File in MDDP's

PRELIMINARY/FINAL DRAINAGE REPORT

FOR

PARK SITE AT CHAPEL HILLS DRIVE

AND

AMENDMENT TO

FINAL DRAINAGE REPORT

FOR

CHAPEL HILLS DRIVE

J·R ENGINEERING

A Subsidiary of Westrian

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PRELIMINARY/FINAL DRAINAGE REPORT
FOR
PARK SITE AT CHAPEL HILLS DRIVE
AND
AMENDMENT TO
FINAL DRAINAGE REPORT
FOR
CHAPEL HILLS DRIVE

December1997
Revised June 1998

Prepared For:

LP47, LLC dba
LA PLATA INVESTMENTS, LLC
7150 Campus Drive, Suite 365
Colorado Springs, CO 80920
(719) 260-7477

Prepared By:

JR ENGINEERING, LTD.
4935 North 30th Street
Colorado Springs, CO 80919
(719) 593-2593

Job No. 8716.16

JR Engineering, Ltd.
4935 North 30th Street
Colorado Springs, Colorado 80919
(719) 593-2593 • FAX (719) 528-6613
www.jreng.com

PRELIMINARY/FINAL DRAINAGE REPORT
PARK SITE -CHAPEL HILLS DRIVE
AND AMENDMENT TO
"FINAL DRAINAGE REPORT FOR CHAPEL HILLS DRIVE"

DRAINAGE REPORT STATEMENT

ENGINEER'S STATEMENT:
The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the City for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors, or omissions on my part in preparing this report.

Kyle R. Campbell, Colorado P.E. #29794
For and On Behalf of JR Engineering, Ltd.

6-10-98
Date

DEVELOPER'S STATEMENT:
I, the developer, have read and will comply with all of the requirements specified in this drainage report and plan.

Business Name:	LP47, LLC dba La Plata Investments, LLC	Academy School District 20
By:	Bob Ingels	Carl Barteck
Title:		Director of Facilities Maintenance
Address:	7150 Campus Drive, Suite 365 Colorado Springs, CO 80920	7610 North Union Boulevard Colorado Springs, CO 80920

CITY OF COLORADO SPRINGS ONLY:
Filed in accordance with Section 15-3-906 of the Code of the City of Colorado Springs, 1980, as amended.

City Engineer

7/9/98
Date

Conditions

PRELIMINARY/FINAL DRAINAGE REPORT
PARK SITE -CHAPEL HILLS DRIVE
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______________________________ ____________________

City Engineer — Date

Conditions

PRELIMINARY/FINAL DRAINAGE REPORT
PARK SITE - CHAPEL HILLS DRIVE
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TABLE OF CONTENTS

APPENDIX

PRELIMINARY/FINAL DRAINAGE REPORT
PARK SITE - CHAPEL HILLS DRIVE
AND AMENDMENT TO
"FINAL DRAINAGE REPORT FOR CHAPEL HILLS DRIVE"

PURPOSE

This document is the Preliminary/Final Drainage Report for the Park Site - Chapel Hills Drive. The Park Site, which is located at the north east corner of the intersection of Chapel Hills Drive and Lexington Drive in Briargate, will also serve as a detention pond for runoff from 90 acres of developing property. The purpose of this report is to estimate runoff quantities and peak flow rates from the contributing watershed and to demonstrate the adequacy of the proposed facilities to handle this runoff.

Handling runoff from the upstream watershed in the proposed detention pond represents a change from previous drainage reports for this area. This report is to serve as an amendment to the "Final Drainage Report for Chapel Hills Drive", by JR Engineering Ltd., dated January 1997.

GENERAL

The Park Site - Chapel Hills Drive is located in the southeast portion of Section 28, Township 12 South, Range 66 West of the Sixth Principal Meridian, City of Colorado Springs, El Paso County, Colorado. The 5.6 acre site is bounded on the east by proposed Pine Creek Subdivision Filing No. 7, on the south by a future portion of Chapel Hills Drive, on the west by an improved portion of Lexington Drive, and on the north by a future public elementary school site.

The site is presently mostly undisturbed land vegetated with native grass. A temporary paved access road to Pine Creek Golf Course presently traverses a portion of the site. The temporary access road will be removed prior to construction of the park detention pond proposed for the site.

The "Soil Survey of El Paso County Area" prepared by S.C.S. (see appendix) identifies the soil within the Park Site and the contributing watershed as Peyton/Pring Complex Hydrologic Group "B", or Blakeland Loamy Sand, Hydrologic Group "A".

EXISTING DRAINAGE CONDITIONS

The proposed park/pond facility and the bulk of the watershed proposed to contribute to it are located within the Pine Creek Basin Watershed as shown on the Drainage Basin Map contained in the appendix of this report. Approximately 19 acres of watershed proposed to contribute to the proposed park/detention facility are located within the historic Kettle Creek Basin.

The watershed proposed to contribute runoff to the proposed detention pond is mostly undeveloped at the current time. Approximately 8 acres located at east end of the watershed are part of the developed Pine Creek Golf Course. Approximately 7 acres of the school site located north of the proposed detention pond have been developed. Lexington Drive along the western edge of the watershed has been constructed as well as the downstream portion of Chapel Hills Drive located between Lexington Drive and Treelake Drive. Plans have been approved for the remainder of Chapel Hills Drive between Treelake Drive and Briargate Parkway and construction of the roadway is expected to be completed in the near future.

The storm drain system in Chapel Hills Drive has been constructed between Lexington Drive and Pine Creek, the outfall for the system. This system includes a 6' long curb inlet located at the north east corner of the intersection of Lexington Drive and Chapel Hills Drive. This inlet will serve as the outfall for the proposed detention basin. The full pipe capacity of the 18" diameter storm drain outlet from this inlet, laid at minimum slopes of 2.5%, is 16.6 cfs according to a Mannings equation solution. Due to the limited amount of head that can be developed at the entrance to this storm drain (total HW= 2.76') the orifice equation indicates that discharge to the downstream storm drain from the inlet will be limited to 12.1 cfs.

With the exception of the area included in the historic Kettle Creek Basin, the area affected by the proposed improvements has been included in the following drainage reports: "Pine Creek

Drainage Basin Planning Study" and subsequent amendments by Obering, Wurth and Associates, the "Master Drainage Plan for Charter Greens", by JR Engineering Ltd., dated January 1993, and the " Final Drainage Report for Chapel Hills Drive", by JR Engineering, dated January 1997.

The "Final Drainage Plan for Chapel Hills Drive", the most recent plan for this area, indicates that the Park Site and the adjacent portions of Chapel Hills Drive and Lexington Drive would discharge approximately Q_5 = 6 cfs, Q_{100} = 18 cfs to the inlet located at the northwest corner of the Chapel Hills Drive and Lexington Storm Drain intersection (Design Point 40 of the Chapel Hills Drive Report). The plan indicated that the remainder of the watershed proposed to outfall to the currently proposed detention pond (excluding the Kettle Creek Basin area) would outfall to Pine Creek via a then proposed storm drain to be constructed in the Divot Trail right of way. The "Final Drainage Plan for Chapel Hills Drive" as well as the "Master Development Plan for Charter Greens" indicate that the runoff from the Pine Creek Basin portion of the school site as well as the runoff from the adjacent eastern half of Lexington Drive would be collected and discharged to the then proposed Divot Trail storm drain. The plans indicates the developed runoff from the school site would be detained on the school site to achieve a reduction in the peak flow rate from the site as required by the approved "Pine Creek Drainage Basin Planning Study".

The bulk of the existing improvements on the school site as well as the eastern half of adjacent Lexington Drive currently appear to be contributing runoff to the intersection of Chapel Hills Drive and Lexington Drive and no detention pond is apparent on the school site.

PROPOSED DRAINAGE CONDITIONS

(A) General Description

A proposed detention pond will be constructed at the northeast corner of the intersection of Lexington Drive and Chapel Hills Drive. The proposed detention pond will also be configured to serve as a recreational area. This pond will be sized to accept and detain free discharge, 100-year design storm runoff, assuming current land use projections, from a proposed watershed that is approximately 90 acres in size. The proposed detention pond will outfall to the existing Chapel Hills Drive storm drain at a very small discharge rate that will have a negligible impact on the downstream storm drain system. Runoff previously proposed to outfall down a previously proposed storm drain system in Divot Trail will be treated in the currently proposed pond thus eliminating the need for the proposed Divot Trail storm drain system. Approximately 18 acres of land that currently drains to Kettle Creek will be regraded to drain to the proposed pond included in the proposed 90 acre watershed.

The majority of the runoff to be treated will enter the pond via two proposed storm drain systems. One storm drain system will collect and convey runoff from Chapel Hills Drive and contributing areas (Basin CHN1A), the second storm drain system will collect and convey runoff from the school site (Basin CHN1B). The portion of the Park Site that is included in or drains to the proposed pond is included in Basin CHN1A for the purpose of the current analysis. The portion of the Park Site that will not drain to the proposed pond as well as the adjacent one half-street sections of Chapel Hills Drive and Lexington Drive are included in Basin CHN2A.

(B) Drainage Basin Characteristics and Constraints

In the developed condition, land use in Basin CHN1A is expected to consist of detached single family housing, Pine Creek Golf Course, the majority of the Park Site, and approximately 2600 linear feet of Chapel Hills Drive. The north and east boundaries of this basin do not correspond with existing drainage divides but rather correspond to anticipated drainage divides that will be created as the area is graded for development. The north 18 acres of this basin will be graded to drain to the proposed pond versus Kettle Creek. Conversely on the east side, a portion of the historic watershed is excluded from the basin. It is anticipated that runoff will be diverted by a future street to be constructed upslope from the golf course.

The bulk of the runoff from Basin CHN1A will be collected and conveyed to the proposed pond via future residential streets, Chapel Hills Drive and an associated storm drain system to be constructed in Chapel Hills Drive. A preliminary layout for the proposed Chapel Hills Drive storm drain system, based on current assumptions about how the residential streets will be configured, was included in the Preliminary/Final Drainage Report for Pine Creek Filings No. 7

and 8 (not yet approved). A copy of the drainage map from that report has been included in the Appendix of this report. Sufficient inlets are planned in Chapel Hills Drive to intercept all of the significant 100-year runoff in Chapel Hills Drive near Divot Trail and divert it to the proposed pond. As shown on the Pine Creek Filing No. 7 drainage map, a small area consisting of the rear portions of residential lots adjacent to the east side of the proposed pond will drain directly into the pond. The current analysis estimates peak runoff rates from Basin CHN1A at Q_5 = 57 cfs, Q_{100} = 170 cfs.

In the fully developed condition land use in Basin CHNIB is expected to consist of school buildings, parking lots, and play fields. Consistent with the previous reports for this area, as discussed in the existing condition section, it is assumed that all of the runoff from the Pine Creek Basin Portion of the school site will be collected on the school site and will not contribute to Chapel Hills Drive via Lexington Drive. This will require some regrading of the existing parking lot and driveway serving the existing school facilities. This regrading should occur before or concurrent with the development of the remainder of the school site. Runoff from the school site will be conveyed to the proposed pond via a proposed 36" diameter storm drain to be stubbed into the school site with the current project. A small desiltation basin should be constructed and maintained at the inlet to this storm drain until the school site is fully developed and the potential for sediment contribution from the school site is reduced. A temporary collection system consisting of berms and swales will also be required on the school site to divert runoff to the proposed 36" diameter storm drain instead of down the slopes of the pond until the on site permanent drainage improvements are constructed. The permanent drainage improvements on the school site should likewise collect runoff the site and convey it to the proposed 36" storm drain thus preventing it from discharging directly to the pond. The importance of this is two fold. First, significant flow over the 3:1 pond slopes would be erosive. Second, the pond is designed to prevent run off from frequent storms from impacting the majority of the pond bottom.

The current analysis of Basin CHN1B assumes free discharge via the above discussed storm drain into the proposed pond. The current analysis assumes that the runoff developed in the adjacent portion of Lexington Drive will not be collected and combined with the school runoff but rather will continue to contribute to Chapel Hills Drive as it currently does. The current analysis estimates peak runoff rates from Basin CHN1B at $Q_5 = 43$ cfs, $Q_{100} = 98$ cfs.

In the fully developed condition Basin CHN2A will consist of the eastern half of Lexington Drive adjacent to the school site and the Park Site, the north half of Chapel Hills Drive between Divot Trail and Lexington Drive and the portion of the Park Site that will not drain to the proposed pond. This Basin was included in the current analysis so that a comparison of the peak runoff rates at the north east corner of the intersection of Lexington Drive and Chapel Hills Drive that were estimated in the "Final Drainage Report for Chapel Hills Drive" and the peak runoff rates estimated in the current analysis can be made. The current analysis estimates peak runoff rates from Basin CHN2A at $Q_5 = 5$ cfs, $Q_{100} = 11$ cfs.

(C) Detention Pond Characteristics

The bottom of the proposed detention pond is designed to minimize the area to be flooded in smaller frequent storms. This feature was incorporated into the design to protect the proposed play fields that are to be constructed on the pond bottom from frequent flooding. The proposed pond bottom will flood in three stages. The depressed east end of the pond will flood first followed by the mid section (soccer field) and finally the total pond bottom including the west end (baseball field) will be flooded.

The east end of the pond will be the lowest part of the pond. At it's lowest point (it's southwest corner) the east end of the pond will be 6.9' lower than the adjacent portion of the mid section. As shown on the conceptual plan (contained in the appendix) a combination inlet/outlet structure will be constructed at this lowest corner. The proposed 36" diameter storm drain from the school site as well as the 48" diameter storm drain from Chapel Hills Drive will terminate in the inlet/outlet structure. A 12" diameter, smooth interior, high density polyethylene outlet line will be constructed at a minimum slope of .4% from inlet/outlet to a 4' diameter manhole/area inlet to be located in the southwest corner of the overall pond. The invert of the inlet/outlet structure will be depressed 1.5' below the lowest point in the pond. The intent of this design is that small inflows (up to approximately 2.3 cfs) to the pond will be contained and directed to the outlet line within the inlet/outlet structure and will not flood the pond bottom. At higher inflow rates, stormwater will exceed the capacity of the outlet line and the excess will leave the inlet/outlet structure via a 24' long x 3' high vertical trash rack to be placed in the face of the structure. After inflow to the pond subsides the stormwater stored in the pond will re-enter the structure via the above described trashrack. The bottom of the east end portion of the pond will be graded to drain at a minimum slope of .75% to the above described inlet/outlet structure. Paving the bottom of the of the depressed east end portion of the pond to provide a skating or ball court surface is under consideration at the present time. Most rainfall events will result in flooding of the bottom of the east end of the pond. The east end of the pond will contain the runoff from storms that produce up to 2.8 acre feet of runoff. The current analysis indicates that the storm event that will require 2.8 acre feet of storage will have a frequency of about 4 years. Thus it is estimated that in any given year there will be a 25% chance that the volume of the depressed east end of the pond will be exceeded and additional portions of the pond will be flooded.

The mid section of the pond will begin to flood when the volume of the depressed east end of the pond is exceeded. Water in excess of the east ends' depressed area volume will spill over the grade break to be created just east of the proposed soccer field. The grade break will have a design elevation of 6803.5. Care should be taken in grading this grade break to very near the design elevation all the way across the pond bottom to assure that this over topping does not result in erosive concentrated flow. As shown on the conceptual plan, two area inlets are planned to be constructed within the mid section of the pond. The purpose of these inlets is to allow the bottom of the pond to be graded for proper drainage at 1.5% minimum slopes without displacing excessive storage volume. The pond bottom of the mid section will be divided into two parts with each respective part draining to one of the two area inlets. A grade break with a design elevation of 6804.0 will be created along the east side of the proposed baseball field and it will serve a spill over section from the mid section to the west end of the pond. Total storage volume provided in the east end and mid section of the pond up to the elevation of the grade break or spillover will be approximately 5.3 acre feet. Per the current analysis the 10-year frequency storm will require 5 acre feet of storage thus it is estimated that the west end of the pond bottom (the baseball field has around a 10% chance of being flooded in a given year).

The west end of the pond will begin to flood when the pond stage exceeds elevation 6804.0.

Water will spill into the west end over the above discussed grade break. As discussed previously care should be taken to grade the full length of the grade break to the design elevation to assure that the spillover flow will be not be concentrated. As shown on the conceptual plan an area drain will be constructed on a manhole to be located in the southwest corner of the pond bottom. The baseball field area will be graded to drain to the area drain at a minimum slope of 1.5%. A 12" diameter HDPE or PVC pipe laid at 0.4 percent will connect the manhole to the back of an existing curb inlet located at the northeast corner of Chapel Hills Drive and Lexington Drive.

A 100 foot wide armored spillway is planned to be constructed at elevation 6805.50 along the south side of the proposed pond. The proposed spillway elevation is 0.2' higher than the predicted 100-year maximum water surface in the proposed pond. The planned spillway will discharge the entire 100-year design storm inflow to the pond at a flow depth of 1 foot over the spillway. Two feet of freeboard above the water surface that would occur with the spillway passing the 100-year inflow will be provided around the perimeter of the pond (exclusive of the spillway). The planned spillway will discharge to Chapel Hills Drive.

The proposed outlet system from the pond was designed with the following goals: to contain runoff from frequent smaller storm within the piping, to control discharge from the pond to a rate that would not overburden the existing down stream system, to provide positive drainage from all areas of the pond bottom, to maintain discharge control with as large of opening as possible in order to reduce clogging potential, and to maintain flow velocities above 2.5 feet per second at small flow rates in order to convey sediment through the pipe. The proposed system is designed with 12" diameter pipe. The proposed system will control the small outflow rate without using smaller orifice plates at the entrances. An alternative system was analyzed using the City Standard minimum storm drain size of 18" diameter. A system using 18" diameter pipe would require the use of a 9" diameter orifice plate to maintain the desired discharge rate and would convey small flow rates at lower velocities than the 12" pipe will. Due to these negative aspects of using the 18" pipe in the system use of 12" diameter pipe is recommended for this application. Outflow rates for various water surface elevations in the pond were calculated based on the head required to overcome friction losses and entrance losses in the system. A spreadsheet output of these calculations is included in the Hydraulic Section of the Appendix of this report.

