfs |
| Peak Outflow | = | 90.96 cfs |
| Peak Elevation | = | 19.01 ft |

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

| | | |
|---|---|---|
| Initial Storage | = | 0.00 ac-ft |
| Peak Storage From Storm | = | 3.98 ac-ft |
| Total Storage in Pond | = | 3.98 ac-ft |

Warning: Inflow hydrograph truncated on left side.

Outlet Structure File: COLAB3 .STR

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

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

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 17.00 | 0.0 | 1 |
| 17.20 | 2.3 | 1 |
| 17.40 | 6.6 | 1 |
| 17.60 | 12.2 | 1 |
| 17.80 | 18.7 | 1 |
| 18.00 | 23.6 | 1 |
| 18.20 | 25.9 | 1 |
| 18.40 | 27.6 | 2 |
| 18.60 | 28.5 | 2 +4 |
| 18.80 | 50.2 | 2 +4 |
| 19.00 | 89.0 | 2 +4 |
| 19.20 | 139.1 | 2 +4 |
| 19.40 | 198.2 | 2 +4 |
| 19.60 | 265.0 | 2 +4 |
| 19.80 | 338.7 | 2 +4 |
| 20.00 | 384.6 | 4 |

Outlet Structure File: COLAB3 .STR

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

Outlet Structure File: COLAB3 .STR
Planimeter Input File: COLAB .VOL
Rating Table Output File: COLAB3 .PND

Min. Elev.(ft) = 17 Max. Elev.(ft) = 20 Incr.(ft) = .2

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

**********
SYSTEM CONNECTIVITY
**********

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

Outflow rating table summary was stored in file:
COLAB3 .PND

Outlet Structure File: COLAB3 .STR

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

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

STAND PIPE
Stand Pipe with weir or orifice flow

| | |
|---|---|
| E1 elev.(ft)? | 17 |
| E2 elev.(ft)? | 20 |
| Crest elev.(ft)? | 17 |
| Diameter (ft)? | 2.5 |
| Weir coefficient? | 3.33 |
| Orifice coefficient? | .6 |
| Start transition elev.(ft) @ ? | |
| Transition height (ft)? | |

Outlet Structure File: COLAB3 .STR

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

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

CULVERT-CR
Circular Culvert (With Inlet Control)

| | |
|---|---|
| E1 elev.(ft)? | 17 |
| E2 elev.(ft)? | 20 |
| Diam. (ft)? | 2 |
| Inv. el.(ft)? | 14 |
| Slope (ft/ft)? | .01 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | -.5 |

Outlet Structure File: COLAB3 .STR

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

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

WEIR-VR
Weir - Vertical Rectangular

E1 elev.(ft)? 18.6
E2 elev.(ft)? 20.001
Weir coefficient? 3.33
Weir elev.(ft)? 18.6
Length (ft)? 70
Contracted/Suppressed (C/S)? C

Outlet Structure File: COLAB3 .STR

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

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

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

| Elevation (ft) | Q (cfs) | Computation Messages | |
|---|---|---|---|
| 17.00 | 0.0 | Weir: | H =0.0 |
| 17.20 | 2.3 | Weir: | H =.2 |
| 17.40 | 6.6 | Weir: | H =.4 |
| 17.60 | 12.2 | Weir: | H =.6 |
| 17.80 | 18.7 | Weir: | H =.8 |
| 18.00 | 23.6 | Orifice: | H =1.0 |
| 18.20 | 25.9 | Orifice: | H =1.2 |
| 18.40 | 28.0 | Orifice: | H =1.4 |
| 18.60 | 29.9 | Orifice: | H =1.6 |
| 18.80 | 31.7 | Orifice: | H =1.8 |
| 19.00 | 33.4 | Orifice: | H =2.0 |
| 19.20 | 35.1 | Orifice: | H =2.2 |
| 19.40 | 36.6 | Orifice: | H =2.4 |
| 19.60 | 38.1 | Orifice: | H =2.6 |
| 19.80 | 39.5 | Orifice: | H =2.8 |
| 20.00 | 0.0 | E = or > E2=20 | |

Weir Cw = 3.33 Weir length = 7.853982 ft
Orifice Co = .6 Orifice area = 4.908739 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 17.90371 ft

Outlet Structure File: COLAB3 .STR

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

Outflow Rating Table for Structure #2
CULVERT-CR Circular Culvert (With Inlet Control)

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 17.00 | 20.4 | Submerged: HW =3.0 |
| 17.20 | 21.6 | Submerged: HW =3.2 |
| 17.40 | 22.7 | Submerged: HW =3.4 |
| 17.60 | 23.7 | Submerged: HW =3.6 |
| 17.80 | 24.8 | Submerged: HW =3.8 |
| 18.00 | 25.7 | Submerged: HW =4.0 |
| 18.20 | 26.7 | Submerged: HW =4.2 |
| 18.40 | 27.6 | Submerged: HW =4.4 |
| 18.60 | 28.5 | Submerged: HW =4.6 |
| 18.80 | 29.4 | Submerged: HW =4.8 |
| 19.00 | 30.1 | Submerged: HW =5.0 |
| 19.20 | 31.0 | Submerged: HW =5.2 |
| 19.40 | 31.8 | Submerged: HW =5.4 |
| 19.60 | 32.5 | Submerged: HW =5.6 |
| 19.80 | 33.3 | Submerged: HW =5.8 |
| 20.00 | 0.0 | E = or > E2=20 |

Used Unsubmerged Equ. Form (1) for elev. less than 16.31 ft
Used Submerged Equation for elevations greater than 16.6 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=16.31 ft; Q1=15.55 cfs; Dc=1.42 ft; E2=16.6 ft; Q2=17.77 cfs

Outlet Structure File: COLAB3 .STR

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

Outflow Rating Table for Structure #4
WEIR-VR Weir - Vertical Rectangular

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 17.00 | 0.0 | E < Inv.El.= 18.6 |
| 17.20 | 0.0 | E < Inv.El.= 18.6 |
| 17.40 | 0.0 | E < Inv.El.= 18.6 |
| 17.60 | 0.0 | E < Inv.El.= 18.6 |
| 17.80 | 0.0 | E < Inv.El.= 18.6 |
| 18.00 | 0.0 | E < Inv.El.= 18.6 |
| 18.20 | 0.0 | E < Inv.El.= 18.6 |
| 18.40 | 0.0 | E < Inv.El.= 18.6 |
| 18.60 | 0.0 | H =0.0 |
| 18.80 | 20.8 | H =.2 |
| 19.00 | 58.9 | H =.4 |
| 19.20 | 108.1 | H =.6 |
| 19.40 | 166.4 | H =.8 |
| 19.60 | 232.4 | H =1.0 |
| 19.80 | 305.4 | H =1.2 |
| 20.00 | 384.6 | H =1.4 |

C = 3.33 L (ft) = 70
H (ft) = Table elev. - Invert elev. ( 18.6 ft )
Q (cfs) = C * (L-.2H) * (H**1.5) -- Contracted Weir

Outlet Structure File: COLAB3 .STR

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

Outflow Rating Table 3
Table 3 = 1 ? 2

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 17.00 | 0.0 | 1 |
| 17.20 | 2.3 | 1 |
| 17.40 | 6.6 | 1 |
| 17.60 | 12.2 | 1 |
| 17.80 | 18.7 | 1 |
| 18.00 | 23.6 | 1 |
| 18.20 | 25.9 | 1 |
| 18.40 | 27.6 | 2 |
| 18.60 | 28.5 | 2 |
| 18.80 | 29.4 | 2 |
| 19.00 | 30.1 | 2 |
| 19.20 | 31.0 | 2 |
| 19.40 | 31.8 | 2 |
| 19.60 | 32.5 | 2 |
| 19.80 | 33.3 | 2 |
| 20.00 | 0.0 | - |

# The Colonial Golf Course Drainage and Temporary Sediment Basin Design Information

JAN 1993
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PLANNING DEPARTMENT

prepared by:

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P. O. Box 3584
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January, 1993

# THE COLONIAL GOLF COURSE
# DRAINAGE AND TEMPORARY SEDIMENT BASIN DESIGN INFORMATION

**Drainage and Temporary Sediment Basin Design Philosophy**

**Temporary Sediment Basin Design Data Sheet**

**Culvert Calculations**

**Storm Sewer F-1 Calculations**

**Lake Calculations**

- Lake #1 - Drainage Calculations
- Lake #1 - Routing Calculations
- Lake #2 - Drainage Calculations
- Combine Outflow From Lake #1 With Basin #2 Runoff
- Lake #2 - Routing Calculations
- Lake #3 - Drainage Calculations
- Lake #3 - Routing Calculations

**Colonial Golf Course Drainage and Temporary Sediment Basin Design Philosophy**

**Storm Sewers**

Storm Sewer Systems A-E were designed only to prevent stormwater from ponding in certain areas of the golf course. This will prevent the ground from becoming saturated which would render unplayable conditions on the course. The pipes will convey small storm events but were not sized and are not intended to convey any specific design storm event.

Storm Sewer System F will be the outlet pipe for the future system which will drain the proposed golf course clubhouse site. A 24" Pipe was determined to be adequate but a 30" pipe is provided in the plans to allow for any changes in site plan impervious cover.

Rational calculations for system F were performed using the current conceptual design for the proposed clubhouse site plan and calculations for the peak 10-yr discharge are enclosed. Rainfall intensity, runoff coefficient and time of concentrations were determined by using the nomographs and tables enclosed in the *VDOT Drainage Manual*. Separate hydrographs were calculated for the pervious and impervious portions of the site and these hydrographs were combined to determine peak discharge.

**Culverts**

All culverts were designed to convey the 10-yr storm event with a maximum of 2' head. All culverts were assumed to be inlet control. Rational methodology and the *VDOT Drainage Manual* were again used to size the pipes. All drainage areas were determined using the grading plan for the proposed golf course and the areas are delineated on the Drainage And Erosion & Sediment Control sheet of the golf course plans submitted to James City County. Drainage calculations for the culverts are enclosed.

**Lakes**

All lakes were designed using SCS TR-55 methodology. Haestad Pond Pack was utilized to apply the TR-55 methodology for generating all runoff hydrographs for appropriate storm events. Pond Pack was also used to simulate reservoir routings in each lake and allowed optimum design of all hydraulic structures. All appropriate Pond Pack input and output for hydrograph development and reservoir routing are enclosed.

Lake #1

Lake #1 will be constructed for supplemental irrigation supply purposes and is not intended to function as a principle stormwater management lake. Therefore, pre-development flows were not analyzed for the basin. Although the lake is not intended to provide peak shaving of storm events, considerable peak shaving and water quality benefits will be provided by the impoundment. Six 12" pipes will be provided to convey the 2-yr and 10-yr storm events and all storm events above the 10-yr recurrence interval will be conveyed through an overflow depression located in fairway #18. All drainage from Lake #1 is discharged into Lake #2.

Lake #2

Lake #2 was designated to provide peak shaving and water quality benefits for the impacts created from the proposed clubhouse site. The impoundment was designed to pass the 2-yr and 10-yr storms at less than the predevelopment rate. The principal spillway will also pass the 100-yr storm while maintaining a 1ft freeboard at the top of the impoundment. An overflow depression will be provided in fairway #13 to convey storm events exceeding 100-yrs.

The inflow hydrograph for Lake #2 was created by adding the routed outflow hydrograph for Lake #1 to the additional runoff from the 19.4 ac Basin #2. The pre-development drainage area was modeled using the runoff Curve Number and Tc for existing conditions and was set equal to the sum of the post development drainage areas for Basin #1 and Basin #2 (36.2 ac).

Lake #3

Lake #3 will also be constructed for irrigation storage purposes only. Because there will be no additional impervious cover for the 5.41 acre drainage basin, peak shaving will not be required. Consequently, a predevelopment hydrograph was not computed. All storm events will be passed through a 24" riser and an 18" barrel.

**Sediment Basins**

Two temporary sediment basins are required to meet the state and local Erosion and Sedimentation Control (E&S) regulations. They are to be located in the vicinity of the proposed lakes #2 and #3. By integrating the temporary structures into the permanent lakes, maximum E&S protection is provided for over 45 acres of upstream drainage area with minimized land disturbance. Both basins were designed according to the Virginia E&S Handbook design procedure (Appendix 3.14-a). The design specifications for each basin are included in the text below and in the attached table and worksheets. Both basins are planned as part of the early stages of the golf course development. The implementation of the E&S structures is planned to coincide with the incremental clearing stages. As soon as practical the sediment basins will be constructed within the natural swales where the proposed lakes #2 and 3 are planned. The elevation/storage values were determined based on existing topography of the swales and possible additional volume associated with cutting of the sideslopes in the lake was not considered since the exact amount of cut and timing of cut are not known. They will service the continued clearing and grading activities both within the lakes and for their entire drainage areas. As the permanent embankments are finalized and the outlet structures are constructed, an appropriate temporary structure can be installed as part of the outlet and the upstream embankment can then be removed. The permanent lakes can function as the sediment basins until the lakes are filled for irrigation or aesthetic purposes.

Sediment Basin #1

The rational calculations for the basin were derived and used to calculate the peak flow from the disturbed drainage area to the basin. The calculated 25-year peak flows for the basin located in the proposed Lake #2 is approximately 50 cfs. A runoff coefficient of 0.30 was used to represent the worst conditions likely for the approximately 40-acre watershed during construction of the golf course, and the average intensity (4.1 inches per hour) was determined based on a time of concentration of 0.52 hours which is representative of the potential construction conditions. The design data for the basin is included in the attached summary table and the detailed design information worksheets.

When required for irrigation purposes during grow-in of the course, the temporary structure will be removed. A final clean out of the accumulated sediments can be accomplished if necessary and additional silt fence may be installed around the lakes to minimize further silt loads into the lake. The transition from upstream temporary sediment basin, to the permanent lake site (using the permanent outlet structure) will be accomplished such that proper E&S protection is uninterrupted. The grading for the permanent outlet structure and the construction of the permanent embankment (which is part of the overall fairway construction) will determine the timing for the transition from the temporary sediment basin to the permanent lake structure.

Sediment Basin #2

The rational calculations for the basin were derived and used to calculate the peak flow from the disturbed drainage area to the basin. The calculated 25-year peak flows for the basin located in the proposed Lake #3 is approximately 10 cfs. A runoff coefficient of 0.30 was used to represent the worst conditions likely for the 5.5-acre watershed during construction of the golf course, and the average intensity (6.0 inches per hour) was determined based on a time of concentration of 0.25 hours which is representative of the potential construction conditions. The design data for the basin is included in the attached summary table and the detailed design information worksheets.

It is possible that no temporary embankment will be constructed upstream of the proposed lake dam. The permanent embankment and outlet structure will be used and a temporary outlet structure will be attached. The temporary outlet will be removed when either the drainage area is stabilized or the water amenity of the lake is preferred. A final clean out of the accumulated sediments can be accomplished if necessary and additional silt fence may be installed around the lakes to minimize further silt loads into the lake. No interruption of the E&S protection benefits of the basin will occur during the transition to the permanent lake outlet structure.

## TEMPORARY SEDIMENT BASIN DESIGN DATA

| LOCATION | Units | Design Information Lake #2 | Lake #3 |
|---|---|---|---|
| TOTAL AREA DRAINING TO BASIN | acres | 40 | 5.5 |
| **BASIN VOLUME DESIGN** | | | |
| Wet Storage Volume | cu yds | 2680 | 369 |
| Elevation of required volume | ft msl | 13.0 | 14.0 |
| Excavated volume to obtain required volume | cu yds | NA | NA |
| Available volume before cleanout required | cu yds | 1320 | 182 |
| Elevation corresponding to cleanout level | ft msl | 11.5 | 12.5 |
| Distance from top of riser to cleanout level | feet | 1.5 | 1.5 |
| Dry Storage Volume | cu yds | 2680 | 369 |
| Total available basin volume | cu yds | 5360 | 737 |
| Elevation of required volume | ft msl | 15.0 | 15.5 |
| **DEWATERING** | | | |
| Diameter of dewatering orifice | inches | 12.0 | 4.0 |
| Diameter of flexible tubing | inches | 15.0 | 6.0 |
| **BASIN SHAPE** | | | |
| Length of flow | feet | 600 | 160 |
| Effective width | feet | 120 | 40 |
| If >2, baffles not required | | 5.0 | 4.0 |
| If <2, baffles required | | | |
| **PRINCIPAL SPILLWAY DESIGN** | | | |
| Required spillway capacity=Q25 | cfs | 50 | 10 |
| Riser diameter | inches | 42 | 24 |
| Actual head | feet | 1.3 | 0.7 |
| Barrell length | feet | 65 | 100 |
| Head on barrel | feet | 9.0 | 8.5 |
| Barrell diameter | inches | 30 | 12 |
| Trash rack and Anti-vortex device | | | |
| Diameter | inches | 60 | 36 |
| Height | inches | 19 | 13 |
| **ANTI-SEEP COLLAR** | | | |
| Depth of water at principal spillway crest | feet | 8.0 | |
| Slope of upstream face of embankment | S:S | 2.5 | |
| Slope of principle spillway barrel | % | 1 | |
| Length of barrel in saturated zone | feet | 62 | |
| Number of collars | No. | 3 | |
| Collar dimensions | feet | 6.0 | |
| **DESIGN ELEVATIONS*** | | | |
| Top of dam - elevation | ft msl | 18.5 | 18.5 |
| Designed high water | ft msl | 16.5 | 16.5 |
| Principal spillway crest | ft msl | 15.0 | 15.5 |
| Dewatering Orifice Invert | ft msl | 13.0 | 14.0 |
| Cleanout elevation | ft msl | 11.5 | 12.5 |
| Elevation of upstream toe of dam | ft msl | 7.0 | 9.0 |

* Field grading of lakes may alter temporary basin elevations.
These specifications represent the minimum required volume and appropriate basin design considering natural topographic features.

# Lake Calculations

# Lake #1

# Drainage Calculations

Quick TR-55 Ver.5.44 S/N:1315400034
Executed: 17:25:35 12-28-1992

Pond #1
Post-development Curve Numbers

RUNOFF CURVE NUMBER DATA

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

Composite Area:

| SURFACE DESCRIPTION | AREA (acres) | CN | |
|---|---|---|---|
| Pond | 0.74 | 100 | |
| Grass | 14.46 | 74 | |
| Impervious cover | 1.50 | 98 | |
| COMPOSITE AREA ---> | 16.70 | 77.3 | ( 77 ) |

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Quick TR-55 Ver.5.44 S/N:1315400034
Executed: 17:21:32 12-28-1992 LG1PST.TCT

Colonial Golf Course
Pond #1
Post-development Times of Concentration

Tc COMPUTATIONS FOR: Pond #1

SHEET FLOW (Applicable to Tc only)

| | | | |
|---|---|---|---|
| Segment ID | | 1-1 | |
| Surface description | | grass | |
| Manning's roughness coeff., n | | 0.2400 | |
| Flow length, L (total < or = 300) | ft | 200.0 | |
| Two-yr 24-hr rainfall, P2 | in | 3.600 | |
| Land slope, s | ft/ft | 0.0140 | |

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.45 = 0.45

SHALLOW CONCENTRATED FLOW

| | | | |
|---|---|---|---|
| Segment ID | | 1-2 | |
| Surface (paved or unpaved)? | | Unpaved | |
| Flow length, L | ft | 450.0 | |
| Watercourse slope, s | ft/ft | 0.0300 | |

$$Avg.V = Csf * (s)^{0.5}$$ ft/s 2.7946

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.04 = 0.04

CHANNEL FLOW

| | | | |
|---|---|---|---|
| Segment ID | | | |
| Cross Sectional Flow Area, a | sq.ft | 0.00 | |
| Wetted perimeter, Pw | ft | 0.00 | |
| Hydraulic radius, r = a/Pw | ft | 0.000 | |
| Channel slope, s | ft/ft | 0.0000 | |
| Manning's roughness coeff., n | | 0.0000 | |

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

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TOTAL TIME (hrs) 0.50

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-28-1992 17:54:19
Watershed file: --> LG1PSTR .MOP
Hydrograph file: --> LR1PS2.HYD

Colonial Golf Course
Pond #1
Post Development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| Pond #1 | 13.46 | 74.0 | 0.75 | 0.00 | 3.60 | 1.31 | I.2 | .20 |
| Pond #2 | 3.24 | 98.0 | 0.10 | 0.00 | 3.60 | 3.37 | I.01 | .10 |

16.70

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 16.70 acres or 0.02609 sq.mi
Peak discharge = 18 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | * Tt (hr) | Rounded Values Tc (hr) | * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Pond #1 | 0.70 | 0.00 | 0.75 | 0.00 | Yes | -- |
| Pond #2 | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-28-1992 17:54:19
Watershed file: --> LG1PSTR .MOP
Hydrograph file: --> LR1PS10.HYD

Colonial Golf Course
Pond #1
Post Development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| Pond #1 | 13.46 | 74.0 | 0.75 | 0.00 | 5.70 | 2.93 | I.12 | .12 |
| Pond #2 | 3.24 | 98.0 | 0.10 | 0.00 | 5.70 | 5.46 | I.01 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 16.70 acres or 0.02609 sq.mi
Peak discharge = 32 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | * Tt (hr) | Rounded Values Tc (hr) | * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Pond #1 | 0.70 | 0.00 | 0.75 | 0.00 | Yes | -- |
| Pond #2 | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-28-1992 17:54:19
Watershed file: --> LG1PSTR .MOP
Hydrograph file: --> LR1PS100.HYD

Colonial Golf Course
Pond #1
Post Development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| Pond #1 | 13.46 | 74.0 | 0.75 | 0.00 | 8.10 | 5.02 | I.09 | .10 |
| Pond #2 | 3.24 | 98.0 | 0.10 | 0.00 | 8.10 | 7.86 | I.01 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 16.70 acres or 0.02609 sq.mi
Peak discharge = 49 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Pond #1 | 0.70 | 0.00 | 0.75 | 0.00 | No | Computed Ia/p < .1 |
| Pond #2 | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

# Lake #1

# Routing Calculations

POND-2 Version: 5.15
S/N: 1295100016

Colonial Golf Course
Pond #1 Storage Elevation Information

CALCULATED 12-28-1992 17:19:35
DISK FILE: LGPN1 .VOL

Planimeter scale: 1 inch = 1 ft.

| Elevation (ft) | Planimeter (sq.in.) | Area (acres) | A1+A2+sqr(A1*A2) (acres) | * Volume (acre-ft) | Volume Sum (acre-ft) |
|---|---|---|---|---|---|
| 22.25 | 21,788.00 | 0.50 | 0.00 | 0.00 | 0.00 |
| 25.00 | 30,811.00 | 0.71 | 1.80 | 1.65 | 1.65 |
| 27.00 | 32,042.00 | 0.74 | 2.16 | 1.44 | 3.09 |

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

Outlet Structure File: LGPN16 .STR

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

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

| | Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|---|
| NP | 22.25 | 0.0 | 1 +2 +3 +4 +5 +6 |
| | 22.50 | 1.3 | 1 +2 +3 +4 +5 +6 |
| | 22.75 | 4.5 | 1 +2 +3 +4 +5 +6 |
| | 23.00 | 8.9 | 1 +2 +3 +4 +5 +6 |
| | 23.25 | 13.7 | 1 +2 +3 +4 +5 +6 |
| | 23.50 | 18.0 | 1 +2 +3 +4 +5 +6 |
| | 23.75 | 21.5 | 1 +2 +3 +4 +5 +6 |
| | 24.00 | 30.1 | 1 +2 +3 +4 +5 +6 +7 |
| | 24.25 | 45.9 | 1 +2 +3 +4 +5 +6 +7 |
| | 24.50 | 65.8 | 1 +2 +3 +4 +5 +6 +7 |
| | 24.75 | 88.9 | 1 +2 +3 +4 +5 +6 +7 |
| | 25.00 | 114.6 | 1 +2 +3 +4 +5 +6 +7 |
| Top of Dam | 25.25 | 142.7 | 1 +2 +3 +4 +5 +6 +7 |
| | 25.50 | 173.0 | 1 +2 +3 +4 +5 +6 +7 |
| | 25.75 | 205.3 | 1 +2 +3 +4 +5 +6 +7 |
| | 26.00 | 239.3 | 1 +2 +3 +4 +5 +6 +7 |
| | 26.25 | 275.1 | 1 +2 +3 +4 +5 +6 +7 |
| | 26.50 | 312.4 | 1 +2 +3 +4 +5 +6 +7 |
| | 26.75 | 351.1 | 1 +2 +3 +4 +5 +6 +7 |
| | 27.00 | 391.3 | 1 +2 +3 +4 +5 +6 +7 |

Outlet Structure File: LGPN16 .STR

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

Outlet Structure File: LGPN16 .STR
Planimeter Input File: LGPN1 .VOL
Rating Table Output File: LGPN16 .PND

Plan Stage top = 25.25

Min. Elev.(ft) = 22.25 Max. Elev.(ft) = 27 Incr.(ft) = .25

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

**********
SYSTEM CONNECTIVITY
**********

| Structure | No. | Q Table | | Q Table |
|---|---|---|---|---|
| CULVERT-CR | 1 | | -> | 1 |
| CULVERT-CR | 2 | | -> | 2 |
| CULVERT-CR | 3 | | -> | 3 |
| CULVERT-CR | 4 | | -> | 4 |
| CULVERT-CR | 5 | | -> | 5 |
| CULVERT-CR | 6 | | -> | 6 |
| WEIR-VR | 7 | | -> | 7 |

Outflow rating table summary was stored in file:
LGPN16 .PND

Outlet Structure File: LGPN16 .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)? | 22.25 |
| E2 elev.(ft)? | 27.001 - No |
| Diam. (ft)? | 1.0 |
| Inv. el.(ft)? | 22.25 |
| Slope (ft/ft)? | .01 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | |

Outlet Structure File: LGPN16 .STR

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

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

CULVERT-CR
Circular Culvert (With Inlet Control)

| | |
|---|---|
| E1 elev.(ft)? | 22.25 |
| E2 elev.(ft)? | 27.001 |
| Diam. (ft)? | 1.0 |
| Inv. el.(ft)? | 22.25 |
| Slope (ft/ft)? | .01 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | -.5 |

Outlet Structure File: LGPN16 .STR

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

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

CULVERT-CR
Circular Culvert (With Inlet Control)

| | |
|---|---|
| E1 elev.(ft)? | 22.25 |
| E2 elev.(ft)? | 27.001 |
| Diam. (ft)? | 1.0 |
| Inv. el.(ft)? | 22.25 |
| Slope (ft/ft)? | .01 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | -.5 |

Outlet Structure File: LGPN16 .STR

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

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

CULVERT-CR
Circular Culvert (With Inlet Control)

| | |
|---|---|
| E1 elev.(ft)? | 22.25 |
| E2 elev.(ft)? | 27.001 |
| Diam. (ft)? | 1.0 |
| Inv. el.(ft)? | 22.25 |
| Slope (ft/ft)? | .01 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | -.5 |

Outlet Structure File: LGPN16 .STR

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

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

CULVERT-CR
Circular Culvert (With Inlet Control)

| | |
|---|---|
| E1 elev.(ft)? | 22.25 |
| E2 elev.(ft)? | 27.001 |
| Diam. (ft)? | 1 |
| Inv. el.(ft)? | 22.25 |
| Slope (ft/ft)? | .01 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | -.5 |

Outlet Structure File: LGPN16 .STR

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

>>>>>> Structure No. 6 <<<<<<
(Input Data)

CULVERT-CR
Circular Culvert (With Inlet Control)

| | |
|---|---|
| E1 elev.(ft)? | 22.25 |
| E2 elev.(ft)? | 27.001 |
| Diam. (ft)? | 1.0 |
| Inv. el.(ft)? | 22.25 |
| Slope (ft/ft)? | .01 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | -.5 |

Outlet Structure File: LGPN16 .STR

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

>>>>>> Structure No. 7 <<<<<<
(Input Data)

WEIR-VR
Weir - Vertical Rectangular

| | |
|---|---|
| E1 elev.(ft)? | 23.8 |
| E2 elev.(ft)? | 27.001 |
| Weir coefficient? | 3.1 |
| Weir elev.(ft)? | 23.8 |
| Length (ft)? | 20 |
| Contracted/Suppressed (C/S)? | C |

Outlet Structure File: LGPN16 .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 | | |
|---|---|---|---|---|
| 22.25 | 0.0 | No headwater | | |
| 22.50 | 0.2 | Equ.1: HW =.25 | dc=.19 | Ac=.104 |
| 22.75 | 0.7 | Equ.1: HW =.5 | dc=.353 | Ac=.248 |
| 23.00 | 1.5 | Equ.1: HW =.750 | dc=.517 | Ac=.409 |
| 23.25 | 2.2 | Equ.1: HW =1.0 | dc=.639 | Ac=.53 |
| 23.50 | 3.0 | Transition: HW =1.25 | | |
| 23.75 | 3.6 | Submerged: HW =1.5 | | |
| 24.00 | 4.1 | Submerged: HW =1.75 | | |
| 24.25 | 4.5 | Submerged: HW =2.0 | | |
| 24.50 | 5.0 | Submerged: HW =2.25 | | |
| 24.75 | 5.3 | Submerged: HW =2.5 | | |
| 25.00 | 5.7 | Submerged: HW =2.75 | | |
| 25.25 | 6.0 | Submerged: HW =3.0 | | |
| 25.50 | 6.3 | Submerged: HW =3.25 | | |
| 25.75 | 6.6 | Submerged: HW =3.5 | | |
| 26.00 | 6.9 | Submerged: HW =3.75 | | |
| 26.25 | 7.2 | Submerged: HW =4.0 | | |
| 26.50 | 7.4 | Submerged: HW =4.25 | | |
| 26.75 | 7.7 | Submerged: HW =4.5 | | |
| 27.00 | 8.0 | Submerged: HW =4.75 | | |

Used Unsubmerged Equ. Form (1) for elev. less than 23.41 ft
Used Submerged Equation for elevations greater than 23.56 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=23.41 ft; Q1=2.75 cfs; Dc=.71 ft; E2=23.56 ft; Q2=3.14 cfs

Outlet Structure File: LGPN16 .STR

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

Outflow Rating Table for Structure #2
CULVERT-CR Circular Culvert (With Inlet Control)

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

| Elevation (ft) | Q (cfs) | Computation Messages | | |
|---|---|---|---|---|
| 22.25 | 0.0 | No headwater | | |
| 22.50 | 0.2 | Equ.1: HW =.25 | dc=.19 | Ac=.104 |
| 22.75 | 0.8 | Equ.1: HW =.5 | dc=.367 | Ac=.261 |
| 23.00 | 1.5 | Equ.1: HW =.750 | dc=.517 | Ac=.409 |
| 23.25 | 2.3 | Equ.1: HW =1.0 | dc=.647 | Ac=.538 |
| 23.50 | 3.0 | Transition: HW =1.25 | | |
| 23.75 | 3.6 | Submerged: HW =1.5 | | |
| 24.00 | 4.1 | Submerged: HW =1.75 | | |
| 24.25 | 4.6 | Submerged: HW =2.0 | | |
| 24.50 | 5.0 | Submerged: HW =2.25 | | |
| 24.75 | 5.3 | Submerged: HW =2.5 | | |
| 25.00 | 5.7 | Submerged: HW =2.75 | | |
| 25.25 | 6.0 | Submerged: HW =3.0 | | |
| 25.50 | 6.3 | Submerged: HW =3.25 | | |
| 25.75 | 6.6 | Submerged: HW =3.5 | | |
| 26.00 | 6.9 | Submerged: HW =3.75 | | |
| 26.25 | 7.2 | Submerged: HW =4.0 | | |
| 26.50 | 7.5 | Submerged: HW =4.25 | | |
| 26.75 | 7.7 | Submerged: HW =4.5 | | |
| 27.00 | 8.0 | Submerged: HW =4.75 | | |

Used Unsubmerged Equ. Form (1) for elev. less than 23.4 ft
Used Submerged Equation for elevations greater than 23.55 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=23.4 ft; Q1=2.75 cfs; Dc=.71 ft; E2=23.55 ft; Q2=3.14 cfs

Outlet Structure File: LGPN16 .STR

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

Outflow Rating Table for Structure #3
CULVERT-CR Circular Culvert (With Inlet Control)

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

| Elevation (ft) | Q (cfs) | Computation Messages | | |
|---|---|---|---|---|
| 22.25 | 0.0 | No headwater | | |
| 22.50 | 0.2 | Equ.1: HW =.25 | dc=.19 | Ac=.104 |
| 22.75 | 0.8 | Equ.1: HW =.5 | dc=.367 | Ac=.261 |
| 23.00 | 1.5 | Equ.1: HW =.750 | dc=.517 | Ac=.409 |
| 23.25 | 2.3 | Equ.1: HW =1.0 | dc=.647 | Ac=.538 |
| 23.50 | 3.0 | Transition: HW =1.25 | | |
| 23.75 | 3.6 | Submerged: HW =1.5 | | |
| 24.00 | 4.1 | Submerged: HW =1.75 | | |
| 24.25 | 4.6 | Submerged: HW =2.0 | | |
| 24.50 | 5.0 | Submerged: HW =2.25 | | |
| 24.75 | 5.3 | Submerged: HW =2.5 | | |
| 25.00 | 5.7 | Submerged: HW =2.75 | | |
| 25.25 | 6.0 | Submerged: HW =3.0 | | |
| 25.50 | 6.3 | Submerged: HW =3.25 | | |
| 25.75 | 6.6 | Submerged: HW =3.5 | | |
| 26.00 | 6.9 | Submerged: HW =3.75 | | |
| 26.25 | 7.2 | Submerged: HW =4.0 | | |
| 26.50 | 7.5 | Submerged: HW =4.25 | | |
| 26.75 | 7.7 | Submerged: HW =4.5 | | |
| 27.00 | 8.0 | Submerged: HW =4.75 | | |

Used Unsubmerged Equ. Form (1) for elev. less than 23.4 ft
Used Submerged Equation for elevations greater than 23.55 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=23.4 ft; Q1=2.75 cfs; Dc=.71 ft; E2=23.55 ft; Q2=3.14 cfs

Outlet Structure File: LGPN16 .STR

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

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

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

| Elevation (ft) | Q (cfs) | Computation Messages | | |
|---|---|---|---|---|
| 22.25 | 0.0 | No headwater | | |
| 22.50 | 0.2 | Equ.1: HW =.25 | dc=.19 | Ac=.104 |
| 22.75 | 0.8 | Equ.1: HW =.5 | dc=.367 | Ac=.261 |
| 23.00 | 1.5 | Equ.1: HW =.750 | dc=.517 | Ac=.409 |
| 23.25 | 2.3 | Equ.1: HW =1.0 | dc=.647 | Ac=.538 |
| 23.50 | 3.0 | Transition: HW =1.25 | | |
| 23.75 | 3.6 | Submerged: HW =1.5 | | |
| 24.00 | 4.1 | Submerged: HW =1.75 | | |
| 24.25 | 4.6 | Submerged: HW =2.0 | | |
| 24.50 | 5.0 | Submerged: HW =2.25 | | |
| 24.75 | 5.3 | Submerged: HW =2.5 | | |
| 25.00 | 5.7 | Submerged: HW =2.75 | | |
| 25.25 | 6.0 | Submerged: HW =3.0 | | |
| 25.50 | 6.3 | Submerged: HW =3.25 | | |
| 25.75 | 6.6 | Submerged: HW =3.5 | | |
| 26.00 | 6.9 | Submerged: HW =3.75 | | |
| 26.25 | 7.2 | Submerged: HW =4.0 | | |
| 26.50 | 7.5 | Submerged: HW =4.25 | | |
| 26.75 | 7.7 | Submerged: HW =4.5 | | |
| 27.00 | 8.0 | Submerged: HW =4.75 | | |

Used Unsubmerged Equ. Form (1) for elev. less than 23.4 ft
Used Submerged Equation for elevations greater than 23.55 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=23.4 ft; Q1=2.75 cfs; Dc=.71 ft; E2=23.55 ft; Q2=3.14 cfs

Outlet Structure File: LGPN16 .STR

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

Outflow Rating Table for Structure #5
CULVERT-CR Circular Culvert (With Inlet Control)

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

| Elevation (ft) | Q (cfs) | Computation Messages | | |
|---|---|---|---|---|
| 22.25 | 0.0 | No headwater | | |
| 22.50 | 0.2 | Equ.1: HW =.25 | dc=.19 | Ac=.104 |
| 22.75 | 0.8 | Equ.1: HW =.5 | dc=.367 | Ac=.261 |
| 23.00 | 1.5 | Equ.1: HW =.750 | dc=.517 | Ac=.409 |
| 23.25 | 2.3 | Equ.1: HW =1.0 | dc=.647 | Ac=.538 |
| 23.50 | 3.0 | Transition: HW =1.25 | | |
| 23.75 | 3.6 | Submerged: HW =1.5 | | |
| 24.00 | 4.1 | Submerged: HW =1.75 | | |
| 24.25 | 4.6 | Submerged: HW =2.0 | | |
| 24.50 | 5.0 | Submerged: HW =2.25 | | |
| 24.75 | 5.3 | Submerged: HW =2.5 | | |
| 25.00 | 5.7 | Submerged: HW =2.75 | | |
| 25.25 | 6.0 | Submerged: HW =3.0 | | |
| 25.50 | 6.3 | Submerged: HW =3.25 | | |
| 25.75 | 6.6 | Submerged: HW =3.5 | | |
| 26.00 | 6.9 | Submerged: HW =3.75 | | |
| 26.25 | 7.2 | Submerged: HW =4.0 | | |
| 26.50 | 7.5 | Submerged: HW =4.25 | | |
| 26.75 | 7.7 | Submerged: HW =4.5 | | |
| 27.00 | 8.0 | Submerged: HW =4.75 | | |

Used Unsubmerged Equ. Form (1) for elev. less than 23.4 ft
Used Submerged Equation for elevations greater than 23.55 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=23.4 ft; Q1=2.75 cfs; Dc=.71 ft; E2=23.55 ft; Q2=3.14 cfs

Outlet Structure File: LGPN16 .STR

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

Outflow Rating Table for Structure #6
CULVERT-CR Circular Culvert (With Inlet Control)

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

| Elevation (ft) | Q (cfs) | Computation Messages | | |
|---|---|---|---|---|
| 22.25 | 0.0 | No headwater | | |
| 22.50 | 0.2 | Equ.1: HW =.25 | dc=.19 | Ac=.104 |
| 22.75 | 0.8 | Equ.1: HW =.5 | dc=.367 | Ac=.261 |
| 23.00 | 1.5 | Equ.1: HW =.750 | dc=.517 | Ac=.409 |
| 23.25 | 2.3 | Equ.1: HW =1.0 | dc=.647 | Ac=.538 |
| 23.50 | 3.0 | Transition: HW =1.25 | | |
| 23.75 | 3.6 | Submerged: HW =1.5 | | |
| 24.00 | 4.1 | Submerged: HW =1.75 | | |
| 24.25 | 4.6 | Submerged: HW =2.0 | | |
| 24.50 | 5.0 | Submerged: HW =2.25 | | |
| 24.75 | 5.3 | Submerged: HW =2.5 | | |
| 25.00 | 5.7 | Submerged: HW =2.75 | | |
| 25.25 | 6.0 | Submerged: HW =3.0 | | |
| 25.50 | 6.3 | Submerged: HW =3.25 | | |
| 25.75 | 6.6 | Submerged: HW =3.5 | | |
| 26.00 | 6.9 | Submerged: HW =3.75 | | |
| 26.25 | 7.2 | Submerged: HW =4.0 | | |
| 26.50 | 7.5 | Submerged: HW =4.25 | | |
| 26.75 | 7.7 | Submerged: HW =4.5 | | |
| 27.00 | 8.0 | Submerged: HW =4.75 | | |

Used Unsubmerged Equ. Form (1) for elev. less than 23.4 ft
Used Submerged Equation for elevations greater than 23.55 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=23.4 ft; Q1=2.75 cfs; Dc=.71 ft; E2=23.55 ft; Q2=3.14 cfs

Outlet Structure File: LGPN16 .STR

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

Outflow Rating Table for Structure #7
WEIR-VR Weir - Vertical Rectangular

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 22.25 | 0.0 | E < Inv.El.= 23.8 |
| 22.50 | 0.0 | E < Inv.El.= 23.8 |
| 22.75 | 0.0 | E < Inv.El.= 23.8 |
| 23.00 | 0.0 | E < Inv.El.= 23.8 |
| 23.25 | 0.0 | E < Inv.El.= 23.8 |
| 23.50 | 0.0 | E < Inv.El.= 23.8 |
| 23.75 | 23.8=0 0.0 | E < Inv.El.= 23.8 |
| 24.00 | 5.5 | H =.2 |
| 24.25 | 18.6 | H =.45 |
| 24.50 | 36.1 | H =.7 |
| 24.75 | 56.9 | H =.95 |
| 25.00 | 80.5 | H =1.2 |
| 25.25 | 106.7 +(6×6)=142 | H =1.45 |
| 25.50 | 135.1 | H =1.7 |
| 25.75 | 165.5 | H =1.95 |
| 26.00 | 197.9 | H =2.2 |
| 26.25 | 231.9 | H =2.45 |
| 26.50 | 267.6 | H =2.7 |
| 26.75 | 304.9 | H =2.95 |
| 27.00 | 343.6 | H =3.2 |

C = 3.1 L (ft) = 20
H (ft) = Table elev. - Invert elev. ( 23.8 ft )
Q (cfs) = C * (L-.2H) * (H**1.5) -- Contracted Weir

```
*************************************
*                                   *
*       Colonial Golf Course        *
*             Pond #1               *
*  2-yr Storm Routed Through Pond   *
*                                   *
*                                   *
*************************************
```

Inflow Hydrograph: LR1PS2 .HYD
Rating Table file: LGPN16 .PND

----INITIAL CONDITIONS----
Elevation = 22.25 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 22.25 | 0.0 | 0.000 |
| 22.50 | 1.3 | 0.127 |
| 22.75 | 4.5 | 0.259 |
| 23.00 | 8.9 | 0.395 |
| 23.25 | 13.7 | 0.535 |
| 23.50 | 18.0 | 0.681 |
| 23.75 | 21.5 | 0.830 |
| 24.00 | 30.1 | 0.985 |
| 24.25 | 45.9 | 1.144 |
| 24.50 | 65.8 | 1.309 |
| 24.75 | 88.9 | 1.478 |
| 25.00 | 114.6 | 1.652 |
| 25.25 | 142.7 | 1.829 |
| 25.50 | 173.0 | 2.008 |
| 25.75 | 205.3 | 2.187 |
| 26.00 | 239.3 | 2.366 |
| 26.25 | 275.1 | 2.547 |
| 26.50 | 312.4 | 2.729 |
| 26.75 | 351.1 | 2.911 |
| 27.00 | 391.3 | 3.095 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 0.0 | 0.0 |
| 30.8 | 32.1 |
| 62.6 | 67.1 |
| 95.5 | 104.4 |
| 129.6 | 143.3 |
| 164.7 | 182.7 |
| 200.9 | 222.4 |
| 238.4 | 268.5 |
| 276.9 | 322.8 |
| 316.7 | 382.5 |
| 357.6 | 446.5 |
| 399.8 | 514.4 |
| 442.7 | 585.4 |
| 485.8 | 658.8 |
| 529.1 | 734.4 |
| 572.7 | 812.0 |
| 616.4 | 891.5 |
| 660.4 | 972.8 |
| 704.6 | 1055.7 |
| 749.0 | 1140.3 |

Time increment (t) = 0.100 hrs.

