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: **MC003**

DATE VERIFIED: **September 5, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

MC-0036

ontents for Stormwater Management Facilities As-built Files

ach 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

PC184

COPY

COUNTY OF JAMES CITY, VIRGINIA

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF RUNOFF CONTROL FACILITY

THIS DECLARATION, made this 20th day of September, 2002, between Daniel W. CAPRIO, Susan S. TUTTLE and Richard T. GAY, JR., as TRUSTEES OF GRACE COVENANT PRESBYTERIAN CHURCH, a Virginia religious association, and all successors in interest, hereinafter referred to as the "COVENANTORS (S)," owner(s) of the following property: Parcel II as shown on a plat titled "Plat of Parcels I, II, and III, Property of Mecca Development Corporation" recorded in Plat Book 45, Page No.9; project name, Grace Covenant Presbyterian Church,; and the County of James City, Virginia ("COUNTY.")

WITNESSETH:

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

1. The COVENATOR (S) shall provide maintenance for the drainage system including any runoff control facilities, conveyance systems and associated easements, hereinafter referred to as the "SYSTEM," located on and serving the above-described property to ensure that the facility that the SYSTEM is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations. The SYSTEM shall not include any elements located within any Virginia Department of Transportation rights-of-way.

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

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

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

5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the SYSTEM in accordance with approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work, and the COUNTY may

Instrument # 020022837

Revised 01/02

Recorded on October 3, 2002

asses the COVENANTOR(S) and/or all property served by the SYSTEM for the cost of the work and any applicable penalties.

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

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

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

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

10. Notwithstanding anything to the contrary in this Declaration, pursuant to Section 57-15.1 of the Code of Virginia of 1950, as amended, this Declaration is executed without personal liability of the individuals executing the Declaration on behalf of Grace Covenant Presbyterian Church and shall be the obligation solely of Grace Covenant Presbyterian Church and no other.

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of first above written.

COVENANTORS:

DANIEL W. CAPRIO, SUSAN S. TUTTLE AND RICHARD T. GAY, JR., AS TRUSTEES OF GRACE COVENANT PRESBYTERIAN CHURCH, a Virginia religious association

By: _____ (SEAL)
Trustee

By: _____ (SEAL)
Trustee

By: _____ (SEAL)
Trustee

STATE OF VIRGINIA,

COUNTY OF JAMES CITY, to wit:

The foregoing instrument was duly acknowledged before me this 27th day of September, 2002 by Daniel W. Caprio, Susan S. Tuttle and Richard T. Gay, Jr., as Trustees of Grace Presbyterian Church, a Virginia religious association.

Notary Public

My commission expires: 9/30/2004

Approved as to form:

Asst. County Attorney

This Declaration of Covenants prepared by:

Charles. J. Bodnar, P.E.
(Print Name)

Associate, LandMark Design Group, Inc.
(Title)

4029 Ironbound Road, Suite 100
(Address)

Williamsburg, VA 23188
(City) (State) (Zip)

Printed On 10/18/2011 By WOOLRIDGE

Consideration: 185,000.00

3001 This Deed is Exempt from Recordation Tax Pursuant to Sections 58.1-803(D), 58.1-811(A)(1) and 58.1-811(B)(2) of the Code of Virginia

DEED OF ASSUMPTION BOOK 671 PAGE 514

THIS DEED OF ASSUMPTION, made this 2nd day of February, 1993, between **SETTLERS MILL, INC.**, a Virginia Corporation, party of the first part, hereinafter called the Grantor, and Jerry L. **WOODSON**, Trustee, Ralph C. **CRAFT**, Trustee and Robert D. **HOPPER**, Trustee, as the Trustees of **GRACE COVENANT PRESBYTERIAN CHURCH**, a Virginia Religious Association, party of the second part, hereinafter called the Grantee;

WITNESSETH: That for and in consideration of the sum of Ten Dollars ($10.00) cash in hand paid by the Grantee to the Grantor, and other good and valuable consideration, receipt whereof is hereby acknowledged, the Grantor does hereby GRANT, BARGAIN, SELL and CONVEY with GENERAL WARRANTY and with ENGLISH COVENANTS OF TITLE unto the Grantee, the following described property, to-wit:

All that piece or parcel of real estate situate, lying and being in James City County, Virginia, containing 7.2883 acres, more or less, and being designated as Parcel II, as shown on that certain plat entitled "Plat of Parcels I, II and III, property of Mecca Development Corporation" dated March 10, 1987, and made by AES, a professional corporation, Engineering, Planning and Surveying, a copy of which is recorded in the Clerk's Office of the Circuit Court of James City County, Virginia, in Plat Book 45, Page 9.

Being the same property as that conveyed unto the Grantor herein by Deed dated July 20, 1992 and recorded in James City County Deed Book 575, Page 802.

Subject to all restrictions and easements of record or apparent on the ground.

And further subject to the following additional restriction which the Grantees acknowledge shall run with the land and be binding on their heirs, successors and assigns of the owner of the property described above:

An area seventy-five feet (75') in width along the entire length of the northern boundary of the property shall be maintained as a natural "Buffer Strip". No building or other structure or parking area may be erected or maintained within the Buffer Strip. No soil may be disturbed, nor may any trees or foliage be removed except for windfall and deadfall and as expressly provided below in the Developable Area.

1-6

RETURNED TO KNICELY & COTORCEANU ATTORNEYS WILLIAMSBURG 3/17/94

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The following provisions shall apply only within the portion of the Buffer Strip which is south of a line which parallels the northern boundary of the property fifty feet (50') south of it ("Developable Area"):

> **Landscaping alterations may be made, including the removal of underbrush and the addition of new landscape material. In the Developable Area no existing tree with a diameter of its trunk greater than six inches (6") at a distance three feet (3') above the ground shall be removed.**

The provisions of this restrictive covenant are not intended to and shall not preclude the passive park use and enjoyment of the Buffer Strip by the owner of the property and nothing herein shall grant any right of use of or enjoyment of the Buffer Strip to any person other than the owner of the property, its guests and invitees.

PROVIDED, HOWEVER, that this conveyance is made subject to and the Grantee assumes:

A DEED OF TRUST made by Settlers Mill, Inc., a Virginia Corporation to W. J. Farinholt, John J. Dusewicz and David W. Holland, Trustees, dated August 6, 1992 and recorded in the aforesaid Clerk's Office in Deed Book 575, Page 811, to secure the payment of the principal sum of $139,000.00 and the Grantee herein, as is evidenced by their joining in the execution of this Deed, hereby assumes the payment of the unpaid balance of the debt secured by said Deed of Trust, which the Grantor covenants to be $ 127,334.02 after the January 12, 1994 payment, which has been made, and the Grantee covenants to the Grantor that they will discharge the debt so secured by said Deed of Trust according to the terms and provisions of said Deed of Trust and that they will forever save the Grantor harmless from the covenants and undertakings of said Deed of Trust.

Peninsula Trust Bank has joined in this Deed of Assumption solely for the purpose of indicating its consent to the assumption of the above described indebtedness of the Grantor by the Grantee. It is explicitly understood that the Grantor is not released from liability on the indebtedness described above and that the consent by Peninsula Trust Bank to this assumption does not constitute a waiver or consent to any future assumption.

WITNESS the following signatures and seals:

SETTLERS MILL, INC.

By _____ (SEAL)
Larry R. McCardle, President

GRACE COVENANT PRESBYTERIAN CHURCH

By _____ (SEAL)
Jerry L. Woodson, Trustee

By _____ (SEAL)
Ralph C. Craft, Trustee

By _____ (SEAL)
Robert D. Hopper, Trustee

PENINSULA TRUST BANK

By _____ (SEAL)

Printed On 10/18/2011 By WOOLRIDGE

STATE OF VIRGINIA

CITY/COUNTY OF James City County, to-wit:

The foregoing Deed of Assumption was acknowledged before me by Larry R. McCardle, President of Settlers Mill, Inc., a Virginia Corporation, as Grantor, this 17th day of February, 1994.

Martina Z. Sueltz
NOTARY PUBLIC

My commission expires: 8-31-96

STATE OF VIRGINIA

CITY/COUNTY OF James City County, to-wit:

The foregoing Deed of Assumption was acknowledged before me by Jerry L. Woodson, Trustee of Grace Covenant Presbyterian Church, a Virginia Religious Association, as Grantee, this 12th day of February, 1994.

Kathy A. Buhl
NOTARY PUBLIC

My commission expires: May 31, 1997

4 - 6

Printed On 10/18/2011 By WOOLRIDGE

STATE OF VIRGINIA

CITY/COUNTY OF James City County, to-wit:

The foregoing Deed of Assumption was acknowledged before me by Ralph C. Craft, Trustee of Grace Covenant Presbyterian Church, a Virginia Religious Association, as Grantee, this 17th day of February, 1994.

Kathy A. Buhl
NOTARY PUBLIC

My commission expires: May 31, 1997

STATE OF VIRGINIA

CITY/COUNTY OF James City County, to-wit:

The foregoing Deed of Assumption was acknowledged before me by Robert D. Hopper, Trustee of Grace Covenant Presbyterian Church, a Virginia Religious Association, as Grantee, this 17th day of February, 1994.

Kathy A. Buhl
NOTARY PUBLIC

My commission expires: May 31, 1997

5-6

Printed On 10/18/2011 By WOOLRIDGE

STATE OF VIRGINIA

CITY/COUNTY OF James City, to-wit:

The foregoing Deed of Assumption was acknowledged before me by Lee P Koob

of Peninsula Trust Bank, this 15th day of February,

1994.

Marian B Lucas
NOTARY PUBLIC

My commission expires: 5-31-94

Virginia: City of Williamsburg and County of James City, to Wit:
In the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City the 18 day of Feb 1994
This deed was presented with the certificate annexed and admitted to record at 2:58 o'clock. The taxes imposed by Sect. 58-54 (a) and (b) of the code, have been paid.

STATE TAX	LOCAL TAX	ADDITIONAL TAX
$ Exempt	$ Exempt	$ 58.5

Teste Helene S. Ward, Clerk
By Helene S Ward
Deputy Clerk

\wp51\temp\lenlease.doc

6 - 6

BOOK 575 PAGE 802

10273

THIS DEED, dated as of the 20th day of July, 1992, by SECURITY FEDERAL SAVINGS AND LOAN ASSOCIATION (also known as SECURITY FEDERAL SAVINGS AND LOAN ASSOCIATION OF VIRGINIA), through its Receiver, RESOLUTION TRUST CORPORATION, to be indexed as Grantor, and SECURITY FEDERAL SAVINGS ASSOCIATION through its Receiver, RESOLUTION TRUST CORPORATION, hereinafter Grantor, to SETTLERS MILL, INC., a Virginia corporation, hereinafter Grantee, whose current mailing address is 1111 Old Colony Lane, Williamsburg, Virginia 23185.

W I T N E S S E T H:

WHEREAS, Security Federal Savings and Loan Association was placed into receivership by that certain order number 90-442 of the Office of Thrift Supervision dated March 1, 1990, a copy of which is attached hereto and made a part hereof as Exhibit "A"; and

WHEREAS, Security Federal Savings Association was chartered by the Office of Thrift Supervision by order number 90-443, dated March 1, 1990; and

WHEREAS, pursuant to Order Number 90-444 dated March 1, 1990, the Office of Thrift Supervision appointed the Resolution Trust Corporation as Conservator for Security Federal Savings Association, a copy of which is attached hereto and made a part hereof as Exhibit "B"; and

WHEREAS, pursuant to Order Number 90-1796 dated September 27, 1990, the Office of Thrift Supervision replaced the Resolution Trust Corporation as Conservator for Security Federal Savings Association with the Resolution Trust Corporation as Receiver for Security Federal Savings Association, a copy of which is attached hereto as Exhibit "C"; and

WHEREAS, by operation of law pursuant to 12 U.S.C. Section 1821(d)(2)(A) and Section 1441a(b)(4), the RTC as Receiver of Security Federal Savings Association succeeded to all rights, titles and privileges in the property more particularly described herein below; and

R523

Returned to Anderson Franck & Davis Attys. Wmsbg, Va. 23185 8/26/92

1-9

WHEREAS, Resolution Trust Corporation authorized and empowered certain individuals as its Attorney-in-Fact, any one of whom may act, as fully set forth in that certain Power of Attorney dated March 24, 1992, said instrument being recorded in the Clerk's Office of the Circuit Court of the County of James City, Virginia, in Deed Book 852, page 511;

NOW, THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00), cash in hand paid, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Grantor does hereby grant and convey with **SPECIAL WARRANTY** to the Grantee the following described real property, to-wit:

SEE EXHIBIT D ATTACHED HERETO AND MADE A PART HEREOF.

This conveyance is made subject to recorded conditions, restrictions and easements affecting the property hereby conveyed.

WITNESS the following signature and seal:

SECURITY FEDERAL SAVINGS ASSOCIATION
through its Receiver,
RESOLUTION TRUST CORPORATION

By C. R. Johnson (SEAL)
Attorney-in-fact

STATE OF GEORGIA,
CITY/COUNTY OF Fulton, to-wit:

The foregoing instrument dated July 20, 1992, was acknowledged before me this 24th day of July, 1992, by Charles R. Johnson, acting in his/her capacity as Attorney-in-Fact for Resolution Trust Corporation.

Linda G. Brown
Notary Public

My Commission Expires:
Notary Public, Fulton County, Georgia.
My Commission Expires September 15, 1995

R523

MC003_GCPC_LAKEWOOD_DRIVE - 013

BOOK 575 PAGE 804

JOINDER

RESOLUTION TRUST CORPORATION, acting in its capacity as Receiver of SECURITY FEDERAL SAVINGS AND LOAN ASSOCIATION (also known as SECURITY FEDERAL SAVINGS AND LOAN ASSOCIATION OF VIRGINIA), predecessor-in-interest to Grantor with respect to the above-described real property, hereby conveys and quitclaims to Grantee any and all interest it may have in the real property, and joins in the conveyance of the real property to Grantee, without warranty.

SECURITY FEDERAL SAVINGS AND LOAN ASSOCIATION, through its Receiver, RESOLUTION TRUST CORPORATION

By C. R. Johnson (SEAL)

ATTORNEY-IN-FACT

STATE OF GEORGIA,
CITY/COUNTY OF Fulton, to-wit:

The foregoing instrument dated July 20, 1992, was acknowledged before me this 20th day of July, 1992, by Charles R. Johnson acting in his/her capacity as Attorney-in-Fact for Resolution Trust Corporation.

Linda G. Brown
Notary Public

My Commission Expires:

Notary Public, Fulton County, Georgia.
My Commission Expires September 15, 1995

R523

MC003_GCPC_LAKEWOOD_DRIVE - 014

A

EXHIBIT A

OFFICE OF THRIFT SUPERVISION

BOOK 575 PAGE 805

Appointment of Receiver
Security Federal Savings and Loan Association
Richmond, Virginia

Order No. 90-442
Date: March 1, 1990

RECITALS

A. Security Federal Savings and Loan Association, Richmond, Virginia ("Association") is a federally chartered savings association, the accounts of which are insured by the Federal Deposit Insurance Corporation.

B. Pursuant to § 5(d)(2)(B)(i) of the Home Owners' Loan Act of 1933 ("HOLA"), as amended by § 301 of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 ("FIRREA"), the Director of the Office of Thrift Supervision ("Director") may, without any requirement of notice, hearing or other action, appoint a conservator or receiver for a Federal savings association if the association, by resolution of its board of directors or of its members, consents to such appointment.

C. Pursuant to § 5(d)(2)(H)(ii) of HOLA, as amended by § 301 of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989, the Director shall appoint only the Federal Deposit Insurance Corporation or the Resolution Trust Corporation, as appropriate, as receiver for a savings association for the purpose of liquidation or winding up the affairs of such savings association.

ORDER

1. The Director, upon consideration of the administrative record, and for the rationale set forth in the Legal Memorandum dated February 27, 1990, and the Executive Summary dated March 1, 1990, hereby finds and determines that (a) the Association is in an unsafe and unsound condition to transact business, due to having substantially insufficient capital in that the Association has negative tangible capital; and (b) the Association, by resolution of its board of directors, has consented to the appointment of a receiver; and that grounds for the appointment of a receiver for the Association therefore exist under § 5(d)(2)(A)(iii) and (B) of HOLA, as amended.

MC003_GCPC_LAKEWOOD_DRIVE - 015

OFFICE OF THRIFT SUPERVISION

BOOK 575 PAGE 806

Appointment of Receiver
Security Federal Savings and Loan Association
Richmond, Virginia

2. The Director, upon consideration of the administrative record further finds and determines with respect to the Association that the Association has suffered a pattern of consistent losses.

3. The Director hereby appoints the Resolution Trust Corporation as receiver for the Association for the purpose of liquidation, pursuant to subdivisions (A), (B), (E), and (H)(ii) of § 5(d)(2) of HOLA, as amended.

M. Danny Wall
Director

MC003_GCPC_LAKEWOOD_DRIVE - 016

EXHIBIT B

BOOK 575 PAGE 807

OFFICE OF THRIFT SUPERVISION

Appointment of Conservator for Security Federal Savings Association Richmond, Virginia

Order No. 90-444
Date: March 1, 1990

RECITAL

A. Security Federal Savings and Loan Association, Richmond, Virginia ("Association"), is a federally chartered savings association, the accounts of which are insured by the Federal Deposit Insurance Corporation.

B. The Director of the Office of Thrift Supervision ("Director"), by Order No. 90-442, dated March 1, 1990, appointed the Resolution Trust Corporation as Receiver for the Association, and on application of the Resolution Trust Corporation by Order No. 90-443, dated March 1, 1990, authorized the incorporation of and the issuance of a federal charter for Security Federal Savings Association, Richmond, Virginia ("New Federal"), a Federal savings association organized to take over the assets and liabilities of the Association.

C. Pursuant to § 5(d)(2)(B)(i) of the Home Owners' Loan Act of 1933, ("HOLA") as amended by § 301 of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 ("FIRREA"), the Director may, without any requirement of notice, hearing or other action, appoint a conservator or receiver for a Federal savings association if the association, by resolution of its board of directors or of its members, consents to such appointment.

D. Pursuant to § 5(d)(2)(H) of the HOLA, as amended, the Director, at the Director's discretion, may appoint the Federal Deposit Insurance Corporation or the Resolution Trust Corporation, as appropriate, as conservator for a savings association.

E. The Resolution Trust Corporation, which organized New Federal by application to the Director, pursuant to § 11(d)(2)(F)(i) of the Federal Deposit Insurance Act, as amended by § 212 of FIRREA, exercises the powers of the board of directors of New Federal.

MC003_GCPC_LAKEWOOD_DRIVE - 017

BOOK 575 PAGE 808

OFFICE OF THRIFT SUPERVISION

Appointment of Conservator for Security Federal Savings Association Richmond, Virginia

ORDER

1. Effective upon receipt of the consent of New Federal, by resolution of its board of directors or of its members, or by resolution of the Resolution Trust Corporation exercising the powers of a board of directors of New Federal, the Director hereby appoints the Resolution Trust Corporation as conservator for New Federal ("Conservator"), not for the purpose of liquidation, pursuant to subdivisions (B) and (H) of § 5(d)(2) of the HOLA, as amended.

2. The Resolution Trust Corporation as Conservator for New Federal shall have the powers of a conservator for a Federal savings association granted under HOLA, as amended, the Federal Deposit Insurance Act, as amended, and FIRREA.

M. Danny Wall
Director

MC003_GCPC_LAKEWOOD_DRIVE - 018

EXHIBIT C

A

OFFICE OF THRIFT SUPERVISION BOOK 575 PAGE 809

Replacement of Conservator
With a Receiver
Security Federal Savings Association
Richmond, Virginia

Order No. 90- 1796

Date: September 27, 1990

Issued Under Delegated Authority

RECITALS

A. Security Federal Savings Association, Richmond, Virginia ("Association") is a Federally-chartered savings association, the accounts of which are insured by the Federal Deposit Insurance Corporation, and for which the Resolution Trust Corporation is Conservator.

B. Pursuant to Section 5(d)(2)(H)(ii) of the Home Owners' Loan Act of 1933 ("HOLA"), as amended by Section 301 of the Financial Institutions Reform, Recovery, and Enforcement Act of 1989, the Director of the Office of Thrift Supervision ("Director"), shall appoint only the Federal Deposit Insurance Corporation or the Resolution Trust Corporation, as appropriate, as receiver for a savings association for the purpose of liquidation or winding up the affairs of such savings association.

ORDER

1. The Director, upon consideration of the administrative record, hereby replaces the Conservator for the Association with the Resolution Trust Corporation as Receiver for the Association for the purpose of liquidation, pursuant to subdivision (F) of Section 5(d)(2) of the HOLA, as amended, effective upon the surrender of possession of the Association by the Conservator to the Receiver.

Jonathan L. Fiechter
Senior Deputy Director for
Supervision

8-9

BOOK 575 PAGE 810

LEGAL DESCRIPTION

EXHIBIT D

All that piece or parcel of real estate situate, lying and being in James City County, Virginia, containing 7.2883 acres, more or less, and being designated as Parcel II, as shown on that certain plat entitled "Plat of Parcels I, II and III, property of Mecca Development Corporation" dated March 10, 1987, and made by AES, a Professional Corporation, Engineering, Planning and Surveying, a copy of which plat is recorded in the Clerk's Office of the Circuit Court of James City County, Virginia, in Plat Book 45, page 9.

IT BEING the same property conveyed to SECURITY FEDERAL SAVINGS AND LOAN ASSOCIATION OF VIRGINIA by deed from A. J. Brent, Sole Acting Trustee, dated March 1, 1990, recorded in Deed Book 468, page 335.

City of Williamsburg and County of
In the Clerk's Office of the Circuit Court for the City of Williamsburg and County of
James City the 1 day of Aug 92
This deed was presented with the certificate annexed and admitted to record
at 11:52 o'clock. The taxes imposed by Sect. 58-54 (a) and (b) of the Code
have been paid

STATE TAX	LOCAL TAX	ADDITIONAL TAX
$ 436.50	$ 145.50	$ Exempt

Teste Helene S. Ward, Clerk
By: Helene S. Ward
Deputy Clerk

9 - 1

050011774

Consideration: $60,000.00

Tax Map No.: 47-4 11-2

Prepared by:

Phillips & Bartlett, P.C.

This deed made this 26th day of May, 2005, by and between Donald G. **PONS** and Frances J. **PONS**, husband and wife, as parties of the first part, hereinafter designated as the Grantors, and Mark A. **URICK** and Heather A. **PONS**, husband and wife, as parties of the second part, hereinafter designated as the Grantees, whose mailing address is 1122 Pleasant Point Road, Surry, Virginia, 23883:

WITNESSETH: That for and in consideration of the sum of TEN DOLLARS ($10.00), cash in hand paid by the Grantees to the Grantors, and other good and valuable consideration, receipt whereof is hereby acknowledged, the Grantors do hereby GRANT, BARGAIN and SELL, and CONVEY unto the Grantees with GENERAL WARRANTY and ENGLISH COVENANTS OF TITLE, as tenants by the entirety with the right of survivorship as at common law, the following described property, to-wit:

All that certain lot, piece or parcel of land situate, lying and being in the Jamestown District of James City County, Virginia, designated and shown as Lot 2 on that certain plat of survey entitled, "PLAT OF FIVE LOTS ON JAMESTOWN ROAD OWNED BY: VENTURE INVESTMENTS, INC., JAMES CITY COUNTY, VIRGINIA", made by Rainey Engineering, Christiansburg, Virginia, dated May 15, 1991, and recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 55, Page 60, as amended by that certain plat of survey entitled, "PLAT SHOWING BOUNDARY LINE ADJUSTMENT LOT LINE EXTINGUISHMENT AND DRIVEWAY ACCESS ADJUSTMENT LOTS 2 & 3, SUBDIVISION OF FIVE LOTS ON JAMESTOWN ROAD OWNED BY VENTURE INTERNATIONAL INVESTMENTS, INC., JAMESTOWN DISTRICT, JAMES CITY COUNTY, VIRGINIA", made by AES Consulting Engineers, Williamsburg, Virginia, dated April 29, 1996, as corrected by that certain plat of correction recorded in the aforesaid Clerk's Office in Plat Book 64, Page 70, to which plats specific reference is here made for a more accurate description of the property hereby conveyed.

Together with all and singular the buildings and improvements thereon, the rights, privileges, tenements, hereditaments and appurtenances thereunto belonging or in anywise appertaining.

PHILLIPS & BARTLETT, P.C.
ATTORNEYS AT LAW
WILLIAMSBURG, VIRGINIA

This conveyance is subject to all conditions, restrictions, covenants and easements of record or apparent on th ground.

Being the same property as that conveyed unto the Grantors herein by deed dated February 21, 2003 from Mark Urick and Heather Pons, husband and wife, which deed is of record in the aforesaid Clerk's Office as instrument number 030005780.

WITNESS the following signatures and seals:

(SEAL)
Donald G. Pons

(SEAL)
Frances J. Pons

STATE OF VIRGINIA
CITY OF WILLIAMSBURG, to-wit:

The foregoing deed was acknowledged before me this 26th day of May, 2005, in my aforesaid jurisdiction by Donald G. Pons and Frances J. Pons.

Notary Public

My commission expires: 9/30/05.

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on 26 May 05
at 2:26 AM/PM. The taxes imposed by Virginia Code
Section 58.1-801, 58.1-802 & 58.1-814 have been paid.

STATE TAX	LOCAL TAX	ADDITIONAL TAX
$ 150.00	$ 50.00	$ 60.00

TESTE: BETSY B. WOOLRIDGE, CLERK
BY: Betsy B. Woolridge Clerk

PHILLIPS & BARTLETT, P.C.
ATTORNEYS AT LAW
WILLIAMSBURG, VIRGINIA

Printed On 10/18/2011 By WOOLRIDGE

>>> SELECTED SEARCH CRITERIA <<<

Jurisdiction : 095 JAMES CITY (DEEDS, MARRIAGE LICENSES, WI

10/18/2011 3:15:00 PM

	From Date	To Date
Available : Deeds and Land Records	01/02/1968	10/14/201 1

Search By:
Tax Map #= 4741100002

***** No Record Found In The Database *****

>>> End Of Print Screen <<<

SP-06-02

LAKEWOOD SECTION 2

LOT 8 | LOT 7 | LOT 6 | LOT 5 | LOT 4 | LOT 3 | LOT 2 | LOT 1

LAKEWOOD SECTION 2

S 65°37'12" E 1303.95'

SETBACK LINE

BUFFER LINE

TIMBER RETAINING WALL

PHASE ONE
F.F. 62.00

CONC. WALK

HVAC AREA

GRASS SWALE

BIORETENTION BASIN (BMP #3)

DI
RIM=~~58.60~~ 58.58
INV.=~~53.72~~ 53.86

DI
RIM=~~53.50~~ 53.38
INV.=~~48.58~~ 48.64

DI
RIM=53.50 53.38
INV.=~~48.56~~ 48.64

115-L.F. 12"RCP@2.5%

79-L.F. 12"RCP@3.47%
80-L.F. 12"RCP@3.4%

87-L.F. 12"RCP@3.47%
87-L.F. 12"RCP@2.6%

CONC. HEADWALL
TOP=~~50.96~~ 61.38
INV.12" RCP=~~58.80~~ 58.84

193-L.F. 12"RCP@4.90%
194-L.F. 12"RCP@5.6%

57-L.F. 12"RCP@5.00%
57-L.F. 12"RCP@5.5%

DI
RIM=~~54.4~~ 54.45
INV. IN=~~43.25~~(N) 46.41
INV. IN =~~49.54~~(W) 49.55
INV. OUT=~~46.25~~ 46.17

DI
RIM=~~47.50~~ 48.13
INV.=~~42.83~~
INV. IN=43.03
INV. OUT=43.00

24" RCP
INV.=~~42.25~~ 42.20

DI
RIM=~~51.74~~ 51.74
INV.=~~45.84~~
INV. IN=~~45.89~~(N.W.)
INV. IN=~~46.34~~(N.E.)
INV. OUT=45.96

53-L.F. 15"RCP@3.47%
58-L.F. 15"RCP@3.5%

ES-1
INV.=~~44.00~~ 43.96

16 LF PC-2A @ ~~12.25%~~ @ 8.6%

20-L.F.18"RCP@~~1.65%~~
18-L.F.18"RCP@0.4%

84-L.F.24"RCP@~~0.90%~~
66-L.F.18"RCP@1.2%

ES-1
INV.=~~43.16~~ 43.11

N 65°37'12" W 810.00'

GRASS SWALE

SEE DETAIL 1

CONCRETE OVER FORCE MAIN

CONCRETE OVER FORCE MAIN

EXISTING DETENTION POND (BMP #1)

CONCRETE DITCH

LANDSCAPE AREA

CONCRETE FLUME

INVERT=39.54'

J-CONCRETE ELLIPTICAL STORM PIPE(15"x22")

INV.=38.82

18" RCP

POND OUTFALL STRUCTURE
RIM=~~43.70~~ 43.20
INV. OUT=~~40.80~~ 40.16

LAKEWOOD DRIVE (VARIABLE WIDTH R/W)

S 24°22'48" W 300.00'

JAMESTOWN ROAD – STATE ROUTE 31 (110' R/W)

MC003

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

RECORD INFORMATION
(TYPICAL)

POND OUTFALL STRUCTURE
RIM=~~43.70~~ 43.20
INV. OUT=~~40.80~~ 40.16

THESE RECORD DRAWINGS ARE BASED ON AN ACTUAL FIELD SURVEY OF STORMWATER MANAGEMENT FACILITIES PERFORMED BY LANDMARK DESIGN GROUP NOVEMBER, 2007. IMPROVEMENTS SHOWN OTHER THAN STORMWATER MANAGEMENT FACILITIES, WERE TAKEN FROM THE APPROVED SITE PLAN AND WERE NOT FIELD VERIFIED.

COMMONWEALTH OF VIRGINIA
12/4/07
PETER FARRELL
LIC. No. 002036
LAND SURVEYOR

LANDMARK DESIGN GROUP
Engineers • Planners • Surveyors
Landscape Architects • Environmental Scientists

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Fax. (757) 497-7833
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4029 Ironbound Road
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Williamsburg, VA 23188
Tel. (757) 229-2975
Fax. (757) 220-8616
Email: info@landmarkdg.com

STORM SEWER RECORD DRAWING
GRACE COVENANT PRESBYTERIAN CHURCH
JAMES CITY COUNTY VIRGINIA

Designed: LMDG	Date: 12/04/07
Checked: PF	Scale: 1"=30'
File Mgr./Drawn: AST	CADD File name: GRACE-STORM DWG
Project Number: 2007190-000.00	Dwg. File No.: 1820IW

Drawing Number
R-1
1 OF 2

MC003_GCPC_LAKEWOOD_DRIVE - 024

MAINTENANCE PLAN DETENTION POND BMP

THE OWNER OR ITS DESIGNATED REPRESENTATIVE WILL INSPECT THE SWM/BMP STRUCTURE AFTER EACH SIGNIFICANT RAINFALL EVENT OR THE FOLLOWING WORKING DAY IF A WEEKEND OR HOLIDAY OCCURS. A SIGNIFICANT RAINFALL FOR THIS STRUCTURE IS DEFINED AS ONE (1) INCH OR MORE OF GAUGED RAINFALL WITHIN A 24 HOUR PERIOD. ONCE PER YEAR (MORE OR LESS) A REPRESENTATIVE OF THE COUNTY MAY JOINTLY INSPECT THE STRUCTURE. APPROPRIATE ACTION, PERFORMED AT THE COST OF THE OWNER WILL BE TAKEN TO ENSURE APPROPRIATE MAINTENANCE. KEYS TO LOCKED ACCESS POINTS OR STRUCTURES SHALL BE MADE AVAILABLE TO THE COUNTY UPON REQUEST.

THE DETENTION POND SERVES A DRAINAGE AREA OF 2.2 ACRES ASSOCIATED WITH THE 7.9–ACRE GREENMOUNT INDUSTRIAL PARK LOT 2B SITE. THE FACILITY IS A 4–POINT, DRY–TYPE DETENTION FACILITY, COUNTY TYPE F–2 BMP. SOME INFILTRATION WILL OCCUR AT AN AVERAGE INFILTRATION RATE OF 1/4 INCH PER HOUR. A DRY–TYPE DETENTION POND TEMPORARILY STORES RUNOFF AND IS NORMALLY DRY DURING NON–RAINFALL PERIODS. TYPICALLY DRAW DOWN TIMES RANGE FROM 24 TO 72 HOURS FOLLOWING A STORM EVENT. PRINCIPAL STRUCTURES ASSOCIATED WITH THE BMP CONSIST OF TWO INFLOW STORM DRAINS (12 AND 18 INCH DIAMETER), A 36–INCH VERTICAL RISER, AND A 21–INCH RCP OUTLET BARREL. THERE ARE TWO OPENINGS IN THE RISER TO OFFER CONTROL FOR THE 2– AND 10– YEAR DESIGN STORM EVENTS. DURING THE 100–YEAR STORM, THE MAXIMUM WATER LEVEL SHOULD RISE TO ABOUT 12 INCHES ABOVE THE CREST OF THE RISER AND WITHIN 12 INCHES OF THE TOP OF THE DAM. IF FUNCTIONING PROPERLY, NORMAL STORM EVENTS SHOULD REACH AN ELEVATION JUST BELOW THE TOP OF THE RISER AND THE POND SHOULD DRAW DOWN IN ABOUT 24 TO 36 HOURS.

ADDITIONAL INSPECTION AND MAINTENANCE MEASURES:

1. INSPECT FOR SEDIMENT BUILDUP BY VISUAL OBSERVATION AND A PHYSICAL DETERMINATION OF SEDIMENT DEPTH WITHIN POND STORAGE AREAS. IF THE DEPTH OF SEDIMENT REACHES THE DEPTH OF 12 INCHES ABOVE THE BOTTOM OF POND, REMOVAL IS REQUIRED. AT THE SAME TIME, OR AT LEAST ONCE PER YEAR, CLEAN PRETREATMENT DEVICES, THE RISER BOTTOM AND OUTLET PIPES OF ACCUMULATED SEDIMENTS. DISPOSE OF SEDIMENTS REMOVED FROM THE FACILITY AT AN ACCEPTABLE DISPOSAL AREA.

2. PERFORM MAINTENANCE MOWING OF POND GRASSES AT LEAST TWICE EACH YEAR. GRASSES SUCH AS TALL FESCUE SHOULD BE MOWED IN EARLY SUMMER AFTER EMERGENCE OF THE HEADS ON COOL SEASON GRASSES AND IN LATE FALL TO PREVENT SEEDS OF ANNUAL WEEDS FROM MATURING. MOWING OF LEGUMES CAN BE LESS FREQUENT. TREES, SHRUBS AND WOODY VEGETATION ARE NOT BE PERMITTED TO GROW ALONG OR ON ANY PART OF THE EMBANKMENT EMBANKMENT THAT WAS CONSTRUCTED USING ENGINEERED (COMPACTED) FILLS.

3. PERFORM SOIL SAMPLING ON STABILIZED POND SOIL AREAS AT LEAST ONCE EVERY 4 YEARS. SOIL SAMPLING AND TESTING SHOULD BE PERFORMED BY QUALIFIED INDEPENDENT SOIL TESTING LABORATORY SUCH AS VPI&SU. CONTACT THE LOCAL OFFICE OF THE VIRGINIA COOPERATIVE EXTENSION FOR FURTHER INFORMATIONS. APPLY ADDITIONAL LIME AND FERTILIZER IN ACCORDANCE WITH TEST RECOMMENDATIONS.

4. IN STABILIZED POND AREAS, IF VEGETATION COVERS LESS THAN 40% OF SOIL SURFACES, LIME, FERTILIZE AND SEED IN ACCORDANCE WITH RECOMMENDATIONS FOR NEW SEEDLINGS. IF VEGETATION COVERS MORE THAN 40% BUT LESS THAN 70% OF SOIL SURFACFS, LIME, FERTILIZE AND OVER SEED IN ACCORDANCE WITH CURRENT SEEDING RECOMMENDATIONS OR REQUIREMENTS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK (VESCH).

5. PERFORM QUARTERLY INSPECTIONS OF THE RISER SECTION FOR THE OBSERVANCE OF COLLECTED TRASH AND DEBRIS. IMMEDIATELY REMOVE ANY TRASH OR DEBRIS THAT PREVENTS THE MOVEMENT OF WATER. REMOVE ANY TRASH AND LITTER DOWNSTREAM AND AT STORM DRAIN OR CHANNEL INFLOW LOCATIONS TO MAINTAIN THE INTEGRITY OF THE STRUCTURE.

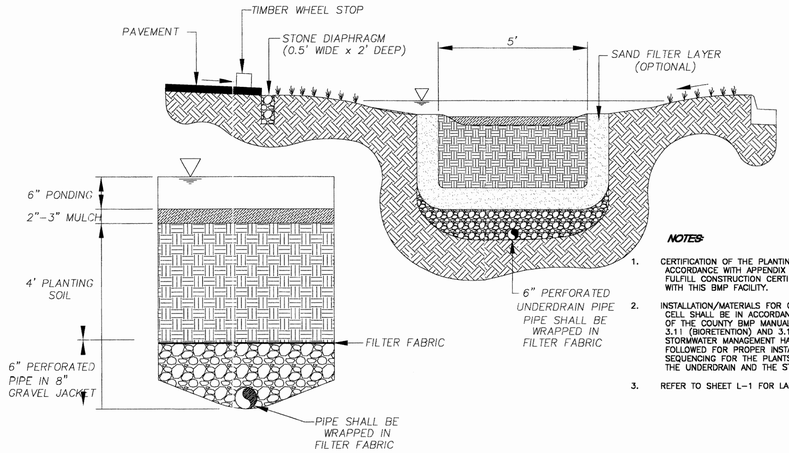
6. PERFORM ANNUAL STRUCTURAL INSPECTIONS OF THE FACILITY FOR DAMAGE. STRUCTURAL INSPECTION SHALL BE PERFORMED ON THE CONCRETE RISER, ANTI–VORTEX DEVICE, TRASH RACK, ORIFICES/WEIRS, OUTLET BARREL AND POND EMBANKMENT. EXPOSED METAL SURFACES SHALL BE RE–PAINTED OR RE–GALVANIZED TO MINIMIZE RUST DAMAGE OR REPLACED IF RUST DAMAGE IS IRREVERSIBLE. IF DAMAGE IS EVIDENT, FURTHER INVESTIGATION BY A QUALIFIED PROFESSIONAL MAY BE REQUIRED TO ASSESS THE INTEGRITY OF THE STRUCTURE.

7. PERFORM QUARTERLY INSPECTIONS OF THE GRADED SIDE SLOPES OF THE FACILITY FOR SIGNS OF ANIMAL/RODENT BURROWS OR SLOPE EROSION. IMMEDIATELY PERFORM NECESSARY REPAIRS, REFILLING OR RESEEDING.