Calculations were based on the following assumptions:

The hydraulic grade line at the connection point to the Chapel Hills Drive Storm Drain is at the flow line of Lexington Drive above the connection point (this is to regulate flow to the design rate when the curb inlet is full and allow larger outflow when additional capacity is available in the downstream system).

All four planned inlet points to the pond outlet line have the capacity to inlet the full design discharge upon submergence to a required depth. Given this, it is assumed that the submerged inlet located most downstream on the outlet line at a given stage will contribute the bulk of the outflow. At elevations below 6803.5 outflow will enter the system at the east end inlet/outlet structure. At elevations between 6803.5 and 6804.0 the bulk of the outflow will enter the system from the south area inlet located in the mid section of the pond. At elevations above 6804.0 the bulk of the outflow will enter the system from the area inlet located in the southwest corner of the pond.

The design peak 100-year discharge from the pond is 9 cfs. The design 100-year peak water surface elevation is 6805.3. A data table containing flow rates, stages, and storage volumes associated with other storm events is contained on the folded Sheet 2 of 2 in the appendix of this report.

(D) Impact On The Existing Downstream System

Under design conditions the proposed pond will discharge directly to the Chapel Hills Drive Storm Drain System. The current analysis indicates that the peak discharge from the pond will not occur until after the peak flow from Basin CHN2A has passed. In addition the pond will reduce the drainage area that was planned to contribute direct discharge to the Chapel Hills Dive storm drain system. The current analysis indicates that the peak rate of the combined discharge from the proposed pond and Basin CHN2A (Design Point 5) will be 16 cfs. This peak rate is less than the peak rate planned for this location in the " Final Drainage Report for Chapel Hills Drive". Thus, the proposed design discharge from the pond should not have a negative impact on the downstream system.

Analysis of the pond under abnormal conditions was performed to assess safety concerns. One analysis was performed assuming a normal empty pond at the start of the 100-year design storm with the outlet completely clogged. Due to the very low normal design discharge from the pond this analysis indicated that only a slightly higher peak water surface would result (6805.6) and peak flow over the spillway would be limited to 13 cfs. This condition would not have a significant negative impact on the downstream system. Another analysis was performed assuming a full pond and a clogged outlet at the beginning of the 100-year design storm. Under this condition the analysis indicated that a peak discharge of 210 cfs would be discharged over the spillway to Chapel Hills Drive.

The portion of Chapel Hills Drive that is located adjacent to and immediately downstream of the proposed spillway is graded at 2%. Assuming that the grades at the right of way lines will be at least 10" above the adjacent flow lines of the street a Mannings normal depth analysis indicated that the 210 cfs could be conveyed in the Chapel Hills Drive right of way. Downstream Chapel Hills Drive is graded at 4% until it reaches the Pine Creek Golf Course and has a conveyance capacity of over 400 cfs at a depth of 10". Adjacent to the Golf Course the slope of the street flattens out and there is a sag vertical curve over Pine Creek. It is unlikely that the circumstances required for 210 cfs discharge to be released will occur. If the 210 cfs discharge does occur the bulk of it is expected to be contained and conveyed to Pine Creek within the Chapel Hills Drive Right of Way. Some damage could be expected to occur to the Golf Course where the flow would likely leave the street section, but the overall damage caused by such a flow should be minimal. Water blocks at least 10" higher than the adjacent flow lines in Chapel Hills Drive should be constructed at future streets that will intersect and grade down from Chapel Hills Drive to maintain the integrity of Chapel Hills Drive as an emergency conveyance.

(E) Special Recommendations

The dual purpose intent of this facility has required special design considerations. To the extent possible, given the existing constraints ponding depths have been minimized over the majority of the pond and slopes have been designed at 3:1 or less to provide easy escape routes out of the pond when flooding occurs. The depressed area at the east end of the pond is expected to be flooded several times a year and in significant events will be flooded up to 9 feet deep. This should be considered if recreational activities or facilities are planned for the area. At a minimum warning signs alerting potential users of the potential danger should be posted and easy access out of the area should be maintained.

The inflow/outflow structure proposed for the east end of the pond was designed to minimize frequent flow impact to the pond bottom and to prevent access by the general public to the ends of the large storm drain lines that will terminate in the pond. Due to the large difference in inflow and outflow rates this structure may collect sediment and require cleaning on a frequent basis at least until the watershed contributing to the pond is developed. Some consideration should be given to postponing construction of recreational facilities and the inlet/outlet structure in the depressed area until development in the watershed reduces the potential for substantial sediment content in the inflow.

An agreement between LP47, LLC dba La Plata Investments and the City of Colorado Springs will be worked out for the construction of this pond. This agreement will include verbiage regarding the responsibilities for pond maintenance.

HYDROLOGIC CALCULATIONS

Hydraulic calculations were performed in accordance with the City of Colorado Springs/El Paso Drainage Criteria Manual, as revised in November 1991 and October 1994. A HEC1 computer model using S.C.S. curve numbers (cn) was utilized to perform the calculations. The SCS Type IIA 24 hour storm distribution was used in the model. A time increment of 3 minutes was utilized. Due to the HEC1 limit of 300 time steps only 15 hours are simulated with a 3 minute time step. The 15 hour time period is adequate as the peak stage in the pond occurs around hour 8.25 and inflow, storage, and outflow decrease beyond that point in time.

The model was run utilizing rainfall depths associated with the 2, 4, 5, 10, 25, 50, and 100-year storms as well as two 100-year storms with less than normal conditions associated with the proposed pond. Output data from these model runs is contained in the appendix of this report.

CONSTRUCTION COST OPINION

Item	Description	Quantity	Unit Cost	Cost
1.	Special area inlet	1 EACH	$1000/EA	$ 1,000.00
2.	Area inlet/manhole	2 EACH	$2400/EA	$ 4,800.00
3.	Spillway	1 EACH	$17,000/EA	$ 17,000.00
4.	Inlet/ outlet structure	1 EACH	$9000/EA	$ 9,000.00
5.	12" HDPE	900 L.F.	$20/L.F.	$ 18,000.00
6.	36" HDPE	280 L.F.	$45/L.F.	$ 12,600.00
7.	48" R.C.P.	80 L.F.	$80/L.F	$ 6,400.00
8.	Earthwork	86,000 C.Y.	$1.70/C.Y.	$ 146,200.00
	TOTAL CONSTRUCTION COST ESTIMATE			**$ 215,000.00**

JR Engineering, Ltd. cannot and does not guarantee that the construction cost will not vary form these opinions of probable construction costs. These opinions represent our best judgement as design professionals familiar with the construction industry and this development in particular.

DRAINAGE, BRIDGE AND POND FEES

Pine Creek Drainage Basin is a non-fee basin. The developer is responsible for the installation of all drainage facilities.

SUMMARY AND RECOMMENDATIONS

The analysis done for this report indicates that the proposed detention pond will be adequate to treat the design runoff from the proposed watershed and discharge it to the existing Chapel Hills Drive Storm Drain without a significant negative impact to the existing system. The proposed pond will provide an outfall for approximately 90 acres of the developing upstream area.

Prepared By:

Vancel S. Fossinger, P.E.
Project Engineer
Land Development
For and On Behalf of JR Engineering, Ltd.

/cw/871616/fnl-drng.doc

REFERENCES

1. "City of Colorado Springs/County of El Paso Drainage Criteria Manual," dated November 1991.

2. Soils Survey of El Paso County Area, Colorado Soil Conservation Service.

3. "Pine Creek Drainage Basin Planning Study," by Obering, Wurth & Associated, dated June 1988, revised October 1988.

4. "Amendment No. 1 to Pine Creek Drainage Basin Planning Study," by Obering, Wurth & Associates, dated July 1992.

5. "Final Drainage Report for Chapel Hills Drive," by JR Engineering, Ltd., dated January 1997.

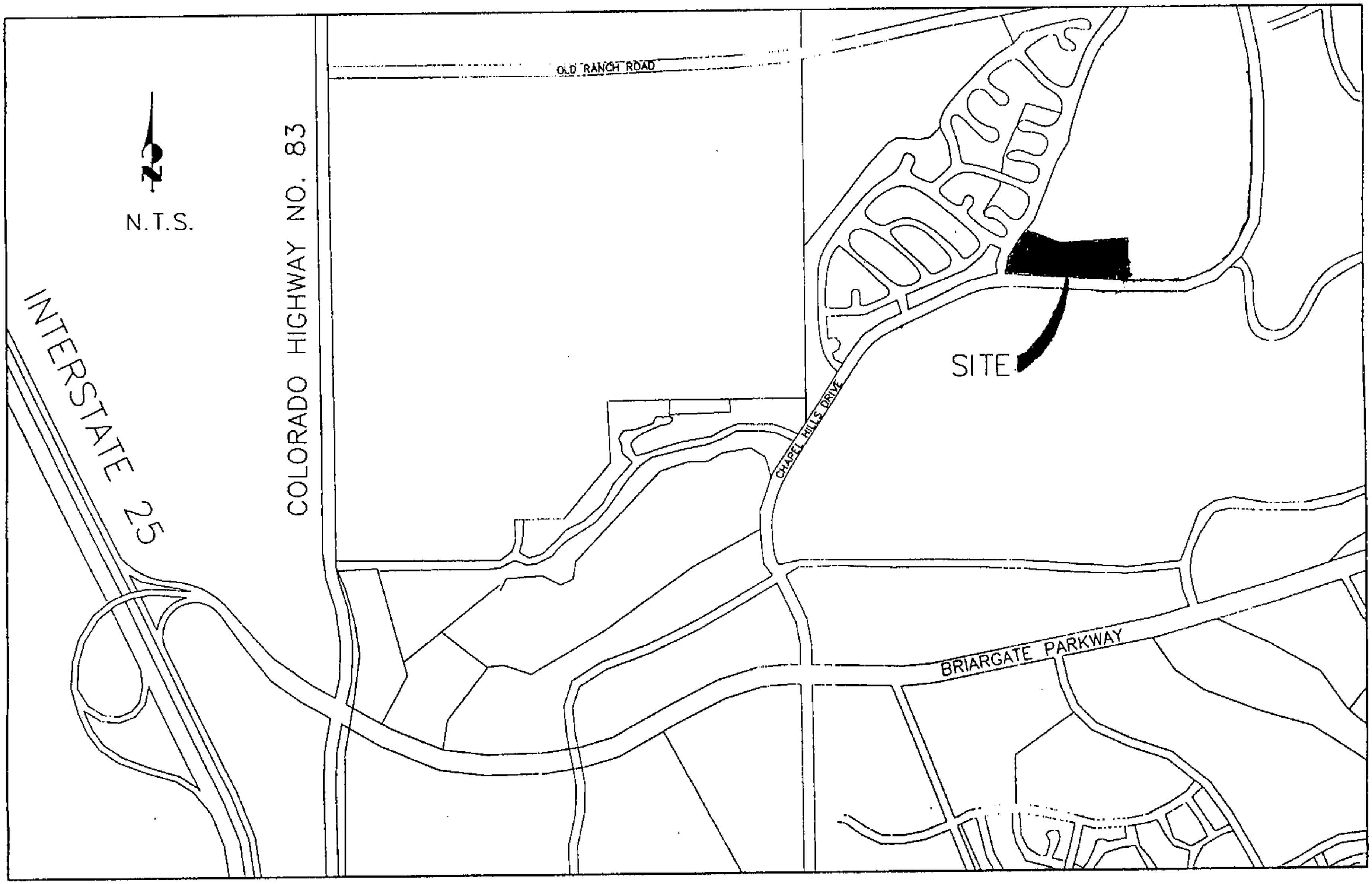
6. "Pine Creek Master Development Drainage Plan," by JR Engineering, Ltd., presently being prepared.

7. "Preliminary/Final Drainage Report for Pine Creek Subdivision Filings No. 7 and 8," by JR Engineering, Ltd., December 1997, not yet approved.

8. "Master Development Drainage Plan for Charter Greens," JR Engineering, Ltd., dated January 1993.

APPENDIX

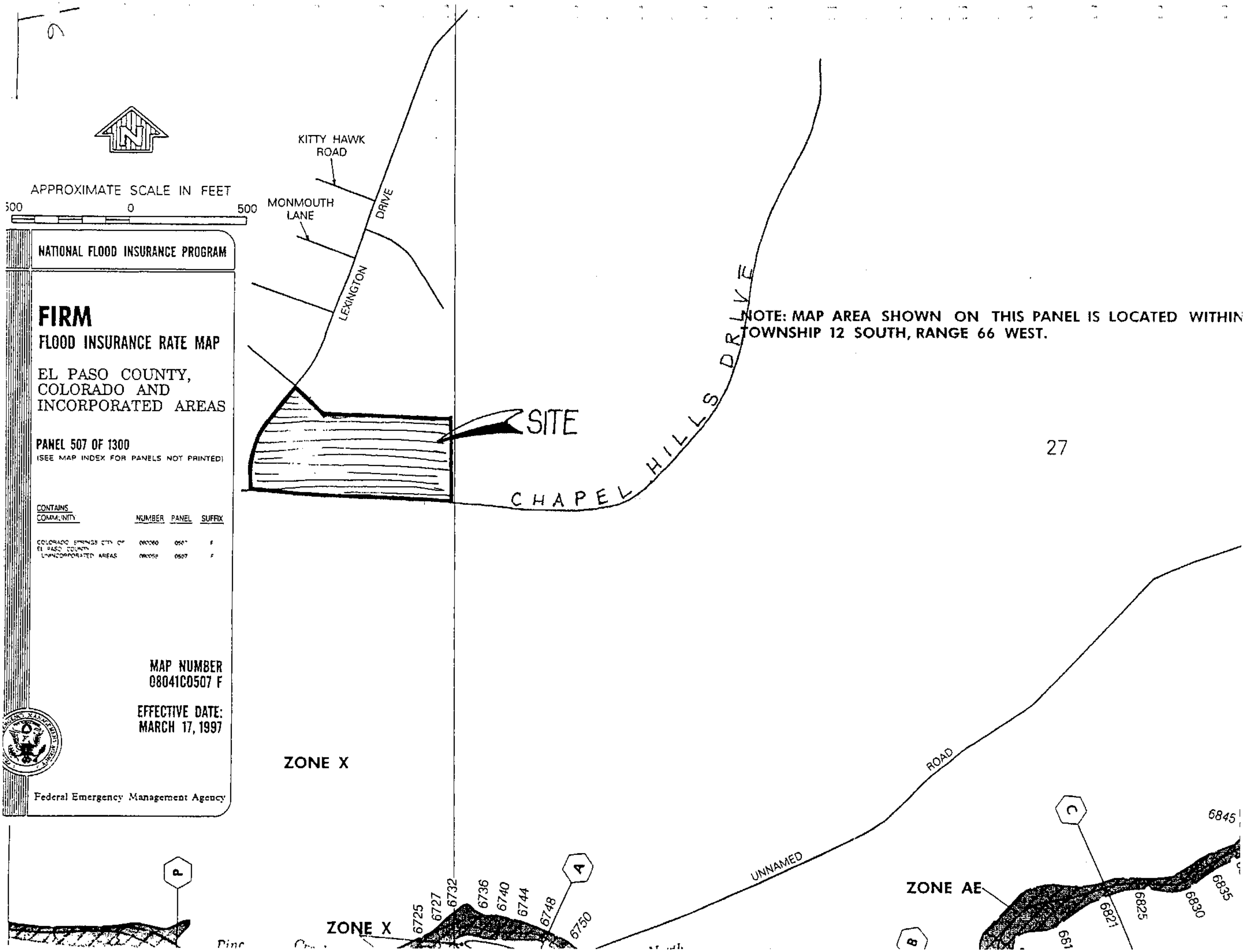
VICINITY MAP



VICINITY MAP

F.E.M.A.