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Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS2 .HYD
Outflow Hydrograph: OUT .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 | 0.00 | ----- | 0.0 | 0.0 | 0.00 | 22.25 |
| 11.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 22.25 |
| 11.200 | 1.00 | 1.0 | 0.9 | 1.0 | 0.04 | 22.26 |
| 11.300 | 1.00 | 2.0 | 2.7 | 2.9 | 0.12 | 22.27 |
| 11.400 | 1.00 | 2.0 | 4.3 | 4.7 | 0.19 | 22.29 |
| 11.500 | 1.00 | 2.0 | 5.8 | 6.3 | 0.26 | 22.30 |
| 11.600 | 1.00 | 2.0 | 7.2 | 7.8 | 0.32 | 22.31 |
| 11.700 | 3.00 | 4.0 | 10.3 | 11.2 | 0.45 | 22.34 |
| 11.800 | 4.00 | 7.0 | 15.9 | 17.3 | 0.70 | 22.38 |
| 11.900 | 6.00 | 10.0 | 23.8 | 25.9 | 1.05 | 22.45 |
| 12.000 | 12.00 | 18.0 | 37.4 | 41.8 | 2.18 | 22.57 |
| 12.100 | 18.00 | 30.0 | 58.3 | 67.4 | 4.53 | 22.75 |
| 12.200 | 13.00 | 31.0 | 75.1 | 89.3 | 7.12 | 22.90 |
| 12.300 | 8.00 | 21.0 | 80.3 | 96.1 | 7.92 | 22.94 |
| 12.400 | 9.00 | 17.0 | 81.2 | 97.3 | 8.05 | 22.95 |
| 12.500 | 11.00 | 20.0 | 84.1 | 101.2 | 8.51 | 22.98 |
| 12.600 | 12.00 | 23.0 | 88.7 | 107.1 | 9.23 | 23.02 |
| 12.700 | 11.00 | 23.0 | 92.1 | 111.7 | 9.79 | 23.05 |
| 12.800 | 11.00 | 22.0 | 93.9 | 114.1 | 10.09 | 23.06 |
| 12.900 | 9.00 | 20.0 | 93.8 | 113.9 | 10.07 | 23.06 |
| 13.000 | 8.00 | 17.0 | 91.4 | 110.8 | 9.68 | 23.04 |
| 13.100 | 7.00 | 15.0 | 88.1 | 106.4 | 9.14 | 23.01 |
| 13.200 | 6.00 | 13.0 | 84.1 | 101.1 | 8.51 | 22.98 |
| 13.300 | 6.00 | 12.0 | 80.3 | 96.1 | 7.92 | 22.94 |
| 13.400 | 5.00 | 11.0 | 76.6 | 91.3 | 7.35 | 22.91 |
| 13.500 | 5.00 | 10.0 | 73.0 | 86.6 | 6.79 | 22.88 |
| 13.600 | 4.00 | 9.0 | 69.5 | 82.0 | 6.25 | 22.85 |
| 13.700 | 4.00 | 8.0 | 66.0 | 77.5 | 5.72 | 22.82 |
| 13.800 | 3.00 | 7.0 | 62.6 | 73.0 | 5.20 | 22.79 |
| 13.900 | 3.00 | 6.0 | 59.3 | 68.6 | 4.68 | 22.76 |
| 14.000 | 3.00 | 6.0 | 56.6 | 65.3 | 4.33 | 22.74 |
| 14.100 | 3.00 | 6.0 | 54.4 | 62.6 | 4.09 | 22.72 |
| 14.200 | 3.00 | 6.0 | 52.7 | 60.4 | 3.89 | 22.70 |
| 14.300 | 3.00 | 6.0 | 51.2 | 58.7 | 3.73 | 22.69 |
| 14.400 | 3.00 | 6.0 | 50.0 | 57.2 | 3.59 | 22.68 |
| 14.500 | 2.00 | 5.0 | 48.2 | 55.0 | 3.39 | 22.66 |
| 14.600 | 2.00 | 4.0 | 46.0 | 52.2 | 3.14 | 22.64 |
| 14.700 | 2.00 | 4.0 | 44.1 | 50.0 | 2.93 | 22.63 |
| 14.800 | 2.00 | 4.0 | 42.6 | 48.1 | 2.76 | 22.61 |
| 14.900 | 1.00 | 3.0 | 40.5 | 45.6 | 2.53 | 22.60 |
| 15.000 | 1.00 | 2.0 | 38.0 | 42.5 | 2.25 | 22.57 |
| 15.100 | 1.00 | 2.0 | 36.0 | 40.0 | 2.02 | 22.56 |
| 15.200 | 1.00 | 2.0 | 34.3 | 38.0 | 1.84 | 22.54 |
| 15.300 | 1.00 | 2.0 | 32.9 | 36.3 | 1.68 | 22.53 |
| 15.400 | 1.00 | 2.0 | 31.8 | 34.9 | 1.56 | 22.52 |

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS2 .HYD
Outflow Hydrograph: OUT .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 15.500 | 1.00 | 2.0 | 30.9 | 33.8 | 1.46 | 22.51 |
| 15.600 | 1.00 | 2.0 | 30.1 | 32.9 | 1.37 | 22.51 |
| 15.700 | 1.00 | 2.0 | 29.5 | 32.1 | 1.31 | 22.50 |
| 15.800 | 1.00 | 2.0 | 29.0 | 31.5 | 1.28 | 22.50 |
| 15.900 | 1.00 | 2.0 | 28.5 | 31.0 | 1.26 | 22.49 |
| 16.000 | 1.00 | 2.0 | 28.0 | 30.5 | 1.23 | 22.49 |
| 16.100 | 1.00 | 2.0 | 27.6 | 30.0 | 1.22 | 22.48 |
| 16.200 | 1.00 | 2.0 | 27.2 | 29.6 | 1.20 | 22.48 |
| 16.300 | 1.00 | 2.0 | 26.8 | 29.2 | 1.18 | 22.48 |
| 16.400 | 1.00 | 2.0 | 26.5 | 28.8 | 1.17 | 22.47 |
| 16.500 | 1.00 | 2.0 | 26.2 | 28.5 | 1.15 | 22.47 |
| 16.600 | 1.00 | 2.0 | 25.9 | 28.2 | 1.14 | 22.47 |
| 16.700 | 1.00 | 2.0 | 25.6 | 27.9 | 1.13 | 22.47 |
| 16.800 | 1.00 | 2.0 | 25.4 | 27.6 | 1.12 | 22.47 |
| 16.900 | 1.00 | 2.0 | 25.2 | 27.4 | 1.11 | 22.46 |
| 17.000 | 1.00 | 2.0 | 25.0 | 27.2 | 1.10 | 22.46 |
| 17.100 | 1.00 | 2.0 | 24.8 | 27.0 | 1.09 | 22.46 |
| 17.200 | 1.00 | 2.0 | 24.6 | 26.8 | 1.09 | 22.46 |
| 17.300 | 1.00 | 2.0 | 24.5 | 26.6 | 1.08 | 22.46 |
| 17.400 | 1.00 | 2.0 | 24.3 | 26.5 | 1.07 | 22.46 |
| 17.500 | 1.00 | 2.0 | 24.2 | 26.3 | 1.07 | 22.45 |
| 17.600 | 1.00 | 2.0 | 24.1 | 26.2 | 1.06 | 22.45 |
| 17.700 | 1.00 | 2.0 | 23.9 | 26.1 | 1.06 | 22.45 |
| 17.800 | 1.00 | 2.0 | 23.8 | 25.9 | 1.05 | 22.45 |
| 17.900 | 1.00 | 2.0 | 23.7 | 25.8 | 1.05 | 22.45 |
| 18.000 | 1.00 | 2.0 | 23.7 | 25.7 | 1.04 | 22.45 |
| 18.100 | 1.00 | 2.0 | 23.6 | 25.7 | 1.04 | 22.45 |
| 18.200 | 1.00 | 2.0 | 23.5 | 25.6 | 1.04 | 22.45 |
| 18.300 | 1.00 | 2.0 | 23.4 | 25.5 | 1.03 | 22.45 |
| 18.400 | 1.00 | 2.0 | 23.4 | 25.4 | 1.03 | 22.45 |
| 18.500 | 1.00 | 2.0 | 23.3 | 25.4 | 1.03 | 22.45 |
| 18.600 | 1.00 | 2.0 | 23.3 | 25.3 | 1.03 | 22.45 |
| 18.700 | 1.00 | 2.0 | 23.2 | 25.3 | 1.02 | 22.45 |
| 18.800 | 1.00 | 2.0 | 23.2 | 25.2 | 1.02 | 22.45 |
| 18.900 | 1.00 | 2.0 | 23.1 | 25.2 | 1.02 | 22.45 |
| 19.000 | 1.00 | 2.0 | 23.1 | 25.1 | 1.02 | 22.45 |
| 19.100 | 1.00 | 2.0 | 23.1 | 25.1 | 1.02 | 22.45 |
| 19.200 | 1.00 | 2.0 | 23.0 | 25.1 | 1.02 | 22.45 |
| 19.300 | 1.00 | 2.0 | 23.0 | 25.0 | 1.01 | 22.45 |
| 19.400 | 1.00 | 2.0 | 23.0 | 25.0 | 1.01 | 22.44 |
| 19.500 | 1.00 | 2.0 | 23.0 | 25.0 | 1.01 | 22.44 |
| 19.600 | 1.00 | 2.0 | 22.9 | 25.0 | 1.01 | 22.44 |
| 19.700 | 1.00 | 2.0 | 22.9 | 24.9 | 1.01 | 22.44 |
| 19.800 | 1.00 | 2.0 | 22.9 | 24.9 | 1.01 | 22.44 |
| 19.900 | 1.00 | 2.0 | 22.9 | 24.9 | 1.01 | 22.44 |
| 20.000 | 1.00 | 2.0 | 22.9 | 24.9 | 1.01 | 22.44 |

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS2 .HYD
Outflow Hydrograph: OUT .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 20.100 | 1.00 | 2.0 | 22.8 | 24.9 | 1.01 | 22.44 |
| 20.200 | 1.00 | 2.0 | 22.8 | 24.8 | 1.01 | 22.44 |
| 20.300 | 1.00 | 2.0 | 22.8 | 24.8 | 1.01 | 22.44 |
| 20.400 | 1.00 | 2.0 | 22.8 | 24.8 | 1.01 | 22.44 |
| 20.500 | 1.00 | 2.0 | 22.8 | 24.8 | 1.01 | 22.44 |
| 20.600 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 20.700 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 20.800 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 20.900 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 21.000 | 0.00 | 1.0 | 21.8 | 23.8 | 0.96 | 22.44 |
| 21.100 | 0.00 | 0.0 | 20.1 | 21.8 | 0.88 | 22.42 |
| 21.200 | 0.00 | 0.0 | 18.4 | 20.1 | 0.81 | 22.41 |
| 21.300 | 0.00 | 0.0 | 16.9 | 18.4 | 0.75 | 22.39 |
| 21.400 | 0.00 | 0.0 | 15.6 | 16.9 | 0.69 | 22.38 |
| 21.500 | 0.00 | 0.0 | 14.3 | 15.6 | 0.63 | 22.37 |
| 21.600 | 0.00 | 0.0 | 13.2 | 14.3 | 0.58 | 22.36 |
| 21.700 | 0.00 | 0.0 | 12.1 | 13.2 | 0.53 | 22.35 |
| 21.800 | 0.00 | 0.0 | 11.1 | 12.1 | 0.49 | 22.34 |
| 21.900 | 0.00 | 0.0 | 10.2 | 11.1 | 0.45 | 22.34 |
| 22.000 | 0.00 | 0.0 | 9.4 | 10.2 | 0.41 | 22.33 |
| 22.100 | 0.00 | 0.0 | 8.6 | 9.4 | 0.38 | 22.32 |
| 22.200 | 0.00 | 0.0 | 7.9 | 8.6 | 0.35 | 22.32 |
| 22.300 | 0.00 | 0.0 | 7.3 | 7.9 | 0.32 | 22.31 |
| 22.400 | 0.00 | 0.0 | 6.7 | 7.3 | 0.29 | 22.31 |
| 22.500 | 0.00 | 0.0 | 6.1 | 6.7 | 0.27 | 22.30 |
| 22.600 | 0.00 | 0.0 | 5.6 | 6.1 | 0.25 | 22.30 |
| 22.700 | 0.00 | 0.0 | 5.2 | 5.6 | 0.23 | 22.29 |
| 22.800 | 0.00 | 0.0 | 4.8 | 5.2 | 0.21 | 22.29 |
| 22.900 | 0.00 | 0.0 | 4.4 | 4.8 | 0.19 | 22.29 |
| 23.000 | 0.00 | 0.0 | 4.0 | 4.4 | 0.18 | 22.28 |
| 23.100 | 0.00 | 0.0 | 3.7 | 4.0 | 0.16 | 22.28 |
| 23.200 | 0.00 | 0.0 | 3.4 | 3.7 | 0.15 | 22.28 |
| 23.300 | 0.00 | 0.0 | 3.1 | 3.4 | 0.14 | 22.28 |
| 23.400 | 0.00 | 0.0 | 2.9 | 3.1 | 0.13 | 22.27 |
| 23.500 | 0.00 | 0.0 | 2.6 | 2.9 | 0.12 | 22.27 |
| 23.600 | 0.00 | 0.0 | 2.4 | 2.6 | 0.11 | 22.27 |
| 23.700 | 0.00 | 0.0 | 2.2 | 2.4 | 0.10 | 22.27 |
| 23.800 | 0.00 | 0.0 | 2.0 | 2.2 | 0.09 | 22.27 |
| 23.900 | 0.00 | 0.0 | 1.9 | 2.0 | 0.08 | 22.27 |
| 24.000 | 0.00 | 0.0 | 1.7 | 1.9 | 0.08 | 22.26 |
| 24.100 | 0.00 | 0.0 | 1.6 | 1.7 | 0.07 | 22.26 |
| 24.200 | 0.00 | 0.0 | 1.5 | 1.6 | 0.06 | 22.26 |
| 24.300 | 0.00 | 0.0 | 1.3 | 1.5 | 0.06 | 22.26 |
| 24.400 | 0.00 | 0.0 | 1.2 | 1.3 | 0.05 | 22.26 |
| 24.500 | 0.00 | 0.0 | 1.1 | 1.2 | 0.05 | 22.26 |
| 24.600 | 0.00 | 0.0 | 1.0 | 1.1 | 0.05 | 22.26 |

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS2 .HYD
Outflow Hydrograph: OUT .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 24.700 | 0.00 | 0.0 | 1.0 | 1.0 | 0.04 | 22.26 |
| 24.800 | 0.00 | 0.0 | 0.9 | 1.0 | 0.04 | 22.26 |
| 24.900 | 0.00 | 0.0 | 0.8 | 0.9 | 0.04 | 22.26 |
| 25.000 | 0.00 | 0.0 | 0.7 | 0.8 | 0.03 | 22.26 |
| 25.100 | 0.00 | 0.0 | 0.7 | 0.7 | 0.03 | 22.26 |
| 25.200 | 0.00 | 0.0 | 0.6 | 0.7 | 0.03 | 22.26 |
| 25.300 | 0.00 | 0.0 | 0.6 | 0.6 | 0.03 | 22.25 |
| 25.400 | 0.00 | 0.0 | 0.5 | 0.6 | 0.02 | 22.25 |
| 25.500 | 0.00 | 0.0 | 0.5 | 0.5 | 0.02 | 22.25 |
| 25.600 | 0.00 | 0.0 | 0.4 | 0.5 | 0.02 | 22.25 |
| 25.700 | 0.00 | 0.0 | 0.4 | 0.4 | 0.02 | 22.25 |
| 25.800 | 0.00 | 0.0 | 0.4 | 0.4 | 0.02 | 22.25 |
| 25.900 | 0.00 | 0.0 | 0.3 | 0.4 | 0.02 | 22.25 |

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

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS2 .HYD
Outflow Hydrograph: OUT .HYD

Starting Pond W.S. Elevation = 22.25 ft

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

Peak Inflow = 18.00 cfs
Peak Outflow = 10.09 cfs
Peak Elevation = 23.06 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.43 ac-ft
---
Total Storage in Pond = 0.43 ac-ft

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS2 .HYD
Outflow Hydrograph: OUT .HYD

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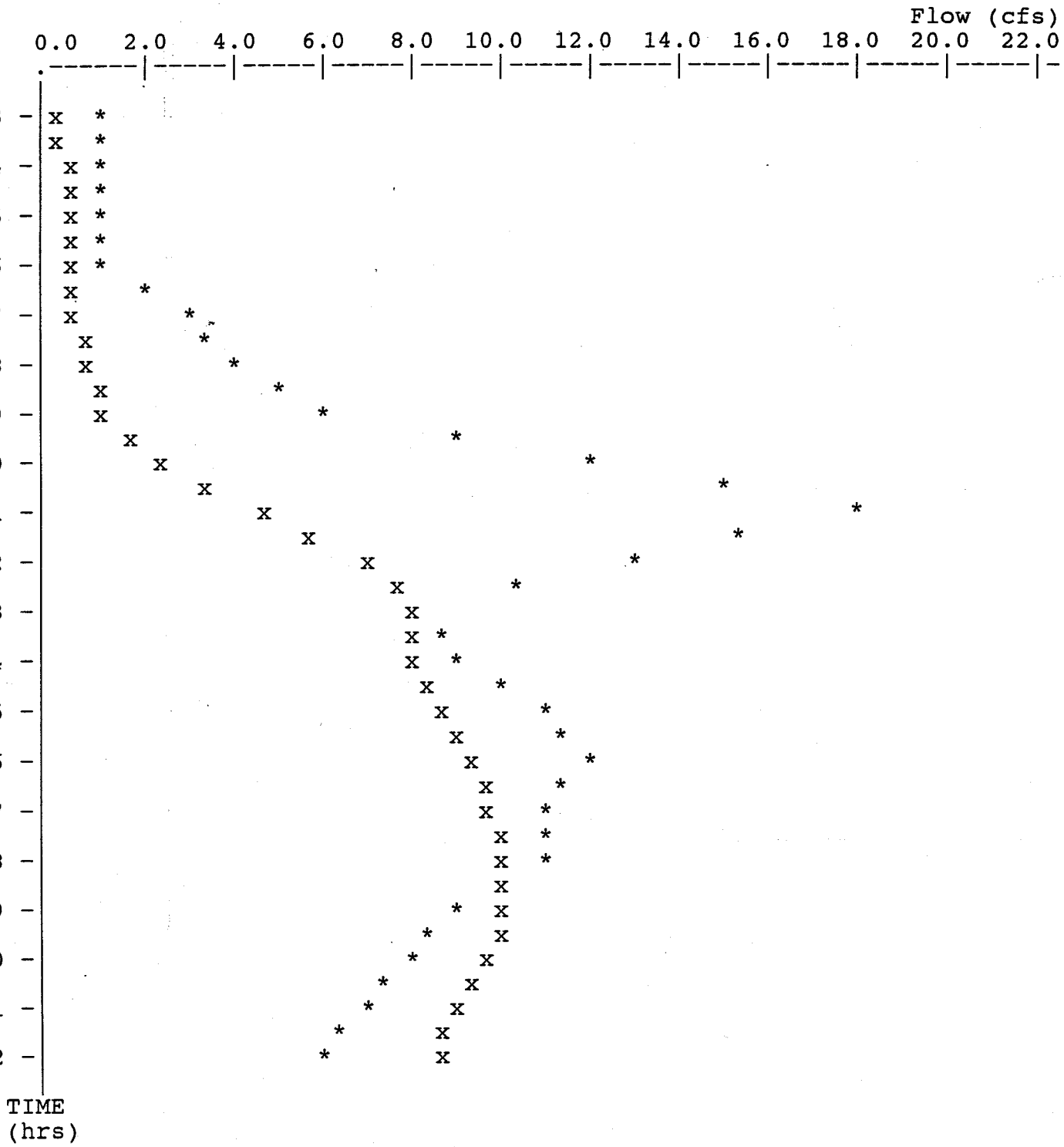
17:14:59

Peak Inflow = 18.00 cfs
Peak Outflow = 10.09 cfs
Peak Elevation = 23.06 ft




* File: LR1PS2 .HYD Qmax = 18.0 cfs
x File: OUT .HYD Qmax = 10.1 cfs

```
*************************
*                       *
*  Colonial Golf Course *
*        Pond #1        *
*  10Ø-YR Flood Routing *
*                       *
*                       *
*************************
```

Inflow Hydrograph: LR1PS10 .HYD
Rating Table file: LGPN16 .PND

----INITIAL CONDITIONS----
Elevation = 22.25 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 22.25 | 0.0 | 0.000 |
| 22.50 | 1.3 | 0.127 |
| 22.75 | 4.5 | 0.259 |
| 23.00 | 8.9 | 0.395 |
| 23.25 | 13.7 | 0.535 |
| 23.50 | 18.0 | 0.681 |
| 23.75 | 21.5 | 0.830 |
| 24.00 | 30.1 | 0.985 |
| 24.25 | 45.9 | 1.144 |
| 24.50 | 65.8 | 1.309 |
| 24.75 | 88.9 | 1.478 |
| 25.00 | 114.6 | 1.652 |
| 25.25 | 142.7 | 1.829 |
| 25.50 | 173.0 | 2.008 |
| 25.75 | 205.3 | 2.187 |
| 26.00 | 239.3 | 2.366 |
| 26.25 | 275.1 | 2.547 |
| 26.50 | 312.4 | 2.729 |
| 26.75 | 351.1 | 2.911 |
| 27.00 | 391.3 | 3.095 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + 0 (cfs) |
|---|---|
| 0.0 | 0.0 |
| 30.8 | 32.1 |
| 62.6 | 67.1 |
| 95.5 | 104.4 |
| 129.6 | 143.3 |
| 164.7 | 182.7 |
| 200.9 | 222.4 |
| 238.4 | 268.5 |
| 276.9 | 322.8 |
| 316.7 | 382.5 |
| 357.6 | 446.5 |
| 399.8 | 514.4 |
| 442.7 | 585.4 |
| 485.8 | 658.8 |
| 529.1 | 734.4 |
| 572.7 | 812.0 |
| 616.4 | 891.5 |
| 660.4 | 972.8 |
| 704.6 | 1055.7 |
| 749.0 | 1140.3 |

Time increment (t) = 0.100 hrs.

EXECUTED: 12-28-1992 17:13:33

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS10 .HYD
Outflow Hydrograph: OUT .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 | 2.00 | ----- | 0.0 | 0.0 | 0.00 | 22.25 |
| 11.100 | 2.00 | 4.0 | 3.7 | 4.0 | 0.16 | 22.28 |
| 11.200 | 2.00 | 4.0 | 7.1 | 7.7 | 0.31 | 22.31 |
| 11.300 | 2.00 | 4.0 | 10.2 | 11.1 | 0.45 | 22.34 |
| 11.400 | 2.00 | 4.0 | 13.0 | 14.2 | 0.57 | 22.36 |
| 11.500 | 2.00 | 4.0 | 15.6 | 17.0 | 0.69 | 22.38 |
| 11.600 | 2.00 | 4.0 | 18.0 | 19.6 | 0.80 | 22.40 |
| 11.700 | 5.00 | 7.0 | 23.0 | 25.0 | 1.01 | 22.45 |
| 11.800 | 8.00 | 13.0 | 32.7 | 36.0 | 1.66 | 22.53 |
| 11.900 | 11.00 | 19.0 | 45.5 | 51.7 | 3.09 | 22.64 |
| 12.000 | 21.00 | 32.0 | 66.1 | 77.5 | 5.72 | 22.82 |
| 12.100 | 32.00 | 53.0 | 97.6 | 119.1 | 10.71 | 23.09 |
| 12.200 | 24.00 | 56.0 | 124.0 | 153.6 | 14.83 | 23.32 |
| 12.300 | 17.00 | 41.0 | 132.8 | 165.0 | 16.07 | 23.39 |
| 12.400 | 21.00 | 38.0 | 137.4 | 170.8 | 16.71 | 23.42 |
| 12.500 | 26.00 | 47.0 | 148.1 | 184.4 | 18.15 | 23.51 |
| 12.600 | 29.00 | 55.0 | 163.5 | 203.1 | 19.80 | 23.63 |
| 12.700 | 27.00 | 56.0 | 177.0 | 219.5 | 21.24 | 23.73 |
| 12.800 | 24.00 | 51.0 | 182.9 | 228.0 | 22.55 | 23.78 |
| 12.900 | 20.00 | 44.0 | 182.3 | 226.9 | 22.34 | 23.77 |
| 13.000 | 17.00 | 37.0 | 176.8 | 219.3 | 21.22 | 23.73 |
| 13.100 | 15.00 | 32.0 | 168.2 | 208.8 | 20.30 | 23.66 |
| 13.200 | 13.00 | 28.0 | 157.8 | 196.2 | 19.19 | 23.59 |
| 13.300 | 11.00 | 24.0 | 146.0 | 181.8 | 17.91 | 23.49 |
| 13.400 | 9.00 | 20.0 | 133.7 | 166.0 | 16.18 | 23.39 |
| 13.500 | 8.00 | 17.0 | 121.6 | 150.7 | 14.51 | 23.30 |
| 13.600 | 7.00 | 15.0 | 110.9 | 136.6 | 12.88 | 23.21 |
| 13.700 | 6.00 | 13.0 | 101.3 | 123.9 | 11.30 | 23.13 |
| 13.800 | 6.00 | 12.0 | 93.3 | 113.3 | 9.99 | 23.06 |
| 13.900 | 6.00 | 12.0 | 87.3 | 105.3 | 9.00 | 23.01 |
| 14.000 | 5.00 | 11.0 | 81.9 | 98.3 | 8.17 | 22.96 |
| 14.100 | 5.00 | 10.0 | 77.1 | 91.9 | 7.43 | 22.92 |
| 14.200 | 4.00 | 9.0 | 72.6 | 86.1 | 6.74 | 22.88 |
| 14.300 | 4.00 | 8.0 | 68.4 | 80.6 | 6.09 | 22.84 |
| 14.400 | 4.00 | 8.0 | 65.2 | 76.4 | 5.60 | 22.81 |
| 14.500 | 4.00 | 8.0 | 62.8 | 73.2 | 5.22 | 22.79 |
| 14.600 | 4.00 | 8.0 | 60.9 | 70.8 | 4.93 | 22.77 |
| 14.700 | 4.00 | 8.0 | 59.5 | 68.9 | 4.71 | 22.76 |
| 14.800 | 4.00 | 8.0 | 58.4 | 67.5 | 4.54 | 22.75 |
| 14.900 | 3.00 | 7.0 | 56.7 | 65.4 | 4.34 | 22.74 |
| 15.000 | 3.00 | 6.0 | 54.5 | 62.7 | 4.10 | 22.72 |
| 15.100 | 3.00 | 6.0 | 52.7 | 60.5 | 3.90 | 22.70 |
| 15.200 | 3.00 | 6.0 | 51.3 | 58.7 | 3.73 | 22.69 |
| 15.300 | 3.00 | 6.0 | 50.1 | 57.3 | 3.60 | 22.68 |
| 15.400 | 3.00 | 6.0 | 49.1 | 56.1 | 3.49 | 22.67 |

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS10 .HYD
Outflow Hydrograph: OUT .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 15.500 | 3.00 | 6.0 | 48.3 | 55.1 | 3.40 | 22.66 |
| 15.600 | 3.00 | 6.0 | 47.6 | 54.3 | 3.33 | 22.66 |
| 15.700 | 3.00 | 6.0 | 47.1 | 53.6 | 3.27 | 22.65 |
| 15.800 | 3.00 | 6.0 | 46.7 | 53.1 | 3.22 | 22.65 |
| 15.900 | 3.00 | 6.0 | 46.3 | 52.7 | 3.18 | 22.65 |
| 16.000 | 3.00 | 6.0 | 46.0 | 52.3 | 3.15 | 22.64 |
| 16.100 | 3.00 | 6.0 | 45.8 | 52.0 | 3.12 | 22.64 |
| 16.200 | 3.00 | 6.0 | 45.6 | 51.8 | 3.10 | 22.64 |
| 16.300 | 3.00 | 6.0 | 45.4 | 51.6 | 3.08 | 22.64 |
| 16.400 | 3.00 | 6.0 | 45.3 | 51.4 | 3.07 | 22.64 |
| 16.500 | 3.00 | 6.0 | 45.2 | 51.3 | 3.05 | 22.64 |
| 16.600 | 3.00 | 6.0 | 45.1 | 51.2 | 3.04 | 22.64 |
| 16.700 | 3.00 | 6.0 | 45.0 | 51.1 | 3.04 | 22.64 |
| 16.800 | 2.00 | 5.0 | 44.1 | 50.0 | 2.94 | 22.63 |
| 16.900 | 2.00 | 4.0 | 42.6 | 48.1 | 2.77 | 22.61 |
| 17.000 | 2.00 | 4.0 | 41.4 | 46.6 | 2.63 | 22.60 |
| 17.100 | 2.00 | 4.0 | 40.3 | 45.4 | 2.51 | 22.59 |
| 17.200 | 2.00 | 4.0 | 39.5 | 44.3 | 2.42 | 22.59 |
| 17.300 | 2.00 | 4.0 | 38.8 | 43.5 | 2.34 | 22.58 |
| 17.400 | 2.00 | 4.0 | 38.3 | 42.8 | 2.28 | 22.58 |
| 17.500 | 2.00 | 4.0 | 37.8 | 42.3 | 2.23 | 22.57 |
| 17.600 | 2.00 | 4.0 | 37.4 | 41.8 | 2.19 | 22.57 |
| 17.700 | 2.00 | 4.0 | 37.1 | 41.4 | 2.15 | 22.57 |
| 17.800 | 1.00 | 3.0 | 36.1 | 40.1 | 2.03 | 22.56 |
| 17.900 | 1.00 | 2.0 | 34.4 | 38.1 | 1.84 | 22.54 |
| 18.000 | 1.00 | 2.0 | 33.0 | 36.4 | 1.69 | 22.53 |
| 18.100 | 1.00 | 2.0 | 31.9 | 35.0 | 1.56 | 22.52 |
| 18.200 | 1.00 | 2.0 | 30.9 | 33.9 | 1.46 | 22.51 |
| 18.300 | 1.00 | 2.0 | 30.2 | 32.9 | 1.38 | 22.51 |
| 18.400 | 1.00 | 2.0 | 29.6 | 32.2 | 1.31 | 22.50 |
| 18.500 | 1.00 | 2.0 | 29.0 | 31.6 | 1.28 | 22.50 |
| 18.600 | 1.00 | 2.0 | 28.5 | 31.0 | 1.26 | 22.49 |
| 18.700 | 1.00 | 2.0 | 28.0 | 30.5 | 1.24 | 22.49 |
| 18.800 | 1.00 | 2.0 | 27.6 | 30.0 | 1.22 | 22.48 |
| 18.900 | 1.00 | 2.0 | 27.2 | 29.6 | 1.20 | 22.48 |
| 19.000 | 1.00 | 2.0 | 26.8 | 29.2 | 1.18 | 22.48 |
| 19.100 | 1.00 | 2.0 | 26.5 | 28.8 | 1.17 | 22.47 |
| 19.200 | 1.00 | 2.0 | 26.2 | 28.5 | 1.15 | 22.47 |
| 19.300 | 1.00 | 2.0 | 25.9 | 28.2 | 1.14 | 22.47 |
| 19.400 | 1.00 | 2.0 | 25.6 | 27.9 | 1.13 | 22.47 |
| 19.500 | 1.00 | 2.0 | 25.4 | 27.6 | 1.12 | 22.47 |
| 19.600 | 1.00 | 2.0 | 25.2 | 27.4 | 1.11 | 22.46 |
| 19.700 | 1.00 | 2.0 | 25.0 | 27.2 | 1.10 | 22.46 |
| 19.800 | 1.00 | 2.0 | 24.8 | 27.0 | 1.09 | 22.46 |
| 19.900 | 1.00 | 2.0 | 24.6 | 26.8 | 1.09 | 22.46 |
| 20.000 | 1.00 | 2.0 | 24.5 | 26.6 | 1.08 | 22.46 |

EXECUTED: 12-28-1992 17:13:33

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS10 .HYD
Outflow Hydrograph: OUT .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 20.100 | 1.00 | 2.0 | 24.3 | 26.5 | 1.07 | 22.46 |
| 20.200 | 1.00 | 2.0 | 24.2 | 26.3 | 1.07 | 22.46 |
| 20.300 | 1.00 | 2.0 | 24.1 | 26.2 | 1.06 | 22.45 |
| 20.400 | 1.00 | 2.0 | 23.9 | 26.1 | 1.06 | 22.45 |
| 20.500 | 1.00 | 2.0 | 23.8 | 25.9 | 1.05 | 22.45 |
| 20.600 | 1.00 | 2.0 | 23.8 | 25.8 | 1.05 | 22.45 |
| 20.700 | 1.00 | 2.0 | 23.7 | 25.8 | 1.04 | 22.45 |
| 20.800 | 1.00 | 2.0 | 23.6 | 25.7 | 1.04 | 22.45 |
| 20.900 | 1.00 | 2.0 | 23.5 | 25.6 | 1.04 | 22.45 |
| 21.000 | 1.00 | 2.0 | 23.4 | 25.5 | 1.03 | 22.45 |
| 21.100 | 1.00 | 2.0 | 23.4 | 25.4 | 1.03 | 22.45 |
| 21.200 | 1.00 | 2.0 | 23.3 | 25.4 | 1.03 | 22.45 |
| 21.300 | 1.00 | 2.0 | 23.3 | 25.3 | 1.03 | 22.45 |
| 21.400 | 1.00 | 2.0 | 23.2 | 25.3 | 1.02 | 22.45 |
| 21.500 | 1.00 | 2.0 | 23.2 | 25.2 | 1.02 | 22.45 |
| 21.600 | 1.00 | 2.0 | 23.1 | 25.2 | 1.02 | 22.45 |
| 21.700 | 1.00 | 2.0 | 23.1 | 25.1 | 1.02 | 22.45 |
| 21.800 | 1.00 | 2.0 | 23.1 | 25.1 | 1.02 | 22.45 |
| 21.900 | 1.00 | 2.0 | 23.0 | 25.1 | 1.02 | 22.45 |
| 22.000 | 1.00 | 2.0 | 23.0 | 25.0 | 1.01 | 22.45 |
| 22.100 | 1.00 | 2.0 | 23.0 | 25.0 | 1.01 | 22.44 |
| 22.200 | 1.00 | 2.0 | 23.0 | 25.0 | 1.01 | 22.44 |
| 22.300 | 1.00 | 2.0 | 22.9 | 25.0 | 1.01 | 22.44 |
| 22.400 | 1.00 | 2.0 | 22.9 | 24.9 | 1.01 | 22.44 |
| 22.500 | 1.00 | 2.0 | 22.9 | 24.9 | 1.01 | 22.44 |
| 22.600 | 1.00 | 2.0 | 22.9 | 24.9 | 1.01 | 22.44 |
| 22.700 | 1.00 | 2.0 | 22.9 | 24.9 | 1.01 | 22.44 |
| 22.800 | 1.00 | 2.0 | 22.8 | 24.9 | 1.01 | 22.44 |
| 22.900 | 1.00 | 2.0 | 22.8 | 24.8 | 1.01 | 22.44 |
| 23.000 | 1.00 | 2.0 | 22.8 | 24.8 | 1.01 | 22.44 |
| 23.100 | 1.00 | 2.0 | 22.8 | 24.8 | 1.01 | 22.44 |
| 23.200 | 1.00 | 2.0 | 22.8 | 24.8 | 1.01 | 22.44 |
| 23.300 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 23.400 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 23.500 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 23.600 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 23.700 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 23.800 | 1.00 | 2.0 | 22.8 | 24.8 | 1.00 | 22.44 |
| 23.900 | 1.00 | 2.0 | 22.7 | 24.8 | 1.00 | 22.44 |
| 24.000 | 0.00 | 1.0 | 21.8 | 23.7 | 0.96 | 22.44 |
| 24.100 | 0.00 | 0.0 | 20.1 | 21.8 | 0.88 | 22.42 |
| 24.200 | 0.00 | 0.0 | 18.4 | 20.1 | 0.81 | 22.41 |
| 24.300 | 0.00 | 0.0 | 16.9 | 18.4 | 0.75 | 22.39 |
| 24.400 | 0.00 | 0.0 | 15.6 | 16.9 | 0.69 | 22.38 |
| 24.500 | 0.00 | 0.0 | 14.3 | 15.6 | 0.63 | 22.37 |
| 24.600 | 0.00 | 0.0 | 13.1 | 14.3 | 0.58 | 22.36 |