8. PERFORM ANNUAL OBSERVATIONS OF PERIMETER AREAS SURROUNDING THE FACILITY TO ENSURE CHANGES IN LAND USE, TOPOGRAPHY OR ACCESS HAVE NOT OCCURRED AND DO NOT AFFECT THE OPERATION, MAINTENANCE, ACCESS OR SAFETY FEATURES AS PROVIDED. APPROPRIATE ACTION IS REQUIRED TO ENSURE ADEQUACY AND TO PROVIDE A CLEAR, SAFE PASSAGE FOR MAINTENANCE VEHICLES TO THE ENGINEERED EMBANKMENT AND PRINCIPAL FLOW CONTROL STRUCTURES.

9. RECORD KEEPING. THE OWNER OR DESIGNATED REPRESENTATIVE SHALL KEEP REASONABLE, ACCURATE WRITTEN RECORDS OF INSPECTIONS PERFORMED FOR THE STRUCTURE. RECORDS SHALL DOCUMENT ROUTINE MAINTENANCE AND/OR REPAIRS PERFORMED. COPIES SHALL BE PROVIDED TO THE COUNTY UPON REQUEST.

10. THE FACILITY SHALL NOT ACCEPT ADDITIONAL DRAINAGE OR BE MODIFIED IN ANY WAY WITHOUT PRIOR CONSENT OR APPROVAL BY THE ENVIRONMENTAL DIVISION OF JAMES CITY COUNTY.



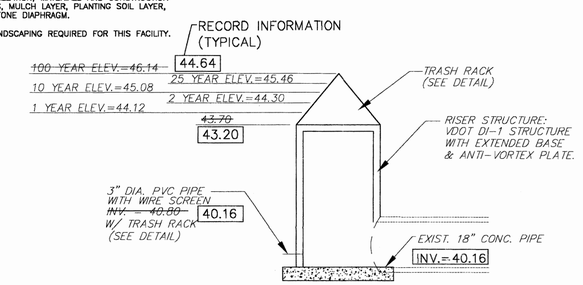
BIORETENTION BASIN SECTIONS

SCALE: NONE

NOTES:

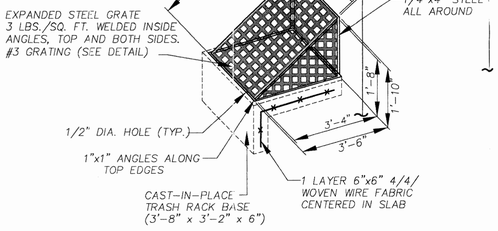
1. CERTIFICATION OF THE PLANTING SOIL LAYER WILL BE REQUIRED IN ACCORDANCE WITH APPENDIX E OF THE COUNTY BMP MANUAL TO FULFILL CONSTRUCTION CERTIFICATION REQUIREMENTS ASSOCIATED WITH THIS BMP FACILITY.
2. INSTALLATION/MATERIALS FOR CONSTRUCTION OF THE BIORETENTION CELL SHALL BE IN ACCORDANCE WITH GROUP D BMP REQUIREMENTS OF THE COUNTY BMP MANUAL, (PAGES 48–50) AND MINIMUM STANDARDS 3.11 (BIORETENTION) AND 3.13 (PAGES 3.13–12 AND 13) OF THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK. THESE REFERENCES SHOULD BE FOLLOWED FOR PROPER INSTALLATION, MATERIALS AND CONSTRUCTION SEQUENCING FOR THE PLANTS, MULCH LAYER, PLANTING SOIL LAYER, THE UNDERDRAIN AND THE STONE DIAPHRAGM.
3. REFER TO SHEET L–1 FOR LANDSCAPING REQUIRED FOR THIS FACILITY.

MC003



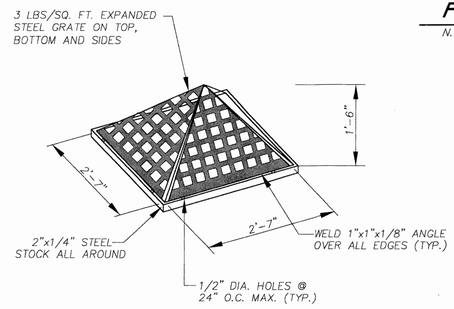
POND OUTFALL STRUCTURE

N.T.S.



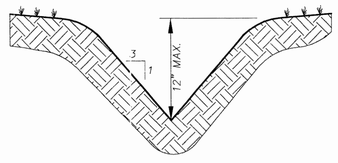
TRASH RACK DETAIL FOR LOW FLOW ORIFACE

N.T.S.



TRASH RACK DETAIL FOR DI–1

N.T.S.



TYPICAL SWALE SECTION

N.T.S.

THESE RECORD DRAWINGS ARE BASED ON AN ACTUAL FIELD SURVEY OF STORMWATER MANAGEMENT FACILITIES PERFORMED BY LANDMARK DESIGN GROUP NOVEMBER, 2007. IMPROVEMENTS SHOWN OTHER THAN STORMWATER MANAGEMENT FACILITIES, WERE TAKEN FROM THE APPROVED SITE PLAN AND WERE NOT FIELD VERIFIED.

COMMONWEALTH OF VIRGINIA
12/4/07
PETER FARRELL
LIC. No. 002036
Peter Farrell
LAND SURVEYOR

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Fax (757) 497–7933
Email: lmdg@landmarkdg.com

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Williamsburg, VA 23188
(757) 229–5648
Fax (757) 229–0049
Email: lmdg@landmarkdg.com

LANDMARK DESIGN GROUP
Engineers • Planners • Surveyors
Landscape Architects • Environmental Scientists

STORM SEWER RECORD DRAWING
GRACE COVENANT PRESBYTERIAN CHURCH
JAMES CITY COUNTY VIRGINIA

Designed: LMDG	Date: 12/04/07
Checked: PF	Scale: AS-NOTED
File Mgr./Drawn: AST	CADD File name: GRACE-STORM.DWG
Project Number: 200793-000.00	Dwg. File No.: 19200W

Drawing Number R-2

2 OF 2

5/23/96
DB 788/1928
PB 64/23

CERTIFICATE OF SOURCE OF TITLE

TITLE TO THE LAND SHOWN HEREON IS VESTED IN VENTURE INVESTMENTS, INC. A VIRGINIA CORPORATION, BY DEED DATED MARCH 31, 1987, RECORDED IN D.B. 335, PAGE 786, ON APRIL 1, 1987 (SEE P.B. 45, PAGE 9) IN THE CLERK'S OFFICE OF THE CIRCUIT COURT OF THE CITY OF WILLIAMSBURG AND COUNTY OF JAMES CITY, VIRGINIA.

OWNER'S CERTIFICATE

THE BOUNDARY LINE ADJUSTMENT AND LOT LINE EXTINGUISHMENT SHOWN ON THIS PLAT IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRE OF THE UNDERSIGNED OWNERS, PROPRIETORS AND OR TRUSTEES.

[signature] 5-7-96
FOR VENTURE INVESTMENT, INC DATE

CERTIFICATE OF NOTARIZATION

STATE OF ~~VIRGINIA~~ TEXAS

~~CITY~~/COUNTY OF HARRIS I ~~DAVID L. TAGGART~~, A NOTARY PUBLIC IN AND FOR THE CITY/COUNTY AND STATE AFORESAID, DO HEREBY CERTIFY THAT THE PERSONS WHOSE NAMES ARE SIGNED TO THE FOREGOING WRITING HAVE ACKNOWLEDGED THE SAME BEFORE ME IN THE CITY/COUNTY AFORESAID GIVEN UNDER MY NAME THIS 7th DAY OF May 19 96. MY COMMISSION EXPIRES Sept 97

Beverly Bienvenu
SIGNATURE

BEVERLY BIENVENU
Notary Public, State of Texas
My Commission Expires
SEPT 8, 1997

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THIS PLAT COMPLIES WITH ALL OF THE REQUIREMENTS OF THE BOARD OF SUPERVISORS AND ORDINANCES OF THE COUNTY OF JAMES CITY, VIRGINIA, REGARDING THE PLATTING OF SUBDIVISIONS WITHIN THE COUNTY.

[signature] 4-29-96
G.T. WILSON, JR., C.L.S. DATE

CLERK'S CERTIFICATE
STATE OF VIRGINIA, COUNTY OF JAMES CITY

IN THE CLERK'S OFFICE OF THE CIRCUIT COURT FOR THE COUNTY OF JAMES CITY THE _____ DAY OF _____ 19__
THIS MAP WAS PRESENTED AND ADMITTED TO THE RECORD AS THE LAW DIRECTS

TESTE: _____, CLERK

PLAT BOOK: _____, PAGE _____

CERTIFICATE OF APPROVAL

THIS BOUNDARY LINE ADJUSTMENT AND LOT LINE EXTINGUISHMENT IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE ADMITTED TO RECORD

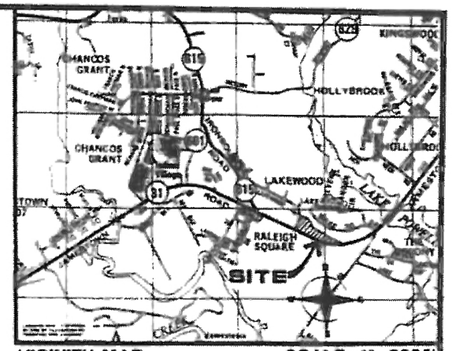
[signature] 5/9/96
VIRGINIA DEPARTMENT OF TRANSPORTATION DATE

[signature] 5/16/96
SUBDIVISION AGENT OF JAMES CITY COUNTY DATE

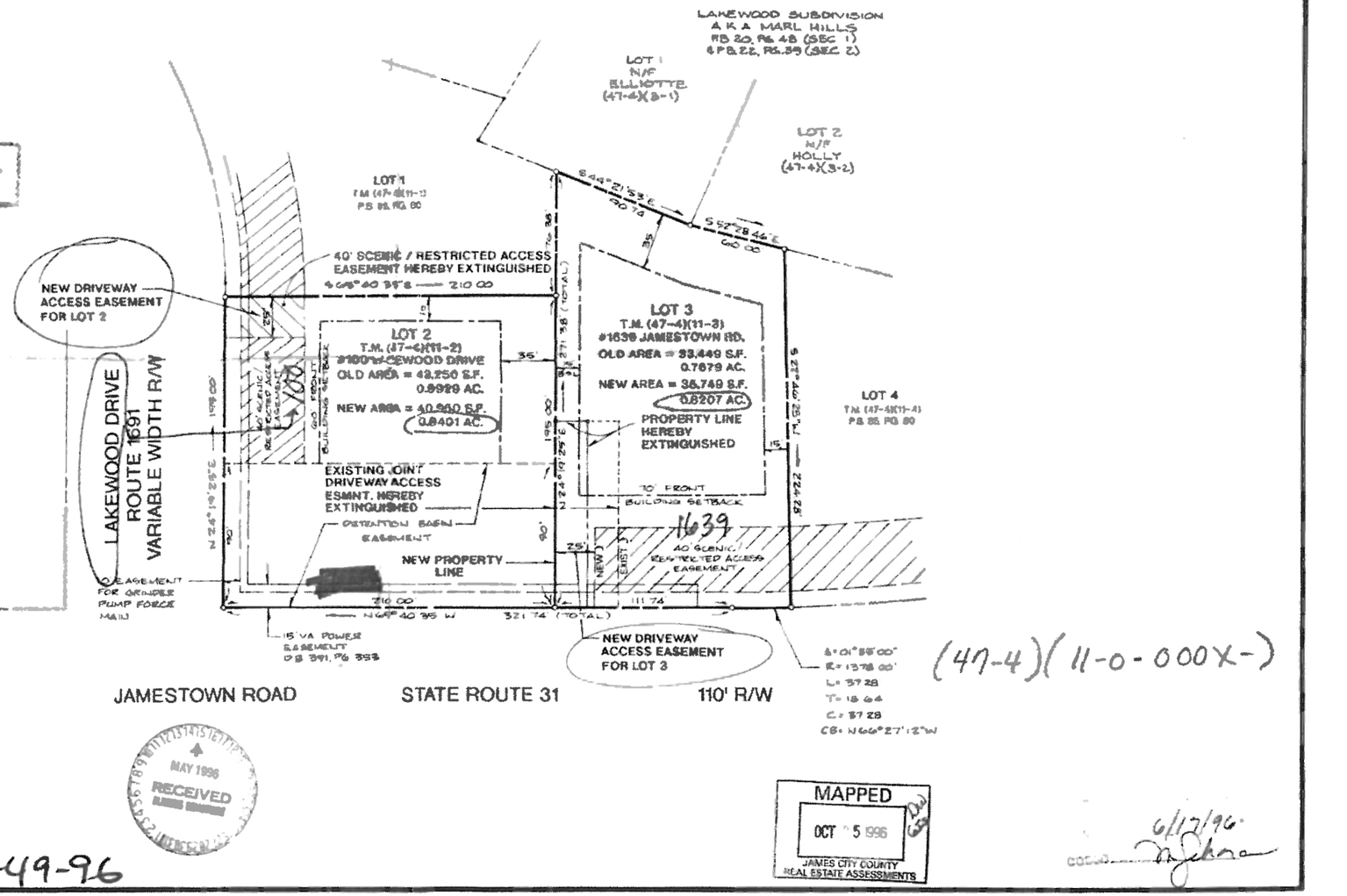
S-49-96

50 0 50
SCALE IN FEET

RECORD MERIDIAN
PLAT BOOK 55, PAGE 60



VICINITY MAP SCALE: 1"=2000'



(47-4)(11-0-000X-)

MAY 1996 RECEIVED

MAPPED
OCT 5 1996
JAMES CITY COUNTY
REAL ESTATE ASSESSMENTS

6/12/96

ES CONSULTING ENGINEERS

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Fax (804) 220-8994

PLAT SHOWING BOUNDARY LINE ADJUSTMENT LOT LINE EXTINGUISHMENT AND DRIVEWAY ACCESS ADJUSTMENT LOTS 2 & 3, SUBDIVISION OF FIVE LOTS ON JAMESTOWN ROAD OWNED BY VENTURES INVESTMENTS, INC.

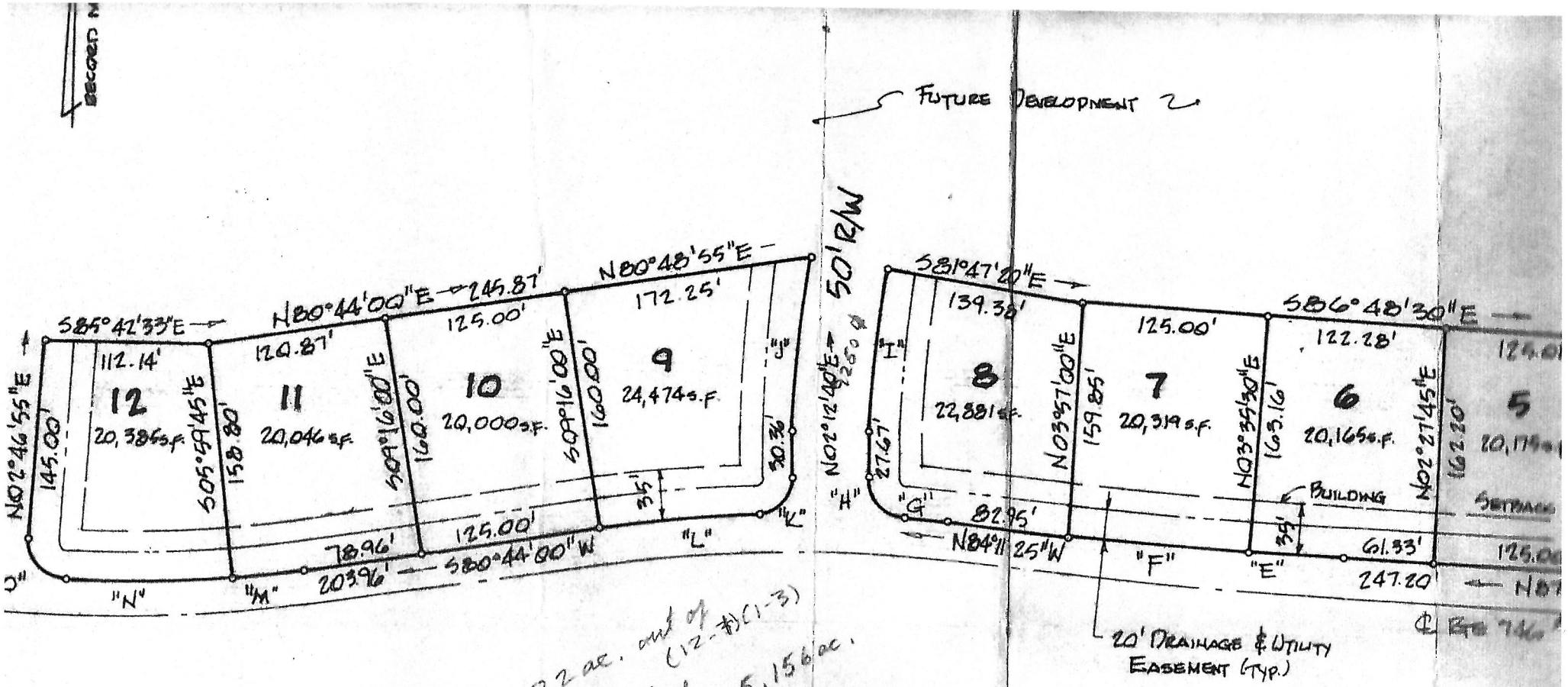
JAMESTOWN DISTRICT JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA
4-29-96
G. T. WILSON, JR.
CERTIFICATE No. 1183
CERTIFIED LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY

Designed CMA	Drawn CMA
Scale 1" = 50'	Date 4/29/96
Project No. 7612-2	
Drawing No. 1 OF 1	

MC003_GCPC_LAKEWOOD_DRIVE_020



22 ac. out of (12-#)(1-3)
12 lots + R/W = 5,156 ac.
Parcel 13 = 16.8990 ac.

- TYPICAL SIDE YARD - 17.5' MINIMUM
  - 35' COMBINED
- TYPICAL REAR YARD - 35' MINIMUM

#6 x 12" Spacer bar (typical)

Support Bar Size (#6 Rebar min.)

Riser Diameter

Riser

Steel or Concrete Base

Outlet

Mortared Joint

Isometric

Riser Connection Detail

SCALE IN FEET

SEDIMENT TRAP #1 (SEE SHEET 4 FOR CALCULATIONS)

DESIGNATED SPOIL PILE LOCATION

DESIGNATED SPOIL PILE LOCATION

NATURAL DRAINAGE TO RAVINE

NATURAL DRAINAGE TO SILT TRAP

GRINDER PUMP (SEE DETAILS)

LAKE DR.

WARE ROAD

B.M. P.K. NAIL & WARE RD. EL. 74.40

B.M. P.K. NAIL EL. 62.83

B.M. P.K. NAIL SET EL. 47.42

20 21 22 23 24 25 26 27 28 29

12 11 10 9 8 7 6 5 4 3 2 1

195 LF 8" @ 0.40%

300' OF 8" PVC @ 0.40%

300' OF 8" PVC @ 0.40%

300' OF 8" PVC @ 0.40%

MH #3
RIM = 75.09
IN/IN = 57.98
IN/OUT = 57.88

MH #4
RIM = 76.39
IN/IN = 59.28
IN/OUT = 59.18

MH #5
RIM = 73.68
IN/IN = 60.58
IN/OUT = 60.48

MH #6
RIM = 68.89
IN/IN = 61.88
IN/OUT = 61.78

@100' INTERVALS IN ROADSIDE DITCHES (TYP)

LIMITS OF CLEARING (TYPICAL)

END PG-2A @ 2+25.10 BOTH SIDES

ZONED R-1

ZONED LB

ZONED R-1

ZONED LB

N 65°40'35" W 100.00'

S 65°40'35" E 100.00'

S 65°40'35" E 100.00'

S 65°40'35" E 100.00'

S 53°13'36" E 130.05'

S 78°07'00" E 130.25'

S 53°2'00" E 140.51'

S 64°58'00" E 119.18'

S 62°48'36" E

S 54°55'36" E 74.61'

S 65°39'28" E 50.00'

S 65°39'19" E 50.00'

S 57°55'55" E

S 62°48'36" E 142.80'

N 65°50'00" W 102.51'

S 66°15'43" W 42.97'

N 65°40'35" W

N 65°40'35" W 100.00'

NOTE: PROVIDE A TEMPORARY DITCH LINER SUCH AS BLACK POLYETHYLENE SHEETS I.L. DITCHES TO BE INSTALLED TO RECEIVE PAVING UNTIL SUCH TIME AS THE PERMANENT LINER IS INSTALLED

5' UTILITY EASEMENT CLEARING RESTRICTED TO 2 BY 4 AND LOWER TREES. NO DRIVEWAYS OR STRUCTURES WILL BE PERMITTED WITHIN EASEMENT

PG-2A CONC "V" DITCH SS=2:1, D=1.0'

PG-2A CONC "V" DITCH SS=2:1, D=1.0'

75' TRAP SHAPED DITCH W=6', D=1.5', SS=1:1, S=1.93%

TRIPLE 108' OF 3'-9"x12" OVAL R.C.P. CL. III @ 0.20% CONTRACTOR SHALL LOCATE CULVERTS AS SHOWN & SHALL TAKE EVERY PRECAUTION TO INSTALL @ GRADE. NOTED CULVERTS SHALL BE SPACED 36" O.C. WITH LONG AXIS PLACED HORIZONTALLY. INV IN = 39.56, IN-OUT = 39.34

105' OF CON. TRAPSHAPED DITCH D=1.5', SS=1:1, S=0.2%

25' TRAPSHAPED CONC PAVED TRANSITION D=1.5', SS=1:1, S=0.2%

INV OUT = 37.63
EXTEND EXISTING 18" CULVERT TO REUSE EXIST. FLARED END SECTION

EMERGENCY SPILLWAY FOR ANY FLOW IN EXCESS OF THE 10 YEAR STORM ELEV = 43.5'

TO LOCAL CREST 300' FROM EXIST CULVERT

DETENTION POND
265' OF PG-1 TYPE D @ 0.2%
TOP OF BERM = 44.00
INV IN = 41.36
INV IN = 40.83
INV OUT = 39.56
INV OUT = 39.25
INV IN = 39.08
INV OUT = 38.98

PROVIDE END CAP & EMERGENCY SPILLWAY CONSTRUCTION ELEVATION = 43.00' SEE DETAIL

CLEARING LIMITS

BORROW PIT

STATE ROUTE 31 110' R/W

STATE ROUTE 31 110' R/W

S.F.

0.36 C

9.18 A

0.52 D

11.75 H

1.25 P

0.81 I

0.20 O

0.35 M

0.11 L

0.30 K

0.15 J

2.54 N

1.3 G

2.1 E

3.21 F

SF CD PS SCC STB ST CRS OB CE TP

AES, a professional corporation
1761 Jamestown Road, Williamsburg, Va. 23185
804-253-0040
Architecture, Engineering, Surveying, Planning

SEWER, DRAINAGE, SEDIMENT & EROSION CONTROL

LAKEWOOD SECTION II

OWNER/DEVELOPER: MECCA DEVELOPMENT CORP.

JAMESTOWN DISTRICT JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA — PAUL C. SMALL — LICENSE NO. 04267 — CERTIFIED PROFESSIONAL ENGINEER

NO.	DATE	REVISION / COMMENT NOTE
1	2-20-86	REVISED PER JCC COMMENTS & ADDED SEDIMENT TRAP

Designed	Drawn
DAR	GSB
Scale	Date
1"=50'	DEC. 1985
Project No.	
6240	
Drawing No.	
5	

MC003_GCPC_LAKEWOOD_DRIVE - 028

S-35-87; MC003

OWNER'S CONSENT & DEDICATION

THIS SUBDIVISION IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE WISHES AND DESIRES OF THE UNDERSIGNED OWNERS AND PROPRIETORS.

FEE TO THE LAND SHOWN HEREON IS VESTED IN VENTURE INVESTMENTS, INC., A VIRGINIA CORPORATION, BY DEED DATED MARCH 31, 1987 AND RECORDED IN DB 336, AT PAGE 796, IN THE CLERK'S OFFICE OF THE CIRCUIT COURT OF JAMES CITY COUNTY, VIRGINIA AND WILLIAMSBURG, AND BY A CORRECTIVE DEED DATED [illegible] AND RECORDED IN DB [illegible], AT PAGE [illegible], IN THE AFORESAID CLERK'S OFFICE.

[illegible]

STATE OF VIRGINIA

[illegible]

NOTARY CERTIFICATE

[illegible]

CERTIFICATE OF APPROVAL

THIS SUBDIVISION KNOWN AS "PLAT OF LAKEWOOD, SECTION II, LOTS 1 THRU LOT 29, PROPERTY OF VENTURE INVESTMENTS, INC., A VIRGINIA CORPORATION" IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE RECORDED.

[illegible] 6/4/87

[illegible]

ENGINEER'S & SURVEYOR'S STATEMENT

[illegible]

0 100 0
SCALE IN FEET

LOCATION MAP 1" = 2000'

SITE

N

S 38°57'25" E 71.74'

ROMEO L. HOMESTEAD
105 sq. ft.

N/F GEORGE JR & ELLEN D MOURELEDES

LAKEWOOD DRIVE 50' R/W

LAKEWOOD SEC. II LOT 30 (DB 40, PG 56)

N/F OLAN D & HELLVIA H PARR

ROUNDUP ROAD 672.45' 150' R/W

PARCEL II
VENTURE INVESTMENTS INC
12.883 AC±
DB 336, PG 79

PARCEL II
VENTURE INVESTMENTS INC.
DB 336, PG 796

ROUNDUP ROAD EASEMENT

AREA TABULATION

	LOTS	PARCEL A	TOTAL
SQ.FT.	533,472	91,524	624,996
ACRES	12.247	2.101	14.348

TOTAL AREA TRANSFERRED 624,996 14.348

GENERAL NOTES:

1. SITE IS A PORTION OF TAX PARCEL [illegible]
2. SITE IS ZONED R-1, LIMITED RESIDENTIAL
3. THIS IS A SUBDIVISION OF PARCEL [illegible] AS SHOWN ON A PLAT ENTITLED "PLAT OF PARCELS I, II & III [illegible] PROPERTY OF VENTURE INVESTMENTS CORPORATION", BY AES, A [illegible] CORPORATION, DATED JANUARY 1987, (D.B. 35, PG. 8).

JAMESTOWN ROAD SR 31 110' R/W

[illegible]

AES, a professional corporation

1761 Jamestown Road, Williamsburg, Va. 23185

804-253-0040

Engineering, Planning, Surveying

PLAT OF
LAKEWOOD SECTION II
LOT 1 thru LOT 29

OWNER/DEVELOPER:
VENTURE INVESTMENTS, INC.
A VIRGINIA CORPORATION

JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA
PAUL C. DAVIS
No. 1247

No.	DATE	REVISION / COMMENT / NOTE	BY
		[illegible] PER JCC COMMENTS DATED [illegible]	

S-35-87

Designed SOW	Drawn C.A.N.
Scale 1" = 100'	Date 6/2/1987
Project No. 6240	
Drawing No. PLAT	

20 SCALE 0 10 20 30 40 50 60 70 80 90 100 110 120

25 SCALE 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

30 SCALE 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180

40 SCALE 0 20 40 60 80 100 120 140 160 180 200 220 240

50 SCALE 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

100 SCALE 0 100 200 300 400 500 600

MC003_GCPC_LAKEWOOD_DRIVE - 029

CERTIFICATE OF SOURCE OF TITLE

TITLE TO THE LAND SHOWN HEREON IS VESTED IN VENTURE INTERNATIONAL INVESTMENTS, INC., BY DEED DATED DECEMBER 1, 1993 RECORDED IN D.B. 662, PAGE 636, ON JANUARY 4, 1994 IN THE CLERK'S OFFICE OF THE CIRCUIT COURT OF THE CITY OF WILLIAMSBURG AND COUNTY OF JAMES CITY, VIRGINIA.

OWNER'S CERTIFICATE

THE BOUNDARY LINE ADJUSTMENT AND LOT LINE EXTINGUISHMENT SHOWN ON THIS PLAT IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRE OF THE UNDERSIGNED OWNERS, PROPRIETORS AND OR TRUSTEES.

VENTURE INTERNATIONAL INVESTMENT, INC. DATE

CERTIFICATE OF NOTARIZATION

STATE OF TEXAS

CITY/COUNTY OF _____ I _____ A NOTARY PUBLIC IN AND FOR THE CITY/COUNTY AND STATE AFORESAID, DO HEREBY CERTIFY THAT THE PERSONS WHOSE NAMES ARE SIGNED TO THE FOREGOING WRITING HAVE ACKNOWLEDGED THE SAME BEFORE ME IN THE CITY/COUNTY AFORESAID. GIVEN UNDER MY NAME THIS ____ DAY OF _____, 19____. MY COMMISSION EXPIRES _____.

SIGNATURE

STEWART NOTARY PUBLIC STATE OF TEXAS My Comm. Exp. 3-99

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS PLAT COMPLIES WITH ALL OF THE REQUIREMENTS OF THE BOARD OF SUPERVISORS AND ORDINANCES OF THE COUNTY OF JAMES CITY, VIRGINIA, REGARDING THE PLATTING OF SUBDIVISIONS WITHIN THE COUNTY.

RONALD W. EADS, L.S. 6-25-96 DATE

CLERK'S CERTIFICATE
STATE OF VIRGINIA, COUNTY OF JAMES CITY

IN THE CLERK'S OFFICE OF THE CIRCUIT COURT FOR THE COUNTY OF JAMES CITY THE 19th DAY OF Oct, 1996 THIS MAP WAS PRESENTED AND ADMITTED TO THE RECORD AS THE LAW DIRECTS.

TESTE: _____, CLERK

PLAT BOOK: 64, PAGE: 70

CERTIFICATE OF APPROVAL

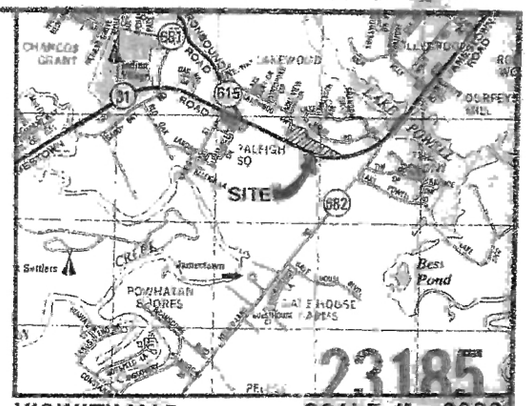
THIS BOUNDARY LINE ADJUSTMENT AND LOT LINE EXTINGUISHMENT IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE ADMITTED TO RECORD

for Mgr. 7/18/96
VIRGINIA DEPARTMENT OF TRANSPORTATION DATE

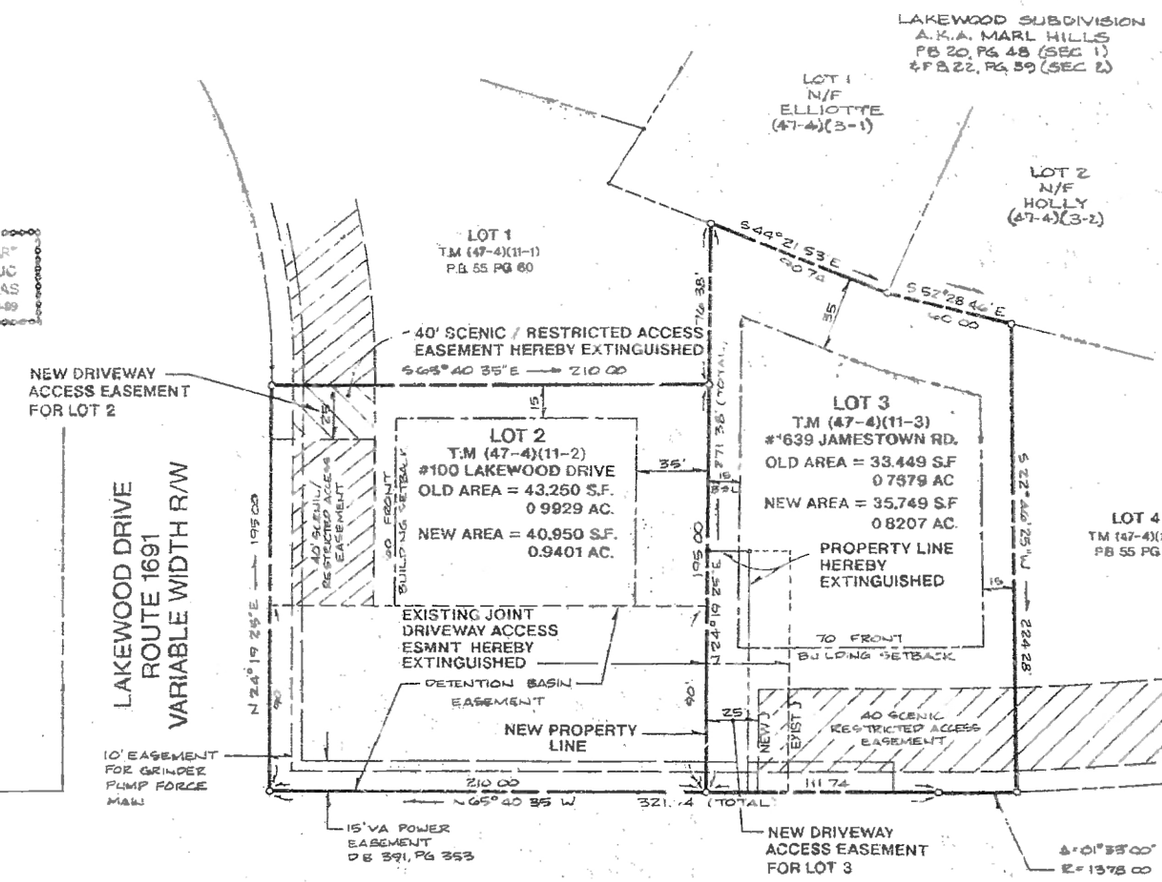
SUBDIVISION AGENT OF JAMES CITY COUNTY 7/18/96 DATE

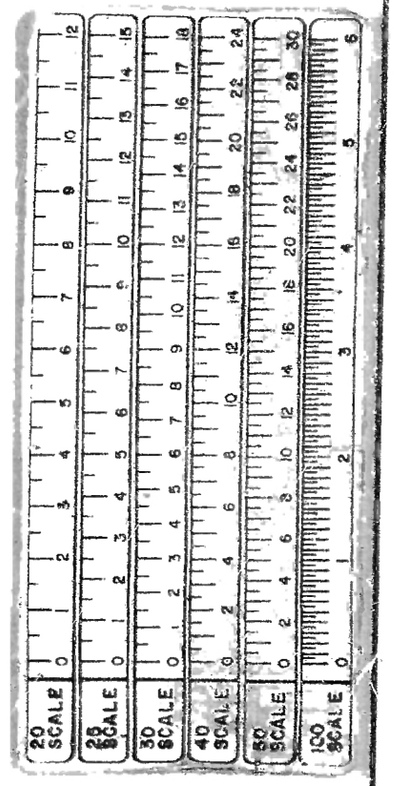
50 0 50
SCALE IN FEET

RECORD MERIDIAN N PLAT BOOK 55, PAGE 60



VICINITY MAP SCALE: 1" = 2000





NOTE:
THE PURPOSE OF THIS PLAT OF CORRECTION IS TO REVISE THE CORRECT NAME OF OWNERSHIP AND SOURCE OF TITLE FROM A PLAT PREVIOUSLY RECORDED IN PLAT BOOK 64, PAGE 23. THERE HAVE BEEN NO OTHER REVISIONS TO THE BOUNDARIES OR TO THE BODY OF SAID PLAT.

PLAT RECORDED IN 64 70

ES CONSULTING ENGINEERS
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(804) 253-0040
Fax (804) 220-8994

MC003_GCPG_LAKEWOOD_DRIVES 030

PLAT OF CORRECTION
PLAT SHOWING BOUNDARY LINE ADJUSTMENT
LOT LINE EXTINGUISHMENT AND
DRIVEWAY ACCESS ADJUSTMENT
LOTS 2 & 3, SUBDIVISION OF FIVE LOTS ON
JAMESTOWN ROAD
OWNED BY
VENTURE INTERNATIONAL INVESTMENTS, INC.
JAMESTOWN DISTRICT JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA
6-25-96
RONALD W. EADS
No. 1948
LAND SURVEYOR

Recorded 2:17 PM 19 Oct 1996
Teste: _____ Clerk

No	DATE	REVISION / COMMENT / NOTE	BY
1	6/25/96	PLAT OF CORRECTION	RWE

Designed CMA	Drawn CMA
Scale 1" = 50	Date 4/29/96
Project No. 7612 - 2	
Drawing No. 1 OF 1	

"A-1" CONSENT AND DEDICATION

THIS SUBDIVISION IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DUTIES AND DESIRES OF THE UNDERSIGNED OWNERS AND PROPRIETORS.

RONALD L. HUNSARLING, PRESIDENT
VENTURE INVESTMENTS INC. — DATE

STATE OF VIRGINIA

I, _____, A NOTARY PUBLIC, DO CERTIFY THAT THE PERSON WHOSE NAME IS SIGNED TO THE FOREGOING WRITING HAVE ACKNOWLEDGED THE SAME BEFORE ME IN MY CITY AND STATE AFORESAID.

GIVEN UNDER MY HAND THIS ____ DAY OF _____, 19__.

MY COMMISSION EXPIRES _____ BY: _____

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL OF THE REQUIREMENTS OF THE BOARD OF SUPERVISORS AND ORDINANCES OF THE COUNTY OF JAMES CITY, VIRGINIA, REGARDING THE PLATTING OF SUBDIVISIONS WITHIN THE COUNTY HAVE BEEN COMPLIED WITH.

GIVEN UNDER MY HAND THIS 15th DAY OF May, 1991.

BY: _____ LS #1652

CLERK'S CERTIFICATE
STATE OF VIRGINIA, COUNTY OF JAMES CITY

IN THE CLERK'S OFFICE OF THE CIRCUIT COURT FOR THE COUNTY OF JAMES CITY THE 31st DAY OF March, 1992, THIS MAP WAS PRESENTED AND ADMITTED TO THE RECORD AS THE LAW DIRECTS.

TESTE: Helen S. Reed, CLERK.

PLAT BOOK: 55, PAGE: 60

CERTIFICATE OF APPROVAL

THIS SUBDIVISION, KNOWN AS FIVE LOTS ON JAMESTOWN ROAD IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE COMMITTED TO RECORD.

DATE Jan. 23, 19 92 — Carl E. Hilbert — HIGHWAY ENGINEER

DATE Mar. 13, 1992 — _____ — HEALTH OFFICER

DATE 3/31/92 — _____ — AGENT OF GOVERNING BODY

SOURCE OF TITLE

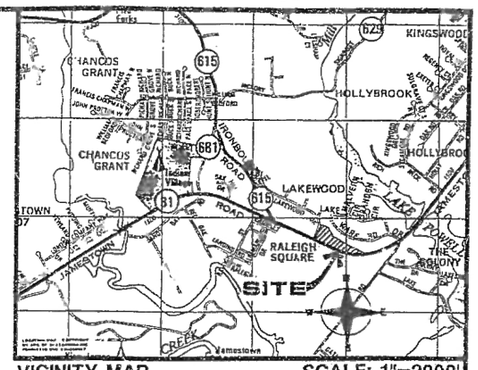
TITLE TO THE LAND SHOWN HEREON IS VESTED IN VENTURE INVESTMENTS, INC., A VIRGINIA CORPORATION, BY DEED DATED MARCH 31, 1987, RECORDED IN DB 336, AT PAGE 796 ON APRIL 1, 1987 (SEE PB 45, PAGE 9) IN THE CLERK'S OFFICE OF THE CIRCUIT COURT OF THE CITY OF WILLIAMSBURG AND COUNTY OF JAMES CITY, VIRGINIA.

