APPENDIX D

Wetland Mitigation Details

Wetland Mitigation Specifications and Drawing Notes
Courtyard at Upper Nyack
February 1, 2005

The mitigation site for impacts to regulated wetlands at the Courtyard at Upper Nyack proposal is an upland/wetland buffer area and existing detention basin on a separate parcel on the west side of Route 9W, directly across from the project site.

A wetland mitigation plan was prepared. This plan shows expanded wetlands and creation of new wetland areas adjacent to an existing detention basin. In total, this plan will add an additional 0.54 acres of wetland. An additional 0.23 acres is proposed to the east of Route 9W on the project site. This area is intended to offset the loss of 0.49 acres due to the proposed development.

The mitigation concept for the proposed Courtyard at Upper Nyack property is to regrade a portion of the hill on the west side of Route 9W to create a series of depressional areas that will pick up runoff and hillside seepage. This site is owned by the Christian Theological Alliance, but the applicant has reached an agreement with the owners to utilize a portion of the property for wetland mitigation. Considering the runoff from the adjacent property to the south and the long slope from the Christian Alliance building, this will provide enough regular input of water to saturate the area and promote the growth of wetland tolerant plants. All of the species shown on the list will tolerate wet conditions, and have also been chosen to be attractive to people and wildlife.

Soil erosion and sediment control fencing will be installed at the outer and down slope limits of the proposed wetland expansion. The location of the proposed wetland will be cleared as necessary, but with an eye toward preserving large trees to the extent possible. Some trees will be removed due to an inability to survive the future inundations. Other trees, specifically the large elms, will be preserved since periodic inundation is typical for this species. Vegetative materials will be hauled to the general construction stockpile areas for recycling on site or for off-site disposal.

Where available, the upper one foot of topsoil will be stripped from the site and set aside from other site grading materials. The temporary storage area will be an upland site either removed from wetlands by 100 feet, within other areas cleared for site development and/or separated from same by a soil erosion and sediment control fence. The topsoil material will be free from all stones larger that 3 inches and any recognizable vegetative materials exceeding one foot in length.

All excavations will be to finished grade elevations as indicated in the mitigation drawings. Per the above, topsoil will be stripped from the site and stockpiled for use in finishing grading.

All grading efforts will proceed from one edge backward to the far edge. To gain access for topsoil placement, such material will be used to create temporary "roadways" at least one foot deep and the topsoil spread laterally from such access locations. Only tracked equipment will be used and always on a minimum of one foot of material. The contractor will notify the property owner's and Village's engineer/environmental monitor, who will make an inspection of the soil and hydrological conditions prior to the topsoil placement work. The stockpiled topsoil will be returned to the site to create a planting surface for

the wetland mitigation as described above. Finished soils at the invert of the mitigation sites will be of landscape quality.

The planting area associated with the mitigation proposal will receive an application of lime several weeks to one month prior to planting. The finished surfaces will be smooth within specified tolerances in uniform levels or slopes between points where elevations are indicated or between such point and existing grades. The accepted grading tolerance will be a smooth and even surface, free of voids, and within 0.25 feet of the specified elevation. During the course of earthwork, inspections will be schedule at a frequency to be determined by the engineer/environmental consultant but no less than weekly.

Any deviation from this grading specification will be obtained in writing from the Office of the Village Engineer and Tim Miller Associates.

Planting Details

Planting specifications for the mitigation wetland were defined according to the newly graded elevations within each wetland. Mitigation areas were designed in some instances to have low-lying depression areas that will retain shallow open water habitat and a surrounding flat emergent habitat. All wetland planting (except for the outer edges) will proceed by hand. Materials will be brought to the site in good condition (see below) and then placed in central drop locations. The materials will then be hand-carried to their planting locations and in turn, planted by hand. Only rounded, shallow planting shovels will be used in this effort.

Criteria for selecting plant material included (1) the plant's ability to withstand saturation and inundation; (2) its demonstrated survival on this site and other nearby sites; (3) its successful establishment in other wetland replacement projects; (4) the plant must be native and non-invasive; and (5) whether the plant material is available at nurseries in the same region as the site. See Table 1 for complete plant species list.

Table 1
WETLAND MITIGATION PLANTING LIST

SD	Salix discolor	Pussy Willow
CSe	Cornus sericea	Redosier dogwood
CR	Cornus amomum	Silky Dogwood
JE	Juncus effuses	Soft rush
IV	Ilex verticillata	Winterberry holly
ST	Scirpus tabernaemontanii	Softstem bulrush
ARu	Acer rubrum	Red Maple
VC	Vaccinium corymbosum	High bush blueberry
VT	Viburnum trilobum	American cranberrybush
CS	Carex stricta	Tussock sedge
VD	Viburnum dentatum	Arrowwood
ASe	Alnus serrulata	Speckled alder
Source: Tim Miller Associates, Inc.		

It must be noted that field adjustments are always necessary in these types of projects, and although the plant quantities will not change, their exact location in the field may change based on final grading and site conditions.

Once the appropriate planting locations are cleared and excavated, the planting bed will be prepared. This will include the addition of approximately six inches of the topsoil layer that was either previously removed and stockpiled or imported to the site. This layer will provide a nutrient-rich environment in which to plant peat pots, seedlings (plugs) and saplings.

Planting will be done in spring or early summer (between April 1 and July 1). Shrubs may also be planted in the late summer to early fall (September 1 to October 30). In all cases, a hole will be dug twice as deep as either the peat pot or root ball. The only shovels allowed are rounded, shallow spades. A small amount of slow release, (10-5-5 or equivalent) fertilizer will be placed in each hole. The hole will then be backfilled with a thin layer of rich, organic topsoil, the plant placed inside, the hole backfilled to the top and then gently tamped down. Trees will be planted on 12 to 15 foot centers and alternated with shrubs on 6 foot centers. Herbaceous species will be planted in clumps of 2 to 3 individuals on 3 foot centers.

Fiber or peat pots will be either planted immediately after being delivered to the job site or stored in a secure, central location. If stored before planting, they will be out of direct exposure to the sun and wind and kept moist until the time for planting (i.e., a means of watering will be provided and watering will occur daily). Plants will be well rooted through the sides and bottoms of peat pots, and firmly contained therein. Herbaceous species will have three stems per pot; shrubs will be erect and 3 -4 feet tall. Plugs will also be planted immediately upon delivery. If this is not possible, they will be stored out of direct exposure to the sun and wind and kept moist (i.e., a means of watering will then be provided and watering will occur daily). The plugs will have solid soil/root masses with the soil in place and the roots will appear clean and white in coloration. Plugs containing shoots that are soft and mushy or appear otherwise rotten and stems that are brittle will not be accepted. Plug cell size will not be less than 1.25 by 1.25 inches.

Container-grown plant material delivered to the job site will be inspected to assure moist soil/root masses. Any dry and light weight plants will not be accepted. As with peat pots and plugs, if not planted immediately the container will be stored out of the sun and wind and kept moist (i.e., a means of watering then will be provided and watering will occur daily). When removed from the containers, the plants will be the size of the specified container. If in leaf, the plants will appear healthy with no spots, leaf damage, discoloration, insects or fungus. If not in leaf, the buds will be firm and free of damage, discoloration, insects or fungus. Containers will be a minimum of quart size for shrubs and gallon size for trees. The contractor/inspector will not and follow the added size specification in that area.

Bare roots plants will be shipped from the nursery immediately after lifting from the field and will be planted immediately upon arrival at the site. If they cannot be planted as soon as arriving at the site, they will be stored in the shade, protected from sun and wind, and kept moist by the use of straw, peat moss, compost, or other suitable materials. Plants not having an abundance of well developed terminal buds on the leaders and branches will be rejected. The stems and branches of all plants will be

turgid and the cambium healthy or the plants rejected. Any bare root plants that are in leaf or have leaflets will be rejected.

Stockpiled hydric soils stripped from filled wetland areas on site will be used as appropriate to provide an organic topsoil in areas where re-grading leaves sandy subsoils on the surface. This will also provide a seedbank from existing site plants for natural re-vegetation of mitigation areas. Healthy trees located in the mitigation areas that have a wetland indicator status of FAC or FACW (common wooded wetland species) will be preserved where possible, including red maple, American elm, and green ash. Wetland tolerant shrub species that are common on the site, including spicebush, witch hazel and winterberry will be planted under the remaining canopy as necessary. Other northeast species that are not common on this site but provide wildlife and aesthetic values will also be used, including highbush blueberry, American cranberrybush, arrowwood and wild raisin.

Monitoring and Maintenance

At least one pre-construction meeting will occur between the chosen grading and/or planting contractor/subcontractor and the site environmental monitor prior to beginning construction (a) on site and (b) on the mitigation site. Monitoring during active construction will take place daily on the first three to seven days and then on a weekly basis thereafter. One to three days of daily inspection will re-occur at the beginning of grading, construction, final grading and placement of topsoil, fertilization of the planting surface, planting delivery and beginning of the planting. The construction monitor will have experience in wetland construction and a Bachelor of Science degree in Natural and/or Physical Resources.

Monitoring and maintenance efforts for the mitigation wetlands will take place over a three year period following construction, and thereafter as needed depending on the results of the initial monitoring. This will include bi-weekly visits for the first growing season, and then twice a year for the next two years, with additional inspections as required depending on conditions. The applicant's environmental monitor will conduct a survey of the site and site conditions will be noted and adjusted as necessary.

Monitoring Reports

Monitoring will be based on the target objectives established for the wetland creation/pond expansion area. Hydrology, vegetation and observed functions will be documented and reported on twice annually for the first two years following construction and annually for the remaining three years unless released from this requirement by the reviewing agencies. The natural vegetation, provision of wildlife habitat, and nutrient uptake processes that the basin is designed to support will be monitored annually through simple observation of the new wetlands. Photographs of the mitigation areas will be taken at least once per year during the growing season (July and August are preferred times from established photo stations). Inspection of the new wetlands will include assessment of:

1. Percent vegetative cover of the wetland by submerged and emergent vegetation; percent of vegetative cover in the shrub planting areas. A vegetative cover of at least 80 percent total coverage with 70 percent species survival will be achieved in all created wetlands by the end of the second

growing season. The percent coverage and any need for replacement plantings shall include consideration for any native wetland species which have "volunteered" onto the site. When this criteria is met it will be assumed that nutrient uptake is high, based on biomass and plant success.

2. Percent of shrub species plantings that produce flowers and fruits during each growing season. By the end of the first full growing season, 25 percent of the fruiting species will have bloomed and produced fruit. By the end of the second growing season, the survival will be up to 50 percent.

3. Percent cover of exotic invasive species (Purple loose strife or Common reed) within the wetlands. Invasive species shall be removed by hand when observed, or selectively treated with a general herbicide by a qualified wetland professional during the appropriate season.

4. Survival of planted species will be calculated, with a mitigation goal of at least 75 percent of the species planted.

5. Use of the wetland and its surrounding shrub plantings by songbird species, amphibians, and reptiles will be noted. Evidence of wetland dependent mammals will also be noted. Coarse woody debris (logs and branches) may be left within the mitigation wetlands to provide additional habitat.

Wetland monitoring data forms (attached) will be filled out for each monitoring plot within the created wetland during each inspection. Copies of the Wetland Monitoring Data Forms will be submitted to the Village after completion. Inspections will be summarized in an annual report, including photographs, which shall be submitted to the regulatory agencies. Field changes to grading within the wetland, replanting, or modifications to the hydrology within the wetland will be reviewed by the appropriate regulatory agencies and described in the annual report.

Plan Notes

1. Nuisance and non-native vegetation will be removed, including phragmites, multi-floral rose, ailanthus.
2. Dumped material and debris will be removed from remaining wetland and mitigation area, and area brought to specified grade with four to six inches of topsoil.
3. All red maple and American elm trees in mitigation area greater than 4 inches in diameter will be preserved.
4. Wetland seed mix will be used as specified to supplement plantings at a rate of 2 pounds per acre. One pound of seed will be used for this site.
5. The area chosen for mitigation is generally a depressional area along Route 9W with occasional stream overflow. Hydrology will be provided by seasonal high groundwater, groundwater seepage under Route 9W, occasional flooding of the adjacent watercourse, and normal precipitation.

TL 59.20-2-1
IPLE BETH TORAH, INC.

ROUTE 9W

HIGHLAND AVENUE B1

N10°36'25"W

L=523.81'

OVERHEAD WIRES

GUY WIRE

CB
CT=333.7
I=327.5

CB
CT=334.8
I=328.3

CB
FI=331.4
I 15"=325.9

15" ADS

15" ADS

24" CMP

I=327.2

N1171'57"W

A1

A2

B2

CI #41
RIM=320.00

CI #42
RIM=320.20
INV=316.0

CI #54
RIM=323.10
INV=317.90

CI #55
RIM=321.45
INV=318.00

CI #52
RIM=319.00
INV=315.00

BUILDING 3
CELLAR FL=316.5
1ST FL=321.0
2ND FL=331.5

BUILDING 4
CELLAR FL=312.5
1ST FL=323.0
2ND FL=333.5

CONC. CURB (TYP)

BENCH (TYP.)

WL-1

WL-2

WL-3B

WL-3D

WL-3E

WL-3F

WL-4

WL-8

WL-9

WL-10

WL-11

Grading Plan

On-site Wetland Mitigation Plan
prepared for
Courtyard at Upper Nyack
Village of Upper Nyack, NY

Prepared by:
Tim Miller Associates, Inc.
12/13/04 Scale 1" = 30'

Plant List

AC - Amelanchier canadensis (shadblow)
Aru - Acer rubrum (red maple)
Ase - Alnus serrulata (speckled alder)
CA - Clethra alnifolia (summersweet)
Cse - Cornus sericea (redosier dogwood)
SD - Salix discolor (pussy willow)
VC - Vaccinium corymbosum (highbush blueberry)
VD - Viburnum dentatum (arrowwood)

Mh1 - Mixed herbaceous including Scirpus tabernaemontanii, Juncus effusus and Carex stricta
Mh2 - Mixed herbaceous including Carex stricta, Carex crinita and Onoclea sensibilis
Mh3 - Mixed herbaceous including Symplocarpus foetidus, Carex stricta and Onoclea sensibilis

Other shaded areas to be seeded using Wetland Diversity Mix or equivalent.

Planting Plan

On-site Wetland Mitigation Plan
prepared for
Courtyard at Upper Nyack
Village of Upper Nyack, NY

Prepared by:
Tim Miller Associates, Inc.
12/13/04 Scale 1" = 30'

New Tree

Shrub Mass

Herbaceous plantings

EXISTING ALLIANCE THEOLOGICAL SEMINARY BUILDING

16" PINE

14" PINE

16"

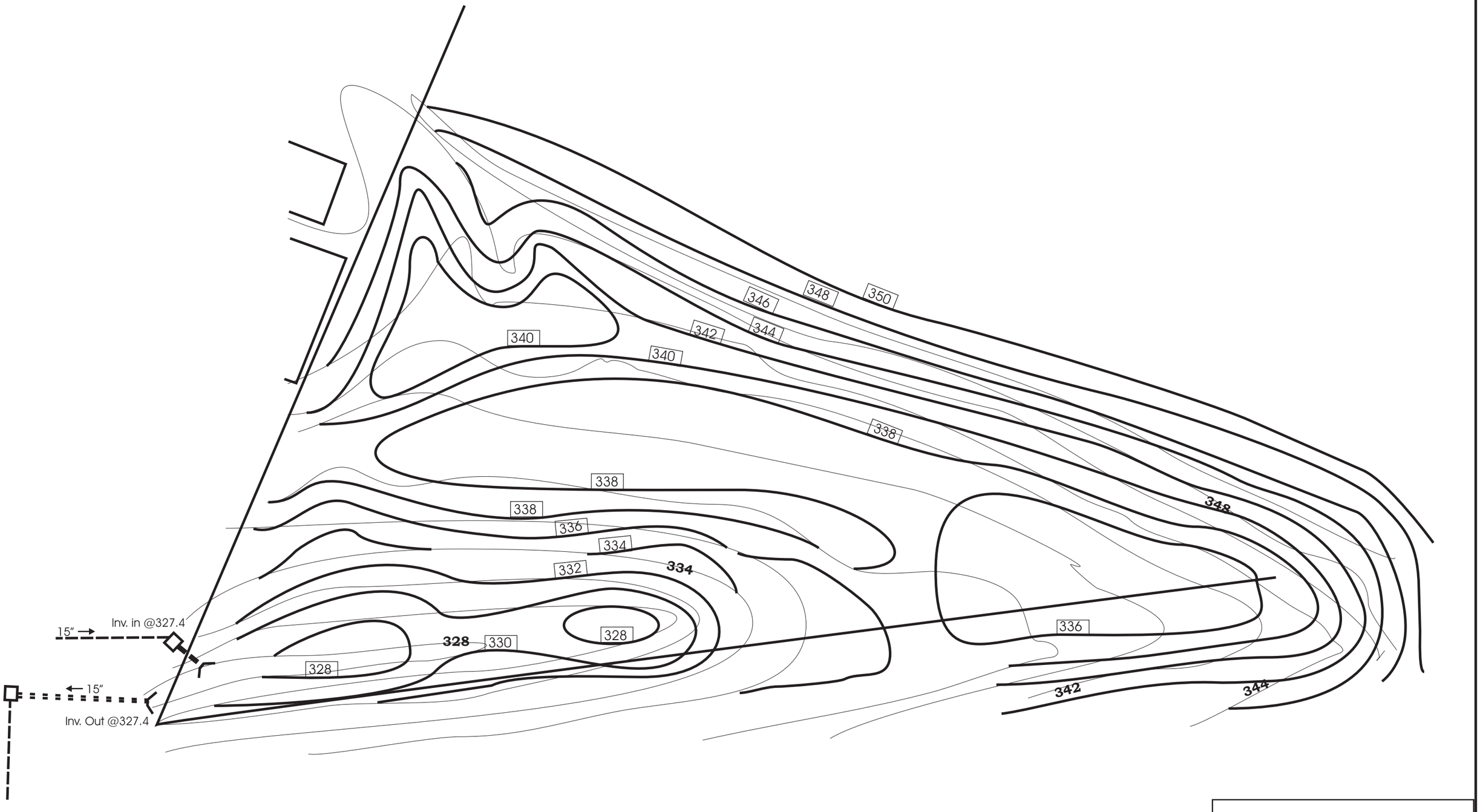
377.76'

N65°44'20"W

506°32'10"E

569.26'

Location of Wetland Mitigation Proposal
Courtyard at Upper Nyack
Village of Upper Nyack, Rockland County
N.T.S.