EXECUTED: 12-28-1992 17:13:33

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS10 .HYD
Outflow Hydrograph: OUT .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 24.700 | 0.00 | 0.0 | 12.1 | 13.1 | 0.53 | 22.35 |
| 24.800 | 0.00 | 0.0 | 11.1 | 12.1 | 0.49 | 22.34 |
| 24.900 | 0.00 | 0.0 | 10.2 | 11.1 | 0.45 | 22.34 |
| 25.000 | 0.00 | 0.0 | 9.4 | 10.2 | 0.41 | 22.33 |
| 25.100 | 0.00 | 0.0 | 8.6 | 9.4 | 0.38 | 22.32 |
| 25.200 | 0.00 | 0.0 | 7.9 | 8.6 | 0.35 | 22.32 |
| 25.300 | 0.00 | 0.0 | 7.3 | 7.9 | 0.32 | 22.31 |
| 25.400 | 0.00 | 0.0 | 6.7 | 7.3 | 0.29 | 22.31 |
| 25.500 | 0.00 | 0.0 | 6.1 | 6.7 | 0.27 | 22.30 |
| 25.600 | 0.00 | 0.0 | 5.6 | 6.1 | 0.25 | 22.30 |
| 25.700 | 0.00 | 0.0 | 5.2 | 5.6 | 0.23 | 22.29 |
| 25.800 | 0.00 | 0.0 | 4.8 | 5.2 | 0.21 | 22.29 |
| 25.900 | 0.00 | 0.0 | 4.4 | 4.8 | 0.19 | 22.29 |

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

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS10 .HYD
Outflow Hydrograph: OUT .HYD

Starting Pond W.S. Elevation = 22.25 ft

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

Peak Inflow = 32.00 cfs
Peak Outflow = 22.55 cfs
Peak Elevation = 23.78 ft

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

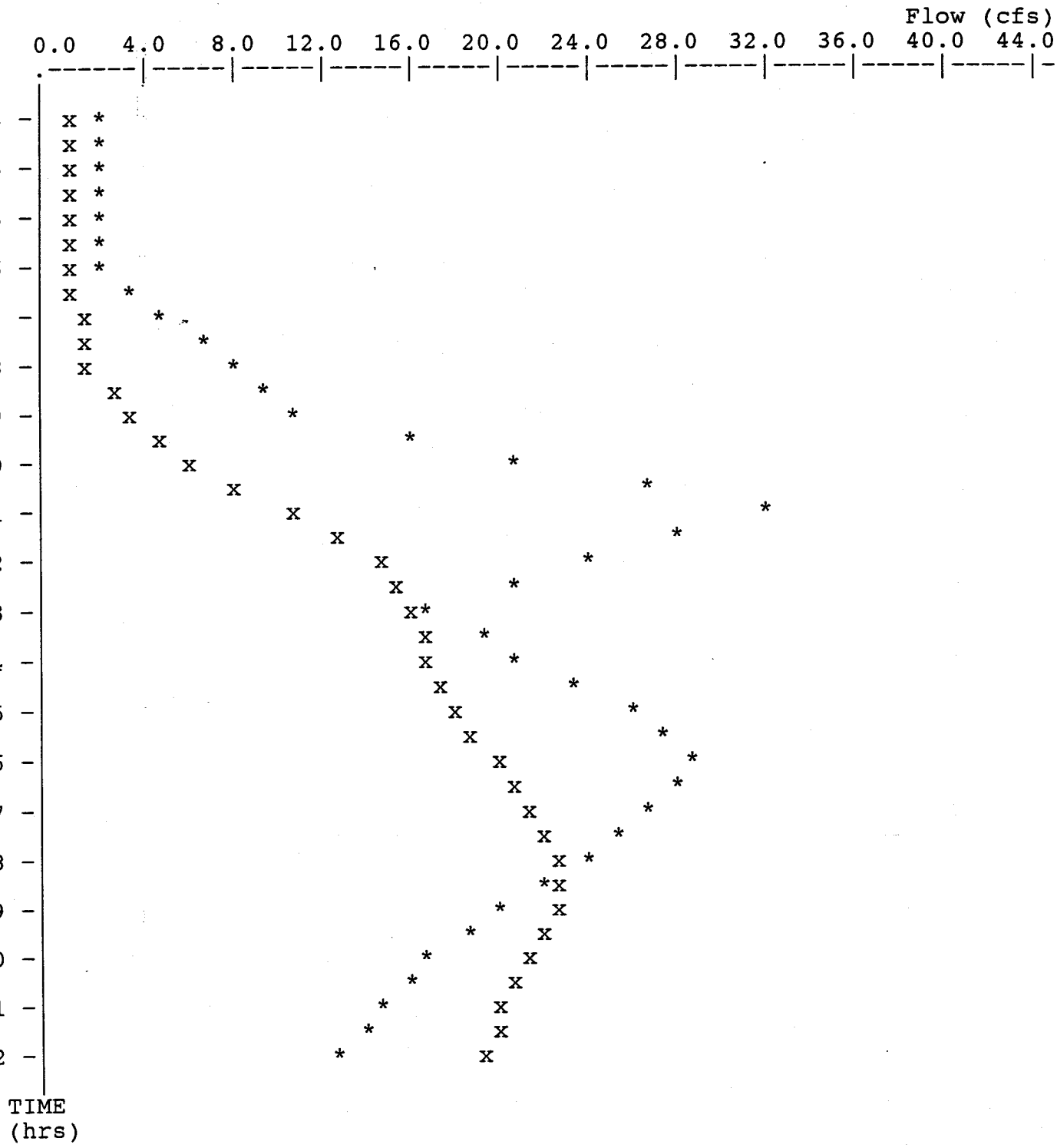
Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.85 ac-ft
---
Total Storage in Pond = 0.85 ac-ft

Warning: Inflow hydrograph truncated on left side.

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS10 .HYD
Outflow Hydrograph: OUT .HYD

EXECUTED: 12-28-1992
17:13:33

Peak Inflow = 32.00 cfs
Peak Outflow = 22.55 cfs
Peak Elevation = 23.78 ft




* File: LR1PS10 .HYD Qmax = 32.0 cfs
x File: OUT .HYD Qmax = 22.5 cfs

```
*************************
*                       *
*  Colonial Golf Course *
*        Pond #1        *
*     100yr Routing     *
*                       *
*                       *
*************************
```

Inflow Hydrograph: LR1PS100.HYD
Rating Table file: LGPN16 .PND

----INITIAL CONDITIONS----
Elevation = 22.25 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 22.25 | 0.0 | 0.000 |
| 22.50 | 1.3 | 0.127 |
| 22.75 | 4.5 | 0.259 |
| 23.00 | 8.9 | 0.395 |
| 23.25 | 13.7 | 0.535 |
| 23.50 | 18.0 | 0.681 |
| 23.75 | 21.5 | 0.830 |
| 24.00 | 30.1 | 0.985 |
| 24.25 | 45.9 | 1.144 |
| 24.50 | 65.8 | 1.309 |
| 24.75 | 88.9 | 1.478 |
| 25.00 | 114.6 | 1.652 |
| 25.25 | 142.7 | 1.829 |
| 25.50 | 173.0 | 2.008 |
| 25.75 | 205.3 | 2.187 |
| 26.00 | 239.3 | 2.366 |
| 26.25 | 275.1 | 2.547 |
| 26.50 | 312.4 | 2.729 |
| 26.75 | 351.1 | 2.911 |
| 27.00 | 391.3 | 3.095 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 0.0 | 0.0 |
| 30.8 | 32.1 |
| 62.6 | 67.1 |
| 95.5 | 104.4 |
| 129.6 | 143.3 |
| 164.7 | 182.7 |
| 200.9 | 222.4 |
| 238.4 | 268.5 |
| 276.9 | 322.8 |
| 316.7 | 382.5 |
| 357.6 | 446.5 |
| 399.8 | 514.4 |
| 442.7 | 585.4 |
| 485.8 | 658.8 |
| 529.1 | 734.4 |
| 572.7 | 812.0 |
| 616.4 | 891.5 |
| 660.4 | 972.8 |
| 704.6 | 1055.7 |
| 749.0 | 1140.3 |

Time increment (t) = 0.100 hrs.

EXECUTED: 12-28-1992 17:10:51

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS100.HYD
Outflow Hydrograph: OUT .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 | 2.00 | ----- | 0.0 | 0.0 | 0.00 | 22.25 |
| 11.100 | 2.00 | 4.0 | 3.7 | 4.0 | 0.16 | 22.28 |
| 11.200 | 3.00 | 5.0 | 8.0 | 8.7 | 0.35 | 22.32 |
| 11.300 | 3.00 | 6.0 | 12.8 | 14.0 | 0.57 | 22.36 |
| 11.400 | 4.00 | 7.0 | 18.2 | 19.8 | 0.80 | 22.40 |
| 11.500 | 4.00 | 8.0 | 24.1 | 26.2 | 1.06 | 22.45 |
| 11.600 | 5.00 | 9.0 | 30.3 | 33.1 | 1.39 | 22.51 |
| 11.700 | 9.00 | 14.0 | 39.5 | 44.3 | 2.42 | 22.59 |
| 11.800 | 13.00 | 22.0 | 53.5 | 61.5 | 3.98 | 22.71 |
| 11.900 | 17.00 | 30.0 | 70.7 | 83.5 | 6.43 | 22.86 |
| 12.000 | 31.00 | 48.0 | 97.3 | 118.7 | 10.66 | 23.09 |
| 12.100 | 47.00 | 78.0 | 140.9 | 175.3 | 17.20 | 23.45 |
| 12.200 | 37.00 | 84.0 | 181.0 | 224.9 | 21.97 | 23.76 |
| 12.300 | 29.00 | 66.0 | 194.8 | 247.0 | 26.09 | 23.88 |
| 12.400 | 37.00 | 66.0 | 203.5 | 260.8 | 28.67 | 23.96 |
| 12.500 | 45.00 | 82.0 | 215.4 | 285.5 | 35.05 | 24.08 |
| 12.600 | 49.00 | 94.0 | 225.4 | 309.4 | 41.99 | 24.19 |
| 12.700 | 46.00 | 95.0 | 230.0 | 320.4 | 45.19 | 24.24 |
| 12.800 | 42.00 | 88.0 | 229.0 | 318.0 | 44.50 | 24.23 |
| 12.900 | 36.00 | 78.0 | 224.4 | 307.0 | 41.30 | 24.18 |
| 13.000 | 30.00 | 66.0 | 217.4 | 290.4 | 36.48 | 24.10 |
| 13.100 | 25.00 | 55.0 | 209.9 | 272.4 | 31.26 | 24.02 |
| 13.200 | 20.00 | 45.0 | 199.8 | 254.9 | 27.57 | 23.93 |
| 13.300 | 18.00 | 38.0 | 189.0 | 237.8 | 24.37 | 23.83 |
| 13.400 | 15.00 | 33.0 | 179.1 | 222.0 | 21.46 | 23.75 |
| 13.500 | 14.00 | 29.0 | 167.6 | 208.1 | 20.24 | 23.66 |
| 13.600 | 12.00 | 26.0 | 155.7 | 193.6 | 18.96 | 23.57 |
| 13.700 | 11.00 | 23.0 | 143.6 | 178.7 | 17.57 | 23.47 |
| 13.800 | 10.00 | 21.0 | 132.5 | 164.6 | 16.02 | 23.39 |
| 13.900 | 9.00 | 19.0 | 122.3 | 151.5 | 14.60 | 23.30 |
| 14.000 | 8.00 | 17.0 | 112.9 | 139.3 | 13.21 | 23.22 |
| 14.100 | 7.00 | 15.0 | 104.3 | 127.9 | 11.80 | 23.15 |
| 14.200 | 7.00 | 14.0 | 97.1 | 118.3 | 10.61 | 23.09 |
| 14.300 | 6.00 | 13.0 | 90.9 | 110.1 | 9.60 | 23.04 |
| 14.400 | 6.00 | 12.0 | 85.5 | 102.9 | 8.72 | 22.99 |
| 14.500 | 5.00 | 11.0 | 80.5 | 96.5 | 7.96 | 22.95 |
| 14.600 | 5.00 | 10.0 | 76.0 | 90.5 | 7.26 | 22.91 |
| 14.700 | 5.00 | 10.0 | 72.6 | 86.0 | 6.73 | 22.88 |
| 14.800 | 5.00 | 10.0 | 69.9 | 82.6 | 6.32 | 22.85 |
| 14.900 | 5.00 | 10.0 | 67.9 | 79.9 | 6.01 | 22.84 |
| 15.000 | 5.00 | 10.0 | 66.4 | 77.9 | 5.77 | 22.82 |
| 15.100 | 5.00 | 10.0 | 65.2 | 76.4 | 5.59 | 22.81 |
| 15.200 | 5.00 | 10.0 | 64.3 | 75.2 | 5.45 | 22.80 |
| 15.300 | 4.00 | 9.0 | 62.8 | 73.3 | 5.23 | 22.79 |
| 15.400 | 4.00 | 8.0 | 61.0 | 70.8 | 4.94 | 22.77 |

EXECUTED: 12-28-1992 17:10:51

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS100.HYD
Outflow Hydrograph: OUT .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 15.500 | 4.00 | 8.0 | 59.5 | 69.0 | 4.72 | 22.76 |
| 15.600 | 4.00 | 8.0 | 58.4 | 67.5 | 4.55 | 22.75 |
| 15.700 | 4.00 | 8.0 | 57.6 | 66.4 | 4.44 | 22.75 |
| 15.800 | 4.00 | 8.0 | 56.8 | 65.6 | 4.36 | 22.74 |
| 15.900 | 4.00 | 8.0 | 56.3 | 64.8 | 4.29 | 22.73 |
| 16.000 | 4.00 | 8.0 | 55.8 | 64.3 | 4.24 | 22.73 |
| 16.100 | 4.00 | 8.0 | 55.4 | 63.8 | 4.19 | 22.73 |
| 16.200 | 4.00 | 8.0 | 55.1 | 63.4 | 4.16 | 22.72 |
| 16.300 | 4.00 | 8.0 | 54.8 | 63.1 | 4.13 | 22.72 |
| 16.400 | 4.00 | 8.0 | 54.6 | 62.8 | 4.11 | 22.72 |
| 16.500 | 4.00 | 8.0 | 54.4 | 62.6 | 4.09 | 22.72 |
| 16.600 | 4.00 | 8.0 | 54.3 | 62.4 | 4.07 | 22.72 |
| 16.700 | 4.00 | 8.0 | 54.2 | 62.3 | 4.06 | 22.72 |
| 16.800 | 3.00 | 7.0 | 53.3 | 61.2 | 3.96 | 22.71 |
| 16.900 | 3.00 | 6.0 | 51.7 | 59.3 | 3.78 | 22.69 |
| 17.000 | 3.00 | 6.0 | 50.4 | 57.7 | 3.64 | 22.68 |
| 17.100 | 3.00 | 6.0 | 49.4 | 56.4 | 3.52 | 22.67 |
| 17.200 | 3.00 | 6.0 | 48.5 | 55.4 | 3.43 | 22.67 |
| 17.300 | 3.00 | 6.0 | 47.8 | 54.5 | 3.35 | 22.66 |
| 17.400 | 3.00 | 6.0 | 47.3 | 53.8 | 3.29 | 22.66 |
| 17.500 | 3.00 | 6.0 | 46.8 | 53.3 | 3.23 | 22.65 |
| 17.600 | 3.00 | 6.0 | 46.4 | 52.8 | 3.19 | 22.65 |
| 17.700 | 3.00 | 6.0 | 46.1 | 52.4 | 3.16 | 22.64 |
| 17.800 | 3.00 | 6.0 | 45.8 | 52.1 | 3.13 | 22.64 |
| 17.900 | 3.00 | 6.0 | 45.6 | 51.8 | 3.10 | 22.64 |
| 18.000 | 3.00 | 6.0 | 45.5 | 51.6 | 3.09 | 22.64 |
| 18.100 | 3.00 | 6.0 | 45.3 | 51.5 | 3.07 | 22.64 |
| 18.200 | 3.00 | 6.0 | 45.2 | 51.3 | 3.06 | 22.64 |
| 18.300 | 3.00 | 6.0 | 45.1 | 51.2 | 3.05 | 22.64 |
| 18.400 | 3.00 | 6.0 | 45.0 | 51.1 | 3.04 | 22.64 |
| 18.500 | 3.00 | 6.0 | 45.0 | 51.0 | 3.03 | 22.64 |
| 18.600 | 3.00 | 6.0 | 44.9 | 51.0 | 3.03 | 22.63 |
| 18.700 | 3.00 | 6.0 | 44.9 | 50.9 | 3.02 | 22.63 |
| 18.800 | 3.00 | 6.0 | 44.9 | 50.9 | 3.02 | 22.63 |
| 18.900 | 3.00 | 6.0 | 44.8 | 50.9 | 3.01 | 22.63 |
| 19.000 | 3.00 | 6.0 | 44.8 | 50.8 | 3.01 | 22.63 |
| 19.100 | 3.00 | 6.0 | 44.8 | 50.8 | 3.01 | 22.63 |
| 19.200 | 3.00 | 6.0 | 44.8 | 50.8 | 3.01 | 22.63 |
| 19.300 | 3.00 | 6.0 | 44.8 | 50.8 | 3.01 | 22.63 |
| 19.400 | 3.00 | 6.0 | 44.7 | 50.8 | 3.01 | 22.63 |
| 19.500 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |
| 19.600 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |
| 19.700 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |
| 19.800 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |
| 19.900 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |
| 20.000 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS100.HYD
Outflow Hydrograph: OUT .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 20.100 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |
| 20.200 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |
| 20.300 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |
| 20.400 | 3.00 | 6.0 | 44.7 | 50.7 | 3.00 | 22.63 |
| 20.500 | 2.00 | 5.0 | 43.9 | 49.7 | 2.91 | 22.63 |
| 20.600 | 2.00 | 4.0 | 42.4 | 47.9 | 2.74 | 22.61 |
| 20.700 | 2.00 | 4.0 | 41.2 | 46.4 | 2.61 | 22.60 |
| 20.800 | 2.00 | 4.0 | 40.2 | 45.2 | 2.50 | 22.59 |
| 20.900 | 2.00 | 4.0 | 39.4 | 44.2 | 2.41 | 22.59 |
| 21.000 | 2.00 | 4.0 | 38.7 | 43.4 | 2.33 | 22.58 |
| 21.100 | 2.00 | 4.0 | 38.2 | 42.7 | 2.27 | 22.58 |
| 21.200 | 2.00 | 4.0 | 37.7 | 42.2 | 2.22 | 22.57 |
| 21.300 | 2.00 | 4.0 | 37.4 | 41.7 | 2.18 | 22.57 |
| 21.400 | 2.00 | 4.0 | 37.1 | 41.4 | 2.15 | 22.57 |
| 21.500 | 2.00 | 4.0 | 36.8 | 41.1 | 2.12 | 22.56 |
| 21.600 | 1.00 | 3.0 | 35.8 | 39.8 | 2.01 | 22.56 |
| 21.700 | 1.00 | 2.0 | 34.2 | 37.8 | 1.82 | 22.54 |
| 21.800 | 1.00 | 2.0 | 32.8 | 36.2 | 1.67 | 22.53 |
| 21.900 | 1.00 | 2.0 | 31.7 | 34.8 | 1.55 | 22.52 |
| 22.000 | 1.00 | 2.0 | 30.8 | 33.7 | 1.45 | 22.51 |
| 22.100 | 1.00 | 2.0 | 30.1 | 32.8 | 1.37 | 22.51 |
| 22.200 | 1.00 | 2.0 | 29.5 | 32.1 | 1.30 | 22.50 |
| 22.300 | 1.00 | 2.0 | 28.9 | 31.5 | 1.28 | 22.50 |
| 22.400 | 1.00 | 2.0 | 28.4 | 30.9 | 1.25 | 22.49 |
| 22.500 | 1.00 | 2.0 | 28.0 | 30.4 | 1.23 | 22.49 |
| 22.600 | 1.00 | 2.0 | 27.5 | 30.0 | 1.21 | 22.48 |
| 22.700 | 1.00 | 2.0 | 27.1 | 29.5 | 1.20 | 22.48 |
| 22.800 | 1.00 | 2.0 | 26.8 | 29.1 | 1.18 | 22.48 |
| 22.900 | 1.00 | 2.0 | 26.4 | 28.8 | 1.17 | 22.47 |
| 23.000 | 1.00 | 2.0 | 26.1 | 28.4 | 1.15 | 22.47 |
| 23.100 | 1.00 | 2.0 | 25.9 | 28.1 | 1.14 | 22.47 |
| 23.200 | 1.00 | 2.0 | 25.6 | 27.9 | 1.13 | 22.47 |
| 23.300 | 1.00 | 2.0 | 25.4 | 27.6 | 1.12 | 22.47 |
| 23.400 | 1.00 | 2.0 | 25.2 | 27.4 | 1.11 | 22.46 |
| 23.500 | 1.00 | 2.0 | 25.0 | 27.2 | 1.10 | 22.46 |
| 23.600 | 1.00 | 2.0 | 24.8 | 27.0 | 1.09 | 22.46 |
| 23.700 | 1.00 | 2.0 | 24.6 | 26.8 | 1.08 | 22.46 |
| 23.800 | 1.00 | 2.0 | 24.4 | 26.6 | 1.08 | 22.46 |
| 23.900 | 1.00 | 2.0 | 24.3 | 26.4 | 1.07 | 22.46 |
| 24.000 | 0.00 | 1.0 | 23.2 | 25.3 | 1.03 | 22.45 |
| 24.100 | 0.00 | 0.0 | 21.4 | 23.2 | 0.94 | 22.43 |
| 24.200 | 0.00 | 0.0 | 19.6 | 21.4 | 0.87 | 22.42 |
| 24.300 | 0.00 | 0.0 | 18.0 | 19.6 | 0.80 | 22.40 |
| 24.400 | 0.00 | 0.0 | 16.6 | 18.0 | 0.73 | 22.39 |
| 24.500 | 0.00 | 0.0 | 15.2 | 16.6 | 0.67 | 22.38 |
| 24.600 | 0.00 | 0.0 | 14.0 | 15.2 | 0.62 | 22.37 |

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS100.HYD
Outflow Hydrograph: OUT .HYD

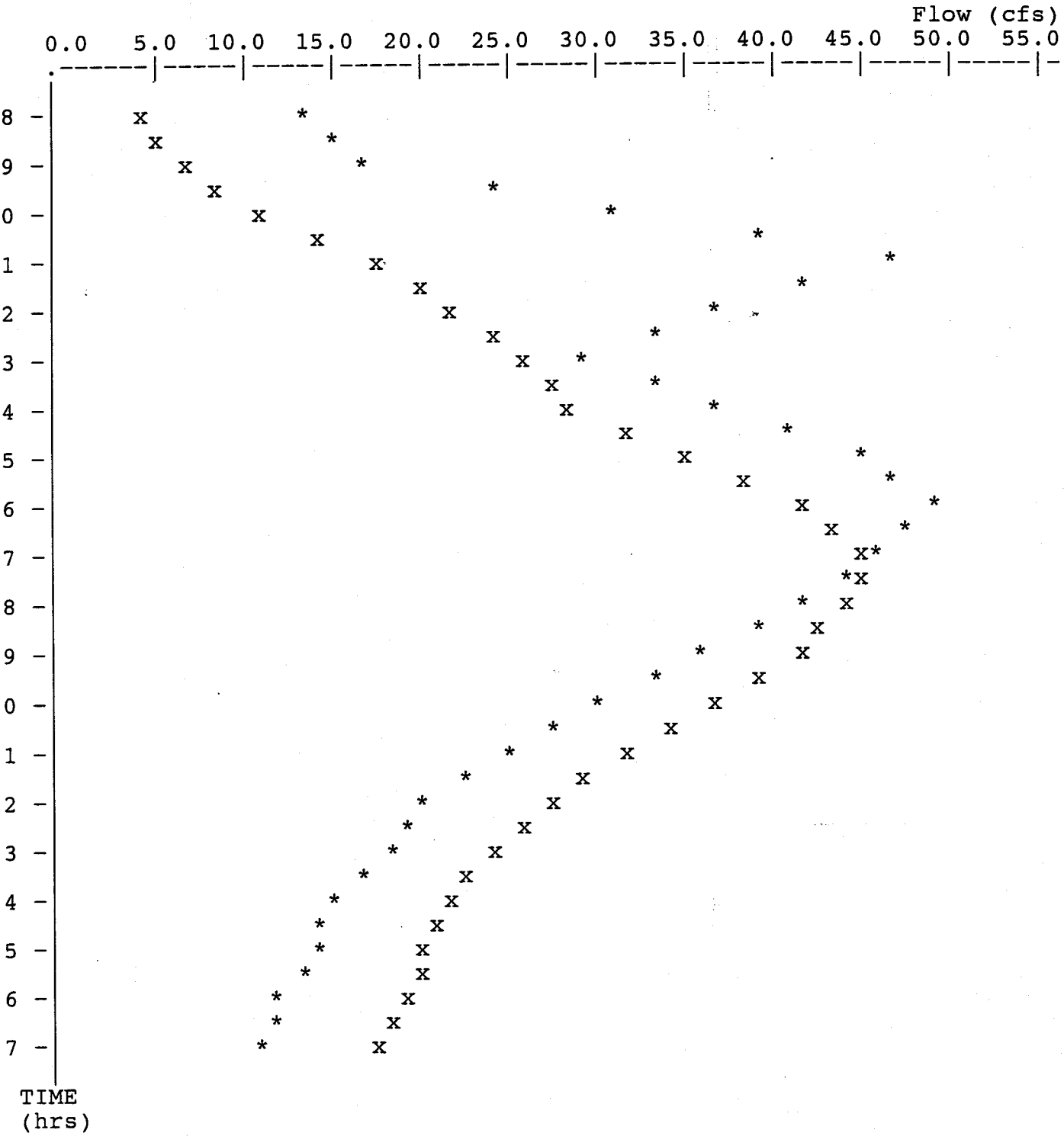
| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 24.700 | 0.00 | 0.0 | 12.9 | 14.0 | 0.57 | 22.36 |
| 24.800 | 0.00 | 0.0 | 11.8 | 12.9 | 0.52 | 22.35 |
| 24.900 | 0.00 | 0.0 | 10.9 | 11.8 | 0.48 | 22.34 |
| 25.000 | 0.00 | 0.0 | 10.0 | 10.9 | 0.44 | 22.33 |
| 25.100 | 0.00 | 0.0 | 9.2 | 10.0 | 0.40 | 22.33 |
| 25.200 | 0.00 | 0.0 | 8.4 | 9.2 | 0.37 | 22.32 |
| 25.300 | 0.00 | 0.0 | 7.7 | 8.4 | 0.34 | 22.32 |
| 25.400 | 0.00 | 0.0 | 7.1 | 7.7 | 0.31 | 22.31 |
| 25.500 | 0.00 | 0.0 | 6.5 | 7.1 | 0.29 | 22.31 |
| 25.600 | 0.00 | 0.0 | 6.0 | 6.5 | 0.27 | 22.30 |
| 25.700 | 0.00 | 0.0 | 5.5 | 6.0 | 0.24 | 22.30 |
| 25.800 | 0.00 | 0.0 | 5.1 | 5.5 | 0.22 | 22.29 |
| 25.900 | 0.00 | 0.0 | 4.7 | 5.1 | 0.21 | 22.29 |

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

Pond File:            LGPN16  .PND
Inflow Hydrograph:    LR1PS100.HYD
Outflow Hydrograph:   OUT     .HYD

Starting Pond W.S. Elevation =    22.25 ft

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

                     Peak Inflow    =    49.00 cfs
                     Peak Outflow   =    45.19 cfs
                     Peak Elevation =    24.24 ft

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

                Initial Storage          =     0.00 ac-ft
                Peak Storage From Storm  =     1.14 ac-ft
                                          ---------------
                Total Storage in Pond    =     1.14 ac-ft

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

Pond File: LGPN16 .PND
Inflow Hydrograph: LR1PS100.HYD
Outflow Hydrograph: OUT .HYD

EXECUTED: 12-28-1992
17:10:51

Peak Inflow = 49.00 cfs
Peak Outflow = 45.19 cfs
Peak Elevation = 24.24 ft




* File: LR1PS100.HYD Qmax = 49.0 cfs
x File: OUT .HYD Qmax = 45.2 cfs

# Lake #2

# Drainage Calculations

Quick TR-55 Ver.5.44 S/N:1315400034
Executed: 17:23:08 12-28-1992 LG2PRE.TCT

Pond #2 Predevelopment flow

Tc COMPUTATIONS FOR: pond #1

SHEET FLOW (Applicable to Tc only)

| | | | |
|---|---|---|---|
| Segment ID | | 1-1 | |
| Surface description | | woods | |
| Manning's roughness coeff., n | | 0.6000 | |
| Flow length, L (total < or = 300) | ft | 250.0 | |
| Two-yr 24-hr rainfall, P2 | in | 3.600 | |
| Land slope, s | ft/ft | 0.0100 | |

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 1.28 = 1.28

SHALLOW CONCENTRATED FLOW

| | | | |
|---|---|---|---|
| Segment ID | | 2-2 | |
| Surface (paved or unpaved)? | | Unpaved | |
| Flow length, L | ft | 230.0 | |
| Watercourse slope, s | ft/ft | 0.0220 | |

$$Avg.V = Csf * (s)^{0.5}$$ ft/s 2.3931

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.03 = 0.03

CHANNEL FLOW

| | | | |
|---|---|---|---|
| Segment ID | | 1-3 | |
| Cross Sectional Flow Area, a | sq.ft | 16.00 | |
| Wetted perimeter, Pw | ft | 52.00 | |
| Hydraulic radius, r = a/Pw | ft | 0.308 | |
| Channel slope, s | ft/ft | 0.0220 | |
| Manning's roughness coeff., n | | 0.0800 | |

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 1.2591

Flow length, L ft 930

T = L / (3600*V) hrs 0.21 = 0.21

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

TOTAL TIME (hrs) 1.51

Quick TR-55 Ver.5.44 S/N:1315400034
Executed: 16:01:03 01-04-1993

Pond #2 Predevelopment Curve Numbers

RUNOFF CURVE NUMBER DATA

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

Composite Area:

| SURFACE DESCRIPTION | AREA (acres) | CN | |
|---|---|---|---|
| Grass type C soil | 4.12 | 71 | |
| Woods type C soil | 18.67 | 72 | |
| COMPOSITE AREA ---> | 22.79 | 71.8 | ( 72 ) |

::::::::::::::::::::::::::::::::::::::::::::::::::::

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-28-1992 17:41:28
Watershed file: --> LG2PRE .MOP
Hydrograph file: --> LG2PR2.HYD

Colonial Golf Course
PRE Pond #2
~~Post~~-development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| pond #2 | 36.20 | 72.0 | 1.50 | 0.00 | 3.60 | 1.19 | I.22 | .22 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 36.20 acres or 0.05656 sq.mi
Peak discharge = 16 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| pond #2 | 1.50 | 0.00 | ** | ** | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-28-1992 17:41:28
Watershed file: --> LG2PRE .MOP
Hydrograph file: --> LG2PR10.HYD

Colonial Golf Course
Pond #2
PRE ~~Post~~-development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| pond #2 | 36.20 | 72.0 | 1.50 | 0.00 | 5.70 | 2.75 | I.14 | .14 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 36.20 acres or 0.05656 sq.mi
Peak discharge = 41 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| pond #2 | 1.50 | 0.00 | ** | ** | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-28-1992 17:41:28
Watershed file: --> LG2PRE .MOP
Hydrograph file: --> LG2PR100.HYD

Colonial Golf Course
Pond #2
PRE ~~Post~~-development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| pond #2 | 36.20 | 72.0 | 1.50 | 0.00 | 8.10 | 4.78 | I.1 | .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 36.20 acres or 0.05656 sq.mi
Peak discharge = 74 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | * Tt (hr) | Rounded Values Tc (hr) | * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| pond #2 | 1.50 | 0.00 | ** | ** | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

```
Quick TR-55 Ver.5.44   S/N:1315400034
Executed: 17:23:37   12-28-1992    LG2PST.TCT

                        Colonial Golf Course
                              Pond #2
                  Post-development Times of Concentration


                     Tc COMPUTATIONS FOR: Pond #2

SHEET FLOW (Applicable to Tc only)
    Segment ID                                        2-1
    Surface description                          grass
    Manning's roughness coeff., n                       0.2400
    Flow length, L (total < or = 300)          ft     300.0
    Two-yr 24-hr rainfall, P2                   in     3.600
    Land slope, s                            ft/ft    0.0110
                        0.8
         .007 * (n*L)
    T =  --------------                        hrs      0.69            =  0.69
            0.5    0.4
          P2    *   s

SHALLOW CONCENTRATED FLOW
    Segment ID                                        2-2
    Surface (paved or unpaved)?                       Unpaved
    Flow length, L                               ft     790.0
    Watercourse slope, s                      ft/ft    0.0210

                          0.5
    Avg.V =  Csf *  (s)                        ft/s    2.3381
    where:   Unpaved Csf = 16.1345
             Paved   Csf = 20.3282

    T = L / (3600*V)                           hrs      0.09            =  0.09


CHANNEL FLOW
    Segment ID
    Cross Sectional Flow Area, a             sq.ft      0.00
    Wetted perimeter, Pw                        ft      0.00
    Hydraulic radius, r = a/Pw                  ft     0.000
    Channel slope, s                         ft/ft    0.0000
    Manning's roughness coeff., n                     0.0000

                      2/3    1/2
          1.49  *  r    *   s
    V =  --------------------                  ft/s    0.0000
                     n

    Flow length, L                              ft         0

    T = L / (3600*V)                           hrs      0.00            =  0.00

  :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                                                 TOTAL TIME (hrs)       0.78
```

Quick TR-55 Ver.5.44 S/N:1315400034
Executed: 15:59:57 01-04-1993

Colonial Golf Course
Pond # 2
Post-development Curve Number

RUNOFF CURVE NUMBER DATA

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

Composite Area:

| SURFACE DESCRIPTION | AREA (acres) | CN | |
|---|---|---|---|
| Pond | 2.15 | 100 | |
| Grass | 13.90 | 74 | |
| Forrest | 1.00 | 72 | |
| COMPOSITE AREA ---> | 17.05 | 77.2 | ( 77 ) |

::::::::::::::::::::::::::::::::::::::::::::::::::::::::

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-28-1992 17:34:28
Watershed file: --> LG2PST .MOP
Hydrograph file: --> LG2PS2.HYD

Colonial Golf Course
Pond #2
Post-development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| subarea #1 | 8.63 | 74.0 | 0.75 | 0.00 | 3.60 | 1.31 | I.2 | .20 |
| subarea #2 | 2.15 | %100.0 | 0.10 | 0.00 | 3.60 | 3.60 | I0 | .10 |
| subarea #3 | 8.63 | 74.0 | 0.75 | 0.00 | 3.60 | 1.31 | I.2 | .20 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 19.41 acres or 0.03033 sq.mi
Peak discharge = 15 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| ubarea #1 | 0.78 | 0.00 | 0.75 | 0.00 | Yes | -- |
| ubarea #2 | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |
| subarea #3 | 0.78 | 0.00 | 0.75 | 0.00 | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-28-1992 17:34:28
Watershed file: --> LG2PST .MOP
Hydrograph file: --> LG2PS10.HYD

Colonial Golf Course
Pond #2
Post-development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used |
|---|---|---|---|---|---|---|---|
| subarea #1 | 8.63 | 74.0 | 0.75 | 0.00 | 5.70 | 2.93 | I.12 .12 |
| subarea #2 | 2.15 | %100.0 | 0.10 | 0.00 | 5.70 | 5.70 | I0 .10 |
| subarea #3 | 8.63 | 74.0 | 0.75 | 0.00 | 5.70 | 2.93 | I.12 .12 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 19.41 acres or 0.03033 sq.mi
Peak discharge = 34 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | * Tt (hr) | Rounded Values Tc (hr) | * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| subarea #1 | 0.78 | 0.00 | 0.75 | 0.00 | Yes | -- |
| subarea #2 | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |
| subarea #3 | 0.78 | 0.00 | 0.75 | 0.00 | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-28-1992 17:34:28
Watershed file: --> LG2PST .MOP
Hydrograph file: --> LG2PS100.HYD

Colonial Golf Course
Pond #2
Post-development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used |
|---|---|---|---|---|---|---|---|
| subarea #1 | 8.63 | 74.0 | 0.75 | 0.00 | 8.10 | 5.02 | I.09 .10 |
| subarea #2 | 2.15 | %100.0 | 0.10 | 0.00 | 8.10 | 8.10 | I0 .10 |
| subarea #3 | 8.63 | 74.0 | 0.75 | 0.00 | 8.10 | 5.02 | I.09 .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 19.41 acres or 0.03033 sq.mi
Peak discharge = 61 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | * Tt (hr) | Rounded Values Tc (hr) | * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| subarea #1 | 0.78 | 0.00 | 0.75 | 0.00 | No | Computed Ia/p < .1 |
| subarea #2 | 0.10 | 0.00 | ** | ** | No | Computed Ia/p < .1 |
| subarea #3 | 0.78 | 0.00 | 0.75 | 0.00 | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.
** Tc & Tt are available in the hydrograph tables.