AREA TABULATION

LOT NO.	S.F.	ACRES	% OF TOTAL
1	29,008	0.6659	16%
2	43,250	0.9929	23%
3	33,449	0.7679	18%
4	30,918	0.7098	17%
5	49,848	1.1444	26%
TOTAL	186,473	4.2809	100%

60 0 60
SCALE IN FEET

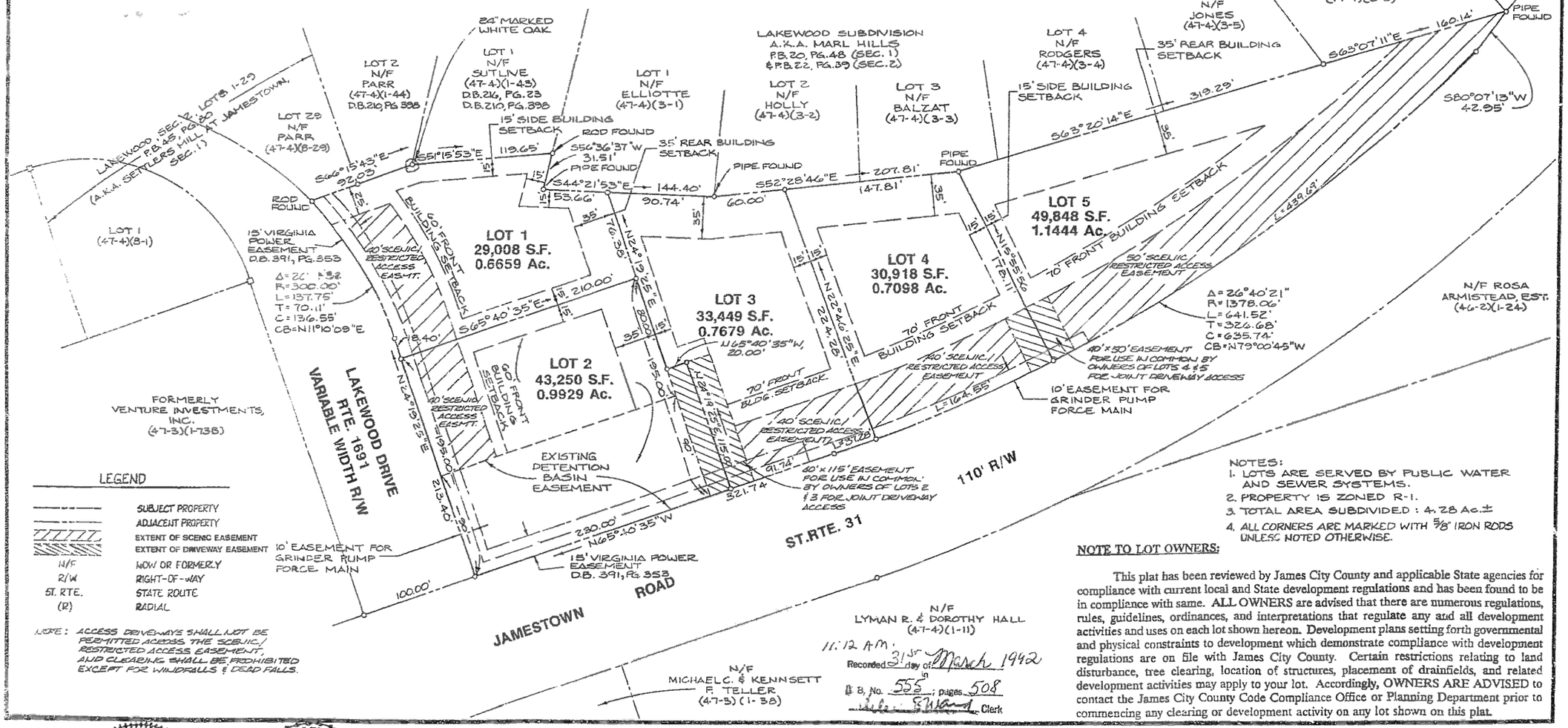
RECORD MERIDIAN PB.45 PG.9



VICINITY MAP SCALE: 1"=2000'

NOTE TO LOT OWNER(S):

LOT OWNERS ARE HEREBY ADVISED TO OBTAIN AND REVIEW THE DEVELOPMENT PLAN (SHEETS 1, 2 & 3 OF 3) DATED MAY 15, 1991 FOR THIS SUBDIVISION. SPECIFIC CONDITIONS, RESTRICTIONS AND REQUIREMENTS WHICH EFFECT THE USE OF EACH LOT ARE RECITED THEREON.



LEGEND

———	SUBJECT PROPERTY
———	ADJACENT PROPERTY
	EXTENT OF SCENIC EASEMENT
	EXTENT OF DRIVEWAY EASEMENT
N/F	NOW OR FORMERLY
R/W	RIGHT-OF-WAY
ST. RTE.	STATE ROUTE
(R)	RADIAL

NOTE: ACCESS DRIVEWAYS SHALL NOT BE PERMITTED ACROSS THE SCENIC/ RESTRICTED ACCESS EASEMENT. AND CLEARING SHALL BE PROHIBITED EXCEPT FOR WINDFALLS & DEAD FALLS.

NOTES:
1. LOTS ARE SERVED BY PUBLIC WATER AND SEWER SYSTEMS.
2. PROPERTY IS ZONED R-1.
3. TOTAL AREA SUBDIVIDED : 4.28 Ac.±
4. ALL CORNERS ARE MARKED WITH 5/8" IRON RODS UNLESS NOTED OTHERWISE.

NOTE TO LOT OWNERS:

This plat has been reviewed by James City County and applicable State agencies for compliance with current local and State development regulations and has been found to be in compliance with same. ALL OWNERS are advised that there are numerous regulations, rules, guidelines, ordinances, and interpretations that regulate any and all development activities and uses on each lot shown hereon. Development plans setting forth governmental and physical constraints to development which demonstrate compliance with development regulations are on file with James City County. Certain restrictions relating to land disturbance, tree clearing, location of structures, placement of drainfields, and related development activities may apply to your lot. Accordingly, OWNERS ARE ADVISED to contact the James City County Code Compliance Office or Planning Department prior to commencing any clearing or development activity on any lot shown on this plat.

11:12 AM
Recorded 31st day of March 1992
in P.B. No. 55, pages 58
Teste: Helen S. Reed, Clerk

COMMONWEALTH OF VIRGINIA — DON A. RAINEY — No. 1652 — LAND SURVEYOR — 4/15/91

COMMONWEALTH OF VIRGINIA — DON A. RAINEY — No. 016210 — PROFESSIONAL ENGINEER — 4/15/91

Prepared by: RAINEY ENGINEERING Christiansburg, Virginia

PLAT OF FIVE LOTS ON JAMESTOWN ROAD OWNED BY: VENTURE INVESTMENTS, INC.

JAMES CITY COUNTY, VIRGINIA

No.	DATE	REVISION / COMMENT / NOTE	BY

Designed DAR	Drawn EAW/DB
Scale 1"=60'	Date MAY 15, 1991
Project No. 90141	
Drawing No. PLAT	

FILE #7612

LOGAN SYSTEMS

MC003_GCPC_LAKEWOOD_DRIVE - 031

7/10/87 352-122 1645-80

OWNER'S CONSENT & DEDICATION

THIS SUBDIVISION IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE WISHES AND DESIRES OF THE UNDERSIGNED OWNERS AND PROPRIETORS.

TITLE TO THE LAND SHOWN HEREON IS VESTED IN VENTURE INVESTMENTS, INC. A VIRGINIA CORPORATION BY DEED DATED MARCH 31ST, 1987, RECORDED IN DB 336, AT PAGE 796 ON APRIL 1, 1987 (DEB PB 45, PAGE 9) IN THE CLERK'S OFFICE OF THE CIRCUIT COURT OF THE CITY OF WILLIAMSBURG AND COUNTY OF JAMES CITY, VIRGINIA.

BY _____
STEPHEN K. RISDEN, CHIEF EXECUTIVE OFFICER

STATE OF VIRGINIA

I, _____, A NOTARY PUBLIC DO CERTIFY THAT THE PERSONS WHOSE NAMES ARE SIGNED TO THE FOREGOING WRITING HAVE ACKNOWLEDGED THE SAME BEFORE ME IN MY CITY AND STATE AFORESAID.

GIVEN UNDER MY HAND THIS ____ DAY OF _____, 1987.

MY COMMISSION EXPIRES _____

CLERK'S CERTIFICATE
STATE OF VIRGINIA, COUNTY OF JAMES CITY

IN THE CLERK'S OFFICE OF THE CIRCUIT COURT FOR THE COUNTY OF JAMES CITY THE ____ DAY OF _____, 19__, THIS MAP WAS PRESENTED AND ADMITTED TO THE RECORD AS THE LAW DIRECTS.

TESTE: _____, CLERK.

PLAT BOOK: ____, PAGE: ____.

CERTIFICATE OF APPROVAL

THIS SUBDIVISION KNOWN AS: PLAT OF LAKEWOOD, SECTION II, LOT 1 THRU LOT 29, PROPERTY OF VENTURE INVESTMENTS, INC. A VIRGINIA CORPORATION IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE COMMITTED TO RECORD.

DATE 6/19/87 _____ HIGHWAY DEPARTMENT

DATE 6/4/87 _____ HEALTH OFFICER

DATE 7/8/87 _____ AGENT OF GOVERNING BODY

ENGINEER'S & SURVEYOR'S STATEMENT

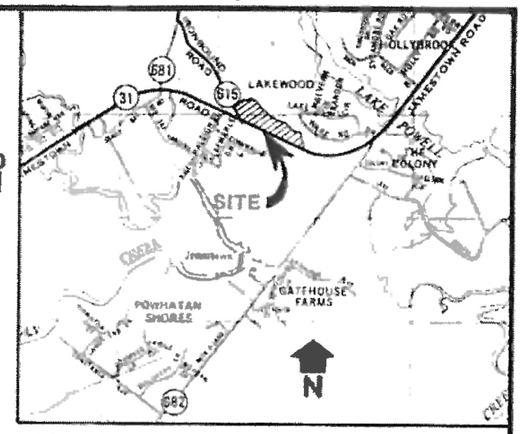
I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL OF THE REQUIREMENTS OF THE BOARD OF SUPERVISORS AND ORDINANCES OF THE COUNTY OF JAMES CITY, VIRGINIA, REGARDING THE PLATTING OF SUBDIVISIONS WITHIN THE COUNTY HAVE BEEN COMPLIED WITH.

GIVEN UNDER MY HAND THIS 3rd DAY OF June, 1987.

BY: _____
PAUL C. SMALL, P.E., L.L.S.

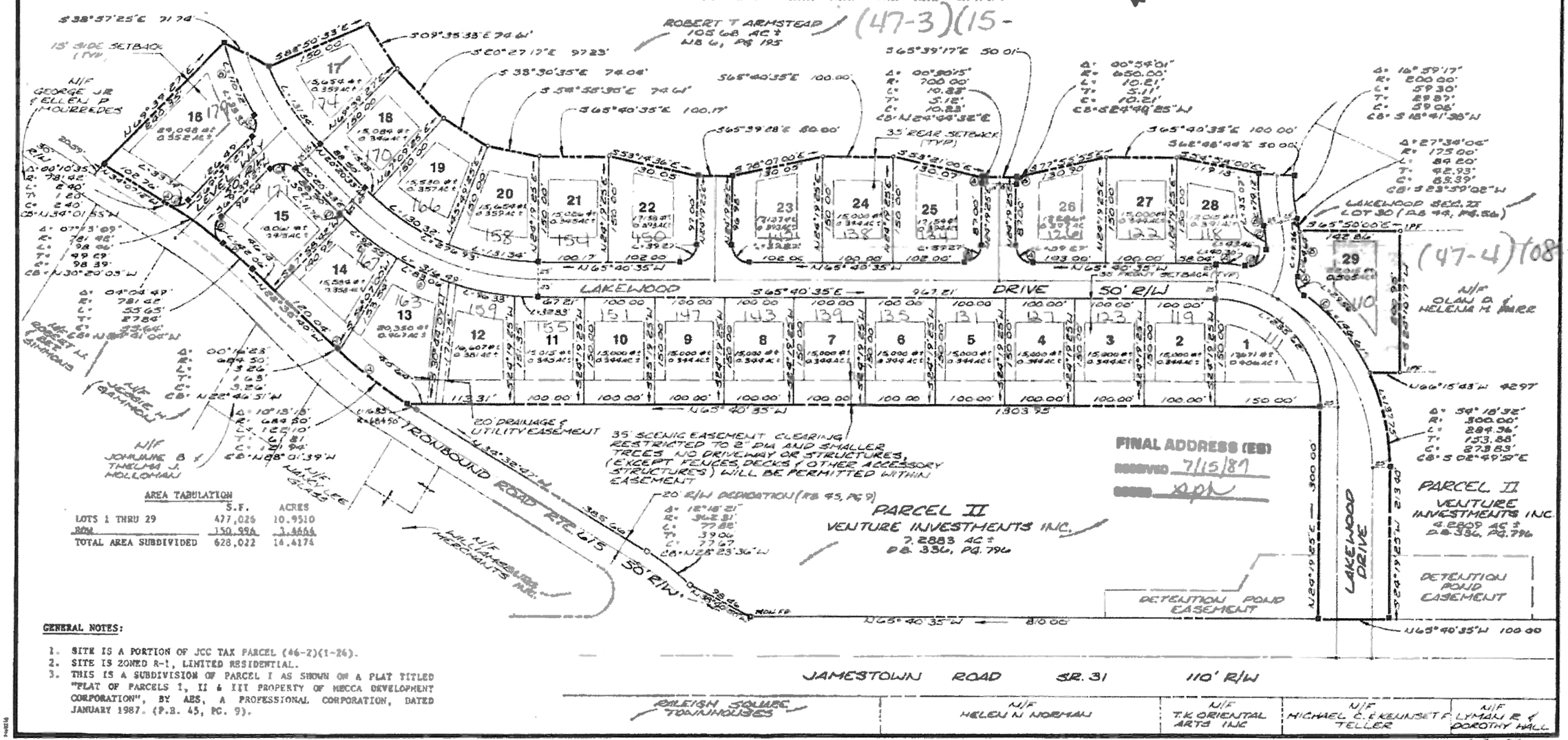
LOT CURVE TABLE

LOT NO.	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING
1	90°00'00"	150.00'	235.62'	150.00'	212.13'	S70°30'35"E
11	04°42'00"	400.00'	32.83'	16.42'	32.82'	S63°09'35"E
12	13°47'32"	400.00'	96.33'	48.40'	96.10'	S54°24'21"E
13A	19°11'18"	454.50'	152.20'	61.21'	121.94'	N25°01'39"W
13B	11°53'31"	400.00'	83.06'	41.66'	82.91'	N41°13'46"E
14A	80°26'23"	484.50'	3.86'	1.63'	3.26'	N22°46'51"W
14B	13°15'36"	400.00'	92.59'	46.48'	92.35'	S25°39'01"E
15A	04°06'49"	781.62'	56.65'	28.84'	56.64'	N24°41'44"W
15B	56°22'16"	25.00'	42.00'	22.99'	37.27'	N21°32'56"E
15C	90°00'00"	25.00'	39.27'	25.00'	35.36'	S65°50'33"E
15D	81°40'45"	405.00'	81.72'	5.86'	11.72'	S25°10'56"E
16A	00°10'23"	781.62'	2.40'	1.20'	2.40'	N24°01'55"W
16B	15°46'36"	400.00'	110.12'	55.41'	109.78'	S21°06'12"W
16C	76°23'36"	25.00'	33.33'	19.62'	30.92'	S31°27'43"W
16D	76°23'36"	25.00'	33.34'	19.62'	30.93'	N72°08'37"W
17	21°30'09"	350.00'	131.34'	66.45'	130.57'	N89°35'33"W
18	82°30'02"	350.00'	15.38'	7.84'	15.27'	N21°33'34"W
19	21°28'08"	350.00'	130.21'	65.72'	129.47'	N33°30'38"W
20	21°30'09"	350.00'	131.34'	66.45'	130.57'	N54°55'32"W
21	90°00'00"	25.00'	39.27'	25.00'	35.36'	S69°09'25"W
22	90°00'00"	25.00'	39.27'	25.00'	35.36'	N20°50'35"W
23A	68°38'15"	700.00'	19.23'	5.13'	10.23'	S34°44'32"W
23B	90°00'00"	25.00'	39.27'	25.00'	35.36'	S69°19'25"W
24A	90°00'00"	25.00'	39.27'	25.00'	35.36'	N20°40'35"W
24B	68°38'15"	650.00'	10.31'	5.11'	10.21'	S24°44'25"E
25A	11°32'44"	350.00'	70.52'	35.35'	70.39'	S59°54'13"W
25B	16°39'17"	250.00'	74.13'	37.30'	73.83'	S18°41'38"W
25C	16°34'31"	125.00'	35.87'	17.65'	34.98'	S18°14'11"W
25D	99°35'39"	25.00'	43.46'	29.36'	38.19'	S76°04'19"W
29A	69°45'10"	25.00'	30.56'	16.78'	28.87'	N01°53'28"E
29B	21°00'46"	175.00'	64.84'	32.69'	64.37'	N27°11'10"E
29C	22°00'00"	300.00'	146.61'	74.00'	145.15'	N63°59'07"W



LOCATION MAP 1" = 2000'

0 100 0
SCALE IN FEET



AREA TABULATION

	S.F.	ACRES
LOTS 1 THRU 29	477,026	10.9510
ROW	150,996	3.4664
TOTAL AREA SUBDIVIDED	628,022	14.4174

GENERAL NOTES:

1. SITE IS A PORTION OF JCC TAX PARCEL (46-2)(1-26).
2. SITE IS ZONED R-1, LIMITED RESIDENTIAL.
3. THIS IS A SUBDIVISION OF PARCEL I AS SHOWN ON A PLAT TITLED "PLAT OF PARCELS I, II & III PROPERTY OF MECCA DEVELOPMENT CORPORATION", BY AES, A PROFESSIONAL CORPORATION, DATED JANUARY 1987. (P.B. 45, PG. 9).

AES, a professional corporation
1761 Jamestown Road, Williamsburg, Va. 23185
804-253-0040
Engineering, Planning, Surveying

PLAT OF LAKEWOOD SECTION II
LOT 1 thru LOT 29

OWNER/DEVELOPER:
VENTURE INVESTMENTS, INC.
A VIRGINIA CORPORATION

JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA
PAUL C. SMALL
No. 1247
LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY
1	7/10/87	REVISED PER JCC COMMENTS REC'D 7/8/87	SDW

Designed SDW	Drawn C.A.H.
Scale 1" = 100'	Date 6/2/1987
Project No. 6240	
Drawing No. PLAT	

5-35-87

MC003_GCPC_LAKEWOOD_DRIVE - 032

Recorded 3/3/92 DB 555/508 PB 55/60

OWNER'S CONSENT AND DEDICATION

THIS SUBDIVISION IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE WISHES AND DESIRES OF THE UNDERSIGNED OWNERS AND PROPRIETORS.

BY: ______________________ ______
RONALD L. HENSARLING, PRESIDENT DATE
VENTURE INVESTMENTS INC.

STATE OF VIRGINIA

I, ______________, A NOTARY PUBLIC, DO CERTIFY THAT THE PERSON WHOSE NAME IS SIGNED TO THE FOREGOING WRITING HAVE ACKNOWLEDGED THE SAME BEFORE ME IN MY CITY AND STATE AFORESAID.

GIVEN UNDER MY HAND THIS ___ DAY OF __________, 19__.

MY COMMISSION EXPIRES __________ BY: __________

SURVEYOR'S STATEMENT

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL OF THE REQUIREMENTS OF THE BOARD OF SUPERVISORS AND ORDINANCES OF THE COUNTY OF JAMES CITY, VIRGINIA, REGARDING THE PLATTING OF SUBDIVISIONS WITHIN THE COUNTY HAVE BEEN COMPLIED WITH.

GIVEN UNDER MY HAND THIS 15th DAY OF May, 1991.

BY: __________ LS#1652

CLERK'S CERTIFICATE
STATE OF VIRGINIA, COUNTY OF JAMES CITY

IN THE CLERK'S OFFICE OF THE CIRCUIT COURT FOR THE COUNTY OF JAMES CITY THE ______ DAY OF ____________, 19__, THIS MAP WAS PRESENTED AND ADMITTED TO THE RECORD AS THE LAW DIRECTS.

TESTE: ______________________, CLERK.

PLAT BOOK: ______, PAGE: ______

CERTIFICATE OF APPROVAL

THIS SUBDIVISION, KNOWN AS FIVE LOTS ON JAMESTOWN ROAD IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE COMMITTED TO RECORD.

DATE ______ ______ HIGHWAY ENGINEER

DATE ______ ______ HEALTH OFFICER

DATE 3/2/92 ______ AGENT OF GOVERNING BODY

SOURCE OF TITLE

TITLE TO THE LAND SHOWN HEREON IS VESTED IN VENTURE INVESTMENTS, INC., A VIRGINIA CORPORATION, BY DEED DATED MARCH 31, 1987, RECORDED IN DB 336, AT PAGE 796 ON APRIL 1, 1987 (SEE PB 48, PAGE 9) IN THE CLERK'S OFFICE OF THE CIRCUIT COURT OF THE CITY OF WILLIAMSBURG AND COUNTY OF JAMES CITY, VIRGINIA.

AREA TABULATION

LOT NO.	S.F.	ACRES	% OF TOTAL
1	29,008	0.6659	16%
2	43,250	0.9929	23%
3	33,449	0.7679	18%
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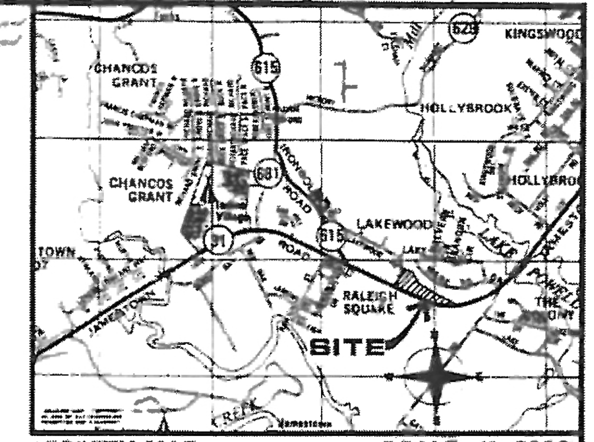
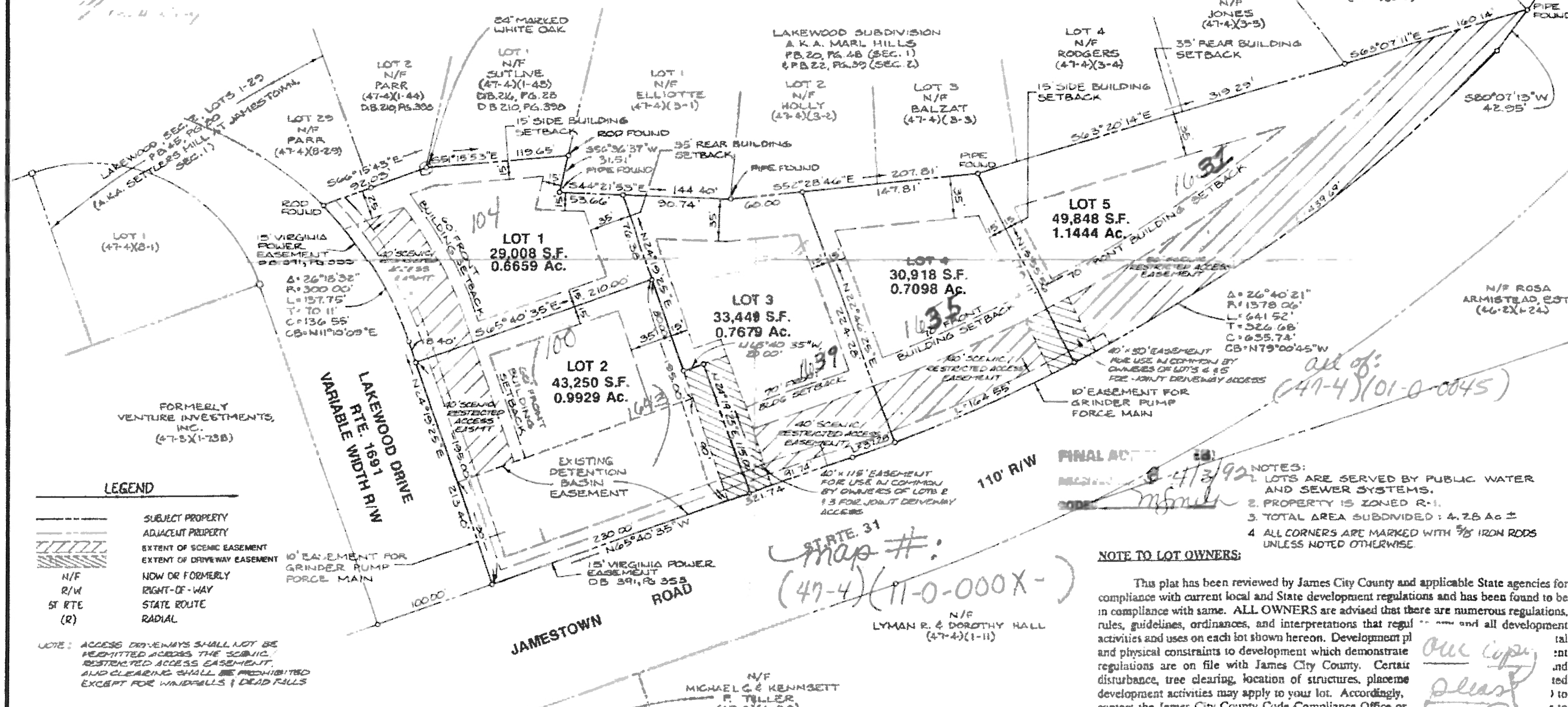
TOTAL	186,473	4.2809	100%



VICINITY MAP SCALE: 1"=2000'

NOTE TO LOT OWNER(S):

LOT OWNERS ARE HEREBY ADVISED TO OBTAIN AND REVIEW THE DEVELOPMENT PLAN (SHEETS 1, 2 & 3 OF 3) DATED MAY 15, 1991 FOR THIS SUBDIVISION. SPECIFIC CONDITIONS, RESTRICTIONS AND REQUIREMENTS WHICH EFFECT THE USE OF EACH LOT ARE RECITED THEREON.



NOTE TO LOT OWNERS:

This plat has been reviewed by James City County and applicable State agencies for compliance with current local and State development regulations and has been found to be in compliance with same. ALL OWNERS are advised that there are numerous regulations, rules, guidelines, ordinances, and interpretations that regul... and all development activities and uses on each lot shown hereon. Development pl... and physical constraints to development which demonstrate... regulations are on file with James City County. Certai... disturbance, tree clearing, location of structures, placeme... development activities may apply to your lot. Accordingly, contact the James City County Code Compliance Office or ... commencing any clearing or development activity on any l...

S-37-91

COMMONWEALTH OF VIRGINIA DON A. RAINEY No. 1652 LAND SURVEYOR

COMMONWEALTH OF VIRGINIA DON A. RAINEY No. 016210 PROFESSIONAL ENGINEER

PLAT OF FIVE LOTS ON JAMESTOWN ROAD
OWNED BY: VENTURE INVESTMENTS, INC.
JAMES CITY COUNTY VIRGINIA

No.	DATE	REVISION / COMMENT / NOTE	BY

Designed	Drawn
DAR	EAW DB
Scale 1"=60'	Date MAY 15, 1991
Project No. 90141	
Drawing No. PLAT	

OWNER'S CONSENT & DEDICATION

THIS SUBDIVISION IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE WISHES AND DESIRES OF THE UNDERSIGNED OWNERS AND PROPRIETORS.

TITLE TO THE LAND SHOWN HEREON IS VESTED IN MECCA DEVELOPMENT CORPORATION BY DEED DATED APRIL 9TH, 1986, RECORDED IN DB 301, AT PAGE 35 ON MAY 2, 1986 (SEE PB 42, PAGE 54.)

BY _____, PRESIDENT

STATE OF VIRGINIA

I, Dennis Hare, A NOTARY PUBLIC DO CERTIFY THAT THE PERSONS WHOSE NAMES ARE SIGNED TO THE FOREGOING WRITING HAVE ACKNOWLEDGED THE SAME BEFORE ME IN MY CITY AND STATE AFORESAID.

GIVEN UNDER MY HAND THIS 25th DAY OF March, 1987.

MY COMMISSION EXPIRES 3/17/88 _____.

CLERK'S CERTIFICATE
STATE OF VIRGINIA, COUNTY OF JAMES CITY

IN THE CLERK'S OFFICE OF THE CIRCUIT COURT FOR THE COUNTY OF JAMES CITY THE 1st DAY OF April, 1987, THIS MAP WAS PRESENTED AND ADMITTED TO THE RECORD AS THE LAW DIRECTS.

TESTE: _____, CLERK.

PLAT BOOK: 45, PAGE: 9.

CERTIFICATE OF APPROVAL

THIS SUBDIVISION KNOWN AS: PLAT OF PARCELS I, II, AND III ON PROPERTY OF MECCA DEVELOPMENT CORPORATION IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE COMMITTED TO RECORD.

DATE 2-20-87 _____ HIGHWAY DEPARTMENT

DATE 2-20-87 _____ HEALTH OFFICER

DATE 3/25/87 _____ AGENT OF GOVERNING BODY

ENGINEER'S & SURVEYOR'S STATEMENT

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL OF THE REQUIREMENTS OF THE BOARD OF SUPERVISORS AND ORDINANCES OF THE COUNTY OF JAMES CITY, VIRGINIA, REGARDING THE PLATTING OF SUBDIVISIONS WITHIN THE COUNTY HAVE BEEN COMPLIED WITH.

GIVEN UNDER MY HAND THIS 20th DAY OF February, 1987.

BY: _____
PAUL C. SMALL, P.E., C.L.S.

GENERAL NOTES:

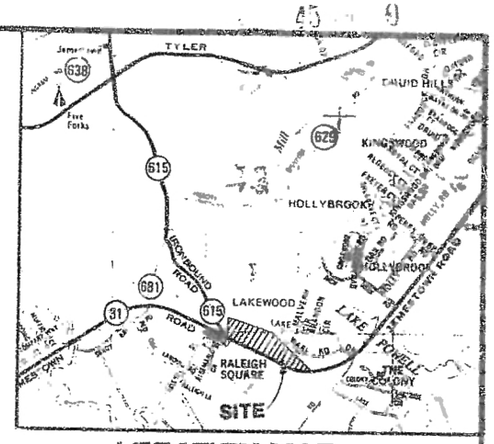
1. SITE IS A PORTION OF JCC TAX PARCEL (46-2)(1-24).
2. THIS IS A SUBDIVISION OF A PORTION OF THE PROPERTY CONVEYED TO MECCA DEVELOPMENT CORP. AS SHOWN ON A PLAT TITLED "PLAT FOR CONVEYANCE OF 27.84 ACRES+ FROM ROBERT T. ARMISTEAD, ET ALS TO MECCA DEVELOPMENT CORPORATION."

200 0 200
SCALE IN FEET

N

AREA TABULATION

	SF	ACRES
PARCEL I	628,022	14.4174
PARCEL II	317,479	7.2883
PARCEL III	186,475	4.2809
20' R/W DEDICATION	21,574	0.4953
TOTAL AREA SUBDIVIDED	1,153,550	26.4819



LOCATION MAP
SCALE: 1"=2000'

ROBERT T. ARMSTEAD ET. ALS.
(W.B.6, Pg. 195)
105.68 AC.±

PARCEL I
628,022 S.F. ±
14.4174 AC. ±
ZONED R-1
ZONED LB

PARCEL II
317,479 S.F.±
7.2883 AC.±
ZONED LB

PARCEL III
186,475 S.F.±
4.2809 AC.±
ZONED R-1

DETENTION POND EASEMENT

LAKEWOOD SUBDIVISION
A.K.A. MARL HILLS
PB. 20, Pg 48

JAMESTOWN ROAD S.R. 31 110' R/W

N/F HELEN N. NORMAN
N/F T.K. ORIENTAL ARTS, INC.
N/F MICHAEL C. & KENNSET F. TELLER
N/F LYMAN R. & DOROTHY HALL
N/F ROSA ARMISTEAD EST

CURVE TABLE

LOT NO.	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING
1	11°28'32"	781.42'	156.51'	78.52'	156.25'	N28°22'56"W
2	10°29'36"	684.50'	125.36'	62.86'	125.19'	N27°53'28"W
3	01°24'31"	684.50'	16.83'	8.42'	16.83'	N33°50'32"W
4	12°18'21"	362.31'	77.82'	39.06'	77.67'	N.8°23'36"W

0 1 2 3
BUSINESS RECORDS CORPORATION

Recorded 21st day of April, 1987
P. B. No. 336, pages 74
_____ Clerk

AES, a professional corporation
1761 Jamestown Road, Williamsburg, Va. 23185
804-253-0040
Engineering, Planning, Surveying

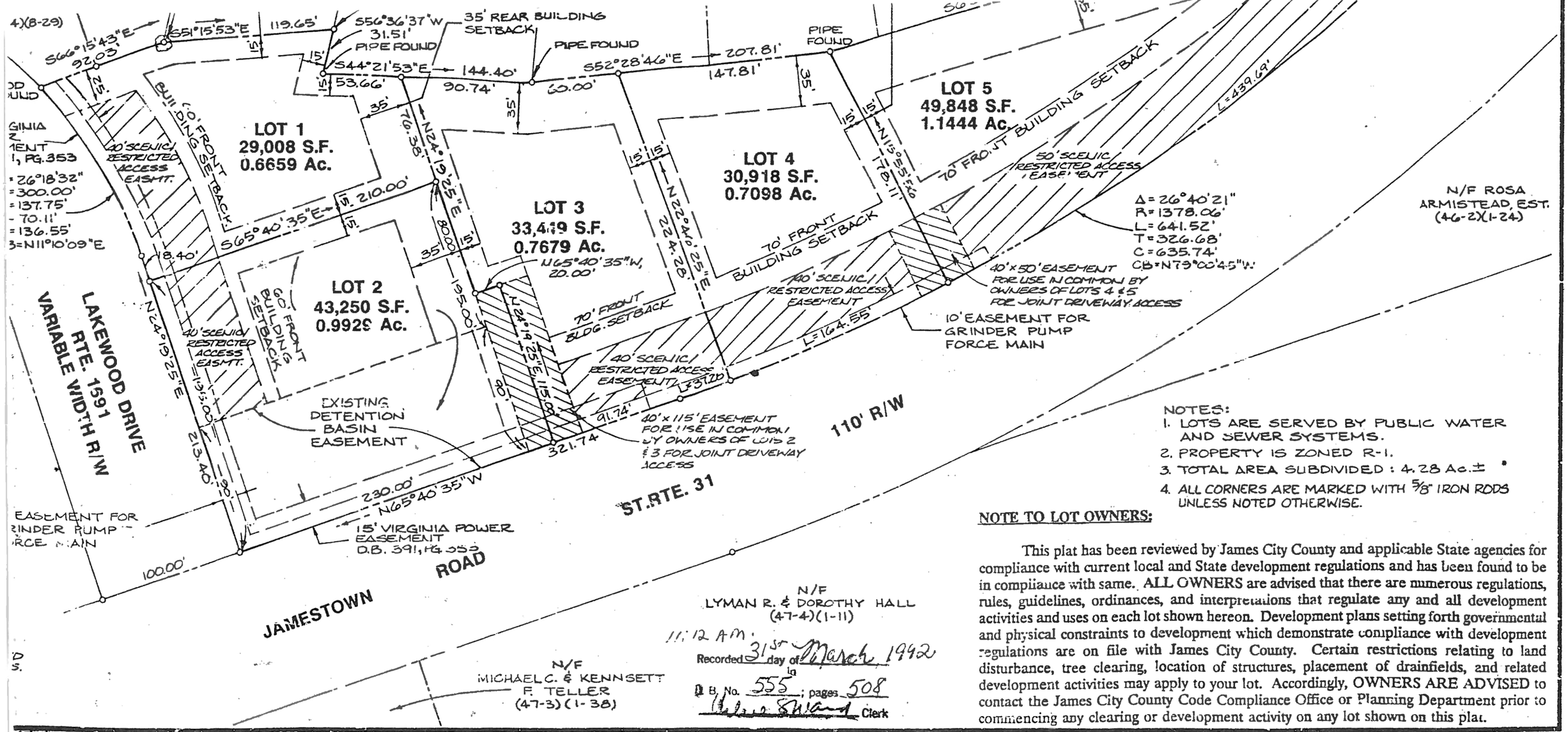
PLAT OF
PARCELS I, II & III
PROPERTY OF
MECCA DEVELOPMENT CORPORATION
JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA
PAUL C. SMALL
1247
LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY
1	3/6/87	ADDED 20' V.D.H.&T. DEDICATION	SCW

Designed SCW	Drawn CRG
Scale 1"=200'	Date JAN.1987
Project No. 6240	
Drawing No. PLAT	

MC003_GCPC_LAKEWOOD_DRIVE - 034



NOTES:
1. LOTS ARE SERVED BY PUBLIC WATER AND SEWER SYSTEMS.
2. PROPERTY IS ZONED R-1.
3. TOTAL AREA SUBDIVIDED : 4.28 Ac.±
4. ALL CORNERS ARE MARKED WITH 5/8" IRON RODS UNLESS NOTED OTHERWISE.

NOTE TO LOT OWNERS:

This plat has been reviewed by James City County and applicable State agencies for compliance with current local and State development regulations and has been found to be in compliance with same. ALL OWNERS are advised that there are numerous regulations, rules, guidelines, ordinances, and interpretations that regulate any and all development activities and uses on each lot shown hereon. Development plans setting forth governmental and physical constraints to development which demonstrate compliance with development regulations are on file with James City County. Certain restrictions relating to land disturbance, tree clearing, location of structures, placement of drainfields, and related development activities may apply to your lot. Accordingly, OWNERS ARE ADVISED to contact the James City County Code Compliance Office or Planning Department prior to commencing any clearing or development activity on any lot shown on this plat.

Recorded 31st day of March, 1992 at 11:12 AM.
D.B. No. 555; pages 508
Clerk

A. RAINEY
. 016210
4/15/91

PLAT
OF
FIVE LOTS ON
JAMESTOWN ROAD
OWNED BY: VENTURE INVESTMENTS, INC.