The Courtyard at Upper Nyack
Wetland Mitigation Plan
Proposed Grading

Dated 2/18/04, rev. 8/24/04

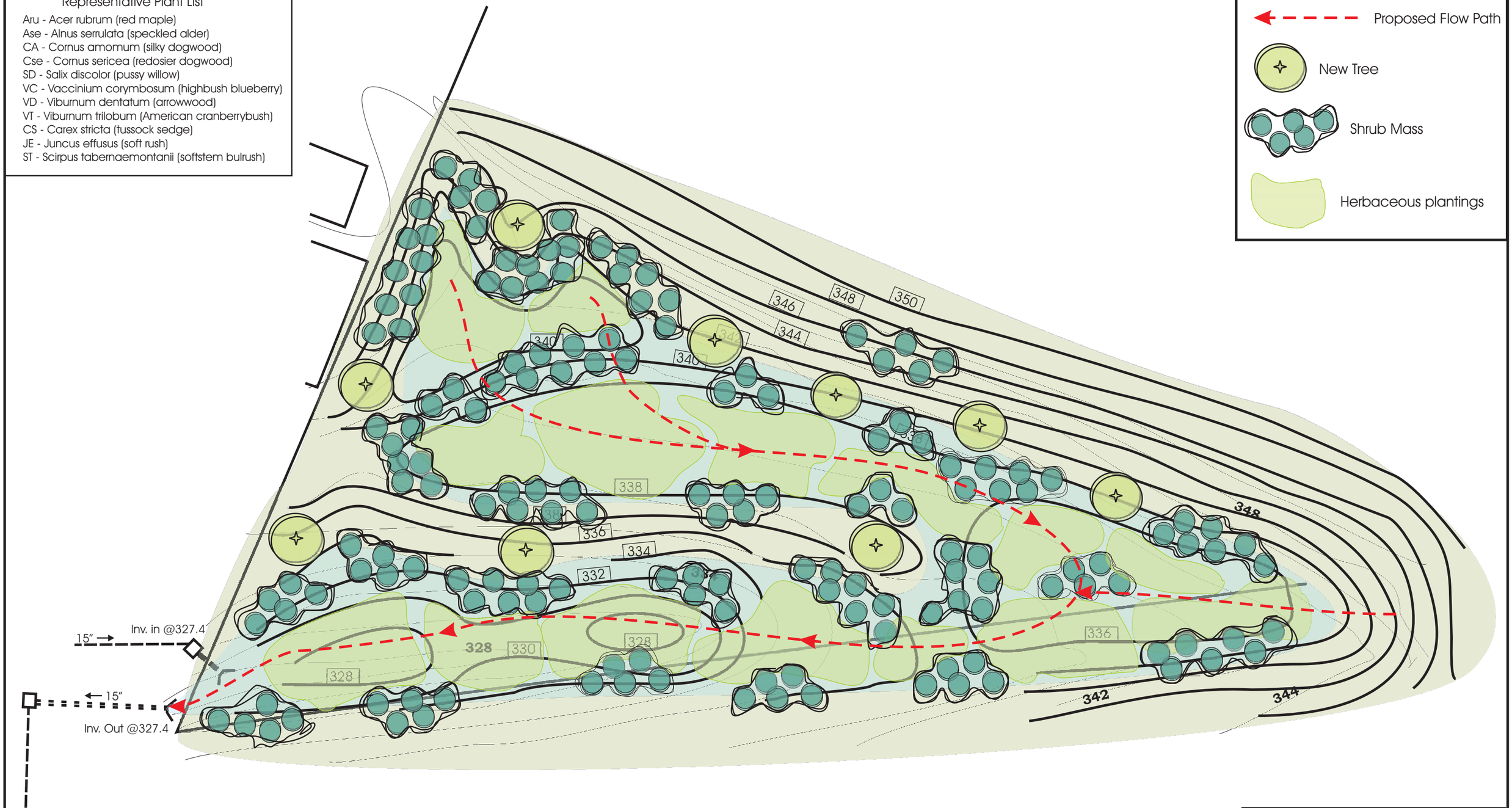
prepared by

Tim Miller Associates, Inc.

Tim Miller Associates, Inc., 10 North Street, Cold Spring, NY 10516 Phone: (845) 265-4400, Fax: (845) 265-4418

Representative Plant List

Aru - Acer rubrum (red maple)
Ase - Alnus serrulata (speckled alder)
CA - Cornus amomum (silky dogwood)
Cse - Cornus sericea (redosier dogwood)
SD - Salix discolor (pussy willow)
VC - Vaccinium corymbosum (highbush blueberry)
VD - Viburnum dentatum (arrowwood)
VT - Viburnum trilobum (American cranberrybush)
CS - Carex stricta (tussock sedge)
JE - Juncus effusus (soft rush)
ST - Scirpus tabernaemontanii (softstem bulrush)



The Courtyard at Upper Nyack
Wetland Mitigation Plan
Proposed Planting Plan
Dated 2/18/04, rev. 8/24/04
prepared by
Tim Miller Associates, Inc.

Tim Miller Associates, Inc., 10 North Street, Cold Spring, NY 10516 Phone: (845) 265-4400, Fax: (845) 265-4418

APPENDIX E

Supplemental Traffic Analysis

Appendix E: Supplemental Traffic Analysis

Some of the road grades used in the DEIS intersection analysis were not correct, and therefore, were reexamined for the FEIS to review the relative sensitivity of the grade corrections. Road grade is one of the less important variables in capacity analysis. The capacity analyses of intersections have numerous inputs to calculate volume to capacity ratios, delays, and levels of service at intersections. Some of these data requirements for unsignalized intersections analysis include:

- Number of lanes
- Grades (not an input for all way stop controlled intersections)
- Lane use (movements permitted by lane)
- Demand volume (traffic for each movement)
- Base saturation flow rate
- Peak hour factor (establishes 15 minute traffic flow)
- Percent of heavy vehicles of traffic

Signalized intersections have further requirements for example:

- Arrival type (degree of signal coordination)
- Cycle length (time before signal phases repeat)
- Green time (by lane group)
- Clearance interval (yellow plus all red)
- Phase operation type (pretimed, or actuated)
- Phase plan (what movements occur simultaneously)

Road grade primarily effects vehicle startup from stopped conditions. The more the grade slopes down toward the intersection, the faster a vehicle can accelerate from a stop or a queue can accelerate, hence the less the vehicle delay. Road grades do not change from Existing to Build Condition unless there is an improvement project being constructed, which is not the case herein. As such, the relative effect of altering the road grades in calculations is reduced because the analyses tends to alter delay in all conditions in the same direction. For example, if the No Build Condition delay is increased, then Build delay will remain the same or increase.

For a two way stop controlled intersection, road grades apply in the capacity analysis to the minor approach (the approach in which traffic stops) and lanes with left turning traffic, whose traffic stops to yield right of way to major street through traffic. Stopping is determined by the rules of the road in the absence of a stop sign. For example, the site driveway will be the minor approach as traffic from driveways must yield to traffic already on a state highway in the absence of traffic controls reassigning this priority.

Because the two way stopped control (unsignalized) intersections on Route 9W that were analyzed in the DEIS traffic analysis operate at levels of service A or B, re-analysis of these intersections utilizing field check grades was not done. The all way stop controlled intersections do not use road grades as a variable in the capacity analysis and, thus, these intersections were also not reanalyzed.

The Highmount Avenue/Route 9W intersection with levels of service D would have reduced delays as the minor approach grade is 3 percent lower than assumed in the DEIS. The 6th

Avenue/Route 9W intersection with levels of service D and E has no grade change and thus the levels of service would remain unchanged. The state requires a low reverse grade at driveways to the state roads so the site driveway grade should remain nearly the same as shown in the DEIS. Thus for these intersections on Route 9W, no grade change was reanalyzed.

For signalized intersections all movements are affected by grade and were reanalyzed with grade changes. Below is an intersection by intersection review. Table E-1 summarizes the changes in level of service from the DEIS to the FEIS (with grade revisions). In two out of the three cases with a difference in level of service in the Build Condition, the revised level of service was better than previously indicated. In all cases the worst levels of service were already shown for at least two lane groups. Thus, the road grade change did not show levels of service previously unforeseen in the DEIS.

Table E-1
All Condition Changes in Level of Service Summary
Signalized Intersections in the Village of Upper Nyack and Nyack

Intersection Roads	Lane Group (Approach Direction-Movement)	Existing Condition				No Build Condition				Build Condition			
		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
		DEIS LOS	FEIS LOS	DEIS LOS	FEIS LOS	DEIS LOS	FEIS LOS	DEIS LOS	FEIS LOS	DEIS LOS	FEIS LOS	DEIS LOS	FEIS LOS
US Route 9W and Christan Herald Rd.													
Christan Herald Rd.	EB-L,T,R	C	C	B	B	D*	D*	C*	B	D	D	C	C*
	WB-L,T,R	B	B	C	C	B	B	C	C	B	B	C	C
US Route 9W	NB-L,T,R	B	B	B	B	B	C*	C*	C*	C*	C	C	C
	SB-L,T,R	C	C	B	B	C	C	C*	C*	D*	D*	C	C
	Overall	C	C	B	B	C	C	C*	C*	D*	C	C	C
US Route 9W and Birchwood Ave.													
Birchwood Avenue	WB-L,R	B	B	B	B	B	B	B	B	B	B	B	B
US Route 9W	NB-T,R	A	A	B	B	A	A	B	B	A	A	B	B
	SB-L,T	B	B	B	B	B	B	B	B	B	B	B	B
	Overall	B	B	B	B	B	B	B	B	B	B	B	B
US Route 9W and High Avenue													
High Avenue	EB-L,T,R	B	B	B	B	C*	C*	C*	C*	C	C	C	C
	WB-L,T,R	B	B	B	B	B	B	B	B	B	B	B	B
US Route 9W	NB-L	B	B	B	B	B	B	B	B	B	B	B	B
	NB-T,R	B	B	B	B	B	C*	B	C*	C*	C	C*	C
US Route 9W	SB-L,T,R	C	C	B	B	C	C	B	B	C	C	C*	B
	Overall	B	B	B	B	C*	C*	B	B	C	C	C*	C*
US Route 9W and Main Street													
Main Street	EB-L	D	D	E	E	D	D	F*	F*	E*	E*	F	F
	EB-T,R	D	D	C	C	D	D	C	C	D	D	C	C
Main Street	WB-L	C	C	D	D	D*	D*	F*	F*	D	D	F	F
	WB-T,R	C	C	E	E	C	C	E	F*	C	C	E	F
US Route 9W	NB-L	D	D	D	D	D	D	E*	D	D	D	E	E*
	NB-T,R	C	C	D	D	C	C	D	D	C	C	D	D
US Route 9W	SB-L	C	C	C	C	C	C	C	C	C	C	C	C
	SB-T,R	D	D	D	D	D	D	D	E*	D	D	E*	E
	Overall	D	D	D	D	D	D	E*	E*	D	D	E	E

LOS = Level of Service (see Table 3.7-8 for level-of-service criteria).
FEIS LOS is with grade revisions.

L = Left, T = Through, R = Right, (e.g. WB-L = Westbound left).

*Decline in level of service from previous condition.

Levels of service shaded indicate a difference between the same conditions based on grade differences.

Christian Herald / Route 9W intersection

With the changes in grades, the existing levels of service remained unchanged. For the No Build Condition there were the same number of changes in level of service to C or D, however, the lane groups level of service changes were different in two instances. In these cases the delay differences between the two analyses was reduced by one second or less. Also in both cases upon reaching the Build Condition, the levels of service changed to C resulting in all the lane groups being the same levels of service under the Build Condition regardless of the grades used. Thus, for this intersection there is no difference in the Build levels of service and the change in level of service was for different lane groups.

Birchwood Avenue / Route 9W intersection

Levels of service for all conditions remained unchanged with the grade corrections, remaining at levels of service A and B. The delays varied by less than one second for each lane group with the change in grades.

High Avenue / Route 9W intersection

Levels of service for the existing conditions were unchanged with the grade revisions. In the revised No Build condition, the northbound through right lane declines from level of service B to C, however the difference in delay was less than one second. With the grade changes there are no lane groups decline in level of service between the No Build and Build Conditions. Without the grade revision the Build Conditions catch up with declines in level of service from B to C for the northbound through right lane. However, the southbound p.m. approach does not decline to level of service C as in the DEIS. Although, the southbound level of service C without the grade change is worse than the revised level of service B the difference in delay per vehicle is a half second.

Main Street and US Route 9W

Levels of service for the existing conditions were the same regardless of grades used. Also the a.m. peak hour levels of service remained the same regardless of the grade changes. For the No Build Conditions both analyses had the westbound and eastbound lefts declining to level of service F. The differences were in the p.m. peak hour No Build Conditions. The original analysis had the northbound left declining to level of service E while the revised southbound through-right declined to E and westbound through right to F. The differences in the level of service E changes that occurred between the Existing and No Build conditions were equalized between the No Build and Build Conditions. Thus the difference in level of service was the revised analysis had a level of service F in the westbound through right verses a level of service E. Overall the difference in vehicle delay at the intersection in the p.m. peak hour was 1.3 seconds per vehicle higher with the grade changes.

Tables E-2 through E-4 show the delay, volume to capacity ratios, and level of service for all signalized intersections with the grade revisions.

Table E-2
Revised Existing Condition Level of Service Summary
Signalized Intersections in the Villages of Upper Nyack and Nyack

Intersection Road	Lane Group (Approach Direction-Movement)	AM Weekday Peak Hour			PM Weekday Peak Hour		
		Volume to Capacity Ratio	Delay (seconds/ vehicle)	Level of Service	Volume to Capacity Ratio	Delay (seconds /vehicle)	Level of Service
US RT 9W and Christan Herald Rd.							
Christan Herald Rd.	EB-L,T,R	0.85	28.4	C	0.59	18.4	B
	WB-L,T,R	0.45	14.8	B	0.69	20.8	C
US Route 9W	NB-L,T,R	0.53	18.3	B	0.77	19.3	B
	SB-L,T,R	0.83	27.8	C	0.71	17.3	B
	Overall		24.6	C		18.9	B
US Route 9W and Birchwood Ave.							
Birchwood Avenue	WB-L,R	0.07	15.1	B	0.04	14.9	B
US Route 9W	NB-T,R	0.32	8.7	A	0.66	13.7	B
	SB-L,T	0.66	13.7	B	0.53	11.3	B
	Overall		12.2	B		12.7	B
US Route 9W and High Avenue							
High Avenue	EB-L,T,R	0.53	18.5	B	0.58	19.2	B
	WB-L,T,R	0.55	18.2	B	0.38	16.3	B
US Route 9W	NB-L	0.27	12.8	B	0.17	11.8	B
	NB-T,R	0.69	18.2	B	0.71	18.8	B
US Route 9W	SB-L,T,R	0.77	20.9	C	0.61	16.2	B
	Overall		19.0	B		17.5	B
US Route 9W and Main Street							
Main Street	EB-L	0.72	37.8	D	0.85	58.4	E
	EB-T,R	0.71	36.4	D	0.59	23.5	C
Main Street	WB-L	0.10	33.3	C	0.64	51.6	D
	WB-T,R	0.49	30.6	C	0.95	69.8	E
US Route 9W	NB-L	0.62	43.0	D	0.68	45.0	D
	NB-T,R	0.36	31.4	C	0.50	38.1	D
US Route 9W	SB-L	0.09	23.5	C	0.08	26.3	C
	SB-T,R	0.72	40.1	D	0.81	51.7	D
	Overall		36.5	D		47.0	D

Level-of-Service (see Table 3.7-8 for level-of-service criteria).
NB = Northbound, SB = Southbound, EB = Eastbound, WB = Westbound.
L = left, R= right, T= through, (e.g. WB-L = Westbound left).

APPENDIX F

Stormwater Drainage Report

LJA | Leonard Jackson Associates **Consulting Engineers**

26 Firemens Memorial Drive . Pomona, New York 10970 . (845) 354-4382 . FAX (845) 354-4401

August 22, 2006

Village of Upper Nyack Planning Board
North Broadway
Village of Upper Nyack, NY 10960

To Whom It May Concern:

Re: Courtyard at Upper Nyack-Drainage Report
Lja # 03118

Dear Sir/Madam:

We have prepared a hydrologic analysis of the proposed subdivision at the 11.2 acre Courtyard at Upper Nyack site. Our analysis indicates that two detention basins are required to mitigate against increases in peak discharges for storms ranging from the 2-year to the 100-year design discharge. Basin #1 and Basin # 2 are controlled by two orifii (3.00" Ø and 12.00 "Ø) and overflow weirs. See details in the Appendix.

Basin # 1 and Basin # 2 have been designed in accordance with N.Y.S.D.E.C. water quality guidelines for a Storm Water Pocket Pond (P-5), which requires a forebay and permanent pond area.