FLOODPLAIN MAP

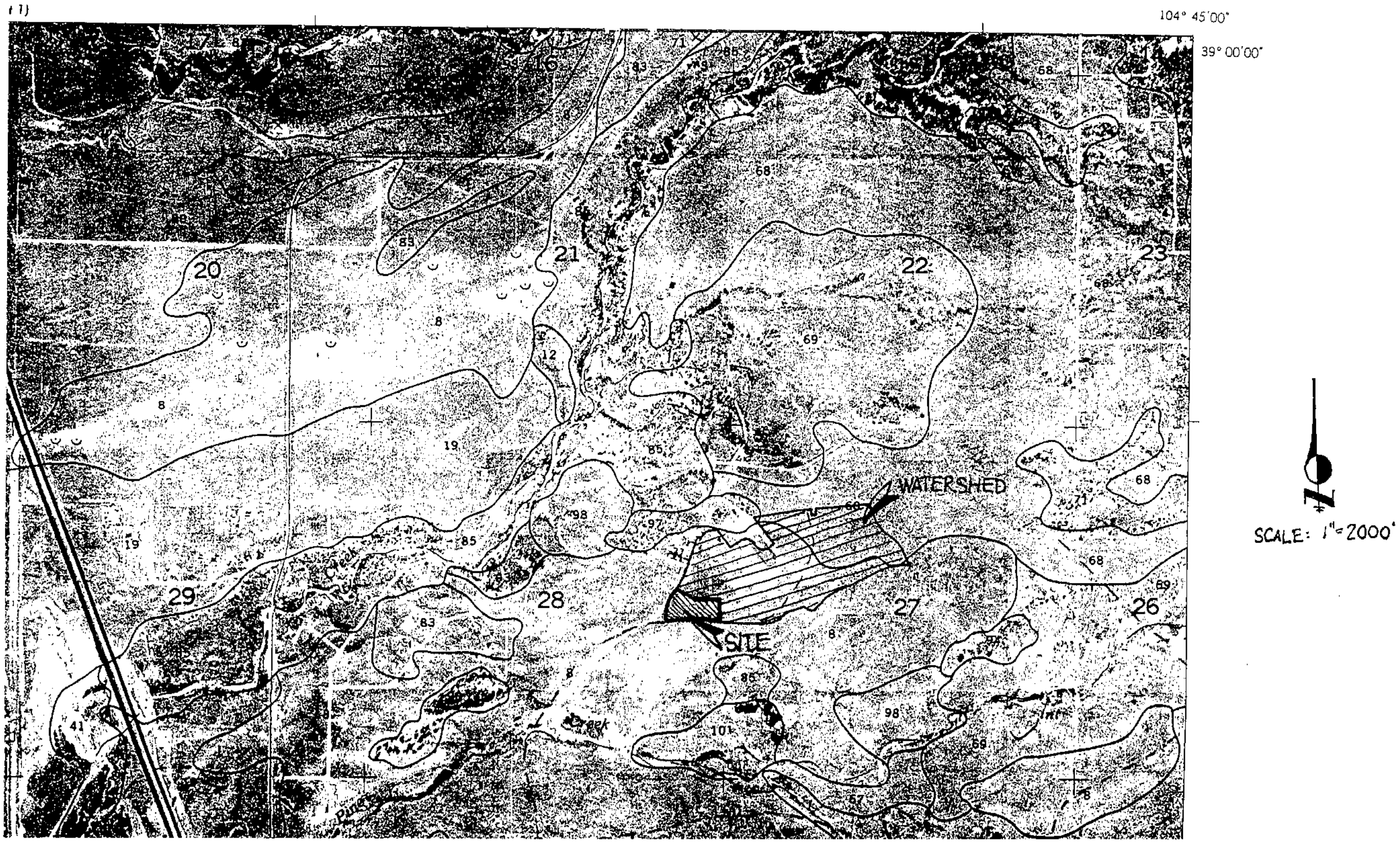


NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
EL PASO COUNTY, COLORADO AND INCORPORATED AREAS
PANEL 507 OF 1300
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS
COMMUNITY NUMBER PANEL SUFFIX
MAP NUMBER 08041C0507 F
EFFECTIVE DATE: MARCH 17, 1997
Federal Emergency Management Agency
APPROXIMATE SCALE IN FEET
500 0 500
KITTY HAWK ROAD
MONMOUTH LANE
LEXINGTON DRIVE
CHAPEL HILLS DRIVE
SITE
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 12 SOUTH, RANGE 66 WEST.
27
ZONE X
UNNAMED ROAD
ZONE AE
ZONE X
6725
6727
6732
6736
6740
6744
6748
6750
6821
6825
6830
6835
6845

S.C.S.

SOIL MAP

SHEET NO. 8
EL PASO COUNTY AREA, COLORADO
(PIKEVIEW QUADRANGLE)



HYDRAULIC CALCULATIONS

EXST. CHAPEL HILLS DR. S.D. FRM LEX INLT
Worksheet for Circular Channel

Project Description	
Project File	untitled.fm2
Worksheet	PARK SITE- CHAPEL HILLS DRIVE
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.025000	ft/ft
Diameter	18.00	in

Results		
Depth	18.0	in
Discharge	16.61	cfs
Flow Area	1.77	ft²
Wetted Perimeter	4.71	ft
Top Width	0.00	ft
Critical Depth	1.43	ft
Percent Full	100.00	
Critical Slope	0.021720	ft/ft
Velocity	9.40	ft/s
Velocity Head	1.37	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	17.87	cfs
Full Flow Capacity	16.61	cfs
Full Flow Slope	0.025000	ft/ft

INLET CONTROL

MAX HEADWATER = LOW PT IN ℄ − S.D INV. = 6794.46 − 6791.70 = 2.76'

CAPACITY OF INLET TO 18" DIA SD = $CA\sqrt{2gh}$

$= .60(1.77)\sqrt{64.4(2.76-.75)} = 12.1\,cfs < 16.6$

ASSUME DOWNSTREAM STORM DRAIN WILL OPERATE UNDER INLET CONTROL − CAPACITY = 12.1 cfs

PROPOSED CHAPEL HILLS DRIVE STORM DRAIN
Worksheet for Circular Channel

Project Description	
Project File	untitled.fm2
Worksheet	PARK SITE- CHAPEL HILLS DRIVE
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data		
Mannings Coefficient	0.013	
Diameter	48.00	in
Discharge	170.00	cfs

Results		
Channel Slope	0.014008	ft/ft
Depth	48.0	in
Flow Area	12.57	ft^2
Wetted Perimeter	12.57	ft
Top Width	0.00	ft
Critical Depth	3.73	ft
Percent Full	100.00	
Critical Slope	0.012113	ft/ft
Velocity	13.53	ft/s
Velocity Head	2.84	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	182.87	cfs
Full Flow Capacity	170.00	cfs
Full Flow Slope	0.014008	ft/ft

STORM DRAIN FROM SCHOOL SITE
Worksheet for Circular Channel

Project Description	
Project File	untitled.fm2
Worksheet	PARK SITE- CHAPEL HILLS DRIVE
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data		
Mannings Coefficient	0.013	
Diameter	36.00	in
Discharge	98.00	cfs

Results		
Channel Slope	0.021591	ft/ft
Depth	36.0	in
Flow Area	7.07	ft²
Wetted Perimeter	9.42	ft
Top Width	0.00	ft
Critical Depth	2.89	ft
Percent Full	100.00	
Critical Slope	0.018850	ft/ft
Velocity	13.86	ft/s
Velocity Head	2.99	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	105.42	cfs
Full Flow Capacity	98.00	cfs
Full Flow Slope	0.021591	ft/ft

Assume use of R-3015 "NEENAH" Curb inlet Frame, Grate, and Curb box with curb opening set at 2½" high.

Grate opening area = 1.3 ft²
Assume 50% Clogged = 1.3 x .5 = 0.65 ft²

Curb Opening Area = (2.5/12)(20/12) = 0.35 ft²

Total Effective opening = 0.65 + 0.35 = 1 ft²

Use orifice equation to estimate Capacity (C = 0.60)

Use average grate elevation = 100.7

Elev	h (ft)	$Q = CA\sqrt{2gh}$
103.5	2.8	8.1 cfs
104.0	3.3	8.7 cfs
105.5	4.8	10.5 cfs
106.5	5.8	11.6 cfs

The calculations indicate that unless area inlets become clogged beyond the above assumption they each have the capacity to dischange the full design Q into the outlet line after they become inudated Thus it is reasonable to assume that at higher stages in the pond that the bulk of the outflow will enter the outlet line at the most downstream flooded inlet.

PARK SITE -CHAPEL HILLS DRIVE
STAGE/DISCHARGE CURVE

DIA ORIFICE (inches)	12
ORIFICE AREA (square feet)	0.79
H.G.L. @ CHAPEL HILLS	794.4
MANNINGS "n" (H.D.P.E. PIPE)	0.01

ASSUMES ALL FLOW FROM DEPRESSED END OF POND

S.D. DIA in	Q cfs	S.D. LENGTH ft	S.D. AREA sf	S.D. HYDRAULIC RADIUS	S.D." K" FACTOR	S.D. FRICTION SLOPE	S.D. FRICTION LOSS	Ke + Hv	MANHOLE ORIFICE VELOCITY HEAD ft	MANHOLE ORIFICE LOSS ft	POND OUTLET VELOCITY HEAD ft	POND OUTLET LOSS ft	TOTAL LOSS ft	POND WATER SURFACE ELEVATION
12.00	5.49	695.00	0.79	0.25	46.10	0.0142	9.86	1.50	0.76	1.14	0.76	1.14	12.13	806.53
12.00	5.25	695.00	0.79	0.25	46.10	0.0130	9.01	1.50	0.69	1.04	0.69	1.04	11.10	805.50
12.00	4.88	695.00	0.79	0.25	46.10	0.0112	7.79	1.50	0.60	0.90	0.60	0.90	9.59	803.99
12.00	4.76	695.00	0.79	0.25	46.10	0.0107	7.41	1.50	0.57	0.86	0.57	0.86	9.12	803.52
12.00	4.35	695.00	0.79	0.25	46.10	0.0089	6.19	1.50	0.48	0.72	0.48	0.71	7.62	802.02
12.00	3.73	695.00	0.79	0.25	46.10	0.0065	4.55	1.50	0.35	0.53	0.35	0.53	5.60	800.00
12.00	3.00	695.00	0.79	0.25	46.10	0.0042	2.94	1.50	0.23	0.34	0.23	0.34	3.62	798.02
12.00	2.54	695.00	0.79	0.25	46.10	0.0030	2.11	1.50	0.16	0.24	0.16	0.24	2.60	797.00
12.00	2.35	695.00	0.79	0.25	46.10	0.0026	1.81	1.50	0.14	0.21	0.14	0.21	2.22	796.62

ASSUMES BULK OF FLOW FROM MID AREA INLET WHEN POND ELEVATION >803.5
ASSUMES BULK OF FLOW FROM S.W. AREA INLET WHEN POND ELEVATION >804

DIA ORIFICE (inches)	12
ORIFICE AREA (square feet)	0.79
H.G.L. @ CHAPEL HILLS	794.4
MANNINGS "n" (H.D.P.E. PIPE)	0.01

S.D. DIA in	Q cfs	S.D. LENGTH ft	S.D. AREA sf	S.D. HYDRAULIC RADIUS	S.D." K" FACTOR	S.D. FRICTION SLOPE	S.D. FRICTION LOSS	Ke + Hv	MANHOLE ORIFICE VELOCITY HEAD ft	MANHOLE ORIFICE LOSS ft	POND OUTLET VELOCITY HEAD ft	POND OUTLET LOSS ft	TOTAL LOSS ft	POND WATER SURFACE ELEVATION
12.00	**9.41**	130.00	0.79	0.25	46.10	0.0417	5.42	1.50	2.23	3.35	2.23	3.34	12.11	**806.51**
12.00	**9.01**	130.00	0.79	0.25	46.10	0.0382	4.97	1.50	2.05	3.07	2.04	3.07	11.10	**805.50**
12.00	**8.39**	130.00	0.79	0.25	46.10	0.0331	4.31	1.50	1.77	2.66	1.77	2.66	9.62	**804.02**
12.00	**5.49**	515.00	0.79	0.25	46.10	0.0142	7.30	1.50	0.76	1.14	0.76	1.14	9.58	**803.98**
12.00	**5.36**	515.00	0.79	0.25	46.10	0.0135	6.96	1.50	0.72	1.09	0.72	1.08	9.13	**803.53**
12.00	**4.75**	695.00	0.79	0.25	46.10	0.0106	7.38	1.50	0.57	0.85	0.57	0.85	9.08	**803.48**
12.00	**4.35**	695.00	0.79	0.25	46.10	0.0089	6.19	1.50	0.48	0.72	0.48	0.71	7.62	**802.02**
12.00	**3.73**	695.00	0.79	0.25	46.10	0.0065	4.55	1.50	0.35	0.53	0.35	0.53	5.60	**800.00**
12.00	**3.00**	695.00	0.79	0.25	46.10	0.0042	2.94	1.50	0.23	0.34	0.23	0.34	3.62	**798.02**
12.00	**2.54**	695.00	0.79	0.25	46.10	0.0030	2.11	1.50	0.16	0.24	0.16	0.24	2.60	**797.00**
12.00	**2.35**	695.00	0.79	0.25	46.10	0.0026	1.81	1.50	0.14	0.21	0.14	0.21	2.22	**796.62**

ESTIMATED SPILLWAY CAPACITY=C x L x h^1.5 (C=2.7, L=100')

ELEVATION	h (feet)	Q(cfs)
805.5	0.00	0
806.5	1.00	270

12" DIA POND OUTFALL CAP. @ MIN VELOCITY
Worksheet for Circular Channel

Project Description	
Project File	untitled.fm2
Worksheet	PARK SITE CHAPEL HILLS DRIVE
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.010	
Channel Slope	0.004000	ft/ft
Diameter	12.00	in
Discharge	0.35	cfs

Results		
Depth	2.8	in
Flow Area	0.14	ft^2
Wetted Perimeter	1.01	ft
Top Width	0.85	ft
Critical Depth	0.24	ft
Percent Full	23.34	
Critical Slope	0.003347	ft/ft
Velocity	2.51	ft/s
Velocity Head	0.10	ft
Specific Energy	0.33	ft
Froude Number	1.09	
Maximum Discharge	3.15	cfs
Full Flow Capacity	2.93	cfs
Full Flow Slope	0.000057	ft/ft
Flow is supercritical.		

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12" DIA POND OUTFALL AT DESIGN Q
Worksheet for Circular Channel

Project Description	
Project File	untitled.fm2
Worksheet	PARK SITE CHAPEL HILLS DRIVE
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Slope

Input Data		
Mannings Coefficient	0.010	
Diameter	12.00	in
Discharge	9.50	cfs

Results		
Channel Slope	0.042075	ft/ft
Depth	12.0	in
Flow Area	0.79	ft^2
Wetted Perimeter	3.14	ft
Top Width	0.00	ft
Critical Depth	0.99	ft
Percent Full	100.00	
Critical Slope	0.039157	ft/ft
Velocity	12.10	ft/s
Velocity Head	2.27	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	10.22	cfs
Full Flow Capacity	9.50	cfs
Full Flow Slope	0.042075	ft/ft

12" DIA POND OUTFALL FULL PIPE CAPACITY

Worksheet for Circular Channel

Project Description	
Project File	untitled.fm2
Worksheet	PARK SITE CHAPEL HILLS DRIVE
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Capacity

Input Data		
Mannings Coefficient	0.010	
Channel Slope	0.004000	ft/ft
Diameter	12.00	in

Results		
Depth	1.00	ft
Discharge	2.93	cfs
Flow Area	0.79	ft²
Wetted Perimeter	3.14	ft
Top Width	0.00	ft
Critical Depth	0.73	ft
Percent Full	100.00	
Critical Slope	0.005066	ft/ft
Velocity	3.73	ft/s
Velocity Head	0.22	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	3.15	cfs
Full Flow Capacity	2.93	cfs
Full Flow Slope	0.004000	ft/ft

Table
Rating Table for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	Chapel Hills Drive
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Constant Data

Input Data	Minimum	Maximum	Increment
Channel Slope	0.020000	0.040000	0.020000 ft/ft
Water Surface Elevation	99.10	99.96	0.10 ft

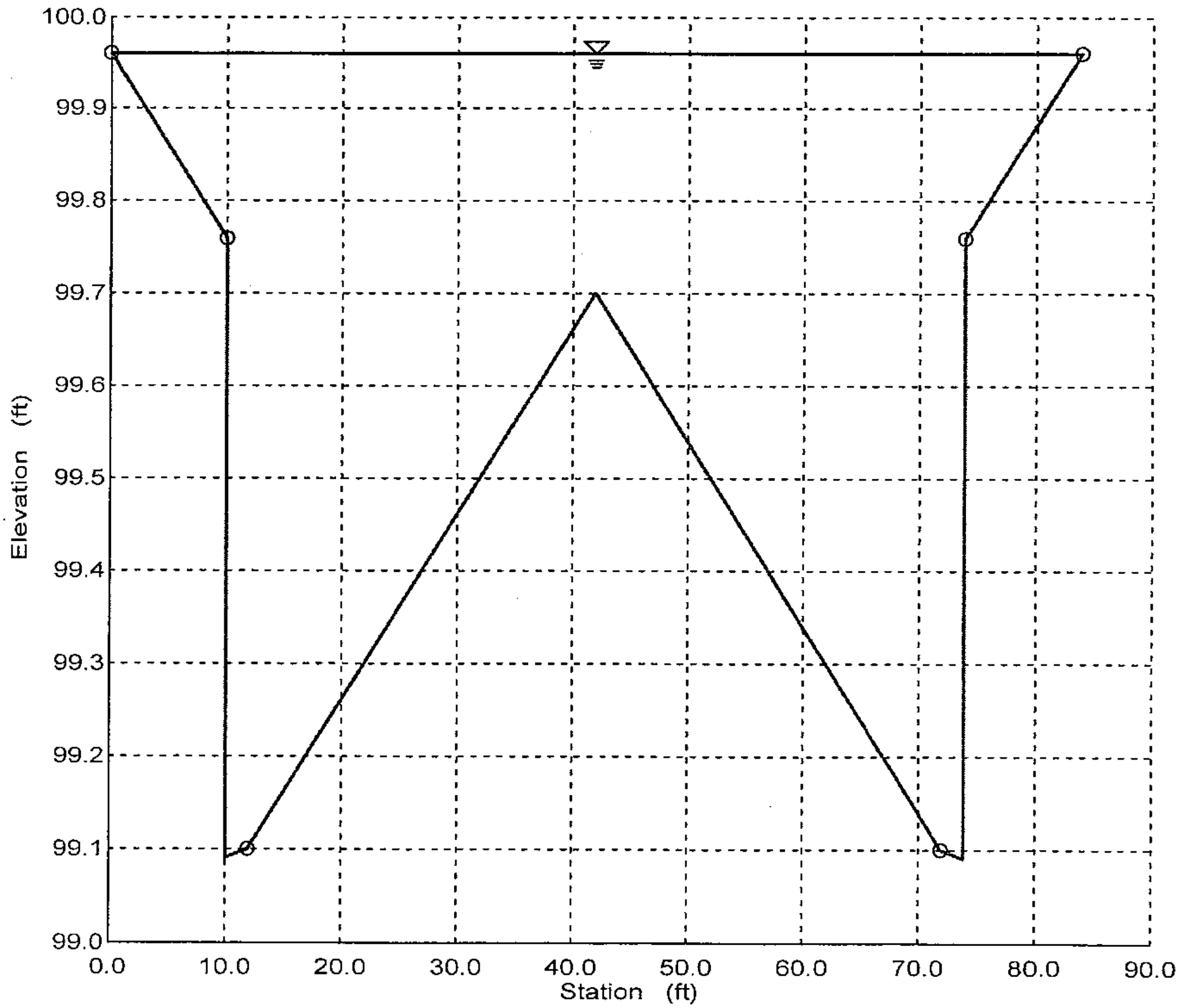
Rating Table

Water Surface Elevation (ft)	Channel Slope (ft/ft)	Wtd. Mannings Coefficient	Discharge (cfs)	Velocity (ft/s)
99.10	0.020000	0.013	0.01	0.47
99.10	0.040000	0.013	0.01	0.67
99.20	0.020000	0.013	2.35	2.55
99.20	0.040000	0.013	3.32	3.61
99.30	0.020000	0.014	9.97	3.54
99.30	0.040000	0.014	14.10	5.00
99.40	0.020000	0.015	24.80	4.34
99.40	0.040000	0.015	35.07	6.13
99.50	0.020000	0.015	48.59	5.05
99.50	0.040000	0.015	68.71	7.14
99.60	0.020000	0.015	82.94	5.71
99.60	0.040000	0.015	117.30	8.08
99.70	0.020000	0.015	129.36	6.34
99.70	0.040000	0.015	182.95	8.96
99.80	0.020000	0.015	200.95	7.47
99.80	0.040000	0.015	284.19	10.56
99.90	0.020000	0.014	287.27	8.40 — .8' or 10" Deep
99.90	0.040000	0.014	406.27	11.88
100.00	0.020000	0.014	390.25	9.20
100.00	0.040000	0.014	551.90	13.01