Y COUNTY, VIRGINIA

No.	DATE	REVISION / COMMENT / NOTE	BY

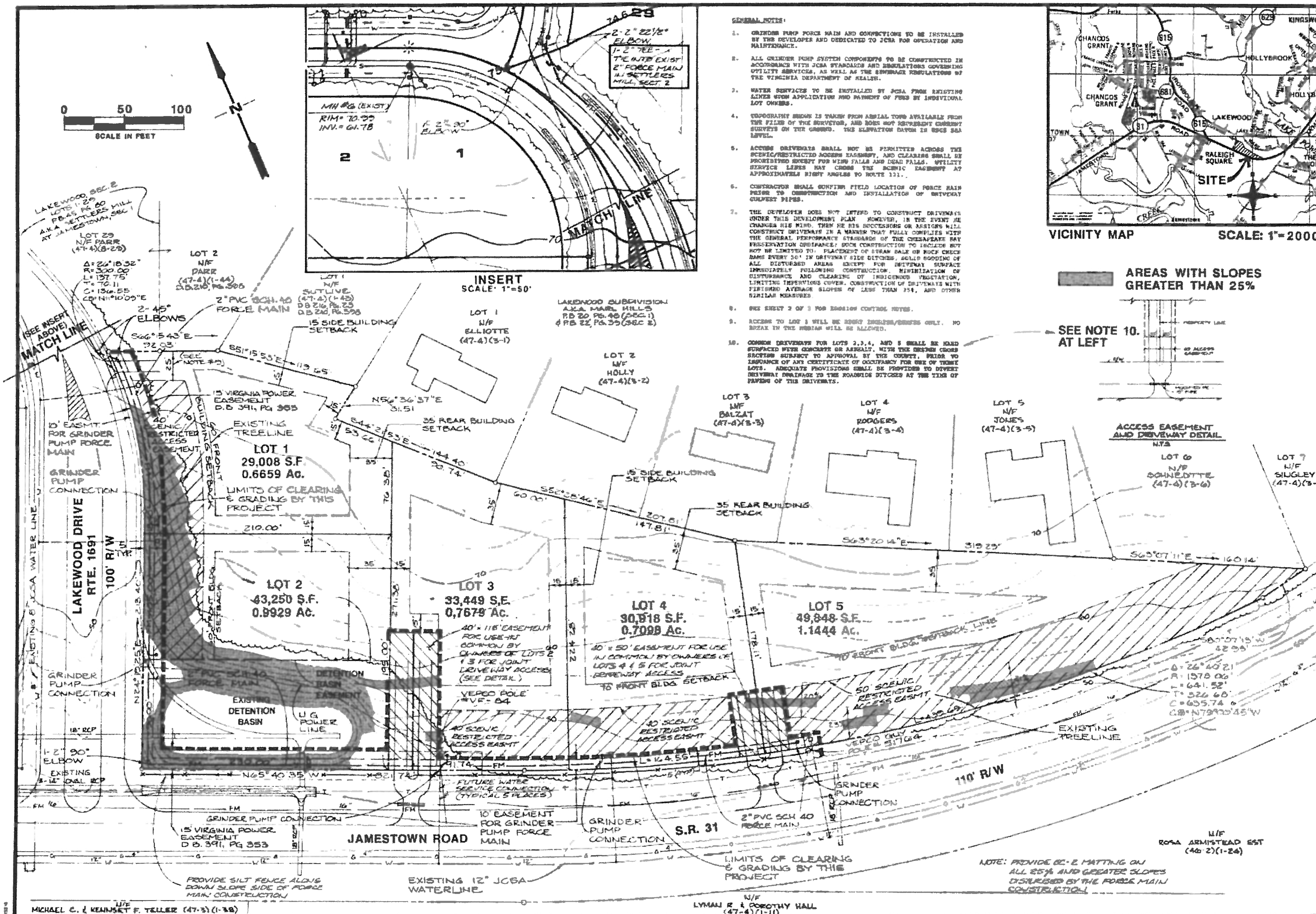
Designed DAR	Drawn EAW/DB
Scale 1"=60'	Date MAY 15, 1991
Project No. 90141	
Drawing No. PLAT	

FILE #7612

LOGAN SYSTEMS

Century 21
Glenn Gilley Realty
7408 Richmond Rd.
Williamsburg, VA 23188
Phone: 757-565-3773
Toll free: 800-296-3773
Fax: 757-565-3812
Home: 757-565-0287
wendellgaffney@aol.com
Wendell Gaffney

MC003_GOPC_LAKEWOOD_DRIVE - 035



GENERAL NOTES:

1. GRINDER PUMP FORCE MAIN AND CONNECTIONS TO BE INSTALLED BY THE DEVELOPER AND DEDICATED TO JCSA FOR OPERATION AND MAINTENANCE.
2. ALL GRINDER PUMP SYSTEM COMPONENTS TO BE CONSTRUCTED IN ACCORDANCE WITH JCSA STANDARDS AND REGULATIONS GOVERNING UTILITY SERVICES, AS WELL AS THE SEWERAGE REGULATIONS OF THE VIRGINIA DEPARTMENT OF HEALTH.
3. WATER SERVICES TO BE INSTALLED BY JCSA FROM EXISTING LINES UPON APPLICATION AND PAYMENT OF FEES BY INDIVIDUAL LOT OWNERS.
4. TOPOGRAPHY SHOWN IS TAKEN FROM AERIAL TOPO AVAILABLE FROM THE FILES OF THE SURVEYOR, AND DOES NOT REPRESENT CURRENT SURVEYS ON THE GROUND. THE ELEVATION DATUM IS USGS SEA LEVEL.
5. ACCESS DRIVEWAYS SHALL NOT BE PERMITTED ACROSS THE SCENIC/RESTRICTED ACCESS EASEMENT, AND CLEARING SHALL BE PROHIBITED EXCEPT FOR WIND FALLS AND DEAD FALLS. UTILITY SERVICE LINES MAY CROSS THE SCENIC EASEMENT AT APPROXIMATELY RIGHT ANGLES TO ROUTE 131.
6. CONTRACTOR SHALL CONFIRM FIELD LOCATION OF FORCE MAIN PRIOR TO CONSTRUCTION AND INSTALLATION OF DRIVEWAY CULVERT PIPES.
7. THE DEVELOPER DOES NOT INTEND TO CONSTRUCT DRIVEWAYS UNDER THIS DEVELOPMENT PLAN. HOWEVER, IN THE EVENT HE CHANGES HIS MIND, THEN HE HIS SUCCESSORS OR ASSIGNS WILL CONSTRUCT DRIVEWAYS IN A MANNER THAT FULLY COMPLIES WITH THE GENERAL PERFORMANCE STANDARDS OF THE CHESAPEAKE BAY PRESERVATION ORDINANCE; SUCH CONSTRUCTION TO INCLUDE BUT NOT BE LIMITED TO: PLACEMENT OF STRAW BALE OR ROCK CHECK DAMS EVERY 50' IN DRIVEWAY SIDE DITCHES, SOLID SODDING OF ALL DISTURBED AREAS EXCEPT FOR DRIVEWAY SURFACE IMMEDIATELY FOLLOWING CONSTRUCTION, MINIMIZATION OF DISTURBANCE AND CLEARING OF INDIGENOUS VEGETATION, LIMITING IMPERVIOUS COVER, CONSTRUCTION OF DRIVEWAYS WITH FINISHED AVERAGE SLOPES OF LESS THAN 25%, AND OTHER SIMILAR MEASURES.
8. SEE SHEET 2 OF 3 FOR EROSION CONTROL NOTES.
9. ACCESS TO LOT 1 WILL BE RIGHT INGRESS/EGRESS ONLY. NO BREAK IN THE MEDIAN WILL BE ALLOWED.
10. COMMON DRIVEWAYS FOR LOTS 2,3,4, AND 5 SHALL BE HARD SURFACED WITH CONCRETE OR ASPHALT, WITH THE DESIGN CROSS SECTION SUBJECT TO APPROVAL BY THE COUNTY, PRIOR TO ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY FOR USE OF THESE LOTS. ADEQUATE PROVISIONS SHALL BE PROVIDED TO DIVERT DRIVEWAY DRAINAGE TO THE ROADSIDE DITCHES AT THE TIME OF PAVING OF THE DRIVEWAYS.

COMMONWEALTH OF VIRGINIA — DON A. RAINEY — No. 1652 — 4/15/4 — LAND SURVEYOR

COMMONWEALTH OF VIRGINIA — DON A. RAINEY — No. 016210 — PROFESSIONAL ENGINEER

RECEIVED MAR 1991 PLANNING DEPARTMENT

DEVELOPMENT PLAN OF FIVE LOTS ON JAMESTOWN ROAD
OWNED BY: VENTURE INVESTMENTS, INC.

JAMES CITY COUNTY, VIRGINIA

No.	DATE	REVISION / COMMENT / NOTE	BY

Designed DAR	Drawn
Scale 1"=50'	Date MAY 15, 1991
Project No. 90141	
Drawing No. 1 OF 3	

Prepared by: RAINEY ENGINEERING Christiansburg, Virginia

FILE #7612

PB20
PG48

LAKE POWELL

R. A. FLINT

POOLE

330'±

HIGH WATER

ROBERT T. ARMISTEAD
& LETITIA HANSON

N70°14'E
157.05'

95'

N58°24'E
101.54'

N44°36'E
126.45'

N11°59'E
108.10'

N10°20'W
44.12'

Δ=10°07'
R=330.00'
T=29.67'
L=58.21'

S73°29'E
28.70'

Δ=57°32'
R=78.67'
T=44.80'
L=81.66'

N6°40'E
65.00'

N20°55'W
185.33'

N15°53'W
161.40'

N55°27'E
166.53'

N4°42'W
144.43'

N52°29'W
207.83'

N63°26'W
478.83'

S80°09'W
167.24'

S28°07'E
111.59'

S22°26'E
118.31'

S48°12'W
162.52'

S75°32'W
110.00'

Δ=4°42'
R=335.00'
T=13.23'
L=26.45'

Δ=1°04'
R=533.52'
T=5.00'
L=10.00'

S2°53'38"W
209.71'

S3°23'E
432.05'

S4°30'W
441.80'

S4°30'W
133.44'

LOT NO. 8

LOT NO. 7

LOT NO. 5

LOT NO. 4

WELL LOT

MARL HILLS SUBDIVISION

MARL HILLS SUBDIVISION

VIRGINIA STATE HIGHWAY ROUTE 31

Recorded May 15, 1963
800
D. B. 90, page 513

A PARCEL OF LAND
STANDING IN THE NAME OF
ROBERT T. ARMISTEAD & LETITIA HANSON
JAMESTOWN DISTRICT
JAMES CITY COUNTY, VIRGINIA
SCALE 1" = 100' OCTOBER 9, 1962

AREA - 20.4 ACRES

M0000[illegible]PG LAKEWOOD DRIVE - 037

A. GENERAL NOTES:

1. BOUNDARY, EASEMENTS, AND SETBACK INFORMATION AS SHOWN WAS TAKEN FROM RECORD PLAT. TOPOGRAPHY AS SHOWN HAS BEEN FIELD VERIFIED BY AES USING THE BENCHMARK NOTED. NO UNDERGROUND UTILITIES HAVE BEEN LOCATED OR VERIFIED BY THIS SURVEY. CONTRACTOR TO CONTACT "MISS UTILITY" PRIOR TO ANY CONSTRUCTION ACTIVITY.
2. ALL TREES MAY BE REMOVED WITHIN THE CLEARING LIMITS SHOWN HEREON.
3. SILT FENCE TO BE PROVIDED ON DOWNSLOPE SIDE OF ALL DISTURBED AREAS.
4. CONTRACTOR TO PROVIDE STANDARD V.D.O.T. COARSE AGGREGATE #1 STONE CONSTRUCTION ENTRANCE.
5. HOUSE DIMENSIONS BASED ON INFORMATION AS SUPPLIED BY THE OWNER AND/OR DEVELOPER. CONTRACTOR TO VERIFY ALL DIMENSIONS, ALIGNMENTS AND PROVISIONS.
6. BUILDER SHALL BE RESPONSIBLE FOR SEEKING A VARIANCE TO THE DRIVEWAY SETBACK REQUIREMENTS FROM THE APPROPRIATE AGENCY. (IF APPLICABLE)

B: BUILDING SETBACKS PER RECORDED PLAT (P.B. 64, PG. 70)

1. FRONT SETBACK: 60 FEET FROM THE FRONT LOT LINE.
2. REAR SETBACK: 35 FEET FROM THEREAR LOT LINE.
3. SIDE SETBACKS: 90 AND 15 FEET FROM THE SIDE LOT LINES;

NOTES:
EXISTING DETENTION BASIN TO BE MONITORED FOR SIGNS OF SEDIMENTATION. ADDITIONAL EROSION AND SEDIMENT CONTROL PRACTICES MAY BE REQUIRED TO PROTECT THE FACILITY.

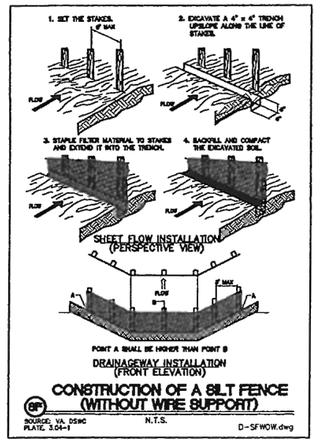
HOUSE DIMENSIONS ARE BASED ON INFORMATION AS SUPPLIED BY THE OWNER AND/OR DEVELOPER. CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ALIGNMENTS AND PROVISIONS PRIOR TO BEGINNING CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED TO AES CONSULTING ENGINEERS FOR CORRECTION AND/OR JUSTIFICATION PRIOR TO PROCEEDING WITH ANY WORK. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ERRORS THAT ARE NOT REPORTED.

NOTE:
AREAS OF SLOPES 25% OR GREATER

NOTE:
PROVIDE 56 L.F. OF 18"RCP @ 6.25% INV. IN=44.00'±, INV. OUT= 40.5'±. WITH RIP RAP OUTLET PROTECTION
(REGRADE ROADSIDE DITCH TO ENSURE POSITIVE DRAINAGE. TOPSOIL, SEED OR SOD, AND HYDRO MULCH/STRAW ALL AREAS OF DISTURBANCE WITHIN R/W.)

EROSION CONTROL NOTE:

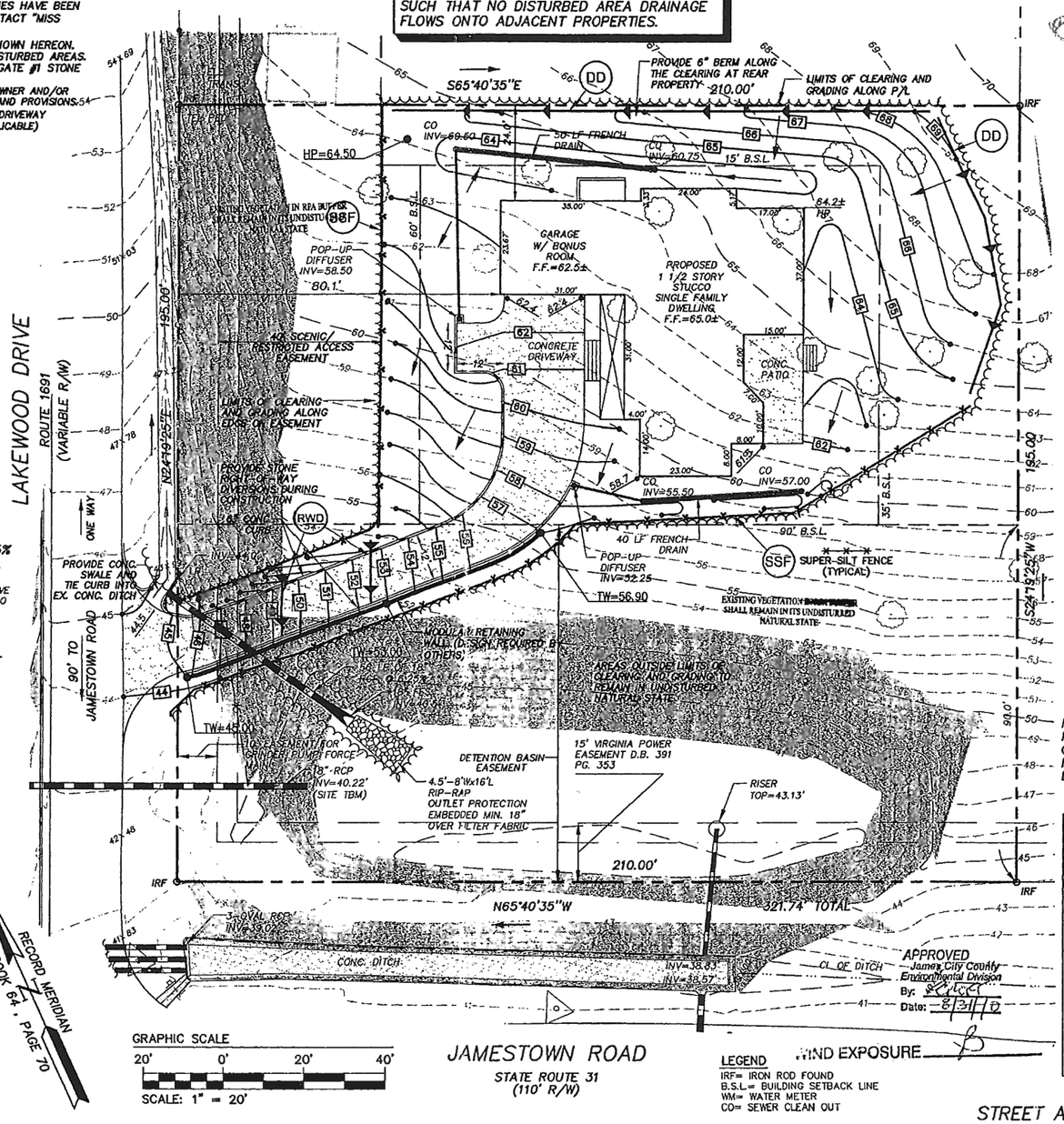
UPON REMOVAL OF ALL EROSION AND SEDIMENT CONTROL ITEMS, ALL TRAPPED/CONTAINED SEDIMENT SHALL BE REMOVED FROM LOT AND PROPERLY DISPOSED OF. ROADSIDE DITCH AND, IF APPLICABLE OUTFALL DITCHES SHALL BE CLEANED OF SEDIMENT/OR CONSTRUCTION DEBRIS ON A REGULAR BASIS DURING CONSTRUCTION.



CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

SOURCE: VA. DSWC PLATE 3.04-1 N.T.S. D-SFWOW.dwg

NOTE:
DRAINAGE CONTROL / IMPROVEMENTS SHALL BE INSTALLED IMMEDIATELY AFTER CLEARING. SUCH THAT NO DISTURBED AREA DRAINAGE FLOWS ONTO ADJACENT PROPERTIES.



GRAPHIC SCALE
20' 0' 20' 40'
SCALE: 1" = 20'

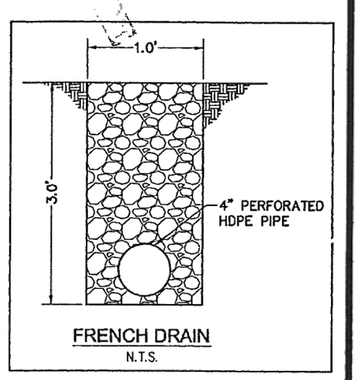
JAMESTOWN ROAD
STATE ROUTE 31
(110' R/W)

LEGEND
IRF= IRON ROD FOUND
B.S.L.= BUILDING SETBACK LINE
WM= WATER METER
CO= SEWER CLEAN OUT

WIND EXPOSURE

APPROVED
James City County
Environmental Division
By:
Date: 8/31/10

AREA OF LOT 2
40,950 S.F.±
0.9401 ACRES±



FRENCH DRAIN
N.T.S.

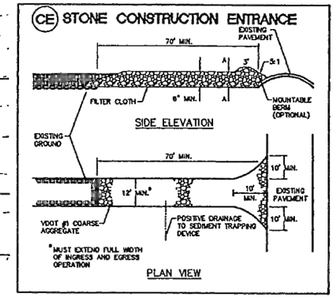
NOTE:
THIS PLAT IS BASED UPON RECORD AND OTHER AVAILABLE INFORMATION AND DOES NOT REPRESENT A CURRENT BOUNDARY SURVEY.

NOTE:
THIS PROPERTY LIES IN ZONE X, (AREAS DETERMINED TO BE OUTSIDE THE 500 YEAR FLOOD PLAIN) PER F.I.R.M. #510201-0045 B, DATED 2/8/91.

NOTES:
1. ALL DISTURBED AREAS ARE TO BE SEEDED, SODDED, OR MULCHED WITHIN 7 DAYS OF REACHING FINAL GRADE.
2. NO RPA CHESAPEAKE BAY AREAS ARE LOCATED ON PROPERTY.

NOTE:
PROVIDE STONE CONSTRUCTION ENTRANCE DURING CONSTRUCTION. CONTRACTOR RESPONSIBLE FOR KEEPING LAKEWOOD DRIVE FREE OF MUD AND DEBRIS ADJACENT TO PROPOSED DRIVEWAY

(CE) STONE CONSTRUCTION ENTRANCE



TAX PARCEL: (47-4)(11-2)
STREET ADDRESS: #100 LAKEWOOD DRIVE

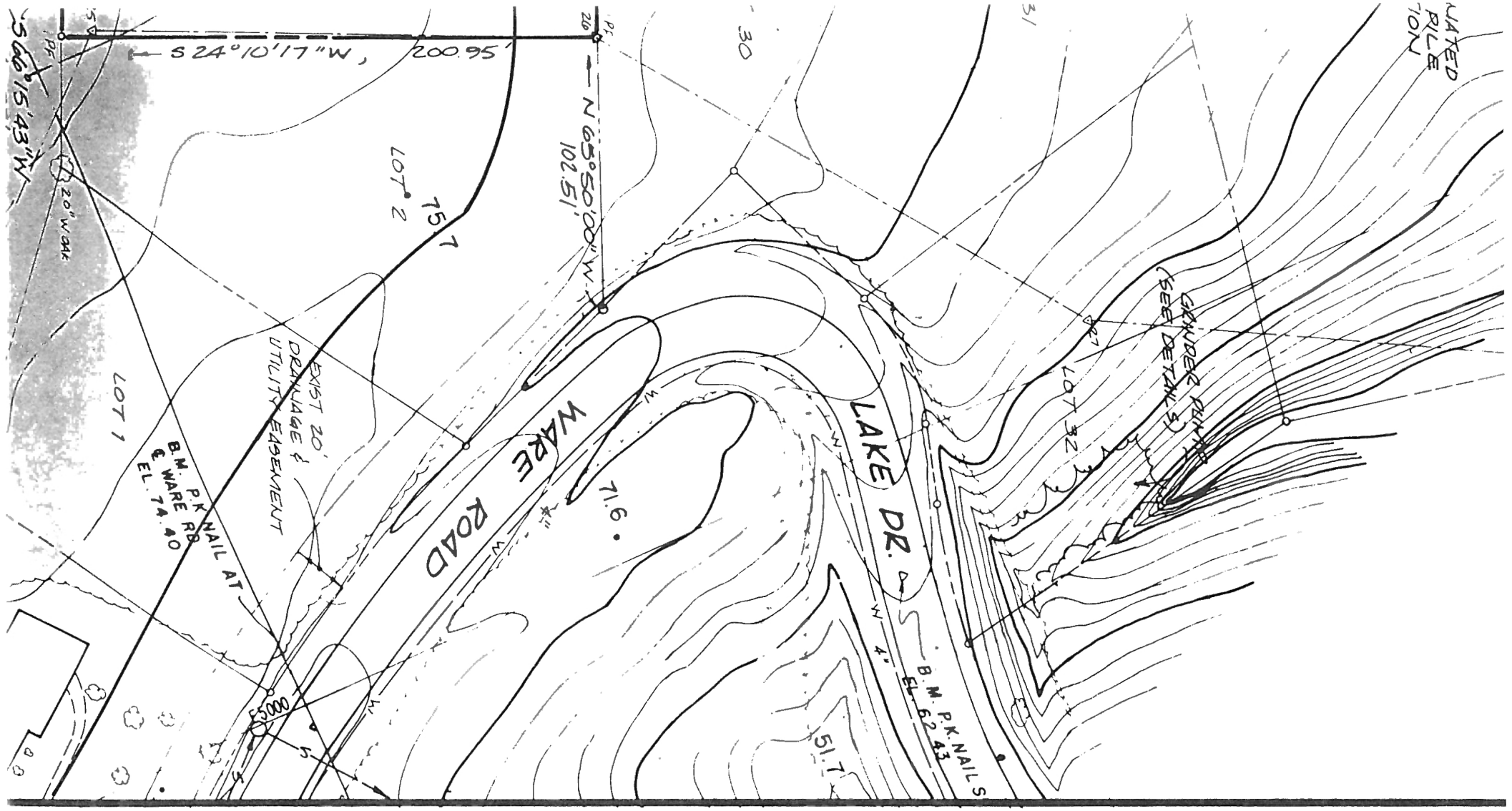
AES CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND • GLOUCESTER
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8994

DEVELOPMENT PLAN
LOT 2, SUBDIVISION OF FIVE LOTS
ON JAMESTOWN ROAD
PREPARED FOR: MARK URICK
JAMESTOWN DISTRICT JAMES CITY COUNTY VIRGINIA

COMMONWEALTH OF VIRGINIA
ROBERT D. MANN
Lic. No. 002509
11/18/09
LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY
2	11/18/09	REVISED PER COUNTY COMMENTS	RED
1	8/24/09	REVISED HOUSE PER NEW PLAN & REVISED GRADING	RED

Designed	Drawn
AES	AES
Scale	Date
1"=20'	11/18/09
Project No.	
9340-1	
Drawing No.	
1 OF 1	



SEWER, DRAINAGE, SEDIMENT & EROSION CONTROL

LAKEWOOD SECTION II

OWNER/DEVELOPER: MECCA DEVELOPMENT CORP.

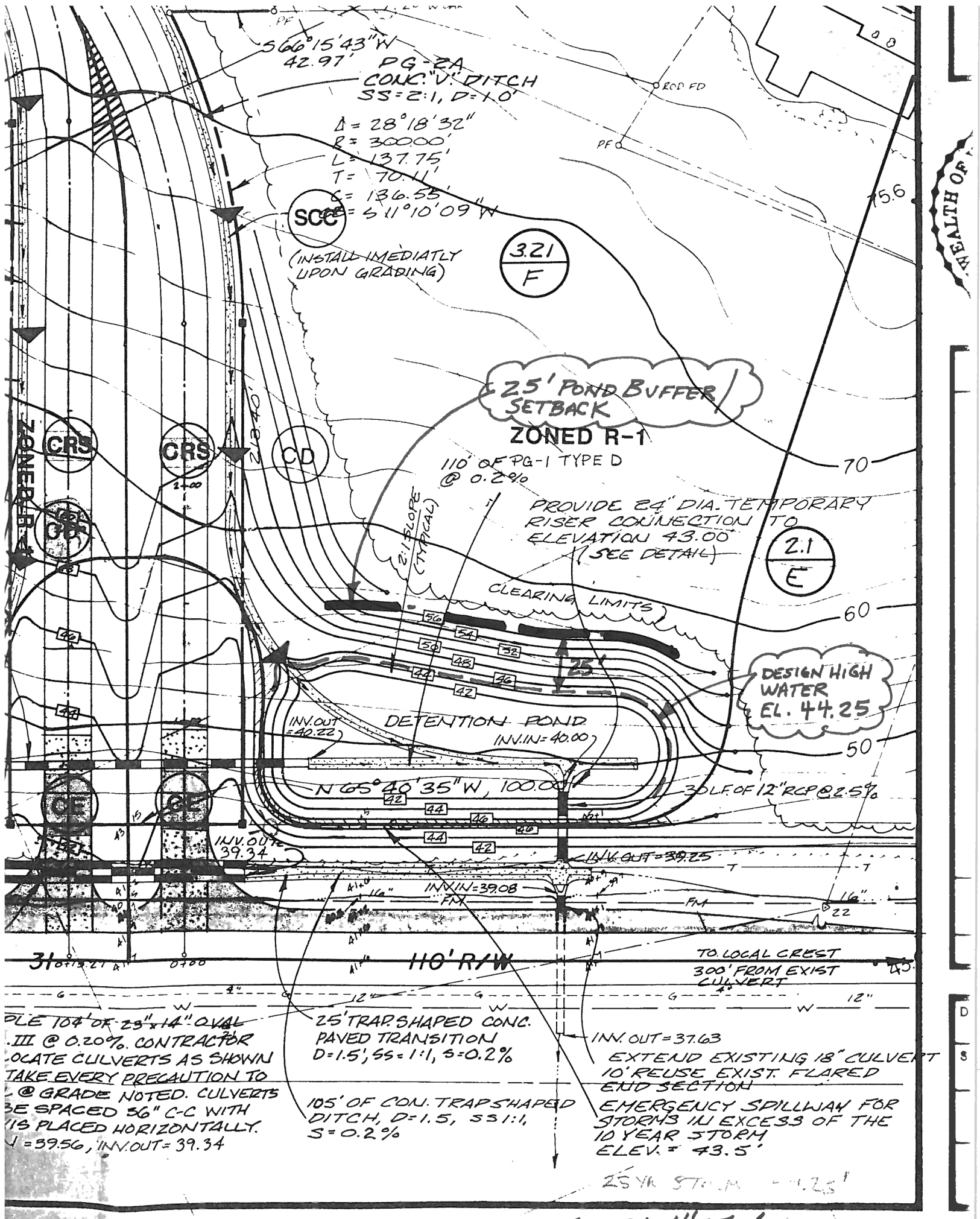
MESTOWN DISTRICT JAMES CITY COUNTY VIRGINIA

AES, a professional corporation

1761 Jamestown Road, Williamsburg, Va. 23185

804-253-0040

Architecture, Engineering, Surveying, Planning



OLE 104' OF 23"x14" OVAL
.III @ 0.20%. CONTRACTOR
OCATE CULVERTS AS SHOWN
AKE EVERY PRECAUTION TO
@ GRADE NOTED. CULVERTS
BE SPACED 56" C-C WITH
IS PLACED HORIZONTALLY.
J = 39.56, INV. OUT = 39.34

25' TRAP. SHAPED CONC. PAVED TRANSITION D=1.5', SS=1:1, S=0.2%

105' OF CON. TRAPSHAPED DITCH, D=1.5, SS 1:1, S=0.2%

INV. OUT = 37.63

EXTEND EXISTING 18" CULVERT 10' REUSE EXIST. FLARED END SECTION

EMERGENCY SPILLWAY FOR STORMS IN EXCESS OF THE 10 YEAR STORM ELEV. = 43.5'

25 YR STORM = 41.25'

SCALE: 1"=50'

S-3E

MC003_GCPC_LAKEWOOD_DRIVE - 040

25 yr. Storm $Q_{in} = 47.9$ cfs

Try Elev. 43.0 $q_o = 7.5$ cfs

Storage = 39000 ft³

$V_o = 75(t_c)(Q_{in} - q_o) = 75(22)(47.9 - 7.5) = 666000$ ft³ (Low)

Try Elev. 44.0 $q_o = 9.0$ cfs

Storage = 60000 ft³

$V_o = 75(22)(47.9 - 9.0) = 64200$ ft³ (Low)

Try Elev. 44.25 $q_o = 9.25$ cfs

Storage = 66000 ft³

$V_o = 75(22)(47.9 - 9.25) = 63750$ ft³ (Close Enough)

25 yr. Storm Elev. = 44.25 ft. $Q = 9.25$ cfs < 10.28 cfs Good

Use 12" RCP

– Req'd Sediment Storage Vol.

$(23.5\ Ac)(67\ yd^3/Ac.)(27\ ft^3/yd^3) = 42500$ ft³

A temporary riser structure is to be place at the enterance of the culvert to elevation 43.0 ft.

Conclusion :

Detention Pond for Sec. II is designed to detain a 25 yr. storm event and release it at a rate 2 yr. pre-development rate. The 25 yr. detention pond elevation is at 44.25 ft. and is released through a 12 inch RCP. The emergency spillway has an invert at 44.25 ft. and is designed to operate in excess of the 25 yr. storm event.

- Design High Water EL. 44.25
- 25-YEAR STORM

Sellers Mill Sec I
LAKEWOOD SEC 2

Public Works

Drainage Calcs

Revised Calcs

Lakewood Sec II

#6240 SCW
2/6/87

Detention Pond Design For Small Sites

Pre-development

A = 1022500 S.F. = 23.5 Ac ±
C = 0.25 (Woodlands)

L = 580' Overland Flow ΔElev. = 76.4 - 70 = 6.4'
S = 6.4/580 = 1.1%
t_c = 33 min (Fig 1.5.1.2)

L = 780' Channel Flow ΔElev. = 70. - 47 = 23
S = 23/780 = 2.9%
t_c = 5.5 min. (Fig 1.5.1.2)

L = 1020' Channel Flow ΔElev. = 47 - 39 = 8'
S = 8/1020 = 0.78%
t_c = 11 min (Fig 1.5.1.2)

t_c = 33 + 5.5 + 11 = 41.5 min.

I_2 = 1.75 in/hr. , Q_2 = 10.28 cfs

I_{10} = 3.1 in/hr. , Q_{10} = 18.2 cfs

Post-development

- Composite "C" Value -

	Area	C	CA
Rdside & Grass Channel	2.7	0.2	0.54
Business Neighborhood Areas	10.35	0.6	6.21
Residential	5.1	0.4	2.04
	ΣA = 18.15		ΣCA = 8.79

$$C = \frac{CA}{A} = 0.48$$

L = 3000' ΔElev. = 75' - 44' = 31'

t_c = 22 min (Fig 1.5.1.2)

$I_2 = \frac{130.3}{18.5+22} = 3.22$ in/hr. , Q_2 = 28.05 cfs

$I_{10} = \frac{189.2}{22.1+22} = 4.29$ in/hr. , Q_{10} = 37.37 cfs

— Critical Storm Duration for 10 Yr. Post-Dev.

$$T_c = \sqrt{\frac{2CAa(b - t_c/4)}{q_o}} - b$$

Trial 1

Given: $C = 0.48$
$A = 18.15$
$t_c = 22$ min.
$a = 189.2$
$b = 22.1$
$q_o = 10.28$ cfs (allowable peak outflow)

$$T_c = \sqrt{\frac{2(0.48)18.15(189.2)(22.1 - 22/4)}{10.28}} - 22.1$$

$T_c = 51$ min.

$t_c = 22$ min.

— Peak Inflow:

$$Q_o = CA\left[\frac{a}{b + T_c}\right] = 0.48(18.15)\left[\frac{189.2}{22.1 + 51}\right] = 22.5 \text{ cfs}$$

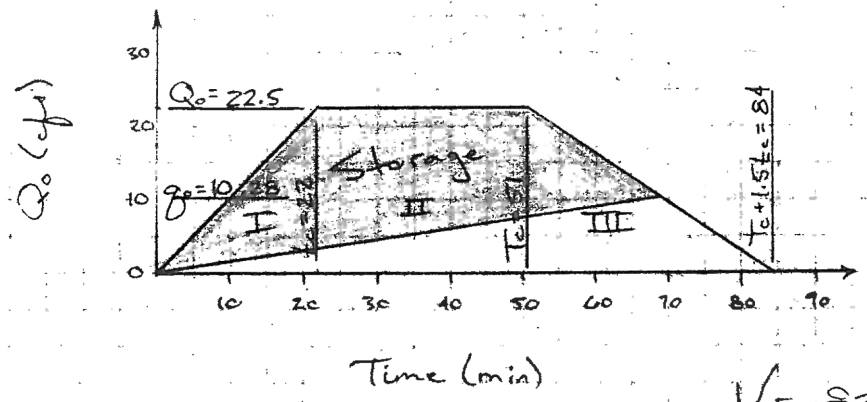
— Req'd Storage for Critical 10 Yr. Storm:

$$V = \left[Q_o T_c + \frac{Q_o t_c}{4} - \frac{q_o T_c}{2} - \frac{3 q_o t_c}{4}\right] 60$$

$$= \left[22.5(51) + \frac{22.5(22)}{4} - \frac{10.28(51)}{2} - \frac{3(10.28)22}{4}\right] 60$$

$$V = 50370 \text{ ft}^3$$

Check:



	Area	
I	$22.5(22)\frac{1}{2} =$	247.5
II	$22.5(51-22) =$	652.5
III	$22.5(84-51)\frac{1}{2} =$	371.25
		1271.25

Unshaded Area
$-10.28(84)\frac{1}{2} = -\ 431.76$
839.49

$V = 839.5(60) = 50370 \text{ ft}^3$

Checks

Critical Storm Duration for 25 yr. Post-Dev.

Pre-development

$A = 23.5$ Ac ±
$C = 0.25$

$t_c = 49.5$ min.

$I_2 = 1.75$ in/hr. , $Q_2 = 10.28$ cfs
$I_{10} = 3.1$ in/hr , $Q_{10} = 18.2$ cfs
$I_{25} = 3.75$ in/hr. , $Q_{25} = 22.0$ cfs

Post-development

$A = 18.15$ Ac ±
$C = 0.48$

$t_c = 22$ min. (Fig. 1.5.12.)

$I_2 = 3.22$ in/hr. , $Q_2 = 28.05$ cfs
$I_{10} = 4.29$ in/hr. , $Q_{10} = 37.37$ cfs
$I_{25} = 5.5$ in/hr. , $Q_{25} = 47.92$ cfs

$I = \frac{a}{b+T}$ (chart)

Outlet Structure:

Try 30'-$\binom{12}{15}$" RCP @ 2.5% Inv. In = 40.00'
Inv. Out = 39.25'

Determine outflow by assuming inlet control. (Chart 2)

Pond Surf. Elev. (ft.)	HW (ft)	HW/D 12" ⇐ D ⇒ 15"		Q (cfs) 12" ⇐ D ⇒ 15"	
43.0	3.0	3.0	2.4	7.5	11
43.5	3.5	3.5	2.8	8.5	12
44.0	4.0	4.0	3.2	9.0	13
44.5	4.5	4.5	3.6	9.5	14
45.0	5.0	5.0	4.0	10.0	15

4/15/87 SDW.

25 yr. Storm $Q_{in} = 47.9$ cfs

Try Elev. 43.0 $q_o = 7.5$ cfs

Storage = 39000 ft³

$V_o = 75(t_c)(Q_{in} - q_o) = 75(22)(47.9 - 7.5) = 666000$ ft³ (Low)

Try Elev. 44.0 $q_o = 9.0$ cfs

Storage = 60000 ft³

$V_o = 75(22)(47.9 - 9.0) = 64200$ ft³ (Low)

Try Elev. 44.25 $q_o = 9.25$ cfs

Storage = 66000 ft³

$V_o = 75(22)(47.9 - 9.25) = 63750$ ft³ (Close Enough)

25 yr. Storm Elev. = 44.25 ft. $Q = 9.25$ cfs < 10.28 cfs Good

Use 12" RCP

– Req'd Sediment Storage Vol.

$(23.5\ Ac)(67\ yd^3/Ac.)(27\ ft^3/yd^3) = 42500$ ft³

A temporary riser structure is to be place at the enterance of the culvert to elevation 43.0 ft.