Our hydrologic analysis concludes that the proposed development will yield no increases in peak rate of runoff at the drainage points downstream (Study Point #A, Study Point #B and Study Point #C) from that which occurs under existing conditions. Our analysis includes storms ranging from the 2-year to the 100-year design. Refer to Summary Table below for a comparison of Existing and Developed Conditions Discharges from the site.

Summary Table # 1 – Site Discharges for Existing and Developed Conditions to an existing 24" Ø RCP located at easterly corner of the site (Study Point # A)

	Storm Frequency (in years)				
Conditions	**2**	**5**	**10**	**25**	**100**
Pre-Development Discharges (cfs)	9.0	15.5	21.5	26.6	41.6
Post-Development Discharges (cfs)	8.3	14.4	19.6	23.8	39.5
Net Change:	-0.7	-1.1	-1.9	-2.8	-2.1

Summary Table # 2 – Site Discharges for Existing and Developed Conditions to an existing 18" ∅ RCP located at the northeasterly side of the site (Study Point # B)

	Storm Frequency (in years)				
Conditions	**2**	**5**	**10**	**25**	**100**
Pre-Development Discharges (cfs)	0.3	0.6	0.9	1.2	2.0
Post-Development Discharges (cfs)	0.3	0.4	0.4	0.4	0.7
Net Change:	0.0	-0.2	-0.5	-0.8	-1.3

Summary Table # 3 – Site Discharges for Existing and Developed Conditions to a point located at the northeasterly corner of the site (Study Point # C)

	Storm Frequency (in years)				
Conditions	**2**	**5**	**10**	**25**	**100**
Pre-Development Discharges (cfs)	0.7	1.4	2.2	2.8	4.7
Post-Development Discharges (cfs)	0.3	0.7	1.0	1.2	2.0
Net Change:	-0.4	-0.7	-1.2	-1.6	-2.5

Very truly yours,

LEONARD JACKSON ASSOCIATES
Leonard Jackson, P.E

LJ:pd
Attachment

P:\Word-Files\2003\03118\drainage report-8-22-06\Village of Upper Nyack 8-22-06.doc

TABLE OF CONTENTS:

LJA

LEONARD JACKSON ASSOCIATES CONSULTING ENGINEERS

26 Firemens Memorial Drive. Suite 201. Pomona, NY 10970

845-354-4382 (phone) 845-354-4401 (fax)

Summary Table #1
Existing & Proposed Conditions
Pollutant Loading Rates

Phosphorous	Existing (lbs/yr)	Post-Development After BMP's (lbs/yr)
	0.6	2.0

Nitrogen	Existing (lbs/yr)	Post-Development After BMP's (lbs/yr)
	3.0	28.2

Suspended Solids	Existing (lbs/yr)	Post-Development After BMP's (lbs/yr)
	268	0

BOD	Existing (lbs/yr)	Post-Development After BMP's (bil. colonies /yr)
	13378	294159

LJA

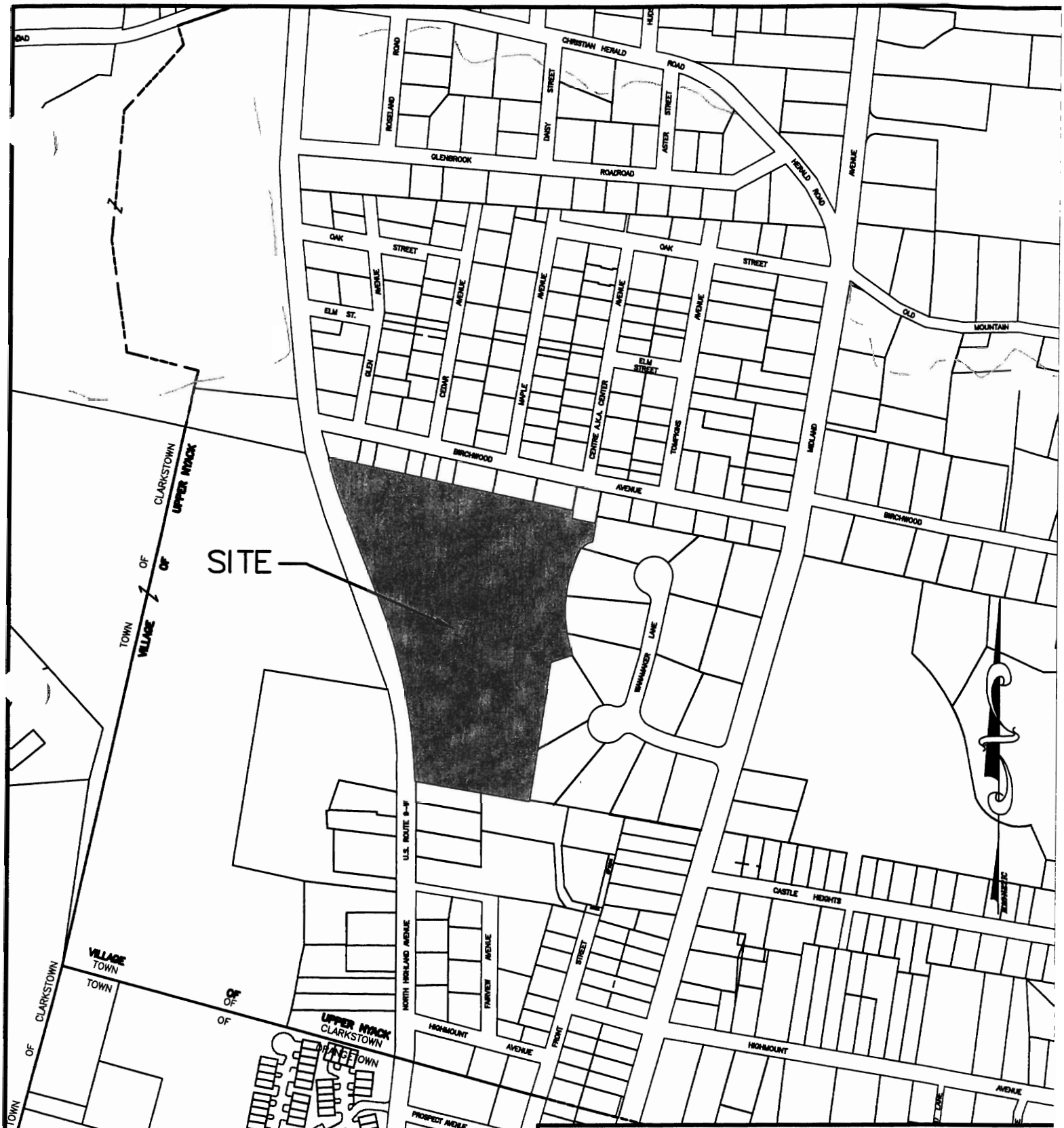
LEONARD JACKSON ASSOCIATES CONSULTING ENGINEERS

26 Firemens Memorial Drive. Suite 201. Pomona, NY 10970

845-354-4382 (phone) 845-354-4401 (fax)

Summary Table #2
Proposed Conditions
Pollutant Loading Breakdown
By Drainage Subbasin

Subbasin	Phosphorous (lbs/yr)	Nitrogen (lbs/yr)	Suspended Solids (lbs/yr)	BOD (bil. colonies /yr)
area to basin 1	0.84	15.28	0	245998.3
area to basin 2	1.16	12.88	0	48160.68
TOTALS	2.00	28.16	0	294159



COURTYARD AT UPPER NYACK

VILLAGE OF UPPER NYACK
ROCKLAND COUNTY, NEW YORK

VICINITY MAP

LJA | LEONARD JACKSON ASSOCIATES
26 FIREMENS MEMORIAL DRIVE, POMONA, NEW YORK 10970
(845) 354-4382

DATE:	SCALE:	DRAWN BY:	JOB NO:	FIGURE NUMBER
02/24/04	1"=100'	J.S.	03118	8

Appendix A – Methodology, Survey and Drainage Area Data:

1.) *Methodology*
2.) *Existing Drainage Area Map*
3.) *Developed Conditions Drainage Area Map*
4.) *Water Quality Basin #1 – Plan View*
5.) *Water Quality Basin #2 – Plan View*
6.) *Outlet Structure #1 Detail*
7.) *Outlet Structure #2 Detail*
8.) *Diversion Manhole Detail*
9.) *Pocket Pond (P-5) Detail*
10.) *Pond Drain Detail*

ENGINEERING METHODOLOGY:

Area Hydrology:

The 11.2-acre site runoff generally drains offsite in two existing storm drainage pipes. The majority draining to an existing 24" Φ RCP located at the easterly side of the site (study point #A) and the rest draining to an existing 18" Φ RCP located at the northeasterly side of the site (study point # B).

Methodology:

Study Points #A and #B were evaluated for pre- and post-development conditions were used to evaluate pre- and post-developed peak discharges offsite.

All drainage area delineations and any changes from existing to proposed conditions are indicated graphically on Drainage Area Maps provided in the Appendix.

Flows were established for existing and developed conditions utilizing the Rational Method.

Time of concentration calculations were tabulated under existing and proposed conditions. Curve numbers were calibrated to match the flow for 25-year storm event. Supporting data is attached in the appendix.

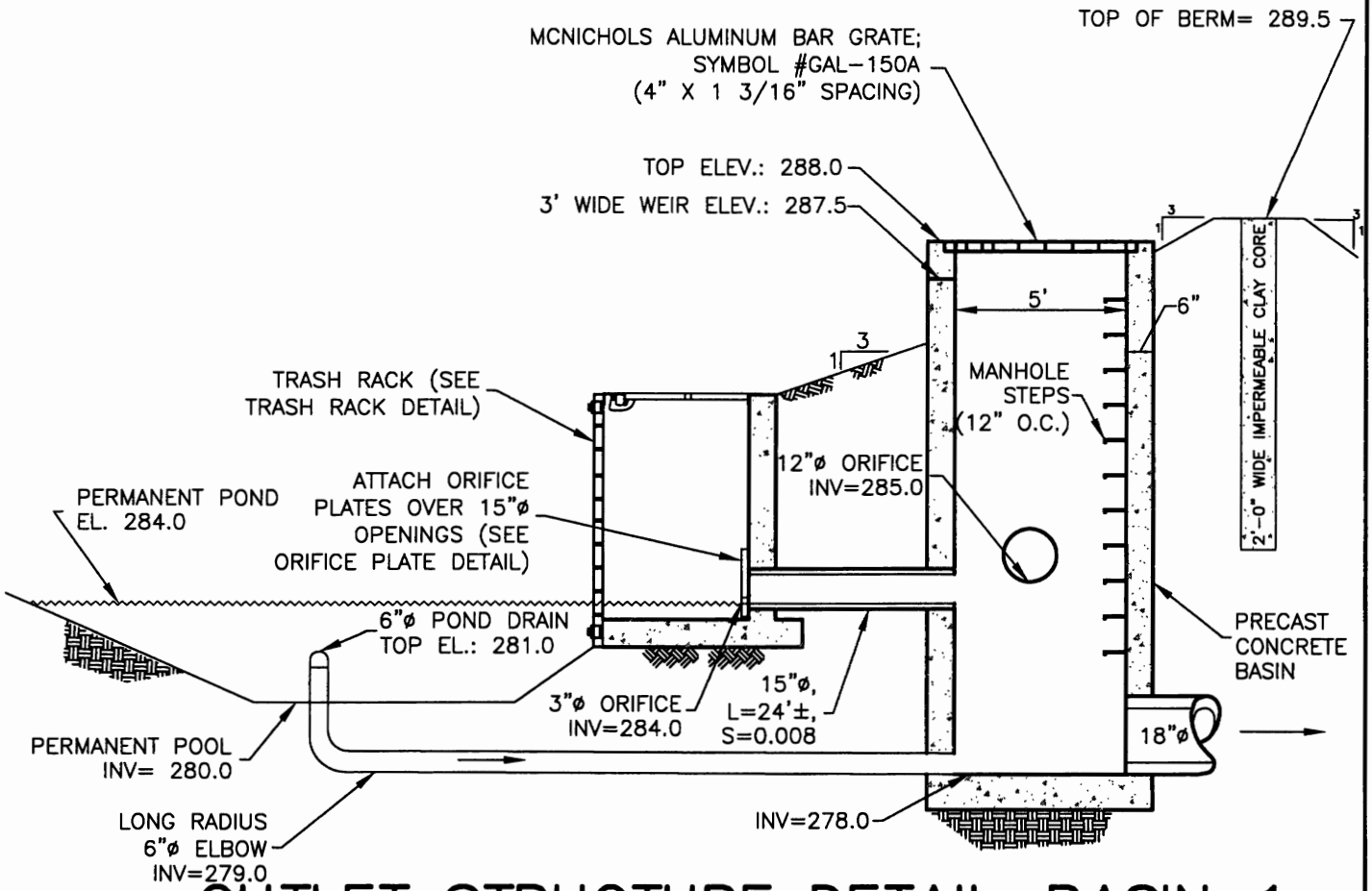
Hydrologic analyses were prepared for existing and proposed conditions and utilize SCS unit hydrographs utilizing the calibrated curve number for pre- and post-development conditions.

The hydrograph calculations and summations were prepared using the Corps of Engineers Hydrological Computer Program, HEC-1. To establish these flows the 2, 5, 10 and 100 year, 24-hour storm precipitation values were derived from available TP-40 information and incorporated in the HEC-1 models.

Our analysis indicates that two detention and water quality basins are required to mitigate against increases in peak discharge for storms ranging from the 2-year to the 100-year design discharge. Detention basin # 1 and # 2 will be controlled by a two orifii (3-inch diameter orifice and 12-inch diameter orifice) and over flow weirs. See details in the Appendix.

Detention Basin # 1 and # 2 are designed in accordance with N.Y.S.D.E.C. water quality guidelines for a *Storm water Pocket Pond (P-5),* which requires a forebay and permanent pond area.

Refer to the Appendix for backup calculations, HEC-1 analyses and other supporting drainage data.



OUTLET STRUCTURE DETAIL-BASIN-1

N.T.S.

BASIN NOTES:

A. ALL BERM FILL TO BE COMPACTED TO 95% MODIFIED PROCTOR MINIMUM DENSITY. LOW PERMEABILITY SOIL FREE OF ORGANIC MATERIALS TO BE UTILIZED IN BERM CONSTRUCTION.

B. A LANDSCAPING PLAN FOR THE STORMWATER POND AND ITS BUFFER SHALL BE PREPARED TO INDICATE HOW AQUATIC AND TERRESTRIAL AREAS WILL BE VEGETATIVELY STABILIZED AND ESTABLISHED.

C. SHOP DRAWINGS OF ALL STRUCTURES TO BE SUBMITTED TO THE DESIGN ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

MAINTENANCE NOTES:

1. A LEGALLY BINDING MAINTENANCE AGREEMENT TO BE PREPARED FOR THE TOWN OF CLARKSTOWN FOR FUTURE MAINTENANCE AND UPKEEP.

2. AN ACCESS AND MAINTENANCE EASEMENT TO BE PROVIDED TO THE TOWN OF CLARKSTOWN.

3. FOREBAY SEDIMENT REMOVAL TO BE PERFORMED EVERY FIVE YEARS OR WHEN THE FOREBAY IS 50% FULL.

COURTYARD AT UPPER NYACK
VILLAGE OF UPPER NYACK
ROCKLAND COUNTY, NEW YORK

OUTLET STRUCTURE DETAIL

LJA | LEONARD JACKSON ASSOCIATES
26 FIREMENS MEMORIAL DRIVE, POMONA, NEW YORK 10970
(845) 354-4382

DATE:	SCALE:	DRAWN BY:	JOB NO:	FIGURE NUMBER
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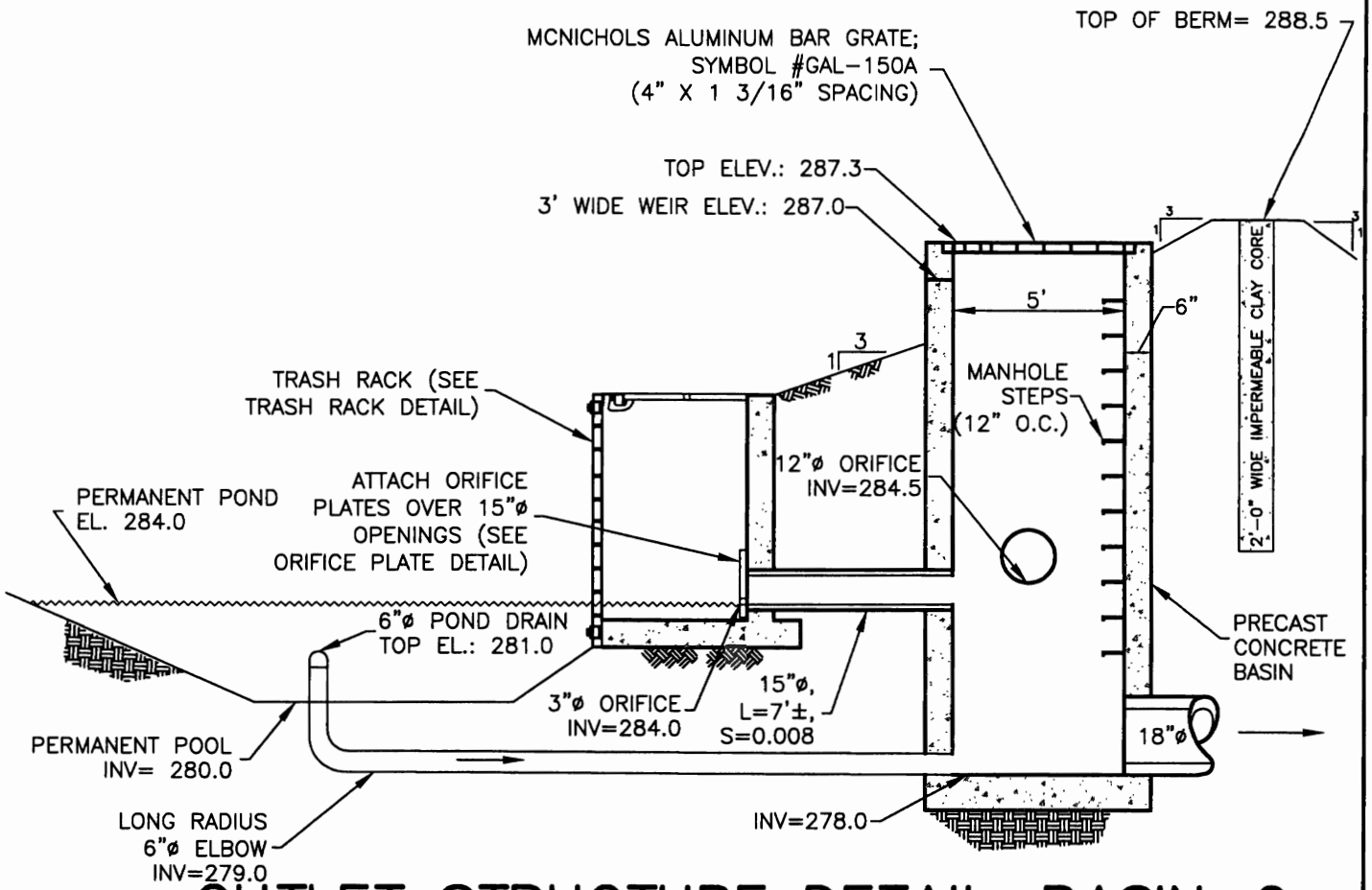

OUTLET STRUCTURE DETAIL-BASIN-2

N.T.S.