Cross Section
Cross Section for Irregular Channel

Project Description	
Project File	untitled.fm2
Worksheet	Chapel Hills Drive
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Discharge

Section Data		
Wtd. Mannings Coefficient	0.014	
Channel Slope	0.020000	ft/ft
Water Surface Elevation	99.96	ft
Discharge	346.68	cfs



DETENTION POND
VOLUME CALCULATIONS

PARK SITE, CHAPEL HILLS DRIVE
POND VOLUME
12/30/1997

ELEVATION feet	AREA acres	ELEVATION DIFFERENCE feet	AVERAGE AREA acres	INCREMENT VOLUME acre-feet	CUMULATIVE VOLUME acre-feet
EAST END					
796.60	0.00	0.00	0.00	0.00	**0.00**
797.00	0.07	0.40	0.04	0.01	**0.01**
798.00	0.34	1.00	0.21	0.21	**0.22**
800.00	0.43	2.00	0.39	0.77	**0.99**
802.00	0.53	2.00	0.48	0.96	**1.95**
803.50	0.60	1.50	0.57	0.85	**2.80**
+MID SECTION					2.80
801.00	0.00	0.00	0.00	0.00	2.80
802.00	0.30	1.00	0.15	0.15	2.95
803.00	1.00	1.00	0.65	0.65	3.60
803.50	1.50	0.50	1.25	0.63	4.22
803.51	2.05	0.01	1.78	0.02	**4.24**
804.00	2.30	0.49	2.18	1.07	**5.31**
+WEST END					5.31
801.00	0.00	0.00	0.00	0.00	5.31
802.00	0.20	1.00	0.10	0.10	5.41
803.00	0.50	1.00	0.35	0.35	5.76
804.00	1.00	1.00	0.75	0.75	6.51
TOTAL POND					6.51
804.01	3.25	0.00	1.63	0.00	**6.51**
805.50	3.64	1.49	3.45	5.13	**11.64**
806.50	3.80	1.00	3.72	3.72	**15.36**

HYDROLOGIC CALCULATIONS

PARK SITE - CHAPEL HILLS DRIVE

LAG TIME ESTIMATE

BASIN	OVERLAND FLOW				SWALE OR STREET FLOW					CHANNEL OR S.D. FLOW					TOTAL	TOTAL	TOTAL
ID.	L (ft)	C(10YR)	S (%)	TC(min)	TYPE	L (ft)	S (%)	V (fps)	TC(min)	TYPE	L (ft)	S(%)	V (fps)	TC(min)	TC(min)	LAG(min.)	LAG(hrs)
CHN1A	100	0.25	2	12.65	ST	2000	4	5.5	6.06	SD	300	3	19	0.26	18.97	11.38	0.190
CHN1B	100	0.25	2	12.65	SW	950	5	5	3.17	SD	300	2	13	0.38	16.20	9.72	0.162
CHN2B	200	0.75	3.8	5.96	ST	1100	3.8	5.5	3.33						9.29	5.57	0.093

SHEET FLOW (TC=1.87*(1.1-C10)(*L^.5)*S^-.33)

STREET AND SWALE VELOCITY PER MANNINGS BASED ON AN ESTIMATED AVERAGE FLOW RATE

CHANNEL VELOCITY PER MANNINGS BASED ON APPROXMATE SECTION AND FLOW RATE
STORM DRAIN VELOCITY PER MANNINGS BASED ON AN ESTIMATED STORM DRAIN SIZE

PARK SITE - CHAPEL HILLS DRIVE

CURVE NUMBER ESTIMATE

	SUB AREA ONE				SUB AREA TWO				SUB AREA THREE				SUB AREA FOUR							
SUB-BASIN LABEL	ASSUMED LAND USE	ESTIMATED PERCENT IMPERVIOUS	ESTIMATED CN	AREA AC.	ASSUMED LAND USE	ESTIMATED PERCENT IMPERVIOUS	ESTIMATED CN	AREA AC.	ASSUMED LAND USE	ESTIMATED PERCENT IMPERVIOUS	ESTIMATED CN	AREA AC.	ASSUMED LAND USE	ESTIMATED PERCENT IMPERVIOUS	ESTIMATED CN	AREA AC.	TOTAL AREA AC.	TOTAL AREA S.M.	WEIGHTED CN	WEIGHTED INPERV.
CHN1A	M.A. STREET	85.0	93.0	5.0	3 DU/AC	30.0	72.0	25.0	4 DU/AC	40.0	76.0	22.0	PARK/GOLF	8.0	65.0	13.4	65.40	0.102	73.5	33.1
CHN1B	SCHOOL	50.0	84.0	24.6													24.60	0.038	84.0	50.0
CHN2A	M.A. STREET	85.0	93.0	1.6	PARK	8.0	65.0	1.1									2.70	0.004	81.6	53.6
																	92.70	0.145		

Basin CHN1A

Estimate "C" value from weighted imperviousness (33%)

$C_{100} = .33(.95) + .67(.35) = 0.55$

$Tc = 18.97 \text{ min} \rightarrow I_{100} = 5.2$

Area = 65.4 ac

$Q_{100} = CIA = 0.55(5.2)(65.4) = 187$ cfs

$CA = 187 \div 5.2 = 36$

Basin CHN1B

Estimate "C" value from weighted imperviousness (50%)

$C_{100} = .50(.95) + .50(.35) = 0.65$

$Tc = 16.2 \text{ min} \rightarrow I_{100} = 5.5$

Area = 24.6 acres

$Q_{100} = CIA = 0.65(5.5)(24.6) = 87.9$ cfs

$CA = 87.9 \div 5.5 = 16$

CHN1A + CHN1B = (36 + 16)(5.2) = 270 cfs

HEC I CHN1A + CHN1B = 266 cfs

270 - 266 ÷ 266 × 100 = 1.5% → Good Agreement

Basin CHN2A

Estimate "C" value from weighted imperviousness (53.6%)

$C_{100} = .54(.95) + .46(.35) = 0.67$

$Tc = 9.3 \text{ min} \rightarrow I_{100} = 7.2$

Area = 2.7 acres

$Q_{100} = CIA = 0.67(7.2)(2.7) = 13.0$ cfs

HEC I CHN2A Q_{100} = 11 cfs → Reasonable Agreement

HEC1 ANALYSIS

GENERAL FORM OF THE MODEL INPUT FOR NORMAL CONDITION ANALYSIS OF 2, 4, 5, 10, 25, 50, AND 100 YEAR EVENT STORMS

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ID PARK SITE, CHAPEL HILLS DRIVE - 24HR, FULL DEVELOPED CONDITION
ID IIA _____STORM)
ID NORMAL CONDITIONS
ID FILE CHDDB.DAT
*FREE
*DIAGRAM
IT 3,0,0,300
IO 5
KK DP-1
KM COMPUTE RUNOFF FROM CHN1A, THE WATERSHED CONTRIBUTING TO THE PARK SITE AT
KM CHAPEL HILLS DRIVE/DETENTION BASIN, VIA THE PROPOSED CHAPEL HILLS DRIVE STORM
KM DRAIN
KM THIS BASIN ALSO INCLUDES THE AREA OF THE PARK THAT CONTRIBUTES TO THE POND
BA .102
IN 15
PB _____
PC  0000   .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143
PC .0165   .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530
PC .0600   .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900
PC .8000   .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550
PC .8600   .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938
PC .8975   .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270
PC .9300   .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525
PC .9550   .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775
PC .9800   .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913
PC .9925   .9938   .9950   .9963   .9975   .9988   1.000
LS 0,73.5
UD .190
KK  DP-2
KM COMPUTE RUNOFF FROM CHN1B, THE PUBLIC SCHOOL SITE LOCATED NORTH OF THE PARK
KM SITE AT CHAPEL HILLS DRIVE/DETENTION BASIN
BA .038
LS 0,84
UD .162
KK DP-3
KM COMBINE RUNOFF FROM CHN1A & CHN1B FOR THE TOTAL PROPOSED INFLOW TO
KM THE DETENTION POND AT THE PARK SITE, CHAPEL HILLS DRIVE
HC 2
KK DP-4
KM ROUTE COMBINED FLOW FROM CHN1A AND CHN1B THROUGH THE PROPOSED DETENTION
KM POND AT THE PARK SITE-CHAPEL HILLS DRIVE
KM STAGE STORAGE CURVE PER THE 12/22/97 GRADING PLAN
KM DISCHARGE CURVE REFLECTS  12" DIAMETER OUTLET PIPE CONTROL FOR NORMAL
KM DISCHARGE AND 100' LONG SPILLWAY SET AT ELEVATION 6805.5
KO 2,1
RS 1,STOR,0
SV      0,    .01,    .22,    .99,   1.95,   2.80,    4.25,5.31,   6.51,  11.64,   15.36
SQ   2.35,   2.54,   3.00,   3.73,   4.35,   4.75,    5.36,5.50,   8.39,   9.01,    279
SE 6796.6,6797.0,6798.0,6800.0,6802.0,6803.5,6803.51,6804,6804.1,6805.5,6806.5
KK CHN2A
KM COMPUTE RUNOFF FROM CHN2A, THE AREAS OF CHAPEL HILLS DRIVE, LEXINGTON DRIVE,
KM AND THE PARK SITE CONTRIBUTING DIRECT RUNOFF TO THE INLET LOCATED AT THE
KM NORTHEAST CORNER OF THE CHAPEL HILLS DRIVE AND LEXINGTON DRIVE INTERSECTION
BA .0042
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LS 0,81.6
UD .093
KK DP-5
KM COMBINE THE DIRECT RUNOFF FROM CHN2A & THE OUTFLOW FROM THE DETENTION BASIN
KM AT THE INTERSECTION OF CHAPEL HILLS DRIVE AND LEXINGTON DRIVE
HC 2
ZZ
```

HEC1 OUT PUT SUMMARIES

FOR

2-YEAR TO 50-YEAR STORM

ASSUMING NORMAL CONDITIONS

POND EMPTY AND OUTLET FUNCTIONING

AT BEGINNING OF STORM

2 Year Storm

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DP-1	27.	6.10	3.	1.	1.	0.10		
HYDROGRAPH AT	DP-2	27.	6.05	3.	1.	1.	0.04		
2 COMBINED AT	DP-3	53.	6.10	6.	3.	3.	0.14		
ROUTED TO	DP-4	4.	7.20	4.	3.	3.	0.14	6801.40	7.25
HYDROGRAPH AT	CHN2A	3.	6.00	0.	0.	0.	0.00		
2 COMBINED AT	DP-5	6.	6.05	4.	3.	3.	0.14		

*** NORMAL END OF HEC-1 ***

Rainfall Depth = 2.0"

4 Year Storm

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DP-1	46.	6.10	5.	2.	2.	0.10		
HYDROGRAPH AT	DP-2	38.	6.05	4.	2.	2.	0.04		
2 COMBINED AT	DP-3	83.	6.10	9.	4.	4.	0.14		
ROUTED TO	DP-4	5.	8.00	5.	4.	4.	0.14	6803.50	7.70
HYDROGRAPH AT	CHN2A	4.	6.00	0.	0.	0.	0.00		
2 COMBINED AT	DP-5	8.	6.05	5.	4.	4.	0.14		

*** NORMAL END OF HEC-1 ***

Rainfall Depth = 2.4"

5 Year Storm

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DP-1	57.	6.10	6.	3.	3.	0.10		
HYDROGRAPH AT	DP-2	43.	6.05	4.	2.	2.	0.04		
2 COMBINED AT	DP-3	98.	6.10	11.	5.	5.	0.14		
ROUTED TO	DP-4	5.	8.15	5.	4.	4.	0.14	6803.50	7.45
HYDROGRAPH AT	CHN2A	5.	6.00	0.	0.	0.	0.00		
2 COMBINED AT	DP-5	9.	6.05	5.	4.	4.	0.14		

*** NORMAL END OF HEC-1 ***

Rainfall Depth = 2.6"

10 Year Storm

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DP-1	80.	6.10	9.	4.	4.	0.10		
HYDROGRAPH AT	DP-2	55.	6.05	6.	2.	2.	0.04		
2 COMBINED AT	DP-3	132.	6.10	14.	6.	6.	0.14		
ROUTED TO	DP-4	5.	8.15	5.	4.	4.	0.14	6803.87	8.20
HYDROGRAPH AT	CHN2A	6.	6.00	1.	0.	0.	0.00		
2 COMBINED AT	DP-5	10.	6.05	6.	4.	4.	0.14		

*** NORMAL END OF HEC-1 ***

Rainfall Depth = 3.00"

25 Year Storm

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DP-1	117.	6.10	13.	6.	6.	0.10		
HYDROGRAPH AT	DP-2	73.	6.05	8.	3.	3.	0.04		
2 COMBINED AT	DP-3	186.	6.05	20.	9.	9.	0.14		
ROUTED TO	DP-4	8.	8.05	8.	5.	5.	0.14	6804.28	8.15
HYDROGRAPH AT	CHN2A	8.	6.00	1.	0.	0.	0.00		
2 COMBINED AT	DP-5	13.	6.00	9.	6.	6.	0.14		

*** NORMAL END OF HEC-1 ***

Rainfall Depth = 3.60"

50 Year Storm

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DP-1	143.	6.10	15.	7.	7.	0.10		
HYDROGRAPH AT	DP-2	85.	6.05	9.	4.	4.	0.04		
2 COMBINED AT	DP-3	225.	6.05	24.	11.	11.	0.14		
ROUTED TO	DP-4	9.	8.20	9.	6.	6.	0.14	6804.77	8.20
HYDROGRAPH AT	CHN2A	10.	6.00	1.	0.	0.	0.00		
2 COMBINED AT	DP-5	15.	6.00	9.	6.	6.	0.14		

*** NORMAL END OF HEC-1 ***

Rainfall Depth = 4.00"

100-YEAR TYPE IIA STORM

NORMAL CONDITIONS
POND EMPTY AND OUTLET FUNCTIONING
AT BEGINNING OF STORM

HEC1 S/N: 1343000062   HMVersion: 6.33   Data File: X:\870000.ALL\871616\HEC1\CHDDB.DAT

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY  1991               *
*           VERSION 4.0.1E             *
*                                      *
*  RUN DATE  01/02/1998  TIME 12:10:03 *
*                                      *
****************************************
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****************************************
*                                      *
*   U.S. ARMY CORPS OF ENGINEERS       *
*   HYDROLOGIC ENGINEERING CENTER      *
*        609 SECOND STREET             *
*     DAVIS, CALIFORNIA 95616          *
*         (916) 756-1104               *
*                                      *
****************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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:::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::
:::                                     :::
:::  Full Microcomputer Implementation  :::
:::                 by                  :::
:::         Haestad Methods, Inc.       :::
:::                                     :::
:::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          ID    PARK SITE, CHAPEL HILLS DRIVE - 24HR, FULL DEVELOPED CONDITION
          ID    100 YEAR, TYPE IIA STROM
          ID    NORMAL OPERATING CONDITIONS
          ID    FILE CHDDB100.DAT
*** FREE ***
          *DIAGRAM
          IT        3       0       0     300
          IO        5

          KK     DP-1
          KM    COMPUTE RUNOFF FROM CHN1A, THE WATERSHED CONTRIBUTING TO THE PARK SITE AT
          KM    CHAPEL HILLS DRIVE/DETENTION BASIN, VIA THE PROPOSED CHAPEL HILLS DRIVE STORM
          KM    DRAIN. THIS BASIN ALSO INCLUDES THE AREA OF THE PARK THAT CONTRIBUTES TO THE
          KM    POND.
          BA     .102
          IN       15
          PB      4.4
          PC     0000   .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143
          PC    .0165   .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530
          PC    .0600   .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900
          PC    .8000   .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550
          PC    .8600   .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938
          PC    .8975   .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270
          PC    .9300   .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525
          PC    .9550   .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775
          PC    .9800   .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913
          PC    .9925   .9938   .9950   .9963   .9975   .9988   1.000
          LS        0    73.5
          UD     .190

          KK     DP-2
          KM    COMPUTE RUNOFF FROM CHN1B, THE PUBLIC SCHOOL SITE LOCATED NORTH OF THE PARK
          KM    SITE AT CHAPEL HILLS DRIVE/DETENTION BASIN
          BA     .038
          LS        0      84
          UD     .162

          KK     DP-3
          KM    COMBINE RUNOFF FROM CHN1A & CHN1B FOR THE TOTAL PROPOSED INFLOW TO
          KM    THE DETENTION POND AT THE PARK SITE, CHAPEL HILLS DRIVE
          HC        2

          KK     DP-4
          KM    ROUTE COMBINED FLOW FROM CHN1A AND CHN1B THROUGH THE PROPOSED DETENTION
          KM    POND AT THE PARK SITE-CHAPEL HILLS DRIVE
          KM    STAGE STORAGE CURVE PER THE 12/22/97 GRADING PLAN
          KM    DISCHARGE CURVE REFLECTS  12" DIAMETER OUTLET PIPE CONTROL FOR NORMAL
          KM    DISCHARGE AND 100' LONG SPILLWAY SET AT ELEVATION 6805.5
          KO        2       1
          RS        1    STOR       0
          SV        0     .01     .22     .99    1.95    2.80    4.25    5.31    6.51   11.64
          SV    15.36
          SQ     2.35    2.54    3.00    3.73    4.35    4.75    5.36    5.50    8.39    9.01
          SQ      279
          SE   6796.6  6797.0  6798.0  6800.0  6802.0  6803.5 6803.51    6804  6804.1  6805.5
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  50          SE  6806.5

  51          KK   CHN2A
  52          KM   COMPUTE RUNOFF FROM CHN2A, THE AREAS OF CHAPEL HILLS DRIVE, LEXINGTON DRIVE,
  53          KM   AND THE PARK SITE CONTRIBUTING DIRECT RUNOFF TO THE INLET LOCATED AT THE
  54          KM   NORTHEAST CORNER OF THE CHAPEL HILLS DRIVE AND LEXINGTON DRIVE INTERSECTION
  55          BA   .0042
  56          LS      0     81.6
  57          UD    .093

  58          KK    DP-5
  59          KM   COMBINE THE DIRECT RUNOFF FROM CHN2A & THE OUTFLOW FROM THE DETENTION BASIN
  60          KM   AT THE INTERSECTION  OF CHAPEL HILLS DRIVE AND LEXINGTON DRIVE
  61          HC      2
  62          ZZ
```

```
                    SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

 NO.       (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

   7         DP-1
               .
               .
  27           .          DP-2
               .             .
               .             .
  33         DP-3.............
               V
               V
  37         DP-4
               .
               .
  51           .         CHN2A
               .             .
               .             .
  58         DP-5.............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
****************************************                                        **************************************
*                                      *                                        *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                        *   U.S. ARMY CORPS OF ENGINEERS     *
*              MAY  1991               *                                        *   HYDROLOGIC ENGINEERING CENTER    *
*           VERSION 4.0.1E             *                                        *         609 SECOND STREET          *
*                                      *                                        *      DAVIS, CALIFORNIA 95616       *
*  RUN DATE  01/02/1998  TIME  12:10:03 *                                       *          (916) 756-1104            *
*                                      *                                        *                                    *
****************************************                                        **************************************
```


```
                         PARK SITE, CHAPEL HILLS DRIVE - 24HR, FULL DEVELOPED CONDITION
                         100 YEAR, TYPE IIA STROM
                         NORMAL OPERATING CONDITIONS
                         FILE CHDDB100.DAT

   6 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN          3  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1   0  STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1   0  ENDING DATE
                     NDTIME       1457  ENDING TIME
                      ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL    0.05 HOURS
                      TOTAL TIME BASE   14.95 HOURS

          ENGLISH UNITS
               DRAINAGE AREA          SQUARE MILES
               PRECIPITATION DEPTH    INCHES
               LENGTH, ELEVATION      FEET
               FLOW                   CUBIC FEET PER SECOND
               STORAGE VOLUME         ACRE-FEET
               SURFACE AREA           ACRES
               TEMPERATURE            DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              **************
              *            *
  37 KK       *    DP-4    *
              *            *
              **************

  43 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          2  PRINT CONTROL
                      IPLOT          1  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

  44 RS          STORAGE ROUTING
                      NSTPS          1  NUMBER OF SUBREACHES
                       ITYP       STOR  TYPE OF INITIAL CONDITION
                     RSVRIC       0.00  INITIAL CONDITION
                          X       0.00  WORKING R AND D COEFFICIENT

  45 SV        STORAGE          0.0       0.0       0.2       1.0       2.0       2.8       4.3       5.3       6.5      11.6
                               15.4

  47 SQ        DISCHARGE         2.        3.        3.        4.        4.        5.        5.        6.        8.        9.
                               279.

  49 SE        ELEVATION    6796.60   6797.00   6798.00   6800.00   6802.00   6803.50   6803.51   6804.00   6804.10   6805.50
                            6806.50
                                                                 ***

*****************************************************************************************************************************
```

