UNIVERSITY HONORS PROGRAM

SENIOR PROJECT - APPROVAL

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College: Engineering Department: Civil and Environmental

Faculty Mentor: Dr. Chris Cox

PROJECT TITLE: Stormwater and Drainage Design for the Site Development of Malcolm Martin Park and Beardsley Community Farm

I have reviewed this completed senior honors thesis with this student and certify that it is a project commensurate with honors level undergraduate research in this field.

Signed: Chris D Cox, Faculty Mentor

Date: 8/7/00

Comments (Optional):

SENIOR PROJECT COMPONENTS - CHECK LIST

Note: Not all components will necessarily be appropriate parts of every honors project. Which components are necessary or relevant to your project?

__X__1. Abstract

__X__2. Title page

__X__3. Introduction

____4. Review of literature

____5. Statement of problem

__X__6. Purpose statement

____7. Hypotheses/questions

____8. Analysis of data

____9. Conclusions

____10. Recommendations

__X__11. Bibliography/References

____12. Style guide

____13. Visuals

____14. Figures/charts/tables

____15. Appendix

__X__16. Approval Form Signed by the Faculty Mentor – copy in the Honors Handbook

____17. Table of Contents

TYPES OF PROJECTS:

1. Creative – fine arts, literary
2. Analytical – historical, non-experimentatl science, critical review
3. Experimental – science, technology

Stormwater and Drainage Design for the Site Development Of Malcolm Martin Park and Beardsley Community Farm

Lee Bryant

Senior Honors Thesis
The University of Tennessee, Civil and Environmental Engineering
Dr. Chris Cox, faculty mentor
Dr. Thomas Broadhead, University Honors Program Director

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BASEBALL FIELD
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Proposed Site for Gymnasium/Kitchen
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Abstract

This senior honors project is based on the overall site development of Malcolm Martin Park and Beardsley Community Farm. The purpose of the overall design project was to re-design the existing park to meet the needs of our three clients: for (1) park assets for the City of Knoxville and (2) the Office of Aging organization, to design a gymnasium/kitchen and for (3) the Community Action Committee, to establish various farm assets. My contribution to this overall project was assuming the role as head of the stormwater/drainage team.

The main aspects of the stormwater design plan stem from correcting existing drainage problems on the site and providing adequate drainage for the various parts of the development plan. The stormwater/drainage designs are primarily based on controlling pre- and post-construction run-off and drainage and correcting the main drainage/erosion problems on site. The clients did not actually designate the drainage problems they wanted solved. They specified only that the site be capable of handling storm run-off. The existing site has very little designated drainage control. The main problems our team noticed include lack of drainage ditches on site and erosion problems below the farm at the main drainage ditch. The addition of tied, cut evergreen trees into the slope of the drainage ditch was determined to be one of the most cost-efficient and environmentally-friendly solutions. We also added drainage trenches along side the baseball field to control erosion and the evident washing away of the ball field.

A computer analysis was performed on the main drainage ditch to ensure that the ditch would not overflow during peak storm conditions. Analyses were also performed on all proposed pond locations. After several trial locations, the existing pond location was selected to be modified to contain the post-construction runoff.

For stormwater piping design, flow was directed as necessary toward the main drainage ditch or detention pond through standard 18-inch diameter reinforced concrete pipes. The most effective and cost-efficient pipe layout possible was maintained in the design plan.

Introduction

The purpose of this project is to design a suitable stormwater and drainage control plan for the site development of Malcolm Martin Park and Beardsley Community Farm. The stormwater design plan was part the Civil Engineering Senior Design Project (CE 400) led by Dr. Chris Cox this spring. The purpose of the overall design project was to re-design the existing park to meet the needs of our three clients. For (1) the City of Knoxville and (2) the Office on Aging, we were to design a building containing a gymnasium and kitchen and for (3) the Community Action Committee (CAC), we were to establish various farm assets. This overall project was divided into several design teams: Structures, Environmental and Utilities, Geotechnical, Agricultural and

Recreation, Transportation, and Stormwater/Drainage. My contribution to this overall plan was to take the role as the head of the stormwater/drainage team

The overall site development plan that our class presented to the clients at the end of the semester will be taken into consideration as an option for development, along with other plans developed by local architectural and engineering firms. Malcolm Martin Park is a 17-acre city park located off of Western Avenue near Knoxville College. This area is known to be an impoverished community of inner city Knoxville. The park site was formerly the home of Beardsley Junior High School. The current redevelopment plans are tied into HOPE VI, a multi-million dollar project which will eventually replace College Homes and vacant lots in this area with single family housing, new commercial developments, and city parks. The City of Knoxville is supporting the CAC's use of part of the park as the site for Beardsley Community Farm, where activities such as gardening and self-sustainability skills could be taught, as well as allowing local citizens to earn produce through volunteering. The City has also received a grant of $200,000 to improve the park section of the site.

Design Summary

The main aspects of the stormwater design plan stem from correcting existing drainage problems on the site and providing adequate drainage for the various parts of the development plan. We based our designs primarily on controlling pre- and post-construction run-off and drainage and correcting the main drainage/erosion problems on site.

The clients did not actually designate drainage problems they wanted solved; they specified only that the site be capable of handling storm run-off. The existing site has very little designated drainage control. The main problems we noticed included lack of drainage ditches on site and erosion problems below the farm at the main drainage ditch. The addition of tied, cut evergreen trees into the slope of the drainage ditch was determined to be one of the most cost-efficient and environmentally-friendly solutions. We also added drainage trenches along side the baseball field to control erosion and the evident washing away of the ball field.

Computer analyses were performed for all of our design work regarding the abidance of regulations for pre- and post-construction run-off, detention pond size, and suitability of drainage piping layouts. TR-55, a program which takes into consideration soil type, impermeability, and runoff type (sheet, shallow concentrated, or open channel), was used to estimate times of concentration and hydrologic curve numbers for peak flow conditions. SMADA, a program which uses total area and hydrologic curve numbers to estimate actual peak flow values, was used to size the detention pond and drainage piping. All of the

hydrologic and hydraulic computations performed with SMADA were in accordance with SCS Unit Hydrograph procedures using AMC II curve numbers (from TR-55) and Type II rainfall distribution for 24-hour, 2-year (3.3 inches) and 10-year (4.8 inches) storms (City of Knoxville Engineering Department Sections 22A-32). Printouts of these computer analyses, as well as sample calculations done by hand, can be found in the Appendix.

A computer analysis was performed on the main drainage ditch to ensure that the ditch would not overflow during peak storm conditions. We used topographic maps to calculate the total drainage area involved and then divided these areas into permeability regions. This information was used to calculate the expected overflow during the required conditions (City of Knoxville Engineering Department Sections 22A-31) of 24-hour 10-year and 100-year storms. These calculations ensured that the drainage ditch could control water resulting from these storm conditions. Floodwater heights were also checked to make sure that the bridge crossing the ditch would not be washed away.

All of our drainage calculations and analyses were performed to meet the Knoxville Stormwater Ordinance regulations (City of Knoxville Engineering Department Sections 22A-31-36) as well as standard extended detention pond requirements. A detention pond was designed to contain the first 4000 ft^3 of runoff from a 10-year storm coming from the building and its related parking areas, as well as runoff directed on site from surrounding areas (City of Knoxville Engineering Department Sections 22A-35). After several trial locations, the existing pond location was selected to be modified to contain the post-construction runoff.

For stormwater piping design, we directed flow as necessary toward the main drainage ditch or detention pond through standard 18-inch diameter reinforced concrete pipes (Dewberry and Davis 472-477). We attempted to design the most effective and cost-efficient pipe layout possible.

This project was designed to include all major components of a complete engineering design report. Thus, drawings of the overall site plan layout, drainage details, and cross-sections of the drainage ditch and detention pond were created. Also, cost estimations and sample specifications were included in this report. The drawings were all created with the AutoCAD computer drafting program. Cost estimations were performed by looking up the estimated cost of each design component in either the *RSMeans Constructional Cost Data Book* or the *BNi Building News General Construction Costbook*. Sample specifications, used to help integrate the engineering plans into the actual construction of a project, were developed in accordance with standard design specification outline format (http://www.sweets.com/index).

In respect to the multiple clients of this project, the main stormwater issues were divided into three basic sections primarily for cost and responsibility purposes. The pond, building drainage layout, and farm drainage layout were the basic divisions.

Issues Considered

Due to the fact that there were no specific stormwater/drainage requirements from the clients, we had to consider many issues and decisions in our design of the overall drainage plan.

One of the first issues with which we dealt was the need for a bridge or culvert over the main drainage ditch. Following the sizing of the overall watershed area contributing to flow through the ditch, we ran computer simulations to determine the peak flow during a 10-year storm to estimate the size needed for such a crossing. We then designed the necessary culvert adequate for the simulated flow. However, following the conceptual design meeting with the client, a bridge was chosen instead of a box culvert, so the Structures team took over this design aspect.

Detention pond placement was one of our major design considerations. Following pre- and post-construction run-off comparisons, it was evident that the site needed a pond in addition to basic stormwater ordinance requirements. We considered three locations: behind the farm, beside the baseball field, and an extension of the existing pond. The location behind the farm was initially discussed as a possible wetland area. However, this area proved to be unfeasible due to regulations and the basic site layout. After designating watershed areas and calculating the appropriate time of concentrations for each of the remaining options, flow calculations were done to test the performance of the site by the field and the existing pond. The proximity of the existing pond to the site of the proposed kitchen/gymnasium building and its associated parking

as well as general site layout and topography ultimately proved the existing pond site as the ideal location. We discussed the use of two ponds since a large portion of the overall site runoff is directed toward the ball field pond site. However, since the farm construction actually decreased the runoff flow of that area, the second pond was deemed unnecessary.

In our design of the detention pond, several issues were considered. Basic design requirements were followed from the *Knoxville Stormwater Ordinances* and from the *Land Development Handbook* (Dewberry and Davis 619-634). The pond is designed to contain the first 4000 ft^3 of runoff during both a 2-year and 10-year 24-hour duration storm (City of Knoxville Engineering Department Sections 22A-35). The designated pond area is adequate for all storm stages except for peak flow during the 10-year storm. Thus, a dry field area is designated as an extension of the pond to contain this excess stormwater. An emergency catch-basin spillway was also incorporated into the design to provide additional protection against flooding, especially since the pond is situated in such close proximity to the swimming pool.

In our design of stormwater pipeline layout, we attempted to create the most direct and effective plan. Pipelines were designed to follow existing topography whenever possible while maintaining appropriate slope needed for flow. The minimum number of catch basins and curb inlets needed to carry the stormwater capacity of the post-construction plan were used in the layout.

In regard to erosion control, we used the cheapest and most environmentally-friendly methods available.

Personal Development

I knew very little about stormwater design and the extreme level of detail involved in site design and project management before this assignment. This has been one of the most difficult and time-consuming projects I have encountered since I have been in school. However, I feel the experience has been invaluable in helping me relate much of what I have learned during the past five years to real-world engineering experience.

This project influenced me in two major ways. I had never assumed a leadership position before, and it was both an educational and rewarding experience. At first, I was not sure our team (composed of Ryan Casey, Jason Flowers, Kurt Stafford, and me) would be able to do a successful job since we came into the project knowing basically nothing about stormwater design or what steps we needed to take to accomplish all of our tasks. However, by working together, doing what needed to be done (sometimes several times before we got it right) and extensively researching the regulations and guidelines, we managed to learn an amazing amount about stormwater design and teamwork. The sheer amount of information I learned about stormwater design and basic design work in general was the second major influence of this project. I came into the project knowing very little about any of what we were expected to complete. By the end of the semester I was amazed at how many guidelines, regulations, and details that had to be taken into account for a design plan.

One of the more difficult tasks of this project was attempting to integrate the various requests of our clients. The City of Knoxville requested a

gymnasium. The Office on Aging desired a large kitchen area adjoining the gymnasium where meals for the elderly could be prepared for home delivery. The CAC wanted to maintain as much greenspace as possible, establish a natural area, community garden plots, a farmer's market, a demonstration pond, and a farm office. Many of these requests contradicted one another, and several compromises had to be worked out.

This has been one of the most difficult and time-consuming projects I have encountered since I have been in school. However, the leadership and teamwork skills and the amount I learned about the engineering design process far outweigh these difficulties. It was also especially rewarding to work on a real-life project in a part of our local community. I feel the experience has been invaluable in helping me relate much of what I have learned during the past five years to real-world engineering experience.

Cost Estimates for Stormwater Group

Building (Kitchen & Gym)

- Concrete Pipe:

  18" Diameter
  872'x15.30$/ft = $13,342
  10" Diameter
  120'x10.45$/ft = $1,254

- Curb Inlets:

  1@ 6<d<8 = $870
  1@ d≥ 8 = $870

- Catch Basins:

  7@ d≤6 = 7x$690 = $4,830
  1@ d≥8 = $1,400

- Headwall:

  1x$456 = $456

- Excavation:

  Trenching from parking lot to pond = $248

  Gravel backfill = $945

  Structural backfill = $1,674

Total = $25,889

Pond

- Piping:

  18" diameter
  30'x15.30$/ft = $459

  Pipe tee for emergency spillway = $2,200

- Catch basins:

  1@ d<6 = $690

- Pond Linings:

  6" compacted clay layer = $15

  Erosion control mesh = $130.41

- Outlet:

  35"x35" steel plate w/galvanized iron mesh & anchor bolts = $300

- Excavation:

  Trenching of emergency spillway = $63

  Gravel backfill = $32

  Structural backfill = $30

  Pond and additional storage area excavations = $385

Total = $4,113

Farm

- Piping:

  18" diameter
  139'x15.30$/ft = $2,127

  20" diameter
  25'x21.45$/ft = $536

- Catch basins:

  1@ d<6 = $690

- Excavation:

  Trenching = $232

  Gravel backfill = $150

  Structural backfill = $178

  Trenches at ball field = $274

Total = $4,187

SECTION 02660
DETENTION POND

PART 1 GENERAL

A. Work Included

1. Water Pollution Control
2. Erosion Control
3. Clay Liner
4. Excavation
5. Embankment
6. Seeding and Mulching
7. Slotted Drain Grate
8. Outlet Orifice

B. Related Work Specified Elsewhere

1. Earthwork
2. Utility Work
3. Drainage

C. Quality Assurance

1. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
2. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements and substrate conditions.

PART 2 PRODUCTS

2.1 CONTROLS

A. Water Pollution Control

1. The Contractor shall not pollute any rivers or streams with fuels, oils, bitumens, calcium chloride, acids or harmful materials. It is the responsibility of the Contractor to investigate and comply with all applicable Federal, State, County, and Municipal laws concerning pollution of rivers and streams. All work under this

contract shall be performed in such a manner that objectionable conditions will not be created.

2. At all times of the year, special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, herbicides, and cement drainage from entering public waters.

3. Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, chemicals, etc., in areas adjacent to streams and pond will be subject to approval. If any waste material is dumped in unauthorized areas the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed of as directed and replaced with suitable fill material, compacted and finished with topsoil all at the expense of the Contractor.

4. The Contractor shall at all times perform all work and take such steps required to minimize the severity and duration of any interferences or disturbances to fish and wildlife. The Contractor will not be permitted to disturb native habitat adjacent to the project area that, in the opinion of the Owner, are critical to fish and wildlife. Fouling or polluting of water will not be permitted. Wash waters and wastes shall be processed, filtered, ponded, or otherwise treated prior to their release into the streams.

B. Erosion Control

Prior to any major construction, the Contractor shall submit a plan for approval showing the scheme for controlling erosion and disposing of wastes. Surface drainage from cuts and fills within the construction limits, whether or not completed and from waste disposal areas, shall, if turbidity producing materials are present, be held in suitable sedimentation ponds or shall be graded to control erosion within acceptable limits. Temporary erosion and sediment control measures such as berms, drains, or sedimentation basins, if required to meet the above standards, shall be provided and maintained until the permanent pond is completed and operative. The area of bare soil exposed at any one time by construction operations shall be held to a minimum. Fills and waste areas shall be constructed by selective placement to eliminate silts or clays on the surface that will erode and contaminate the streams.

2.2 MATERIALS

A. Clay Liner

1. Line pond bottom with 6" impermeable clay liner.

B. Embankments

1. Embankments shall be of satisfactory soil, granular material, or rock. The test methods used to determine the various properties shall be as follows:

a. Liquid Limit	ASTM Designation: D 423
b. Plasticity Index	ASTM Designation: D 424
c. Grain Size Analysis	ASTM Designation: D 422

2. Soil

   Soil material shall be considered as layers or deposits of disintegrating rock lying on or near the surface of the earth which has resulted from natural processes, such as weathering, decay or chemical action, or a combination of these processes, and in which no less than 35 percent by weight of the grains or particles pass the No. 200 sieve.

3. Granular Material:

   a. Granular material shall be considered as natural or synthetic mineral aggregate, such as broken or crushed rock, gravel, sand or slag; which can be incorporated in an 8-inch loose depth layer; and in which not more than 35 percent by weight of the grains or particles pass the No. 200 sieve.

   b. The plasticity index shall not be more than ten.

4. Rock:

   Rock shall be considered as broken sandstone, limestone, boulders, old concrete, brick, etc., which cannot readily be incorporated in an eight-inch layer.

C. Erosion Control

Use of geo-textile fabric along pond bank for necessary root reinforcement and natural revegetation. Greenstreak, PEC-MAT, Eakamat Turf Reinforcement Mat, or similar product recommended.

D. Slotted Drain Grate Catchbasin

a. 461 Ductile Iron Slotted for emergency spillway

E. Reinforced Concrete Storm Sewer Pipe

a. Reinforced Concrete Pipe ASTM C-76
   1. 18" diameter pipe at pond inlet (coming from building parking lot)
   2. 18" diameter pipe connecting emergency spillway to outlet pipe
   3. 24" diameter existing outlet pipe from existing headwall

F. Outlet Orifice

a. 10" diameter orifice in ¼" steel plate of dimensions 35" x 35" on headwall (see attached details on Fig. 1 on following page)

b. Steel plate shall be covered in metal grating (galvanized steel) welded to plate (3" x 1" maximum opening)

PART 3 EXECUTION

3.1 CONSTRUCTION METHODS

A. Excavation

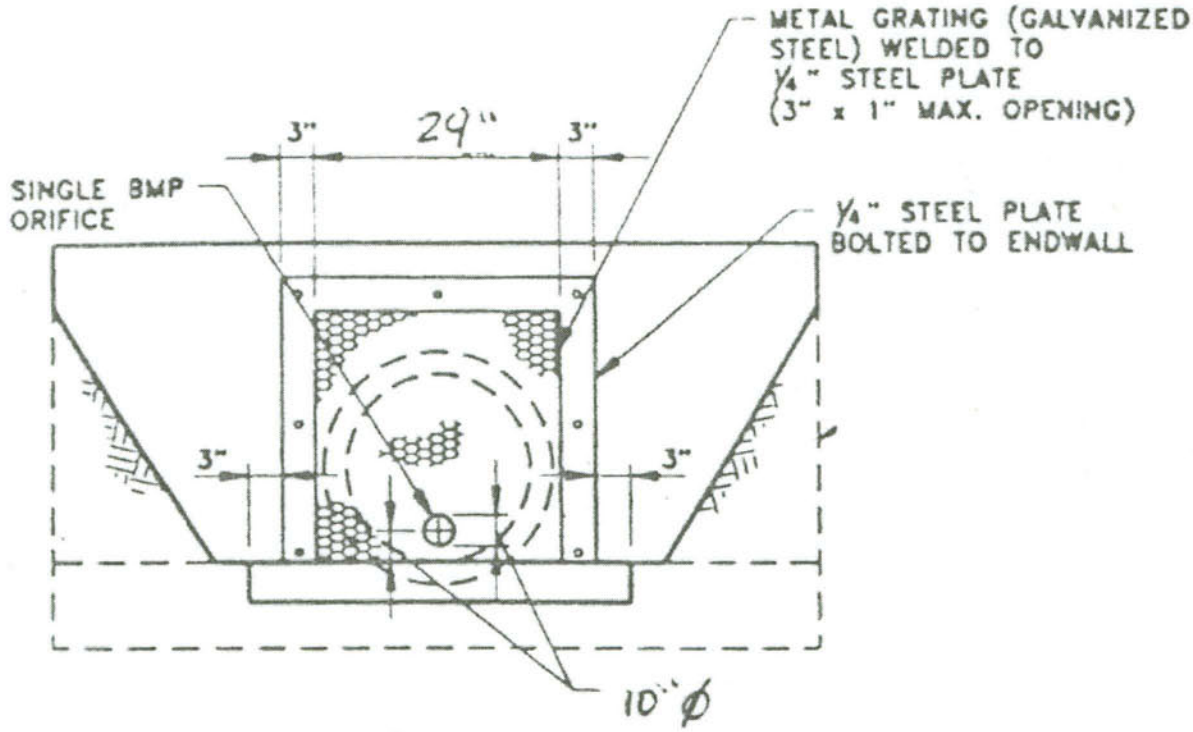
1. Slopes

a. Slope lines shall conform to the lines and grades shown on the Plans or established by the Engineer. The angle may be varied only by permission of the Engineer. Designated pond slope wall is 3:1 (H:V).

b. Slopes shall be trimmed neatly to present a uniform surface, free from hollows or protrusions and loose or overhanging rocks. Slopes shall not be undercut.

c. The tops of all slopes, except where the materials are of solid rock, shall be rounded as shown on plans.

d. The Contractor shall take precautions by benching or other methods, as directed by the Engineer, to prevent slides and slipouts.



ELEVATION

NOT TO SCALE

2. Pond Dimensions

    a. 10' x 10' square base.

    b. 5.5' depth with base of headwall at 0.5' height from pond base. Depth of 5.5' does not include 6" of clay liner.

    c. Side wall slope at 3:1 (H:V).

3. Top Stage Excavation

    a. Excavate 0.129 acres to 1.0' depth in accordance with site layout plan to allow for dry field stage.

4. Disposal of material

    a. Suitable Material

        (1) All suitable material excavated as above provided shall be used for forming embankments for the roadways.

        (2) Soil, granular material, shale, and rock as defined in 2.1.C are suitable for use in embankments. Within soil groups, preference shall be given to the more granular soils which have greater dry weights, greater percentages of course and fine aggregate, and lower liquid limits.

    b. Unsuitable Material

        (1) Material which cannot be satisfactorily placed and compacted to a stable and durable condition may be designated as unsuitable by the Engineer. Sod, trash, organic substances, and muck are considered unfit for use in embankments.

        (2) Sod to be excavated or being excavated that contains excessive moisture shall also be considered unsuitable for use in embankments. However, the Contractor may at his option dry the material and use it in the construction of embankments. Aeration, or other drying method, shall be at the expense of the Contractor.

(3) If the contractor elects to waste and not to dry suitable replacement material if needed to complete the embankments or otherwise fulfill the intent of the Plans shall be furnished and placed by the contractor at his expense.

c. Waste

(1) The Contractor shall locate and furnish all sites for disposition of waste and surplus material.

(2) When directed by the Engineer, surplus material shall be used in uniform flattening of embankment slopes. Steepening of slopes will not be permitted.

(3) Before any waste will be permitted, the Contractor shall prepare a plan showing the limits and details of the proposed waste site. When wasting is proposed adjacent to any roadway, every effort shall be made to keep the top of waste sites below shoulder elevations.

(4) Such plans shall be submitted to the Engineer for review and approval before disposition of waste materials is begun.

(5) The Contractor shall conduct all wasting operations so as to minimize pollution or sedimentation of rivers, streams, lakes, ponds, or other bodies of water.

(6) Waste areas shall be graded, fertilized, seeded and mulched by the Contractor.

(7) Upon completion of work, all waste sites shall be neatly trimmed and drained and all debris and spoil disposed of in an acceptable manner.

B. Embankment

1. Preparation

a. When fills are five feet or less in depth, the topsoil and sod shall be stripped to the depth specified by the engineer, and the top eight inches of the embankment foundation shall be scarified and compacted to the density hereinafter specified.

b. If the required density is unobtainable due to excessive moisture, organic substances, or other causes, the

Contractor may be required, as directed by the Engineer, to remove and waste the in-place material to a depth prescribed by the Engineer before starting embankment; or to place an initial layer of rock, hard shale, or granular material, thickness to be prescribed by the Engineer; or both.

c. All existing slopes, other than rock, against which embankments are to be placed shall be plowed or deeply scarified so as to allow blending of the in-place material with the embankment material.

d. When specified in the Contract or directed by the Engineer, the slopes shall be benched before the embankment is placed.

e. Prior to the commencement of excavation and embankment, when called for in the Contract, topsoil shall be salvaged and stockpiled at the locations designated by the Engineer.

2. Placing embankment

a. No embankment shall be placed on frozen material.

b. Depositing and compacting embankment in layers shall begin at the lowest point of the fill below the grade, at the bottom of ravines, and at the foot of slopes on the side hills.

c. Unconsolidated soil or random materials, unless removed under other provisions of the Specifications, shall be removed as directed by the Engineers, replaced and compacted as herein specified before placing embankment thereon.

d. The layers shall be constructed approximately parallel with the finished grade.

e. Each layer, before starting the next, shall be leveled and smoothed by means of power-driven graders, bulldozers or other suitable equipment approved by the Engineer as to weight, capacity, and adequacy of power to do work.

f. Layers shall extend across the entire fill at the layer of depositing unless otherwise authorized by the Engineer. Each layer, before starting the next, shall be compacted.

g. Materials to be used in any area of an embankment shall be free of stumps and spongy or frozen soil, and reasonably free of organic materials such as leaves, grass, roots, or

other objectionable materials or substances which prevent satisfactory compaction.

h. Soil, granular materials and soft shale shall be placed in embankments in successive layers not exceeding eight inches in thickness before compaction.

i. When embankments are to be constructed across low swampy grounds which will not support the weight of trucks or hauling equipment, the lower part of the fill may be constructed by damping successive loads of rock, hard shale or granular material in a uniformly distributed layer. The thickness of a layer shall not be greater than necessary to support the vehicle placing subsequent layers, after which the remainder of the embankment shall be constructed in layers and compacted as herein specified.

3. Compaction of Embankments

a. Embankments and subgrade material consisting of soil, granular material, shale, and random material, which does not contain sufficient moisture to be compacted to the requirements specified herein shall receive applications of water as directed by the Engineer.

b. Water shall be applied with suitable devices and shall be thoroughly incorporated into the material which is to be compacted.

c. Embankment and subgrade materials which contain excess moisture shall be dried, prior to or during compaction, as necessary to obtain satisfactory compaction.

d. Layers of soil shall be moistened or dried to a tolerance of plus three percentage points or minus four percentage points from the optimum at the time compactive effort is applied, except that soils which evidence pronounced elasticity as the result of compactive effort shall be dried top optimum moisture content, if necessary, to achieve stability. Water shall be added to or excess moisture removed from soils by the use of plows, discs, or by other approved methods when so ordered by the Engineer.

C. Seeding and Mulching

a. All cuts and fill slopes, and draining ditches unless otherwise called for in the plans, shall be seeded and mulched.

D. Slotted Drain Grate

a. Slotted drain shall be installed to the line and grade as shown in the plans. The drain shall be placed in such a manner that the top of the grate is coincident with the finished embankment. Location of the drain is specified on the drawing.

b. The drain shall be temporarily secured and held at the prescribed grade and the trench backfilled to subgrade elevation with a lean grout to assure a uniform foundation and side support.

c. During the construction operation, the slot shall be covered with duct tape, metal strips, lumber or similar material to preclude clogging of the drain with construction materials.

E. Reinforced Concrete Storm Sewer Pipe

a. Inlet composed of 18" pipe coming from main parking lot.

b. Outlet composed of existing 24" concrete pipe at existing headwall.

c. Emergency 18" piping from slotted drain grate catchbasin to adjoin 24" outlet pipe.

F. Outlet Orifice

a. Iron plate of dimensions 35"x 35" covering 24" diameter outlet.

b. Orifice diameter in iron plate is 10".

References

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Appendix

- Drawings
- Photographs
- Sample Calculations
- Computer Analyses

Malcolm Martin Park and Beardsley Farm

Site Improvements

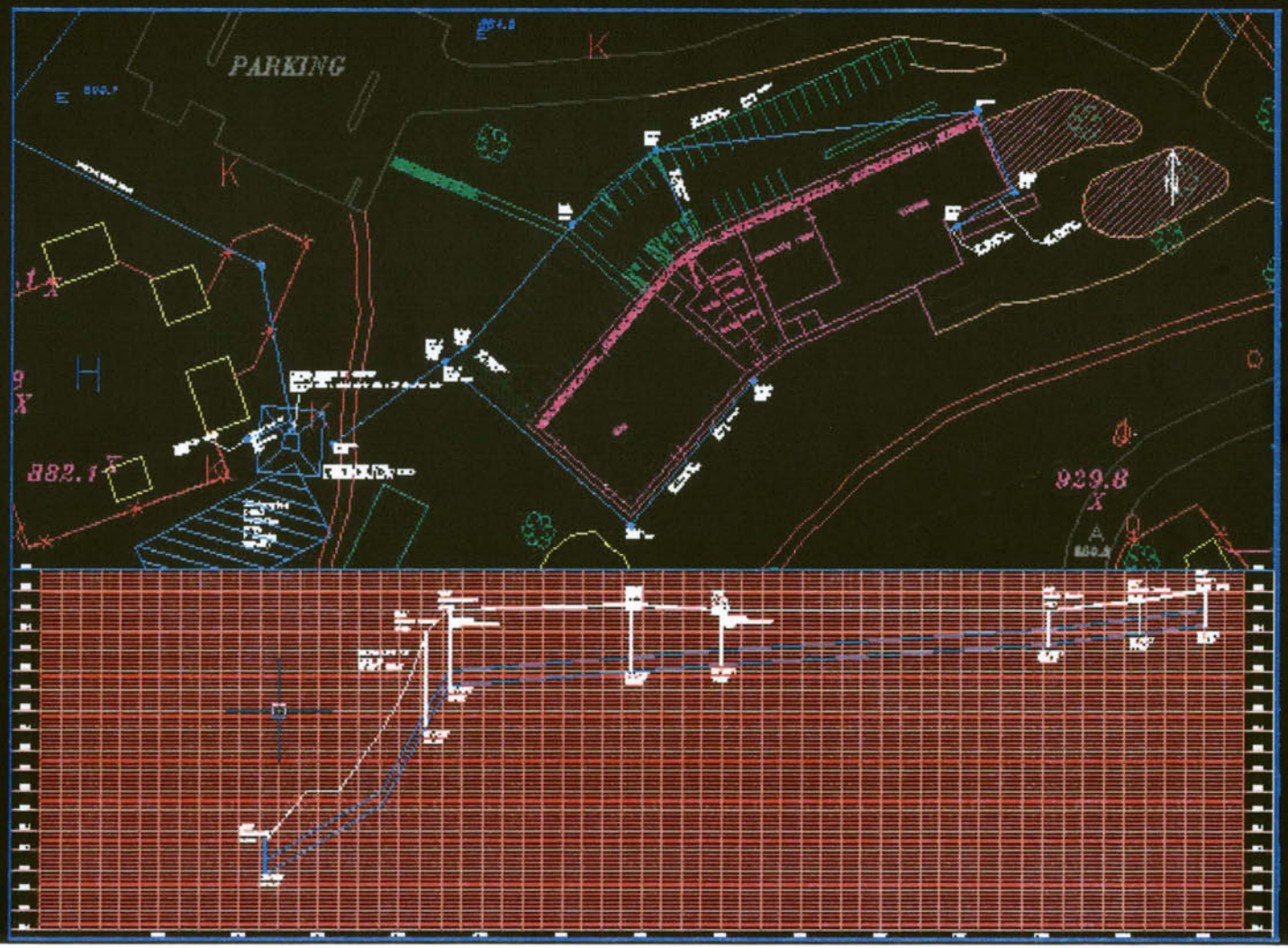
Overall site plan.