BASIN NOTES:

A. ALL BERM FILL TO BE COMPACTED TO 95% MODIFIED PROCTOR MINIMUM DENSITY. LOW PERMEABILITY SOIL FREE OF ORGANIC MATERIALS TO BE UTILIZED IN BERM CONSTRUCTION.

B. A LANDSCAPING PLAN FOR THE STORMWATER POND AND ITS BUFFER SHALL BE PREPARED TO INDICATE HOW AQUATIC AND TERRESTRIAL AREAS WILL BE VEGETATIVELY STABILIZED AND ESTABLISHED.

C. SHOP DRAWINGS OF ALL STRUCTURES TO BE SUBMITTED TO THE DESIGN ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.

MAINTENANCE NOTES:

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COURTYARD AT UPPER NYACK
VILLAGE OF UPPER NYACK
ROCKLAND COUNTY, NEW YORK

OUTLET STRUCTURE DETAIL

LJA | LEONARD JACKSON ASSOCIATES
26 FIREMENS MEMORIAL DRIVE, POMONA, NEW YORK 10970
(845) 354-4382

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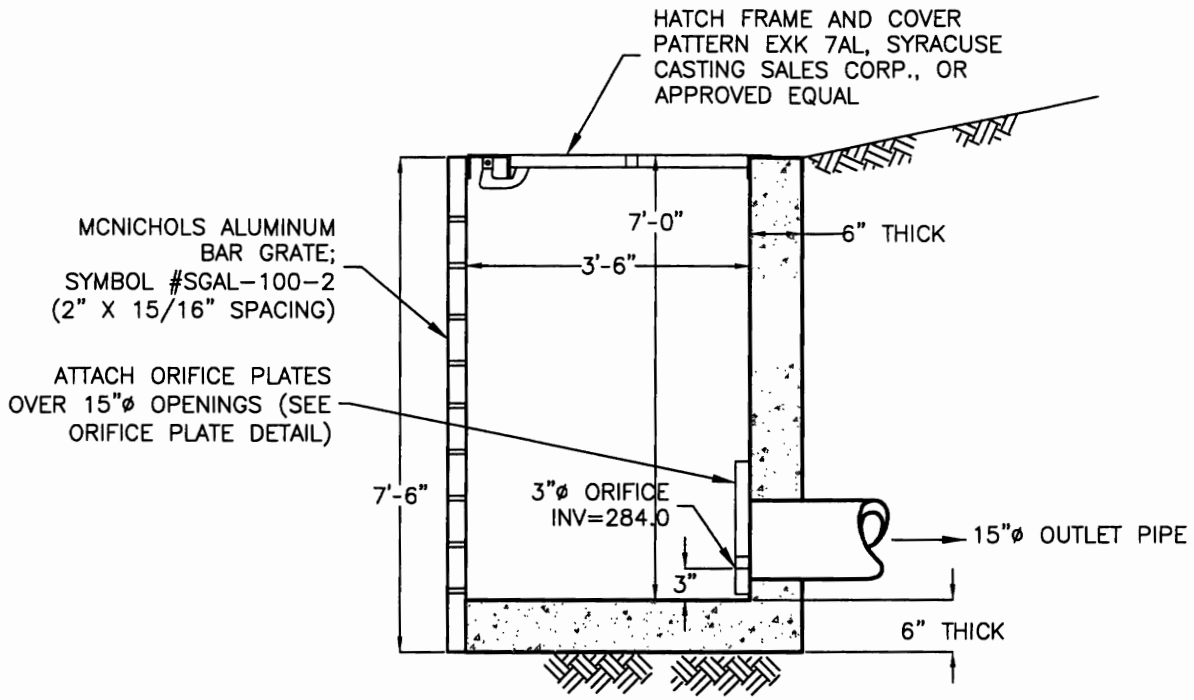
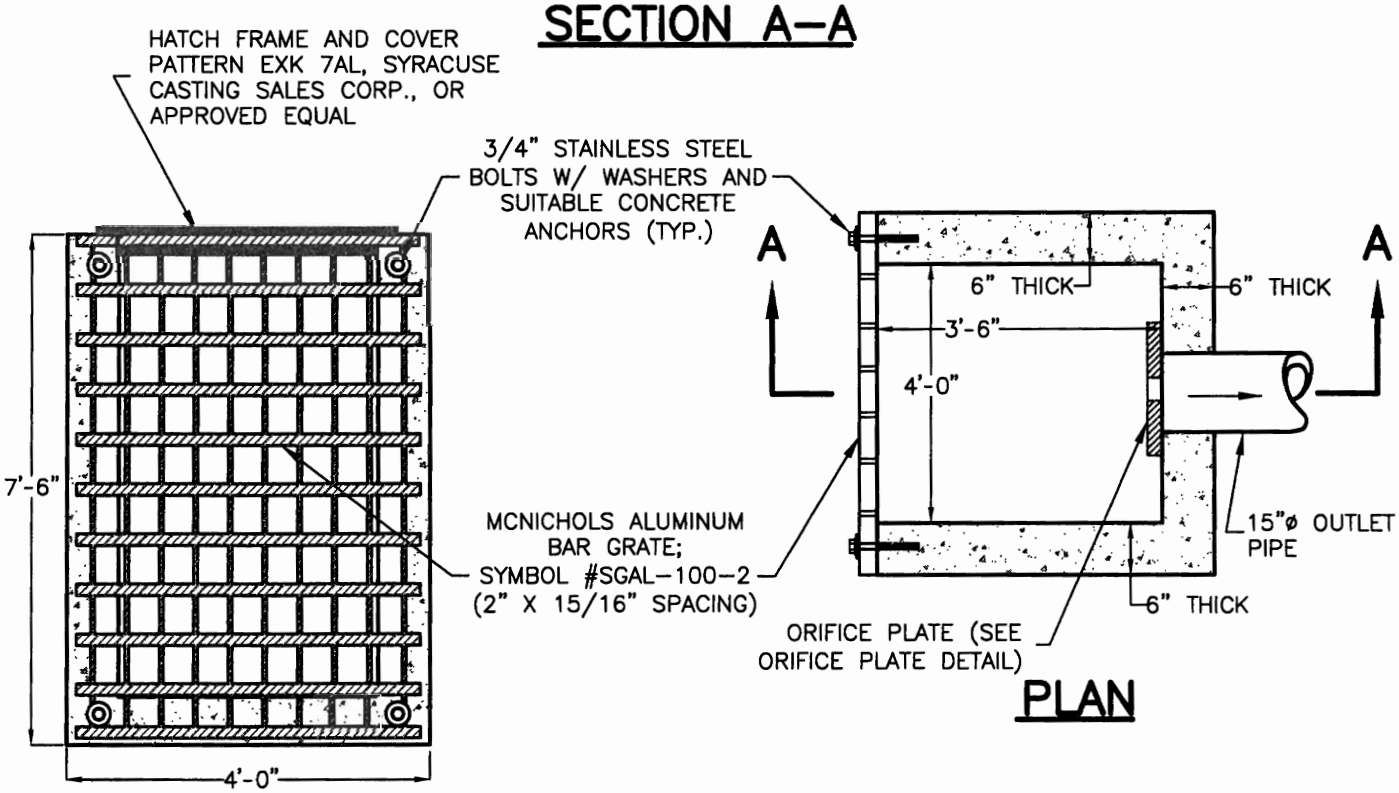


SECTION A-A



PLAN

FRONT ELEVATION

TRASH RACK DETAIL

N.T.S.

COURTYARD AT UPPER NYACK
VILLAGE OF UPPER NYACK
ROCKLAND COUNTY, NEW YORK

TRASH RACK DETAIL

LJA | LEONARD JACKSON ASSOCIATES
26 FREMENS MEMORIAL DRIVE, POMONA, NEW YORK 10970
(845) 354-4382

DATE:	SCALE:	DRAWN BY:	JOB NO:	FIGURE NUMBER
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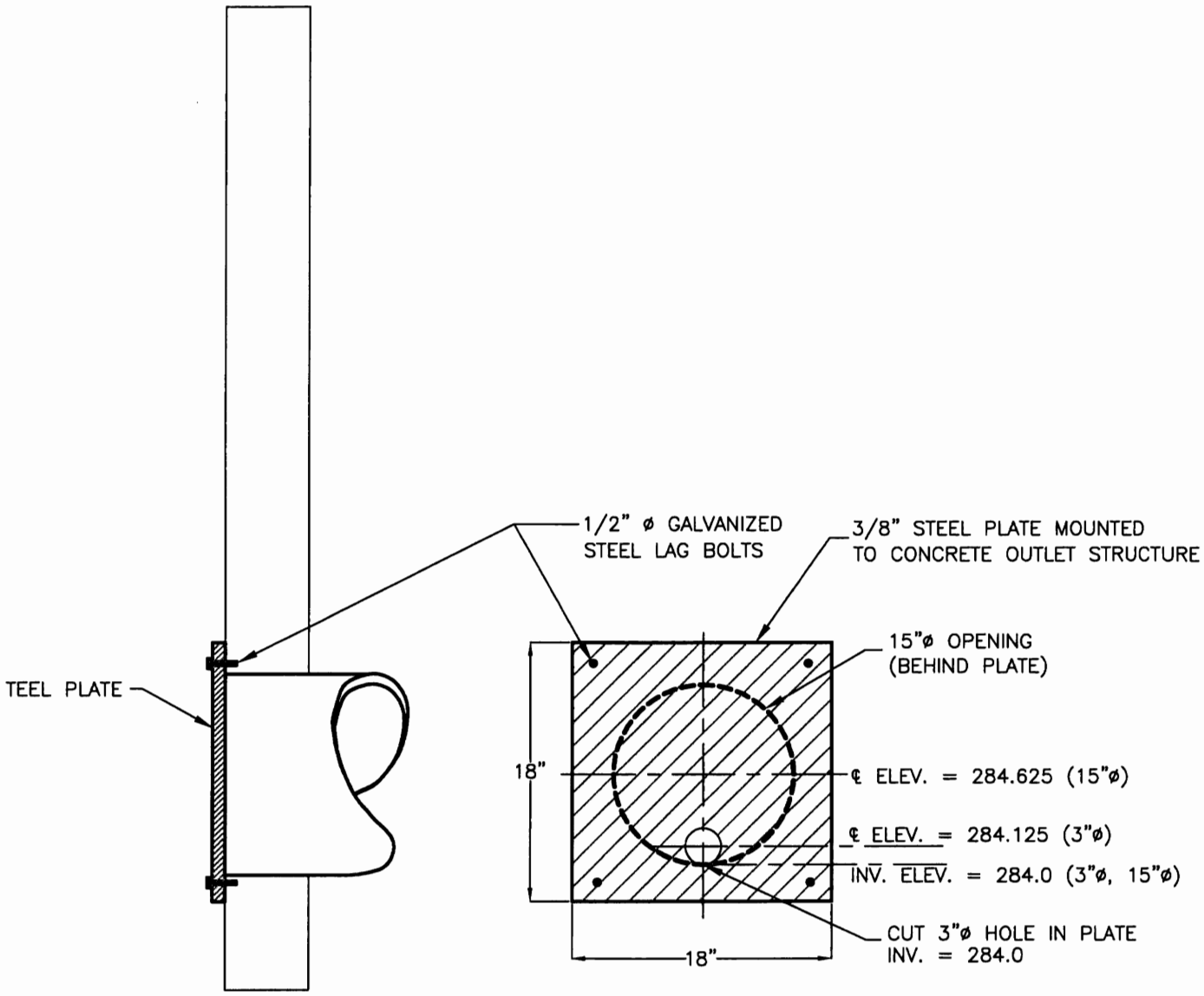
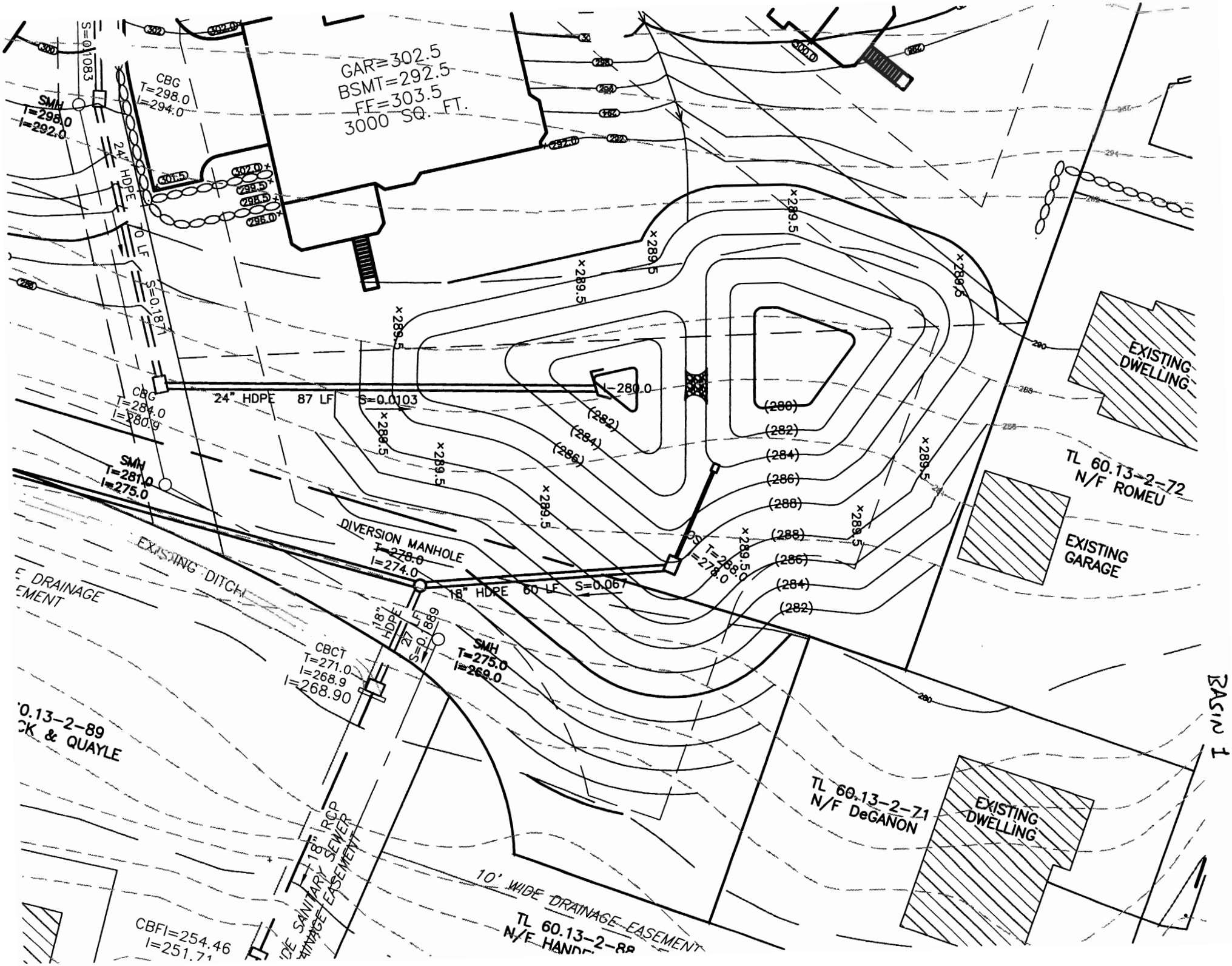


ORIFICE PLATE DETAIL

N.T.S.

