



See also MC009 and MC024

The three BMPs were repaired in 1998.

MC009 is pond #1

MC024 is pond #2

MC025 is pond #3

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: MC025

DATE VERIFIED: December 4, 2012

QUALITY ASSURANCE TECHNICIAN: Leah Hardenbergh

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA



Stormwater Division

MEMORANDUM

Date: March 29, 2012
To: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services
From: Leah Hardenbergh
PO: 110426
Re: Files Approved for Scanning

General File ID or BMP ID: MC025
PIN: 4830200001
Owner Name (if known): ROLLING WOODS
Legal Property Description: OPEN SPACE S-3 ROLLING WDS
Site Address: BASIN # 2- 2730 PERSIMMON PLACE

(For internal use only):

Box # 3

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

MC-025

Contents for Stormwater Management Facilities As-built Files

Each file is to contain:

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

000021748

000020722

RE-RECORDING OF
EASEMENT AND MAINTENANCE AGREEMENT

RE-RECORDING OF THIS
This **EASEMENT AND MAINTENANCE AGREEMENT** (this "Agreement") is made

this 24th day of October 2000, by and between **ROLLING WOODS HOMEOWNERS' ASSOCIATION OF WILLIAMSBURG, INC.**, a Virginia non-stock corporation ("ASSOCIATION"), Grantor, whose registered agent is Stephen J. Roberts, Esq., with an address of 905 Richmond Road, Williamsburg, Virginia 23185; and **JAMES CITY COUNTY**, a Political Subdivision of the Commonwealth of Virginia ("COUNTY"), Grantee, with an address of Attention: County Administrator, 101-C Mounts Bay Road, Williamsburg, Virginia, 23185.

RECITALS

WHEREAS, the ASSOCIATION is the umbrella homeowners' association responsible for the maintenance, management, operation and control of the Common Areas in the residential community known as Rolling Woods, located in the County of James City, Virginia; and

WHEREAS, Rolling Woods is subject to certain covenants and restrictions set forth in the Rolling Woods Declaration of Covenants and Restrictions dated _____, and recorded in the Clerk's office of the Circuit Court of the City of Williamsburg and the County of James City, Virginia (the Williamsburg/James City County Clerk's Office) in Deed Book _____, Page _____,

This Instrument prepared by:

Colleen K. Killilea, Esq.
Jones, Blechman, Woltz & Kelly, P.C.
460 McLaws Circle, Suite 220
Williamsburg, Virginia 23185
(757) 259-5740
(757) 259-5717 (fax)

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NOV 16 00 01

OCT 26 0289

NOV 16 0002

the Amended and Restated Declaration of Covenants and Restrictions dated _____ and recorded in the Williamsburg/James City Clerk's Office in Deed Book ____, Page ____, and ____; and as may be further amended, restated, modified or supplemented (the "Declaration"); and

WHEREAS, pursuant to the Declaration, the ASSOCIATION is responsible for the maintenance and upkeep of the Common Areas in Rolling Woods; and

WHEREAS, there are ~~three privately owned stormwater detention basins in Rolling Woods~~, located within a certain piece or parcel of land identified as "OPEN SPACE" on a certain plat entitled "ROLLING WOODS SUBDIVISION SECTION 3, THE DIGGES BROTHERS, INC - OWNER/DEVELOPER, JAMES CITY COUNTY, VIRGINIA", dated October 19, 1988 by the DeYoung-Johnson Group, Inc., Engineers-Architects-Surveyors, Williamsburg, Virginia, which plat was recorded in the Williamsburg/James City County Circuit Court Clerk's Office in Plat Book 49, pages 78-79. These three stormwater detention basins provide the stormwater management and drainage for the Rolling Woods community, and said system, hereinafter referred to as the "SYSTEM," also includes any runoff control facilities, pipes, conveyance systems and associated improvements and easements, located on and serving the above-described property. The SYSTEM shall not include any elements located within any Virginia Department Transportation rights-of-way.

WHEREAS, the ASSOCIATION and the COUNTY have agreed, subject to the provisions of Paragraph 15 herein, that ~~the ASSOCIATION will be responsible for certain routine maintenance and repairs of the SYSTEM, and the County will be responsible for certain non-routine maintenance, emergency repairs and replacements all as hereinafter set forth; and~~

WHEREAS, the purpose of the maintenance is to ensure that the SYSTEM detains and releases stormwater in accordance with the approved SYSTEM design as presented in the approved

plans, James City County Case Number S-17-87 and S-34-88, and with the law and applicable executive regulation except as otherwise provided for in Item 9 below.

NOW THEREFORE, in consideration of TEN DOLLARS (\$10.00), the mutual covenants contained herein and other good valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. County's Duties. The COUNTY agrees, subject to the provisions of Paragraph 15 herein, to perform all "Non-routine Work" (as hereinafter defined in paragraph 4 below) to the SYSTEM. In connection with the exercise of its duties hereunder, the COUNTY agrees to complete all work lien free and in a good and workmanlike manner, and to restore all disturbed areas upon completion of the work to substantially the original condition of such areas. The COUNTY further agrees to serve as the primary advisor to the ASSOCIATION on all state and federal regulations regarding the management and operation of the stormwater detention basins.

2. Association's Duties

The ASSOCIATION

- a) agrees to perform all "Routine Work" (as hereinafter defined in paragraph 4 below) to the SYSTEM; and
- b) agrees to levy regular or special assessments, if necessary, to the fullest extent permitted under the Declaration of Covenants and/or Virginia law, against all present or subsequent owners of property, subject to the Declaration of Covenants and served by the SYSTEM to ensure that the ASSOCIATION has adequate funds available to perform its obligations in accordance with this Agreement; and

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c) hereby grants and conveys to the COUNTY the non-exclusive right of ingress and egress over and across those certain access areas designated as “_____” on Exhibit A attached hereto for the purpose of (i) providing access to and from the SYSTEM to enable the COUNTY to perform its duties under this Agreement; (ii) providing perpetual access from the public right-of-ways to the SYSTEM for the COUNTY, its employees, its agent and its contractor, and (iii) for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the SYSTEM; and

d) hereby agrees to promptly notify the COUNTY when the ASSOCIATION legally transfers any of the responsibilities for the SYSTEM. The ASSOCIATION shall supply the COUNTY with a copy of any document of transfer, executed by the ASSOCIATION and by the transferee, indicating the transferee’s agreement to assume the ASSOCIATION’S obligations hereunder.

Definitions.

A. “Routine Work.” As used herein, the term “Routine Work” means the performance of the following duties.

- (i) Mowing and seeding of the stormwater detention basin embankment.
- (ii) Removal of downed trees from the stormwater detention basins themselves, insofar as they inhibit the function of the stormwater detention basins.
- (iii) Removal of tree growth from the dam embankment itself.

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- (iv) Maintaining storm water outlets and release structures free of trash and debris.
- (v) Commercially reasonable management of aquatic vegetation, such that said vegetation does not interfere with the function of the stormwater detention basin and dam.
- (vi) Routine maintenance of dam embankment to prevent surface erosion of the dam.
- (vii) Commercially reasonable action to control animals (such as beavers and muskrats) that may live in or around the stormwater detention basins, insofar as they pose a hazard to the function of the settlement basin.

B. "Non-routine Work." As used herein, the term "Non-routine Work" means performance of the following duties.

- (i) Dredging and cleaning of the stormwater detention basins to maintain an appropriate depth for storm water management purposes.
- (ii) Periodic checks of the stormwater detention basin depths, as appropriate.
- (iii) Making all necessary structural repairs to the dam embankment and associated dams and spillways, other than mowing and seeding.
- (iv) Replacing pipe spillways when damaged to the extent that their function is impaired.
- (v) Providing emergency repairs to the stormwater detention basins, dams, spillways, pipes and embankments, to include dam embankment failures.

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5. **Compliance with Laws.** The work performed by any party shall be completed in a good and workmanlike manner and shall comply with all federal, state and local laws, regulations and ordinances.

6. **Reservation.** The ASSOCIATION reserves (a) the right to landscape and grade the easement areas and to install fencing on easement areas other than easements for ingress/egress or access, (b) the right to install (or to grant others the right to install) other utilities in, on or about the easement areas, and (c) the right to otherwise use the easement areas for such other purposes as the ASSOCIATION may desire, provided that such use is not inconsistent with and does not interfere with the easements granted by this instrument, and further provided that the function of the dam is not impaired by such use.

7. **Duration.** The easements hereby granted and the other covenants, agreements and licenses contained herein shall be covenants and agreements running with the land and shall inure to the benefit of, and be binding upon, the parties hereto and all persons claiming under them, in perpetuity unless terminated or amended in accordance with paragraph 14 below.

8. **Remedies.** In addition to all rights and remedies otherwise available at law or in equity, in the event of any default under or violation or threatened violation of this Agreement by any party hereto, then the County shall have the following rights:

A. After notice to the ASSOCIATION setting forth the specific failures to comply with this Agreement, if those failures are not corrected within thirty (30) days after the delivery of the notice, then the COUNTY shall have the right to correct the failures, and the ASSOCIATION shall pay the costs thereof.

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9. **Separability.** The invalidation of any of the grants or covenants contained herein, by order of court, legislative mandate or otherwise, shall not affect any of the other provisions hereof and such other provisions shall remain in full force and effect.

10. **Notice.** Any notice required or intended to be given to any party under the terms of this Agreement shall be in writing and shall be deemed to be duly given if hand delivered or if deposited in the United States Mail, marked certified or registered, return receipt requested, postage prepaid or if sent by commercial courier service (e.g. Federal Express or UPS), addressed to the party to whom notice is to be given at the party's address set forth above, or at such other address as the party may hereafter designate by notice.

11. **Nonwaiver.** The forbearance or waiver by any party of a breach of any provision of this Agreement shall not operate as or be construed to be a waiver of any continuing breach or subsequent breach of this Agreement.

12. **Miscellaneous.** Whenever used herein, the singular shall include the plural, the plural the singular and the use of any gender shall include all other genders. The use of paragraph headings or captions is for ease of reference only and such headings or captions shall have no substantive meaning in the interpretation of this Agreement.

13. **Governing Law.** This Agreement shall be construed in accordance with, and governed by, the laws of the Commonwealth of Virginia.

14. **Amendment/Termination.** This Agreement may not be amended or terminated except by an instrument in writing duly executed by all parties and recorded in the Clerk's Office. However, the parties agree that when the COUNTY implements a stormwater management maintenance program to limit and manage the volume of stormwater runoff and to prevent the degradation of the County's waterways, that the COUNTY will not exclude

OCT 26 02 95

NOV 16 00 08

Rolling Woods from inclusion in the County's plan, based either in whole or in part on the existence of this Agreement, and once Rolling Woods is included in such a system, the parties agree that this Agreement will terminate and that all maintenance of the stormwater detention basins, whether routine or non-routine, will become the responsibility of the COUNTY.

15. Appropriations Clause. Notwithstanding any other provision herein to the contrary, this Agreement shall in no way obligate the County or the Board of Supervisors to appropriate money in order to fulfill any of the terms and conditions of this Agreement. However, it is the present intention of the County to fulfill the obligations under this Agreement.

WITNESS the following duly authorized signatures and seals:

**ROLLING WOODS HOMEOWNERS
ASSOCIATION OF WILLIAMSBURG, INC.**

A Virginia non-stock corporation

By: 
Vernon Dockins, President

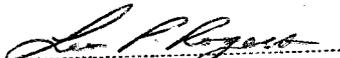
**THE COUNTY OF JAMES CITY, a Political
Subdivision of the Commonwealth of Virginia**

By: 

Name: Sanford B. Wanner

Title: County Administrator

APPROVED AS TO FORM


COUNTY ATTORNEY

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF James City :

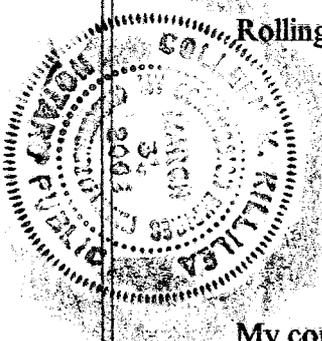
The foregoing instrument was acknowledged before me in James City County, Virginia, this
24th day of October, 2000, by Vernon Dockins, President of

Rolling Woods Homeowners Association, a Virginia non-stock corporation, on its behalf.

Colleen K. Kuehn

Notary Public

My commission expires: 3/31/2002



OCT 26 02 96

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF James City :

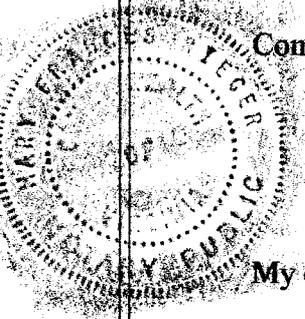
The foregoing instrument was acknowledged before me in James City County, Virginia, this
25th day of October, 2000, by Sanford B. Warner,

County Administrator, of James City County, a Political Subdivision of the

Commonwealth of Virginia, on its behalf.

Mary Frances Rieger
Notary Public

My commission expires: Oct. 31, 2001.



NOV 16 00 09

VIRGINIA: City of Williamsburg and County of James City, to-wit:

This Re-Recording was presented with certificate annexed and admitted to record on 16 Nov, 2000, at 8:57 AM in the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City.

TESTE: BETSY B. WOOLRIDGE, CLERK

Betsy B. Woolridge Clerk

VIRGINIA: City of Williamsburg and County of James City, to-wit:

This Easement Agreement was presented with certificate annexed and admitted to record on 26 Oct., 2000, at 3:22 PM in the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City.

TESTE: BETSY B. WOOLRIDGE, CLERK

Betsy B. Woolridge Clerk

030 008750

CORRECTED EASEMENT AND MAINTENANCE AGREEMENT

COPY

This **CORRECTED EASEMENT AND MAINTENANCE AGREEMENT** (this "Agreement") is made this 5th day of March 2003, by and between **ROLLING WOODS HOMEOWNERS' ASSOCIATION OF WILLIAMSBURG, INC.**, a Virginia non-stock corporation ("ASSOCIATION"), Grantor, whose registered agent is Stephen J. Roberts, Esq., with an address of 905 Richmond Road, Williamsburg, Virginia 23185; and **JAMES CITY COUNTY**, a Political Subdivision of the Commonwealth of Virginia ("COUNTY"), Grantee, with an address of Attention: County Administrator, 101-C Mounts Bay Road, Williamsburg, Virginia, 23185.

RECITALS

WHEREAS, the ASSOCIATION is the umbrella homeowners' association responsible for the maintenance, management, operation and control of the Common Areas in the residential community known as Rolling Woods, located in the County of James City, Virginia; and

WHEREAS, Rolling Woods is subject to certain covenants and restrictions set forth in the Rolling Woods Declaration of Covenants and Restrictions dated October 20, 1987, and recorded in the Clerk's office of the Circuit Court of the City of Williamsburg and the County of James City, Virginia (the Williamsburg/James City County Clerk's Office) in Deed Book 413, Pages 1-5, the Amended and Restated Declaration of Covenants and Restrictions dated March 8, 1989 and recorded in the Williamsburg/James City County Clerk's Office in Deed Book 478, Page 732, and 733; and as may be further amended, restated, modified or supplemented (the "Declaration"); and

MAR 25 8 04 32

WHEREAS, pursuant to the Declaration, the ASSOCIATION is responsible for the maintenance and upkeep of the Common Areas in Rolling Woods; and

WHEREAS, there are three privately owned stormwater detention basins in Rolling Woods, located within a certain piece or parcel of land identified as "OPEN SPACE" on a certain plat entitled "ROLLING WOODS SUBDIVISION SECTION 3, THE DIGGES BROTHERS, INC - OWNER/DEVELOPER, JAMES CITY COUNTY, VIRGINIA", dated October 19, 1988 by the DeYoung-Johnson Group, Inc., Engineers-Architects-Surveyors, Williamsburg, Virginia, which plat was recorded in the Williamsburg/James City County Circuit Court Clerk's Office in Plat Book 49, pages 78-79. These three stormwater detention basins provide the stormwater management and drainage for the Rolling Woods community, and said system, hereinafter referred to as the "SYSTEM," also includes any runoff control facilities, pipes, conveyance systems and associated improvements and easements, located on and serving the above-described property. The SYSTEM shall not include any elements located within any Virginia Department Transportation rights-of-way.

WHEREAS, the ASSOCIATION and the COUNTY have agreed, subject to the provisions of Paragraph 15 herein, that the ASSOCIATION will be responsible for certain routine maintenance and repairs of the SYSTEM, and the County will be responsible for certain non-routine maintenance, emergency repairs and replacements all as hereinafter set forth; and

WHEREAS, the purpose of the maintenance is to ensure that the SYSTEM detains and releases stormwater in accordance with the approved SYSTEM design as presented in the approved plans, James City County Case Number S-17-87 and S-34-88, and with the law and applicable executive regulation except as otherwise provided for in Item 9 below.

MAR 25 04 33

NOW THEREFORE, in consideration of TEN DOLLARS (\$10.00), the mutual covenants contained herein and other good valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. County's Duties. The COUNTY agrees, subject to the provisions of Paragraph 15 herein, to perform all "Non-routine Work" (as hereinafter defined in paragraph 4 below) to the SYSTEM. In connection with the exercise of its duties hereunder, the COUNTY agrees to complete all work lien free and in a good and workmanlike manner, and to restore all disturbed areas upon completion of the work to substantially the original condition of such areas. The COUNTY further agrees to serve as the primary advisor to the ASSOCIATION on all state and federal regulations regarding the management and operation of the stormwater detention basins.

2. Association's Duties

The ASSOCIATION

- a) agrees to perform all "Routine Work" (as hereinafter defined in paragraph 4 below) to the SYSTEM; and
- b) agrees to levy regular or special assessments, if necessary, to the fullest extent permitted under the Declaration of Covenants and/or Virginia law, against all present or subsequent owners of property, subject to the Declaration of Covenants and served by the SYSTEM to ensure that the ASSOCIATION has adequate funds available to perform its obligations in accordance with this Agreement; and
- c) hereby grants and conveys to the COUNTY the non-exclusive right of ingress and egress over and across those certain access areas located on lots 48, 49, and 53 in

MAR 25 04 34

Section 3; and lot 10 in Section 4; and all adjacent areas owned by the ASSOCIATION for the purpose of (i) providing access to and from the SYSTEM to enable the COUNTY to perform its duties under this Agreement; (ii) providing perpetual access from the public right-of-ways to the SYSTEM for the COUNTY, its employees, its agent and its contractor, and (iii) for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the SYSTEM; and

d) hereby agrees to promptly notify the COUNTY when the ASSOCIATION legally transfers any of the responsibilities for the SYSTEM. The ASSOCIATION shall supply the COUNTY with a copy of any document of transfer, executed by the ASSOCIATION and by the transferee, indicating the transferee's agreement to assume the ASSOCIATION'S obligations hereunder.

Definitions.

A. "Routine Work." As used herein, the term "Routine Work" means the performance of the following duties.

- (i) Mowing and seeding of the stormwater detention basin embankment.
- (ii) Removal of downed trees from the stormwater detention basins themselves, insofar as they inhibit the function of the stormwater detention basins.
- (iii) Removal of tree growth from the dam embankment itself.

- (iv) Maintaining storm water outlets and release structures free of trash and debris.
- (v) Commercially reasonable management of aquatic vegetation, such that said vegetation does not interfere with the function of the stormwater detention basin and dam.
- (vi) Routine maintenance of dam embankment to prevent surface erosion of the dam.
- (vii) Commercially reasonable action to control animals (such as beavers and muskrats) that may live in or around the stormwater detention basins, insofar as they pose a hazard to the function of the settlement basin.

B. "Non-routine Work." As used herein, the term "Non-routine Work" means performance of the following duties.

- (i) Dredging and cleaning of the stormwater detention basins to maintain an appropriate depth for storm water management purposes.
- (ii) Periodic checks of the stormwater detention basin depths, as appropriate.
- (iii) Making all necessary structural repairs to the dam embankment and associated dams and spillways, other than mowing and seeding.
- (iv) Replacing pipe spillways when damaged to the extent that their function is impaired.
- (v) Providing emergency repairs to the stormwater detention basins, dams, spillways, pipes and embankments, to include dam embankment failures.

MAR 25 8 04 36

5. **Compliance with Laws.** The work performed by any party shall be completed in a good and workmanlike manner and shall comply with all federal, state and local laws, regulations and ordinances.

6. **Reservation.** The ASSOCIATION reserves (a) the right to landscape and grade the easement areas and to install fencing on easement areas other than easements for ingress/egress or access, (b) the right to install (or to grant others the right to install) other utilities in, on or about the easement areas, and (c) the right to otherwise use the easement areas for such other purposes as the ASSOCIATION may desire, provided that such use is not inconsistent with and does not interfere with the easements granted by this instrument, and further provided that the function of the dam is not impaired by such use.

7. **Duration.** The easements hereby granted and the other covenants, agreements and licenses contained herein shall be covenants and agreements running with the land and shall inure to the benefit of, and be binding upon, the parties hereto and all persons claiming under them, in perpetuity unless terminated or amended in accordance with paragraph 14 below.

8. **Remedies.** In addition to all rights and remedies otherwise available at law or in equity, in the event of any default under or violation or threatened violation of this Agreement by any party hereto, then the County shall have the following rights:

A. After notice to the ASSOCIATION setting forth the specific failures to comply with this Agreement, if those failures are not corrected within thirty (30) days after the delivery of the notice, then the COUNTY shall have the right to correct the failures, and the ASSOCIATION shall pay the costs thereof.

MAR 25 04 37

9. **Separability**. The invalidation of any of the grants or covenants contained herein, by order of court, legislative mandate or otherwise, shall not affect any of the other provisions hereof and such other provisions shall remain in full force and effect.

10. **Notice**. Any notice required or intended to be given to any party under the terms of this Agreement shall be in writing and shall be deemed to be duly given if hand delivered or if deposited in the United States Mail, marked certified or registered, return receipt requested, postage prepaid or if sent by commercial courier service (e.g. Federal Express or UPS), addressed to the party to whom notice is to be given at the party's address set forth above, or at such other address as the party may hereafter designate by notice.

11. **Nonwaiver**. The forbearance or waiver by any party of a breach of any provision of this Agreement shall not operate as or be construed to be a waiver of any continuing breach or subsequent breach of this Agreement.

12. **Miscellaneous**. Whenever used herein, the singular shall include the plural, the plural the singular and the use of any gender shall include all other genders. The use of paragraph headings or captions is for ease of reference only and such headings or captions shall have no substantive meaning in the interpretation of this Agreement.

13. **Governing Law**. This Agreement shall be construed in accordance with, and governed by, the laws of the Commonwealth of Virginia.

14. **Amendment/Termination**. This Agreement may not be amended or terminated except by an instrument in writing duly executed by all parties and recorded in the Clerk's Office. However, the parties agree that when the COUNTY implements a stormwater management maintenance program to limit and manage the volume of stormwater runoff and

MAR 25 8 04 38

to prevent the degradation of the County's waterways, that the COUNTY will not exclude Rolling Woods from inclusion in the County's plan, based either in whole or in part on the existence of this Agreement, and once Rolling Woods is included in such a system, the parties agree that this Agreement will terminate and that all maintenance of the stormwater detention basins, whether routine or non-routine, will become the responsibility of the COUNTY.

15. **Appropriations Clause.** Notwithstanding any other provision herein to the contrary, this Agreement shall in no way obligate the County or the Board of Supervisors to appropriate money in order to fulfill any of the terms and conditions of this Agreement. However, it is the present intention of the County to fulfill the obligations under this Agreement.

WITNESS the following duly authorized signatures and seals:

ROLLING WOODS HOMEOWNERS' ASSOCIATION OF WILLIAMSBURG, INC.
A Virginia non-stock corporation

By: Michael Foote
Michael Foote, President

THE COUNTY OF JAMES CITY, a Political Subdivision of the Commonwealth of Virginia

By: Sanford B. Wanner

Name: Sanford B. Wanner

Title: County Administrator

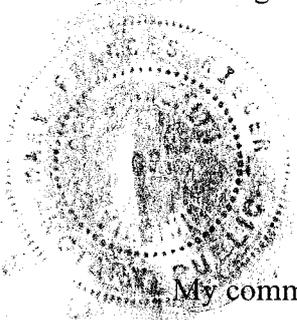
APPROVED AS TO FORM

Lee P. Rogers
COUNTY ATTORNEY

MAR 25 04 39

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF James City:

The foregoing instrument was acknowledged before me in James City County, Virginia, this
5th day of March, 2003, by Michael Foote, President of
Rolling Woods Homeowners Association, a Virginia non-stock corporation, on its behalf.

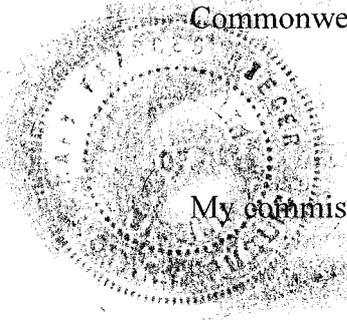


Mary Frances Rieger
Notary Public

My commission expires: October 31, 2005.

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF James City:

The foregoing instrument was acknowledged before me in James City County, Virginia, this
18th day of March, 2003, by Sanford B. Wanner,
County Administrator, of James City County, a Political Subdivision of the
Commonwealth of Virginia, on its behalf.



Mary Frances Rieger
Notary Public

My commission expires: October 31, 2005.

This Instrument prepared by:
Leo P. Rogers, Esq.
James City County
101-C Mounts Bay Road
Williamsburg, Virginia 23185
(757) 253-6614

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on 25 Mar. 03
at 11:20 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
\$ <u> </u>	\$ <u> </u>	\$ <u> </u>

TESTE: BETSY B. WOOLRIDGE, CLERK

BY: Betsy B. Woolridge Clerk

HAR 25 0440

000021424

THIS DEED EXEMPT FROM RECORDING TAXES PURSUANT TO VIRGINIA CODE §58.1-810 (3).

THIS DEED OF GIFT, made this 24 day of June, 1999, by and between THE DIGGES BROS., INC. and SASHA L. DIGGES and WILLIAM E. D. DIGGES, Trustees in liquidation, hereinafter referred to as "Grantor", and ROLLING WOODS HOMEOWNER'S ASSOCIATION OF WILLIAMSBURG, INC., hereinafter referred to as "Grantee", whose mailing address is 905 Richmond Road, Williamsburg, Virginia
23185 (90 Stephen Roberts).

WHEREAS, The Digges Bros., Inc. was a Virginia corporation whose existence was terminated by the Virginia State Corporation Commission on September 1, 1996 for failure to file an Annual Report and pay the required Franchise Tax; and

WHEREAS, at the time of termination of corporate existence, the Directors of the aforesaid corporation were Sasha L. Digges and William E. D. Digges; and

WHEREAS, at the time of termination of corporate existence, the aforesaid corporation held title to the property described below and, pursuant to Virginia Code Section 13.1-752, the directors are given the authority to convey said property.

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 ENGLISH COVENANTS OF TITLE unto ROLLING WOODS HOMEOWNER'S ASSOCIATION OF WILLIAMSBURG, INC., the following described property, to-wit:

NOV-88 0062

All that certain piece or parcel of land, situate in District in James City County, Virginia, identified as "OPEN SPACE" on a certain plat entitled, "ROLLING WOODS SUBDIVISION SECTION 3, THE DIGGES BROTHERS, INC.-OWNER DEVELOPER, JAMES CITY COUNTY, VIRGINIA" dated October 19, 1988 by The DeYoung- Johnson Group, Inc., Engineers - Architects - Surveyors, Williamsburg, Virginia, which plat was recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City, Virginia in Plat Book 49, pages 78-79.

Being a portion of the same property as that conveyed unto Grantors herein by Deed dated October 1, 1986 from Trust James Twenty Seven, Thirty One & Woods of Williamsburg Co., which Deed was recorded in the aforesaid Clerk's Office in Deed Book 319, at page 346.

This conveyance is made expressly subject to the conditions, restrictions and easements, if any, of record, constituting constructive notice.

WITNESS the following signatures and seals:

THE DIGGES BROS., INC.

By: *Sasha L. Digges*
Title: _____

Sasha L. Digges
SASHA L. DIGGES

William E. D. Digges
WILLIAM E. D. DIGGES

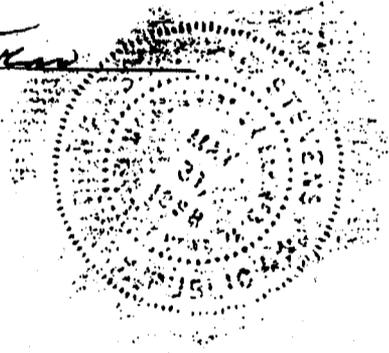
STATE OF VIRGINIA

CITY/COUNTY OF James City, to-wit:

The foregoing Deed was acknowledged before me by *Sasha L. Digges*, _____ of THE DIGGES BROS., INC., Trustee in liquidation, this 27th day of December, 1999.

Betty M. Stinson
NOTARY PUBLIC

My Commission Expires: May 31, 2012



4900 88-A0N
4900 88 0064

STATE OF VIRGINIA

CITY/COUNTY OF James City, to-wit:

The foregoing Deed was acknowledged before me by WILLIAM E. D. DIGGES, Trustee in liquidation, this 23rd day of August, 1999.



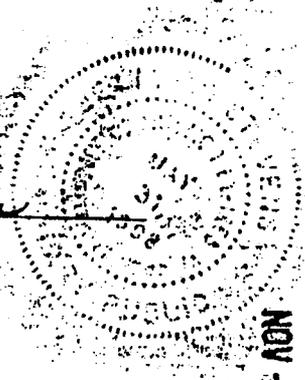
[Signature]
NOTARY PUBLIC

My Commission Expires: August 31, 2000

STATE OF VIRGINIA

CITY/COUNTY OF James City, to-wit:

The foregoing Deed was acknowledged before me by SASHA L. DIGGES, Trustee in liquidation, this 29th day of December, 1999.



[Signature]
NOTARY PUBLIC

My Commission Expires: May 31, 2002

PREPARED BY:
JONES, BLECHMAN, WOLTZ & KELLY, P.C.
David W. Otey, Jr.
460 McLaws Circle, Suite 220
Williamsburg, Va 23185

NOV-88 0065

VIRGINIA City of Williamsburg and County of James City, to-wit:
This Deed was presented with certificate annexed and admitted to record on 8 Nov, 2000 at 9:16 AM in the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City.

TESTE: BETSY B. WOOLRIDGE, CLERK
BY: [Signature] Deputy Clerk

1,012,500.00

DEED 319 PAGE 346

This Deed, made this 1st. day of October, 1986, by and between James H. SELLERS, TRUSTEE under Trust identified as TRUST JAMES TWENTY-SEVEN, James H. SELLERS, TRUSTEE under Trust identified as TRUST JAMES THIRTY-TWO, James H. SELLERS, TRUSTEE under Trust identified as TRUST JAMES THIRTY-THREE, and WOODS OF WILLIAMSBURG COMPANY, a Virginia Limited Partnership whose Certificate is recorded in the Clerk's Office of the Circuit Court of Williamsburg and James City County, Va., parties of the first part; and THE DIGGES BROS., INC., whose address is 16 Mile Course, Williamsburg, Va., 23105, party of the second part.

Witness, for and in consideration of \$10, cash in hand paid, and other good and valuable considerations, the receipt whereof is hereby acknowledged, the parties of the first part do grant and convey with Special Warranty unto the party of the second part, the following described property, to-wit:

All those certain contiguous tracts, pieces, or parcels of land, situate, lying, and being in James City County, Va., and being more particularly bounded and described as follows:

A. Parcels I, II, and III, Parcel III being 99.88 acs. +/-, and a 1.79 acre parcel, all as shown on plat recorded with deed in Deed Book 150 page 95, which plat is recorded in Plat Book 31 page 54 in the aforesaid Clerk's Office.

B. The southern portion of Lake Loring #2 as shown on plat entitled Birchwood Park Sec. B Part 3 and recorded in said Clerk's Office in Plat Book 18 page 35, bounded by "A" above on the east, west, and south; and on the north by the centerline of a stream as shown on said plat, which centerline is the line to which the dotted lines of lots 91 thru 96 on said plat would be extended as per legend on said plat.

C. Beginning at a point in the northernmost corner of lot 89 as shown on plat entitled Birchwood Park Section B Part 2 and recorded in Map Book 17 page 39; thence westerly along the north line of said lot 89 to "A" above; thence northerly along the boundary of "A" above to its intersection with the edge of Lake Loring #2; thence northeastwardly in a straight line to the southernmost corner of lot 91 on aforesaid plat in Map Book 18 page 35; thence northwardly along east line of said lot 91 to south line of lot 30 as shown on plat entitled Birchwood Park Sec. B Part 2 and recorded in Map Book 17 pages 19 and 20; thence eastwardly along said south line of said lot 30 to the southeast corner of said lot 30; thence southeastwardly in a straight line to the point of beginning.

D. Bounded on the east by Old Jamestown Road (now known as Lake Powell Road); on the north by south line of lots 3 and 4 as shown on plat recorded with Deed Book 151 page 488 in Map

1.

Book 32 page 33 on the west by east lines of lots 64 through 68 on aforesaid plat in Map Book 17 page 39; and on the south by "A" above.

E. There is excepted a small parcel of land, heretofore condemned of record by James City County for a sewage pump station, which parcel is approximately 200 feet southwesterly from the southern terminus of Redbud Lane and approximately 500 feet west of Lake Powell Road, plat in Deed Book 162 page 343.

It being the same or a part of the same conveyed to parties of the first part by the following deeds: Deed Book 226 page 43, Deed Book 158 page 839, and Deed Book 159 page 167.

First parties have granted easements to James City Service Authority, dated March 20, 1986 and recorded in Deed Book 302 pages 116 et seq, 122 et seq, 126 et seq, and 553 et seq, and by Condemnation in Deed Book 162 page 344, and Deed Book 164 page 334.

Witness the following signatures and seals, and in witness whereof, Woods of Williamsburg Company has caused its name to be signed hereto and this instrument sealed by Polly M. Sellers, its General Partner.

James H. Sellers, Trustee (SEAL)
James H. Sellers, Trustee for
Trust identified as Trust James
Twenty-seven

James H. Sellers, Trustee (SEAL)
James H. Sellers, Trustee for
Trust identified as Trust James
Thirty-two

James H. Sellers, Trustee (SEAL)
James H. Sellers, Trustee for
Trust identified as Trust James
Thirty-three

Woods of Williamsburg Company (SEAL)

by Polly M. Sellers (SEAL)
General Partner

State of Virginia- at large
City of Norfolk, to-wit:

The foregoing instrument was acknowledged before me this
23 rd. day of October, 1986 by James H. Sellers in his capacity

as Trustee and by Polly M. Sellers, General Partner of Woods of Williamsburg Company on behalf of the Partnership.

My commission expires: 12/20/88 Sarah J. Sellers
Sarah: J. Sellers-Notary Public

3.

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 31 day of Oct 1988
This deed was presented with the certificate annexed and admitted to record at 1:35 o'clock. The taxes imposed by Sect. 58-54 (a) and (b) of the code have been paid.

STATE TAX	LOCAL TAX	ADDITIONAL TAX
<u>1,578.75</u>	<u>506.25</u>	<u>1,012.50</u>
Total: <u>3,097.50</u>		

By Debra S. Ward
Deputy Clerk

RECORDED IN THE CLERK'S OFFICE OF THE CIRCUIT COURT FOR THE CITY OF WILLIAMSBURG AND COUNTY OF JAMES CITY, VIRGINIA, ON 10/31/88 AT 1:35 O'CLOCK P.M.

CLERK: Debra S. Ward
DEPUTY CLERK

NOTARY PUBLIC: Sarah J. Sellers
COMMISSION EXPIRES: 12/20/88

STATE TAX: 1,578.75
LOCAL TAX: 506.25
ADDITIONAL TAX: 1,012.50
TOTAL: 3,097.50



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
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678
INTEGRATED PEST MANAGEMENT
(757) 253-2620

October 29, 1998

Mr. Dave King
Rolling Woods Homeowners' Association
2710 Linden Lane
Williamsburg, VA 23185

RE: Inspection/Maintenance Agreement for the Rolling Woods Ponds

Dear Mr. King:

The maintenance work on the three Rolling Woods ponds that is a prerequisite for turning over the ponds to the Homeowners' Association should begin in a few days. The work is being accomplished by Cinter Construction under contract to the County. As you recall, we went over the scope of work with the Homeowners' Association Board prior to advertisement of the work for bid.

In an earlier meeting with the Homeowners' Association Board, it was agreed that after acceptance of the ponds by the Association, long-term maintenance would be a shared responsibility between the County and the Association. To formalize the arrangement, an Inspection/Maintenance Agreement needs to be executed between the two parties. Therefore, I have enclosed a copy of such an agreement. It is the County's standard Inspection / Maintenance Agreement that is executed for all new development in the County with stormwater management systems with one modification. The modification is the addition of item 9 which presents the maintenance responsibilities of the County. The Agreement needs to be signed by the appropriate person and returned to this office.

If you have any questions concerning the Agreement or the upcoming work, please contact me at 253-6673 if you have any questions.

Sincerely,

Darryl E. Cook, P.E.
Environmental Director



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
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678
INTEGRATED PEST MANAGEMENT
(757) 253-2620

May 1, 1998

Mr. Ed Digges
Digges Brothers Inc.
16 Mile Course
Williamsburg, VA 23185

Dear Mr. Digges:

The James City County Environmental Division is in the process of transferring maintenance responsibility of the three stormwater management ponds in the Rolling Woods subdivision. The Rolling Woods Homeowners Association has agreed to assume these responsibilities following a routine inspection and repair by James City County. This repair work will consist of removal of any small trees growing on the dam structures, repairing any erosion at inlet and outlet pipes, removal of any accumulated sediment in the vicinity of the riser structures, and restabilization of the dam structures and associated easements.

James City County would like to make you, as developer of this subdivision, aware of our plans to do this repair work and transfer of maintenance responsibility. We ask that you sign in the space provided at the bottom of this letter, indicating that you have read and agreed to this arrangement. We understand that Digges Brothers, Inc. is not responsible for this or any other work related to the stormwater management ponds in the Rolling Woods subdivision.

Thank you for your cooperation in this matter. Should you have any questions, please feel free to contact me at 253-6702.

Sincerely,

Mark Eversole
Engineering Inspector

I have read this letter and have no objections to the work described above to take place in Rolling Woods.

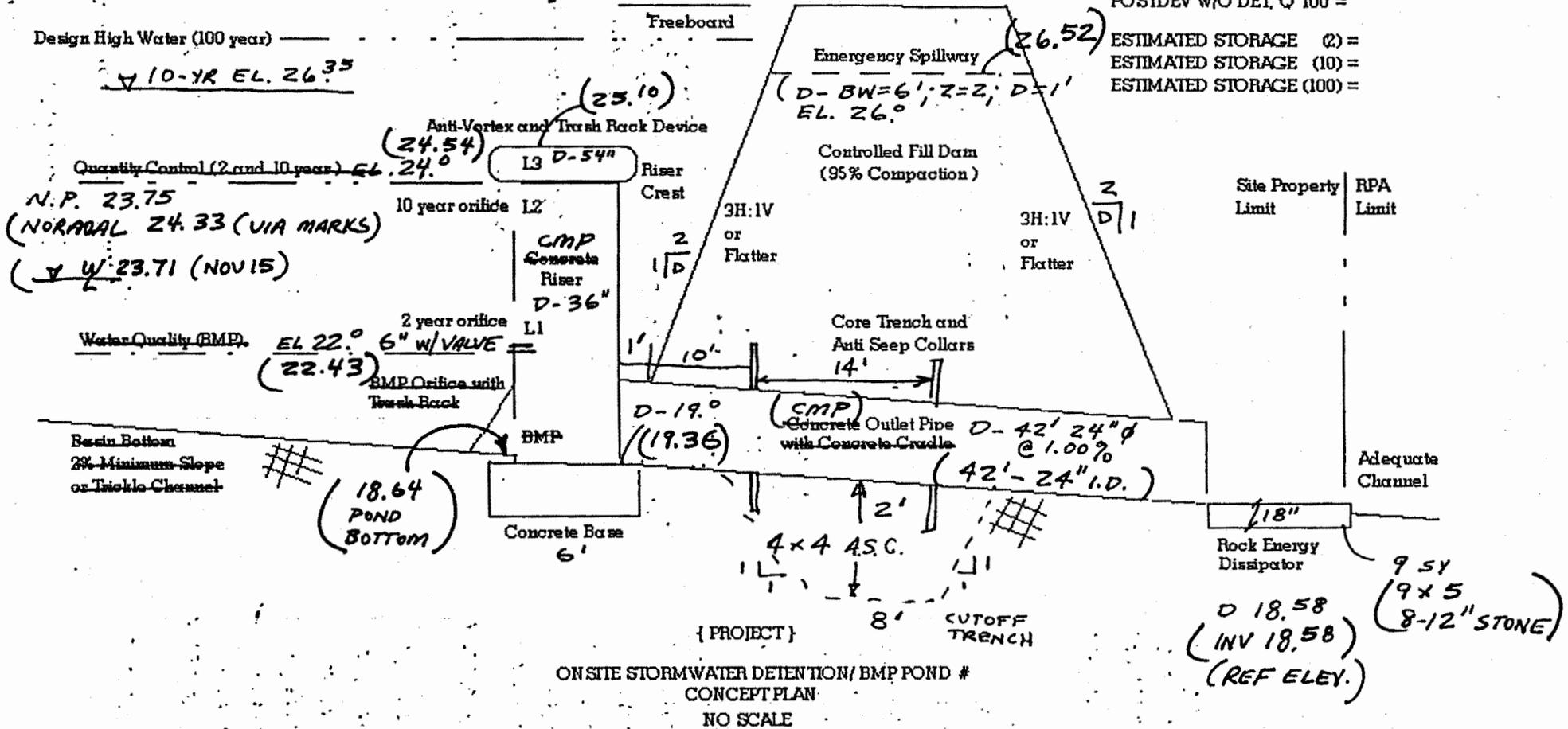
Edward Digges
Digges Brothers, Inc.

POND CONCEPT
PRELIMINARY HYDROLOGY

ALLOWABLE q 2 = 29 CFS
ALLOWABLE q 10 =

POSIDEV W/O DET, Q 2 =
POSIDEV W/O DET, Q 10 =
POSIDEV W/O DET, Q 100 =

ESTIMATED STORAGE (2) =
ESTIMATED STORAGE (10) =
ESTIMATED STORAGE (100) =



DESIGN (BLUE)
(AS-BUILT) (RED)

(EMB LOW = 27.19 @ 2 BARREL)
AVG. 27.57

AS-BUILT DATA

PERSIMMON DESIGN VS. ASBUILT

ROLLING WOODS SEC 3 BMP #2
2730 Persimmon Drive.

NOV 15, 2000 -

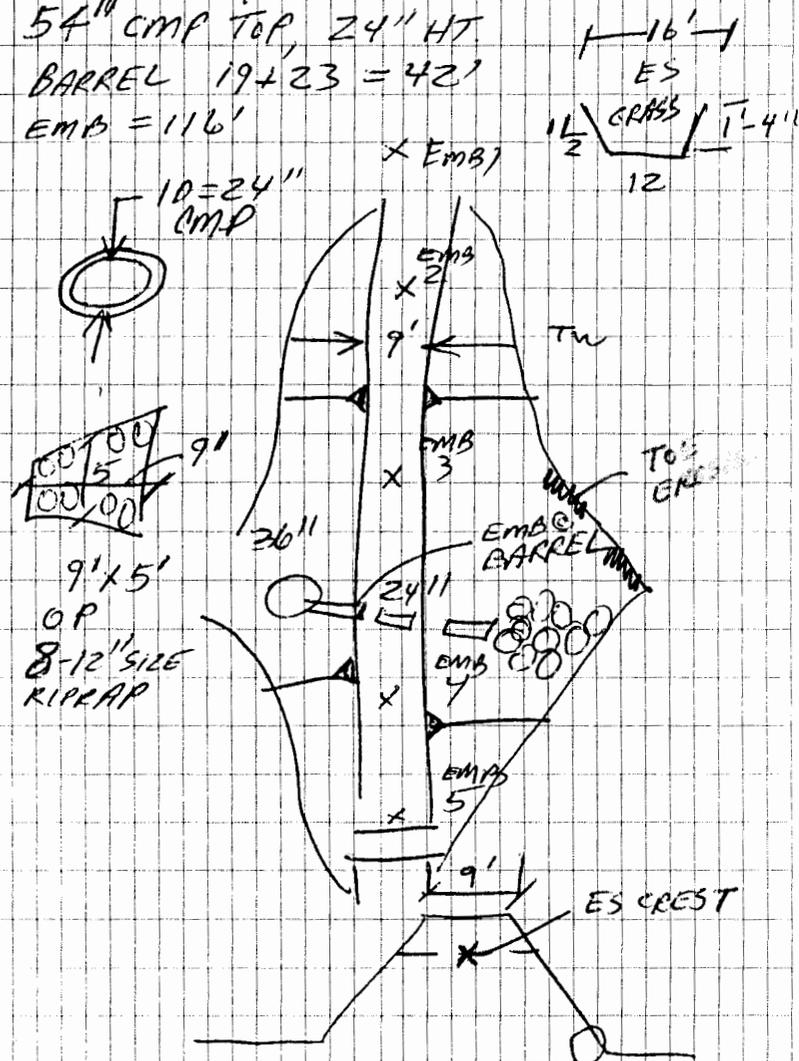
SThomas, WBASS + HI - REF ELEV 18.58
DESIGN ELEV BARREL OUT

	HI	ELEV
INV. BARREL (AT RISER)	12.69	19.36
Riser crest	7.51	24.54
TOP PLUG (4")	4.62	22.43
TOP CMP CAP (B)	6.95	25.10
INV POND @ RISER	13.41	18.64
INV 24" OUT BARREL	13.47	18.58
EMB @ BARREL	4.86	21.19
EMB 1	4.24	21.81
EMB 2	4.13	27.92
EMB 3	4.77	27.28
EMB 4	4.43	27.62
EMB 5	4.41	27.64
5		
ES CREST	5.53	26.52
W 11-15	8.34	23.71
NORM W	7.72	24.33

TOE EROSION DS LEFT (LOOKING DOWN)

Rollingwoods Sec 3 Pond #2 Persimmon

RISER 36" ϕ
54" CMP TOP, 24" HT
BARREL 19+23 = 42'
EMB = 116'



AS-BUILT SURVEY NOTES
11/15/2000

POND CONCEPT
PRELIMINARY HYDROLOGY

ALLOWABLE q 2 = 29 CFS
ALLOWABLE q 10 =

POSTDEV W/O DET, Q 2 =
POSTDEV W/O DET, Q 10 =
POSTDEV W/O DET, Q 100 =

ESTIMATED STORAGE (2) =
ESTIMATED STORAGE (10) =
ESTIMATED STORAGE (100) =

(27.19 @ 2 BARREL)
D - 27.0
Top Width, Min. 6 ft.

Design High Water (100 year)
10-YR EL. 26.35

Anti-Vortex and Trash Rack Device
(24.54)
Quantity Control (2 and 10 year) EL. 24.0
N.P. 23.75
(NORMAL 24.33 (VIA MARKS))
(W 23.71 (NOV 15))

Water Quality (BMP)
EL 22.0
(22.43)
2 year orifice L1
6" w/ VALVE
BMP Orifice with Trash Rack

Basin Bottom
2% Minimum Slope
or Trickle Channel

(18.64)
POND
BOTTOM

Freeboard

Emergency Spillway (26.52)
(D-BW=6', Z=2, D=1'
EL. 26.0)

Controlled Fill Dam
(95% Compaction)

Riser
Crest

3H:1V
or
Flatter

3H:1V
or
Flatter

Site Property
Limit RPA
Limit

Core Trench and
Anti Seep Collars

D-19.0
(19.36)
Concrete Outlet Pipe
with Concrete Cradle
D-42' 24" ϕ
@ 1.00%
(42'-24" I.D.)

Adequate
Channel

Concrete Base
6'

{ PROJECT }

4x4 A.S.C.
8' CUTOFF
TRENCH

Rock Energy
Dissipator
9.5Y
(9x5
8-12" STONE)
D 18.58
(INV 18.58)
(REF ELEY.)