Malcolm Martin Park and Beardsley Farm

Site Improvements

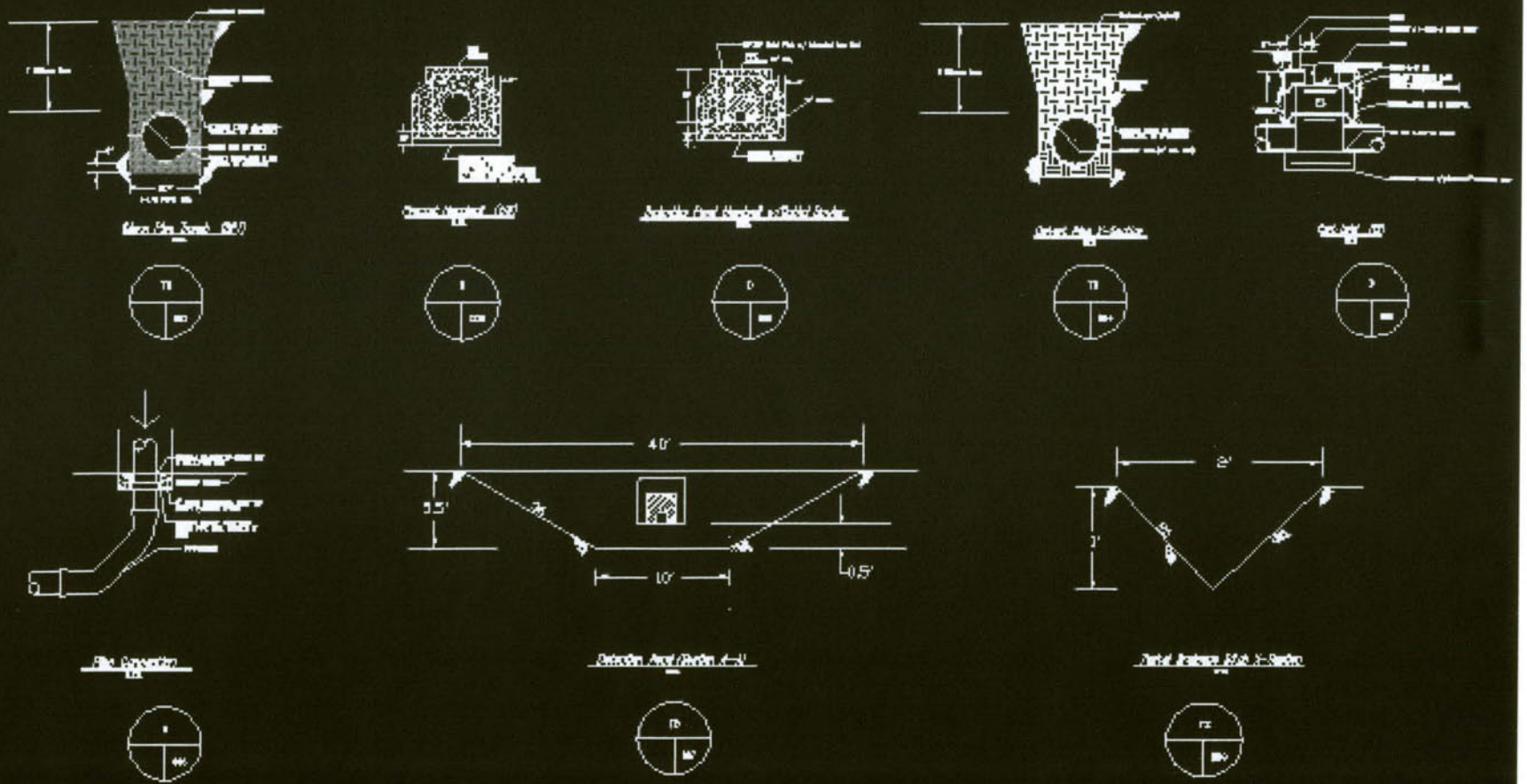
Profile of storm water line.



Malcolm Martin Park and Beardsley Farm

Site Improvements

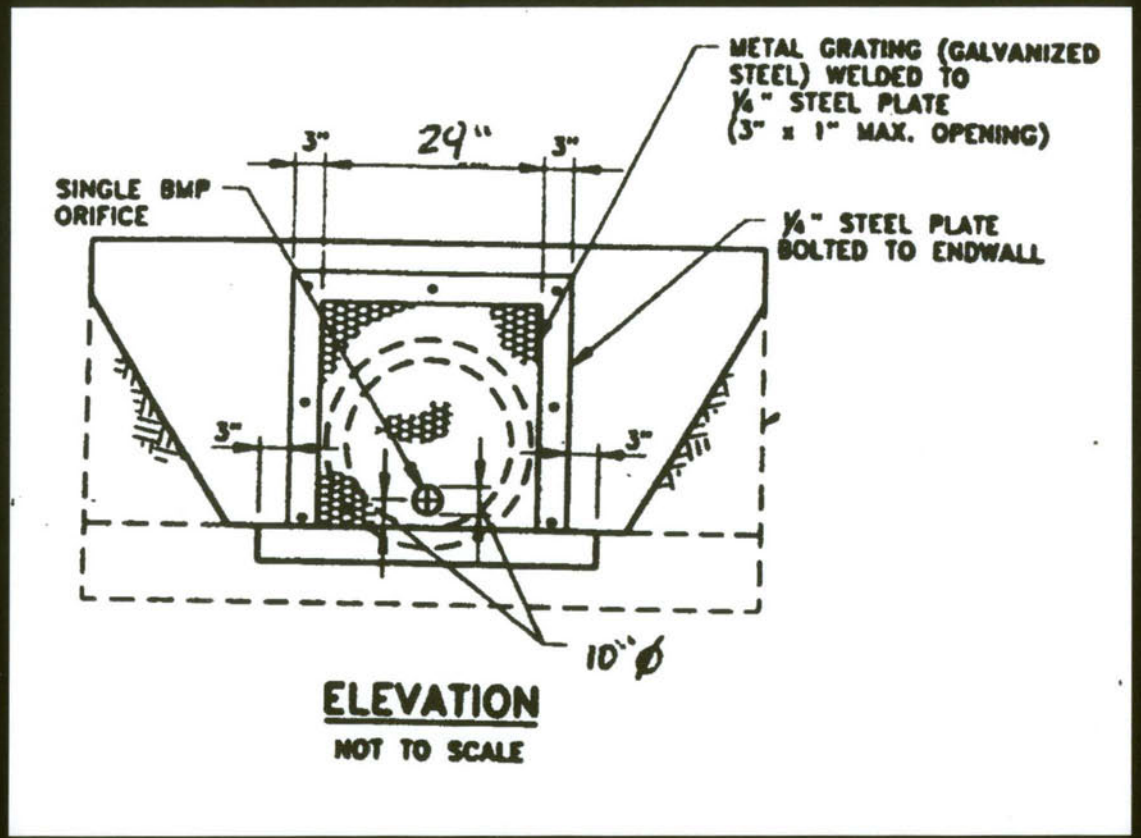
Drainage design details.



Malcolm Martin Park and Beardsley Farm

Site Improvements

Designed orifice outlet for detention pond.



Malcolm Martin Park and Beardsley Farm

Site Improvements

Current Detention Pond Location







Malcolm Martin Park and Beardsley Farm

Site Improvements

Existing drainage pond during heavy storm.



Malcolm Martin Park and Beardsley Farm

Site Improvements

Location of trenches to be installed for baseball field erosion control.



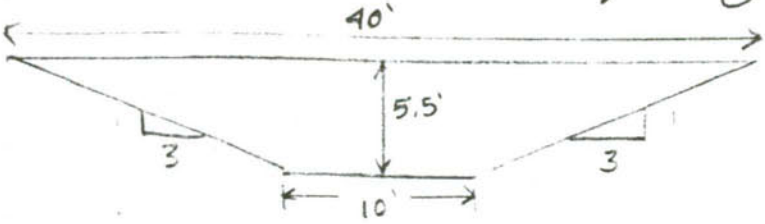
Malcolm Martin Park and Beardsley Farm

Site Improvements



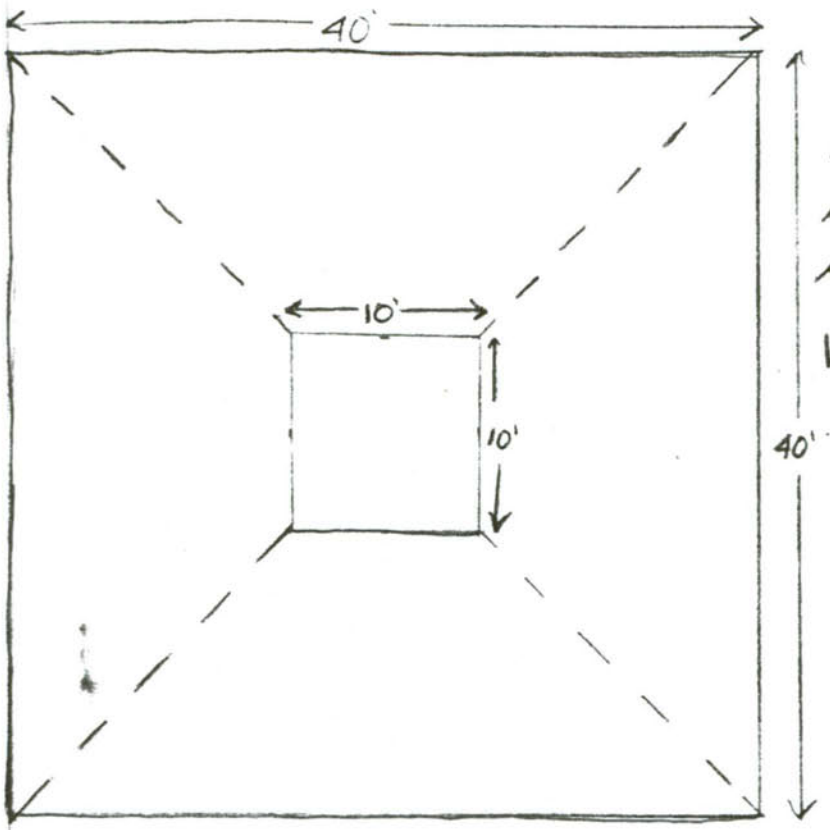
Detention Pond Calculations

=7 to hold first 4000 ft^3 of run-off in 10-yr storm



1" = 10'

Profile



Top Area = $(40')^2 = 1600 ft^2$

Bottom Area = $(10')^2 = 100 ft^2$

$A_T = 1600 ft^2 = 0.037$ acre

$A_B = 100 ft^2 = 0.002$ acre

$V_T = 5.5'(1600 ft^2 + 100 ft^2)/2$

$= 4250 ft^3$

$43560 ft^3$/acre

$= 0.098$ acre · ft

For 10-yr storm, SMADA produced max. stage height w/ this pond design of 9.02'. To prevent overflow above the designed 5.5' pond depth (max. stage), additional storage in the form of a designated area acting as a dry field with the exception of the occurrence of a 10-yr. storm.

The needed area located behind the pool is;

$A_T = 0.037$ acre $= 1600 ft^2$

$(9.02' - 5.5') \times 1600 ft^2 = 5632 ft^3$ total excess water

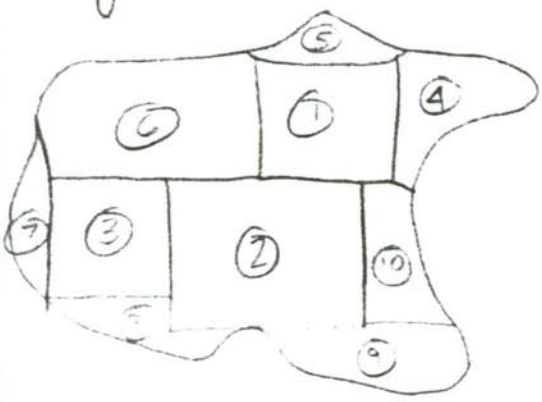
At field excavation of 1.0 ft depth,

$5632 ft^3 / 1.0 ft = 5632 ft^2 = 0.129$ acre dry field

Total Watershed Calculations

- to gage peakflow in main drainage ditch to make sure flooding is not a problem

Using planimeter: $4\ in^2 = 0.325$ planimeter measurement



① $7" \times 7" = 49\ in^2$

② $9" \times 7.25" = 65.25\ in^2$

③ $6" \times 6" = 36\ in^2$

④ 2.014
⑤ 0.805
⑥ 2.937
⑦ 0.743
⑧ 0.780
⑨ 1.985
⑩ 0.939

$10.204 \left(\frac{4\ in^2}{0.325}\right) = 125.90\ in^2$

$\Sigma\ 275.84\ in^2$

$$\frac{275.84\ in^2 \mid 40{,}000\ ft^2 \mid 1\ acre}{\quad \mid 1\ in^2 \mid 43560\ ft^2} = 253.29\ acres$$

⇒ Total Watershed Area

Longest Flow Path

Sheet flow = 300' max

Shallow Concentrated = 1800' length

$$n = \frac{1062' - 922'}{1800} = 0.0777$$

Open-Channel ⇒

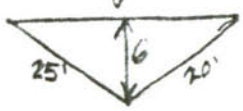
1) 800' length of 15" pipe $n = \frac{922' - 895'}{800} = 0.0343$

Manning's $n = 0.011$ $W_p = 2\pi(15/2) = 3.93'$

$A = \pi/4\,(15/12)^2 = 1.23\ ft^2$

2) 2600' length of drainage d.tch $n = \frac{895' - 853'}{2600'} = 0.0161$

Manning: $n = 0.045$



$A = 0.5(20 \times 6) + 0.5(25 \times 6) \approx 130\ ft^2$ avg.

$W_p = 25' + 20' = 45'$

Change in Impervious Areas due to Construction

Baseball Field Pond Area

1) office - 1000 ft^2
2) tractor shed - 500 ft^2
3) 1/4 walking trail - 0.25 (0.385 acres)
4) Farm Road - 4080 ft^2
5) Farm lot - 6020 ft^2

Σ 0.363 acre impervious

Existing Pond Area

1) Pavilion - 1800 ft^2
2) building - 24,000 ft^2
3) 3/4 walking trail - 0.75 (0.385 acres)
4) Loading Dock & truck entrance - 9654 ft^2
5) Kitchen lot - 21,500 ft^2

Σ 1.1 acres impervious

Existing Pond Watershed Calculations

Using planimeter: ★ took into account only water on site & directly flowing across from Keystone for pond treatment

$A_{in^2} = 0.325$

$$\text{Area} = 0.495 \frac{\text{sq miles}}{\text{mod}} \left| \frac{A_{in^2}}{0.325} \right| \frac{40\,000\ ft^2}{1\ in^2} \left| \frac{1\ acre}{43560\ ft^2} \right. = 5.6\ acres$$

Estimated pre-impervious area to be 0 acres on-site.

Flow along longest time of concentration path

Sheet: 300 ft at $n = 0.05 \Rightarrow \frac{893 - 877}{300} = 0.05$

Shallow Concentrated: 800 ft at $n = 0.15 \Rightarrow \frac{1013 - 893}{800} = 0.15$

Baseball Field Pond Calculations

⇒ we did not need this pond as impervious area increase did not alter watershed characteristics determined by comparison of pre- & post-construction flows.

Using planimeter:
$4\ in^2 = 0.325$

$$\text{Area} = \frac{0.708 \text{ (planimeter reading)} \mid 4\ in^2 \mid 40{,}000\ ft^2 \mid 1\ acre}{0.325 \mid 1\ in^2 \mid 43560\ ft^2} = 8 \text{ acres}$$

Estimated pre-construction impervious acreage = 1.5 acres

Post-construction impervious acreage = 1.86 acres

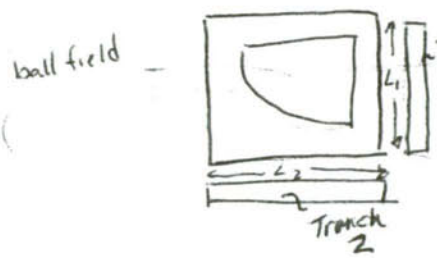
Flow - along longest time of conc. path

Sheet 300 ft at $n = 0.167$

Shallow Concentrated 200 ft at $n = 0.14$

Trenches Along Ball-field

- Designed to prevent erosion and washing away of field
- Designed to contain flow from 18" Ø pipe from farm
  Area = $\pi/4\,(18/12)^2 = 1.77\ ft^2$ Both trenches designed at same size for uniformity.



Trench 1 $L_1 = 315'$

$V_1 = 315' \times 1.77\ ft^2 = 558\ ft^3$

Trench 2 $L_2 = 520'$

$V_2 = 520' \times 1.77\ ft^2 = 920\ ft^3$

Cost Estimating

Reference: R.S. Means 1999
Construction Cost Data
57th Annual Edition
copyright 1998
Senior editor [illegible]

Building (Kitchen & Gym)

872' of 18" ∅ concrete pipe at $30/ft = $13,542

120' of 10" ∅ concrete pipe at $10.45/ft = $1254

2 curb inlets:
1 @ 6' < d < 8' = 2 @ $570 = $1740
1 @ d < 6'

8 catch basins:
7 @ d < 6' = 7 × 540 = $4830
1 @ d ≥ 8' = $1400

1 headwall = $456

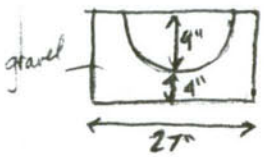
Excavation

$27"/12" = 2.25\ ft \times 6\ ft_{avg.depth} = 13.5\ ft^2$

trenching from building lot to pond = $\frac{(49.01 \times 13.5)\ ft^3}{27\ ft^3/yd^3} \left| \frac{55}{yd^3} \right. = \$248$

backfill area of 872' of trench.

27" wide trench (1.5 pipe ∅)



$A = (27" \times 13") - \frac{1}{2}(\pi/4)(18")^2 = 224\ in^2 = 1.55\ ft^2$ gravel

$V_{gravel} = 1.55\ ft^2 (872') = 1355\ ft^3$ gravel

gravel = $\frac{1355\ ft^3}{27\ ft^3} \left| \frac{yd^3}{} \right. \left| \frac{(515 + 3.84)}{1\ yd^3} \right. = \$945$

Structural backfill

$27" \times (H_{avg} = 6' \times 12"/ft) = 1944\ in^2 = 13.5\ ft^2$ str. backfill

$13.5\ ft^2 \times 872'$ trench $= 11,772\ ft^3$

$\frac{11,772\ ft^3}{27\ ft^3} \left| \frac{yd^3}{} \right. \left| \frac{\$3.84}{yd^3} \right. = \$1674$

Building Total Σ $25,889

Farm

139' of 18" ∅ concrete pipe @ $15.30/ft = $2,127

25' of 20" ∅ corrugated metal pipe @ $21.45/ft = $536

1 catch basin @ d<C' = $1690

Excavation

trench = $\frac{(139\,ft \times 2.25' \times 4') \mid \$5}{27\,ft^3 \mid yd^3} = \$232$

backfill

$V_{gravel} = 1.55\,ft^2(139) = \frac{215\,ft^3 \mid (\$15 + 3.84)}{27\,ft^3 \mid yd^3} = \$150$ (gravel, backfill)

structural fill

27" (cover) × (4' × 12"/ft) = 1296 in² = 9 ft² × 139' = 1251 ft³

$\frac{1251\,ft^3 \mid yd^3 \mid \$3.84}{27\,ft^3 \mid \mid yd^3} = \$178$

Trenches at ball field

Erosion control cost accounted for w/ pond purchase of roll of geo-tech fabric

Trenches excavation

$\frac{(558 + 920)\,ft^3 \mid \$5}{27\,ft^3 \mid yd^3} = \$274$

Farm Total Σ $4,187

Pond

30' of 18" ∅ concrete pipe at $15.30/ft = $459

1 catchbasin at <6' depth = $690

Pipe tee to emergency spillway = $2200
6 ∅ "Sp" way

Clay liner - 6" compacted = $\frac{50 ft^3}{27 ft^3/yd^3} \times \$8.40/yd^3 = \$15$

Erosion control mesh $\frac{70 ft^2}{9 ft^2/yd^2} \times \$1.21/yd^2 = \$9.41$

⇒ buy roll at 100 yd²/roll for pond + ditches = $21

Outlet = including 35"x35" steel plate w/ galvanized iron mesh + anchor bolts + labor = $300

Excavation

trenching of emergency spillway pipe = $\frac{(30' \times 1.25' \times 5')}{27} \Big| \$5 = \$63$

gravel backfill of 30' trench at 5' depth

$V_{gravel} = 1.55 ft^2 \times 30' = \frac{46.50 ft^3}{27 ft^3/yd^3} \Big| \frac{(\$15+3.84)}{yd^3} = \$32$

structural backfill

$27" \times (3' \times 12"/ft) = 972 in^2 = 6.75 ft^2 \times 30' = 203' ft^3$

$\frac{203 ft^3}{27 ft^3} \Big| yd^3 \Big| \frac{\$3.84}{yd^3} = \$30$

Excavation of Pond w/ front end loader

Pond = 4050 - 2958 (existing) = 1092 ft³ } 6711 ft³
Add. Storage = 0.129 acre x 1 ft = 5619 ft³ }

$\frac{6711 ft^3}{27 ft^3/yd^3} \Big| \frac{\$1.55}{yd^3} = \$385$

Pond Total Σ $4,113

Time of Concentration & Pipe Sizing for Parking Lots

Building + Lot

Total Impervious Area: 24,000 + 21,500 − 9,654 = 55,154 ft²

Parking Lot (3 equiv. drains)

$3\sqrt{21,500} = 7167\ ft^2 = 0.165$ acre

Loading Dock = 9654 ft² = 0.222 acres

$Q = CiA$

$C = 0.83$ (p. 530 Land Development Handbook)

Longest path = 561' (worst case)

$R_h = \frac{\pi/4 (D)^2}{D/4} = \pi D$

$Q = 0.83(6.2\ in/hr)(1.27\ acres)$

$Q = 6.52\ cfs$

$Q = \frac{1.49}{0.011} (\pi D)^{2/3} (0.002)^{1/2} (\pi/4 D^2)$

$6.52 = 10.19 D^{8/3} \Rightarrow D = 0.845' = 10.1'' \Rightarrow$ size to 15" ϕ

⇒ We ultimately decided to use 18" ϕ pipe to conform with standard design

Farm Lot

Area = 0.363 acres

Longest Flow path = 148'

$Q = 0.83(6.2\ in/hr)(0.363) = 1.96\ cfs$

$1.96 = \frac{1.49}{0.011} (\pi D)^{2/3} (0.001)^{1/2} (\pi/4 D^2)$

$D = 6.5''$ ⇒ use 18" ϕ as standard and also to help account for overland flow from across Reynold's Street.

Time of Concentration for Parking Lots

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : Tc for farm parking lot User: CEE Date: 04-18-2000

County : KNOX State: TN Checked: ____ Date: _____
Subtitle:

Subarea #1 - .363

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.3	148	.001	a					0.090

Time of Concentration = 0.09*
=====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Burmuda	--- Surface Codes ---
C Cultivated < 20 % Res.	H Woods, Light	P Paved
D Cultivated > 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : Tc for main parking lot User: CEE Date: 04-18-2000

County : KNOX State: TN Checked: ____ Date: _____
Subtitle:

Subarea #1 - 1.27

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.3	300	.002	a					0.120
Open Channel		261	.002		.011	1.77	2.25		0.014
							Time of Concentration =		0.13*
									=====

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense
J Range, Natural

--- Shallow Concentrated --- Surface Codes ---

P Paved
U Unpaved

Total Surrounding Watershed Calculations

RUNOFF CURVE NUMBER COMPUTATION Version 2.10

Project : Beardsley Farm Watershed Area User: CEE Date: 03-03-2000

County : KNOX State: TN Checked: ____ Date: _____
Subtitle:
Subarea : 253.29

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
		Acres (CN)		
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Poor condition; grass cover < 50%	-	-	-	20(89)
Fair condition; grass cover 50% to 75%	-	-	140(79)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	-	15(98)	-
Streets and roads				
Paved; curbs and storm sewers	-	-	30(98)	-
Paved; open ditches (w/right-of-way)	-	-	3(92)	-
Residential districts Avg % imperv (by average lot size)				
1/4 acre 38	-	-	45(83)	-
Total Area (by Hydrologic Soil Group)			233	20
			====	====

SUBAREA: 253.29 TOTAL DRAINAGE AREA: 253 Acres WEIGHTED CURVE NUMBER: 84

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : Beardsley Farm Watershed Area User: CEE Date: 03-03-2000

County : KNOX State: TN Checked: ____ Date: _____
Subtitle:

Subarea #1 - 253.29

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.3	300	.0200	f					0.564
Shallow Concent'd		1800	.0777	u					0.111
Open Channel		800	.0343		.01	11.23	3.93		0.019
Open Channel		2600	.0161		.045	130	45		0.085
								Time of Concentration =	0.78*
									=====

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense
J Range, Natural

--- Shallow Concentrated --- Surface Codes ---

P Paved
U Unpaved

SMADA 6.0 for Windows
Watershed Information

Watershed Total Area (acres)	:253.2900
Impervious Area (acres)	:48.0000
Time of Concentration (min)	:46.8
% Impervious Directly Connected	:50.00

Additional Abstraction

Over Pervious Area (inches)	:0.00
Over Impervious Area (inches)	:0.00

Infiltration Characteristics:

Max Infiltration Capacity (in)	:999.00
SCS Curve Number for Pervious	:84
Initial Abstraction Factor	:0.20

10-yr storm:

Time (hr)	Time HHMM	Rain (in)	Cumulative (in)
0.050	00003	0.002	0.002
0.100	00006	0.002	0.004
0.150	00009	0.002	0.006
0.200	00012	0.002	0.008
0.250	00015	0.002	0.010
0.300	00018	0.003	0.013
0.350	00021	0.003	0.016
0.400	00024	0.003	0.019
0.450	00027	0.003	0.022
0.500	00030	0.003	0.025
0.550	00033	0.003	0.028
0.600	00036	0.003	0.031
0.650	00039	0.003	0.033
0.700	00042	0.003	0.036
0.750	00045	0.003	0.039
0.800	00048	0.003	0.042
0.850	00051	0.003	0.045
0.900	00054	0.003	0.048
0.950	00057	0.003	0.051
1.000	00100	0.003	0.054
1.050	00103	0.003	0.057
1.100	00106	0.003	0.060
1.150	00109	0.003	0.063
1.200	00112	0.003	0.066
1.250	00115	0.003	0.069
1.300	00118	0.003	0.072
1.350	00121	0.003	0.075
1.400	00124	0.003	0.078
1.450	00127	0.003	0.081
1.500	00130	0.003	0.084
1.550	00133	0.003	0.087
1.600	00136	0.003	0.090
1.650	00139	0.003	0.093
1.700	00142	0.003	0.096
1.750	00145	0.003	0.098
1.800	00148	0.003	0.101
1.850	00151	0.003	0.104
1.900	00154	0.003	0.107
1.950	00157	0.003	0.110
2.000	00200	0.003	0.113
2.050	00203	0.003	0.116
2.100	00206	0.003	0.119
2.150	00209	0.003	0.122
2.200	00212	0.003	0.125
2.250	00215	0.003	0.128
2.300	00218	0.003	0.131
2.350	00221	0.003	0.134
2.400	00224	0.003	0.137
2.450	00227	0.003	0.140
2.500	00230	0.003	0.143
2.550	00233	0.003	0.146
2.600	00236	0.003	0.149
2.650	00239	0.003	0.152
2.700	00242	0.003	0.155
2.750	00245	0.003	0.158
2.800	00248	0.003	0.161
2.850	00251	0.003	0.164
2.900	00254	0.003	0.166
2.950	00257	0.003	0.169
3.000	00300	0.003	0.172
3.050	00303	0.003	0.175
3.100	00306	0.003	0.178
3.150	00309	0.003	0.181
3.200	00312	0.003	0.184
3.250	00315	0.003	0.187
3.300	00318	0.003	0.190
3.350	00321	0.003	0.193
3.400	00324	0.003	0.196
3.450	00327	0.003	0.199
3.500	00330	0.003	0.202
3.550	00333	0.003	0.205
3.600	00336	0.003	0.208
3.650	00339	0.003	0.211
3.700	00342	0.003	0.214
3.750	00345	0.003	0.217
3.800	00348	0.004	0.221
3.850	00351	0.004	0.225
3.900	00354	0.004	0.229
3.950	00357	0.004	0.232
4.000	00400	0.004	0.236
4.050	00403	0.004	0.240
4.100	00406	0.004	0.244

4.150	00409	0.004	0.248
4.200	00412	0.004	0.252
4.250	00415	0.004	0.256
4.300	00418	0.004	0.260
4.350	00421	0.004	0.264
4.400	00424	0.004	0.268
4.450	00427	0.004	0.272
4.500	00430	0.004	0.276
4.550	00433	0.004	0.280
4.600	00436	0.004	0.284
4.650	00439	0.004	0.288
4.700	00442	0.004	0.292
4.750	00445	0.004	0.295
4.800	00448	0.004	0.299
4.850	00451	0.004	0.303
4.900	00454	0.004	0.307
4.950	00457	0.004	0.311
5.000	00500	0.004	0.315
5.050	00503	0.004	0.319
5.100	00506	0.004	0.323
5.150	00509	0.004	0.327
5.200	00512	0.004	0.331
5.250	00515	0.004	0.335
5.300	00518	0.004	0.339
5.350	00521	0.004	0.343
5.400	00524	0.004	0.347
5.450	00527	0.004	0.351
5.500	00530	0.004	0.355
5.550	00533	0.004	0.359
5.600	00536	0.004	0.362
5.650	00539	0.004	0.366
5.700	00542	0.004	0.370
5.750	00545	0.004	0.374
5.800	00548	0.004	0.378
5.850	00551	0.004	0.382
5.900	00554	0.004	0.386
5.950	00557	0.004	0.390
6.000	00600	0.004	0.394
6.050	00603	0.005	0.399
6.100	00606	0.005	0.404
6.150	00609	0.005	0.409
6.200	00612	0.005	0.414
6.250	00615	0.005	0.419
6.300	00618	0.005	0.424
6.350	00621	0.005	0.428
6.400	00624	0.005	0.433
6.450	00627	0.005	0.438
6.500	00630	0.005	0.443
6.550	00633	0.005	0.448
6.600	00636	0.005	0.453
6.650	00639	0.005	0.458
6.700	00642	0.005	0.463
6.750	00645	0.005	0.468
6.800	00648	0.005	0.473
6.850	00651	0.005	0.478
6.900	00654	0.005	0.483
6.950	00657	0.005	0.488
7.000	00700	0.005	0.492
7.050	00703	0.005	0.497
7.100	00706	0.005	0.502
7.150	00709	0.005	0.507
7.200	00712	0.005	0.512
7.250	00715	0.005	0.517
7.300	00718	0.005	0.522
7.350	00721	0.005	0.527
7.400	00724	0.005	0.532
7.450	00727	0.005	0.537
7.500	00730	0.005	0.542
7.550	00733	0.005	0.547
7.600	00736	0.005	0.552
7.650	00739	0.005	0.557
7.700	00742	0.005	0.561
7.750	00745	0.005	0.566
7.800	00748	0.005	0.571
7.850	00751	0.005	0.576
7.900	00754	0.005	0.581
7.950	00757	0.005	0.586
8.000	00800	0.005	0.591
8.050	00803	0.006	0.597
8.100	00806	0.006	0.603
8.150	00809	0.006	0.609
8.200	00812	0.006	0.615
8.250	00815	0.006	0.621
8.300	00818	0.007	0.627
8.350	00821	0.007	0.634
8.400	00824	0.007	0.641
8.450	00827	0.007	0.648