Conclusion :

Detention Pond for Sec. II is designed to detain a 25 yr. storm event and release it at a rate 2 yr. pre-development rate. The 25 yr. detention pond elevation is at 44.25 ft. and is released through a 12 inch RCP. The emergency spillway has an invert at 44.25 ft. and is designed to operate in excess of the 25 yr. storm event.

For Public Works

LAKEWOOD, SECTION II

Re-development Calc's to Existing 18" Culvert Under Rt. 31

2/12/87

MC 003
S-35-87

VOID SEE 2/6/87 CALCS.

D.A. = 34.18 Ac. ±

Composite "C" Value

Watershed	A	C	CA
A	9.18	0.3	2.75
Lakewood Area	25.6	0.25	6.4
	34.78		9.15

$C = 9.11/34.78 = 0.26$

L = 850' Overland Flow
ΔElev = 28.3'
S = 3.3%
t_{c_1} = 27 min (fig 1.5.1.1)

L = 1720' Roadside Channel Flow
ΔElev = 10'
S = 0.58%
t_{c_2} = 17 min (fig 1.5.1.2)

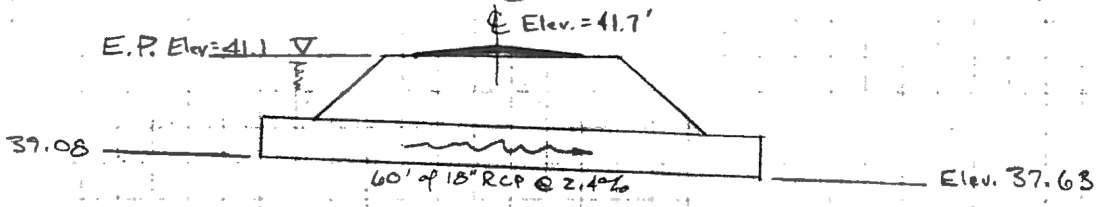
$T_c = t_{c_1} + t_{c_2} = 44$ min

$I_2 = 1.8$ in/hr , $Q_2 = 16.3$ cfs

$I_{10} = 3.4$ in/hr. , $Q_{10} = 30.7$ cfs

Upon field inspection it is discovered that the culvert outlet is presently half filled with earth and a proper swale leaving the culvert does not exist. By redefining the swale and flushing the pipe the hydraulic performance of the culvert can be improved. Thus, the stormwater from the culvert will flow away from a roadway fill via a swale which will then transition to sheet flow following the natural drainage pattern to Powhatan Creek.

Assume W.S. @ shoulder elev. (Worst condition)



Check Capacity of 18" RCP Culvert Under Rt 31

Known:
- Dia = 18"
- Length = 60'
- Inv. In = 39.08'
- Inv. Out = 37.63
- Slope = 2.4%

- Q_{cap} = 15 cfs
- V = 8.47 fps
- d_c = 1.45 ft
- $h_o = \frac{d_c + D}{2}$
- $HW = H + h_o - LS_o$

Inlet Control

Assume: HW = 41.1 − 39.08 = 2.02', HW/D = 1.35
Groove end w/ headwall

Q = 10 cfs (Chart 2)

Outlet Control

Downstream obstructions establishing a tailwater surface equal to or greater than the top of the culvert outlet do not exist. Therefore TW ≤ D. Assume flow at Qcap, 15 cfs

V = 8.47, A = 1.77 S.F., d_c = 1.45 ft., W_p = 4.14 S.F. (by Seeley Pg. 18-73, fig. B)

R = 0.377, $H = \left[1 + 0.5 + \frac{29(0.015)^2 60}{0.427^{1.33}}\right]\frac{8.47^2}{64.4} = 3.02$ → HW = 3.02 + 1.475 − 1.44 = 3.05

Inv. In Elev. (39.08) + (3.05) + HW = 42.13' is well above the road surface elevation and highly unlikely

Assume $T_w = D = h_o = 1.5' > d_c$, H = 2.02 − 1.5 + 1.44 = 1.96' then from Chart 9C

Q = 11.5 cfs > 10 cfs

Conclude: Inlet Controls

Conclusion:

Presently the 18" culvert recieves a Q_{total} = 30.7 cfs from a 34.78 Ac. ± watershed during a 10 yr. storm event. The watershed is 27% residential and 73% woodlands. Based on field data and the assumption that headwater equals 1.35 times the diameter of the entrance culvert ... it is determined that the culvert operates under inlet controled conditions at a capacity of Q_{cap} = 10 cfs. Therefore the 18 inch culvert is inadequate to function properly within a 10yr. or 2yr. storm event.

Drainage Calcs

#6240 SAW. 2/6/87

Lakewood Sec. II

Detention Pond Design For Small Sites

Pre-development

A = 1022500 S.F. ± = 23.5 Ac ±
C = 0.25 (Woodlands)

L = 580' Overland Flow ΔElev. = 76.4 - 70 = 6.4'
S = 6.4/580 = 1.1%
t_{c_1} = 33 min (fig.

L = 780' Channel Flow ΔElev. = 70. - 47 = 23
S = 23/780 = 2.9%
t_{c_2} = 5.5 min. (fig 1.5.1.2)

L = 1020' Channel Flow ΔElev. = 47 - 39 = 8'
S = 8/1020 = 0.78%
t_{c_3} = 11 min (fig 1.5.1.2)

t_c = 33 + 5.5 + 11 = 49.5 min.

I_2 = 1.75 in/hr., Q_2 = 10.28 cfs

I_{10} = 3.1 in/hr., Q_{10} = 18.2 cfs

23.5
10.15
= .35 ac gain

Post-development

- Composite "C" Value -

seems low

	Area	C	CA
Roadside & Grass Channel	2.7	0.2	0.54
Business Neighborhood Areas	10.35	0.6	6.21
Residential	5.1	0.4	2.04
	ΣA = 18.15		ΣCA = 8.79

$C = \frac{CA}{A} = 0.48$

L = 3000' ΔElev. = 75 - 44 = 31'

t_c = 22 min (fig. 1.5.1.2)

$I_2 = \frac{130.3}{18.5+22} = 3.22$ in/hr., Q_2 = 28.05 cfs

$I_{10} = \frac{189.2}{22.1+22} = 4.29$ in/hr., Q_{10} = 37.37 cfs

— Critical Storm Duration for 10 Yr. Post-Dev.

$$T_c = \frac{\sqrt{2CAa(b - t_c/4)}}{q_o} - b$$

Trial 1

Given: $C = 0.48$
$A = 18.15$
$t_c = 22$ min.
$a = 189.2$
$b = 22.1$
$q_o = 10.28$ cfs (allowable peak outflow)

$$T_c = \frac{\sqrt{2(0.48)18.15(189.2)(22.1 - 22/4)}}{10.28} - 22.1$$

$T_c = 51$ min.

$t_c = 22$ min.

— Peak Inflow:

$$Q_o = CA\left[\frac{a}{b + T_c}\right] = 0.48(18.15)\left[\frac{189.2}{22.1 + 51}\right] = 22.5 \text{ cfs}$$

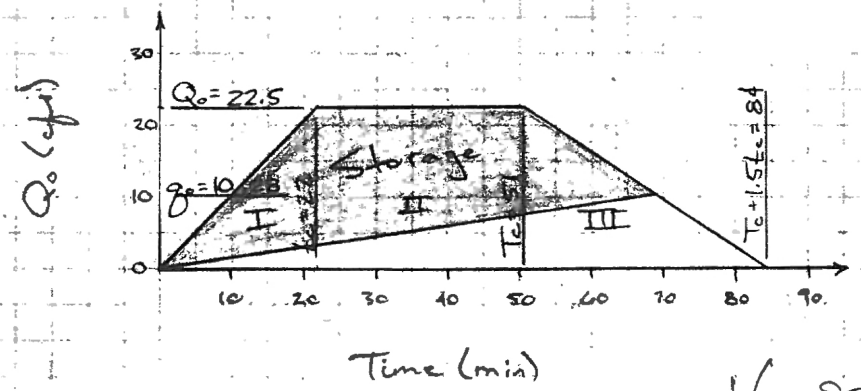
— Req'd Storage for Critical 10 Yr. Storm:

$$V = \left[Q_o T_c + \frac{Q_o t_c}{4} - \frac{q_o T_c}{2} - \frac{3 q_o t_c}{4}\right] 60$$

$$= \left[22.5(51) + \frac{22.5(22)}{4} - \frac{10.28(51)}{2} - \frac{3(10.28)22}{4}\right] 60$$

$$V = 50370 \text{ ft}^3$$

Check:



		Area
I	$22.5(22)\frac{1}{2} =$	247.5
II	$22.5(51-22) =$	652.5
III	$22.5(84-51)\frac{1}{2} =$	371.25
		1271.25

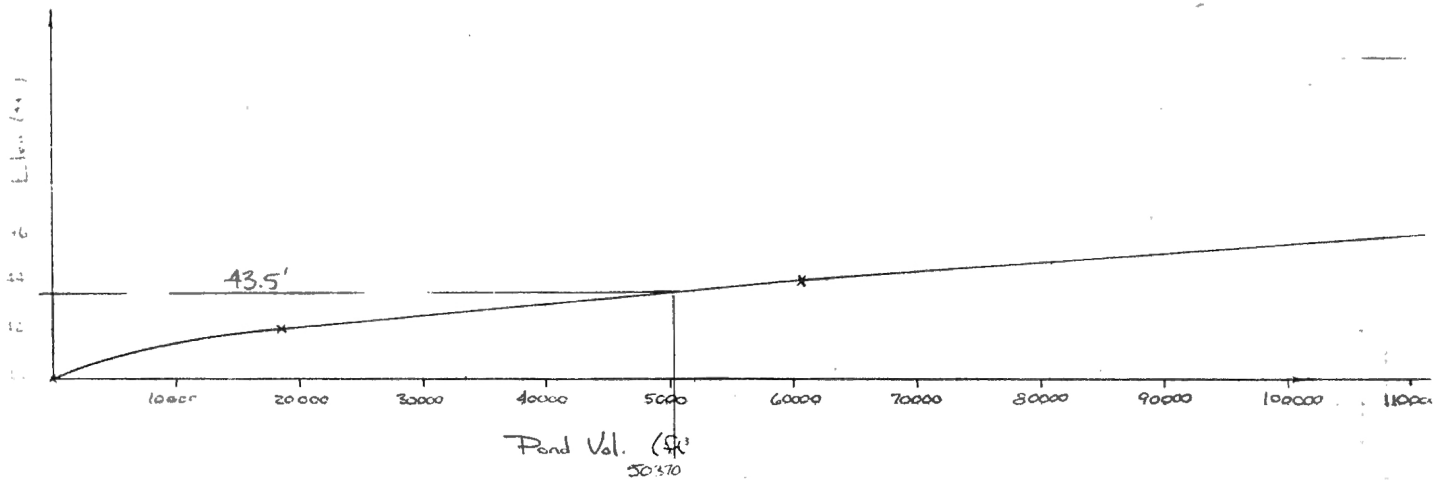
Unshaded Area
$-10.28(84)\frac{1}{2} = -\ 431.76$
839.49

$V = 839.5(60) = 50370 \text{ ft}^3$

Checks

"B"

Elev. (ft)	Area (ft^2)	Avg. Area (ft^2)	Depth (ft)	Incremental Vol (ft^3)	ΣVol (ft^3)
40	0				0
		9250	2	18500	
42	18500				18500
		21125	2	42250	
44	23750				60750
		27000	2	54000	
46	30250				114750



- Req'd Sediment Storage Vol.

$(23.5\ Ac \times 67\ ft^3/Ac.) = 1574.5\ ft^3$

→ Turned up pipe to be

42,511 cy for 18 ac
or 33,100

— Determine Pipe Size to Pass Q_2 Pre-dev.

Given: Pond Elev. = 43.5'
T_W = 1.5' (Assumed)
Q_2 = 14.34 cfs (pre-dev.)
HW = 43.5 - 40.0 = 3.5'

$HW = H + h_o - LS_o$

where: $h_o = T_W = 1.5'$
$LS_o = 30(0.025) = 0.75'$

$H = 3.5 - (1.5 - 0.75) = 2.75'$

$$H = \left[1 + K_e + \frac{29n^2L}{R^{1.33}}\right]\frac{V^2}{2g}$$

where: $K_e = 0.5$
$n = 0.015$ for RCP
$L = 30$
$R = A/W_p$

Try 18" Dia

$A = 1.77\ ft^2$
$WP = 4.71\ ft$
$R = 0.376$

$$2.75 = \left[1 + 0.5 + \frac{29(0.015)^2\,30}{0.376^{1.33}}\right]\frac{V^2}{2(32.2)}$$

$V = \sqrt{2.75(29.02)} = 8.93$ fps

$\therefore Q = 1.77(8.93) = 15.81$ cfs > 10.28 cfs

NG

Try 1.5 ~~~

$A = 1.23\ ft^2$
$WP = 3.93\ ft$
$R = 0.313$

$$2.75 = \left[1 + 0.5 + \frac{29(0.015)^2 30}{0.313^{1.33}}\right]\frac{V^2}{64.4}$$

$$V = \sqrt{2.75(26.64)} = 8.56\ fps$$

$$\therefore\ Q = 1.23(8.56) = 10.50\ cfs \quad \underline{\text{Close Enough}}$$

$$q_o = 10.50\ cfs$$

Trial 2

- Critical Storm Duration for 10 Yr. Post-Dev.:

$$T_c = \sqrt{\frac{2(0.48)\,18.15\,(189.2)(22.1 - 22/4)}{10.50}} - 22.1$$

$T_c = 50.0$ min

$t_c = 22$ min.

- Peak Inflow:

$$Q_o = 0.48(18.15)\left[\frac{189.2}{22.1 + 50.0}\right] = 22.9\ cfs$$

- Req'd Storage for Critical 10 Yr. Storm:

$$V = \left[22.9(50.0) + \frac{22.9(22)}{4} - \frac{10.50(50.0)}{2} - \frac{3(10.50)(22)}{4}\right]60$$

$$\underline{V = 50112\ ft^3} \rightarrow \text{Pond Elev.} = 43.5'$$

Conclusion: Detention Pond for Sec. II is designed to detain a 10 Yr. storm and release it at a 2yr. pre-development rate. The 10yr. detention pond elevation is at 43.5 ft and is released through a 15 in RCP pipe. The emergency spillway has an invert at 43.5 ft and is designed to operate in excess of 10 yr. storm events.

Sizing of Culvert Under Lakewood Dr. (Post Dev.) and Level Way

Composite "C" Value

Watershed	A	C	CA
A	9.18	0.3	2.75
B	0.5	0.45	0.23
Level Way to Rt 31	0.36	0.66	0.24
Rt 615 to Lakewood Dr	0.52	0.56	0.29
	10.56		3.51

$C = 3.51/10.56 = 0.33$

$A = 10.56$ Ac

L = 850 Overland Flow @ S = 3.3%
t_c = 27 min.

L = 1720 Channel Flow @ S = 0.58%
t_c = 17 min.

T_c = 44 min.

$I_2 = 1.8$ in/hr., $Q_2 = 6.27$ cfs

$I_{10} = 3.4$ in/hr., $Q_{10} = 11.85$ cfs

Use 3 - 14" x 23" Elliptical Pipe @ 0.2%
(Designated Equivalent = 18" Round)

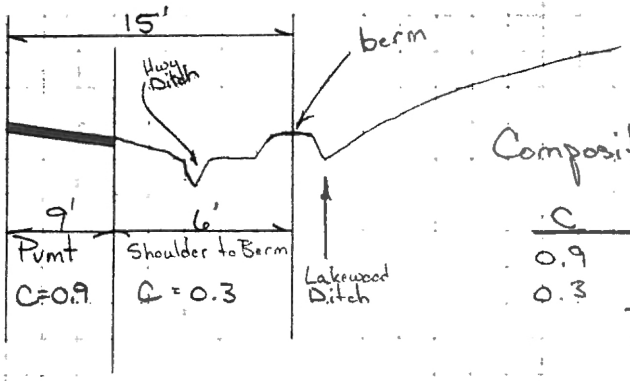
$Q_{cap} = 4.3$ cfs

$3 \times Q_{cap} = 12.9$ cfs > 11.85 cfs

Good

2/11/08

℄ of Rt 615 to Crest of Berm (From Level Way to Rt 31)



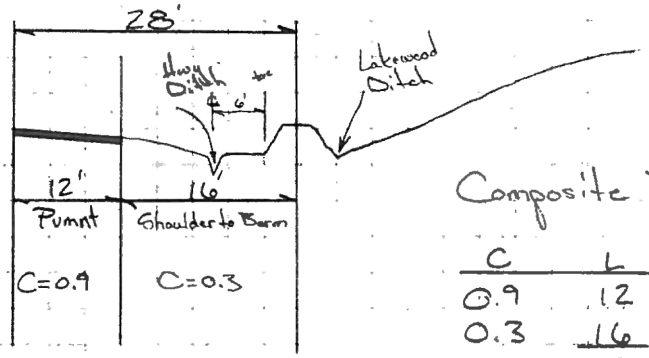
Composite "C" Value for ROW

C	L	CL
0.9	9	8.1
0.3	6	1.8
	15	9.9

$C = 9.9/15 = 0.66$

$A = 15'(1050') = 15750$ S.F. $= 0.36$ Ac.

℄ of Rt 31 to Crest of Berm (From Rt. 615 to Lakewood Dr.)



Composite "C" Value

C	L	CL
0.9	12	10.8
0.3	16	4.8
	28	15.6

$C = 15.6/28 = 0.56$

$A = 28'(810') = 22680$ S.F.± $= 0.52$ Ac.±

Sizing of Culvert at Level Way & Rt 615

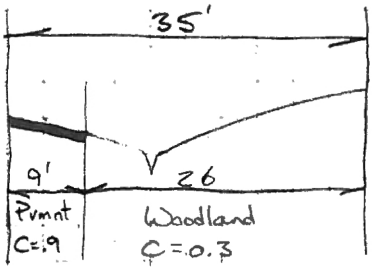
$A = 0.5\ Ac$

$C = 0.45$

$L = 390'$

$\Delta Elev. = 76 - 72.8 = 3.2'$

$S = 3.2/390 = 0.82\%$



Composite "C" Value

C	L	CL
0.9	9	8.1
0.3	26	7.8
	35	15.9

$C = 15.9/35 = 0.45$

$t_c = 21$ min

$I_2 = 3.0$ in/hr. , $Q = 0.68$ cfs

$I_{10} = 5.6$ in/hr. , $Q = 1.26$ cfs

Use a 15" RCP @ 2.1% $Q_{cap} = 8.5$ cfs **Good** ✓

Watershed A

$A = 9.18\ Ac \pm$

$C = 0.3$ (Residential)

Overland Flow $L = 850'$ $C = 0.3$ (Residential)

$\Delta Elev. = 78.4 - 50.1 = 28.3$

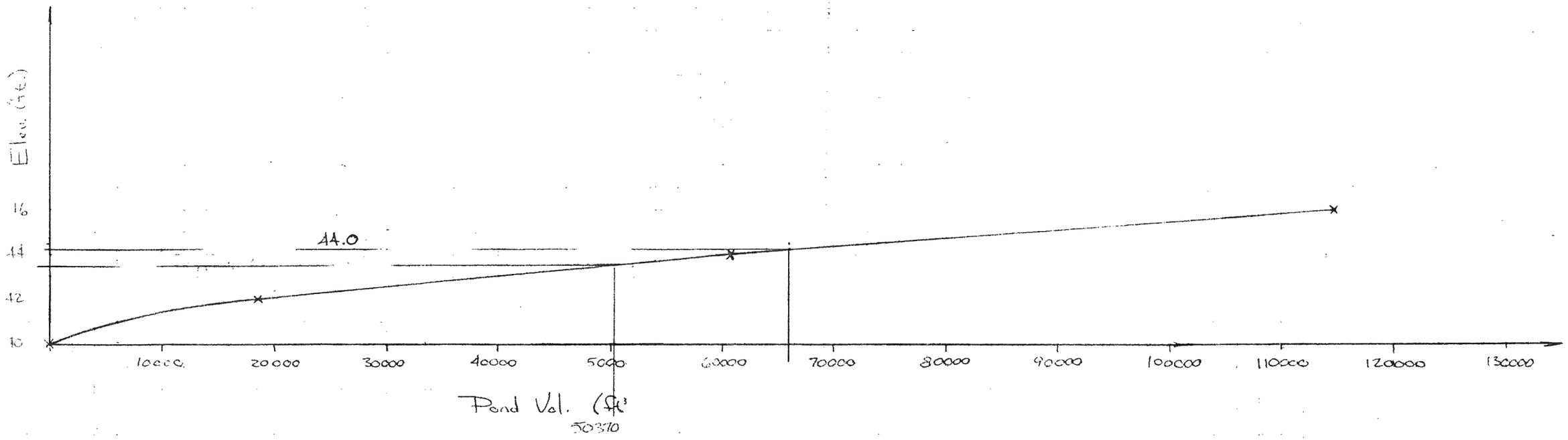
$S = 28.3/850 = 3.3\%$

$t_c = 27$ min.

3/

"B"

Elev. (ft)	Area (ft^2)	Avg. Area (ft^2)	Depth (ft)	Incremental Vol. (ft^3)	Σ Vol. (ft^3)
40	0				0
		9250	2	18500	
42	18500				18500
		21125	2	42250	
44	23750				60750
		27000	2	54000	
46	30250				114750



My Copy

Revised

Drainage Calcs

Lakewood Sec. II

#6240 Sew.
2/6/87

Detention Pond Design For Small Sites

Pre-development

A = 1022500 S.F. = = 23.5 Ac ±
C = 0.25 (Woodlands)

L = 580' Overland Flow ΔElev. = 76.4 - 70 = 6.4'
S = 6.4/580 = 1.1%
t_{c_1} = 33 min (Fig

L = 780' Channel Flow ΔElev. = 70. - 47 = 23
S = 23/780 = 2.9%
t_{c_2} = 5.5 min. (Fig 1 5.1.2)

L = 1020' Channel Flow ΔElev. = 47 - 39 = 8'
S = 8/1020 = 0.78%
t_{c_3} = 11 min (Fig 1.5.1.2)

t_c = 33 + 5.5 + 11 = 49.5 min.

I_2 = 1.75 in/hr. , Q_2 = 10.28 cfs

I_{10} = 3.1 in/hr. , Q_{10} = 18.2 cfs

Post-development

- Composite "C" Value -

	Area	C	CA
Roadside & Grass Channel	2.7	0.2	0.54
Business Neighborhood Areas	10.35	0.6	6.21
Residential	5.1	0.4	2.04
	ΣA = 18.15		ΣCA = 8.79

$C = \frac{CA}{A} = 0.48$

L = 3000' ΔElev. = 75' - 44' = 31'

t_c = 22 min (Fig 1.5.1.2)

$I_2 = \frac{130.3}{18.5+22} = 3.22$ in/hr. , Q_2 = 28.05 cfs

$I_{10} = \frac{189.2}{22.1+22} = 4.29$ in/hr. , Q_{10} = 37.37 cfs

— Critical Storm Duration for 10 Yr. Post-Dev.

$$T_c = \frac{\sqrt{2CA_a(b - t_c/4)}}{q_o} - b$$

Trial 1

Given: $C = 0.48$
$A = 18.15$
$t_c = 22$ min.
$a = 189.2$
$b = 22.1$
$q_o = 10.28$ cfs (allowable peak outflow)

$$T_c = \frac{\sqrt{2(0.48)18.15(189.2)(22.1 - 22/4)}}{10.28} - 22.1$$

$T_c = 51$ min.

$t_c = 22$ min.

— Peak Inflow:

$$Q_o = CA\left[\frac{a}{b + T_c}\right] = 0.48(18.15)\left[\frac{189.2}{22.1 + 51}\right] = 22.5 \text{ cfs}$$

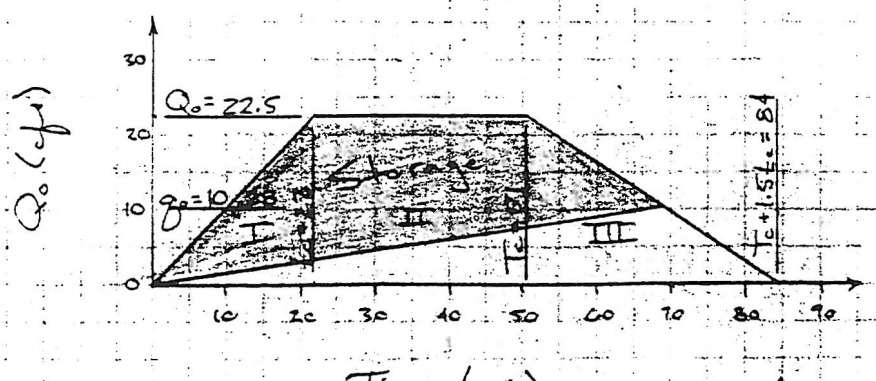
— Req'd Storage for Critical 10 Yr. Storm:

$$V = \left[Q_o T_c + \frac{Q_o t_c}{4} - \frac{q_o T_c}{2} - \frac{3 q_o t_c}{4}\right] 60$$

$$= \left[22.5(51) + \frac{22.5(22)}{4} - \frac{10.28(51)}{2} - \frac{3(10.28)22}{4}\right] 60$$

$$V = 50370 \text{ ft}^3$$

Check:

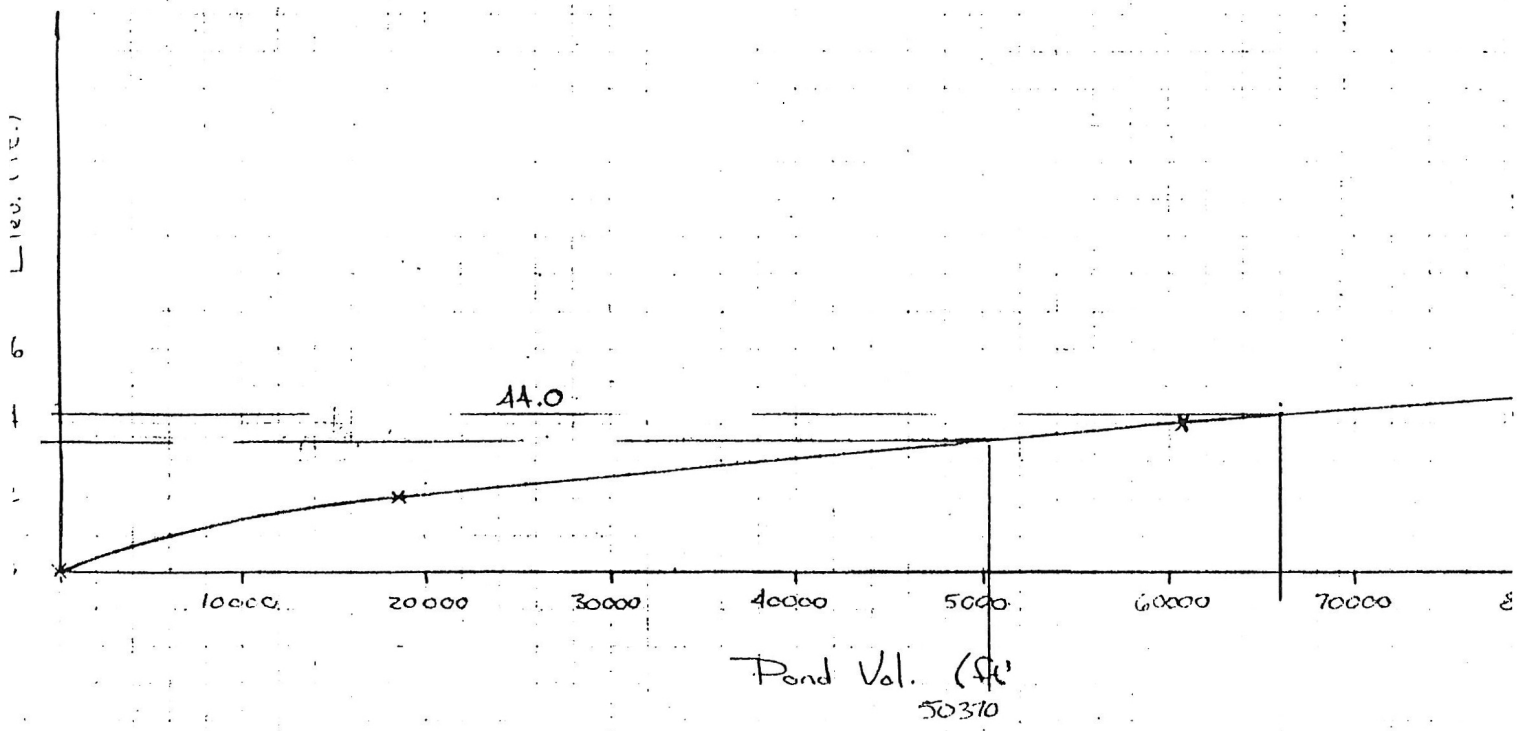


		Area
I	$22.5(22)\frac{1}{2} =$	247.5
II	$22.5(51-22) =$	652.5
III	$22.5(84-51)\frac{1}{2} =$	371.25
		1271.25
Unshaded Area	$-10.28(84)\frac{1}{2} =$	− 431.76
		839.49

$V = 839.5(60) = 50370 \text{ ft}^3$

Checks

Elev. (ft)	Area (ft^2)	Avg. Area (ft^2)	Depth (ft)	Incremental Vol. (ft^3)	Σ Vol. (ft^3)
40	0				0
		9250	2	18500	
42	18500				18500
		21125	2	42250	
44	23750				60750
		27000	2	54000	
46	30250				114750



Critical Storm Duration for 25 yr. Post-Dev.

Pre-development

$A = 23.5\ Ac =$
$C = 0.25$

$t_c = 49.5$ min.

$I_2 = 1.75$ in/hr. , $Q_2 = 10.28$ cfs
$I_{10} = 3.1$ in/hr , $Q_{10} = 18.2$ cfs
$I_{25} = 3.75$ in/hr. , $Q_{25} = 22.0$ cfs

Post-development

$A = 18.15\ Ac =$
$C = 0.48$

$t_c = 22$ min. (Fig. 1.5.12.)

$I_2 = 3.22$ in/hr , $Q_2 = 28.05$ cfs
$I_{10} = 4.29$ in/hr. , $Q_{10} = 37.37$ cfs
$I_{25} = 5.5$ in/hr. , $Q_{25} = 47.92$ cfs (chart)

$I = \frac{a}{b+T}$

Outlet Structure:

Try $30'-\binom{12}{15}$" RCP @ 2.5% Inv. In = 40.00'
Inv. Out = 39.25'

Determine outflow by assuming inlet control (Chart 2)

Pond Surf. Elev. (ft.)	HW (ft)	HW/D 12" ⇐ D ⇒ 15"		Q(cfs) 12" ⇐ D ⇒ 15"	
43.0	3.0	3.0	2.4	7.5	11
43.5	3.5	3.5	2.8	8.5	12
44.0	4.0	4.0	3.2	9.0	13
44.5	4.5	4.5	3.6	9.5	14
45.0	5.0	5.0	4.0	10.0	15

25 yr. Storm $Q_{in} = 47.9$ cfs

Try Elev. 43.0 $q_o = 7.5$ cfs

Storage = 39000 ft³

$V_o = 75(t_c)(Q_{in} - q_o) = 75(22)(47.9 - 7.5) = 666000$ ft³ (Low)

Try Elev. 44.0 $q_o = 9.0$ cfs

Storage = 60000 ft³

$V_o = 75(22)(47.9 - 9.0) = 64200$ ft³ (Low)

Try Elev. 44.25 $q_o = 9.25$ cfs

Storage = 66000 ft³

$V_o = 75(22)(47.9 - 9.25) = 63750$ ft³ (Close Enough)

25 yr. Storm Elev. = 44.25 ft. $Q = 9.25$ cfs < 10.28 cfs Good

Use 12" RCP

- Req'd Sediment Storage Vol.

$(23.5\ Ac)(67\ yd^3/Ac.)(27\ ft^3/yd^3) = 42500\ ft^3$

A temporary riser structure is to be place at the enterance of the culvert to elevation 43.0 ft.

Conclusion :

Detention Pond for Sec. II is designed to detain a 25 yr. storm event and release it at a rate 2 yr. pre-development rate. The 25 yr. detention pond elevation is at 44.25 ft. and is released through a 12 inch RCP. The emergency spillway has an invert at 44.25 ft. and is designed to operate in excess of the 25 yr. storm event.

For Public Works

Pre-development Calc's to Existing 18" Culvert Under Rt. 31

± 66.90

2/12/87

D.A. = 34.78 Ac. ±

Composite "C" Value

Watershed	A	C	CA
A	9.18	0.3	2.75
Lakewood Area	25.6	0.25	6.4
	34.78		9.15

$C = 9.11 / 34.78 = 0.26$

L = 850' Overland Flow
ΔElev = 28.3'
S = 3.3%
t_{c_1} = 27 min (fig 1.5.1.1)

L = 1720' Roadside Channel Flow
ΔElev = 10'
S = 0.58%
t_{c_2} = 17 min (fig 1.5.1.2)

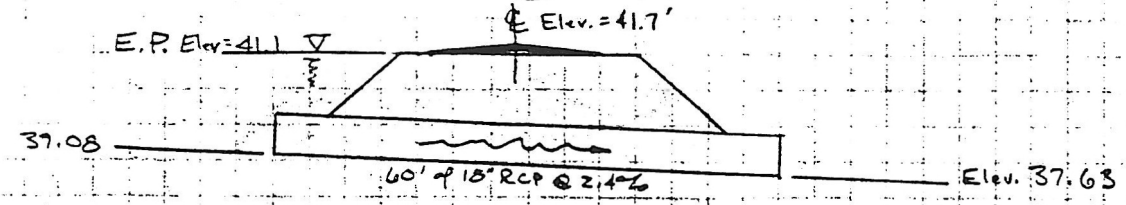
$T_c = t_{c_1} + t_{c_2}$ = 44 min

I_2 = 1.8 in/hr , Q_2 = 16.3 cfs

I_{10} = 3.4 in/hr. , Q_{10} = 30.7 cfs

Upon field inspection it is discovered that the culvert outlet is presently half filled with earth and a proper swale leaving the culvert does not exist. By redefining the swale and flushing the pipe the hydraulic performance of the culvert can be improved. Thus, the stormwater from the culvert will flow away from a roadway fill via a swale which will then transition to sheet flow following the natural drainage pattern to Powhatan Creek.

Assume W.S. @ shoulder elev. (Worst condition)



Check Capacity of 18" RCP Culvert Under Rt 31

Known: Dia = 18"
Length = 60'
Inv. In = 39.08'
Inv. Out = 37.63
Slope = 2.4%

Q_{cap} = 15 cfs
V = 8.47 fps
d_c = 1.45 ft
$h_o = \frac{d_c + D}{2}$
$HW = H + h_o - LS_o$

Inlet Control

Assume: HW = 41.1 − 39.08 = 2.02', HW/D = 1.35
Groove end w/ headwall

Q = 10 cfs (Chart 2)

Outlet Control

Downstream obstructions establishing a tailwater surface equal to or greater than the top of the culvert outlet do not exist. Therefore $TW \leq D$. Assume flow at Q_{cap}, 15 cfs

V = 8.47, A = 1.77 S.F, d_c = 1.45 ft, W_p = 4.14 S.F (by Seeley Pg. 18-73, fig. 8)
R = 0.377 $H = \left[1 + 0.5 + \frac{29(0.015)^2(60)}{0.427^{1.33}}\right]\frac{8.47^2}{64.4} = 3.02$ → HW = 3.02 + 1.475 − 1.44 = 3.0

Inv. In Elev. (39.08) + (3.05) + HW = 42.13' is well above the road surface elevation and highly unlik.

Assume $T_w = D = h_o = 1.5' > d_c$, H = 2.02 − 1.5 + 1.44 = 1.96' then from Chart 2

Q = 11.5 cfs > 10 cfs

Conclude: Inlet Controls

Conclusion:

Presently the 18" culvert recieves a Q_{total} = 30.7 cfs from a 34.78 Ac. ± watershed during a 10 yr. storm event. The watershed is 27% residential and 73% woodlands. Based on field data and the assumption that headwater equals 1.35 times the diameter of the entrance culvert, it is determined that the culvert operates under inlet controled conditions at a capacity of Q_{cap} = 10 cfs. Therefore the 18 inch culvert is inadequate to function properly within a 10yr. or 2yr. storm event.

Drainage Calcs

Lakewood Sec. II

#6240 SGH 2/6/87

Detention Pond Design For Small Sites

Pre-development

A = 1022500 S.F. ± = 23.5 Ac ±
C = 0.25 (Woodlands)

L = 580' Overland Flow ΔElev. = 76.4 − 70 = 6.4'
S = 6.4/580 = 1.1%
t_{c_1} = 33 min (fig.

L = 780' Channel Flow ΔElev. = 70. − 47 = 23
S = 23/780 = 2.9%
t_{c_2} = 5.5 min. (fig 1.5.1.2)

L = 1020' Channel Flow ΔElev. = 47 − 39 = 8'
S = 8/1020 = 0.78%
t_{c_3} = 11 min (fig 1.5.1.2)

t_c = 33 + 5.5 + 11 = 49.5 min.

I_2 = 1.75 in/hr., Q_2 = 10.28 cfs ✓

I_{10} = 3.1 in/hr., Q_{10} = 18.2 cfs

23.5
18.15
5.35 are gone

Post-development

- Composite "C" Value -

	Area	C	CA
Rdside & Grass Channel	2.7	0.2	0.54
Business Neighborhood Areas	10.35	0.6	4.21
Residential	5.1	0.4	2.04
	ΣA = 18.15		ΣCA = 8.79

$C = \frac{CA}{A} = 0.48$

L = 3000' ΔElev. = 75' − 44' = 31'

t_c = 22 min (fig. 1.5.1.2)

$I_2 = \frac{130.3}{18.5+22} = 3.22$ in/hr., Q_2 = 28.05 cfs

$I_{10} = \frac{189.2}{22.1+22} = 4.29$ in/hr., Q_{10} = 37.37 cfs

— Critical Storm Duration for 10 Yr. Post-Dev.

$$T_c = \frac{\sqrt{2CAa(b - t_c/4)}}{q_o} - b$$

Trial 1

Given: $C = 0.48$
$A = 18.15$
$t_c = 22$ min.
$a = 189.2$
$b = 22.1$
$q_o = 10.28$ cfs (allowable peak outflow)

$$T_c = \frac{\sqrt{2(0.48)18.15(189.2)(22.1 - 22/4)}}{10.28} - 22.1$$

$T_c = 51$ min.

$t_c = 22$ min.