ON SITE STORMWATER DETENTION/ BMP POND #
CONCEPT PLAN
NO SCALE

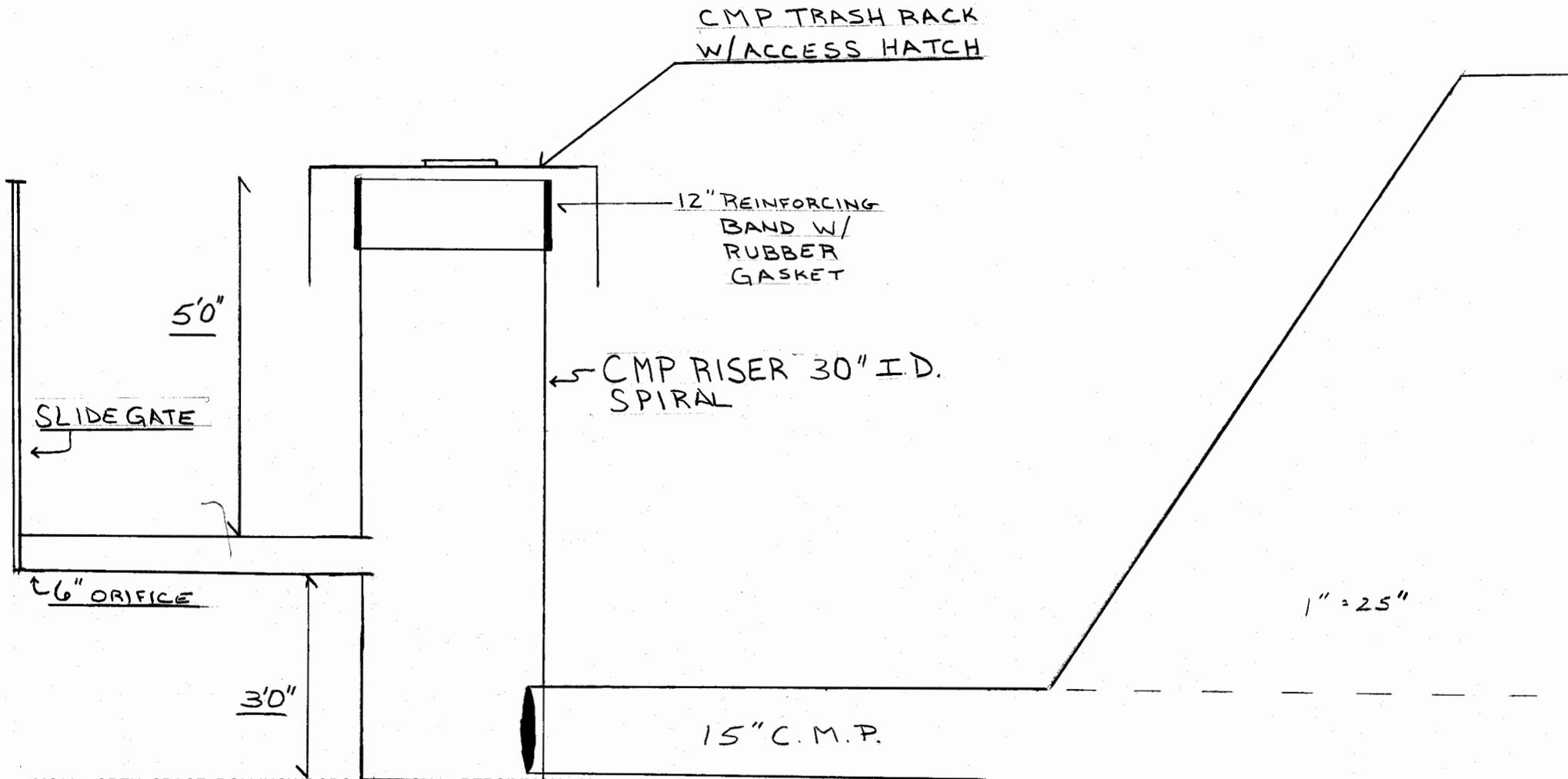
DESIGN (BLUE)
(AS-BUILT) (RED)

(EMB LOW = 27.19 @ 2 BARREL)
AVG. 27.57

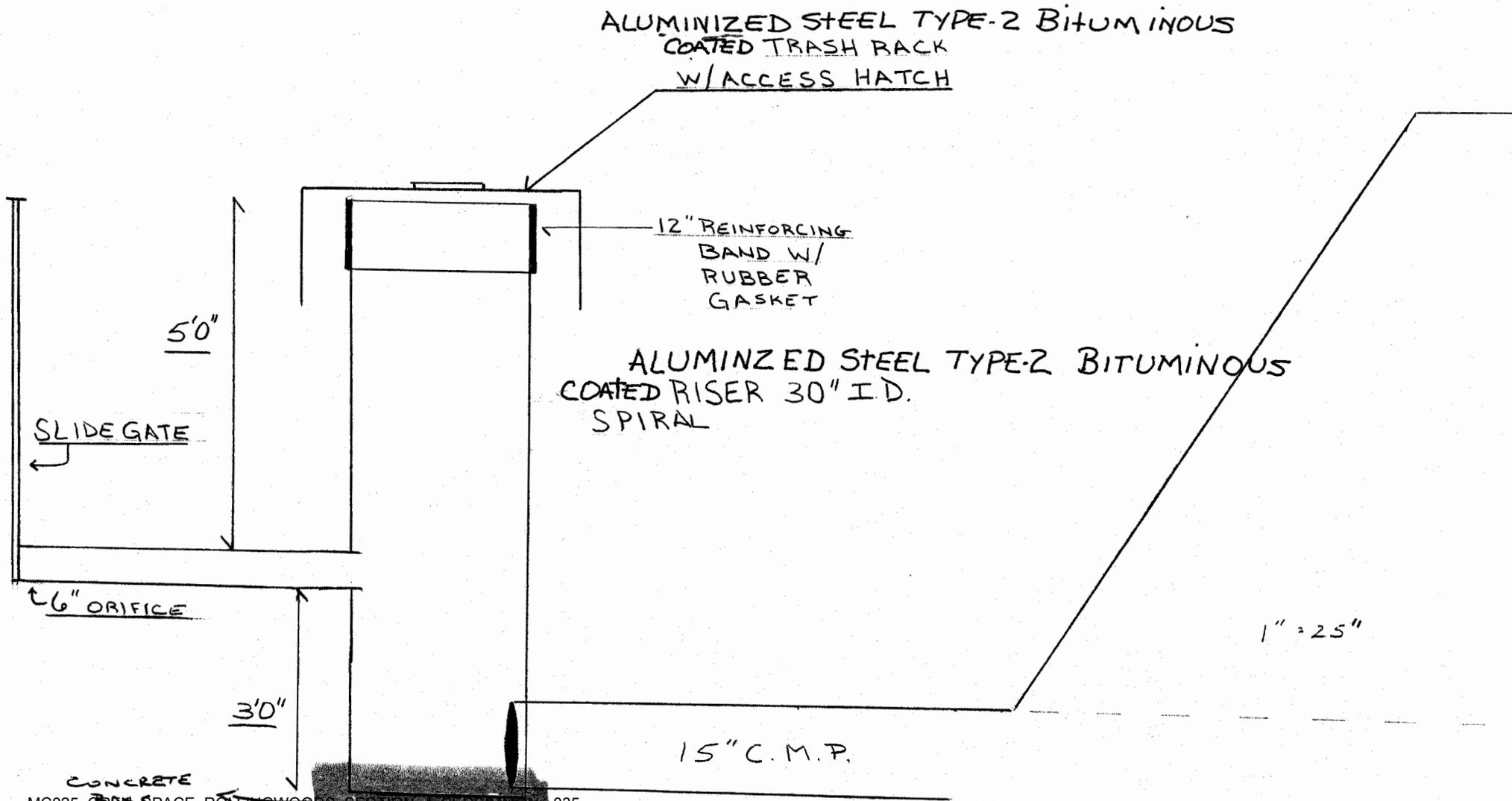
AS-BUILT DATA

PERSIMMON ORIGINAL DESIGN VS. ASBUILT (BEFORE MODIFICATION)

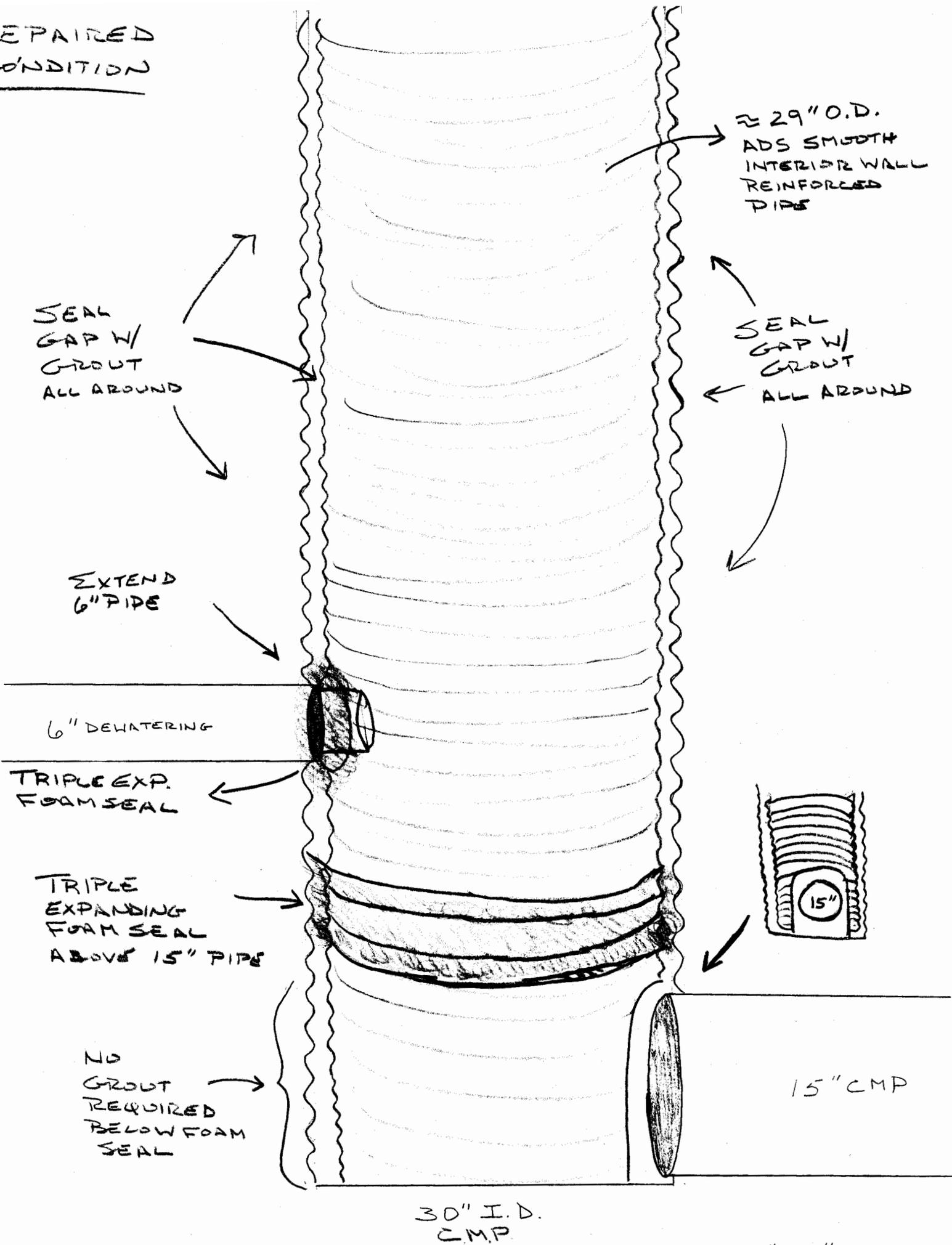
ROLLING WOODS POND 1



ROLLING WOODS POND 1



REPAIRED
CONDITION



≈ 29" O.D.
ADS SMOOTH
INTERIOR WALL
REINFORCED
PIPE

SEAL
GAP W/
GROUT
ALL AROUND

SEAL
GAP W/
GROUT
ALL AROUND

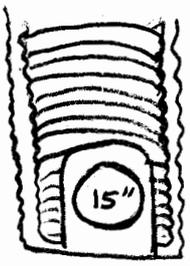
EXTEND
6" PIPE

6" DEWATERING

TRIPLE EXP.
FOAM SEAL

TRIPLE
EXPANDING
FOAM SEAL
ABOVE 15" PIPE

NO
GROUT
REQUIRED
BELOW FOAM
SEAL



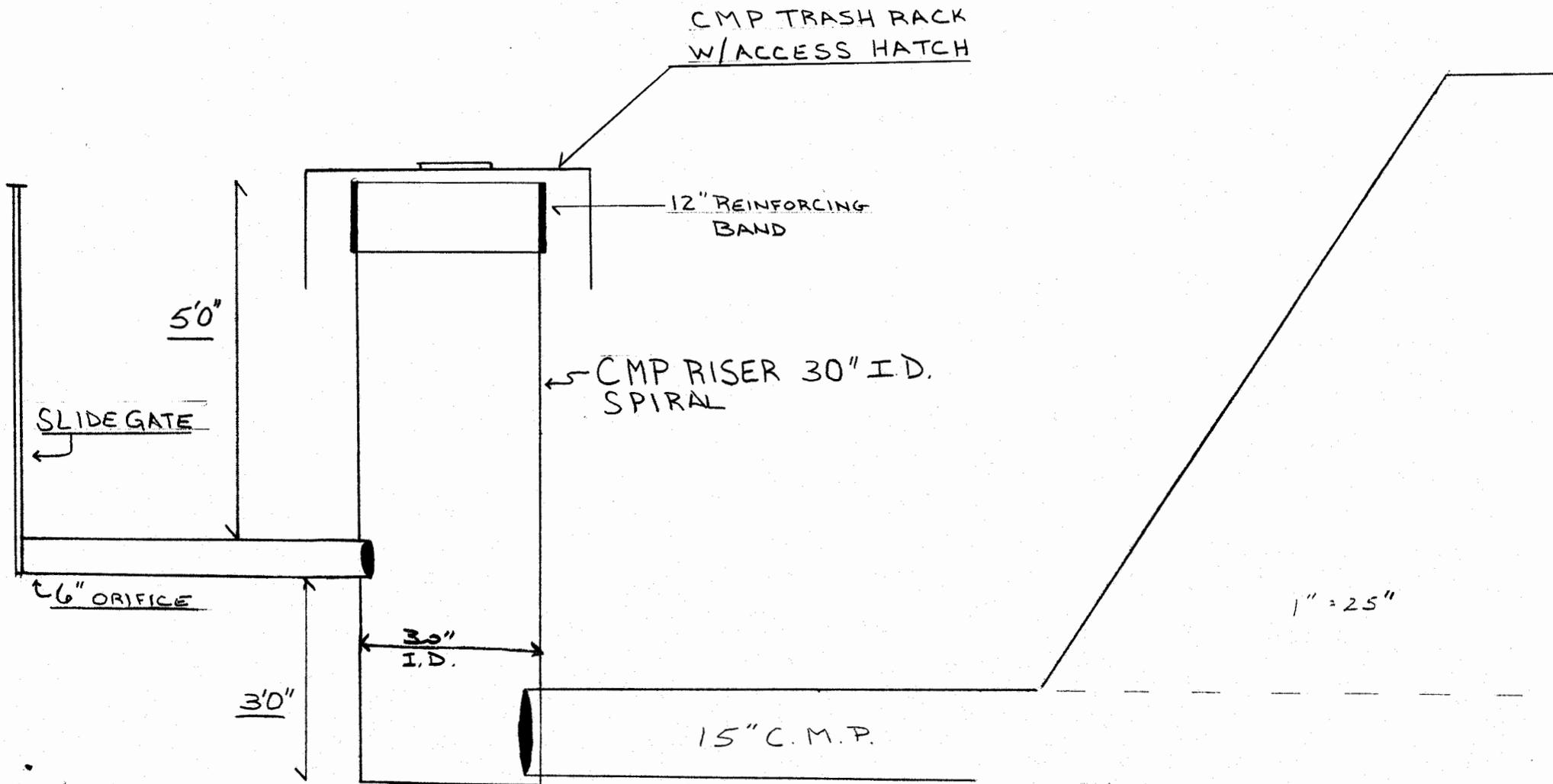
15" CMP

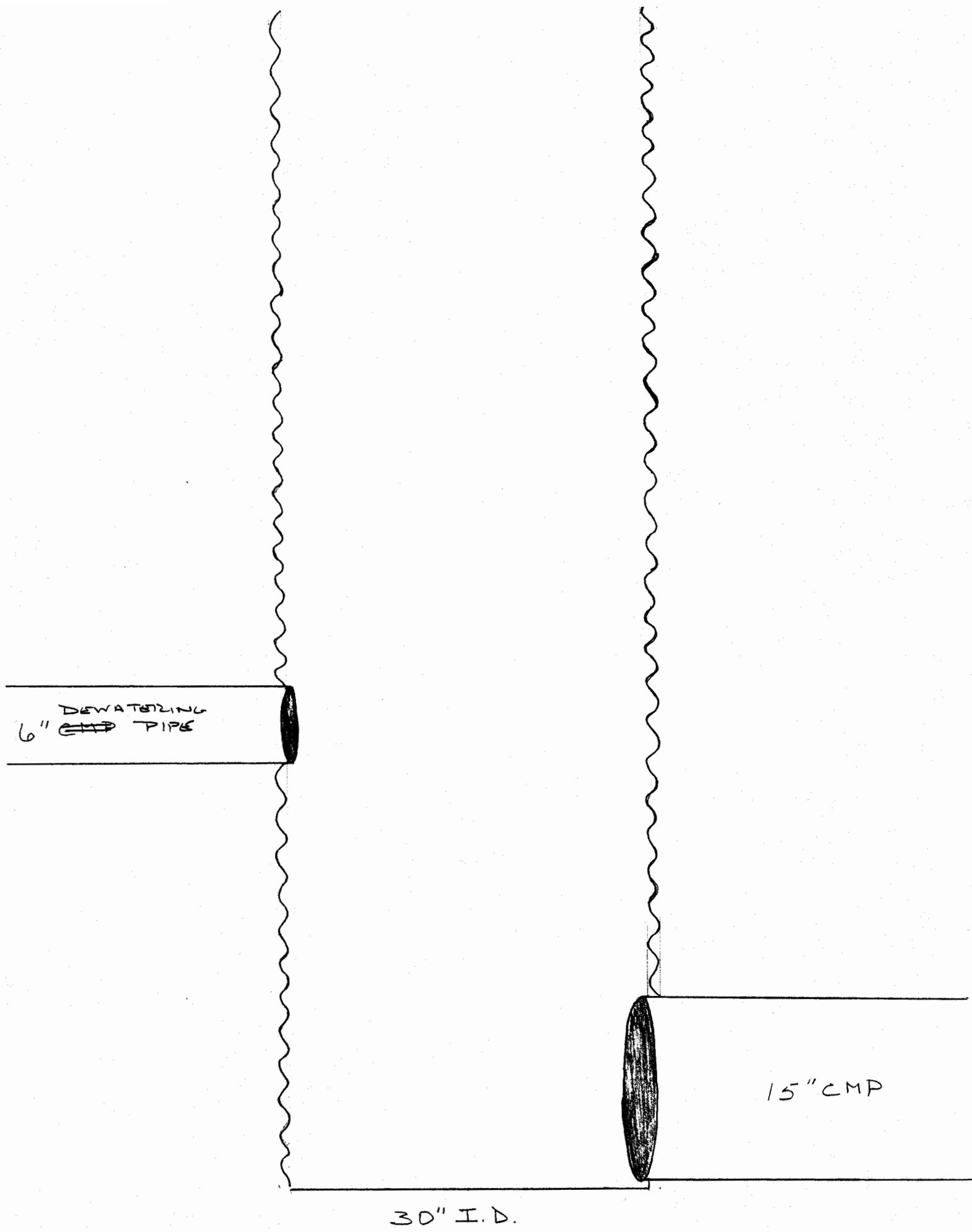
30" I.D.
C.M.P.

1" = 10"

MCE - 8-12-95

EXISTING CONDITION



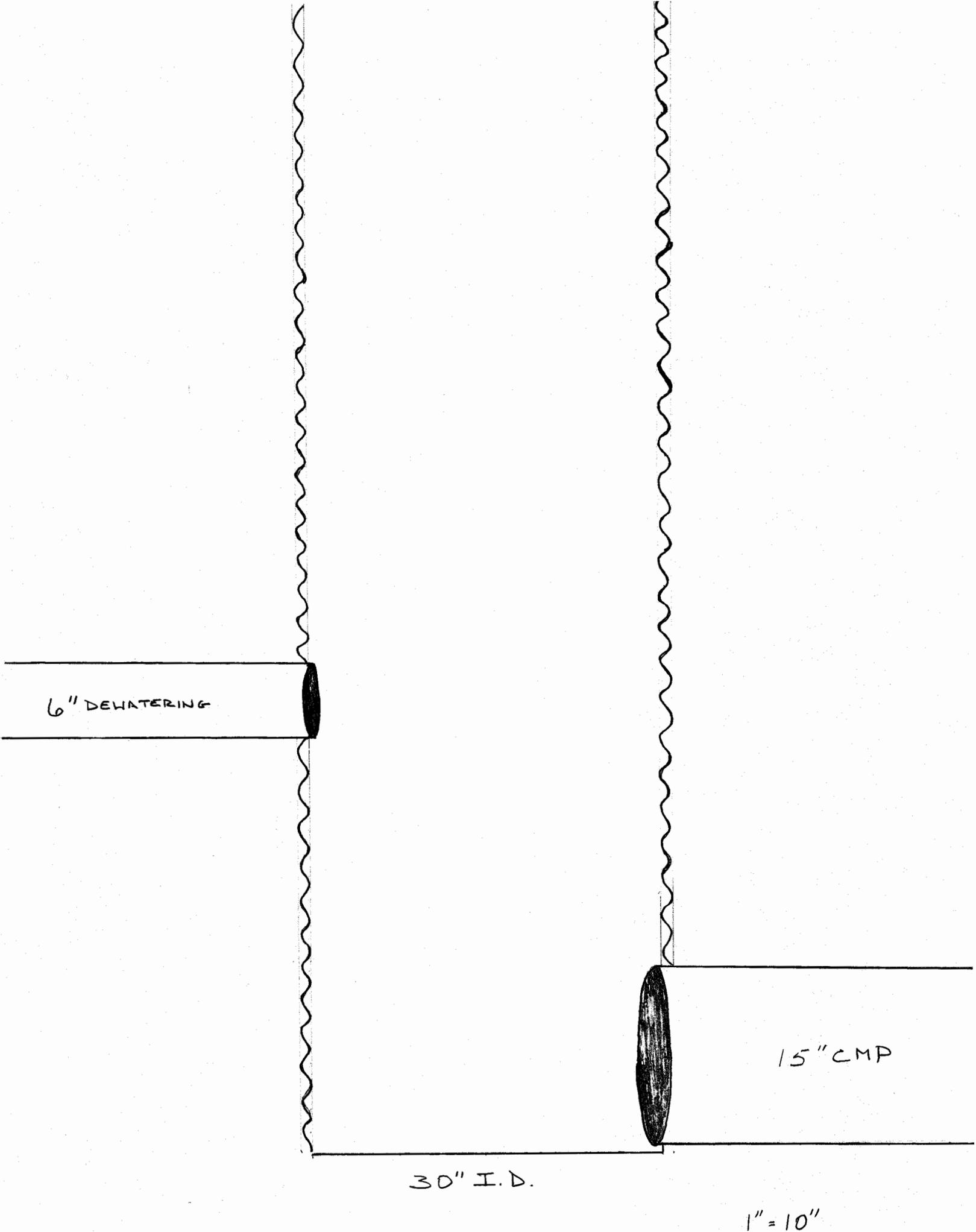


6" DEWATERING
PIPE

15" CMP

30" I.D.

1" = 10"



See
-4)(1-8)

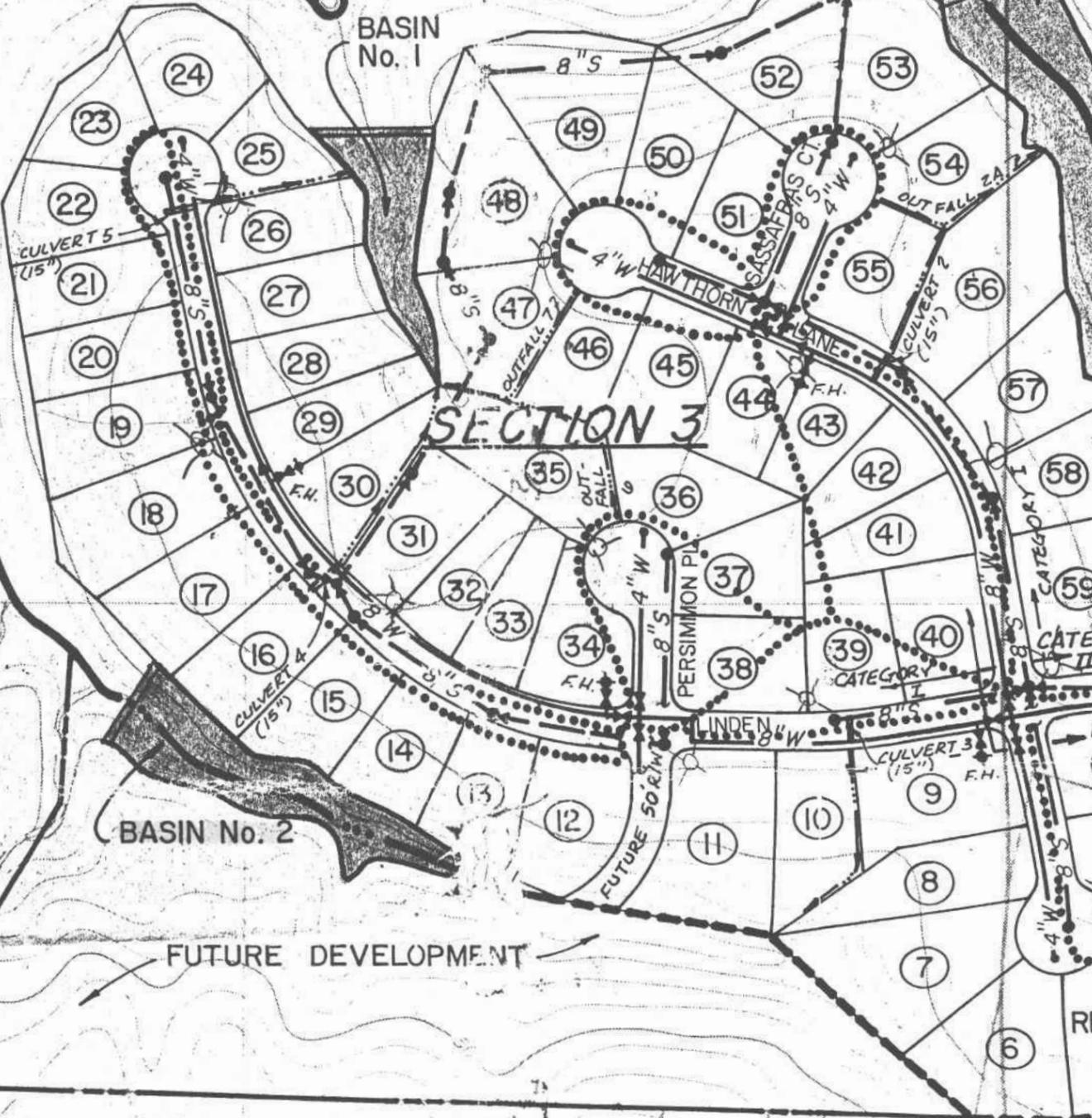
POWELL

Open

Space

BASIN No. 1

EXIS'
BASIN

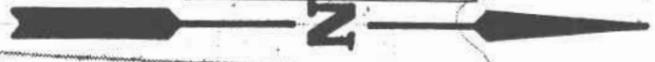


SECTION 3

BASIN No. 2

FUTURE DEVELOPMENT

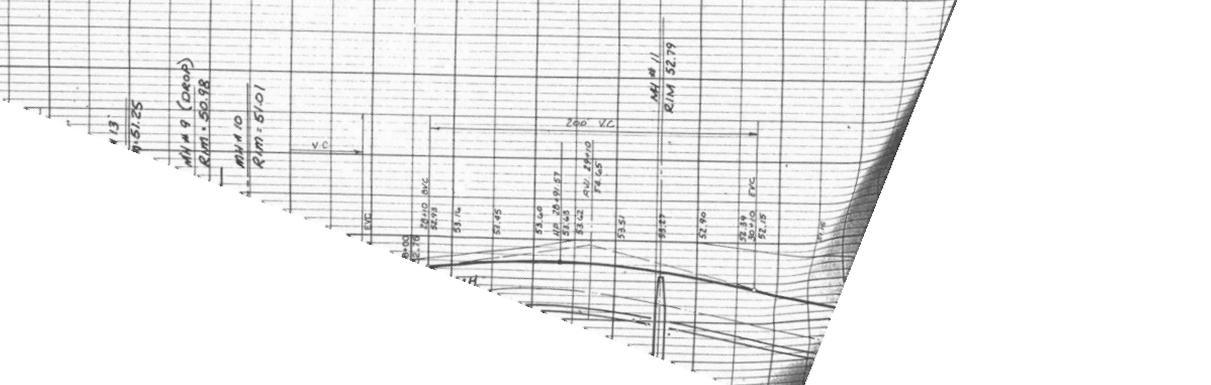
SCALE: 1" = 200'

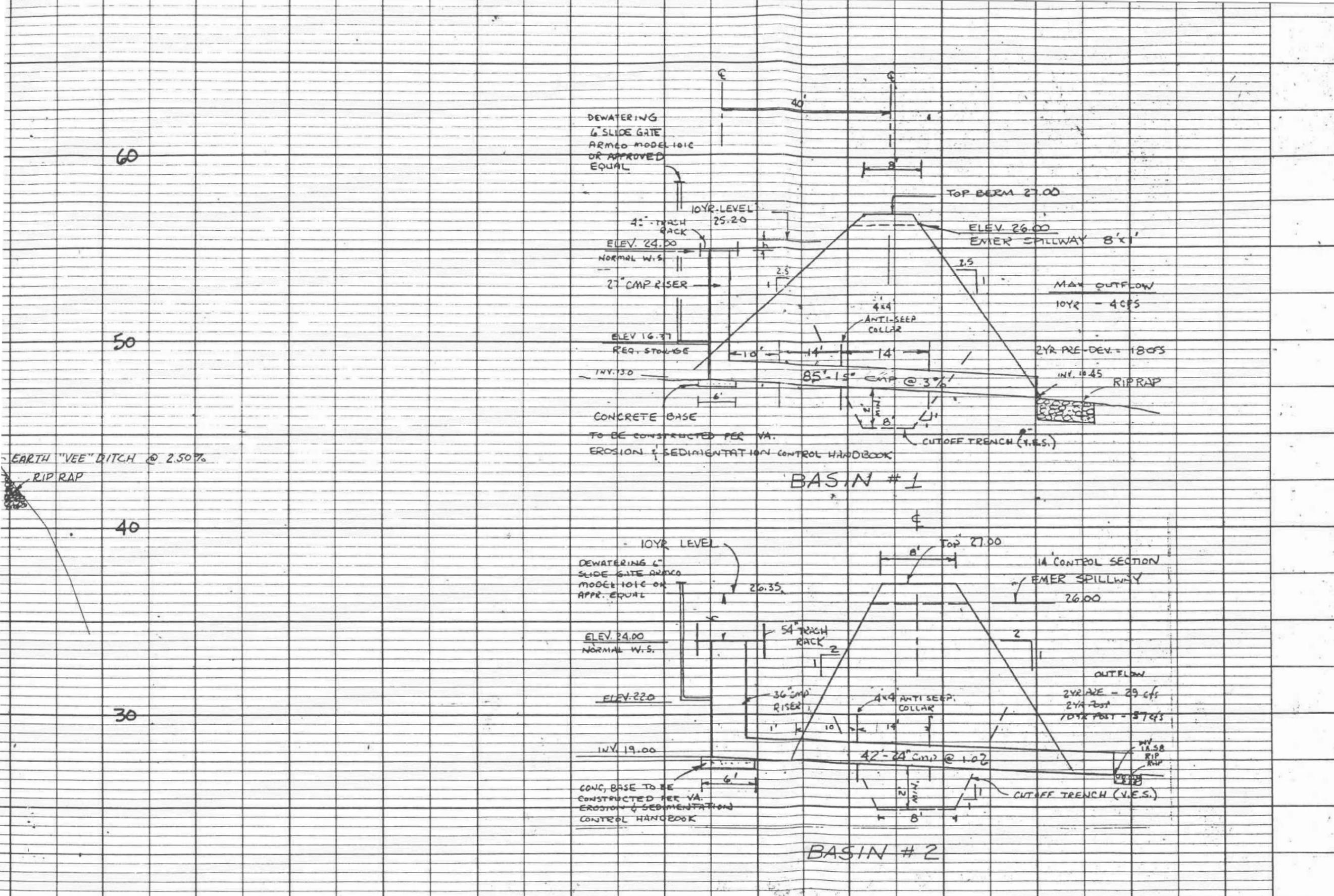




RAD.	ARC	TAN
469.60	347.36	182.02
525.00	312.63	161.10

SEE SHEET NO. 2





60

50

40

30

EARTH "VEE" DITCH @ 2.50%
RIP RAP

DEWATERING
6" SLIDE GATE
ARMCO MODEL 101C
OR APPROVED
EQUAL

10YR. LEVEL
25.20
4" TRASH
RACK
ELEV. 24.00
NORMAL W.S.
27" CMP RISER

ELEV. 16.37
REQ. STORAGE
INV. 13.0

CONCRETE BASE
TO BE CONSTRUCTED PER VA.
EROSION & SEDIMENTATION CONTROL HANDBOOK

BASIN # 1

10YR LEVEL
26.35
DEWATERING 6"
SLIDE GATE ARMCO
MODEL 101C OR
APPR. EQUAL

ELEV. 24.00
NORMAL W.S.
ELEV. 22.0

INV. 19.00

CONG. BASE TO BE
CONSTRUCTED PER VA.
EROSION & SEDIMENTATION
CONTROL HANDBOOK

BASIN # 2



THE DEYOUNG-JOHNSON GROUP, IN
ENGINEERS · ARCHITECTS · SURVEYORS

P.O. BOX 197 WILLIAMSBURG, VIRGINIA 23187 (804) 253-0

1860832

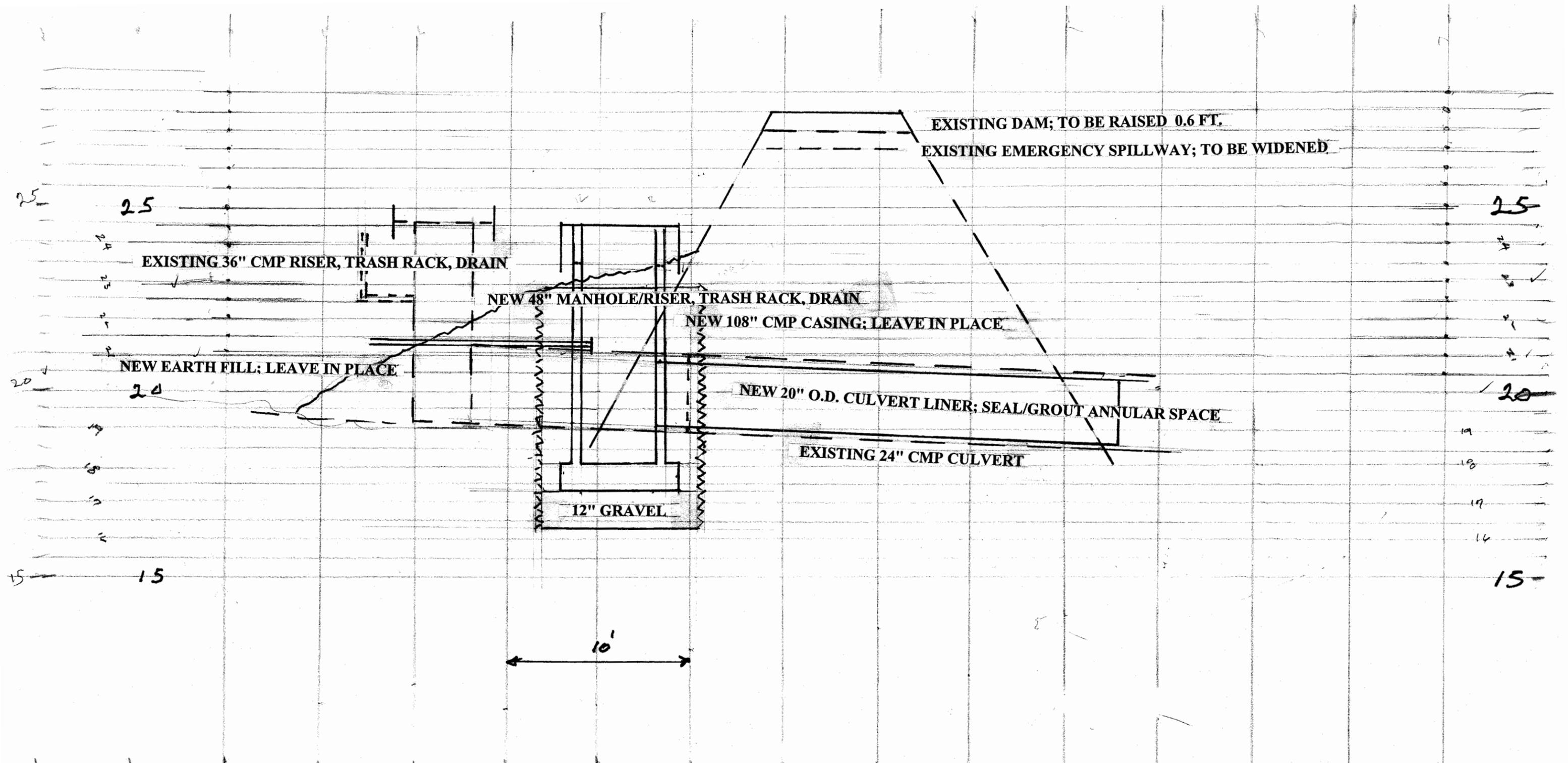
3 OF 9

DATE 4/21/88

DESIGNED DPC

DRAWN DPC

CHECKED LDE



EXISTING DAM; TO BE RAISED 0.6 FT.
 EXISTING EMERGENCY SPILLWAY; TO BE WIDENED

EXISTING 36" CMP RISER, TRASH RACK, DRAIN

NEW 48" MANHOLE/RISER, TRASH RACK, DRAIN

NEW 108" CMP CASING; LEAVE IN PLACE

NEW EARTH FILL; LEAVE IN PLACE

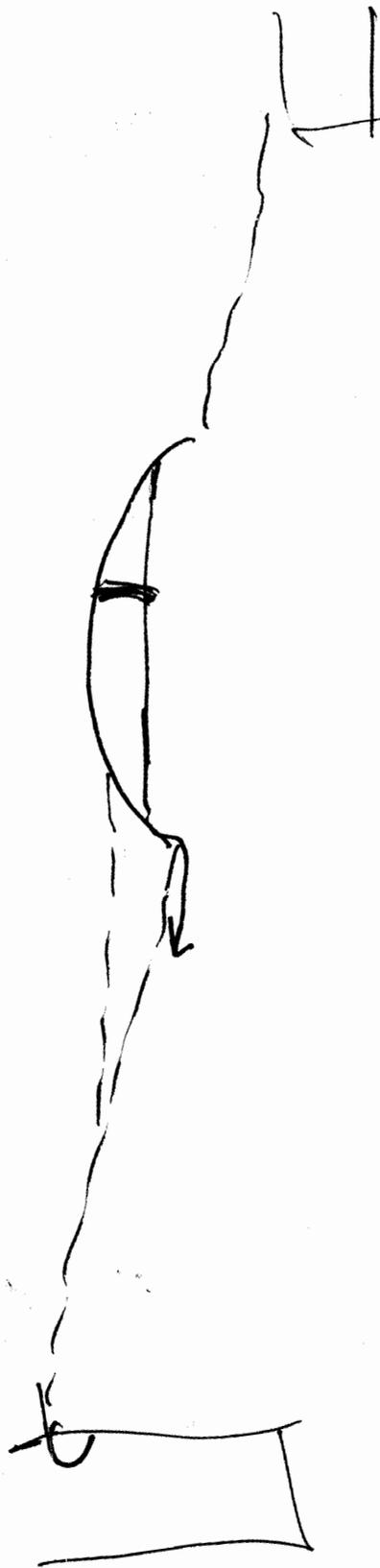
NEW 20" O.D. CULVERT LINER; SEAL/GROUT ANNULAR SPACE

EXISTING 24" CMP CULVERT

12" GRAVEL

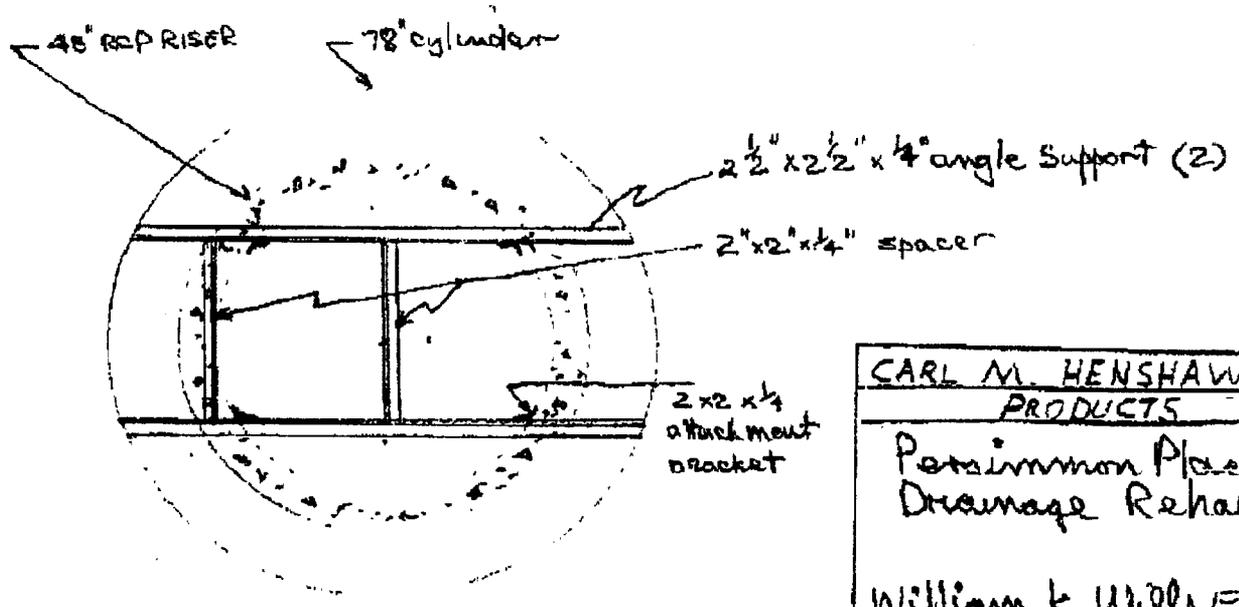
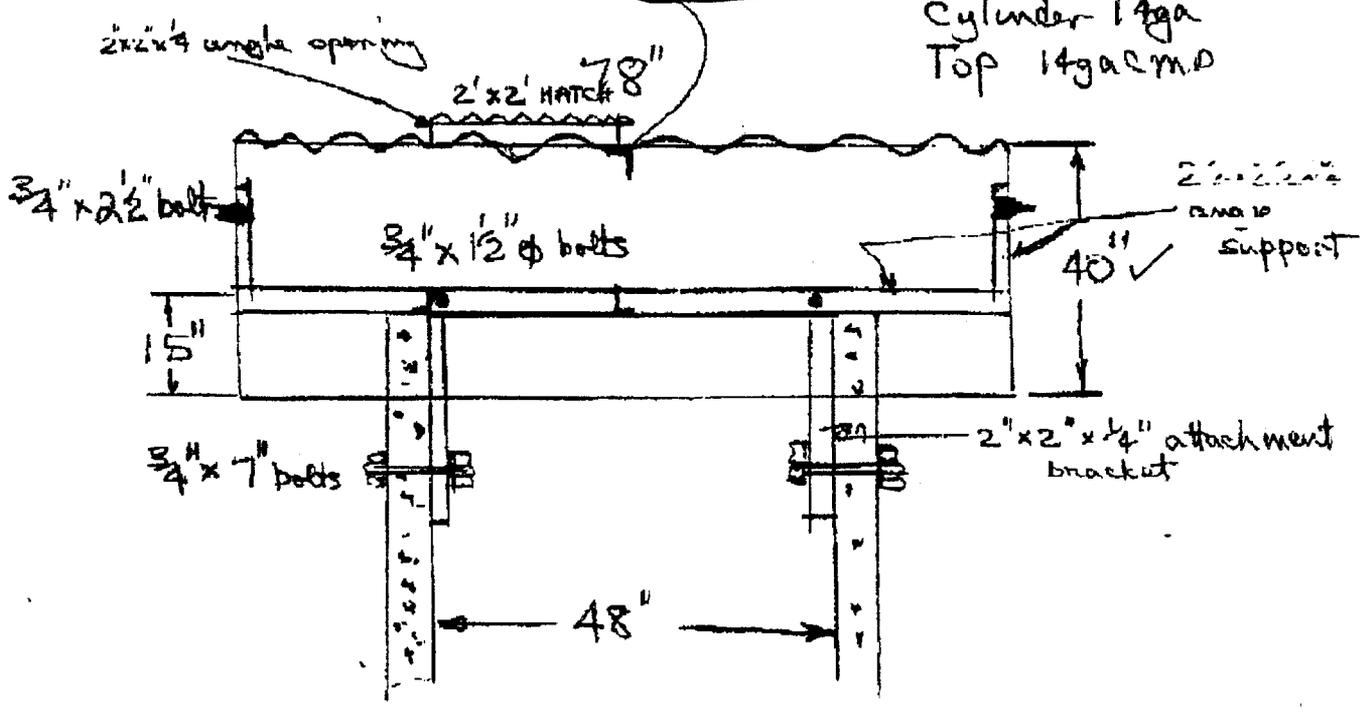
10'

DAM CROSS SECTION DRAWING 3/7



STIFFENER
 support bar Portop 2" x 2" x 1/4"

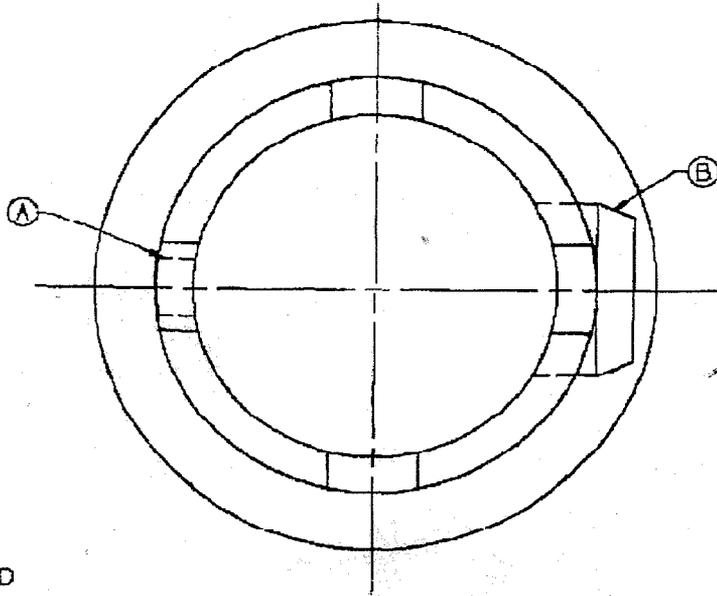
Cylinder 14ga
 Top 14ga 2MD



CARL M. HENSHAW DRAINAGE PRODUCTS		
Persimmon Place Drainage Rehab		
William k Wills Excavator		
DRAWN BY GMP	DATE 7-9-91	REVISION

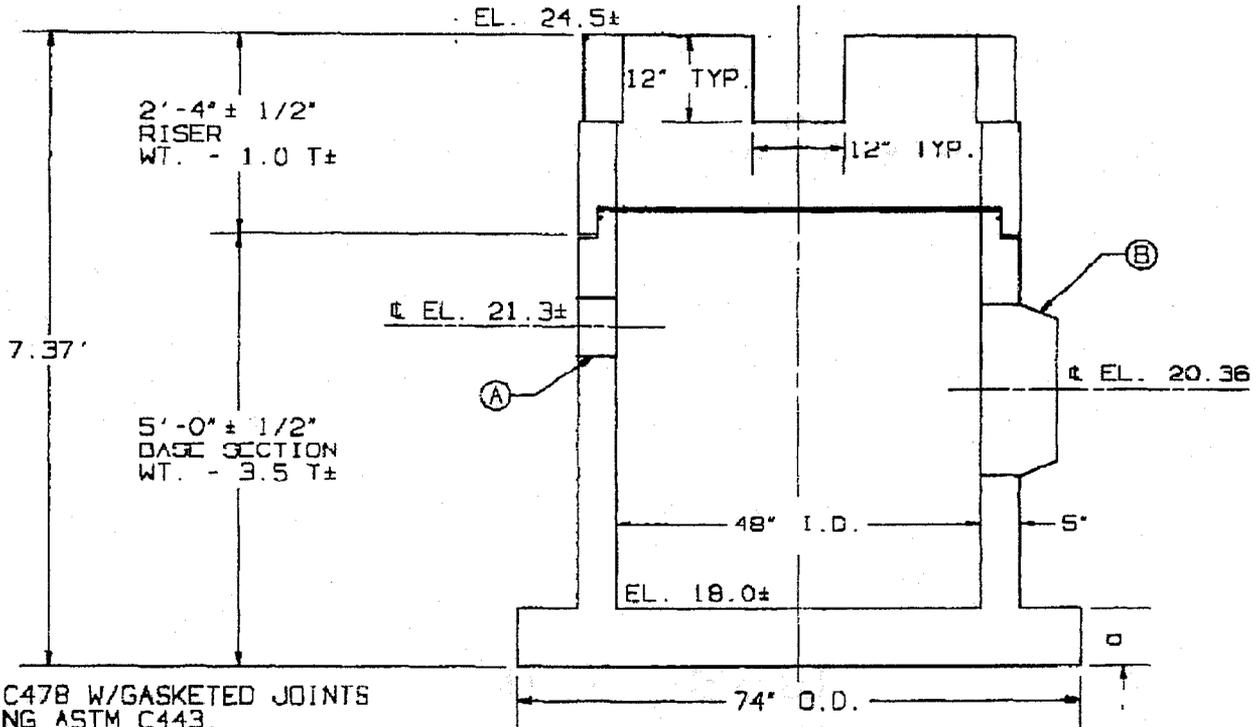
OPENINGS

- (A) 7" ROUGH Ø FOR 7" PIPE
- (B) S206-24 KOR-N-SEAL BOOT FOR 20" O.D. LINER



PLAN

NOTE: ALL ELEVATIONS SCALED & SUBJECT TO CHANGE.



SECTION

ASTM C478 W/GASKETED JOINTS MEETING ASTM C443.

WILLIAM WILLS - CONTRACTOR

**48" STANDPIPE
PERSIMMON PLACE DRAINAGE FACILITY
JAMES CITY CO., VA**

ORIGINAL DATE	7-05-01
LAST REVISION	7-18-01
SCALE	1/2" = 1'-0"

HANSON PIPE & PRODUCTS, INC.

2900 Terminal Ave. □ Richmond, Virginia 23234 □ 804-233-5471

TOPIC - PROJECT # - DRAWING #
MH-1938-00A

Fax: 804-233-5542 S-S Sales Jul 18 2001 10:41 P.02

*SCOTT - FYC - T. Van...
OK with me. Scott Thomas*

JAMES CITY COUNTY FAX FORM

Name: WILLIAM WILLS
 Firm or Company: WILLS EXCAVATING
 Facsimile Number: 804-758-1309
 From: WAYLAND BASS
 Number of pages including this transmittal 2

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



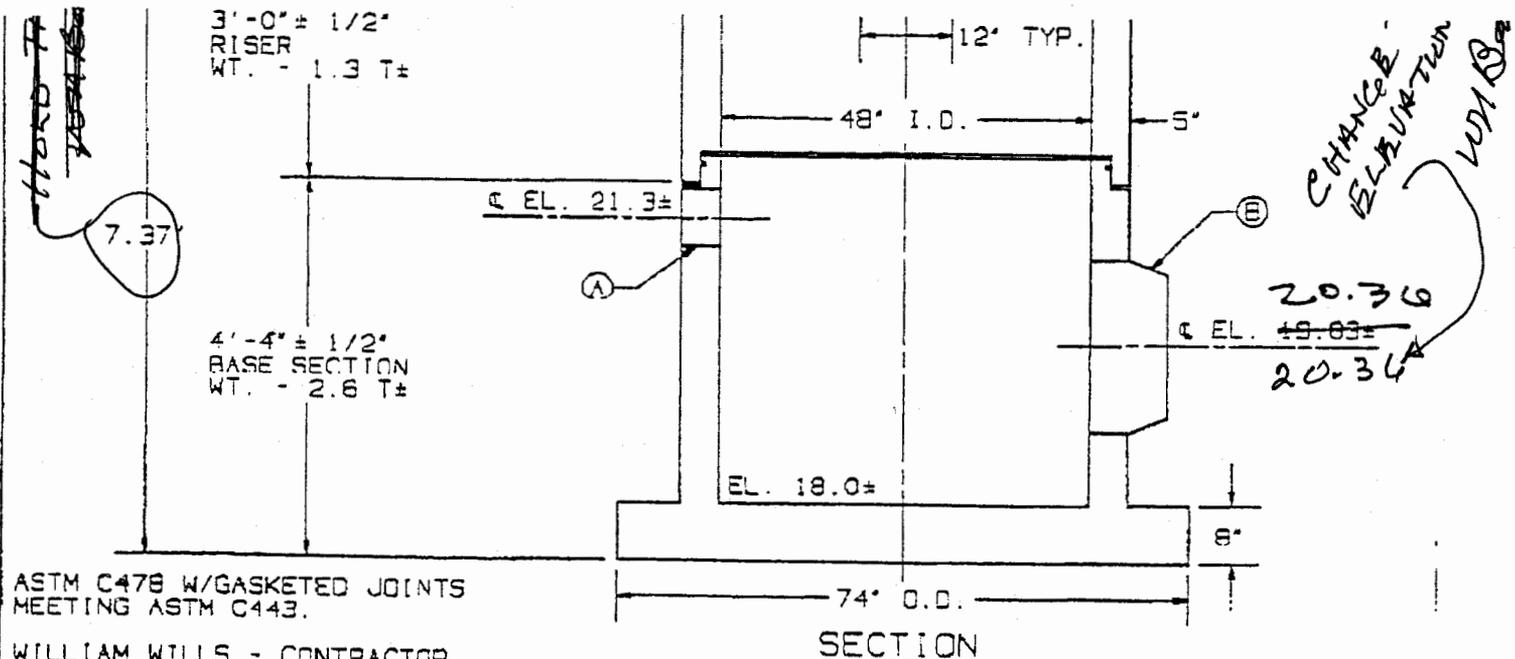
Office Phone: 757-253-_____ Fax Number: 757-253-6850

MR. WILLS

Comments: 1. HOLD TOP ELEV @ 24.5
2. RAISE & ELEV @ (B) TO 20.34
3. ~~THE~~ HEIGHT MAY CHANGE

THANKS WMB

Date: 7/12/01 Time 9:30am If you do not receive all pages, call 757-253-6685.