8.500	00830	0.007	0.655
8.550	00833	0.007	0.662
8.600	00836	0.007	0.669
8.650	00839	0.007	0.676
8.700	00842	0.007	0.683
8.750	00845	0.007	0.689
8.800	00848	0.007	0.696
8.850	00851	0.007	0.703
8.900	00854	0.007	0.710
8.950	00857	0.007	0.717
9.000	00900	0.007	0.724
9.050	00903	0.008	0.732
9.100	00906	0.008	0.740
9.150	00909	0.008	0.748
9.200	00912	0.008	0.755
9.250	00915	0.008	0.763
9.300	00918	0.008	0.771
9.350	00921	0.008	0.779
9.400	00924	0.008	0.787
9.450	00927	0.008	0.795
9.500	00930	0.008	0.803
9.550	00933	0.009	0.812
9.600	00936	0.009	0.821
9.650	00939	0.009	0.829
9.700	00942	0.009	0.838
9.750	00945	0.009	0.847
9.800	00948	0.009	0.856
9.850	00951	0.009	0.865
9.900	00954	0.009	0.874
9.950	00957	0.009	0.883
10.00	01000	0.009	0.891
10.05	01003	0.010	0.901
10.10	01006	0.010	0.911
10.15	01009	0.010	0.921
10.20	01012	0.010	0.931
10.25	01015	0.010	0.941
10.30	01018	0.012	0.952
10.35	01021	0.012	0.964
10.40	01024	0.012	0.976
10.45	01027	0.012	0.988
10.50	01030	0.012	1.000
10.55	01033	0.015	1.015
10.60	01036	0.015	1.029
10.65	01039	0.015	1.044
10.70	01042	0.015	1.059
10.75	01045	0.015	1.074
10.80	01048	0.018	1.091
10.85	01051	0.018	1.109
10.90	01054	0.018	1.127
10.95	01057	0.018	1.145
11.00	01100	0.018	1.162
11.05	01103	0.021	1.183
11.10	01106	0.021	1.204
11.15	01109	0.021	1.224
11.20	01112	0.021	1.245
11.25	01115	0.021	1.266
11.30	01118	0.026	1.291
11.35	01121	0.026	1.317
11.40	01124	0.026	1.343
11.45	01127	0.026	1.368
11.50	01130	0.026	1.394
11.55	01133	0.102	1.496
11.60	01136	0.102	1.599
11.65	01139	0.102	1.701
11.70	01142	0.102	1.804
11.75	01145	0.102	1.906
11.80	01148	0.272	2.178
11.85	01151	0.272	2.450
11.90	01154	0.272	2.722
11.95	01157	0.272	2.993
12.00	01200	0.272	3.265
12.05	01203	0.043	3.309
12.10	01206	0.043	3.352
12.15	01209	0.043	3.395
12.20	01212	0.043	3.439
12.25	01215	0.043	3.482
12.30	01218	0.028	3.510
12.35	01221	0.028	3.537
12.40	01224	0.028	3.565
12.45	01227	0.028	3.592
12.50	01230	0.028	3.620
12.55	01233	0.023	3.643
12.60	01236	0.023	3.665
12.65	01239	0.023	3.688
12.70	01242	0.023	3.710
12.75	01245	0.023	3.733
12.80	01248	0.018	3.751

12.85	01251	0.018	3.769
12.90	01254	0.018	3.786
12.95	01257	0.018	3.804
13.00	01300	0.018	3.822
13.05	01303	0.015	3.837
13.10	01306	0.015	3.851
13.15	01309	0.015	3.866
13.20	01312	0.015	3.881
13.25	01315	0.015	3.896
13.30	01318	0.013	3.908
13.35	01321	0.013	3.921
13.40	01324	0.013	3.934
13.45	01327	0.013	3.947
13.50	01330	0.013	3.960
13.55	01333	0.011	3.971
13.60	01336	0.011	3.981
13.65	01339	0.011	3.992
13.70	01342	0.011	4.003
13.75	01345	0.011	4.014
13.80	01348	0.010	4.024
13.85	01351	0.010	4.034
13.90	01354	0.010	4.043
13.95	01357	0.010	4.053
14.00	01400	0.010	4.063
14.05	01403	0.009	4.072
14.10	01406	0.009	4.081
14.15	01409	0.009	4.090
14.20	01412	0.009	4.099
14.25	01415	0.009	4.107
14.30	01418	0.008	4.115
14.35	01421	0.008	4.123
14.40	01424	0.008	4.131
14.45	01427	0.008	4.139
14.50	01430	0.008	4.147
14.55	01433	0.007	4.154
14.60	01436	0.007	4.161
14.65	01439	0.007	4.168
14.70	01442	0.007	4.174
14.75	01445	0.007	4.181
14.80	01448	0.007	4.188
14.85	01451	0.007	4.195
14.90	01454	0.007	4.202
14.95	01457	0.007	4.209
15.00	01500	0.007	4.216
15.05	01503	0.007	4.223
15.10	01506	0.007	4.230
15.15	01509	0.007	4.236
15.20	01512	0.007	4.243
15.25	01515	0.007	4.250
15.30	01518	0.006	4.256
15.35	01521	0.006	4.262
15.40	01524	0.006	4.268
15.45	01527	0.006	4.274
15.50	01530	0.006	4.280
15.55	01533	0.006	4.286
15.60	01536	0.006	4.292
15.65	01539	0.006	4.298
15.70	01542	0.006	4.303
15.75	01545	0.006	4.309
15.80	01548	0.006	4.315
15.85	01551	0.006	4.321
15.90	01554	0.006	4.327
15.95	01557	0.006	4.333
16.00	01600	0.006	4.339
16.05	01603	0.006	4.345
16.10	01606	0.006	4.351
16.15	01609	0.006	4.357
16.20	01612	0.006	4.363
16.25	01615	0.006	4.368
16.30	01618	0.006	4.374
16.35	01621	0.006	4.380
16.40	01624	0.006	4.386
16.45	01627	0.006	4.392
16.50	01630	0.006	4.398
16.55	01633	0.005	4.403
16.60	01636	0.005	4.408
16.65	01639	0.005	4.413
16.70	01642	0.005	4.418
16.75	01645	0.005	4.423
16.80	01648	0.005	4.428
16.85	01651	0.005	4.432
16.90	01654	0.005	4.437
16.95	01657	0.005	4.442
17.00	01700	0.005	4.447
17.05	01703	0.005	4.452
17.10	01706	0.005	4.457
17.15	01709	0.005	4.462

17.20	01712	0.005	4.467
17.25	01715	0.005	4.472
17.30	01718	0.005	4.477
17.35	01721	0.005	4.482
17.40	01724	0.005	4.487
17.45	01727	0.005	4.492
17.50	01730	0.005	4.497
17.55	01733	0.005	4.501
17.60	01736	0.005	4.506
17.65	01739	0.005	4.511
17.70	01742	0.005	4.516
17.75	01745	0.005	4.521
17.80	01748	0.004	4.525
17.85	01751	0.004	4.529
17.90	01754	0.004	4.533
17.95	01757	0.004	4.537
18.00	01800	0.004	4.541
18.05	01803	0.004	4.545
18.10	01806	0.004	4.549
18.15	01809	0.004	4.553
18.20	01812	0.004	4.557
18.25	01815	0.004	4.561
18.30	01818	0.004	4.564
18.35	01821	0.004	4.568
18.40	01824	0.004	4.572
18.45	01827	0.004	4.576
18.50	01830	0.004	4.580
18.55	01833	0.004	4.584
18.60	01836	0.004	4.588
18.65	01839	0.004	4.592
18.70	01842	0.004	4.596
18.75	01845	0.004	4.600
18.80	01848	0.004	4.604
18.85	01851	0.004	4.608
18.90	01854	0.004	4.612
18.95	01857	0.004	4.616
19.00	01900	0.004	4.620
19.05	01903	0.004	4.624
19.10	01906	0.004	4.628
19.15	01909	0.004	4.631
19.20	01912	0.004	4.635
19.25	01915	0.004	4.639
19.30	01918	0.004	4.643
19.35	01921	0.004	4.647
19.40	01924	0.004	4.651
19.45	01927	0.004	4.655
19.50	01930	0.004	4.659
19.55	01933	0.004	4.663
19.60	01936	0.004	4.667
19.65	01939	0.004	4.671
19.70	01942	0.004	4.675
19.75	01945	0.004	4.679
19.80	01948	0.003	4.682
19.85	01951	0.003	4.685
19.90	01954	0.003	4.688
19.95	01957	0.003	4.691
20.00	02000	0.003	4.694
20.05	02003	0.003	4.696
20.10	02006	0.003	4.699
20.15	02009	0.003	4.702
20.20	02012	0.003	4.705
20.25	02015	0.003	4.708
20.30	02018	0.003	4.711
20.35	02021	0.003	4.714
20.40	02024	0.003	4.717
20.45	02027	0.003	4.720
20.50	02030	0.003	4.723
20.55	02033	0.003	4.726
20.60	02036	0.003	4.729
20.65	02039	0.003	4.732
20.70	02042	0.003	4.735
20.75	02045	0.003	4.738
20.80	02048	0.003	4.741
20.85	02051	0.003	4.744
20.90	02054	0.003	4.747
20.95	02057	0.003	4.750
21.00	02100	0.003	4.753
21.05	02103	0.003	4.756
21.10	02106	0.003	4.759
21.15	02109	0.003	4.761
21.20	02112	0.003	4.764
21.25	02115	0.003	4.767
21.30	02118	0.003	4.770
21.35	02121	0.003	4.773
21.40	02124	0.003	4.776
21.45	02127	0.003	4.779
21.50	02130	0.003	4.782

21.55	02133	0.003	4.785
21.60	02136	0.003	4.788
21.65	02139	0.003	4.791
21.70	02142	0.003	4.794
21.75	02145	0.003	4.797
21.80	02148	0.003	4.800
21.85	02151	0.003	4.803
21.90	02154	0.003	4.806
21.95	02157	0.003	4.809
22.00	02200	0.003	4.812
22.05	02203	0.003	4.815
22.10	02206	0.003	4.818
22.15	02209	0.003	4.821
22.20	02212	0.003	4.824
22.25	02215	0.003	4.826
22.30	02218	0.003	4.829
22.35	02221	0.003	4.832
22.40	02224	0.003	4.835
22.45	02227	0.003	4.838
22.50	02230	0.003	4.841
22.55	02233	0.003	4.844
22.60	02236	0.003	4.847
22.65	02239	0.003	4.850
22.70	02242	0.003	4.853
22.75	02245	0.003	4.856
22.80	02248	0.003	4.859
22.85	02251	0.003	4.862
22.90	02254	0.003	4.865
22.95	02257	0.003	4.868
23.00	02300	0.003	4.871
23.05	02303	0.003	4.874
23.10	02306	0.003	4.877
23.15	02309	0.003	4.880
23.20	02312	0.003	4.883
23.25	02315	0.003	4.886
23.30	02318	0.003	4.889
23.35	02321	0.003	4.892
23.40	02324	0.003	4.894
23.45	02327	0.003	4.897
23.50	02330	0.003	4.900
23.55	02333	0.003	4.903
23.60	02336	0.003	4.906
23.65	02339	0.003	4.909
23.70	02342	0.003	4.912
23.75	02345	0.003	4.915
23.80	02348	0.002	4.917
23.85	02351	0.002	4.919
23.90	02354	0.002	4.921
23.95	02357	0.002	4.923
24.00	00000	0.002	4.925

4.92

10-yr. Storm

Untitled

Time□□(hrs)	Rainfall□□(inches)		Infiltration□□(inches)	Excess □□(cfs)	Runoff□□(cfs)
0.05	0.002	0.002	0.929	0.003	
0.10	0.002	0.002	0.929	0.009	
0.15	0.002	0.002	0.929	0.017	
0.20	0.002	0.002	0.929	0.029	
0.25	0.002	0.002	0.929	0.043	
0.30	0.003	0.003	1.393	0.062	
0.35	0.003	0.003	1.393	0.085	
0.40	0.003	0.003	1.393	0.112	
0.45	0.003	0.003	1.393	0.143	
0.50	0.003	0.003	1.393	0.179	
0.55	0.003	0.003	1.393	0.219	
0.60	0.003	0.003	1.393	0.264	
0.65	0.003	0.003	1.393	0.312	
0.70	0.003	0.003	1.393	0.365	
0.75	0.003	0.003	1.393	0.423	
0.80	0.003	0.003	1.393	0.482	
0.85	0.003	0.003	1.393	0.542	
0.90	0.003	0.003	1.393	0.601	
0.95	0.003	0.003	1.393	0.660	
1.00	0.003	0.003	1.393	0.719	
1.05	0.003	0.003	1.393	0.776	
1.10	0.003	0.003	1.393	0.831	
1.15	0.003	0.003	1.393	0.883	
1.20	0.003	0.003	1.393	0.933	
1.25	0.003	0.003	1.393	0.980	
1.30	0.003	0.003	1.393	1.025	
1.35	0.003	0.003	1.393	1.066	
1.40	0.003	0.003	1.393	1.106	
1.45	0.003	0.003	1.393	1.143	
1.50	0.003	0.003	1.393	1.177	
1.55	0.003	0.003	1.393	1.209	
1.60	0.003	0.003	1.393	1.238	
1.65	0.003	0.003	1.393	1.264	
1.70	0.003	0.003	1.393	1.288	
1.75	0.003	0.003	1.393	1.309	
1.80	0.003	0.003	1.393	1.328	
1.85	0.003	0.003	1.393	1.344	
1.90	0.003	0.003	1.393	1.358	
1.95	0.003	0.003	1.393	1.369	
2.00	0.003	0.003	1.393	1.377	
2.05	0.003	0.003	1.393	1.383	
2.10	0.003	0.003	1.393	1.387	
2.15	0.003	0.003	1.393	1.390	
2.20	0.003	0.003	1.393	1.392	
2.25	0.003	0.003	1.393	1.393	
2.30	0.003	0.003	1.393	1.394	

				Untitled
2.35	0.003	0.003	1.393	1.393
2.40	0.003	0.003	1.393	1.393
2.45	0.003	0.003	1.393	1.393
2.50	0.003	0.003	1.393	1.393
2.55	0.003	0.003	1.393	1.393
2.60	0.003	0.003	1.393	1.393
2.65	0.003	0.003	1.393	1.393
2.70	0.003	0.003	1.393	1.393
2.75	0.003	0.003	1.393	1.393
2.80	0.003	0.003	1.393	1.393
2.85	0.003	0.003	1.393	1.393
2.90	0.003	0.003	1.393	1.393
2.95	0.003	0.003	1.393	1.393
3.00	0.003	0.003	1.393	1.393
3.05	0.003	0.003	1.393	1.393
3.10	0.003	0.003	1.393	1.393
3.15	0.003	0.003	1.393	1.393
3.20	0.003	0.003	1.393	1.393
3.25	0.003	0.003	1.393	1.393
3.30	0.003	0.003	1.393	1.393
3.35	0.003	0.003	1.393	1.393
3.40	0.003	0.003	1.393	1.393
3.45	0.003	0.003	1.393	1.393
3.50	0.003	0.003	1.393	1.393
3.55	0.003	0.003	1.393	1.393
3.60	0.003	0.003	1.393	1.393
3.65	0.003	0.003	1.393	1.393
3.70	0.003	0.003	1.393	1.393
3.75	0.003	0.003	1.393	1.393
3.80	0.004	0.003	1.858	1.395
3.85	0.004	0.003	1.858	1.398
3.90	0.004	0.003	1.858	1.402
3.95	0.004	0.003	1.858	1.408
4.00	0.004	0.003	1.858	1.415
4.05	0.004	0.003	1.858	1.424
4.10	0.004	0.003	1.858	1.434
4.15	0.004	0.003	1.858	1.445
4.20	0.004	0.003	1.858	1.458
4.25	0.004	0.003	1.858	1.472
4.30	0.004	0.003	1.858	1.488
4.35	0.004	0.003	1.858	1.505
4.40	0.004	0.003	1.858	1.524
4.45	0.004	0.003	1.858	1.544
4.50	0.004	0.003	1.858	1.565
4.55	0.004	0.003	1.858	1.587
4.60	0.004	0.003	1.858	1.609
4.65	0.004	0.003	1.858	1.629
4.70	0.004	0.003	1.858	1.648

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4.75	0.004	0.003	1.858	1.667
4.80	0.004	0.003	1.858	1.685
4.85	0.004	0.003	1.858	1.701
4.90	0.004	0.003	1.858	1.717
4.95	0.004	0.003	1.858	1.733
5.00	0.004	0.003	1.858	1.747
5.05	0.004	0.003	1.858	1.760
5.10	0.004	0.003	1.858	1.773
5.15	0.004	0.003	1.858	1.784
5.20	0.004	0.003	1.858	1.795
5.25	0.004	0.003	1.858	1.805
5.30	0.004	0.003	1.858	1.814
5.35	0.004	0.003	1.858	1.823
5.40	0.004	0.003	1.858	1.830
5.45	0.004	0.003	1.859	1.837
5.50	0.004	0.003	1.912	1.842
5.55	0.004	0.003	1.991	1.848
5.60	0.004	0.003	2.070	1.853
5.65	0.004	0.003	2.148	1.858
5.70	0.004	0.003	2.226	1.864
5.75	0.004	0.003	2.303	1.870
5.80	0.004	0.003	2.380	1.877
5.85	0.004	0.003	2.456	1.884
5.90	0.004	0.003	2.532	1.894
5.95	0.004	0.003	2.607	1.907
6.00	0.004	0.003	2.682	1.922
6.05	0.005	0.004	3.456	1.942
6.10	0.005	0.004	3.571	1.967
6.15	0.005	0.004	3.685	1.998
6.20	0.005	0.004	3.798	2.035
6.25	0.005	0.004	3.911	2.078
6.30	0.005	0.004	4.022	2.127
6.35	0.005	0.004	4.132	2.183
6.40	0.005	0.004	4.242	2.245
6.45	0.005	0.004	4.350	2.312
6.50	0.005	0.004	4.458	2.386
6.55	0.005	0.004	4.565	2.466
6.60	0.005	0.004	4.671	2.552
6.65	0.005	0.004	4.776	2.643
6.70	0.005	0.004	4.881	2.741
6.75	0.005	0.004	4.984	2.844
6.80	0.005	0.004	5.087	2.952
6.85	0.005	0.004	5.189	3.062
6.90	0.005	0.004	5.290	3.174
6.95	0.005	0.004	5.390	3.287
7.00	0.005	0.004	5.490	3.402
7.05	0.005	0.004	5.588	3.518
7.10	0.005	0.004	5.686	3.635

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7.15	0.005	0.004	5.784	3.752
7.20	0.005	0.004	5.880	3.870
7.25	0.005	0.004	5.976	3.989
7.30	0.005	0.004	6.071	4.107
7.35	0.005	0.004	6.165	4.225
7.40	0.005	0.004	6.259	4.342
7.45	0.005	0.004	6.351	4.459
7.50	0.005	0.004	6.444	4.574
7.55	0.005	0.004	6.535	4.689
7.60	0.005	0.004	6.626	4.802
7.65	0.005	0.003	6.716	4.914
7.70	0.005	0.003	6.805	5.024
7.75	0.005	0.003	6.894	5.133
7.80	0.005	0.003	6.982	5.240
7.85	0.005	0.003	7.069	5.346
7.90	0.005	0.003	7.156	5.450
7.95	0.005	0.003	7.242	5.552
8.00	0.005	0.003	7.327	5.652
8.05	0.006	0.004	8.905	5.755
8.10	0.006	0.004	9.026	5.861
8.15	0.006	0.004	9.146	5.971
8.20	0.006	0.004	9.265	6.085
8.25	0.006	0.004	9.383	6.204
8.30	0.007	0.005	11.094	6.332
8.35	0.007	0.005	11.251	6.470
8.40	0.007	0.004	11.407	6.617
8.45	0.007	0.004	11.561	6.775
8.50	0.007	0.004	11.714	6.943
8.55	0.007	0.004	11.865	7.121
8.60	0.007	0.004	12.015	7.310
8.65	0.007	0.004	12.163	7.510
8.70	0.007	0.004	12.310	7.722
8.75	0.007	0.004	12.455	7.945
8.80	0.007	0.004	12.599	8.176
8.85	0.007	0.004	12.741	8.412
8.90	0.007	0.004	12.882	8.652
8.95	0.007	0.004	13.022	8.897
9.00	0.007	0.004	13.160	9.146
9.05	0.008	0.005	15.208	9.403
9.10	0.008	0.005	15.385	9.662
9.15	0.008	0.005	15.559	9.924
9.20	0.008	0.005	15.732	10.188
9.25	0.008	0.005	15.903	10.455
9.30	0.008	0.005	16.073	10.724
9.35	0.008	0.004	16.240	10.996
9.40	0.008	0.004	16.406	11.270
9.45	0.008	0.004	16.569	11.546
9.50	0.008	0.004	16.732	11.825

9.55	0.009	0.005	19.015	12.112	
9.60	0.009	0.005	19.215	12.408	
9.65	0.009	0.005	19.413	12.712	
9.70	0.009	0.005	19.609	13.026	
9.75	0.009	0.005	19.802	13.349	
9.80	0.009	0.005	19.993	13.677	
9.85	0.009	0.005	20.182	14.005	
9.90	0.009	0.005	20.369	14.332	
9.95	0.009	0.005	20.553	14.659	
10.00	0.009	0.005	20.736	14.985	
10.05	0.010	0.005	23.251	15.318	
10.10	0.010	0.005	23.471	15.657	
10.15	0.010	0.005	23.688	16.006	
10.20	0.010	0.005	23.902	16.364	
10.25	0.010	0.005	24.113	16.732	
10.30	0.012	0.006	29.211	17.120	
10.35	0.012	0.006	29.507	17.522	
10.40	0.012	0.006	29.799	17.942	
10.45	0.012	0.006	30.086	18.380	
10.50	0.012	0.006	30.369	18.836	
10.55	0.014	0.007	38.354	19.334	
10.60	0.014	0.007	38.781	19.874	
10.65	0.014	0.007	39.202	20.457	
10.70	0.014	0.007	39.614	21.083	
10.75	0.014	0.007	40.019	21.754	
10.80	0.017	0.008	48.548	22.490	
10.85	0.017	0.008	49.109	23.286	
10.90	0.017	0.008	49.658	24.142	
10.95	0.017	0.007	50.196	25.059	
11.00	0.017	0.007	50.722	26.038	
11.05	0.020	0.008	59.827	27.097	
11.10	0.020	0.008	60.512	28.223	
11.15	0.020	0.008	61.181	29.420	
11.20	0.020	0.008	61.834	30.689	
11.25	0.020	0.008	62.472	32.031	
11.30	0.025	0.010	78.209	33.477	
11.35	0.025	0.009	79.137	35.007	
11.40	0.025	0.009	80.039	36.622	
11.45	0.025	0.009	80.917	38.322	
11.50	0.025	0.009	81.770	40.109	
11.55	0.100	0.034	335.158	42.745	
11.60	0.100	0.032	347.092	46.243	
11.65	0.100	0.030	357.849	50.638	
11.70	0.100	0.028	367.563	55.956	
11.75	0.100	0.026	376.379	62.223	
11.80	0.265	0.062	1035.903		71.453
11.85	0.265	0.053	1080.687		83.756
11.90	0.265	0.046	1116.609		99.241

11.95	0.265	0.041	1145.861		117.994
12.00	0.265	0.036	1170.000		140.088
12.05	0.042	0.005	188.477	162.461	
12.10	0.042	0.005	188.967	185.069	
12.15	0.042	0.005	189.457	207.913	
12.20	0.042	0.005	189.921	230.990	
12.25	0.042	0.005	190.383	254.297	
12.30	0.027	0.003	121.384	277.119	
12.35	0.027	0.003	121.564	298.684	
12.40	0.027	0.003	121.735	318.948	
12.45	0.027	0.003	121.910	337.858	
12.50	0.027	0.003	122.075	355.369	
12.55	0.022	0.002	100.403	370.086	
12.60	0.022	0.002	100.510	379.970	
12.65	0.022	0.002	100.622	384.837	
12.70	0.022	0.002	100.727	384.520	
12.75	0.022	0.002	100.836	378.885	
12.80	0.017	0.002	78.988	369.732	
12.85	0.017	0.002	79.050	359.965	
12.90	0.017	0.002	79.114	349.605	
12.95	0.017	0.002	79.174	338.645	
13.00	0.017	0.002	79.238	327.084	
13.05	0.014	0.001	66.077	315.016	
13.10	0.014	0.001	66.120	302.647	
13.15	0.014	0.001	66.160	290.000	
13.20	0.014	0.001	66.203	277.067	
13.25	0.014	0.001	66.242	263.851	
13.30	0.012	0.001	57.445	250.368	
13.35	0.012	0.001	57.474	236.682	
13.40	0.012	0.001	57.505	222.833	
13.45	0.012	0.001	57.533	208.812	
13.50	0.012	0.001	57.564	194.621	
13.55	0.011	0.001	48.731	180.275	
13.60	0.011	0.001	48.749	165.842	
13.65	0.011	0.001	48.771	151.971	
13.70	0.011	0.001	48.791	138.511	
13.75	0.011	0.001	48.814	125.481	
13.80	0.010	0.001	44.392	112.909	
13.85	0.010	0.001	44.411	100.851	
13.90	0.010	0.001	44.427	90.995	
13.95	0.010	0.001	44.445	82.981	
14.00	0.010	0.001	44.458	76.869	
14.05	0.009	0.001	40.029	72.711	
14.10	0.009	0.001	40.039	70.575	
14.15	0.009	0.001	40.055	67.921	
14.20	0.009	0.001	40.067	65.457	
14.25	0.009	0.001	40.081	63.183	
14.30	0.008	0.001	35.638	61.104	

14.35	0.008	0.001	35.648	59.247
14.40	0.008	0.001	35.658	57.434
14.45	0.008	0.001	35.668	55.716
14.50	0.008	0.001	35.678	54.092
14.55	0.007	0.001	31.226	52.558
14.60	0.007	0.001	31.236	51.128
14.65	0.007	0.001	31.242	49.744
14.70	0.007	0.001	31.251	48.424
14.75	0.007	0.001	31.256	47.167
14.80	0.007	0.001	31.267	45.983
14.85	0.007	0.001	31.272	44.883
14.90	0.007	0.001	31.281	43.813
14.95	0.007	0.001	31.287	42.789
15.00	0.007	0.001	31.295	41.809
15.05	0.007	0.001	31.303	40.883
15.10	0.007	0.001	31.309	40.025
15.15	0.007	0.001	31.318	39.200
15.20	0.007	0.001	31.324	38.419
15.25	0.007	0.001	31.333	37.680
15.30	0.006	0.000	26.862	36.979
15.35	0.006	0.000	26.867	36.330
15.40	0.006	0.000	26.872	35.709
15.45	0.006	0.000	26.878	35.124
15.50	0.006	0.000	26.883	34.573
15.55	0.006	0.000	26.889	34.058
15.60	0.006	0.000	26.893	33.578
15.65	0.006	0.000	26.899	33.110
15.70	0.006	0.000	26.905	32.661
15.75	0.006	0.000	26.910	32.231
15.80	0.006	0.000	26.913	31.820
15.85	0.006	0.000	26.920	31.428
15.90	0.006	0.000	26.924	31.043
15.95	0.006	0.000	26.929	30.669
16.00	0.006	0.000	26.935	30.305
16.05	0.006	0.000	26.940	29.961
16.10	0.006	0.000	26.945	29.650
16.15	0.006	0.000	26.950	29.360
16.20	0.006	0.000	26.956	29.095
16.25	0.006	0.000	26.960	28.855
16.30	0.006	0.000	26.965	28.639
16.35	0.006	0.000	26.971	28.448
16.40	0.006	0.000	26.976	28.270
16.45	0.006	0.000	26.980	28.108
16.50	0.006	0.000	26.986	27.963
16.55	0.005	0.000	22.491	27.821
16.60	0.005	0.000	22.494	27.681
16.65	0.005	0.000	22.497	27.532
16.70	0.005	0.000	22.501	27.378

16.75	0.005	0.000	22.505	27.217
16.80	0.005	0.000	22.508	27.052
16.85	0.005	0.000	22.511	26.880
16.90	0.005	0.000	22.515	26.703
16.95	0.005	0.000	22.518	26.520
17.00	0.005	0.000	22.521	26.331
17.05	0.005	0.000	22.525	26.137
17.10	0.005	0.000	22.529	25.937
17.15	0.005	0.000	22.531	25.732
17.20	0.005	0.000	22.536	25.520
17.25	0.005	0.000	22.538	25.303
17.30	0.005	0.000	22.542	25.090
17.35	0.005	0.000	22.544	24.892
17.40	0.005	0.000	22.547	24.700
17.45	0.005	0.000	22.551	24.516
17.50	0.005	0.000	22.554	24.340
17.55	0.005	0.000	22.558	24.173
17.60	0.005	0.000	22.560	24.014
17.65	0.005	0.000	22.564	23.863
17.70	0.005	0.000	22.568	23.720
17.75	0.005	0.000	22.570	23.585
17.80	0.004	0.000	18.060	23.445
17.85	0.004	0.000	18.060	23.300
17.90	0.004	0.000	18.064	23.148
17.95	0.004	0.000	18.065	22.991
18.00	0.004	0.000	18.068	22.828
18.05	0.004	0.000	18.070	22.660
18.10	0.004	0.000	18.071	22.486
18.15	0.004	0.000	18.074	22.306
18.20	0.004	0.000	18.075	22.121
18.25	0.004	0.000	18.078	21.930
18.30	0.004	0.000	18.079	21.733
18.35	0.004	0.000	18.082	21.530
18.40	0.004	0.000	18.083	21.322
18.45	0.004	0.000	18.087	21.109
18.50	0.004	0.000	18.087	20.889
18.55	0.004	0.000	18.091	20.673
18.60	0.004	0.000	18.091	20.474
18.65	0.004	0.000	18.094	20.279
18.70	0.004	0.000	18.095	20.093
18.75	0.004	0.000	18.099	19.915
18.80	0.004	0.000	18.101	19.745
18.85	0.004	0.000	18.100	19.584
18.90	0.004	0.000	18.104	19.431
18.95	0.004	0.000	18.104	19.286
19.00	0.004	0.000	18.108	19.150
19.05	0.004	0.000	18.108	19.022
19.10	0.004	0.000	18.112	18.902

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19.15	0.004	0.000	18.112	18.791
19.20	0.004	0.000	18.115	18.688
19.25	0.004	0.000	18.116	18.593
19.30	0.004	0.000	18.120	18.506
19.35	0.004	0.000	18.120	18.428
19.40	0.004	0.000	18.124	18.358
19.45	0.004	0.000	18.123	18.297
19.50	0.004	0.000	18.128	18.244
19.55	0.004	0.000	18.130	18.199
19.60	0.004	0.000	18.129	18.163
19.65	0.004	0.000	18.134	18.134
19.70	0.004	0.000	18.133	18.115
19.75	0.004	0.000	18.137	18.103
19.80	0.003	0.000	13.604	18.086
19.85	0.003	0.000	13.605	18.063
19.90	0.003	0.000	13.605	18.023
19.95	0.003	0.000	13.607	17.969
20.00	0.003	0.000	13.608	17.901
20.05	0.003	0.000	13.609	17.819
20.10	0.003	0.000	13.610	17.723
20.15	0.003	0.000	13.611	17.613
20.20	0.003	0.000	13.612	17.489
20.25	0.003	0.000	13.613	17.351
20.30	0.003	0.000	13.615	17.199
20.35	0.003	0.000	13.615	17.033
20.40	0.003	0.000	13.616	16.853
20.45	0.003	0.000	13.618	16.659
20.50	0.003	0.000	13.619	16.451
20.55	0.003	0.000	13.619	16.237
20.60	0.003	0.000	13.621	16.033
20.65	0.003	0.000	13.622	15.836
20.70	0.003	0.000	13.623	15.648
20.75	0.003	0.000	13.623	15.468
20.80	0.003	0.000	13.625	15.297
20.85	0.003	0.000	13.626	15.133
20.90	0.003	0.000	13.627	14.979
20.95	0.003	0.000	13.628	14.832
21.00	0.003	0.000	13.630	14.694
21.05	0.003	0.000	13.630	14.565
21.10	0.003	0.000	13.631	14.443
21.15	0.003	0.000	13.632	14.330
21.20	0.003	0.000	13.634	14.226
21.25	0.003	0.000	13.634	14.129
21.30	0.003	0.000	13.635	14.042
21.35	0.003	0.000	13.637	13.962
21.40	0.003	0.000	13.637	13.891
21.45	0.003	0.000	13.639	13.828
21.50	0.003	0.000	13.640	13.774