Combine Outflow From Lake #1

With Basin #2 Runoff

Executed 12-28-1992 18:14:03

Data directory: *.HYD

File Summary for Composite Hydrograph

| Time (hrs) | 1ROUT10 (cfs) | LG2PS10 (cfs) | LGPS10 (Total) |
|---|---|---|---|
| 10.90 | 0.0 | 0.0 | 0.0 |
| 11.00 | 0.0 | 0.0 | 0.0 |
| 11.10 | 0.2 | 1.0 | 1.2 |
| 11.20 | 0.3 | 2.0 | 2.3 |
| 11.30 | 0.4 | 3.0 | 3.4 |
| 11.40 | 0.6 | 3.0 | 3.6 |
| 11.50 | 0.7 | 3.0 | 3.7 |
| 11.60 | 0.8 | 3.0 | 3.8 |
| 11.70 | 1.0 | 5.0 | 6.0 |
| 11.80 | 1.7 | 6.0 | 7.7 |
| 11.90 | 3.1 | 8.0 | 11.1 |
| 12.00 | 5.7 | 16.0 | 21.7 |
| 12.10 | 10.7 | 23.0 | 33.7 |
| 12.20 | 14.8 | 20.0 | 34.8 |
| 12.30 | 16.1 | 18.0 | 34.1 |
| 12.40 | 16.7 | 25.0 | 41.7 |
| 12.50 | 18.1 | 32.0 | 50.2 |
| 12.60 | 19.8 | 34.0 | 53.8 |
| 12.70 | 21.2 | 34.0 | 55.2 |
| 12.80 | 22.5 | 29.0 | 51.6 |
| 12.90 | 22.3 | 25.0 | 47.3 |
| 13.00 | 21.2 | 21.0 | 42.2 |
| 13.10 | 20.3 | 18.0 | 38.3 |
| 13.20 | 19.2 | 15.0 | 34.2 |
| 13.30 | 17.9 | 13.0 | 30.9 |
| 13.40 | 16.2 | 11.0 | 27.2 |
| 13.50 | 14.5 | 10.0 | 24.5 |
| 13.60 | 12.9 | 9.0 | 21.9 |
| 13.70 | 11.3 | 8.0 | 19.3 |
| 13.80 | 10.0 | 7.0 | 17.0 |
| 13.90 | 9.0 | 6.0 | 15.0 |
| 14.00 | 8.2 | 5.0 | 13.2 |
| 14.10 | 7.4 | 5.0 | 12.4 |
| 14.20 | 6.7 | 5.0 | 11.7 |
| 14.30 | 6.1 | 5.0 | 11.1 |
| 14.40 | 5.6 | 5.0 | 10.6 |
| 14.50 | 5.2 | 5.0 | 10.2 |
| 14.60 | 4.9 | 5.0 | 9.9 |
| 14.70 | 4.7 | 4.0 | 8.7 |
| 14.80 | 4.5 | 4.0 | 8.5 |

Executed 12-28-1992 18:14:03

Data directory: *.HYD

File Summary for Composite Hydrograph

| Time (hrs) | 1ROUT10 (cfs) | LG2PS10 (cfs) | LGPS10 (Total) |
|---|---|---|---|
| 14.90 | 4.3 | 3.0 | 7.3 |
| 15.00 | 4.1 | 3.0 | 7.1 |
| 15.10 | 3.9 | 3.0 | 6.9 |
| 15.20 | 3.7 | 3.0 | 6.7 |
| 15.30 | 3.6 | 2.0 | 5.6 |
| 15.40 | 3.5 | 2.0 | 5.5 |
| 15.50 | 3.4 | 2.0 | 5.4 |
| 15.60 | 3.3 | 2.0 | 5.3 |
| 15.70 | 3.3 | 2.0 | 5.3 |
| 15.80 | 3.2 | 2.0 | 5.2 |
| 15.90 | 3.2 | 2.0 | 5.2 |
| 16.00 | 3.2 | 2.0 | 5.2 |
| 16.10 | 3.1 | 2.0 | 5.1 |
| 16.20 | 3.1 | 2.0 | 5.1 |
| 16.30 | 3.1 | 2.0 | 5.1 |
| 16.40 | 3.1 | 2.0 | 5.1 |
| 16.50 | 3.0 | 2.0 | 5.1 |
| 16.60 | 3.0 | 2.0 | 5.0 |
| 16.70 | 3.0 | 2.0 | 5.0 |
| 16.80 | 2.9 | 2.0 | 4.9 |
| 16.90 | 2.8 | 2.0 | 4.8 |
| 17.00 | 2.6 | 2.0 | 4.6 |
| 17.10 | 2.5 | 2.0 | 4.5 |
| 17.20 | 2.4 | 2.0 | 4.4 |
| 17.30 | 2.3 | 2.0 | 4.3 |
| 17.40 | 2.3 | 2.0 | 4.3 |
| 17.50 | 2.2 | 2.0 | 4.2 |

Executed 12-28-1992 18:16:37

Data directory: *.HYD

File Summary for Composite Hydrograph

| Time (hrs) | 1ROUT100 (cfs) | LG2PS100 (cfs) | LGPS100 (Total) |
|---|---|---|---|
| 10.90 | 0.0 | Missing | 0.0 |
| 11.00 | 0.0 | 3.0 | 3.0 |
| 11.10 | 0.2 | 3.0 | 3.2 |
| 11.20 | 0.3 | 3.0 | 3.3 |
| 11.30 | 0.6 | 3.0 | 3.6 |
| 11.40 | 0.8 | 4.0 | 4.8 |
| 11.50 | 1.1 | 4.0 | 5.1 |
| 11.60 | 1.4 | 5.0 | 6.4 |
| 11.70 | 2.4 | 8.0 | 10.4 |
| 11.80 | 4.0 | 10.0 | 14.0 |
| 11.90 | 6.4 | 13.0 | 19.4 |
| 12.00 | 10.7 | 24.0 | 34.7 |
| 12.10 | 17.2 | 37.0 | 54.2 |
| 12.20 | 22.0 | 33.0 | 55.0 |
| 12.30 | 26.1 | 32.0 | 58.1 |
| 12.40 | 28.7 | 44.0 | 72.7 |
| 12.50 | 35.0 | 55.0 | 90.1 |
| 12.60 | 42.0 | 61.0 | 103.0 |
| 12.70 | 45.2 | 58.0 | 103.2 |
| 12.80 | 44.5 | 52.0 | 96.5 |
| 12.90 | 41.3 | 44.0 | 85.3 |
| 13.00 | 36.5 | 36.0 | 72.5 |
| 13.10 | 31.3 | 31.0 | 62.3 |
| 13.20 | 27.6 | 26.0 | 53.6 |
| 13.30 | 24.4 | 22.0 | 46.4 |
| 13.40 | 21.5 | 17.0 | 38.5 |
| 13.50 | 20.2 | 15.0 | 35.2 |
| 13.60 | 19.0 | 13.0 | 32.0 |
| 13.70 | 17.6 | 12.0 | 29.6 |
| 13.80 | 16.0 | 11.0 | 27.0 |
| 13.90 | 14.6 | 10.0 | 24.6 |
| 14.00 | 13.2 | 9.0 | 22.2 |
| 14.10 | 11.8 | 8.0 | 19.8 |
| 14.20 | 10.6 | 8.0 | 18.6 |
| 14.30 | 9.6 | 7.0 | 16.6 |
| 14.40 | 8.7 | 7.0 | 15.7 |
| 14.50 | 8.0 | 7.0 | 15.0 |
| 14.60 | 7.3 | 7.0 | 14.3 |
| 14.70 | 6.7 | 6.0 | 12.7 |
| 14.80 | 6.3 | 6.0 | 12.3 |

Executed 12-28-1992 18:16:37

Data directory: *.HYD

File Summary for Composite Hydrograph

| Time (hrs) | 1ROUT100 (cfs) | LG2PS100 (cfs) | LGPS100 (Total) |
|---|---|---|---|
| 14.90 | 6.0 | 5.0 | 11.0 |
| 15.00 | 5.8 | 5.0 | 10.8 |
| 15.10 | 5.6 | 5.0 | 10.6 |
| 15.20 | 5.4 | 5.0 | 10.4 |
| 15.30 | 5.2 | 5.0 | 10.2 |
| 15.40 | 4.9 | 5.0 | 9.9 |
| 15.50 | 4.7 | 5.0 | 9.7 |
| 15.60 | 4.6 | 5.0 | 9.6 |
| 15.70 | 4.4 | 5.0 | 9.4 |
| 15.80 | 4.4 | 5.0 | 9.4 |
| 15.90 | 4.3 | 5.0 | 9.3 |
| 16.00 | 4.2 | 5.0 | 9.2 |
| 16.10 | 4.2 | 5.0 | 9.2 |
| 16.20 | 4.2 | 5.0 | 9.2 |
| 16.30 | 4.1 | 5.0 | 9.1 |
| 16.40 | 4.1 | 5.0 | 9.1 |
| 16.50 | 4.1 | 5.0 | 9.1 |
| 16.60 | 4.1 | 5.0 | 9.1 |
| 16.70 | 4.1 | 4.0 | 8.1 |
| 16.80 | 4.0 | 4.0 | 8.0 |
| 16.90 | 3.8 | 3.0 | 6.8 |
| 17.00 | 3.6 | 3.0 | 6.6 |
| 17.10 | 3.5 | 3.0 | 6.5 |
| 17.20 | 3.4 | 3.0 | 6.4 |
| 17.30 | 3.3 | 3.0 | 6.3 |
| 17.40 | 3.3 | 3.0 | 6.3 |
| 17.50 | 3.2 | 3.0 | 6.2 |

Executed 12-28-1992 18:32:12

Data directory: *.HYD

File Summary for Composite Hydrograph

| Time (hrs) | 1ROUT2 (cfs) | LG2PS2 (cfs) | LGPS2 (Total) |
|---|---|---|---|
| 10.90 | 0.0 | 0.0 | 0.0 |
| 11.00 | 0.0 | 0.0 | 0.0 |
| 11.10 | 0.0 | 0.0 | 0.0 |
| 11.20 | 0.0 | 0.0 | 0.0 |
| 11.30 | 0.1 | 0.0 | 0.1 |
| 11.40 | 0.2 | 0.0 | 0.2 |
| 11.50 | 0.3 | 1.0 | 1.3 |
| 11.60 | 0.3 | 1.0 | 1.3 |
| 11.70 | 0.4 | 2.0 | 2.5 |
| 11.80 | 0.7 | 3.0 | 3.7 |
| 11.90 | 1.0 | 4.0 | 5.1 |
| 12.00 | 2.2 | 8.0 | 10.2 |
| 12.10 | 4.5 | 14.0 | 18.5 |
| 12.20 | 7.1 | 10.0 | 17.1 |
| 12.30 | 7.9 | 7.0 | 14.9 |
| 12.40 | 8.1 | 10.0 | 18.0 |
| 12.50 | 8.5 | 13.0 | 21.5 |
| 12.60 | 9.2 | 15.0 | 24.2 |
| 12.70 | 9.8 | 15.0 | 24.8 |
| 12.80 | 10.1 | 13.0 | 23.1 |
| 12.90 | 10.1 | 11.0 | 21.1 |
| 13.00 | 9.7 | 9.0 | 18.7 |
| 13.10 | 9.1 | 8.0 | 17.1 |
| 13.20 | 8.5 | 7.0 | 15.5 |
| 13.30 | 7.9 | 6.0 | 13.9 |
| 13.40 | 7.3 | 5.0 | 12.4 |
| 13.50 | 6.8 | 5.0 | 11.8 |
| 13.60 | 6.3 | 5.0 | 11.3 |
| 13.70 | 5.7 | 4.0 | 9.7 |
| 13.80 | 5.2 | 3.0 | 8.2 |
| 13.90 | 4.7 | 2.0 | 6.7 |
| 14.00 | 4.3 | 2.0 | 6.3 |
| 14.10 | 4.1 | 2.0 | 6.1 |
| 14.20 | 3.9 | 2.0 | 5.9 |
| 14.30 | 3.7 | 2.0 | 5.7 |
| 14.40 | 3.6 | 2.0 | 5.6 |
| 14.50 | 3.4 | 2.0 | 5.4 |
| 14.60 | 3.1 | 2.0 | 5.1 |
| 14.70 | 2.9 | 2.0 | 4.9 |
| 14.80 | 2.8 | 2.0 | 4.8 |

Executed 12-28-1992 18:32:12

Data directory: *.HYD

File Summary for Composite Hydrograph

| Time (hrs) | 1ROUT2 (cfs) | LG2PS2 (cfs) | LGPS2 (Total) |
|---|---|---|---|
| 14.90 | 2.5 | 2.0 | 4.5 |
| 15.00 | 2.3 | 2.0 | 4.3 |
| 15.10 | 2.0 | 2.0 | 4.0 |
| 15.20 | 1.8 | 2.0 | 3.8 |
| 15.30 | 1.7 | 2.0 | 3.7 |
| 15.40 | 1.6 | 2.0 | 3.6 |
| 15.50 | 1.5 | 2.0 | 3.5 |
| 15.60 | 1.4 | 2.0 | 3.4 |
| 15.70 | 1.3 | 2.0 | 3.3 |
| 15.80 | 1.3 | 2.0 | 3.3 |
| 15.90 | 1.3 | 2.0 | 3.3 |
| 16.00 | 1.2 | 2.0 | 3.2 |
| 16.10 | 1.2 | 2.0 | 3.2 |
| 16.20 | 1.2 | 2.0 | 3.2 |
| 16.30 | 1.2 | 2.0 | 3.2 |
| 16.40 | 1.2 | 2.0 | 3.2 |
| 16.50 | 1.1 | 2.0 | 3.2 |
| 16.60 | 1.1 | 2.0 | 3.1 |
| 16.70 | 1.1 | 1.0 | 2.1 |
| 16.80 | 1.1 | 1.0 | 2.1 |
| 16.90 | 1.1 | 0.0 | 1.1 |
| 17.00 | 1.1 | 0.0 | 1.1 |
| 17.10 | 1.1 | 0.0 | 1.1 |
| 17.20 | 1.1 | 0.0 | 1.1 |
| 17.30 | 1.1 | 0.0 | 1.1 |
| 17.40 | 1.1 | 0.0 | 1.1 |
| 17.50 | 1.1 | 0.0 | 1.1 |

# Lake #2

# Routing Calculations

POND-2 Version: 5.15
S/N: 1295100016

Pond #2 Stage Storage Data

CALCULATED 01-04-1993 16:06:40
DISK FILE: LGPN2 .VOL

Planimeter scale: 1 inch = 1 ft.

| Elevation (ft) | Planimeter (sq.in.) | Area (acres) | A1+A2+sqr(A1*A2) (acres) | * Volume (acre-ft) | Volume Sum (acre-ft) |
|---|---|---|---|---|---|
| 18.00 | 91,066.00 | 2.09 | 0.00 | 0.00 | 0.00 |
| 20.00 | 106,368.00 | 2.44 | 6.79 | 4.53 | 4.53 |
| 26.00 | 106,368.00 | 2.44 | 7.33 | 14.65 | 19.18 |

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

Outlet Structure File: LGPN82 .STR

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

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

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 18.00 | 0.0 | 1 |
| 18.25 | 4.3 | 1 |
| 18.50 | 12.1 | 1 |
| 18.75 | 22.1 | 1 |
| 19.00 | 34.1 | 1 |
| 19.25 | 47.1 | 2 |
| 19.50 | 48.6 | 2 |
| 19.75 | 50.2 | 2 |
| 20.00 | 51.7 | 2 |
| 20.25 | 53.1 | 2 |
| 20.50 | 54.6 | 2 |
| 20.75 | 55.9 | 2 |
| 21.00 | 57.2 | 2 |
| 21.25 | 58.6 | 2 |
| 21.50 | 59.8 | 2 |
| 21.75 | 61.0 | 2 |
| 22.00 | 62.3 | 2 |
| 22.25 | 63.5 | 2 |
| 22.50 | 64.7 | 2 |
| 22.75 | 65.8 | 2 |
| 23.00 | 66.9 | 2 |
| 23.25 | 68.1 | 2 |
| 23.50 | 69.2 | 2 |
| 23.75 | 70.3 | 2 |
| 24.00 | 71.3 | 2 |
| 24.25 | 72.4 | 2 |
| 24.50 | 73.4 | 2 |
| 24.75 | 74.5 | 2 |
| 25.00 | 75.4 | 2 |
| 25.25 | 76.5 | 2 |
| 25.50 | 77.4 | 2 |
| 25.75 | 78.4 | 2 |

Outlet Structure File: LGPN82 .STR

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

Outlet Structure File: LGPN82 .STR
Planimeter Input File: LGPN2 .VOL
Rating Table Output File: LGPN82 .PND

Top Dam = 21.1

Min. Elev.(ft) = 18 Max. Elev.(ft) = 25.75 Incr.(ft) = .25

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

**********
SYSTEM CONNECTIVITY
**********

| Structure | No. | Q Table | | Q Table |
|---|---|---|---|---|
| INLET BOX | 1 | | -> | 1 |
| CULVERT-CR | 2 | ? 1 | -> | 3 |

Outflow rating table summary was stored in file:
LGPN82 .PND

Outlet Structure File: LGPN82 .STR

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

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

INLET BOX
Weir & Orifice defined by length and area

| | |
|---|---|
| E1 elev.(ft)? | 18 |
| E2 elev.(ft)? | 25.751 |
| Crest elev.(ft)? | 18 |
| Weir length (ft)? | 11 |
| Weir coefficient? | 3.1 |
| Orifice area (sq.ft)? | 9.62 |
| Orifice coefficient? | .6 |
| Start transition elev.(ft) @ ? | |
| Transition height (ft)? | |

Outlet Structure File: LGPN82 .STR

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

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

CULVERT-CR
Circular Culvert (With Inlet Control)

| | |
|---|---|
| E1 elev.(ft)? | 14 |
| E2 elev.(ft)? | 25.751 |
| Diam. (ft)? | 2.5 |
| Inv. el.(ft)? | 14 |
| Slope (ft/ft)? | .065 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | -.5 |

Outlet Structure File: LGPN82 .STR

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

Outflow Rating Table for Structure #1
INLET BOX Weir & Orifice defined by length and area

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

| Elevation (ft) | Q (cfs) | Computation | Messages |
|---|---|---|---|
| 18.00 | 0.0 | Weir: | H =0.0 |
| 18.25 | 4.3 | Weir: | H =.25 |
| 18.50 | 12.1 | Weir: | H =.5 |
| 18.75 | 22.1 | Weir: | H =.750 |
| 19.00 | 34.1 | Weir: | H =1.0 |
| 19.25 | 47.7 | Weir: | H =1.25 |
| 19.50 | 56.7 | Orifice: | H =1.5 |
| 19.75 | 61.3 | Orifice: | H =1.75 |
| 20.00 | 65.5 | Orifice: | H =2.0 |
| 20.25 | 69.5 | Orifice: | H =2.25 |
| 20.50 | 73.2 | Orifice: | H =2.5 |
| 20.75 | 76.8 | Orifice: | H =2.75 |
| 21.00 | 80.2 | Orifice: | H =3.0 |
| 21.25 | 83.5 | Orifice: | H =3.25 |
| 21.50 | 86.7 | Orifice: | H =3.5 |
| 21.75 | 89.7 | Orifice: | H =3.75 |
| 22.00 | 92.6 | Orifice: | H =4.0 |
| 22.25 | 95.5 | Orifice: | H =4.25 |
| 22.50 | 98.3 | Orifice: | H =4.5 |
| 22.75 | 101.0 | Orifice: | H =4.75 |
| 23.00 | 103.6 | Orifice: | H =5.0 |
| 23.25 | 106.1 | Orifice: | H =5.25 |
| 23.50 | 108.6 | Orifice: | H =5.5 |
| 23.75 | 111.1 | Orifice: | H =5.75 |
| 24.00 | 113.5 | Orifice: | H =6.0 |
| 24.25 | 115.8 | Orifice: | H =6.25 |
| 24.50 | 118.1 | Orifice: | H =6.5 |
| 24.75 | 120.3 | Orifice: | H =6.75 |
| 25.00 | 122.6 | Orifice: | H =7.0 |
| 25.25 | 124.7 | Orifice: | H =7.25 |
| 25.50 | 126.9 | Orifice: | H =7.5 |
| 25.75 | 128.9 | Orifice: | H =7.75 |

Weir Cw = 3.1 Weir length = 11 ft
Orifice Co = .6 Orifice area = 9.62 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 19.35836 ft

Outlet Structure File: LGPN82 .STR

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

Outflow Rating Table for Structure #2
CULVERT-CR Circular Culvert (With Inlet Control)

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 18.00 | 38.1 | Submerged: HW =4.0 |
| 18.25 | 40.1 | Submerged: HW =4.25 |
| 18.50 | 42.0 | Submerged: HW =4.5 |
| 18.75 | 43.7 | Submerged: HW =4.75 |
| 19.00 | 45.4 | Submerged: HW =5.0 |
| 19.25 | 47.1 | Submerged: HW =5.25 |
| 19.50 | 48.6 | Submerged: HW =5.5 |
| 19.75 | 50.2 | Submerged: HW =5.75 |
| 20.00 | 51.7 | Submerged: HW =6.0 |
| 20.25 | 53.1 | Submerged: HW =6.25 |
| 20.50 | 54.6 | Submerged: HW =6.5 |
| 20.75 | 55.9 | Submerged: HW =6.75 |
| 21.00 | 57.2 | Submerged: HW =7.0 |
| 21.25 | 58.6 | Submerged: HW =7.25 |
| 21.50 | 59.8 | Submerged: HW =7.5 |
| 21.75 | 61.0 | Submerged: HW =7.75 |
| 22.00 | 62.3 | Submerged: HW =8.0 |
| 22.25 | 63.5 | Submerged: HW =8.25 |
| 22.50 | 64.7 | Submerged: HW =8.5 |
| 22.75 | 65.8 | Submerged: HW =8.75 |
| 23.00 | 66.9 | Submerged: HW =9.0 |
| 23.25 | 68.1 | Submerged: HW =9.25 |
| 23.50 | 69.2 | Submerged: HW =9.5 |
| 23.75 | 70.3 | Submerged: HW =9.75 |
| 24.00 | 71.3 | Submerged: HW =10.0 |
| 24.25 | 72.4 | Submerged: HW =10.25 |
| 24.50 | 73.4 | Submerged: HW =10.5 |
| 24.75 | 74.5 | Submerged: HW =10.75 |
| 25.00 | 75.4 | Submerged: HW =11.0 |
| 25.25 | 76.5 | Submerged: HW =11.25 |
| 25.50 | 77.4 | Submerged: HW =11.5 |
| 25.75 | 78.4 | Submerged: HW =11.75 |

Used Unsubmerged Equ. Form (1) for elev. less than 16.82 ft
Used Submerged Equation for elevations greater than 17.19 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=16.82 ft; Q1=27.16 cfs; Dc=1.78 ft; E2=17.19 ft; Q2=31.05 cfs

Outlet Structure File: LGPN82 .STR

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

Outflow Rating Table 3
Table 3 = 1 ? 2

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 18.00 | 0.0 | 1 |
| 18.25 | 4.3 | 1 |
| 18.50 | 12.1 | 1 |
| 18.75 | 22.1 | 1 |
| 19.00 | 34.1 | 1 |
| 19.25 | 47.1 | 2 |
| 19.50 | 48.6 | 2 |
| 19.75 | 50.2 | 2 |
| 20.00 | 51.7 | 2 |
| 20.25 | 53.1 | 2 |
| 20.50 | 54.6 | 2 |
| 20.75 | 55.9 | 2 |
| 21.00 | 57.2 | 2 |
| 21.25 | 58.6 | 2 |
| 21.50 | 59.8 | 2 |
| 21.75 | 61.0 | 2 |
| 22.00 | 62.3 | 2 |
| 22.25 | 63.5 | 2 |
| 22.50 | 64.7 | 2 |
| 22.75 | 65.8 | 2 |
| 23.00 | 66.9 | 2 |
| 23.25 | 68.1 | 2 |
| 23.50 | 69.2 | 2 |
| 23.75 | 70.3 | 2 |
| 24.00 | 71.3 | 2 |
| 24.25 | 72.4 | 2 |
| 24.50 | 73.4 | 2 |
| 24.75 | 74.5 | 2 |
| 25.00 | 75.4 | 2 |
| 25.25 | 76.5 | 2 |
| 25.50 | 77.4 | 2 |
| 25.75 | 78.4 | 2 |

POND-2 Version: 5.15 S/N: 1295100016
EXECUTED: 12-28-1992 18:33:28


Return Freq: 2 years

Inflow Hydrograph: LGPS2 .HYD
Rating Table file: LGPN82 .PND

----INITIAL CONDITIONS----
Elevation = 18.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 18.00 | 0.0 | 0.000 |
| 18.25 | 4.1 | 0.538 |
| 18.50 | 11.7 | 1.075 |
| 18.75 | 21.4 | 1.613 |
| 19.00 | 33.0 | 2.151 |
| 19.25 | 46.1 | 2.689 |
| 19.50 | 48.3 | 3.226 |
| 19.75 | 49.8 | 3.764 |
| 20.00 | 51.2 | 4.302 |
| 20.25 | 52.7 | 4.839 |
| 20.50 | 54.2 | 5.377 |
| 20.75 | 55.5 | 5.915 |
| 21.00 | 56.8 | 6.452 |
| 21.25 | 58.2 | 6.990 |
| 21.50 | 59.4 | 7.528 |
| 21.75 | 60.7 | 8.066 |
| 22.00 | 62.0 | 8.603 |
| 22.25 | 63.1 | 9.141 |
| 22.50 | 64.4 | 9.679 |
| 22.75 | 65.5 | 10.216 |
| 23.00 | 66.7 | 10.754 |
| 23.25 | 67.8 | 11.292 |
| 23.50 | 68.9 | 11.830 |
| 23.75 | 70.0 | 12.367 |
| 24.00 | 71.0 | 12.905 |
| 24.25 | 72.1 | 13.443 |
| 24.50 | 73.1 | 13.980 |
| 24.75 | 74.2 | 14.518 |
| 25.00 | 75.1 | 15.056 |
| 25.25 | 76.2 | 15.593 |
| 25.50 | 77.2 | 16.131 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 0.0 | 0.0 |
| 130.1 | 134.2 |
| 260.2 | 271.9 |
| 390.4 | 411.8 |
| 520.5 | 553.5 |
| 650.6 | 696.7 |
| 780.8 | 829.1 |
| 910.9 | 960.7 |
| 1041.0 | 1092.2 |
| 1171.1 | 1223.8 |
| 1301.3 | 1355.5 |
| 1431.4 | 1486.9 |
| 1561.5 | 1618.3 |
| 1691.6 | 1749.8 |
| 1821.7 | 1881.1 |
| 1951.9 | 2012.6 |
| 2082.0 | 2144.0 |
| 2212.1 | 2275.2 |
| 2342.3 | 2406.7 |
| 2472.4 | 2537.9 |
| 2602.5 | 2669.2 |
| 2732.6 | 2800.4 |
| 2862.8 | 2931.7 |
| 2992.9 | 3062.9 |
| 3123.0 | 3194.0 |
| 3253.1 | 3325.2 |
| 3383.2 | 3456.3 |
| 3513.4 | 3587.6 |
| 3643.5 | 3718.6 |
| 3773.6 | 3849.8 |
| 3903.8 | 3981.0 |

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 25.75 | 78.2 | 16.669 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 4033.9 | 4112.1 |

Time increment (t) = 0.100 hrs.

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS2 .HYD
Outflow Hydrograph: 2ROUT2 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 10.900 | 0.00 | ----- | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.000 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.200 | 0.04 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.300 | 0.12 | 0.2 | 0.2 | 0.2 | 0.01 | 18.00 |
| 11.400 | 0.19 | 0.3 | 0.5 | 0.5 | 0.02 | 18.00 |
| 11.500 | 1.26 | 1.5 | 1.8 | 1.9 | 0.06 | 18.00 |
| 11.600 | 1.32 | 2.6 | 4.1 | 4.4 | 0.13 | 18.01 |
| 11.700 | 2.45 | 3.8 | 7.4 | 7.9 | 0.24 | 18.01 |
| 11.800 | 3.70 | 6.2 | 12.7 | 13.5 | 0.41 | 18.03 |
| 11.900 | 5.05 | 8.8 | 20.2 | 21.5 | 0.66 | 18.04 |
| 12.000 | 10.18 | 15.2 | 33.2 | 35.4 | 1.08 | 18.07 |
| 12.100 | 18.53 | 28.7 | 58.2 | 61.9 | 1.89 | 18.12 |
| 12.200 | 17.12 | 35.7 | 88.1 | 93.8 | 2.87 | 18.17 |
| 12.300 | 14.92 | 32.0 | 112.8 | 120.1 | 3.67 | 18.22 |
| 12.400 | 18.05 | 33.0 | 136.3 | 145.7 | 4.74 | 18.27 |
| 12.500 | 21.51 | 39.6 | 163.0 | 175.8 | 6.40 | 18.33 |
| 12.600 | 24.23 | 45.7 | 192.4 | 208.8 | 8.21 | 18.39 |
| 12.700 | 24.79 | 49.0 | 221.3 | 241.4 | 10.01 | 18.44 |
| 12.800 | 23.09 | 47.9 | 246.1 | 269.2 | 11.55 | 18.50 |
| 12.900 | 21.07 | 44.2 | 264.3 | 290.3 | 12.97 | 18.53 |
| 13.000 | 18.68 | 39.8 | 276.2 | 304.1 | 13.93 | 18.56 |
| 13.100 | 17.14 | 35.8 | 283.1 | 312.1 | 14.48 | 18.57 |
| 13.200 | 15.51 | 32.7 | 286.3 | 315.7 | 14.74 | 18.58 |
| 13.300 | 13.92 | 29.4 | 286.2 | 315.7 | 14.73 | 18.58 |
| 13.400 | 12.35 | 26.3 | 283.5 | 312.5 | 14.51 | 18.57 |
| 13.500 | 11.79 | 24.1 | 279.3 | 307.6 | 14.17 | 18.56 |
| 13.600 | 11.25 | 23.0 | 274.7 | 302.3 | 13.81 | 18.55 |
| 13.700 | 9.72 | 21.0 | 269.0 | 295.7 | 13.34 | 18.54 |
| 13.800 | 8.20 | 17.9 | 261.4 | 286.9 | 12.74 | 18.53 |
| 13.900 | 6.68 | 14.9 | 252.3 | 276.3 | 12.00 | 18.51 |
| 14.000 | 6.33 | 13.0 | 242.6 | 265.3 | 11.33 | 18.49 |
| 14.100 | 6.09 | 12.4 | 233.5 | 255.1 | 10.77 | 18.47 |
| 14.200 | 5.89 | 12.0 | 225.0 | 245.5 | 10.24 | 18.45 |
| 14.300 | 5.73 | 11.6 | 217.1 | 236.6 | 9.75 | 18.44 |
| 14.400 | 5.59 | 11.3 | 209.9 | 228.5 | 9.30 | 18.42 |
| 14.500 | 5.39 | 11.0 | 203.1 | 220.8 | 8.88 | 18.41 |
| 14.600 | 5.14 | 10.5 | 196.6 | 213.6 | 8.48 | 18.39 |
| 14.700 | 4.93 | 10.1 | 190.5 | 206.7 | 8.10 | 18.38 |
| 14.800 | 4.76 | 9.7 | 184.7 | 200.2 | 7.74 | 18.37 |
| 14.900 | 4.53 | 9.3 | 179.2 | 194.0 | 7.40 | 18.36 |
| 15.000 | 4.25 | 8.8 | 173.9 | 188.0 | 7.07 | 18.35 |
| 15.100 | 4.02 | 8.3 | 168.6 | 182.1 | 6.74 | 18.34 |
| 15.200 | 3.84 | 7.9 | 163.6 | 176.5 | 6.43 | 18.33 |
| 15.300 | 3.68 | 7.5 | 158.9 | 171.2 | 6.14 | 18.32 |

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS2 .HYD
Outflow Hydrograph: 2ROUT2 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 15.400 | 3.56 | 7.2 | 154.4 | 166.1 | 5.86 | 18.31 |
| 15.500 | 3.46 | 7.0 | 150.2 | 161.4 | 5.60 | 18.30 |
| 15.600 | 3.37 | 6.8 | 146.3 | 157.1 | 5.36 | 18.29 |
| 15.700 | 3.31 | 6.7 | 142.7 | 153.0 | 5.14 | 18.28 |
| 15.800 | 3.28 | 6.6 | 139.5 | 149.3 | 4.93 | 18.28 |
| 15.900 | 3.26 | 6.5 | 136.5 | 146.0 | 4.75 | 18.27 |
| 16.000 | 3.23 | 6.5 | 133.8 | 143.0 | 4.58 | 18.27 |
| 16.100 | 3.22 | 6.5 | 131.4 | 140.3 | 4.43 | 18.26 |
| 16.200 | 3.20 | 6.4 | 129.2 | 137.8 | 4.30 | 18.26 |
| 16.300 | 3.18 | 6.4 | 127.3 | 135.6 | 4.18 | 18.25 |
| 16.400 | 3.17 | 6.4 | 125.4 | 133.6 | 4.08 | 18.25 |
| 16.500 | 3.15 | 6.3 | 123.7 | 131.8 | 4.02 | 18.25 |
| 16.600 | 3.14 | 6.3 | 122.1 | 130.0 | 3.97 | 18.24 |
| 16.700 | 2.13 | 5.3 | 119.6 | 127.3 | 3.89 | 18.24 |
| 16.800 | 2.12 | 4.3 | 116.2 | 123.8 | 3.78 | 18.23 |
| 16.900 | 1.11 | 3.2 | 112.2 | 119.5 | 3.65 | 18.22 |
| 17.000 | 1.10 | 2.2 | 107.4 | 114.4 | 3.49 | 18.21 |
| 17.100 | 1.09 | 2.2 | 102.9 | 109.6 | 3.35 | 18.20 |
| 17.200 | 1.09 | 2.2 | 98.7 | 105.1 | 3.21 | 18.20 |
| 17.300 | 1.08 | 2.2 | 94.7 | 100.8 | 3.08 | 18.19 |
| 17.400 | 1.07 | 2.2 | 90.9 | 96.8 | 2.96 | 18.18 |
| 17.500 | 1.07 | 2.1 | 87.4 | 93.0 | 2.84 | 18.17 |

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

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS2 .HYD
Outflow Hydrograph: 2ROUT2 .HYD

Starting Pond W.S. Elevation = 18.00 ft

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

Peak Inflow = 24.79 cfs
Peak Outflow = 14.74 cfs
Peak Elevation = 18.58 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 1.24 ac-ft
---
Total Storage in Pond = 1.24 ac-ft

Warning: Inflow hydrograph truncated on right side.