HYDROGRAPH AT STATION DP-4

DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	2.	0.0	6796.6	*	1		0500	101	2.	0.0	6796.6	*	1		1000	201	9.	10.5	6805.2
1		0003	2	2.	0.0	6796.6	*	1		0503	102	2.	0.0	6796.6	*	1		1003	202	9.	10.5	6805.2
1		0006	3	2.	0.0	6796.6	*	1		0506	103	2.	0.0	6796.6	*	1		1006	203	9.	10.5	6805.2
1		0009	4	2.	0.0	6796.6	*	1		0509	104	2.	0.0	6796.6	*	1		1009	204	9.	10.5	6805.2
1		0012	5	2.	0.0	6796.6	*	1		0512	105	2.	0.0	6796.6	*	1		1012	205	9.	10.5	6805.2
1		0015	6	2.	0.0	6796.6	*	1		0515	106	2.	0.0	6796.6	*	1		1015	206	9.	10.5	6805.2
1		0018	7	2.	0.0	6796.6	*	1		0518	107	2.	0.0	6796.6	*	1		1018	207	9.	10.5	6805.2
1		0021	8	2.	0.0	6796.6	*	1		0521	108	2.	0.0	6796.6	*	1		1021	208	9.	10.5	6805.2
1		0024	9	2.	0.0	6796.6	*	1		0524	109	2.	0.0	6796.6	*	1		1024	209	9.	10.4	6805.2
1		0027	10	2.	0.0	6796.6	*	1		0527	110	2.	0.0	6796.6	*	1		1027	210	9.	10.4	6805.2
1		0030	11	2.	0.0	6796.6	*	1		0530	111	2.	0.0	6796.6	*	1		1030	211	9.	10.4	6805.2
1		0033	12	2.	0.0	6796.6	*	1		0533	112	2.	0.0	6796.6	*	1		1033	212	9.	10.4	6805.2
1		0036	13	2.	0.0	6796.6	*	1		0536	113	2.	0.0	6796.6	*	1		1036	213	9.	10.4	6805.2
1		0039	14	2.	0.0	6796.6	*	1		0539	114	3.	0.0	6797.1	*	1		1039	214	9.	10.4	6805.2
1		0042	15	2.	0.0	6796.6	*	1		0542	115	3.	0.1	6797.6	*	1		1042	215	9.	10.4	6805.1
1		0045	16	2.	0.0	6796.6	*	1		0545	116	3.	0.4	6798.4	*	1		1045	216	9.	10.3	6805.1
1		0048	17	2.	0.0	6796.6	*	1		0548	117	3.	0.7	6799.3	*	1		1048	217	9.	10.3	6805.1
1		0051	18	2.	0.0	6796.6	*	1		0551	118	4.	1.2	6800.4	*	1		1051	218	9.	10.3	6805.1
1		0054	19	2.	0.0	6796.6	*	1		0554	119	4.	1.9	6801.8	*	1		1054	219	9.	10.3	6805.1
1		0057	20	2.	0.0	6796.6	*	1		0557	120	5.	2.7	6803.2	*	1		1057	220	9.	10.3	6805.1
1		0100	21	2.	0.0	6796.6	*	1		0600	121	5.	3.6	6803.5	*	1		1100	221	9.	10.3	6805.1
1		0103	22	2.	0.0	6796.6	*	1		0603	122	5.	4.6	6803.7	*	1		1103	222	9.	10.2	6805.1
1		0106	23	2.	0.0	6796.6	*	1		0606	123	6.	5.7	6804.0	*	1		1106	223	9.	10.2	6805.1
1		0109	24	2.	0.0	6796.6	*	1		0609	124	8.	6.7	6804.1	*	1		1109	224	9.	10.2	6805.1
1		0112	25	2.	0.0	6796.6	*	1		0612	125	9.	7.5	6804.4	*	1		1112	225	9.	10.2	6805.1
1		0115	26	2.	0.0	6796.6	*	1		0615	126	9.	8.1	6804.5	*	1		1115	226	9.	10.2	6805.1
1		0118	27	2.	0.0	6796.6	*	1		0618	127	9.	8.6	6804.7	*	1		1118	227	9.	10.2	6805.1
1		0121	28	2.	0.0	6796.6	*	1		0621	128	9.	8.9	6804.8	*	1		1121	228	9.	10.1	6805.1
1		0124	29	2.	0.0	6796.6	*	1		0624	129	9.	9.2	6804.8	*	1		1124	229	9.	10.1	6805.1

1	0127	30	2.	0.0	6796.6	*	1	0627	130	9.	9.4	6804.9	*	1	1127	230	9.	10.1	6805.1
1	0130	31	2.	0.0	6796.6	*	1	0630	131	9.	9.5	6804.9	*	1	1130	231	9.	10.1	6805.1
1	0133	32	2.	0.0	6796.6	*	1	0633	132	9.	9.7	6805.0	*	1	1133	232	9.	10.1	6805.1
1	0136	33	2.	0.0	6796.6	*	1	0636	133	9.	9.8	6805.0	*	1	1136	233	9.	10.1	6805.1
1	0139	34	2.	0.0	6796.6	*	1	0639	134	9.	9.9	6805.0	*	1	1139	234	9.	10.1	6805.1
1	0142	35	2.	0.0	6796.6	*	1	0642	135	9.	10.0	6805.1	*	1	1142	235	9.	10.0	6805.1
1	0145	36	2.	0.0	6796.6	*	1	0645	136	9.	10.1	6805.1	*	1	1145	236	9.	10.0	6805.1
1	0148	37	2.	0.0	6796.6	*	1	0648	137	9.	10.1	6805.1	*	1	1148	237	9.	10.0	6805.1
1	0151	38	2.	0.0	6796.6	*	1	0651	138	9.	10.2	6805.1	*	1	1151	238	9.	10.0	6805.0
1	0154	39	2.	0.0	6796.6	*	1	0654	139	9.	10.3	6805.1	*	1	1154	239	9.	10.0	6805.0
1	0157	40	2.	0.0	6796.6	*	1	0657	140	9.	10.3	6805.1	*	1	1157	240	9.	10.0	6805.0
1	0200	41	2.	0.0	6796.6	*	1	0700	141	9.	10.4	6805.1	*	1	1200	241	9.	9.9	6805.0
1	0203	42	2.	0.0	6796.6	*	1	0703	142	9.	10.4	6805.2	*	1	1203	242	9.	9.9	6805.0
1	0206	43	2.	0.0	6796.6	*	1	0706	143	9.	10.4	6805.2	*	1	1206	243	9.	9.9	6805.0
1	0209	44	2.	0.0	6796.6	*	1	0709	144	9.	10.5	6805.2	*	1	1209	244	9.	9.9	6805.0
1	0212	45	2.	0.0	6796.6	*	1	0712	145	9.	10.5	6805.2	*	1	1212	245	9.	9.9	6805.0
1	0215	46	2.	0.0	6796.6	*	1	0715	146	9.	10.5	6805.2	*	1	1215	246	9.	9.9	6805.0
1	0218	47	2.	0.0	6796.6	*	1	0718	147	9.	10.6	6805.2	*	1	1218	247	9.	9.8	6805.0
1	0221	48	2.	0.0	6796.6	*	1	0721	148	9.	10.6	6805.2	*	1	1221	248	9.	9.8	6805.0
1	0224	49	2.	0.0	6796.6	*	1	0724	149	9.	10.6	6805.2	*	1	1224	249	9.	9.8	6805.0
1	0227	50	2.	0.0	6796.6	*	1	0727	150	9.	10.6	6805.2	*	1	1227	250	9.	9.8	6805.0
1	0230	51	2.	0.0	6796.6	*	1	0730	151	9.	10.6	6805.2	*	1	1230	251	9.	9.8	6805.0
1	0233	52	2.	0.0	6796.6	*	1	0733	152	9.	10.7	6805.2	*	1	1233	252	9.	9.8	6805.0
1	0236	53	2.	0.0	6796.6	*	1	0736	153	9.	10.7	6805.2	*	1	1236	253	9.	9.8	6805.0
1	0239	54	2.	0.0	6796.6	*	1	0739	154	9.	10.7	6805.2	*	1	1239	254	9.	9.7	6805.0
1	0242	55	2.	0.0	6796.6	*	1	0742	155	9.	10.7	6805.2	*	1	1242	255	9.	9.7	6805.0
1	0245	56	2.	0.0	6796.6	*	1	0745	156	9.	10.7	6805.3	*	1	1245	256	9.	9.7	6805.0
1	0248	57	2.	0.0	6796.6	*	1	0748	157	9.	10.7	6805.3	*	1	1248	257	9.	9.7	6805.0
1	0251	58	2.	0.0	6796.6	*	1	0751	158	9.	10.8	6805.3	*	1	1251	258	9.	9.7	6805.0
1	0254	59	2.	0.0	6796.6	*	1	0754	159	9.	10.8	6805.3	*	1	1254	259	9.	9.7	6805.0
1	0257	60	2.	0.0	6796.6	*	1	0757	160	9.	10.8	6805.3	*	1	1257	260	9.	9.6	6805.0
1	0300	61	2.	0.0	6796.6	*	1	0800	161	9.	10.8	6805.3	*	1	1300	261	9.	9.6	6805.0
1	0303	62	2.	0.0	6796.6	*	1	0803	162	9.	10.8	6805.3	*	1	1303	262	9.	9.6	6804.9
1	0306	63	2.	0.0	6796.6	*	1	0806	163	9.	10.8	6805.3	*	1	1306	263	9.	9.6	6804.9
1	0309	64	2.	0.0	6796.6	*	1	0809	164	9.	10.9	6805.3	*	1	1309	264	9.	9.6	6804.9
1	0312	65	2.	0.0	6796.6	*	1	0812	165	9.	10.9	6805.3	*	1	1312	265	9.	9.6	6804.9
1	0315	66	2.	0.0	6796.6	*	1	0815	166	9.	10.9	6805.3	*	1	1315	266	9.	9.6	6804.9
1	0318	67	2.	0.0	6796.6	*	1	0818	167	9.	10.9	6805.3	*	1	1318	267	9.	9.5	6804.9
1	0321	68	2.	0.0	6796.6	*	1	0821	168	9.	10.9	6805.3	*	1	1321	268	9.	9.5	6804.9
1	0324	69	2.	0.0	6796.6	*	1	0824	169	9.	10.8	6805.3	*	1	1324	269	9.	9.5	6804.9
1	0327	70	2.	0.0	6796.6	*	1	0827	170	9.	10.8	6805.3	*	1	1327	270	9.	9.5	6804.9
1	0330	71	2.	0.0	6796.6	*	1	0830	171	9.	10.8	6805.3	*	1	1330	271	9.	9.5	6804.9
1	0333	72	2.	0.0	6796.6	*	1	0833	172	9.	10.8	6805.3	*	1	1333	272	9.	9.4	6804.9
1	0336	73	2.	0.0	6796.6	*	1	0836	173	9.	10.8	6805.3	*	1	1336	273	9.	9.4	6804.9
1	0339	74	2.	0.0	6796.6	*	1	0839	174	9.	10.8	6805.3	*	1	1339	274	9.	9.4	6804.9
1	0342	75	2.	0.0	6796.6	*	1	0842	175	9.	10.8	6805.3	*	1	1342	275	9.	9.4	6804.9
1	0345	76	2.	0.0	6796.6	*	1	0845	176	9.	10.8	6805.3	*	1	1345	276	9.	9.4	6804.9
1	0348	77	2.	0.0	6796.6	*	1	0848	177	9.	10.8	6805.3	*	1	1348	277	9.	9.4	6804.9
1	0351	78	2.	0.0	6796.6	*	1	0851	178	9.	10.8	6805.3	*	1	1351	278	9.	9.3	6804.9
1	0354	79	2.	0.0	6796.6	*	1	0854	179	9.	10.8	6805.3	*	1	1354	279	9.	9.3	6804.9
1	0357	80	2.	0.0	6796.6	*	1	0857	180	9.	10.7	6805.3	*	1	1357	280	9.	9.3	6804.9
1	0400	81	2.	0.0	6796.6	*	1	0900	181	9.	10.7	6805.3	*	1	1400	281	9.	9.3	6804.9
1	0403	82	2.	0.0	6796.6	*	1	0903	182	9.	10.7	6805.3	*	1	1403	282	9.	9.3	6804.9
1	0406	83	2.	0.0	6796.6	*	1	0906	183	9.	10.7	6805.2	*	1	1406	283	9.	9.2	6804.8
1	0409	84	2.	0.0	6796.6	*	1	0909	184	9.	10.7	6805.2	*	1	1409	284	9.	9.2	6804.8
1	0412	85	2.	0.0	6796.6	*	1	0912	185	9.	10.7	6805.2	*	1	1412	285	9.	9.2	6804.8
1	0415	86	2.	0.0	6796.6	*	1	0915	186	9.	10.7	6805.2	*	1	1415	286	9.	9.2	6804.8
1	0418	87	2.	0.0	6796.6	*	1	0918	187	9.	10.7	6805.2	*	1	1418	287	9.	9.2	6804.8
1	0421	88	2.	0.0	6796.6	*	1	0921	188	9.	10.7	6805.2	*	1	1421	288	9.	9.2	6804.8
1	0424	89	2.	0.0	6796.6	*	1	0924	189	9.	10.7	6805.2	*	1	1424	289	9.	9.1	6804.8
1	0427	90	2.	0.0	6796.6	*	1	0927	190	9.	10.7	6805.2	*	1	1427	290	9.	9.1	6804.8
1	0430	91	2.	0.0	6796.6	*	1	0930	191	9.	10.6	6805.2	*	1	1430	291	9.	9.1	6804.8
1	0433	92	2.	0.0	6796.6	*	1	0933	192	9.	10.6	6805.2	*	1	1433	292	9.	9.1	6804.8
1	0436	93	2.	0.0	6796.6	*	1	0936	193	9.	10.6	6805.2	*	1	1436	293	9.	9.1	6804.8
1	0439	94	2.	0.0	6796.6	*	1	0939	194	9.	10.6	6805.2	*	1	1439	294	9.	9.0	6804.8
1	0442	95	2.	0.0	6796.6	*	1	0942	195	9.	10.6	6805.2	*	1	1442	295	9.	9.0	6804.8
1	0445	96	2.	0.0	6796.6	*	1	0945	196	9.	10.6	6805.2	*	1	1445	296	9.	9.0	6804.8
1	0448	97	2.	0.0	6796.6	*	1	0948	197	9.	10.6	6805.2	*	1	1448	297	9.	9.0	6804.8
1	0451	98	2.	0.0	6796.6	*	1	0951	198	9.	10.6	6805.2	*	1	1451	298	9.	9.0	6804.8
1	0454	99	2.	0.0	6796.6	*	1	0954	199	9.	10.6	6805.2	*	1	1454	299	9.	8.9	6804.8
1	0457	100	2.	0.0	6796.6	*	1	0957	200	9.	10.6	6805.2	*	1	1457	300	9.	8.9	6804.8

PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	14.95-HR
9.	8.25	(CFS)	9.	6.	6.	6.
		(INCHES)	0.589	1.031	1.031	1.031
		(AC-FT)	4.	8.	8.	8.

PEAK STORAGE (AC-FT)	TIME (HR)	MAXIMUM AVERAGE STORAGE 6-HR	24-HR	72-HR	14.95-HR
11.	8.25	10.	6.	6.	6.

PEAK STAGE (FEET)	TIME (HR)	MAXIMUM AVERAGE STAGE 6-HR	24-HR	72-HR	14.95-HR
6805.29	8.25	6805.15	6801.74	6801.74	6801.74

CUMULATIVE AREA = 0.14 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DP-1	170.	6.10	18.	8.	8.	0.10		
HYDROGRAPH AT	DP-2	98.	6.05	10.	4.	4.	0.04		
2 COMBINED AT	DP-3	266.	6.05	29.	13.	13.	0.14		
ROUTED TO	DP-4	9.	8.25	9.	6.	6.	0.14	6805.29	8.25
HYDROGRAPH AT	CHN2A	11.	6.00	1.	0.	0.	0.00		
2 COMBINED AT	DP-5	16.	6.00	10.	7.	7.	0.14		

*** NORMAL END OF HEC-1 ***

100-YEAR TYPE IIA STORM

POND EMPTY, OUTLET CLOGGED
AT BEGINNING OF STORM

HEC1 S/N: 1343000062   HMVersion: 6.33   Data File: X:\870000.ALL\871616\HEC1\CHDDBOC.DAT