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21.55	0.003	0.000	13.640	13.728
21.60	0.003	0.000	13.642	13.690
21.65	0.003	0.000	13.642	13.661
21.70	0.003	0.000	13.644	13.640
21.75	0.003	0.000	13.645	13.628
21.80	0.003	0.000	13.646	13.624
21.85	0.003	0.000	13.646	13.628
21.90	0.003	0.000	13.648	13.629
21.95	0.003	0.000	13.649	13.630
22.00	0.003	0.000	13.650	13.631
22.05	0.003	0.000	13.651	13.632
22.10	0.003	0.000	13.651	13.633
22.15	0.003	0.000	13.653	13.634
22.20	0.003	0.000	13.654	13.635
22.25	0.003	0.000	13.655	13.636
22.30	0.003	0.000	13.656	13.637
22.35	0.003	0.000	13.657	13.638
22.40	0.003	0.000	13.658	13.639
22.45	0.003	0.000	13.658	13.640
22.50	0.003	0.000	13.660	13.641
22.55	0.003	0.000	13.661	13.642
22.60	0.003	0.000	13.661	13.643
22.65	0.003	0.000	13.662	13.644
22.70	0.003	0.000	13.663	13.645
22.75	0.003	0.000	13.664	13.646
22.80	0.003	0.000	13.665	13.647
22.85	0.003	0.000	13.666	13.648
22.90	0.003	0.000	13.667	13.649
22.95	0.003	0.000	13.668	13.650
23.00	0.003	0.000	13.668	13.651
23.05	0.003	0.000	13.670	13.652
23.10	0.003	0.000	13.671	13.653
23.15	0.003	0.000	13.672	13.654
23.20	0.003	0.000	13.673	13.655
23.25	0.003	0.000	13.674	13.656
23.30	0.003	0.000	13.675	13.657
23.35	0.003	0.000	13.676	13.658
23.40	0.003	0.000	13.676	13.659
23.45	0.003	0.000	13.678	13.660
23.50	0.003	0.000	13.679	13.661
23.55	0.003	0.000	13.680	13.662
23.60	0.003	0.000	13.680	13.663
23.65	0.003	0.000	13.682	13.664
23.70	0.003	0.000	13.683	13.665
23.75	0.003	0.000	13.683	13.666
23.80	0.002	0.000	9.123	13.653
23.85	0.002	0.000	9.123	13.626
23.90	0.002	0.000	9.124	13.585

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23.95	0.002	0.000	9.124	13.529
24.00	0.002	0.000	9.124	13.460
24.05	0.000	0.000	0.000	13.348
24.10	0.000	0.000	0.000	13.195
24.15	0.000	0.000	0.000	12.998
24.20	0.000	0.000	0.000	12.760
24.25	0.000	0.000	0.000	12.480
24.30	0.000	0.000	0.000	12.157
24.35	0.000	0.000	0.000	11.792
24.40	0.000	0.000	0.000	11.384
24.45	0.000	0.000	0.000	10.935
24.50	0.000	0.000	0.000	10.443
24.55	0.000	0.000	0.000	9.918
24.60	0.000	0.000	0.000	9.373
24.65	0.000	0.000	0.000	8.809
24.70	0.000	0.000	0.000	8.224
24.75	0.000	0.000	0.000	7.620
24.80	0.000	0.000	0.000	7.015
24.85	0.000	0.000	0.000	6.434
24.90	0.000	0.000	0.000	5.879
24.95	0.000	0.000	0.000	5.349
25.00	0.000	0.000	0.000	4.845
25.05	0.000	0.000	0.000	4.365
25.10	0.000	0.000	0.000	3.911
25.15	0.000	0.000	0.000	3.482
25.20	0.000	0.000	0.000	3.079
25.25	0.000	0.000	0.000	2.701
25.30	0.000	0.000	0.000	2.348
25.35	0.000	0.000	0.000	2.020
25.40	0.000	0.000	0.000	1.718

100-year storm

Time (hr)	Time HHMM	Rain (in)	Cumulative (in)
0.050	00003	0.003	0.003
0.100	00006	0.003	0.005
0.150	00009	0.003	0.008
0.200	00012	0.003	0.011
0.250	00015	0.003	0.013
0.300	00018	0.004	0.017
0.350	00021	0.004	0.021
0.400	00024	0.004	0.025
0.450	00027	0.004	0.029
0.500	00030	0.004	0.033
0.550	00033	0.004	0.037
0.600	00036	0.004	0.041
0.650	00039	0.004	0.045
0.700	00042	0.004	0.049
0.750	00045	0.004	0.053
0.800	00048	0.004	0.057
0.850	00051	0.004	0.061
0.900	00054	0.004	0.065
0.950	00057	0.004	0.069
1.000	00100	0.004	0.073
1.050	00103	0.004	0.077
1.100	00106	0.004	0.081
1.150	00109	0.004	0.084
1.200	00112	0.004	0.088
1.250	00115	0.004	0.092
1.300	00118	0.004	0.096
1.350	00121	0.004	0.100
1.400	00124	0.004	0.104
1.450	00127	0.004	0.108
1.500	00130	0.004	0.112
1.550	00133	0.004	0.116
1.600	00136	0.004	0.120
1.650	00139	0.004	0.124
1.700	00142	0.004	0.128
1.750	00145	0.004	0.132
1.800	00148	0.004	0.136
1.850	00151	0.004	0.140
1.900	00154	0.004	0.144
1.950	00157	0.004	0.148
2.000	00200	0.004	0.152
2.050	00203	0.004	0.156
2.100	00206	0.004	0.160
2.150	00209	0.004	0.164
2.200	00212	0.004	0.168
2.250	00215	0.004	0.172
2.300	00218	0.004	0.176
2.350	00221	0.004	0.180
2.400	00224	0.004	0.183
2.450	00227	0.004	0.187
2.500	00230	0.004	0.191
2.550	00233	0.004	0.195
2.600	00236	0.004	0.199
2.650	00239	0.004	0.203
2.700	00242	0.004	0.207
2.750	00245	0.004	0.211
2.800	00248	0.004	0.215
2.850	00251	0.004	0.219
2.900	00254	0.004	0.223
2.950	00257	0.004	0.227
3.000	00300	0.004	0.231
3.050	00303	0.004	0.235
3.100	00306	0.004	0.239
3.150	00309	0.004	0.243
3.200	00312	0.004	0.247
3.250	00315	0.004	0.251
3.300	00318	0.004	0.255
3.350	00321	0.004	0.259
3.400	00324	0.004	0.263
3.450	00327	0.004	0.267
3.500	00330	0.004	0.271
3.550	00333	0.004	0.275
3.600	00336	0.004	0.279
3.650	00339	0.004	0.282
3.700	00342	0.004	0.286
3.750	00345	0.004	0.290
3.800	00348	0.005	0.296
3.850	00351	0.005	0.301
3.900	00354	0.005	0.306
3.950	00357	0.005	0.312
4.000	00400	0.005	0.317
4.050	00403	0.005	0.322
4.100	00406	0.005	0.327

4.150	00409	0.005	0.333
4.200	00412	0.005	0.338
4.250	00415	0.005	0.343
4.300	00418	0.005	0.348
4.350	00421	0.005	0.354
4.400	00424	0.005	0.359
4.450	00427	0.005	0.364
4.500	00430	0.005	0.370
4.550	00433	0.005	0.375
4.600	00436	0.005	0.380
4.650	00439	0.005	0.385
4.700	00442	0.005	0.391
4.750	00445	0.005	0.396
4.800	00448	0.005	0.401
4.850	00451	0.005	0.407
4.900	00454	0.005	0.412
4.950	00457	0.005	0.417
5.000	00500	0.005	0.422
5.050	00503	0.005	0.428
5.100	00506	0.005	0.433
5.150	00509	0.005	0.438
5.200	00512	0.005	0.444
5.250	00515	0.005	0.449
5.300	00518	0.005	0.454
5.350	00521	0.005	0.459
5.400	00524	0.005	0.465
5.450	00527	0.005	0.470
5.500	00530	0.005	0.475
5.550	00533	0.005	0.480
5.600	00536	0.005	0.486
5.650	00539	0.005	0.491
5.700	00542	0.005	0.496
5.750	00545	0.005	0.502
5.800	00548	0.005	0.507
5.850	00551	0.005	0.512
5.900	00554	0.005	0.517
5.950	00557	0.005	0.523
6.000	00600	0.005	0.528
6.050	00603	0.007	0.535
6.100	00606	0.007	0.541
6.150	00609	0.007	0.548
6.200	00612	0.007	0.554
6.250	00615	0.007	0.561
6.300	00618	0.007	0.568
6.350	00621	0.007	0.574
6.400	00624	0.007	0.581
6.450	00627	0.007	0.587
6.500	00630	0.007	0.594
6.550	00633	0.007	0.601
6.600	00636	0.007	0.607
6.650	00639	0.007	0.614
6.700	00642	0.007	0.620
6.750	00645	0.007	0.627
6.800	00648	0.007	0.634
6.850	00651	0.007	0.640
6.900	00654	0.007	0.647
6.950	00657	0.007	0.653
7.000	00700	0.007	0.660
7.050	00703	0.007	0.667
7.100	00706	0.007	0.673
7.150	00709	0.007	0.680
7.200	00712	0.007	0.686
7.250	00715	0.007	0.693
7.300	00718	0.007	0.700
7.350	00721	0.007	0.706
7.400	00724	0.007	0.713
7.450	00727	0.007	0.719
7.500	00730	0.007	0.726
7.550	00733	0.007	0.733
7.600	00736	0.007	0.739
7.650	00739	0.007	0.746
7.700	00742	0.007	0.752
7.750	00745	0.007	0.759
7.800	00748	0.007	0.766
7.850	00751	0.007	0.772
7.900	00754	0.007	0.779
7.950	00757	0.007	0.785
8.000	00800	0.007	0.792
8.050	00803	0.008	0.800
8.100	00806	0.008	0.808
8.150	00809	0.008	0.816
8.200	00812	0.008	0.824
8.250	00815	0.008	0.832
8.300	00818	0.009	0.841
8.350	00821	0.009	0.850
8.400	00824	0.009	0.859
8.450	00827	0.009	0.869

8.500	00830	0.009	0.878
8.550	00833	0.009	0.887
8.600	00836	0.009	0.896
8.650	00839	0.009	0.906
8.700	00842	0.009	0.915
8.750	00845	0.009	0.924
8.800	00848	0.009	0.933
8.850	00851	0.009	0.942
8.900	00854	0.009	0.952
8.950	00857	0.009	0.961
9.000	00900	0.009	0.970
9.050	00903	0.011	0.981
9.100	00906	0.011	0.991
9.150	00909	0.011	1.002
9.200	00912	0.011	1.012
9.250	00915	0.011	1.023
9.300	00918	0.011	1.034
9.350	00921	0.011	1.044
9.400	00924	0.011	1.055
9.450	00927	0.011	1.065
9.500	00930	0.011	1.076
9.550	00933	0.012	1.088
9.600	00936	0.012	1.100
9.650	00939	0.012	1.111
9.700	00942	0.012	1.123
9.750	00945	0.012	1.135
9.800	00948	0.012	1.147
9.850	00951	0.012	1.159
9.900	00954	0.012	1.171
9.950	00957	0.012	1.183
10.00	01000	0.012	1.195
10.05	01003	0.013	1.208
10.10	01006	0.013	1.221
10.15	01009	0.013	1.234
10.20	01012	0.013	1.247
10.25	01015	0.013	1.261
10.30	01018	0.016	1.276
10.35	01021	0.016	1.292
10.40	01024	0.016	1.308
10.45	01027	0.016	1.324
10.50	01030	0.016	1.340
10.55	01033	0.020	1.360
10.60	01036	0.020	1.379
10.65	01039	0.020	1.399
10.70	01042	0.020	1.419
10.75	01045	0.020	1.439
10.80	01048	0.024	1.463
10.85	01051	0.024	1.486
10.90	01054	0.024	1.510
10.95	01057	0.024	1.534
11.00	01100	0.024	1.558
11.05	01103	0.028	1.585
11.10	01106	0.028	1.613
11.15	01109	0.028	1.641
11.20	01112	0.028	1.668
11.25	01115	0.028	1.696
11.30	01118	0.034	1.731
11.35	01121	0.034	1.765
11.40	01124	0.034	1.799
11.45	01127	0.034	1.833
11.50	01130	0.034	1.868
11.55	01133	0.137	2.005
11.60	01136	0.137	2.142
11.65	01139	0.137	2.280
11.70	01142	0.137	2.417
11.75	01145	0.137	2.554
11.80	01148	0.364	2.919
11.85	01151	0.364	3.283
11.90	01154	0.364	3.647
11.95	01157	0.364	4.011
12.00	01200	0.364	4.376
12.05	01203	0.058	4.434
12.10	01206	0.058	4.492
12.15	01209	0.058	4.550
12.20	01212	0.058	4.608
12.25	01215	0.058	4.666
12.30	01218	0.037	4.703
12.35	01221	0.037	4.740
12.40	01224	0.037	4.777
12.45	01227	0.037	4.814
12.50	01230	0.037	4.851
12.55	01233	0.030	4.881
12.60	01236	0.030	4.912
12.65	01239	0.030	4.942
12.70	01242	0.030	4.972
12.75	01245	0.030	5.003
12.80	01248	0.024	5.027

12.85	01251	0.024	5.050
12.90	01254	0.024	5.074
12.95	01257	0.024	5.098
13.00	01300	0.024	5.122
13.05	01303	0.020	5.141
13.10	01306	0.020	5.161
13.15	01309	0.020	5.181
13.20	01312	0.020	5.201
13.25	01315	0.020	5.221
13.30	01318	0.017	5.238
13.35	01321	0.017	5.255
13.40	01324	0.017	5.272
13.45	01327	0.017	5.289
13.50	01330	0.017	5.306
13.55	01333	0.015	5.321
13.60	01336	0.015	5.335
13.65	01339	0.015	5.350
13.70	01342	0.015	5.364
13.75	01345	0.015	5.379
13.80	01348	0.013	5.392
13.85	01351	0.013	5.405
13.90	01354	0.013	5.419
13.95	01357	0.013	5.432
14.00	01400	0.013	5.445
14.05	01403	0.012	5.457
14.10	01406	0.012	5.469
14.15	01409	0.012	5.481
14.20	01412	0.012	5.493
14.25	01415	0.012	5.504
14.30	01418	0.011	5.515
14.35	01421	0.011	5.526
14.40	01424	0.011	5.536
14.45	01427	0.011	5.547
14.50	01430	0.011	5.557
14.55	01433	0.009	5.566
14.60	01436	0.009	5.576
14.65	01439	0.009	5.585
14.70	01442	0.009	5.594
14.75	01445	0.009	5.603
14.80	01448	0.009	5.613
14.85	01451	0.009	5.622
14.90	01454	0.009	5.631
14.95	01457	0.009	5.640
15.00	01500	0.009	5.650
15.05	01503	0.009	5.659
15.10	01506	0.009	5.668
15.15	01509	0.009	5.677
15.20	01512	0.009	5.687
15.25	01515	0.009	5.696
15.30	01518	0.008	5.704
15.35	01521	0.008	5.712
15.40	01524	0.008	5.720
15.45	01527	0.008	5.727
15.50	01530	0.008	5.735
15.55	01533	0.008	5.743
15.60	01536	0.008	5.751
15.65	01539	0.008	5.759
15.70	01542	0.008	5.767
15.75	01545	0.008	5.775
15.80	01548	0.008	5.783
15.85	01551	0.008	5.791
15.90	01554	0.008	5.799
15.95	01557	0.008	5.807
16.00	01600	0.008	5.815
16.05	01603	0.008	5.823
16.10	01606	0.008	5.830
16.15	01609	0.008	5.838
16.20	01612	0.008	5.846
16.25	01615	0.008	5.854
16.30	01618	0.008	5.862
16.35	01621	0.008	5.870
16.40	01624	0.008	5.878
16.45	01627	0.008	5.886
16.50	01630	0.008	5.894
16.55	01633	0.007	5.900
16.60	01636	0.007	5.907
16.65	01639	0.007	5.914
16.70	01642	0.007	5.920
16.75	01645	0.007	5.927
16.80	01648	0.007	5.933
16.85	01651	0.007	5.940
16.90	01654	0.007	5.947
16.95	01657	0.007	5.953
17.00	01700	0.007	5.960
17.05	01703	0.007	5.966
17.10	01706	0.007	5.973
17.15	01709	0.007	5.980

17.20	01712	0.007	5.986
17.25	01715	0.007	5.993
17.30	01718	0.007	5.999
17.35	01721	0.007	6.006
17.40	01724	0.007	6.013
17.45	01727	0.007	6.019
17.50	01730	0.007	6.026
17.55	01733	0.007	6.032
17.60	01736	0.007	6.039
17.65	01739	0.007	6.046
17.70	01742	0.007	6.052
17.75	01745	0.007	6.059
17.80	01748	0.005	6.064
17.85	01751	0.005	6.069
17.90	01754	0.005	6.075
17.95	01757	0.005	6.080
18.00	01800	0.005	6.085
18.05	01803	0.005	6.090
18.10	01806	0.005	6.096
18.15	01809	0.005	6.101
18.20	01812	0.005	6.106
18.25	01815	0.005	6.112
18.30	01818	0.005	6.117
18.35	01821	0.005	6.122
18.40	01824	0.005	6.127
18.45	01827	0.005	6.133
18.50	01830	0.005	6.138
18.55	01833	0.005	6.143
18.60	01836	0.005	6.149
18.65	01839	0.005	6.154
18.70	01842	0.005	6.159
18.75	01845	0.005	6.164
18.80	01848	0.005	6.170
18.85	01851	0.005	6.175
18.90	01854	0.005	6.180
18.95	01857	0.005	6.186
19.00	01900	0.005	6.191
19.05	01903	0.005	6.196
19.10	01906	0.005	6.201
19.15	01909	0.005	6.207
19.20	01912	0.005	6.212
19.25	01915	0.005	6.217
19.30	01918	0.005	6.222
19.35	01921	0.005	6.228
19.40	01924	0.005	6.233
19.45	01927	0.005	6.238
19.50	01930	0.005	6.244
19.55	01933	0.005	6.249
19.60	01936	0.005	6.254
19.65	01939	0.005	6.259
19.70	01942	0.005	6.265
19.75	01945	0.005	6.270
19.80	01948	0.004	6.274
19.85	01951	0.004	6.278
19.90	01954	0.004	6.282
19.95	01957	0.004	6.286
20.00	02000	0.004	6.290
20.05	02003	0.004	6.294
20.10	02006	0.004	6.298
20.15	02009	0.004	6.302
20.20	02012	0.004	6.306
20.25	02015	0.004	6.310
20.30	02018	0.004	6.314
20.35	02021	0.004	6.318
20.40	02024	0.004	6.321
20.45	02027	0.004	6.325
20.50	02030	0.004	6.329
20.55	02033	0.004	6.333
20.60	02036	0.004	6.337
20.65	02039	0.004	6.341
20.70	02042	0.004	6.345
20.75	02045	0.004	6.349
20.80	02048	0.004	6.353
20.85	02051	0.004	6.357
20.90	02054	0.004	6.361
20.95	02057	0.004	6.365
21.00	02100	0.004	6.369
21.05	02103	0.004	6.373
21.10	02106	0.004	6.377
21.15	02109	0.004	6.381
21.20	02112	0.004	6.385
21.25	02115	0.004	6.389
21.30	02118	0.004	6.393
21.35	02121	0.004	6.397
21.40	02124	0.004	6.401
21.45	02127	0.004	6.405
21.50	02130	0.004	6.409

21.55	02133	0.004	6.413
21.60	02136	0.004	6.417
21.65	02139	0.004	6.420
21.70	02142	0.004	6.424
21.75	02145	0.004	6.428
21.80	02148	0.004	6.432
21.85	02151	0.004	6.436
21.90	02154	0.004	6.440
21.95	02157	0.004	6.444
22.00	02200	0.004	6.448
22.05	02203	0.004	6.452
22.10	02206	0.004	6.456
22.15	02209	0.004	6.460
22.20	02212	0.004	6.464
22.25	02215	0.004	6.468
22.30	02218	0.004	6.472
22.35	02221	0.004	6.476
22.40	02224	0.004	6.480
22.45	02227	0.004	6.484
22.50	02230	0.004	6.488
22.55	02233	0.004	6.492
22.60	02236	0.004	6.496
22.65	02239	0.004	6.500
22.70	02242	0.004	6.504
22.75	02245	0.004	6.508
22.80	02248	0.004	6.512
22.85	02251	0.004	6.516
22.90	02254	0.004	6.519
22.95	02257	0.004	6.523
23.00	02300	0.004	6.527
23.05	02303	0.004	6.531
23.10	02306	0.004	6.535
23.15	02309	0.004	6.539
23.20	02312	0.004	6.543
23.25	02315	0.004	6.547
23.30	02318	0.004	6.551
23.35	02321	0.004	6.555
23.40	02324	0.004	6.559
23.45	02327	0.004	6.563
23.50	02330	0.004	6.567
23.55	02333	0.004	6.571
23.60	02336	0.004	6.575
23.65	02339	0.004	6.579
23.70	02342	0.004	6.583
23.75	02345	0.004	6.587
23.80	02348	0.003	6.589
23.85	02351	0.003	6.592
23.90	02354	0.003	6.595
23.95	02357	0.003	6.597
24.00	00000	0.003	6.600

6.60

100-yr storm

Untitled

Time□□(hrs)	Rainfall□□(inches)			Infiltration□□(inches)	Excess
□□(cfs)	Runoff□□(cfs)				
0.05	0.003	0.002	1.277	0.004	
0.10	0.003	0.002	1.277	0.012	
0.15	0.003	0.002	1.277	0.024	
0.20	0.003	0.002	1.277	0.039	
0.25	0.003	0.002	1.277	0.059	
0.30	0.004	0.004	1.916	0.085	
0.35	0.004	0.004	1.916	0.116	
0.40	0.004	0.004	1.916	0.154	
0.45	0.004	0.004	1.916	0.197	
0.50	0.004	0.004	1.916	0.246	
0.55	0.004	0.004	1.916	0.301	
0.60	0.004	0.004	1.916	0.362	
0.65	0.004	0.004	1.916	0.429	
0.70	0.004	0.004	1.916	0.502	
0.75	0.004	0.004	1.916	0.581	
0.80	0.004	0.004	1.916	0.663	
0.85	0.004	0.004	1.916	0.745	
0.90	0.004	0.004	1.916	0.827	
0.95	0.004	0.004	1.916	0.908	
1.00	0.004	0.004	1.916	0.988	
1.05	0.004	0.004	1.916	1.067	
1.10	0.004	0.004	1.916	1.143	
1.15	0.004	0.004	1.916	1.214	
1.20	0.004	0.004	1.916	1.283	
1.25	0.004	0.004	1.916	1.347	
1.30	0.004	0.004	1.916	1.409	
1.35	0.004	0.004	1.916	1.466	
1.40	0.004	0.004	1.916	1.521	
1.45	0.004	0.004	1.916	1.571	
1.50	0.004	0.004	1.916	1.618	
1.55	0.004	0.004	1.916	1.662	
1.60	0.004	0.004	1.916	1.702	
1.65	0.004	0.004	1.916	1.738	
1.70	0.004	0.004	1.916	1.771	
1.75	0.004	0.004	1.916	1.800	
1.80	0.004	0.004	1.916	1.826	
1.85	0.004	0.004	1.916	1.848	
1.90	0.004	0.004	1.916	1.867	
1.95	0.004	0.004	1.916	1.882	
2.00	0.004	0.004	1.916	1.894	
2.05	0.004	0.004	1.916	1.902	
2.10	0.004	0.004	1.916	1.906	
2.15	0.004	0.004	1.916	1.911	
2.20	0.004	0.004	1.916	1.914	
2.25	0.004	0.004	1.916	1.916	
2.30	0.004	0.004	1.916	1.916	

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2.35	0.004	0.004	1.916	1.916
2.40	0.004	0.004	1.916	1.916
2.45	0.004	0.004	1.916	1.916
2.50	0.004	0.004	1.916	1.916
2.55	0.004	0.004	1.916	1.916
2.60	0.004	0.004	1.916	1.916
2.65	0.004	0.004	1.916	1.916
2.70	0.004	0.004	1.916	1.916
2.75	0.004	0.004	1.916	1.916
2.80	0.004	0.004	1.916	1.916
2.85	0.004	0.004	1.916	1.916
2.90	0.004	0.004	1.916	1.916
2.95	0.004	0.004	1.916	1.916
3.00	0.004	0.004	1.916	1.916
3.05	0.004	0.004	1.916	1.916
3.10	0.004	0.004	1.916	1.916
3.15	0.004	0.004	1.916	1.916
3.20	0.004	0.004	1.916	1.916
3.25	0.004	0.004	1.916	1.916
3.30	0.004	0.004	1.916	1.916
3.35	0.004	0.004	1.916	1.916
3.40	0.004	0.004	1.916	1.916
3.45	0.004	0.004	1.916	1.916
3.50	0.004	0.004	1.916	1.916
3.55	0.004	0.004	1.916	1.916
3.60	0.004	0.004	1.916	1.916
3.65	0.004	0.004	1.916	1.916
3.70	0.004	0.004	1.916	1.916
3.75	0.004	0.004	1.916	1.916
3.80	0.005	0.005	2.555	1.918
3.85	0.005	0.005	2.555	1.922
3.90	0.005	0.005	2.555	1.928
3.95	0.005	0.005	2.555	1.936
4.00	0.005	0.005	2.555	1.946
4.05	0.005	0.005	2.555	1.957
4.10	0.005	0.005	2.555	1.971
4.15	0.005	0.005	2.555	1.987
4.20	0.005	0.005	2.555	2.005
4.25	0.005	0.005	2.567	2.024
4.30	0.005	0.005	2.690	2.047
4.35	0.005	0.005	2.840	2.071
4.40	0.005	0.005	2.987	2.100
4.45	0.005	0.005	3.134	2.132
4.50	0.005	0.005	3.279	2.168
4.55	0.005	0.005	3.423	2.208
4.60	0.005	0.005	3.565	2.249
4.65	0.005	0.005	3.706	2.293
4.70	0.005	0.005	3.846	2.340

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4.75	0.005	0.004	3.985	2.390
4.80	0.005	0.004	4.122	2.443
4.85	0.005	0.004	4.259	2.501
4.90	0.005	0.004	4.394	2.563
4.95	0.005	0.004	4.527	2.630
5.00	0.005	0.004	4.660	2.703
5.05	0.005	0.004	4.791	2.781
5.10	0.005	0.004	4.922	2.864
5.15	0.005	0.004	5.051	2.951
5.20	0.005	0.004	5.179	3.044
5.25	0.005	0.004	5.306	3.140
5.30	0.005	0.004	5.431	3.240
5.35	0.005	0.004	5.556	3.344
5.40	0.005	0.004	5.680	3.451
5.45	0.005	0.004	5.802	3.561
5.50	0.005	0.004	5.924	3.673
5.55	0.005	0.004	6.044	3.788
5.60	0.005	0.004	6.163	3.904
5.65	0.005	0.004	6.282	4.023
5.70	0.005	0.004	6.399	4.142
5.75	0.005	0.004	6.516	4.263
5.80	0.005	0.004	6.631	4.384
5.85	0.005	0.004	6.745	4.506
5.90	0.005	0.004	6.859	4.629
5.95	0.005	0.004	6.971	4.754
6.00	0.005	0.004	7.083	4.880
6.05	0.007	0.005	9.009	5.011
6.10	0.007	0.005	9.180	5.149
6.15	0.007	0.005	9.349	5.292
6.20	0.007	0.005	9.517	5.441
6.25	0.007	0.005	9.683	5.596
6.30	0.007	0.005	9.847	5.757
6.35	0.007	0.005	10.009	5.923
6.40	0.007	0.005	10.170	6.095
6.45	0.007	0.005	10.329	6.273
6.50	0.007	0.005	10.487	6.457
6.55	0.007	0.005	10.643	6.647
6.60	0.007	0.004	10.797	6.844
6.65	0.007	0.004	10.950	7.048
6.70	0.007	0.004	11.101	7.258
6.75	0.007	0.004	11.251	7.476
6.80	0.007	0.004	11.399	7.697
6.85	0.007	0.004	11.546	7.917
6.90	0.007	0.004	11.692	8.134
6.95	0.007	0.004	11.836	8.350
7.00	0.007	0.004	11.978	8.564
7.05	0.007	0.004	12.119	8.775
7.10	0.007	0.004	12.259	8.984

7.15	0.007	0.004	12.398	9.190
7.20	0.007	0.004	12.535	9.394
7.25	0.007	0.004	12.671	9.595
7.30	0.007	0.004	12.805	9.793
7.35	0.007	0.004	12.938	9.989
7.40	0.007	0.004	13.070	10.181
7.45	0.007	0.004	13.201	10.369
7.50	0.007	0.004	13.330	10.555
7.55	0.007	0.004	13.459	10.737
7.60	0.007	0.004	13.586	10.915
7.65	0.007	0.004	13.712	11.090
7.70	0.007	0.004	13.836	11.261
7.75	0.007	0.004	13.960	11.428
7.80	0.007	0.004	14.082	11.591
7.85	0.007	0.004	14.203	11.749
7.90	0.007	0.004	14.324	11.904
7.95	0.007	0.004	14.442	12.054
8.00	0.007	0.004	14.560	12.200
8.05	0.008	0.004	17.626	12.350
8.10	0.008	0.004	17.793	12.505
8.15	0.008	0.004	17.957	12.669
8.20	0.008	0.004	18.120	12.842
8.25	0.008	0.004	18.281	13.023
8.30	0.009	0.005	21.529	13.222
8.35	0.009	0.005	21.743	13.439
8.40	0.009	0.005	21.955	13.676
8.45	0.009	0.005	22.164	13.931
8.50	0.009	0.005	22.370	14.206
8.55	0.009	0.005	22.573	14.500
8.60	0.009	0.005	22.775	14.815
8.65	0.009	0.005	22.974	15.149
8.70	0.009	0.005	23.170	15.505
8.75	0.009	0.005	23.363	15.881
8.80	0.009	0.005	23.555	16.273
8.85	0.009	0.005	23.744	16.672
8.90	0.009	0.005	23.931	17.077
8.95	0.009	0.005	24.116	17.490
9.00	0.009	0.004	24.299	17.909
9.05	0.011	0.005	27.991	18.340
9.10	0.011	0.005	28.223	18.774
9.15	0.011	0.005	28.453	19.211
9.20	0.011	0.005	28.679	19.649
9.25	0.011	0.005	28.903	20.091
9.30	0.011	0.005	29.123	20.534
9.35	0.011	0.005	29.340	20.980
9.40	0.011	0.005	29.555	21.428
9.45	0.011	0.005	29.767	21.878
9.50	0.011	0.005	29.976	22.331