POND-2 Version: 5.15 S/N: 1295100016

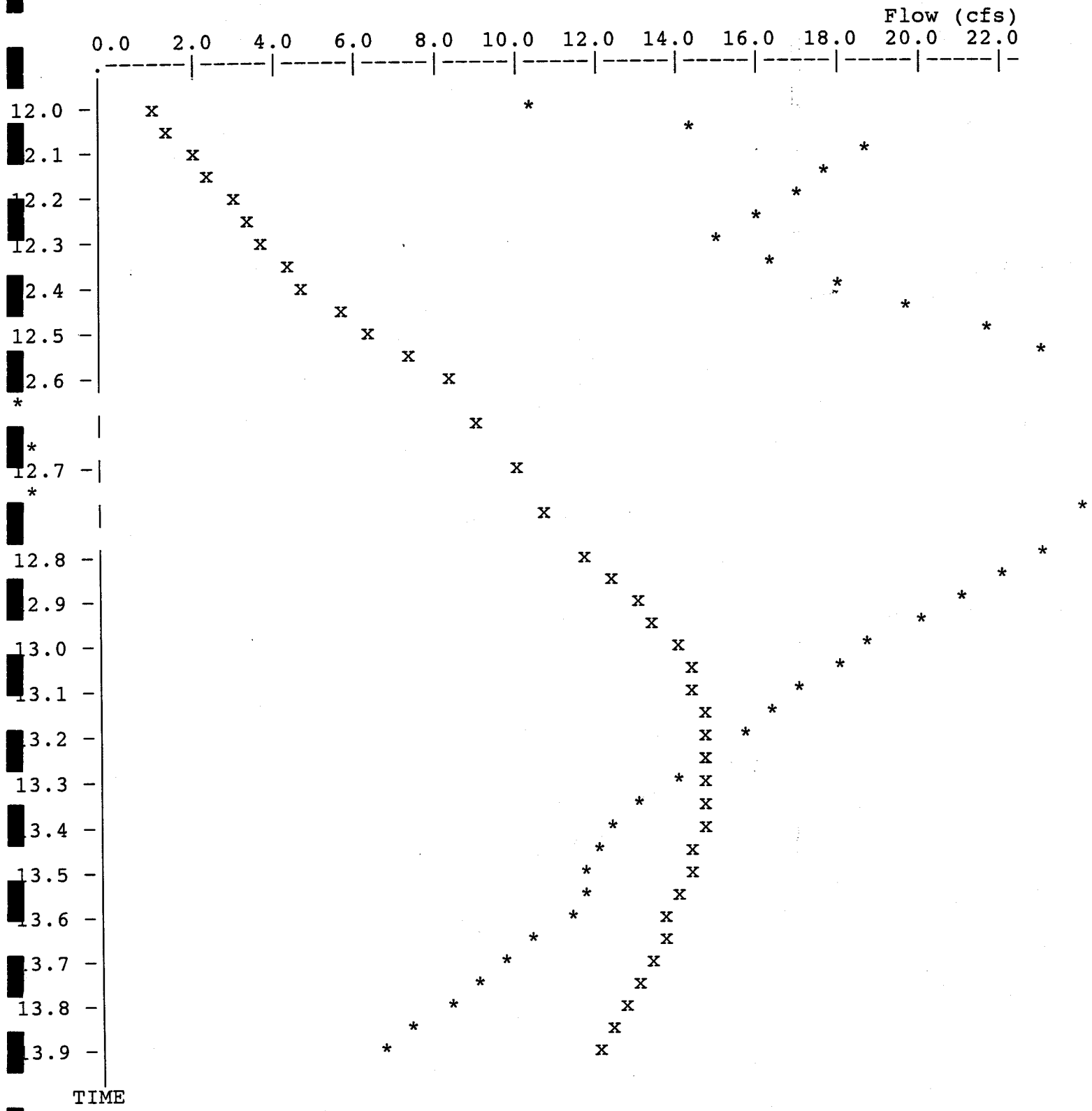


Return Freq: 2 years

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS2 .HYD
Outflow Hydrograph: 2ROUT2 .HYD

EXECUTED: 12-28-1992
18:33:28

Peak Inflow = 24.79 cfs
Peak Outflow = 14.74 cfs
Peak Elevation = 18.58 ft



```
(hrs)

*  File:  LGPS2    .HYD   Qmax =    24.8 cfs
x  File:  2ROUT2   .HYD   Qmax =    14.7 cfs
```

Inflow Hydrograph: LGPS10 .HYD
Rating Table file: LGPN82 .PND

----INITIAL CONDITIONS----
Elevation = 18.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 18.00 | 0.0 | 0.000 |
| 18.25 | 4.1 | 0.538 |
| 18.50 | 11.7 | 1.075 |
| 18.75 | 21.4 | 1.613 |
| 19.00 | 33.0 | 2.151 |
| 19.25 | 46.1 | 2.689 |
| 19.50 | 48.3 | 3.226 |
| 19.75 | 49.8 | 3.764 |
| 20.00 | 51.2 | 4.302 |
| 20.25 | 52.7 | 4.839 |
| 20.50 | 54.2 | 5.377 |
| 20.75 | 55.5 | 5.915 |
| 21.00 | 56.8 | 6.452 |
| 21.25 | 58.2 | 6.990 |
| 21.50 | 59.4 | 7.528 |
| 21.75 | 60.7 | 8.066 |
| 22.00 | 62.0 | 8.603 |
| 22.25 | 63.1 | 9.141 |
| 22.50 | 64.4 | 9.679 |
| 22.75 | 65.5 | 10.216 |
| 23.00 | 66.7 | 10.754 |
| 23.25 | 67.8 | 11.292 |
| 23.50 | 68.9 | 11.830 |
| 23.75 | 70.0 | 12.367 |
| 24.00 | 71.0 | 12.905 |
| 24.25 | 72.1 | 13.443 |
| 24.50 | 73.1 | 13.980 |
| 24.75 | 74.2 | 14.518 |
| 25.00 | 75.1 | 15.056 |
| 25.25 | 76.2 | 15.593 |
| 25.50 | 77.2 | 16.131 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 0.0 | 0.0 |
| 130.1 | 134.2 |
| 260.2 | 271.9 |
| 390.4 | 411.8 |
| 520.5 | 553.5 |
| 650.6 | 696.7 |
| 780.8 | 829.1 |
| 910.9 | 960.7 |
| 1041.0 | 1092.2 |
| 1171.1 | 1223.8 |
| 1301.3 | 1355.5 |
| 1431.4 | 1486.9 |
| 1561.5 | 1618.3 |
| 1691.6 | 1749.8 |
| 1821.7 | 1881.1 |
| 1951.9 | 2012.6 |
| 2082.0 | 2144.0 |
| 2212.1 | 2275.2 |
| 2342.3 | 2406.7 |
| 2472.4 | 2537.9 |
| 2602.5 | 2669.2 |
| 2732.6 | 2800.4 |
| 2862.8 | 2931.7 |
| 2992.9 | 3062.9 |
| 3123.0 | 3194.0 |
| 3253.1 | 3325.2 |
| 3383.2 | 3456.3 |
| 3513.4 | 3587.6 |
| 3643.5 | 3718.6 |
| 3773.6 | 3849.8 |
| 3903.8 | 3981.0 |

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 25.75 | 78.2 | 16.669 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 4033.9 | 4112.1 |

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.15 S/N: 1295100016
EXECUTED: 12-28-1992 18:33:28


Return Freq: 10 years

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS10 .HYD
Outflow Hydrograph: 2ROUT10 .HYD

INFLOW HYDROGRAPH

| TIME (hrs) | INFLOW (cfs) |
|---|---|
| 10.900 | 0.00 |
| 11.000 | 0.00 |
| 11.100 | 1.16 |
| 11.200 | 2.31 |
| 11.300 | 3.45 |
| 11.400 | 3.57 |
| 11.500 | 3.69 |
| 11.600 | 3.80 |
| 11.700 | 6.01 |
| 11.800 | 7.66 |
| 11.900 | 11.09 |
| 12.000 | 21.72 |
| 12.100 | 33.71 |
| 12.200 | 34.83 |
| 12.300 | 34.07 |
| 12.400 | 41.71 |
| 12.500 | 50.15 |
| 12.600 | 53.80 |
| 12.700 | 55.24 |
| 12.800 | 51.55 |
| 12.900 | 47.34 |
| 13.000 | 42.22 |
| 13.100 | 38.30 |
| 13.200 | 34.19 |
| 13.300 | 30.91 |
| 13.400 | 27.18 |
| 13.500 | 24.51 |
| 13.600 | 21.88 |
| 13.700 | 19.30 |
| 13.800 | 16.99 |
| 13.900 | 15.00 |
| 14.000 | 13.17 |
| 14.100 | 12.43 |
| 14.200 | 11.74 |
| 14.300 | 11.09 |
| 14.400 | 10.60 |
| 14.500 | 10.22 |
| 14.600 | 9.93 |
| 14.700 | 8.71 |
| 14.800 | 8.54 |
| 14.900 | 7.34 |
| 15.000 | 7.10 |
| 15.100 | 6.90 |
| 15.200 | 6.73 |
| 15.300 | 5.60 |

ROUTING COMPUTATIONS

| I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
|---|---|---|---|---|
| ----- | 0.0 | 0.0 | 0.00 | 18.00 |
| 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 1.2 | 1.1 | 1.2 | 0.04 | 18.00 |
| 3.5 | 4.3 | 4.6 | 0.14 | 18.01 |
| 5.8 | 9.4 | 10.0 | 0.31 | 18.02 |
| 7.0 | 15.4 | 16.4 | 0.50 | 18.03 |
| 7.3 | 21.3 | 22.7 | 0.69 | 18.04 |
| 7.5 | 27.0 | 28.8 | 0.88 | 18.05 |
| 9.8 | 34.6 | 36.9 | 1.13 | 18.07 |
| 13.7 | 45.3 | 48.3 | 1.47 | 18.09 |
| 18.8 | 60.2 | 64.1 | 1.96 | 18.12 |
| 32.8 | 87.3 | 93.0 | 2.84 | 18.17 |
| 55.4 | 133.6 | 142.7 | 4.57 | 18.27 |
| 68.5 | 186.4 | 202.1 | 7.85 | 18.37 |
| 68.9 | 233.8 | 255.3 | 10.78 | 18.47 |
| 75.8 | 280.9 | 309.5 | 14.31 | 18.57 |
| 91.9 | 335.4 | 372.8 | 18.70 | 18.68 |
| 104.0 | 392.0 | 439.3 | 23.66 | 18.80 |
| 109.0 | 443.7 | 501.1 | 28.71 | 18.91 |
| 106.8 | 484.9 | 550.4 | 32.75 | 18.99 |
| 98.9 | 512.3 | 583.8 | 35.77 | 19.05 |
| 89.6 | 527.0 | 601.8 | 37.42 | 19.08 |
| 80.5 | 531.6 | 607.5 | 37.94 | 19.09 |
| 72.5 | 528.9 | 604.1 | 37.63 | 19.09 |
| 65.1 | 520.6 | 594.0 | 36.70 | 19.07 |
| 58.1 | 508.1 | 578.7 | 35.30 | 19.04 |
| 51.7 | 492.6 | 559.7 | 33.57 | 19.01 |
| 46.4 | 475.4 | 539.0 | 31.81 | 18.97 |
| 41.2 | 456.6 | 516.5 | 29.98 | 18.93 |
| 36.3 | 436.8 | 492.9 | 28.04 | 18.89 |
| 32.0 | 416.7 | 468.8 | 26.07 | 18.85 |
| 28.2 | 396.6 | 444.8 | 24.11 | 18.81 |
| 25.6 | 377.7 | 422.2 | 22.26 | 18.77 |
| 24.2 | 360.5 | 401.9 | 20.71 | 18.73 |
| 22.8 | 344.4 | 383.3 | 19.42 | 18.70 |
| 21.7 | 329.7 | 366.1 | 18.23 | 18.67 |
| 20.8 | 316.2 | 350.5 | 17.15 | 18.64 |
| 20.2 | 304.0 | 336.3 | 16.17 | 18.62 |
| 18.6 | 292.2 | 322.6 | 15.22 | 18.59 |
| 17.3 | 280.9 | 309.5 | 14.30 | 18.57 |
| 15.9 | 269.9 | 296.7 | 13.42 | 18.54 |
| 14.4 | 259.2 | 284.3 | 12.56 | 18.52 |
| 14.0 | 249.6 | 273.2 | 11.79 | 18.50 |
| 13.6 | 240.8 | 263.3 | 11.22 | 18.48 |
| 12.3 | 231.8 | 253.2 | 10.66 | 18.47 |

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS10 .HYD
Outflow Hydrograph: 2ROUT10 .HYD

INFLOW HYDROGRAPH

| TIME (hrs) | INFLOW (cfs) |
|---|---|
| 15.400 | 5.49 |
| 15.500 | 5.40 |
| 15.600 | 5.33 |
| 15.700 | 5.27 |
| 15.800 | 5.22 |
| 15.900 | 5.18 |
| 16.000 | 5.15 |
| 16.100 | 5.12 |
| 16.200 | 5.10 |
| 16.300 | 5.08 |
| 16.400 | 5.07 |
| 16.500 | 5.05 |
| 16.600 | 5.04 |
| 16.700 | 5.04 |
| 16.800 | 4.94 |
| 16.900 | 4.77 |
| 17.000 | 4.63 |
| 17.100 | 4.51 |
| 17.200 | 4.42 |
| 17.300 | 4.34 |
| 17.400 | 4.28 |
| 17.500 | 4.23 |

ROUTING COMPUTATIONS

| I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
|---|---|---|---|---|
| 11.1 | 222.7 | 242.9 | 10.10 | 18.45 |
| 10.9 | 214.4 | 233.6 | 9.58 | 18.43 |
| 10.7 | 206.9 | 225.2 | 9.12 | 18.42 |
| 10.6 | 200.1 | 217.5 | 8.70 | 18.40 |
| 10.5 | 194.0 | 210.6 | 8.32 | 18.39 |
| 10.4 | 188.5 | 204.4 | 7.97 | 18.38 |
| 10.3 | 183.5 | 198.8 | 7.66 | 18.37 |
| 10.3 | 179.0 | 193.7 | 7.38 | 18.36 |
| 10.2 | 174.9 | 189.2 | 7.13 | 18.35 |
| 10.2 | 171.3 | 185.1 | 6.91 | 18.34 |
| 10.2 | 168.0 | 181.4 | 6.71 | 18.34 |
| 10.1 | 165.1 | 178.1 | 6.52 | 18.33 |
| 10.1 | 162.5 | 175.2 | 6.36 | 18.32 |
| 10.1 | 160.1 | 172.5 | 6.21 | 18.32 |
| 10.0 | 157.9 | 170.1 | 6.08 | 18.32 |
| 9.7 | 155.8 | 167.6 | 5.94 | 18.31 |
| 9.4 | 153.5 | 165.2 | 5.81 | 18.31 |
| 9.1 | 151.3 | 162.7 | 5.67 | 18.30 |
| 8.9 | 149.2 | 160.3 | 5.54 | 18.30 |
| 8.8 | 147.1 | 158.0 | 5.41 | 18.29 |
| 8.6 | 145.2 | 155.8 | 5.29 | 18.29 |
| 8.5 | 143.3 | 153.7 | 5.17 | 18.29 |

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

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS10 .HYD
Outflow Hydrograph: 2ROUT10 .HYD

Starting Pond W.S. Elevation = 18.00 ft

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

Peak Inflow = 55.24 cfs
Peak Outflow = 37.94 cfs
Peak Elevation = 19.09 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 2.35 ac-ft
---
Total Storage in Pond = 2.35 ac-ft

Warning: Inflow hydrograph truncated on right side.

POND-2 Version: 5.15 S/N: 1295100016

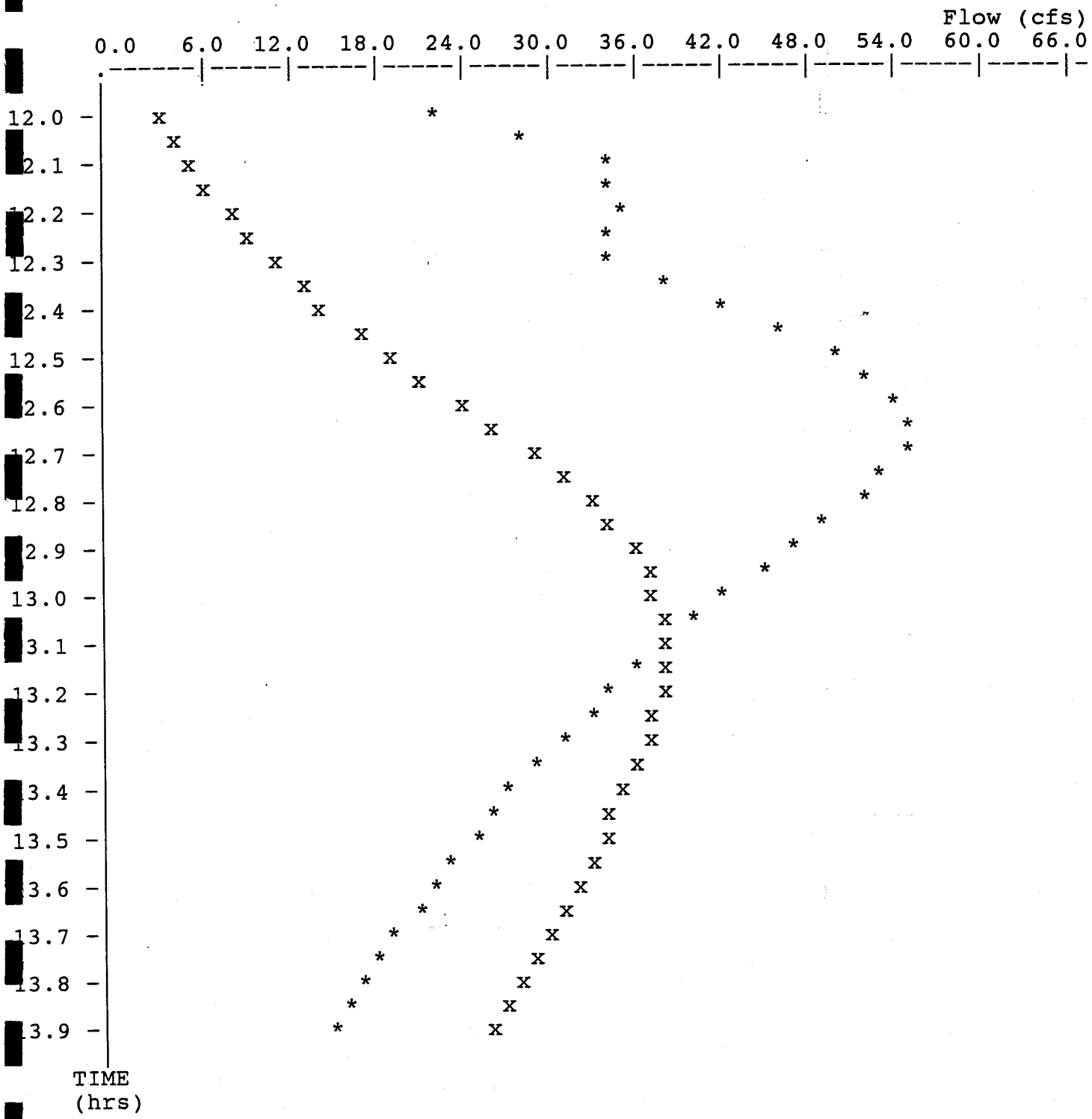


Return Freq: 10 years

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS10 .HYD
Outflow Hydrograph: 2ROUT10 .HYD

EXECUTED: 12-28-1992
18:33:28

Peak Inflow = 55.24 cfs
Peak Outflow = 37.94 cfs
Peak Elevation = 19.09 ft




* File: LGPS10 .HYD Qmax = 55.2 cfs
x File: 2ROUT10 .HYD Qmax = 37.9 cfs

POND-2 Version: 5.15 S/N: 1295100016
EXECUTED: 12-28-1992 18:33:28


Return Freq: 100 years

Inflow Hydrograph: LGPS100 .HYD
Rating Table file: LGPN82 .PND

----INITIAL CONDITIONS----
Elevation = 18.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 18.00 | 0.0 | 0.000 |
| 18.25 | 4.1 | 0.538 |
| 18.50 | 11.7 | 1.075 |
| 18.75 | 21.4 | 1.613 |
| 19.00 | 33.0 | 2.151 |
| 19.25 | 46.1 | 2.689 |
| 19.50 | 48.3 | 3.226 |
| 19.75 | 49.8 | 3.764 |
| 20.00 | 51.2 | 4.302 |
| 20.25 | 52.7 | 4.839 |
| 20.50 | 54.2 | 5.377 |
| 20.75 | 55.5 | 5.915 |
| 21.00 | 56.8 | 6.452 |
| 21.25 | 58.2 | 6.990 |
| 21.50 | 59.4 | 7.528 |
| 21.75 | 60.7 | 8.066 |
| 22.00 | 62.0 | 8.603 |
| 22.25 | 63.1 | 9.141 |
| 22.50 | 64.4 | 9.679 |
| 22.75 | 65.5 | 10.216 |
| 23.00 | 66.7 | 10.754 |
| 23.25 | 67.8 | 11.292 |
| 23.50 | 68.9 | 11.830 |
| 23.75 | 70.0 | 12.367 |
| 24.00 | 71.0 | 12.905 |
| 24.25 | 72.1 | 13.443 |
| 24.50 | 73.1 | 13.980 |
| 24.75 | 74.2 | 14.518 |
| 25.00 | 75.1 | 15.056 |
| 25.25 | 76.2 | 15.593 |
| 25.50 | 77.2 | 16.131 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 0.0 | 0.0 |
| 130.1 | 134.2 |
| 260.2 | 271.9 |
| 390.4 | 411.8 |
| 520.5 | 553.5 |
| 650.6 | 696.7 |
| 780.8 | 829.1 |
| 910.9 | 960.7 |
| 1041.0 | 1092.2 |
| 1171.1 | 1223.8 |
| 1301.3 | 1355.5 |
| 1431.4 | 1486.9 |
| 1561.5 | 1618.3 |
| 1691.6 | 1749.8 |
| 1821.7 | 1881.1 |
| 1951.9 | 2012.6 |
| 2082.0 | 2144.0 |
| 2212.1 | 2275.2 |
| 2342.3 | 2406.7 |
| 2472.4 | 2537.9 |
| 2602.5 | 2669.2 |
| 2732.6 | 2800.4 |
| 2862.8 | 2931.7 |
| 2992.9 | 3062.9 |
| 3123.0 | 3194.0 |
| 3253.1 | 3325.2 |
| 3383.2 | 3456.3 |
| 3513.4 | 3587.6 |
| 3643.5 | 3718.6 |
| 3773.6 | 3849.8 |
| 3903.8 | 3981.0 |

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 25.75 | 78.2 | 16.669 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + 0 (cfs) |
|---|---|
| 4033.9 | 4112.1 |

Time increment (t) = 0.100 hrs.

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS100 .HYD
Outflow Hydrograph: 2ROUT100.HYD

INFLOW HYDROGRAPH / ROUTING COMPUTATIONS

| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
|---|---|---|---|---|---|---|
| 10.900 | 0.00 | ----- | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.000 | 3.00 | 3.0 | 2.8 | 3.0 | 0.09 | 18.01 |
| 11.100 | 3.16 | 6.2 | 8.4 | 9.0 | 0.27 | 18.02 |
| 11.200 | 3.35 | 6.5 | 14.0 | 14.9 | 0.46 | 18.03 |
| 11.300 | 3.57 | 6.9 | 19.7 | 20.9 | 0.64 | 18.04 |
| 11.400 | 4.80 | 8.4 | 26.3 | 28.0 | 0.86 | 18.05 |
| 11.500 | 5.06 | 9.9 | 34.0 | 36.2 | 1.11 | 18.07 |
| 11.600 | 6.39 | 11.5 | 42.6 | 45.4 | 1.39 | 18.08 |
| 11.700 | 10.42 | 16.8 | 55.8 | 59.5 | 1.82 | 18.11 |
| 11.800 | 13.98 | 24.4 | 75.3 | 80.2 | 2.45 | 18.15 |
| 11.900 | 19.43 | 33.4 | 102.1 | 108.7 | 3.32 | 18.20 |
| 12.000 | 34.66 | 54.1 | 145.6 | 156.2 | 5.31 | 18.29 |
| 12.100 | 54.20 | 88.9 | 215.2 | 234.4 | 9.63 | 18.43 |
| 12.200 | 54.97 | 109.2 | 293.7 | 324.3 | 15.33 | 18.59 |
| 12.300 | 58.09 | 113.1 | 364.6 | 406.7 | 21.05 | 18.74 |
| 12.400 | 72.67 | 130.8 | 438.9 | 495.4 | 28.24 | 18.90 |
| 12.500 | 90.05 | 162.7 | 526.8 | 601.6 | 37.40 | 19.08 |
| 12.600 | 102.99 | 193.0 | 626.9 | 719.9 | 46.48 | 19.29 |
| 12.700 | 103.19 | 206.2 | 736.4 | 833.1 | 48.35 | 19.51 |
| 12.800 | 96.50 | 199.7 | 837.0 | 936.1 | 49.52 | 19.70 |
| 12.900 | 85.30 | 181.8 | 918.0 | 1018.8 | 50.42 | 19.86 |
| 13.000 | 72.48 | 157.8 | 973.7 | 1075.8 | 51.03 | 19.97 |
| 13.100 | 62.26 | 134.7 | 1005.7 | 1108.5 | 51.39 | 20.03 |
| 13.200 | 53.57 | 115.8 | 1018.4 | 1121.5 | 51.53 | 20.06 |
| 13.300 | 46.37 | 99.9 | 1015.4 | 1118.4 | 51.50 | 20.05 |
| 13.400 | 38.46 | 84.8 | 997.6 | 1100.2 | 51.29 | 20.02 |
| 13.500 | 35.24 | 73.7 | 969.4 | 1071.3 | 50.98 | 19.96 |
| 13.600 | 31.96 | 67.2 | 935.4 | 1036.6 | 50.61 | 19.89 |
| 13.700 | 29.57 | 61.5 | 896.5 | 996.9 | 50.19 | 19.82 |
| 13.800 | 27.02 | 56.6 | 853.7 | 953.1 | 49.71 | 19.74 |
| 13.900 | 24.60 | 51.6 | 807.0 | 905.3 | 49.17 | 19.64 |
| 14.000 | 22.21 | 46.8 | 756.6 | 853.8 | 48.58 | 19.55 |
| 14.100 | 19.80 | 42.0 | 703.0 | 798.6 | 47.79 | 19.44 |
| 14.200 | 18.61 | 38.4 | 647.8 | 741.4 | 46.84 | 19.33 |
| 14.300 | 16.60 | 35.2 | 593.3 | 683.0 | 44.84 | 19.23 |
| 14.400 | 15.72 | 32.3 | 546.4 | 625.6 | 39.60 | 19.13 |
| 14.500 | 14.96 | 30.7 | 506.8 | 577.1 | 35.16 | 19.04 |
| 14.600 | 14.26 | 29.2 | 472.9 | 536.0 | 31.57 | 18.97 |
| 14.700 | 12.73 | 27.0 | 442.6 | 499.9 | 28.61 | 18.91 |
| 14.800 | 12.32 | 25.1 | 415.7 | 467.7 | 25.98 | 18.85 |
| 14.900 | 11.01 | 23.3 | 391.8 | 439.1 | 23.63 | 18.80 |
| 15.000 | 10.77 | 21.8 | 370.5 | 413.6 | 21.55 | 18.75 |
| 15.100 | 10.59 | 21.4 | 351.8 | 391.8 | 20.02 | 18.71 |
| 15.200 | 10.45 | 21.0 | 335.4 | 372.8 | 18.70 | 18.68 |
| 15.300 | 10.23 | 20.7 | 321.0 | 356.1 | 17.54 | 18.65 |

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS100 .HYD
Outflow Hydrograph: 2ROUT100.HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 15.400 | 9.94 | 20.2 | 308.2 | 341.2 | 16.51 | 18.62 |
| 15.500 | 9.72 | 19.7 | 296.7 | 327.9 | 15.58 | 18.60 |
| 15.600 | 9.55 | 19.3 | 286.5 | 316.0 | 14.75 | 18.58 |
| 15.700 | 9.44 | 19.0 | 277.4 | 305.5 | 14.02 | 18.56 |
| 15.800 | 9.36 | 18.8 | 269.4 | 296.2 | 13.38 | 18.54 |
| 15.900 | 9.29 | 18.7 | 262.5 | 288.1 | 12.82 | 18.53 |
| 16.000 | 9.24 | 18.5 | 256.3 | 281.0 | 12.33 | 18.52 |
| 16.100 | 9.19 | 18.4 | 251.0 | 274.8 | 11.90 | 18.51 |
| 16.200 | 9.16 | 18.4 | 246.2 | 269.3 | 11.55 | 18.50 |
| 16.300 | 9.13 | 18.3 | 241.9 | 264.5 | 11.29 | 18.49 |
| 16.400 | 9.11 | 18.2 | 238.1 | 260.2 | 11.05 | 18.48 |
| 16.500 | 9.09 | 18.2 | 234.6 | 256.3 | 10.83 | 18.47 |
| 16.600 | 9.07 | 18.2 | 231.5 | 252.8 | 10.64 | 18.47 |
| 16.700 | 8.06 | 17.1 | 227.8 | 248.6 | 10.41 | 18.46 |
| 16.800 | 7.96 | 16.0 | 223.5 | 243.8 | 10.15 | 18.45 |
| 16.900 | 6.78 | 14.7 | 218.6 | 238.2 | 9.84 | 18.44 |
| 17.000 | 6.64 | 13.4 | 213.0 | 232.0 | 9.49 | 18.43 |
| 17.100 | 6.52 | 13.2 | 207.8 | 226.2 | 9.17 | 18.42 |
| 17.200 | 6.43 | 13.0 | 203.0 | 220.8 | 8.88 | 18.41 |
| 17.300 | 6.35 | 12.8 | 198.6 | 215.8 | 8.60 | 18.40 |
| 17.400 | 6.29 | 12.6 | 194.5 | 211.2 | 8.35 | 18.39 |
| 17.500 | 6.23 | 12.5 | 190.8 | 207.0 | 8.12 | 18.38 |

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

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS100 .HYD
Outflow Hydrograph: 2ROUT100.HYD

Starting Pond W.S. Elevation = 18.00 ft

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

Peak Inflow = 103.19 cfs
Peak Outflow = 51.53 cfs
Peak Elevation = 20.06 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 4.42 ac-ft
---
Total Storage in Pond = 4.42 ac-ft

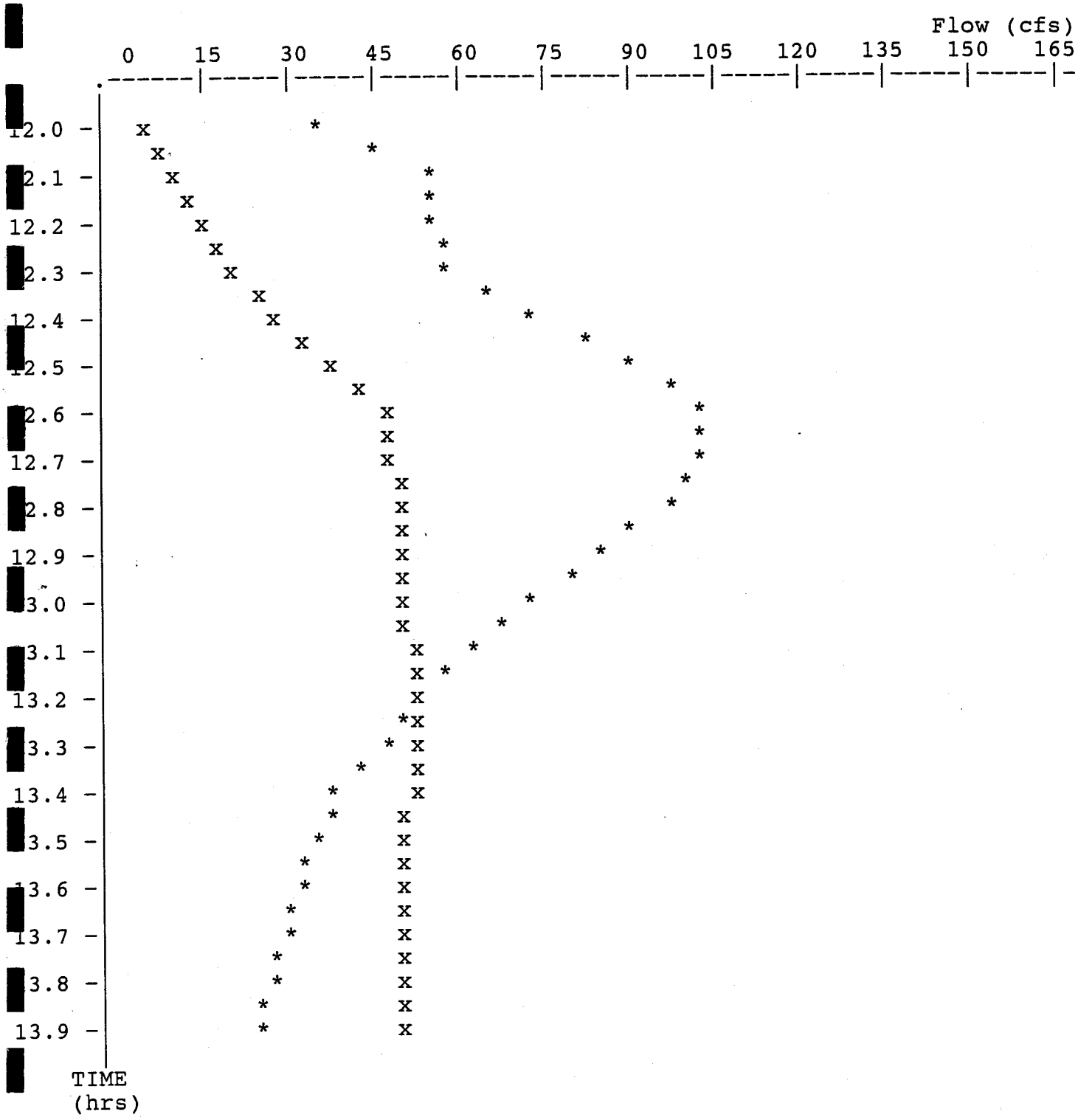
Warning: Inflow hydrograph truncated on right side.

Return Freq: 100 years

Pond File: LGPN82 .PND
Inflow Hydrograph: LGPS100 .HYD
Outflow Hydrograph: 2ROUT100.HYD

EXECUTED: 12-28-1992
18:33:28

Peak Inflow = 103.19 cfs
Peak Outflow = 51.53 cfs
Peak Elevation = 20.06 ft




* File: LGPS100 .HYD Qmax = 103.2 cfs
x File: 2ROUT100.HYD Qmax = 51.5 cfs

# Lake #3

# Drainage Calculations

Quick TR-55 Ver.5.44 S/N:1315400034
Executed: 08:53:45 12-31-1992 LG3PST.TCT

? COMPUTATIONS FOR:

SHEET FLOW (Applicable to Tc only)

| | | |
|---|---|---|
| Segment ID | | 1-1 |
| Surface description | | grass |
| Manning's roughness coeff., n | | 0.2400 |
| Flow length, L (total < or = 300) | ft | 250.0 |
| Two-yr 24-hr rainfall, P2 | in | 3.600 |
| Land slope, s | ft/ft | 0.0200 |

$$T = \frac{.007 * (n*L)^{0.8}}{P2^{0.5} * s^{0.4}}$$ hrs 0.47 = 0.47

SHALLOW CONCENTRATED FLOW

| | | |
|---|---|---|
| Segment ID | | 1-2 |
| Surface (paved or unpaved)? | | Unpaved |
| Flow length, L | ft | 150.0 |
| Watercourse slope, s | ft/ft | 0.0200 |

$$Avg.V = Csf * (s)^{0.5}$$ ft/s 2.2818

where: Unpaved Csf = 16.1345
Paved Csf = 20.3282

T = L / (3600*V) hrs 0.02 = 0.02

CHANNEL FLOW

| | | |
|---|---|---|
| Segment ID | | |
| Cross Sectional Flow Area, a | sq.ft | 0.00 |
| Wetted perimeter, Pw | ft | 0.00 |
| Hydraulic radius, r = a/Pw | ft | 0.000 |
| Channel slope, s | ft/ft | 0.0000 |
| Manning's roughness coeff., n | | 0.0000 |

$$V = \frac{1.49 * r^{2/3} * s^{1/2}}{n}$$ ft/s 0.0000

Flow length, L ft 0

T = L / (3600*V) hrs 0.00 = 0.00

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

TOTAL TIME (hrs) 0.48

Quick TR-55 Ver.5.44 S/N:1315400034
Executed: 08:59:19 12-31-1992

Colonial Golf Course
Pond #3
Post-development Time of Concentration

RUNOFF CURVE NUMBER DATA

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

Composite Area:

| SURFACE DESCRIPTION | AREA (acres) | CN | |
|---|---|---|---|
| Grass | 5.41 | 74 | |
| COMPOSITE AREA ---> | 5.41 | 74.0 | ( 74 ) |

::::::::::::::::::::::::::::::::::::::::::::::::::::::

Return Frequency: 2 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-31-1992 08:59:51
Watershed file: --> LG3PST .MOP
Hydrograph file: --> LG3PS2.HYD

Colonial Golf Course
Pond #3
Post-development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used | |
|---|---|---|---|---|---|---|---|---|
| Pond #3 | 5.41 | 74.0 | 0.50 | 0.00 | 3.60 | 1.31 | I.2 | .20 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 5.41 acres or 0.00845 sq.mi
Peak discharge = 5 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Pond #3 | 0.48 | 0.00 | 0.50 | 0.00 | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 10 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-31-1992 08:59:51
Watershed file: --> LG3PST .MOP
Hydrograph file: --> LG3PS10.HYD

Colonial Golf Course
Pond #3
Post-development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used |
|---|---|---|---|---|---|---|---|
| Pond #3 | 5.41 | 74.0 | 0.50 | 0.00 | 5.70 | 2.93 | I.12 .12 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 5.41 acres or 0.00845 sq.mi
Peak discharge = 13 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | Input Values * Tt (hr) | Rounded Values Tc (hr) | Rounded Values * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Pond #3 | 0.48 | 0.00 | 0.50 | 0.00 | Yes | -- |

* Travel time from subarea outfall to composite watershed outfall point.

Return Frequency: 100 years

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 12-31-1992 08:59:51
Watershed file: --> LG3PST .MOP
Hydrograph file: --> LG3PS100.HYD

Colonial Golf Course
Pond #3
Post-development Hydrographs

>>>> Input Parameters Used to Compute Hydrograph <<<<

| Subarea Description | AREA (acres) | CN | Tc (hrs) | * Tt (hrs) | Precip. (in) | Runoff (in) | Ia/p input/used |
|---|---|---|---|---|---|---|---|
| Pond #3 | 5.41 | 74.0 | 0.50 | 0.00 | 8.10 | 5.02 | I .09 .10 |

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 5.41 acres or 0.00845 sq.mi
Peak discharge = 22 cfs

>>>> Computer Modifications of Input Parameters <<<<<

| Subarea Description | Input Values Tc (hr) | * Tt (hr) | Rounded Values Tc (hr) | * Tt (hr) | Ia/p Interpolated (Yes/No) | Ia/p Messages |
|---|---|---|---|---|---|---|
| Pond #3 | 0.48 | 0.00 | 0.50 | 0.00 | No | Computed Ia/p < .1 |

* Travel time from subarea outfall to composite watershed outfall point.

# Lake #3

# Routing Calculations

POND-2 Version: 5.15
S/N: 1295100016

Colonial Golf Course
Pond #3

CALCULATED 12-31-1992 09:04:51
DISK FILE: LGPN3 .VOL

Planimeter scale: 1 inch = 1 ft.

| Elevation (ft) | Planimeter (sq.in.) | Area (acres) | A1+A2+sqr(A1*A2) (acres) | * Volume (acre-ft) | Volume Sum (acre-ft) |
|---|---|---|---|---|---|
| 18.00 | 35,510.00 | 0.82 | 0.00 | 0.00 | 0.00 |
| 22.00 | 35,510.00 | 0.82 | 2.45 | 3.26 | 3.26 |

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

Outlet Structure File: LGPNT2 .STR

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

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

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 18.00 | 0.0 | 1 |
| 18.25 | 2.4 | 1 |
| 18.50 | 6.7 | 1 |
| 18.75 | 12.2 | 1 |
| 19.00 | 15.1 | 1 |
| 19.25 | 16.9 | 1 |
| 19.50 | 18.5 | 1 |
| 19.75 | 20.0 | 1 |
| 20.00 | 21.4 | 1 |

Outlet Structure File: LGPNT2 .STR

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

Outlet Structure File: LGPNT2 .STR
Planimeter Input File: LGPN3 .VOL
Rating Table Output File: LGPNT2 .PND

Min. Elev.(ft) = 18 Max. Elev.(ft) = 20 Incr.(ft) = .25

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

**********
SYSTEM CONNECTIVITY
**********

| Structure | No. | Q Table | | Q Table |
|---|---|---|---|---|
| INLET BOX | 1 | | -> | 1 |
| CULVERT-CR | 2 | ? 1 | -> | 3 |

Outflow rating table summary was stored in file:
LGPNT2 .PND

Outlet Structure File: LGPNT2 .STR

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

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

INLET BOX
Weir & Orifice defined by length and area

| | |
|---|---|
| E1 elev.(ft)? | 18 |
| E2 elev.(ft)? | 20.001 |
| Crest elev.(ft)? | 18 |
| Weir length (ft)? | 6.28 |
| Weir coefficient? | 3.0 |
| Orifice area (sq.ft)? | 3.14 |
| Orifice coefficient? | .6 |
| Start transition elev.(ft) @ ? | |
| Transition height (ft)? | |

Outlet Structure File: LGPNT2 .STR

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

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

CULVERT-CR
Circular Culvert (With Inlet Control)

| | |
|---|---|
| E1 elev.(ft)? | 8 |
| E2 elev.(ft)? | 20.001 |
| Diam. (ft)? | 1.5 |
| Inv. el.(ft)? | 8 |
| Slope (ft/ft)? | .01 |
| T1 ratio? | |
| T2 ratio? | |
| K Coeff.? | .0098 |
| M Coeff.? | 2 |
| c Coeff.? | .0398 |
| Y Coeff.? | .67 |
| Form 1 or 2? | 1 |
| Slope factor? | -.5 |

Outlet Structure File: LGPNT2 .STR

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

Outflow Rating Table for Structure #1
INLET BOX Weir & Orifice defined by length and area

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

| Elevation (ft) | Q (cfs) | Computation | Messages |
|---|---|---|---|
| 18.00 | 0.0 | Weir: | H =0.0 |
| 18.25 | 2.4 | Weir: | H =.25 |
| 18.50 | 6.7 | Weir: | H =.5 |
| 18.75 | 12.2 | Weir: | H =.750 |
| 19.00 | 15.1 | Orifice: | H =1.0 |
| 19.25 | 16.9 | Orifice: | H =1.25 |
| 19.50 | 18.5 | Orifice: | H =1.5 |
| 19.75 | 20.0 | Orifice: | H =1.75 |
| 20.00 | 21.4 | Orifice: | H =2.0 |

Weir Cw = 3 Weir length = 6.28 ft
Orifice Co = .6 Orifice area = 3.14 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 18.8025 ft

Outlet Structure File: LGPNT2 .STR

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

Outflow Rating Table for Structure #2
CULVERT-CR Circular Culvert (With Inlet Control)

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

| Elevation (ft) | Q (cfs) | Computation Messages |
|---|---|---|
| 18.00 | 26.6 | Submerged: HW =10.0 |
| 18.25 | 26.9 | Submerged: HW =10.25 |
| 18.50 | 27.3 | Submerged: HW =10.5 |
| 18.75 | 27.7 | Submerged: HW =10.75 |
| 19.00 | 28.0 | Submerged: HW =11.0 |
| 19.25 | 28.4 | Submerged: HW =11.25 |
| 19.50 | 28.7 | Submerged: HW =11.5 |
| 19.75 | 29.0 | Submerged: HW =11.75 |
| 20.00 | 29.4 | Submerged: HW =12.0 |

Used Unsubmerged Equ. Form (1) for elev. less than 9.73 ft
Used Submerged Equation for elevations greater than 9.95 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=9.73 ft; Q1=7.58 cfs; Dc=1.07 ft; E2=9.95 ft; Q2=8.66 cfs

Outlet Structure File: LGPNT2 .STR

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

Outflow Rating Table 3
Table 3 = 1 ? 2

| Elevation (ft) | Q (cfs) | Contributing Structures |
|---|---|---|
| 18.00 | 0.0 | 1 |
| 18.25 | 2.4 | 1 |
| 18.50 | 6.7 | 1 |
| 18.75 | 12.2 | 1 |
| 19.00 | 15.1 | 1 |
| 19.25 | 16.9 | 1 |
| 19.50 | 18.5 | 1 |
| 19.75 | 20.0 | 1 |
| 20.00 | 21.4 | 1 |

Inflow Hydrograph: LG3PS2 .HYD
Rating Table file: LGPNT2 .PND

----INITIAL CONDITIONS----
Elevation = 18.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 18.00 | 0.0 | 0.000 |
| 18.25 | 2.4 | 0.204 |
| 18.50 | 6.7 | 0.408 |
| 18.75 | 12.2 | 0.611 |
| 19.00 | 15.1 | 0.815 |
| 19.25 | 16.9 | 1.019 |
| 19.50 | 18.5 | 1.223 |
| 19.75 | 20.0 | 1.427 |
| 20.00 | 21.4 | 1.630 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 0.0 | 0.0 |
| 49.3 | 51.7 |
| 98.6 | 105.3 |
| 148.0 | 160.2 |
| 197.3 | 212.4 |
| 246.6 | 263.5 |
| 295.9 | 314.4 |
| 345.2 | 365.2 |
| 394.6 | 416.0 |

Time increment (t) = 0.100 hrs.