ASTM C478 W/GASKETED JOINTS MEETING ASTM C443.

WILLIAM WILLS - CONTRACTOR

SECTION

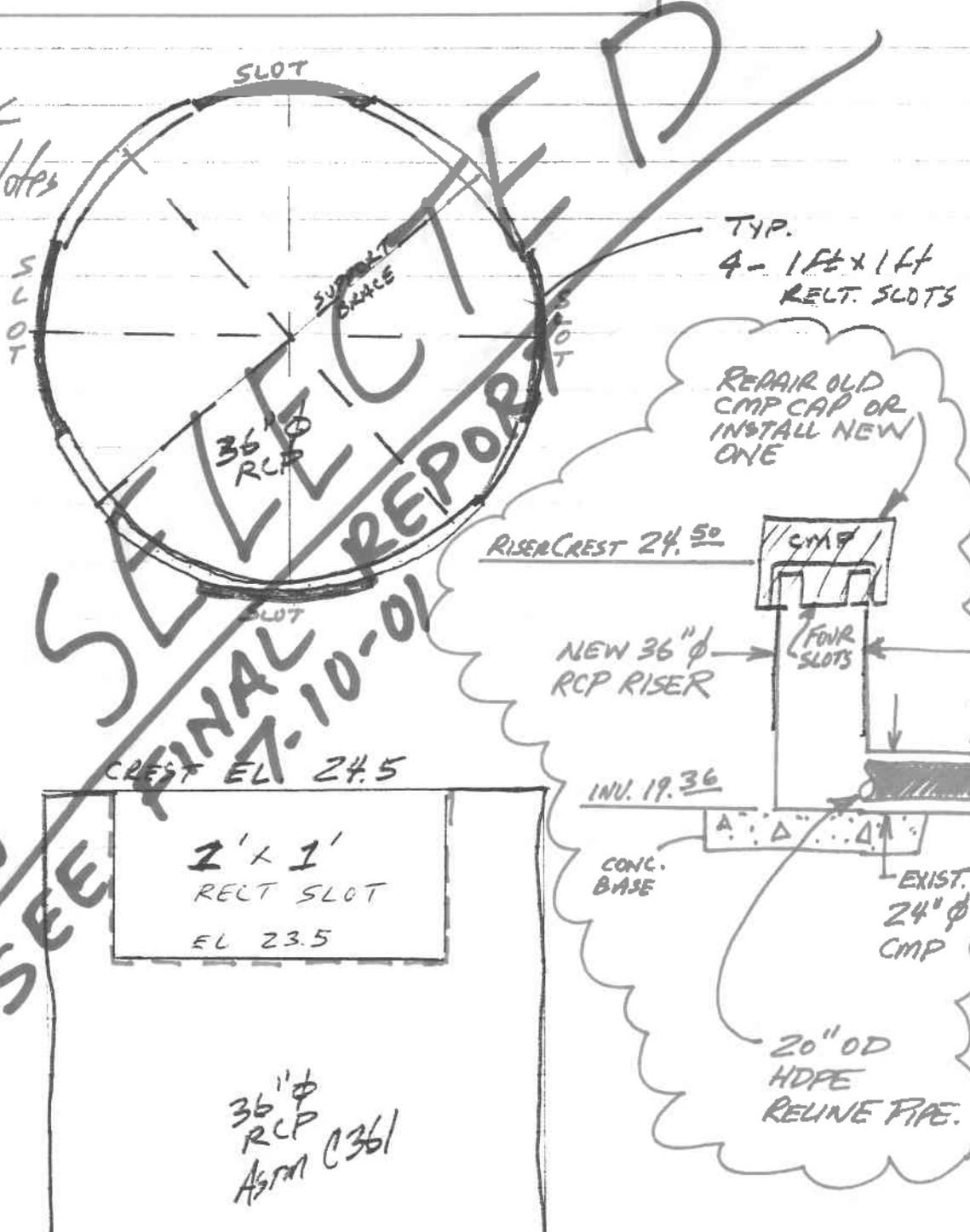
48" STANDPIPE PERSIMMON PLACE DRAINAGE FACILITY JAMES CITY CO., VA	ORIGINAL DATE	---
	LAST REVISION	
HANSON PIPE & PRODUCTS, INC. 2900 Terminal Ave. □ Richmond, Virginia 23234 □ 804-233-5471	SCALE	1/2" = 1'-0"
	TOPIC - PROJECT # - DRAWING	MH-1938-00

TRIAL 4-FINAL SAME AS ABOVE
E.S. to 16' WIDTH

Proposed Riser
CONFIG.

To: WAYLAND BASS
From: SCOTT THOMAS
RE: Persimmon Pond Repair Notes.
6/25/01

- 1) Riser Sketch
- 2) Scope of Work
- 3) As-Built Survey Notes



~~VOID 48" SEE FINAL 10-01~~

ELEV. TOP DAM 27.5'

INV. 18.58
24"

PROPOSED SPILLWAY
X ← EXISTING GROUND
ELEV. 26.8

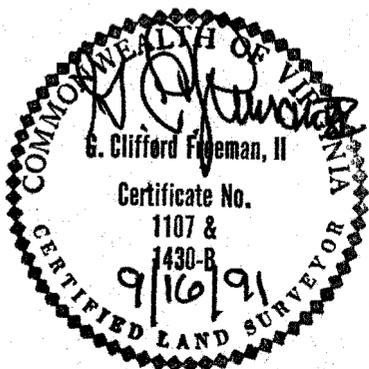
OVERFLOW 24.20'

AREA OF CONTOUR
LINE 24.20
0.574 AC.

CONTOUR LINE
27.5

AREA OF POND INSIDE
27.5 CONTOUR IS 0.997 AC.

ROLLING WOODS
SCALE 1" = 50' 9-8-91

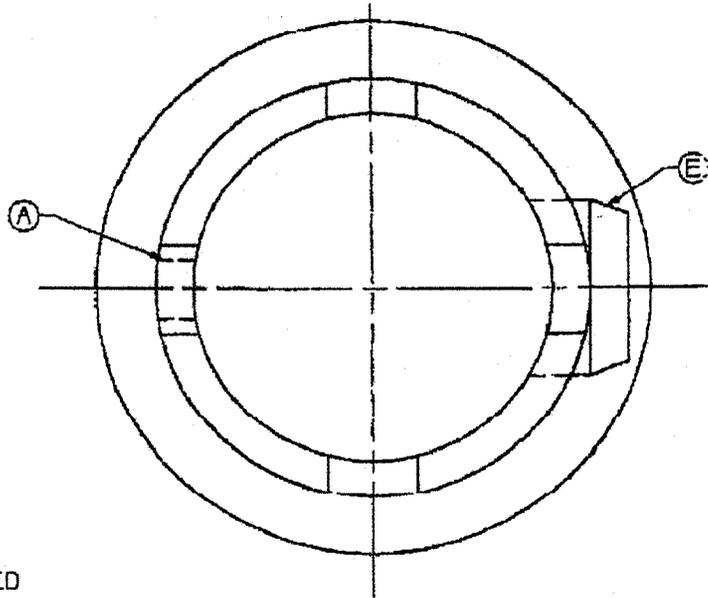


36" C.P.
INV. 25.80'

MANUFACTURER CVT SHEET - RISER

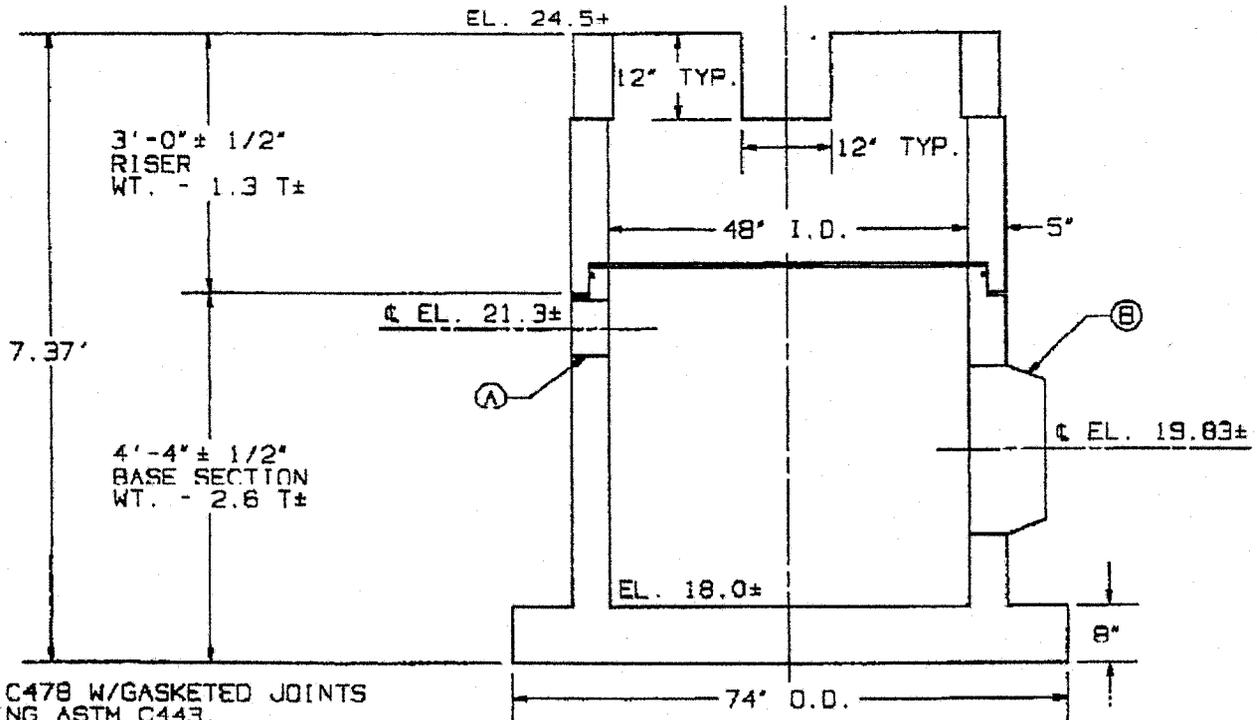
OPENINGS

- (A) 7" ROUGH Ø FOR 7" PIPE
- (B) S206-24 KOR-N-SEAL BOOT FOR 20' O.D. LINER



PLAN

NOTE: ALL ELEVATIONS SCALED & SUBJECT TO CHANGE.



SECTION

ASTM C478 W/GASKETED JOINTS MEETING ASTM C443.

WILLIAM WILLS - CONTRACTOR

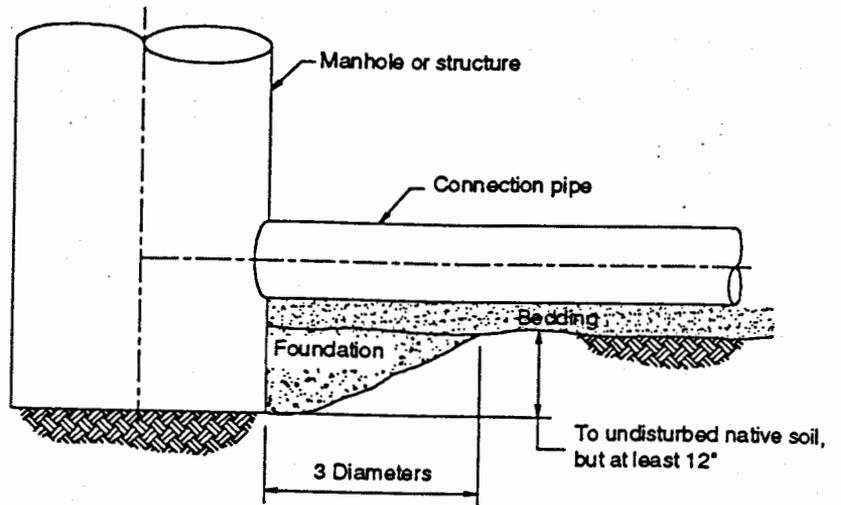
48" STANDPIPE
 PERSIMMON PLACE DRAINAGE FACILITY
 JAMES CITY CO., VA

HANSON PIPE & PRODUCTS, INC.

2900 Terminal Ave. □ Richmond, Virginia 23234 □ 804-233-5471

ORIGINAL DATE	---
LAST REVISION	
SCALE	1/2" = 1'-0"
TOPIC - PROJECT # - DRAWING #	MH-1938-00

Figure 1. Bedding For Transition From Trench Support to Manhole Connection.

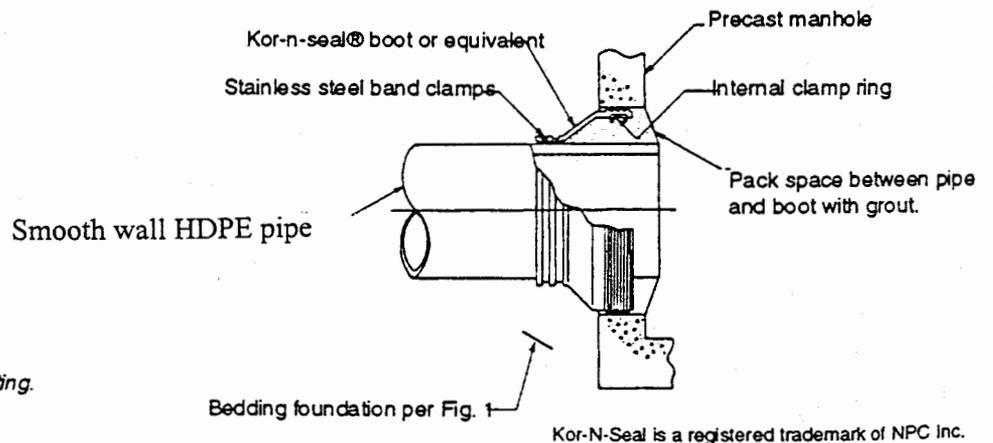


Note: Compact foundation and bedding to a minimum of 95% standard proctor density.

Figure 2: Connection to Manhole

Cast or fasten a Kor-N-Seal® boot or equivalent into the manhole outlet wall.

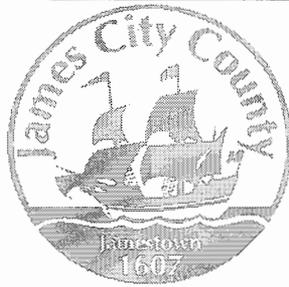
Push pipe into into the boot and clamp in place.



- Notes:**
1. Do not stand in or on pipe while grouting.
 2. Tighten clamps per manufacturer's recommendations

Kor-N-Seal is a registered trademark of NPC Inc.

Pipe - to - Manhole Connection Standard Detail

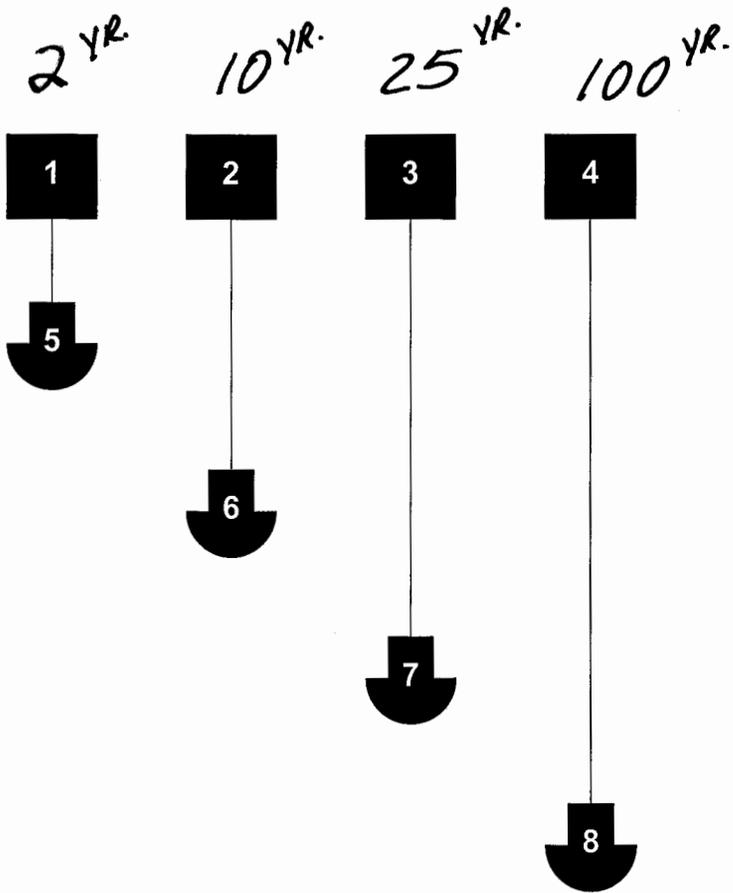


**James City County, Virginia
Environmental Division**

**Rollingwoods Subdivision
MC 025 - Persimmon Wet Pond
County Repair Project**

*Final Hydrology & Hydraulics
Repair Plan
Material Data
Survey Data*

07/10/01
AT.



Legend

- Runoff
- Combined
- Channel Reach
- Diversion
- ⌵ Pond Route

Project: MC025Persim.GPW

IDF: Sample.idf

8 hyd's

07-11-2001

Hydrograph Summary Report

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	SCS Runoff	45.75	6	732	190,241	2	---	---	---	Persimmon DA 2-
2	SCS Runoff	106.51	6	726	432,330	10	---	---	---	Persimmon DA 10-
3	SCS Runoff	123.31	6	726	499,864	25	---	---	---	Persimmon DA 25-
4	SCS Runoff	168.74	6	726	684,930	100	---	---	---	Persimmon DA 100-

POST ROUTE

5	Reservoir	20.47	6	750	156,896	2	1	25.07	68,675	Persimmon Wet Pond 2-
6	Reservoir	80.31	6	738	398,984	10	2	26.54	124,951	Persimmon Wet Pond 10-
7	Reservoir	98.92	6	738	466,519	25	3	26.75	134,478	Persimmon Wet Pond 25-
8	Reservoir	144.24	6	738	651,584	100	4	27.20(DHW)	154,965	Persimmon Wet Pond 100-

PREDEV: A=35AC; CN=73; Tc=26.1min; Q2=35.75CFS; Q10=93.49CFS
 POSTDEV: A=35AC; CN=78 (15% IMPERV); Tc=19.98min.

PONDPACK

HYDRAFLOW

	IN	OUT	WSEL	IN	OUT	WSEL
2-	54.79cfs	28.24cfs	25.06	45.75cfs	20.47cfs	25.07
10-	125.6cfs	88.34cfs	26.55	106.51cfs	80.31cfs	26.54
25-	144.87cfs	110.66cfs	26.78	123.31cfs	98.92cfs	26.75
100-	196.81cfs	163.91cfs	27.27	168.74cfs	144.24cfs	27.20

IMPORTANT NOTES:

- Routed 2-year (modified dam) does not exceed pre-2.
- 48" φ RISER; CREST @ EL 24.5 WITH FOUR 1'x2' SLOTS AT CREST EL. 23.5.
- EMER SPILLWAY AT CREST 25.5; BW=18'; SS=2H:1V
- T.O.D. MODIFIED TO EL. 28.2
- OUTLET BARREL: EXIST 24 INCH SLIPWED WITH 20" OD (18.77" ID) SWAPTITE HDPE OR EQUAL INV U/S = 19.05; INV D/S = 18.58 ± TO MATCH
- FB 28.2 - 27.2 = 1.0'

Proj. file: MC025Persim.GPW

IDF file: Sample.idf

Run date: 07-11-2001

Hydrograph Report

Hyd. No. 1

INFLOW 2-YR.

Persimmon DA

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 35.00 ac
Basin Slope = 8.0 %
Tc method = USER
Total precip. = 3.50 in
Storm duration = 24 hrs

Peak discharge = 45.75 cfs
Time interval = 6 min
Curve number = 78
Hydraulic length = 2200 ft
Time of conc. (Tc) = 20 min
Distribution = Type II
Shape factor = 484

Total Volume = 190,241 cuft

Hydrograph Discharge Table

Time -- Outflow	Time -- Outflow	Time -- Outflow	Time -- Outflow
(hrs cfs)	(hrs cfs)	(hrs cfs)	(hrs cfs)
10.70 0.54	13.90 3.89	17.10 1.89	20.30 1.21
10.80 0.64	14.00 3.71	17.20 1.87	20.40 1.20
10.90 0.76	14.10 3.55	17.30 1.85	20.50 1.19
11.00 0.90	14.20 3.40	17.40 1.83	20.60 1.19
11.10 1.04	14.30 3.28	17.50 1.81	20.70 1.18
11.20 1.22	14.40 3.18	17.60 1.79	20.80 1.18
11.30 1.44	14.50 3.10	17.70 1.76	20.90 1.17
11.40 1.75	14.60 3.04	17.80 1.74	21.00 1.17
11.50 2.12	14.70 2.98	17.90 1.72	21.10 1.17
11.60 2.90	14.80 2.92	18.00 1.70	21.20 1.16
11.70 4.91	14.90 2.87	18.10 1.68	21.30 1.16
11.80 9.65	15.00 2.81	18.20 1.66	21.40 1.15
11.90 20.47	15.10 2.76	18.30 1.64	21.50 1.15
12.00 34.69	15.20 2.70	18.40 1.62	21.60 1.15
12.10 45.27	15.30 2.64	18.50 1.60	21.70 1.14
12.20 45.75 <<	15.40 2.59	18.60 1.57	21.80 1.14
12.30 38.10	15.50 2.53	18.70 1.55	21.90 1.13
12.40 29.70	15.60 2.47	18.80 1.53	22.00 1.13
12.50 21.16	15.70 2.41	18.90 1.51	22.10 1.13
12.60 13.53	15.80 2.35	19.00 1.49	22.20 1.12
12.70 9.39	15.90 2.29	19.10 1.47	22.30 1.12
12.80 8.17	16.00 2.24	19.20 1.44	22.40 1.11
12.90 7.24	16.10 2.18	19.30 1.42	22.50 1.11
13.00 6.54	16.20 2.13	19.40 1.40	22.60 1.10
13.10 6.01	16.30 2.08	19.50 1.38	22.70 1.10
13.20 5.61	16.40 2.04	19.60 1.36	22.80 1.10
13.30 5.28	16.50 2.02	19.70 1.33	22.90 1.09
13.40 4.98	16.60 1.99	19.80 1.31	23.00 1.09
13.50 4.72	16.70 1.97	19.90 1.29	23.10 1.08
13.60 4.49	16.80 1.95	20.00 1.27	23.20 1.08
13.70 4.27	16.90 1.93	20.10 1.25	23.30 1.08
13.80 4.07	17.00 1.91	20.20 1.23	23.40 1.07

Continues on next page...

Hydrograph Report

INFLOW 10-YR.

English

Hyd. No. 2

Persimmon DA

Hydrograph type	= SCS Runoff	Peak discharge	= 106.51 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Drainage area	= 35.00 ac	Curve number	= 78
Basin Slope	= 8.0 %	Hydraulic length	= 2200 ft
Tc method	= USER	Time of conc. (Tc)	= 20 min
Total precip.	= 5.80 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 432,330 cuft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)						
9.30	1.12	12.50	45.36	15.70	4.75	18.90	2.93
9.40	1.20	12.60	28.24	15.80	4.63	19.00	2.88
9.50	1.27	12.70	19.34	15.90	4.51	19.10	2.84
9.60	1.34	12.80	16.76	16.00	4.39	19.20	2.80
9.70	1.41	12.90	14.79	16.10	4.28	19.30	2.75
9.80	1.50	13.00	13.32	16.20	4.17	19.40	2.71
9.90	1.61	13.10	12.21	16.30	4.08	19.50	2.67
10.00	1.74	13.20	11.36	16.40	4.01	19.60	2.62
10.10	1.89	13.30	10.67	16.50	3.95	19.70	2.58
10.20	2.05	13.40	10.06	16.60	3.90	19.80	2.54
10.30	2.24	13.50	9.51	16.70	3.86	19.90	2.49
10.40	2.45	13.60	9.02	16.80	3.82	20.00	2.45
10.50	2.67	13.70	8.57	16.90	3.77	20.10	2.41
10.60	2.92	13.80	8.16	17.00	3.73	20.20	2.37
10.70	3.20	13.90	7.78	17.10	3.69	20.30	2.34
10.80	3.53	14.00	7.42	17.20	3.65	20.40	2.32
10.90	3.89	14.10	7.08	17.30	3.61	20.50	2.30
11.00	4.30	14.20	6.78	17.40	3.57	20.60	2.29
11.10	4.70	14.30	6.53	17.50	3.52	20.70	2.28
11.20	5.19	14.40	6.33	17.60	3.48	20.80	2.27
11.30	5.81	14.50	6.17	17.70	3.44	20.90	2.26
11.40	6.69	14.60	6.03	17.80	3.40	21.00	2.25
11.50	7.73	14.70	5.91	17.90	3.35	21.10	2.25
11.60	9.95	14.80	5.80	18.00	3.31	21.20	2.24
11.70	15.53	14.90	5.68	18.10	3.27	21.30	2.23
11.80	27.90	15.00	5.57	18.20	3.23	21.40	2.22
11.90	53.53	15.10	5.45	18.30	3.18	21.50	2.21
12.00	84.91	15.20	5.34	18.40	3.14	21.60	2.20
12.10	106.51 <<	15.30	5.22	18.50	3.10	21.70	2.20
12.20	104.73	15.40	5.10	18.60	3.06	21.80	2.19
12.30	85.59	15.50	4.99	18.70	3.01	21.90	2.18
12.40	65.29	15.60	4.87	18.80	2.97	22.00	2.17

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Hydrograph Report

Hyd. No. 3

INFLOW 25-YR.

Persimmon DA

Hydrograph type	= SCS Runoff	Peak discharge	= 123.31 cfs
Storm frequency	= 25 yrs	Time interval	= 6 min
Drainage area	= 35.00 ac	Curve number	= 78
Basin Slope	= 8.0 %	Hydraulic length	= 2200 ft
Tc method	= USER	Time of conc. (Tc)	= 20 min
Total precip.	= 6.40 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 499,864 cuft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)						
9.00	1.25	12.20	120.78	15.40	5.76	18.60	3.44
9.10	1.36	12.30	98.45	15.50	5.63	18.70	3.39
9.20	1.46	12.40	74.86	15.60	5.49	18.80	3.34
9.30	1.56	12.50	51.83	15.70	5.36	18.90	3.30
9.40	1.65	12.60	32.13	15.80	5.23	19.00	3.25
9.50	1.73	12.70	21.97	15.90	5.09	19.10	3.20
9.60	1.80	12.80	19.02	16.00	4.96	19.20	3.15
9.70	1.89	12.90	16.78	16.10	4.83	19.30	3.10
9.80	2.00	13.00	15.10	16.20	4.71	19.40	3.05
9.90	2.13	13.10	13.84	16.30	4.60	19.50	3.00
10.00	2.28	13.20	12.88	16.40	4.52	19.60	2.95
10.10	2.46	13.30	12.08	16.50	4.46	19.70	2.90
10.20	2.66	13.40	11.39	16.60	4.40	19.80	2.86
10.30	2.88	13.50	10.77	16.70	4.35	19.90	2.81
10.40	3.13	13.60	10.21	16.80	4.30	20.00	2.76
10.50	3.41	13.70	9.70	16.90	4.26	20.10	2.71
10.60	3.71	13.80	9.24	17.00	4.21	20.20	2.67
10.70	4.04	13.90	8.80	17.10	4.16	20.30	2.63
10.80	4.43	14.00	8.39	17.20	4.11	20.40	2.61
10.90	4.87	14.10	8.01	17.30	4.07	20.50	2.59
11.00	5.35	14.20	7.67	17.40	4.02	20.60	2.58
11.10	5.82	14.30	7.39	17.50	3.97	20.70	2.57
11.20	6.40	14.40	7.16	17.60	3.92	20.80	2.56
11.30	7.14	14.50	6.97	17.70	3.88	20.90	2.55
11.40	8.19	14.60	6.82	17.80	3.83	21.00	2.54
11.50	9.41	14.70	6.68	17.90	3.78	21.10	2.53
11.60	12.04	14.80	6.55	18.00	3.73	21.20	2.52
11.70	18.65	14.90	6.42	18.10	3.68	21.30	2.51
11.80	33.16	15.00	6.29	18.20	3.64	21.40	2.50
11.90	62.85	15.10	6.16	18.30	3.59	21.50	2.49
12.00	98.83	15.20	6.03	18.40	3.54	21.60	2.48
12.10	123.31 <<	15.30	5.89	18.50	3.49	21.70	2.47

Continues on next page...

Hydrograph Report

INFLOW 100-YR.

Hyd. No. 4

Persimmon DA

Hydrograph type	= SCS Runoff	Peak discharge	= 168.74 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Drainage area	= 35.00 ac	Curve number	= 78
Basin Slope	= 8.0 %	Hydraulic length	= 2200 ft
Tc method	= USER	Time of conc. (Tc)	= 20 min
Total precip.	= 8.00 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

Total Volume = 684,930 cuft

Hydrograph Discharge Table

Time (hrs)	Outflow (cfs)						
8.60	1.80	11.80	47.70	15.00	8.20	18.20	4.72
8.70	1.94	11.90	88.37	15.10	8.03	18.30	4.66
8.80	2.09	12.00	136.67	15.20	7.86	18.40	4.59
8.90	2.24	12.10	168.74 <<	15.30	7.68	18.50	4.53
9.00	2.40	12.20	164.07	15.40	7.51	18.60	4.47
9.10	2.56	12.30	133.04	15.50	7.33	18.70	4.40
9.20	2.71	12.40	100.54	15.60	7.16	18.80	4.34
9.30	2.85	12.50	69.11	15.70	6.98	18.90	4.28
9.40	2.98	12.60	42.52	15.80	6.81	19.00	4.21
9.50	3.08	12.70	28.96	15.90	6.63	19.10	4.15
9.60	3.19	12.80	25.05	16.00	6.46	19.20	4.08
9.70	3.30	12.90	22.08	16.10	6.28	19.30	4.02
9.80	3.45	13.00	19.85	16.20	6.13	19.40	3.96
9.90	3.65	13.10	18.18	16.30	5.99	19.50	3.89
10.00	3.87	13.20	16.90	16.40	5.88	19.60	3.83
10.10	4.14	13.30	15.85	16.50	5.80	19.70	3.77
10.20	4.43	13.40	14.93	16.60	5.72	19.80	3.70
10.30	4.77	13.50	14.11	16.70	5.66	19.90	3.64
10.40	5.14	13.60	13.38	16.80	5.60	20.00	3.57
10.50	5.54	13.70	12.71	16.90	5.53	20.10	3.51
10.60	5.98	13.80	12.09	17.00	5.47	20.20	3.46
10.70	6.47	13.90	11.52	17.10	5.41	20.30	3.41
10.80	7.03	14.00	10.98	17.20	5.35	20.40	3.38
10.90	7.67	14.10	10.47	17.30	5.28	20.50	3.35
11.00	8.37	14.20	10.03	17.40	5.22	20.60	3.34
11.10	9.03	14.30	9.65	17.50	5.16	20.70	3.32
11.20	9.85	14.40	9.35	17.60	5.10	20.80	3.31
11.30	10.90	14.50	9.10	17.70	5.03	20.90	3.30
11.40	12.41	14.60	8.90	17.80	4.97	21.00	3.29
11.50	14.15	14.70	8.72	17.90	4.91	21.10	3.27
11.60	17.93	14.80	8.55	18.00	4.85	21.20	3.26
11.70	27.34	14.90	8.38	18.10	4.78	21.30	3.25

Continues on next page...

Reservoir Report

Reservoir No. 1 - Persimmon Pond

Pond Data

Pond storage is based on known contour areas

Reservoir Pond HYDRAULICS

Stage / Storage Table

Stage ft	Elevation ft	Contour area sqft	Incr. Storage cuft	Total storage cuft
0.00	19.00	200	0	0
1.00	20.00	3,044	1,622	1,622
2.00	21.00	5,966	4,505	6,127
3.00	22.00	9,244	7,605	13,732
4.00	23.00	13,446	11,345	25,077
5.00	24.00	19,628	16,537	41,614
6.00	25.00	29,236	24,432	66,046
7.00	26.00	41,200	35,218	101,264
7.50	26.50	47,000	22,050	123,314
8.19	27.19	43,429	31,198	154,512
9.00	28.00	45,211	35,899	190,411

Culvert / Orifice Structures

20" OD SLOPLINE

	[A]	[B]	[C]	[D]
Rise in	= 18.8	0.0	0.0	0.0
Span in	= 18.8	0.0	0.0	0.0
No. Barrels	= 1	0	0	0
Invert El. ft	= 19.05	0.00	0.00	0.00
Length ft	= 42.0	0.0	0.0	0.0
Slope %	= 1.12	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

*RISER CREST
FOUR (X) SLOTS*

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.56	4.00	18.00	0.00
Crest El. ft	= 24.50	23.50	25.50	0.00
Weir Coeff.	= 3.00	3.00	3.00	0.00
Eqn. Exp.	= 1.50	1.50	1.50	0.00
Multi-Stage	= Yes	Yes	No	No

Tailwater Elevation = 20.18 ft *(0.80)*

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	19.00	0.00	---	---	---	0.00	0.00	0.00	---	0.00
0.10	162	19.10	0.00	---	---	---	0.00	0.00	0.00	---	0.00
0.20	324	19.20	0.00	---	---	---	0.00	0.00	0.00	---	0.00
0.30	487	19.30	0.00	---	---	---	0.00	0.00	0.00	---	0.00
0.40	649	19.40	0.00	---	---	---	0.00	0.00	0.00	---	0.00
0.50	811	19.50	0.00	---	---	---	0.00	0.00	0.00	---	0.00
0.60	973	19.60	0.00	---	---	---	0.00	0.00	0.00	---	0.00
0.70	1,135	19.70	0.00	---	---	---	0.00	0.00	0.00	---	0.00
0.80	1,298	19.80	0.00	---	---	---	0.00	0.00	0.00	---	0.00
0.90	1,460	19.90	0.00	---	---	---	0.00	0.00	0.00	---	0.00
1.00	1,622	20.00	0.00	---	---	---	0.00	0.00	0.00	---	0.00

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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
1.10	2,073	20.10	0.00	---	---	---	0.00	0.00	0.00	---	0.00
1.20	2,523	20.20	1.04	---	---	---	0.00	0.00	0.00	---	0.00
1.30	2,974	20.30	2.78	---	---	---	0.00	0.00	0.00	---	0.00
1.40	3,424	20.40	4.00	---	---	---	0.00	0.00	0.00	---	0.00
1.50	3,875	20.50	5.09	---	---	---	0.00	0.00	0.00	---	0.00
1.60	4,325	20.60	5.99	---	---	---	0.00	0.00	0.00	---	0.00
1.70	4,776	20.70	6.67	---	---	---	0.00	0.00	0.00	---	0.00
1.80	5,226	20.80	7.28	---	---	---	0.00	0.00	0.00	---	0.00
1.90	5,677	20.90	7.85	---	---	---	0.00	0.00	0.00	---	0.00
2.00	6,127	21.00	8.38	---	---	---	0.00	0.00	0.00	---	0.00
2.10	6,888	21.10	8.87	---	---	---	0.00	0.00	0.00	---	0.00
2.20	7,648	21.20	9.34	---	---	---	0.00	0.00	0.00	---	0.00
2.30	8,409	21.30	9.79	---	---	---	0.00	0.00	0.00	---	0.00
2.40	9,169	21.40	10.22	---	---	---	0.00	0.00	0.00	---	0.00
2.50	9,930	21.50	10.63	---	---	---	0.00	0.00	0.00	---	0.00
2.60	10,690	21.60	11.02	---	---	---	0.00	0.00	0.00	---	0.00
2.70	11,451	21.70	11.41	---	---	---	0.00	0.00	0.00	---	0.00
2.80	12,211	21.80	11.77	---	---	---	0.00	0.00	0.00	---	0.00
2.90	12,972	21.90	12.13	---	---	---	0.00	0.00	0.00	---	0.00
3.00	13,732	22.00	12.48	---	---	---	0.00	0.00	0.00	---	0.00
3.10	14,867	22.10	12.82	---	---	---	0.00	0.00	0.00	---	0.00
3.20	16,001	22.20	13.15	---	---	---	0.00	0.00	0.00	---	0.00
3.30	17,136	22.30	13.47	---	---	---	0.00	0.00	0.00	---	0.00
3.40	18,270	22.40	13.78	---	---	---	0.00	0.00	0.00	---	0.00
3.50	19,405	22.50	14.09	---	---	---	0.00	0.00	0.00	---	0.00
3.60	20,539	22.60	14.39	---	---	---	0.00	0.00	0.00	---	0.00
3.70	21,674	22.70	14.69	---	---	---	0.00	0.00	0.00	---	0.00
3.80	22,808	22.80	14.97	---	---	---	0.00	0.00	0.00	---	0.00
3.90	23,943	22.90	15.26	---	---	---	0.00	0.00	0.00	---	0.00
4.00	25,077	23.00	15.54	---	---	---	0.00	0.00	0.00	---	0.00
4.10	26,731	23.10	15.81	---	---	---	0.00	0.00	0.00	---	0.00
4.20	28,384	23.20	16.08	---	---	---	0.00	0.00	0.00	---	0.00
4.30	30,038	23.30	16.34	---	---	---	0.00	0.00	0.00	---	0.00
4.40	31,692	23.40	16.60	---	---	---	0.00	0.00	0.00	---	0.00
4.50	33,345	23.50	16.86	---	---	---	0.00	0.00	0.00	---	0.00
4.60	34,999	23.60	17.11	---	---	---	0.00	0.38	0.00	---	0.38
4.70	36,653	23.70	17.36	---	---	---	0.00	1.07	0.00	---	1.07
4.80	38,307	23.80	17.60	---	---	---	0.00	1.97	0.00	---	1.97
4.90	39,960	23.90	17.84	---	---	---	0.00	3.04	0.00	---	3.04
5.00	41,614	24.00	18.08	---	---	---	0.00	4.24	0.00	---	4.24
5.10	44,057	24.10	18.32	---	---	---	0.00	5.58	0.00	---	5.58
5.20	46,500	24.20	18.55	---	---	---	0.00	7.03	0.00	---	7.03
5.30	48,944	24.30	18.78	---	---	---	0.00	8.59	0.00	---	8.59
5.40	51,387	24.40	19.00	---	---	---	0.00	10.25	0.00	---	10.25
5.50	53,830	24.50	19.23	---	---	---	0.00	12.00	0.00	---	12.00
5.60	56,273	24.60	19.45	---	---	---	1.19	13.84	0.00	---	15.04
5.70	58,716	24.70	19.67	---	---	---	3.37	15.77	0.00	---	19.14
5.80	61,160	24.80	19.88	---	---	---	6.19	17.79	0.00	---	19.88
5.90	63,603	24.90	20.10	---	---	---	9.53	19.88	0.00	---	20.10
6.00	66,046	25.00	20.31	---	---	---	13.32	22.05	0.00	---	20.31
6.10	69,568	25.10	20.52	---	---	---	17.51	24.29	0.00	---	20.52
6.20	73,090	25.20	20.73	---	---	---	22.07	26.60	0.00	---	20.73
6.30	76,611	25.30	20.93	---	---	---	26.96	28.98	0.00	---	20.93

— 1x1 SLOTS

— RISER CREST

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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
6.40	80,133	25.40	21.14	---	---	---	32.17	31.43	0.00	---	21.14
6.50	83,655	25.50	21.34	---	---	---	37.68	33.94	0.00	---	21.34
6.60	87,177	25.60	21.54	---	---	---	43.47	36.52	1.71	---	23.25
6.70	90,699	25.70	21.74	---	---	---	49.53	39.16	4.83	---	26.57
6.80	94,220	25.80	21.93	---	---	---	55.85	41.86	8.87	---	30.80
6.90	97,742	25.90	22.13	---	---	---	62.42	44.62	13.66	---	35.79
7.00	101,264	26.00	22.32	---	---	---	69.22	47.43	19.09	---	41.41
7.05	103,469	26.05	22.41	---	---	---	72.71	48.86	22.03	---	44.44
7.10	105,674	26.10	22.51	---	---	---	76.26	50.31	25.10	---	47.61
7.15	107,879	26.15	22.60	---	---	---	79.86	51.77	28.30	---	50.90
7.20	110,084	26.20	22.70	---	---	---	83.52	53.24	31.63	---	54.32
7.25	112,289	26.25	22.79	---	---	---	87.23	54.72	35.07	---	57.87
7.30	114,494	26.30	22.89	---	---	---	91.00	56.22	38.64	---	61.53
7.35	116,699	26.35	22.98	---	---	---	94.81	57.74	42.32	---	65.30
7.40	118,904	26.40	23.07	---	---	---	98.68	59.26	46.11	---	69.18
7.45	121,109	26.45	23.16	---	---	---	102.60	60.80	50.00	---	73.17
7.50	123,314	26.50	23.26	---	---	---	106.58	62.35	54.00	---	77.26
7.57	126,434	26.57	23.38	---	---	---	112.14	64.52	59.68	---	83.07
7.64	129,554	26.64	23.51	---	---	---	117.79	66.71	65.56	---	89.06
7.71	132,673	26.71	23.63	---	---	---	123.54	68.92	71.61	---	95.24
7.78	135,793	26.78	23.76	---	---	---	129.38	71.15	77.83	---	101.59
7.84	138,913	26.85	23.88	---	---	---	135.31	73.41	84.23	---	108.12
7.91	142,033	26.91	24.01	---	---	---	141.32	75.70	90.80	---	114.80
7.98	145,153	26.98	24.13	---	---	---	147.43	78.00	97.52	---	121.65
8.05	148,273	27.05	24.25	---	---	---	153.61	80.33	104.41	---	128.66
8.12	151,392	27.12	24.37	---	---	---	159.89	82.68	111.45	---	135.82
8.19	154,512	27.19	24.49	---	---	---	166.24	85.06	118.64	---	143.13
8.27	158,102	27.27	24.63	---	---	---	173.81	87.88	127.27	---	151.90
8.35	161,692	27.35	24.78	---	---	---	181.48	90.72	136.10	---	160.87
8.43	165,282	27.43	24.91	---	---	---	189.27	93.60	145.12	---	170.04
8.51	168,872	27.51	25.05	---	---	---	197.16	96.50	154.34	---	179.39
8.60	172,462	27.59	25.19	---	---	---	205.16	99.44	163.75	---	188.94
8.68	176,052	27.68	25.33	---	---	---	213.27	102.41	173.33	---	198.66
8.76	179,642	27.76	25.47	---	---	---	221.48	105.40	183.10	---	208.57
8.84	183,232	27.84	25.60	---	---	---	229.79	108.42	193.05	---	218.65
8.92	186,822	27.92	25.74	---	---	---	238.21	111.47	203.16	---	228.90
9.00	190,411	28.00	25.87	---	---	---	246.72	114.55	213.45	---	239.32

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...End

Hydrograph Report

ROUTED 2-YR.

Hyd. No. 5

Persimmon Wet Pond

Hydrograph type = Reservoir
 Storm frequency = 2 yrs
 Inflow hyd. No. = 1
 Max. Elevation = 25.07 ft

Peak discharge = 20.47 cfs
 Time interval = 6 min
 Reservoir name = Persmimmon Pond
 Max. Storage = 68,675 cuft

Storage Indication method used.

Total Volume = 156,896 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
12.10	45.27	23.80	17.61	----	----	----	----	2.00	----	----	2.00
12.20	45.75 <<	24.44	19.10	----	----	----	0.00	10.97	----	----	10.97
12.30	38.10	24.83	19.95	----	----	----	7.23	18.44	----	----	19.95
12.40	29.70	25.02	20.36	----	----	----	14.30	22.57	----	----	20.36
12.50	21.16	25.07 <<	20.47	----	----	----	16.45	23.72	----	----	20.47 <<
12.60	13.53	25.04	20.40	----	----	----	15.13	23.01	----	----	20.40
12.70	9.39	24.93	20.17	----	----	----	10.75	20.57	----	----	20.17
12.80	8.17	24.77	19.82	----	----	----	5.29	17.15	----	----	19.65
12.90	7.24	24.62	19.49	----	----	----	1.63	14.23	----	----	15.86
13.00	6.54	24.51	19.26	----	----	----	0.16	12.25	----	----	12.41
13.10	6.01	24.43	19.08	----	----	----	0.00	10.85	----	----	10.85
13.20	5.61	24.37	18.93	----	----	----	----	9.72	----	----	9.72
13.30	5.28	24.31	18.81	----	----	----	----	8.79	----	----	8.79
13.40	4.98	24.26	18.70	----	----	----	----	8.03	----	----	8.03
13.50	4.72	24.22	18.60	----	----	----	----	7.37	----	----	7.37
13.60	4.49	24.19	18.51	----	----	----	----	6.82	----	----	6.82
13.70	4.27	24.15	18.44	----	----	----	----	6.35	----	----	6.35
13.80	4.07	24.12	18.37	----	----	----	----	5.93	----	----	5.93
13.90	3.89	24.10	18.31	----	----	----	----	5.55	----	----	5.55
14.00	3.71	24.07	18.26	----	----	----	----	5.24	----	----	5.24
14.10	3.55	24.05	18.21	----	----	----	----	4.95	----	----	4.95
14.20	3.40	24.03	18.16	----	----	----	----	4.69	----	----	4.69
14.30	3.28	24.02	18.12	----	----	----	----	4.44	----	----	4.44
14.40	3.18	24.00	18.08	----	----	----	----	4.22	----	----	4.22
14.50	3.10	23.98	18.03	----	----	----	----	3.97	----	----	3.97
14.60	3.04	23.96	17.99	----	----	----	----	3.76	----	----	3.76
14.70	2.98	23.95	17.95	----	----	----	----	3.59	----	----	3.59
14.80	2.92	23.93	17.92	----	----	----	----	3.44	----	----	3.44
14.90	2.87	23.92	17.90	----	----	----	----	3.31	----	----	3.31
15.00	2.81	23.91	17.88	----	----	----	----	3.20	----	----	3.20
15.10	2.76	23.91	17.86	----	----	----	----	3.11	----	----	3.11
15.20	2.70	23.90	17.84	----	----	----	----	3.02	----	----	3.02
15.30	2.64	23.89	17.82	----	----	----	----	2.95	----	----	2.95
15.40	2.59	23.89	17.81	----	----	----	----	2.88	----	----	2.88
15.50	2.53	23.88	17.79	----	----	----	----	2.81	----	----	2.81
15.60	2.47	23.87	17.78	----	----	----	----	2.75	----	----	2.75

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Hydrograph Report

ROUTED 10-YR

English

Hyd. No. 6

Persimmon Wet Pond

Hydrograph type = Reservoir
 Storm frequency = 10 yrs
 Inflow hyd. No. = 2
 Max. Elevation = 26.54 ft

Peak discharge = 80.31 cfs
 Time interval = 6 min
 Reservoir name = Persmimmon Pond
 Max. Storage = 124,951 cuft

Storage Indication method used.

Total Volume = 398,984 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
11.80	27.90	24.01	18.10	----	----	----	----	4.36	----	----	4.36
11.90	53.53	24.49	19.20	----	----	----	0.00	11.82	----	----	11.82
12.00	84.91	25.19	20.70	----	----	----	21.49	26.30	----	----	20.70
12.10	106.51 <<	25.88	22.09	----	----	----	61.21	44.11	12.78	----	34.87
12.20	104.73	26.36	22.99	----	----	----	95.33	57.94	42.82	----	65.82
12.30	85.59	26.54 <<	23.32	----	----	----	109.49	63.49	56.98	----	80.31 <<
12.40	65.29	26.51	23.27	----	----	----	107.16	62.58	54.59	----	77.86
12.50	45.36	26.37	23.01	----	----	----	96.27	58.31	43.74	----	66.75
12.60	28.24	26.18	22.66	----	----	----	82.09	52.66	30.32	----	52.99
12.70	19.34	25.99	22.30	----	----	----	68.52	47.14	18.53	----	40.83
12.80	16.76	25.81	21.94	----	----	----	56.27	42.03	9.18	----	31.12
12.90	14.79	25.68	21.69	----	----	----	48.12	38.54	4.10	----	25.79
13.00	13.32	25.57	21.48	----	----	----	41.88	35.81	1.24	----	22.72
13.10	12.21	25.48	21.29	----	----	----	36.47	33.39	0.00	----	21.29
13.20	11.36	25.38	21.10	----	----	----	31.22	30.98	----	----	21.10
13.30	10.67	25.28	20.89	----	----	----	25.97	28.50	----	----	20.89
13.40	10.06	25.17	20.67	----	----	----	20.85	25.98	----	----	20.67
13.50	9.51	25.06	20.44	----	----	----	15.97	23.46	----	----	20.44
13.60	9.02	24.93	20.16	----	----	----	10.61	20.49	----	----	20.16
13.70	8.57	24.76	19.81	----	----	----	5.20	17.08	----	----	19.63
13.80	8.16	24.63	19.50	----	----	----	1.74	14.33	----	----	16.07
13.90	7.78	24.53	19.29	----	----	----	0.35	12.54	----	----	12.89
14.00	7.42	24.46	19.14	----	----	----	0.00	11.35	----	----	11.35
14.10	7.08	24.41	19.03	----	----	----	0.00	10.41	----	----	10.41
14.20	6.78	24.36	18.92	----	----	----	----	9.64	----	----	9.64
14.30	6.53	24.32	18.83	----	----	----	----	8.99	----	----	8.99
14.40	6.33	24.29	18.76	----	----	----	----	8.44	----	----	8.44
14.50	6.17	24.26	18.69	----	----	----	----	7.99	----	----	7.99
14.60	6.03	24.24	18.63	----	----	----	----	7.60	----	----	7.60
14.70	5.91	24.22	18.58	----	----	----	----	7.27	----	----	7.27
14.80	5.80	24.20	18.54	----	----	----	----	6.98	----	----	6.98
14.90	5.68	24.18	18.50	----	----	----	----	6.74	----	----	6.74
15.00	5.57	24.17	18.47	----	----	----	----	6.52	----	----	6.52
15.10	5.45	24.15	18.44	----	----	----	----	6.33	----	----	6.33
15.20	5.34	24.14	18.41	----	----	----	----	6.15	----	----	6.15
15.30	5.22	24.13	18.38	----	----	----	----	5.98	----	----	5.98

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Hydrograph Report

Hyd. No. 7

Routed 25-yr.

Persimmon Wet Pond

Hydrograph type = Reservoir
 Storm frequency = 25 yrs
 Inflow hyd. No. = 3
 Max. Elevation = 26.75 ft

Peak discharge = 98.92 cfs
 Time interval = 6 min
 Reservoir name = Persimmon Pond
 Max. Storage = 134,478 cuft

Storage Indication method used.