COURTYARD AT UPPER NYACK VILLAGE OF UPPER NYACK ROCKLAND COUNTY, NEW YORK				
ORIFICE PLATE DETAIL				
LJA — LEONARD JACKSON ASSOCIATES 28 FIREMENS MEMORIAL DRIVE, POMONA, NEW YORK 10970 (845) 354-4382				
DATE: 08/24/06	SCALE: 1"=100'	DRAWN BY: P.D.	JOB NO: 03118	FIGURE NUMBER B11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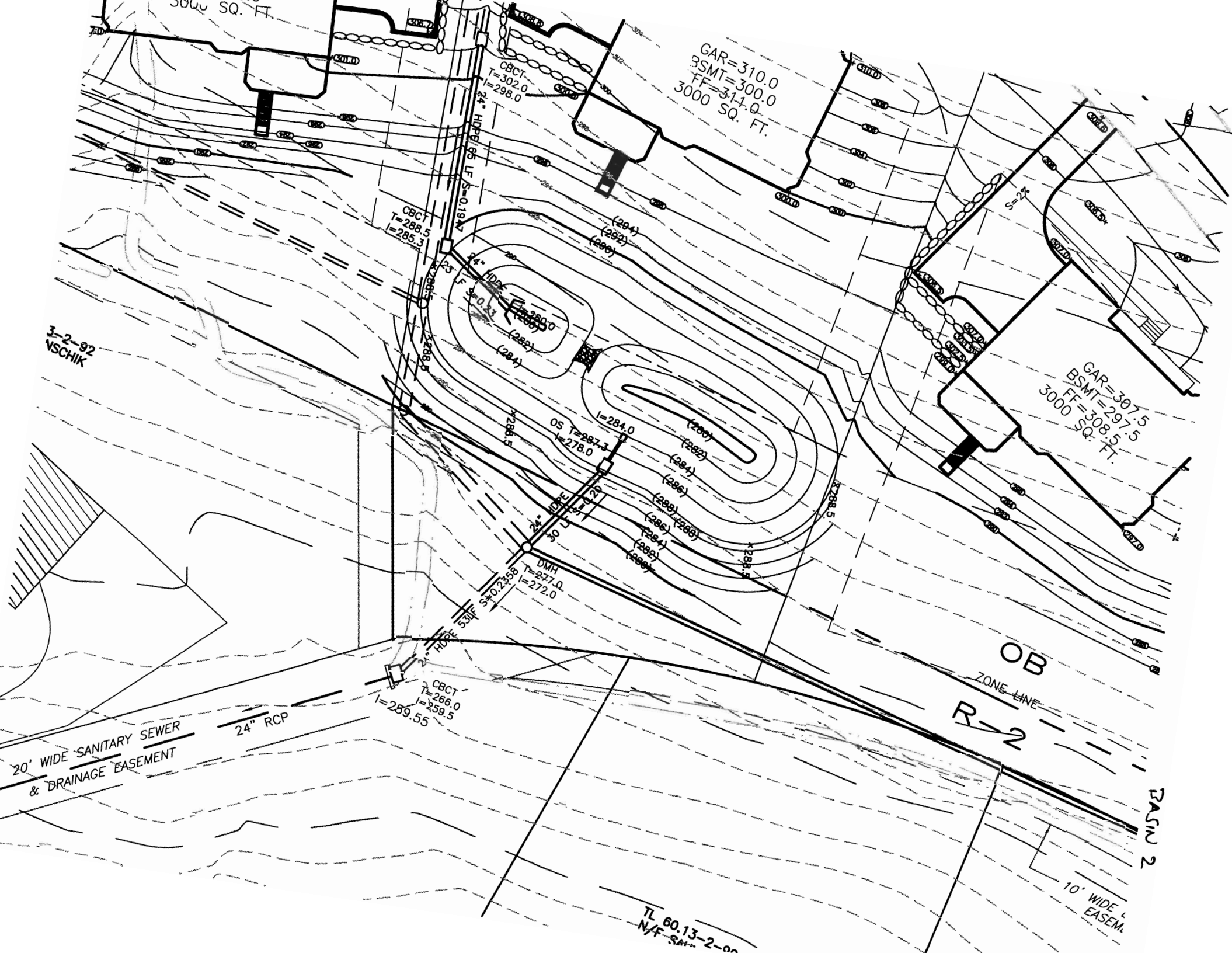
BSMT=292.5
FF=303.5
3000 SQ. FT.
SMH
T=298.0
I=292.0
CBG
T=298.0
I=294.0
24" HDPE 70 LF S=0.1871
24" HDPE 87 LF S=0.0103
I=280.0
CBG
T=284.0
I=280.9
SMH
T=281.0
I=275.0
DIVERSION MANHOLE
T=278.0
I=274.0
T=268.0
I=278.0
18" HDPE 60 LF S=0.067
18" HDPE 27 LF S=0.1889
SMH
T=275.0
I=269.0
CBCT
T=271.0
I=268.9
I=268.90
EXISTING DITCH
DRAINAGE
EMENT
EXISTING DWELLING
TL 60.13-2-72
N/F ROMEU
EXISTING GARAGE
TL 60.13-2-71
N/F DeGANON
EXISTING DWELLING
10' WIDE DRAINAGE EASEMENT
TL 60.13-2-88
CBFI=254.46
I=251.71
18" RCP
SANITARY SEWER
DRAINAGE EASEMENT
0.13-2-89
CK & QUAYLE
BASIN 1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CBCT
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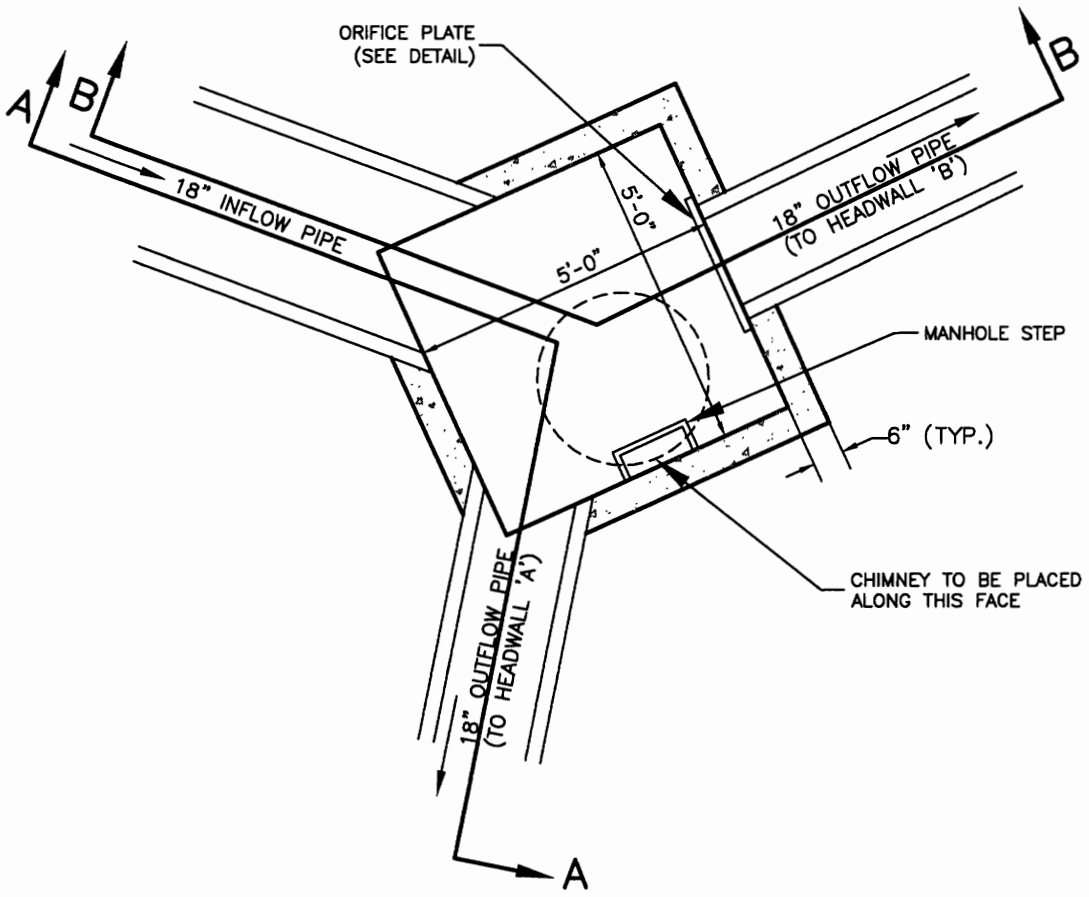
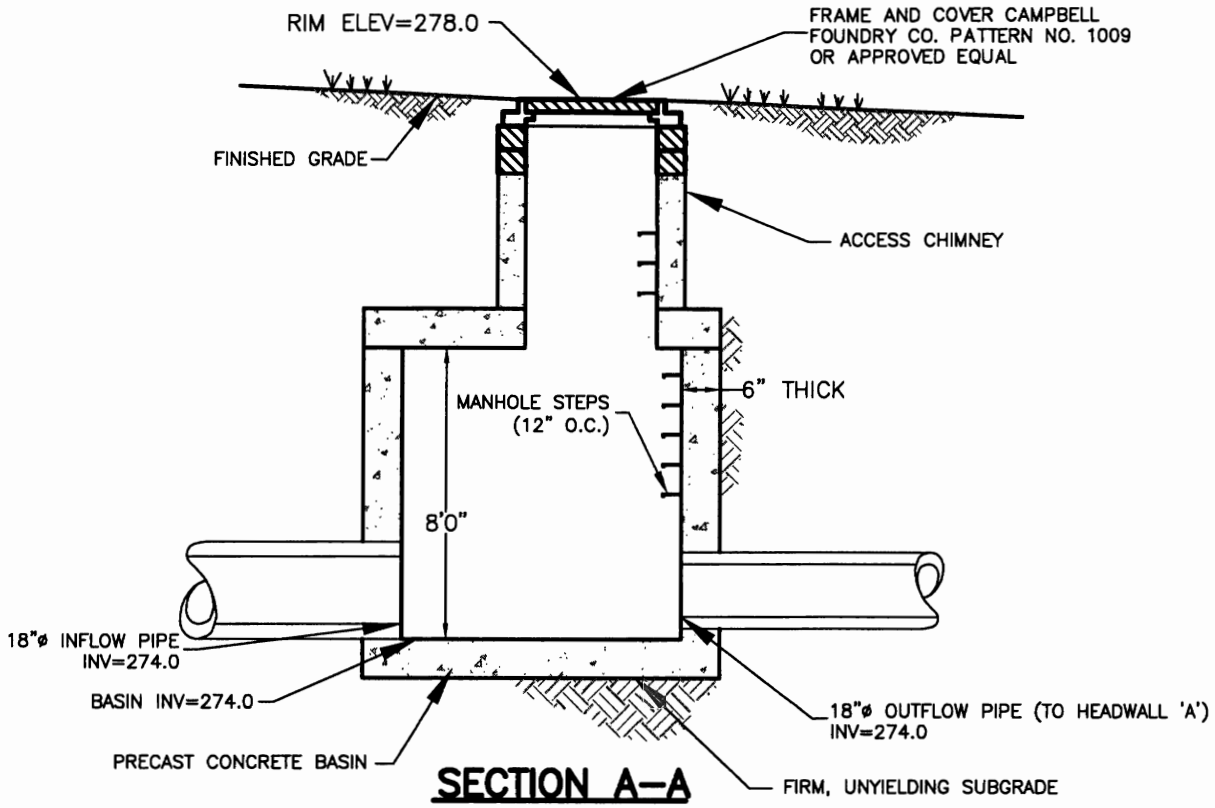
I=298.0
24" HDPE 86 LF S=0.19
CBCT
T=288.5
I=285.3
25 LF
24" HDPE
S=0.33
CBCT
T=280.0
I=276.0
GAR=310.0
BSMT=300.0
FF=311.0
3000 SQ. FT.
S=2%
GAR=307.5
BSMT=297.5
FF=308.5
3000 SQ. FT.
3-2-92
VSCHIK
OS T=287.3
I=278.0
I=284.0
24" HDPE
30 LF
DMH
T=277.0
I=272.0
S=0.23%
53LF
2" HDPE
CBCT
T=266.0
I=259.5
I=259.55
20' WIDE SANITARY SEWER
& DRAINAGE EASEMENT
24" RCP
OB
ZONE LINE
R-2
BASIN 2
10' WIDE
EASEM.
TL 60.13-2-92
N/F



PLAN

DIVERSION STRUCTURE DETAIL

N.T.S.



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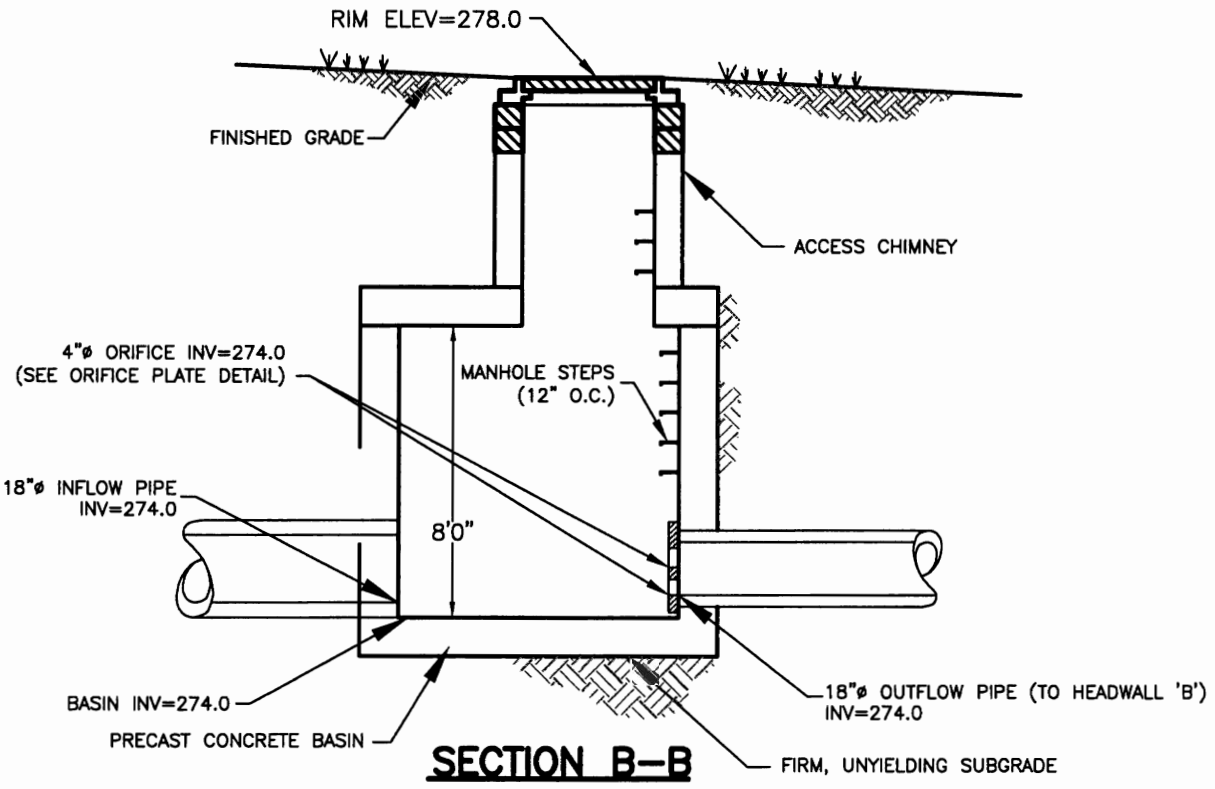