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS2 .HYD
Outflow Hydrograph: 2ROUT100.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 | 0.00 | ----- | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.200 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.300 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.400 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.500 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.600 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.700 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.800 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.900 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 12.000 | 1.00 | 1.0 | 0.9 | 1.0 | 0.05 | 18.00 |
| 12.100 | 1.00 | 2.0 | 2.6 | 2.9 | 0.13 | 18.01 |
| 12.200 | 3.00 | 4.0 | 6.0 | 6.6 | 0.31 | 18.03 |
| 12.300 | 4.00 | 7.0 | 11.8 | 13.0 | 0.60 | 18.06 |
| 12.400 | 5.00 | 9.0 | 18.9 | 20.8 | 0.97 | 18.10 |
| 12.500 | 5.00 | 10.0 | 26.2 | 28.9 | 1.34 | 18.14 |
| 12.600 | 4.00 | 9.0 | 31.9 | 35.2 | 1.63 | 18.17 |
| 12.700 | 3.00 | 7.0 | 35.3 | 38.9 | 1.81 | 18.19 |
| 12.800 | 3.00 | 6.0 | 37.5 | 41.3 | 1.92 | 18.20 |
| 12.900 | 2.00 | 5.0 | 38.5 | 42.5 | 1.97 | 18.21 |
| 13.000 | 2.00 | 4.0 | 38.6 | 42.5 | 1.97 | 18.21 |
| 13.100 | 2.00 | 4.0 | 38.6 | 42.6 | 1.98 | 18.21 |
| 13.200 | 1.00 | 3.0 | 37.8 | 41.6 | 1.93 | 18.20 |
| 13.300 | 1.00 | 2.0 | 36.1 | 39.8 | 1.85 | 18.19 |
| 13.400 | 1.00 | 2.0 | 34.6 | 38.1 | 1.77 | 18.18 |
| 13.500 | 1.00 | 2.0 | 33.2 | 36.6 | 1.70 | 18.18 |
| 13.600 | 1.00 | 2.0 | 31.9 | 35.2 | 1.63 | 18.17 |
| 13.700 | 1.00 | 2.0 | 30.7 | 33.9 | 1.57 | 18.16 |
| 13.800 | 1.00 | 2.0 | 29.7 | 32.7 | 1.52 | 18.16 |
| 13.900 | 1.00 | 2.0 | 28.8 | 31.7 | 1.47 | 18.15 |
| 14.000 | 1.00 | 2.0 | 27.9 | 30.8 | 1.43 | 18.15 |
| 14.100 | 1.00 | 2.0 | 27.1 | 29.9 | 1.39 | 18.14 |
| 14.200 | 1.00 | 2.0 | 26.4 | 29.1 | 1.35 | 18.14 |
| 14.300 | 1.00 | 2.0 | 25.8 | 28.4 | 1.32 | 18.14 |
| 14.400 | 1.00 | 2.0 | 25.2 | 27.8 | 1.29 | 18.13 |
| 14.500 | 0.00 | 1.0 | 23.8 | 26.2 | 1.22 | 18.13 |
| 14.600 | 0.00 | 0.0 | 21.6 | 23.8 | 1.10 | 18.11 |
| 14.700 | 0.00 | 0.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 14.800 | 0.00 | 0.0 | 17.8 | 19.6 | 0.91 | 18.09 |
| 14.900 | 0.00 | 0.0 | 16.1 | 17.8 | 0.82 | 18.09 |
| 15.000 | 0.00 | 0.0 | 14.6 | 16.1 | 0.75 | 18.08 |
| 15.100 | 0.00 | 0.0 | 13.3 | 14.6 | 0.68 | 18.07 |
| 15.200 | 0.00 | 0.0 | 12.0 | 13.3 | 0.62 | 18.06 |
| 15.300 | 0.00 | 0.0 | 10.9 | 12.0 | 0.56 | 18.06 |
| 15.400 | 0.00 | 0.0 | 9.9 | 10.9 | 0.51 | 18.05 |

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS2 .HYD
Outflow Hydrograph: 2ROUT100.HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 15.500 | 0.00 | 0.0 | 9.0 | 9.9 | 0.46 | 18.05 |
| 15.600 | 0.00 | 0.0 | 8.1 | 9.0 | 0.42 | 18.04 |
| 15.700 | 0.00 | 0.0 | 7.4 | 8.1 | 0.38 | 18.04 |
| 15.800 | 0.00 | 0.0 | 6.7 | 7.4 | 0.34 | 18.04 |
| 15.900 | 0.00 | 0.0 | 6.1 | 6.7 | 0.31 | 18.03 |
| 16.000 | 0.00 | 0.0 | 5.5 | 6.1 | 0.28 | 18.03 |
| 16.100 | 0.00 | 0.0 | 5.0 | 5.5 | 0.26 | 18.03 |
| 16.200 | 0.00 | 0.0 | 4.5 | 5.0 | 0.23 | 18.02 |
| 16.300 | 0.00 | 0.0 | 4.1 | 4.5 | 0.21 | 18.02 |
| 16.400 | 0.00 | 0.0 | 3.7 | 4.1 | 0.19 | 18.02 |
| 16.500 | 0.00 | 0.0 | 3.4 | 3.7 | 0.17 | 18.02 |
| 16.600 | 0.00 | 0.0 | 3.1 | 3.4 | 0.16 | 18.02 |
| 16.700 | 0.00 | 0.0 | 2.8 | 3.1 | 0.14 | 18.01 |
| 16.800 | 0.00 | 0.0 | 2.5 | 2.8 | 0.13 | 18.01 |
| 16.900 | 0.00 | 0.0 | 2.3 | 2.5 | 0.12 | 18.01 |
| 17.000 | 0.00 | 0.0 | 2.1 | 2.3 | 0.11 | 18.01 |
| 17.100 | 0.00 | 0.0 | 1.9 | 2.1 | 0.10 | 18.01 |
| 17.200 | 0.00 | 0.0 | 1.7 | 1.9 | 0.09 | 18.01 |
| 17.300 | 0.00 | 0.0 | 1.6 | 1.7 | 0.08 | 18.01 |
| 17.400 | 0.00 | 0.0 | 1.4 | 1.6 | 0.07 | 18.01 |
| 17.500 | 0.00 | 0.0 | 1.3 | 1.4 | 0.07 | 18.01 |
| 17.600 | 0.00 | 0.0 | 1.2 | 1.3 | 0.06 | 18.01 |
| 17.700 | 0.00 | 0.0 | 1.1 | 1.2 | 0.05 | 18.01 |
| 17.800 | 0.00 | 0.0 | 1.0 | 1.1 | 0.05 | 18.01 |
| 17.900 | 0.00 | 0.0 | 0.9 | 1.0 | 0.04 | 18.00 |
| 18.000 | 0.00 | 0.0 | 0.8 | 0.9 | 0.04 | 18.00 |
| 18.100 | 0.00 | 0.0 | 0.7 | 0.8 | 0.04 | 18.00 |
| 18.200 | 0.00 | 0.0 | 0.6 | 0.7 | 0.03 | 18.00 |
| 18.300 | 0.00 | 0.0 | 0.6 | 0.6 | 0.03 | 18.00 |
| 18.400 | 0.00 | 0.0 | 0.5 | 0.6 | 0.03 | 18.00 |
| 18.500 | 0.00 | 0.0 | 0.5 | 0.5 | 0.02 | 18.00 |
| 18.600 | 0.00 | 0.0 | 0.4 | 0.5 | 0.02 | 18.00 |
| 18.700 | 0.00 | 0.0 | 0.4 | 0.4 | 0.02 | 18.00 |
| 18.800 | 0.00 | 0.0 | 0.4 | 0.4 | 0.02 | 18.00 |
| 18.900 | 0.00 | 0.0 | 0.3 | 0.4 | 0.02 | 18.00 |
| 19.000 | 0.00 | 0.0 | 0.3 | 0.3 | 0.02 | 18.00 |
| 19.100 | 0.00 | 0.0 | 0.3 | 0.3 | 0.01 | 18.00 |
| 19.200 | 0.00 | 0.0 | 0.2 | 0.3 | 0.01 | 18.00 |
| 19.300 | 0.00 | 0.0 | 0.2 | 0.2 | 0.01 | 18.00 |
| 19.400 | 0.00 | 0.0 | 0.2 | 0.2 | 0.01 | 18.00 |
| 19.500 | 0.00 | 0.0 | 0.2 | 0.2 | 0.01 | 18.00 |
| 19.600 | 0.00 | 0.0 | 0.2 | 0.2 | 0.01 | 18.00 |
| 19.700 | 0.00 | 0.0 | 0.2 | 0.2 | 0.01 | 18.00 |
| 19.800 | 0.00 | 0.0 | 0.1 | 0.2 | 0.01 | 18.00 |
| 19.900 | 0.00 | 0.0 | 0.1 | 0.1 | 0.01 | 18.00 |
| 20.000 | 0.00 | 0.0 | 0.1 | 0.1 | 0.01 | 18.00 |

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS2 .HYD
Outflow Hydrograph: 2ROUT100.HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 20.100 | 0.00 | 0.0 | 0.1 | 0.1 | 0.01 | 18.00 |
| 20.200 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 20.300 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 20.400 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 20.500 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 20.600 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 20.700 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 20.800 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 20.900 | 0.00 | 0.0 | 0.0 | 0.1 | 0.00 | 18.00 |
| 21.000 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 21.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 21.200 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 21.300 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 21.400 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 21.500 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 21.600 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 21.700 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 21.800 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 21.900 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.000 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.200 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.300 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.400 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.500 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.600 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.700 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.800 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 22.900 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.000 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.200 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.300 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.400 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.500 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.600 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.700 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.800 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 23.900 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.000 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.200 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.300 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.400 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.500 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.600 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS2 .HYD
Outflow Hydrograph: 2ROUT100.HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 24.700 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.800 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.900 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.000 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.200 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.300 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.400 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.500 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.600 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.700 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.800 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.900 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |

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

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS2 .HYD
Outflow Hydrograph: 2ROUT100.HYD

Starting Pond W.S. Elevation = 18.00 ft

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

| | | |
|---|---|---|
| Peak Inflow | = | 5.00 cfs |
| Peak Outflow | = | 1.98 cfs |
| Peak Elevation | = | 18.21 ft |

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

| | | |
|---|---|---|
| Initial Storage | = | 0.00 ac-ft |
| Peak Storage From Storm | = | 0.17 ac-ft |
| Total Storage in Pond | = | 0.17 ac-ft |

POND-2 Version: 5.15 S/N: 1295100016

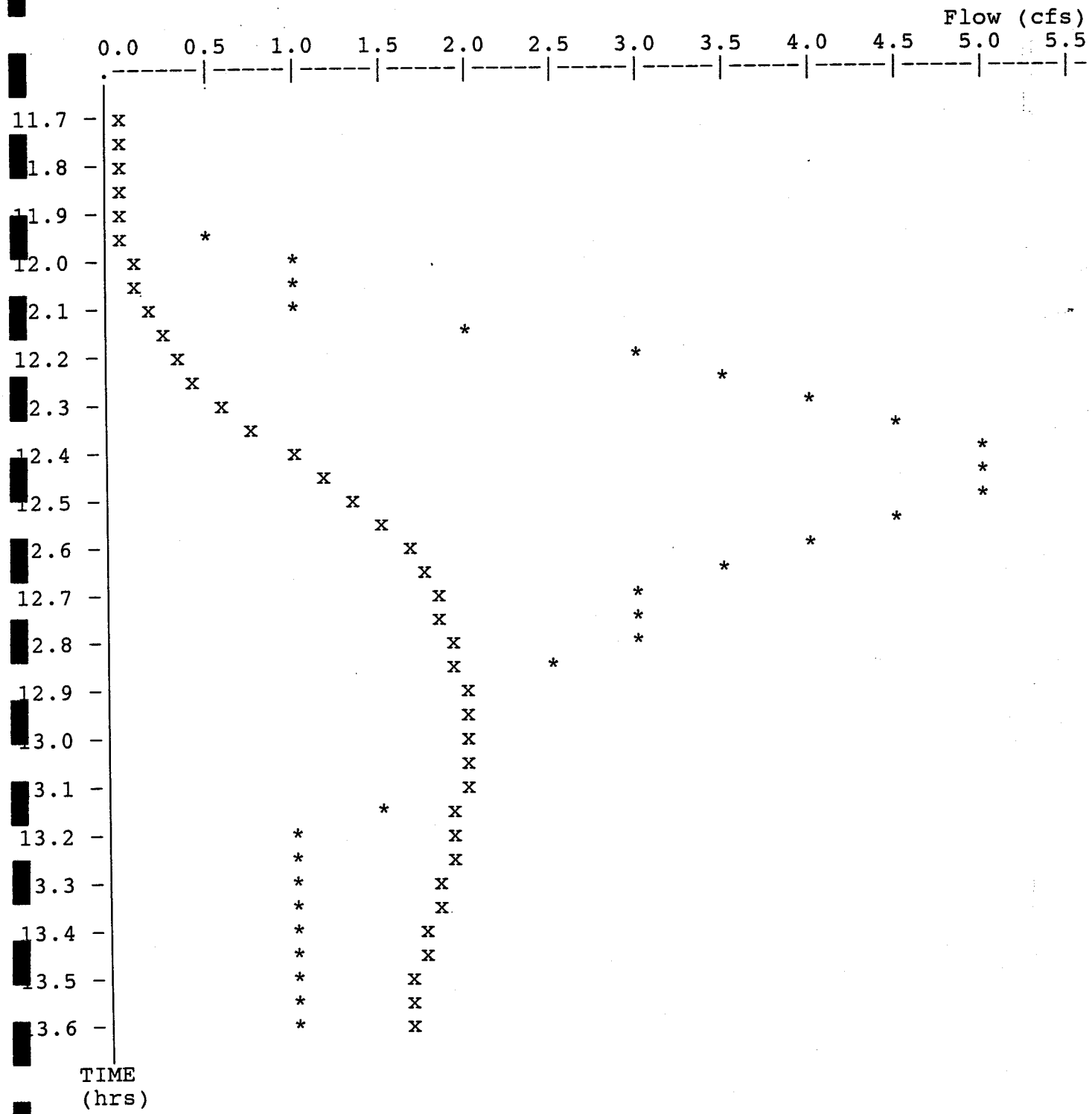


Return Freq: 100 years

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS2 .HYD
Outflow Hydrograph: 2ROUT100.HYD

EXECUTED: 12-31-1992
09:07:23

Peak Inflow = 5.00 cfs
Peak Outflow = 1.98 cfs
Peak Elevation = 18.21 ft




* File: LG3PS2 .HYD Qmax = 5.0 cfs
x File: 2ROUT100.HYD Qmax = 2.0 cfs

Inflow Hydrograph: LG3PS10 .HYD
Rating Table file: LGPNT2 .PND

----INITIAL CONDITIONS----
Elevation = 18.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 18.00 | 0.0 | 0.000 |
| 18.25 | 2.4 | 0.204 |
| 18.50 | 6.7 | 0.408 |
| 18.75 | 12.2 | 0.611 |
| 19.00 | 15.1 | 0.815 |
| 19.25 | 16.9 | 1.019 |
| 19.50 | 18.5 | 1.223 |
| 19.75 | 20.0 | 1.427 |
| 20.00 | 21.4 | 1.630 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 0.0 | 0.0 |
| 49.3 | 51.7 |
| 98.6 | 105.3 |
| 148.0 | 160.2 |
| 197.3 | 212.4 |
| 246.6 | 263.5 |
| 295.9 | 314.4 |
| 345.2 | 365.2 |
| 394.6 | 416.0 |

Time increment (t) = 0.100 hrs.

POND-2 Version: 5.15 S/N: 1295100016
EXECUTED: 12-31-1992 09:07:23


Return Freq: 10 years

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS10 .HYD
Outflow Hydrograph: 2ROUT10 .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 | 0.00 | ----- | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.200 | 1.00 | 1.0 | 0.9 | 1.0 | 0.05 | 18.00 |
| 11.300 | 1.00 | 2.0 | 2.6 | 2.9 | 0.13 | 18.01 |
| 11.400 | 1.00 | 2.0 | 4.2 | 4.6 | 0.22 | 18.02 |
| 11.500 | 1.00 | 2.0 | 5.6 | 6.2 | 0.29 | 18.03 |
| 11.600 | 1.00 | 2.0 | 6.9 | 7.6 | 0.35 | 18.04 |
| 11.700 | 1.00 | 2.0 | 8.1 | 8.9 | 0.41 | 18.04 |
| 11.800 | 1.00 | 2.0 | 9.2 | 10.1 | 0.47 | 18.05 |
| 11.900 | 1.00 | 2.0 | 10.1 | 11.2 | 0.52 | 18.05 |
| 12.000 | 2.00 | 3.0 | 11.9 | 13.1 | 0.61 | 18.06 |
| 12.100 | 4.00 | 6.0 | 16.2 | 17.9 | 0.83 | 18.09 |
| 12.200 | 7.00 | 11.0 | 24.7 | 27.2 | 1.26 | 18.13 |
| 12.300 | 11.00 | 18.0 | 38.8 | 42.7 | 1.98 | 18.21 |
| 12.400 | 13.00 | 24.0 | 56.2 | 62.8 | 3.28 | 18.30 |
| 12.500 | 12.00 | 25.0 | 71.7 | 81.2 | 4.76 | 18.39 |
| 12.600 | 10.00 | 22.0 | 82.1 | 93.7 | 5.76 | 18.45 |
| 12.700 | 7.00 | 17.0 | 86.7 | 99.1 | 6.20 | 18.47 |
| 12.800 | 6.00 | 13.0 | 87.2 | 99.7 | 6.25 | 18.47 |
| 12.900 | 5.00 | 11.0 | 86.0 | 98.2 | 6.13 | 18.47 |
| 13.000 | 4.00 | 9.0 | 83.2 | 95.0 | 5.87 | 18.45 |
| 13.100 | 3.00 | 7.0 | 79.3 | 90.2 | 5.49 | 18.43 |
| 13.200 | 2.00 | 5.0 | 74.2 | 84.3 | 5.01 | 18.40 |
| 13.300 | 2.00 | 4.0 | 69.2 | 78.2 | 4.53 | 18.37 |
| 13.400 | 2.00 | 4.0 | 64.9 | 73.2 | 4.12 | 18.35 |
| 13.500 | 2.00 | 4.0 | 61.4 | 68.9 | 3.78 | 18.33 |
| 13.600 | 2.00 | 4.0 | 58.4 | 65.4 | 3.50 | 18.31 |
| 13.700 | 2.00 | 4.0 | 55.9 | 62.4 | 3.26 | 18.30 |
| 13.800 | 1.00 | 3.0 | 52.9 | 58.9 | 2.97 | 18.28 |
| 13.900 | 1.00 | 2.0 | 49.6 | 54.9 | 2.66 | 18.26 |
| 14.000 | 1.00 | 2.0 | 46.8 | 51.6 | 2.40 | 18.25 |
| 14.100 | 1.00 | 2.0 | 44.3 | 48.8 | 2.27 | 18.24 |
| 14.200 | 1.00 | 2.0 | 42.0 | 46.3 | 2.15 | 18.22 |
| 14.300 | 1.00 | 2.0 | 39.9 | 44.0 | 2.04 | 18.21 |
| 14.400 | 1.00 | 2.0 | 38.0 | 41.9 | 1.94 | 18.20 |
| 14.500 | 1.00 | 2.0 | 36.3 | 40.0 | 1.86 | 18.19 |
| 14.600 | 1.00 | 2.0 | 34.8 | 38.3 | 1.78 | 18.19 |
| 14.700 | 1.00 | 2.0 | 33.3 | 36.8 | 1.71 | 18.18 |
| 14.800 | 1.00 | 2.0 | 32.1 | 35.3 | 1.64 | 18.17 |
| 14.900 | 1.00 | 2.0 | 30.9 | 34.1 | 1.58 | 18.16 |
| 15.000 | 1.00 | 2.0 | 29.8 | 32.9 | 1.53 | 18.16 |
| 15.100 | 1.00 | 2.0 | 28.9 | 31.8 | 1.48 | 18.15 |
| 15.200 | 1.00 | 2.0 | 28.0 | 30.9 | 1.43 | 18.15 |
| 15.300 | 1.00 | 2.0 | 27.2 | 30.0 | 1.39 | 18.15 |
| 15.400 | 1.00 | 2.0 | 26.5 | 29.2 | 1.36 | 18.14 |

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS10 .HYD
Outflow Hydrograph: 2ROUT10 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 15.500 | 1.00 | 2.0 | 25.9 | 28.5 | 1.32 | 18.14 |
| 15.600 | 1.00 | 2.0 | 25.3 | 27.9 | 1.29 | 18.13 |
| 15.700 | 1.00 | 2.0 | 24.8 | 27.3 | 1.27 | 18.13 |
| 15.800 | 1.00 | 2.0 | 24.3 | 26.8 | 1.24 | 18.13 |
| 15.900 | 1.00 | 2.0 | 23.8 | 26.3 | 1.22 | 18.13 |
| 16.000 | 1.00 | 2.0 | 23.4 | 25.8 | 1.20 | 18.12 |
| 16.100 | 1.00 | 2.0 | 23.1 | 25.4 | 1.18 | 18.12 |
| 16.200 | 1.00 | 2.0 | 22.7 | 25.1 | 1.16 | 18.12 |
| 16.300 | 1.00 | 2.0 | 22.5 | 24.7 | 1.15 | 18.12 |
| 16.400 | 1.00 | 2.0 | 22.2 | 24.5 | 1.13 | 18.12 |
| 16.500 | 1.00 | 2.0 | 21.9 | 24.2 | 1.12 | 18.12 |
| 16.600 | 1.00 | 2.0 | 21.7 | 23.9 | 1.11 | 18.12 |
| 16.700 | 1.00 | 2.0 | 21.5 | 23.7 | 1.10 | 18.11 |
| 16.800 | 1.00 | 2.0 | 21.3 | 23.5 | 1.09 | 18.11 |
| 16.900 | 1.00 | 2.0 | 21.2 | 23.3 | 1.08 | 18.11 |
| 17.000 | 1.00 | 2.0 | 21.0 | 23.2 | 1.08 | 18.11 |
| 17.100 | 1.00 | 2.0 | 20.9 | 23.0 | 1.07 | 18.11 |
| 17.200 | 1.00 | 2.0 | 20.8 | 22.9 | 1.06 | 18.11 |
| 17.300 | 1.00 | 2.0 | 20.6 | 22.8 | 1.06 | 18.11 |
| 17.400 | 1.00 | 2.0 | 20.5 | 22.6 | 1.05 | 18.11 |
| 17.500 | 1.00 | 2.0 | 20.5 | 22.5 | 1.05 | 18.11 |
| 17.600 | 1.00 | 2.0 | 20.4 | 22.5 | 1.04 | 18.11 |
| 17.700 | 1.00 | 2.0 | 20.3 | 22.4 | 1.04 | 18.11 |
| 17.800 | 0.00 | 1.0 | 19.3 | 21.3 | 0.99 | 18.10 |
| 17.900 | 0.00 | 0.0 | 17.5 | 19.3 | 0.90 | 18.09 |
| 18.000 | 0.00 | 0.0 | 15.9 | 17.5 | 0.81 | 18.08 |
| 18.100 | 0.00 | 0.0 | 14.4 | 15.9 | 0.74 | 18.08 |
| 18.200 | 0.00 | 0.0 | 13.1 | 14.4 | 0.67 | 18.07 |
| 18.300 | 0.00 | 0.0 | 11.9 | 13.1 | 0.61 | 18.06 |
| 18.400 | 0.00 | 0.0 | 10.8 | 11.9 | 0.55 | 18.06 |
| 18.500 | 0.00 | 0.0 | 9.8 | 10.8 | 0.50 | 18.05 |
| 18.600 | 0.00 | 0.0 | 8.9 | 9.8 | 0.45 | 18.05 |
| 18.700 | 0.00 | 0.0 | 8.0 | 8.9 | 0.41 | 18.04 |
| 18.800 | 0.00 | 0.0 | 7.3 | 8.0 | 0.37 | 18.04 |
| 18.900 | 0.00 | 0.0 | 6.6 | 7.3 | 0.34 | 18.04 |
| 19.000 | 0.00 | 0.0 | 6.0 | 6.6 | 0.31 | 18.03 |
| 19.100 | 0.00 | 0.0 | 5.4 | 6.0 | 0.28 | 18.03 |
| 19.200 | 0.00 | 0.0 | 4.9 | 5.4 | 0.25 | 18.03 |
| 19.300 | 0.00 | 0.0 | 4.5 | 4.9 | 0.23 | 18.02 |
| 19.400 | 0.00 | 0.0 | 4.1 | 4.5 | 0.21 | 18.02 |
| 19.500 | 0.00 | 0.0 | 3.7 | 4.1 | 0.19 | 18.02 |
| 19.600 | 0.00 | 0.0 | 3.3 | 3.7 | 0.17 | 18.02 |
| 19.700 | 0.00 | 0.0 | 3.0 | 3.3 | 0.16 | 18.02 |
| 19.800 | 0.00 | 0.0 | 2.8 | 3.0 | 0.14 | 18.01 |
| 19.900 | 0.00 | 0.0 | 2.5 | 2.8 | 0.13 | 18.01 |
| 20.000 | 0.00 | 0.0 | 2.3 | 2.5 | 0.12 | 18.01 |

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS10 .HYD
Outflow Hydrograph: 2ROUT10 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 20.100 | 0.00 | 0.0 | 2.1 | 2.3 | 0.11 | 18.01 |
| 20.200 | 0.00 | 0.0 | 1.9 | 2.1 | 0.10 | 18.01 |
| 20.300 | 0.00 | 0.0 | 1.7 | 1.9 | 0.09 | 18.01 |
| 20.400 | 0.00 | 0.0 | 1.5 | 1.7 | 0.08 | 18.01 |
| 20.500 | 0.00 | 0.0 | 1.4 | 1.5 | 0.07 | 18.01 |
| 20.600 | 0.00 | 0.0 | 1.3 | 1.4 | 0.06 | 18.01 |
| 20.700 | 0.00 | 0.0 | 1.1 | 1.3 | 0.06 | 18.01 |
| 20.800 | 0.00 | 0.0 | 1.0 | 1.1 | 0.05 | 18.01 |
| 20.900 | 0.00 | 0.0 | 0.9 | 1.0 | 0.05 | 18.01 |
| 21.000 | 0.00 | 0.0 | 0.9 | 0.9 | 0.04 | 18.00 |
| 21.100 | 0.00 | 0.0 | 0.8 | 0.9 | 0.04 | 18.00 |
| 21.200 | 0.00 | 0.0 | 0.7 | 0.8 | 0.04 | 18.00 |
| 21.300 | 0.00 | 0.0 | 0.6 | 0.7 | 0.03 | 18.00 |
| 21.400 | 0.00 | 0.0 | 0.6 | 0.6 | 0.03 | 18.00 |
| 21.500 | 0.00 | 0.0 | 0.5 | 0.6 | 0.03 | 18.00 |
| 21.600 | 0.00 | 0.0 | 0.5 | 0.5 | 0.02 | 18.00 |
| 21.700 | 0.00 | 0.0 | 0.4 | 0.5 | 0.02 | 18.00 |
| 21.800 | 0.00 | 0.0 | 0.4 | 0.4 | 0.02 | 18.00 |
| 21.900 | 0.00 | 0.0 | 0.4 | 0.4 | 0.02 | 18.00 |
| 22.000 | 0.00 | 0.0 | 0.3 | 0.4 | 0.02 | 18.00 |
| 22.100 | 0.00 | 0.0 | 0.3 | 0.3 | 0.01 | 18.00 |
| 22.200 | 0.00 | 0.0 | 0.3 | 0.3 | 0.01 | 18.00 |
| 22.300 | 0.00 | 0.0 | 0.2 | 0.3 | 0.01 | 18.00 |
| 22.400 | 0.00 | 0.0 | 0.2 | 0.2 | 0.01 | 18.00 |
| 22.500 | 0.00 | 0.0 | 0.2 | 0.2 | 0.01 | 18.00 |
| 22.600 | 0.00 | 0.0 | 0.2 | 0.2 | 0.01 | 18.00 |
| 22.700 | 0.00 | 0.0 | 0.2 | 0.2 | 0.01 | 18.00 |
| 22.800 | 0.00 | 0.0 | 0.1 | 0.2 | 0.01 | 18.00 |
| 22.900 | 0.00 | 0.0 | 0.1 | 0.1 | 0.01 | 18.00 |
| 23.000 | 0.00 | 0.0 | 0.1 | 0.1 | 0.01 | 18.00 |
| 23.100 | 0.00 | 0.0 | 0.1 | 0.1 | 0.01 | 18.00 |
| 23.200 | 0.00 | 0.0 | 0.1 | 0.1 | 0.01 | 18.00 |
| 23.300 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 23.400 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 23.500 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 23.600 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 23.700 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 23.800 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 23.900 | 0.00 | 0.0 | 0.1 | 0.1 | 0.00 | 18.00 |
| 24.000 | 0.00 | 0.0 | 0.0 | 0.1 | 0.00 | 18.00 |
| 24.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.200 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.300 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.400 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.500 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.600 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS10 .HYD
Outflow Hydrograph: 2ROUT10 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 24.700 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.800 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 24.900 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.000 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.100 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.200 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.300 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.400 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.500 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.600 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.700 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.800 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |
| 25.900 | 0.00 | 0.0 | 0.0 | 0.0 | 0.00 | 18.00 |

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

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS10 .HYD
Outflow Hydrograph: 2ROUT10 .HYD

Starting Pond W.S. Elevation = 18.00 ft

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

Peak Inflow = 13.00 cfs
Peak Outflow = 6.25 cfs
Peak Elevation = 18.47 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.39 ac-ft
---
Total Storage in Pond = 0.39 ac-ft

POND-2 Version: 5.15 S/N: 1295100016

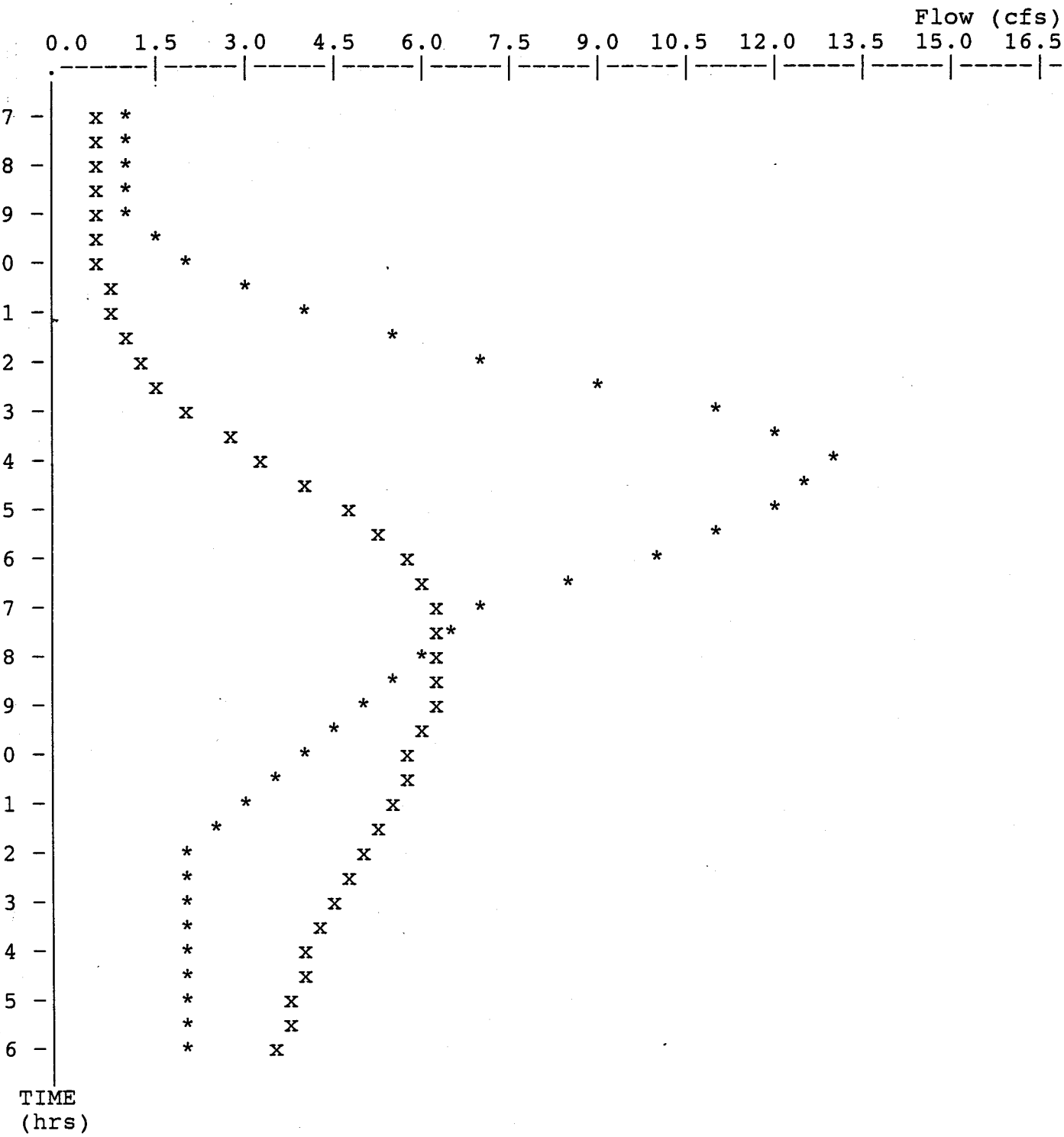


Return Freq: 10 years

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS10 .HYD
Outflow Hydrograph: 2ROUT10 .HYD

EXECUTED: 12-31-1992
09:07:23

Peak Inflow = 13.00 cfs
Peak Outflow = 6.25 cfs
Peak Elevation = 18.47 ft




* File: LG3PS10 .HYD Qmax = 13.0 cfs
x File: 2ROUT10 .HYD Qmax = 6.3 cfs

Inflow Hydrograph: LG3PS100.HYD
Rating Table file: LGPNT2 .PND

----INITIAL CONDITIONS----
Elevation = 18.00 ft
Outflow = 0.00 cfs
Storage = 0.00 ac-ft

GIVEN POND DATA

| ELEVATION (ft) | OUTFLOW (cfs) | STORAGE (ac-ft) |
|---|---|---|
| 18.00 | 0.0 | 0.000 |
| 18.25 | 2.4 | 0.204 |
| 18.50 | 6.7 | 0.408 |
| 18.75 | 12.2 | 0.611 |
| 19.00 | 15.1 | 0.815 |
| 19.25 | 16.9 | 1.019 |
| 19.50 | 18.5 | 1.223 |
| 19.75 | 20.0 | 1.427 |
| 20.00 | 21.4 | 1.630 |

INTERMEDIATE ROUTING COMPUTATIONS

| 2S/t (cfs) | 2S/t + O (cfs) |
|---|---|
| 0.0 | 0.0 |
| 49.3 | 51.7 |
| 98.6 | 105.3 |
| 148.0 | 160.2 |
| 197.3 | 212.4 |
| 246.6 | 263.5 |
| 295.9 | 314.4 |
| 345.2 | 365.2 |
| 394.6 | 416.0 |

Time increment (t) = 0.100 hrs.