Total Volume = 466,519 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
11.60	12.04	23.83	17.68	----	----	----	----	2.33	----	----	2.33
11.70	18.65	24.06	18.22	----	----	----	----	5.03	----	----	5.03
11.80	33.16	24.34	18.86	----	----	----	----	9.19	----	----	9.19
11.90	62.85	24.83	19.95	----	----	----	7.16	18.39	----	----	19.95
12.00	98.83	25.50	21.33	----	----	----	37.50	33.86	0.00	----	21.33
12.10	123.31 <<	26.20	22.69	----	----	----	83.29	53.15	31.42	----	54.11
12.20	120.78	26.61	23.47	----	----	----	115.85	65.95	63.54	----	87.00
12.30	98.45	26.75 <<	23.71	----	----	----	126.92	70.21	75.21	----	98.92 <<
12.40	74.86	26.68	23.58	----	----	----	120.90	67.90	68.82	----	92.40
12.50	51.83	26.50	23.26	----	----	----	106.83	62.45	54.26	----	77.52
12.60	32.13	26.28	22.85	----	----	----	89.74	55.72	37.45	----	60.31
12.70	21.97	26.07	22.45	----	----	----	74.21	49.48	23.33	----	45.78
12.80	19.02	25.89	22.10	----	----	----	61.46	44.21	12.96	----	35.06
12.90	16.78	25.74	21.82	----	----	----	52.31	40.34	6.61	----	28.43
13.00	15.10	25.64	21.61	----	----	----	45.69	37.48	2.85	----	24.46
13.10	13.84	25.55	21.43	----	----	----	40.34	35.13	0.79	----	22.21
13.20	12.88	25.46	21.26	----	----	----	35.50	32.94	0.00	----	21.26
13.30	12.08	25.37	21.08	----	----	----	30.69	30.73	----	----	21.08
13.40	11.39	25.28	20.89	----	----	----	25.84	28.43	----	----	20.89
13.50	10.77	25.18	20.68	----	----	----	21.06	26.09	----	----	20.68
13.60	10.21	25.07	20.47	----	----	----	16.45	23.72	----	----	20.47
13.70	9.70	24.95	20.21	----	----	----	11.61	21.06	----	----	20.21
13.80	9.24	24.80	19.88	----	----	----	6.16	17.76	----	----	19.88
13.90	8.80	24.66	19.57	----	----	----	2.44	14.95	----	----	17.39
14.00	8.39	24.56	19.35	----	----	----	0.66	13.02	----	----	13.67
14.10	8.01	24.49	19.20	----	----	----	0.00	11.79	----	----	11.79
14.20	7.67	24.44	19.09	----	----	----	0.00	10.89	----	----	10.89
14.30	7.39	24.39	18.99	----	----	----	----	10.13	----	----	10.13
14.40	7.16	24.36	18.90	----	----	----	----	9.50	----	----	9.50
14.50	6.97	24.32	18.83	----	----	----	----	8.97	----	----	8.97
14.60	6.82	24.30	18.77	----	----	----	----	8.52	----	----	8.52
14.70	6.68	24.27	18.71	----	----	----	----	8.16	----	----	8.16
14.80	6.55	24.25	18.67	----	----	----	----	7.84	----	----	7.84
14.90	6.42	24.23	18.63	----	----	----	----	7.56	----	----	7.56
15.00	6.29	24.22	18.59	----	----	----	----	7.31	----	----	7.31
15.10	6.16	24.20	18.56	----	----	----	----	7.09	----	----	7.09

Continues on next page...

Hydrograph Report

Hyd. No. 8

ROUTED 100-YR.

Persimmon Wet Pond

Hydrograph type = Reservoir
 Storm frequency = 100 yrs
 Inflow hyd. No. = 4
 Max. Elevation = 27.20 ft

Peak discharge = 144.24 cfs
 Time interval = 6 min
 Reservoir name = Persimmon Pond
 Max. Storage = 154,965 cuft

Storage Indication method used.

Total Volume = 651,584 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
10.90	7.67	23.83	17.68	----	----	----	----	2.31	----	----	2.31
11.00	8.37	23.94	17.94	----	----	----	----	3.55	----	----	3.55
11.10	9.03	24.03	18.15	----	----	----	----	4.63	----	----	4.63
11.20	9.85	24.09	18.30	----	----	----	----	5.49	----	----	5.49
11.30	10.90	24.16	18.45	----	----	----	----	6.43	----	----	6.43
11.40	12.41	24.23	18.61	----	----	----	----	7.47	----	----	7.47
11.50	14.15	24.31	18.79	----	----	----	----	8.67	----	----	8.67
11.60	17.93	24.40	19.01	----	----	----	0.00	10.28	----	----	10.28
11.70	27.34	24.56	19.36	----	----	----	0.69	13.07	----	----	13.77
11.80	47.70	24.86	20.02	----	----	----	8.27	19.09	----	----	20.02
11.90	88.37	25.39	21.12	----	----	----	31.63	31.17	----	----	21.12
12.00	136.67	26.14	22.58	----	----	----	79.13	51.47	27.65	----	50.23
12.10	168.74 <<	26.76	23.74	----	----	----	128.40	70.78	76.79	----	100.53
12.20	164.07	27.14	24.41	----	----	----	161.66	83.35	113.46	----	137.86
12.30	133.04	27.20 <<	24.51	----	----	----	167.20	85.41	119.73	----	144.24 <<
12.40	100.54	27.05	24.24	----	----	----	153.07	80.13	103.80	----	128.04
12.50	69.11	26.80	23.80	----	----	----	131.32	71.89	79.93	----	103.73
12.60	42.52	26.52	23.29	----	----	----	107.93	62.88	55.39	----	78.68
12.70	28.96	26.25	22.79	----	----	----	87.33	54.76	35.17	----	57.96
12.80	25.05	26.05	22.42	----	----	----	72.93	48.95	22.21	----	44.63
12.90	22.08	25.90	22.12	----	----	----	62.22	44.53	13.52	----	35.64
13.00	19.85	25.78	21.89	----	----	----	54.38	41.23	7.93	----	29.82
13.10	18.18	25.69	21.71	----	----	----	48.65	38.77	4.38	----	26.08
13.20	16.90	25.61	21.56	----	----	----	44.13	36.80	2.05	----	23.60
13.30	15.85	25.54	21.43	----	----	----	40.24	35.08	0.75	----	22.18
13.40	14.93	25.48	21.30	----	----	----	36.54	33.42	0.00	----	21.30
13.50	14.11	25.41	21.16	----	----	----	32.77	31.70	0.00	----	21.16
13.60	13.38	25.34	21.01	----	----	----	28.83	29.86	----	----	21.01
13.70	12.71	25.26	20.84	----	----	----	24.77	27.91	----	----	20.84
13.80	12.09	25.17	20.66	----	----	----	20.69	25.90	----	----	20.66
13.90	11.52	25.08	20.48	----	----	----	16.68	23.84	----	----	20.48
14.00	10.98	24.98	20.27	----	----	----	12.61	21.64	----	----	20.27
14.10	10.47	24.84	19.98	----	----	----	7.61	18.68	----	----	19.98
14.20	10.03	24.71	19.68	----	----	----	3.52	15.88	----	----	19.18
14.30	9.65	24.60	19.45	----	----	----	1.17	13.81	----	----	14.99
14.40	9.35	24.53	19.30	----	----	----	0.39	12.60	----	----	12.98

Continues on next page...

26.5	0.9622
27.19	0.997
28.00	X

$$\frac{28 - 27.19}{28 - 26.5} = \frac{X - 0.997}{X - 0.9622}$$

$$\frac{28 - 26.5}{27.19 - 26.5} = \frac{22960 - X}{0.997 - 0.9622}$$

$$\frac{1.5}{0.69} = \frac{X - 0.9622}{0.0348}$$

$$2.1739 = 1.0$$

$$X = 1.0379$$

PREDEV ←

A = 35 AC.

CN = 73 (10% IMPERV.)

T_c = 0.435 HRS. (26.10 MIN.)

DESIGN

2 YR - 29 CFS

POSTDEV ←

A = 35 AC.

CN = 78 (15% IMPERV.)

T_c = 0.333 HRS. (19.98 MIN.)

DESIGN - INFLOW

2 YR - 38 CFS

10 YR - 87 CFS

DESIGN SCSUH

29 ~ 35.8

87 ~ 125.6

38 ~ 54.79

ROUTED

~~2 YR - 26 CFS @ 25.78~~

~~10 YR - 37 CFS @ 26.35~~

SCS UNIT HYD.
METHOD

SJT COMPS CK.

PREDEV

1-YR = 20.89 CFS

2-YR = 35.75 CFS ←

10-YR = 93.49 CFS

25-YR = 109.76 CFS

50-YR = 131.87 CFS

100-YR = 154.31 CFS

.. SCENA...

POSTDEV W/O DET (INFLOW)

1-YR = 35.34 CFS

2-YR = 54.79 CFS

10-YR = 125.6 CFS

25-YR = 144.87 CFS

50-YR = 170.77 CFS

100-YR = 196.81 CFS

... SCENB...

ROUTING (ORIG DESIGN)

1-YR = 6.06 CFS @ 24.32

2-YR = 24.56 CFS @ 24.80

10-YR = 55.6 CFS @ 27.03

25-YR = 70.14 CFS @ 27.46

100-YR =

....DEV....

ROUT (NEW DESIGN)

18" RELINE OVERTOP 10-YR.
USE 21-INCH AND
ADJUST DESIGN.

FINAL = 20" OD.

EXISTING POND HYDROLOGY SUMMARY

60" ϕ RISER \leftarrow TRY 60" ϕ

		<u>WSEL</u>
1-YEAR	9.84	24.38
2-YR	21.23	25.05
10-YR	88.28	26.55
25-YR	110.63	26.78
50-YR	137.96	27.04
100-YR.	163.88	27.27

IT IS PRESUMED A 60" DIA. PRECAST RISER WILL BE QUITE MORE EXPENSIVE THAN 48" ϕ WITH NO BETTER HYDRAVIC PERFORMANCE USE 48" ϕ PRECAST RISER.

\therefore USE 48 inch DIA.

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JCC.RNQ

JCCSCSdata

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
Dev..1	2.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
Dev..2	3.5000	Synthetic Curve	SCSTYPES	TypeII 24hr
Dev.10	5.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
Dev.25	6.4000	Synthetic Curve	SCSTYPES	TypeII 24hr
Dev100	8.0000	Synthetic Curve	SCSTYPES	TypeII 24hr

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return Type	Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
*OUT 10	JCT	1	2.881		12.3000	20.19		
*OUT 10	JCT	2	4.364		12.3000	31.78		
*OUT 10	JCT	10	9.917		12.2000	92.09		
*OUT 10	JCT	25	11.467		12.2000	112.03		
*OUT 10	JCT	100	15.713		12.2000	162.72		
POND	IN POND	1	2.881		12.1000	35.34		
POND	IN POND	2	4.364		12.1000	54.79		
POND	IN POND	10	9.917		12.1000	125.60		
POND	IN POND	25	11.467		12.1000	144.87		
POND	IN POND	100	15.713		12.1000	196.81		
POND	OUT POND	1	2.881		12.3000	20.19	24.84	1.396
POND	OUT POND	2	4.364		12.3000	31.78	25.31	1.719
POND	OUT POND	10	9.917		12.2000	92.09	26.45	2.730
POND	OUT POND	25	11.467		12.2000	112.03	26.67	2.942
POND	OUT POND	100	15.713		12.2000	162.72	27.17	3.436
SCS UH 10	AREA	1	2.881		12.1000	35.34		
SCS UH 10	AREA	2	4.364		12.1000	54.79		
SCS UH 10	AREA	10	9.917		12.1000	125.60		
SCS UH 10	AREA	25	11.467		12.1000	144.87		

MEETS
 PRE-2
 ALLOWABLE
 29.0/35.75

1.03' FB

Persimmon Pond - As RECONSTRUCTED 2001
4 - 1'x1' WEIR SLOTS

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage	Return	HYG Vol	Qpeak	Qpeak	Max WSEL	Max
Node ID	Type Event	ac-ft	Trun	hrs	ft	Pond
						ac-ft
SCS UH 10	AREA 100	15.713		12.1000	196.81	

Type.... SCS Unit Hyd. Summary
Name.... SCS UH 10 Tag: Dev..1
File.... C:\HAESTAD\PPKW\JCCPROJECTS\PERSIMMON.PPW
Storm... TypeII 24hr Tag: Dev..1

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Event: 1 yr

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration = 24.0000 hrs Rain Depth = 2.8000 in
Rain Dir = C:\HAESTAD\PPKW\RAINFALL\
Rain File -ID = SCSTYPES.RNF - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\
HYG File - ID = PERSIMMO.HYG - SCS UH 10 Dev..1
Tc = .3330 hrs
Drainage Area = 35.000 acres Runoff CN= 78

=====
Computational Time Increment = .04440 hrs
Computed Peak Time = 12.1212 hrs
Computed Peak Flow = 35.41 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.1000 hrs
Peak Flow, Interpolated Output = 35.34 cfs
=====

DRAINAGE AREA

ID:None Selected ✓
CN = 78 ✓
Area = 35.000 acres ✓
S = 2.8205 in
0.25 = .5641 in

Cumulative Runoff

.9887 in
2.884 ac-ft

HYG Volume... 2.881 ac-ft (area under HYG curve)

***** UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .33300 hrs (ID: None Selected) ✓
Computational Incr, Tm = .04440 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 119.09 cfs
Unit peak time Tp = .22200 hrs
Unit receding limb, Tr = .88800 hrs
Total unit time, Tb = 1.11000 hrs

Type.... Vol: Elev-Area
Name.... PERSIMMON

File.... C:\HAESTAD\PPKW\JCCPROJECTS\PERSIMMON.PPW
Title... Persimmon Pond

Elevation (ft)	Planimeter (sq. in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
19.00	-----	.0046	.0000	.000	.000
20.00	-----	.0699	.0924	.031	.031
21.00	-----	.1370	.3048	.102	.132
22.00	-----	.2122	.5197	.173	.306
23.00	-----	.3087	.7768	.259	.565
24.00	-----	.4506	1.1323	.377	.942
25.00	-----	.6712	1.6717	.557	1.499
26.00	-----	.9458	2.4138	.805	2.304
26.50	-----	.9642	2.8650	.477	2.781
27.19	-----	.9970	2.9417	.677	3.458
28.00	-----	1.0300	3.0404	.821	4.279
28.50	-----	1.0500	3.1200	.520	4.799

POND VOLUME EQUATIONS

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

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment
Area1, Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Type.... Outlet Input Data
Name.... FOURSLOTS

File.... C:\HAESTAD\PPKW\JCCPROJECTS\PERSIMMON.PPW
Title... Raise Up 6 inches

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 19.00 ft
Increment = .50 ft
Max. Elev.= 28.50 ft

OUTLET CONNECTIVITY

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	ES	--->	TW	25.500	28.500
Stand Pipe	SP	--->	CV	24.500	28.500
Culvert-Circular	CV	--->	TW	19.050	28.500
Orifice-Area	SS	--->	TW	23.500	28.500
TW SETUP, DS Channel					

Type.... Outlet Input Data
Name.... FOURSLOTS

File.... C:\HAESTAD\PPKW\JCCPROJECTS\PERSIMMON.PPW
Title... Raise Up 6 inches

OUTLET STRUCTURE INPUT DATA

Structure ID = ES
Structure Type = Weir-Rectangular

of Openings = 1
Crest Elev. = 25.50 ft
Weir Length = 18.00 ft
Weir Coeff. = 3.100000

Weir TW effects (Use adjustment equation)

*EMERG.
SPILLWAY*

Structure ID = SP
Structure Type = Stand Pipe

of Openings = 1
Invert Elev. = 24.50 ft
Diameter = 4.0000 ft
Orifice Area = 12.5664 sq.ft
Orifice Coeff. = .600
Weir Length = 12.57 ft
Weir Coeff. = 3.000
K, Submerged = .000
K, Reverse = 1.000
Kb, Barrel = .000000 (per ft of full flow)
Barrel Length = .00 ft
Mannings n = .0000

*48" ϕ RCP
RISER*

Type.... Outlet Input Data
Name.... FOURSLOTS

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File.... C:\HAESTAD\PPKW\JCCPROJECTS\PERSIMMON.PPW
Title... Raise Up 6 inches

OUTLET STRUCTURE INPUT DATA

Structure ID = CV
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 1.5600 ft
Upstream Invert = 19.05 ft
Dnstream Invert = 18.58 ft
Horiz. Length = 42.00 ft
Barrel Length = 42.00 ft
Barrel Slope = .01119 ft/ft

*18.77" ID
HDPE BARREL*

OUTLET CONTROL DATA...

Mannings n = .0090
Ke = .5000 (forward entrance loss)
Kb = .008285 (per ft of full flow)
Kr = .5000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...

Equation form = 1
Inlet Control K = .0098
Inlet Control M = 2.0000
Inlet Control c = .03980
Inlet Control Y = .6700
T1 ratio (HW/D) = 1.155
T2 ratio (HW/D) = 1.301
Slope Factor = -.500
Calc inlet only = Yes

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

At T1 Elev = 20.85 ft ---> Flow = 8.36 cfs
At T2 Elev = 21.08 ft ---> Flow = 9.55 cfs

S/N: 521502A06A8A

PondPack Ver. 7.5 (767)

Compute Time: 15:41:26

Date: 05/06/2005

Type.... Outlet Input Data
Name.... FOURSLOTS

File.... C:\HAESTAD\PPKW\JCCPROJECTS\PERSIMMON.PPW
Title... Raise Up 6 inches

OUTLET STRUCTURE INPUT DATA

Structure ID = SS
Structure Type = Orifice-Area

of Openings = 4
Invert Elev. = 23.50 ft
Area = .5000 sq.ft
Top of Orifice = 24.50 ft
Datum Elev. = 23.50 ft
Orifice Coeff. = .600

*4 - 1'x1' WEIR
SLOTS*

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 30
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .10 cfs
Max. Q tolerance = .10 cfs

Type.... Composite Rating Curve
 Name.... FOURSLOTS

File.... C:\HAESTAD\PPKW\JCCPROJECTS\PERSIMMON.PPW
 Title... Raise Up 6 inches

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

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
19.00	.00	Free Outfall		(no Q: ES,SP,CV,SS)
19.05	.00	Free Outfall		(no Q: ES,SP,CV,SS)
19.50	.00	Free Outfall		(no Q: ES,SP,CV,SS)
20.00	.00	Free Outfall		(no Q: ES,SP,CV,SS)
20.50	.00	Free Outfall		(no Q: ES,SP,CV,SS)
21.00	.00	Free Outfall		(no Q: ES,SP,CV,SS)
21.50	.00	Free Outfall		(no Q: ES,SP,CV,SS)
22.00	.00	Free Outfall		(no Q: ES,SP,CV,SS)
22.50	.00	Free Outfall		(no Q: ES,SP,CV,SS)
23.00	.00	Free Outfall		(no Q: ES,SP,CV,SS)
<u>PP</u> 23.50	.00	Free Outfall		(no Q: ES,SP,CV,SS)
24.00	4.81	Free Outfall		SS (no Q: ES,SP,CV) ✓
<u>R.C.</u> 24.50	9.63	Free Outfall		SS (no Q: ES,SP,CV) ✓
25.00	25.12	Free Outfall		SP,CV,SS (no Q: ES) ✓
<u>ES.</u> 25.50	35.91	Free Outfall		SP,CV,SS (no Q: ES) ✓
26.00	58.14	Free Outfall		ES,SP,CV,SS ✓
26.50	96.11	Free Outfall		ES,SP,CV,SS
27.00	144.00	Free Outfall		ES,SP,CV,SS
27.50	199.66	Free Outfall		ES,SP,CV,SS
28.00	261.81	Free Outfall		ES,SP,CV,SS
28.50	329.60	Free Outfall		ES,SP,CV,SS

Type.... Pond Routing Summary
Name.... POND OUT Tag: Dev..1
File.... C:\HAESTAD\PPKW\JCCPROJECTS\PERSIMMON.PPW
Storm... TypeII 24hr Tag: Dev..1

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Event: 1 yr

LEVEL POOL ROUTING SUMMARY

HYG Dir = C:\HAESTAD\PPKW\JCCPROJECTS\
Inflow HYG file = PERSIMMO.HYG - POND IN Dev..1
Outflow HYG file = PERSIMMO.HYG - POND OUT Dev..1

Pond Node Data = POND
Pond Volume Data = Persimmon
Pond Outlet Data = FOURSLOTS

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 23.50 ft
Starting Volume = .736 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

✓ PERMANENT
POOL ELEV.

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====
Peak Inflow = 35.34 cfs at 12.1000 hrs
Peak Outflow = 20.19 cfs at 12.3000 hrs

Peak Elevation = 24.84 ft
Peak Storage = 1.396 ac-ft
=====

MASS BALANCE (ac-ft)

+ Initial Vol = .736
+ HYG Vol IN = 2.881
- Infiltration = .000
- HYG Vol OUT = 2.881
- Retained Vol = .736

Unrouted Vol = -.000 ac-ft (.000% of Inflow Volume)

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JCC.RNQ JCCSCSdata

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID
A....1	2.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
A....2	3.5000	Synthetic Curve	SCSTYPES	TypeII 24hr
A...10	5.8000	Synthetic Curve	SCSTYPES	TypeII 24hr
A...25	6.4000	Synthetic Curve	SCSTYPES	TypeII 24hr
A..100	8.0000	Synthetic Curve	SCSTYPES	TypeII 24hr

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
*OUT 10	JCT	1	2.675		12.3000	20.95		
*OUT 10	JCT	2	4.157		12.3000	32.29		
*OUT 10	JCT	10	9.711		12.2000	94.28		
*OUT 10	JCT	25	11.260		12.2000	113.91		
*OUT 10	JCT	100	15.506		12.2000	163.60		
POND	IN POND	1	2.881		12.1000	35.34		
POND	IN POND	2	4.364		12.1000	54.79		
POND	IN POND	10	9.917		12.1000	125.60		
POND	IN POND	25	11.467		12.1000	144.87		
POND	IN POND	100	15.713		12.1000	196.81		
POND	OUT POND	1	2.675		12.3000	20.95	24.94	1.458
POND	OUT POND	2	4.157		12.3000	<u>32.29</u>	25.42	1.803
POND	OUT POND	10	9.711		12.2000	94.28	26.50	2.777
POND	OUT POND	25	11.260		12.2000	113.91	26.70	2.976
POND	OUT POND	100	15.506		12.2000	163.60	<u>27.19</u> <i>DHW</i>	3.456
SCS UH 10	AREA	1	2.881		12.1000	35.34		
SCS UH 10	AREA	2	4.364		12.1000	54.79		
SCS UH 10	AREA	10	9.917		12.1000	125.60		
SCS UH 10	AREA	25	11.467		12.1000	144.87		

MEETS PRE-2 29.0/35.75 cfs

1.01' FB

Persimmon Pond
RAISE 6"

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JCC.RNQ JCCSCSdata

Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID	
B....1	2.8000	Synthetic Curve	SCSTYPES	TypeII	24hr
B....2	3.5000	Synthetic Curve	SCSTYPES	TypeII	24hr
B...10	5.8000	Synthetic Curve	SCSTYPES	TypeII	24hr
B...25	6.4000	Synthetic Curve	SCSTYPES	TypeII	24hr
B..100	8.0000	Synthetic Curve	SCSTYPES	TypeII	24hr

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return Type	Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
*OUT 10	JCT	1	2.424		12.3500	16.04		
*OUT 10	JCT	2	3.906		12.3000	29.12		
*OUT 10	JCT	10	9.460		12.2000	97.14		
*OUT 10	JCT	25	11.009		12.2000	115.52		
*OUT 10	JCT	100	15.255		12.2000	164.82		
POND	IN POND	1	2.881		12.1000	35.34		
POND	IN POND	2	4.364		12.1000	54.79		
POND	IN POND	10	9.917		12.1000	125.60		
POND	IN POND	25	11.467		12.1000	144.87		
POND	IN POND	100	15.713		12.1000	196.81		
POND	OUT POND	1	2.424		12.3500	16.04	25.15	1.604
POND	OUT POND	2	3.906		12.3000	29.12	25.67	2.004
POND	OUT POND	10	9.460		12.2000	97.14	26.69	2.965
POND	OUT POND	25	11.009		12.2000	115.52	26.89	3.159
POND	OUT POND	100	15.255		12.2000	164.82	27.36	3.625
SCS UH 10	AREA	1	2.881		12.1000	35.34		
SCS UH 10	AREA	2	4.364		12.1000	54.79		
SCS UH 10	AREA	10	9.917		12.1000	125.60		
SCS UH 10	AREA	25	11.467		12.1000	144.87		

0.76' FB
 NO GOOD
 LESS THAN 1'

Persimmon Pond
Riser Crest - Raise 12"

MASTER DESIGN STORM SUMMARY

Default Network Design Storm File, ID JCC.RNQ JCCSCSdata

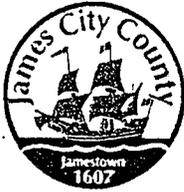
Return Event	Total Depth in	Rainfall Type	RNF File	RNF ID	
Pre..1	2.8000	Synthetic Curve	SCSTYPES	TypeII	24hr
Pre..2	3.5000	Synthetic Curve	SCSTYPES	TypeII	24hr
Pre.10	5.8000	Synthetic Curve	SCSTYPES	TypeII	24hr
Pre.25	6.4000	Synthetic Curve	SCSTYPES	TypeII	24hr
Pre100	8.0000	Synthetic Curve	SCSTYPES	TypeII	24hr

MASTER NETWORK SUMMARY
 SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Storage Node ID	Return Type	Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond ac-ft
*OUT 10	JCT	1	2.149		12.2000	20.89		
*OUT 10	JCT	2	3.440		12.1500	<u>35.75</u>		
*OUT 10	JCT	10	8.525		12.1500	<u>93.49</u>		
*OUT 10	JCT	25	9.982		12.1500	109.76		
*OUT 10	JCT	100	14.026		12.1500	154.31		
SCS UH 10	AREA	1	2.149		12.2000	20.89		
SCS UH 10	AREA	2	3.440		12.1500	35.75		
SCS UH 10	AREA	10	8.525		12.1500	93.49		
SCS UH 10	AREA	25	9.982		12.1500	109.76		
SCS UH 10	AREA	100	14.026		12.1500	154.31		

Persimmon Pond
PREDEV ALLOWABLES
 A = 35 acres
 CN = 73
 TC = 0.435 hrs



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
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678
INTEGRATED PEST MANAGEMENT
(757) 253-2620

BY: SJT DATE: 1-12-01 SHEET 1 OF 2
CHKD: _____ DATE: _____ PROJECT NO. _____
APRVD: _____ DATE: _____

48" RISER (ASTM C 478 PRECAST RC MH)

~~REPLACE EXISTING~~

TOP @ EL. 28.0

RC to match existing at EL 24.5

ES DOWN TO EL. 25.5, 18' BW; 24" IV SS.

4 - 1' x 1' REIN SLOTS IN TOP RISER @ EL 23.5

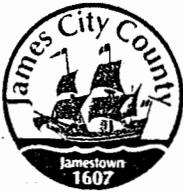
20" OD REINER PIPE (18.77" ID)

	<u>INFLOW</u>	<u>OUTFLOW</u>	<u>WSEL</u>
1-YR	35.34 CFS	9.84 CFS	24.38
2-YR	54.79 CFS	21.24 CFS	25.06
10-YR	125.6 CFS	88.34 CFS	26.55
25-YR	144.87 CFS	110.66 CFS	26.78
50-YR	170.77 CFS	137.99 CFS	27.04 (1' FB)
100-YR	196.81 CFS	163.91 CFS	27.27

- 48-INCH DIAMETER RISER WILL WORK TO REPLACE 36"
- MEETS 50-YEAR DESIGN WITH 1 FT. FB.
- PASSES 100-YR WITH 0.73' FREEBOARD.
- ADD ES 18' BW, 24" IV SS, CREST EL. 25.5.

CHECK ROUTE
[PONDPACK V 6.0]

SEE P.2
FOR RATING
CURVE



DEVELOPMENT MANAGEMENT

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(757) 253-2620

BY: _____ DATE: _____ SHEET 2 OF 2
CHKD: _____ DATE: _____ PROJECT NO. _____
APRVD: _____ DATE: _____

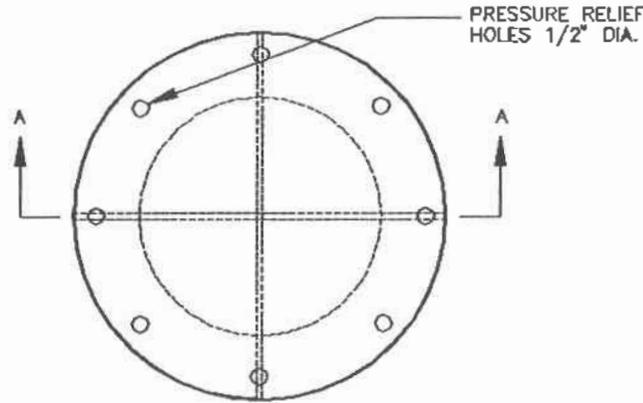
18.64

0

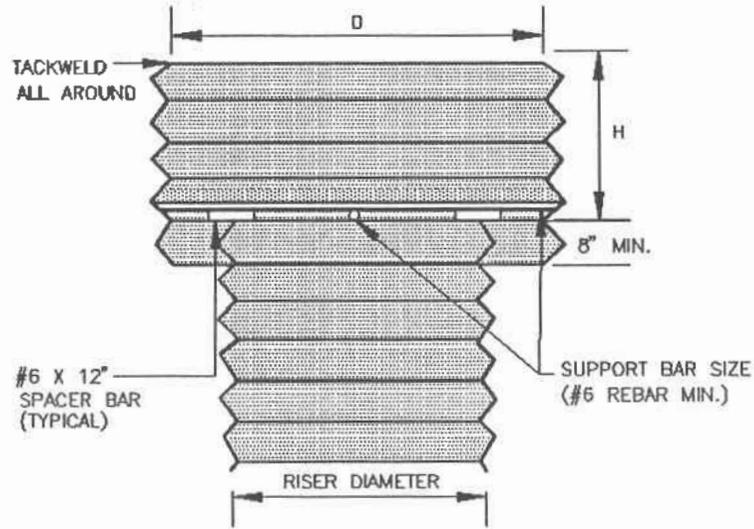
COMPOSITE RATING TABLE 48" Principal Emerg Spillway

<u>ELEV</u>	<u>Q CFS</u>	<u>ELEV</u>	<u>Q CFS</u>
23.50	0	27.64	209.7
23.64	0.65	27.89	242.56
23.89	2.96	28.00	257.52
24.14	6.15		
24.39	9.95		
24.50	11.78		
24.54	12.78		
24.64	16.27		
24.89	20.86		
25.14	21.43		
25.39	21.99		
25.50	22.44		
25.64	25.68		
25.89	37.61		
26.14	54.07		
26.39	73.94		
26.64	96.64		
26.89	121.81		
27.14	149.17		
27.39	178.52		

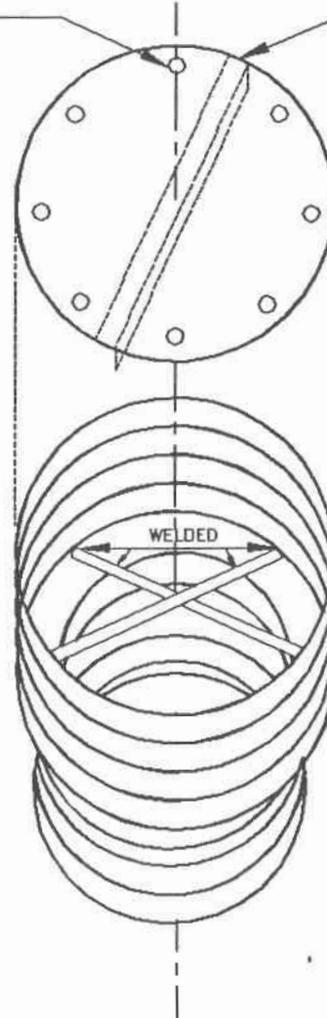
ANTI-VORTEX DEVICE DESIGN



PLAN VIEW



SECTION A-A



ISOMETRIC

PRESSURE RELIEF HOLES 1/2" DIA.

TOP STIFFENER (IF REQUIRED) IS ___X___ANGLE WELDED TO TOP AND ORIENTED PERPENDICULAR TO CORRUGATIONS.

TOP IS ___GAGE CORRUGATED METAL OR 1/8" STEEL PLATE. PRESSURE RELIEF HOLES MAY BE OMITTED, IF ENDS OF CORRUGATIONS ARE LEFT FULLY OPEN WHEN THE TOP IS ATTACHED.

CYLINDER IS ___GAGE CORRUGATED METAL PIPE OR FABRICATED FROM 1/8" STEEL PLATE.

NOTES:

1. THE CYLINDER MUST BE FIRMLY FASTENED TO THE TOP OF THE RISER.
2. SUPPORT BARS ARE WELDED TO THE TOP OF THE RISER OR ATTACHED BY STRAPS BOLTED TO TOP OF RISER.

Source: USDA-SCS

ASTM A 929

III - 103

Plate 3.14-10

TABLE 3.14-D

CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE DESIGN TABLE

Riser Diam., in.	Cylinder		Height, inches	Minimum Size Support Bar	Minimum Top	
	Diameter, inches	Thickness, gage			Thickness	Stiffener
12	18	16	6	#6 Rebar or 1½ x 1½ x 3/16 angle	16 ga. (F&C)	-
15	21	16	7	" "	" "	-
18	27	16	8	" "	" "	-
21	30	16	11	" "	16 ga.(C), 14 ga.(F)	-
24	36	16	13	" "	" "	-
27	42	16	15	" "	" "	-
36	54	14	17	#8 Rebar	14 ga.(C), 12 ga.(F)	-
42	60	16	19	" "	" "	-
48	72	16	21	1¼" pipe or 1¼ x 1¼ x ¼ angle	14 ga.(C), 10 ga.(F)	-
54	78	16	25	2x2x¼ OK	14 ga OK	2x2x¼ OK
60	90	14	29	1½" pipe or 1½ x 1½ x ¼ angle	12 ga.(C), 8 ga.(F)	-
66	96	14	33	2" pipe or 2 x 2 x 3/16 angle	12 ga.(C), 8 ga.(F) w/stiffener	2 x 2 x ¼ angle
72	102	14	36	" "	" "	2½ x 2½ x ¼ angle
78	114	14	39	2½" pipe or 2 x 2 x ¼ angle	" "	" "
84	120	12	42	2½" pipe or 2½ x 2½ x ¼ angle	" "	2½ x 2½ x 5/16 angle

Handwritten notes: "RISER" with an arrow pointing to the 48 riser diameter cell. "TR" with an arrow pointing to the 78 cylinder diameter cell. "14 OK" next to the 16 thickness cell for riser 54. "25 OK" next to the 25 height cell for riser 54. "2x2x¼ OK" next to the support bar cell for riser 54. "14 ga OK" next to the thickness cell for riser 54. "2x2x¼ OK" next to the stiffener cell for riser 54.

Note₁: The criterion for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.

Note₂: Corrugation for 12"-36" pipe measures 2¾" x ½"; for 42" -84" the corrugation measures 5" x 1" or 8" x 1".

Note₃: C = corrugated; F = flat.

Source: Adapted from USDA-SCS and Carl M. Henshaw Drainage Products Information.

PERSIMMON PL POND

2730 PERSIMMON

REF ELEV = 18.58

(FS)

(BS)

+ HI

-

BMP 2

Sept 7, 2001

EXIST
24" CMP
OUTFALL INV.

ELEV

18.58 STAKE

~~13.47~~ 13.47 32.05

5.09 26.96

TBM 1

2 1/2" IN V
BARREL

12.68 19.37 1" IN V
BARREL

MUD
SHOTS - MUD 0.5" depth

A 11.42 20.63 TOP MUCK

B 10.45 26.60 TOP MUCK

MATERIAL ONSITE

13.47 (+)

18.58 BM

32.05 TBM HI

- 5.09 (-)

26.96 TBM ELEV

32.05
12.68

19.37 ~ 19.37 OK

32.05 32.05
11.42 10.45
20.63 26.60

Pipe - SNAP TITE HOPE

Riser - ARM C-478

48" x 5'-0"

Equipment Onsite

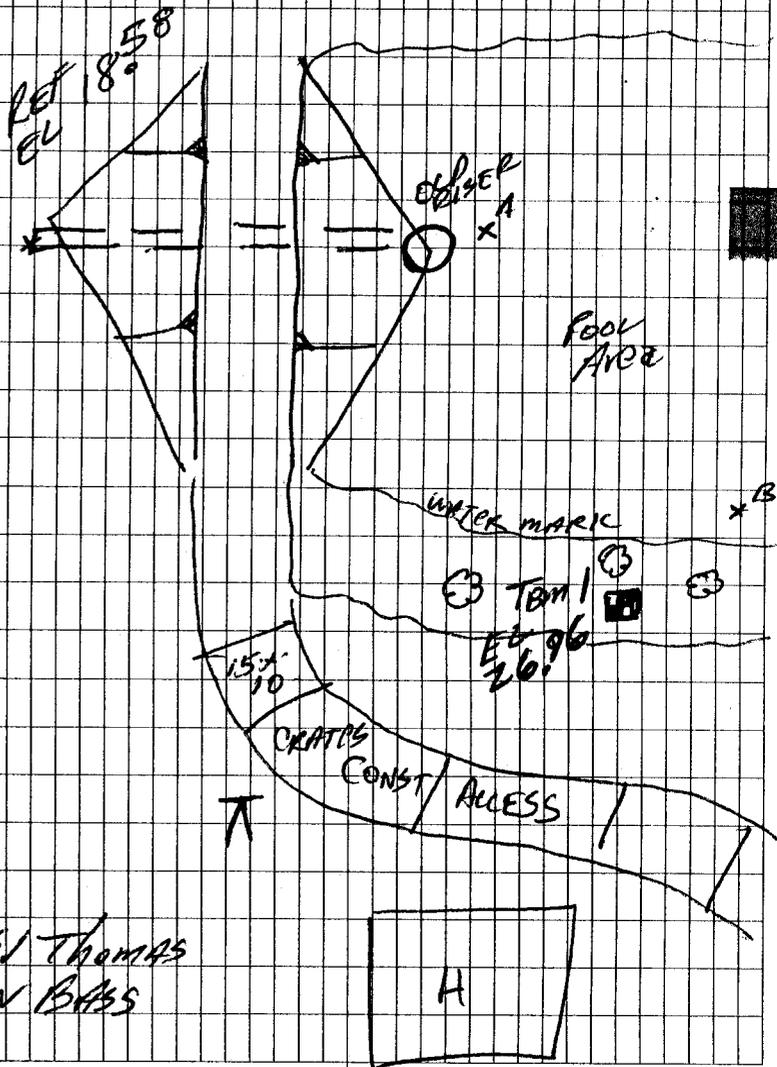
Hydraulic EXCAVATOR

Pump

1 Operator

TBM BENCHMARK

(Start of Construction - Contractor
Onsite, Draining Pond, Start of
EXCAVATION AT RISER



Response to HOA/Residents
Request to Raise Perm. Pool

Scott Thomas

From: Scott Thomas
Sent: Thursday, May 05, 2005 5:17 PM
To: 'tderrickson@aesva.com'; 'LMGABES@msn.com'
Subject: Persimmon Pond

Tom

In 2001, the County repaired the Persimmon Pond in Rollingwoods due to degraded conditions of the riser/barrel. The riser was replaced with a 48-inch concrete unit and the barrel was slip-lined with 20-inch OD SNAP-TITE solid wall HDPE pipe. We modeled the pond in-house using PondPack to determine what modifications were needed. Based on our hydraulic model (using the SCS method), the original pond design would not even safely pass a 10-year design storm event. Also, upgrade of the pond to meet current stream channel protection requirements would have resulted in extensive pond grading, wetland impacts and disruption to local homes and the neighborhood. In our upgrades, we made modifications so that the basin that would maintain the established 2-year predevelopment allowable plus be able to safely pass a 100-year design storm event with adequate freeboard (1 foot). So, in addition to the riser/barrel modifications, we also modified the emergency spillway, raised top of dam slightly and added four 1 ft. x 1 ft. weir slots to the riser. The purpose of the weir slots was to allow water to pass through the riser before it topped the riser crest to try and keep water surface elevations down in the pond, yet not exceed predevelopment allowables.

As requested, I've revisited the hydraulic model of the reconstructed basin to see if there was any way possible to raise the permanent pool elevation without affecting pond hydraulics. This was a request by local residents in an effort to minimize algae problems on the pond. The feeling is that the pond is now shallower, which is making the algae problem worse. However, this may not be totally the case. Based on my file information, the original design permanent pool was at El. 24.0. However, due to leakage in the previous riser/barrel, the permanent pool the local residents were used to was slightly lower. Based on survey before we did the work, the permanent pool was at about El. 23.75. In the repair work, we set the weir slots at invert El. 23.5 which is about 3 inches lower than what the local residents would have been used to but it would not have been a noticeable difference.

The model was revised to see if two scenarios were feasible:

- Raise the Permanent Pool from existing elevation to Permanent Pool at the current Riser Crest El. 24.5 (ie. raise 1 foot)
- Raise the Permanent Pool from existing elevation to Permanent Pool at Elevation 24.0 (ie. raise 6 inches)

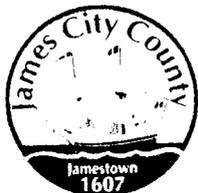
For the first scenario (raise 1 foot), freeboard between the 100-year water surface elevation and top of dam becomes 0.85 feet which is well below minimum required (1 ft.). This is not recommended. For the second scenario (raise 6 inches), freeboard is close but maintained at the minimum 1 foot (actually 1.01 feet).

Therefore, it appears the normal pool can be raised 6-inches without detrimental effects to the hydraulics of the basin. This can be accomplished by use of brick and mortar in the slots or by use of cut timbers bolted to the concrete. Rather than direct bolting the timbers to the concrete, I would suggest finding a way to mount U-type channels to each side of all four slots and then using cut timbers that can slide down into the U-channels. This is a common practice for decant structures in which adjustments need to be made to water levels. In that way, the pool level can be adjusted up or down easily by removing timbers.

This change would not be initiated by the County and must come from the HOA. Also, remember that routine maintenance of the BMP is the responsibility of the HOA. Also, as always, I recommend that watershed education material through the County's PRIDE water quality education program be distributed to all residents in the subdivision either through HOA newsletters or at meetings as homeowner practices do have a significant affect on the presence of nutrients and algae in the basin. The PRIDE website can be found at www.protectedwithpride.org

If you have any questions about this let me know and keep me posted if you proceed with this.

5/6/2005



COUNTY ATTORNEY

101 C MOUNTAIN BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6612

Fax: (757) 253-6833

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(757) 253-6613

LEO P. ROGERS
DEPUTY COUNTY ATTORNEY
E-MAIL ADDRESS: lprogers@james-city.va.us
(757) 253-6614

GREG H. DOHRMAN
ASSISTANT COUNTY ATTORNEY
E-MAIL ADDRESS: ghdohrman@james-city.va.us
(757) 253-6832

April 8, 2003

Mrs. Margaret Mondul
5547 Rolling Woods Drive
Williamsburg, VA 23185



Dear Mrs. Mondul:

RE: Rolling Woods Homeowners' Association of Williamsburg, Inc. / Corrected Easement
and Maintenance Agreement

Enclosed for your file is a copy of the recorded Corrected Easement and Maintenance Agreement
for the above referenced matter.

I want to thank you for your assistance in bringing in files from the homeowner's association and
working with us so that a new agreement could be prepared. Although it took several months to
get the easement corrected and recorded, your perseverance in seeing this through was most
helpful.

If we can be of further assistance, please let me know.

Sincerely,

Leo P. Rogers (mfr)

Leo P. Rogers
Deputy County Attorney

/mfr

Enclosure

cc: Susan B. Tarley, Esquire

bc: ✓ Darryl Cook, Environmental Division

Pat Menichino

From: Pat Menichino
Sent: Friday, August 06, 2010 1:56 PM
To: 'jjkern@aol.com'
Cc: Frances Geissler
Subject: Rolling Woods BMPs

Mr. Kern:

I have been asked to respond to your questions concerning the stormwater management facilities (BMPs) in Rolling Woods. Inspections of the (3) BMPs in Rolling Woods were completed on May 21, 2010. The inspection reports that we have generated will describe the condition of the BMPs and any maintenance/repairs that may be required. We are scheduled to mail out a large number of inspection reports next week. If you would like to set up a meeting to discuss the BMPs I will be happy to meet with you.

Please feel free to call me with any questions you may have.

Thanks,

Pat

Patrick T. Menichino
Stormwater Specialist
James City County Stormwater Division
757-259-1443
pmenichi@james-city.va.us

JAMES CITY COUNTY FAX FORM

Name: BARRY HUCKABY
Firm or Company: CENTER CONSTRUCTION
Facsimile Number: 253-3795
Number of pages including this transmittal: 2
From: MARK EVERSOLE

James City County
P.O. Box 8784
Williamsburg, Virginia 23187-8784
Office Phone: 757-253-6702
Fax Number: 757-253-6850

Comments: PLEASE PROCEED W/ THIS WORK:
THANKS FOR YOUR QUICK RESPONSE

Mark Eversole

Date: _____ Time: _____

If you do not receive all pages, call 757-253-6671 as soon as possible

Follow up w/ Anne

3/17-

*She will send a memo stating
exoneration has been authorized.*

MEMO

To: Anne Davis, Treasurer
From: Darryl E. Cook, Environmental Director
Subject: Exoneration of Taxes for (48-3)(2-1)
Date: March 4, 1999

I am requesting that the back taxes owed for tax parcel (48-3)(2-1) be exonerated. The total of the tax bill is approximately \$300. The subject property consists of the common areas for the Rolling Woods subdivision. The taxes are owed by the Diggs Brothers, Inc., the subdivision's developer, which is now a bankrupt corporation. The Rolling Woods Homeowners Association is preparing to have the property transferred to them so that in the future a responsible entity will have control of the property but they do not want to have to pay the developer's tax bill.

The County is very interested in having this transaction occur as within the common area are three stormwater management ponds that have not been maintained for several years. The County, using the remainder of the developer's bond, has performed the maintenance on the ponds that was necessary for the Association to agree to take over the future maintenance responsibilities. If the taxes are not exonerated, the County will be in the position of paying the tax bill itself as it is a greater benefit to have property transferred and the maintenance of the ponds borne by the Association than it is to collect the amount of the taxes owed.

Please let me know if you need any additional information to process this request.

KAUFMAN & CANOLES

— LA Professional Corporation —
Attorneys and Counselors at Law

11817 Canon Boulevard
Suite 408
Newport News, VA 23606
757 / 873-6300
fax: 757 / 873-6359

CONFIDENTIAL

FACSIMILE COVER SHEET

TO: *Darryl Cook*
FAX PHONE: 253-6850
OFFICE PHONE: 253-6673

FROM: *Paula Donnelly*
FILE NO.: 47028
FILE NAME: *County of James City*
Date: *Feb. 25, 1999*

TOTAL NUMBER OF PAGES INCLUDING THIS COVER SHEET: 2

IN CASE OF TRANSMISSION PROBLEMS, PLEASE CALL (757) 873-6300.

ADDITIONAL COMMENTS:

*These figures are good thru the end of February.
These figures do not include taxes that were due
Dec. 5, 1998.*

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Chesapeake
757 / 547-7177

Norfolk
757 / 624-3000

Virginia Beach
757 / 491-4000

James City County Taxes Due

Parcel ID: (48-3)(02-0-0001-)

Legal Description: OPEN SPACE S-3 ROLLING WDS

Location:

Land Value: 1000

Building Value: 0

Payment should be made to:

Kaufman and Canoles, P.C.

11817 Canon Boulevard, Ste 408

Newport News, VA 23606

Year	Type	Bill No#	Tax	Penalty	Interest	Admin Fee	Atty Fee	Credits	Total
1990	RE	90003783	\$7.10	\$7.10	\$9.31	\$10.00	\$4.70	\$0.00	\$38.22
1991	RE	91003864	\$7.10	\$7.10	\$8.17	\$10.00	\$4.47	\$0.00	\$36.85
1992	RE	92003957	\$7.30	\$7.30	\$7.23	\$10.00	\$4.37	\$0.00	\$36.19
1993	RE	93004043	\$7.50	\$7.50	\$6.22	\$10.00	\$4.24	\$0.00	\$35.47
1994	RE	94004166	\$8.30	\$8.30	\$5.55	\$10.00	\$4.43	\$0.00	\$36.58
1995	RE	95004362	\$8.40	\$8.40	\$4.27	\$10.00	\$4.21	\$0.00	\$35.28
1996	RE	96004478	\$8.70	\$8.70	\$3.02	\$10.00	\$4.08	\$0.00	\$34.50
1997	RE	97R4534	\$8.70	\$0.87	\$1.12	\$10.00	\$2.14	\$0.00	\$22.82
1998	RE	98R4706	\$4.35	\$0.44	\$0.32	\$10.00	\$1.02	\$0.00	\$16.13
Totals:			\$67.45	\$55.71	\$45.21	\$90.00	\$33.67	\$0.00	\$292.04

1998 - \$ 4.87 + int.

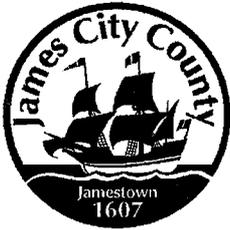
Total \approx \$300

Owner: DIGGES BROTHERS, INC, TH

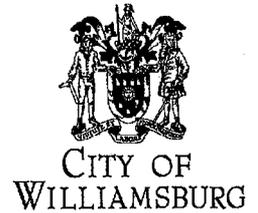
C/O:

Street: 16 MILE COURSE

City/State: WILLIAMSBURG, VA 231855525



OFFICE OF THE TREASURER
ANN DAVIS, TREASURER
COUNTY OF JAMES CITY
P.O. BOX 8701
WILLIAMSBURG, VIRGINIA 23187-8701
(757) 253-6705
FAX (757) 253-6844



MEMORANDUM

DATE: June 4, 1999



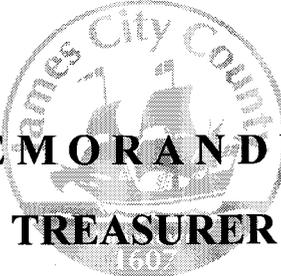
TO: Darryl E. Cook, Environmental Director

FROM: Ann Davis, Treasurer 

SUBJECT: *Notice of Exoneration of Taxes for (48-3)(2-1)*

Based on the information provided by your office, Richard Sebastian, Real Estate Assessor, and I have approved the exoneration of real estate taxes, penalty and interest on the above property. Therefore, neither James City County nor the Rolling Woods Homeowners Association will be assuming any tax liability when ownership of property is transferred.

Should you need any further assistance, please contact me at 757/253-6709.



MEMORANDUM
TREASURER



Date: June 4, 1999

To: Darryl E. Cook, Environmental Director

From: Ann Davis, Treasurer

Subject: Notice of Exoneration of Taxes for (48-3)(2-1)

Based on the information provided by your office, Richard Sebastian, Real Estate Assessor, and I have approved the exoneration of real estate tax, penalty and interest for all years outstanding on the above property. Therefore, James City County will not be assuming any tax liability when ownership of the property is conveyed.

Should you need further assistance, please contact me at 757/253-6709

copies: Richard Sebastian
Real Estate Assessor

MEMO

To: Anne Davis, Treasurer
From: Darryl E. Cook, Environmental Director DEC
Subject: Exoneration of Taxes for (48-3)(2-1)
Date: March 4, 1999

I am requesting that the back taxes owed for tax parcel (48-3)(2-1) be exonerated. The total of the tax bill is approximately \$300. The subject property consists of the common areas for the Rolling Woods subdivision. The taxes are owed by the Diggs Brothers, Inc., the subdivision's developer, which is now a bankrupt corporation. The Rolling Woods Homeowners Association is preparing to have the property transferred to them so that in the future a responsible entity will have control of the property but they do not want to have to pay the developer's tax bill.

The County is very interested in having this transaction occur as within the common area are three stormwater management ponds that have not been maintained for several years. The County, using the remainder of the developer's bond, has performed the maintenance on the ponds that was necessary for the Association to agree to take over the future maintenance responsibilities. If the taxes are not exonerated, the County will be in the position of paying the tax bill itself as it is a greater benefit to have property transferred and the maintenance of the ponds borne by the Association than it is to collect the amount of the taxes owed.

Please let me know if you need any additional information to process this request.