SECTION B–B

DIVERSION STRUCTURE SECTIONS

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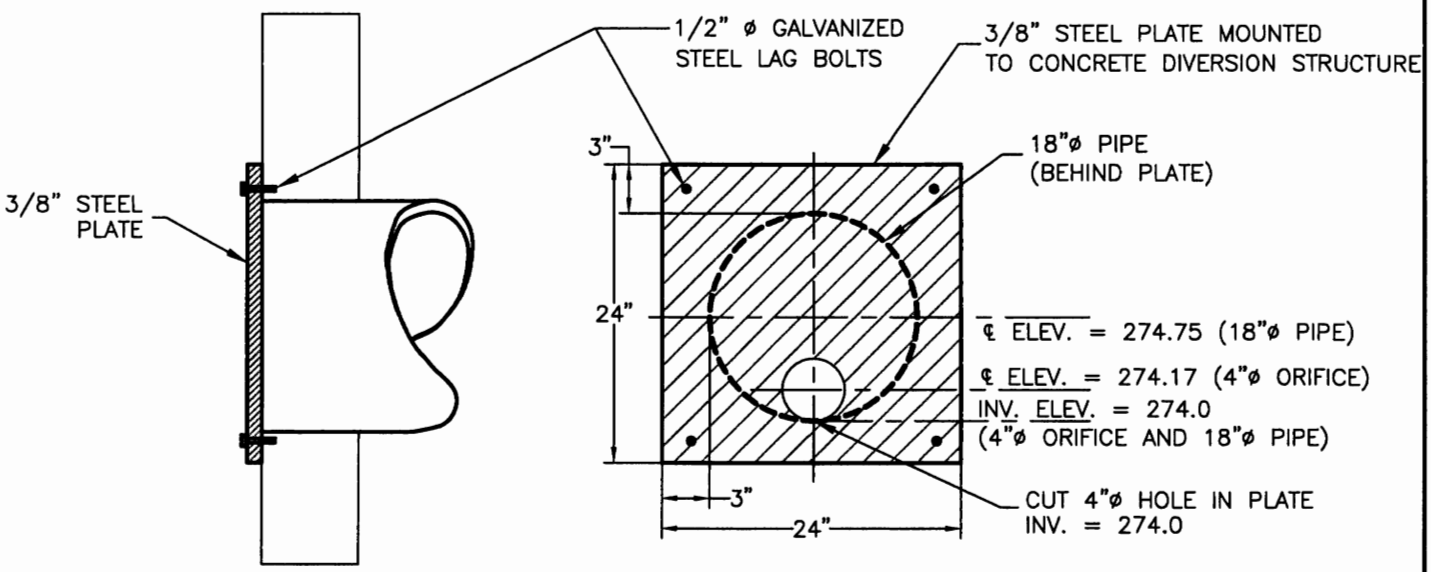
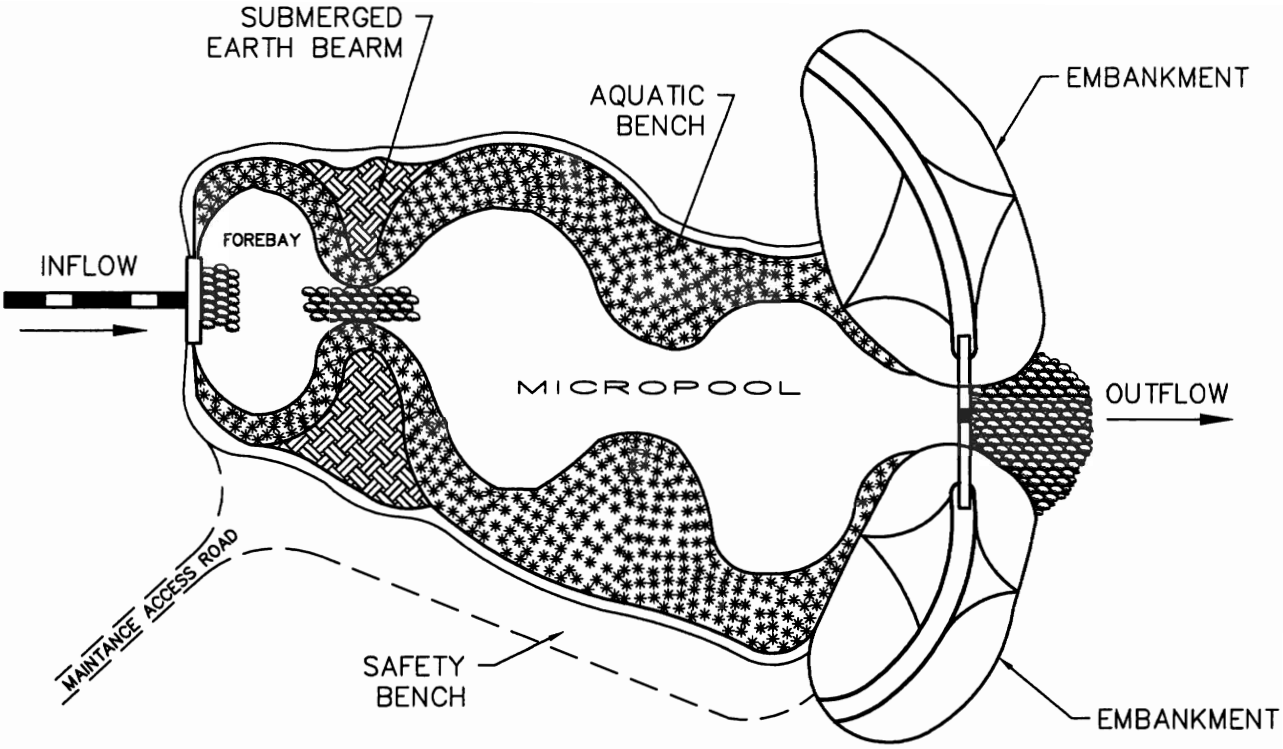


DIVERSION STRUCTURE ORIFICE PLATE DETAIL (FOR PIPE TO HEADWALL 'B')

N.T.S.



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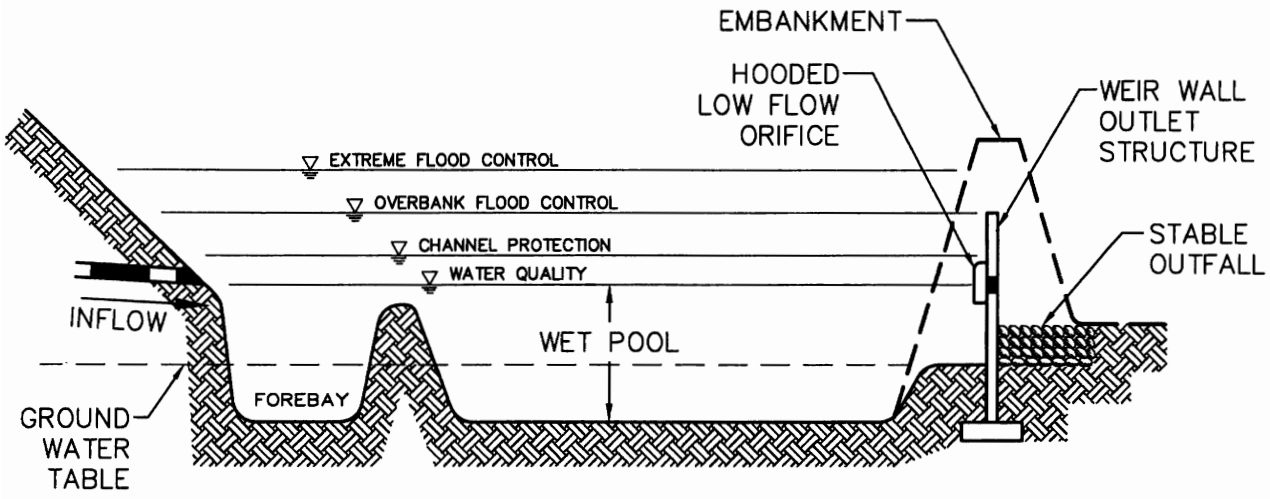
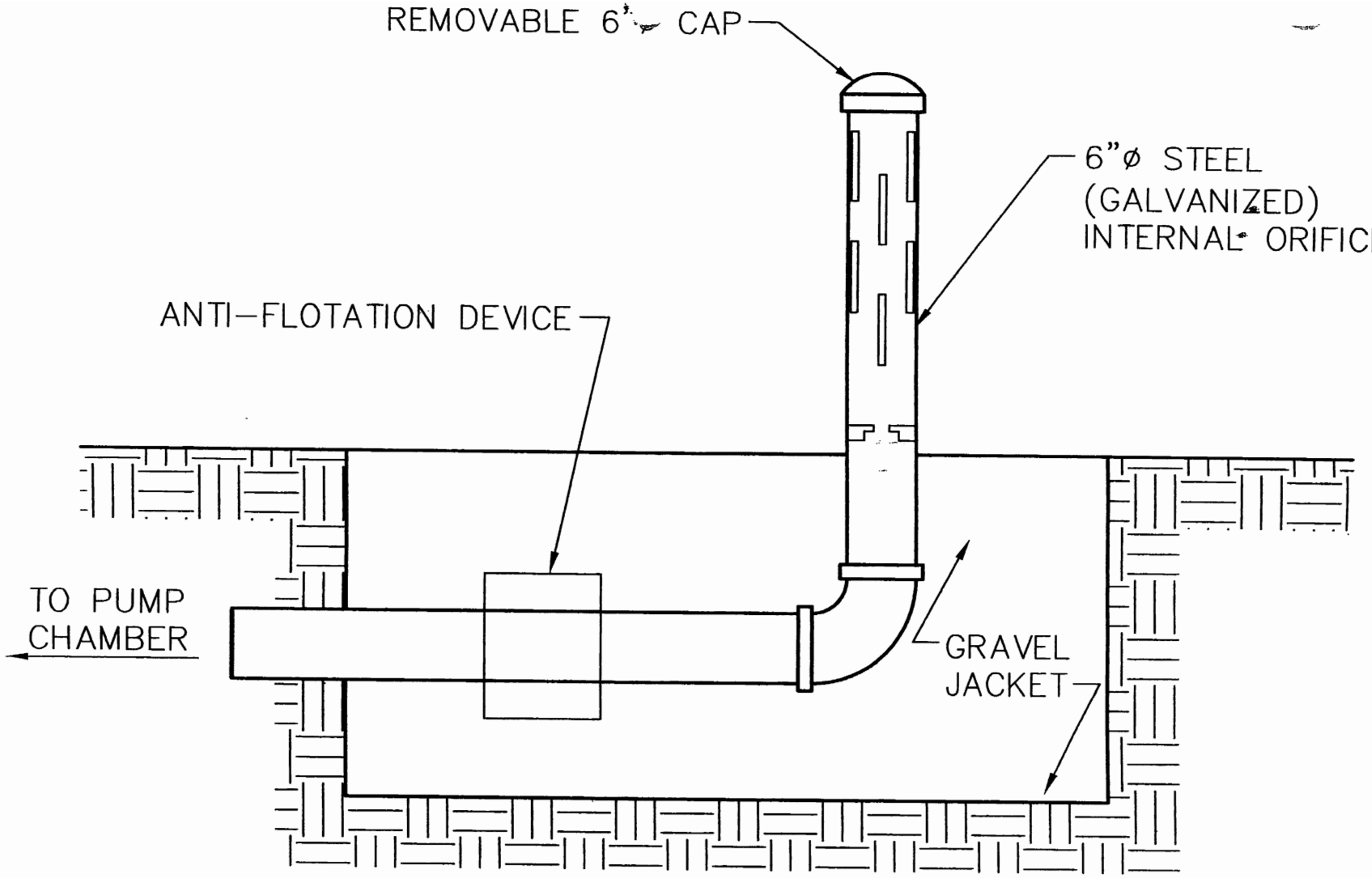


PROFILE

POCKET POND (P-5) DETAIL

N.T.S.



POND DRAIN DETAIL

N.T.S.

Appendix B – Times of Concentration Calculations:

1.) Times of Concentration Calculations.

LEONARD JACKSON ASSOCIATES
26 Firemens Memorial Drive
Pomona, NY 10970
845-354-4382

Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack JOB #: 03118 BY: JS
LOCATION: Village of Upper Nyack, NY DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 1, Offsite area contributing to stream flowing through the site, to Point of Interest 'A'
Subarea conditions do not vary between Existing and Developed Conditions

Sheet Flow:

	Segment ID:	575-526			
1. Surface description (table 3-1).....		Unpaved			
2. Manning's Roughness Coeff., n (table 3-1).....		0.4			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		200			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.33			
5. Land Slope, S.....(ft./ft.)		0.245			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)	0.22		=	**0.22** (hrs.)

Shallow Concentrated Flow:

	Segment ID:	526-327.2			
1. Surface description (paved or unpaved).....		unpaved			
2. Flow Length, L .....(ft.)		1015			
3. Watercourse Slope, s.....(ft./ft.)		0.196			
4. Average Velocity, V (figure 3-1)..... (ft./s)		7.1			
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)	0.04		=	**0.04** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.00**

= **0.00** (hrs.)

Total Tc = **0.26** (hrs.)
15.8 (min.)

LEONARD JACKSON ASSOCIATES
26 Firemens Memorial Drive
Pomona, NY 10970
845-354-4382

Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack JOB #: 03118 BY: JS
LOCATION: Village of Upper Nyack, NY DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 2, Offsite area draining through site to Point of Interest 'C'

Sheet Flow:	Segment ID:	347.7-.43			
1. Surface description (table 3-1).....		PAVED			
2. Manning's Roughness Coeff., n (table 3-1).....		0.02			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		75			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.33			
5. Land Slope, S.....(ft./ft.)		0.063			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)	0.02		=	**0.02** (hrs.)

Shallow Concentrated Flow:	Segment ID:				
1. Surface description (paved or unpaved).....					
2. Flow Length, L ..... (ft.)					
3. Watercourse Slope, s.....(ft./ft.)					
4. Average Velocity, V (figure 3-1)..... (ft./s)					
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)			=	**0.00** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.00**

= **0.00** (hrs.)

Total Tc = **0.02** (hrs.)
1.0 (min.)

LEONARD JACKSON ASSOCIATES
26 Firemens Memorial Drive
Pomona, NY 10970
845-354-4382

Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack JOB #: 03118 BY: JS
LOCATION: Village of Upper Nyack, NY DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 3, Offsite area draining through site to Point of Interest 'B'

Sheet Flow: Segment ID:

1. Surface description (table 3-1).....	347-342				
2. Manning's Roughness Coeff., n (table 3-1).....	PAVED				
3. Flow Length, L (total < or = to 300 ft.).....(ft.)	0.02				
4. Two year, 24 hr rainfall, P_2.....(in.)	60				
5. Land Slope, S.....(ft./ft.)	3.33				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$ Compute T_t = ...(hr.)	0.083				
	0.01		=	**0.01**	(hrs.)

Shallow Concentrated Flow: Segment ID:

1. Surface description (paved or unpaved).....					
2. Flow Length, L .....(ft.)					
3. Watercourse Slope, s.....(ft./ft.)					
4. Average Velocity, V (figure 3-1)..... (ft./s)					
6. $T_t = \frac{L}{3600\ V}$ Compute T_t = ...(hr.)			=	**0.00**	(hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.00**

= **0.00** (hrs.)

Total Tc = **0.01** (hrs.)
0.7 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack JOB #: 03118 BY: JS
LOCATION: Village of Upper Nyack, NY DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 4, Offsite area draining through the site to point of interest 'A'

Sheet Flow:	Segment ID:	341-333			
1. Surface description (table 3-1).....		grass			
2. Manning's Roughness Coeff., n (table 3-1).....		0.2			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		20			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.33			
5. Land Slope, S.....(ft./ft.)		0.400			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)	0.02		=	**0.02** (hrs.)

Shallow Concentrated Flow:	Segment ID:				
1. Surface description (paved or unpaved).....					
2. Flow Length, L .....(ft.)					
3. Watercourse Slope, s.....(ft./ft.)					
4. Average Velocity, V (figure 3-1)..... (ft./s)					
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)			=	**0.00** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.00**

= **0.00** (hrs.)

Total Tc = **0.02** (hrs.)
1.0 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack JOB #: 03118 BY: JS
LOCATION: Village of Upper Nyack, NY DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 5, Onsite area draining to Point of Interest 'C'

Sheet Flow:	Segment ID:	343-324			
1. Surface description (table 3-1).....		Light Brush			
2. Manning's Roughness Coeff., n (table 3-1).....		0.4			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		200			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.33			
5. Land Slope, S.....(ft./ft.)		0.095			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)	0.33		=	**0.33** (hrs.)

Shallow Concentrated Flow:	Segment ID:	324-267			
1. Surface description (paved or unpaved).....		unpaved			
2. Flow Length, L ..... (ft.)		540			
3. Watercourse Slope, s.....(ft./ft.)		0.106			
4. Average Velocity, V (figure 3-1)..... (ft./s)		5.2			
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)	0.03		=	**0.03** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)			
Flow Length, L:	*0*	*0.000*			
	(Start)	(End)	(Change in ft.)		
Elevation Change:	*0.0*	*0.0*	*0.0*		
$T_t = (11.9L^3/H)^{0.385}$					
T_t =	**0.00**			=	**0.00** (hrs.)

Total Tc = **0.36** (hrs.)
21.4 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: JS
LOCATION: Village of Upper Nyack, NY | DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 6, Onsite area draining to Point of Interest 'B'

Sheet Flow:

	Segment ID:				
1. Surface description (table 3-1).....		342-322.5			
2. Manning's Roughness Coeff., n (table 3-1).....		Light Brush			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		0.4			
4. Two year, 24 hr rainfall, P_2.....(in.)		200			
5. Land Slope, S.....(ft./ft.)		3.33			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$ Compute T_t = ...(hr.)		0.098			
		0.32		=	**0.32** (hrs.)

Shallow Concentrated Flow:

	Segment ID:				
1. Surface description (paved or unpaved).....		322.5-274.5			
2. Flow Length, L .....(ft.)		unpaved			
3. Watercourse Slope, s.....(ft./ft.)		400			
4. Average Velocity, V (figure 3-1)..... (ft./s)		0.120			
6. $T_t = \frac{L}{3600\ V}$ Compute T_t = ...(hr.)		5.5			
		0.02		=	**0.02** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)			
Flow Length, L:	*0*	*0.000*			
	(Start)	(End)	(Change in ft.)		
Elevation Change:	*0.0*	*0.0*	*0.0*		
$T_t = (11.9L^3/H)^{0.385}$					
T_t =	**0.00**			=	**0.00** (hrs.)

Total Tc = **0.34** (hrs.) / **20.7** (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack JOB #: 03118 BY: JS
LOCATION: Village of Upper Nyack, NY DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 7, Onsite area draining to Point of Interest 'A'

Sheet Flow:

	Segment ID:	342-322			
1. Surface description (table 3-1).....		Light Brush			
2. Manning's Roughness Coeff., n (table 3-1).....		0.4			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		200			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.33			
5. Land Slope, S.....(ft./ft.)		0.100			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)	0.32		=	**0.32** (hrs.)

Shallow Concentrated Flow:

	Segment ID:	322-278			
1. Surface description (paved or unpaved).....		unpaved			
2. Flow Length, L ..... (ft.)		350			
3. Watercourse Slope, s.....(ft./ft.)		0.126			
4. Average Velocity, V (figure 3-1)..... (ft./s)		5.7			
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)	0.02		=	**0.02** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.00**

= **0.00** (hrs.)

Total Tc = **0.34** (hrs.)
20.3 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: JS
LOCATION: Village of Upper Nyack, NY | DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 8, Onsite area draining to Point of Interest 'D'

Sheet Flow:

	Segment ID:	333-328.5			
1. Surface description (table 3-1).....		Light Brush			
2. Manning's Roughness Coeff., n (table 3-1).....		0.4			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		60			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.33			
5. Land Slope, S.....(ft./ft.)		0.075			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)	0.14		=	**0.14** (hrs.)

Shallow Concentrated Flow:

	Segment ID:				
1. Surface description (paved or unpaved).....					
2. Flow Length, L .....(ft.)					
3. Watercourse Slope, s.....(ft./ft.)					
4. Average Velocity, V (figure 3-1)..... (ft./s)					
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)			=	**0.00** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.00**

= **0.00** (hrs.)