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS100.HYD
Outflow Hydrograph: 2ROUT2 .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 | 1.00 | ----- | 0.0 | 0.0 | 0.00 | 18.00 |
| 11.100 | 1.00 | 2.0 | 1.8 | 2.0 | 0.09 | 18.01 |
| 11.200 | 1.00 | 2.0 | 3.5 | 3.8 | 0.18 | 18.02 |
| 11.300 | 1.00 | 2.0 | 5.0 | 5.5 | 0.25 | 18.03 |
| 11.400 | 1.00 | 2.0 | 6.3 | 7.0 | 0.32 | 18.03 |
| 11.500 | 1.00 | 2.0 | 7.5 | 8.3 | 0.39 | 18.04 |
| 11.600 | 1.00 | 2.0 | 8.7 | 9.5 | 0.44 | 18.05 |
| 11.700 | 1.00 | 2.0 | 9.7 | 10.7 | 0.49 | 18.05 |
| 11.800 | 2.00 | 3.0 | 11.5 | 12.7 | 0.59 | 18.06 |
| 11.900 | 2.00 | 4.0 | 14.1 | 15.5 | 0.72 | 18.07 |
| 12.000 | 4.00 | 6.0 | 18.2 | 20.1 | 0.93 | 18.10 |
| 12.100 | 7.00 | 11.0 | 26.5 | 29.2 | 1.35 | 18.14 |
| 12.200 | 13.00 | 20.0 | 42.2 | 46.5 | 2.16 | 18.22 |
| 12.300 | 20.00 | 33.0 | 66.6 | 75.2 | 4.28 | 18.36 |
| 12.400 | 22.00 | 42.0 | 94.6 | 108.6 | 7.03 | 18.51 |
| 12.500 | 22.00 | 44.0 | 118.5 | 138.6 | 10.03 | 18.65 |
| 12.600 | 17.00 | 39.0 | 133.6 | 157.5 | 11.93 | 18.74 |
| 12.700 | 13.00 | 30.0 | 138.8 | 163.6 | 12.39 | 18.77 |
| 12.800 | 10.00 | 23.0 | 137.3 | 161.8 | 12.29 | 18.76 |
| 12.900 | 8.00 | 18.0 | 131.8 | 155.3 | 11.71 | 18.73 |
| 13.000 | 6.00 | 14.0 | 124.3 | 145.8 | 10.76 | 18.68 |
| 13.100 | 5.00 | 11.0 | 115.9 | 135.3 | 9.71 | 18.64 |
| 13.200 | 4.00 | 9.0 | 107.6 | 124.9 | 8.66 | 18.59 |
| 13.300 | 4.00 | 8.0 | 100.1 | 115.6 | 7.73 | 18.55 |
| 13.400 | 3.00 | 7.0 | 93.4 | 107.1 | 6.88 | 18.51 |
| 13.500 | 3.00 | 6.0 | 86.9 | 99.4 | 6.22 | 18.47 |
| 13.600 | 3.00 | 6.0 | 81.5 | 92.9 | 5.70 | 18.44 |
| 13.700 | 2.00 | 5.0 | 76.1 | 86.5 | 5.19 | 18.41 |
| 13.800 | 2.00 | 4.0 | 70.8 | 80.1 | 4.68 | 18.38 |
| 13.900 | 2.00 | 4.0 | 66.3 | 74.8 | 4.25 | 18.36 |
| 14.000 | 2.00 | 4.0 | 62.5 | 70.3 | 3.89 | 18.34 |
| 14.100 | 2.00 | 4.0 | 59.3 | 66.5 | 3.59 | 18.32 |
| 14.200 | 2.00 | 4.0 | 56.7 | 63.3 | 3.33 | 18.30 |
| 14.300 | 2.00 | 4.0 | 54.4 | 60.7 | 3.12 | 18.29 |
| 14.400 | 2.00 | 4.0 | 52.6 | 58.4 | 2.94 | 18.28 |
| 14.500 | 2.00 | 4.0 | 51.0 | 56.6 | 2.79 | 18.27 |
| 14.600 | 2.00 | 4.0 | 49.7 | 55.0 | 2.66 | 18.27 |
| 14.700 | 2.00 | 4.0 | 48.5 | 53.7 | 2.56 | 18.26 |
| 14.800 | 2.00 | 4.0 | 47.6 | 52.5 | 2.47 | 18.25 |
| 14.900 | 1.00 | 3.0 | 45.9 | 50.6 | 2.35 | 18.24 |
| 15.000 | 1.00 | 2.0 | 43.5 | 47.9 | 2.22 | 18.23 |
| 15.100 | 1.00 | 2.0 | 41.2 | 45.5 | 2.11 | 18.22 |
| 15.200 | 1.00 | 2.0 | 39.2 | 43.2 | 2.01 | 18.21 |
| 15.300 | 1.00 | 2.0 | 37.4 | 41.2 | 1.91 | 18.20 |
| 15.400 | 1.00 | 2.0 | 35.8 | 39.4 | 1.83 | 18.19 |

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS100.HYD
Outflow Hydrograph: 2ROUT2 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 15.500 | 1.00 | 2.0 | 34.2 | 37.8 | 1.75 | 18.18 |
| 15.600 | 1.00 | 2.0 | 32.9 | 36.2 | 1.68 | 18.18 |
| 15.700 | 1.00 | 2.0 | 31.6 | 34.9 | 1.62 | 18.17 |
| 15.800 | 1.00 | 2.0 | 30.5 | 33.6 | 1.56 | 18.16 |
| 15.900 | 1.00 | 2.0 | 29.5 | 32.5 | 1.51 | 18.16 |
| 16.000 | 1.00 | 2.0 | 28.6 | 31.5 | 1.46 | 18.15 |
| 16.100 | 1.00 | 2.0 | 27.7 | 30.6 | 1.42 | 18.15 |
| 16.200 | 1.00 | 2.0 | 27.0 | 29.7 | 1.38 | 18.14 |
| 16.300 | 1.00 | 2.0 | 26.3 | 29.0 | 1.34 | 18.14 |
| 16.400 | 1.00 | 2.0 | 25.7 | 28.3 | 1.31 | 18.14 |
| 16.500 | 1.00 | 2.0 | 25.1 | 27.7 | 1.28 | 18.13 |
| 16.600 | 1.00 | 2.0 | 24.6 | 27.1 | 1.26 | 18.13 |
| 16.700 | 1.00 | 2.0 | 24.1 | 26.6 | 1.23 | 18.13 |
| 16.800 | 1.00 | 2.0 | 23.7 | 26.1 | 1.21 | 18.13 |
| 16.900 | 1.00 | 2.0 | 23.3 | 25.7 | 1.19 | 18.12 |
| 17.000 | 1.00 | 2.0 | 23.0 | 25.3 | 1.17 | 18.12 |
| 17.100 | 1.00 | 2.0 | 22.6 | 25.0 | 1.16 | 18.12 |
| 17.200 | 1.00 | 2.0 | 22.4 | 24.6 | 1.14 | 18.12 |
| 17.300 | 1.00 | 2.0 | 22.1 | 24.4 | 1.13 | 18.12 |
| 17.400 | 1.00 | 2.0 | 21.9 | 24.1 | 1.12 | 18.12 |
| 17.500 | 1.00 | 2.0 | 21.6 | 23.9 | 1.11 | 18.12 |
| 17.600 | 1.00 | 2.0 | 21.5 | 23.6 | 1.10 | 18.11 |
| 17.700 | 1.00 | 2.0 | 21.3 | 23.5 | 1.09 | 18.11 |
| 17.800 | 1.00 | 2.0 | 21.1 | 23.3 | 1.08 | 18.11 |
| 17.900 | 1.00 | 2.0 | 21.0 | 23.1 | 1.07 | 18.11 |
| 18.000 | 1.00 | 2.0 | 20.8 | 23.0 | 1.07 | 18.11 |
| 18.100 | 1.00 | 2.0 | 20.7 | 22.8 | 1.06 | 18.11 |
| 18.200 | 1.00 | 2.0 | 20.6 | 22.7 | 1.05 | 18.11 |
| 18.300 | 1.00 | 2.0 | 20.5 | 22.6 | 1.05 | 18.11 |
| 18.400 | 1.00 | 2.0 | 20.4 | 22.5 | 1.04 | 18.11 |
| 18.500 | 1.00 | 2.0 | 20.3 | 22.4 | 1.04 | 18.11 |
| 18.600 | 1.00 | 2.0 | 20.3 | 22.3 | 1.04 | 18.11 |
| 18.700 | 1.00 | 2.0 | 20.2 | 22.3 | 1.03 | 18.11 |
| 18.800 | 1.00 | 2.0 | 20.1 | 22.2 | 1.03 | 18.11 |
| 18.900 | 1.00 | 2.0 | 20.1 | 22.1 | 1.03 | 18.11 |
| 19.000 | 1.00 | 2.0 | 20.0 | 22.1 | 1.02 | 18.11 |
| 19.100 | 1.00 | 2.0 | 20.0 | 22.0 | 1.02 | 18.11 |
| 19.200 | 1.00 | 2.0 | 19.9 | 22.0 | 1.02 | 18.11 |
| 19.300 | 1.00 | 2.0 | 19.9 | 21.9 | 1.02 | 18.11 |
| 19.400 | 1.00 | 2.0 | 19.9 | 21.9 | 1.02 | 18.11 |
| 19.500 | 1.00 | 2.0 | 19.8 | 21.9 | 1.02 | 18.11 |
| 19.600 | 1.00 | 2.0 | 19.8 | 21.8 | 1.01 | 18.11 |
| 19.700 | 1.00 | 2.0 | 19.8 | 21.8 | 1.01 | 18.11 |
| 19.800 | 1.00 | 2.0 | 19.8 | 21.8 | 1.01 | 18.11 |
| 19.900 | 1.00 | 2.0 | 19.8 | 21.8 | 1.01 | 18.11 |
| 20.000 | 1.00 | 2.0 | 19.7 | 21.8 | 1.01 | 18.11 |

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS100.HYD
Outflow Hydrograph: 2ROUT2 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 20.100 | 1.00 | 2.0 | 19.7 | 21.7 | 1.01 | 18.11 |
| 20.200 | 1.00 | 2.0 | 19.7 | 21.7 | 1.01 | 18.10 |
| 20.300 | 1.00 | 2.0 | 19.7 | 21.7 | 1.01 | 18.10 |
| 20.400 | 1.00 | 2.0 | 19.7 | 21.7 | 1.01 | 18.10 |
| 20.500 | 1.00 | 2.0 | 19.7 | 21.7 | 1.01 | 18.10 |
| 20.600 | 1.00 | 2.0 | 19.7 | 21.7 | 1.01 | 18.10 |
| 20.700 | 1.00 | 2.0 | 19.6 | 21.7 | 1.00 | 18.10 |
| 20.800 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 20.900 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.000 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.100 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.200 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.300 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.400 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.500 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.600 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.700 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.800 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 21.900 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.000 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.100 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.200 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.300 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.400 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.500 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.600 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.700 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.800 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 22.900 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.000 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.100 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.200 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.300 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.400 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.500 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.600 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.700 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.800 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 23.900 | 1.00 | 2.0 | 19.6 | 21.6 | 1.00 | 18.10 |
| 24.000 | 0.00 | 1.0 | 18.6 | 20.6 | 0.95 | 18.10 |
| 24.100 | 0.00 | 0.0 | 16.9 | 18.6 | 0.87 | 18.09 |
| 24.200 | 0.00 | 0.0 | 15.3 | 16.9 | 0.78 | 18.08 |
| 24.300 | 0.00 | 0.0 | 13.9 | 15.3 | 0.71 | 18.07 |
| 24.400 | 0.00 | 0.0 | 12.6 | 13.9 | 0.65 | 18.07 |
| 24.500 | 0.00 | 0.0 | 11.5 | 12.6 | 0.59 | 18.06 |
| 24.600 | 0.00 | 0.0 | 10.4 | 11.5 | 0.53 | 18.06 |

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS100.HYD
Outflow Hydrograph: 2ROUT2 .HYD

| INFLOW HYDROGRAPH | | ROUTING COMPUTATIONS | | | | |
|---|---|---|---|---|---|---|
| TIME (hrs) | INFLOW (cfs) | I1+I2 (cfs) | 2S/t - O (cfs) | 2S/t + O (cfs) | OUTFLOW (cfs) | ELEVATION (ft) |
| 24.700 | 0.00 | 0.0 | 9.4 | 10.4 | 0.48 | 18.05 |
| 24.800 | 0.00 | 0.0 | 8.6 | 9.4 | 0.44 | 18.05 |
| 24.900 | 0.00 | 0.0 | 7.8 | 8.6 | 0.40 | 18.04 |
| 25.000 | 0.00 | 0.0 | 7.0 | 7.8 | 0.36 | 18.04 |
| 25.100 | 0.00 | 0.0 | 6.4 | 7.0 | 0.33 | 18.03 |
| 25.200 | 0.00 | 0.0 | 5.8 | 6.4 | 0.30 | 18.03 |
| 25.300 | 0.00 | 0.0 | 5.3 | 5.8 | 0.27 | 18.03 |
| 25.400 | 0.00 | 0.0 | 4.8 | 5.3 | 0.24 | 18.03 |
| 25.500 | 0.00 | 0.0 | 4.3 | 4.8 | 0.22 | 18.02 |
| 25.600 | 0.00 | 0.0 | 3.9 | 4.3 | 0.20 | 18.02 |
| 25.700 | 0.00 | 0.0 | 3.6 | 3.9 | 0.18 | 18.02 |
| 25.800 | 0.00 | 0.0 | 3.2 | 3.6 | 0.17 | 18.02 |
| 25.900 | 0.00 | 0.0 | 2.9 | 3.2 | 0.15 | 18.02 |

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

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS100.HYD
Outflow Hydrograph: 2ROUT2 .HYD

Starting Pond W.S. Elevation = 18.00 ft

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

Peak Inflow = 22.00 cfs
Peak Outflow = 12.39 cfs
Peak Elevation = 18.77 ft

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

Initial Storage = 0.00 ac-ft
Peak Storage From Storm = 0.62 ac-ft
---
Total Storage in Pond = 0.62 ac-ft

Warning: Inflow hydrograph truncated on left side.

POND-2 Version: 5.15 S/N: 1295100016

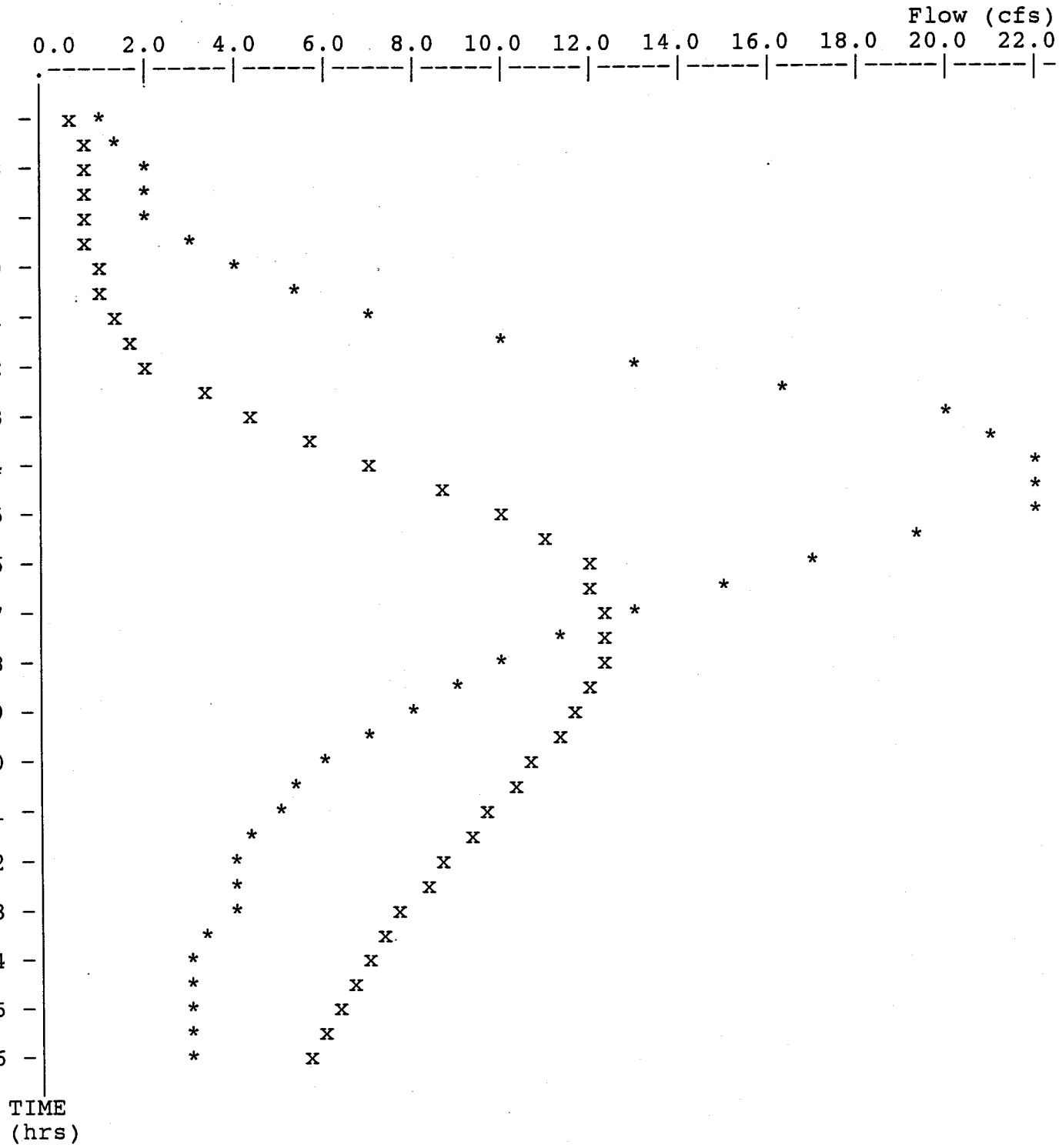


Return Freq: 2 years

Pond File: LGPNT2 .PND
Inflow Hydrograph: LG3PS100.HYD
Outflow Hydrograph: 2ROUT2 .HYD

EXECUTED: 12-31-1992
09:07:23

Peak Inflow = 22.00 cfs
Peak Outflow = 12.39 cfs
Peak Elevation = 18.77 ft




* File: LG3PS100.HYD Qmax = 22.0 cfs
x File: 2ROUT2 .HYD Qmax = 12.4 cfs

File - Colonial Golf Course

**Randall A. Strawbridge Inc.**
A PROFESSIONAL CORPORATION/CONSULTING ENGINEERS
15 South Auburn Avenue, Richmond, Virginia 23221
Phone (804) 355-7887 • Fax. 355-4392

DC005
SP-112-92
(PLAN REVISION BMP LAKE 2)

April 15, 1994

Joseph H. Scales & Associates
2556 Hadensville-Fife Road
Goochland, VA 23063

Attention: Joseph H. Scales

Re: Colonial Golf Course
Lake No. 2, (Plan No. 2)
Rte. 603, Toano, VA
File No. 94073

Gentlemen:

I have reviewed the hydrology calculations and plan, sheet No. 3 of 3, dated January 10, 1994, for the above-referenced dam and lake.

I understand that the dam is to be used for water-pumped storage and as a retention basin for on-site drainage. Also that the downstream berm was not built and the downstream side is one continuous slope.

The design of the above-referenced dam was done according to the Virginia Dam Safety Regularions and Division of Soil and Water Conservation Standards and meets with my approval.

Please call me if you have any questions.

Yours very truly,

Randall A. Strawbridge, P. E.

COMMONWEALTH OF VIRGINIA
RANDALL A. STRAWBRIDGE
No. 4100
PROFESSIONAL ENGINEER

JOSEPH H. SCALES & ASSOCIATES
PROFESSIONAL CONSERVATIONIST & ENVIRONMENTALIST
2556 HADENSVILLE-FIFE ROAD · GOOCHLAND, VIRGINIA 23063
PHONE (804) 457-4529

JOSEPH H. SCALES, PROF. CONSERVATIONIST
SHAWNA W. SHADE, CONSERVATION TECH.
WILLIAM H. STREET, III ASSISTING
ASSOCIATED
RANDALL A. STRAWBRIDGE, PROF. ENG.

April 25, 1994

Mr. Francis Fenderson
9901 Drouin Drive
Richmond, VA 23233

**RE: Reply to Questions Raised in Letter From James City County, Environmental Engineer, dated 3/29/94**

Dear Mr. Fenderson,

The following are answers to questions raised in the above mentioned letter. The answers are numbered according to the corresponding question.

1. See letter from Mr. Randall A. Strawbridge, Professional Engineer, Registration No. 4100. The Virginia Dam Safety Regulations to which Mr. Strawbridge refers to are for larger dams, those 25 or more feet in height and impounding 50 or more acre feet of water. The safety features of your dam appear to be ample in that they meet the same requirements for larger dams.

2. The principal spillway of PVC pipe is in the design approved by Mr. Strawbridge and is also approved by specifications of the USDA, Soil Conservation Service (copy of specifications are attached). PVC pipe is also widely used in ponds of smaller watersheds.

3. A hydrograph for 2 yr., 10 yr., and 100 yr. frequency rainfalls is enclosed. The hydrograph shows no water will be released downstream even from the 100 yr. flood. This is made easy due to the small watershed, 18 acres, in relation to the large (for this watershed) area pond, 2.7 acre.

4. The riser pipe in the revised design has a 12" to 8" reducer installed 2 feet below the designed water elevation. The original plan was revised to accomplish this.

5. The soil is identified as a moderately deep sandy loam, hydrologic soil group "B", similar to Norfolk sandy loam with a rather rapid infiltration and permeability rate.

6. Seepage is controlled by the more currently accepted practice of using bentonite clay along the pipe barrel which expands and prevents all seepage along the pipe. This method is used in dams impounding water up to 30 feet in depth.

7. I believe you and Mr. Pelter plan to have the watershed to this pond established to permanent vegetation, Fescue and Bermuda grass sod, within the next 90days or so. After this time, the reservoir will no longer function as a sediment basin. The principal spillway, as modified with a 12" riser, will have a capacity, with 1 foot head, of 3.5 c.f.s. at the specified 0.2 c.f.s./acre rate specified.

This is from the Virginia Erosion and Sediment Control Handbook, III ed., page 97, plate 3.14-8, titled "Riser Inflow Curves":

$$\frac{3.7 \text{ c.f.s.}}{0.2 \text{ c.f.s./acre}} = 18.5 \text{ acres}$$

After 90 days, the dam will function as a storage reservoir for irrigation water. The water will be stored in the reservoir until used for irrigation. A 10 yr. frequency flood will be routed downstream through the principal spillway and by detention in the reservoir. There will be no flow in the emergency spillway. The dam was redesigned to accomplish this.

Please find enclosed:

1. revised pond plan including;
   a. 1 foot increase in dam height above water elevation
   b. 12" riser pipe inlet
2. letter of approval from Mr. Randall Strawbridge
3. specifications for pond designs by USDA-SCS showing PVC pipe is approved
4. sections from the Virginia Erosion and Sediment Control Handbook, III ed. (1992) with items highlighted that are germane to this pond.
5. copy of Virginia Dam Safety Regulations under which Mr. Strawbridge and myself have designed and inspected many dams that were subjected to these regulations.
6. calculations of hydrology showing that the storage, etc. of the dam exceeds requirements set by USDA-SCS by storing a very high percentage of flood water and releasing it slowly downstream for 2, 10, and 100 year floods

The dam was not quite completed when we inspected it on 4/19/94; there was additional work required for the dam to conform to the revised plans. The top of the dam may be brought to the designed heighth once the topsoil is spread.

Mr. Henshaw has on hand a 12" to 8" PVC reducer and 12" PVC pipe required for the riser pipe in the revised plan.

If we can be of further assistance or if you have questions give us a call. With best wishes;

Sincerely,

Joseph H. Scales
Professional Conservationist

Jamestown 1607
JAMES CITY COUNTY

**DEPARTMENT OF DEVELOPMENT MANAGEMENT**
P. O. Box 8784
Williamsburg, Virginia 23187-8784

County Government Center, 101-E Mounts Bay Road

Development Manager
(804) 253-6671

Code Compliance
253-6626

County Engineer
253-6678

Planning
253-6685

Integrated Pest Management
253-2620

March 29, 1994

Mr. Francis M. Fenderson, Jr.
The Colonial Golf Course, Inc.
P.O. Box 356
Williamsburg, VA 23187

RE: Colonial Golf Course - Lake Design

Dear Mr. Fenderson:

I have received and reviewed the as-built plans for Lake #2. The as-built drawings were requested at this time because it appeared from visual inspection that the dam was not constructed in accordance with the approved plans. The submitted plans confirm that the dam was not constructed in accordance with the plans. In accordance with the James City County Erosion and Sediment Control Ordinance, Section 5A-10, an approved plan can only be amended by the county, not the applicant. Further, any proposed changes must be approved prior to construction and not after.

The lake was not constructed simply as a water supply or water hazard for the golf course. It also serves as the major sediment control measure for the construction activities, provides peak flow reduction for storm flows, and serves as a best management practice (BMP) to reduce the long term water quality impact of the project on the receiving waters and wetlands. There was a considerable amount of time invested by both the county and your consultant in the planning and design of the course including the lake to insure that the project met environmental concerns and ordinances.

I have numerous concerns related to the present design and construction of the dam. Some of the criteria used to identify the design deficiencies are contained within the Virginia Erosion and Sediment Control Handbook (VESCH) standard for sediment basins while other concerns are violations of county policy and good engineering practices. The major deficiencies are as follows:

1. The dam must be designed by a qualified professional engineer as it is a permanent structure. The design submitted was certified by a professional soil scientist.

2. The principal spillway must be constructed of either corrugated metal or reinforced concrete pipe. The principal spillway has been constructed of PVC pipe.

3. The redesign of the basin was done using an unacceptable engineering calculation procedure. The VESCH requires that the procedure employed be

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either the Soil Conservation Service (SCS) method contained in TR-55 or the SCS Unit Hydrograph method. The county will also allow the use of the Modified Rational Method if the watershed is less than 20 acres in size and gives comparable results to either of the two methods above. In any event, a dam structure must be designed using a method that develops a hydrograph and then flood routes the hydrograph through the dam outlet structures. The submitted design does neither.

4. The barrel and riser diameter are the same size which will cause an unstable plug or slug flow condition to develop.

5. The design submitted incorrectly identifies the watershed soil type as Norfolk sandy loam. The James City County Soil Survey identifies the majority of the soils in the lake watershed as Slagle, a soil with different runoff characteristics than assumed.

6. Seepage control must be provided in the dam. The original design provided anti-seep collars and a filter blanket at the toe of the dam. This redesign does neither.

7. The principal spillway must pass at least 0.2 cfs/acre of drainage area when lake is functioning as a sediment basin and the 10-year storm without discharge through the emergency spillway when functioning as a permanent detention basin. Also, there must be one-foot of freeboard between the routed 100-year storm elevation and the top of the dam. The constructed dam meets none of these criteria.

There are other minor deficiencies that could be identified but the above suffice to detail the major problems. The dam is constructed with the wrong pipe material, the principal spillway does not have the hydraulic capacity to function properly, the height of the dam is insufficient, and no seepage control has been provided. All of these result in an unacceptable dam design. The dam is potentially unsafe and it is unclear if it will meet its original design function. Please contact me at 253-6673 to further discuss the situation and how it can be remedied so that the construction and opening of the golf course are not delayed.

Sincerely,

Darryl E Cook

Darryl E. Cook
Development Engineer

cc: Williamsburg Environmental Group

Refer to Question No. 2



**Pond**
**Standard**
**Code 378**
**(Reported by No.)**

## Definition

A water impoundment made by constructing a dam or an embankment or by excavating a pit or dugout.

In this standard, ponds constructed by the first method are referred to as embankment ponds, and those constructed by the second method are referred to as excavated ponds. Ponds constructed by both the excavation and the embankment methods are classified as embankment ponds if the depth of water impounded against the embankment at spillway elevation is 3 ft or more.

## Purpose

To provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard spraying, and other related uses, and to maintain or improve water quality.

## Scope

This standard establishes the minimum acceptable quality for the design and construction of ponds if:

1. Failure of the dam will not result in loss of life; in damage to homes, commercial or industrial buildings, main highways, or railroads; or in interruption of the use or service of public utilities.

2. The product of the storage times the effective height of the dam is less than 3,000. Storage is the volume, in acre-feet, in the reservoir below the elevation of the crest of the emergency spillway. The effective height of the dam is the difference in elevation, in feet, between the emergency spillway crest and the lowest point in the cross section taken along the centerline of the dam. If there is no emergency spillway, the top of the dam is the upper limit.

3. The effective height of the dam is 35 ft or less, and the dam is hazard class (a).

## Conditions Where Practice Applies

**Site Conditions.** Site conditions shall be such that runoff from the design storm can be safely passed through (1) a natural or constructed emergency spillway, (2) a combination of a principal spillway and an emergency spillway, or (3) a principal spillway.

**Drainage Area.** The drainage area above the pond must be protected against erosion to the extent that expected sedimentation will not shorten the planned effective life of the structure. The drainage area shall be large enough so that surface runoff and groundwater flow will maintain an adequate supply of water in the pond. The quality shall be suitable for the water's intended use.

**Reservoir Area.** The topography and soils of the site shall permit storage of water at a depth and volume that ensure a dependable supply, considering beneficial use, sedimentation, season of use, and evaporation and seepage losses. If surface runoff is the primary source of water for a pond, the soils shall be impervious enough to prevent excessive seepage losses or shall be of a type that sealing is practicable.

## Planning Considerations

### Water Quantity

1. Effects upon components of the water budget, especially effects on volumes and rates of runoff,

Note PVC Pipe Page 5

infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. Variability of effects caused by seasonal or climatic changes.

3. Effects on the downstream flows or aquifers that could affect other water uses or users.

4. Potential for multiple use.

5. Effects on the volume of downstream flow to prohibit undesirable environmental, social or economic effects.

**Water Quality**

1. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment attached substances that are carried by runoff.

2. Effects on the visual quality of onsite and downstream water resources.

3. Short-term and construction-related effects on the quality of downstream water courses.

4. Effects of water level control on the temperatures of downstream water to prevent undesired effects on aquatic and wildlife communities.

5. Effects on wetlands and water-related wildlife habitats.

6. Effects of water levels on soil nutrient processes such as plant nitrogen use or dentrification.

7. Effects of soil water level control on the salinity of soils, soil water, or downstream water.

8. Potential for earth moving to uncover or redistribute toxic materials such as saline soils.

## Design Criteria for Embankment Ponds

**Foundation Cutoff.** A cutoff of relatively impervious material shall be provided under the dam if necessary. The cutoff shall be located at or upstream from the centerline of the dam. It shall extend up the abutments as required and be deep enough to extend into a relatively impervious layer or provide for a stable dam when combined with seepage control. The cutoff trench shall have a bottom width adequate to accommodate the equipment used for excavation, backfill, and compaction operations. Side slopes shall not be steeper than one horizontal to one vertical.

**Seepage Control.** Seepage control is to be included if (1) pervious layers are not intercepted by the cutoff, (2) seepage creates swamping downstream, (3) such control is needed to insure a stable embankment, or (4) special problems require drainage for a stable dam. Seepage may be controlled by (1) foundation, abutment, or embankment drains; (2) reservoir blanketing; or (3) a combination of these measures.

**Earth Embankment.** The minimum top width for a dam is shown in table 1. If the embankment top is to be used as a public road, the minimum width shall be 16 ft for one-way traffic and 26 ft for two-way traffic. Guardrails or other safety measures shall be used where necessary and shall meet the requirements of the responsible road authority.



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**Table 1.-Minimum top width for dams**

| Total height of embankment ft | Top Width ft |
|---|---|
| 10 or less | 6 |
| 10-15 | 8 |
| 15-20 | 10 |
| 20-25 | 12 |
| 25-35 | 14 |
| 35 or more | 15 |

The combined upstream and downstream side slopes of the settled embankments shall not be less than five horizontal to one vertical, and neither slope shall be steeper than two horizontal to one vertical. All slopes must be designed to be stable, even if flatter side slopes are required.

If needed to protect the slopes of the dam, special measures, such as berms, rock riprap, sand-gravel, soil cement, or special vegetation, shall be provided (Technical Releases 56 and 69).

The minimum elevation of the top of the settled embankment shall be 1 ft above the water surface in the reservoir with the emergency spillway flowing at design depth. The minimum difference in elevation between the crest of the emergency spillway and the settled top of the dam shall be 2 ft for all dams having more than a 20-acre drainage area or more than 20 ft in effective height.

The design height of the dam shall be increased by the amount needed to insure that after settlement the height of the dam equals or exceeds the design height. This increase shall not be less than 5 percent, except where detailed soil testing and laboratory analyses show that a lesser amount is adequate.

**Principal Spillway.** A pipe conduit, with needed appurtenances, shall be placed under or through the dam, except where rock, concrete, or other types of mechanical spillways are used, or where the rate and duration of flow can be safely handled by a vegetated or earth spillway.

The crest elevation shall be no less than 0.5 ft below the crest of the emergency spillway for dams having a drainage area of 20 acres or less, and no less than 1 ft for those having a drainage area of more than 20 acres.

When design discharge of the principal spillway is considered in calculating peak outflow through the emergency spillway, the crest elevation of the inlet shall be such that the full flow will be generated in the conduit before there is discharge through the emergency spillway. The inlets and outlets shall be designed to function satisfactorily for the full range of flow and hydraulic head anticipated.

The capacity of the pipe conduit shall be adequate to discharge long-duration, continuous, or frequent flows without flow through the emergency spillways. The diameter of the pipe shall not be less than 4 in. If the pipe conduit diameter is 10 in or greater, its design discharge may be considered when calculating the peak outflow rate through the emergency spillway.

Pipe conduits under or through the dam shall meet the following requirements. The pipe shall be capable of withstanding external loading without yielding, buckling, or cracking. Flexible pipe strength shall not be less than that necessary to support the design load with a maximum of 5 percent deflection. The inlets and outlets shall be structurally sound and made of materials compatible with those of the pipe. All pipe joints shall be made watertight by the use of couplings, gaskets, caulking, or by welding.



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For dams 20 ft or less in effective height, acceptable pipe materials are cast-iron, steel, corrugated steel or aluminum, asbestos-cement, concrete, plastic, vitrified clay with rubber gaskets, and cast-in-place reinforced concrete. Asbestos-cement, concrete, and vitrified clay pipe shall be laid in a concrete bedding. Plastic pipe that will be exposed to direct sunlight shall be made of ultraviolet-resistant materials and protected by coating or shielding, or provisions for replacement should be made as necessary. Connections of plastic pipe to less flexible pipe or structures must be designed to avoid stress concentrations that could rupture the plastic.

For dams more than 20 ft in effective height, conduits shall be plastic, reinforced concrete, cast-in-place reinforced concrete, corrugated steel or aluminum, or welded steel pipe. The maximum height of fill over any principal spillway steel or aluminum pipe must not exceed 25 ft. Pipe shall be watertight. The joints between sections of pipe shall be designed to remain watertight after joint elongation caused by foundation consolidation. Concrete pipe shall have concrete bedding or a concrete cradle, if required. Cantilever outlet sections, if used, shall be designed to withstand the cantilever load. Pipe supports shall be provided when needed. Other suitable devices such as a Saint Anthony Falls stilling basin or an impact basin may be used to provide a safe outlet. Protective coatings of asbestos-bonded, asphalt coated, or vinyl coating on galvanized corrugated metal pipe, or coal tar enamel on welded steel pipe should be provided in areas that have a history of pipe corrosion, or where the saturated soil resistivity is less than 4,000 ohms-cm, or where soil pH is lower than 5.

Specifications in tables 2, 3, 4, and 5 are to be followed for polyvinyl chloride (PVC), steel, and aluminum pipe.

Cathodic protection is to be provided for coated welded steel and galvanized corrugated metal pipe where soil and resistivity studies indicate that the pipe needs a protective coating, and where the need and importance of the structure warrant additional protection and longevity. If cathodic protection is not provided for in the original design and installation, electrical continuity in the form of joint-bridging straps should be considered on pipes that have protective coatings. Cathodic protection should be added later if monitoring indicates the need.

Practice standard 430-FF provides criteria for cathodic protection of welded steel pipe.

Seepage control along a pipe conduit spillway shall be provided if any of the following conditions exist:

1. The effective height of dam is greater than 15 ft.
2. The conduit is of smooth pipe larger than 8 in. in diameter.
3. The conduit is of corrugated pipe larger than 12 in. in diameter.

**Table 2.**-Acceptable PVC pipe for use in earth dams

| Nominal pipe size in. | Schedule for standard dimension ratio (SDR) | Maximum depth of fill over pipe ft. |
|---|---|---|
| 4 or smaller | Schedule 40 | 15 |
| | Schedule 80 | 20 |
| | SDR 26 | 10 |
| 6, 8, 10, 12 | Schedule 40 | 10 |
| | Schedule 80 | 15 |
| | SDR 26 | 10 |

1Polyvinyl chloride pipe, PVC 1120 or PVC 1220, conforming to ATSM-D-1785 or ATSM-D-2241.

**Table 3.**-Minimum gage for corrugated steel and aluminum pipe [2-2/3-in x 1/2-in corrugations]1

| Fill Height Above Pipe (Feet) | Steel- Minimum Gage | | | | | | Aluminum pipe2 Minimum Thickness (inches) Equivalent Standard Gage () | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pipe Diameter in Inches | | | | | | | | | | | |
| | 21 and less | 24 | 30 | 36 | 42 | 48 | 21 and less | 24 | | 30 | | 36 | |
| 1-15 | 16 | 16 | 16 | 14 | 12 | 10 | 0.06 | (16) | 0.06 | (16) | 0.075 | (14) | 0.075 | (14) |
| 15-20 | 16 | 16 | 16 | 14 | 12 | 10 | .06 | (16) | .075 | (14) | .105 | (12) | .105 | (12) |
| 20-25 | 16 | 16 | 14 | 12 | 10 | 10 | .06 | (16) | .105 | (12) | .135 | (10) | 3 | |

1 Pipe with 6, 8, and 10 in diameters has 1-1/2 in x 1/4-in corrugations.
2 Riveted or helical fabrication.
3 Not permitted.

**Table 4.** Minimum gage for corrugated steel pipe [3 inch x 1 inch corrugations]

| Fill Height Above Pipe (Feet) | Steel- Minimum Gage | | | | | |
|---|---|---|---|---|---|---|
| | Pipe Diameter In Inches | | | | | |
| | 24 &less | 24 | 30 | 36 | 42 | 48 |
| 0-20 | 16 | 16 | 16 | 16 | 16 | 16 |
| 20-25 | 16 | 16 | 16 | 16 | 16 | 14 |

**Table 5.** Minimum gage for corrugated aluminum pipe [3 inch x 1 inch helical corrugations]

| Fill Height Above Pipe (Feet) | Aluminum - Minimum Equivalent Gage | | | |
|---|---|---|---|---|
| | Pipe Diameter In Inches | | | |
| | 30 | 36 | 42 | 48 |
| 0-20 | 16 | 16 | 16 | 16 |
| 20-25 | 16 | 14 | 8 | 8 |

JOSEPH H. SCALES & ASSOCIATES
PROFESSIONAL CONSERVATIONIST & ENVIRONMENTALIST
2556 HADENSVILLE-FIFE ROAD · GOOCHLAND, VIRGINIA 23063
PHONE (804) 457-4529

JOSEPH H. SCALES, PROF. CONSERVATIONIST
SHAWNA W. SHADE, CONSERVATION TECH.
WILLIAM H. STREET, III ASSISTING
ASSOCIATED
RANDALL A. STRAWBRIDGE, PROF. ENG.

January 10, 1994

**SPECIFICATIONS FOR POND AND DAM CONSTRUCTION-Colonial Golf Course, Lake No. 2**

SITE PREPARATION: Following clearing of the area strip and stockpile, at a convenient location, topsoil for use in dam side slopes.

CUTOFF CORE: A cutoff trench will be excavated as provided in the plans and refilled with suitable material, well compacted, at near optimum moisture content, to prevent objectionable seepage under the embankment. It is highly recommended that a soil scientist examine excavated core and backfill material to assure satisfactory construction.

DRAIN PIPE: To be as specified on plan sheet. Spread 50 lbs. bentonite clay along side of pipe. Firm soil by hand or otherwise around pipe to prevent seepage along the pipe and to prevent damage by heavy equipment.

EMBANKMENT CONSTRUCTION: Fill material will be placed in level layers, not to exceed eight inches in depth, uniformly over the entire fill area, and compacted before the next layer is started. Material will be moist enough to obtain good compaction. Fill material should not be obtained in the water impounding area within 30 feet of the toe of the upstream slope of the fill.

The embankment will be constructed to the height, length, width, slopes and location as shown in the plans. The fill will be completed and left in as uniform and smooth shape as the workmanlike skilled operation of the equipment will permit.

FILL MATERIAL: Is to be CH, SC, and MH soil texture according to unified classification systems. Soil material meeting these requirements is found in some areas of the reservoir and on each end and at elevations above the dam.

EMERGENCY SPILLWAY: To be excavated around the east end of the dam as shown on plans.

VEGETATIVE ESTABLISHMENT: Dam and all disturbed areas not covered by water will be mulched and seeded immediately upon completion of earthmoving.



PROFESSIONAL SOIL SCIENTIST

Additional Agency Comments
Case No. SP-112-92. The Colonial Golf Course

Virginia Department of Transportation

See Attached letter.

Planning Division

1. Add a note to the site plan that the club house, entrance road, driving range, and landscaping plan shall submitted as an individual site plan for approval by the County.

2. Provide tree protection fencing around all clearing limit. Provide a detail of how this shall be accomplished.

3. Show a construction staging area on the site plan. This area shall be located in an area that will not affect the archaeological site identified by the archaeological study.

4. Provide a detailed plan of how archaeological site in the path of the course are to be protected.

5. Provide a copy of all federal and state permits required for this project.

6. In accordance with SUP Condition No. 3 an operation and maintenance plan, including an integrated pest management plan, shall be approved prior to final site plan approval.

Division of Code Compliance

1. A Land Disturbing Permit and Siltation Agreement, with surety are required for this project.

2. As-built drawings shall be provided for all detention basins upon completion.

3. The Land Disturbing Permit shall require construction of the sediment basins and traps prior to any other construction activities on the remainder of the project.