HERBERT V. KELLY
RAYMOND H. SUTTLE
B.M. MILLNER
RALPH M. GOLDSTEIN
JOHN T. TOMPKINS, III
CONWAY H. SHEILD, III
SVEIN J. LASSEN
DAVID W. O'NEE
HERBERT V. KELLY, JR.
RICHARD B. DONALDSON, JR.
DAVID W. O'NEE, JR.
MICHAEL B. WARR
ROBYN HYLTON HANSEN
LEONARD C. HEATH, JR.
RAYMOND H. SUTTLE, JR.
GARY A. MILLS

Jones, Blechman, Woltz & Kelly, P.C.
Attorneys and Counselors at Law

600 THIMBLE SHOALS BOULEVARD
POST OFFICE BOX 12888
NEWPORT NEWS, VIRGINIA 23612-2888
(757) 873-8000
FACSIMILE: (757) 873-8103

450 McLAWS CIRCLE, SUITE 220
WILLIAMSBURG, VIRGINIA 23185
(757) 259-5700
FACSIMILE: (757) 259-5717

AJLAN D. JONES, 1875-1954
DANIEL SCHLOSSER, 1915-1977
F.O. BLECHMAN, 1903-1946
ARTHUR W. WOLTZ, 1905-1993

OF COUNSEL
THOMAS N. DOWNING

BRYAN H. SCHEMPF
ROBERT M. BROWN, JR.
COLLEEN K. KILLILEA
DYWONA L. VANTRAPP-KILLILEA
IRVING B. GOLDSTEIN
MAI LAN ISLER
MATTHEW W. SMITH
HELENA S. MOCK

REPLY TO: Williamsburg

Direct Dial No. 259-5740

Internet E-Mail Address:

To: Ann Davis, Treasurer

Fax Number: 253-6844

From: Colleen K. Killilea

Date: October 17, 2000

Re: Open Space, Rolling Woods, S-3 (48-3)(2-1_

Number of Pages: 2, including cover

Comments:

I noticed in Saturday's gazette that the above-described property was listed as being delinquent in taxes, and was to be sold to pay off those taxes. This property is currently owned by the Digges Brother's and is to be turned over to the Rolling Woods Homeowner's Association. The Homeowner's Association is in the process of entering into a contract with the County for the maintenance of the settlement detention basins located on that property. The matter is scheduled to be on the Board of Supervisor's agenda on October 24th, after which the Homeowner's Association will assume ownership of the property (the deeds are prepared, but not yet recorded).

Last June you exonerated the County of any liability for taxes on that property. A copy of your memo to Darryl Cook is attached. I later asked Darryl about specifically exonerating the Homeowner's Association, and he advised me (on September 28, 1999) that he had received that revised exoneration from your office. I requested a copy, but could not locate it.

I would ask that your records be corrected to reflect this exoneration of taxes, and that Kaufman & Canoles be advised. If you have any questions, please feel free to contact me. I assume that Darryl Cook would also be willing to speak to you on this issue.

Thank you. I hope to hear from you soon



cc: Vernon Dockins, RWHOA President
Darryl Cook, JCC Environmental Division

*Director
James City County
Environmental Division*

Visit:
http://www.james-city.va.us/resources/devmgmt/div_devmgmt_environ.html
and
www.protectedwithpride.org

From: William A. Cain
Sent: Friday, December 28, 2007 12:05 PM
To: Joe Buchite; Mike Woolson; Scott Thomas; Frances C. Geissler
Cc: Joe Basilone
Subject: RE: Rolling Woods BMP

I have no information in my office that would indicate that this work was authorized by our division. I also have no idea what this accomplishes as the it is the barrel size and riser diameter that would regulate the discharges from this basin, not the anti-vortex device.

William Cain, P.E.
*James City County Environmental Division
Chief Civil Engineer
Email: wacain@james-city.va.us
Phone: (757) 253-6702
Fax: (757) 253-4032*

From: Joe Buchite
Sent: Friday, December 28, 2007 9:33 AM
To: William A. Cain; Mike Woolson; Scott Thomas; Frances C. Geissler
Cc: Joe Basilone
Subject: Rolling Woods BMP

To all,
Joe Basilone had some questions in reference to modifications made to a BMP located in his backyard. The pond in question is located in the Rolling Woods Subdivision at 5801 Hawthorn Lane and is identified as MC-024 on GIS. Joe's concerns involve the modification of the existing riser. Apparently the management company for the ponds installed an additional orifice approximately 2 inches wide and 8 to 10 inches tall in the riser. Has anyone directed the management company to do this and what are the implications to this type of modification? I intend to take a look at the structure today and will take some pictures.
Thank you,
Joe Buchite

CinTer Construction Company Incorporated

Mailing:

P. O. Box 108
Lightfoot, VA 23090
Phone: 757-258-3007



Office:

300 A Ewell Road
Williamsburg, VA
Fax: 757-258-3795

Date: 11/19/98

To: James City County
Mark Eversole
Phone: 757-253-6702
Fax: 757-253-6850

From: CinTer Construction Co. Inc.
Barry Huckaby
Phone: 757-258-3007
Fax: 757-258-3795

Pages (including cover): 2

Subject:
Mark,

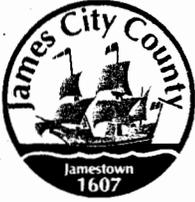
Here is our proposal to modify the two riser tops.

COMPLETE SITE WORK

CLEARING & GRINDING ~ GRADING ~ PAVING ~ UTILITIES

DAM REPAIRS -

1998



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
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678
INTEGRATED PEST MANAGEMENT
(757) 253-2620

November 18, 1998

Mr. Barry Huckaby
Cinter Construction Co., Inc.
P.O. Box 108
Lightfoot, VA

Dear Mr. Huckaby:

In response to your inquiry about the corroded and leaking riser pipes in the Rolling Woods ponds, James City County proposes the following corrective actions. The top portions of both riser pipes (on ponds 1 and 2) will be reinforced with "Contech brand," 1 foot Hugger bands and corresponding O-ring gaskets. Copies of a Contech brochure have been attached for your use.

Pond 1, accessed from Sassafras Court, will require 2 (two) Hugger bands, placed, adjoining one another, on the top two feet of the riser pipe. The existing riser pipe will not be cut or removed at all.

Pond 2, accessed from Hawthorne Lane, will require 1 (one) Hugger band, placed at the top 1 foot of the existing riser pipe. The existing riser pipe will not be cut or removed.

Two O-ring gaskets will be used on each Hugger, one at each end.

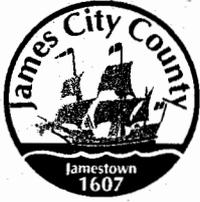
This should cover the existing corrosion and leaks in the risers. These hugger bands should also provide the stability necessary for support of new trash racks. It is understood that this is possibly a short term solution, and that Cinter Construction will not be held liable for any future failure of the riser structure.

Please provide a price for labor and materials, for acceptance prior to ordering these materials. Acceptable substitutes for the Hugger bands will be considered if details are provided.

Thank you for bringing this to our attention.

Sincerely,

Mark Eversole
Engineering Inspector



FINANCIAL AND MANAGEMENT SERVICES

101-A MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784

E-MAIL: fms@james-city.va.us

ACCOUNTING (757) 253-6636 FAX: (757) 253-6663	BUDGET/FINANCE (757) 253-6630 FAX: (757) 253-6663	FLEET MAINTENANCE (757) 229-4988 FAX: (757) 229-4992	PURCHASING (757) 253-6646 FAX: (757) 253-6753	REAL ESTATE ASSESSMENTS (757) 253-6650 FAX: (757) 253-6733
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November 5, 1998

Mr. Frank W Huckaby
Cinter Construction Co Inc
P O Box 108
Lightfoot VA 23090

Reference: Contract Number K99-036
Repair Storm Drain System



Dear Mr. Huckaby:

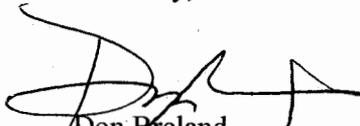
You will find enclosed for your files a copy of the above executed Contract to **Repair Storm Drain System (s)** located in James City County as delineated in the Contract Documents. This Contract, any approved Contract Change Orders, the original Bid and Addenda shall comprise the Contract Documents.

The Contract Number has been assigned for accounting purposes. Please reference this number on all correspondence and requests for payment.

Mr. Darryl Cook, Civil Engineer, Environmental Division, James City County, will issue the **Notice to Proceed** and is your point of contact for this project. You may contact him at (757) 253-6673.

Thank you for your bid and interest in providing service to James City County.

Sincerely,


Don Breland
Senior Buyer

Enclosure

cc:
D. Cook
Mark Ebersole

Spotswood A. Johnson

From: Frances C. Geissler
Sent: Wednesday, January 02, 2008 8:29 AM
To: Spotswood A. Johnson
Subject: FW: Rolling Woods BMP

Spotswood: Can you pull this file from the as-builts?
THANKS

From: Scott Thomas
Sent: Monday, December 31, 2007 5:09 PM
To: William A. Cain; Joe Buchite; Mike Woolson; Frances C. Geissler
Cc: Joe Basilone
Subject: RE: Rolling Woods BMP

Representatives with the HOA (Tom Derrickson) approached me some time ago about putting notches in the top of the risers to aid with solving debris and algae accumulations in the ponds in Rollingwoods. This accompanied a request to do some storm pipe outfall work and talk we had about possibly doing a PRIDE pond buffer demonstration project at MC 025. I remember an email and some hydraulic check computations to this effect, which is probably in the asbuilt files for Rolling Woods (which are now in the Stormwater Division's possession) and granting permission to the HOA to do this limited work, if desired. There was some success with this "notching" technique at the Persimmon Pond (MC 025, near Linda Morris' house) and the HOA desired to apply it to the other ponds.

I have attached a BMP map for the subdivision. I would need to check the asbuilt files (or get the stormwater folks to help me) to check for sure on the date and scope of the work allowed. But it was very limited to notching on the crest of the risers.

I remind everyone that there are agreements in effects for the RollingWoods ponds and drainage systems between the County and the HOA for maintenance. This is beyond our typical Declaration of Covenants, Inspection/Maintenance agreement. It is a very comprehensive agreement which gives the HOA the right to do routine maintenance and the County to do non-routine maintenance, but the HOA needs to correspond with the County on any work on the BMPs. The agreement is also in the asbuilt files - somewhere. The County stepped in and got involved due to citizen requests because the developer went bankrupt. I can't remember the exact date it went to the board for approval; however, I did somehow find a copy of the executed and recorded agreement. Copy is attached in .pdf.

Fran – you may be interested in Item # 14 from that agreement!!!!

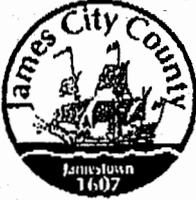


Rollingwoods.BMPs.
jpg



Rollingwoods.BMP.a
greement.pdf...

Scott J. Thomas, P.E.



FINANCIAL AND MANAGEMENT SERVICES

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---	---	--	---	--

November 5, 1998

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Cinter Construction Co Inc
P O Box 108
Lightfoot VA 23090

Reference: Contract Number K99-036
Repair Storm Drain System

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Mr. Darryl Cook, Civil Engineer, Environmental Division, James City County, will issue the **Notice to Proceed** and is your point of contact for this project. You may contact him at (757) 253-6673.

Thank you for your bid and interest in providing service to James City County.

Sincerely,

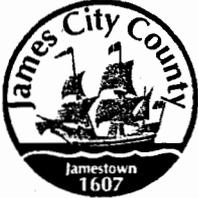
Don Breland
Senior Buyer

Enclosure

cc:

D. Cook ←
Mark Ebersole ←

*Fm: Don Breland
TO: Darryl Cook
Mark Ebersole
FYI - copy of contract
in P.O. to Darryl.
DM*



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
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678
INTEGRATED PEST MANAGEMENT
(757) 253-2620

October 14, 1998

Mr. Frank Huckaby
Cinter Construction Company, Inc.
P.O. Box 108
Lightfoot, VA 23090

RE: Contract Award for 99-B-0013, Drainage Improvement Project and Repair of
Stormwater Management Ponds

Dear Mr. Huckaby:

Based on the results of the bid opening on October 1, 1998, your firm was determined to be the low responsive and responsible bidder for the above referenced project. The James City County Board of Supervisors passed a resolution on October 13, 1998, that awarded the contract to your firm.

It is our intent to proceed with the work as soon as possible and a contact should be executed in the next two weeks to allow you to begin the work. If you have any questions regarding the proposed projects, please contact me at 253-6673.

Sincerely,

Darryl E. Cook, P.E.
Environmental Director

F A X M E S S A G E

To: Scott J. Thomas, P.E.
James City County
Fax: 1-757-259-4032

From: William Wills
William Wills, Contractors
Tel: 804-758-5244
Fax: 804-758-1309

Number of pages (including coversheet): 2

Date: 7/19/01 10:06a

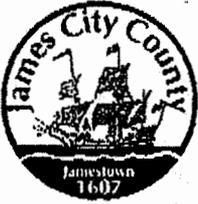
Mr. Thomas,

I have forwarded your 07/17/01 comments to the supplier, Henshaw Drainage products. Attached is a drawing of the trash rack for your review and comments.

Thank You,
Wm. Wills Contractor

*All APPEARS
ACCEPTABLE PER
VESCH MIN STD 3.14
REQUIREMENTS.*

*Scott J. Thomas P.E.
CIVIL ENGINEER
ENV DW. 07-20-01*



FINANCIAL AND MANAGEMENT SERVICES

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---	---	--	---	--

November 5, 1998

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Cinter Construction Co Inc
P O Box 108
Lightfoot VA 23090

Reference: Contract Number K99-036
Repair Storm Drain System

Dear Mr. Huckaby:

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Mr. Darryl Cook, Civil Engineer, Environmental Division, James City County, will issue the Notice to Proceed and is your point of contact for this project. You may contact him at (757) 253-6673.

Thank you for your bid and interest in providing service to James City County.

Sincerely,

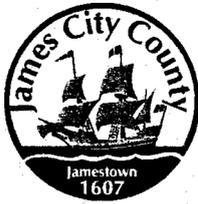
Don Breland
Senior Buyer

Enclosure

cc:

Don Cook
Mark Ebersole

*Fm: Don Breland
TO: Darryl Cook
Mark Ebersole
FYI - copy of contract
in party to Darryl
DM*



DEVELOPMENT MANAGEMENT

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planning@james-city.va.us

COUNTY ENGINEER
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INTEGRATED PEST MANAGEMENT
(757) 253-2620

October 14, 1998

Mr. Frank Huckaby
Cinter Construction Company, Inc.
P.O. Box 108
Lightfoot, VA 23090

RE: Contract Award for 99-B-0013, Drainage Improvement Project and Repair of
Stormwater Management Ponds

Dear Mr. Huckaby:

Based on the results of the bid opening on October 1, 1998, your firm was determined to be the low responsive and responsible bidder for the above referenced project. The James City County Board of Supervisors passed a resolution on October 13, 1998, that awarded the contract to your firm.

It is our intent to proceed with the work as soon as possible and a contract should be executed in the next two weeks to allow you to begin the work. If you have any questions regarding the proposed projects, please contact me at 253-6673.

Sincerely,

Darryl E. Cook, P.E.
Environmental Director

**CONTRACT FORM
CONTRACT CHANGE ORDER**

*Delivered
to
Don Breland
11-25-98*

PROJECT DESCRIPTION: DRAINAGE IMPROVEMENT
 CONTRACT FOR: REPAIRING STORM DRAINAGE SYSTEM.
 CONTRACT DATE: OCTOBER 21, 1998
 OWNER: JAMES CITY COUNTY

CONTRACT NO.: K99-036
 CHANGE ORDER NO.: 1 (ONE)
 DATE: NOVEMBER 25, 1998
 PROJECT NO.: 99-B-0013
 OTHER: _____
 LOCATION: 180 JOHN ROLFE LANE

CONTRACTOR: CINTER CONSTRUCTION COMPANY, INC.

The following changes are hereby made to the Contract Documents:

Item No.	Description	Decrease in Contract Price	Increase in Contract Price
1)	- SUPPLY AND INSTALL 2-30" H-12-1 HUGGER BANDS WITH 2 "O-RING" GASKETS EACH. - SUPPLY AND INSTALL 1-30" DIMPLE BAND WITH 12" WIDE FLAT GASKET. - MODIFY BANDS AS NEEDED IN ORDER TO BOLT TRASH RACK TO RISER.		\$ 558.62

TOTALS: \$ - \$ 558.62
 NET CHANGE IN CONTRACT PRICE: \$ - \$ 558.62

JUSTIFICATION: EXISTING RISER STRUCTURES HAVE RUSTED THROUGH IN TOP 2' OF ELEVATION. BANDS WILL REINFORCE RISER STRUCTURES.

ATTACHMENTS: COPY OF PROPOSAL FROM CINTER, LETTER FROM JCC ENV. DIVISION

CONTRACT PRICE PRIOR TO THIS CHANGE ORDER: \$82,982.⁰⁰ \$ 82,982.⁰⁰
 CONTRACT PRICE BY THIS CHANGE ORDER WILL BE: INCREASED BY < 1% \$ 558.⁶²
 NEW CONTRACT PRICE INCLUDING THIS CHANGE ORDER WILL BE: \$ 83,540.⁶²
 COMPLETION DATE PRIOR TO THIS CHANGE ORDER: JANUARY 5, 1999
 NEW CONTRACT TIME WILL BE UNCHANGED BY _____ CALENDAR DAYS.
 NEW DATE FOR COMPLETION OF ALL WORK WILL BE: JANUARY 5, 1999

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

REQUESTED BY: Barry Hockaby (nee) CINTER CONSTRUCTION 11-17-98
 Name By Title Date

RECOMMENDED BY: Mark Eversole ENGINEERING INSP. JCC 11-18-98
 Name By Title Date

ACCEPTED BY: _____
 Name By Title Date

APPROVED BY: _____
 Name By Title Date

NOTICE TO PROCEED

TO: FRANK HUCKABY
CINTER CONSTRUCTION CO. INC.
P.O. Box 108
LIGHTFOOT, VA.

DATE: NOVEMBER 6, 1998
PROJECT: K99-036
REPAIR STORMDRAIN - FIRST COLONY
REPAIR STORMWATER PONDS -
ROLLING WOODS

You are hereby notified to commence WORK in accordance with the Agreement dated
OCTOBER 21, 1998, on or before NOVEMBER 16, 1998, and you are to
complete the WORK within SIXTY (60)
consecutive calendar days thereafter. The date of completion of all WORK is therefore JANUARY 5,
1999.

Liquidated damages in the amount of \$100.00/CALENDAR DAY will be assessed by the Owner for failure to
substantially complete the work on or before the date of completion stated above or as may be modified by
duly executed change orders.

JAMES CITY COUNTY OWNER
Darryl E Cook
BY
Environmental Director
TITLE

ACCEPTANCE OF NOTICE:

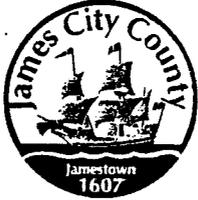
Receipt of the above NOTICE TO PROCEED is
hereby acknowledged by:

this the ninth day of
November, 1998

CONTRACTOR
Lisa Beatto
BY
Project Manager.
TITLE

NOTE TO CONTRACTOR:

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



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

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November 18, 1998

Mr. Barry Huckaby
Cinter Construction Co., Inc.
P.O. Box 108
Lightfoot, VA

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Pond 2, accessed from Hawthorne Lane, will require 1 (one) Hugger band, placed at the top 1 foot of the existing riser pipe. The existing riser pipe will not be cut or removed.

Two O-ring gaskets will be used on each Hugger, one at each end.

This should cover the existing corrosion and leaks in the risers. These hugger bands should also provide the stability necessary for support of new trash racks. It is understood that this is possibly a short term solution, and that Cinter Construction will not be held liable for any future failure of the riser structure.

Please provide a price for labor and materials, for acceptance prior to ordering these materials. Acceptable substitutes for the Hugger bands will be considered if details are provided.

Thank you for bringing this to our attention.

Sincerely,

Mark Eversole
Engineering Inspector

Scott Thomas

From: Scott Thomas
Sent: Wednesday, July 11, 2001 2:52 PM
To: Wayland Bass
Cc: Darryl Cook
Subject: Persimmon Repair

I reviewed the manufacturers cut sheet for the 48-inch precast riser and found it acceptable.

Please remember, that due to the reline pipe being a smaller size than the original outlet barrel (from 24 inch to 18.77 inch ID), other modifications are required in conjunction with the riser to get the facility to work hydraulically and to get it into compliance with our current regulations, as much as possible. The previous design showed the facility would overtop for larger storm events.

In addition to the riser per Hanson Pipe drawing, the following is necessary:

1. The emergency spillway crest must be lowered to El. 25.5 (1 foot above riser crest) and the bottom width increased to 18 feet (2H:1V sideslopes). If the level section is lined with matting, lining must come up 2 feet, as final depth of flow in the spillway is about 1.7 feet.
2. Top of dam must be raised level to El. 28.2. This will provide 1 foot of freeboard from the 100-year design high water. Based on our field spot shots this would result in an average of about 0.6 feet of fill across the 120 ft. dam length. Surveyed shots ranged from a low at 27.19 to a high of 27.92. If not raised, the dam would completely fill with no freeboard and/or overtop at the low spot. I suggest this still be done as there will be excess material from the emergency spillway excavation.
3. The reline pipe is HDPE 20" OD; 18.77" ID per Snap-tite specifications or equal.
4. Since a smaller barrel is being used, outlet pipe velocities at the end of the pipe barrel will be higher. Additional riprap outlet protection is required at the end of barrel. Final specs per the VESCH are Class I riprap, length 30 feet; width at pipe 4.5 ft.; width at end 34.5 feet although some adjustments could be made. I think the most important thing is to get some new Class I riprap at the new outfall, larger than the size that was there; otherwise scour and erosion of the downstream channel may occur.
5. A new anti-vortex/trash rack will be needed for the new 48" RCP riser. Originally we had said we were going to try and use a 36 inch riser to match existing riser size so we could try and salvage the top cap. Using the 48-inch precast RCP riser (which is a better choice) would require a new cap. I suggest a CMP cap, rather than concrete in accordance with VESCH Minimum Standard 3.14. A minimum 72 inch CMP cap would be required per the VESCH. I suggest a next larger size of 78 inch ASTM A 929, 14 gauge.

Using the cut-sheet from Hanson, I did a re-check of the hydraulic model with the above improvements. Here are the final numbers.

Storm	Inflow	Outflow	WSEL	Note
2-yr.	45.8 cfs	20.5 cfs	25.07	0.5 feet above riser crest. Meets pre-2 allowable.
10-yr.	106.5 cfs	80.3 cfs	26.54	emergency spillway in operation.
25-yr.	123.3 cfs	98.9 cfs	26.75	emergency spillway in operation.
100-yr.	168.7 cfs	144.2 cfs	27.20	adequate freeboard would not exist currently. Raise top of dam to El. 28.2

Scott

- *As previously stated, need more time to run model/hydraulics for any modifications to the riser or emergency spillway to safely pass larger storm events and provide acceptable freeboard to top of dam (El. 27.19 as-built).*

January 10th 2001

- *Basin size and drainage area at 35 acres is larger than the Hawthorne Pond (12 acres).*
- *Use of SCS Unit Hydrograph Method was used for design conservancy. Available storage volumes per design were used, but are questionable and were not as-built verified.*
- *Use of Snap-Tite Solid wall polyethylene liner pipe was selected. OD = 20 inch; ID = 18.77 inch; Wall Thick = 0.615 inch; DR=32.5. Allows for 2 inch annular space each side if concentrically centered. More annular space for insertion if placed along bottom of host pipe. Specification attached.*
- *Estimation Price for 20-inch Snap Tite is \$ 1,088.22 plus freight = \$ 1,900 (about \$ 45 per lf) 1-2 weeks delivery time. 22-inch OD is not available at this time.*
- *Since basin was only designed for 10-year event and liner pipe ID size was substantially reduced from 24-inch to 18.77 inch, needed to play with hydraulics to try and get pond more into conformance with current regs for dam construction. Smaller barrel sizes tend to raise WSEL's in facility; therefore, spillway modifications were required to discharge flow at lower elevations. Based on initial routings, design to contain 100-year with 1 foot of freeboard was not obtainable based on available volumes. Set goal to upgrade facility from 10-year design to 50-year design with 1 foot of freeboard with minimal pond modifications that did not exceed predevelopment allowables for the 2-year event at 29 cfs.*

*FULL SCOPE OF WORK
ALL ITEMS NECESSARY*

Pond Modifications (Scope of Work):

- *Replace existing 36 inch CMP riser/base with new 36 inch RCP Riser (ASTM C 361 O-Ring Pipe) with 6' x 6' x 18 inch thick concrete base. Riser crest set to match existing at El. 24.5.*
- *Modify riser with Four - 1 ft. x 1 ft. rectangular slots cut into top of riser. Crest El. 23.5. Ninety (90) degree separation between slots. Will lower current normal pool elevation as surveyed at El. 23.75 (which is lower than design due to pipe leakage) by 3 inches. Minor impact to pond habitat and aesthetics.*
- *Existing CMP Trash Rack/Anti-Vortex device appeared salvagable. Clean rust and reapply galvanized coating (Z.R.C. Cold Galvanized compound or approved equal) to trash rack and support bars and attach to concrete riser by straps or angle iron bolted to riser. If trash rack is deteriorated to a point where existing device is unusable, new 54 inch diameter cylinder anti-vortex/trash rack device is required. New device to meet VESCH Minimum Standard 3.14 requirements and materials to comply with ASTM A 929, 14 gage 0.064 inch thickness (same as Hawthorne Pond cap).*



- **Slipliner Pipe insertion into existing 24 inch ID CMP pipe. Use 20-inch OD Snap-Tite Solid or approved equal. Pipe must meet attached specification, 42 feet length. Inverts to match existing (upstream EL. 19.36; downstream EL. 18.58).**
- **Proper connection of carrier/host pipe to concrete manhole using flexible rubber boot pipe-to-manhole connection (Kor-N-Seal or approved equal). Alternate connection types and procedures must be approved in advance. Specification/detail attached.**
- **Grouting- Annular space between reline pipe and host pipe. Grout pressures must not exceed pipe allowables as pipe buckling can occur. Recommended grouting procedure information attached.**

• **Emergency Spillway**

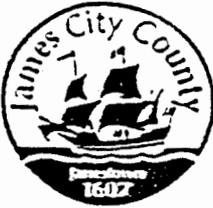
Configuration- Widen from 12 ft. to 18 ft. bottom width with current 2H:1V sideslopes. Use EC-2 matting in level section. Emergency spillway will not discharge 10-year event, but will for larger 25-and 50-year storms. 100-year will overtop embankment.

Elevation- Lower Emergency Spillway crest elevation approximately 1 foot to EL. 25.5 (to be set at 1' minimum above riser crest).

Excavated material - From emergency spillway lowering to be spread across top of dam to achieve level top of dam elevation at EL. 28.2. Maintain minimum 8 ft. wide dam width. Current average top of dam is 9 ft. Average depth of fill required across top of dam crest (120 feet length) is 0.6 feet (Current elevation varies from high at 27.92 to low at 27.19, average elevation is 27.5).

- **Minor fill placement and compaction in toe erosion area at downstream right embankment toe. Use excess material from emergency spillway excavation.**
- **Outlet Protection- Due to decrease in outlet barrel size, higher outlet velocities will be present, thus bigger outlet protection required. Using the 10-year discharge and based on VESCH Minimum Standard 3.18 & 3.19, use OP with La= 30 feet, downstream width W=34.5 feet , upstream width at pipe 4.5 feet and Class I riprap.**
- **Erosion Protection- EC-2 matting of entire downstream embankment to protection toe erosion area and for 100-year overtopping.**
- **Stabilize with seed & mulch all disturbed and matted areas.**
- **Final Routing Using Pondpack v 6.0, SCS hydrology and Level Pool routing methods**

	<u>Inflow</u>	<u>Outflow</u>	<u>WSEL</u>
1-year	35.34 cfs	9.8 cfs	24.38
2-year	54.79 cfs	21.2 cfs	25.06
10-year	125.6 cfs	88.4 cfs	26.55
25-year	144.87 cfs	110.7 cfs	26.78
50-year	170.77 cfs	154.9 cfs	27.19
100-year	196.81 cfs	Overtops	Freeboard to New TOD, 1 ft.



JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670

Fax Number: 757-259-4032

DATE SENT: 07/17/01

Name: William Wills
 Firm or Company: William Wills Contractors
 Facsimile Number: 804-758-1309
 Number of pages including this transmittal: 5
 From: SCOTT J. THOMAS (per WAYLAND BASS)

James City County
 P O Box 8734
 Williamsburg VA 23187-8734

Comments:

Reviewed your request for the trash rack spec for Persimmon
POND. All appears acceptable. No special coating or
painting requirements; however the TR should be aluminum
meeting ASTM A929. Plain galvanized would not be permitted.
 If you do not receive all pages, call 757-253-6670 as soon as possible

Scott J. Thomas
 ENVIRONMENTAL DIVISION



SCOTT J. THOMAS, P.E.
 CIVIL ENGINEER

ENVIRONMENTAL DIVISION

101 MOUNTS BAY ROAD, P.O. Box 8734
 WILLIAMSBURG, VIRGINIA 23187-8734

(757) 253-6639

Fax: (757) 259-4032

E-MAIL: scott@james-city.va.us

To: Gary M. Potter (1-804-794-2178)

From: 1-804-758-1309

7/8/01 04:40:21p

Page 1 of 2

F A X

M E S S A G E

To: Gary M. Potter
Henshaw Drainage Products
Fax: 1-804-794-2178

From: William Wills
William Wills, Contractors
Tel: 804-758-5244
Fax: 804-758-1309

Number of pages (Including coversheet): 2

Date: 7/8/01 4:38p

Mr Potter, Attached is the bid sheet for Persimmon Place. Please proceed with construction. "Ship To" will come later. Any questions please call.

Thanks William K. Wills

✓ This is the 78" Trash Rack w/ access hatch.

✓ Verify that riser is 48" RCP

✓ Verify hatch is 2'x2'

✓ Verify height of TR is 40" and the bottom of TR is 15" below crest.

Verify Trash Rack has no special coating (asphalt) or paint system

Thanks for the order.

ASPA A929
11 ALUMINUMIZED
NO SPECIAL COATING OR
PAINT REQUIREMENTS.

F A X M E S S A G E

To: Wayland Bass- Engineer
James City County
Fax: 1-757-253-6850

From: William Wills
William Wills, Contractors
Tel: 804-758-5244
Fax: 804-758-1309

Number of pages (including coversheet): 2

Date: 7/13/01 1:35p

Mr Bass,
Please review the specs. for the trash rack. Thank you

Wm. Wills

James City County Stormwater Division Stormwater Management Facility (SWMF) Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

BMP ID # MC025 PIN 4830200001 Responsible Party: ROLLING WOODS

Site Address: District: 4

Location (other): BASIN # 2- 2730 PERSIMMON PLACE

Date: 5/21/2010 Inspector: TC

(3 or 4 requires attention):

Structure Type: Retention

Total Score 2

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
1. Forebay Score:	0	
2. Inlet(s):	2	Remove woody vegetation within 10' of inlet and outfall of inlet Remove woody vegetation within 10' of concrete inlet flume
*3. Outlet:	2	Remove woody vegetation within 10' outlet and outfall of outlet Place more riprap at the base (toe) of outlet to prevent further erosion and undercutting. Erosion-stabilize area above outlet pipe (toe of embankment)
*4. Principal Spillway:	1	
5. Emergency Spillway:	2	Allow grass to grow to a height of 8 inches
6. Basin Bottom and Side Slopes:	1	
7. Safety Devices:	0	
*8. Embankments:	2	Ground cover to short/bare spots, allow grass to grow to a height of 8 inches
*9. Structural Components:	1	
*10. Media:	0	

James City County Stormwater Division Stormwater Management Facility (SWMF) Inspection Report

Score Definitions: 0-N/A, 1-Adequate, 2-Routine Maintenance, 3-Non-routine repair, 4-Urgent repair(s), item has failed or is failing.

Criteria	Score	Comments: (Listed below are the items/tasks that should be rectified/ completed prior to re-inspection)
11. Routine Maintenance:	2	Remove sediment and debris from concrete inlet flumes, erosion-stabilize area around flare
12. Condition of Aquatic Environment:	2	Excessive algae growth, reconsider fertilization practices to reduce amount of algae growth
13. Vegetation:	1	
*14. Storage Volume:	1	
15. Debris/Sediment Accumulation:	2	Excessive debris located at base of concrete inlet flumes
16. Standing Water:	1	
17. Safety and Aquatic Bench:	0	
18. Side Slope Vegetation:	1	
19. Other:	0	

Checked below identify corrective work required on your stormwater management facility.

- Remove all trees and other woody vegetation from the embankment (earthen dam) and also within 10' of the toe of the embankment slope.
- Remove all trees and other woody vegetation from within 10' of the principal spillway, any principal inlet devices, and the principal outfall.
- Remove all trees and other woody vegetation from within 10' of any inlet structures, such as: pipes, end sections, concrete channels, flumes, rip rap channels, etc.
- Remove all trees and other woody vegetation from within the emergency spillway and also from within 10' of the spillway.
- Investigate the cause of any settlement, sink holes, subsidence, or erosion, noted on the report and develop and implement an appropriate plan to correct the deficiencies noted permanently.
- Remove all accumulated sediment, leaves and debris from within any pipes, end sections, concrete channels, emergency spillways, flumes, rip rap channels, etc. and dispose of the material in an appropriate method and location.
- Stabilize any disturbed, unstable, denuded or bare soil areas, by installing top soil and planting a permanent grass seed to establish an effective grass ground cover over these areas.
- All grassed areas of the BMP such as: access roads, emergency spillways, embankments (earthen dam), or other non-treed areas, shall be maintained at a minimum grass height of 8", and should not be subjected to low mowing.
- Trees and woody vegetation should be cut flush with the ground, and smaller trees and limbs (less than 4" dia) may be processed with a wood chipper and dispersed in natural areas.

RESOLUTION

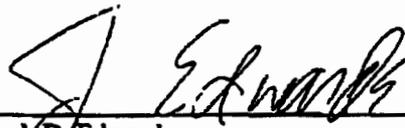
BID AWARD - DRAINAGE IMPROVEMENT PROJECT

AND REPAIR OF STORMWATER MANAGEMENT PONDS

WHEREAS, bids for the drainage improvement project and repair of stormwater management ponds were opened on October 1, 1998, with Cinter Construction Company, Inc., submitting the low bid of \$82,982; and

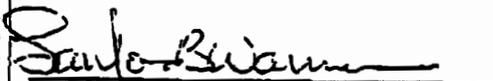
WHEREAS, funds are in the FY 99 Drainage Improvement CIP Budget and in escrow from the Rolling Woods developer.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, awards the Drainage Improvement Project and Repair of Stormwater Management Ponds to Cinter Construction Company, Inc., for \$82,982.



Jack D. Edwards
Chairman, Board of Supervisors

ATTEST:



Sanford B. Wanner
Clerk to the Board

<u>SUPERVISOR</u>	<u>VOTE</u>
SISK	AYE
MCGLENNON	AYE
BRADSHAW	AYE
NERVITT	AYE
EDWARDS	AYE

Adopted by the Board of Supervisors of James City County, Virginia, this 13th day of October, 1998.

drainimp.res

Darryl Cook

CONSTRUCTION CONTRACT
CONTRACT NUMBER: **K99-036**

This AGREEMENT, dated this **21st** day of **October, 1998**, by and between **JAMES CITY COUNTY** (a COUNTY organized and existing under the laws of the State of Virginia); and **CINTER CONSTRUCTION, INC** (a corporation organized and existing under the laws of the State of Virginia), hereinafter called the CONTRACTOR.

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

Scope of Work:

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

Section 1. Repair Storm Drainage Outfall in First Colony Subdivision at 180 John Rolf

Section 1. Repair Three (3) Storm Water Management Ponds in Rolling Woods Subdivision

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

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

Guarantee:

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

Contract Price:

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

The Contract Amount is **Eighty Two Thousand Nine Hundred Eighty Two Dollars (\$82,982.00)** based on unit and lump sum prices extended as herein contained.

Payments:

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

Time:

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

ALL CONTRACT WORK - **60** CALENDAR DAYS FROM DATE OF NOTICE TO PROCEED

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

Component Parts of the Contract:

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

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

ADDENDA:

None

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the day and year first above written in (2) counterparts each of which shall for all purposes be deemed an original.

ATTEST:

Mary Frances Rieger
Administrative Secretary
TITLE County Attorney's Office

JAMES CITY COUNTY
OWNER
Sanford B. Wanner
BY
County Administrator
TITLE

ATTEST:

Barbara H. Rogers
NAME
Bookkeeper
TITLE

CINTER CONSTRUCTION, INC
CONTRACTOR
Frank W. Huley
BY
President
TITLE

CONTRACTOR'S ADDRESS:

PO BOX 108
Lightfoot, VA 23090

54-1313368
CONTRACTOR'S FEDERAL I.D. NO.

F. Wanner
COUNTY ATTORNEY - APPROVAL OF
CONTRACT AS TO FORM

BID FORM

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

FROM: Cinter Construction Co, Inc (Name of Contractor)
PO Box 108 Lightfoot, VA (Address)
757-258-3007 (Telephone)
757-258-3795 (Fax Number)

FOR: The repair of storm drainage system for One (1) Drainage Outfall and Repair of Three (3) Stormwater Management Ponds **IFB 99-B-0013**

Section 1: First Colony at 180 John Rolfe

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

Bid Schedule Descriptions

Description of Item	Quantity	Unit Cost	Total Cost
1. Clear temporary construction easement and work area of trees and other vegetation.	LS	\$1500.00	\$1500.00
2. Remove and dispose of any trees and clearing debris necessary to complete the repairs.	LS	\$1500.00	\$1500.00
3. Install a riprap and VDOT No. 1 stone check dam as shown on the plan (12' L x 3' H x 5' W).	LS	330.00	330.00
4. Install a temporary 15-inch culvert within the existing roadside ditch with fill for construction access. Remove on completion of project.	LS	660.00	660.00

Description of Item	Quantity	Unit Cost	Total Cost
5. Excavate a minimum three-foot wide trench for installation of the 15-inch diameter N-12 diameter HDPE pipe. Depth of excavation shall be at least five inches below finished grade of pipe.	90 CY	\$ 5.00	\$ 450.00
6. Place backfill in the trench excavation to provide a minimum five-inch thick bedding under the pipe. Following installation of the pipe, fill material shall be placed to top of pipe ensuring adequate support under the pipe haunches. Fill shall be compacted to 90 percent standard density.	30 CY	\$ 19.50	\$ 585.00
7. Install 15-inch diameter N-12 HDPE pipe on grade.	175 LF	15.00	2625.00
8. Cover pipe with a minimum of 12 inches of native material and mechanically compact.	55 CY	2.00	110.00
9. Install one 15-inch diameter HDPE flared end section.	LS	250.00	250.00
10. Install one VDOT standard DI-7 drainage inlet with Bar Grate A, Type III at location and depth shown on plan.	LS	1450.00	1450.00
11. Install one VDOT standard MH-2 manhole complete with frame and cover at location and depth shown on plan.	LS	1650.00	1650.00
12. Install one VDOT standard EW-1 endwall at location shown on plan.	LS	950.00	950.00
13. Install woven geotextile fabric in regraded channel below flared end section. Properly anchor and pin in accordance with manufacturer's specifications.	8 SY	2.50	20.00
14. Install 18 inches of VDOT Class 1 Riprap over filter fabric as shown on plan. Existing stone check dam to be removed and spread as part of riprap outfall protection.	23 TONS	30.00	690.00
15. Fill all sections of eroded channel with native material.	LS	1150.00	1150.00
16. Stabilize all disturbed areas with permanent seed and mulch.	7,500 SF	.40	3000.00

Description of Item	Quantity	Unit Cost	Total Cost
17. Stabilize with permanent seed and EC-2 erosion control mats all excavated areas (over the pipe).	200 SY	\$ 2.50	\$ 500.00
TOTAL PRICE			17,420.00

TOTAL IN WORDS: Seventeen Thousand Four Hundred Twenty

Notes:

1. Attached are a vicinity sketch, site plan, and details of the repair and restoration of the eroding swale located in First Colony.
2. All fill material, unless specified as native material, shall be either VDOT No. 57 stone, VDOT Grade B fine aggregate, or VDOT No. 10 stone.
3. Stabilization with seed and mulch means preparing the seedbed including three inches of topsoil, providing an appropriate seed mixture, and covering the newly stabilized areas in accordance with Specification 1.66, Permanent Seeding, in the Virginia Erosion and Sediment Control Handbook.
4. The woven geotextile filter fabric shall be Amoco Propex 1198, or approved equal.

SECTION 2: ROLLING WOODS SUBDIVISION

POND NUMBER 1

Description of Item	Quantity	Unit Cost	Total Cost
1. Clear temporary construction easement of trees and other vegetation.	LS	1500.00	1500.00
2. Remove and dispose of any trees and clearing debris necessary to complete the repairs.	LS	1000.00	1000.00
3. Remove and dispose of all trees and woody vegetation from the entire dam structure. Remove all stumps from dam structure.	LS	2500.00	2500.00
4. Install silt fence at the downstream toe of the dam slope.	180 LF	2.00	360.00
5. Remove and dispose of wooden baffle structure in pond.	LS	400.00	400.00
6. Repair scoured area at and under outfall of barrel pipe and add additional rip rap outlet protection	2 CY	150.00	300.00
7. Line inside face of dam from one foot below normal pool to one foot above normal pool with rip rap to stabilize eroded area.	15 CY	80.00	1200.00
8. Replace existing anti-vortex device with a 42" CMP anti-vortex device/trash rack. Top must have a locking access hatch.	LS	7000.00	7000.00
9. Remove any debris/sediment accumulated around riser structure.	LS	150.00	150.00
10. Regrade and provide a minimum 3 inches of topsoil to entire dam structure.	LS	3080.00	3080.00
11. Stabilize entire dam structure with seed and excelsior matting. Matting is to be properly anchored and pinned in accordance with manufacturer's specifications.	1200 SY	3.33	4000.00
12. Stabilize construction and access easements with topsoil, seed and straw.	LS	4000.00	4000.00
TOTAL PRICE			25,490.00

TOTAL IN WORDS: Twenty Five Thousand Four Hundred Ninety

POND NUMBER 2

Description of Item	Quantity	Unit Cost	Total Cost
1. Clear temporary construction easement of trees and other vegetation.	LS	1500.00	1500.00
2. Remove and dispose of any trees and clearing debris necessary to complete the repairs.	LS	1000.00	1000.00
3. Remove and dispose of all trees and woody vegetation from the entire dam structure. Remove all stumps from dam structure.	LS	2500.00	2500.00
4. Install silt fence at the downstream toe of the dam slope.	200 LF	2.00	400.00
5. Remove and dispose of wooden baffle structure in pond.	LS	400.00	400.00
6. Construct emergency spillway in natural ground on northern end of dam. Spillway is to be 8 feet wide, at an elevation one foot above that of the crest of the riser pipe.	LS	3000.00	3000.00
7. Replace existing anti-vortex device with a 36" CMP anti-vortex device/trash rack. Top must have a locking access hatch.	LS	6000.00	6000.00
8. Remove any debris/sediment accumulated around riser structure.	LS	150.00	150.00
9. Regrade and provide a minimum 3 inches of topsoil to the entire dam structure.	LS	2940.00	2940.00
10. Stabilize entire dam structure with seed and excelsior matting. Matting is to be properly anchored and pinned in accordance with manufacturer's specifications.	SY 1200	3.38 1200.00 3100	4056.00 3.38 3100
11. Stabilize construction and access easements with topsoil, seed and straw.	LS	3000.00	3000.00
TOTAL PRICE			24,946.00

TOTAL IN WORDS: Twenty Four Thousand Nine Hundred Forty Six

POND NUMBER 3

Description of Item	Quantity	Unit Cost	Total Cost
1. Remove and dispose of all trees and woody vegetation from the entire dam structure. Remove all tree stumps from dam.	LS	\$2000.00	\$2000.00
2. Remove fallen trees laying in and around pond.	2	250.00	500.00 500.00
3. Cut access hole in trash rack. Install locking hatch cover to access opening.	LS	300.00	300.00
4. Install silt fence at the downstream toe of the dam slope.	180 LF	2.00	360.00
5. Repair eroded emergency spillway and stabilize with EC-3 matting. Matting is to be installed and pinned in accordance with manufacturers recommendations.	1 LS	1000.00	1000.00
9. Remove and dispose of any debris/sediment accumulated around riser structure.	LS	150.00	150.00
10. Regrade and provide a minimum of 3 inches of topsoil to entire dam structure.	LS	870.00	870.00
11. Stabilize entire dam structure with seed and excelsior matting. Matting is to be properly anchored and pinned in accordance with manufacturer's specifications.	1200 SY	4.70	5640.00
12. Regrade and stabilize construction and access easements with topsoil, seed and straw .	LS	4306.00	4306.00
TOTAL PRICE			

TOTAL IN WORDS: _____

Notes for Section 2:

- All work will conform with the 1992 edition of the Virginia Erosion and Sediment Control Handbook.
- Stabilization with seed and mulch means preparing the seedbed including 3 inches of topsoil, providing an appropriate seed mixture, and covering the newly stabilized areas in accordance with Specification 1.66. Permanent Seeding, in the Virginia Erosion and Sediment Control Handbook.
- Attached are a vicinity sketch, site plan, and details of the repair and restoration of the Three (3) pond areas.

The Undersigned Agrees:

- A. To hold bid opened until 60 days after opening of bids.
- B. To accept the stipulation of the Specifications regarding disposition of security, time for completion and other provisions.
- C. To enter into and execute a Contract if awarded on the basis of this bid and to furnish Guaranty Bonds and Insurance Documents as required.
- D. To accomplish the work in accordance with the Contract Documents and Specifications.
- E. To complete all work within 60 consecutive calendar days from the date of Notice to Proceed.

The Bidder acknowledges receipt of the following addenda:

ADDENDA #1 RECEIVED

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

State Registration Number:

2701035845A

Cinter Construction, Co., Inc
Legal Name of Person, Persons, or Corporation

By: Frank W. Huckaby

Title: President

Signature: *Frank W. Huckaby*

Frank W. Huckaby
Typed or Printed Name

Date: 10-1-98

Seal:

ACORD CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YY)
10/26/98

PRODUCER
BROOKS AGENCY INC

P O BOX GT
WILLIAMSBURG VA 23187

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

COMPANIES AFFORDING COVERAGE

COMPANY A SELECTIVE INSURANCE CO
COMPANY B
COMPANY C
COMPANY D

INSURED
CINTER CONSTRUCTION CO INC

P O BOX 108
LIGHTFOOT VA 23090

COVERAGES
THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS
A	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> OWNER'S & CONTRACTOR'S PROT	S1405426	2/26/98	2/26/99	GENERAL AGGREGATE \$3,000,000 PRODUCTS - COMP/OP AGG \$3,000,000 PERSONAL & ADV INJURY \$1,000,000 EACH OCCURRENCE \$1,000,000 FIRE DAMAGE (Any one fire) \$ 50,000 MED EXP (Any one person) \$ 5,000
A	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input checked="" type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input checked="" type="checkbox"/> NON-OWNED AUTOS	S1405426	2/26/98	2/26/99	COMBINED SINGLE LIMIT \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE \$
	GARAGE LIABILITY <input type="checkbox"/> ANY AUTO				AUTO ONLY - EA ACCIDENT \$ OTHER THAN AUTO ONLY: \$ EACH ACCIDENT \$ AGGREGATE \$
	EXCESS LIABILITY <input type="checkbox"/> UMBRELLA FORM <input type="checkbox"/> OTHER THAN UMBRELLA FORM				EACH OCCURRENCE \$ AGGREGATE \$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY THE PROPRIETOR/PARTNERS/EXECUTIVE OFFICERS ARE: <input checked="" type="checkbox"/> INCL <input type="checkbox"/> EXCL	WC33019	2/26/98	2/26/99	<input checked="" type="checkbox"/> WC STATUTORY LIMITS <input type="checkbox"/> OTHER EL EACH ACCIDENT \$ 100,000 EL DISEASE-POLICY LIMIT \$ 500,000 EL DISEASE-EA EMPLOYEE \$ 100,000
	OTHER				

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS
EVIDENCE OF COVERAGE, PROJECT NO: K99-036: REPAIR STORM DRAINAGE OUTFALL AT 180 JOHN ROLFE, FIRST COLONY SUBDIVISION; AND REPAIR 3 STORM WATER MGT PONDS IN ROLLING WOODS SUBDIVISION.

CERTIFICATE HOLDER
JAMES CITY COUNTY, VA

101-A MOUNTS BAY ROAD
WILLIAMSBURG, VA. 23187

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL ENDEAVOR TO MAIL _____ DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO MAIL SUCH NOTICE SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE COMPANY, ITS AGENTS OR REPRESENTATIVES.
AUTHORIZED REPRESENTATIVE
R. B. Nash Francis, Jr. NF A

CONTRACTOR DATA SHEET

To Be Completed by Bidder

Qualification of Bidder:

The Bidder must have the capability in all respects to fully satisfy all of the contractual requirements.

Years in Business:

Indicate the length of time you have been in business providing this type of service:

Number of Years: 13

Months: 0

References:

<u>Name of Firm</u>	<u>Address</u>	<u>Telephone Number</u>	<u>Contact Person</u>
1. <u>The Franciscus Co. VA Beach</u>	<u>425-8391</u>	<u>John Kupper</u>	
2. <u>Fairfield Communities Williamsburg</u>	<u>220-16310</u>		
3. <u>O.K. James Const. Williamsburg</u>	<u>253-0445</u>	<u>Kent James</u>	
4. _____	_____	_____	_____
5. _____	_____	_____	_____

Cinter Construction Co., Inc.

Name of Person, Persons, or Corporation

Frank W. Huckaby

Signature

Frank W. Huckaby

Typed or Printed Name

MEMORANDUM

DATE: October 13, 1998
TO: The Board of Supervisors
FROM: Darryl E. Cook, Director of the Environmental Division
SUBJECT: Bid Award - Drainage Improvement Project and Repair Stormwater Management Ponds

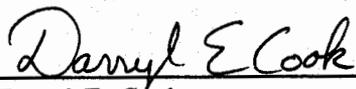
Bids for the drainage improvement project and repair of Stormwater Management Ponds were opened on October 1, 1998. Three firms submitted bids with the following result:

<u>Firm</u>	<u>Amount</u>
Cinter Construction Company, inc.	\$ 82,982
Wolf Contractors, Inc.	164,349
EMP General Contractors	212,730

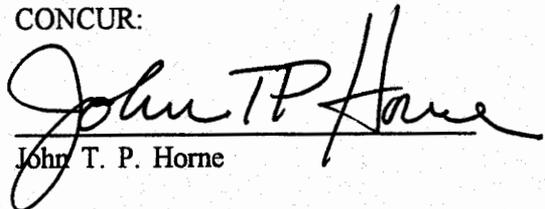
The drainage improvement project consists of the repair of an eroded outfall in First Colony. The stormwater management pond repairs are necessary to bring three ponds in Rolling Woods to an acceptable condition for acceptance by the Rolling Woods Homeowners Association. Funds for this work are from the developer's surety posted to guarantee completion of the Rolling Woods subdivision improvements. The breakdown on the project's funding is \$56,902 from the developer's surety and \$26,080 from County funds.

The low bid of \$82,982 for the project was submitted by Cinter Construction Company. The County's estimate is \$70,575. Staff has determined that Cinter Construction Company has adequate experience and qualifications to perform the work and is the lowest responsive and responsible bidder.

I recommend that the Board approve the attached resolution awarding the Cinter Construction Company, Inc., in the amount of \$82,982.