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*             MAY  1991                *
*           VERSION 4.0.1E             *
*                                      *
*  RUN DATE  01/02/1998  TIME  11:56:12 *
*                                      *
****************************************
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***************************************
*                                     *
*   U.S. ARMY CORPS OF ENGINEERS      *
*   HYDROLOGIC ENGINEERING CENTER     *
*        609 SECOND STREET            *
*     DAVIS, CALIFORNIA 95616         *
*         (916) 756-1104              *
*                                     *
***************************************
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X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
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::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::
:::                                    :::
:::  Full Microcomputer Implementation :::
:::               by                   :::
:::       Haestad Methods, Inc.        :::
:::                                    :::
::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::
```

37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          ID   PARK SITE, CHAPEL HILLS DRIVE - 24HR, FULL DEVELOPED CONDITION
          ID   TYPE IIA 100 YEAR STORM,  OUTLET PIPE CLOGGED, POND EMPTY AT
          ID   BEGINNING OF STORM
          ID   FILE CHDDBOC.DAT
*** FREE ***
          *DIAGRAM
          IT      3       0       0     300
          IO      5

          KK    DP-1
          KM   COMPUTE RUNOFF FROM CHN1A, THE WATERSHED CONTRIBUTING TO THE PARK SITE AT
          KM   CHAPEL HILLS DRIVE/DETENTION BASIN, VIA THE PROPOSED CHAPEL HILLS DRIVE STORM
          KM   DRAIN. THIS BASIN ALSO INCLUDES THE AREA OF THE PARK THAT CONTRIBUTES TO THE
          KM   POND.
          BA    .102
          IN      15
          PB     4.4
          PC    0000   .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143
          PC   .0165   .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530
          PC   .0600   .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900
          PC   .8000   .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550
          PC   .8600   .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938
          PC   .8975   .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270
          PC   .9300   .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525
          PC   .9550   .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775
          PC   .9800   .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913
          PC   .9925   .9938   .9950   .9963   .9975   .9988   1.000
          LS       0    73.5
          UD    .190

          KK    DP-2
          KM   COMPUTE RUNOFF FROM CHN1B, THE PUBLIC SCHOOL SITE LOCATED NORTH OF THE PARK
          KM   SITE AT CHAPEL HILLS DRIVE/DETENTION BASIN
          BA    .038
          LS       0      84
          UD    .162

          KK    DP-3
          KM   COMBINE RUNOFF FROM CHN1A & CHN1B FOR THE TOTAL PROPOSED INFLOW TO
          KM   THE DETENTION POND AT THE PARK SITE, CHAPEL HILLS DRIVE
          HC       2

          KK    DP-4
          KM   ROUTE COMBINED FLOW FROM CHN1A AND CHN1B THROUGH THE PROPOSED DETENTION
          KM   POND AT THE PARK SITE-CHAPEL HILLS DRIVE
          KM   STAGE STORAGE CURVE PER THE 12/22/97 GRADING PLAN
          KM   DISCHARGE CURVE REFLECTS  12" DIAMETER OUTLET PIPE CONTROL FOR NORMAL
          KM   DISCHARGE AND 100' LONG SPILLWAY SET AT ELEVATION 6805.5
          KO       2       1
          RS       1    STOR       0
          SV       0     .01     .22     .99    1.95    2.80    4.25    5.31    6.51   11.64
          SV   15.36
          SQ       0       0       0       0       0       0       0       0       0       0
          SQ     270
          SE  6796.6  6797.0  6798.0  6800.0  6802.0  6803.5 6803.51    6804  6804.1  6805.5
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LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 50           SE  6806.5

 51           KK   CHN2A
 52           KM   COMPUTE RUNOFF FROM CHN2A, THE AREAS OF CHAPEL HILLS DRIVE, LEXINGTON DRIVE,
 53           KM   AND THE PARK SITE CONTRIBUTING DIRECT RUNOFF TO THE INLET LOCATED AT THE
 54           KM   NORTHEAST CORNER OF THE CHAPEL HILLS DRIVE AND LEXINGTON DRIVE INTERSECTION
 55           BA   .0042
 56           LS       0    81.6
 57           UD    .093

 58           KK    DP-5
 59           KM   COMBINE THE DIRECT RUNOFF FROM CHN2A & THE OUTFLOW FROM THE DETENTION BASIN
 60           KM   AT THE INTERSECTION  OF CHAPEL HILLS DRIVE AND LEXINGTON DRIVE
 61           HC       2
 62           ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
LINE     (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

  7      DP-1
            .
            .
 27         .          DP-2
            .             .
            .             .
 33      DP-3.............
            V
            V
 37      DP-4
            .
            .
 51         .         CHN2A
            .             .
            .             .
 58      DP-5.............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

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HEC1 S/N: 1343000062        HMVersion: 6.33    Data File: X:\870000.ALL\871616\HEC1\CHDDBOC.DAT

****************************************                                        ****************************************
*                                      *                                        *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                        *   U.S. ARMY CORPS OF ENGINEERS       *
*             MAY  1991                *                                        *   HYDROLOGIC ENGINEERING CENTER      *
*           VERSION 4.0.1E             *                                        *          609 SECOND STREET           *
*                                      *                                        *       DAVIS, CALIFORNIA 95616        *
* RUN DATE  01/02/1998  TIME  11:56:12 *                                        *          (916) 756-1104              *
*                                      *                                        *                                      *
****************************************                                        ****************************************



                              PARK SITE, CHAPEL HILLS DRIVE - 24HR, FULL DEVELOPED CONDITION
                              TYPE IIA 100 YEAR STORM,  OUTLET PIPE CLOGGED, POND EMPTY AT
                              BEGINNING OF STORM
                              FILE CHDDBOC.DAT

   6 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           5  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                       NMIN           3  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      1    0  ENDING DATE
                     NDTIME        1457  ENDING TIME
                      ICENT          19  CENTURY MARK

                 COMPUTATION INTERVAL    0.05 HOURS
                      TOTAL TIME BASE   14.95 HOURS

         ENGLISH UNITS
              DRAINAGE AREA           SQUARE MILES
              PRECIPITATION DEPTH     INCHES
              LENGTH, ELEVATION       FEET
              FLOW                    CUBIC FEET PER SECOND
              STORAGE VOLUME          ACRE-FEET
              SURFACE AREA            ACRES
              TEMPERATURE             DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

             **************
             *            *
  37 KK      *    DP-4    *
             *            *
             **************

  43 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           2  PRINT CONTROL
                      IPLOT           1  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

            HYDROGRAPH ROUTING DATA

  44 RS          STORAGE ROUTING
                      NSTPS           1  NUMBER OF SUBREACHES
                       ITYP        STOR  TYPE OF INITIAL CONDITION
                     RSVRIC        0.00  INITIAL CONDITION
                          X        0.00  WORKING R AND D COEFFICIENT

  45 SV          STORAGE          0.0       0.0       0.2       1.0       2.0       2.8       4.3       5.3       6.5      11.6
                                 15.4

  47 SQ        DISCHARGE           0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
                                 270.

  49 SE        ELEVATION      6796.60   6797.00   6798.00   6800.00   6802.00   6803.50   6803.51   6804.00   6804.10   6805.50
                              6806.50
                                                                 ***
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****

HYDROGRAPH AT STATION DP-4

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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	0.0	6796.6	*	1		0500	101	0.	0.0	6796.6	*	1		1000	201	7.	11.7	6805.5
1		0003	2	0.	0.0	6796.6	*	1		0503	102	0.	0.0	6796.6	*	1		1003	202	7.	11.7	6805.5
1		0006	3	0.	0.0	6796.6	*	1		0506	103	0.	0.0	6796.6	*	1		1006	203	7.	11.7	6805.5
1		0009	4	0.	0.0	6796.6	*	1		0509	104	0.	0.0	6796.6	*	1		1009	204	6.	11.7	6805.5
1		0012	5	0.	0.0	6796.6	*	1		0512	105	0.	0.0	6796.6	*	1		1012	205	6.	11.7	6805.5
1		0015	6	0.	0.0	6796.6	*	1		0515	106	0.	0.0	6796.6	*	1		1015	206	6.	11.7	6805.5
1		0018	7	0.	0.0	6796.6	*	1		0518	107	0.	0.0	6796.6	*	1		1018	207	6.	11.7	6805.5
1		0021	8	0.	0.0	6796.6	*	1		0521	108	0.	0.0	6796.6	*	1		1021	208	6.	11.7	6805.5
1		0024	9	0.	0.0	6796.6	*	1		0524	109	0.	0.0	6796.6	*	1		1024	209	6.	11.7	6805.5
1		0027	10	0.	0.0	6796.6	*	1		0527	110	0.	0.0	6796.6	*	1		1027	210	6.	11.7	6805.5
1		0030	11	0.	0.0	6796.6	*	1		0530	111	0.	0.0	6796.6	*	1		1030	211	5.	11.7	6805.5
1		0033	12	0.	0.0	6796.6	*	1		0533	112	0.	0.0	6796.8	*	1		1033	212	5.	11.7	6805.5
1		0036	13	0.	0.0	6796.6	*	1		0536	113	0.	0.0	6797.0	*	1		1036	213	5.	11.7	6805.5
1		0039	14	0.	0.0	6796.6	*	1		0539	114	0.	0.1	6797.3	*	1		1039	214	5.	11.7	6805.5
1		0042	15	0.	0.0	6796.6	*	1		0542	115	0.	0.2	6797.8	*	1		1042	215	5.	11.7	6805.5
1		0045	16	0.	0.0	6796.6	*	1		0545	116	0.	0.4	6798.5	*	1		1045	216	5.	11.7	6805.5
1		0048	17	0.	0.0	6796.6	*	1		0548	117	0.	0.8	6799.4	*	1		1048	217	5.	11.7	6805.5
1		0051	18	0.	0.0	6796.6	*	1		0551	118	0.	1.3	6800.6	*	1		1051	218	5.	11.7	6805.5
1		0054	19	0.	0.0	6796.6	*	1		0554	119	0.	2.0	6802.0	*	1		1054	219	5.	11.7	6805.5
1		0057	20	0.	0.0	6796.6	*	1		0557	120	0.	2.8	6803.4	*	1		1057	220	5.	11.7	6805.5
1		0100	21	0.	0.0	6796.6	*	1		0600	121	0.	3.7	6803.5	*	1		1100	221	5.	11.7	6805.5
1		0103	22	0.	0.0	6796.6	*	1		0603	122	0.	4.8	6803.8	*	1		1103	222	5.	11.7	6805.5
1		0106	23	0.	0.0	6796.6	*	1		0606	123	0.	5.9	6804.0	*	1		1106	223	5.	11.7	6805.5
1		0109	24	0.	0.0	6796.6	*	1		0609	124	0.	6.9	6804.2	*	1		1109	224	5.	11.7	6805.5
1		0112	25	0.	0.0	6796.6	*	1		0612	125	0.	7.7	6804.4	*	1		1112	225	5.	11.7	6805.5
1		0115	26	0.	0.0	6796.6	*	1		0615	126	0.	8.4	6804.6	*	1		1115	226	5.	11.7	6805.5
1		0118	27	0.	0.0	6796.6	*	1		0618	127	0.	8.9	6804.8	*	1		1118	227	5.	11.7	6805.5
1		0121	28	0.	0.0	6796.6	*	1		0621	128	0.	9.3	6804.9	*	1		1121	228	5.	11.7	6805.5
1		0124	29	0.	0.0	6796.6	*	1		0624	129	0.	9.6	6804.9	*	1		1124	229	5.	11.7	6805.5

1	0127	30	0.	0.0	6796.6	*	1	0627	130	0.	9.8	6805.0	*	1	1127	230	5.	11.7	6805.5
1	0130	31	0.	0.0	6796.6	*	1	0630	131	0.	10.0	6805.1	*	1	1130	231	5.	11.7	6805.5
1	0133	32	0.	0.0	6796.6	*	1	0633	132	0.	10.2	6805.1	*	1	1133	232	5.	11.7	6805.5
1	0136	33	0.	0.0	6796.6	*	1	0636	133	0.	10.3	6805.1	*	1	1136	233	5.	11.7	6805.5
1	0139	34	0.	0.0	6796.6	*	1	0639	134	0.	10.5	6805.2	*	1	1139	234	5.	11.7	6805.5
1	0142	35	0.	0.0	6796.6	*	1	0642	135	0.	10.6	6805.2	*	1	1142	235	5.	11.7	6805.5
1	0145	36	0.	0.0	6796.6	*	1	0645	136	0.	10.7	6805.3	*	1	1145	236	5.	11.7	6805.5
1	0148	37	0.	0.0	6796.6	*	1	0648	137	0.	10.8	6805.3	*	1	1148	237	5.	11.7	6805.5
1	0151	38	0.	0.0	6796.6	*	1	0651	138	0.	10.9	6805.3	*	1	1151	238	5.	11.7	6805.5
1	0154	39	0.	0.0	6796.6	*	1	0654	139	0.	11.0	6805.3	*	1	1154	239	5.	11.7	6805.5
1	0157	40	0.	0.0	6796.6	*	1	0657	140	0.	11.1	6805.4	*	1	1157	240	5.	11.7	6805.5
1	0200	41	0.	0.0	6796.6	*	1	0700	141	0.	11.2	6805.4	*	1	1200	241	5.	11.7	6805.5
1	0203	42	0.	0.0	6796.6	*	1	0703	142	0.	11.3	6805.4	*	1	1203	242	5.	11.7	6805.5
1	0206	43	0.	0.0	6796.6	*	1	0706	143	0.	11.3	6805.4	*	1	1206	243	5.	11.7	6805.5
1	0209	44	0.	0.0	6796.6	*	1	0709	144	0.	11.4	6805.4	*	1	1209	244	5.	11.7	6805.5
1	0212	45	0.	0.0	6796.6	*	1	0712	145	0.	11.5	6805.5	*	1	1212	245	5.	11.7	6805.5
1	0215	46	0.	0.0	6796.6	*	1	0715	146	0.	11.5	6805.5	*	1	1215	246	5.	11.7	6805.5
1	0218	47	0.	0.0	6796.6	*	1	0718	147	0.	11.6	6805.5	*	1	1218	247	5.	11.7	6805.5
1	0221	48	0.	0.0	6796.6	*	1	0721	148	2.	11.7	6805.5	*	1	1221	248	5.	11.7	6805.5
1	0224	49	0.	0.0	6796.6	*	1	0724	149	5.	11.7	6805.5	*	1	1224	249	5.	11.7	6805.5
1	0227	50	0.	0.0	6796.6	*	1	0727	150	7.	11.7	6805.5	*	1	1227	250	5.	11.7	6805.5
1	0230	51	0.	0.0	6796.6	*	1	0730	151	9.	11.8	6805.5	*	1	1230	251	5.	11.7	6805.5
1	0233	52	0.	0.0	6796.6	*	1	0733	152	10.	11.8	6805.5	*	1	1233	252	5.	11.7	6805.5
1	0236	53	0.	0.0	6796.6	*	1	0736	153	11.	11.8	6805.5	*	1	1236	253	5.	11.7	6805.5
1	0239	54	0.	0.0	6796.6	*	1	0739	154	11.	11.8	6805.5	*	1	1239	254	5.	11.7	6805.5
1	0242	55	0.	0.0	6796.6	*	1	0742	155	12.	11.8	6805.5	*	1	1242	255	5.	11.7	6805.5
1	0245	56	0.	0.0	6796.6	*	1	0745	156	12.	11.8	6805.5	*	1	1245	256	5.	11.7	6805.5
1	0248	57	0.	0.0	6796.6	*	1	0748	157	12.	11.8	6805.5	*	1	1248	257	5.	11.7	6805.5
1	0251	58	0.	0.0	6796.6	*	1	0751	158	12.	11.8	6805.5	*	1	1251	258	5.	11.7	6805.5
1	0254	59	0.	0.0	6796.6	*	1	0754	159	13.	11.8	6805.5	*	1	1254	259	5.	11.7	6805.5
1	0257	60	0.	0.0	6796.6	*	1	0757	160	13.	11.8	6805.5	*	1	1257	260	5.	11.7	6805.5
1	0300	61	0.	0.0	6796.6	*	1	0800	161	13.	11.8	6805.5	*	1	1300	261	5.	11.7	6805.5
1	0303	62	0.	0.0	6796.6	*	1	0803	162	13.	11.8	6805.5	*	1	1303	262	5.	11.7	6805.5
1	0306	63	0.	0.0	6796.6	*	1	0806	163	13.	11.8	6805.5	*	1	1306	263	5.	11.7	6805.5
1	0309	64	0.	0.0	6796.6	*	1	0809	164	12.	11.8	6805.5	*	1	1309	264	5.	11.7	6805.5
1	0312	65	0.	0.0	6796.6	*	1	0812	165	12.	11.8	6805.5	*	1	1312	265	5.	11.7	6805.5
1	0315	66	0.	0.0	6796.6	*	1	0815	166	11.	11.8	6805.5	*	1	1315	266	5.	11.7	6805.5
1	0318	67	0.	0.0	6796.6	*	1	0818	167	11.	11.8	6805.5	*	1	1318	267	5.	11.7	6805.5
1	0321	68	0.	0.0	6796.6	*	1	0821	168	10.	11.8	6805.5	*	1	1321	268	5.	11.7	6805.5
1	0324	69	0.	0.0	6796.6	*	1	0824	169	9.	11.8	6805.5	*	1	1324	269	5.	11.7	6805.5
1	0327	70	0.	0.0	6796.6	*	1	0827	170	9.	11.8	6805.5	*	1	1327	270	5.	11.7	6805.5
1	0330	71	0.	0.0	6796.6	*	1	0830	171	8.	11.8	6805.5	*	1	1330	271	5.	11.7	6805.5
1	0333	72	0.	0.0	6796.6	*	1	0833	172	8.	11.7	6805.5	*	1	1333	272	5.	11.7	6805.5
1	0336	73	0.	0.0	6796.6	*	1	0836	173	8.	11.7	6805.5	*	1	1336	273	4.	11.7	6805.5
1	0339	74	0.	0.0	6796.6	*	1	0839	174	7.	11.7	6805.5	*	1	1339	274	4.	11.7	6805.5
1	0342	75	0.	0.0	6796.6	*	1	0842	175	7.	11.7	6805.5	*	1	1342	275	4.	11.7	6805.5
1	0345	76	0.	0.0	6796.6	*	1	0845	176	7.	11.7	6805.5	*	1	1345	276	4.	11.7	6805.5
1	0348	77	0.	0.0	6796.6	*	1	0848	177	7.	11.7	6805.5	*	1	1348	277	4.	11.7	6805.5
1	0351	78	0.	0.0	6796.6	*	1	0851	178	7.	11.7	6805.5	*	1	1351	278	4.	11.7	6805.5
1	0354	79	0.	0.0	6796.6	*	1	0854	179	7.	11.7	6805.5	*	1	1354	279	4.	11.7	6805.5
1	0357	80	0.	0.0	6796.6	*	1	0857	180	7.	11.7	6805.5	*	1	1357	280	4.	11.7	6805.5
1	0400	81	0.	0.0	6796.6	*	1	0900	181	7.	11.7	6805.5	*	1	1400	281	4.	11.7	6805.5
1	0403	82	0.	0.0	6796.6	*	1	0903	182	7.	11.7	6805.5	*	1	1403	282	4.	11.7	6805.5
1	0406	83	0.	0.0	6796.6	*	1	0906	183	7.	11.7	6805.5	*	1	1406	283	4.	11.7	6805.5
1	0409	84	0.	0.0	6796.6	*	1	0909	184	7.	11.7	6805.5	*	1	1409	284	4.	11.7	6805.5
1	0412	85	0.	0.0	6796.6	*	1	0912	185	7.	11.7	6805.5	*	1	1412	285	4.	11.7	6805.5
1	0415	86	0.	0.0	6796.6	*	1	0915	186	7.	11.7	6805.5	*	1	1415	286	4.	11.7	6805.5
1	0418	87	0.	0.0	6796.6	*	1	0918	187	7.	11.7	6805.5	*	1	1418	287	4.	11.7	6805.5
1	0421	88	0.	0.0	6796.6	*	1	0921	188	7.	11.7	6805.5	*	1	1421	288	4.	11.7	6805.5
1	0424	89	0.	0.0	6796.6	*	1	0924	189	7.	11.7	6805.5	*	1	1424	289	4.	11.7	6805.5
1	0427	90	0.	0.0	6796.6	*	1	0927	190	7.	11.7	6805.5	*	1	1427	290	4.	11.7	6805.5
1	0430	91	0.	0.0	6796.6	*	1	0930	191	7.	11.7	6805.5	*	1	1430	291	4.	11.7	6805.5
1	0433	92	0.	0.0	6796.6	*	1	0933	192	7.	11.7	6805.5	*	1	1433	292	4.	11.7	6805.5
1	0436	93	0.	0.0	6796.6	*	1	0936	193	7.	11.7	6805.5	*	1	1436	293	4.	11.7	6805.5
1	0439	94	0.	0.0	6796.6	*	1	0939	194	7.	11.7	6805.5	*	1	1439	294	4.	11.7	6805.5
1	0442	95	0.	0.0	6796.6	*	1	0942	195	7.	11.7	6805.5	*	1	1442	295	4.	11.7	6805.5
1	0445	96	0.	0.0	6796.6	*	1	0945	196	7.	11.7	6805.5	*	1	1445	296	4.	11.7	6805.5
1	0448	97	0.	0.0	6796.6	*	1	0948	197	7.	11.7	6805.5	*	1	1448	297	4.	11.7	6805.5
1	0451	98	0.	0.0	6796.6	*	1	0951	198	7.	11.7	6805.5	*	1	1451	298	4.	11.7	6805.5
1	0454	99	0.	0.0	6796.6	*	1	0954	199	7.	11.7	6805.5	*	1	1454	299	4.	11.7	6805.5
1	0457	100	0.	0.0	6796.6	*	1	0957	200	7.	11.7	6805.5	*	1	1457	300	4.	11.7	6805.5
						*							*						

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PEAK FLOW (CFS)	TIME (HR)		6-HR	24-HR	72-HR	14.95-HR
			MAXIMUM AVERAGE FLOW			
13.	8.05	(CFS)	7.	3.	3.	3.
		(INCHES)	0.440	0.516	0.516	0.516
		(AC-FT)	3.	4.	4.	4.

PEAK STORAGE (AC-FT)	TIME (HR)		6-HR	24-HR	72-HR	14.95-HR
			MAXIMUM AVERAGE STORAGE			
12.	8.00		12.	7.	7.	7.

PEAK STAGE (FEET)	TIME (HR)		6-HR	24-HR	72-HR	14.95-HR
			MAXIMUM AVERAGE STAGE			
6805.55	8.00		6805.49	6801.99	6801.99	6801.98

CUMULATIVE AREA = 0.14 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DP-1	170.	6.10	18.	8.	8.	0.10		
HYDROGRAPH AT	DP-2	98.	6.05	10.	4.	4.	0.04		
2 COMBINED AT	DP-3	266.	6.05	29.	13.	13.	0.14		
ROUTED TO	DP-4	13.	8.05	7.	3.	3.	0.14	6805.55	8.00
HYDROGRAPH AT	CHN2A	11.	6.00	1.	0.	0.	0.00		
2 COMBINED AT	DP-5	13.	8.05	7.	4.	4.	0.14		

*** NORMAL END OF HEC-1 ***

100-YEAR TYPE IIA STORM

OUTLET CLOGGED AND POND FULL
AT BEGINNING OF STORM

HEC1 S/N: 1343000062 HMVersion: 6.33 Data File: X:\870000.ALL\871616\HEC1\CHDDBPF.DAT

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****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY  1991               *
*           VERSION 4.0.1E             *
*                                      *
* RUN DATE  01/02/1998  TIME  12:05:49 *
*                                      *
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*                                      *
*     U.S. ARMY CORPS OF ENGINEERS     *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
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X       X  XXXXXXX   XXXXX           X
X       X  X        X     X         XX
X       X  X        X                X