Total Tc = **0.14** (hrs.) / **8.2** (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: JS
LOCATION: Village of Upper Nyack, NY | DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 9, Offsite area draining to Point of Interest 'B'

Sheet Flow:

	Segment ID:	276-268.9			
1. Surface description (table 3-1).....		grass			
2. Manning's Roughness Coeff., n (table 3-1).....		0.2			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		105			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.33			
5. Land Slope, S.....(ft./ft.)		0.068			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)	0.13		=	**0.13** (hrs.)

Shallow Concentrated Flow:

	Segment ID:				
1. Surface description (paved or unpaved).....					
2. Flow Length, L .....(ft.)					
3. Watercourse Slope, s.....(ft./ft.)					
4. Average Velocity, V (figure 3-1)..... (ft./s)					
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)			=	**0.00** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.00**

= **0.00** (hrs.)

Total Tc = **0.13** (hrs.)
7.7 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: JS
LOCATION: Village of Upper Nyack, NY | DATE: 02/24/04

Mark One: Existing Developed

Subarea Description: Subarea 10, Offsite area draining to Point of Interest 'A'

Sheet Flow:

		Segment ID:	288-282			
1. Surface description (table 3-1).....			grass			
2. Manning's Roughness Coeff., n (table 3-1).....			0.2			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)			100			
4. Two year, 24 hr rainfall, P_2.....(in.)			3.33			
5. Land Slope, S.....(ft./ft.)			0.060			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)		0.13		=	**0.13** (hrs.)

Shallow Concentrated Flow:

		Segment ID:				
1. Surface description (paved or unpaved).....						
2. Flow Length, L .....(ft.)						
3. Watercourse Slope, s.....(ft./ft.)						
4. Average Velocity, V (figure 3-1)..... (ft./s)						
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)				=	**0.00** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*340*	*0.064*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*282.0*	*276.0*	*6.0*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.05**

= **0.05** (hrs.)

Total Tc = **0.18** (hrs.)
11.1 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: JS
LOCATION: Village of Upper Nyack, NY | DATE: 02/24/04

Mark One: Existing | Developed

Subarea Description: Subarea 1, Offsite area contributing to stream flowing through the site, to Point of Interest 'A'
Subarea conditions do not vary between Existing and Developed Conditions

Sheet Flow:

	Segment ID:				
1. Surface description (table 3-1).....		575-526			
2. Manning's Roughness Coeff., n (table 3-1).....		Unpaved			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		0.4			
4. Two year, 24 hr rainfall, P_2.....(in.)		200			
5. Land Slope, S.....(ft./ft.)		3.33			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$ Compute T_t = ...(hr.)		0.245			
		0.22		=	**0.22** (hrs.)

Shallow Concentrated Flow:

	Segment ID:				
1. Surface description (paved or unpaved).....		526-327.2			
2. Flow Length, L ..... (ft.)		unpaved			
3. Watercourse Slope, s.....(ft./ft.)		1015			
4. Average Velocity, V (figure 3-1)..... (ft./s)		0.196			
6. $T_t = \frac{L}{3600\ V}$ Compute T_t = ...(hr.)		7.1			
		0.04		=	**0.04** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)		
Flow Length, L:	*0*	*0.000*		
	(Start)	(End)	(Change in ft.)	
Elevation Change:	*0.0*	*0.0*	*0.0*	

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.00**

= **0.00** (hrs.)

Total Tc = **0.26** (hrs.)
15.8 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: JS
LOCATION: Village of Upper Nyack, NY | DATE: 02/24/04

Mark One: Existing | Developed

Description: Lag Subarea 1 to Point of Interest 'A'

Sheet Flow: Segment ID:

1. Surface description (table 3-1)……..
2. Manning's Roughness Coeff., n (table 3-1)…….. .
3. Flow Length, L (total < or = to 300 ft.)…….(ft.)
4. Two year, 24 hr rainfall, P_2……..(in.)
5. Land Slope, S……..(ft./ft.)
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$ Compute T_t = ……(hr.) = **0.00**

Shallow Concentrated Flow: Segment ID:

1. Surface description (paved or unpaved)……..
2. Flow Length, L ……..(ft.)
3. Watercourse Slope, s……..(ft./ft.)
4. Average Velocity, V (figure 3-1)…….. (ft./s)
6. $T_t = \frac{L}{3600\ V}$ Compute T_t = ……(hr.) = **0.00**

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*650*	*0.123*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*327.2*	*259.6*	*67.7*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.05** = **0.05**

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: PD
LOCATION: Village of Upper Nyack, NY | DATE: 08/21/06

Mark One: Existing | Developed

Subarea Description: Subarea 2, Offsite area draining through site to Point of Interest 'C'

Sheet Flow:	Segment ID:	347.7-.43			
1. Surface description (table 3-1)……		PAVED			
2. Manning's Roughness Coeff., n (table 3-1)…..…		0.02			
3. Flow Length, L (total < or = to 300 ft.)…..…..(ft.)		75			
4. Two year, 24 hr rainfall, P_2……..……..(in.)		3.33			
5. Land Slope, S……..……..……..(ft./ft.)		0.063			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ……..…..(hr.)	0.02		=	**0.02** (hrs.)

Shallow Concentrated Flow:	Segment ID:				
1. Surface description (paved or unpaved)……..……..					
2. Flow Length, L ……..…..……..…..…... (ft.)					
3. Watercourse Slope, s…..……..……..(ft./ft.)					
4. Average Velocity, V (figure 3-1)……..…….. (ft./s)					
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ……..…..(hr.)			=	**0.00** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

$T_t =$ **0.00**

= **0.00** (hrs.)

Total Tc = **0.02** (hrs.) / **1.0** (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: PD
LOCATION: Village of Upper Nyack, NY | DATE: 08/21/06

Mark One: Existing | Developed

Subarea Description: Subarea 3, Offsite area draining through site to Point of Interest 'B'

Sheet Flow:

	Segment ID:				
1. Surface description (table 3-1)……		PAVED			
2. Manning's Roughness Coeff., n (table 3-1)……		0.02			
3. Flow Length, L (total < or = to 300 ft.)……(ft.)		60			
4. Two year, 24 hr rainfall, P_2……(in.)		3.33			
5. Land Slope, S……(ft./ft.)		0.083			
6. $T_t = \frac{0.007 (nL)^{0.8}}{P_2^{0.5} S^{0.4}}$	Compute T_t = ……(hr.)	0.01		=	**0.01** (hrs.)

Shallow Concentrated Flow:

	Segment ID:				
1. Surface description (paved or unpaved)……					
2. Flow Length, L …… (ft.)					
3. Watercourse Slope, s……(ft./ft.)					
4. Average Velocity, V (figure 3-1)…… (ft./s)					
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ……(hr.)			=	**0.00** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

$T_t =$ **0.00**

= **0.00** (hrs.)

Total Tc = **0.01** (hrs.)
0.7 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: PD
LOCATION: Village of Upper Nyack, NY | DATE: 08/21/06

Mark One: Existing | Developed

Subarea Description: Subarea 4, Offsite area draining through the site to point of interest 'A'

Sheet Flow: Segment ID:

1. Surface description (table 3-1).....	341-333				
2. Manning's Roughness Coeff., n (table 3-1).....	grass				
3. Flow Length, L (total < or = to 300 ft.).....(ft.)	0.2				
4. Two year, 24 hr rainfall, P_2.....(in.)	20				
5. Land Slope, S.....(ft./ft.)	3.33				
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$ Compute T_t = ...(hr.)	0.400				
	0.02		=	**0.02**	(hrs.)

Shallow Concentrated Flow: Segment ID:

1. Surface description (paved or unpaved).....					
2. Flow Length, L ..... (ft.)					
3. Watercourse Slope, s.....(ft./ft.)					
4. Average Velocity, V (figure 3-1)..... (ft./s)					
6. $T_t = \frac{L}{3600\ V}$ Compute T_t = ...(hr.)			=	**0.00**	(hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

$T_t =$ **0.00**

= **0.00** (hrs.)

Total Tc = **0.02** (hrs.) / **1.0** (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: PD
LOCATION: Village of Upper Nyack, NY | DATE: 08/21/06

Mark One: Existing | Developed

Subarea Description: Subarea 5

Sheet Flow:	Segment ID:	341-333				
1. Surface description (table 3-1).....		grass				
2. Manning's Roughness Coeff., n (table 3-1).....		0.2				
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		20				
4. Two year, 24 hr rainfall, P_2.....(in.)		3.33				
5. Land Slope, S.....(ft./ft.)		0.400				
6. $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5}\,S^{0.4}}$ Compute T_t = ...(hr.)		0.02		=	**0.02**	(hrs.)

Shallow Concentrated Flow:	Segment ID:					
1. Surface description (paved or unpaved).....						
2. Flow Length, L .....(ft.)						
3. Watercourse Slope, s.....(ft./ft.)						
4. Average Velocity, V (figure 3-1)..... (ft./s)						
6. $T_t = \frac{L}{3600\ V}$ Compute T_t = ...(hr.)				=	**0.00**	(hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*0*	*0.000*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*0.0*	*0.0*	*0.0*

$T_t = (11.9L^3/H)^{0.385}$

T_t = **0.00**

= **0.00** (hrs.)

Total Tc = **0.02** (hrs.)
1.0 (min.)

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Worksheet 3: Time of Concentration (Tc) Calculations

PROJECT: Courtyard at Upper Nyack | JOB #: 03118 | BY: PD
LOCATION: Village of Upper Nyack, NY | DATE: 08/21/06

Mark One: Existing | Developed

Subarea Description: Subarea 10, Offsite area draining to Point of Interest 'A'

Sheet Flow:	Segment ID:	288-282			
1. Surface description (table 3-1).....		grass			
2. Manning's Roughness Coeff., n (table 3-1).....		0.2			
3. Flow Length, L (total < or = to 300 ft.).....(ft.)		100			
4. Two year, 24 hr rainfall, P_2.....(in.)		3.33			
5. Land Slope, S.....(ft./ft.)		0.060			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ S^{0.4}}$	Compute T_t = ...(hr.)	0.13		=	**0.13** (hrs.)

Shallow Concentrated Flow:	Segment ID:				
1. Surface description (paved or unpaved).....					
2. Flow Length, L .....(ft.)					
3. Watercourse Slope, s.....(ft./ft.)					
4. Average Velocity, V (figure 3-1)..... (ft./s)					
6. $T_t = \frac{L}{3600\ V}$	Compute T_t = ...(hr.)			=	**0.00** (hrs.)

Open Channel Flow (California Method):

	(ft.)	(mi.)	
Flow Length, L:	*340*	*0.064*	
	(Start)	(End)	(Change in ft.)
Elevation Change:	*282.0*	*276.0*	*6.0*

$T_t = (11.9L^3/H)^{0.385}$

$T_t =$ **0.05**

= **0.05** (hrs.)

Total Tc = **0.18** (hrs.)
11.1 (min.)

Appendix C – Drainage Calculations:

1.) *Rational Method Drainage Calculations*
2.) *Pollutant Loading Calculations*

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PROJECT: Courtyard at Upper Nyack
DATE: Aug-06 PD

Rational Method
25 Year Discharge Calculations:

Sub-basin Name	Time of Concentration (min.)		*25 year Intensity (U.C.)		Total Contributing Drainage Area (ac.)		C Values			Breakdown of Existing Drainage Area (ac.)			**Breakdown of Developed Drainage Area (ac.)			Sum of Area x C		25 year Discharge (cfs)	
	Existing	Developed	Existing	Developed	Existing	Developed	Woods	Grass	Imp.	Woods	Grass/Lawn	Impervious	Woods	Grass/Lawn	Impervious	Existing	Developed	Existing	Developed
sub1	14.8	14.8	5.3	5.3	7.75	7.75	0.2	0.3	0.9	4.73	2.37	0.65	4.73	2.37	0.65	2.24	2.24	11.87	11.87
sub2	1.0	1.0	5.5	5.5	0.24	0.10	0.2	0.3	0.9	0.00	0.13	0.12	0.00	0.05	0.05	0.14	0.06	0.78	0.32
sub3	0.7	0.7	5.5	5.5	0.08	0.14	0.2	0.3	0.9	0.00	0.06	0.03	0.01	0.07	0.07	0.04	0.08	0.22	0.45
sub4	1.0	1.0	5.5	5.5	0.19	0.15	0.2	0.3	0.9	0.00	0.19	0.00	0.01	0.07	0.07	0.06	0.09	0.32	0.48
sub5	21.4	1.0	4.6	5.5	3.60	0.12	0.2	0.3	0.9	3.60	0.00	0.00	0.01	0.06	0.06	0.72	0.07	3.31	0.38
sub6	20.7	21.4	4.7	4.6	1.50	0.95	0.2	0.3	0.9	1.50	0.00	0.00	0.55	0.40	0.00	0.30	0.23	1.41	1.06
sub7	20.3	12.8	4.8	5.5	5.93	5.43	0.2	0.3	0.9	5.93	0.00	0.00	2.77	1.33	1.33	1.19	2.15	5.63	11.83
sub8	8.2	9.6	5.5	5.5	0.15	1.90	0.2	0.3	0.9	0.15	0.00	0.00	1.10	0.80	0.00	0.03	0.46	0.17	2.53
sub9	7.7	3.2	5.5	5.5	0.03	2.90	0.2	0.3	0.9	0.00	0.03	0.00	1.03	0.90	0.97	0.01	1.35	0.05	7.42
sub10	11.1	11.2	5.5	5.5	0.16	0.19	0.2	0.3	0.9	0.00	0.16	0.00	0.00	0.19	0.00	0.05	0.06	0.26	0.31

**Note: For Rational Equation 25 year Intensity, a minimum Time of Concentration of 15 minutes is used.*

LIA

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845-354-4382 (phone) 845-354-4401 (fax)

Project: **Courtyard at Upper Nyack** By: PD
Location: **Village of Upper Nyack, NY** Date: 23-Aug-06
Job # 03118 AREA TO BASIN -1

Pre Development Loadings

1) Existing Conditions

Total Area	=	5.43	Ac.
Impervious Area	=	0.000	Ac.
Pervious Area	=	5.43	Ac.

(a) Calculate Runoff Coefficient R_v

% Impervious = $\frac{0}{5.43}$ x 100% = ***0.00%***

Rv = 0.05 + 0.009 x % Impervious
Rv = 0.05 + 0.009 x 0.00 = ***0.050***

(b) Calculate Phosphorous Load

$L_{TP} = P \times P_J \times R_V \times C_P \times A \times 0.2267$

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.050	
C_P	=	0.15	mg/L
A	=	5.43	Ac.

Existing L_{TP} = 0.4 lbs./yr.

(c) Calculate Nitrogen Load

$L_{TN} = P \times P_J \times R_V \times C_P \times A \times 0.2267$

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.050	
C_P	=	0.78	mg/L
A	=	5.43	Ac.

Existing L_{TN} = 1.9 lbs./yr.

1) Existing Conditions (continued)

(d) Calculate Suspended Solids Load

L_{TSS} = $P \times P_J \times R_V$ x $C_P \times A \times 0.2267$

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.050	
C_P	=	70	mg/L
A	=	5.43	Ac.

Existing L_{TSS} = 174 lbs./yr.

(e) Calculate BOD Load

L_{BOD} = $P \times P_J \times R_V$ x $C_P \times A \times 103$

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.050	
C_P	=	7.7	1,000 col/ml
A	=	5.43	Ac.

Existing L_{BOD} = 8721 billion colonies /yr.

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Project: **Courtyard at Upper Nyack** By: PD
Location: **Village of Upper Nyack, NY** Date: 23-Aug-06
Job # 03118

Post Development Loadings

2) Proposed Conditions - Area to Basin 1

Total Area	=	5.43	Ac.
Impervious Area	=	1.330	Ac.
Pervious Area	=	4.100	Ac.

(a) Calculate Runoff Coefficient R_V

% Impervious = $\frac{1.33}{5.43}$ x 100% = ***24.49%***

Rv = 0.05 + 0.009 x % Impervious
Rv = 0.05 + 0.009 x 24.49 = ***0.270***

(b) Proposed Coverage Breakdown

Coverage	Area (sf)	Phos. Loading Conc.	Nit. Loading Conc.	S.S. Loading Conc.	B.O.D. Loading Conc.
roof	28967	0.11	1.5	19	0.26
C/R Parking	28967	0.15	1.9	27	1.8
landscaping	120661	0	0	37	94
Lawn	57934	2.1	9.1	602	24

(c) Calculate Pretreatment Phosphorous

L_{TP} = $P \times P_J \times R_V$ x Weighted Average C_P x A x 0.2267

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.270	
Weighted Average C_P	=	0.5	mg/L
A	=	5.43	Ac.

Pretreatment L_{TP} = 7.4 lbs./yr.

2) Area to Basin 1 (continued)

(d) Calculate Phosphorous Load

BMP Removal Method:	Extended Detention Basin		
Removal Rate:	80%		
Phosphorous Load:	7.4 X (1- 0.8) =	**0.84**	**lbs./yr.**

(e) Calculate Pretreatment Nitrogen

L_{TN} = $P \times P_J \times R_V$ x Weighted Average $C_P \times A \times 0.2267$

Where;			
P	=	45	in.
P_J	=	0.9	
R_V	=	0.270	
Weighted Average C_P	=	2.6	mg/L
A	=	5.43	Ac.

Pretreatment L_{TP} = 35.7 lbs./yr.