— Peak Inflow:

$$Q_o = CA\left[\frac{a}{b + T_c}\right] = 0.48(18.15)\left[\frac{189.2}{22.1 + 51}\right] = 22.5 \text{ cfs}$$

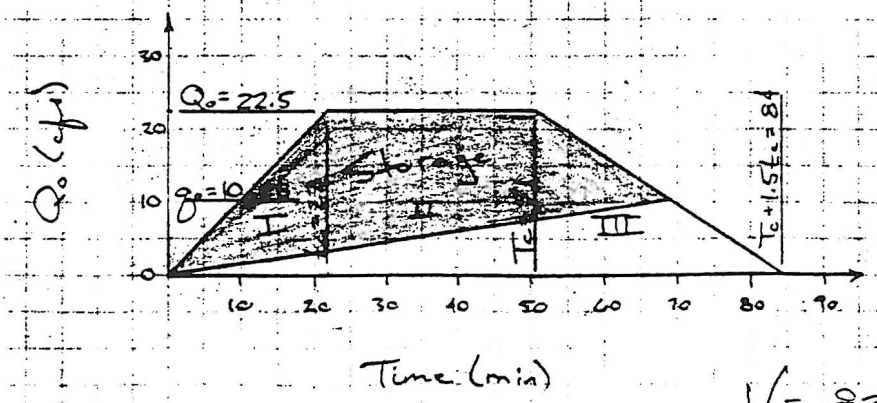
— Req'd Storage for Critical 10 Yr. Storm:

$$V = \left[Q_o T_c + \frac{Q_o t_c}{4} - \frac{q_o T_c}{2} - \frac{3 q_o t_c}{4}\right] 60$$

$$= \left[22.5(51) + \frac{22.5(22)}{4} - \frac{10.28(51)}{2} - \frac{3(10.28)22}{4}\right] 60$$

$$V = 50370 \text{ ft}^3$$

Check:

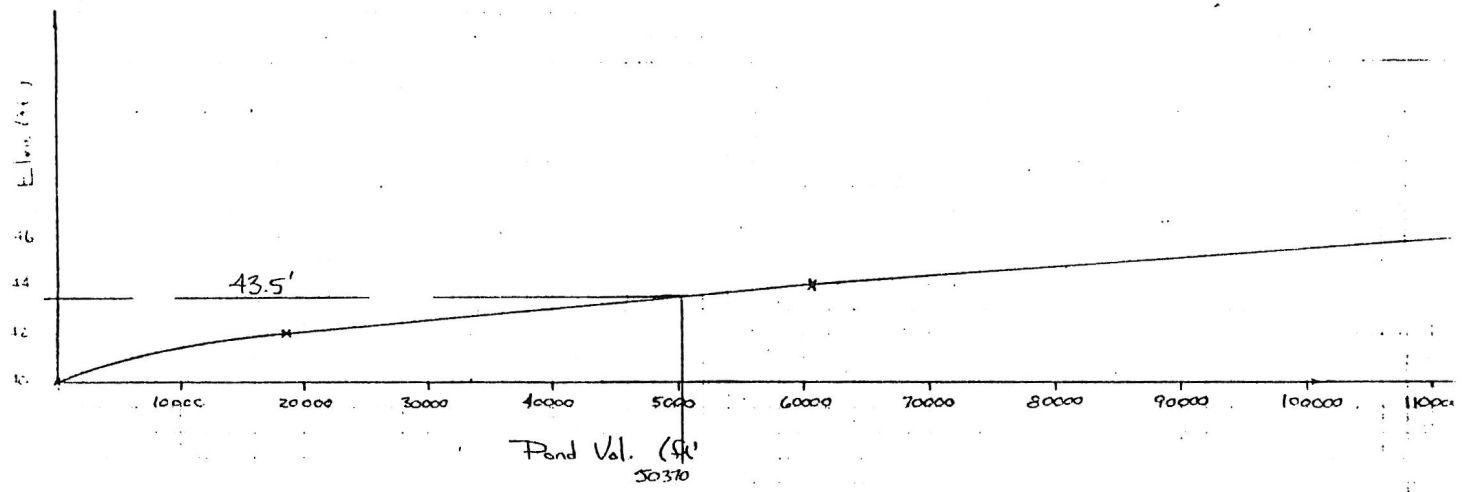


	Area	
I	22.5(22)½ =	247.5
II	22.5(51-22) =	652.5
III	22.5(84-51)½ =	371.25
		1271.25
Unshaded Area	−10.28(84)½ =	− 431.76
		839.49

$V = 839.5(60) = 50370 \text{ ft}^3$

Checks

Elev. (ft)	Area (ft^2)	Avg. Area (ft^2)	Depth (ft)	Incremental Vol. (ft^3)	Σ Vol. (ft^3)
40	0				0
		9250	2	18500	
42	18500				18500
		21125	2	42250	
44	23750				60750
		27000	2	54000	
46	30250				114750



- Req'd Sediment Storage Vol.

$(23.5\ Ac \times 67\ ft^3/Ac.) = 1574.5\ ft^3$

→ Turned up pipe to be 42,511 (y) for 18 ac or 33,100

— Determine Pipe Size to Pass Q_2 Pre-dev.

Given: Pond Elev. = 43.5'
T_W = 1.5' (Assumed)
Q_2 = 14.34 cfs (pre-dev.)
HW = 43.5 - 40.0 = 3.5'

$HW = H + h_o - LS_o$

where: $h_o = T_W = 1.5'$
$LS_o = 30(0.025) = 0.75'$

$H = 3.5 - (1.5 - 0.75) = 2.75'$

$$H = \left[1 + K_e + \frac{29n^2L}{R^{1.33}}\right]\frac{V^2}{2g}$$

where: $K_e = 0.5$
$n = 0.015$ for RCP
$L = 30$
$R = A/W_p$

Try 18" = Dia

$A = 1.77\ ft^2$
$WP = 4.71\ ft$
$R = 0.376$

$$2.75 = \left[1 + 0.5 + \frac{29(0.015)^2 30}{0.376^{1.33}}\right]\frac{V^2}{2(32.2)}$$

$$V = \sqrt{2.75(29.02)} = 8.93\ fps$$

$\therefore Q = 1.77(8.93) = 15.81\ cfs > 10.28\ cfs$

NG

Try 15 :

$A = 1.23\ ft^2$
$WP = 3.93\ ft$
$R = 0.313$

$$2.75 = \left[1 + 0.5 + \frac{29(0.015)^2 30}{0.313^{1.33}}\right]\frac{V^2}{64.4}$$

$$V = \sqrt{2.75(26.64)} = 8.56\ fps$$

$\therefore Q = 1.23(8.56) = 10.50\ cfs$ Close Enough

$q_o = 10.50\ cfs$

Trial 2

– Critical Storm Duration for 10 Yr. Post-Dev.:

$$T_c = \sqrt{\frac{2(0.48)18.15(189.2)(22.1 - 22/4)}{10.50}} - 22.1$$

$T_c = 50.0\ min$

$t_c = 22\ min.$

– Peak Inflow:

$$Q_o = 0.48(18.15)\left[\frac{189.2}{22.1 + 50.0}\right] = 22.9\ cfs$$

– Req'd Storage for Critical 10 Yr. Storm:

$$V = \left[22.9(50.0) + \frac{22.9(22)}{4} - \frac{10.50(50.0)}{2} - \frac{3(10.50)(22)}{4}\right]60$$

$V = 5011.2\ ft^3$ → Pond Elev. = 43.5'

Conclusion: Detention Pond for Sec. II is designed to detain a 10 Yr. storm and release it at a 2yr. pre-development rate. The 10yr. detention pond elevation is at 43.5 ft and is released through a 15 in RCP pipe. The emergency spillway has an invert at 43.5 ft and is designed to operate in excess of 10 yr. storm events.

Sizing of Culvert Under Lakewood Dr. (Post Dev.) and Level Way

Composite "C" Value

Watershed	A	C	CA
A	9.18	0.3	2.75
B	0.5	0.45	0.23
Level Way to Rt 31	0.36	0.66	0.24
Rt 615 to Lakewood Dr	0.52	0.56	0.29
	10.56		3.51

$C = 3.51/10.56 = 0.33$

$A = 10.56$ Ac

L = 850 Overland Flow @ S = 3.3%
t_c = 27 min.

L = 1720 Channel Flow @ S = 0.58%
t_c = 17 min.

T_c = 44 min.

$I_2 = 1.8$ in/hr., $Q_2 = 6.27$ cfs

$I_{10} = 3.4$ in/hr., $Q_{10} = 11.85$ cfs

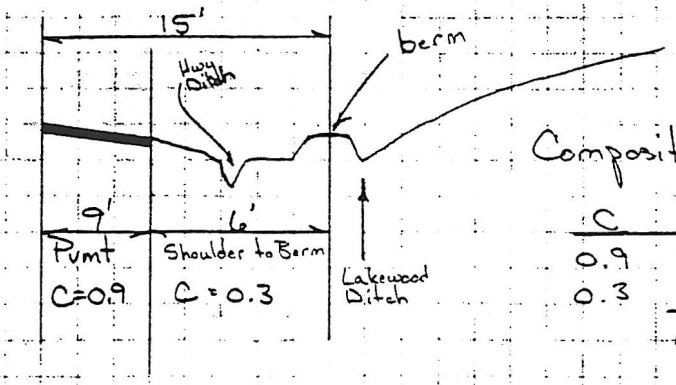
Use 3 - 14" x 23" Elliptical Pipe @ 0.2%
(Designated Equivalent = 18" Round)

$Q_{cap} = 4.3$ cfs

$3 \times Q_{cap} = 12.9$ cfs > 11.85 cfs

Good

℄ of Rt 615 to Crest of Berm (From Level Way to Rt 31)



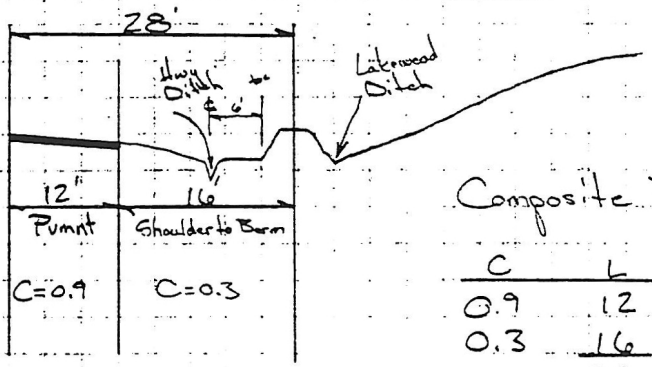
Composite "C" Value for ROW

C	L	CL
0.9	9	8.1
0.3	6	1.8
	15	9.9

$C = 9.9/15 = 0.66$

$A = 15'(1050') = 15750$ S.F. $= 0.36$ Ac.

℄ of Rt 31 to Crest of Berm (From Rt. 615 to Lakewood Dr.)



Composite "C" Value

C	L	CL
0.9	12	10.8
0.3	16	4.8
	28	15.6

$C = 15.6/28 = 0.56$

$A = 28'(810') = 22680$ S.F.± $= 0.52$ Ac.±

Sizing of Culvert at Level Way & Rt 615

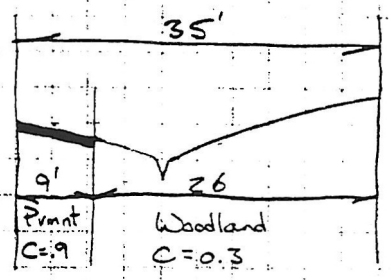
$A = 0.5\ Ac$

$C = 0.45$

$L = 390'$

$\Delta Elev. = 76 - 72.8 = 3.2'$

$S = 3.2/390 = 0.82\%$



Composite "C" Value

C	L	CL
0.9	9	8.1
0.3	26	7.8
	35	15.9

$C = 15.9/35 = 0.45$

$t_c = 21$ min

$I_2 = 3.0$ in/hr. , $Q = 0.68$ cfs

$I_{10} = 5.6$ in/hr. , $Q = 1.26$ cfs

Use a 15" RCP @ 2.1% $Q_{cap} = 8.5$ cfs. **Good** ✓

Watershed A

$A = 9.18\ Ac \pm$

$C = 0.3$ (Residential)

Overland Flow $L = 850'$ $C = 0.3$ (Residential)

$\Delta Elev. = 78.4 - 50.1 = 28.3$

$S = 28.3/850 = 3.3\%$

$t_c = 27$ min.

Hydrograph Summary Report

SP-66-02
MC 003

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Return period (yrs)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	Manual	13.66	22	66	59,334	1	----	------	------	1-Yr. Pre-Develope
2	Manual	16.40	22	66	71,227	2	----	------	------	2-Yr. Pre-Develope
3	Manual	22.85	22	66	99,224	10	----	------	------	10-Yr. Pre-Develop
4	Manual	26.26	22	66	114,061	25	----	------	------	25-Yr. Pre-Develop
5	Manual	31.73	22	66	137,768	100	----	------	------	100-Yr. Pre-Develo
6	Manual	14.38	22	66	62,436	1	----	------	------	1-Yr. Post-Develop
7	Manual	17.26	22	66	74,976	2	----	------	------	2-Yr. Post-Develop
8	Manual	24.05	22	66	108,860	10	----	------	------	10-Yr. Post-Develo
9	Manual	27.64	22	66	120,041	25	----	------	------	25-Yr. Post-Develo
10	Manual	33.40	22	66	145,028	100	----	------	------	100-Yr. Post-Devel
11	Reservoir	6.04	22	110	59,334	1	1	42.28	23,225	Orig. 1-Yr design
12	Reservoir	6.80	22	110	71,227	2	2	42.48	27,538	Original 2-Yr desi
13	Reservoir	8.66	22	110	99,224	10	3	43.08	40,265	Orig 10-Yr. Design
14	Reservoir	9.55	22	110	114,061	25	4	43.42	47,408	Orig. 25-Yr Design
15	Reservoir	10.88	22	110	137,768	100	5	43.99	59,357	Orig 100-Yr Design
16	Reservoir	6.23	22	110	62,436	1	6	42.33	24,287	Orig. 1-Yr Post
17	Reservoir	7.05	22	110	74,976	2	7	42.55	29,087	Orig. 2-Yr Post
18	Reservoir	8.99	22	110	108,860	10	8	43.20	42,748	Orig. 10-Yr Post
19	Reservoir	9.90	22	110	120,041	25	9	43.56	50,367	Orig. 25-Yr Post
20	Reservoir	11.19	22	110	145,028	100	10	44.13	63,186	Orig. 100-Yr Post
21	Reservoir	9.59	22	88	62,436	1	6	44.12	17,757	Proposed Design 1-
22	Reservoir	10.04	22	88	74,976	2	7	44.30	20,853	Proposed Design 2-
23	Reservoir	11.75	22	88	108,860	10	8	45.08	34,056	Proposed Design 10
24	Reservoir	12.54	22	110	120,041	25	9	45.48	40,817	Proposed Design 25
25	Reservoir	13.74	22	110	145,028	100	10	46.14	51,911	Proposed Design 10

DHW

BMP #1

MODIFICATION TO RISER AS PART OF SP-66-02 GRACE COV. PRES CHURCH

Proj. file: swmfdesign.GPW	IDF file: Norfolk.IDF	Run date: 07-16-2002

Hydrograph Report

English

Hyd. No. 7

2-Yr. Post-Developed

Hydrograph type	= Manual	Peak discharge	= 17.26 cfs
Storm frequency	= 2 yrs	Time interval	= 22 min

Total Volume = 74,976 cuft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.37	3.63
0.73	5.18
1.10	17.26 <<
1.47	9.32
1.83	6.73
2.20	4.32
2.57	3.11
2.93	2.59
3.30	2.42
3.67	2.24

...End

Hydrograph Report

English

Hyd. No. 8

10-Yr. Post-Developed

Hydrograph type	= Manual	Peak discharge	= 24.05 cfs
Storm frequency	= 10 yrs	Time interval	= 22 min

Total Volume = 108,860 cuft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.37	5.05
0.73	7.21
1.10	24.05 <<
1.47	12.99
1.83	9.38
2.20	6.01
2.57	4.33
2.93	3.61
3.30	3.37
3.67	3.34
4.03	3.13

...End

Hydrograph Report

English

Hyd. No. 9

25-Yr. Post-Developed

Hydrograph type	= Manual	Peak discharge	= 27.64 cfs
Storm frequency	= 25 yrs	Time interval	= 22 min

Total Volume = 120,041 cuft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)
0.37	5.80
0.73	8.29
1.10	27.64 <<
1.47	14.93
1.83	10.78
2.20	6.91
2.57	4.98
2.93	4.15
3.30	3.87
3.67	3.59

...End

Hydrograph Report

English

Hyd. No. 10

100-Yr. Post-Developed

Hydrograph type	= Manual	Peak discharge	= 33.40 cfs
Storm frequency	= 100 yrs	Time interval	= 22 min

Total Volume = 145,028 cuft

Hydrograph Discharge Table

Time (hrs)	Outflow cfs)
0.37	7.01
0.73	10.02
1.10	33.40 <<
1.47	18.03
1.83	13.02
2.20	8.35
2.57	6.01
2.93	5.01
3.30	4.68
3.67	4.34

...End

Hydrograph Report

English

Hyd. No. 11

Orig. 1-Yr design

Hydrograph type	= Reservoir	Peak discharge	= 6.04 cfs
Storm frequency	= 1 yrs	Time interval	= 22 min
Inflow hyd. No.	= 1	Reservoir name	= Original Design
Max. Elevation	= 42.28 ft	Max. Storage	= 23,225 cuft

Storage Indication method used.

Total Volume = 59,334 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
0.37	2.87	40.32	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
0.73	4.10	40.74	0.89	-----	-----	-----	-----	-----	-----	-----	0.89
1.10	13.66 <<	41.72	3.11	-----	-----	-----	-----	-----	-----	-----	3.11
1.47	7.38	42.25	5.95	-----	-----	-----	-----	-----	-----	-----	5.95
1.83	5.33	42.28 <<	6.04	-----	-----	-----	-----	-----	-----	-----	6.04 <<
2.20	3.41	42.18	5.67	-----	-----	-----	-----	-----	-----	-----	5.67
2.57	2.46	42.03	4.99	-----	-----	-----	-----	-----	-----	-----	4.99
2.93	2.05	41.79	3.60	-----	-----	-----	-----	-----	-----	-----	3.60
3.30	1.91	41.64	2.44	-----	-----	-----	-----	-----	-----	-----	2.44
3.67	1.78	41.56	2.32	-----	-----	-----	-----	-----	-----	-----	2.32
4.03	0.00	41.37	2.20	-----	-----	-----	-----	-----	-----	-----	2.20
4.40	0.00	41.09	1.68	-----	-----	-----	-----	-----	-----	-----	1.68
4.77	0.00	40.88	1.23	-----	-----	-----	-----	-----	-----	-----	1.23
5.13	0.00	40.73	0.86	-----	-----	-----	-----	-----	-----	-----	0.86
5.50	0.00	40.63	0.62	-----	-----	-----	-----	-----	-----	-----	0.62
5.87	0.00	40.55	0.47	-----	-----	-----	-----	-----	-----	-----	0.47
6.23	0.00	40.49	0.35	-----	-----	-----	-----	-----	-----	-----	0.35
6.60	0.00	40.44	0.29	-----	-----	-----	-----	-----	-----	-----	0.29
6.97	0.00	40.41	0.24	-----	-----	-----	-----	-----	-----	-----	0.24
7.33	0.00	40.38	0.19	-----	-----	-----	-----	-----	-----	-----	0.19
7.70	0.00	40.35	0.16	-----	-----	-----	-----	-----	-----	-----	0.16
8.07	0.00	40.33	0.13	-----	-----	-----	-----	-----	-----	-----	0.13
8.43	0.00	40.31	0.11	-----	-----	-----	-----	-----	-----	-----	0.11
8.80	0.00	40.30	0.10	-----	-----	-----	-----	-----	-----	-----	0.10
9.17	0.00	40.28	0.09	-----	-----	-----	-----	-----	-----	-----	0.09
9.53	0.00	40.27	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
9.90	0.00	40.26	0.08	-----	-----	-----	-----	-----	-----	-----	0.08
10.27	0.00	40.25	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
10.63	0.00	40.24	0.07	-----	-----	-----	-----	-----	-----	-----	0.07
11.00	0.00	40.23	0.06	-----	-----	-----	-----	-----	-----	-----	0.06

...End

Reservoir Report

English

Reservoir No. 2 - Original Design

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	40.12	00	0	0
1.88	42.00	18,500	17,390	17,390
3.88	44.00	23,750	42,250	59,640
5.88	46.00	30,250	54,000	113,640

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 18.0	0.0	0.0	0.0
Span in	= 18.0	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 40.12	0.00	0.00	0.00
Length ft	= 150.0	0.0	0.0	0.0
Slope %	= 0.07	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= -----	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	0.00	0.00	0.00
Crest El. ft	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 0.00	0.00	0.00	0.00
Eqn. Exp.	= 0.00	0.00	0.00	0.00
Multi-Stage	= No	No	No	No

Tailwater Elevation = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	40.12	0.00	---	---	---	---	---	---	---	0.00
0.19	1,739	40.31	0.10	---	---	---	---	---	---	---	0.10
0.38	3,478	40.50	0.36	---	---	---	---	---	---	---	0.36
0.56	5,217	40.68	0.74	---	---	---	---	---	---	---	0.74
0.75	6,956	40.87	1.21	---	---	---	---	---	---	---	1.21
0.94	8,695	41.06	1.62	---	---	---	---	---	---	---	1.62
1.13	10,434	41.25	2.02	---	---	---	---	---	---	---	2.02
1.32	12,173	41.44	2.30	---	---	---	---	---	---	---	2.30
1.50	13,912	41.62	2.33	---	---	---	---	---	---	---	2.33
1.69	15,651	41.81	3.80	---	---	---	---	---	---	---	3.80
1.88	17,390	42.00	4.84	---	---	---	---	---	---	---	4.84

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Hydrograph Report

English

Hyd. No. 21

Proposed Design 1-Yr

Hydrograph type	= Reservoir	Peak discharge	= 9.59 cfs
Storm frequency	= 1 yrs	Time interval	= 22 min
Inflow hyd. No.	= 6	Reservoir name	= Modified Origin
Max. Elevation	= 44.12 ft	Max. Storage	= 17,757 cuft

Storage Indication method used.

Total Volume = 62,436 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
0.37	3.02	42.15	2.31	0.24	-----	-----	-----	-----	-----	-----	0.24
0.73	4.31	42.74	5.11	0.30	-----	-----	-----	-----	-----	-----	0.30
1.10	14.38 <<	43.76	8.65	0.34	-----	-----	6.46	-----	-----	-----	6.80
1.47	7.76	44.12 <<	9.59	0.08	-----	-----	23.19	-----	-----	-----	9.59 <<
1.83	5.61	43.86	8.92	0.28	-----	-----	10.26	-----	-----	-----	8.42
2.20	3.59	43.64	8.33	0.36	-----	-----	2.85	-----	-----	-----	3.21
2.57	2.59	43.64	8.31	0.36	-----	-----	2.67	-----	-----	-----	3.04
2.93	2.16	43.61	8.23	0.37	-----	-----	1.70	-----	-----	-----	2.07
3.30	2.01	43.61	8.23	0.37	-----	-----	1.72	-----	-----	-----	2.09
3.67	1.87	43.60	8.21	0.37	-----	-----	1.50	-----	-----	-----	1.87
4.03	0.00	43.50	7.91	0.36	-----	-----	0.76	-----	-----	-----	1.12
4.40	0.00	43.37	7.51	0.35	-----	-----	-----	-----	-----	-----	0.35
4.77	0.00	43.31	7.31	0.35	-----	-----	-----	-----	-----	-----	0.35
5.13	0.00	43.25	7.11	0.34	-----	-----	-----	-----	-----	-----	0.34
5.50	0.00	43.19	6.91	0.34	-----	-----	-----	-----	-----	-----	0.34
5.87	0.00	43.13	6.70	0.33	-----	-----	-----	-----	-----	-----	0.33
6.23	0.00	43.07	6.49	0.33	-----	-----	-----	-----	-----	-----	0.33
6.60	0.00	43.02	6.28	0.32	-----	-----	-----	-----	-----	-----	0.32
6.97	0.00	42.96	6.05	0.32	-----	-----	-----	-----	-----	-----	0.32
7.33	0.00	42.90	5.82	0.32	-----	-----	-----	-----	-----	-----	0.32
7.70	0.00	42.85	5.60	0.31	-----	-----	-----	-----	-----	-----	0.31
8.07	0.00	42.79	5.37	0.31	-----	-----	-----	-----	-----	-----	0.31
8.43	0.00	42.74	5.11	0.30	-----	-----	-----	-----	-----	-----	0.30
8.80	0.00	42.69	4.86	0.30	-----	-----	-----	-----	-----	-----	0.30
9.17	0.00	42.64	4.61	0.29	-----	-----	-----	-----	-----	-----	0.29
9.53	0.00	42.59	4.34	0.29	-----	-----	-----	-----	-----	-----	0.29
9.90	0.00	42.54	4.02	0.28	-----	-----	-----	-----	-----	-----	0.28
10.27	0.00	42.49	3.71	0.28	-----	-----	-----	-----	-----	-----	0.28
10.63	0.00	42.44	3.41	0.27	-----	-----	-----	-----	-----	-----	0.27
11.00	0.00	42.39	3.13	0.27	-----	-----	-----	-----	-----	-----	0.27
11.37	0.00	42.34	2.94	0.26	-----	-----	-----	-----	-----	-----	0.26
11.73	0.00	42.30	2.76	0.26	-----	-----	-----	-----	-----	-----	0.26
12.10	0.00	42.25	2.58	0.25	-----	-----	-----	-----	-----	-----	0.25
12.47	0.00	42.21	2.40	0.25	-----	-----	-----	-----	-----	-----	0.25
12.83	0.00	42.17	2.33	0.25	-----	-----	-----	-----	-----	-----	0.25
13.20	0.00	42.12	2.28	0.24	-----	-----	-----	-----	-----	-----	0.24

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
13.57	0.00	42.08	2.24	0.24	-----	-----	-----	-----	-----	-----	0.24
13.93	0.00	42.04	2.19	0.23	-----	-----	-----	-----	-----	-----	0.23
14.30	0.00	42.00	2.14	0.23	-----	-----	-----	-----	-----	-----	0.23
14.67	0.00	41.57	1.21	0.17	-----	-----	-----	-----	-----	-----	0.17
15.03	0.00	41.25	0.51	0.12	-----	-----	-----	-----	-----	-----	0.12

...End

Reservoir Report

English

Reservoir No. 4 - Modified Original Design

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	40.80	02	0	0
1.20	42.00	1,220	733	733
3.20	44.00	13,821	15,041	15,774
5.60	46.40	19,938	40,511	56,285

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 18.0	3.0	0.0	0.0
Span in	= 18.0	3.0	0.0	0.0
No. Barrels	= 1	1	0	0
Invert El. ft	= 40.80	40.80	0.00	0.00
Length ft	= 150.0	5.0	0.0	0.0
Slope %	= 0.07	1.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= -----	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 15.71	0.00	0.00	0.00
Crest El. ft	= 43.50	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= Yes	No	No	No

Tailwater Elevation = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	40.80	0.00	0.00	---	---	0.00	---	---	---	0.00
0.12	73	40.92	0.04	0.03	---	---	0.00	---	---	---	0.03
0.24	147	41.04	0.15	0.06	---	---	0.00	---	---	---	0.06
0.36	220	41.16	0.36	0.10	---	---	0.00	---	---	---	0.10
0.48	293	41.28	0.56	0.13	---	---	0.00	---	---	---	0.13
0.60	367	41.40	0.81	0.15	---	---	0.00	---	---	---	0.15
0.72	440	41.52	1.07	0.16	---	---	0.00	---	---	---	0.16
0.84	513	41.64	1.42	0.18	---	---	0.00	---	---	---	0.18
0.96	587	41.76	1.68	0.20	---	---	0.00	---	---	---	0.20
1.08	660	41.88	1.92	0.21	---	---	0.00	---	---	---	0.21
1.20	733	42.00	2.15	0.23	---	---	0.00	---	---	---	0.23

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Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
1.40	2,237	42.20	2.37	0.25	---	---	0.00	---	---	---	0.25
1.60	3,741	42.40	3.16	0.27	---	---	0.00	---	---	---	0.27
1.80	5,246	42.60	4.42	0.29	---	---	0.00	---	---	---	0.29
2.00	6,750	42.80	5.40	0.31	---	---	0.00	---	---	---	0.31
2.20	8,254	43.00	6.22	0.32	---	---	0.00	---	---	---	0.32
2.40	9,758	43.20	6.94	0.34	---	---	0.00	---	---	---	0.34
2.60	11,262	43.40	7.60	0.35	---	---	0.00	---	---	---	0.35
2.80	12,766	43.60	8.21	0.37	---	---	1.49	---	---	---	1.86
3.00	14,270	43.80	8.77	0.33	---	---	7.74	---	---	---	8.07
3.20	15,774	44.00	9.30	0.16	---	---	16.66	---	---	---	9.30
3.44	19,825	44.24	9.90	0.00	---	---	30.00	---	---	---	9.90
3.68	23,876	44.48	10.46	0.00	---	---	45.72	---	---	---	10.46
3.92	27,927	44.72	10.99	0.00	---	---	63.51	---	---	---	10.99
4.16	31,979	44.96	11.50	0.00	---	---	83.14	---	---	---	11.50
4.40	36,030	45.20	11.99	0.00	---	---	104.47	---	---	---	11.99
4.64	40,081	45.44	12.46	0.00	---	---	127.35	---	---	---	12.46
4.88	44,132	45.68	12.91	0.00	---	---	151.70	---	---	---	12.91
5.12	48,183	45.92	13.35	0.00	---	---	177.43	---	---	---	13.35
5.36	52,234	46.16	13.77	0.00	---	---	204.47	---	---	---	13.77
5.60	56,285	46.40	14.18	0.00	---	---	232.75	---	---	---	14.18

...End

Hydrograph Report

English

Hyd. No. 22

Proposed Design 2-Yr.

Hydrograph type	= Reservoir	Peak discharge	= 10.04 cfs
Storm frequency	= 2 yrs	Time interval	= 22 min
Inflow hyd. No.	= 7	Reservoir name	= Modified Origin
Max. Elevation	= 44.30 ft	Max. Storage	= 20,853 cuft

Storage Indication method used.

Total Volume = 74,976 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
0.37	3.63	42.20	2.37	0.25	-----	-----	-----	-----	-----	-----	0.25
0.73	5.18	42.92	5.90	0.32	-----	-----	-----	-----	-----	-----	0.32
1.10	17.26 <<	44.02	9.35	0.14	-----	-----	17.75	-----	-----	-----	9.35
1.47	9.32	44.30 <<	10.04	-----	-----	-----	33.99	-----	-----	-----	10.04 <<
1.83	6.73	44.16	9.69	0.05	-----	-----	25.39	-----	-----	-----	9.69
2.20	4.32	43.79	8.74	0.33	-----	-----	7.44	-----	-----	-----	7.77
2.57	3.11	43.60	8.20	0.37	-----	-----	1.48	-----	-----	-----	1.85
2.93	2.59	43.65	8.34	0.36	-----	-----	2.94	-----	-----	-----	3.30
3.30	2.42	43.61	8.23	0.37	-----	-----	1.77	-----	-----	-----	2.13
3.67	2.24	43.62	8.26	0.37	-----	-----	2.05	-----	-----	-----	2.42
4.03	0.00	43.50	7.91	0.36	-----	-----	0.77	-----	-----	-----	1.13
4.40	0.00	43.37	7.51	0.35	-----	-----	-----	-----	-----	-----	0.35
4.77	0.00	43.31	7.31	0.35	-----	-----	-----	-----	-----	-----	0.35
5.13	0.00	43.25	7.11	0.34	-----	-----	-----	-----	-----	-----	0.34
5.50	0.00	43.19	6.91	0.34	-----	-----	-----	-----	-----	-----	0.34
5.87	0.00	43.13	6.70	0.33	-----	-----	-----	-----	-----	-----	0.33
6.23	0.00	43.07	6.49	0.33	-----	-----	-----	-----	-----	-----	0.33
6.60	0.00	43.02	6.28	0.32	-----	-----	-----	-----	-----	-----	0.32
6.97	0.00	42.96	6.05	0.32	-----	-----	-----	-----	-----	-----	0.32
7.33	0.00	42.90	5.82	0.32	-----	-----	-----	-----	-----	-----	0.32
7.70	0.00	42.85	5.60	0.31	-----	-----	-----	-----	-----	-----	0.31
8.07	0.00	42.80	5.37	0.31	-----	-----	-----	-----	-----	-----	0.31
8.43	0.00	42.74	5.11	0.30	-----	-----	-----	-----	-----	-----	0.30
8.80	0.00	42.69	4.86	0.30	-----	-----	-----	-----	-----	-----	0.30
9.17	0.00	42.64	4.61	0.29	-----	-----	-----	-----	-----	-----	0.29
9.53	0.00	42.59	4.34	0.29	-----	-----	-----	-----	-----	-----	0.29
9.90	0.00	42.54	4.03	0.28	-----	-----	-----	-----	-----	-----	0.28
10.27	0.00	42.49	3.72	0.28	-----	-----	-----	-----	-----	-----	0.28
10.63	0.00	42.44	3.41	0.27	-----	-----	-----	-----	-----	-----	0.27
11.00	0.00	42.39	3.13	0.27	-----	-----	-----	-----	-----	-----	0.27
11.37	0.00	42.34	2.94	0.26	-----	-----	-----	-----	-----	-----	0.26
11.73	0.00	42.30	2.76	0.26	-----	-----	-----	-----	-----	-----	0.26
12.10	0.00	42.25	2.58	0.26	-----	-----	-----	-----	-----	-----	0.26
12.47	0.00	42.21	2.41	0.25	-----	-----	-----	-----	-----	-----	0.25
12.83	0.00	42.17	2.33	0.25	-----	-----	-----	-----	-----	-----	0.25
13.20	0.00	42.12	2.28	0.24	-----	-----	-----	-----	-----	-----	0.24

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
13.57	0.00	42.08	2.24	0.24	-----	-----	-----	-----	-----	-----	0.24
13.93	0.00	42.04	2.19	0.23	-----	-----	-----	-----	-----	-----	0.23
14.30	0.00	42.00	2.15	0.23	-----	-----	-----	-----	-----	-----	0.23
14.67	0.00	41.57	1.21	0.17	-----	-----	-----	-----	-----	-----	0.17
15.03	0.00	41.25	0.52	0.12	-----	-----	-----	-----	-----	-----	0.12

...End

Reservoir Report

English

Reservoir No. 4 - Modified Original Design

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	40.80	02	0	0
1.20	42.00	1,220	733	733
3.20	44.00	13,821	15,041	15,774
5.60	46.40	19,938	40,511	56,285

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 18.0	3.0	0.0	0.0
Span in	= 18.0	3.0	0.0	0.0
No. Barrels	= 1	1	0	0
Invert El. ft	= 40.80	40.80	0.00	0.00
Length ft	= 150.0	5.0	0.0	0.0
Slope %	= 0.07	1.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= -----	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 15.71	0.00	0.00	0.00
Crest El. ft	= 43.50	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= Yes	No	No	No

Tailwater Elevation = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	40.80	0.00	0.00	---	---	0.00	---	---	---	0.00
0.12	73	40.92	0.04	0.03	---	---	0.00	---	---	---	0.03
0.24	147	41.04	0.15	0.06	---	---	0.00	---	---	---	0.06
0.36	220	41.16	0.36	0.10	---	---	0.00	---	---	---	0.10
0.48	293	41.28	0.56	0.13	---	---	0.00	---	---	---	0.13
0.60	367	41.40	0.81	0.15	---	---	0.00	---	---	---	0.15
0.72	440	41.52	1.07	0.16	---	---	0.00	---	---	---	0.16
0.84	513	41.64	1.42	0.18	---	---	0.00	---	---	---	0.18
0.96	587	41.76	1.68	0.20	---	---	0.00	---	---	---	0.20
1.08	660	41.88	1.92	0.21	---	---	0.00	---	---	---	0.21
1.20	733	42.00	2.15	0.23	---	---	0.00	---	---	---	0.23

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Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
1.40	2,237	42.20	2.37	0.25	---	---	0.00	---	---	---	0.25
1.60	3,741	42.40	3.16	0.27	---	---	0.00	---	---	---	0.27
1.80	5,246	42.60	4.42	0.29	---	---	0.00	---	---	---	0.29
2.00	6,750	42.80	5.40	0.31	---	---	0.00	---	---	---	0.31
2.20	8,254	43.00	6.22	0.32	---	---	0.00	---	---	---	0.32
2.40	9,758	43.20	6.94	0.34	---	---	0.00	---	---	---	0.34
2.60	11,262	43.40	7.60	0.35	---	---	0.00	---	---	---	0.35
2.80	12,766	43.60	8.21	0.37	---	---	1.49	---	---	---	1.86
3.00	14,270	43.80	8.77	0.33	---	---	7.74	---	---	---	8.07
3.20	15,774	44.00	9.30	0.16	---	---	16.66	---	---	---	9.30
3.44	19,825	44.24	9.90	0.00	---	---	30.00	---	---	---	9.90
3.68	23,876	44.48	10.46	0.00	---	---	45.72	---	---	---	10.46
3.92	27,927	44.72	10.99	0.00	---	---	63.51	---	---	---	10.99
4.16	31,979	44.96	11.50	0.00	---	---	83.14	---	---	---	11.50
4.40	36,030	45.20	11.99	0.00	---	---	104.47	---	---	---	11.99
4.64	40,081	45.44	12.46	0.00	---	---	127.35	---	---	---	12.46
4.88	44,132	45.68	12.91	0.00	---	---	151.70	---	---	---	12.91
5.12	48,183	45.92	13.35	0.00	---	---	177.43	---	---	---	13.35
5.36	52,234	46.16	13.77	0.00	---	---	204.47	---	---	---	13.77
5.60	56,285	46.40	14.18	0.00	---	---	232.75	---	---	---	14.18

...End

Hydrograph Report

English

Hyd. No. 23

Proposed Design 10-Yr.

Hydrograph type	= Reservoir	Peak discharge	= 11.75 cfs
Storm frequency	= 10 yrs	Time interval	= 22 min
Inflow hyd. No.	= 8	Reservoir name	= Modified Origin
Max. Elevation	= 45.08 ft	Max. Storage	= 34,056 cuft

Storage Indication method used.