Darryl E. Cook

CONCUR:


John T. P. Horne

DEC/tp
drainimp.mem

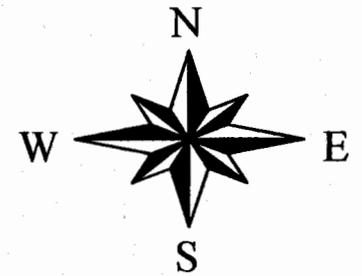
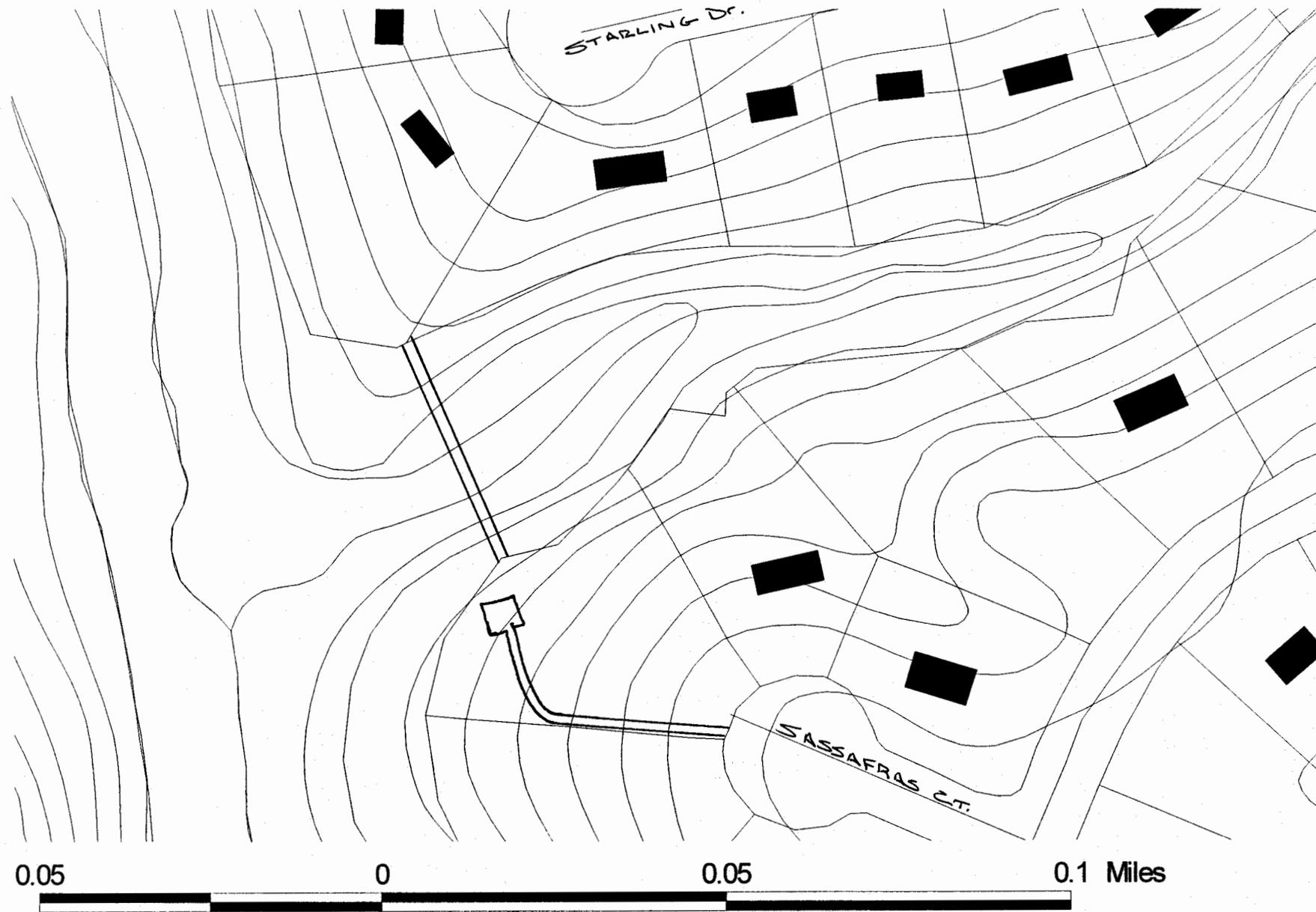
Attachment

253-6753
Fax for Dan

ROLLING WOODS POND MAINTENANCE



ROLLING WOODS POND # 1



JAMES CITY COUNTY
 REQUEST FOR QUOTATION 97-?-??
 STORMWATER MANAGEMENT POND REPAIRS
 ROLLING WOODS SUBDIVISION

The project consists of the repair of three pond dam structures located in the Rolling Woods subdivision. Attached are a vicinity sketch, site plan and details of the repair and restoration of the three areas. The following presents the scope of work for the project:

POND NUMBER 1

Description of Item	Quantity	Unit Price	Total Price
1. Clear temporary construction easement of trees and other vegetation.	LS		
2. Remove and dispose of any trees and clearing debris necessary to complete the repairs.	LS		
3. Remove and dispose of all trees and woody vegetation from the entire dam structure. Remove all stumps from dam structure.	LS		
4. Install silt fence at the downstream toe of the dam slope.	180LF		
5. Remove and dispose of wooden baffle structure in pond.	LS		
6. Repair scoured area at and under outfall of barrel pipe and add additional rip rap outlet protection	2 CY		
7. Line inside face of dam from one foot below normal pool to one foot above normal pool with rip rap to stabilize eroded area.	15 CY		
8. Replace existing anti-vortex device with a 42" CMP anti-vortex device/trash rack. Top must have a locking access hatch.	LS		
9. Remove any debris/sediment accumulated around riser structure.	LS		
10. Regrade and provide a minimum 2 inches of topsoil to entire dam structure.	LS		
11. Stabilize entire dam structure with seed and excelsior matting. Matting is to be properly anchored and pinned in accordance with manufacturer's specifications.	1200 SY		
12. Stabilize construction and access easements with topsoil, seed and straw	LS		
TOTAL PRICE			

Notes:

1. All work will conform with the 1992 edition of the Virginia Erosion and Sediment Control Handbook.
2. Stabilization with seed and mulch means preparing the seedbed including 3 inches of topsoil, providing an

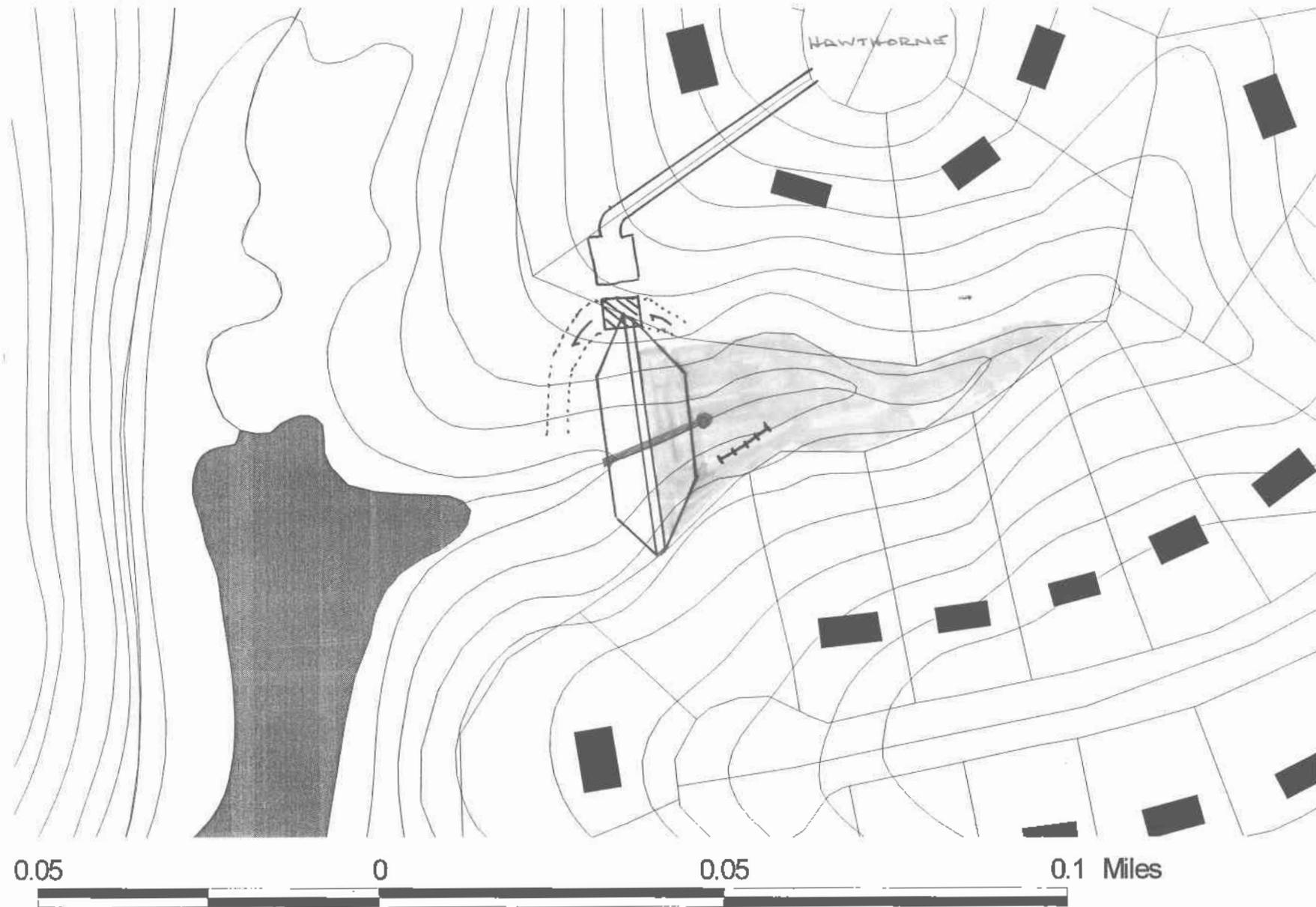
appropriate seed mixture, and covering the newly stabilized areas in accordance with Specification 1.66, Permanent Seeding, in the Virginia Erosion and Sediment Control Handbook.

Contractor _____
Address _____
Telephone _____
Fax _____

Authorized Signature/Title

Name - Printed
Date _____

ROLLING WOODS POND # 2



JAMES CITY COUNTY
 REQUEST FOR QUOTATION 97-?-??
 STORMWATER MANAGEMENT POND REPAIRS
 ROLLING WOODS SUBDIVISION

The project consists of the repair of three pond dam structures located in the Rolling Woods subdivision. Attached are a vicinity sketch, site plan and details of the repair and restoration of the three areas. The following presents the scope of work for the project:

POND NUMBER 2

Description of Item	Quantity	Unit Price	Total Price
1. Clear temporary construction easement of trees and other vegetation.	LS		
2. Remove and dispose of any trees and clearing debris necessary to complete the repairs.	LS		
3. Remove and dispose of all trees and woody vegetation from the entire dam structure. Remove all stumps from dam structure.	LS		
4. Install silt fence at the downstream toe of the dam slope.	200LF		
5. Remove and dispose of wooden baffle structure in pond.	LS		
6. Construct emergency spillway in natural ground on northern end of dam. Spillway is to be 8 feet wide, at an elevation one foot above that of the crest of the riser pipe.	LS		
7. Replace existing anti-vortex device with a 36" CMP anti-vortex device/trash rack. Top must have a locking access hatch.	LS		
8. Remove any debris/sediment accumulated around riser structure.	LS		
9. Regrade and provide a minimum 2 inches of topsoil to the entire dam structure.	LS		
10. Stabilize entire dam structure with seed and excelsior matting. Matting is to be properly anchored and pinned in accordance with manufacturer's specifications.	SY		
11. Stabilize construction and access easements with topsoil, seed and straw .	LS		
TOTAL PRICE			

Notes:

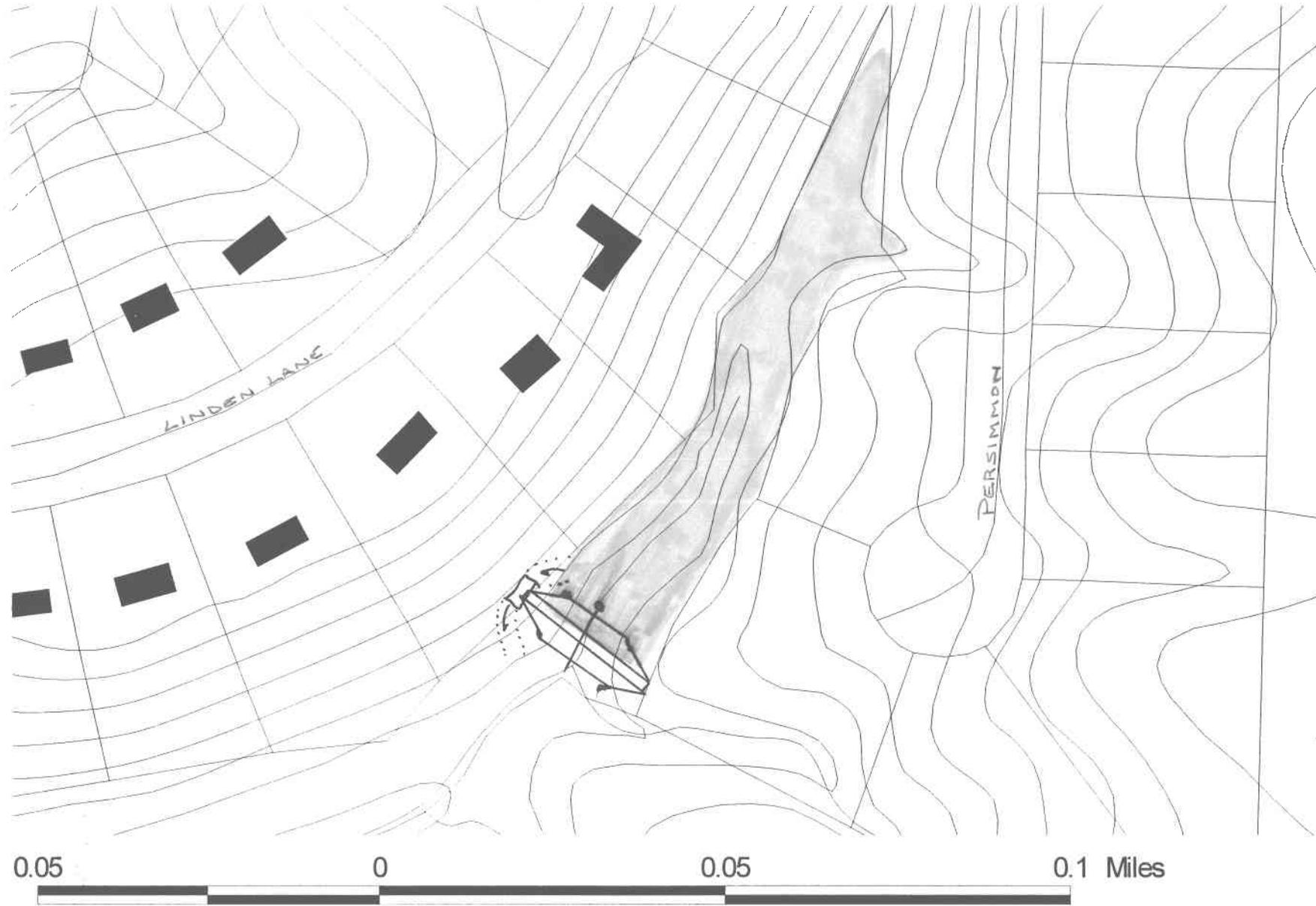
1. All work will conform with the 1992 edition of the Virginia Erosion and Sediment Control Handbook.
2. Stabilization with seed and mulch means preparing the seedbed including 3 inches of topsoil, providing an appropriate seed mixture, and covering the newly stabilized areas in accordance with Specification 1.66, Permanent Seeding, in the Virginia Erosion and Sediment Control Handbook.

Contractor _____
Address _____
Telephone _____
Fax _____

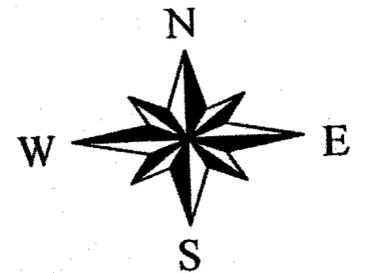
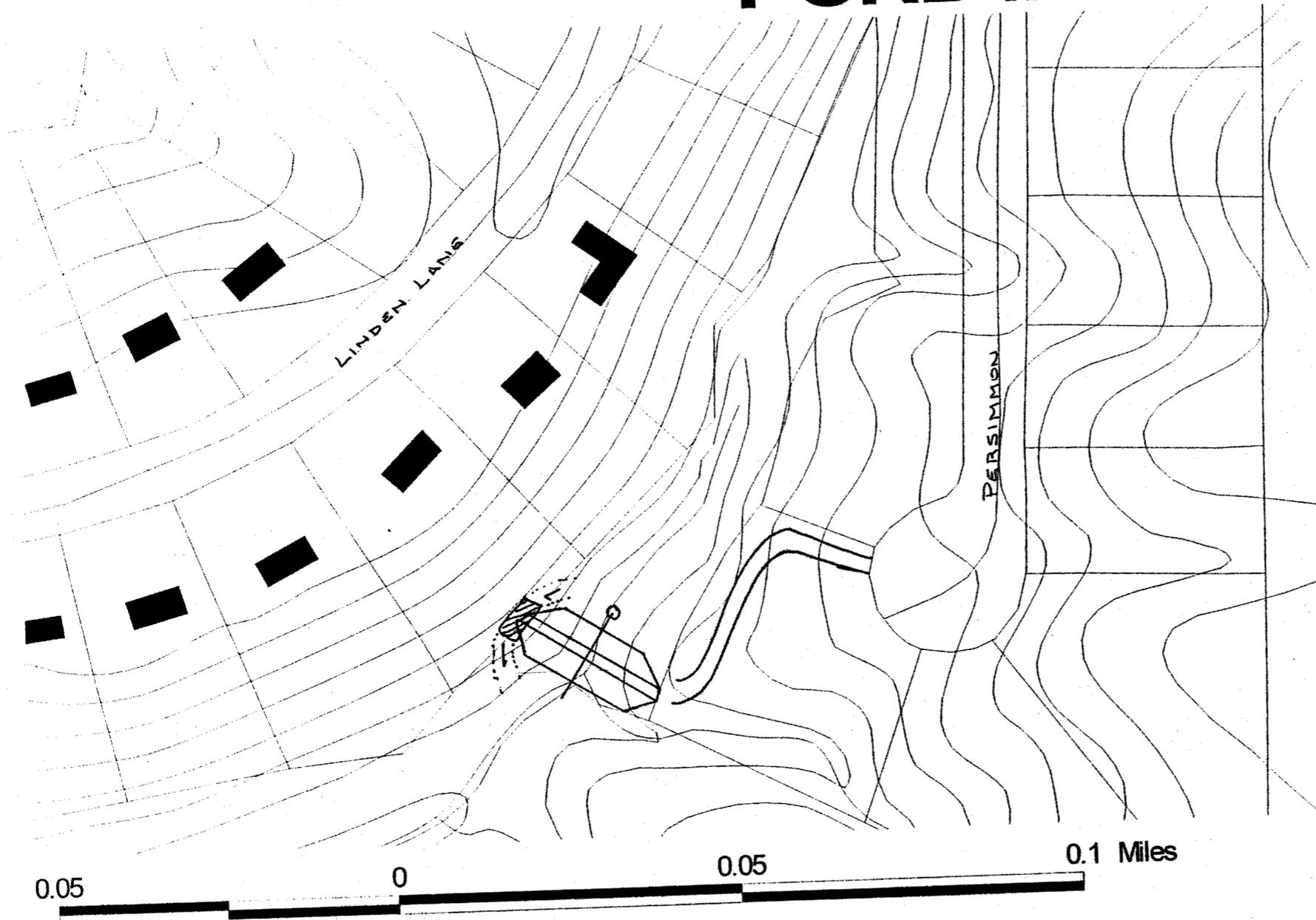
Authorized Signature/Title

Name - Printed
Date _____

ROLLING WOODS POND # 3



ROLLING WOODS POND # 3



JAMES CITY COUNTY
 REQUEST FOR QUOTATION 97-?-??
 STORMWATER MANAGEMENT POND REPAIRS
 ROLLING WOODS SUBDIVISION

The project consists of the repair of three pond dam structures located in the Rolling Woods subdivision. Attached are a vicinity sketch, site plan and details of the repair and restoration of the three areas. The following presents the scope of work for the project:

POND NUMBER 3

Description of Item	Quantity	Unit Price	Total Price
1. Remove and dispose of all trees and woody vegetation from the entire dam structure. Remove all tree stumps from dam.	LS		
2. Remove fallen trees laying in and around pond.	2		
3. Cut access hole in trash rack. Install locking hatch cover to access opening.	LS		
4. Install silt fence at the downstream toe of the dam slope.	180LF		
5. Repair eroded emergency spillway and stabilize with EC-3 matting. Matting to be installed and pinned in accordance with manufacturers recommendations.			
9. Remove and dispose of any debris/sediment accumulated around riser structure.	LS		
10. Regrade and provide a minimum of 2 inches of topsoil to entire dam structure.	LS		
11. Stabilize entire dam structure with seed and excelsior matting. Matting is to be properly anchored and pinned in accordance with manufacturer's specifications.	1200 SY		
12. Regrade and stabilize construction and access easements with topsoil, seed and straw .	LS		
TOTAL PRICE			

Notes:

1. All work will conform with the 1992 edition of the Virginia Erosion and Sediment Control Handbook.
2. Stabilization with seed and mulch means preparing the seedbed including 3 inches of topsoil, providing an appropriate seed mixture, and covering the newly stabilized areas in accordance with Specification 1.66, Permanent Seeding, in the Virginia Erosion and Sediment Control Handbook.

Contractor _____

 Authorized Signature/Title

JAMES CITY COUNTY
REQUEST FOR QUOTATION
STORMWATER MANAGEMENT POND REPAIRS
ROLLING WOODS SUBDIVISION

The project consists of the repair of three pond dam structures located in the Rolling Woods subdivision. Attached are a vicinity sketch, site plan and details of the repair and restoration of the three areas. The following presents the scope of work for each pond:

POND NUMBER 3

Description of Item	Quantity	Unit Price	Total Price
1. Remove and dispose of all trees and woody vegetation from the entire dam structure. Remove all tree stumps from dam.	LS		2000
2. Remove fallen trees laying in and around pond.	2		1000
3. Cut access hole in trash rack. Install locking hatch cover to access opening.	LS		500
4. Install silt fence at the downstream toe of the dam slope.	180LF		1260
5. Repair eroded emergency spillway and stabilize with EC-3 matting. Matting to be installed and pinned in accordance with manufacturers recommendations.			500. ⁰⁰
9. Remove and dispose of any debris/sediment accumulated around riser structure.	LS		800. ⁰⁰
10. Regrade and provide a minimum of 3 inches of topsoil to entire dam structure.	LS		2000. ⁰⁰
11. Stabilize entire dam structure with seed and excelsior matting. Matting is to be properly anchored and pinned in accordance with manufacturer's specifications.	1200 SY		2400. ⁰⁰
12. Regrade and stabilize construction and access easements with topsoil, seed and straw .	LS		1500. ⁰⁰
<i>Contractors Profit + overhead</i>			4000
TOTAL PRICE			16000

Notes:

- All work will conform with the 1992 edition of the Virginia Erosion and Sediment Control Handbook.
- Stabilization with seed and mulch means preparing the seedbed including 3 inches of topsoil, providing an appropriate seed mixture, and covering the newly stabilized areas in accordance with Specification 1.66, Permanent Seeding, in the Virginia Erosion and Sediment Control Handbook.

Contractor _____
Address _____
Telephone _____
Fax _____

Authorized Signature/Title

Name - Printed

Date _____

Address _____
Telephone _____
Fax _____

Name - Printed
Date _____

AEGIS SECURITY INSURANCE COMPANY

2407 Park Drive, Suite 200, P.O. Box 3153, Harrisburg, PA 17110 (717) 657-9671 Fax (717) 657-5837

CONTRACT STATUS INQUIRY

DATE: September 16, 1999

89-21-99P03:07 RCVD

TO: James City County
101-A Mounts Bay Road
Williamsburg, VA 23187

BOND NO: B00 001 788
PRINCIPAL: Cinter Construction, Inc.
DESCRIPTION: #K99-036 -- Repair Storm Drainage Outfall -- First Colony Subdivision
Repair Three Storm Water Management Ponds in Rolling Woods
AMOUNT: \$ 82,982.00

Aegis Security Insurance Company is Surety on the above bond. We will appreciate your cooperation in providing the information requested below. Please return this form to us so that we may have current status information on the captioned job. A postage paid envelope is provided. Thank you for your assistance. Tina L. Magill

PLEASE COMPLETE ONE SECTION ONLY

I. IF THE CONTRACT HAS BEEN COMPLETED:

1. What was the completion date? _____
Date of acceptance: _____
2. What was the final contract price? _____
Has the full amount been paid? _____
3. Was the work satisfactory? _____
4. Have all labor and material bills been paid? _____

II. IF THE CONTRACT HAS NOT BEEN COMPLETED:

1. What percentage of work has been completed to date? 100% of original contract -
2. Total amount paid to Contractor to date? 83,240.62 change order
3. What is amount of retainage? \$300 pending
4. What is the anticipated date of completion? Fall
5. Is the Contractor paying labor and material bills? Unknown
6. Is the work progressing satisfactorily? Yes

Firm: JAMES CITY COUNTY
By: Darryl E Cook
Date: 9/22/99

Address: P.O. Box 8784
WILLIAMSBURG VA 23187
Phone: (757) 253-6673

AEGIS SECURITY INSURANCE COMPANY

2407 Park Drive, Suite 200, P.O. Box 3153, Harrisburg, PA 17110 (717) 657-9671 Fax (717) 657-5837

CONTRACT STATUS INQUIRY

DATE: ~~November 16, 1999~~
Dec. 2, 1999

TO: James City County
101-A Mounts Bay Road
Williamsburg, VA 23187

BOND NO: B00 001 788
PRINCIPAL: Cinter Construction, Inc.
DESCRIPTION: #K99-036 - Repair Storm Drainage Outfall - First Colony Subdivision
Repair Three Storm Water Management Ponds in Rolling Woods
AMOUNT: \$ 82,982.00

Aegis Security Insurance Company is Surety on the above bond. We will appreciate your cooperation in providing the information requested below. Please return this form to us so that we may have current status information on the captioned job. A postage paid envelope is provided. Thank you for your assistance. Tina L. Magill

PLEASE COMPLETE ONE SECTION ONLY

I. IF THE CONTRACT HAS BEEN COMPLETED:

1. What was the completion date? _____
Date of acceptance: _____
2. What was the final contract price? _____
Has the full amount been paid? _____
3. Was the work satisfactory? _____
4. Have all labor and material bills been paid? _____

II. IF THE CONTRACT HAS NOT BEEN COMPLETED:

1. What percentage of work has been completed to date? 100% of original contract
2. Total amount paid to Contractor to date? 83,240.62 *change order*
3. What is amount of retainage? \$300 *pending*
4. What is the anticipated date of completion? March, 2000
5. Is the Contractor paying labor and material bills? Unknown
6. Is the work progressing satisfactorily? Yes

Work is on hold to develop + process a change order.

Firm: James City County Address: PO Box 8784
By: Darryl E Cook
Date: 12/16/99 Phone: (757) 253-6670

7. Provide temporary linings (such as polyethylene sheets) for ditches at the end of Hidden Lake Drive, Warbler Place, and Starling Drive until the ditches can be paved.
8. Provide a baffle in Basin A below the outfall of the paved ditch that runs between Lots 34 and 35. See Virginia Erosion Control Handbook for details.
9. Basin A shall remain as a permanent stormwater control device. The four-inch dewatering outlet shall be eliminated when the basin is converted to a permanent pond. The dam and riser should both be increased in height to allow for greater depth (6-foot minimum) in the permanent pool. The contours shown on the plan shall agree with the elevations specified for the pipe system. Also, the pond as shown on the plan seems larger than detailed in the calculations. ~~The pond shall be designed so that it is not larger than approximately 5-6 acre-feet in volume (based on the 28-1/2 acre watershed).~~ Specify width of Emergency Spillway.

James City Service Authority

1. Page 1, Note #13: Change Department of Public Works to James City Service Authority.
2. Clearly show where existing water and sewer lines end and proposed lines begin.
3. Show water meter connections to the existing 12-inch main to be wet taps.
4. Show the sanitary sewer connections for Lots 4 through 7.
5. 18 inches of vertical separation shall be provided between the water and sewer main at the intersection of Nuthatch Drive and Warbler Place.
6. There is a conflict on the profile between the 4-inch water main and the drainage culvert on East Starling Drive.
7. Provide additional details on the proposed sewer bridge between Manhole No. 7 and Manhole No. 8.
8. Show the paved ditch on the sewer profile between Manhole No. 12.
9. Provide an angle of flow of 90° or greater between Manhole No. 16 and Manhole No. 14.
10. Provide revised overall water and sewer plans.

JCC Handle Emergency repairs & non-routine dredging

HOA { aesthetic
functional

Normal Maint

Mowing

Removal of trees

Unclogging Spillways, both ~~pipe~~ principle & emergency

Trash / Debris Removal

^{Gross} Vegetation Management -

Aquatic Vegetation Mgt

Animal Control - Beavers, Muskrats etc.

Non-routine

Dredging Pipe

Replacement of Spillway

Structural Repairs

Total Maint Costs -

5% of const cost

3% - annual maint

2% - long-term maint.

WQV

41,600 ft³

110,032

Est. cost 127.24 (WQV)^{0.607}

Basin #2 (sect 3+4) = \$81,000

Basin #1 (sect 3) = \$146,160

Basin ^{Sect} ~~Basin~~ 2 on 3

~~Ann. Maint~~

~~2430~~

~~4385~~

~~Long term Maint~~

~~1620~~

~~2923~~

Copy D-1 - App. D

$$\text{Alt. Cost Calc} = 23.065 V_s^{.7052}$$

$$V_s = wQV + 2 \text{ yr vol.}$$

	wQV	2 yr Vol	Cost Cost	<u>Annul</u> <u>Maint</u>	<u>Long Term</u> <u>Maint</u>
Basin 2	41,600	53,113	74,527	2235	1490
Basin 1	110,032	20,000	92,930	2790	1860

Cost Estimates

Basin 2 -

$$450 \text{ cyds} \times \$15/\text{eyd} = \$6750$$

$$\text{Rim / Barrel, inst.} = \$10,000$$

$$\text{Crg} - 1.5 \text{ ac} \times 5000 = 6500$$

$$\text{Mobil.} = 2500$$

$$\underline{25,750}$$

$$25\% \text{ cont} + \underline{6437}$$

$$32,187$$

$$\text{Annual Maint} \quad .03 \times 32,187 = 965 \approx \$1000$$

$$.02 \times 32,187 = 645 \times \$650$$

$$\rightarrow 15 \text{ yrs} \times 650 = \$10,000$$

$$20 \text{ yrs} \times 650 = \$13,000$$

Basin 1

2120 cyds x 15 =	31,800
Riser/Barril =	10,000
Cing 14 @ 5000 =	<u>5000</u>
Mobil	2500
	<u>49,300</u>
	50,800
Cost 25%	<u>12,000</u>
	<u>61,600</u>

Maint	.03 x 48,600 =	1850
		2000
	.02 x "	1250
		<u>1300</u>

$$1250 \times 15 = 18,750$$

$$+ 300 \times 15 = \underline{4,500}$$

Basin A - Sect 2

DA = 28.5 ac

S.A. = 39,000 sf = 0.9 ac

Depth = 6'

Vol = .4 x 6 x 39,000 = 93,600 ft³ ?

275 SF/Ft x 150' Long / 2 = 20,625 Ft³
= 765 CY.

Cost Est = \$ 15/cy x 800 = 12,000

Riser/Barril = 10,000

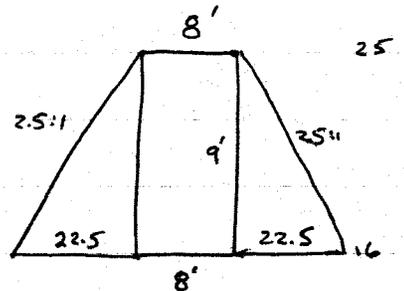
Cing 1.5 = 7500

Mobil = 2500

\$ 32,000

25% cont 8000

\$ 40,000



James City County
101-A Mounts Bay Road
Williamsburg, VA 23187

FROM: CINTER CONSTRUCTION CO., INC.
P.O. BOX 108
LIGHTFOOT, VA 23090

PROJECT: Repair Storm Drain
ARCHITECT'S
PROJECT NO.:

APPLICATION NUMBER : 2

PERIOD FROM 12/03/98 TO 05/22/01

DATE THIS APPLICATION 05/23/01

PROOFS OF NET AMOUNT PAYABLE

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR: CINTER CONSTRUCTION CO., INC.
[Signature] Date 5/23/01

State of: Virginia, City of: LIGHTFOOT
Subscribed and sworn before me
is 23 day of May 2001
Notary Public: [Signature]
Commission expires: 12/25/2002

ORIGINAL CONTRACT SUM	\$ 82,982.00
Net change by Change Orders	558.62
CONTRACT SUM TO DATE	\$ 83,540.62
<hr/>	
TOTAL COMPLETED & STORED TO DATE	\$ 83,540.62
RETAINAGE (.00%)	0.00
TOTAL EARNED LESS RETAINAGE	\$ 83,540.62
LESS PREVIOUS CERTIFICATES FOR PAYMENT ...	\$ 83,240.62
CURRENT PAYMENT DUE	300.00 X
BALANCE TO FINISH, PLUS RETAINAGE	0.00

In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED

AMOUNT CERTIFIED\$ _____
ARCHITECT: _____
DATE _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

OK to pay \$ 300.00
Daryl E Cook 6/4/01

Work Complete -
Final Payment.



Contract
K99036

P.O. BOX 108 LIGHTFOOT

VA 23090

(Job : 9813 Repair Storm Drain) (Customer : 1015 James City County)

Contract # K99-036

IA Document G703 - 1983
Application Number: 2

Period From 12/03/98 to 05/22/01

Date this Application 05/23/01

.....WORK COMPLETED.....

Phase	Description	Scheduled Value	Previous	...This Application...		to Date	% Comp	Balance to Complete	Retainage
				in Place	Stored				
110	Clearing	21,500.00	21,500.00	0.00		21,500.00	100.00	0.00	0.00
131	Earthwork	2,450.00	2,450.00	0.00		2,450.00	100.00	0.00	0.00
161	Seeding	26,602.00	26,602.00	0.00		26,602.00	100.00	0.00	0.00
1000	CHANGE ORDER 1	558.62	558.62	0.00		558.62	100.00	0.00	0.00
1402	Topsoil	6,890.00	6,890.00	0.00		6,890.00	100.00	0.00	0.00
1502	Silt Fence	1,120.00	1,120.00	0.00		1,120.00	100.00	0.00	0.00
1504	Fabric	1,190.00	1,190.00	0.00		1,190.00	100.00	0.00	0.00
1515	Riprap	1,200.00	1,200.00	0.00		1,200.00	100.00	0.00	0.00
3102	RCP & Culvert	4,095.00	4,095.00	0.00		4,095.00	100.00	0.00	0.00
3105	Man Holes	17,935.00	17,935.00	0.00		17,935.00	100.00	0.00	0.00
Totals --->>		83,540.62	83,540.62	0.00		83,540.62	100.00	0.00	0.00



Document G703 - 1983

Application Number: 2

Period From 12/03/98 to 05/22/01

Date this Application 05/23/01

.....CHANGE ORDER SUMMARY.....

Phase	Description	Additions	Deductions
1000	CHANGE ORDER 1	558.62	0.00
		558.62	0.00

Jan-
Budget code
001-104-0430
Christy



TO: James City County
101-A Mounts Bay Road
Williamsburg, VA 23187

FROM: CINTER CONSTRUCTION CO., INC.
P.O. BOX 108
LIGHTFOOT, VA 23090

PROJECT: Repair Storm Drain
ARCHITECT'S
PROJECT NO.:

APPLICATION NUMBER : 2

PERIOD FROM 12/03/98 TO 04/30/99

DATE THIS APPLICATION 05/07/99

APPROVALS OF NET AMOUNT PAYABLE

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR: CINTER CONSTRUCTION CO., INC.

Date 5/7/99

State of: Virginia, City of: LIGHTFOOT

Subscribed and sworn before me

this 7 day of May 1999

Notary Public: [Signature]

My Commission expires: November 30, 2001

ORIGINAL CONTRACT SUM	\$ 82,982.00
Net change by Change Orders	\$ 558.62
CONTRACT SUM TO DATE	\$ 83,540.62
<hr/>	
TOTAL COMPLETED & STORED TO DATE	\$ 83,540.62
RETAINAGE (.00%)	\$ 0.00
TOTAL EARNED LESS RETAINAGE	\$ 83,540.62
LESS PREVIOUS CERTIFICATES FOR PAYMENT ...	\$ 75,186.56
CURRENT PAYMENT DUE	\$ 8,354.06
BALANCE TO FINISH, PLUS RETAINAGE	\$ 0.00

AMOUNT CERTIFIED\$ _____

ARCHITECT: _____

DATE _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

Contract # K 99036

OK to pay \$8,054.06
Darryl E Cook 5/10/99

P.O. BOX 108 LIGHTFOOT VA 23090

(Job : 9813 Repair Storm Drain) (Customer : 1015 James City County)

AIA Document G703 - 1983

Application Number: 2

Period From 12/03/98 to 04/30/99

Date this Application 05/07/99

.....WORK COMPLETED.....

Phase Description	Scheduled Value	Previous	...This Application...		to Date	% Comp	Balance to Complete	Retainage
			in Place	Stored				
110 Clearing	21,500.00	21,500.00	0.00		21,500.00	100.00	0.00	0.00
131 Earthwork	2,450.00	2,450.00	0.00		2,450.00	100.00	0.00	0.00
161 Seeding	26,602.00	26,602.00	0.00		26,602.00	100.00	0.00	0.00
1000 CHANGE ORDER 1	558.62	558.62	0.00		558.62	100.00	0.00	0.00
1402 Topsoil	6,890.00	6,890.00	0.00		6,890.00	100.00	0.00	0.00
1502 Silt Fence	1,120.00	1,120.00	0.00		1,120.00	100.00	0.00	0.00
1504 Fabric	1,190.00	1,190.00	0.00		1,190.00	100.00	0.00	0.00
1515 Riprap	1,200.00	1,200.00	0.00		1,200.00	100.00	0.00	0.00
3102 RCP & Culvert	4,095.00	4,095.00	0.00		4,095.00	100.00	0.00	0.00
3105 Man Holes	17,935.00	17,935.00	0.00		17,935.00	100.00	0.00	0.00
Totals --->>	83,540.62	83,540.62	0.00		83,540.62	100.00	0.00	0.00

83,540.62

AIA Document G703 - 1983

Application Number: 2

Period From 12/03/98 to 04/30/99

Date this Application 05/07/99

-----CHANG E O R D E R S U M M A R Y-----

Phase	Description	Additions	Deductions
1000	CHANGE ORDER 1	558.62	0.00
		558.62	0.00

**CONTRACT FORM
CONTRACT CHANGE ORDER**

**D. Cook
Environ. Div
Blair**

PROJECT DESCRIPTION: DRAINAGE IMPROVEMENT
 CONTRACT FOR: REPAIRING STORM DRAINAGE SYSTEM.
 CONTRACT DATE: OCTOBER 21, 1998
 OWNER: JAMES CITY COUNTY

CONTRACT NO.: K99-036
 CHANGE ORDER NO.: 1 (ONE)
 DATE: NOVEMBER 25, 1998
 PROJECT NO.: 99-B-0013
 OTHER: _____
 LOCATION: 180 JOHN ROLFE LANE

CONTRACTOR: CINTER CONSTRUCTION COMPANY, INC.

The following changes are hereby made to the Contract Documents:

Item No.	Description	Decrease in Contract Price	Increase in Contract Price
1)	- SUPPLY AND INSTALL 2-30" H-12-1 HUGGER BANDS WITH 2 "O-RING" GASKETS EACH. - SUPPLY AND INSTALL 1-30" DIMPLE BAND WITH 12" WIDE FLAT GASKET. - MODIFY BANDS AS NEEDED IN ORDER TO BOLT TRASH RACK TO RISER.		\$ 558.62

TOTALS: \$ - \$ 558.62
 NET CHANGE IN CONTRACT PRICE: \$ - \$ 558.62

JUSTIFICATION: EXISTING RISER STRUCTURES HAVE RUSTED THROUGH IN TOP 2' OF ELEVATION. BANDS WILL REINFORCE RISER STRUCTURES.

ATTACHMENTS: COPY OF PROPOSAL FROM CINTER, LETTER FROM JCC ENV. DIVISION

CONTRACT PRICE PRIOR TO THIS CHANGE ORDER: \$82,982.⁰⁰ \$ 82,982.⁰⁰
 CONTRACT PRICE BY THIS CHANGE ORDER WILL BE: INCREASED BY 170 \$ 558.62
 NEW CONTRACT PRICE INCLUDING THIS CHANGE ORDER WILL BE: \$ 83,540.62
 COMPLETION DATE PRIOR TO THIS CHANGE ORDER: JANUARY 5, 1999
 NEW CONTRACT TIME WILL BE UNCHANGED BY _____ CALENDAR DAYS.
 NEW DATE FOR COMPLETION OF ALL WORK WILL BE: JANUARY 5, 1999

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

REQUESTED BY: Barry Hekaby (nee) CINTER CONSTRUCTION 11-17-98
 Name By Title Date

RECOMMENDED BY: Mark Eversole ENGINEERING INSP. JCC 11-18-98
 Name By Title Date

ACCEPTED BY: See attached correspondence confirming acceptance by CinterConst.
 Name By Title Date

APPROVED BY: Sanford B. Wanner County Administrator 12/7/98
 Name By Title Date

CinTer Construction Company Incorporated

Mailing:
P. O. Box 108
Lightfoot, VA 23090
Phone: 757-258-3007

Office:
300 A Ewell Road
Williamsburg, VA
Fax: 757-258-3795

November 19, 1998

Mark Eversole
James City County
101-E Mounts Bay Road
Williamsburg, VA 23187-8784

Dear Mark:

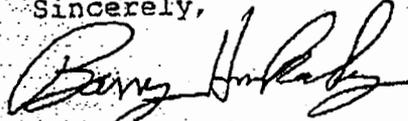
I just received a quote back from our supplier related to the Contech products you recommended. Because the two 30 inch riser pipes are different we will have to use two different types

of "hugger bands." I will call this proposal Change Order #1.

Quantity	Description	Price Each	Total Price
2	30" H-12-1 Hugger Bands with 2 "O-Ring" gaskets each	\$ 69.79	\$ 139.57
1	30" Dimple Band with 12" wide Flat Gasket	94.05	94.05
	Delivery		25.00
	Installation of Gaskets & bands and modifying bands in order to bolt to trash tops		300.00
	Total		\$ 558.62

Mark, please let me know as soon as possible that this is acceptable to you so we can proceed with this project. Just sign below and fax back to me.

Sincerely,


Barry Huckaby

Accepted Darryl E Cook
Title Environmental Director

Date 11/20/98

COMPLETE SITE WORK
CLEANING ~ GRINDING ~ GRADING ~ PAVING ~ UTILITIES

NOTICE OF AWARD(K99-036)

**TO: CINTER CONSTRUCTION COMPANY
PO BOX 108
LIGHTFOOT VA 23090**

PROJECT DESCRIPTION: Repair of Storm Drainage System

The OWNER has considered the BID submitted by you for the above described work in response to its Advertisement dated **September 13, 1998** and Instructions to Bidders.

You are hereby notified that your **BID** has been accepted for work in the amount of **Eighty-two Thousand Nine Hundred and Eight Two Dollars (\$82,982.00)**.

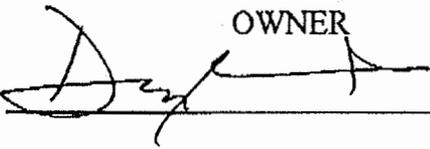
You are required by the Instructions to Bidders to execute the Agreement and furnish **CONTRACTOR'S Performance BOND, Payment BOND and Certificate of Insurance** within ten (10) calendar days from the date of this Notice to you. **BONDS shall not be dated later than the date of the Contract.**

If you fail to execute said Agreement and to furnish said **BONDS** and **Certificate of Insurance** within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

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

Dated this **16th** day of **October 1998**.

JAMES CITY COUNTY
OWNER

BY:  _____

TITLE: Senior Buyer

ACCEPTANCE OF NOTICE

RECEIPT OF THE ABOVE NOTICE OF AWARD IS HEREBY ACKNOWLEDGED:

BY: _____

CONTRACTOR

TITLE: _____

THIS IS THE _____ DAY OF _____, 19____.

10/16/98
Fm: Don Breland
TO: DARAYL COOK
JOANETTE BURGER
F.Y.I. Contract # 0160
10/16/98
JCB

NOTICE TO PROCEED

TO: FRANK HUCKABY
CINTER CONSTRUCTION CO. INC.
P.O. Box 108
LIGHTFOOT, VA.

DATE: NOVEMBER 6, 1998
PROJECT: K99-036
REPAIR STORMDRAIN - FIRST COLONY
REPAIR STORMWATER PONDS -
ROLLING WOODS

You are hereby notified to commence WORK in accordance with the Agreement dated
OCTOBER 21, 1998, on or before NOVEMBER 16, 1998, and you are to
complete the WORK within SIXTY (60)
consecutive calendar days thereafter. The date of completion of all WORK is therefore JANUARY 5,
1999.

Liquidated damages in the amount of \$100.00/CALENDAR DAY will be assessed by the Owner for failure to
substantially complete the work on or before the date of completion stated above or as may be modified by
duly executed change orders.

JAMES CITY COUNTY OWNER
Darryl E Cook
BY
Environmental Director
TITLE

ACCEPTANCE OF NOTICE:

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

_____ day of _____, 19____

CONTRACTOR

BY

TITLE

NOTE TO CONTRACTOR:

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

TO: James City County
101-A Mounts Bay Road
Williamsburg, VA 23187

FROM: CINTER CONSTRUCTION CO., INC.
P.O. BOX 108
LIGHTFOOT, VA 23090

PROJECT: Repair Storm Drain
ARCHITECT'S
PROJECT NO.:

APPLICATION NUMBER : 1

PERIOD FROM 11/01/98 TO 12/02/98

DATE THIS APPLICATION 12/02/98

APPROVALS OF NET AMOUNT PAYABLE

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR: CINTER CONSTRUCTION CO., INC.

Sherrill A. Hurdley
Date 12-2-98

State of: Virginia, City of: LIGHTFOOT
Subscribed and sworn before me
this 2 day of December 1998
Notary Public: Judith B. Hurdley
My Commission expires 8/31/02

In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED

AMOUNT CERTIFIED\$ _____
ARCHITECT: _____
DATE _____

ORIGINAL CONTRACT SUM	\$	82,982.00
Net change by Change Orders	\$	558.62
CONTRACT SUM TO DATE	\$	83,540.62
<hr/>		
TOTAL COMPLETED & STORED TO DATE	\$	83,540.62
RETAINAGE (10.00%)	\$	8,354.06
TOTAL EARNED LESS RETAINAGE	\$	75,186.56
LESS PREVIOUS CERTIFICATES FOR PAYMENT ...	\$	0.00
CURRENT PAYMENT DUE	\$	75,186.56
BALANCE TO FINISH, PLUS RETAINAGE	\$	8,354.06

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

OK to pay 75,186.56
Darryl E Cook
Contract No. K99-036

Accounting
x 6636

AIA Document G703 - 1983

Application Number: 1

Period From 11/01/98 to 12/02/98

Date this Application 12/02/98

.....W O R K C O M P L E T E D.....

Phase	Description	Scheduled Value	Previous	...This Application...		to Date	% Comp	Balance to Complete	Retainage
				in Place	Stored				
110	Clearing	21,500.00	0.00	21,500.00		21,500.00	100.00	0.00	2,150.00
131	Earthwork	2,450.00	0.00	2,450.00		2,450.00	100.00	0.00	245.00
161	Seeding	26,602.00	0.00	26,602.00		26,602.00	100.00	0.00	2,660.20
1000	CHANGE ORDER 1	558.62	0.00	558.62		558.62	100.00	0.00	55.86
1402	Topsoil	6,890.00	0.00	6,890.00		6,890.00	100.00	0.00	689.00
1502	Silt Fence	1,120.00	0.00	1,120.00		1,120.00	100.00	0.00	112.00
1504	Fabric	1,190.00	0.00	1,190.00		1,190.00	100.00	0.00	119.00
1515	Riprap	1,200.00	0.00	1,200.00		1,200.00	100.00	0.00	120.00
3102	RCF & Culvert	4,095.00	0.00	4,095.00		4,095.00	100.00	0.00	409.50
3105	Man Holes	17,935.00	0.00	17,935.00		17,935.00	100.00	0.00	1,793.50
Totals --->>		83,540.62	0.00	83,540.62		83,540.62	100.00	0.00	8,354.06

P.O. BOX 108 LIGHTFOOT

VA 23090

(Job : 9813 Repair Storm Drain) (Customer : 1015 James City County)

AIA Document G703 - 1983

Application Number: 1

Period From 11/01/98 to 12/02/98

Date this Application 12/02/98

-----CHANG E O R D E R S U M M A R Y-----

Phase	Description	Additions	Deductions
1000	CHANGE ORDER 1	558.62	0.00
		558.62	0.00

All three ponds at Rolling Woods
have Silt fence to be removed.
Grass on one Dam needs to be overseeded
in the fall.

- FYI - at this time, all 3 ponds have
green algae/Scum on their entire
Surface thick enough to walk on.
- Trees are growing on Dams.

Mark 11/20

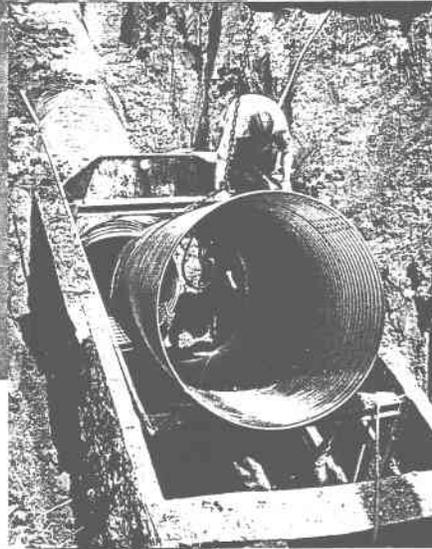
Go ahead + authorize
this work to proceed.

Darryl

ONTECH

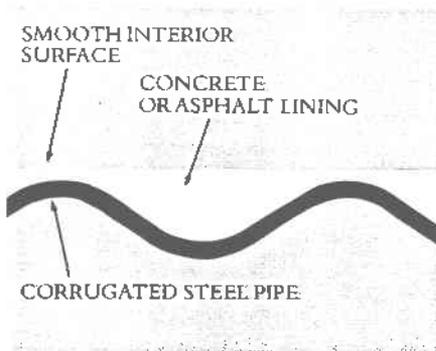
CONSTRUCTION PRODUCTS INC.