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9.55	0.012	0.005	33.969	22.796	
9.60	0.012	0.005	34.227	23.276	
9.65	0.012	0.005	34.480	23.769	
9.70	0.012	0.005	34.731	24.276	
9.75	0.012	0.005	34.977	24.798	
9.80	0.012	0.005	35.220	25.326	
9.85	0.012	0.005	35.460	25.851	
9.90	0.012	0.005	35.696	26.373	
9.95	0.012	0.005	35.929	26.891	
10.00	0.012	0.005	36.158	27.405	
10.05	0.013	0.005	40.441	27.927	
10.10	0.013	0.005	40.717	28.458	
10.15	0.013	0.005	40.988	29.005	
10.20	0.013	0.005	41.255	29.566	
10.25	0.013	0.005	41.518	30.142	
10.30	0.016	0.006	50.163	30.749	
10.35	0.016	0.006	50.530	31.379	
10.40	0.016	0.006	50.889	32.038	
10.45	0.016	0.006	51.243	32.725	
10.50	0.016	0.006	51.590	33.440	
10.55	0.020	0.007	64.967	34.224	
10.60	0.020	0.007	65.488	35.076	
10.65	0.020	0.007	65.999	35.999	
10.70	0.020	0.007	66.498	36.993	
10.75	0.020	0.007	66.987	38.058	
10.80	0.024	0.008	81.015	39.229	
10.85	0.024	0.008	81.687	40.495	
10.90	0.024	0.008	82.344	41.858	
10.95	0.024	0.008	82.982	43.318	
11.00	0.024	0.007	83.605	44.876	
11.05	0.028	0.008	98.308	46.560	
11.10	0.028	0.008	99.113	48.347	
11.15	0.028	0.008	99.896	50.246	
11.20	0.028	0.008	100.657	52.256	
11.25	0.028	0.008	101.398	54.378	
11.30	0.034	0.010	126.537	56.663	
11.35	0.034	0.009	127.605	59.073	
11.40	0.034	0.009	128.639	61.610	
11.45	0.034	0.009	129.640	64.275	
11.50	0.034	0.009	130.608	67.068	
11.55	0.137	0.033	531.525	71.198	
11.60	0.137	0.031	544.794	76.663	
11.65	0.137	0.028	556.571	83.505	
11.70	0.137	0.026	567.051	91.753	
11.75	0.137	0.024	576.436	101.432	
11.80	0.364	0.057	1568.491		115.572
11.85	0.364	0.048	1614.250		134.269
11.90	0.364	0.041	1650.029		157.630

11.95	0.364	0.036	1678.535	185.739
12.00	0.364	0.031	1701.613	218.665
12.05	0.058	0.005	273.118	251.951
12.10	0.058	0.005	273.576	285.521
12.15	0.058	0.004	274.036	319.382
12.20	0.058	0.004	274.466	353.528
12.25	0.058	0.004	274.900	387.957
12.30	0.037	0.003	175.147	421.567
12.35	0.037	0.003	175.318	453.146
12.40	0.037	0.003	175.473	482.653
12.45	0.037	0.003	175.639	510.029
12.50	0.037	0.003	175.787	535.225
12.55	0.030	0.002	144.517	556.160
12.60	0.030	0.002	144.613	569.806
12.65	0.030	0.002	144.718	575.993
12.70	0.030	0.002	144.812	574.550
12.75	0.030	0.002	144.914	565.349
12.80	0.024	0.002	113.477	551.044
12.85	0.024	0.002	113.534	535.865
12.90	0.024	0.002	113.592	519.846
12.95	0.024	0.002	113.648	502.975
13.00	0.024	0.001	113.706	485.253
13.05	0.020	0.001	94.795	466.818
13.10	0.020	0.001	94.837	447.966
13.15	0.020	0.001	94.871	428.733
13.20	0.020	0.001	94.913	409.111
13.25	0.020	0.001	94.946	389.100
13.30	0.017	0.001	82.319	368.725
13.35	0.017	0.001	82.345	348.078
13.40	0.017	0.001	82.375	327.223
13.45	0.017	0.001	82.400	306.146
13.50	0.017	0.001	82.428	284.846
13.55	0.015	0.001	69.768	263.349
13.60	0.015	0.001	69.783	241.750
13.65	0.015	0.001	69.805	221.078
13.70	0.015	0.001	69.823	201.077
13.75	0.015	0.001	69.843	181.770
13.80	0.013	0.001	63.506	163.191
13.85	0.013	0.001	63.524	145.413
13.90	0.013	0.001	63.538	130.979
13.95	0.013	0.001	63.554	119.292
14.00	0.013	0.001	63.568	110.411
14.05	0.012	0.001	57.226	104.389
14.10	0.012	0.001	57.236	101.301
14.15	0.012	0.001	57.248	97.460
14.20	0.012	0.001	57.259	93.895
14.25	0.012	0.001	57.273	90.608
14.30	0.011	0.001	50.917	87.604

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14.35	0.011	0.001	50.927	84.922
14.40	0.011	0.001	50.937	82.305
14.45	0.011	0.001	50.947	79.824
14.50	0.011	0.001	50.955	77.481
14.55	0.009	0.001	44.593	75.269
14.60	0.009	0.001	44.599	73.206
14.65	0.009	0.001	44.607	71.212
14.70	0.009	0.001	44.613	69.310
14.75	0.009	0.001	44.621	67.499
14.80	0.009	0.001	44.627	65.793
14.85	0.009	0.000	44.634	64.210
14.90	0.009	0.000	44.641	62.670
14.95	0.009	0.000	44.646	61.195
15.00	0.009	0.000	44.654	59.785
15.05	0.009	0.000	44.660	58.454
15.10	0.009	0.000	44.668	57.219
15.15	0.009	0.000	44.674	56.033
15.20	0.009	0.000	44.680	54.908
15.25	0.009	0.000	44.686	53.845
15.30	0.008	0.000	38.308	52.838
15.35	0.008	0.000	38.314	51.904
15.40	0.008	0.000	38.318	51.011
15.45	0.008	0.000	38.324	50.169
15.50	0.008	0.000	38.326	49.377
15.55	0.008	0.000	38.332	48.636
15.60	0.008	0.000	38.336	47.945
15.65	0.008	0.000	38.342	47.273
15.70	0.008	0.000	38.346	46.627
15.75	0.008	0.000	38.350	46.009
15.80	0.008	0.000	38.356	45.417
15.85	0.008	0.000	38.360	44.853
15.90	0.008	0.000	38.364	44.299
15.95	0.008	0.000	38.369	43.762
16.00	0.008	0.000	38.374	43.239
16.05	0.008	0.000	38.377	42.744
16.10	0.008	0.000	38.385	42.297
16.15	0.008	0.000	38.385	41.880
16.20	0.008	0.000	38.393	41.498
16.25	0.008	0.000	38.397	41.152
16.30	0.008	0.000	38.401	40.841
16.35	0.008	0.000	38.405	40.565
16.40	0.008	0.000	38.409	40.308
16.45	0.008	0.000	38.413	40.074
16.50	0.008	0.000	38.419	39.864
16.55	0.007	0.000	32.020	39.658
16.60	0.007	0.000	32.022	39.456
16.65	0.007	0.000	32.028	39.240
16.70	0.007	0.000	32.026	39.017

16.75	0.007	0.000	32.034	38.786
16.80	0.007	0.000	32.033	38.547
16.85	0.007	0.000	32.037	38.300
16.90	0.007	0.000	32.039	38.045
16.95	0.007	0.000	32.045	37.782
17.00	0.007	0.000	32.045	37.511
17.05	0.007	0.000	32.051	37.231
17.10	0.007	0.000	32.051	36.944
17.15	0.007	0.000	32.055	36.649
17.20	0.007	0.000	32.057	36.346
17.25	0.007	0.000	32.063	36.035
17.30	0.007	0.000	32.065	35.728
17.35	0.007	0.000	32.067	35.445
17.40	0.007	0.000	32.071	35.169
17.45	0.007	0.000	32.071	34.905
17.50	0.007	0.000	32.077	34.653
17.55	0.007	0.000	32.079	34.412
17.60	0.007	0.000	32.083	34.183
17.65	0.007	0.000	32.083	33.966
17.70	0.007	0.000	32.089	33.761
17.75	0.007	0.000	32.089	33.568
17.80	0.005	0.000	25.676	33.366
17.85	0.005	0.000	25.676	33.157
17.90	0.005	0.000	25.678	32.940
17.95	0.005	0.000	25.680	32.714
18.00	0.005	0.000	25.682	32.481
18.05	0.005	0.000	25.684	32.239
18.10	0.005	0.000	25.684	31.990
18.15	0.005	0.000	25.690	31.733
18.20	0.005	0.000	25.688	31.467
18.25	0.005	0.000	25.692	31.194
18.30	0.005	0.000	25.690	30.912
18.35	0.005	0.000	25.696	30.623
18.40	0.005	0.000	25.695	30.325
18.45	0.005	0.000	25.699	30.020
18.50	0.005	0.000	25.697	29.706
18.55	0.005	0.000	25.701	29.397
18.60	0.005	0.000	25.703	29.112
18.65	0.005	0.000	25.705	28.834
18.70	0.005	0.000	25.705	28.568
18.75	0.005	0.000	25.709	28.314
18.80	0.005	0.000	25.711	28.071
18.85	0.005	0.000	25.711	27.841
18.90	0.005	0.000	25.713	27.622
18.95	0.005	0.000	25.715	27.415
19.00	0.005	0.000	25.717	27.220
19.05	0.005	0.000	25.717	27.036
19.10	0.005	0.000	25.723	26.865

				Untitled
19.15	0.005	0.000	25.721	26.705
19.20	0.005	0.000	25.725	26.558
19.25	0.005	0.000	25.723	26.422
19.30	0.005	0.000	25.729	26.298
19.35	0.005	0.000	25.729	26.185
19.40	0.005	0.000	25.731	26.085
19.45	0.005	0.000	25.731	25.996
19.50	0.005	0.000	25.735	25.920
19.55	0.005	0.000	25.737	25.855
19.60	0.005	0.000	25.737	25.802
19.65	0.005	0.000	25.741	25.761
19.70	0.005	0.000	25.739	25.732
19.75	0.005	0.000	25.745	25.714
19.80	0.004	0.000	19.308	25.689
19.85	0.004	0.000	19.310	25.656
19.90	0.004	0.000	19.310	25.598
19.95	0.004	0.000	19.312	25.520
20.00	0.004	0.000	19.312	25.422
20.05	0.004	0.000	19.314	25.305
20.10	0.004	0.000	19.312	25.168
20.15	0.004	0.000	19.316	25.011
20.20	0.004	0.000	19.314	24.834
20.25	0.004	0.000	19.318	24.637
20.30	0.004	0.000	19.318	24.420
20.35	0.004	0.000	19.320	24.183
20.40	0.004	0.000	19.320	23.927
20.45	0.004	0.000	19.320	23.650
20.50	0.004	0.000	19.322	23.354
20.55	0.004	0.000	19.324	23.051
20.60	0.004	0.000	19.324	22.759
20.65	0.004	0.000	19.324	22.479
20.70	0.004	0.000	19.326	22.211
20.75	0.004	0.000	19.326	21.955
20.80	0.004	0.000	19.328	21.711
20.85	0.004	0.000	19.328	21.479
20.90	0.004	0.000	19.328	21.259
20.95	0.004	0.000	19.330	21.050
21.00	0.004	0.000	19.330	20.853
21.05	0.004	0.000	19.332	20.669
21.10	0.004	0.000	19.334	20.496
21.15	0.004	0.000	19.334	20.335
21.20	0.004	0.000	19.334	20.186
21.25	0.004	0.000	19.336	20.049
21.30	0.004	0.000	19.338	19.923
21.35	0.004	0.000	19.338	19.810
21.40	0.004	0.000	19.338	19.708
21.45	0.004	0.000	19.340	19.619
21.50	0.004	0.000	19.340	19.541

				Untitled
21.55	0.004	0.000	19.342	19.475
21.60	0.004	0.000	19.340	19.421
21.65	0.004	0.000	19.344	19.379
21.70	0.004	0.000	19.342	19.349
21.75	0.004	0.000	19.344	19.331
21.80	0.004	0.000	19.346	19.324
21.85	0.004	0.000	19.348	19.330
21.90	0.004	0.000	19.348	19.331
21.95	0.004	0.000	19.348	19.332
22.00	0.004	0.000	19.350	19.333
22.05	0.004	0.000	19.350	19.334
22.10	0.004	0.000	19.352	19.334
22.15	0.004	0.000	19.352	19.335
22.20	0.004	0.000	19.352	19.336
22.25	0.004	0.000	19.353	19.337
22.30	0.004	0.000	19.355	19.338
22.35	0.004	0.000	19.353	19.339
22.40	0.004	0.000	19.355	19.340
22.45	0.004	0.000	19.355	19.341
22.50	0.004	0.000	19.357	19.342
22.55	0.004	0.000	19.359	19.343
22.60	0.004	0.000	19.359	19.343
22.65	0.004	0.000	19.359	19.344
22.70	0.004	0.000	19.361	19.345
22.75	0.004	0.000	19.363	19.346
22.80	0.004	0.000	19.363	19.347
22.85	0.004	0.000	19.363	19.348
22.90	0.004	0.000	19.365	19.349
22.95	0.004	0.000	19.365	19.350
23.00	0.004	0.000	19.365	19.351
23.05	0.004	0.000	19.367	19.351
23.10	0.004	0.000	19.367	19.352
23.15	0.004	0.000	19.369	19.353
23.20	0.004	0.000	19.367	19.354
23.25	0.004	0.000	19.371	19.355
23.30	0.004	0.000	19.371	19.356
23.35	0.004	0.000	19.373	19.357
23.40	0.004	0.000	19.373	19.358
23.45	0.004	0.000	19.373	19.358
23.50	0.004	0.000	19.375	19.359
23.55	0.004	0.000	19.377	19.360
23.60	0.004	0.000	19.377	19.361
23.65	0.004	0.000	19.377	19.362
23.70	0.004	0.000	19.377	19.363
23.75	0.004	0.000	19.379	19.364
23.80	0.003	0.000	12.921	19.345
23.85	0.003	0.000	12.921	19.306
23.90	0.003	0.000	12.921	19.247

				Untitled
23.95	0.003	0.000	12.921	19.168
24.00	0.003	0.000	12.921	19.069
24.05	0.000	0.000	0.000	18.910
24.10	0.000	0.000	0.000	18.692
24.15	0.000	0.000	0.000	18.414
24.20	0.000	0.000	0.000	18.076
24.25	0.000	0.000	0.000	17.678
24.30	0.000	0.000	0.000	17.221
24.35	0.000	0.000	0.000	16.703
24.40	0.000	0.000	0.000	16.126
24.45	0.000	0.000	0.000	15.489
24.50	0.000	0.000	0.000	14.792
24.55	0.000	0.000	0.000	14.048
24.60	0.000	0.000	0.000	13.277
24.65	0.000	0.000	0.000	12.477
24.70	0.000	0.000	0.000	11.649
24.75	0.000	0.000	0.000	10.794
24.80	0.000	0.000	0.000	9.936
24.85	0.000	0.000	0.000	9.113
24.90	0.000	0.000	0.000	8.327
24.95	0.000	0.000	0.000	7.576
25.00	0.000	0.000	0.000	6.861
25.05	0.000	0.000	0.000	6.182
25.10	0.000	0.000	0.000	5.539
25.15	0.000	0.000	0.000	4.932
25.20	0.000	0.000	0.000	4.361
25.25	0.000	0.000	0.000	3.825
25.30	0.000	0.000	0.000	3.325
25.35	0.000	0.000	0.000	2.861

Existing Pond Calculations

Existing Pond Pre-Construction Data

RUNOFF CURVE NUMBER COMPUTATION Version 2.00

Project : Existing Detention Pond User: Date:
County : State: Checked: ____ Date: _____
Subtitle: Pre-Construction
Subarea : 5.6

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
		Acres (CN)		
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Fair condition; grass cover 50% to 75%	-	-	5.6(79)	-
Total Area (by Hydrologic Soil Group)			5.6	
			====	

SUBAREA: 5.6 TOTAL DRAINAGE AREA: 5.6 Acres WEIGHTED CURVE NUMBER: 79

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.00

Project : Existing Detention Pond User: Date:
County : State: Checked: ____ Date: _____
Subtitle: Pre-Construction

Subarea #1 - 5.6

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.3	300	.05	f					0.391
Shallow Concent'd		800	.15	u					0.036
								Time of Concentration =	0.43*
									=====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Burmuda	--- Surface Codes ---
C Cultivated < 20 % Res.	H Woods, Light	P Paved
D Cultivated > 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

SMADA 6.0 for Windows
Watershed Information

Watershed Total Area (acres)	:5.60
Impervious Area (acres)	:0.00
Time of Concentration (min)	:25.8
% Impervious Directly Connected	:00.00

Additional Abstraction

Over Pervious Area (inches)	:0.00
Over Impervious Area (inches)	:0.00

Infiltration Characteristics:

Max Infiltration Capacity (in)	:999.00
SCS Curve Number for Pervious	:79
Initial Abstraction Factor	:0.20

Time (hr)	Time HHMM	Rain (in)	Cumulative (in)
0.167	00010	0.006	0.006
0.333	00020	0.008	0.015
0.500	00030	0.010	0.024
0.667	00040	0.010	0.034
0.833	00050	0.010	0.044
1.000	00100	0.010	0.054
1.167	00110	0.010	0.063
1.333	00120	0.010	0.073
1.500	00130	0.010	0.083
1.667	00140	0.010	0.093
1.833	00150	0.010	0.102
2.000	00200	0.010	0.112
2.167	00210	0.010	0.122
2.333	00220	0.010	0.132
2.500	00230	0.010	0.141
2.667	00240	0.010	0.151
2.833	00250	0.010	0.161
3.000	00300	0.010	0.171
3.167	00310	0.010	0.180
3.333	00320	0.010	0.190
3.500	00330	0.010	0.200
3.667	00340	0.010	0.210
3.833	00350	0.011	0.221
4.000	00400	0.013	0.234
4.167	00410	0.013	0.247
4.333	00420	0.013	0.260
4.500	00430	0.013	0.273
4.667	00440	0.013	0.286
4.833	00450	0.013	0.299
5.000	00500	0.013	0.312
5.167	00510	0.013	0.325
5.333	00520	0.013	0.338
5.500	00530	0.013	0.351
5.667	00540	0.013	0.364
5.833	00550	0.013	0.377
6.000	00600	0.013	0.390
6.167	00610	0.016	0.406
6.333	00620	0.016	0.422
6.500	00630	0.016	0.439
6.667	00640	0.016	0.455
6.833	00650	0.016	0.471
7.000	00700	0.016	0.487
7.167	00710	0.016	0.504
7.333	00720	0.016	0.520
7.500	00730	0.016	0.536
7.667	00740	0.016	0.552
7.833	00750	0.016	0.569
8.000	00800	0.016	0.585
8.167	00810	0.019	0.604
8.333	00820	0.021	0.625
8.500	00830	0.023	0.648
8.667	00840	0.023	0.671
8.833	00850	0.023	0.694
9.000	00900	0.023	0.716
9.167	00910	0.026	0.742
9.333	00920	0.026	0.768
9.500	00930	0.026	0.794
9.667	00940	0.029	0.824
9.833	00950	0.029	0.853
10.00	01000	0.029	0.882
10.16	01010	0.032	0.915
10.33	01020	0.036	0.950
10.50	01030	0.039	0.989
10.66	01040	0.049	1.038
10.83	01050	0.054	1.092
11.00	01100	0.058	1.150
11.16	01110	0.068	1.219
11.33	01120	0.076	1.295
11.50	01130	0.084	1.379
11.66	01140	0.338	1.717
11.83	01150	0.617	2.335
12.00	01200	0.897	3.231
12.16	01210	0.143	3.374
12.33	01220	0.117	3.491
12.50	01230	0.091	3.582
12.66	01240	0.075	3.657
12.83	01250	0.067	3.724
13.00	01300	0.058	3.782
13.16	01310	0.049	3.831
13.33	01320	0.045	3.876

13.50	01330	0.042	3.919
13.66	01340	0.036	3.954
13.83	01350	0.034	3.989
14.00	01400	0.032	4.021
14.16	01410	0.029	4.050
14.33	01420	0.028	4.078
14.50	01430	0.026	4.104
14.66	01440	0.023	4.127
14.83	01450	0.023	4.149
15.00	01500	0.023	4.172
15.16	01510	0.023	4.195
15.33	01520	0.021	4.216
15.50	01530	0.019	4.236
15.66	01540	0.019	4.255
15.83	01550	0.019	4.275
16.00	01600	0.019	4.294
16.16	01610	0.019	4.313
16.33	01620	0.019	4.333
16.50	01630	0.019	4.352
16.66	01640	0.016	4.369
16.83	01650	0.016	4.385
17.00	01700	0.016	4.401
17.16	01710	0.016	4.417
17.33	01720	0.016	4.434
17.50	01730	0.016	4.450
17.66	01740	0.016	4.466
17.83	01750	0.015	4.481
18.00	01800	0.013	4.494
18.16	01810	0.013	4.507
18.33	01820	0.013	4.520
18.50	01830	0.013	4.533
18.66	01840	0.013	4.546
18.83	01850	0.013	4.559
19.00	01900	0.013	4.572
19.16	01910	0.013	4.585
19.33	01920	0.013	4.598
19.50	01930	0.013	4.611
19.66	01940	0.013	4.624
19.83	01950	0.011	4.635
20.00	02000	0.010	4.645
20.16	02010	0.010	4.655
20.33	02020	0.010	4.664
20.50	02030	0.010	4.674
20.66	02040	0.010	4.684
20.83	02050	0.010	4.694
21.00	02100	0.010	4.703
21.16	02110	0.010	4.713
21.33	02120	0.010	4.723
21.50	02130	0.010	4.733
21.66	02140	0.010	4.742
21.83	02150	0.010	4.752
22.00	02200	0.010	4.762
22.16	02210	0.010	4.772
22.33	02220	0.010	4.781
22.50	02230	0.010	4.791
22.66	02240	0.010	4.801
22.83	02250	0.010	4.811
23.00	02300	0.010	4.820
23.16	02310	0.010	4.830
23.33	02320	0.010	4.840
23.50	02330	0.010	4.850
23.66	02340	0.010	4.859
23.83	02350	0.008	4.868
24.00	00000	0.006	4.874

Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Excess (in)	Excess (cfs)	Outflow (cfs)
0.167	00010	0.006	0.006	0.006	0.000	0.000	0.000
0.333	00020	0.008	0.015	0.008	0.000	0.000	0.000
0.500	00030	0.010	0.024	0.010	0.000	0.000	0.000
0.667	00040	0.010	0.034	0.010	0.000	0.000	0.000
0.833	00050	0.010	0.044	0.010	0.000	0.000	0.000
1.000	00100	0.010	0.054	0.010	0.000	0.000	0.000
1.167	00110	0.010	0.063	0.010	0.000	0.000	0.000
1.333	00120	0.010	0.073	0.010	0.000	0.000	0.000
1.500	00130	0.010	0.083	0.010	0.000	0.000	0.000
1.667	00140	0.010	0.093	0.010	0.000	0.000	0.000
1.833	00150	0.010	0.102	0.010	0.000	0.000	0.000
2.000	00200	0.010	0.112	0.010	0.000	0.000	0.000
2.167	00210	0.010	0.122	0.010	0.000	0.000	0.000
2.333	00220	0.010	0.132	0.010	0.000	0.000	0.000
2.500	00230	0.010	0.141	0.010	0.000	0.000	0.000
2.667	00240	0.010	0.151	0.010	0.000	0.000	0.000
2.833	00250	0.010	0.161	0.010	0.000	0.000	0.000
3.000	00300	0.010	0.171	0.010	0.000	0.000	0.000
3.167	00310	0.010	0.180	0.010	0.000	0.000	0.000
3.333	00320	0.010	0.190	0.010	0.000	0.000	0.000
3.500	00330	0.010	0.200	0.010	0.000	0.000	0.000
3.667	00340	0.010	0.210	0.010	0.000	0.000	0.000
3.833	00350	0.011	0.221	0.011	0.000	0.000	0.000
4.000	00400	0.013	0.234	0.013	0.000	0.000	0.000
4.167	00410	0.013	0.247	0.013	0.000	0.000	0.000
4.333	00420	0.013	0.260	0.013	0.000	0.000	0.000
4.500	00430	0.013	0.273	0.013	0.000	0.000	0.000
4.667	00440	0.013	0.286	0.013	0.000	0.000	0.000
4.833	00450	0.013	0.299	0.013	0.000	0.000	0.000
5.000	00500	0.013	0.312	0.013	0.000	0.000	0.000
5.167	00510	0.013	0.325	0.013	0.000	0.000	0.000
5.333	00520	0.013	0.338	0.013	0.000	0.000	0.000
5.500	00530	0.013	0.351	0.013	0.000	0.000	0.000
5.667	00540	0.013	0.364	0.013	0.000	0.000	0.000
5.833	00550	0.013	0.377	0.013	0.000	0.000	0.000
6.000	00600	0.013	0.390	0.013	0.000	0.000	0.000
6.167	00610	0.016	0.406	0.016	0.000	0.000	0.000
6.333	00620	0.016	0.422	0.016	0.000	0.000	0.000
6.500	00630	0.016	0.439	0.016	0.000	0.000	0.000
6.667	00640	0.016	0.455	0.016	0.000	0.000	0.000
6.833	00650	0.016	0.471	0.016	0.000	0.000	0.000
7.000	00700	0.016	0.487	0.016	0.000	0.000	0.000
7.167	00710	0.016	0.504	0.016	0.000	0.000	0.000
7.333	00720	0.016	0.520	0.016	0.000	0.000	0.000
7.500	00730	0.016	0.536	0.016	0.000	0.000	0.000
7.667	00740	0.016	0.552	0.016	0.000	0.005	0.001
7.833	00750	0.016	0.569	0.016	0.000	0.012	0.003
8.000	00800	0.016	0.585	0.016	0.001	0.018	0.008
8.167	00810	0.019	0.604	0.019	0.001	0.030	0.014
8.333	00820	0.021	0.625	0.020	0.001	0.043	0.023
8.500	00830	0.023	0.648	0.021	0.002	0.058	0.034
8.667	00840	0.023	0.671	0.021	0.002	0.069	0.046
8.833	00850	0.023	0.694	0.020	0.002	0.080	0.058
9.000	00900	0.023	0.716	0.020	0.003	0.091	0.070
9.167	00910	0.026	0.742	0.023	0.003	0.118	0.084
9.333	00920	0.026	0.768	0.022	0.004	0.131	0.101
9.500	00930	0.026	0.794	0.022	0.004	0.145	0.117
9.667	00940	0.029	0.824	0.024	0.005	0.178	0.135
9.833	00950	0.029	0.853	0.024	0.006	0.194	0.156
10.00	01000	0.029	0.882	0.023	0.006	0.210	0.176
10.16	01010	0.032	0.915	0.025	0.007	0.251	0.198
10.33	01020	0.036	0.950	0.027	0.009	0.296	0.228
10.50	01030	0.039	0.989	0.029	0.010	0.347	0.265
10.66	01040	0.049	1.038	0.035	0.014	0.468	0.319
10.83	01050	0.054	1.092	0.037	0.016	0.556	0.395
11.00	01100	0.058	1.150	0.039	0.019	0.654	0.480
11.16	01110	0.068	1.219	0.044	0.024	0.821	0.584
11.33	01120	0.076	1.295	0.047	0.029	0.989	0.714
11.50	01130	0.084	1.379	0.050	0.035	1.176	0.863
11.66	01140	0.338	1.717	0.177	0.161	5.444	1.657
11.83	01150	0.617	2.335	0.254	0.363	12.294	4.109
12.00	01200	0.897	3.231	0.265	0.632	21.395	8.701
12.16	01210	0.143	3.374	0.034	0.109	3.681	11.205
12.33	01220	0.117	3.491	0.027	0.090	3.056	9.503
12.50	01230	0.091	3.582	0.020	0.071	2.403	7.225
12.66	01240	0.075	3.657	0.016	0.059	1.990	4.842
12.83	01250	0.067	3.724	0.014	0.053	1.785	2.904
13.00	01300	0.058	3.782	0.012	0.047	1.576	2.082
13.16	01310	0.049	3.831	0.010	0.039	1.319	1.778

13.33	01320	0.045	3.876	0.009	0.037	1.236	1.543
13.50	01330	0.042	3.919	0.008	0.034	1.152	1.375
13.66	01340	0.036	3.954	0.007	0.029	0.978	1.233
13.83	01350	0.034	3.989	0.006	0.028	0.936	1.107
14.00	01400	0.032	4.021	0.006	0.026	0.894	1.016
14.16	01410	0.029	4.050	0.005	0.024	0.806	0.939
14.33	01420	0.028	4.078	0.005	0.023	0.763	0.869
14.50	01430	0.026	4.104	0.005	0.021	0.719	0.812
14.66	01440	0.023	4.127	0.004	0.019	0.631	0.754
14.83	01450	0.023	4.149	0.004	0.019	0.632	0.699
15.00	01500	0.023	4.172	0.004	0.019	0.633	0.664
15.16	01510	0.023	4.195	0.004	0.019	0.634	0.644
15.33	01520	0.021	4.216	0.004	0.017	0.589	0.628
15.50	01530	0.019	4.236	0.003	0.016	0.545	0.606
15.66	01540	0.019	4.255	0.003	0.016	0.545	0.582
15.83	01550	0.019	4.275	0.003	0.016	0.546	0.564
16.00	01600	0.019	4.294	0.003	0.016	0.547	0.552
16.16	01610	0.019	4.313	0.003	0.016	0.547	0.547
16.33	01620	0.019	4.333	0.003	0.016	0.548	0.547
16.50	01630	0.019	4.352	0.003	0.016	0.549	0.548
16.66	01640	0.016	4.369	0.003	0.014	0.458	0.534
16.83	01650	0.016	4.385	0.003	0.014	0.458	0.507
17.00	01700	0.016	4.401	0.003	0.014	0.459	0.485
17.16	01710	0.016	4.417	0.003	0.014	0.459	0.470
17.33	01720	0.016	4.434	0.003	0.014	0.460	0.461
17.50	01730	0.016	4.450	0.003	0.014	0.460	0.459
17.66	01740	0.016	4.466	0.003	0.014	0.461	0.460
17.83	01750	0.015	4.481	0.002	0.012	0.415	0.453
18.00	01800	0.013	4.494	0.002	0.011	0.369	0.432
18.16	01810	0.013	4.507	0.002	0.011	0.369	0.407
18.33	01820	0.013	4.520	0.002	0.011	0.370	0.388
18.50	01830	0.013	4.533	0.002	0.011	0.370	0.376
18.66	01840	0.013	4.546	0.002	0.011	0.370	0.371
18.83	01850	0.013	4.559	0.002	0.011	0.370	0.370
19.00	01900	0.013	4.572	0.002	0.011	0.371	0.370
19.16	01910	0.013	4.585	0.002	0.011	0.371	0.371
19.33	01920	0.013	4.598	0.002	0.011	0.371	0.371
19.50	01930	0.013	4.611	0.002	0.011	0.372	0.371
19.66	01940	0.013	4.624	0.002	0.011	0.372	0.371
19.83	01950	0.011	4.635	0.002	0.010	0.326	0.364
20.00	02000	0.010	4.645	0.002	0.008	0.279	0.343
20.16	02010	0.010	4.655	0.001	0.008	0.279	0.318
20.33	02020	0.010	4.664	0.001	0.008	0.279	0.299
20.50	02030	0.010	4.674	0.001	0.008	0.280	0.286
20.66	02040	0.010	4.684	0.001	0.008	0.280	0.281
20.83	02050	0.010	4.694	0.001	0.008	0.280	0.280
21.00	02100	0.010	4.703	0.001	0.008	0.280	0.280
21.16	02110	0.010	4.713	0.001	0.008	0.280	0.280
21.33	02120	0.010	4.723	0.001	0.008	0.280	0.280
21.50	02130	0.010	4.733	0.001	0.008	0.280	0.280
21.66	02140	0.010	4.742	0.001	0.008	0.281	0.280
21.83	02150	0.010	4.752	0.001	0.008	0.281	0.281
22.00	02200	0.010	4.762	0.001	0.008	0.281	0.281
22.16	02210	0.010	4.772	0.001	0.008	0.281	0.281
22.33	02220	0.010	4.781	0.001	0.008	0.281	0.281
22.50	02230	0.010	4.791	0.001	0.008	0.281	0.281
22.66	02240	0.010	4.801	0.001	0.008	0.281	0.281
22.83	02250	0.010	4.811	0.001	0.008	0.282	0.281
23.00	02300	0.010	4.820	0.001	0.008	0.282	0.281
23.16	02310	0.010	4.830	0.001	0.008	0.282	0.282
23.33	02320	0.010	4.840	0.001	0.008	0.282	0.282
23.50	02330	0.010	4.850	0.001	0.008	0.282	0.282
23.66	02340	0.010	4.859	0.001	0.008	0.282	0.282
23.83	02350	0.008	4.868	0.001	0.007	0.235	0.275
24.00	00000	0.006	4.874	0.001	0.006	0.188	0.253
24.16	00010	0.000	4.874	0.000	0.000	0.000	0.199
24.33	00020	0.000	4.874	0.000	0.000	0.000	0.121
24.50	00030	0.000	4.874	0.000	0.000	0.000	0.063
24.66	00040	0.000	4.874	0.000	0.000	0.000	0.025
			4.874	2.181	2.693	2.692	