Total Volume = 108,860 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
0.37	5.05	42.32	2.86	0.26	-----	-----	-----	-----	-----	-----	0.26
0.73	7.21	43.34	7.42	0.35	-----	-----	-----	-----	-----	-----	0.35
1.10	24.05 <<	44.51	10.52	-----	-----	-----	47.62	-----	-----	-----	10.52
1.47	12.99	45.08 <<	11.75	-----	-----	-----	94.08	-----	-----	-----	11.75 <<
1.83	9.38	45.04	11.67	-----	-----	-----	90.42	-----	-----	-----	11.67
2.20	6.01	44.75	11.07	-----	-----	-----	66.35	-----	-----	-----	11.07
2.57	4.33	44.33	10.11	-----	-----	-----	35.96	-----	-----	-----	10.11
2.93	3.61	43.83	8.84	0.31	-----	-----	9.02	-----	-----	-----	8.25
3.30	3.37	43.57	8.12	0.37	-----	-----	1.28	-----	-----	-----	1.65
3.67	3.34	43.67	8.40	0.36	-----	-----	3.61	-----	-----	-----	3.97
4.03	3.13	43.63	8.30	0.36	-----	-----	2.53	-----	-----	-----	2.89
4.40	0.00	43.53	8.01	0.36	-----	-----	1.00	-----	-----	-----	1.36
4.77	0.00	43.38	7.55	0.35	-----	-----	-----	-----	-----	-----	0.35
5.13	0.00	43.32	7.34	0.35	-----	-----	-----	-----	-----	-----	0.35
5.50	0.00	43.26	7.15	0.34	-----	-----	-----	-----	-----	-----	0.34
5.87	0.00	43.20	6.95	0.34	-----	-----	-----	-----	-----	-----	0.34
6.23	0.00	43.14	6.73	0.33	-----	-----	-----	-----	-----	-----	0.33
6.60	0.00	43.08	6.52	0.33	-----	-----	-----	-----	-----	-----	0.33
6.97	0.00	43.03	6.31	0.33	-----	-----	-----	-----	-----	-----	0.33
7.33	0.00	42.97	6.09	0.32	-----	-----	-----	-----	-----	-----	0.32
7.70	0.00	42.91	5.86	0.32	-----	-----	-----	-----	-----	-----	0.32
8.07	0.00	42.86	5.64	0.31	-----	-----	-----	-----	-----	-----	0.31
8.43	0.00	42.80	5.41	0.31	-----	-----	-----	-----	-----	-----	0.31
8.80	0.00	42.75	5.16	0.30	-----	-----	-----	-----	-----	-----	0.30
9.17	0.00	42.70	4.90	0.30	-----	-----	-----	-----	-----	-----	0.30
9.53	0.00	42.65	4.65	0.29	-----	-----	-----	-----	-----	-----	0.29
9.90	0.00	42.60	4.39	0.29	-----	-----	-----	-----	-----	-----	0.29
10.27	0.00	42.55	4.08	0.28	-----	-----	-----	-----	-----	-----	0.28
10.63	0.00	42.50	3.77	0.28	-----	-----	-----	-----	-----	-----	0.28
11.00	0.00	42.45	3.46	0.27	-----	-----	-----	-----	-----	-----	0.27
11.37	0.00	42.40	3.16	0.27	-----	-----	-----	-----	-----	-----	0.27
11.73	0.00	42.35	2.98	0.26	-----	-----	-----	-----	-----	-----	0.26
12.10	0.00	42.31	2.79	0.26	-----	-----	-----	-----	-----	-----	0.26
12.47	0.00	42.26	2.61	0.26	-----	-----	-----	-----	-----	-----	0.26
12.83	0.00	42.22	2.43	0.25	-----	-----	-----	-----	-----	-----	0.25
13.20	0.00	42.17	2.34	0.25	-----	-----	-----	-----	-----	-----	0.25

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
13.57	0.00	42.13	2.29	0.24	-----	-----	-----	-----	-----	-----	0.24
13.93	0.00	42.09	2.25	0.24	-----	-----	-----	-----	-----	-----	0.24
14.30	0.00	42.05	2.20	0.23	-----	-----	-----	-----	-----	-----	0.23
14.67	0.00	42.01	2.16	0.23	-----	-----	-----	-----	-----	-----	0.23
15.03	0.00	41.64	1.42	0.18	-----	-----	-----	-----	-----	-----	0.18
15.40	0.00	41.30	0.61	0.13	-----	-----	-----	-----	-----	-----	0.13

...End

Reservoir Report

English

Reservoir No. 4 - Modified Original Design

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	40.80	02	0	0
1.20	42.00	1,220	733	733
3.20	44.00	13,821	15,041	15,774
5.60	46.40	19,938	40,511	56,285

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 18.0	3.0	0.0	0.0
Span in	= 18.0	3.0	0.0	0.0
No. Barrels	= 1	1	0	0
Invert El. ft	= 40.80	40.80	0.00	0.00
Length ft	= 150.0	5.0	0.0	0.0
Slope %	= 0.07	1.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= -----	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 15.71	0.00	0.00	0.00
Crest El. ft	= 43.50	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= Yes	No	No	No

Tailwater Elevation = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	40.80	0.00	0.00	---	---	0.00	---	---	---	0.00
0.12	73	40.92	0.04	0.03	---	---	0.00	---	---	---	0.03
0.24	147	41.04	0.15	0.06	---	---	0.00	---	---	---	0.06
0.36	220	41.16	0.36	0.10	---	---	0.00	---	---	---	0.10
0.48	293	41.28	0.56	0.13	---	---	0.00	---	---	---	0.13
0.60	367	41.40	0.81	0.15	---	---	0.00	---	---	---	0.15
0.72	440	41.52	1.07	0.16	---	---	0.00	---	---	---	0.16
0.84	513	41.64	1.42	0.18	---	---	0.00	---	---	---	0.18
0.96	587	41.76	1.68	0.20	---	---	0.00	---	---	---	0.20
1.08	660	41.88	1.92	0.21	---	---	0.00	---	---	---	0.21
1.20	733	42.00	2.15	0.23	---	---	0.00	---	---	---	0.23

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Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
1.40	2,237	42.20	2.37	0.25	---	---	0.00	---	---	---	0.25
1.60	3,741	42.40	3.16	0.27	---	---	0.00	---	---	---	0.27
1.80	5,246	42.60	4.42	0.29	---	---	0.00	---	---	---	0.29
2.00	6,750	42.80	5.40	0.31	---	---	0.00	---	---	---	0.31
2.20	8,254	43.00	6.22	0.32	---	---	0.00	---	---	---	0.32
2.40	9,758	43.20	6.94	0.34	---	---	0.00	---	---	---	0.34
2.60	11,262	43.40	7.60	0.35	---	---	0.00	---	---	---	0.35
2.80	12,766	43.60	8.21	0.37	---	---	1.49	---	---	---	1.86
3.00	14,270	43.80	8.77	0.33	---	---	7.74	---	---	---	8.07
3.20	15,774	44.00	9.30	0.16	---	---	16.66	---	---	---	9.30
3.44	19,825	44.24	9.90	0.00	---	---	30.00	---	---	---	9.90
3.68	23,876	44.48	10.46	0.00	---	---	45.72	---	---	---	10.46
3.92	27,927	44.72	10.99	0.00	---	---	63.51	---	---	---	10.99
4.16	31,979	44.96	11.50	0.00	---	---	83.14	---	---	---	11.50
4.40	36,030	45.20	11.99	0.00	---	---	104.47	---	---	---	11.99
4.64	40,081	45.44	12.46	0.00	---	---	127.35	---	---	---	12.46
4.88	44,132	45.68	12.91	0.00	---	---	151.70	---	---	---	12.91
5.12	48,183	45.92	13.35	0.00	---	---	177.43	---	---	---	13.35
5.36	52,234	46.16	13.77	0.00	---	---	204.47	---	---	---	13.77
5.60	56,285	46.40	14.18	0.00	---	---	232.75	---	---	---	14.18

...End

Hydrograph Report

English

Hyd. No. 24

Proposed Design 25-Yr

Hydrograph type	= Reservoir	Peak discharge	= 12.54 cfs
Storm frequency	= 25 yrs	Time interval	= 22 min
Inflow hyd. No.	= 9	Reservoir name	= Modified Origin
Max. Elevation	= 45.48 ft	Max. Storage	= 40,817 cuft

Storage Indication method used.

Total Volume = 120,041 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
0.37	5.80	42.39	3.12	0.27	-----	-----	-----	-----	-----	-----	0.27
0.73	8.29	43.50	7.91	0.36	-----	-----	0.76	-----	-----	-----	1.12
1.10	27.64 <<	44.71	10.97	-----	-----	-----	62.78	-----	-----	-----	10.97
1.47	14.93	45.46	12.49	-----	-----	-----	129.10	-----	-----	-----	12.49
1.83	10.78	45.48 <<	12.54	-----	-----	-----	131.78	-----	-----	-----	12.54 <<
2.20	6.91	45.21	12.02	-----	-----	-----	105.89	-----	-----	-----	12.02
2.57	4.98	44.78	11.11	-----	-----	-----	68.04	-----	-----	-----	11.11
2.93	4.15	44.31	10.05	-----	-----	-----	34.26	-----	-----	-----	10.05
3.30	3.87	43.80	8.77	0.33	-----	-----	7.73	-----	-----	-----	8.06
3.67	3.59	43.59	8.18	0.37	-----	-----	1.42	-----	-----	-----	1.79
4.03	0.00	43.59	8.18	0.37	-----	-----	1.42	-----	-----	-----	1.79
4.40	0.00	43.40	7.61	0.35	-----	-----	0.01	-----	-----	-----	0.37
4.77	0.00	43.34	7.40	0.35	-----	-----	-----	-----	-----	-----	0.35
5.13	0.00	43.28	7.20	0.35	-----	-----	-----	-----	-----	-----	0.35
5.50	0.00	43.22	7.00	0.34	-----	-----	-----	-----	-----	-----	0.34
5.87	0.00	43.16	6.79	0.34	-----	-----	-----	-----	-----	-----	0.34
6.23	0.00	43.10	6.58	0.33	-----	-----	-----	-----	-----	-----	0.33
6.60	0.00	43.04	6.37	0.33	-----	-----	-----	-----	-----	-----	0.33
6.97	0.00	42.98	6.16	0.32	-----	-----	-----	-----	-----	-----	0.32
7.33	0.00	42.93	5.93	0.32	-----	-----	-----	-----	-----	-----	0.32
7.70	0.00	42.87	5.70	0.31	-----	-----	-----	-----	-----	-----	0.31
8.07	0.00	42.82	5.47	0.31	-----	-----	-----	-----	-----	-----	0.31
8.43	0.00	42.77	5.23	0.30	-----	-----	-----	-----	-----	-----	0.30
8.80	0.00	42.71	4.97	0.30	-----	-----	-----	-----	-----	-----	0.30
9.17	0.00	42.66	4.72	0.29	-----	-----	-----	-----	-----	-----	0.29
9.53	0.00	42.61	4.47	0.29	-----	-----	-----	-----	-----	-----	0.29
9.90	0.00	42.56	4.16	0.28	-----	-----	-----	-----	-----	-----	0.28
10.27	0.00	42.51	3.85	0.28	-----	-----	-----	-----	-----	-----	0.28
10.63	0.00	42.46	3.55	0.28	-----	-----	-----	-----	-----	-----	0.28
11.00	0.00	42.41	3.24	0.27	-----	-----	-----	-----	-----	-----	0.27
11.37	0.00	42.37	3.03	0.27	-----	-----	-----	-----	-----	-----	0.27
11.73	0.00	42.32	2.84	0.26	-----	-----	-----	-----	-----	-----	0.26
12.10	0.00	42.27	2.66	0.26	-----	-----	-----	-----	-----	-----	0.26
12.47	0.00	42.23	2.48	0.25	-----	-----	-----	-----	-----	-----	0.25
12.83	0.00	42.19	2.35	0.25	-----	-----	-----	-----	-----	-----	0.25
13.20	0.00	42.14	2.30	0.24	-----	-----	-----	-----	-----	-----	0.24

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Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
13.57	0.00	42.10	2.26	0.24	-----	-----	-----	-----	-----	-----	0.24
13.93	0.00	42.06	2.21	0.23	-----	-----	-----	-----	-----	-----	0.23
14.30	0.00	42.02	2.17	0.23	-----	-----	-----	-----	-----	-----	0.23
14.67	0.00	41.76	1.68	0.20	-----	-----	-----	-----	-----	-----	0.20
15.03	0.00	41.39	0.78	0.14	-----	-----	-----	-----	-----	-----	0.14

...End

Reservoir Report

English

Reservoir No. 4 - Modified Original Design

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	40.80	02	0	0
1.20	42.00	1,220	733	733
3.20	44.00	13,821	15,041	15,774
5.60	46.40	19,938	40,511	56,285

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 18.0	3.0	0.0	0.0
Span in	= 18.0	3.0	0.0	0.0
No. Barrels	= 1	1	0	0
Invert El. ft	= 40.80	40.80	0.00	0.00
Length ft	= 150.0	5.0	0.0	0.0
Slope %	= 0.07	1.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= -----	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 15.71	0.00	0.00	0.00
Crest El. ft	= 43.50	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= Yes	No	No	No

Tailwater Elevation = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	40.80	0.00	0.00	---	---	0.00	---	---	---	0.00
0.12	73	40.92	0.04	0.03	---	---	0.00	---	---	---	0.03
0.24	147	41.04	0.15	0.06	---	---	0.00	---	---	---	0.06
0.36	220	41.16	0.36	0.10	---	---	0.00	---	---	---	0.10
0.48	293	41.28	0.56	0.13	---	---	0.00	---	---	---	0.13
0.60	367	41.40	0.81	0.15	---	---	0.00	---	---	---	0.15
0.72	440	41.52	1.07	0.16	---	---	0.00	---	---	---	0.16
0.84	513	41.64	1.42	0.18	---	---	0.00	---	---	---	0.18
0.96	587	41.76	1.68	0.20	---	---	0.00	---	---	---	0.20
1.08	660	41.88	1.92	0.21	---	---	0.00	---	---	---	0.21
1.20	733	42.00	2.15	0.23	---	---	0.00	---	---	---	0.23

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Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
1.40	2,237	42.20	2.37	0.25	---	---	0.00	---	---	---	0.25
1.60	3,741	42.40	3.16	0.27	---	---	0.00	---	---	---	0.27
1.80	5,246	42.60	4.42	0.29	---	---	0.00	---	---	---	0.29
2.00	6,750	42.80	5.40	0.31	---	---	0.00	---	---	---	0.31
2.20	8,254	43.00	6.22	0.32	---	---	0.00	---	---	---	0.32
2.40	9,758	43.20	6.94	0.34	---	---	0.00	---	---	---	0.34
2.60	11,262	43.40	7.60	0.35	---	---	0.00	---	---	---	0.35
2.80	12,766	43.60	8.21	0.37	---	---	1.49	---	---	---	1.86
3.00	14,270	43.80	8.77	0.33	---	---	7.74	---	---	---	8.07
3.20	15,774	44.00	9.30	0.16	---	---	16.66	---	---	---	9.30
3.44	19,825	44.24	9.90	0.00	---	---	30.00	---	---	---	9.90
3.68	23,876	44.48	10.46	0.00	---	---	45.72	---	---	---	10.46
3.92	27,927	44.72	10.99	0.00	---	---	63.51	---	---	---	10.99
4.16	31,979	44.96	11.50	0.00	---	---	83.14	---	---	---	11.50
4.40	36,030	45.20	11.99	0.00	---	---	104.47	---	---	---	11.99
4.64	40,081	45.44	12.46	0.00	---	---	127.35	---	---	---	12.46
4.88	44,132	45.68	12.91	0.00	---	---	151.70	---	---	---	12.91
5.12	48,183	45.92	13.35	0.00	---	---	177.43	---	---	---	13.35
5.36	52,234	46.16	13.77	0.00	---	---	204.47	---	---	---	13.77
5.60	56,285	46.40	14.18	0.00	---	---	232.75	---	---	---	14.18

...End

Hydrograph Report

English

Hyd. No. 25

Proposed Design 100-Yr

Hydrograph type	= Reservoir	Peak discharge	= 13.74 cfs
Storm frequency	= 100 yrs	Time interval	= 22 min
Inflow hyd. No.	= 10	Reservoir name	= Modified Origin
Max. Elevation	= 46.14 ft	Max. Storage	= 51,911 cuft

DHW

Storage Indication method used.

Total Volume = 145,028 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
0.37	7.01	42.49	3.75	0.28	-----	-----	-----	-----	-----	-----	0.28
0.73	10.02	43.65	8.36	0.36	-----	-----	3.17	-----	-----	-----	3.53
1.10	33.40 <<	44.96	11.49	-----	-----	-----	82.82	-----	-----	-----	11.49
1.47	18.03	45.99	13.47	-----	-----	-----	185.40	-----	-----	-----	13.47
1.83	13.02	46.14 <<	13.74	-----	-----	-----	202.31	-----	-----	-----	13.74 <<
2.20	8.35	45.92	13.34	-----	-----	-----	177.16	-----	-----	-----	13.34
2.57	6.01	45.47	12.51	-----	-----	-----	130.19	-----	-----	-----	12.51
2.93	5.01	44.96	11.50	-----	-----	-----	83.13	-----	-----	-----	11.50
3.30	4.68	44.48	10.46	-----	-----	-----	45.73	-----	-----	-----	10.46
3.67	4.34	44.05	9.43	0.12	-----	-----	19.71	-----	-----	-----	9.43
4.03	0.00	43.55	8.05	0.37	-----	-----	1.10	-----	-----	-----	1.46
4.40	0.00	43.39	7.56	0.35	-----	-----	-----	-----	-----	-----	0.35
4.77	0.00	43.33	7.36	0.35	-----	-----	-----	-----	-----	-----	0.35
5.13	0.00	43.27	7.16	0.34	-----	-----	-----	-----	-----	-----	0.34
5.50	0.00	43.21	6.96	0.34	-----	-----	-----	-----	-----	-----	0.34
5.87	0.00	43.15	6.75	0.33	-----	-----	-----	-----	-----	-----	0.33
6.23	0.00	43.09	6.54	0.33	-----	-----	-----	-----	-----	-----	0.33
6.60	0.00	43.03	6.33	0.33	-----	-----	-----	-----	-----	-----	0.33
6.97	0.00	42.97	6.11	0.32	-----	-----	-----	-----	-----	-----	0.32
7.33	0.00	42.92	5.88	0.32	-----	-----	-----	-----	-----	-----	0.32
7.70	0.00	42.86	5.65	0.31	-----	-----	-----	-----	-----	-----	0.31
8.07	0.00	42.81	5.43	0.31	-----	-----	-----	-----	-----	-----	0.31
8.43	0.00	42.75	5.18	0.30	-----	-----	-----	-----	-----	-----	0.30
8.80	0.00	42.70	4.92	0.30	-----	-----	-----	-----	-----	-----	0.30
9.17	0.00	42.65	4.67	0.29	-----	-----	-----	-----	-----	-----	0.29
9.53	0.00	42.60	4.42	0.29	-----	-----	-----	-----	-----	-----	0.29
9.90	0.00	42.55	4.10	0.28	-----	-----	-----	-----	-----	-----	0.28
10.27	0.00	42.50	3.79	0.28	-----	-----	-----	-----	-----	-----	0.28
10.63	0.00	42.45	3.48	0.27	-----	-----	-----	-----	-----	-----	0.27
11.00	0.00	42.40	3.18	0.27	-----	-----	-----	-----	-----	-----	0.27
11.37	0.00	42.36	2.99	0.27	-----	-----	-----	-----	-----	-----	0.27
11.73	0.00	42.31	2.81	0.26	-----	-----	-----	-----	-----	-----	0.26
12.10	0.00	42.26	2.62	0.26	-----	-----	-----	-----	-----	-----	0.26
12.47	0.00	42.22	2.45	0.25	-----	-----	-----	-----	-----	-----	0.25
12.83	0.00	42.18	2.34	0.25	-----	-----	-----	-----	-----	-----	0.25
13.20	0.00	42.13	2.30	0.24	-----	-----	-----	-----	-----	-----	0.24

Continues on next page...

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Outflow cfs
13.57	0.00	42.09	2.25	0.24	-----	-----	-----	-----	-----	-----	0.24
13.93	0.00	42.05	2.20	0.23	-----	-----	-----	-----	-----	-----	0.23
14.30	0.00	42.01	2.16	0.23	-----	-----	-----	-----	-----	-----	0.23
14.67	0.00	41.67	1.49	0.19	-----	-----	-----	-----	-----	-----	0.19

...End

Reservoir Report

English

Reservoir No. 4 - Modified Original Design

Pond Data

Pond storage is based on known contour areas

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	40.80	02	0	0
1.20	42.00	1,220	733	733
3.20	44.00	13,821	15,041	15,774
5.60	46.40	19,938	40,511	56,285

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 18.0	3.0	0.0	0.0
Span in	= 18.0	3.0	0.0	0.0
No. Barrels	= 1	1	0	0
Invert El. ft	= 40.80	40.80	0.00	0.00
Length ft	= 150.0	5.0	0.0	0.0
Slope %	= 0.07	1.00	0.00	0.00
N-Value	= .013	.013	.000	.000
Orif. Coeff.	= 0.60	0.60	0.00	0.00
Multi-Stage	= -----	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 15.71	0.00	0.00	0.00
Crest El. ft	= 43.50	0.00	0.00	0.00
Weir Coeff.	= 3.00	0.00	0.00	0.00
Eqn. Exp.	= 1.50	0.00	0.00	0.00
Multi-Stage	= Yes	No	No	No

Tailwater Elevation = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
0.00	0	40.80	0.00	0.00	---	---	0.00	---	---	---	0.00
0.12	73	40.92	0.04	0.03	---	---	0.00	---	---	---	0.03
0.24	147	41.04	0.15	0.06	---	---	0.00	---	---	---	0.06
0.36	220	41.16	0.36	0.10	---	---	0.00	---	---	---	0.10
0.48	293	41.28	0.56	0.13	---	---	0.00	---	---	---	0.13
0.60	367	41.40	0.81	0.15	---	---	0.00	---	---	---	0.15
0.72	440	41.52	1.07	0.16	---	---	0.00	---	---	---	0.16
0.84	513	41.64	1.42	0.18	---	---	0.00	---	---	---	0.18
0.96	587	41.76	1.68	0.20	---	---	0.00	---	---	---	0.20
1.08	660	41.88	1.92	0.21	---	---	0.00	---	---	---	0.21
1.20	733	42.00	2.15	0.23	---	---	0.00	---	---	---	0.23

Continues on next page...

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Discharge cfs
1.40	2,237	42.20	2.37	0.25	---	---	0.00	---	---	---	0.25
1.60	3,741	42.40	3.16	0.27	---	---	0.00	---	---	---	0.27
1.80	5,246	42.60	4.42	0.29	---	---	0.00	---	---	---	0.29
2.00	6,750	42.80	5.40	0.31	---	---	0.00	---	---	---	0.31
2.20	8,254	43.00	6.22	0.32	---	---	0.00	---	---	---	0.32
2.40	9,758	43.20	6.94	0.34	---	---	0.00	---	---	---	0.34
2.60	11,262	43.40	7.60	0.35	---	---	0.00	---	---	---	0.35
2.80	12,766	43.60	8.21	0.37	---	---	1.49	---	---	---	1.86
3.00	14,270	43.80	8.77	0.33	---	---	7.74	---	---	---	8.07
3.20	15,774	44.00	9.30	0.16	---	---	16.66	---	---	---	9.30
3.44	19,825	44.24	9.90	0.00	---	---	30.00	---	---	---	9.90
3.68	23,876	44.48	10.46	0.00	---	---	45.72	---	---	---	10.46
3.92	27,927	44.72	10.99	0.00	---	---	63.51	---	---	---	10.99
4.16	31,979	44.96	11.50	0.00	---	---	83.14	---	---	---	11.50
4.40	36,030	45.20	11.99	0.00	---	---	104.47	---	---	---	11.99
4.64	40,081	45.44	12.46	0.00	---	---	127.35	---	---	---	12.46
4.88	44,132	45.68	12.91	0.00	---	---	151.70	---	---	---	12.91
5.12	48,183	45.92	13.35	0.00	---	---	177.43	---	---	---	13.35
5.36	52,234	46.16	13.77	0.00	---	---	204.47	---	---	---	13.77
5.60	56,285	46.40	14.18	0.00	---	---	232.75	---	---	---	14.18

...End

GEO DESIGN CONSULTANTS, INC.
204-B GRAYSON RD.
VIRGINIA BEACH, VIRGINIA 23462
Phone: (804) 473-9533
Fax: (804) 473-9534

Project: SETTLERS MILL SUBDIVISION
Client: SETTLERS MILL SETTLEMENT
General Contractor: SAME
Grading Contractor: SAME
Technician: MIKE HIGGINS

Job No.: 94.130T
Client Job No.:
Date: 4/19/94
Weather: CLEAR Temp.(°F): 75
Field Copy Given to Client? ___ Yes _X_ No

Test No.	Moisture (%)	Dry Density (PCF)	Proctor Number	% of Proctor		Pass	Fail	Elevation Below Finish Grade (FT)	Location, Grid, Coordinates, or Roadway Station
				Spec	Actual				
1	17.0	110.1	1	95	97	X		- 0'	DAM KEYWAY
2	17.2	110.0	1	95	97	X		- 1'	
3	17.2	109.5	1	95	96	X		- 2'	

Compaction Equipment Used:
(1) Test Location Established By: ESTIMATION
(2) Depth of Elev. of Test Established By: ESTIMATION
(3) Test Conducted On: INTERMITTENT BASIS
(4) Proctor Type: ASTM D698 (Standard)

Field Rep.
Proctor No.: 1
Max. Density (PCF): 113.0
Opt. Moisture (%): 16.5

Remarks:

APR-22-94 FRI 13:42 Geo Design Consultants P.02

GEO DESIGN CONSULTANTS, INC.
204-B GRAYSON RD.
VIRGINIA BEACH, VIRGINIA 23462
Phone: (804) 473-9533
Fax: (804) 473-9534

Project: SETTLERS MILL SUBDIVISION
Client: SETTLERS MILL DEVELOPMENT
General Contractor: SAME
Grading Contractor: SAME
Technician: MIKE HIGGINS

Job No.: 94.130T
Client Job No.:
Date: 4/20/94
Weather: CLEAR Temp.(°F): 85
Field Copy Given to Client? ___ Yes _X_ No

Test No.	Moisture (%)	Dry Density (PCF)	Proctor Number	% of Proctor		Pass	Fail	Elevation Below Finish Grade (FT)	Location, Grid, Coordinates, or Roadway Station
				Spec	Actual				
1	22.2	99.9	2	95	95	X		1' ABOVE KEY	CENTER OF DAM
2	22.4	99.8	2	95	95	X		2' ABOVE KEY	CENTER OF DAM

Compaction Equipment Used:
(1) Test Location Established By:
(2) Depth of Elev. of Test Established By:
(3) Test Conducted On:
(4) Proctor Type: ASTM D698 (Standard)

Field Rep.
Proctor No.: 2
Max. Density (PCF): 105.5
Opt. Moisture (%): 18.4

Remarks:

APR-22-94 FRI 13:43 Geo Design Consultants P.03

APR-22-94 FRI 13:44 Geo Design Consultants P.04

GEO DESIGN CONSULTANTS, INC.
204-B GRAYSON RD.
VIRGINIA BEACH, VIRGINIA 23462
Phone: (804) 473-9533
Fax: (804) 473-9534

Project: SETTLERS MILL SUBDIVISION
Client: SETTLERS MILL DEVELOPMENT
General Contractor: SAME
Grading Contractor: SAME
Technician: W. ALEXANDER

Job No.: 94.130T
Client Job No.:
Date: 4/21/94
Weather: CLOUDY Temp.(°F): 60
Field Copy Given to Client? ___ Yes _X_ No

Test No.	Moisture (%)	Dry Density (PCF)	Proctor Number	% of Proctor		Pass	Fail	Elevation Below Finish Grade (FT)	Location, Grid, Coordinates, or Roadway Station
				Spec	Actual				
1	22.8	101.1	2	95	96	X		2' ABOVE KEY	CENTER OF DAM
2	23.0	102	2	95	97	X		3' ABOVE KEY	CENTER OF DAM
3	22.1	99.9	2	95	95	X		4' ABOVE KEY	CENTER OF DAM
4	22.5	99.8	2	95	95	X		5' ABOVE KEY	CENTER OF DAM

Compaction Equipment Used:
(1) Test Location Established By: ESTIMATION
(2) Depth of Elev. of Test Established By: CONTRACTOR
(3) Test Conducted On: PART-TIME
(4) Proctor Type: ASTM D698 (Standard)

Field Rep.
Proctor No.: 2
Max. Density (PCF): 105.5
Opt. Moisture (%): 18.4

Remarks: CONTRACTOR EXCAVATED TEST PITS

Geo Design Consultants, Inc.

MOISTURE DENSITY RELATIONSHIP
(Proctor Method)

Job Name SETTLERS MILL SUBDIVISION Proctor No. 2

Job No. 94.130T Date 4-19-94

Client SETTLERS MILL DEVELOPMENT

Material Description TAN SILTY CLAY W/LITTLE F-SAND

Sampling Location OFF-SITE Depth N/A

Test Method ASTM D698A

Maximum Dry Density (pcf) 113.0

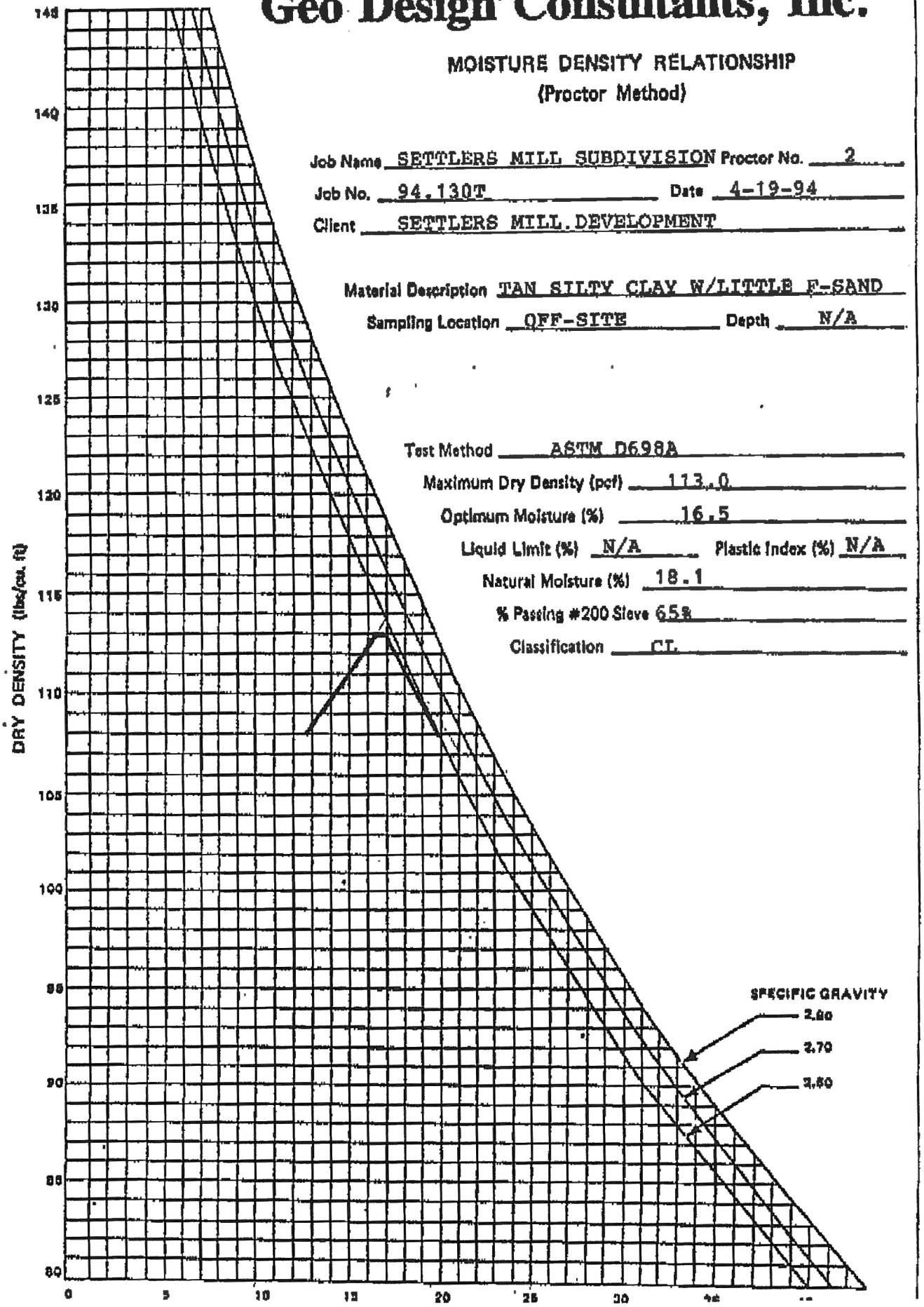
Optimum Moisture (%) 16.5

Liquid Limit (%) N/A Plastic Index (%) N/A

Natural Moisture (%) 18.1

% Passing #200 Sieve 65%

Classification CL



Geo Design Consultants, Inc.

MOISTURE DENSITY RELATIONSHIP
(Proctor Method)

Job Name SETTLERS MILL SUBDIVISION Proctor No. 3

Job No. 94.130T Date 4-22-94

Client SETTLERS MILL DEVELOPMENT

Material Description TAN SILTY CLAY W/LITTLE F-SAND

Sampling Location OFF-SITE Depth N/A

Test Method ASTM D698A

Maximum Dry Density (pcf) 105.5

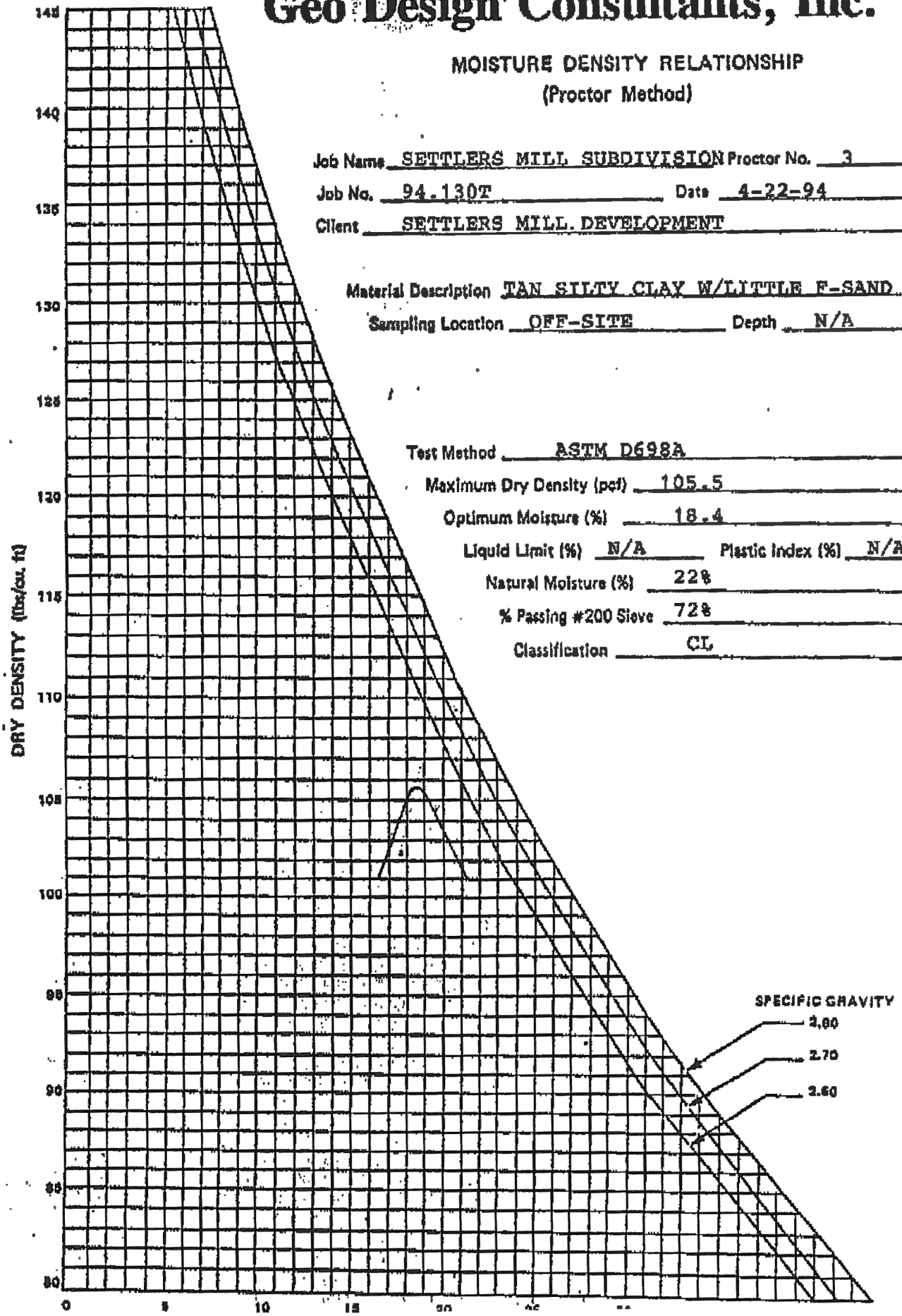
Optimum Moisture (%) 18.4

Liquid Limit (%) N/A Plastic Index (%) N/A

Natural Moisture (%) 22%

% Passing #200 Sieve 72%

Classification CL



GEO DESIGN CONSULTANTS, INC.
204-B GRAYSON ROAD
VIRGINIA BEACH, VA 23462
PHONE:(804) 473-9533
FAX:(804) 473-9534

FACSIMILE COVER SHEET

DATE: 4/22/94
TO: Pat Menichini
COMPANY:
FAX #: 253-6663
FROM: Camille A. Kattan, P.E.

NO. OF PAGES INCLUDING COVER SHEET 6

MESSAGE:

IF THERE ARE ANY PROBLEMS WITH THE TRANSMISSION OF THIS FAX OR YOU HAVE RECEIVED THIS FAX IN ERROR; PLEASE CONTACT OUR OFFICE AT: (804) 473-9533

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
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ENVIRONMENTAL DIVISION
(757) 253-6670
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PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620

September 11, 2002

Mr. Charles J. Bodnar, P.E.
LandMark Design Group
4029 Ironbound Road, Suite 100
Williamsburg, Va. 23188

Re: Reduced Freeboard Variance Request
Grace Covenant Presbyterian Church
County Plan No. SP-066-02
County BMP ID Code: MC 003

Dear Mr. Bodnar:

The Environmental Division is in receipt of your written request dated August 27th 2002 to obtain variance for reduced freeboard associated with BMP # 1 which is situated in the southeast corner of the site along Jamestown Road. The stormwater management facility is an existing dry pond facility which will be modified to accept drainage from the proposed development site.

Minimum Standard 3.01 of the Virginia Stormwater Management Handbook and County standards would require a minimum of 2 feet of freeboard from the 100-year design high water elevation to top of dam for facilities without an emergency spillway. For this specific BMP, an emergency spillway was not provided. The principal spillway is intended to pass the 100-year design event safely through the facility and based on the 100-year design high water elevation (El. 46.14) as compared to design top of dam elevation (El. 46.5), only 0.36 feet of freeboard is provided.

The plan approving authority may waive or modify any of the Minimum Standards which are deemed inappropriate or too restrictive for site conditions. Based on our full review of information as submitted, the variance as requested is hereby ***approved.***

The variance was considered appropriate due to information as submitted in the revised plan of development application and the variance request letter including: 1) there are distinct restraints and limitations to expand the size of the dry pond due to the Community Character Corridor to the north, the entrance to Lakewood/Settlers Mill Subdivision to the east, VDOT right-of-way to the south and the proposed site entrance to the west; 2) the principal spillway device is being modified to meet current standards; 3) a bioretention facility was added to the onsite parking lot island to provide additional extended detention and attenuation prior to the conveyance of drainage to BMP # 1; 4) an enhanced maintenance plan was provided for the owner to routinely inspect the riser for clogging after each storm event; 5) there appears to be an adequate and safe flow path which would not impact Jamestown Road and Lakewood Drive should the modified facility overtop due to unexpected conditions.