XXXXXXX    XXXX     X        XXXXX   X
X       X  X        X                X
X       X  X        X     X          X
X       X  XXXXXXX   XXXXX          XXX
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::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::
:::                                    :::
:::  Full Microcomputer Implementation :::
:::                by                  :::
:::        Haestad Methods, Inc.       :::
:::                                    :::
::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::::::::::::::::
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37 Brookside Road * Waterbury, Connecticut 06708 * (203) 755-1666

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

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            LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

               1        ID    PARK SITE, CHAPEL HILLS DRIVE - 24HR, FULL DEVELOPED CONDITION
               2        ID    100 YEAR, TYPE IIA STORM
               3        ID    OUTLET PIPE CLOGGED AND POND FULL AT BEGINNING OF STORM
               4        ID    FILE CHDDBPF.DAT
*** FREE ***
                        *DIAGRAM
               5        IT        3       0       0     300
               6        IO        5

               7        KK     DP-1
               8        KM    COMPUTE RUNOFF FROM CHN1A, THE WATERSHED CONTRIBUTING TO THE PARK SITE AT
               9        KM    CHAPEL HILLS DRIVE/DETENTION BASIN, VIA THE PROPOSED CHAPEL HILLS DRIVE STORM
              10        KM    DRAIN. THIS BASIN ALSO INCLUDES THE AREA OF THE PARK THAT CONTRIBUTES TO THE
              11        KM    POND.
              12        BA     .102
              13        IN       15
              14        PB      4.4
              15        PC     0000   .0005   .0015   .0030   .0045   .0060   .0080   .0100   .0120   .0143
              16        PC    .0165   .0188   .0210   .0233   .0255   .0278   .0320   .0390   .0460   .0530
              17        PC    .0600   .0750   .1000   .4000   .7000   .7250   .7500   .7650   .7800   .7900
              18        PC    .8000   .8100   .8200   .8250   .8300   .8350   .8400   .8450   .8500   .8550
              19        PC    .8600   .8638   .8675   .8713   .8750   .8788   .8825   .8863   .8900   .8938
              20        PC    .8975   .9013   .9050   .9083   .9115   .9148   .9180   .9210   .9240   .9270
              21        PC    .9300   .9325   .9350   .9375   .9400   .9425   .9450   .9475   .9500   .9525
              22        PC    .9550   .9575   .9600   .9625   .9650   .9675   .9700   .9725   .9750   .9775
              23        PC    .9800   .9813   .9825   .9838   .9850   .9863   .9875   .9888   .9900   .9913
              24        PC    .9925   .9938   .9950   .9963   .9975   .9988   1.000
              25        LS        0    73.5
              26        UD     .190

              27        KK     DP-2
              28        KM    COMPUTE RUNOFF FROM CHN1B, THE PUBLIC SCHOOL SITE LOCATED NORTH OF THE PARK
              29        KM    SITE AT CHAPEL HILLS DRIVE/DETENTION BASIN
              30        BA     .038
              31        LS        0      84
              32        UD     .162

              33        KK     DP-3
              34        KM    COMBINE RUNOFF FROM CHN1A & CHN1B FOR THE TOTAL PROPOSED INFLOW TO
              35        KM    THE DETENTION POND AT THE PARK SITE, CHAPEL HILLS DRIVE
              36        HC        2

              37        KK     DP-4
              38        KM    ROUTE COMBINED FLOW FROM CHN1A AND CHN1B THROUGH THE PROPOSED DETENTION
              39        KM    POND AT THE PARK SITE-CHAPEL HILLS DRIVE
              40        KM    STAGE STORAGE CURVE PER THE 12/22/97 GRADING PLAN
              41        KM    DISCHARGE CURVE REFLECTS  12" DIAMETER OUTLET PIPE CONTROL FOR NORMAL
              42        KM    DISCHARGE AND 100' LONG SPILLWAY SET AT ELEVATION 6805.5
              43        KO        2       1
              44        RS        1    STOR   11.64
              45        SV        0     .01     .22     .99    1.95    2.80    4.25    5.31    6.51   11.64
              46        SV    15.36
              47        SQ        0       0       0       0       0       0       0       0       0       0
              48        SQ      270
              49        SE   6796.6  6797.0  6798.0  6800.0  6802.0  6803.5 6803.51    6804  6804.1  6805.5
```

```
ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

SE  6806.5

KK   CHN2A
KM   COMPUTE RUNOFF FROM CHN2A, THE AREAS OF CHAPEL HILLS DRIVE, LEXINGTON DRIVE,
KM   AND THE PARK SITE CONTRIBUTING DIRECT RUNOFF TO THE INLET LOCATED AT THE
KM   NORTHEAST CORNER OF THE CHAPEL HILLS DRIVE AND LEXINGTON DRIVE INTERSECTION
BA   .0042
LS      0    81.6
UD    .093

KK    DP-5
KM   COMBINE THE DIRECT RUNOFF FROM CHN2A & THE OUTFLOW FROM THE DETENTION BASIN
KM   AT THE INTERSECTION  OF CHAPEL HILLS DRIVE AND LEXINGTON DRIVE
HC      2
ZZ
```

```
                    SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   7        DP-1
              .
              .
  27          .         DP-2
              .            .
              .            .
  33        DP-3............
              V
              V
  37        DP-4
              .
              .
  51          .        CHN2A
              .            .
              .            .
  58        DP-5............

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION
```

```
****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              MAY   1991              *
*           VERSION 4.0.1E             *
*                                      *
* RUN DATE  01/02/1998  TIME  12:05:49 *
*                                      *
****************************************
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***************************************
*                                     *
*   U.S. ARMY CORPS OF ENGINEERS      *
*   HYDROLOGIC ENGINEERING CENTER     *
*        609 SECOND STREET            *
*     DAVIS, CALIFORNIA 95616         *
*         (916) 756-1104              *
*                                     *
***************************************
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                        PARK SITE, CHAPEL HILLS DRIVE - 24HR, FULL DEVELOPED CONDITION
                        100 YEAR, TYPE IIA STORM
                        OUTLET PIPE CLOGGED AND POND FULL AT BEGINNING OF STORM
                        FILE CHDDBPF.DAT

   6 IO          OUTPUT CONTROL VARIABLES
                       IPRNT            5  PRINT CONTROL
                       IPLOT            0  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN            3  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1     0  STARTING DATE
                       ITIME         0000  STARTING TIME
                          NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      1     0  ENDING DATE
                      NDTIME         1457  ENDING TIME
                       ICENT           19  CENTURY MARK

                   COMPUTATION INTERVAL    0.05 HOURS
                        TOTAL TIME BASE   14.95 HOURS

          ENGLISH UNITS
               DRAINAGE AREA           SQUARE MILES
               PRECIPITATION DEPTH     INCHES
               LENGTH, ELEVATION       FEET
               FLOW                    CUBIC FEET PER SECOND
               STORAGE VOLUME          ACRE-FEET
               SURFACE AREA            ACRES
               TEMPERATURE             DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

                 **************
                 *            *
   37 KK         *    DP-4    *
                 *            *
                 **************

   43 KO         OUTPUT CONTROL VARIABLES
                       IPRNT            2  PRINT CONTROL
                       IPLOT            1  PLOT CONTROL
                       QSCAL           0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

   44 RS         STORAGE ROUTING
                       NSTPS            1  NUMBER OF SUBREACHES
                        ITYP         STOR  TYPE OF INITIAL CONDITION
                      RSVRIC        11.64  INITIAL CONDITION
                           X         0.00  WORKING R AND D COEFFICIENT

   45 SV           STORAGE          0.0       0.0       0.2       1.0       2.0       2.8       4.3       5.3       6.5      11.6
                                   15.4

   47 SQ          DISCHARGE          0.        0.        0.        0.        0.        0.        0.        0.        0.        0.
                                   270.

   49 SE          ELEVATION     6796.60   6797.00   6798.00   6800.00   6802.00   6803.50   6803.51   6804.00   6804.10   6805.50
                                6806.50
                                                                ***

*************************************************************************************************************************************

                                                   HYDROGRAPH AT STATION     DP-4

*************************************************************************************************************************************
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DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE	*	DA	MON	HRMN	ORD	OUTFLOW	STORAGE	STAGE
1		0000	1	0.	11.6	6805.5	*	1		0500	101	0.	11.6	6805.5	*	1		1000	201	7.	11.7	6805.5
1		0003	2	0.	11.6	6805.5	*	1		0503	102	0.	11.6	6805.5	*	1		1003	202	7.	11.7	6805.5
1		0006	3	0.	11.6	6805.5	*	1		0506	103	0.	11.6	6805.5	*	1		1006	203	7.	11.7	6805.5
1		0009	4	0.	11.6	6805.5	*	1		0509	104	0.	11.6	6805.5	*	1		1009	204	6.	11.7	6805.5
1		0012	5	0.	11.6	6805.5	*	1		0512	105	0.	11.6	6805.5	*	1		1012	205	6.	11.7	6805.5
1		0015	6	0.	11.6	6805.5	*	1		0515	106	0.	11.6	6805.5	*	1		1015	206	6.	11.7	6805.5
1		0018	7	0.	11.6	6805.5	*	1		0518	107	0.	11.6	6805.5	*	1		1018	207	6.	11.7	6805.5
1		0021	8	0.	11.6	6805.5	*	1		0521	108	0.	11.6	6805.5	*	1		1021	208	6.	11.7	6805.5
1		0024	9	0.	11.6	6805.5	*	1		0524	109	0.	11.6	6805.5	*	1		1024	209	6.	11.7	6805.5
1		0027	10	0.	11.6	6805.5	*	1		0527	110	0.	11.6	6805.5	*	1		1027	210	6.	11.7	6805.5
1		0030	11	0.	11.6	6805.5	*	1		0530	111	0.	11.6	6805.5	*	1		1030	211	5.	11.7	6805.5
1		0033	12	0.	11.6	6805.5	*	1		0533	112	0.	11.6	6805.5	*	1		1033	212	5.	11.7	6805.5
1		0036	13	0.	11.6	6805.5	*	1		0536	113	1.	11.7	6805.5	*	1		1036	213	5.	11.7	6805.5
1		0039	14	0.	11.6	6805.5	*	1		0539	114	4.	11.7	6805.5	*	1		1039	214	5.	11.7	6805.5
1		0042	15	0.	11.6	6805.5	*	1		0542	115	10.	11.8	6805.5	*	1		1042	215	5.	11.7	6805.5
1		0045	16	0.	11.6	6805.5	*	1		0545	116	22.	11.9	6805.6	*	1		1045	216	5.	11.7	6805.5
1		0048	17	0.	11.6	6805.5	*	1		0548	117	39.	12.2	6805.6	*	1		1048	217	5.	11.7	6805.5
1		0051	18	0.	11.6	6805.5	*	1		0551	118	61.	12.5	6805.7	*	1		1051	218	5.	11.7	6805.5
1		0054	19	0.	11.6	6805.5	*	1		0554	119	87.	12.8	6805.8	*	1		1054	219	5.	11.7	6805.5
1		0057	20	0.	11.6	6805.5	*	1		0557	120	116.	13.2	6805.9	*	1		1057	220	5.	11.7	6805.5
1		0100	21	0.	11.6	6805.5	*	1		0600	121	146.	13.7	6806.0	*	1		1100	221	5.	11.7	6805.5
1		0103	22	0.	11.6	6805.5	*	1		0603	122	175.	14.0	6806.1	*	1		1103	222	5.	11.7	6805.5
1		0106	23	0.	11.6	6805.5	*	1		0606	123	198.	14.4	6806.2	*	1		1106	223	5.	11.7	6805.5
1		0109	24	0.	11.6	6805.5	*	1		0609	124	210.	14.5	6806.3	*	1		1109	224	5.	11.7	6805.5
1		0112	25	0.	11.6	6805.5	*	1		0612	125	209.	14.5	6806.3	*	1		1112	225	5.	11.7	6805.5
1		0115	26	0.	11.6	6805.5	*	1		0615	126	196.	14.3	6806.2	*	1		1115	226	5.	11.7	6805.5
1		0118	27	0.	11.6	6805.5	*	1		0618	127	177.	14.1	6806.2	*	1		1118	227	5.	11.7	6805.5
1		0121	28	0.	11.6	6805.5	*	1		0621	128	154.	13.8	6806.1	*	1		1121	228	5.	11.7	6805.5
1		0124	29	0.	11.6	6805.5	*	1		0624	129	133.	13.5	6806.0	*	1		1124	229	5.	11.7	6805.5

1	0127	30	0.	11.6	6805.5	*	1	0627	130	113.	13.2	6805.9	*	1	1127	230	5.	11.7	6805.5
1	0130	31	0.	11.6	6805.5	*	1	0630	131	97.	13.0	6805.9	*	1	1130	231	5.	11.7	6805.5
1	0133	32	0.	11.6	6805.5	*	1	0633	132	83.	12.8	6805.8	*	1	1133	232	5.	11.7	6805.5
1	0136	33	0.	11.6	6805.5	*	1	0636	133	71.	12.6	6805.8	*	1	1136	233	5.	11.7	6805.5
1	0139	34	0.	11.6	6805.5	*	1	0639	134	62.	12.5	6805.7	*	1	1139	234	5.	11.7	6805.5
1	0142	35	0.	11.6	6805.5	*	1	0642	135	53.	12.4	6805.7	*	1	1142	235	5.	11.7	6805.5
1	0145	36	0.	11.6	6805.5	*	1	0645	136	47.	12.3	6805.7	*	1	1145	236	5.	11.7	6805.5
1	0148	37	0.	11.6	6805.5	*	1	0648	137	41.	12.2	6805.7	*	1	1148	237	5.	11.7	6805.5
1	0151	38	0.	11.6	6805.5	*	1	0651	138	36.	12.1	6805.6	*	1	1151	238	5.	11.7	6805.5
1	0154	39	0.	11.6	6805.5	*	1	0654	139	32.	12.1	6805.6	*	1	1154	239	5.	11.7	6805.5
1	0157	40	0.	11.6	6805.5	*	1	0657	140	29.	12.0	6805.6	*	1	1157	240	5.	11.7	6805.5
1	0200	41	0.	11.6	6805.5	*	1	0700	141	27.	12.0	6805.6	*	1	1200	241	5.	11.7	6805.5
1	0203	42	0.	11.6	6805.5	*	1	0703	142	25.	12.0	6805.6	*	1	1203	242	5.	11.7	6805.5
1	0206	43	0.	11.6	6805.5	*	1	0706	143	23.	12.0	6805.6	*	1	1206	243	5.	11.7	6805.5
1	0209	44	0.	11.6	6805.5	*	1	0709	144	22.	11.9	6805.6	*	1	1209	244	5.	11.7	6805.5
1	0212	45	0.	11.6	6805.5	*	1	0712	145	21.	11.9	6805.6	*	1	1212	245	5.	11.7	6805.5
1	0215	46	0.	11.6	6805.5	*	1	0715	146	19.	11.9	6805.6	*	1	1215	246	5.	11.7	6805.5
1	0218	47	0.	11.6	6805.5	*	1	0718	147	18.	11.9	6805.6	*	1	1218	247	5.	11.7	6805.5
1	0221	48	0.	11.6	6805.5	*	1	0721	148	17.	11.9	6805.6	*	1	1221	248	5.	11.7	6805.5
1	0224	49	0.	11.6	6805.5	*	1	0724	149	16.	11.9	6805.6	*	1	1224	249	5.	11.7	6805.5
1	0227	50	0.	11.6	6805.5	*	1	0727	150	16.	11.9	6805.6	*	1	1227	250	5.	11.7	6805.5
1	0230	51	0.	11.6	6805.5	*	1	0730	151	15.	11.8	6805.6	*	1	1230	251	5.	11.7	6805.5
1	0233	52	0.	11.6	6805.5	*	1	0733	152	14.	11.8	6805.6	*	1	1233	252	5.	11.7	6805.5
1	0236	53	0.	11.6	6805.5	*	1	0736	153	14.	11.8	6805.6	*	1	1236	253	5.	11.7	6805.5
1	0239	54	0.	11.6	6805.5	*	1	0739	154	14.	11.8	6805.6	*	1	1239	254	5.	11.7	6805.5
1	0242	55	0.	11.6	6805.5	*	1	0742	155	14.	11.8	6805.6	*	1	1242	255	5.	11.7	6805.5
1	0245	56	0.	11.6	6805.5	*	1	0745	156	13.	11.8	6805.5	*	1	1245	256	5.	11.7	6805.5
1	0248	57	0.	11.6	6805.5	*	1	0748	157	13.	11.8	6805.5	*	1	1248	257	5.	11.7	6805.5
1	0251	58	0.	11.6	6805.5	*	1	0751	158	13.	11.8	6805.5	*	1	1251	258	5.	11.7	6805.5
1	0254	59	0.	11.6	6805.5	*	1	0754	159	13.	11.8	6805.5	*	1	1254	259	5.	11.7	6805.5
1	0257	60	0.	11.6	6805.5	*	1	0757	160	13.	11.8	6805.5	*	1	1257	260	5.	11.7	6805.5
1	0300	61	0.	11.6	6805.5	*	1	0800	161	13.	11.8	6805.5	*	1	1300	261	5.	11.7	6805.5
1	0303	62	0.	11.6	6805.5	*	1	0803	162	13.	11.8	6805.5	*	1	1303	262	5.	11.7	6805.5
1	0306	63	0.	11.6	6805.5	*	1	0806	163	13.	11.8	6805.5	*	1	1306	263	5.	11.7	6805.5
1	0309	64	0.	11.6	6805.5	*	1	0809	164	13.	11.8	6805.5	*	1	1309	264	5.	11.7	6805.5
1	0312	65	0.	11.6	6805.5	*	1	0812	165	12.	11.8	6805.5	*	1	1312	265	5.	11.7	6805.5
1	0315	66	0.	11.6	6805.5	*	1	0815	166	11.	11.8	6805.5	*	1	1315	266	5.	11.7	6805.5
1	0318	67	0.	11.6	6805.5	*	1	0818	167	11.	11.8	6805.5	*	1	1318	267	5.	11.7	6805.5
1	0321	68	0.	11.6	6805.5	*	1	0821	168	10.	11.8	6805.5	*	1	1321	268	5.	11.7	6805.5
1	0324	69	0.	11.6	6805.5	*	1	0824	169	9.	11.8	6805.5	*	1	1324	269	5.	11.7	6805.5
1	0327	70	0.	11.6	6805.5	*	1	0827	170	9.	11.8	6805.5	*	1	1327	270	5.	11.7	6805.5
1	0330	71	0.	11.6	6805.5	*	1	0830	171	8.	11.8	6805.5	*	1	1330	271	5.	11.7	6805.5
1	0333	72	0.	11.6	6805.5	*	1	0833	172	8.	11.7	6805.5	*	1	1333	272	5.	11.7	6805.5
1	0336	73	0.	11.6	6805.5	*	1	0836	173	8.	11.7	6805.5	*	1	1336	273	4.	11.7	6805.5
1	0339	74	0.	11.6	6805.5	*	1	0839	174	7.	11.7	6805.5	*	1	1339	274	4.	11.7	6805.5
1	0342	75	0.	11.6	6805.5	*	1	0842	175	7.	11.7	6805.5	*	1	1342	275	4.	11.7	6805.5
1	0345	76	0.	11.6	6805.5	*	1	0845	176	7.	11.7	6805.5	*	1	1345	276	4.	11.7	6805.5
1	0348	77	0.	11.6	6805.5	*	1	0848	177	7.	11.7	6805.5	*	1	1348	277	4.	11.7	6805.5
1	0351	78	0.	11.6	6805.5	*	1	0851	178	7.	11.7	6805.5	*	1	1351	278	4.	11.7	6805.5
1	0354	79	0.	11.6	6805.5	*	1	0854	179	7.	11.7	6805.5	*	1	1354	279	4.	11.7	6805.5
1	0357	80	0.	11.6	6805.5	*	1	0857	180	7.	11.7	6805.5	*	1	1357	280	4.	11.7	6805.5
1	0400	81	0.	11.6	6805.5	*	1	0900	181	7.	11.7	6805.5	*	1	1400	281	4.	11.7	6805.5
1	0403	82	0.	11.6	6805.5	*	1	0903	182	7.	11.7	6805.5	*	1	1403	282	4.	11.7	6805.5
1	0406	83	0.	11.6	6805.5	*	1	0906	183	7.	11.7	6805.5	*	1	1406	283	4.	11.7	6805.5
1	0409	84	0.	11.6	6805.5	*	1	0909	184	7.	11.7	6805.5	*	1	1409	284	4.	11.7	6805.5
1	0412	85	0.	11.6	6805.5	*	1	0912	185	7.	11.7	6805.5	*	1	1412	285	4.	11.7	6805.5
1	0415	86	0.	11.6	6805.5	*	1	0915	186	7.	11.7	6805.5	*	1	1415	286	4.	11.7	6805.5
1	0418	87	0.	11.6	6805.5	*	1	0918	187	7.	11.7	6805.5	*	1	1418	287	4.	11.7	6805.5
1	0421	88	0.	11.6	6805.5	*	1	0921	188	7.	11.7	6805.5	*	1	1421	288	4.	11.7	6805.5
1	0424	89	0.	11.6	6805.5	*	1	0924	189	7.	11.7	6805.5	*	1	1424	289	4.	11.7	6805.5
1	0427	90	0.	11.6	6805.5	*	1	0927	190	7.	11.7	6805.5	*	1	1427	290	4.	11.7	6805.5
1	0430	91	0.	11.6	6805.5	*	1	0930	191	7.	11.7	6805.5	*	1	1430	291	4.	11.7	6805.5
1	0433	92	0.	11.6	6805.5	*	1	0933	192	7.	11.7	6805.5	*	1	1433	292	4.	11.7	6805.5
1	0436	93	0.	11.6	6805.5	*	1	0936	193	7.	11.7	6805.5	*	1	1436	293	4.	11.7	6805.5
1	0439	94	0.	11.6	6805.5	*	1	0939	194	7.	11.7	6805.5	*	1	1439	294	4.	11.7	6805.5
1	0442	95	0.	11.6	6805.5	*	1	0942	195	7.	11.7	6805.5	*	1	1442	295	4.	11.7	6805.5
1	0445	96	0.	11.6	6805.5	*	1	0945	196	7.	11.7	6805.5	*	1	1445	296	4.	11.7	6805.5
1	0448	97	0.	11.6	6805.5	*	1	0948	197	7.	11.7	6805.5	*	1	1448	297	4.	11.7	6805.5
1	0451	98	0.	11.6	6805.5	*	1	0951	198	7.	11.7	6805.5	*	1	1451	298	4.	11.7	6805.5
1	0454	99	0.	11.6	6805.5	*	1	0954	199	7.	11.7	6805.5	*	1	1454	299	4.	11.7	6805.5
1	0457	100	0.	11.6	6805.5	*	1	0957	200	7.	11.7	6805.5	*	1	1457	300	4.	11.7	6805.5

****

PEAK FLOW (CFS)	TIME (HR)		6-HR	24-HR	72-HR	14.95-HR
			MAXIMUM AVERAGE FLOW			
210.	6.15	(CFS)	29.	13.	13.	13.
		(INCHES)	1.903	2.075	2.075	2.075
		(AC-FT)	14.	15.	15.	15.

PEAK STORAGE (AC-FT)	TIME (HR)	6-HR	24-HR	72-HR	14.95-HR
		MAXIMUM AVERAGE STORAGE			
15.	6.15	12.	12.	12.	12.

PEAK STAGE (FEET)	TIME (HR)	6-HR	24-HR	72-HR	14.95-HR
		MAXIMUM AVERAGE STAGE			
6806.28	6.15	6805.60	6805.55	6805.55	6805.54

CUMULATIVE AREA = 0.14 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
HYDROGRAPH AT	DP-1	170.	6.10	18.	8.	8.	0.10		
HYDROGRAPH AT	DP-2	98.	6.05	10.	4.	4.	0.04		
2 COMBINED AT	DP-3	266.	6.05	29.	13.	13.	0.14		
ROUTED TO	DP-4	210.	6.15	29.	13.	13.	0.14	6806.28	6.15
HYDROGRAPH AT	CHN2A	11.	6.00	1.	0.	0.	0.00		
2 COMBINED AT	DP-5	215.	6.15	30.	13.	13.	0.14		

*** NORMAL END OF HEC-1 ***

24" x 36" FOLDED SHEETS IN POCKET

Sheet No.	Title
1/2	Park Site – Chapel Hills Drive, Drainage Basin Map
2/2	Park Site – Chapel Hills Drive, Conceptual Pond Plan
1/1	Pine Creek Filings No. 7 and 8, Drainage Plan (for information only)