Corrugated Steel Pipe and Pipe-Arch

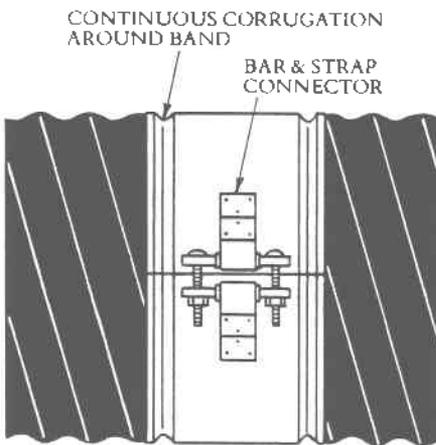




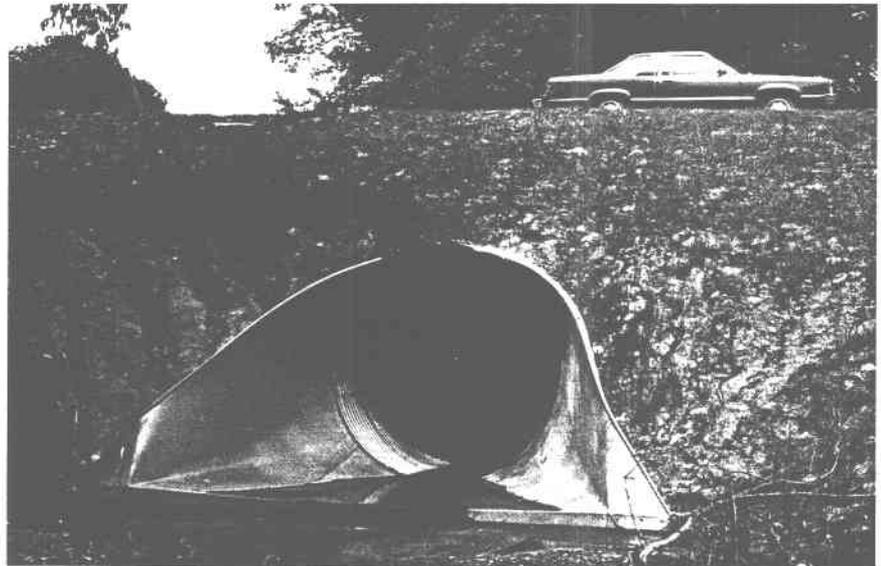
PAVED-INVERT Pipe has extra protection in the bottom of the pipe where most wear takes place.



SMOOTH-FLO or HEL-COR CL lining fills all interior corrugations completely.



HUGGER Joint with bar and strap connector.



End section for economical, hydraulically efficient end finish.

Joints and fittings

Standard fittings such as tees, wyes, elbows, saddle branches and reducers are available for Contech Pipe and Pipe-Arches. Special fittings including manholes and catch basins can be fabricated to meet your needs.

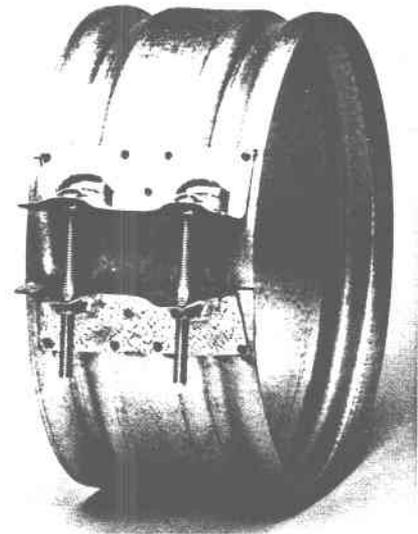
Contech Weld-Seam and Lock-Seam HEL-COR Pipe and Pipe-Arch feature universal ends, so a variety of standard couplings may be used.

Contech offers an exclusive HUGGER-type joint. This joint uses an annular corrugation to fully engage each annular pipe end for 360°. When used with optional rubber O-ring gaskets on weld-seam pipe, the HUGGER Joint is the industry's tightest.

End Sections

Contech End Sections provide an economical, attractive, hydraulically efficient and durable inlet and outlet on culverts and sewers. End sections provide protection against erosion and scouring. They improve hydraulic capacity by channeling flow into and out of the pipe efficiently. They are also reusable if lengthening or relocating the drainage structure is necessary.

End sections present a clean-cut effect that is aesthetically pleasing. The tapered sides blend with the contour of the slope to increase roadside aesthetics. Compared with concrete



HUGGER Band with Scafo-type connector.

headwalls, end sections are safer and easier to maintain. Weeds are cut easily with regular highway mowers. The wide opening minimizes collection of debris and silting.

~~PRELIMINARY~~ **DESIGN REPORT**
Rollingwoods Basin 2 - Persimmon (MC 025, S-34-88)

December 5th 2000

- *As-built data compared well to design data. Better than Hawthorne Basin. Emergency spillway and riser crest were about 0.5 feet above design elevations.*
- *Original design based on 10-year WSEL of 26.35 (top of dam 27.0). Recommend control of 100-year if possible by hydraulic design improvements such as adjustment to riser crest, rectangular slots in riser and/or emergency spillway modifications.*
- *Basin inflows per SCS Unit Hydrograph Method exceed peak design flows used in the original design of Basin 2.*

<u>Original Design</u>		<u>PondPack Model</u>	
Pre 2 Design	29 cfs	Pre 2 SCS UH	35.75 cfs
Post 2 Design	38 cfs	Post 2 SCS UH	54.79 cfs
Post 10 Design	87 cfs	Post 10 SCS UH	125.6 cfs

Therefore, Pondpack model is overtopping embankment for 10-year event. Need to adjust model inflows to more match original design, since they appear to be historically acceptable, or be conservative and make pond repairs fit the SCS peak discharges. I prefer the conservative approach. In either case, need additional time to run model and determine modifications to the riser or emergency spillway.

- Outlet Barrel Size: *Initially, pond hydraulics appear to be in inlet control (ie. based on barrel inlet opening size). Therefore, reliner should match existing barrel ID (24 inch) as close as possible. Use of 18 inch would be too much reduction in opening size compared to the existing 24 inch ID barrel. Based on corrugated polyethylene pipe reliner manufacturer data, use 21 inch size.*

	<u>Nom Size</u>	<u>ID</u>	<u>OD</u>
Culvert Renew	21 inch 21	23.65	
Snap-Tite Pro Line	21 inch 21	23.65	

Although there is very little annular space between the carrier pipe and the reline pipe, based on pipe barrel inspection there did not appear to be any wall failures or deflections present to prohibit the slip-line process. Need to check barrel again with lamp test.

- *Pipe Specifications: Two (2) samples attached. Culvert Renew (Thread-Loc Joint) manufactured by Poly Profiles Technology, Inc. of Steelville, MO and Snap-Tite Pro Line by ISCO of Louisville, KY.*
- *Grout Specification: Information attached. Need grouting specification in project documents.*

Proposed County Repair Project

FINAL HYDRAULIC REPORT.

- As previously stated, need more time to run model/hydraulics for any modifications to the riser or emergency spillway to safely pass larger storm events and provide acceptable freeboard to top of dam (El. 27.19 as-built).

January 10th 2001

- Basin size and drainage area at 35 acres is larger than the Hawthorne Pond (12 acres).
- Use of SCS Unit Hydrograph Method was used for design conservancy. Available storage volumes per design were used, but are questionable and were not as-built verified.
- Use of Snap-Tite Solid wall polyethylene liner pipe was selected. OD = 20 inch; ID = 18.77 inch; Wall Thick = 0.615 inch; DR=32.5. Allows for 2 inch annular space each side if concentrically centered. More annular space for insertion if placed along bottom of host pipe. Specification attached.
- Estimation Price for 20-inch Snap Tite is \$ 1,088.22 plus freight = \$ 1,900 (about \$ 45 per lf) 1-2 weeks delivery time. 22-inch OD is not available at this time.
- Since basin was only designed for 10-year event and liner pipe ID size was substantially reduced from 24-inch to 18.77 inch, needed to play with hydraulics to try and get pond more into conformance with current regs for dam construction. Smaller barrel sizes tend to raise WSEL's in facility; therefore, spillway modifications were required to discharge flow at lower elevations. Based on initial routings, design to contain 100-year with 1 foot of freeboard was not obtainable based on available volumes. Set goal to upgrade facility from 10-year design to 50-year design with 1 foot of freeboard with minimal pond modifications that did not exceed predevelopment allowables for the 2-year event at 29 cfs.

- Pond Modifications (Scope of Work):

- **48"Ø RCP RISER PRECAST**
Replace existing 36 inch CMP riser/base with new ~~36 inch RCP Riser (ASTM C 361 Ø Ring Pipe)~~ **ASTM C 478** with 6' x 6' x 18 inch thick concrete base. Riser crest set to match existing at El. 24.5.
- Modify riser with Four - 1 ft. x 1 ft. rectangular slots cut into top of riser. Crest El. 23.5. Ninety (90) degree separation between slots. Will lower current normal pool elevation as surveyed at El. 23.75 (which is lower than design due to pipe leakage) by 3 inches. Minor impact to pond habitat and aesthetics. • **SLOTS WILL HELP DISCHARGE FLOW AT LOWER LEVELS.**
- Existing CMP Trash Rack/Anti-Vortex device appeared salvagable. Clean rust and reapply galvanized coating (Z.R.C. Cold Galvanized compound or approved equal) to trash rack and support bars and attach to concrete riser by straps or angle iron bolted to riser. If trash rack is deteriorated to a point where existing device is unusable, new 54 inch diameter cylinder anti-vortex/trash rack device is required. New device to meet VESCH Minimum Standard 3.14 requirements and materials to comply with ASTM A 929, 14 gage 0.064 inch thickness (same as Hawthorne Pond cap).

- **Slipliner Pipe insertion into existing 24 inch ID CMP pipe. Use 20-inch OD Snap-Tite Solid or approved equal. Pipe must meet attached specification, 42 feet length. Inverts to match existing (upstream El. 19.36; downstream El. 18.58).**
- **Proper connection of carrier/host pipe to concrete manhole using flexible rubber boot pipe-to-manhole connection (Kor-N-Seal or approved equal). Alternate connection types and procedures must be approved in advance. Specification/detail attached.**
- **Grouting- Annular space between reline pipe and host pipe. Grout pressures must not exceed pipe allowables as pipe buckling can occur. Recommended grouting procedure information attached.**

Emergency Spillway

EMERGENCY SPILLWAY WILL DISCHARGE

Configuration- Widen from 12 ft. to 18 ft. bottom width with current 2H:1V sideslopes; D=2' MIN. Use EC-2 matting in level section. ~~Emergency spillway will not discharge 10-year event, but will for larger 25 and 50-year storms. 100-year will overtop embankment. 10-YR AND LARGER STORMS. 50-YEAR HAS 1' FB. 100-YR HAS NEAR 1'.~~

Elevation- Lower Emergency Spillway crest elevation approximately 1 foot to El. 25.5 (to be set at 1' minimum above riser crest).

(NOTE: 1.7' DEEP IN E. S.)

Excavated material - From emergency spillway lowering to be spread across top of dam to achieve level top of dam elevation at El. 28.2. Maintain minimum 8 ft. wide dam width. Current average top of dam is 9 ft. Average depth of fill required across top of dam crest (120 feet length) is 0.6 feet (Current elevation varies from high at 27.92 to low at 27.19, average elevation is 27.5).

- **Minor fill placement and compaction in toe erosion area at downstream right embankment toe. Use excess material from emergency spillway excavation.**
- **Outlet Protection-** Due to decrease in outlet barrel size, higher outlet velocities will be present, thus bigger outlet protection required. Using the 10-year discharge and based on VESCH Minimum Standard 3.18 & 3.19, use OP with La= 30 feet, downstream width W=34.5 feet, upstream width at pipe 4.5 feet and Class I riprap.

Erosion Protection- EC-2 matting of ~~entire~~ ^{SELECT} downstream embankment ~~to protection too~~ ^{FOR ERODED AREAS} erosion area and ~~for 100-year overtopping.~~ • 100-YEAR CONTAINED WITH 1' OF FB, IF EMBANK IS RAISED.

Stabilize with seed & mulch all disturbed and matted areas.

Final Routing Using Pondpack v 6.0, SCS hydrology and Level Pool routing methods

48" RISER; 20" OD BARREL

SEE

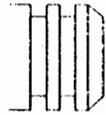
COMPS. AND MODEL

	Inflow	Outflow	WSEL
1-year	35.34 cfs	9.8 cfs	24.38
2-year	54.79 cfs	21.2 cfs	25.06
10-year	125.6 cfs	58.4 cfs	26.55
25-year	144.87 cfs	110.7 cfs	26.78
50-year	170.77 cfs	154.9 cfs	27.19
100-year	196.81 cfs	Overtops	27.27
		163.91	27.04

Freeboard to New TOD, ±ft. 1.2 FT.
FB ~ 1.0'

H.D. POLYETHYLENE PIPE SYSTEMS, INC.

Featuring



SNAP-TITE:
Your Culvert Lining Solution

Manufactured From

DRISCOPIPE

Corrugated Metal Pipe (CMP) Comparisons

Existing CMP I.D. Size	Snap-Tite Nominal O.D. Size	Snap-Tite Average O.D. Size	Snap-Tite Average I.D. Size	Snap-Tite Wall Thickness	Lbs. per Foot	% of Flow
12"	10"	10.75"	10.09"	0.330"	4.62	165%
15"	12"	12.75"	11.97"	0.390"	6.48	145%
18"	14"	14"	13.14"	0.430"	7.83	104%
18"	16"	16"	15.02"	0.490"	10.12	120%
21"	16"	16"	15.02"	0.490"	10.12	109%
21"	18"	18"	16.89"	0.555"	12.94	150%
24"	18"	18"	16.89"	0.555"	12.94	104%
24"	20"	20"	18.77"	0.615"	15.96	138%
27"	20"	20"	18.77"	0.615"	15.96	101%
27"	22"	22"	20.65"	0.675"	19.32	130%
30"	22"	22"	20.65"	0.675"	19.32	98%
30"	24"	24"	22.52"	0.740"	22.98	124%
36"	28"	28"	26.28"	0.860"	31.31	115%
36"	30"	30"	28.15"	0.925"	35.92	138%
42"	32"	32"	30.03"	0.895"	40.89	109%
42"	34"	34"	31.91"	1.045"	46.14	128%
48"	36"	36"	33.78"	1.110"	51.74	104%
48"	40"	39.37"	36.95"	1.210"	61.85	132%

Reinforced Concrete Pipe (RCP) Comparisons

Existing RCP I.D. Size	Snap-Tite Nominal O.D. Size	Snap-Tite Average O.D. Size	Snap-Tite Average I.D. Size	Snap-Tite Wall Thickness	Lbs. per Foot	% of Flow
12"	10"	10.75"	10.09"	0.330"	4.62	105%
15"	13"	13.39"	12.56"	0.415"	7.15	91%
18"	14"	14"	13.14"	0.430"	7.83	72%
18"	16"	16"	15.02"	0.490"	10.12	104%
21"	18"	18"	16.89"	0.555"	12.94	92%
21"	20"	20"	18.77"	0.615"	15.96	116%
24"	20"	20"	18.77"	0.615"	15.96	87%
24"	22"	22"	20.65"	0.675"	19.32	110%
27"	22"	22"	20.65"	0.675"	19.32	80%
27"	24"	24"	22.52"	0.740"	22.98	101%
30"	24"	24"	22.52"	0.740"	22.98	76%
30"	28"	28"	26.28"	0.860"	31.31	115%
36"	30"	30"	28.15"	0.925"	35.92	86%
36"	32"	32"	30.03"	0.895"	40.89	98%
42"	36"	36"	33.78"	1.110"	51.74	92%
42"	40"	39.37"	36.95"	1.210"	61.85	115%
48"	40"	39.37"	36.95"	1.210"	61.85	86%
48"	42"	42"	39.42"	1.290"	70.39	97%



Snap-Tite Solid vs. Corrugated Metal Pipe

CMP ID (IN.)	SNAP-TITE SOLID OD	SNAP-TITE SOLID ID	PERCENT FLOW
12	10.75	10.08	168%
15	12.75	11.966	146%
18	14	13.138	115%
18	16	15.016	165%
21	16	15.016	109%
21	18	16.892	149%
24	18	16.892	105%
24	20	18.77	139%
24	22	20.646	179%
27	22	20.646	130%
27	24	22.524	165%
30	24	22.524	124%
30	28	26.278	187%
36	28	26.278	115%
36	30	28.154	138%
36	32	30.03	165%
42	32	30.03	109%
42	34	31.908	128%
48	36	33.784	105%
48	40	36.948	133%
48	42	39.416	158%
54	42	39.416	115%
54	48	44.336	158%
60	48	44.336	119%
60	54	50.676	170%
72	63	59.02	138%

n CMP = 0.024, n Snap-Tite Solid = 0.009,
n CONC = 0.015



Snap-Tite Solid vs. Reinforced Concrete Pipe

RCP ID (IN.)	SNAP-TITE SOLID OD	SNAP-TITE SOLID ID	PERCENT FLOW
12	10.75	10.08	105%
15	12.75	11.966	91%
18	16	15.016	103%
21	18	16.892	93%
24	22	20.646	112%
27	24	22.524	103%
30	28	26.278	117%
36	32	30.03	103%
42	36	33.784	93%
48	42	39.416	99%
54	48	44.336	99%
60	54	50.676	106%
72	63	59.02	98%

n CMP = 0.024, n Snap-Tite Solid = 0.009,
n CONC = 0.015



Chapter 5

Product Dimensions

Snap-Tite Profile and Snap-Tite Solid

Snap-Tite comes in two product lines: Snap-Tite Pro Line and Snap-Tite Solid. Both products feature the patented Snap-Tite joining system which will ensure an easy-to-install, reliable, water-tight seal. Snap-Tite Pro Line is our “profile-wall” piping system. Lighter weight,

yet just as durable, Pro Line offers greater pipe stiffness, specifically 45 PSI. Snap-Tite Solid is constructed of solid-wall polyethylene pipe and provides flexibility for lining obstructed culverts with the possibility of offset joints or slight bends.

Snap-Tite Solid

	PIPE SDR	1 BS/FT	I.D.	MINIMUM WALL THICKNESS
10" (10.750 OD)	32.5	4.75	10.088	0.331
12" (12.750 OD)	32.5	6.67	11.966	0.392
14.000 OD	32.5	8.05	13.138	0.431
16.000 OD	32.5	10.5	15.016	0.492
18.000 OD	32.5	13.3	16.892	0.554
20.000 OD	32.5	16.41	18.77	0.615
22.000 OD	32.5	19.86	20.646	0.677
24.000 OD	32.5	23.62	22.524	0.738
28.000 OD	32.5	32.19	26.276	0.862
32.000 OD	32.5	42.04	30.03	0.985
36.000 OD	32.5	53.2	33.784	1.108
42.000 OD	32.5	72.37	39.416	1.292
47.244 OD	32.5	91.62	44.336	1.454
54.000 OD	32.5	119.7	50.676	1.662
63.2" OD	32.5	163.46	59.02	1.945



Corrugated Polyethylene Pipe (CPP) Connection to Reinforced Concrete Manholes

This is a general specification prepared by the James City County Environmental Division for connection of high density, corrugated polyethylene with smooth wall outside diameter O.D. pipe to concrete manholes.

Although similar material connections (polyethylene pipe to polyethylene manholes) by heat fusion or thermal welding methods are preferred; frequently for stormwater management and drainage applications, connection to reinforced concrete manholes (dissimilar material connection) is necessary. Connection integrity and water tightness depends on care taken during installation. Proper installation will ensure a sound, watertight connection sufficient for storm drainage applications..

Trench bottom for the storm drain should be over-excavated and properly compacted to minimize differential settlement between the pipe and the manhole. If native soil is stiffer than compacted foundation material, then over-excavation can be omitted. Installation shall be in accordance with recommendations of the Corrugated Polyethylene Pipe Association (CPPA) and ASTM D2321, "Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe".

Field cutting and connections to manholes, catch basins or other pipe materials shall be of a watertight connection using a pipe adapter and manhole boot method in accordance with Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings by the Corrugated Polyethylene Pipe Association (CPPA).

Flexible rubber boot pipe-to-manhole connections shall be of the locked-in factory assembled rubber ring type with stainless steel or durable molded plastic band as manufactured by Kor-N-Seal or approved equal. Installation shall be per manufacturers recommendations and in accordance with the attached drawings. Alternate types and/or procedures must be approved by the James City County Environmental Division.

Depth of minimum cover for initial and final backfill is at least one (1) foot over the pipe crown. Depth of minimum cover may need to be increased for loads during construction, which are sometimes much heavier than anticipated design loads.

Corrugated polyethylene pipe has the potential to deflect or collapse when concrete is poured around it. Deflection must be controlled by use of temporary horizontal and vertical struts installed within the pipe near concrete pours. Recommended strut length is nominal pipe inside diameter I.D. \pm 1/8 inch.

RECOMMENDED

GROUTING
PROCEDURES

SOME NOTES ON THE GROUTING PROCEDURE FOR HDPE CULVERT LINER PIPE

1. The culvert lining rehab job is not completed until some cement/grouting work is done. As a very minimum the inlet end must be cemented between the existing culvert (or headwall) and the newly inserted liner pipe, so that all of the water will then be directed into the liner - unless that is accomplished, we have not repaired the problem.

It is also considered mandatory to cement/grout seal the outlet end, in the same manner, so that the interior annular space between the existing culvert and the liner is completely sealed off from the atmosphere, thereby slowing further corrosion of the existing cmp pipe.

It is considered desirable and highly recommended to then grout the entire annular space between the old and new, end to end. Not all DOT's do this and they have not experienced further deterioration and silt through, but it could happen. It is best, however, to grout full length.

2. Ends are cemented and sealed first, after the liner pipe has been inserted, leaving about 2 feet of liner pipe extended on both ends. This is most easily accomplished with fresh cement and a trowel, working it in around the annular space, from each end to a depth of about one-half the liner pipe dia. Let this dry before grouting the interior, so that the hardened ends form donut-like seals at each end.
3. The grout is poured into the annular space between the old and new pipes, after the outer cement rings on both ends have hardened. This may be accomplished by several different procedures, but the engineer on site will have determined in advance how they are going to do it. Usually, this will involve leaving entry and air vent holes in the ends, or going down through the old culvert to let the grout in. The air vent hole is placed in a strategic position so that it also serves as an indicator when the culvert is full (when grout starts coming out of the vent).

Depending on culvert angle, the grout mixture being used, overall size of the space to be filled, or some combination of these factors, the grout may be allowed to fill by gravity or it may be pumped in under pressure.

4. Caution - if the culvert's original problem involved bottom wash-out, make sure that the soil beneath the culvert does not open into a deep hole. If it does, they may end up pouring grout into a bottomless pit, and wondering what happened.
5. A number of states and counties have specs already in place for "Low Strength Mortar Backfill Material".

For your information, the grout to be used should be something resembling the following:

(BY WEIGHT - NOT BY VOLUME)

Cement	3%
Fly Ash	7%
Water	14%
Sand	76%

SAMPLE-. MATERIAL AND GROUT SPECIFICATIONS FOR CULVERT LINERS

A. Material. The pipe liners shall be a high-density polyethylene with the requirements of ASTM D-1248 for Type M, Class C, Category 5, grade P 34 having a Plastic Pipe Industries (PPI) recommended designation of PE 3408 and a cell classification of PE 345434C such as Phillips Driscopipe, of Richardson, TX, or, Chevron Plexco. of Bensenville, IL-, or Poly Pipe, of Gainsville, TX, or Poly Systems, of Steelville, MO. The pipe shall have a minimum SDR (Standard Dimension Ratio) of 21 or a minimum pipe stiffness of 33 psi in accordance ASTM-2412.

The liner outside diameter is to be a maximum of 10% clearance between ID of existing pipe and OD of PE liner, or as close as manufacture availability allows.

B. Annular Space, Grouting. The contractor shall use a grout plant that is capable of accurately measuring, proportioning, mixing, and discharging by volume. The plant must also contain a positive displacement cement injection pump capable of applying 2-3 psi but not to exceed 4 psi at the end of the discharge pipe, as required by the engineer.

C. Grouting Materials.

500-3 APWA. ANNULAR SPACE GROUTING, PROCEDURES
PER APWA, AND AS FOLLOWS:

500-3.1.4 Materials. The grout materials shall consist of portland cement and flyash and other additives. (Example: Sand 2300# to meet the requirements of ASTM C 33. Water 280 - 300#.

Portland Cement 100# ASTM C 150.

Fly Ash 300# ASTM C 618,

Darafill 2 Eggs per yd. as manufactured by W.R. Grace. (Or approved equal) This mix will allow pumping through a 2" pump and will yield a 200-400 psi mix. according to ASTM C 39, and have a density of 90-110#.



Chapter 10

Annular Space Grouting

Culverts are vital to the long life of highways. The continued proper functioning of culverts means that the bedding of the highway will remain in place and there will be fewer problems. Before you replace old culverts or repair them, time should be taken to properly analyze their condition.

When rehabilitating culverts, the primary goals are to stop the leakage of water and road back-fill materials, secure the liner in place and reinforce the old culvert if needed. Our Snap-Tite high-density polyethylene liner is designed to accomplish these goals.

Grouting the annular space is a key process in reaching these goals. Small spaces require high flow grouts to be properly filled. Large amounts of space may require centering of the liner to prevent high loads. Proper grouting of the annular space insures a long life for the pipe system. This is critical for culvert rehabilitation.

Warning! All piping materials can be collapsed if excessive grouting pressures are used. Use Table 1, "Ring Compression Strength for Snap-Tite Liner" to determine the maximum grouting pressure.

Installation of Grout

The following key factors should be determined first in order to successfully grout the annular space between a Snap-Tite liner and an existing pipe:

1. Condition of existing pipe
2. Pipe length
3. Annular space
4. Flotation
5. Elevation Change

6. Bulkheading Pipe Ends

7. Grout Types

Condition of Existing Pipe

The condition of the pipe to be lined is important in determining the liner and grout requirements. Grout will fill the space between the liner and the pipe and assist in maintaining a pipe seal. If the existing pipe has lost its ability to handle soil and highway loads, a liner and a grout must be selected to handle these loads. In most situations, a liner with a DR of 32.5 (see Table 1) and a low-density foam grout with 100 to 300 psi strength will handle these loads.

There are many types of grout available. The conditions, annular space and load requirements will determine the type required. The flow rates and strength vary greatly. See the section on grout for more information

It is important to keep in mind that, as with most situations, there is no one solution. A thorough analysis of the existing culvert pipe is needed before making liner and grout selections. Engineering analysis is required.

Pipe Length

The length of the pipe is a very important consideration when grouting. For short runs of pipe, almost any sand-cement grout mix will work as long as low pumping pressure is applied. Gravity flow is normally used (provided there is less than a ten foot elevation change) to provide pressure for grouting short runs of pipe up to eighty feet in length, depending upon the flow rate of the grout. As the length of pipe increases, the amount of pressure required for grouting the annular space increases. See

Injection Procedures and Pressure for more specific information.

Annular Space

Annular space is the area between the liner and the existing pipe. If there is only a small area between the liner and the existing pipe, more pressure may be required to fill this space. If there is a large difference between the liner and the existing pipe, there may be a large amount of weight applied to the liner after installation.

A large annular space occurs when a 48" liner is placed inside of a 72" pipe. If the liner sits on the bottom of the 72" pipe, there is a 24" space between the top of the 48" pipe and the 72" pipe. When large spaces occur, the liner can be filled with water or blocked internally to prevent problems. Also, see "Flotation Control" for more information.

When the annular space is small, a high flow, low-density grout under low pressure (less than five feet of head or 2 psi) will fill this space. Portland cement grouts often require higher pressure than is allowable to flow the length of the pipe.

Flotation

Why is flotation a concern? When a pipe is grouted in place, it will rise to the top of the culvert if the liner weighs less than the grout. On longer runs of pipe, the ends of the liner are held in place but the center of the liner may float. The occurrence of either of these events will change the grade of the liner; consequently, less water will flow through the lined pipe. Methods that help prevent this problem are:

- Filling the liner with water.
- Attaching wood, plastic or metallic boards inside along the top of the culvert to prevent flotation. This technique is also referred to as bridging or blocking.

- Runners attached to the bottom of the liner are also used to center the liner.

In most cases, filling the Snap-Tite liner with water and using a low-density grout makes flotation less likely to occur. If the annular space is less than two to four inches between the pipe and the liner, flotation is generally not a concern.

Elevation Change

When there are large changes in elevation between the ends of a section of pipe being lined with Snap-Tite liner, collapse pressure must be considered. When the elevation difference is greater than five feet, the method of grout installation must be altered to prevent collapse of the liner. See Installation Considerations for more specific information.

Bulkheading Pipe Ends

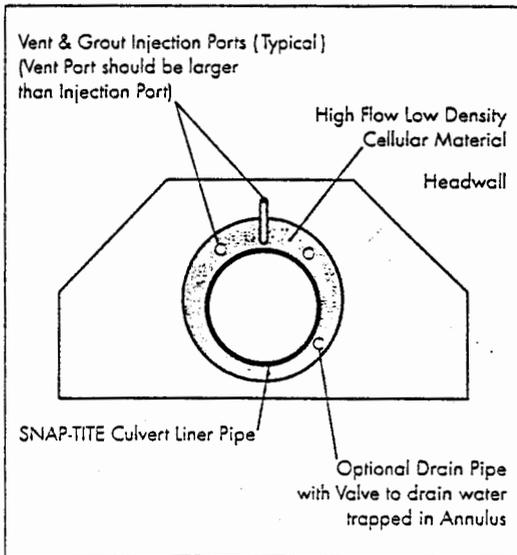
After sealing the Snap-Tite Liner in place when it has been pulled or pushed inside the culvert pipe, the annular space between the culvert and the liner must be sealed in order to stop leakage from the old pipe. After the Snap-Tite Liner is installed and ends sealed, the flow of water through the annular space will stop; soil and backfill will remain in place.

End seals can be made in many different ways. For small diameter liners, Oakum soaked in water-activated urethane sealant is frequently used. However, when there is a large difference in annular space between the liner and the original culvert pipe, bricks and mortar are often used as end seals. In this case, expansive chemical grouts are used to fill any leaks in the end seal.

In special situations, head walls are cast at the end of the culvert pipe and around the liner. When head walls are used, the wall must be designed to handle the forces of expansion and contraction. The design must include sealing of the liner to the head wall. On long sections of

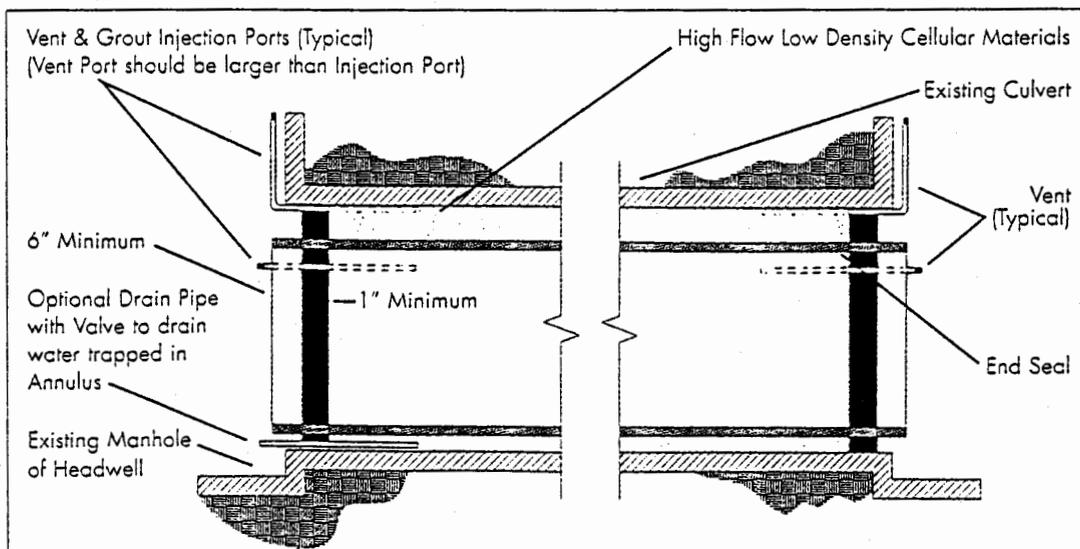
liner, it is important to extend the liner through the wall at least 6 inches on each end to allow for possible contraction. Often, a water stop is attached to the Snap-Tite liner and cast into the head wall. Drawing 1 shows the use of a head wall.

Drawing 1



When the annular space between the Snap-Tite liner and the culvert pipe is grouted with low density, high flow grout, the end seal is used to hold the grout in place during installation. Since these grouts readily flow through any leaking area, the end seal must hold the grout until it sets up. Drawing 2 shows this detail.

Drawing 2



Grout Types

Grout has traditionally been defined as "a thin, course mortar used for filling masonry joints." In recent years the definition of grout has been expanded to cover a wide range of concrete and organic compounds used to fill masonry joints or space in or around pipes or liners.

Grout can be classified as cellular or non-cellular. Cellular grouts are formed with a multitude of macroscopic, non-interconnected air cells, which are distributed throughout the mass.

The mechanical properties and density may be changed to increase flow or strength characteristics. The amount of foam, water and cement influences these properties.

Various grout types include the following:

- Non-cellular concrete grouts are the traditional Portland cement formulations. These products are well known and are used to grout liners in place. The pumping pressure required to move this grout is often above the collapse pressure of the liner. When working with these products, keep pumping pressures below the pressures shown in Table 1.

- Cellular concrete grouts with low density have strengths in the 75 psi to 500 psi range. As aggregates are added to cellular grouts the density increases. Additional pressure may be required.
- Low-density foam grouts have low weight (20 to 80 lbs per cubic foot) and high flow rates as measured by flow cone (ASTM C939). These new low-density foam grouts are highly viscous as compared to regular cement grouts. The flow cone measure of viscosity is less than 18 seconds as compared to water with a value of 8 seconds. This shows an excellent flow rate. This shorter time, higher flow rate, and lower pressure put less pressure on the liner during pumping of this grout.
- Flowable fills are sometimes used to fill the annular space or as backfill around Snap-Tite liner pipe. Flowable fills are available in cellular and non-cellular forms. As a sand/cement grout the density range is from 80 to 120 lbs per cubic foot. These products can be formulated to handle many different applications. The flow characteristics and strength must be analyzed to determine the suitability for a given application.
- Chemical grouts are composed of organic compounds. Epoxy, polyurethane, and acrylamide compounds are used as chemical grouts. Epoxy grouts are used to seal cracks in concrete. Their prime use is to bond and seal cracks less than 1/4" in width.
- Acrylamide and polyurethane grouts are used to seal leaking joints in pipes. These grouts do not provide structural support.
- Polyurethane grouts expand from 10 to 20 times their original volume by foaming. These grouts are used to fill void areas around sewer pipes and culvert pipes.

- Acrylamide grouts are gels. These grouts fill in around a pipe and stop leaks.
- Polyurethane grouts are often used in combination with oakum to seal Snap-Tite liners into culvert pipes. This forms the end seal as shown in Drawing 2. Oakum is soaked in the polyurethane grout. Then the oakum is packed around the Snap-Tite liner. Water is added. The polyurethane grout then foams and increases in volume providing a leak-free seal of the annular space between the liner and the old culvert. This seal keeps high volume, low-density cellular grouts in place until they cure.

Grout materials for short lengths of liner in culverts can consist of Portland cement and fly ash and other additives. A typical formula for a grout consist of: Sand 2.650 # to meet the requirements of ASTM C33, Water 55-60 gallons; Portland Cement 100# ASTM C 150; and Fly ash This mix can be pumped through a 2" pump. When grouting lined culverts more than 100 feet in length, controlled low-density cellular grout (CLDCG) should be used. The grout should have a density of less than 59 lbs per cubic foot. The compressive strength should be 100 psi to 300 psi.

Installation Considerations

Common ways to install cement grouts are:

- fill the annular space with multiple lifts;
- fill from multiple ports so that little pressure is required to flow the grout;
- pull a wand through the annular space while pumping the grout in place;
- filling the liner with water to counter the collapse and buoyancy forces.

Table 1 shows the collapse pressure of Snap-Tite liners of different wall thickness. The DR is the ratio of the wall thickness to the diameter. A higher DR indicates a thinner wall.

Table 1
Ring Compression Strength for Snap-Tite Liner

SERVICE LIFE	PIPE DR 17	PIPE DR 21	PIPE DR 26	PIPE DR 32.5
1 day	65 ft of water	36 ft of water	18 ft of water	10 ft of water
	28 psi	16 psi	8 psi	4 psi
1 month	34 ft of water	25 ft of water	10 ft of water	6 ft of water
	15 psi	11 psi	4 psi	2 psi
1 year	32 ft of water	19 ft of water	10 ft of water	6 ft of water
	14 psi	8 psi	4 psi	2 psi
50 years	29 ft of water	17 ft of water	9 ft of water	4 ft of water
	13 psi	7 psi	4 psi	2 psi

Data for this table is from "Phillips Driscopipe Design Manual". This data may be used for liners using solid wall high-density polyethylene pipe. This data applies to unsupported pipe only. Temperature is 73 F.

*Note: Direct burial or grouting of the pipe supports the pipe increasing structural differential-pressure capability about four-fold.

Data from Table 1 is also used to determine the long-term strength of the liner when exposed to ring compression loading from water above the pipe. If a liner is not grouted in place or buried, then the values in the above table indicate the amount of water that the unsupported liner can withstand. Example: if the normal water table is 3.5 feet above the culvert pipe, the DR 32.5 liner can be used because the liner can withstand 4 feet of water above the liner pipe for fifty years.

When the liner is grouted in place, the grout provides sidewall support for the liner pipe. In most situations, the strength of the grout determines the strength of the culvert and the liner pipe. When a liner is buried and the soil modulus is 1,000 psi or greater, the numbers in Table 1 can be multiplied by 4 to determine the collapse pressure from hydrostatic pressure.

If a 36" pipe 200 feet long with an elevation

change of 35 feet is being lined with a 32" DR 32.5 liner, and the annular space is to be filled with a low density grout (65 lbs. per cubic foot), the collapse force will be greater than the 10 ft of water. To compensate for this collapse force, the liner must be capped on the lower end and filled with water. Once the liner is filled with water the force on the inside will be greater than the force on the outside (assuming a grout density of 65 lbs. per cubic foot) and the liner can be grouted in place without collapsing the liner.

Internal Liner Support

In many cases, it is not practical to fill large liners (36" and larger) with water. Another way to reinforce large diameter liners before grouting is to cross brace the pipe with timbers. The inside diameter of the liner must be measured and a vertical and horizontal supports cut to fit. The size of the support timbers is determined by the loading around the liner pipe. The fol-

Table 2
Determining Grout Requirements

CULVERT SIZE	LINER OD	GROUT	
		CU. FT/FT	CU. YD/10 FT
12" ID	10.75 OD	.25	.10
15" ID	12.75 OD	.34	.13
18" ID	16.00 OD	.70	.26
18" ID	16.00 OD	.37	.14
21" ID	16.00 OD	1.01	.37
21" ID	18.00 OD	.63	.24
24" ID	20.00 OD	.96	.36
24" ID	22.00 OD	.50	.19
27" ID	22.00 OD	1.34	.49
27" ID	24.00 OD	.83	.31
30" ID	24.00 OD	1.77	.65
30" ID	28.00 OD	.63	.23
36" ID	28.00 OD	2.79	1.03
36" ID	30.00 OD	2.16	.80
36" ID	32.00 OD	1.48	.55
42" ID	34.00 OD	3.31	1.23
42" ID	36.00 OD	2.55	.95
48" ID	39.37 OD	4.11	1.52
48" ID	42.00 OD	2.94	1.09
54" ID	42.00 OD	6.28	2.33
54" ID	47.25 OD	3.73	1.38
60" ID	47.25 OD	7.46	2.76
60" ID	54.00 OD	3.73	1.38
72" ID	54.00 OD	12.36	4.60

* No allowance for spillage or voids outside of culvert. 1 cubic Yard = 27 cubic Feet
 Volume in Cubic Feet = $0.00545 (D_C^2 - D_L^2)$
 Volume in Cubic Yards / 10 Ft. length = $.002018 (D_C^2 - D_L^2)$

Example*:

36" ID Existing Culvert, 54 Foot long
 32" OD Snap-Tite Liner Installed

Grout Required:

From Table above; $(1.48 \times 54') \div 27 = 2.96$ cu. yard use 3 YARDS

or

$(0.55 \times 54') \div 10 = 2.96$ CU. YD., use min 3 YARDS

ADD: Allowance for spillage, voids and headwall

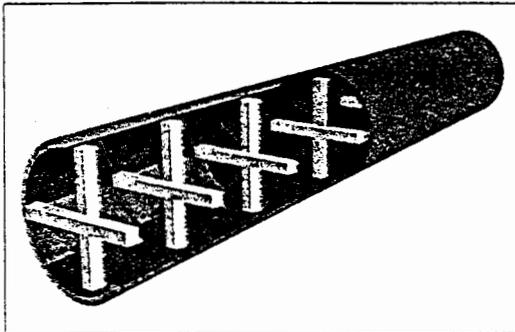
lowing factors affect the load on the liner:

- Density of the grout
- Pumping pressure to install grout
- Amount of annular space and mass of grout above liner.

These internal supports prevent pipes from collapsing when external grouting exceeds the strength of the liner. This is an excellent method for supporting the liner to prevent collapse and reduce the chance of the joints leaking.

The size of support timbers is determined by the amount of loading on the liner. Typically supports are made from 4" x 4" timbers or 6" x 6" timbers. Drawing 3 shows typical internal supports.

Drawing 3
Internal Support for Snap-Tite Liners



Cross braces are usually constructed of 4x4 or 6x6 timbers.

Internal supports are best used in pipe sizes over 30" ID. A person must be able to assemble and disassemble the supports.

ANNULAR SPACE GROUTING PROCEDURES

Equipment

Portland Cement based grout: Cement mixer and grout pump.

Controlled density cellular grout: Foam generator. Example: Cellufoam Model 620, Strong Manufacturing compressed air foam generator.

Most suppliers of foam additives require trained operators for owners or certified contractors for specialty equipment. Experience and certification are important when using these new specialty products.

Injection Procedure and Pressure

Care must be given to the pumping pressure applied to the grout being pumped around the Snap-Tite liner. Table 1, "Ring Compressive Strength for Snap-Tite Liner" shows the ring compression strength of the various wall thickness' (DR) of liners. It is recommended that grout be pumped with very low pressure and with no more than two PSI hammer.

Pumping equipment shall be of a size sufficient to inject grout at a velocity and pressure relative to the size of the annular space. Gauges to monitor grout pressure shall be attached immediately adjacent to each injection port. The gauges shall conform to an accuracy of one-half percent error over the full range of the gauge. The range of the gauge shall not be more than twice the design grout pressure or 5 PSI which ever is smaller. Pressure gauges shall be instrument oil filled and attached to a saddle-type diaphragm seal (gauge saver) to prevent clogging with grout. All gauges shall be certified and calibrated in accordance with ANSI B-0, Grade 2A.

Porting of Annular Space

The annular space around the liner must be sealed on each end. When using controlled low-density cellular grout, these seals must be leak free. This grout flows like water and will be lost if not properly sealed. Some of the grout will fill voids around the pipe and reinforce the piping system.

The annular space will have a grout inlet pipe and an air outlet vent pipe. Drawing 2 shows a typical pipe arrangement and end seal. The air outlet pipe is very important. Air must be allowed to discharge or grout can not fill the entire annular space.

In addition, no water shall be present in the annular space before injecting the grout. The presence of water changes the grout mix and can change the strength and characteristics of the grout.

Testing

To insure proper installation of grout, the following tests are suggested:

- 1) Viscosity shall be checked with a flow-cone used according to ASTM C 939.
 - 2) A performance test will be performed on each type of grout and grouting systems used.
 - 3) All grout pumps shall be equipped with a pressure gauge. Injection pressure shall approach zero for level applications. Injection pressure shall not exceed the ring compression loading of the liner under any condition.
 - 4) The water shall be free of acids, salts, oils and organic materials. A pH test may be required if water is used from sources other than an approved water system.
 - 5) The suppliers of the foam concentrate, the cement, the fly ash, the aggregate, the admixture, the retarders and the plasticizers may require other tests.
- 1.3 "RELINING UNDER THE INTER-STATE", OTEC '94, Len I. Liotti, Midwest Mole, Inc., November 30, 1994
 - 1.4 "A CLOSER LOOK AT FLOWABLE FILL", Warren Burns, Utility Contractor, Aug. 1999
 - 1.5 "Greenbook", Standard Specifications for Public Works Construction, 1997 Edition; BNI Building News, 1612 So. Clementine St; Anaheim, CA 92802
 - 1.6 "Phillips Driscopipe Design Manual", Phillips Driscopipe, Inc., Richardson, TX
 - 1.7 "WEHOLITE Design Information", KWH Pipe, Huntsville, Ontario

References

- 1.1 Plastic Pipe Instate (PPI)- Chapter 10- "Pipeline Rehabilitation by Sliplining with Polyethylene Pipe", 1993
- 1.2 "ULTRA-LITE AND TERRA-FILL GEOTECHNICAL CELLULAR CONCRETES", Cellufoam Concrete Systems, Ontario, Canada

Snap-Tite Culvert Liners



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<http://www.isco-pipe.com>



H.D. POLYETHYLENE PIPE SYSTEMS, INC.

Featuring



SNAP-TITE:
Your Culvert Lining Solution

Manufactured From
DRISCOPE

Corrugated Metal Pipe (CMP) Comparisons

Existing CMP I.D. Size	Snap-Tite Nominal O.D. Size	Snap-Tite Average O.D. Size	Snap-Tite Average I.D. Size	Snap-Tite Wall Thickness	Lbs. per Foot	% of Flow
12"	10"	10.75"	10.09"	0.330"	4.62	165%
15"	12"	12.75"	11.97"	0.390"	6.48	145%
18"	14"	14"	13.14"	0.430"	7.83	104%
18"	16"	16"	15.02"	0.490"	10.12	120%
21"	16"	16"	15.02"	0.490"	10.12	109%
21"	18"	18"	16.89"	0.555"	12.94	150%
24"	18"	18"	16.89"	0.555"	12.94	104%
24"	20"	20"	18.77"	0.615"	15.96	138%
27"	20"	20"	18.77"	0.615"	15.96	101%
27"	22"	22"	20.65"	0.675"	19.32	130%
30"	22"	22"	20.65"	0.675"	19.32	98%
30"	24"	24"	22.52"	0.740"	22.98	124%
36"	28"	28"	26.28"	0.860"	31.31	115%
36"	30"	30"	28.15"	0.925"	35.92	138%
42"	32"	32"	30.03"	0.895"	40.89	109%
42"	34"	34"	31.91"	1.045"	46.14	128%
48"	36"	36"	33.78"	1.110"	51.74	104%
48"	40"	39.37"	36.95"	1.210"	61.85	132%

Reinforced Concrete Pipe (RCP) Comparisons

Existing RCP I.D. Size	Snap-Tite Nominal O.D. Size	Snap-Tite Average O.D. Size	Snap-Tite Average I.D. Size	Snap-Tite Wall Thickness	Lbs per Foot	% of Flow
12"	10"	10.75"	10.09"	0.330"	4.62	105%
15"	13"	13.39"	12.56"	0.415"	7.15	91%
18"	14"	14"	13.14"	0.430"	7.83	72%
18"	16"	16"	15.02"	0.490"	10.12	104%
21"	18"	18"	16.89"	0.555"	12.94	92%
21"	20"	20"	18.77"	0.615"	15.96	116%
24"	20"	20"	18.77"	0.615"	15.96	87%
24"	22"	22"	20.65"	0.675"	19.32	110%
27"	22"	22"	20.65"	0.675"	19.32	80%
27"	24"	24"	22.52"	0.740"	22.98	101%
30"	24"	24"	22.52"	0.740"	22.98	76%
30"	28"	28"	26.28"	0.860"	31.31	115%
36"	30"	30"	28.15"	0.925"	35.92	86%
36"	32"	32"	30.03"	0.895"	40.89	98%
42"	36"	36"	33.78"	1.110"	51.74	92%
42"	40"	39.37"	36.95"	1.210"	61.85	115%
48"	40"	39.37"	36.95"	1.210"	61.85	86%
48"	42"	42"	39.42"	1.290"	70.39	97%



Snap-Tite Solid vs. Corrugated Metal Pipe

CMP ID (IN.)	SNAP-TITE SOLID OD	SNAP-TITE SOLID ID	PERCENT FLOW
12	10.75	10.08	168%
15	12.75	11.966	146%
18	14	13.138	115%
18	16	15.016	165%
21	16	15.016	109%
21	18	16.892	149%
24	18	16.892	105%
24	20	18.77	139%
24	22	20.646	179%
27	22	20.646	130%
27	24	22.524	165%
30	24	22.524	124%
30	28	26.278	187%
36	28	26.278	115%
36	30	28.154	138%
36	32	30.03	165%
42	32	30.03	109%
42	34	31.908	128%
48	36	33.784	105%
48	40	36.948	133%
48	42	39.416	158%
54	42	39.416	115%
54	48	44.336	158%
60	48	44.336	119%
60	54	50.676	170%
72	63	59.02	138%

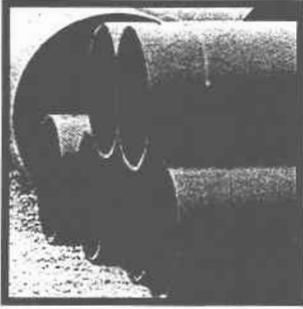
n CMP = 0.024, n Snap-Tite Solid = 0.009,
n CONC = 0.015



Snap-Tite Solid vs. Reinforced Concrete Pipe

RCP ID (IN.)	SNAP-TITE SOLID OD	SNAP-TITE SOLID ID	PERCENT FLOW
12	10.75	10.08	105%
15	12.75	11.966	91%
18	16	15.016	103%
21	18	16.892	93%
24	22	20.646	112%
27	24	22.524	103%
30	28	26.278	117%
36	32	30.03	103%
42	36	33.784	93%
48	42	39.416	99%
54	48	44.336	99%
60	54	50.676	106%
72	63	59.02	98%

n CMP = 0.024, n Snap-Tite Solid = 0.009,
n CONC = 0.015



Chapter 5

Product Dimensions

Snap-Tite Profile and Snap-Tite Solid

Snap-Tite comes in two product lines: Snap-Tite Pro Line and Snap-Tite Solid. Both products feature the patented Snap-Tite joining system which will ensure an easy-to-install, reliable, water-tight seal. Snap-Tite Pro Line is our “profile-wall” piping system. Lighter weight,

yet just as durable, Pro Line offers greater pipe stiffness, specifically 45 PSI. Snap-Tite Solid is constructed of solid-wall polyethylene pipe and provides flexibility for lining obstructed culverts with the possibility of offset joints or slight bends.

Snap-Tite Solid

	PIPE SDR	1 BS/FT	I.D.	MINIMUM WALL THICKNESS
10" (10.750 OD)	32.5	4.75	10.088	0.331
12" (12.750 OD)	32.5	6.67	11.966	0.392
14.000 OD	32.5	8.05	13.138	0.431
16.000 OD	32.5	10.5	15.016	0.492
18.000 OD	32.5	13.3	16.892	0.554
20.000 OD	32.5	16.41	18.77	0.615
22.000 OD	32.5	19.86	20.646	0.677
24.000 OD	32.5	23.62	22.524	0.738
28.000 OD	32.5	32.19	26.276	0.862
32.000 OD	32.5	42.04	30.03	0.985
36.000 OD	32.5	53.2	33.784	1.108
42.000 OD	32.5	72.37	39.416	1.292
47.244 OD	32.5	91.62	44.336	1.454
54.000 OD	32.5	119.7	50.676	1.662
63.2" OD	32.5	163.46	59.02	1.945



Corrugated Polyethylene Pipe (CPP) Connection to Reinforced Concrete Manholes

This is a general specification prepared by the James City County Environmental Division for connection of high density, corrugated polyethylene with smooth wall outside diameter O.D. pipe to concrete manholes.

Although similar material connections (polyethylene pipe to polyethylene manholes) by heat fusion or thermal welding methods are preferred; frequently for stormwater management and drainage applications, connection to reinforced concrete manholes (dissimilar material connection) is necessary. Connection integrity and water tightness depends on care taken during installation. Proper installation will ensure a sound, watertight connection sufficient for storm drainage applications..

Trench bottom for the storm drain should be over-excavated and properly compacted to minimize differential settlement between the pipe and the manhole. If native soil is stiffer than compacted foundation material, then over-excavation can be omitted. Installation shall be in accordance with recommendations of the Corrugated Polyethylene Pipe Association (CPPA) and ASTM D2321, "Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe".