Totals for Watershed in inches over 5.60 acres

Rational Coefficient = 0.553 Peak Flow (cfs) = 11.21

Stage (ft)	Storage (ac-ft)	Weir 1 Q (cfs)	Weir 2 Q (cfs)	Discharge (cfs)
0.00	0.00	0.00	0.00	0.00
0.50	0.00	0.37	0.00	0.37
1.00	0.00	2.00	0.00	2.00
1.50	0.01	2.72	0.00	2.72
2.00	0.01	3.28	0.00	3.28
2.50	0.02	3.77	0.00	3.77
3.00	0.03	4.19	0.00	4.19
3.50	0.04	4.58	0.00	4.58
4.00	0.05	4.94	0.00	4.94
4.50	0.06	5.27	0.00	5.27
5.00	0.08	5.59	0.00	5.59
5.50	0.10	5.88	0.00	5.88

Weir Number1
Type : Circular Orifice
Equation : Q = C*A*2g^.5*H^n
Weir Invert (ft) : 0.00
C: 0.60 n: 0.50
Orifice Diameter (ft) : 0.83

Existing Pond Post-Construction Data

RUNOFF CURVE NUMBER COMPUTATION Version 2.00

Project : Existing Detention Pond User: Date:
County : State: Checked: ____ Date: _____
Subtitle: Post-Construction
Subarea : 5.6

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
		Acres (CN)		
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Good condition; grass cover > 75%	-	-	4.5(74)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	-	1.1(98)	-
Total Area (by Hydrologic Soil Group)			5.6	

SUBAREA: 5.6 TOTAL DRAINAGE AREA: 5.6 Acres WEIGHTED CURVE NUMBER: 79

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.00

Project : Existing Detention Pond User: Date:
County : State: Checked: ____ Date: _____
Subtitle: Post-Construction

Subarea #1 - 5.6

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.3	300	.05	f					0.391
Shallow Concent'd		800	.15	u					0.036
								Time of Concentration =	0.43*
									=====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Burmuda	--- Surface Codes ---
C Cultivated < 20 % Res.	H Woods, Light	P Paved
D Cultivated > 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

SMADA 6.0 for Windows

Watershed Information

Watershed Total Area (acres)	:5.60
Impervious Area (acres)	:1.10
Time of Concentration (min)	:25.8
% Impervious Directly Connected	:90.00

Additional Abstraction

Over Pervious Area (inches)	:0.00
Over Impervious Area (inches)	:0.00

Infiltration Characteristics:

Max Infiltration Capacity (in)	:999.00
SCS Curve Number for Pervious	:79
Initial Abstraction Factor	:0.20

10-year storm peak flow

Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Excess (in)	Excess (cfs)	Outflow (cfs)
0.167	00010	0.006	0.006	0.005	0.001	0.039	0.006
0.333	00020	0.008	0.015	0.007	0.001	0.048	0.019
0.500	00030	0.010	0.024	0.008	0.002	0.058	0.033
0.667	00040	0.010	0.034	0.008	0.002	0.058	0.045
0.833	00050	0.010	0.044	0.008	0.002	0.058	0.053
1.000	00100	0.010	0.053	0.008	0.002	0.058	0.056
1.167	00110	0.010	0.063	0.008	0.002	0.058	0.058
1.333	00120	0.010	0.073	0.008	0.002	0.058	0.058
1.500	00130	0.010	0.083	0.008	0.002	0.058	0.058
1.667	00140	0.010	0.092	0.008	0.002	0.058	0.058
1.833	00150	0.010	0.102	0.008	0.002	0.058	0.058
2.000	00200	0.010	0.112	0.008	0.002	0.058	0.058
2.167	00210	0.010	0.121	0.008	0.002	0.058	0.058
2.333	00220	0.010	0.131	0.008	0.002	0.058	0.058
2.500	00230	0.010	0.141	0.008	0.002	0.058	0.058
2.667	00240	0.010	0.151	0.008	0.002	0.058	0.058
2.833	00250	0.010	0.160	0.008	0.002	0.058	0.058
3.000	00300	0.010	0.170	0.008	0.002	0.058	0.058
3.167	00310	0.010	0.180	0.008	0.002	0.058	0.058
3.333	00320	0.010	0.189	0.008	0.002	0.058	0.058
3.500	00330	0.010	0.199	0.008	0.002	0.058	0.058
3.667	00340	0.010	0.209	0.008	0.002	0.058	0.058
3.833	00350	0.011	0.220	0.009	0.002	0.068	0.059
4.000	00400	0.013	0.233	0.011	0.002	0.077	0.064
4.167	00410	0.013	0.246	0.011	0.002	0.077	0.069
4.333	00420	0.013	0.259	0.011	0.002	0.077	0.073
4.500	00430	0.013	0.272	0.011	0.002	0.077	0.076
4.667	00440	0.013	0.285	0.011	0.002	0.077	0.077
4.833	00450	0.013	0.298	0.011	0.002	0.077	0.077
5.000	00500	0.013	0.311	0.011	0.002	0.077	0.077
5.167	00510	0.013	0.324	0.011	0.002	0.077	0.077
5.333	00520	0.013	0.337	0.011	0.002	0.077	0.077
5.500	00530	0.013	0.350	0.011	0.002	0.077	0.077
5.667	00540	0.013	0.363	0.011	0.002	0.077	0.077
5.833	00550	0.013	0.375	0.011	0.002	0.077	0.077
6.000	00600	0.013	0.388	0.011	0.002	0.077	0.077
6.167	00610	0.016	0.405	0.013	0.003	0.096	0.080
6.333	00620	0.016	0.421	0.013	0.003	0.096	0.086
6.500	00630	0.016	0.437	0.013	0.003	0.096	0.091
6.667	00640	0.016	0.453	0.013	0.003	0.096	0.094
6.833	00650	0.016	0.469	0.013	0.003	0.096	0.096
7.000	00700	0.016	0.486	0.013	0.003	0.096	0.096
7.167	00710	0.016	0.502	0.013	0.003	0.096	0.096
7.333	00720	0.016	0.518	0.013	0.003	0.096	0.096
7.500	00730	0.016	0.534	0.013	0.003	0.098	0.097
7.667	00740	0.016	0.550	0.013	0.003	0.103	0.098
7.833	00750	0.016	0.566	0.013	0.003	0.109	0.101
8.000	00800	0.016	0.583	0.013	0.003	0.114	0.105
8.167	00810	0.019	0.602	0.015	0.004	0.144	0.114
8.333	00820	0.021	0.623	0.016	0.005	0.164	0.129
8.500	00830	0.023	0.646	0.017	0.005	0.186	0.147
8.667	00840	0.023	0.668	0.017	0.006	0.196	0.166
8.833	00850	0.023	0.691	0.016	0.006	0.205	0.182
9.000	00900	0.023	0.714	0.016	0.006	0.214	0.195
9.167	00910	0.026	0.740	0.018	0.008	0.255	0.211
9.333	00920	0.026	0.765	0.018	0.008	0.267	0.231
9.500	00930	0.026	0.791	0.018	0.008	0.277	0.249
9.667	00940	0.029	0.820	0.019	0.010	0.325	0.270
9.833	00950	0.029	0.850	0.019	0.010	0.338	0.296
10.00	01000	0.029	0.879	0.019	0.010	0.351	0.317
10.16	01010	0.032	0.911	0.020	0.012	0.404	0.342
10.33	01020	0.036	0.947	0.022	0.014	0.461	0.377
10.50	01030	0.039	0.986	0.023	0.015	0.523	0.422
10.66	01040	0.049	1.034	0.028	0.020	0.681	0.490
10.83	01050	0.053	1.088	0.030	0.023	0.783	0.584
11.00	01100	0.058	1.146	0.032	0.026	0.892	0.689
11.16	01110	0.068	1.214	0.036	0.032	1.089	0.812
11.33	01120	0.076	1.290	0.038	0.038	1.276	0.962
11.50	01130	0.084	1.374	0.040	0.044	1.478	1.131
11.66	01140	0.337	1.711	0.143	0.192	6.513	2.058
11.83	01150	0.615	2.326	0.205	0.408	13.803	4.823
12.00	01200	0.893	3.219	0.213	0.676	22.912	9.744
12.16	01210	0.142	3.361	0.027	0.114	3.871	12.289
12.33	01220	0.117	3.478	0.021	0.095	3.202	10.326
12.50	01230	0.091	3.568	0.016	0.074	2.511	7.769
12.66	01240	0.074	3.643	0.013	0.061	2.076	5.145
12.83	01250	0.066	3.709	0.011	0.055	1.860	3.051
13.00	01300	0.058	3.767	0.010	0.048	1.640	2.174
13.16	01310	0.049	3.816	0.008	0.040	1.371	1.853

13.33	01320	0.045	3.861	0.007	0.038	1.284	1.606
13.50	01330	0.042	3.903	0.007	0.035	1.196	1.430
13.66	01340	0.036	3.939	0.005	0.030	1.014	1.280
13.83	01350	0.034	3.973	0.005	0.029	0.970	1.149
14.00	01400	0.032	4.005	0.005	0.027	0.926	1.054
14.16	01410	0.029	4.035	0.004	0.025	0.835	0.973
14.33	01420	0.028	4.062	0.004	0.023	0.789	0.900
14.50	01430	0.026	4.088	0.004	0.022	0.744	0.840
14.66	01440	0.023	4.111	0.003	0.019	0.652	0.780
14.83	01450	0.023	4.133	0.003	0.019	0.653	0.723
15.00	01500	0.023	4.156	0.003	0.019	0.654	0.687
15.16	01510	0.023	4.179	0.003	0.019	0.654	0.666
15.33	01520	0.021	4.200	0.003	0.018	0.608	0.649
15.50	01530	0.019	4.219	0.003	0.017	0.562	0.626
15.66	01540	0.019	4.238	0.003	0.017	0.563	0.601
15.83	01550	0.019	4.258	0.003	0.017	0.563	0.582
16.00	01600	0.019	4.277	0.003	0.017	0.564	0.570
16.16	01610	0.019	4.297	0.003	0.017	0.564	0.565
16.33	01620	0.019	4.316	0.003	0.017	0.565	0.564
16.50	01630	0.019	4.336	0.003	0.017	0.566	0.565
16.66	01640	0.016	4.352	0.002	0.014	0.472	0.551
16.83	01650	0.016	4.368	0.002	0.014	0.472	0.522
17.00	01700	0.016	4.384	0.002	0.014	0.472	0.500
17.16	01710	0.016	4.400	0.002	0.014	0.473	0.484
17.33	01720	0.016	4.416	0.002	0.014	0.473	0.475
17.50	01730	0.016	4.433	0.002	0.014	0.473	0.473
17.66	01740	0.016	4.449	0.002	0.014	0.474	0.473
17.83	01750	0.015	4.463	0.002	0.013	0.427	0.466
18.00	01800	0.013	4.476	0.002	0.011	0.380	0.445
18.16	01810	0.013	4.489	0.002	0.011	0.380	0.419
18.33	01820	0.013	4.502	0.002	0.011	0.380	0.400
18.50	01830	0.013	4.515	0.002	0.011	0.380	0.387
18.66	01840	0.013	4.528	0.002	0.011	0.380	0.381
18.83	01850	0.013	4.541	0.002	0.011	0.381	0.380
19.00	01900	0.013	4.554	0.002	0.011	0.381	0.381
19.16	01910	0.013	4.567	0.002	0.011	0.381	0.381
19.33	01920	0.013	4.580	0.002	0.011	0.381	0.381
19.50	01930	0.013	4.593	0.002	0.011	0.382	0.381
19.66	01940	0.013	4.606	0.002	0.011	0.382	0.381
19.83	01950	0.011	4.617	0.001	0.010	0.334	0.374
20.00	02000	0.010	4.627	0.001	0.008	0.287	0.353
20.16	02010	0.010	4.637	0.001	0.008	0.287	0.326
20.33	02020	0.010	4.646	0.001	0.008	0.287	0.307
20.50	02030	0.010	4.656	0.001	0.008	0.287	0.294
20.66	02040	0.010	4.666	0.001	0.008	0.287	0.288
20.83	02050	0.010	4.675	0.001	0.008	0.287	0.287
21.00	02100	0.010	4.685	0.001	0.008	0.287	0.287
21.16	02110	0.010	4.695	0.001	0.008	0.287	0.287
21.33	02120	0.010	4.704	0.001	0.008	0.288	0.287
21.50	02130	0.010	4.714	0.001	0.008	0.288	0.287
21.66	02140	0.010	4.724	0.001	0.008	0.288	0.288
21.83	02150	0.010	4.734	0.001	0.008	0.288	0.288
22.00	02200	0.010	4.743	0.001	0.009	0.288	0.288
22.16	02210	0.010	4.753	0.001	0.009	0.288	0.288
22.33	02220	0.010	4.763	0.001	0.009	0.288	0.288
22.50	02230	0.010	4.772	0.001	0.009	0.288	0.288
22.66	02240	0.010	4.782	0.001	0.009	0.288	0.288
22.83	02250	0.010	4.792	0.001	0.009	0.289	0.288
23.00	02300	0.010	4.802	0.001	0.009	0.289	0.288
23.16	02310	0.010	4.811	0.001	0.009	0.289	0.289
23.33	02320	0.010	4.821	0.001	0.009	0.289	0.289
23.50	02330	0.010	4.831	0.001	0.009	0.289	0.289
23.66	02340	0.010	4.840	0.001	0.009	0.289	0.289
23.83	02350	0.008	4.849	0.001	0.007	0.241	0.282
24.00	00000	0.006	4.855	0.001	0.006	0.193	0.260
24.16	00010	0.000	4.855	0.000	0.000	0.000	0.203
24.33	00020	0.000	4.855	0.000	0.000	0.000	0.124
24.50	00030	0.000	4.855	0.000	0.000	0.000	0.064
24.66	00040	0.000	4.855	0.000	0.000	0.000	0.025
			4.855	1.761	3.070	3.070	

Totals for Watershed in inches over 5.60 acres

Rational Coefficient = 0.637 Peak Flow (cfs) = 12.29

Orifice Design

Stage (ft)	Storage (ac-ft)	Weir 1 Q (cfs)	Weir 2 Q (cfs)	Discharge (cfs)
0.00	0.00	0.00	0.00	0.00
0.50	0.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00
1.50	0.01	0.37	0.00	0.37
2.00	0.01	2.00	0.00	2.00
2.50	0.02	2.72	0.00	2.72
3.00	0.03	3.28	0.00	3.28
3.50	0.04	3.77	0.00	3.77
4.00	0.05	4.19	0.00	4.19
4.50	0.06	4.58	0.00	4.58
5.00	0.08	4.94	0.00	4.94
5.50	0.10	5.27	0.00	5.27

Weir Number1
Type : Circular Orifice
Equation : Q = C*A*2g^.5*H^n
Weir Invert (ft) : 1.00
C: 0.60 n: 0.50
Orifice Diameter (ft) : 0.83

14.00	1.05	1.05	1.71	0.01
14.17	0.97	0.97	1.68	0.01
14.33	0.89	0.89	1.66	0.01
14.50	0.83	0.83	1.64	0.01
14.67	0.77	0.77	1.62	0.01
14.83	0.72	0.72	1.61	0.01
15.00	0.68	0.68	1.60	0.01
15.17	0.66	0.66	1.59	0.01
15.33	0.64	0.64	1.59	0.01
15.50	0.62	0.62	1.58	0.01
15.67	0.60	0.60	1.57	0.01
15.83	0.58	0.58	1.56	0.01
16.00	0.57	0.57	1.56	0.01
16.17	0.56	0.56	1.56	0.01
16.33	0.56	0.56	1.56	0.01
16.50	0.56	0.56	1.56	0.01
16.67	0.55	0.55	1.56	0.01
16.83	0.52	0.52	1.55	0.01
17.00	0.50	0.50	1.54	0.01
17.17	0.48	0.48	1.53	0.01
17.33	0.47	0.47	1.53	0.01
17.50	0.47	0.47	1.53	0.01
17.67	0.47	0.47	1.53	0.01
17.83	0.46	0.46	1.53	0.01
18.00	0.44	0.44	1.52	0.01
18.17	0.42	0.42	1.51	0.01
18.33	0.40	0.40	1.51	0.01
18.50	0.38	0.38	1.51	0.01
18.67	0.38	0.38	1.50	0.01
18.83	0.38	0.38	1.50	0.01
19.00	0.38	0.38	1.50	0.01
19.17	0.38	0.38	1.50	0.01
19.33	0.38	0.38	1.50	0.01
19.50	0.38	0.38	1.50	0.01
19.67	0.38	0.38	1.50	0.01
19.83	0.37	0.37	1.50	0.01
20.00	0.35	0.35	1.48	0.01
20.17	0.32	0.33	1.45	0.01
20.33	0.30	0.31	1.42	0.01
20.50	0.29	0.29	1.40	0.01
20.67	0.29	0.29	1.39	0.01
20.83	0.28	0.29	1.39	0.01
21.00	0.28	0.28	1.39	0.01
21.17	0.28	0.28	1.39	0.01
21.33	0.29	0.29	1.39	0.01
21.50	0.29	0.29	1.39	0.01
21.67	0.29	0.29	1.39	0.01
21.83	0.29	0.29	1.39	0.01
22.00	0.29	0.29	1.39	0.01
22.17	0.29	0.29	1.39	0.01
22.33	0.29	0.29	1.39	0.01
22.50	0.29	0.29	1.39	0.01
22.67	0.29	0.29	1.39	0.01
22.83	0.29	0.29	1.39	0.01
23.00	0.29	0.29	1.39	0.01
23.17	0.29	0.29	1.39	0.01
23.33	0.29	0.29	1.39	0.01
23.50	0.29	0.29	1.39	0.01
23.67	0.29	0.29	1.39	0.01
23.83	0.28	0.28	1.38	0.01
24.00	0.26	0.26	1.36	0.01
24.17	0.20	0.21	1.29	0.01
24.33	0.12	0.14	1.19	0.01
24.50	0.06	0.08	1.11	0.00
24.67	0.02	0.03	1.05	0.00
24.83	0.00	0.01	1.01	0.00
Max:	12.17	7.62	9.02	0.23

Initial Pond Volume : 000.000 ac-ft
+
Total Inflow Volume : 001.419 ac-ft
-
Total Outflow Volume : 001.408 ac-ft
Total Percolation Volume : 000.000 ac-ft
=
Final Pond Volume (stage): 000.004 ac-ft
Final Pond Volume (calc) : 000.011 ac-ft

Difference (error) : -000.007 ac-ft

2-year storm for existing pond

SMADA 6.0 for Windows
Watershed Information

Watershed Total Area (acres)	:5.60
Impervious Area (acres)	:1.10
Time of Concentration (min)	:25.8
% Impervious Directly Connected	:90.00
Additional Abstraction	
Over Pervious Area (inches)	:0.00
Over Impervious Area (inches)	:0.00
Infiltration Characteristics:	
Max Infiltration Capacity (in)	:999.00
SCS Curve Number for Pervious	:79
Initial Abstraction Factor	:0.20

Time (hr)	Time HHMM	Rain (in)	Cumulative (in)
0.167	00010	0.004	0.004
0.333	00020	0.005	0.010
0.500	00030	0.007	0.016
0.667	00040	0.007	0.023
0.833	00050	0.007	0.030
1.000	00100	0.007	0.036
1.167	00110	0.007	0.043
1.333	00120	0.007	0.050
1.500	00130	0.007	0.056
1.667	00140	0.007	0.063
1.833	00150	0.007	0.069
2.000	00200	0.007	0.076
2.167	00210	0.007	0.082
2.333	00220	0.007	0.089
2.500	00230	0.007	0.096
2.667	00240	0.007	0.102
2.833	00250	0.007	0.109
3.000	00300	0.007	0.115
3.167	00310	0.007	0.122
3.333	00320	0.007	0.129
3.500	00330	0.007	0.135
3.667	00340	0.007	0.142
3.833	00350	0.008	0.150
4.000	00400	0.009	0.158
4.167	00410	0.009	0.167
4.333	00420	0.009	0.176
4.500	00430	0.009	0.185
4.667	00440	0.009	0.194
4.833	00450	0.009	0.202
5.000	00500	0.009	0.211
5.167	00510	0.009	0.220
5.333	00520	0.009	0.229
5.500	00530	0.009	0.238
5.667	00540	0.009	0.246
5.833	00550	0.009	0.255
6.000	00600	0.009	0.264
6.167	00610	0.011	0.275
6.333	00620	0.011	0.286
6.500	00630	0.011	0.297
6.667	00640	0.011	0.308
6.833	00650	0.011	0.319
7.000	00700	0.011	0.330
7.167	00710	0.011	0.341
7.333	00720	0.011	0.352
7.500	00730	0.011	0.363
7.667	00740	0.011	0.374
7.833	00750	0.011	0.385
8.000	00800	0.011	0.396
8.167	00810	0.013	0.409
8.333	00820	0.014	0.423
8.500	00830	0.015	0.439
8.667	00840	0.015	0.454
8.833	00850	0.015	0.470
9.000	00900	0.015	0.485
9.167	00910	0.018	0.503
9.333	00920	0.018	0.520
9.500	00930	0.018	0.538
9.667	00940	0.020	0.558
9.833	00950	0.020	0.577
10.00	01000	0.020	0.597
10.16	01010	0.022	0.619
10.33	01020	0.024	0.643
10.50	01030	0.026	0.670
10.66	01040	0.033	0.703
10.83	01050	0.036	0.739
11.00	01100	0.040	0.779
11.16	01110	0.046	0.825
11.33	01120	0.052	0.877
11.50	01130	0.057	0.934
11.66	01140	0.229	1.163
11.83	01150	0.418	1.581
12.00	01200	0.607	2.188
12.16	01210	0.097	2.285
12.33	01220	0.079	2.364
12.50	01230	0.062	2.425
12.66	01240	0.051	2.476
12.83	01250	0.045	2.521
13.00	01300	0.040	2.561
13.16	01310	0.033	2.594
13.33	01320	0.031	2.625
13.50	01330	0.029	2.653
13.66	01340	0.024	2.677

13.83	01350	0.023	2.700
14.00	01400	0.022	2.722
14.16	01410	0.020	2.742
14.33	01420	0.019	2.761
14.50	01430	0.018	2.779
14.66	01440	0.015	2.794
14.83	01450	0.015	2.809
15.00	01500	0.015	2.825
15.16	01510	0.015	2.840
15.33	01520	0.014	2.854
15.50	01530	0.013	2.868
15.66	01540	0.013	2.881
15.83	01550	0.013	2.894
16.00	01600	0.013	2.907
16.16	01610	0.013	2.920
16.33	01620	0.013	2.934
16.50	01630	0.013	2.947
16.66	01640	0.011	2.958
16.83	01650	0.011	2.969
17.00	01700	0.011	2.980
17.16	01710	0.011	2.991
17.33	01720	0.011	3.002
17.50	01730	0.011	3.013
17.66	01740	0.011	3.024
17.83	01750	0.010	3.034
18.00	01800	0.009	3.043
18.16	01810	0.009	3.051
18.33	01820	0.009	3.060
18.50	01830	0.009	3.069
18.66	01840	0.009	3.078
18.83	01850	0.009	3.087
19.00	01900	0.009	3.095
19.16	01910	0.009	3.104
19.33	01920	0.009	3.113
19.50	01930	0.009	3.122
19.66	01940	0.009	3.131
19.83	01950	0.008	3.138
20.00	02000	0.007	3.145
20.16	02010	0.007	3.151
20.33	02020	0.007	3.158
20.50	02030	0.007	3.165
20.66	02040	0.007	3.171
20.83	02050	0.007	3.178
21.00	02100	0.007	3.184
21.16	02110	0.007	3.191
21.33	02120	0.007	3.198
21.50	02130	0.007	3.204
21.66	02140	0.007	3.211
21.83	02150	0.007	3.217
22.00	02200	0.007	3.224
22.16	02210	0.007	3.231
22.33	02220	0.007	3.237
22.50	02230	0.007	3.244
22.66	02240	0.007	3.250
22.83	02250	0.007	3.257
23.00	02300	0.007	3.264
23.16	02310	0.007	3.270
23.33	02320	0.007	3.277
23.50	02330	0.007	3.283
23.66	02340	0.007	3.290
23.83	02350	0.006	3.296
24.00	00000	0.004	3.300

3.30

Stage (ft)	Storage (ac-ft)	Weir 1 Q (cfs)	Weir 2 Q (cfs)	Discharge (cfs)
0.00	0.00	0.00	0.00	0.00
0.50	0.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00
1.50	0.01	0.37	0.00	0.37
2.00	0.01	2.00	0.00	2.00
2.50	0.02	2.72	0.00	2.72
3.00	0.03	3.28	0.00	3.28
3.50	0.04	3.77	0.00	3.77
4.00	0.05	4.19	0.00	4.19
4.50	0.06	4.58	0.00	4.58
5.00	0.08	4.94	0.00	4.94
5.50	0.10	5.27	0.00	5.27

Weir Number1
Type : Circular Orifice
Equation : Q = C*A*2g^.5*H^n
Weir Invert (ft) : 1.00
C: 0.60 n: 0.50
Orifice Diameter (ft) : 0.83

Time (hr)	Inflow (cfs)	Outflow (cfs)	Stage (ft)	Storage (ac-ft)
0.17	0.00	0.00	0.03	0.00
0.33	0.01	0.00	0.11	0.00
0.50	0.02	0.00	0.26	0.00
0.67	0.03	0.00	0.46	0.00
0.83	0.04	0.00	0.57	0.00
1.00	0.04	0.00	0.66	0.00
1.17	0.04	0.00	0.75	0.00
1.33	0.04	0.00	0.84	0.00
1.50	0.04	0.00	0.93	0.00
1.67	0.04	0.01	1.02	0.00
1.83	0.04	0.04	1.05	0.00
2.00	0.04	0.04	1.05	0.00
2.17	0.04	0.04	1.05	0.00
2.33	0.04	0.04	1.05	0.00
2.50	0.04	0.04	1.05	0.00
2.67	0.04	0.04	1.05	0.00
2.83	0.04	0.04	1.05	0.00
3.00	0.04	0.04	1.05	0.00
3.17	0.04	0.04	1.05	0.00
3.33	0.04	0.04	1.05	0.00
3.50	0.04	0.04	1.05	0.00
3.67	0.04	0.04	1.05	0.00
3.83	0.04	0.04	1.05	0.00
4.00	0.04	0.04	1.06	0.00
4.17	0.05	0.05	1.06	0.00
4.33	0.05	0.05	1.07	0.00
4.50	0.05	0.05	1.07	0.00
4.67	0.05	0.05	1.07	0.00
4.83	0.05	0.05	1.07	0.00
5.00	0.05	0.05	1.07	0.00
5.17	0.05	0.05	1.07	0.00
5.33	0.05	0.05	1.07	0.00
5.50	0.05	0.05	1.07	0.00
5.67	0.05	0.05	1.07	0.00
5.83	0.05	0.05	1.07	0.00
6.00	0.05	0.05	1.07	0.00
6.17	0.05	0.05	1.07	0.00
6.33	0.06	0.06	1.08	0.00
6.50	0.06	0.06	1.08	0.00
6.67	0.06	0.06	1.09	0.00
6.83	0.07	0.07	1.09	0.00
7.00	0.07	0.07	1.09	0.00
7.17	0.07	0.07	1.09	0.00
7.33	0.07	0.07	1.09	0.00
7.50	0.07	0.07	1.09	0.00
7.67	0.07	0.07	1.09	0.00
7.83	0.07	0.07	1.09	0.00
8.00	0.07	0.07	1.09	0.00
8.17	0.07	0.07	1.09	0.00
8.33	0.07	0.07	1.10	0.00
8.50	0.08	0.08	1.11	0.00
8.67	0.09	0.08	1.11	0.00
8.83	0.09	0.09	1.12	0.00
9.00	0.09	0.09	1.12	0.00
9.17	0.09	0.09	1.13	0.00
9.33	0.10	0.10	1.13	0.00
9.50	0.10	0.10	1.14	0.00
9.67	0.11	0.11	1.15	0.00
9.83	0.12	0.12	1.16	0.00
10.00	0.13	0.13	1.17	0.01
10.17	0.14	0.14	1.19	0.01
10.33	0.16	0.15	1.21	0.01
10.50	0.18	0.18	1.24	0.01
10.67	0.21	0.21	1.28	0.01
10.83	0.26	0.25	1.34	0.01
11.00	0.31	0.30	1.41	0.01
11.17	0.37	0.36	1.49	0.01
11.33	0.45	0.45	1.53	0.01
11.50	0.54	0.54	1.55	0.01
11.67	1.03	1.03	1.70	0.01
11.83	2.53	2.40	2.28	0.01
12.00	5.36	3.95	3.71	0.04
12.17	6.92	4.84	4.86	0.07
12.33	5.88	5.10	5.24	0.09
12.50	4.48	4.99	5.08	0.08
12.67	3.01	4.51	4.41	0.06
12.83	1.82	3.43	3.16	0.03
13.00	1.31	1.53	1.86	0.01
13.17	1.12	1.12	1.73	0.01
13.33	0.97	0.97	1.69	0.01
13.50	0.87	0.87	1.65	0.01
13.67	0.78	0.78	1.63	0.01
13.83	0.70	0.70	1.60	0.01