4. Provide riprap outlet protection for all pipe systems and culverts. Specify the amount of stone to be used in accordance with Spec 3.19 of the third edition of the Virginia Erosion Control Handbook (VESCH).

5. Provide culvert inlet protection for culverts #1, 9, and 16. Label the inlet protection provided for all storm drain inlets.

6. Provide additional silt fence as discussed with the engineer.

7. Include information on the plans regarding the key trench, toe drains, and anti-seep collars when available from the geotechnical engineer. Provide a copy of the geotechnical report.

Jamestown 1607
JAMES CITY COUNTY

**DEPARTMENT OF DEVELOPMENT MANAGEMENT**
P. O. Box 8784
Williamsburg, Virginia 23187-8784

County Government Center, 101-E Mounts Bay Road

Development Manager
(804) 253-6671

Code Compliance
253-6626

County Engineer
253-6678

Planning
253-6685

Integrated Pest Management
253-2620

March 29, 1994

Mr. Francis M. Fenderson, Jr.
The Colonial Golf Course, Inc.
P.O. Box 356
Williamsburg, VA 23187

RE: Colonial Golf Course - Lake Design

Dear Mr. Fenderson:

I have received and reviewed the as-built plans for Lake #2. The as-built drawings were requested at this time because it appeared from visual inspection that the dam was not constructed in accordance with the approved plans. The submitted plans confirm that the dam was not constructed in accordance with the plans. In accordance with the James City County Erosion and Sediment Control Ordinance, Section 5A-10, an approved plan can only be amended by the county, not the applicant. Further, any proposed changes must be approved prior to construction and not after.

The lake was not constructed simply as a water supply or water hazard for the golf course. It also serves as the major sediment control measure for the construction activities, provides peak flow reduction for storm flows, and serves as a best management practice (BMP) to reduce the long term water quality impact of the project on the receiving waters and wetlands. There was a considerable amount of time invested by both the county and your consultant in the planning and design of the course including the lake to insure that the project met environmental concerns and ordinances.

I have numerous concerns related to the present design and construction of the dam. Some of the criteria used to identify the design deficiencies are contained within the Virginia Erosion and Sediment Control Handbook (VESCH) standard for sediment basins while other concerns are violations of county policy and good engineering practices. The major deficiencies are as follows:

1. The dam must be designed by a qualified professional engineer as it is a permanent structure. The design submitted was certified by a professional soil scientist.

2. The principal spillway must be constructed of either corrugated metal or reinforced concrete pipe. The principal spillway has been constructed of PVC pipe.

3. The redesign of the basin was done using an unacceptable engineering calculation procedure. The VESCH requires that the procedure employed be

Fax: (804) 253-6663

either the Soil Conservation Service (SCS) method contained in TR-55 or the SCS Unit Hydrograph method. The county will also allow the use of the Modified Rational Method if the watershed is less than 20 acres in size and gives comparable results to either of the two methods above. In any event, a dam structure must be designed using a method that develops a hydrograph and then flood routes the hydrograph through the dam outlet structures. The submitted design does neither.

4. The barrel and riser diameter are the same size which will cause an unstable plug or slug flow condition to develop.

5. The design submitted incorrectly identifies the watershed soil type as Norfolk sandy loam. The James City County Soil Survey identifies the majority of the soils in the lake watershed as Slagle, a soil with different runoff characteristics than assumed.

6. Seepage control must be provided in the dam. The original design provided anti-seep collars and a filter blanket at the toe of the dam. This redesign does neither.

7. The principal spillway must pass at least 0.2 cfs/acre of drainage area when lake is functioning as a sediment basin and the 10-year storm without discharge through the emergency spillway when functioning as a permanent detention basin. Also, there must be one-foot of freeboard between the routed 100-year storm elevation and the top of the dam. The constructed dam meets none of these criteria.

There are other minor deficiencies that could be identified but the above suffice to detail the major problems. The dam is constructed with the wrong pipe material, the principal spillway does not have the hydraulic capacity to function properly, the height of the dam is insufficient, and no seepage control has been provided. All of these result in an unacceptable dam design. The dam is potentially unsafe and it is unclear if it will meet its original design function. Please contact me at 253-6673 to further discuss the situation and how it can be remedied so that the construction and opening of the golf course are not delayed.

Sincerely,

Darryl E Cook

Darryl E. Cook
Development Engineer

cc: Williamsburg Environmental Group

*The Colonial Golf Course, Inc.*
*Post Office Box 356*
*Williamsburg, Virginia 23187-0356*
*Telephone (804) 566-1600*

*Francis M. Fenderson, Jr.*
*President*

March 18, 1994

Mr. Darryl E. Cook
James City County
Department of Code Compliance
Post Office Box 8784
Williamsburg, Virginia 23187-8784

Re: The Colonial Golf Course, Inc.

Dear Mr. Cook:

Enclosed please find plans for the construction of lake #2, which plans are in lieu of those earlier filed.

Very truly yours,

Francis M. Fenderson, Jr.

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| | |
|---|---|
| To SUNNY PELTER | From JOE SCALES |
| Co. | Co. |
| Dept. | Phone # |
| Fax # 566-1600 | Fax # 672-5169 |

January 11, 1994

**HYDROLOGY OF POND SITE:** Colonial Golf Course, Lake No.2

**GIVEN:**

1. Watershed area from USGS — 22.0 Acres
2. Approximate Pond Surface Area — 2.0 Acres
3. Ground Cover
   - a. woodland — 2.0 Acres
   - b. grassland — 18.0 Acres
   - c. cropland — 0 Acres
   - d. homesites, roads — 2.0 Acres

   Total — 22.0 Acres
4. Soils in watershed — Hydrologic Soils Group
   Norfolk fine sandy loam — B
5. Average slope of soils in watershed — 3 %
6. 50 yr. 24 Hr. rainfall frequency — 7 Inches

**SOUGHT:**

1. Peak run-off, using Run-off Curve No. 62 — 25 c.f.s.
2. Flood routing:
   - a. normal water to spw. — 1 ft.
   - b. pond to w/s ratio
     22 acres in w/s area / 2.2 acres of pond area — 10:1
   - c. peak flow reduction (amt. temp. stored) — 60 %
3. Capacity of 8 inch pipe — 3 c.f.s.
4. Required discharge:
   ~~peak 25~~ c.f.s. x .40 flood routing = — 10 c.f.s.
5. Required spillway capacity:
   10 c.f.s. dschrge. - 30 c.f.s. pipe cap.= 7 c.f.s.
6. Spillway bottom width:
   12 ft. 0.5 stage and 3 % exit grade — 30 c.f.s.
7. Excess spw. capacity:
   spw 30 c.f.s. - required 7 c.f.s. =
   excess capacity 23 c.f.s.

By Joseph H. Scales & Assoc.
Joseph H. Scales

COMMONWEALTH OF VIRGINIA
JOSEPH H. SCALES
NO. 000015
PROFESSIONAL SOIL SCIENTIST

11/11/94 JHC

For Hydrology
Pipe Capacity: Colonial Golf Course Pond No. 2

Capacity of pipe =

$$Q = A\sqrt{\frac{2gh}{1+(L/n)}}$$

Q = Quantity of water cubic feet per second
A = Area of cross section of pipe sq ft.
g = acceleration of gravity 32 ft. sec./sec
h = head of water (pressure) in feet
L = Length of pipe
n = Coefficient of friction

A = $\pi r^2$ = 3.14 $(.3)^2$ = 0.34 sq ft
h = is 10 ft.
L = 90 ft.
n = 0.01

$$Q = 0.34\sqrt{\frac{64\times10}{1+90\times(0.01)}} = \sqrt{\frac{640}{1.9}} = \sqrt{336} = 18.3$$

Q = 0.34 x 18.3 = 6.22 or 6 cu. ft. second

Note: For design use 50% of computed capacity or 3 cu ft. second

JOSHEPH H. COALES
NO. C00010

JOSEPH H. SCALES & ASSOCIATES
PROFESSIONAL CONSERVATIONIST & ENVIRONMENTALIST
2556 HADENSVILLE-FIFE ROAD · GOOCHLAND, VIRGINIA 23063
PHONE (804) 457-4529

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SHAWNA W. SHADE, CONSERVATION TECH.
WILLIAM H. STREET, III ASSISTING
ASSOCIATED
RANDALL A. STRAWBRIDGE, PROF. ENG.

January 10, 1994

**SPECIFICATIONS FOR POND AND DAM CONSTRUCTION-Colonial Golf Course, Lake No. 2**

SITE PREPARATION: Following clearing of the area strip and stockpile, at a convenient location, topsoil for use in dam side slopes.

CUTOFF CORE: A cutoff trench will be excavated as provided in the plans and refilled with suitable material, well compacted, at near optimum moisture content, to prevent objectionable seepage under the embankment. It is highly recommended that a soil scientist examine excavated core and backfill material to assure satisfactory construction.

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PROFESSIONAL SOIL SCIENTIST

DC006_COLONIAL_GOLF_COURSE - 234

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| | |
|---|---|
| To SHANNY PELTER | From JOE SCALES |
| Co. | Co. |
| Dept. | Phone # |
| Fax # 566-1600 | Fax # 672-5169 |

January 11, 1994

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5. Required spillway capacity:

   10 c.f.s. dschrge. - 30 c.f.s. pipe cap.= 7 c.f.s.
6. Spillway bottom width: — 30 c.f.s.

   12 ft. 0.5 stage and 3 % exit grade
7. Excess spw. capacity:

   spw 30 c.f.s. - required 7 c.f.s. = excess capacity 23 c.f.s.

By Joseph H. Scales & Assoc.

Joseph H. Scales

COMMONWEALTH OF VIRGINIA
JOSEPH H. SCALES
NO. 000015
PROFESSIONAL SOIL SCIENTIST

11/11/94 JHC

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Q = 0.34 x 18.3 = 6.22 or 6 cu. ft. second

Note: For design use 50% of computed capacity or 3 cu ft. second

JOSEPH H. COALES
NO. 00010



DC006_COLONIAL_GOLF_COURSE - 236

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RANDALL A. STRAWBRIDGE, PROF. ENG.

January 10, 1994

**SPECIFICATIONS FOR POND AND DAM CONSTRUCTION-Colonial Golf Course, Lake No. 2**

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VEGETATIVE ESTABLISHMENT: Dam and all disturbed areas not covered by water will be mulched and seeded immediately upon completion of earthmoving.



PROFESSIONAL SOIL SCIENTIST

DC006_COLONIAL_GOLF_COURSE - 237

## Scott Thomas

**From:** Scott Thomas
**Sent:** Friday, September 20, 2002 5:02 PM
**To:** Jim Rudnicky
**Cc:** Pat Menichino; Darryl Cook
**Subject:** Smith Memorial & Colonial Golf Course Projects

Jim

I will respond to you on both these projects, the easy one first.

Smith Memorial (SP-118-99; County BMP ID Code: YC 024)
I previously received a construction certification received for the project, which is ok. I just got the as-builts in a week after your email. I will need to review the asbuilts and perform a final inspection, probably next week as I need to get out and do several others. Depending on the results of review of the asbuilts and the field inspection, I may or may not need to issue a letter to the Owner. If both are ok, then we can release/reduce bond. As this is an underground manufactured BMP (stormchambers), obviously the field inspection mainly focus on the inflows and outflows to the chambers and stabilization of the drainage area. I will rely heavily upon the asbuilts and certification information. This was strongly stressed during the precon and construction stages to both the owner and Massie and his certifying engineers, VHB and ECS.

Colonial Golf Course (SP-112-92; County BMP ID Codes: DC 005, Large Lake 2 and DC 006 Smaller Lake)
This thing had quite a history to it but I think I got it sorted out by reviewing the files and talking to Gerry. The original plan SP-112-92 called for 3 ponds on the site. The central bigger lake was actually two interconnected ponds (Lake 1 and Lake 2) and the third was a smaller lake in the southwest corner (Holes 3 & 5).

The original plans and Environmental (Code Compliance) comments required asbuilts only for the onsite ponds. Note # 21 on Sheet 10 states the following: "Asbuilt drawings shall be provided for all detention basins upon completion." Plan review comment # 2 for the project also says the same thing. Therefore, asbuilts are required for the project but not construction certification.

However, as I interpret it, Lake 1/2 did not get constructed per the approved plan. Darryl issued a letter in March 1994 stating that asbuilts were required due to visual inspections which showed the lakes were not constructed per the approved plan. He also relayed 7 comments about the revised design and construction of the dam which seriously concerned him. Computations were forwarded back and forth until finally a letter dated April 15th 1994 by PE Randall Strawbridge was forwarded to our office. To me it does not look like this package was an asbuilt but served as a formal "design" revision to the dam. This is supported by language in that package that states that "the dam was not quite completed when we inspected it on 4/19/94; there was additional work required for the dam to conform to the revised plans."

I can find anything that resembles asbuilts in the files after that April 1994 date. **Therefore, asbuilts are required but none were ever received or reviewed by this office. We would need asbuilts for Lake 2 and Lake 3.**

DC 005 Lake 2 Large Pond between Holes 13/18
DC 006 Lake 3 Smaller Pond SW Corner of the site, Holes 3/5

Hopefully this answers your questions for both projects.

Scott

-----Original Message-----
**From:** Jim Rudnicky
**Sent:** Tuesday, September 10, 2002 7:42 AM
**To:** Scott Thomas
**Cc:** Pat Menichino
**Subject:** Projects Requesting Close Outs

Hi Scott,

Because you have been so busy lately, I thought I would put into writing recent requests I received from groups that want to close out their projects.

Colonial golf course wants to close out that project. I was originally contacted by Francis Fenderson, but now a Ms. Trudy Sears from the golf course has been in contact with me. She wants me to give her updates and let her know what they need to do to finalize the project and release their money which is held in a CD.

Smith Memorial Baptist church wants to close out their parking lot expansion/new building project. If you have not received their as-builts yet, they will be sending them to you soon.

**********

Jim Rudnicky
Environmental Inspector
James City County
757-259-4026 (Office)
757-259-4032 (Fax)
jrudnicky@james-city.va.us
**********

<< File: Jim Rudnicky.vcf >>

**Williamsburg Environmental Group, Inc.**
Post Office Box 3584
Williamsburg, Virginia 23187
(804) 220-6869
Fax (804) 229-4507

## FACSIMILE TRANSMITTAL

| | |
|---|---|
| File | **Colonial Golf Course** |
| Date | **August 23, 1993** |
| To | **Darryl Cook** |
| From | **Ron Boyd** |
| Phone Number of Receiving Fax Machine | **253-6663** |
| Number of Pages Following | **1** |

If you do not receive all pages of this transmittal, please contact **Becky** at (804) 220-6869 as soon as possible.

Special Instructions

**Attached is the temporary sediment basin design data, included on the plans, for the two lakes. I have circled the relevant information pertaining to the drainage area, wet volume and dry volume for each basin. If you have any questions please call me or Erik Allen.**

## TEMPORARY SEDIMENT BASIN DESIGN DATA

| | Units | Design Information | |
|---|---|---|---|
| | | Lake #2 | Lake #3 |
| **LOCATION** | | | |
| **TOTAL AREA DRAINING TO BASIN** | acres | 40 | 5.5 |
| **BASIN VOLUME DESIGN** | | | |
| Wet Storage Volume | cu yds | 2680 | 359 |
| Elevation of required volume | ft msl | 13.0 | 14.0 |
| Excavated volume to obtain required volume | cu yds | NA | NA |
| Available volume before cleanout required | cu yds | 1329 | 182 |
| Elevation corresponding to cleanout level | ft msl | 11.5 | 12.5 |
| Distance from top of riser to cleanout level | feet | 1.5 | 1.5 |
| Dry Storage Volume | cu yds | 2680 | 359 |
| Total available basin volume | cu yds | 3980 | 737 * |
| Elevation of required volume | ft msl | 15.0 | 15.5 |
| **DEWATERING** | | | |
| Diameter of dewatering orifice | inches | 12.0 | 4.0 |
| Diameter of flexible tubing | inches | 15.0 | 6.0 |
| **BASIN SHAPE** | | | |
| Length of flow | feet | 600 | 160 |
| Effective width | feet | 120 | 40 |
| If >2, baffles not required | | 5.0 | 4.0 |
| If <2, baffles required | | | |
| **PRINCIPAL SPILLWAY DESIGN** | | | |
| Required spillway capacity=Q25 | cfs | 50 | 10 |
| Riser diameter | inches | 42 | 24 |
| Actual head | feet | 1.3 | 0.7 |
| Barrell length | feet | 66 | 100 |
| Head on barrel | feet | 0.0 | 0.5 |
| Barrell diameter | inches | 30 | 12 |
| Trash rack and Anti-vortex device | | | |
| Diameter | inches | 60 | 36 |
| Height | inches | 19 | 18 |
| **ANTI-SEEP COLLAR** | | | |
| Depth of water at principal spillway crest | feet | 5.0 | |
| Slope of upstream face of embankment | S:S | 2.5 | |
| Slope of principle spillway barrel | % | 1 | |
| Length of barrel in saturated zone | feet | 62 | |
| Number of collars | No. | 3 | |
| Collar dimensions | feet | 6.0 | |
| **DESIGN ELEVATIONS*** | | | |
| Top of dam - elevation | ft msl | 16.5 | 16.5 |
| Designed high water | ft msl | 16.5 | 16.5 |
| Principal spillway crest | ft msl | 15.0 | 15.5 |
| Dewatering Orifice invert | ft msl | 13.0 | 14.0 |
| Cleanout elevation | ft msl | 11.5 | 12.5 |
| Elevation of upstream toe of dam | ft msl | 7.0 | 9.0 |

* Field grading of lakes may alter temporary basin elevations. These specifications represent the minimum required volume and appropriate basin design considering natural topographic features.

Note: Lake #2 Sediment Basin will incorporate the permanent outlet structure of the lake to meet the sediment basin design specifications during construction of the lake. Initially a 6'+- portion of the riser may be installed to allow the structure to function as a sediment basin during core and embankment construction. The outlet will be upgraded to a permanent spillway as shown in the Lake Cross-Section by attaching a 9'+- section of pipe upon construction of the overflow spillway. Upon permanent stabilization of the turf areas, the lake will be filled for irrigation purposes. Alternative design and construction methods may be employed if erosion and sedimentation control requirements for the sediment basin can be met while constructing the embankment.

Note: Lake #3 Sediment Basin will incorporate the permanent outlet structure of the lake to meet the sediment basin design specifications. Appropriate design and construction methods will be coordinated by the contractor and engineer to meet the erosion and sedimentation control requirements.

Golf Course Maint Fac.

Clubhouse SP Amended

Orig Plan SP-112-92

SUP-2-92

SP-14-93

SP-126-94

Colonial Golf Course (18 hole GC)

DC 006 — ~~Lake 1~~

DC 005 — Lake 2

~~DC 004~~ — Lake 3

CO Permit 94-22

0940100002

8285 Diascund Road

Lanexa 23089

Colonial Golf Course Inc.

P.O Box 356

Wmbg VA 23187

210 AC.

A1

Dist Area 103 AC

SP-112-92

DC005 Lake 2 Large Pond Between Holes 13 & 18

DC 006 Lake 3 Small Pond SE Corner Holes 3+5

Plan Sheet 7

Details Sheet 9

AB Note #21 Sheet 10 "AB drawings shall be provided for all Ret Basins Upon Completion

AB Code Compliance Comm #2 Letter DEC [No AB Found]

WILLIAMSBURG
ENVIRONMENTAL
GROUP, INC.

*Environmental Consultants*

# FACSIMILE TRANSMITTAL

File: COLONIAL

Date: 6-2-94

To: DARRYL COOK

From: ERIK ALLEN

Phone Number of Receiving Fax Machine: 253-6853

Number of Pages Following: 9

If you do not receive all pages of this transmittal, please contact ERIK at (804) 220-6869 as soon as possible.

Special Instructions

DARRYL

THIS IS THE STRUCTURE FILE I USED FOR THE PREVIOUSLY SUBMITTED ROUTINGS. SORRY FOR THE CONFUSION.

THANKS

ERIK

*516-B South Henry Street Williamsburg, Virginia 23185 (804) 220-6869 FAX (804) 229-4507*

WILLIAMSBURG ENVIRONMENTAL GROUP, INC.

*Environmental Consultants*

# TRANSMITTAL LETTER

TO DARRYL COOK

DATE 6-2-94

RE COLONIAL GOLF COURSE

WE ARE SENDING ☐ ATTACHED ☐ UNDER SEPERATE COVER VIA _____

☐ Plans ☐ Contracts ☐ Letters
☐ Prints ☐ Literature ☐ Other:
☐ Copies ☐ Samples

| COPIES | DATED | DESCRIPTION |
|---|---|---|
| 1 | 6-2-94 | OUTLET STRUCTURE RATING CURVE |
| | | |
| | | |
| | | |

THESE ARE BEING SENT:

☐ As per your request ☐ For your comments ☐ For your signature
☐ For your review ☐ For your use/files ☐ For your _____

NOTES DARRYL, THE FAX MACHINE WOULD NOT SEND THIS TRANSMITTAL.
THANKS
ERIK

COPY TO

SIGNATURE Erik Allen

TITLE STAFF ENGINEER

DATE 6-2-94

*516-B South Henry Street Williamsburg, Virginia 23185 (804) 220-6869 FAX (804) 229-4507*

WILLIAMSBURG
ENVIRONMENTAL
GROUP, INC.

FILE - COLONIAL GOLF

RECEIVED 5-31-94

*Environmental Consultants*

May 27, 1994

Mr. Darryl Cook
Code Compliance
James City County
P.O. Box JC
Williamsburg, Virginia 23185

RE: Colonial Golf Course Irrigation Lake Outlet Pipe Calculations

Please find attached two sketches of the proposed outlet pipe for the Colonial Golf Course irrigation lake along with supporting hydrologic and hydraulic routing computations. The outlet consists of a 30-inch vertical standpipe and a horizontal 24-inch barrel (both pipes ACMP-2). Williamsburg Environmental Group, Inc. has prepared the hydrologic and hydraulic calculations for the determination of the outlet structure type and size, but has not been responsible for the structural design of the dam.

If you have any questions regarding this submittal, please call me or Erik Allen. We look forward to hearing from you following your review of this information.

Sincerely,

Ronald J. Boyd, P.E.
President

cc: Mr. Francis Fenderson

Attachments

Design approved 6/3/94
Darryl E Cook

*516-B South Henry Street Williamsburg, Virginia 23185 (804) 220-6869 FAX (804) 229-4507*

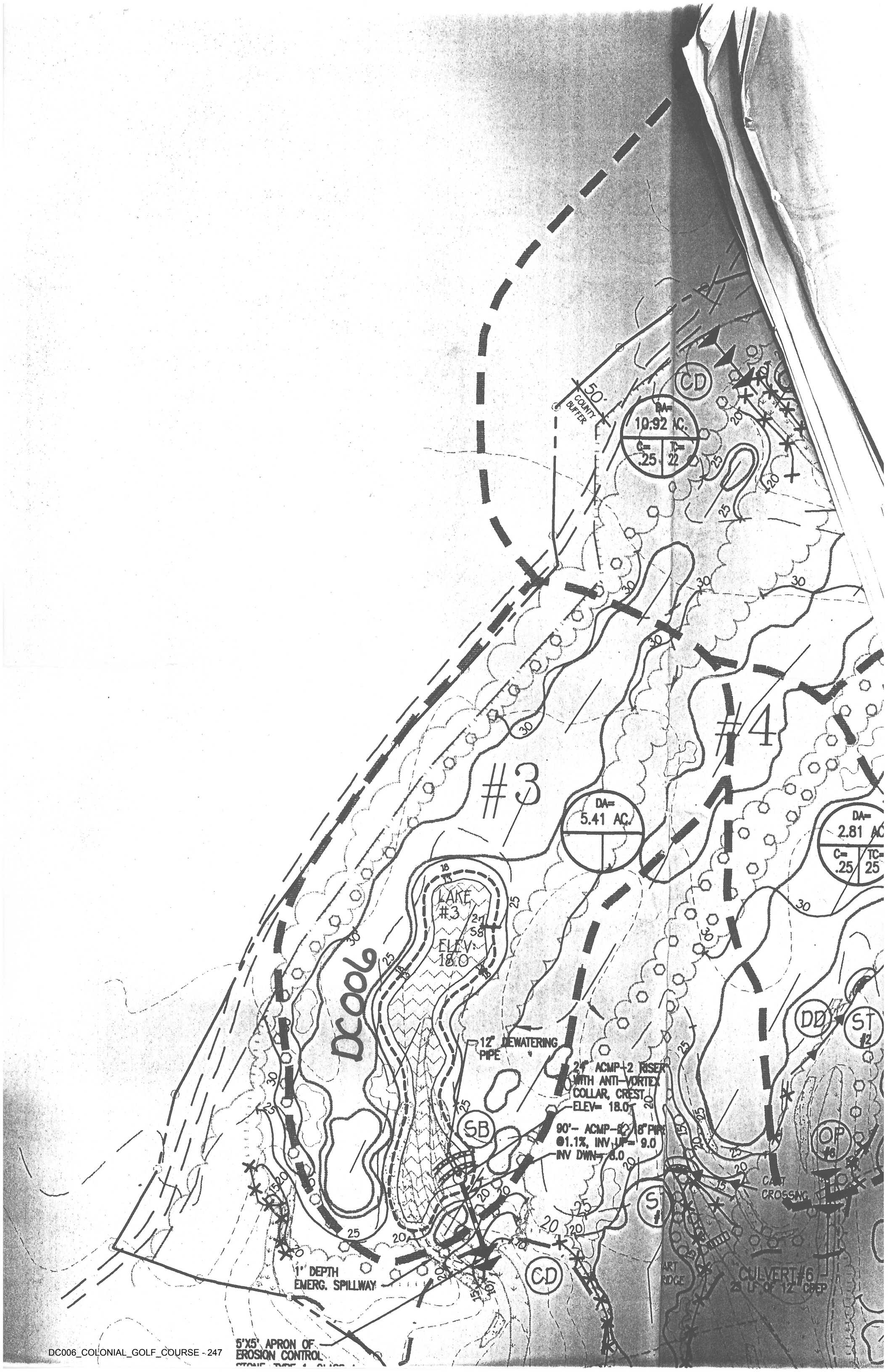
| | | | | | |
|---|---|---|---|---|---|
| WATERSHED | DC | MAINTENANCE PLAN | No | CTRL STRUC DESC | Riser |
| BMP ID NO | 006 | SITE AREA acre | 210 | CTRL STRUC SIZE inches | 24 |
| PLAN NO | | LAND USE | COMM | OTLT BARRL DESC | ACMP-2 |
| TAX PARCEL | (9-4)(1-2) | old BMP TYP | Wet Pond | OTLT BARRL SIZE inch | 18 |
| PIN NO | 940100002 | JCC BMP CODE | | | |
| CONSTRUCTION DATE | 1/1/1994 | POINT VALUE | | EMERG SPILLWAY | No |
| PROJECT NAME | The Colonial Golf Course BMP 3 0f 3 | | | DESIGN HW ELEV | 16.5 |
| FACILITY LOCATION | 8285 Diascund Creek Road | | | PERM POOL ELE | |
| CITY-STATE | Lanexa, VA | SVC DRAIN AREA acres | 5.5 | 2-YR OUTFLOW cfs | 5.00 |
| CURRENT OWNER | Colonial Golf Course Inc. | | | 10-YR OUTFLOW cfs | 13.00 |
| OWNER ADDRESS | 9901 Drouin Drive | | | REC DRAWING | No |
| OWNER ADDRESS 2 | | SERVICE AREA DESCRI | NONE | | |
| CITY-STATE-ZIP CODE | Richmond, VA 23233 | IMPERV AREA acres | | CONSTR CERTI | No |
| OWNER PHONE | | RECV STREAM | DIASCOND CREEK | | |
| MAINT AGREEMENT | No | EXT DET-WQ-CTRL | No | LAST INSP DATE | |
| | | WTR QUAL VOL acre-ft | 0.62 | INTERNAL RATING | |
| EMERG ACTION PLAN | No | CHAN PROT CTRL | No | MISC/COMMENTS | |
| | | CHAN PROT VOL acre-ft | 0 | LARP 3 SW Corner | |
| | | SW/FLOOD CONTROL | No | | |
| | | GEOTECH REPORT | No | | |

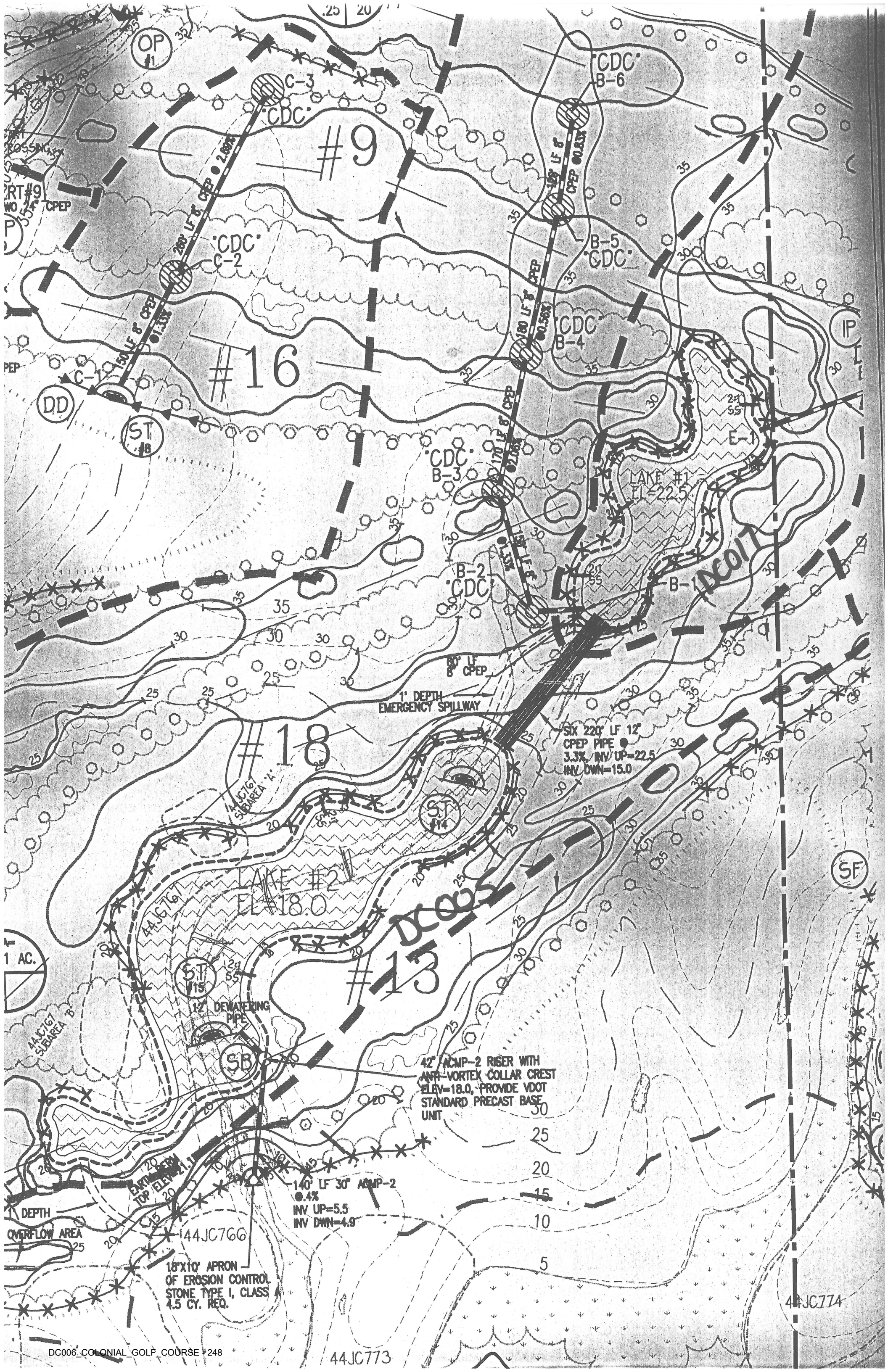
Get Last BMP No

Return to Menu

LARC #3

Form Laurel Glen Golf Course


50' COUNTY BUFFER
DA= 10.92 AC.
C= .25
TC= 22
CD
#3
#4
DA= 5.41 AC.
DA= 2.81 AC
C= .25
TC= 25
LAKE #3
ELEV: 18.0
DC006
12" DEWATERING PIPE
24" ACMP+2 RISER WITH ANTI-VORTEX COLLAR, CREST ELEV= 18.0
90'- ACMP-2 18" PIPE @1.1%, INV UP= 9.0 INV DWN= 8.0
SB
DD
ST
OP
S
CART CROSSING
CULVERT #6 25 LF OF 12" CMP
1' DEPTH EMERG. SPILLWAY
5'X5' APRON OF EROSION CONTROL


#9
#16
#18
#13
LAKE #1
EL=22.5
LAKE #2
EL=18.0
C-3
CDC
C-2
C-1
B-6
B-5
B-4
B-3
B-2
B-1
E-1
OP #1
DD
ST #8
ST #14
ST #15
SB
SF
IP
P
CROSSING
RT #9
TWO 4" CPEP
260' LF 8" CPEP @ 2.69%
150 LF 8" CPEP @ 1.33%
120' LF 8" CPEP @ 0.83%
180 LF 8" CPEP @ 0.56%
170 LF 8" CPEP @ 2.06%
60' LF 8" CPEP
1' DEPTH EMERGENCY SPILLWAY
SIX 220' LF 12" CPEP PIPE @ 3.3%, INV UP=22.5 INV DWN=15.0
44JC767 SUBAREA 'A'
44JC767 SUBAREA 'B'
12" DEWATERING PIPE
42" ACMP-2 RISER WITH ANTI-VORTEX COLLAR CREST ELEV=18.0, PROVIDE VDOT STANDARD PRECAST BASE UNIT
140' LF 30" ACMP-2 @ 0.4% INV UP=5.5 INV DWN=4.9
EARTHEN BERM TOP ELEV=21.1
DEPTH
OVERFLOW AREA
18'X10' APRON OF EROSION CONTROL STONE TYPE I, CLASS A 4.5 CY. REQ.
44JC766
44JC773
44JC774
DC017
DC005
1 AC.

JOSEPH H. SCALES & ASSOCIATES
PROFESSIONAL CONSERVATIONIST & ENVIRONMENTALIST
2556 HADENSVILLE-FIFE ROAD · GOOCHLAND, VIRGINIA 23063
PHONE (804) 457-4529

JOSEPH H. SCALES, PROF. CONSERVATIONIST
SHAWNA W. SHADE, CONSERVATION TECH.
WILLIAM H. STREET, III ASSISTING
ASSOCIATED
RANDALL A. STRAWBRIDGE, PROF. ENG.

April 25, 1994

**Hydrology of Pond Site: Colonial Golf Course Lake No. 2 ***

*These computations are revised from 4/13/94 as a result of plan revisions for dam and on site determination of pond and watershed area. Procedure used is that from Soil Conservation Service National Engineering Handbook Section 4 and from Virginia Erosion and Sediment Control Handbook.

Given:

1. Watershed area from USGS — 18.0 Acres
2. Surface Area of Pond (actual survey) — 2.7 Acres
3. Ground Cover:
   - (a) grassland — 17.0 Acres
     - 1. fescue — 40%
     - 2. bermuda hybrid — 60%
   - (b) golf cart trails — 1.0 Acres

   Total 18 Acres
4. Soils in Watershed; friable sandy loam, moderately deep, Norfolk sandy loam or similar soil
   Hydrologic Group B
5. Average slopes of soils in watershed — 3%
6. Depth 24 Hr. Rainfall:
   - 2 Yr. 3.5"
   - 10 Yr. 6.0"
   - 100 Yr. 8.0"
7. 

| | Depth 24 Hr. Rainfall | Run-off Volume | Quantity 18Ac. watershed | Run-off Max.Rate c.f.s. |
|---|---|---|---|---|
| 2 Yr. | 3.5" | 0.55" | 9.9 Ac. In. | 3.8 |
| 10 Yr. | 6.0" | 1.92" | 35.6 Ac. In. | 26.0 |
| 100 Yr. | 8.0" | 3.33" | 60.0 Ac. In. | 44.0 |

8. Temporary storage capacity, water elevation 16.5 to elevation of emergency spillway 18.0
   - 1.5 feet x 2.7 ac. area = 4.05 ac. ft.
   - 4.05 ac. ft. x 12 in. = 48.6 ac. in.

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April 25, 1994

**PIPE CAPACITY: Colonial Golf Course, Pond No. 2**

Capacity of pipe =

$$Q = A\sqrt{\frac{2qh}{1 + Ln}}$$

Q = quantity of water, c.f.s.
A = area of cross section of pipe, sq. ft.
g = acceleration of gravity, 32 ft. sec.
h = head of water (pressure), feet
L = lenght of pipe, feet
n = coefficent of friction

therefore: $A = (3.14)r^2 = 3.14(.33)^2 = 0.34$ sq. ft.
g = 32 ft. sec.
h = 10 ft.
L = 90 ft.
n = 0.01

$$Q = 0.34\sqrt{\frac{2(32) \times 10}{1 + 90(0.01)}} = \sqrt{\frac{640}{1.9}} = \sqrt{336} = 18.3$$

Q = 0.34 x 18.3 = 6.22 or 6 c.f.s.

Note: For design, use 50% of computed capacity or 3 c.f.s.

Note: Capacity of emergency spillway with 12′ bottom width, 4:1 side slopes, 2% exit grade and water in reservoir at stage 18.8 is 40 c.f.s.

**HYDROGRAPH: Colonial Golf Course Lake No. 2**

The principal spillway and temporary storage are sufficient to contain and discharge up to and include the 100 year storm without discharge through the emergency spillway.

| Time Hr. | Quantity ac. in. | Pipe Cap. ac. in. | Net Storage ac. in. | Depth in Reservoir | Elev. in Reservoir | Total Storage Capacity ac. in. | Reserve Capacity ac. in. |
|---|---|---|---|---|---|---|---|
| **For 2 yr., 24 Hr. storm; 3.5" rainfall, 0.55" runoff. Time is 12 Hrs., w/s area 18 ac.** | | | | | | | |
| 0-12 | 9.9 | 6 1cfs | 3.9 | 1.44" | 16.62 | 48.6 | 38.7 |
| **For 10 yr., 24 Hr. storm; 6.0" rainfall, 1.92" runoff. Time is 12 Hrs., w/s area 18 ac.** | | | | | | | |
| 0-12 | 34.56 | 23 @ 2 c.f.s. | 11.56 | 4.28 | 16.68 | 48.6 | 37.0 |
| **For 100 yr., 24 Hr. storm, 8" rainfall, 3.3" runoff. Time is 12 Hrs., w/s area 18 ac.** | | | | | | | |
| 0-12 | 60.0 | 25.3 @ 2cfs | 34.70 | 12.1 | 17.5 | 48.6 | 13.9 |

Design Note: This reservoir is to be used as a water storage reservoir to store water pumped from a nearby stream for irrigating the golf course. Combined, the 18 acre watershed and weak spring flow this reservoir will not be full of water in the absence of pumping water into it. A 20 acre watershed per surface acre of reservoir for this climate and hydrologic path dicitates, 2.7 acre reservoir x 20 acres = 54 acres desired watershed area.

(Prepared by Joseph H. Scales and Associates, April 25, 1994)