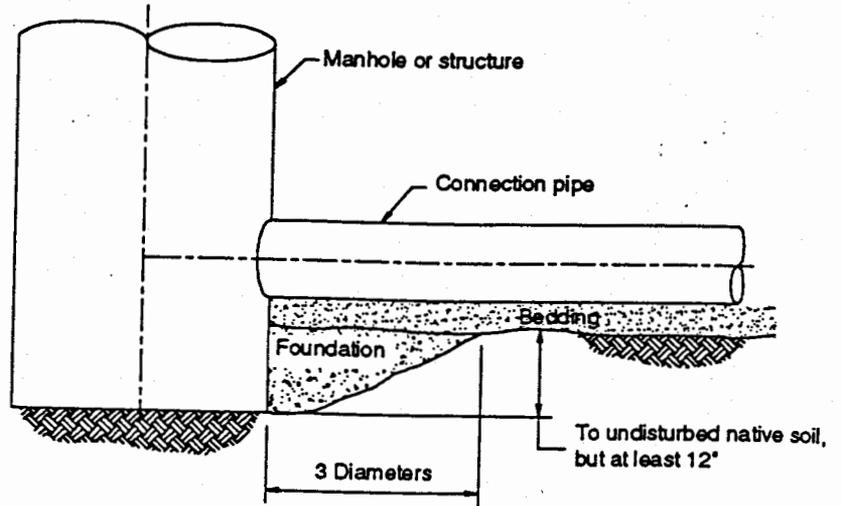
Field cutting and connections to manholes, catch basins or other pipe materials shall be of a watertight connection using a pipe adapter and manhole boot method in accordance with Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings by the Corrugated Polyethylene Pipe Association (CPPA).

Flexible rubber boot pipe-to-manhole connections shall be of the locked-in factory assembled rubber ring type with stainless steel or durable molded plastic band as manufactured by Kor-N-Seal or approved equal. Installation shall be per manufacturers recommendations and in accordance with the attached drawings. Alternate types and/or procedures must be approved by the James City County Environmental Division.

Depth of minimum cover for initial and final backfill is at least one (1) foot over the pipe crown. Depth of minimum cover may need to be increased for loads during construction, which are sometimes much heavier than anticipated design loads.

Corrugated polyethylene pipe has the potential to deflect or collapse when concrete is poured around it. Deflection must be controlled by use of temporary horizontal and vertical struts installed within the pipe near concrete pours. Recommended strut length is nominal pipe inside diameter I.D. \pm 1/8 inch.

Figure 1. Bedding For Transition From Trench Support to Manhole Connection.

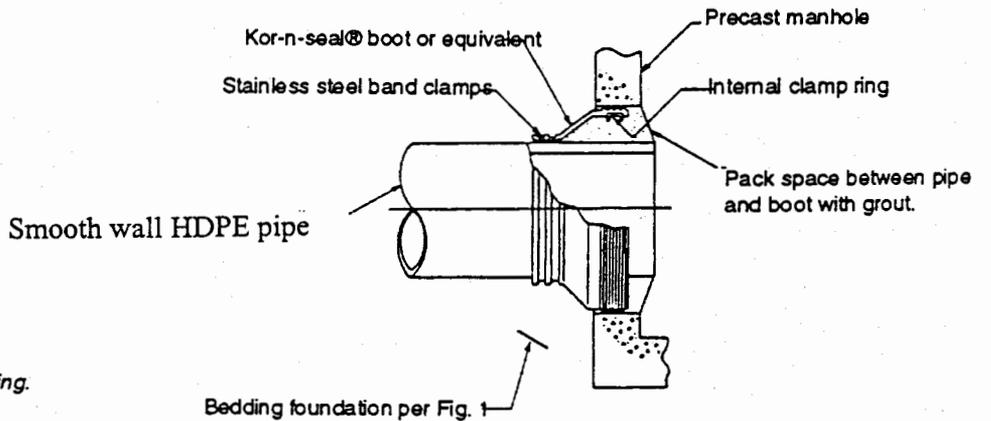


Note: Compact foundation and bedding to a minimum of 95% standard proctor density.

Figure 2: Connection to Manhole

Cast or fasten a Kor-N-Seal® boot or equivalent into the manhole outlet wall.

Push pipe into into the boot and clamp in place.



Notes:

1. Do not stand in or on pipe while grouting.
2. Tighten clamps per manufacturer's recommendations

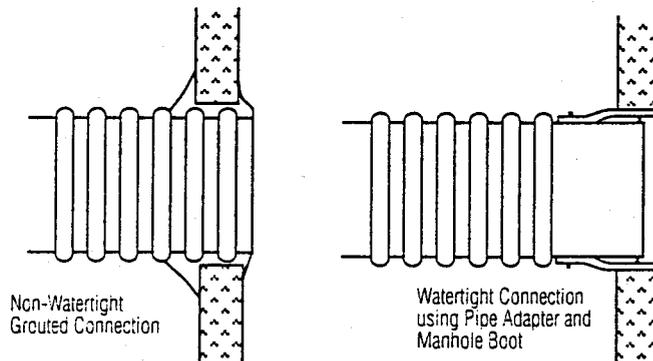
Kor-N-Seal is a registered trademark of NPC Inc.

Connections to Manholes and Catch Basins

Manholes and catch basins provide points for changes in pipe grade, direction, and size; allow storm runoff to enter; and provide for system access.

The method used to join the pipe and the structure depends on the project needs, type of pipe, and the style of the structure. The most common practice for corrugated polyethylene and other pipe is to grout the pipe into the concrete manhole or basin opening. The grout mixture should be pressed between the corrugated pipe and the manhole opening. This type of connection is soil tight, as a minimum, and is acceptable for the majority of storm sewers. Because of the corrugated exterior, this connection also creates a waterstop effect. Flexible watertight connections, or manhole "boots" as they are sometimes called, are also available for projects requiring a tight system. These connections work best on pipe with a smooth outside diameter and so may require the use of pipe adapters. Figure 11 provides additional detail on manhole and catch basin connections.

Figure 11: Manhole and Catch Basin Details

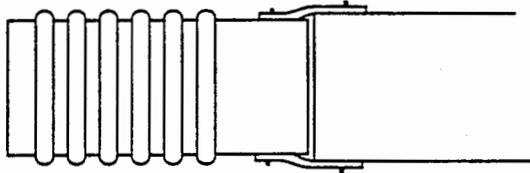


Polyethylene manholes are tailored for use with specific types of polyethylene pipe so that the connection can be with a coupling band or other joint appropriate for the project. The manhole manufacturer should be contacted for additional recommendations.

Connecting Corrugated Polyethylene Pipe to Other Pipe Materials

It is not unusual for corrugated polyethylene pipe to be connected to other types of pipe materials. Available options depend on the joint quality required throughout the system and the particular combination of pipe materials. In most storm sewer applications, the pipe can be joined by butting the pipe ends together, wrapping them with a geotextile, and pouring a concrete collar around them. Although such a connection is dependent on contractor expertise, it will generally limit soil intrusion but not provide a watertight joint. Watertight connections between different materials will require additional fittings and adapters. If those options are not acceptable, a manhole can be used to make the transition. One example of a watertight connection commonly used is shown in Figure 12.

Figure 12: Watertight Connections Between Different Pipe Materials



Pipe manufacturers are a valuable resource during the project planning stage since they are familiar with adapters that work well with their own products.

Curved Alignments

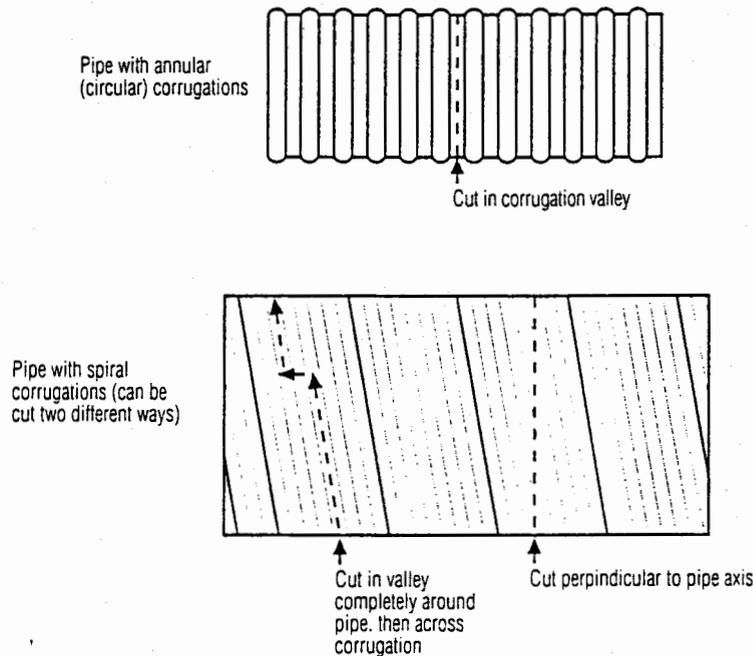
The capability to install pipe in a slightly curved line may allow the drainage system to follow bends along roads or avoid interfering with existing utility lines without the use of fittings.

Polyethylene pipe that has a corrugated exterior and interior is flexible enough to accommodate many curved installations. Smaller diameters can be curved into a tighter radius than larger diameters. The coupling band or other connector usually allows for additional curvature.

Field Cutting Pipe

Pipe lengths will usually need to be modified in the field to meet site requirements. Polyethylene pipe is easy to cut with a hand saw, reciprocating saw, or similar tool. For pipe that will be connected to a manhole or catch basin, the cut should be made in the corrugation valley, as shown in Figure 10.

Figure 10: Field Cutting Pipe for Manhole and Catch Basin Connections



A variety of joint qualities and configurations are available so, if pipe is cut with the intent of joining it with another length of pipe, instructions should be obtained from the individual pipe manufacturer. This will ensure optimal joint performance.

Taps, or connections coming into the pipe perpendicular to its axis, may also be needed to connect a downspout or similar small diameter pipe to the storm sewer. For systems not required to be watertight, options include using a fitting designed for such an application. Watertight systems may require additional fittings or adapters. Not all pipe sizes or types can be connected in this manner. In order to maintain the integrity of the main sewer line, the manufacturer should always be contacted for suggestions on these types of connections.

RESOLUTION

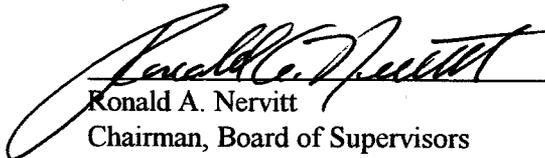
THE EASEMENT AND MAINTENANCE AGREEMENT FOR

THE ROLLING WOODS DETENTION PONDS

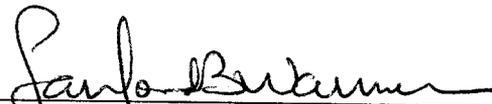
WHEREAS, there currently exists three detention ponds in the Rolling Woods subdivision for which there is no long-term maintenance agreement; and

WHEREAS, the Rolling Woods Homeowners' Association of Williamsburg, Inc., is willing to perform all routine maintenance and the County is willing, subject to appropriations, to provide all non-routine maintenance of the detention ponds.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of James City County, Virginia, hereby authorizes and directs the County Administrator to enter into the Easement and Maintenance Agreement with the Rolling Woods Homeowners' Association of Williamsburg, Inc., for the detention ponds in the Rolling Woods subdivision.


Ronald A. Nervitt
Chairman, Board of Supervisors

ATTEST:


Sanford B. Wanner
Clerk to the Board

<u>SUPERVISOR</u>	<u>VOTE</u>
MCGLENNON	AYE
HARRISON	AYE
GOODSON	ABSENT
KENNEDY	AYE
NERVITT	AYE

Adopted by the Board of Supervisors of James City County, Virginia, this 24th day of October, 2000.

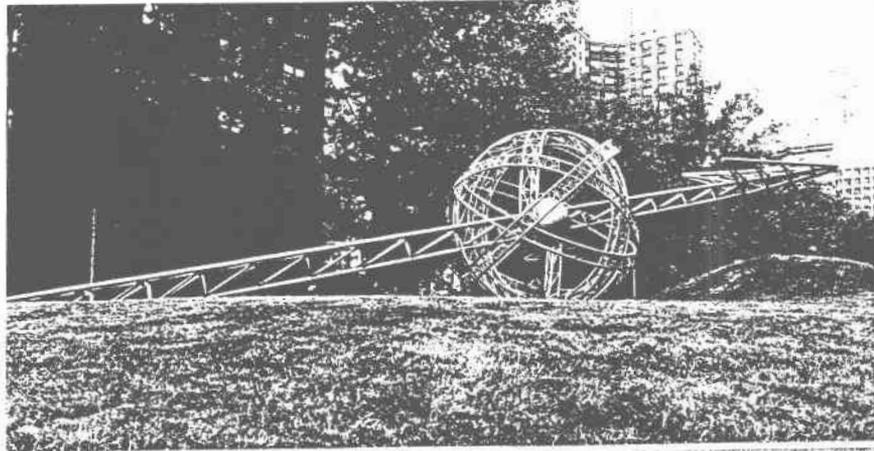
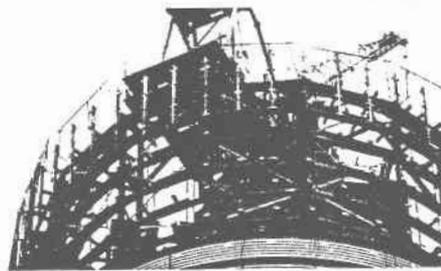
Floyd 9/16/99

CORROSION CONTROL

11/12/2006 00:00:00

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galvanized metal!

ZRC Worldwide



ZRC Worldwide

**COLD GALVANIZING
COMPOUND**





COLD GALVANIZING COMPOUND... a proven concept for CORROSION CONTROL

MR/MANUFACTURER

ZRC® Worldwide, a division of Norfolk Corporation, has been manufacturing Z.R.C.® Cold Galvanizing Compound since 1952. Developed as a reliable answer to corrosion problems, Z.R.C. is widely accepted for stopping rust and rust creepage on metal surfaces.

Because of its unique 95% zinc composition and genuine cathodic protection, as recognized by Underwriter's Laboratories, Inc., Z.R.C. has a long history of preventing corrosion in applications ranging from aerospace tracking antennas to high-rise buildings and industrial complexes the world over. ZRC Worldwide has grown from being a regional and then national manufacturer to becoming an international leader in corrosion control.

All Z.R.C. is produced and tested at the company's modern manufacturing facility in Marshfield, Massachusetts, just south of Boston. ZRC Worldwide has a reputation for providing a premium quality product backed by extensive experience and engineering background.

DT/DOCUMENT

This catalog is intended as an introduction to Z.R.C. Cold Galvanizing Compound and to ZRC Worldwide, as a quality supplier to the construction, architectural, industrial, O.E.M., government and marine industries. It contains an overview of product applications along with appropriate technical and specifications data.

PP/PRODUCT PRESENTATION

DESCRIPTION

Z.R.C. is a liquid compound containing 95% zinc in the dried film that bonds

Captions for front cover photos:

Top: Office complex, Tokyo, Japan
Middle, Left: Danbury Hospital, Danbury, CT
Middle, Right: Penthouse Casino, Atlantic City, NJ
Bottom: HERA sculpture, ORBITAL CONNECTOR, Governor Smith Houses, NYC, ©HERA
32 W 20 NYC 212-924-4518 1989

to clean iron, steel or aluminum through electrochemical action to provide maximum protection against rust and rust creepage.

Z.R.C.® vs. PAINT

It is important that there is an understanding of the conceptual difference between Z.R.C. and paint.

While all types of paints provide only a "skin" protection, Z.R.C. imparts cathodic action against corrosion - i.e., in the presence of moisture, its metallic zinc content becomes an anode and the underlying surface a cathode. Corrosion attacks the zinc leaving the base metal untouched.

If the "skin" of a paint is broken in any way, it will rust in that area and also allow rust creepage under the break. However, if Z.R.C. is scratched to the bare metal, the zinc will form an insoluble zinc salt on the exposed area. This heals the break and continues to protect the surface against any corrosion.

Thus - Z.R.C. Compound will not allow rust creepage.

ADVANTAGES & FEATURES

In zinc compounds, as in all protective coatings, there are various levels of quality and performance. Z.R.C. Cold Galvanizing Compound is at the top of the scale in terms of both product formulation and performance characteristics.

With 95% pure zinc metal content produced under carefully controlled conditions, Z.R.C. provides true cathodic protection for ferrous and nonferrous surfaces. It has proven itself repeatedly in the most hostile environments. No other zinc coating surpasses the protection of Z.R.C.

Z.R.C. offers the following features:

- Stops rust AND rust creepage on any surface, any size, anywhere - also renews worn or broken hot-dip galvanized surfaces.
- Ready for use directly from container.
- Application: brush, spray, roller.
- Effective on all ferrous and nonferrous surfaces.
- VOC-compliant.
- Accepted by U.S. Department of Agriculture.
- Authorized for food contact.
- Recognized by independent testing laboratories as the equivalent of hot-dip galvanizing.

UA/ USES, APPLICATIONS

Z.R.C. INSTEAD OF HOT-DIP GALVANIZING

Z.R.C. Cold Galvanizing Compound is used widely in place of hot-dip galvanizing. It is recognized by independent tests to be the equivalent of hot-dip galvanizing when applied in a dry film thickness of 3 mils. A comprehensive report from Underwriter's Laboratories, Inc. is available. Easily applied by brush or spray, Z.R.C. provides galvanic action to stop rust in virtually any atmosphere.*



REPAIR DAMAGED HOT-DIP GALVANIZING

Z.R.C. Compound is used extensively to repair hot-dip surfaces damaged by welding, cutting, burning, shearing or during construction. Hot-dip galvanizing properly repaired by Z.R.C. is accepted under Federal Specification DOD-P-21035A (Galvanizing Repair Spec.) Z.R.C. meets and exceeds the ingredient and performance requirements of this specification.*



REGALVANIZING WORN HOT-DIP SURFACES

Eroded hot-dip surfaces such as corrugated steel may be regalvanized with Z.R.C. The surface must first be wire brushed to remove rust and loose materials and then cleaned. If the surface is very unevenly eroded, bare areas should be spot primed with Z.R.C. before coating.*



PROTECTION OF WELDMENTS

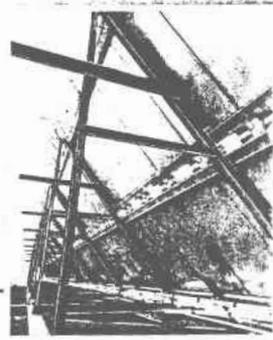
Weldments are susceptible to corrosion due to the weld area having a different electrical potential than the base metal. Z.R.C. applied to weld seams galvanically inhibits corrosion. The surface must be brushed and cleaned with a phosphoric acid-base compound per MIL-C-10578C type II or strong solvent (if oily). Z.R.C. is easily applied to provide lasting protection.

REPAIRING INORGANIC ZINC SURFACES

Z.R.C. Compound is suitable for the touch-up of inorganic zinc silicate coatings damaged by welding, cutting or transit. Both damaged and contiguous area should be thoroughly washed with water or mild detergent to remove any zinc oxides that may have formed. When dry, a full coat of Z.R.C. should be applied within the washed area.

*Detailed specification guidelines available upon request.

OFF-SHORE RIGS: Z.R.C.® is utilized to protect above and below the water line.



05030/ZRC

Z.R.C. Worldwide

FABRICATION: Z.R.C. is specified for long-term protection of miscellaneous metals.

COLD GALVANIZING INSTEAD OF HOT-DIP: Z.R.C. makes galvanizing an "in-plant" operation for many manufacturers.



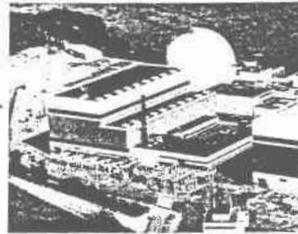
MANUFACTURING: International manufacturers such as Leach Co., Oshkosh, WI specify Z.R.C. to protect their products. Z.R.C. is used by Leach to prevent corrosion on the inside surfaces of water tanks.

BRIDGES: Z.R.C. is specified as the base coat for the protection of structural support steel.



PARABOLIC ANTENNAS: Z.R.C. is used extensively as a base coat in a two-coat system for the superior protection required in highly corrosive locations.

NUCLEAR PLANTS: Z.R.C. has many applications in all phases of construction. At Seabrook Station, Seabrook, NH, Z.R.C. is used to protect HVAC ductwork throughout the complex.



TRANSMISSION TOWERS: Z.R.C. is used as original protection for structural steel and for regalvanizing support cables. Also over worn hot-dip.

INDUSTRIAL MAINTENANCE: Z.R.C. is used for maintenance of structures and equipment inside and outside industrial, petrochemical and food processing plants (Acceptable to USDA).



PUBLIC PROJECTS: Steel structures, such as the railings of the Peace Bridge between Buffalo, NY and Fort Erie, Ontario, are protected by Z.R.C.



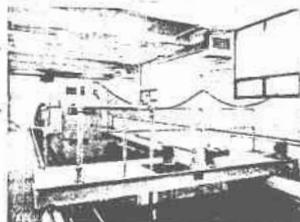
CONSTRUCTION: Unlimited uses, i.e., Z.R.C. is used on structural channel frames, Bank of America Building, San Francisco. Also part of curtain wall support system, I.D.S. Center, Minneapolis; curtain wall mullions, Republic Bank Tower, Dallas.



TANKS: Z.R.C. is used on the exterior surface of water tanks. The tank shown was protected by Z.R.C. in an extremely corrosive environment for over 20 years.



WATER AND WASTE: Z.R.C. is used to protect steel in extremely hostile environments such as water and waste plants.



TS/TECHNICAL SUPPORT

Z.R.C.® is a metallic zinc coating based on an organic binder. Because of the uniqueness of the formulation, Z.R.C. is recognized under the Component Program of Underwriter's Laboratories, Inc.

TYPE: Single pack, premixed, ready to apply, liquid organic compound.

FINISH: Flat light gray or shiny metallic. **THEORETICAL COVERAGE:** 400 square feet per gallon at 1.5 mil dry film thickness.

METALLIC ZINC CONTENT: 95% by weight in dry film.

FLASH POINT: 111°F (SETA method).

WEIGHT PER GALLON: 24 lbs.

SOLIDS CONTENT: 52% by volume.

VISCOSITY: 1900 cps. Brookfield spindle #6 at 100 RPM, at 25°C.

MAXIMUM SERVICE TEMP.: 750°F intermittent (surrounding air temp.)

SPECIFIC GRAVITY: 2.797

IMPACT RESISTANCE: Greater than 30 inch-lbs. (extrusion). (per ASTM-D2794).

ABRASION RESISTANCE: 11.5 liters per dry mil (tested at 3 dry mils) (per ASTM-D968-51)

POT LIFE: At least 24 hours.

SHELF LIFE: (a) Bulk type, 3 years minimum. (b) Aerosol type, 1 year minimum.

PACKING: 3.5 gallon pails, gallon, quart, half-pint and aerosol cans.

DRY TIME: (Set to touch). When ambient air dried, 20-30 minutes.

RECOAT TIME: (Second coat of Z.R.C.). After 12 hours. Under certain conditions, recoat time can be reduced. Please contact manufacturer for specifics.

TOPCOATING: After 24-48 hours, Z.R.C. may be topcoated with acrylic, chlorinated rubber, epoxy, urethane or vinyl type products. **DO NOT USE** alkyd or lacquer-type products.

AI/ASSEMBLY, INSTALLATION

SURFACE PREPARATION:

Dependent upon surface condition and intended services. Typical examples are as follows:

Grease and Oils- Solvent clean to SSPC-SP1-63.

Rust scale- Power tool clean to SSPC-SP11-87.

Mill scale- Sandblast to SSPC-SP6-63 (commercial).

Water immersion- (100°F Maximum) Sandblast to SSPC-SP10-63T (near-white).

APPLICATION

SPRAY (low-pressure compressor type)

Atomized air pressure - 50 lbs.

Fluid pressure- 15-20 lbs.

Orifice of tip- 80/100ths (.080).

Viscosity reduction- 4 parts Z.R.C. to 1 part XXX Thinner* or 16 parts Z.R.C. to 1 part Xylol/Xylene.

SPRAY (airless type)

Pump- 30:1.

Hose- 1/2" (I.D.) Airless type

Orifice of tip-60°- 26/100ths (.026).

Type of tip- Tungsten carbide, reversing (self-cleaning).

Filter screens- Complete removal is recommended. However, if screens are employed, use no less than 30 mesh.

Viscosity- No reduction required.

Recommended procedure- Connect hose directly to pump, without filter assembly, ensuring a hose length of 50 ft. maximum. Use least pressure possible. Start at 1500 lbs. and increase as required for good spraying properties.

BRUSH OR ROLLER

Apply as received in container.

CLEAN-UP

XXX Thinner* of Xylol/Xylene.

*XXX Thinner is our special solvent.

CC/CODES, CERTIFICATION

TESTING AND SPECIFICATION CONFORMANCE DATA

Z.R.C.® meets and exceeds Fed. Spec. DOD-P-21035, formerly MIL-P-21035 (Galvanizing Repair Spec.)

Z.R.C. meets and exceeds Fed. Spec. MIL-P-26915A (USAF Zinc Dust Primer).

Z.R.C. may be used under Fed. Spec. MIL-P-26433 (Towers-Temperate and Arctic).

Z.R.C. passes 3000 hours salt-spray testing without failure.* (ASTM Des.B117)

Z.R.C. passed Preece Test (ASTM Des. A239-41) for hot-dip galvanizing.

Z.R.C. resists intermittent dry-heat temperatures up to 750°F.

Z.R.C. meets and exceeds Canadian Government Spec. I-GP-181A (Zinc Coating).

Z.R.C. meets and exceeds ASTM Des. A-780 (Standard Practice for Repair of Damaged Hot-Dip Galvanized Coatings).

Z.R.C. meets and exceeds SSPC-Paint 20 (Specification for Zinc-Rich Primers).

UNDERWRITER'S LABORATORIES, INC.

Z.R.C. Compound is recognized under the Component Program of Underwriter's Laboratories, Inc.

AUTHORIZED FOR FOOD CONTACT

Z.R.C. Compound is authorized under Federal Regulation 21 CFR 175.390 as a coating for use as the food contact surface for bulk reusable containers intended for storing, handling and transporting food.

ACCEPTED BY USDA*

Z.R.C. Compound is chemically acceptable. It may be used in processing or storage areas for meat or poultry products prepared under Federal inspection.

OM/OPERATION, MAINTENANCE

Z.R.C. Cold Galvanizing Compound provides long lasting protection and does not require maintenance beyond the usual periodic inspection of surface conditions.

*Copies of reports available upon request.



AC/AVAILABILITY, COST

Immediately available off the shelf, Z.R.C. Cold Galvanizing Compound is offered through a worldwide distribution network. The initial cost of Z.R.C. is more than offset by substantial maintenance savings and the increased service life of protected surfaces. Contact ZRC Worldwide for further information.

MF/MATERIALS, FINISHES

A unique formulation of 95% pure zinc metal as a liquid coating, Z.R.C. Cold Galvanizing Compound is manufactured to exacting standards in our own plant.

Z.R.C. is available in flat light gray or shiny metallic finish.

ALSO AVAILABLE IN CONVENIENT AEROSOL SPRAY

Z.R.C. Cold Galvanizing Compound is also available in an aerosol spray.

- Easy to use
- Convenient for smaller jobs, such as coating welds or touch-up of damaged hot-dip galvanizing
- Ideal for hard-to-reach spots
- Unique nonclogging spray tip
- Hydrocarbon solvent will not affect the ozone layer (No Chlorofluorocarbons)
- Eliminates clean-up



COLD GALVANIZING COMPOUND A Proven Concept for Corrosion Control

ZRC® WORLDWIDE, 145 ENTERPRISE DRIVE, MARSHFIELD, MA 02050
781-319-0400 800-831-3275 FAX 781-319-0404
E-Mail: info@zrcworldwide.com
WEBSITE: <http://www.zrcworldwide.com>

NOTICE OF AWARD(K99-036)

**TO: CINTER CONSTRUCTION COMPANY
PO BOX 108
LIGHTFOOT VA 23090**

PROJECT DESCRIPTION: Repair of Storm Drainage System

The OWNER has considered the BID submitted by you for the above described work in response to its Advertisement dated **September 13, 1998** and Instructions to Bidders.

You are hereby notified that your **BID** has been accepted for work in the amount of **Eighty-two Thousand Nine Hundred and Eight Two Dollars (\$82,982.00)**.

You are required by the Instructions to Bidders to execute the Agreement and furnish **CONTRACTOR'S Performance BOND, Payment BOND and Certificate of Insurance** within ten (10) calendar days from the date of this Notice to you. **BONDS shall not be dated later than the date of the Contract.**

If you fail to execute said Agreement and to furnish said **BONDS and Certificate of Insurance** within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

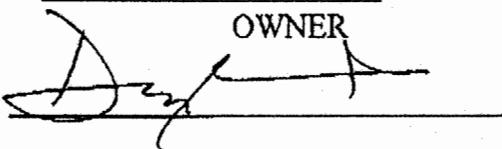
You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this **16th** day of **October 1998**.

JAMES CITY COUNTY

OWNER

BY: _____



TITLE: Senior Buyer

ACCEPTANCE OF NOTICE

RECEIPT OF THE ABOVE NOTICE OF AWARD IS HEREBY ACKNOWLEDGED:

BY: _____

CONTRACTOR

TITLE: _____

THIS IS THE _____ DAY OF _____, 19____.

*10/16/98
FM: Don Breland
TO: DARRYL COOK
JOANETTE BURGEN
FYI. Contract # 01160
10/16/98
[Signature]*

Add
Drain

PRELIMINARY DESIGN REPORT Rollingwoods Basin 2 - Persimmon (MC 025, S-34-88)

December 5th 2000

- *As-built data compared well to design data. Better than Hawthorne Basin. Emergency spillway and riser crest were about 0.5 feet above design elevations.*
- *Original design based on 10-year WSEL of 26.35 (top of dam 27.0). Recommend control of 100-year if possible by hydraulic design improvements such as adjustment to riser crest, rectangular slots in riser and/or emergency spillway modifications.*
- *Basin inflows per SCS Unit Hydrograph Method exceed peak design flows used in the original design of Basin 2.*

<u>Original Design</u>		<u>PondPack Model</u>	
Pre 2 Design	29 cfs	Pre 2 SCS UH	35.75 cfs
Post 2 Design	38 cfs	Post 2 SCS UH	54.79 cfs
Post 10 Design	87 cfs	Post 10 SCS UH	125.6 cfs

Therefore, Pondpack model is overtopping embankment for 10-year event. Need to adjust model inflows to more match original design, since they appear to be historically acceptable, or be conservative and make pond repairs fit the SCS peak discharges. I prefer the conservative approach. In either case, need additional time to run model and determine modifications to the riser or emergency spillway.

- Outlet Barrel Size: *Initially, pond hydraulics appear to be in inlet control (ie. based on barrel inlet opening size). Therefore, reliner should match existing barrel ID (24 inch) as close as possible. Use of 18 inch would be too much reduction in opening size compared to the existing 24 inch ID barrel. Based on corrugated polyethylene pipe reliner manufacturer data, use 21 inch size.*

	<u>Nom Size</u>	<u>ID</u>	<u>OD</u>
Culvert Renew	21 inch 21	23.65	
Snap-Tite Pro Line	21 inch 21	23.65	

Although there is very little annular space between the carrier pipe and the reline pipe, based on pipe barrel inspection there did not appear to be any wall failures or deflections present to prohibit the slip-line process. Need to check barrel again with lamp test.

- *Pipe Specifications: Two (2) samples attached. Culvert Renew (Thread-Loc Joint) manufactured by Poly Profiles Technology, Inc. of Steelville, MO and Snap-Tite Pro Line by ISCO of Louisville, KY.*
- *Grout Specification: Information attached. Need grouting specification in project documents.*

- *As previously stated, need more time to run model/hydraulics for any modifications to the riser or emergency spillway to safely pass larger storm events and provide acceptable freeboard to top of dam (El. 27.19 as-built).*

January 10th 2001

- *Basin size and drainage area at 35 acres is larger than the Hawthorne Pond (12 acres).*
- *Use of SCS Unit Hydrograph Method was used for design conservancy. Available storage volumes per design were used, but are questionable and were not as-built verified.*
- *Use of Snap-Tite Solid wall polyethylene liner pipe was selected. OD = 20 inch; ID = 18.77 inch; Wall Thick = 0.615 inch; DR=32.5. Allows for 2 inch annular space each side if concentrically centered. More annular space for insertion if placed along bottom of host pipe. Specification attached.*
- *Estimation Price for 20-inch Snap Tite is \$ 1,088.22 plus freight = \$ 1,900 (about \$ 45 per lf) 1-2 weeks delivery time. 22-inch OD is not available at this time.*
- *Since basin was only designed for 10-year event and liner pipe ID size was substantially reduced from 24-inch to 18.77 inch, needed to play with hydraulics to try and get pond more into conformance with current regs for dam construction. Smaller barrel sizes tend to raise WSEL's in facility; therefore, spillway modifications were required to discharge flow at lower elevations. Based on initial routings, design to contain 100-year with 1 foot of freeboard was not obtainable based on available volumes. Set goal to upgrade facility from 10-year design to 50-year design with 1 foot of freeboard with minimal pond modifications that did not exceed predevelopment allowables for the 2-year event at 29 cfs.*
- **Pond Modifications (Scope of Work):**
 - *Replace existing 36 inch CMP riser/base with new 36 inch RCP Riser (ASTM C 361 O-Ring Pipe) with 6' x 6' x 18 inch thick concrete base. Riser crest set to match existing at El. 24.5.*
 - *Modify riser with Four - 1 ft. x 1 ft. rectangular slots cut into top of riser. Crest El. 23.5. Ninety (90) degree separation between slots. Will lower current normal pool elevation as surveyed at El. 23.75 (which is lower than design due to pipe leakage) by 3 inches. Minor impact to pond habitat and aesthetics.*
 - *Existing CMP Trash Rack/Anti-Vortex device appeared salvagable. Clean rust and reapply galvanized coating (Z.R.C. Cold Galvanized compound or approved equal) to trash rack and support bars and attach to concrete riser by straps or angle iron bolted to riser. If trash rack is deteriorated to a point where existing device is unusable, new 54 inch diameter cylinder anti-vortex/trash rack device is required. New device to meet VESCH Minimum Standard 3.14 requirements and materials to comply with ASTM A 929, 14 gage 0.064 inch thickness (same as Hawthorne Pond cap).*

- **Slipliner Pipe insertion into existing 24 inch ID CMP pipe. Use 20-inch OD Snap-Tite Solid or approved equal. Pipe must meet attached specification, 42 feet length. Inverts to match existing (upstream El. 19.36; downstream El. 18.58).**
- **Proper connection of carrier/host pipe to concrete manhole using flexible rubber boot pipe-to-manhole connection (Kor-N-Seal or approved equal). Alternate connection types and procedures must be approved in advance. Specification/detail attached.**
- **Grouting- Annular space between relined pipe and host pipe. Grout pressures must not exceed pipe allowables as pipe buckling can occur. Recommended grouting procedure information attached.**

Emergency Spillway

Configuration- Widen from 12 ft. to 18 ft. bottom width with current 2H:1V sideslopes. Use EC-2 matting in level section. Emergency spillway will not discharge 10-year event, but will for larger 25-and 50-year storms. 100-year will overtop embankment.

Elevation- Lower Emergency Spillway crest elevation approximately 1 foot to El. 25.5 (to be set at 1' minimum above riser crest).

Excavated material - From emergency spillway lowering to be spread across top of dam to achieve level top of dam elevation at El. 28.2. Maintain minimum 8 ft. wide dam width. Current average top of dam is 9 ft. Average depth of fill required across top of dam crest (120 feet length) is 0.6 feet (Current elevation varies from high at 27.92 to low at 27.19, average elevation is 27.5).

- **Minor fill placement and compaction in toe erosion area at downstream right embankment toe. Use excess material from emergency spillway excavation.**
- **Outlet Protection- Due to decrease in outlet barrel size, higher outlet velocities will be present, thus bigger outlet protection required. Using the 10-year discharge and based on VESCH Minimum Standard 3.18 & 3.19, use OP with $L_a = 30$ feet, downstream width $W = 34.5$ feet, upstream width at pipe 4.5 feet and Class I riprap.**
- **Erosion Protection- EC-~~2~~³ matting of entire downstream embankment to protection toe erosion area and for 100-year overtopping.**
- **Stabilize with seed & mulch all disturbed and matted areas.**
- **Final Routing Using Pondpack v 6.0, SCS hydrology and Level Pool routing methods**

Property Issue?

	<u>Inflow</u>	<u>Outflow</u>	<u>WSEL</u>
1-year	35.34 cfs	9.8 cfs	24.38
2-year	54.79 cfs	21.2 cfs	25.06
10-year	125.6 cfs	88.4 cfs	26.55
25-year	144.87 cfs	110.7 cfs	26.78
50-year	170.77 cfs	154.9 cfs	27.19
100-year	196.81 cfs	Overtops	

- pre $Q_2 = 29$ cfs

Freeboard to New TOD, 1 ft.

Pipe Reliner Specification

Materials. The liner pipe shall be made of high density polyethylene resin in accordance with the requirements of ASTM D-3350-98a with a cell classification of PE 345464C and shall have a Plastic Pipe Institute designation of PE 3408. The liner pipe shall comply with the dimension of ASTM F-714 with a minimum dimension rating (DR) of 32.5. The liner shall have a smooth, non-corrugated interior and exterior capable of maintaining a minimum flow rate equivalent to 100 percent of the original in-place culvert. The liner pipe shall resist the effects of UV rays.

Joints and Couplings. The liner pipe shall be capable of being joined into continuous lengths by an approved method. The joints shall not create an increase in the outside diameter (OD) of the liner pipe to eliminate coupling hang-ups. The joints must contain a gasket and be water-tight and meet the requirements of ASTM D 3212. The joining for the liner shall be Snap-Tite as manufactured by ISCO of Louisville, Kentucky or approved equal.

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H.D. POLY. PIPE SYSTEMS, INC.

PHONE: 910-692-4043
FAX: 910-692-0905

QUOTATION
P.O. BOX 5253
PINEHURST, NC 28374

DATE: Jan. 10-01
CUST. R.F.O.: Phone

BILLED TO: JAMES CITY COUNTY
701 MOUNTS BAY RD.
SHIP TO: P.O. Box 8784
ATTN: Williamsburg, VA 23187-8784
MR. SCOTT THOMAS PE, CIVIL ENGR.
PHONE: 757 253-6639
FAX: " 259-4032

QUOTATION NO.:
SALESMAN: STEVE MULLER
DELIVERY:
TERMS NET 30 DAYS:

20"OD = one to two weeks
22"OD = 2 to 3 wks
please see below:

ITEM	QTY.	SIZE	DESCRIPTION	PRICE	TOTAL
This Quotation is for SNAP-TITE g.H. Density pipe					
PE 3408, SDR. 32.5 with M/Female ends, watertight gasket factory installed.					
20"OD					
Existing L.H. Pipe		SNAP-TITE			
24" ID		20" OD	T.L. FT = 42' Price = \$25.91/FT.		
			138% FLOW of existing pipe		9
			use qty one 20"OD - 24" = 25.91 x 24' =		621.84
			plus one 18' = 18 x 25.91 =		466.38
			42' TLF TOTALS		1088.22
Optional size		22" OD	Price = \$29.16/FT		
			qty 1 - 24' Length (L.A.I.D) 24 x 29.16 =		699.84
			179% FLOW of original pipe		
			plus 1-18' " " = 18 x 29.16		524.88
			TOTALS 42' TLF		1,224.72
			PLUS Freight Est. \$800		
			PLUS any applicable TAXES		

cc Fax Steve Ramsey Fed. ID#
FSec 56 205-4771

SUB-TOTAL:
TAX ESTIMATE:
FREIGHT ESTIMATE:
TOTAL:

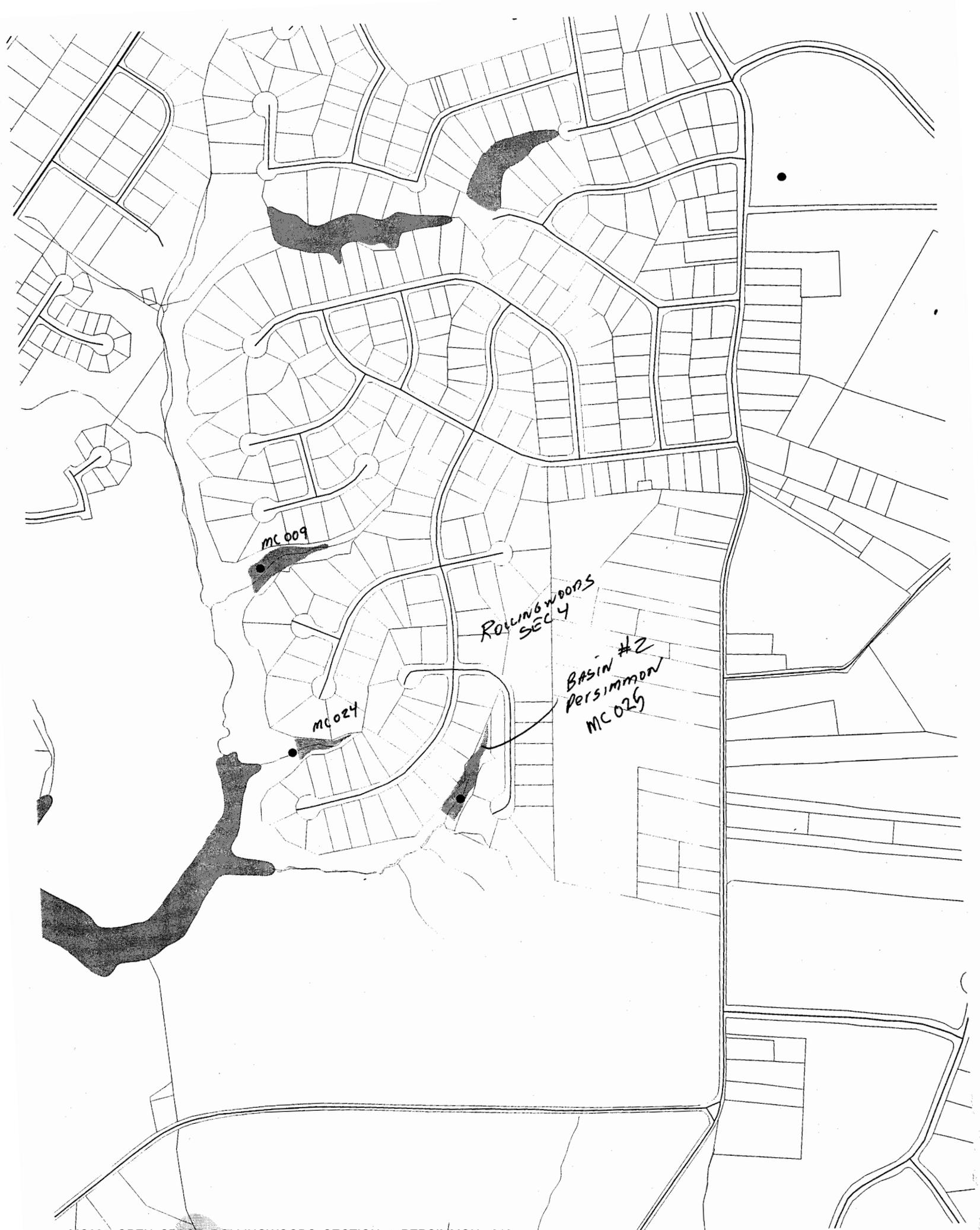
Re Shipment:
20"OD is in stock
22"OD to be ordered so we may still get it in one week or it may be 2 to 4 weeks.

ACCEPTED BY:

Note - Please see
"% Flow of original pipe"

Steve Muller
H.D. POLY PIPE SYSTEMS, INC.

VENDER #





MC009

MC024

MC025

2804

Dave King

898-2225 (W)

565-0294 (H)

July 6
7:00 P.M.

2760 Linden.

H.D. POLY. PIPE SYSTEMS, INC.

PHONE: 910-692-4043
FAX: 910-692-0905

QUOTATION
P.O. BOX 5253
PINEHURST, NC 28374

DATE: Jan 10-01
CUST. R.F.Q: Phone

BILLED TO: JAMES CITY COUNTY
701 MOUNTS BAY RD.

SHIP TO: P.O. Box 8784
ATTN: Williamsburg, VA 23187-8784
MR. SCOTT THOMAS PE, Civil Engr.

PHONE: 757 253-6639
FAX: " 259-4032

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SALESMAN: STEVE MULLIE
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please see below:

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EXISTING C.H. Pipe		SNAP-TITE			
24" ID		20" OD	T.L FT = 42' Price = 25.91/FT. 138% FLOW of existing pipe		
			use qty one 20"OD - 24' = 25.91 x 24' =		621.84
			plus one 18' = 18' x 25.91 =		466.38
			42 TLF TOTALS		1088.22
optional size		22" OD	Price = 29.16/FT		
			qty 1 - 24' length (L.A.I.D) 24' x 29.16 =		699.84
			179% FLOW of original pipe		
			plus 1-18' " " = 18' x 29.16		524.88
			TOTALS 42' TLF		1,224.72
			Plus Freight Est. \$800		
			Plus any applicable TAXES		

20"OD

cc Fax Steve Raussey
I see

Fed. ID#
56 205-4771

SUB-TOTAL:
TAX ESTIMATE:
FREIGHT ESTIMATE:
TOTAL:

Re Shipment:

20"OD is in stock
22"OD to be ordered so we may still get it in one week or it may be 2 to 4 weeks.

ACCEPTED BY:

Steve Mullie
H.D. POLY PIPE SYSTEMS, INC.

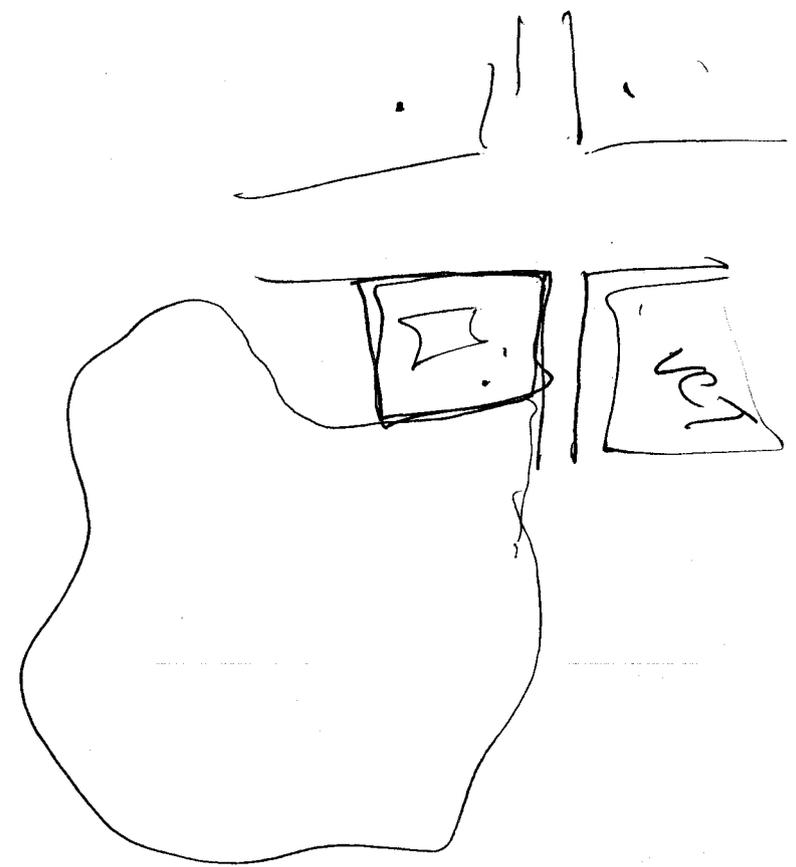
Note - Please see
"% Flow of original pipe"

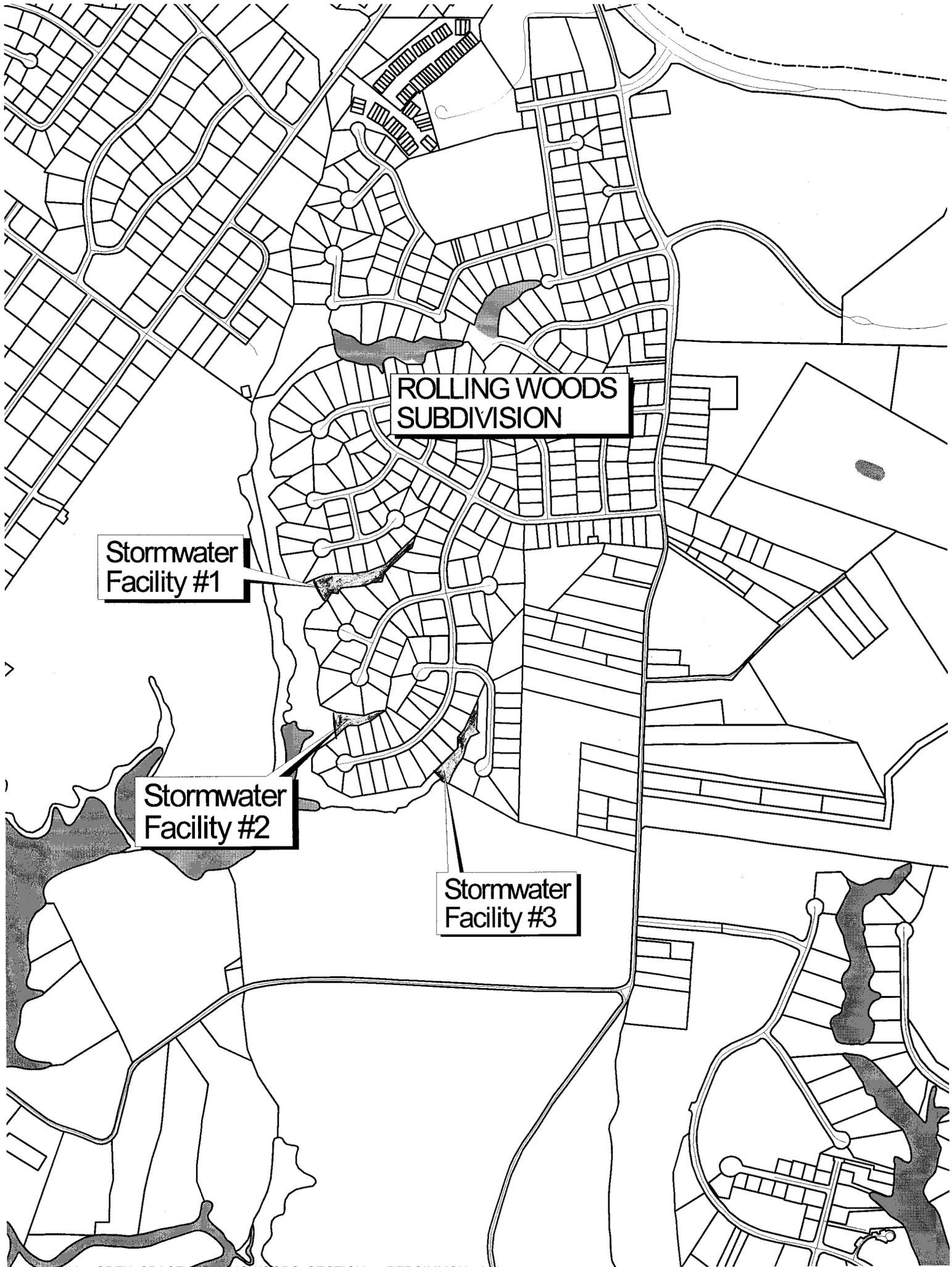
VENDER #

LINDA MORRIS
LMGABES@msn.com
565-7303

as manufactured
Phillips 66 Driscopipe
Mfg - ISCO

HighMark™





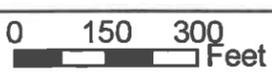
**ROLLING WOODS
SUBDIVISION**

**Stormwater
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**Stormwater
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JAMES CITY COUNTY
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