14.00	0.64	0.64	1.58	0.01
14.17	0.59	0.59	1.57	0.01
14.33	0.55	0.55	1.56	0.01
14.50	0.51	0.51	1.55	0.01
14.67	0.48	0.48	1.53	0.01
14.83	0.44	0.44	1.52	0.01
15.00	0.42	0.42	1.52	0.01
15.17	0.41	0.41	1.51	0.01
15.33	0.40	0.40	1.51	0.01
15.50	0.38	0.38	1.51	0.01
15.67	0.37	0.37	1.50	0.01
15.83	0.36	0.36	1.49	0.01
16.00	0.35	0.35	1.48	0.01
16.17	0.35	0.35	1.47	0.01
16.33	0.35	0.35	1.47	0.01
16.50	0.35	0.35	1.47	0.01
16.67	0.34	0.34	1.46	0.01
16.83	0.32	0.33	1.44	0.01
17.00	0.31	0.31	1.42	0.01
17.17	0.30	0.30	1.41	0.01
17.33	0.29	0.29	1.40	0.01
17.50	0.29	0.29	1.40	0.01
17.67	0.29	0.29	1.40	0.01
17.83	0.29	0.29	1.39	0.01
18.00	0.28	0.28	1.38	0.01
18.17	0.26	0.26	1.36	0.01
18.33	0.25	0.25	1.34	0.01
18.50	0.24	0.24	1.33	0.01
18.67	0.24	0.24	1.32	0.01
18.83	0.24	0.24	1.32	0.01
19.00	0.24	0.24	1.32	0.01
19.17	0.24	0.24	1.32	0.01
19.33	0.24	0.24	1.32	0.01
19.50	0.24	0.24	1.32	0.01
19.67	0.24	0.24	1.32	0.01
19.83	0.23	0.23	1.32	0.01
20.00	0.22	0.22	1.30	0.01
20.17	0.20	0.21	1.28	0.01
20.33	0.19	0.19	1.26	0.01
20.50	0.18	0.18	1.25	0.01
20.67	0.18	0.18	1.25	0.01
20.83	0.18	0.18	1.24	0.01
21.00	0.18	0.18	1.24	0.01
21.17	0.18	0.18	1.24	0.01
21.33	0.18	0.18	1.24	0.01
21.50	0.18	0.18	1.24	0.01
21.67	0.18	0.18	1.24	0.01
21.83	0.18	0.18	1.24	0.01
22.00	0.18	0.18	1.24	0.01
22.17	0.18	0.18	1.24	0.01
22.33	0.18	0.18	1.24	0.01
22.50	0.18	0.18	1.24	0.01
22.67	0.18	0.18	1.24	0.01
22.83	0.18	0.18	1.24	0.01
23.00	0.18	0.18	1.25	0.01
23.17	0.18	0.18	1.25	0.01
23.33	0.18	0.18	1.25	0.01
23.50	0.18	0.18	1.25	0.01
23.67	0.18	0.18	1.25	0.01
23.83	0.18	0.18	1.24	0.01
24.00	0.16	0.16	1.22	0.01
24.17	0.13	0.13	1.18	0.01
24.33	0.08	0.09	1.12	0.00
24.50	0.04	0.05	1.07	0.00
24.67	0.02	0.02	1.03	0.00
24.83	0.00	0.00	1.01	0.00
Max:	6.92	5.10	5.24	0.09

Initial Pond Volume : 000.000 ac-ft
+
Total Inflow Volume : 000.825 ac-ft
-
Total Outflow Volume : 000.813 ac-ft
Total Percolation Volume : 000.000 ac-ft
=
Final Pond Volume (stage): 000.004 ac-ft
Final Pond Volume (calc) : 000.012 ac-ft

Difference (error) : -000.008 ac-ft

Baseball Field Pond Calculations

RUNOFF CURVE NUMBER COMPUTATION Version 2.10

Baseball Field (BBF)

Project : Pre-Construction BBF User: CEE Date: 04-09-2000

County : KNOX State: TN Checked: ____ Date: _____
Subtitle:

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
		Acres (CN)		
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Fair condition; grass cover 50% to 75%	-	-	6.5(79)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	-	1.5(98)	-
Total Area (by Hydrologic Soil Group)			8	
			====	

TOTAL DRAINAGE AREA: 8 Acres WEIGHTED CURVE NUMBER: 83

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : Pre-Construction BBF User: CEE Date: 04-09-2000

County : KNOX State: TN Checked: ____ Date: _____
Subtitle:

Subarea #1 - 8

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.3	300	.167	g					0.370
Shallow Concent'd		200	.14	u					0.009
								Time of Concentration =	0.38*
									=====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Burmuda	--- Surface Codes ---
C Cultivated < 20 % Res.	H Woods, Light	P Paved
D Cultivated > 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

BBF
PRE-CONST
2YR
(Baseball Field - BBF)

Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Excess (in)	Excess (cfs)	Outflow (cfs)
0.167	00010	0.004	0.004	0.004	0.000	0.010	0.002
0.333	00020	0.006	0.010	0.005	0.000	0.013	0.006
0.500	00030	0.007	0.017	0.006	0.000	0.015	0.010
0.667	00040	0.007	0.023	0.006	0.000	0.015	0.013
0.833	00050	0.007	0.030	0.006	0.000	0.015	0.015
1.000	00100	0.007	0.037	0.006	0.000	0.015	0.015
1.167	00110	0.007	0.044	0.006	0.000	0.015	0.015
1.333	00120	0.007	0.050	0.006	0.000	0.015	0.015
1.500	00130	0.007	0.057	0.006	0.000	0.015	0.015
1.667	00140	0.007	0.064	0.006	0.000	0.015	0.015
1.833	00150	0.007	0.070	0.006	0.000	0.015	0.015
2.000	00200	0.007	0.077	0.006	0.000	0.015	0.015
2.167	00210	0.007	0.084	0.006	0.000	0.015	0.015
2.333	00220	0.007	0.090	0.006	0.000	0.015	0.015
2.500	00230	0.007	0.097	0.006	0.000	0.015	0.015
2.667	00240	0.007	0.104	0.006	0.000	0.015	0.015
2.833	00250	0.007	0.110	0.006	0.000	0.015	0.015
3.000	00300	0.007	0.117	0.006	0.000	0.015	0.015
3.167	00310	0.007	0.124	0.006	0.000	0.015	0.015
3.333	00320	0.007	0.131	0.006	0.000	0.015	0.015
3.500	00330	0.007	0.137	0.006	0.000	0.015	0.015
3.667	00340	0.007	0.144	0.006	0.000	0.015	0.015
3.833	00350	0.008	0.152	0.007	0.000	0.018	0.016
4.000	00400	0.009	0.161	0.008	0.001	0.020	0.017
4.167	00410	0.009	0.170	0.008	0.001	0.020	0.019
4.333	00420	0.009	0.179	0.008	0.001	0.020	0.020
4.500	00430	0.009	0.187	0.008	0.001	0.020	0.020
4.667	00440	0.009	0.196	0.008	0.001	0.020	0.020
4.833	00450	0.009	0.205	0.008	0.001	0.020	0.020
5.000	00500	0.009	0.214	0.008	0.001	0.020	0.020
5.167	00510	0.009	0.223	0.008	0.001	0.020	0.020
5.333	00520	0.009	0.232	0.008	0.001	0.020	0.020
5.500	00530	0.009	0.241	0.008	0.001	0.020	0.020
5.667	00540	0.009	0.250	0.008	0.001	0.020	0.020
5.833	00550	0.009	0.259	0.008	0.001	0.020	0.020
6.000	00600	0.009	0.268	0.008	0.001	0.020	0.020
6.167	00610	0.011	0.279	0.011	0.001	0.025	0.021
6.333	00620	0.011	0.290	0.011	0.001	0.025	0.023
6.500	00630	0.011	0.301	0.011	0.001	0.025	0.024
6.667	00640	0.011	0.312	0.011	0.001	0.025	0.025
6.833	00650	0.011	0.324	0.011	0.001	0.025	0.025
7.000	00700	0.011	0.335	0.011	0.001	0.025	0.025
7.167	00710	0.011	0.346	0.010	0.001	0.028	0.026
7.333	00720	0.011	0.357	0.010	0.001	0.034	0.028
7.500	00730	0.011	0.368	0.010	0.001	0.039	0.032
7.667	00740	0.011	0.379	0.010	0.001	0.044	0.036
7.833	00750	0.011	0.391	0.010	0.001	0.049	0.042
8.000	00800	0.011	0.402	0.010	0.001	0.054	0.047
8.167	00810	0.013	0.415	0.012	0.002	0.072	0.054
8.333	00820	0.015	0.430	0.012	0.002	0.085	0.065
8.500	00830	0.016	0.445	0.013	0.003	0.101	0.079
8.667	00840	0.016	0.461	0.013	0.003	0.110	0.092
8.833	00850	0.016	0.477	0.013	0.003	0.118	0.104
9.000	00900	0.016	0.492	0.012	0.003	0.127	0.114
9.167	00910	0.018	0.510	0.014	0.004	0.155	0.127
9.333	00920	0.018	0.528	0.014	0.004	0.165	0.143
9.500	00930	0.018	0.546	0.013	0.004	0.176	0.157
9.667	00940	0.020	0.566	0.015	0.005	0.209	0.175
9.833	00950	0.020	0.586	0.014	0.006	0.221	0.195
10.00	01000	0.020	0.606	0.014	0.006	0.233	0.212
10.16	01010	0.022	0.628	0.015	0.007	0.272	0.233
10.33	01020	0.025	0.653	0.017	0.008	0.315	0.262
10.50	01030	0.027	0.680	0.018	0.009	0.362	0.298
10.66	01040	0.033	0.713	0.021	0.012	0.478	0.355
10.83	01050	0.037	0.750	0.023	0.014	0.557	0.432
11.00	01100	0.040	0.790	0.024	0.016	0.643	0.516
11.16	01110	0.047	0.837	0.027	0.020	0.794	0.616
11.33	01120	0.052	0.889	0.029	0.024	0.940	0.739
11.50	01130	0.058	0.947	0.030	0.028	1.100	0.876
11.66	01140	0.232	1.180	0.106	0.126	4.946	1.751
11.83	01150	0.424	1.604	0.151	0.273	10.740	4.318
12.00	01200	0.616	2.220	0.155	0.461	18.120	8.831
12.16	01210	0.098	2.318	0.020	0.078	3.079	10.605
12.33	01220	0.080	2.398	0.015	0.065	2.550	8.258
12.50	01230	0.062	2.461	0.012	0.051	2.001	5.534
12.66	01240	0.051	2.512	0.009	0.042	1.655	3.009
12.83	01250	0.046	2.558	0.008	0.038	1.483	1.422
13.00	01300	0.040	2.598	0.007	0.033	1.308	1.594
13.16	01310	0.033	2.632	0.006	0.028	1.094	1.372
13.33	01320	0.031	2.663	0.005	0.026	1.025	1.205
13.50	01330	0.029	2.692	0.005	0.024	0.954	1.084

13.66	01340	0.025	2.716	0.004	0.021	0.810	0.972
13.83	01350	0.023	2.740	0.004	0.020	0.774	0.877
14.00	01400	0.022	2.762	0.004	0.019	0.739	0.811
14.16	01410	0.020	2.782	0.003	0.017	0.667	0.750
14.33	01420	0.019	2.801	0.003	0.016	0.631	0.696
14.50	01430	0.018	2.819	0.003	0.015	0.594	0.654
14.66	01440	0.016	2.835	0.002	0.013	0.521	0.605
14.83	01450	0.016	2.850	0.002	0.013	0.522	0.560
15.00	01500	0.016	2.866	0.002	0.013	0.522	0.536
15.16	01510	0.016	2.882	0.002	0.013	0.523	0.523
15.33	01520	0.015	2.896	0.002	0.012	0.486	0.513
15.50	01530	0.013	2.909	0.002	0.011	0.449	0.495
15.66	01540	0.013	2.923	0.002	0.011	0.450	0.473
15.83	01550	0.013	2.936	0.002	0.011	0.450	0.458
16.00	01600	0.013	2.950	0.002	0.011	0.451	0.450
16.16	01610	0.013	2.963	0.002	0.011	0.451	0.449
16.33	01620	0.013	2.976	0.002	0.011	0.452	0.451
16.50	01630	0.013	2.990	0.002	0.012	0.452	0.452
16.66	01640	0.011	3.001	0.002	0.010	0.377	0.437
16.83	01650	0.011	3.012	0.002	0.010	0.377	0.411
17.00	01700	0.011	3.023	0.002	0.010	0.378	0.392
17.16	01710	0.011	3.034	0.002	0.010	0.378	0.380
17.33	01720	0.011	3.046	0.002	0.010	0.378	0.376
17.50	01730	0.011	3.057	0.002	0.010	0.379	0.378
17.66	01740	0.011	3.068	0.002	0.010	0.379	0.379
17.83	01750	0.010	3.078	0.001	0.009	0.341	0.371
18.00	01800	0.009	3.087	0.001	0.008	0.304	0.351
18.16	01810	0.009	3.096	0.001	0.008	0.304	0.328
18.33	01820	0.009	3.105	0.001	0.008	0.304	0.312
18.50	01830	0.009	3.114	0.001	0.008	0.304	0.304
18.66	01840	0.009	3.123	0.001	0.008	0.304	0.303
18.83	01850	0.009	3.131	0.001	0.008	0.305	0.304
19.00	01900	0.009	3.140	0.001	0.008	0.305	0.305
19.16	01910	0.009	3.149	0.001	0.008	0.305	0.305
19.33	01920	0.009	3.158	0.001	0.008	0.305	0.305
19.50	01930	0.009	3.167	0.001	0.008	0.305	0.305
19.66	01940	0.009	3.176	0.001	0.008	0.306	0.305
19.83	01950	0.008	3.184	0.001	0.007	0.267	0.298
20.00	02000	0.007	3.191	0.001	0.006	0.229	0.277
20.16	02010	0.007	3.197	0.001	0.006	0.229	0.254
20.33	02020	0.007	3.204	0.001	0.006	0.230	0.238
20.50	02030	0.007	3.211	0.001	0.006	0.230	0.230
20.66	02040	0.007	3.217	0.001	0.006	0.230	0.228
20.83	02050	0.007	3.224	0.001	0.006	0.230	0.230
21.00	02100	0.007	3.231	0.001	0.006	0.230	0.230
21.16	02110	0.007	3.238	0.001	0.006	0.230	0.230
21.33	02120	0.007	3.244	0.001	0.006	0.230	0.230
21.50	02130	0.007	3.251	0.001	0.006	0.230	0.230
21.66	02140	0.007	3.258	0.001	0.006	0.230	0.230
21.83	02150	0.007	3.264	0.001	0.006	0.230	0.230
22.00	02200	0.007	3.271	0.001	0.006	0.231	0.230
22.16	02210	0.007	3.278	0.001	0.006	0.231	0.230
22.33	02220	0.007	3.284	0.001	0.006	0.231	0.231
22.50	02230	0.007	3.291	0.001	0.006	0.231	0.231
22.66	02240	0.007	3.298	0.001	0.006	0.231	0.231
22.83	02250	0.007	3.304	0.001	0.006	0.231	0.231
23.00	02300	0.007	3.311	0.001	0.006	0.231	0.231
23.16	02310	0.007	3.318	0.001	0.006	0.231	0.231
23.33	02320	0.007	3.325	0.001	0.006	0.231	0.231
23.50	02330	0.007	3.331	0.001	0.006	0.231	0.231
23.66	02340	0.007	3.338	0.001	0.006	0.231	0.231
23.83	02350	0.006	3.344	0.001	0.005	0.193	0.224
24.00	00000	0.004	3.348	0.001	0.004	0.154	0.203
24.16	00010	0.000	3.348	0.000	0.000	0.000	0.149
24.33	00020	0.000	3.348	0.000	0.000	0.000	0.078
24.50	00030	0.000	3.348	0.000	0.000	0.000	0.030
			3.348	1.328	2.019	2.019	

Totals for Watershed in inches over 6.50 acres
Rational Coefficient = 0.603 Peak Flow (cfs) = 10.61

BBF
PRE-CONST
10 YR

Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Excess (in)	Excess (cfs)	Outflow (cfs)
0.167	00010	0.006	0.006	0.006	0.000	0.015	0.003
0.333	00020	0.008	0.015	0.008	0.000	0.018	0.009
0.500	00030	0.010	0.024	0.009	0.001	0.022	0.015
0.667	00040	0.010	0.034	0.009	0.001	0.022	0.019
0.833	00050	0.010	0.044	0.009	0.001	0.022	0.022
1.000	00100	0.010	0.054	0.009	0.001	0.022	0.022
1.167	00110	0.010	0.063	0.009	0.001	0.022	0.022
1.333	00120	0.010	0.073	0.009	0.001	0.022	0.022
1.500	00130	0.010	0.083	0.009	0.001	0.022	0.022
1.667	00140	0.010	0.092	0.009	0.001	0.022	0.022
1.833	00150	0.010	0.102	0.009	0.001	0.022	0.022
2.000	00200	0.010	0.112	0.009	0.001	0.022	0.022
2.167	00210	0.010	0.122	0.009	0.001	0.022	0.022
2.333	00220	0.010	0.131	0.009	0.001	0.022	0.022
2.500	00230	0.010	0.141	0.009	0.001	0.022	0.022
2.667	00240	0.010	0.151	0.009	0.001	0.022	0.022
2.833	00250	0.010	0.161	0.009	0.001	0.022	0.022
3.000	00300	0.010	0.170	0.009	0.001	0.022	0.022
3.167	00310	0.010	0.180	0.009	0.001	0.022	0.022
3.333	00320	0.010	0.190	0.009	0.001	0.022	0.022
3.500	00330	0.010	0.200	0.009	0.001	0.022	0.022
3.667	00340	0.010	0.209	0.009	0.001	0.022	0.022
3.833	00350	0.011	0.221	0.011	0.001	0.026	0.023
4.000	00400	0.013	0.234	0.012	0.001	0.029	0.025
4.167	00410	0.013	0.247	0.012	0.001	0.029	0.027
4.333	00420	0.013	0.260	0.012	0.001	0.029	0.029
4.500	00430	0.013	0.273	0.012	0.001	0.029	0.029
4.667	00440	0.013	0.286	0.012	0.001	0.029	0.030
4.833	00450	0.013	0.299	0.012	0.001	0.029	0.029
5.000	00500	0.013	0.312	0.012	0.001	0.029	0.029
5.167	00510	0.013	0.325	0.012	0.001	0.029	0.029
5.333	00520	0.013	0.338	0.012	0.001	0.030	0.029
5.500	00530	0.013	0.350	0.012	0.001	0.035	0.031
5.667	00540	0.013	0.363	0.012	0.001	0.042	0.034
5.833	00550	0.013	0.376	0.012	0.001	0.049	0.039
6.000	00600	0.013	0.389	0.012	0.001	0.056	0.046
6.167	00610	0.016	0.406	0.014	0.002	0.080	0.056
6.333	00620	0.016	0.422	0.014	0.002	0.090	0.070
6.500	00630	0.016	0.438	0.014	0.003	0.100	0.083
6.667	00640	0.016	0.454	0.013	0.003	0.110	0.095
6.833	00650	0.016	0.471	0.013	0.003	0.119	0.106
7.000	00700	0.016	0.487	0.013	0.003	0.129	0.115
7.167	00710	0.016	0.503	0.013	0.003	0.137	0.124
7.333	00720	0.016	0.519	0.013	0.004	0.146	0.133
7.500	00730	0.016	0.535	0.012	0.004	0.155	0.142
7.667	00740	0.016	0.552	0.012	0.004	0.163	0.151
7.833	00750	0.016	0.568	0.012	0.004	0.171	0.159
8.000	00800	0.016	0.584	0.012	0.005	0.179	0.167
8.167	00810	0.019	0.604	0.014	0.006	0.225	0.183
8.333	00820	0.021	0.625	0.015	0.007	0.256	0.209
8.500	00830	0.023	0.647	0.015	0.007	0.289	0.240
8.667	00840	0.023	0.670	0.015	0.008	0.303	0.270
8.833	00850	0.023	0.693	0.015	0.008	0.316	0.293
9.000	00900	0.023	0.716	0.014	0.008	0.329	0.310
9.167	00910	0.026	0.742	0.016	0.010	0.391	0.333
9.333	00920	0.026	0.768	0.016	0.010	0.406	0.363
9.500	00930	0.026	0.793	0.015	0.011	0.421	0.390
9.667	00940	0.029	0.823	0.017	0.012	0.491	0.424
9.833	00950	0.029	0.852	0.016	0.013	0.509	0.462
10.00	01000	0.029	0.881	0.016	0.013	0.526	0.491
10.16	01010	0.032	0.914	0.017	0.015	0.603	0.528
10.33	01020	0.036	0.949	0.018	0.017	0.685	0.583
10.50	01030	0.039	0.988	0.019	0.020	0.773	0.650
10.66	01040	0.049	1.037	0.023	0.025	1.001	0.760
10.83	01050	0.054	1.090	0.024	0.029	1.143	0.909
11.00	01100	0.058	1.149	0.025	0.033	1.294	1.064
11.16	01110	0.068	1.217	0.028	0.040	1.568	1.248
11.33	01120	0.076	1.293	0.030	0.046	1.823	1.468
11.50	01130	0.084	1.378	0.031	0.053	2.094	1.708
11.66	01140	0.338	1.715	0.107	0.230	9.052	3.282
11.83	01150	0.617	2.332	0.145	0.472	18.540	7.724
12.00	01200	0.896	3.227	0.141	0.755	29.675	15.100
12.16	01210	0.143	3.370	0.018	0.125	4.925	17.752
12.33	01220	0.117	3.487	0.014	0.103	4.060	13.665
12.50	01230	0.091	3.578	0.010	0.081	3.175	9.003
12.66	01240	0.075	3.653	0.008	0.067	2.619	4.795
12.83	01250	0.067	3.719	0.007	0.060	2.342	2.227
13.00	01300	0.058	3.778	0.006	0.052	2.063	2.521
13.16	01310	0.049	3.826	0.005	0.044	1.723	2.166
13.33	01320	0.045	3.872	0.004	0.041	1.611	1.900
13.50	01330	0.042	3.914	0.004	0.038	1.499	1.706

13.66	01340	0.036	3.950	0.003	0.032	1.270	1.528
13.83	01350	0.034	3.984	0.003	0.031	1.214	1.377
14.00	01400	0.032	4.016	0.003	0.029	1.158	1.273
14.16	01410	0.029	4.045	0.003	0.027	1.043	1.175
14.33	01420	0.028	4.073	0.002	0.025	0.986	1.089
14.50	01430	0.026	4.099	0.002	0.024	0.929	1.023
14.66	01440	0.023	4.122	0.002	0.021	0.814	0.945
14.83	01450	0.023	4.144	0.002	0.021	0.814	0.875
15.00	01500	0.023	4.167	0.002	0.021	0.815	0.837
15.16	01510	0.023	4.190	0.002	0.021	0.816	0.817
15.33	01520	0.021	4.211	0.002	0.019	0.758	0.800
15.50	01530	0.019	4.230	0.002	0.018	0.700	0.773
15.66	01540	0.019	4.250	0.002	0.018	0.701	0.738
15.83	01550	0.019	4.269	0.002	0.018	0.701	0.714
16.00	01600	0.019	4.289	0.002	0.018	0.702	0.701
16.16	01610	0.019	4.308	0.002	0.018	0.702	0.700
16.33	01620	0.019	4.328	0.002	0.018	0.702	0.702
16.50	01630	0.019	4.347	0.002	0.018	0.703	0.702
16.66	01640	0.016	4.363	0.001	0.015	0.586	0.680
16.83	01650	0.016	4.380	0.001	0.015	0.586	0.639
17.00	01700	0.016	4.396	0.001	0.015	0.587	0.609
17.16	01710	0.016	4.412	0.001	0.015	0.587	0.590
17.33	01720	0.016	4.428	0.001	0.015	0.587	0.583
17.50	01730	0.016	4.444	0.001	0.015	0.588	0.587
17.66	01740	0.016	4.461	0.001	0.015	0.588	0.587
17.83	01750	0.015	4.475	0.001	0.013	0.529	0.576
18.00	01800	0.013	4.488	0.001	0.012	0.471	0.544
18.16	01810	0.013	4.501	0.001	0.012	0.471	0.508
18.33	01820	0.013	4.514	0.001	0.012	0.471	0.484
18.50	01830	0.013	4.527	0.001	0.012	0.471	0.471
18.66	01840	0.013	4.540	0.001	0.012	0.471	0.469
18.83	01850	0.013	4.553	0.001	0.012	0.471	0.471
19.00	01900	0.013	4.566	0.001	0.012	0.472	0.471
19.16	01910	0.013	4.579	0.001	0.012	0.472	0.472
19.33	01920	0.013	4.592	0.001	0.012	0.472	0.472
19.50	01930	0.013	4.605	0.001	0.012	0.472	0.472
19.66	01940	0.013	4.618	0.001	0.012	0.472	0.472
19.83	01950	0.011	4.629	0.001	0.011	0.413	0.461
20.00	02000	0.010	4.639	0.001	0.009	0.354	0.428
20.16	02010	0.010	4.649	0.001	0.009	0.355	0.392
20.33	02020	0.010	4.659	0.001	0.009	0.355	0.368
20.50	02030	0.010	4.668	0.001	0.009	0.355	0.355
20.66	02040	0.010	4.678	0.001	0.009	0.355	0.353
20.83	02050	0.010	4.688	0.001	0.009	0.355	0.355
21.00	02100	0.010	4.698	0.001	0.009	0.355	0.355
21.16	02110	0.010	4.707	0.001	0.009	0.355	0.355
21.33	02120	0.010	4.717	0.001	0.009	0.355	0.355
21.50	02130	0.010	4.727	0.001	0.009	0.355	0.355
21.66	02140	0.010	4.737	0.001	0.009	0.355	0.355
21.83	02150	0.010	4.746	0.001	0.009	0.355	0.355
22.00	02200	0.010	4.756	0.001	0.009	0.356	0.355
22.16	02210	0.010	4.766	0.001	0.009	0.356	0.356
22.33	02220	0.010	4.776	0.001	0.009	0.356	0.356
22.50	02230	0.010	4.785	0.001	0.009	0.356	0.356
22.66	02240	0.010	4.795	0.001	0.009	0.356	0.356
22.83	02250	0.010	4.805	0.001	0.009	0.356	0.356
23.00	02300	0.010	4.814	0.001	0.009	0.356	0.356
23.16	02310	0.010	4.824	0.001	0.009	0.356	0.356
23.33	02320	0.010	4.834	0.001	0.009	0.356	0.356
23.50	02330	0.010	4.844	0.001	0.009	0.356	0.356
23.66	02340	0.010	4.853	0.001	0.009	0.356	0.356
23.83	02350	0.008	4.862	0.001	0.008	0.297	0.345
24.00	00000	0.006	4.868	0.000	0.006	0.238	0.312
24.16	00010	0.000	4.868	0.000	0.000	0.000	0.229
24.33	00020	0.000	4.868	0.000	0.000	0.000	0.121
24.50	00030	0.000	4.868	0.000	0.000	0.000	0.046
			4.868	1.466	3.401	3.401	

Totals for Watershed in inches over 6.50 acres
Rational Coefficient = 0.699 Peak Flow (cfs) = 17.75

RUNOFF CURVE NUMBER COMPUTATION Version 2.10

Project : Post Construction BBF User: CEE Date: 04-09-2000

County : KNOX State: TN Checked: ____ Date: _____
Subtitle:
Subarea : 8

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
		Acres (CN)		
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Fair condition; grass cover 50% to 75%	-	-	6.14(79)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	-	1.86(98)	-
Total Area (by Hydrologic Soil Group)			8	

SUBAREA: 8 TOTAL DRAINAGE AREA: 8 Acres WEIGHTED CURVE NUMBER: 83

TIME OF CONCENTRATION AND TRAVEL TIME Version 2.10

Project : Post Construction BBF User: CEE Date: 04-09-2000

County : KNOX State: TN Checked: ____ Date: _____
Subtitle:

Subarea #1 - 8

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	3.3	300	.167	g					0.370
Shallow Concent'd		200	.14	u					0.009
								Time of Concentration =	0.38*
									=====

--- Sheet Flow Surface Codes ---

A Smooth Surface	F Grass, Dense	--- Shallow Concentrated ---
B Fallow (No Res.)	G Grass, Burmuda	--- Surface Codes ---
C Cultivated < 20 % Res.	H Woods, Light	P Paved
D Cultivated > 20 % Res.	I Woods, Dense	U Unpaved
E Grass-Range, Short	J Range, Natural	

BOF

POST-CONST.