In addition, approval of the variance is subject to following conditions:

1. The Owner/Applicant should be made completely aware of the reduced freeboard requirement and all provisions of this variance and the Inspection/Maintenance Agreement for the BMP;

2. The variance approval shall become part of the approved site stormwater management plan;

3. The Owner/Applicant should ensure that maintenance of BMP # 1 is adequately performed in accordance with the schedule presented on Sheet C-7 of the plan set and Minimum Standards 3.01 and 3.02 of the Virginia Stormwater Management Handbook. Proper maintenance will reduce the chance of clogging of the principal flow control and the potential for subsequent overtopping of the dam embankment.

Please note that approval of this variance, with the conditions stated, in no way implies final approval of a site or subdivision plan as required by the Chapter 24 Zoning or Chapter 19 Subdivisions of the County Code; nor, does it constitute final approval of an erosion and sediment control or stormwater management plan as required by Chapter 8 Erosion and Sediment Control and Chapter 23 Chesapeake Bay Preservation of the County Code. Approval of this variance is also contingent upon no major (substantial) changes in the development plan, the subject best management practice facility, or if site conditions change, become apparent or alter significantly following the date of this approval.

Sincerely,

Darryl E. Cook, P.E.
Environmental Director

DEC/sjt

cc: Christopher Johnson, Planning

SWMProg/Variances/SPvar/Var091102

Larry S. Barry, P.E., President
Norman H. Mason, L.S., VP
Vaughn B. Rinner, C.L.A.
Elizabeth J. Anderson, P.E.
Kenneth A. Dierks
Robert P. Kerr, R.E.P., P.W.S.

LANDMARK DESIGN GROUP

Clayton E. Massey, P.E.
Charles R. Orsborne, L.S.
Stephen A. Romeo, L.S.
Mark W. Strickland, P.E.
William R. Turner, Jr., A.I.C.P.
A. Gary Webb, P.E.

August 27, 2002

Mr. Darryl Cook, P.E.
Environmental Division Manager
James City County Environmental Division
P.O. Box 8784
Williamsburg, VA 23187-8784

Re: Grace Covenant Presbyterian Church
Jamestown Road
LMDG Job No. 2001201-000.03
JCC Plan No. SP-066-02

Dear Darryl:

Per discussions with Mr. Scott Thomas, P.E., we are hereby requesting a variance to the 100-year freeboard requirement for BMP No. 1 for the above referenced project.

BMP No. 1 was designed and constructed as part of the Lakewood Subdivision, Section 2. The facility was designed - to meet flow attenuation requirements - with the Grace Covenant Presbyterian Church site having a weighted "c" of 0.60. The facility called for a top of embankment between the VDOT drainage ditch along Jamestown Road and the facility to have an elevation of 46. From the topographic survey of the site, it appears that the facility was not constructed in accordance with the approved construction plans. The area to be cleared required for correct installation of the original design was not cleared and the BMP was constructed closer to Jamestown Road than originally planned. Due to these facts, the embankment between the facility and the Jamestown Road drainage ditch was not built to the correct elevation. We are, as part of this construction plan, constructing the top of the embankment to an elevation of 46.5. We are accomplishing this by steeping the side slope of the Jamestown Road drainage ditch and shrinking the area of BMP No. 1.

Since the construction of the facility, the County has declared Jamestown Road a Community Corridor Buffer and restricts the amount of clearing that can be performed adjacent to the right-of-way. With the proposed plan for Grace Covenant, no clearing - beyond that which is needed for utilities and entrances - can be made adjacent to the Jamestown Road right-of-way without violating the Community Corridor Buffer. With this requirement, BMP No. 1 is restricted to the area between the existing woodsline, the drainage ditch along Jamestown Road and Lakewood Drive.

As you know, the *Virginia Stormwater Management Handbook* indicates "an embankment without an emergency spillway must provide at least 2 feet of freeboard from the maximum 100-year storm WSE to the lowest point on the top of the embankment." In addition, "an embankment with an emergency spillway

must provide at least 1 foot of freeboard from the maximum 100-year storm WSE to the lowest point on the top of the embankment." An emergency spillway must be constructed in a cut area. Due to the site constraints, three sides of the basin are in fill and the final side is wooded. Thus, no emergency spillway can be provided for this facility.

We have explored the use of other on-site treatment facilities in order to reduce the storage volume required for this facility. We have installed a bioretention facility to provide water quality treatment of a portion of the site. The reduction in storage volume due to this facility is accounted for in the calculations for BMP No. 1.

Under the current design, the 100-year storm is designed to pass through the principal spillway. The 100-year storm WSE rises to within 0.36 feet of the top of the embankment. We have analyzed the basin to see if the freeboard requirement for this facility could be met if the top of the embankment were raised. Using the maximum maintainable slope of 3:1, we analyzed elevations 47, 47.5 and 48 to see what would happen on the 100-year storm event. Elevation 48 was chosen as the maximum top of embankment elevation due to the requirement to match the grades along the edge of Lakewood Drive. Under each of these other scenarios, the freeboard provided was less than the designed elevation of 46.5.

Provisions have been made in the BMP Maintenance Plan (Sheet C-7) requiring Grace Covenant to check the riser structure for trash and debris after each storm event. This will prevent clogging of the principal spillway that could result in overtopping of the dam. An anti-vortex device has been specified on the plans for the principal spillway since it is designed to handle the 100-year storm event.

We have explored every avenue to repair this facility to meet the requirements of the *Virginia Stormwater Management Handbook* and the *James City County BMP Manual*. We are unable to meet the requirement for 2-feet of freeboard between the 100-year storm WSE and the top of embankment. We, thus, ask for a variance for this facility.

If you have any questions or comments, please do not hesitate to contact us.

Best regards,
The LandMark Design Group Inc.

Charles J. Bodnar, P.E.
Associate

CJB/cb

Copy to: File 2001201-000.03
Grace Covenant Presbyterian Church

Larry S. Barry, P.E., President
Norman H. Mason, L.S., VP
Vaughn B. Rinner, C.L.A.
Elizabeth J. Anderson, P.E.
Kenneth A. Dierks
Robert P. Kerr, R.E.P., P.W.S.

LANDMARK DESIGN GROUP

Clayton E. Massey, P.E.
Charles R. Orsborne, L.S.
Stephen A. Romeo, L.S.
Mark W. Strickland, P.E.
William R. Turner, Jr., A.I.C.P.
A. Gary Webb, P.E.

August 27, 2002

Mr. Chris Johnson
James City County Planning Division
P.O. Box 8784
Williamsburg, VA 23187-8784

Re: Grace Covenant Presbyterian Church
Jamestown Road
LMDG Job No. 2001201-000.03
JCC Plan No. SP-066-02

Dear Chris:

We are pleased to submit, for approval, twelve (12) copies of the revised site plan for the above referenced project. In response to the comments of your facsimile dated August 23, 2002, we offer the following:

JCSA

1. Water and sewer data sheets were not changed by previous comments. Data sheets submitted with the project in May 2002 are still valid.
2. The requested note has been added to Sheet C-3 of the construction plans. In addition, concrete channels have been added within the ditch where the proposed ditch crosses the existing force main.
3. The note has been changed per the comment.

VDOT

1. Sight distance information and speed limits have been added to Sheet C-3 of the plan.
2. The radii at the entrance have been changed to 25-feet.

Environmental

1. The revised BMP point worksheet is attached as part of this submittal package and has been provided to Mr. Scott Thomas, P.E. under separate cover.
2. As discussed with Mr. Scott Thomas, P.E., the conservation easement plat is in process and will be submitted when completed.
3. The off-site weighted "c" calculation is attached as part of this submittal package and has been provided to Mr. Scott Thomas, P.E. under separate cover.

4. Please find attached a copy of the required variance request for BMP No. 1. This letter has been forwarded to Mr. Scott Thomas, P.E. under separate cover.
5. The trash rack for the top of the riser structure has been changed, on Sheet C-5, to be a fully symmetrical, triangular-shaped unit. In addition, it has been noted on the riser detail, on Sheet C-5, that the riser shall contain an anti-vortex plate.
6. The blank "x's" in the BMP maintenance plan, on Sheet C-7, have been filled in with the required elevations and dimensions.
7. In regards to the bioretention facility, we offer the following:

    a. The bioretention facility has been labeled, on Sheet C-3, as BMP No. 3.
    b. It has been noted on the detail, on Sheet C-5, that the sand layer is optional.
    c. As discussed with Mr. Scott Thomas, P.E., we will ensure that the filter fabric between the planting soil media and the stone underdrain is the appropriate type of fabric.
    d. The width of the cell section has been noted on the detail on Sheet C-5.
    e. The width and depth of the gravel diaphragm have been added to the detail on Sheet C-5.
    f. A note has been added to the detail on Sheet C-5 requiring the certification of the planting soil layer be part of the construction certification requirements associated with the BMP.
    g. A note has been added to the detail on Sheet C-5 indicating that the bioretention facility must be constructed in accordance with the County BMP Manual and the State Minimum Standards.
    h. Sheet L-1 has been modified to show the landscaping required by the County BMP Manual and the State Minimum Standards. A note has been added to the detail on Sheet C-5 to refer the Contractor to the Landscape Plan for planting requirements.

As discussed this morning, Grace Covenant would like to acquire the Land Disturbing Permit next week to allow for erosion control installation, clearing and rough grading of the site to begin. Please contact us as soon as the Environmental Division has signed off on the plan so this permit can be acquired. If you have any questions or comments, please do not hesitate to contact us.

Best regards,
The LandMark Design Group Inc.

Charles J. Bodnar, P.E.
Associate

CJB/tmp

Copy to: File 2001201-000.03
Grace Covenant Presbyterian Church

Wendell

After your voice mail message, I was able to look into our records and find information on the BMP. It was in the Settlers Mill Section 1 file, however, the plan was for Lakewood Section 2, County Plan No. S-35-87. Assigned County BMP ID Code for the BMP is MC 003.

Design of the facility was based on the 25-year storm event, so this would be the official design high water. Design high water elevation for the 25-year storm is at El. 44.25 and the 25 ft. buffer would be landward of that elevation. I transposed this information onto the 1 inch = 50 ft. scale plan to give you an idea of how far that is into Lot 2 buildable area.

As you can see, the 25 ft. buffer would not encroach onto Lot 2 beyond the top of the graded sideslope of the pond. Therefore, any development (clearing, grading or permanent structures) for Lot 2 could not encroach onto the graded slope of the pond. This is reasonable and probably would not be performed anyway; therefore, it would appear that the 25 ft. buffer requirement would result in virtually no impact to Lot 2 at all.

This is a preliminary assessment using available information. If the limit of clearing, grading or permanent structure proposed on Lot 2 would be in the vicinity of the BMP, the building application (plot plan) for Lot 2 would need to show design high water for the BMP and the 25 ft. setback, so we could make final determination. At that time we would either ask to reconfigure the plan to avoid the buffer or if there is no way to avoid impacts to the buffer, a variance request requested in writing from the owner or tenant (current or future), not the builder, would be necessary to our division. This is an administrative process where we try to limit impact to the greatest extent possible and try to restore impacted buffer area back to natural meadow or forest conditions to the greatest extent practical or by use of native tree, shrub or groundcover landscaping.

This should answer your questions. If not call me at 757-253-6639.

Scott J. Thomas SAT 7-16-02
Civil Engineer
Environmental Division

Per Bill Cain

Open space drainage easement generic so belongs to Co

ENVIRONMENTAL – STORMWATER TRANSMITTAL

PROTECTING RESOURCES PRIDE IN DELICATE ENVIRONMENTS

James City County Jamestown 1607

COUNTY PLAN NO: SP-66-02

BMP ID CODE: MC003

WATERSHED: MILL CREEK

- ☐ **ENTIRE RECORD FILE**
- ☐ **ASBUILTS**
- ☐ **CONSTRUCTION CERTIFICATION**
- ☐ **COMPUTATIONS**
- ☑ **OTHER:** A copy of these revised computations, for SP-66-02 Grace Covenant Presbyterian Church, needs to go in the MC003 file. The BMP riser on the existing pond was modified on the church plan.

NAME: Scott J. Thomas

SIGNATURE: Scott J Thomas

DATE: 9/24/08

Grace Covenant Presbyterian Church

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670 Fax Number: 757-259-4032

DATE SENT: 7/16/02

Name: Wendell Gaffney
Firm or Company: Century 21 REALTY
Facsimile Number: 757-565-3812
Number of pages including this transmittal: 5
From: Scott J. Thomas

James City County
P O Box 8784
Williamsburg VA 23187-8784

Comments: See Attached Note + Plans.
RE: LOT 2, FIVE LOTS ON Jamestown ROAD.

If you do not receive all pages, call 757-253-6670 as soon as possible

RE: LOT 2
NEXT TO MC 003.

SCOTT J. THOMAS, P.E.
CIVIL ENGINEER

ENVIRONMENTAL DIVISION

101 MOUNTS BAY ROAD, P.O. BOX 8784 (757) 253-6639
WILLIAMSBURG, VIRGINIA 23187-8784 FAX: (757) 259-4032
E-MAIL: scottt@james-city.va.us

Frances C. Geissler

From: Adam Kinsman
Sent: Monday, June 09, 2008 4:46 PM
To: Frances C. Geissler; John Horne
Subject: RE: Generic Easements

The county is not responsible for maintenance of undesignated, generic utility (or other) easements.

From: Frances C. Geissler
Sent: Monday, June 09, 2008 4:40 PM
To: Adam Kinsman; John Horne
Subject: Generic Easements

Question of the Week: Does the presence of a generic utility easement on a subdivision plat in a neighborhood without a mandatory HOA imply responsibility on the part of the County? If there is an undesignated easement and no responsible party, is the County responsible? OR, asked another way, do we have the ability to maintain the structure or are we required to maintain the structure? How responsible are we when no one else is responsible?

We think we have the ability, not the obligation, to act. Would that view hold up in court?

THANKS – seriously!

WATERSHED	MC	MAINTENANCE PLAN	No	CTRL STRUC DESC	None
BMP ID NO	003	SITE AREA acre	14.4	CTRL STRUC SIZE inches	
PLAN NO	S-35-87	LAND USE	SF Residential	OTLT BARRL DESC	RCP Barrel
TAX PARCEL	(47-4)(9-1A)	old BMP TYP	Dry Pond	OTLT BARRL SIZE inch	18
PIN NO	4740900001A	JCC BMP CODE			
CONSTRUCTION DATE	1/1/1987	POINT VALUE		EMERG SPILLWAY	No
PROJECT NAME	Settlers Mill Basin at Jamestown Rd			DESIGN HW ELEV	
FACILITY LOCATION	Settlers Mill Entrance Jamestown Road			PERM POOL ELEV	
CITY-STATE	Williamsburg, Va. 23185	SVC DRAIN AREA acres	18.15	2-YR OUTFLOW cfs	28.04
CURRENT OWNER	Settlers Mill Inc.			10-YR OUTFLOW cfs	37.37
OWNER ADDRESS	111 Old Colony Lane			REC DRAWING	No
OWNER ADDRESS 2		SERVICE AREA DESCRI	Settlers Mill & Jamestown Road		
CITY-STATE-ZIP CODE	Williamsburg, Va. 23185	IMPERV AREA acres		CONSTR CERTIF	No
OWNER PHONE		RECV STREAM	UT of Mill Creek-Lake Pow		
MAINT AGREEMENT	No	EXT DET-WQ-CTRL	No	LAST INSP DATE	1/12/2001
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft	0	INTERNAL RATING	4
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0	form Lakewood Sec 2. At Lakewood Drive entrance.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

Previous Comments

GEL | SJT

ENVIRONMENTAL DIVISION REVIEW COMMENTS
GRACE COVENANT PRESBYTERIAN CHURCH
COUNTY PLAN NO. SP - 066 - 02
August 9, 2002

Stormwater Management / Drainage:

1. ✓ Open Space Credit. Previous comment # 23 was not fully addressed. Although an "Easement Exhibit" was provided, it does not appear the hatched area as shown on the exhibit as Proposed Conservation Easement area totals 3.566 acres as previously claimed in the BMP worksheet. Also, the response to previous comment # 23 indicated that "the BMP point calculation has been adjusted to meet the recalculated area of the conservation easement". The revised BMP worksheet was not found in the design report or resubmittal documents. OK

2. ✓ Open Space Credit. Provide a conservation easement plat for conservation easement areas as claimed in the BMP worksheet and as shown on the "Easement Exhibit" as provided. IN PROCESS

3. ✓ BMP # 1 Design. Previous comment # 31 was not fully addressed. The weighted runoff coefficient computation for a C factor of 0.43, as used for postdevelopment analyses of BMP # 1, was not found in the design report or resubmittal documents.

4. ✓ BMP # 1. Response to previous comment # 32 is acknowledged. Although page 5-51 of the VSMH indicates that if emergency spillways are not practical due to site constraints, the 100-year storm event must be routed through the riser and barrel system, Minimum Standard 3.01 of the VSMH (page 3.01-12) indicates that "an embankment without an emergency spillway must provide at least 2 feet of freeboard from the maximum 100-year storm WSE to the lowest point on the top of the embankment." County policy as outlined on page 12 of the design plan checklist is consistent with this VSMH requirement. Based on the current design, the riser/barrel system will pass the 100-year design event with only 0.35 feet of freeboard to top of dam. A variance request, in writing, must be presented to the Environmental Division to vary from County requirements and Minimum Standard 3.01 of the VSMH. The variance request must clearly outline site restraints that restrict raising the dam or providing additional storage volume in the basin and whether reduced freeboard may cause any consequences to the dam structure or adjacent roadways. *(Note: If minimum freeboard requirements are not honored, heavy reliance will be placed on the maintenance aspects of BMP # 1 to ensure the facility functions as designed as clogging of the principal spillway could result in overtopping of the dam. Therefore, the maintenance plan is not typical of most detention basins. Ensure the BMP maintenance plan for BMP # 1 as shown on Sheet C-7 adequately addresses this concern if a variance request is deemed necessary.)*

Variance request letter dated Aug 27 2002

5. ✓ BMP # 1 Trash Rack. The trash rack as proposed for the DI-1 top of BMP # 1 is similar to the trash rack necessary for the low flow orifice on the riser (per details Sheet C-5). A fully symmetrical, triangular-shaped trash rack is recommended for the top of the proposed DI-1 riser structure rather than the right triangle type unit as proposed. A symmetrical unit would be more aesthetically pleasing and is more typically used for riser tops. Also, an anti-vortex plate should be a part of the trash rack design, especially if the riser is being utilized to pass the 100-year storm event.

6. ✓ Maintenance Plan. Some information is missing in the first paragraph and in Item # 1 of the maintenance plan for BMP # 1 on Sheet C-7. Numeric or elevation data is required for several blank "x's".

7. Bioretention Cell. A bioretention area was added to the main parking cell in the middle of the site to address previous comment # 42. The following comments pertain to the bioretention cell:

7a) Label the bioretention cell in the parking area as BMP # 3 on plan Sheet C-3.
7b) The sand filter layer per the detail on Sheet C-5 is optional.
7c) Ensure geotextile as shown on the detail on Sheet C-5, between the stone underdrain and planting soil media layers is properly designed and specified to permit the free flow of water yet retain soil particle migration into the gravel envelope.
7d) Show a dimension for the width of the cell section on the details on Sheet C-7.
7e) Show approximate width and depth dimensions for the pea gravel diaphragm on the detail on Sheet C-7.
7f) Certification of the planting soil layer will be required in accordance with Appendix E of the County BMP manual to fulfill construction certification requirements associated with this BMP.
7g) Add a note to the "Bioretention Basin Sections" detail on Sheet C-5 of the plan to indicate that installation/materials for construction of the bioretention cell shall be in accordance with Group D BMP requirements of the County BMP Manual (pages 48-50) and Minimum Standards 3.11 (Bioretention) and 3.13 (pages 3.13-12 and 13) of the Virginia Stormwater Management Handbook. These references should be followed for proper installation, materials and construction sequencing for the plants, mulch layer, planting soil layer, the underdrain and the stone diaphragm.
7h) Landscape Plan Sheet L-1 should also refer to Minimum Standard 3.11 of the VSMH for proper selection and requirements associated with bioretention cell plantings; or alternatively, appropriate notes should be provided on Sheet L-1 referring to bioretention details on Sheet C-5. A minimum of three species of trees and three species of shrubs and herbaceous ground cover are required. Refer to pages 3.11-16 through 38 of the VSMH. *(Currently, the landscape plan is not consistent with VSMH Minimum Standard requirements for bioretention BMPs.)*

8. Storm Structure. A 12-inch storm drain was added to the plan in the southwest corner of the site to address previous comment # 37. It does not appear that a typical ES-1 headwall configuration will work at this location due the sharp deflection angle between the swale and the pipe entrance and due to the slope area in back (south) of the pipe entrance. Flow may bypass the headwall and overflow down the slope. An L-shaped headwall may be necessary at this location. Please evaluate the design to ensure the proper headwall is used so that flow from within the channel is not bypassed around the headwall and culvert entrance in an uncontrolled manner onto the downstream slope.

L-wall added Sheet C-3.

BMP POINT CALCULATIONS
FOR
GRACE COVENANT CHURCH

LMDG File No. 2001201-000.03

- Per boundary of site, the site area is 7.288 acres.

- Per meeting of March 8, 2002, with Scott Thomas (JCC Environmental Division), the existing borrow pit can be counted as an infiltration basin for the project. The borrow pit accepts drainage from 0.969 acres of the site, and 0.128 acres of off-site. Thus, the total drainage area served by the existing borrow pit is 1.097 acres.

  BMP Points = $\frac{1.097}{7.288}$ x 8 = **1.20 BMP points**

- The existing dry detention basin (Part of the subdivision design) will be modified to become an extended dry detention basin. This basin will be designed to serve a site drainage area of 6.235 acres. In addition, this basin serves an off-site drainage area of 7.626 acres. Thus, the total drainage area served by this basin is 13.861 acres.

  BMP Points = $\frac{13.861}{7.288}$ x 4 = **7.61 BMP points**

- A total of 2.814 acres of open space will remain in its natural state for this project.

  BMP Points = $\frac{2.814}{7.288}$ x 100 x 0.10 = **3.86 BMP points**

- Total BMP Points for Site = 1.20 + 7.61 + 3.86 = **12.67 BMP points**

FINAL BMP WORKSHEET

OFF-SITE WEIGHTED C CALCULATION
FOR
GRACE COVENANT CHURCH

LMDG File No. 2001201-000.03

- Total off-site area that drains to BMP No. 1 is 7.626 acres. From County GIS mapping, we were able to determine that 1.602 acres of the drainage area is impervious (roadways, houses, walks, driveways, etc).

- Weighted c = $\frac{0.9\ (1.602) + 0.3\ (6.024)}{7.626}$

  Weighted c = 0.43

MC003

FORWARDED TO GCPC

216 Mill Stream Way

Williamsburg, Virginia

August 19, 2013

Fran Geissler Stormwater Director

James City County

Dear Fran

Enclosed are my picture of the water problem in front of Settles Mill and the church property.

I have noted the area I believed is causing the problem. When I look more pictures last Friday your landscape crew for the church had just finished. Please note the grass clippings in the water.

I request and check on our landscape crew to blow all grass clippings and leaves away from this area.

I have requested that they remove debris form the top of the pyramid weekly. This is possible only when the water is no longer a problem.

I hope you can help solve this problem before it gets much worse.

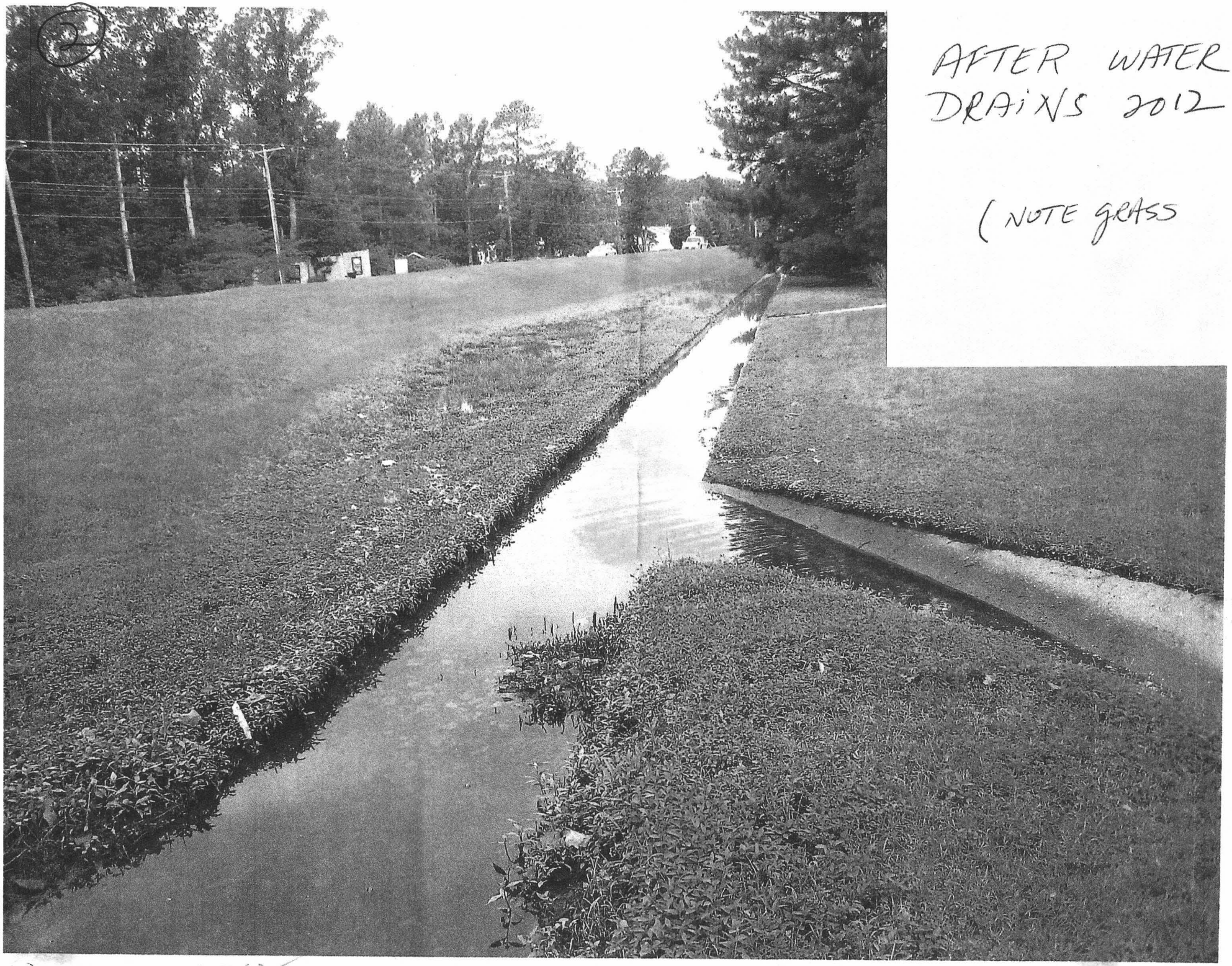
Thank you for your help.

Sincerely

Pat Rathke

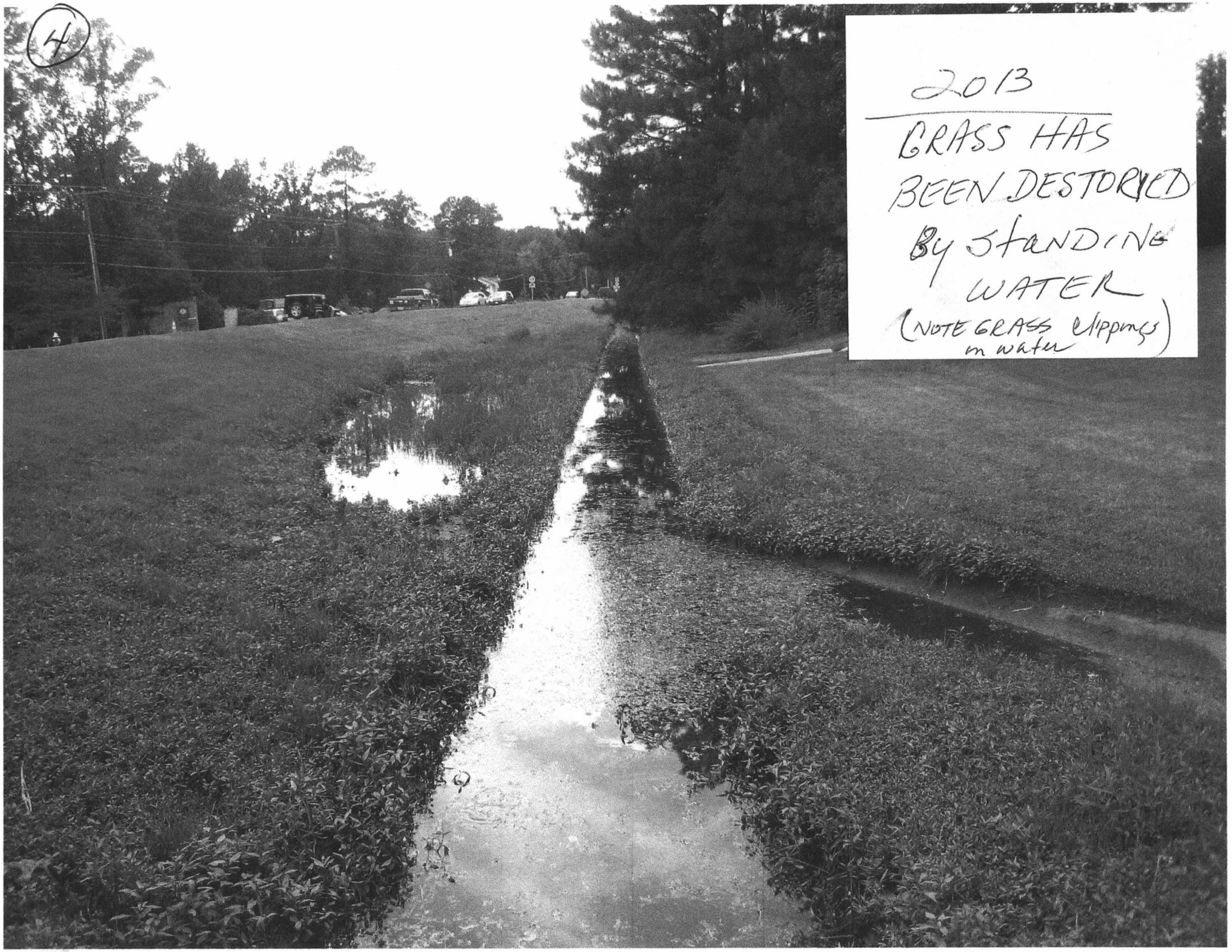
Pat Rathke

1
POND
AFTER RAIN
in 2012
2012

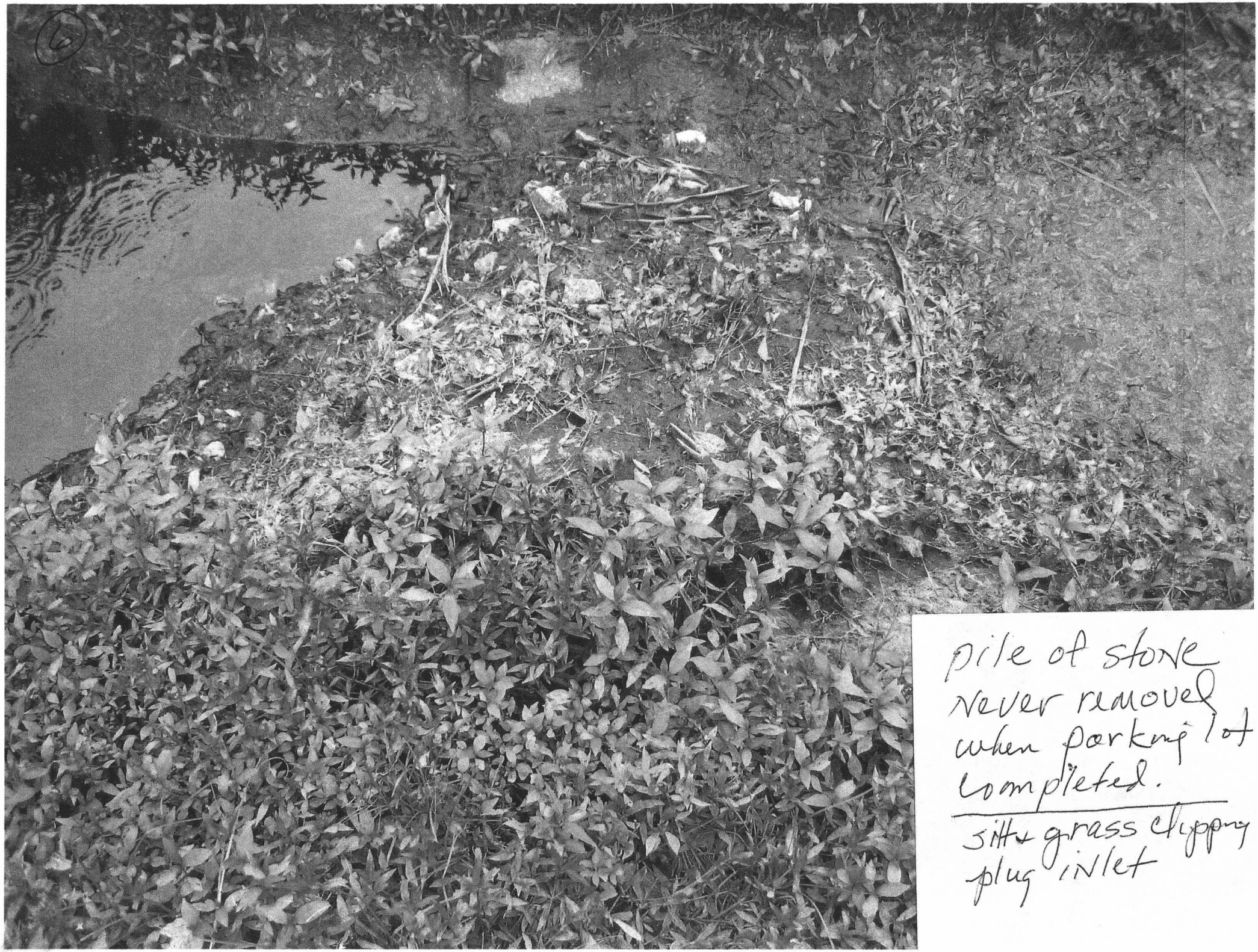

2
AFTER WATER
DRAINS 2012
(NOTE GRASS

GRATE PLUGGED
2012

(12)

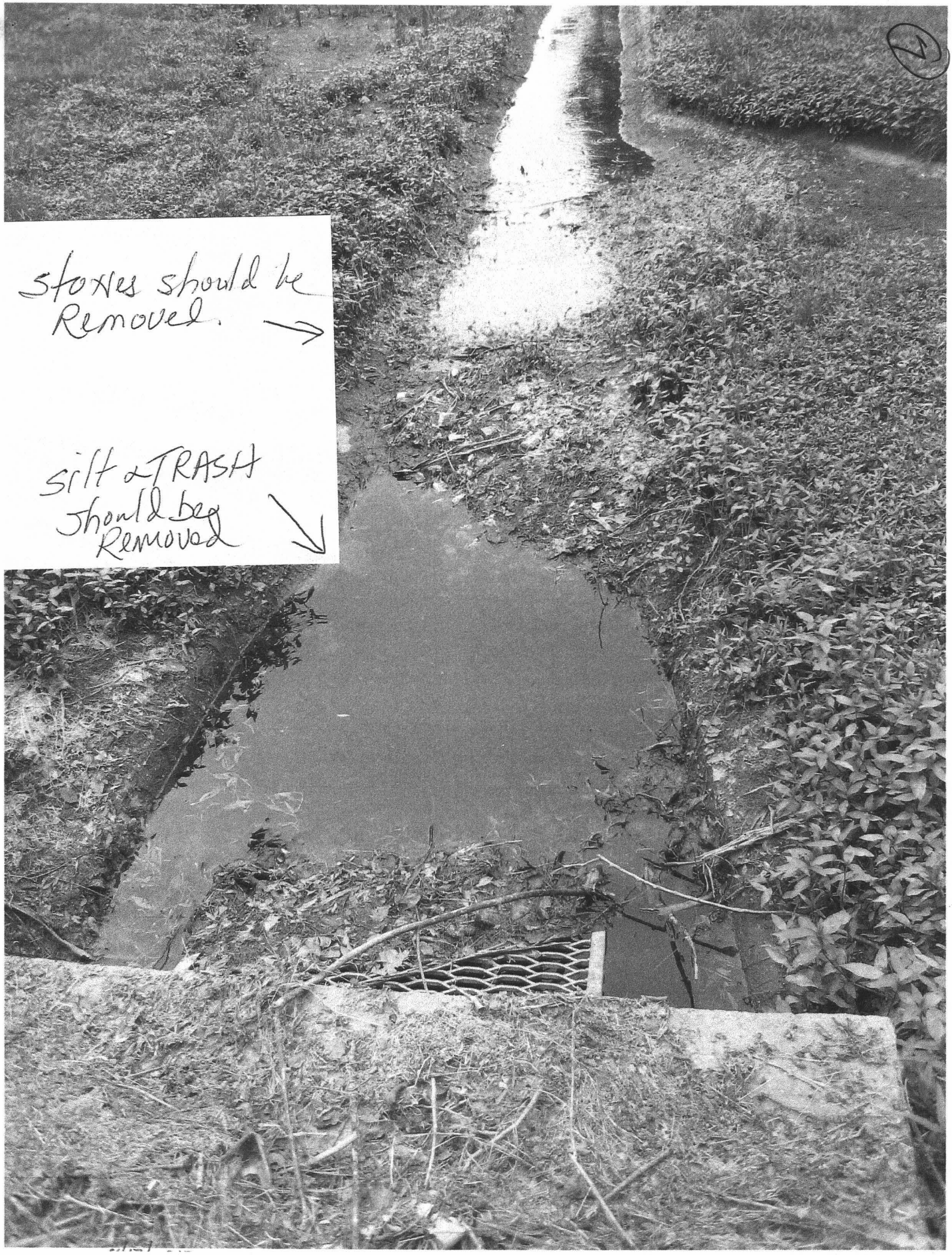

4
2013
GRASS HAS
BEEN DESTORIED
By STANDING
WATER
(NOTE GRASS CLIPPINGS
in water)

6
Friday 8/17/2013
FRESH
GRASS CLIPPING
FROM CHURCH
HILLSIDE



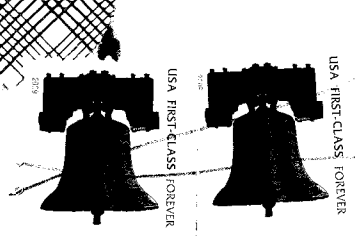
pile of stone never removed when parking lot completed.

silt + grass clipping plug inlet


stones should be Removed.
silt & TRASH should be Removed

8
↑ pyrimid can be clean & water Runs free there
Grate ↓ below plugged with grass clippings →
Dig under front of grate →

Mrs. Patricia A. Rathke
216 Mill Stream Way
Williamsburg, VA 23185



Fran Geissler
Stormwater Director
5320 Palmer Lane Ste 2A
Williamsburg, 23188