10YR

Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Excess (in)	Excess (cfs)	Outflow (cfs)
0.167	00010	0.006	0.006	0.006	0.000	0.018	0.004
0.333	00020	0.008	0.015	0.007	0.001	0.023	0.011
0.500	00030	0.010	0.024	0.009	0.001	0.027	0.018
0.667	00040	0.010	0.034	0.009	0.001	0.027	0.024
0.833	00050	0.010	0.044	0.009	0.001	0.027	0.027
1.000	00100	0.010	0.053	0.009	0.001	0.027	0.027
1.167	00110	0.010	0.063	0.009	0.001	0.027	0.027
1.333	00120	0.010	0.073	0.009	0.001	0.027	0.027
1.500	00130	0.010	0.082	0.009	0.001	0.027	0.027
1.667	00140	0.010	0.092	0.009	0.001	0.027	0.027
1.833	00150	0.010	0.102	0.009	0.001	0.027	0.027
2.000	00200	0.010	0.111	0.009	0.001	0.027	0.027
2.167	00210	0.010	0.121	0.009	0.001	0.027	0.027
2.333	00220	0.010	0.131	0.009	0.001	0.027	0.027
2.500	00230	0.010	0.141	0.009	0.001	0.027	0.027
2.667	00240	0.010	0.150	0.009	0.001	0.027	0.027
2.833	00250	0.010	0.160	0.009	0.001	0.027	0.027
3.000	00300	0.010	0.170	0.009	0.001	0.027	0.027
3.167	00310	0.010	0.179	0.009	0.001	0.027	0.027
3.333	00320	0.010	0.189	0.009	0.001	0.027	0.027
3.500	00330	0.010	0.199	0.009	0.001	0.027	0.027
3.667	00340	0.010	0.208	0.009	0.001	0.027	0.027
3.833	00350	0.011	0.220	0.010	0.001	0.032	0.028
4.000	00400	0.013	0.233	0.012	0.001	0.036	0.031
4.167	00410	0.013	0.246	0.012	0.001	0.036	0.033
4.333	00420	0.013	0.258	0.012	0.001	0.036	0.035
4.500	00430	0.013	0.271	0.012	0.001	0.036	0.036
4.667	00440	0.013	0.284	0.012	0.001	0.036	0.036
4.833	00450	0.013	0.297	0.012	0.001	0.036	0.036
5.000	00500	0.013	0.310	0.012	0.001	0.036	0.036
5.167	00510	0.013	0.323	0.012	0.001	0.041	0.037
5.333	00520	0.013	0.336	0.012	0.001	0.048	0.040
5.500	00530	0.013	0.349	0.011	0.001	0.055	0.045
5.667	00540	0.013	0.362	0.011	0.002	0.062	0.052
5.833	00550	0.013	0.375	0.011	0.002	0.069	0.059
6.000	00600	0.013	0.388	0.011	0.002	0.075	0.065
6.167	00610	0.016	0.404	0.013	0.003	0.103	0.076
6.333	00620	0.016	0.420	0.013	0.003	0.113	0.091
6.500	00630	0.016	0.436	0.013	0.003	0.122	0.105
6.667	00640	0.016	0.452	0.013	0.004	0.131	0.117
6.833	00650	0.016	0.468	0.012	0.004	0.140	0.127
7.000	00700	0.016	0.485	0.012	0.004	0.149	0.136
7.167	00710	0.016	0.501	0.012	0.004	0.157	0.145
7.333	00720	0.016	0.517	0.012	0.004	0.165	0.153
7.500	00730	0.016	0.533	0.011	0.005	0.173	0.161
7.667	00740	0.016	0.549	0.011	0.005	0.181	0.169
7.833	00750	0.016	0.565	0.011	0.005	0.188	0.177
8.000	00800	0.016	0.582	0.011	0.005	0.196	0.185
8.167	00810	0.019	0.601	0.013	0.007	0.244	0.200
8.333	00820	0.021	0.622	0.014	0.007	0.276	0.227
8.500	00830	0.023	0.645	0.014	0.008	0.310	0.259
8.667	00840	0.023	0.667	0.014	0.009	0.322	0.289
8.833	00850	0.023	0.690	0.014	0.009	0.334	0.313
9.000	00900	0.023	0.712	0.013	0.009	0.346	0.329
9.167	00910	0.026	0.738	0.015	0.011	0.409	0.351
9.333	00920	0.026	0.764	0.014	0.011	0.424	0.381
9.500	00930	0.026	0.790	0.014	0.012	0.437	0.408
9.667	00940	0.029	0.819	0.015	0.014	0.508	0.440
9.833	00950	0.029	0.848	0.015	0.014	0.524	0.478
10.00	01000	0.029	0.877	0.015	0.015	0.539	0.506
10.16	01010	0.032	0.909	0.016	0.017	0.616	0.542
10.33	01020	0.036	0.945	0.017	0.019	0.698	0.596
10.50	01030	0.039	0.984	0.018	0.021	0.784	0.663
10.66	01040	0.048	1.032	0.021	0.027	1.011	0.772
10.83	01050	0.053	1.086	0.022	0.031	1.150	0.919
11.00	01100	0.058	1.144	0.023	0.035	1.297	1.072
11.16	01110	0.068	1.212	0.026	0.042	1.565	1.252
11.33	01120	0.076	1.287	0.027	0.049	1.812	1.467
11.50	01130	0.084	1.371	0.028	0.056	2.073	1.700
11.66	01140	0.336	1.707	0.097	0.239	8.891	3.240
11.83	01150	0.614	2.321	0.129	0.485	17.992	7.553
12.00	01200	0.892	3.213	0.124	0.767	28.497	14.631
12.16	01210	0.142	3.355	0.015	0.127	4.709	17.126
12.33	01220	0.116	3.471	0.012	0.104	3.878	13.152
12.50	01230	0.090	3.562	0.009	0.082	3.031	8.635
12.66	01240	0.074	3.636	0.007	0.067	2.499	4.580
12.83	01250	0.066	3.702	0.006	0.060	2.234	2.121
13.00	01300	0.058	3.760	0.005	0.053	1.966	2.405
13.16	01310	0.048	3.809	0.004	0.044	1.642	2.065
13.33	01320	0.045	3.854	0.004	0.041	1.535	1.811
13.50	01330	0.042	3.896	0.004	0.038	1.428	1.625

13.66	01340	0.036	3.932	0.003	0.033	1.210	1.456
13.83	01350	0.034	3.966	0.003	0.031	1.156	1.312
14.00	01400	0.032	3.998	0.003	0.030	1.103	1.212
14.16	01410	0.029	4.027	0.002	0.027	0.993	1.119
14.33	01420	0.027	4.054	0.002	0.025	0.939	1.037
14.50	01430	0.026	4.080	0.002	0.024	0.884	0.974
14.66	01440	0.023	4.103	0.002	0.021	0.775	0.900
14.83	01450	0.023	4.126	0.002	0.021	0.775	0.833
15.00	01500	0.023	4.148	0.002	0.021	0.776	0.796
15.16	01510	0.023	4.171	0.002	0.021	0.776	0.777
15.33	01520	0.021	4.192	0.002	0.019	0.721	0.762
15.50	01530	0.019	4.211	0.001	0.018	0.666	0.735
15.66	01540	0.019	4.231	0.001	0.018	0.667	0.702
15.83	01550	0.019	4.250	0.001	0.018	0.667	0.679
16.00	01600	0.019	4.269	0.001	0.018	0.667	0.667
16.16	01610	0.019	4.289	0.001	0.018	0.668	0.665
16.33	01620	0.019	4.308	0.001	0.018	0.668	0.667
16.50	01630	0.019	4.327	0.001	0.018	0.668	0.668
16.66	01640	0.016	4.344	0.001	0.015	0.557	0.646
16.83	01650	0.016	4.360	0.001	0.015	0.557	0.607
17.00	01700	0.016	4.376	0.001	0.015	0.558	0.579
17.16	01710	0.016	4.392	0.001	0.015	0.558	0.561
17.33	01720	0.016	4.408	0.001	0.015	0.558	0.554
17.50	01730	0.016	4.424	0.001	0.015	0.558	0.558
17.66	01740	0.016	4.441	0.001	0.015	0.559	0.558
17.83	01750	0.015	4.455	0.001	0.014	0.503	0.548
18.00	01800	0.013	4.468	0.001	0.012	0.447	0.517
18.16	01810	0.013	4.481	0.001	0.012	0.447	0.483
18.33	01820	0.013	4.494	0.001	0.012	0.448	0.460
18.50	01830	0.013	4.507	0.001	0.012	0.448	0.448
18.66	01840	0.013	4.520	0.001	0.012	0.448	0.446
18.83	01850	0.013	4.533	0.001	0.012	0.448	0.448
19.00	01900	0.013	4.546	0.001	0.012	0.448	0.448
19.16	01910	0.013	4.558	0.001	0.012	0.448	0.448
19.33	01920	0.013	4.571	0.001	0.012	0.448	0.448
19.50	01930	0.013	4.584	0.001	0.012	0.449	0.448
19.66	01940	0.013	4.597	0.001	0.012	0.449	0.449
19.83	01950	0.011	4.609	0.001	0.011	0.393	0.438
20.00	02000	0.010	4.618	0.001	0.009	0.337	0.407
20.16	02010	0.010	4.628	0.001	0.009	0.337	0.373
20.33	02020	0.010	4.638	0.001	0.009	0.337	0.349
20.50	02030	0.010	4.647	0.001	0.009	0.337	0.337
20.66	02040	0.010	4.657	0.001	0.009	0.337	0.335
20.83	02050	0.010	4.667	0.001	0.009	0.337	0.337
21.00	02100	0.010	4.676	0.001	0.009	0.337	0.337
21.16	02110	0.010	4.686	0.001	0.009	0.337	0.337
21.33	02120	0.010	4.696	0.001	0.009	0.337	0.337
21.50	02130	0.010	4.705	0.001	0.009	0.337	0.337
21.66	02140	0.010	4.715	0.001	0.009	0.337	0.337
21.83	02150	0.010	4.725	0.001	0.009	0.338	0.337
22.00	02200	0.010	4.735	0.001	0.009	0.338	0.337
22.16	02210	0.010	4.744	0.001	0.009	0.338	0.338
22.33	02220	0.010	4.754	0.001	0.009	0.338	0.338
22.50	02230	0.010	4.764	0.001	0.009	0.338	0.338
22.66	02240	0.010	4.773	0.001	0.009	0.338	0.338
22.83	02250	0.010	4.783	0.001	0.009	0.338	0.338
23.00	02300	0.010	4.793	0.001	0.009	0.338	0.338
23.16	02310	0.010	4.802	0.001	0.009	0.338	0.338
23.33	02320	0.010	4.812	0.001	0.009	0.338	0.338
23.50	02330	0.010	4.822	0.001	0.009	0.338	0.338
23.66	02340	0.010	4.831	0.001	0.009	0.338	0.338
23.83	02350	0.008	4.840	0.000	0.008	0.282	0.327
24.00	00000	0.006	4.846	0.000	0.006	0.226	0.296
24.16	00010	0.000	4.846	0.000	0.000	0.000	0.218
24.33	00020	0.000	4.846	0.000	0.000	0.000	0.114
24.50	00030	0.000	4.846	0.000	0.000	0.000	0.044
			4.846	1.351	3.494	3.494	

Totals for Watershed in inches over 6.14 acres

Rational Coefficient = 0.721 Peak Flow (cfs) = 17.13

BBF
POST-CON.
2YR
HYDRO-
GRAPH

Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Excess (in)	Excess (cfs)	Outflow (cfs)
0.167	00010	0.004	0.004	0.004	0.000	0.013	0.002
0.333	00020	0.006	0.010	0.005	0.000	0.016	0.008
0.500	00030	0.007	0.017	0.006	0.001	0.019	0.013
0.667	00040	0.007	0.024	0.006	0.001	0.019	0.016
0.833	00050	0.007	0.030	0.006	0.001	0.019	0.019
1.000	00100	0.007	0.037	0.006	0.001	0.019	0.019
1.167	00110	0.007	0.044	0.006	0.001	0.019	0.019
1.333	00120	0.007	0.050	0.006	0.001	0.019	0.019
1.500	00130	0.007	0.057	0.006	0.001	0.019	0.019
1.667	00140	0.007	0.064	0.006	0.001	0.019	0.019
1.833	00150	0.007	0.071	0.006	0.001	0.019	0.019
2.000	00200	0.007	0.077	0.006	0.001	0.019	0.019
2.167	00210	0.007	0.084	0.006	0.001	0.019	0.019
2.333	00220	0.007	0.091	0.006	0.001	0.019	0.019
2.500	00230	0.007	0.097	0.006	0.001	0.019	0.019
2.667	00240	0.007	0.104	0.006	0.001	0.019	0.019
2.833	00250	0.007	0.111	0.006	0.001	0.019	0.019
3.000	00300	0.007	0.118	0.006	0.001	0.019	0.019
3.167	00310	0.007	0.124	0.006	0.001	0.019	0.019
3.333	00320	0.007	0.131	0.006	0.001	0.019	0.019
3.500	00330	0.007	0.138	0.006	0.001	0.019	0.019
3.667	00340	0.007	0.144	0.006	0.001	0.019	0.019
3.833	00350	0.008	0.152	0.007	0.001	0.022	0.020
4.000	00400	0.009	0.161	0.008	0.001	0.025	0.021
4.167	00410	0.009	0.170	0.008	0.001	0.025	0.023
4.333	00420	0.009	0.179	0.008	0.001	0.025	0.024
4.500	00430	0.009	0.188	0.008	0.001	0.025	0.025
4.667	00440	0.009	0.197	0.008	0.001	0.025	0.025
4.833	00450	0.009	0.206	0.008	0.001	0.025	0.025
5.000	00500	0.009	0.215	0.008	0.001	0.025	0.025
5.167	00510	0.009	0.224	0.008	0.001	0.025	0.025
5.333	00520	0.009	0.233	0.008	0.001	0.025	0.025
5.500	00530	0.009	0.242	0.008	0.001	0.025	0.025
5.667	00540	0.009	0.251	0.008	0.001	0.025	0.025
5.833	00550	0.009	0.260	0.008	0.001	0.025	0.025
6.000	00600	0.009	0.269	0.008	0.001	0.025	0.025
6.167	00610	0.011	0.280	0.010	0.001	0.031	0.026
6.333	00620	0.011	0.291	0.010	0.001	0.031	0.029
6.500	00630	0.011	0.302	0.010	0.001	0.031	0.030
6.667	00640	0.011	0.313	0.010	0.001	0.032	0.031
6.833	00650	0.011	0.325	0.010	0.001	0.036	0.033
7.000	00700	0.011	0.336	0.010	0.001	0.042	0.035
7.167	00710	0.011	0.347	0.010	0.001	0.047	0.040
7.333	00720	0.011	0.358	0.010	0.001	0.052	0.045
7.500	00730	0.011	0.369	0.010	0.002	0.057	0.050
7.667	00740	0.011	0.381	0.010	0.002	0.062	0.055
7.833	00750	0.011	0.392	0.009	0.002	0.067	0.060
8.000	00800	0.011	0.403	0.009	0.002	0.072	0.065
8.167	00810	0.013	0.416	0.011	0.002	0.092	0.073
8.333	00820	0.015	0.431	0.012	0.003	0.108	0.085
8.500	00830	0.016	0.447	0.012	0.003	0.124	0.100
8.667	00840	0.016	0.462	0.012	0.004	0.133	0.115
8.833	00850	0.016	0.478	0.012	0.004	0.141	0.127
9.000	00900	0.016	0.494	0.012	0.004	0.149	0.137
9.167	00910	0.018	0.512	0.013	0.005	0.180	0.150
9.333	00920	0.018	0.529	0.013	0.005	0.190	0.166
9.500	00930	0.018	0.547	0.013	0.005	0.199	0.181
9.667	00940	0.020	0.568	0.014	0.006	0.235	0.199
9.833	00950	0.020	0.588	0.014	0.007	0.246	0.220
10.00	01000	0.020	0.608	0.013	0.007	0.257	0.236
10.16	01010	0.022	0.630	0.014	0.008	0.298	0.257
10.33	01020	0.025	0.655	0.015	0.009	0.343	0.287
10.50	01030	0.027	0.682	0.016	0.011	0.391	0.324
10.66	01040	0.034	0.715	0.020	0.014	0.512	0.383
10.83	01050	0.037	0.752	0.021	0.016	0.592	0.463
11.00	01100	0.040	0.792	0.022	0.018	0.678	0.549
11.16	01110	0.047	0.840	0.025	0.022	0.831	0.651
11.33	01120	0.053	0.892	0.026	0.026	0.978	0.775
11.50	01130	0.058	0.950	0.028	0.031	1.137	0.913
11.66	01140	0.233	1.183	0.097	0.136	5.040	1.800
11.83	01150	0.425	1.608	0.136	0.289	10.732	4.366
12.00	01200	0.618	2.226	0.138	0.479	17.806	8.798
12.16	01210	0.099	2.325	0.018	0.081	3.003	10.493
12.33	01220	0.081	2.405	0.014	0.067	2.484	8.141
12.50	01230	0.063	2.468	0.010	0.052	1.947	5.426
12.66	01240	0.051	2.520	0.008	0.043	1.609	2.932
12.83	01250	0.046	2.566	0.007	0.039	1.441	1.378
13.00	01300	0.040	2.606	0.006	0.034	1.270	1.550
13.16	01310	0.034	2.639	0.005	0.029	1.062	1.333
13.33	01320	0.031	2.671	0.005	0.027	0.994	1.170

13.66	01340	0.025	2.724	0.003	0.021	0.785	0.944
13.83	01350	0.024	2.748	0.003	0.020	0.751	0.851
14.00	01400	0.022	2.770	0.003	0.019	0.716	0.787
14.16	01410	0.020	2.790	0.003	0.017	0.646	0.727
14.33	01420	0.019	2.810	0.003	0.016	0.611	0.674
14.50	01430	0.018	2.827	0.002	0.016	0.576	0.633
14.66	01440	0.016	2.843	0.002	0.014	0.504	0.586
14.83	01450	0.016	2.859	0.002	0.014	0.505	0.542
15.00	01500	0.016	2.874	0.002	0.014	0.506	0.519
15.16	01510	0.016	2.890	0.002	0.014	0.506	0.507
15.33	01520	0.015	2.905	0.002	0.013	0.471	0.497
15.50	01530	0.013	2.918	0.002	0.012	0.435	0.480
15.66	01540	0.013	2.932	0.002	0.012	0.435	0.458
15.83	01550	0.013	2.945	0.002	0.012	0.436	0.443
16.00	01600	0.013	2.958	0.002	0.012	0.436	0.436
16.16	01610	0.013	2.972	0.002	0.012	0.436	0.435
16.33	01620	0.013	2.985	0.002	0.012	0.437	0.436
16.50	01630	0.013	2.999	0.002	0.012	0.437	0.437
16.66	01640	0.011	3.010	0.001	0.010	0.365	0.423
16.83	01650	0.011	3.021	0.001	0.010	0.365	0.397
17.00	01700	0.011	3.032	0.001	0.010	0.365	0.379
17.16	01710	0.011	3.043	0.001	0.010	0.365	0.367
17.33	01720	0.011	3.055	0.001	0.010	0.366	0.363
17.50	01730	0.011	3.066	0.001	0.010	0.366	0.366
17.66	01740	0.011	3.077	0.001	0.010	0.366	0.366
17.83	01750	0.010	3.087	0.001	0.009	0.330	0.359
18.00	01800	0.009	3.096	0.001	0.008	0.293	0.339
18.16	01810	0.009	3.105	0.001	0.008	0.294	0.317
18.33	01820	0.009	3.114	0.001	0.008	0.294	0.302
18.50	01830	0.009	3.123	0.001	0.008	0.294	0.294
18.66	01840	0.009	3.132	0.001	0.008	0.294	0.293
18.83	01850	0.009	3.141	0.001	0.008	0.294	0.294
19.00	01900	0.009	3.150	0.001	0.008	0.294	0.294
19.16	01910	0.009	3.159	0.001	0.008	0.294	0.294
19.33	01920	0.009	3.168	0.001	0.008	0.295	0.294
19.50	01930	0.009	3.177	0.001	0.008	0.295	0.295
19.66	01940	0.009	3.186	0.001	0.008	0.295	0.295
19.83	01950	0.008	3.193	0.001	0.007	0.258	0.288
20.00	02000	0.007	3.200	0.001	0.006	0.221	0.268
20.16	02010	0.007	3.207	0.001	0.006	0.221	0.245
20.33	02020	0.007	3.214	0.001	0.006	0.222	0.230
20.50	02030	0.007	3.220	0.001	0.006	0.222	0.222
20.66	02040	0.007	3.227	0.001	0.006	0.222	0.220
20.83	02050	0.007	3.234	0.001	0.006	0.222	0.222
21.00	02100	0.007	3.240	0.001	0.006	0.222	0.222
21.16	02110	0.007	3.247	0.001	0.006	0.222	0.222
21.33	02120	0.007	3.254	0.001	0.006	0.222	0.222
21.50	02130	0.007	3.261	0.001	0.006	0.222	0.222
21.66	02140	0.007	3.267	0.001	0.006	0.222	0.222
21.83	02150	0.007	3.274	0.001	0.006	0.222	0.222
22.00	02200	0.007	3.281	0.001	0.006	0.222	0.222
22.16	02210	0.007	3.287	0.001	0.006	0.222	0.222
22.33	02220	0.007	3.294	0.001	0.006	0.223	0.222
22.50	02230	0.007	3.301	0.001	0.006	0.223	0.223
22.66	02240	0.007	3.308	0.001	0.006	0.223	0.223
22.83	02250	0.007	3.314	0.001	0.006	0.223	0.223
23.00	02300	0.007	3.321	0.001	0.006	0.223	0.223
23.16	02310	0.007	3.328	0.001	0.006	0.223	0.223
23.33	02320	0.007	3.334	0.001	0.006	0.223	0.223
23.50	02330	0.007	3.341	0.001	0.006	0.223	0.223
23.66	02340	0.007	3.348	0.001	0.006	0.223	0.223
23.83	02350	0.006	3.354	0.001	0.005	0.186	0.216
24.00	00000	0.004	3.358	0.000	0.004	0.149	0.195
24.16	00010	0.000	3.358	0.000	0.000	0.000	0.144
24.33	00020	0.000	3.358	0.000	0.000	0.000	0.075
24.50	00030	0.000	3.358	0.000	0.000	0.000	0.029
			3.358	1.233	2.124	2.124	

Totals for Watershed in inches over 6.14 acres

Rational Coefficient = 0.633 Peak Flow (cfs) = 10.49

Farm Detention Pond Calculations

RUNOFF CURVE NUMBER COMPUTATION Version 2.10

Project : CE 400 User: CEE Date: 02-27-2000

County : KNOX State: TN Checked: ____ Date: _____
Subtitle: Farm Detention Pond
Subarea : 22.000

COVER DESCRIPTION	Hydrologic Soil Group A	B	C	D
		Acres (CN)		
FULLY DEVELOPED URBAN AREAS (Veg Estab.)				
Open space (Lawns,parks etc.)				
Fair condition; grass cover 50% to 75%	-	-	14(79)	-
Impervious Areas				
Paved parking lots, roofs, driveways	-	-	8.00(98)	-
Total Area (by Hydrologic Soil Group)			22	

SUBAREA: 22.000 TOTAL DRAINAGE AREA: 22 Acres WEIGHTED CURVE NUMBER: 86

TIME OF CONCENTRATION AND TRAVEL TIME Version 2

Project : CE 400 User: CEE Date: 02-27-

County : KNOX State: TN Checked: ____ Date: _____
Subtitle: Farm Detention Pond

Subarea #1 - 22.000

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	
Sheet	3.3	300	.07	E					0
Shallow Concent'd		1000	.07	U					0

Time of Concentration = 0.1
===

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense
J Range, Natural

--- Shallow Concentrated Surface Codes ---

P Paved
U Unpaved

Time (hr)	Time HHMM	Rain (in)	Cumulative (in)
0.167	00010	0.018	0.018
0.333	00020	0.023	0.041
0.500	00030	0.023	0.064
0.667	00040	0.023	0.087
0.833	00050	0.023	0.110
1.000	00100	0.023	0.133
1.167	00110	0.023	0.156
1.333	00120	0.023	0.180
1.500	00130	0.023	0.203
1.667	00140	0.028	0.230
1.833	00150	0.031	0.261
2.000	00200	0.031	0.292
2.167	00210	0.031	0.323
2.333	00220	0.031	0.353
2.500	00230	0.031	0.384
2.667	00240	0.038	0.422
2.833	00250	0.038	0.461
3.000	00300	0.038	0.499
3.167	00310	0.038	0.538
3.333	00320	0.038	0.576
3.500	00330	0.049	0.625
3.667	00340	0.054	0.679
3.833	00350	0.058	0.736
4.000	00400	0.063	0.800
4.167	00410	0.069	0.869
4.333	00420	0.083	0.951
4.500	00430	0.112	1.064
4.667	00440	0.150	1.213
4.833	00450	0.345	1.558
5.000	00500	1.624	3.182
5.167	00510	0.292	3.474
5.333	00520	0.181	3.656
5.500	00530	0.127	3.782
5.667	00540	0.098	3.880
5.833	00550	0.080	3.960
6.000	00600	0.066	4.026
6.167	00610	0.056	4.082
6.333	00620	0.054	4.136
6.500	00630	0.047	4.183
6.667	00640	0.046	4.229
6.833	00650	0.046	4.275
7.000	00700	0.040	4.315
7.167	00710	0.038	4.354
7.333	00720	0.038	4.392
7.500	00730	0.034	4.426
7.667	00740	0.031	4.456
7.833	00750	0.031	4.487
8.000	00800	0.031	4.518
8.167	00810	0.031	4.548
8.333	00820	0.026	4.574
8.500	00830	0.023	4.597
8.667	00840	0.023	4.620
8.833	00850	0.023	4.644
9.000	00900	0.023	4.667
9.167	00910	0.023	4.690
9.333	00920	0.023	4.713
9.500	00930	0.023	4.736
9.667	00940	0.023	4.759
9.833	00950	0.023	4.782
10.00	01000	0.018	4.800
		4.80	

Hydrograph Type :SCS 484 Hydrograph

Time (hr)	Time HHMM	Rain (in)	C Rain (in)	Infiltration (in)	Excess (in)	Excess (cfs)	Outflow (cfs)
0.167	00010	0.018	0.018	0.017	0.001	0.132	0.032
0.333	00020	0.023	0.041	0.022	0.001	0.167	0.095
0.500	00030	0.023	0.064	0.022	0.001	0.167	0.143
0.667	00040	0.023	0.087	0.022	0.001	0.167	0.168
0.833	00050	0.023	0.110	0.022	0.001	0.167	0.168
1.000	00100	0.023	0.133	0.022	0.001	0.167	0.167
1.167	00110	0.023	0.156	0.022	0.001	0.167	0.167
1.333	00120	0.023	0.180	0.022	0.001	0.167	0.167
1.500	00130	0.023	0.203	0.022	0.001	0.167	0.167
1.667	00140	0.028	0.230	0.026	0.002	0.216	0.179
1.833	00150	0.031	0.261	0.028	0.003	0.403	0.245
2.000	00200	0.031	0.292	0.026	0.004	0.597	0.381
2.167	00210	0.031	0.323	0.025	0.006	0.776	0.558
2.333	00220	0.031	0.353	0.024	0.007	0.941	0.742
2.500	00230	0.031	0.384	0.022	0.008	1.095	0.911
2.667	00240	0.038	0.422	0.027	0.012	1.567	1.146
2.833	00250	0.038	0.461	0.025	0.013	1.771	1.443
3.000	00300	0.038	0.499	0.024	0.015	1.957	1.708
3.167	00310	0.038	0.538	0.022	0.016	2.128	1.929
3.333	00320	0.038	0.576	0.021	0.017	2.286	2.096
3.500	00330	0.049	0.625	0.025	0.023	3.124	2.425
3.667	00340	0.054	0.679	0.026	0.028	3.676	2.956
3.833	00350	0.058	0.736	0.026	0.032	4.196	3.540
4.000	00400	0.063	0.800	0.027	0.037	4.891	4.159
4.167	00410	0.069	0.869	0.027	0.042	5.629	4.797
4.333	00420	0.083	0.951	0.029	0.053	7.077	5.676
4.500	00430	0.112	1.064	0.036	0.076	10.162	7.274
4.667	00440	0.150	1.213	0.042	0.108	14.349	9.993
4.833	00450	0.345	1.558	0.077	0.268	35.627	17.818
5.000	00500	1.624	3.182	0.187	1.438	191.301	65.676
5.167	00510	0.292	3.474	0.019	0.273	36.335	97.509
5.333	00520	0.181	3.656	0.010	0.171	22.752	74.210
5.500	00530	0.127	3.782	0.007	0.120	15.954	43.942
5.667	00540	0.098	3.880	0.005	0.093	12.362	14.169
5.833	00550	0.080	3.960	0.004	0.076	10.079	13.267
6.000	00600	0.066	4.026	0.003	0.063	8.392	10.586
6.167	00610	0.056	4.082	0.003	0.053	7.063	8.756
6.333	00620	0.054	4.136	0.002	0.051	6.826	7.552
6.500	00630	0.047	4.183	0.002	0.045	5.979	6.771
6.667	00640	0.046	4.229	0.002	0.044	5.862	6.229
6.833	00650	0.046	4.275	0.002	0.044	5.867	5.971
7.000	00700	0.040	4.315	0.002	0.039	5.137	5.674
7.167	00710	0.038	4.354	0.002	0.037	4.896	5.330
7.333	00720	0.038	4.392	0.002	0.037	4.899	5.045
7.500	00730	0.034	4.426	0.001	0.032	4.289	4.750
7.667	00740	0.031	4.456	0.001	0.029	3.923	4.406
7.833	00750	0.031	4.487	0.001	0.030	3.925	4.105
8.000	00800	0.031	4.518	0.001	0.030	3.927	3.939
8.167	00810	0.031	4.548	0.001	0.030	3.929	3.916
8.333	00820	0.026	4.574	0.001	0.025	3.316	3.780
8.500	00830	0.023	4.597	0.001	0.022	2.949	3.441
8.667	00840	0.023	4.620	0.001	0.022	2.950	3.131
8.833	00850	0.023	4.644	0.001	0.022	2.951	2.964
9.000	00900	0.023	4.667	0.001	0.022	2.952	2.940
9.167	00910	0.023	4.690	0.001	0.022	2.953	2.952
9.333	00920	0.023	4.713	0.001	0.022	2.954	2.953
9.500	00930	0.023	4.736	0.001	0.022	2.955	2.954
9.667	00940	0.023	4.759	0.001	0.022	2.956	2.955
9.833	00950	0.023	4.782	0.001	0.022	2.957	2.955
10.00	01000	0.018	4.800	0.001	0.018	2.341	2.807
10.16	01010	0.000	4.800	0.000	0.000	0.000	1.988
10.33	01020	0.000	4.800	0.000	0.000	0.000	0.873
10.50	01030	0.000	4.800	0.000	0.000	0.000	0.187
			4.800	1.043	3.756	3.756	

Totals for Watershed in inches over 22.00 acres

Rational Coefficient = 0.783 Peak Flow (cfs) = 97.51

Time (hr)	Inflow (cfs)	Outflow (cfs)	Stage (ft)	Storage (ac-ft)
0.17	0.03	0.00	2.00	0.00
0.33	0.09	0.00	2.00	0.00
0.50	0.14	0.00	2.00	0.00
0.67	0.17	0.00	2.00	0.00
0.83	0.17	0.00	2.00	0.00
1.00	0.17	0.00	2.00	0.00
1.17	0.17	0.00	2.00	0.00
1.33	0.17	0.00	2.00	0.00
1.50	0.17	0.00	2.00	0.00
1.67	0.18	0.00	2.00	0.00
1.83	0.24	0.00	2.00	0.00
2.00	0.38	0.00	2.00	0.00
2.17	0.56	0.00	2.00	0.00
2.33	0.74	0.00	2.00	0.00
2.50	0.91	0.00	2.00	0.00
2.67	1.15	0.00	2.00	0.00
2.83	1.44	0.00	2.00	0.00
3.00	1.71	7.00	2.00	0.00
3.17	1.93	0.00	2.00	0.00
3.33	2.10	0.00	2.00	0.00
3.50	2.42	7.00	2.00	0.00
3.67	2.96	7.00	2.00	0.00
3.83	3.54	7.00	2.00	0.00
4.00	4.16	7.00	2.00	0.00
4.17	4.80	0.00	2.00	0.00
4.33	5.68	0.00	2.00	0.00
4.50	7.27	7.00	2.00	0.00
4.67	9.99	7.00	2.00	0.00
4.83	17.82	7.00	2.00	0.00
5.00	65.68	7.00	2.00	0.00
5.17	97.51	7.00	2.00	0.00
5.33	74.21	7.00	2.00	0.00
5.50	43.94	7.00	2.00	0.00
5.67	14.17	7.00	2.00	0.00
5.83	13.27	7.00	2.00	0.00
6.00	10.59	7.00	2.00	0.00
6.17	8.76	7.00	2.00	0.00
6.33	7.55	7.00	2.00	0.00
6.50	6.77	7.00	2.00	0.00
6.67	6.23	7.00	2.00	0.00
6.83	5.97	7.00	2.00	0.00
7.00	5.67	7.00	2.00	0.00
7.17	5.33	7.00	2.00	0.00
7.33	5.05	7.00	2.00	0.00
7.50	4.75	7.00	2.00	0.00
7.67	4.41	7.00	2.00	0.00
7.83	4.11	7.00	2.00	0.00
8.00	3.94	7.00	2.00	0.00
8.17	3.92	7.00	2.00	0.00
8.33	3.78	7.00	2.00	0.00
8.50	3.44	7.00	2.00	0.00
8.67	3.13	7.00	2.00	0.00
8.83	2.96	7.00	2.00	0.00
9.00	2.94	7.00	2.00	0.00
9.17	2.95	7.00	2.00	0.00
9.33	2.95	7.00	2.00	0.00
9.50	2.95	7.00	2.00	0.00
9.67	2.95	7.00	2.00	0.00
9.83	2.96	7.00	2.00	0.00
10.00	2.81	7.00	2.00	0.00
10.17	1.99	7.00	2.00	0.00
10.33	0.87	7.00	2.00	0.00
10.50	0.19	7.00	2.00	0.00
10.67	0.00	7.00	2.00	0.00
10.83	0.00	7.00	2.00	0.00
11.00	0.00	7.00	2.00	0.00
11.17	0.00	7.00	2.00	0.00
11.33	0.00	7.00	2.00	0.00
11.50	0.00	7.00	2.00	0.00
11.67	0.00	7.00	2.00	0.00
11.83	0.00	7.00	2.00	0.00
12.00	0.00	7.00	2.00	0.00
12.17	0.00	7.00	2.00	0.00
12.33	0.00	7.00	2.00	0.00
12.50	0.00	7.00	2.00	0.00
12.67	0.00	7.00	2.00	0.00
12.83	0.00	7.00	2.00	0.00
13.00	0.00	7.00	2.00	0.00
13.17	0.00	7.00	2.00	0.00
13.33	0.00	7.00	2.00	0.00
13.50	0.00	7.00	2.00	0.00
13.67	0.00	7.00	2.00	0.00
13.83	0.00	7.00	2.00	0.00

14.00	0.00	7.00	2.00	0.00
14.17	0.00	7.00	2.00	0.00
14.33	0.00	7.00	2.00	0.00
14.50	0.00	7.00	2.00	0.00
14.67	0.00	7.00	2.00	0.00
14.83	0.00	7.00	2.00	0.00
15.00	0.00	7.00	2.00	0.00
15.17	0.00	7.00	2.00	0.00
15.33	0.00	7.00	2.00	0.00
15.50	0.00	0.00	2.00	0.00
Max:	97.51	7.00	2.00	0.00

```
Initial Pond Volume      :    000.000 ac-ft
+
Total Inflow Volume      :    006.886 ac-ft
-
Total Outflow Volume     :    006.846 ac-ft
Total Percolation Volume :    000.000 ac-ft
=
Final Pond Volume (stage):    000.000 ac-ft
Final Pond Volume (calc) :    000.040 ac-ft
-------------------------------------------------------------
Difference (error)       :   -000.040 ac-ft
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Stage (ft)	Storage (ac-ft)	Weir 1 Q (cfs)	Weir 2 Q (cfs)	Discharge (cfs)
2.00	0.00	0.00	0.00	7.00