(f) Calculate Nitrogen Load

BMP Removal Method:	Extended Detention Basin		
Removal Rate:	60%		
Nitrogen Load:	35.7 X (1- 0.6) =	**15.28**	**lbs./yr.**

(g) Calculate Pretreatment Suspended Solids

L_{SS} = $P \times P_J \times R_V$ x Weighted Average $C_P \times A \times 0.2267$

Where;			
P	=	45	in.
P_J	=	0.9	
R_V	=	0.270	
Weighted Average C_P	=	172.0	mg/L
A	=	5.43	Ac.

Pretreatment L_{SS} = 2318 lbs./yr.

(h) Calculate Suspended Solids Load

BMP Removal Method:	Infiltration followed by Filter Strip		
Removal Rate:	100%		
Suspended Solids Load:		**0**	**lbs./yr.**

2) Area to Basin 1 (continued)

(i) Calculate Pretreatment BOD

L_{BOD} = P x P_J x R_V x Weighted Average C_P x A x 103

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.270	
Weighted Average C_P	=	54.1	mg/L
A	=	5.43	Ac.

Pretreatment L_{BOD} = 331302

(j) Calculate BOD Load

BMP Removal Method: Infiltration followed by Filter Strip

Removal Rate: 60%

BOD Load: 331302.3 X (1- 0.6) = **245998 billion colonies /yr.**

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Project: **Courtyard at Upper Nyack** By: PD
Location: **Village of Upper Nyack, NY** Date: 23-Aug-06
Job # 03118 AREA TO BASIN -2

Pre Development Loadings

1) Existing Conditions

Total Area	=	2.90	Ac.
Impervious Area	=	0.000	Ac.
Pervious Area	=	2.90	Ac.

(a) Calculate Runoff Coefficient R_V

% Impervious = $\frac{0}{2.9}$ x 100% = ***0.00%***

Rv = 0.05 + 0.009 x % Impervious
Rv = 0.05 + 0.009 x 0.00 = ***0.050***

(b) Calculate Phosphorous Load

$L_{TP} = P \times P_J \times R_V \times C_P \times A \times 0.2267$

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.050	
C_P	=	0.15	mg/L
A	=	2.90	Ac.

Existing L_{TP} = 0.2 lbs./yr.

(c) Calculate Nitrogen Load

$L_{TN} = P \times P_J \times R_V \times C_P \times A \times 0.2267$

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.050	
C_P	=	0.78	mg/L
A	=	2.90	Ac.

Existing L_{TN} = 1.0 lbs./yr.

1) Existing Conditions (continued)

(d) Calculate Suspended Solids Load

$L_{TSS} = P \times P_J \times R_V \times C_P \times A \times 0.2267$

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.050	
C_P	=	70	mg/L
A	=	2.90	Ac.

Existing L_{TSS} = 93 lbs./yr.

(e) Calculate BOD Load

$L_{BOD} = P \times P_J \times R_V \times C_P \times A \times 103$

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.050	
C_P	=	7.7	1,000 col/ml
A	=	2.90	Ac.

Existing L_{BOD} = 4657 billion colonies /yr.

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Project: **Courtyard at Upper Nyack** By: PD
Location: **Village of Upper Nyack, NY** Date: 23-Aug-06
Job # 03118

Post Development Loadings

2) Proposed Conditions - Area to Basin 2

Total Area	=	2.90	Ac.
Impervious Area	=	0.970	Ac.
Pervious Area	=	1.930	Ac.

(a) Calculate Runoff Coefficient R_V

% Impervious = $\frac{0.97}{2.9}$ x 100% = ***33.45%***

Rv = 0.05 + 0.009 x % Impervious
Rv = 0.05 + 0.009 x 33.45 = ***0.351***

(b) Proposed Coverage Breakdown

Coverage	Area (sf)	Phos. Loading Conc.	Nit. Loading Conc.	S.S. Loading Conc.	B.O.D. Loading Conc.
roof	21126	0.11	1.5	19	0.26
C/R Parking	21126	0.15	1.9	27	1.8
landscaping	44866	0	0	37	94
Lawn	39204	2.1	9.1	602	24

(c) Calculate Pretreatment Phosphorous

L_{TP} = $P \times P_J \times R_V$ x Weighted Average $C_P \times A \times 0.2267$

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.351	
Weighted Average C_P	=	0.7	mg/L
A	=	2.90	Ac.

Pretreatment L_{TP} = 6.5 lbs./yr.

2) Area to Basin 2 (continued)

(d) Calculate Phosphorous Load

BMP Removal Method:	Extended Detention Basin		
Removal Rate:	80%		
Phosphorous Load:	6.5 X (1- 0.8) =	**1.16**	**lbs./yr.**

(e) Calculate Pretreatment Nitrogen

L_{TN} = $P \times P_J \times R_V$ x Weighted Average $C_P \times A \times 0.2267$

Where;			
P	=	45	in.
P_J	=	0.9	
R_V	=	0.351	
Weighted Average C_P	=	3.4	mg/L
A	=	2.90	Ac.

Pretreatment L_{TP} = 31.7 lbs./yr.

(f) Calculate Nitrogen Load

BMP Removal Method:	Extended Detention Basin		
Removal Rate:	60%		
Nitrogen Load:	31.7 X (1- 0.6) =	**12.88**	**lbs./yr.**

(g) Calculate Pretreatment Suspended Solids

L_{SS} = $P \times P_J \times R_V$ x Weighted Average $C_P \times A \times 0.2267$

Where;			
P	=	45	in.
P_J	=	0.9	
R_V	=	0.351	
Weighted Average C_P	=	207.7	mg/L
A	=	2.90	Ac.

Pretreatment L_{SS} = 1941 lbs./yr.

(h) Calculate Suspended Solids Load

BMP Removal Method:	Infiltration followed by Filter Strip		
Removal Rate:	100%		
Suspended Solids Load:		**0**	**lbs./yr.**

2) Area to Basin 2 (continued)

(i) Calculate Pretreatment BOD

L_{BOD} = P x P_J x R_V x Weighted Average C_P x A x 103

Where;

P	=	45	in.
P_J	=	0.9	
R_V	=	0.351	
Weighted Average C_P	=	41.2	mg/L
A	=	2.90	Ac.

Pretreatment L_{BOD} = 174868

(j) Calculate BOD Load

BMP Removal Method: Infiltration followed by Filter Strip

Removal Rate: 60%

BOD Load: 174867.6 X (1- 0.6) = **48160.7 billion colonies /yr.**

Appendix D – Water Quality Calculations (Volume and Detention Time):

1.) *Required and Provided Water Quality Volume Calculations in Basin 1*
2.) *Elevation versus Discharge Calculations for Basin 1*
3.) *Required and Provided Water Quality Volume Calculations in Basin 2*
4.) *Elevation versus Discharge Calculations for Basin 2*
5.) *Elevation versus Discharge Calculations for Diversion Manhole Design*

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Summary Table #WQ-3:Water Quality Volume Calculations

Project: **Courtyard at Upper Nyack** By: PD
Location: **Village of Upper Nyack, NY** Date: 23-Aug-06
JOB # 03118

Water Quality Calculations - New Developed Area - Provide 100% WQv

NYSDEC Required Storage Volume: Sub-Area: *Basin 1*

Data:

P: 1.3 = 90th Percentile Rainfall Event
Rv: 0.2704 = 0.05 + 0.009(I) (Min. Rv =0.2) Use Rv = 0.27041
I: 24.49 = Impervious coverage percentage
A: 5.43 = Site Area to Basin (in acres)

WQv: **0.159** = Req'd Water Quality Volume (in ac-ft)
= (P)(Rv)(A)
12

Total WQv = 0.159 ac-ft

Forebay Requirements:

Minimum Size: 10% of WQv = *0.0159* ac-ft
Minimum Depth: 4 ft.

Pond P-5 -Permanent Pool Requirements:

Minimum Size: 50% of WQv = *0.0795* ac-ft
Minimum Depth: 4 ft.

Chart : Forebay Storage Volume:

							A	1	2	1-2=3	
Contour Elev. (ft)	Contour Area Proposed (ft^2)	Contour Area Average (ft^2)	Proposed (ac)	Average (ac)	Depth (ft)	Total Volume (ft^3)	Total Volume (ac-ft)	Cumulative Total Volume (ac-ft)	Required Forebay Volume (ac-ft)	Net Volume Provided (ac-ft)	
280	68		0.0016								
		134		0.0031	1	134	0.0031	0.0031	0.0159	-0.0128	
281	200		0.0046								
		340		0.0078	1	340	0.0078	0.0109	0.0159	-0.0050	
282	479		0.0110								
		629		0.0144	1	629	0.0144	0.0253	0.0159	0.0094	ok
283	779		0.0179								
		1021		0.0234	1	1021	0.0234	0.0487	0.0159	0.0328	
284	1263		0.0290								

Chart : Permanent Pool Storage Volume (Including Forebay Volumes)

									1	2	1-2=3
Contour Elev. (ft)	Contour Area Proposed (ft^2)	Contour Area Average (ft^2)	Proposed (ac)	Average (ac)	Depth (ft)	Total Volume (ft^3)	Total Volume (ac-ft)	Total Forebay Volume Provided (ac-ft)	Cumulative Total Volume (ac-ft)	Req'd Permanent Pool Volume (ac-ft)	Net Volume Provided (ac-ft)

280	449		0.0103								
		588		0.0135	1	588	0.0135	0.0031	0.0166	0.0795	-0.0630
281	726		0.0167								
		920		0.0211	1	920	0.0211	0.0078	0.0455	0.0795	-0.0341
282	1114		0.0256								
		1325		0.0304	1	1325	0.0304	0.0144	0.0903	0.0795	0.0108
283	1535		0.0352								
		1802		0.0414	1	1802	0.0414	0.0234	0.1551	0.0795	0.0756
284	2068		0.0475								

0.1064 *(Sum of individual Perm. Pool Volume)*

Balance of Water Quality Volume:

	(Total Req'd Volume)		*(Perm. Pool Cumulative Volume)*			
*Balance of Required Water Quality Volume =	0.1591	-	0.1551	=	0.0039	ac-ft.

(100% water quality in permenant pool)

Chart : Basin Volume (excluding Permanent Pool Volume)

								1	2	1-2=3
Contour	Contour Area				Depth	Total	Total	Cumulative	*Req'd Water	Net Volume
Elev.	Proposed	Average	Proposed	Average		Volume	Volume	Total Volume	Quality Volume	for Cp_v treatment
(ft)	(ft^2)	(ft^2)	(ac)	(ac)	(ft)	(ft^3)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
284	3331		0.0765							
		4457		0.1023	2	8914	0.2046	0.2046	0.004	0.2007
286	5583		0.1282							

Perm. Pool Elevation = 284.00 ft.

Set required WQv Elev:

Elevation: 284.00 ft.

		Elev. (ft.)	Cumulative Volume
Water Quality Basin Permanent Pool Elevation (WQ_{PPE}) =		284.0	(ac-ft)
Water Quality Storage Elevation Range:	High:	286.00	0.2046
	Low:	284.00	0.0000
		Diff. =	0.2046

Minimum WQ Volume required above permanent pool = 0.0039 ac-ft

Interpolated Volume Change = (Higher Cumulative Volume - Req'd WQ Volume over Perm. Pool)/Diff. In Volume in Range

Interpolated Volume Change = (0.2046 - 0.0039)/ 0.2046

Interpolated Volume Ratio = 0.9807

Interpolated Elevation Change = 286.00 - (0.9807 x 2.00)

Interpolated Elevation Change = 284.04 ft.

Minimum Water Quality Volume High Elevation = 284.04 ft.

Set Water Quality Volume Elevation = 284.05 ft.

*Note: Total Storage at elevation: 284.05 is 0.0051 ac-ft, which is greater than req. WQ_v of: 0.0039 ac-ft. ok

Compute the required WQ_v-ED orifice: *(Note: ED means extended detention.)*

Required WQv = 0.0039 ac-ft.

Average ED release rate = 0.0039 x 43560 ft^2/ac / (24 hr x 3600 sec/hr)

Average ED release rate = 0.00 cfs

*Size WQv-ED orifice
to release average of : 0.00 - 0.00 cfs

Qavg =	0.00	cfs

Average WQv-ED orifice rate is:
Average head (h) = $(WQ_{VE} - WQ_{PPE})/2$

$$\text{Average h} = \frac{284.05 - 284.00}{2}$$

Average h =	0.03	ft.

Use the orifice flow equation to calculate the required cross-sectional area and diameter for the WQ_V-ED orifice:

[Q=ca(sq. rt. (2gh))]

where:
c = 0.61
g = 32.2
Average h = 0.03

sqrt(2gh) = 1.269
a= 0.003 sq. ft.

Based upon: [a=Q/c (sq. rt. (2gh))]

Calculate diameter of pipe based upon area = D = 0.057 ft.
D = 0.687 in.

Based upon: [D = sq. rt. (4a/3.15159)]

For Design, Use a	3.0	in. diameter hole or equivalent area.

Orifice centerline elevation = Orifice invert + (Orifice size in feet/2)
Orifice centerline elevation = 284.00 + 0.13

Orifice centerline elevation =	284.13	ft.

LEONARD JACKSON ASSOCIATES

Project: **Courtyard at Upper Nyack**
Location: **Village of Upper Nyack, NY**
JOB # 03118

By: PD
Date: 23-Aug-06
Sub-Area: Basin 1

Outlet Structure - Elevation vs. Discharge Calculations

Known Data:

Orifice #1:

Orifice Dia.:	3.00 in.
Invert El.:	284.00 ft.
Centerline El.:	284.13 ft.
A=	0.049 ft^2

Orifice #2:

Orifice Dia.:	12.00 in.
Invert El.:	285.00 ft.
Centerline El.:	285.50 ft.
A=	0.785 ft^2

Orifice #3:

Orifice Dia.:	0.00 in.
Invert El.:	532.85 ft.
Centerline El.:	532.85 ft.
A=	0.000 ft^2

Orifice #4:

Orifice Dia.:	0.00 in.
Invert El.:	532.85 ft.
Centerline El.:	532.85 ft.
A=	0.000 ft^2

Spillway #1 (Weir):

Spillway Inv. Elev.:	287.5 ft.
Spillway Top Elev.:	n/a ft.
Spillway Length:	3.0 ft.

Spillway #2 (Top Struct.):

Spillway Inv. Elev.:	288.0 ft.
Spillway Top Elev.:	n/a ft.
Spillway Length:	12.0 ft.

In Orifice Flow Eq. ;
Q=cA[sq. rt. (2gH)]

c=	0.61	(orifice #1)
c=	0.61	(orifice #2)
c=	0.61	(orifice #3)
c=	0.61	(orifice #4)
c=	0.61	(orifice #5)
g=	32.2	
H=	(See Below)	

c=	0.61	(orifice #6)
c=	0.61	(orifice #7)
c=	0.61	(orifice #8)
c=	0.61	(orifice #9)

In Weir Flow Eq. ;
Q=cLH**3/2

c=	3.0			
use L=	3.0	> than el.	287.50	ft.
H_4=	(See Below)			

H_1= Height over orifice centerline
H_2= Height over orifice #2 centerline
H_3= Height over orifice #3 centerline
H_4= Height over orifice #4 centerline
H_{10}= Height over spillway #1 elevation
H_{11}= Height over spillway #2 elevation

** c=0.61 for square-edged orifice*
*** c=0.98 for orifice with well-rounded entry*
(Oct., 1959 Seelye Data Book for Civil Engineers)

Elevation vs. Discharge

	Orifice Flows to Orifice #1		*Orifice Flows to Orifice #2*		*Orifice Flows to Orifice #3*		*Orifice Flows to Orifice #4*		*Weir Flows over Spillway #1*		*Weir Flows over Spillway #2*		**Totals**
Elev. (ft.)	H_1 (ft.)	Flow (cfs)	H_2 (ft.)	Flow (cfs)	H_3 (ft.)	Flow (cfs)	H_4 (ft.)	Flow (cfs)	H_{10} (ft.)	Flow (cfs)	H_{11} (ft.)	Flow (cfs)	Cumulative Flow (cfs)
284.00	0.0	0.00											0.00
284.20	0.1	0.07											**0.07**
284.40	0.3	0.13											0.13
284.60	0.5	0.17											**0.17**
284.80	0.7	0.20											**0.20**
285.00	0.9	0.22											0.22
285.20	1.1	0.25											0.25
285.40	1.3	0.27											**0.27**
285.60	1.5	0.29	0.1	1.22									**1.51**
285.80	1.7	0.31	0.3	2.11									2.42
286.00	1.9	0.33	0.5	2.72									3.05
286.20	2.1	0.35	0.7	3.22									3.56
286.40	2.3	0.36	0.9	3.65									4.01
286.60	2.5	0.38	1.1	4.03									4.41
286.80	2.7	0.39	1.3	4.38									4.78
287.00	2.9	0.41	1.5	4.71									5.12
287.20	3.1	0.42	1.7	5.01									**5.43**
287.40	3.3	0.43	1.9	5.30									**5.73**
287.60	3.5	0.45	2.1	5.57					0.1	0.28			**6.30**
287.80	3.7	0.46	2.3	5.83					0.3	1.48			7.77
288.00	3.9	0.47	2.5	6.08					0.5	3.18	0.0	0.00	**9.73**
288.20	4.1	0.49	2.7	6.32					0.7	5.27	0.2	3.22	**15.29**

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Summary Table #WQ-3:Water Quality Volume Calculations

Project: **Courtyard at Upper Nyack** By: PD
Location: **Village of Upper Nyack, NY** Date: 23-Aug-06
JOB # 03118

Water Quality Calculations :

NYSDEC Required Storage Volume: Sub-Area: *Basin 2*

Data:

P: 1.3 = 90th Percentile Rainfall Event
Rv: 0.3511 = 0.05 + 0.009(I) (Min. Rv =0.2) Use Rv = 0.35105
I: 33.45 = Impervious coverage percentage
A: 2.9 = Site Area to Basin (in acres)

WQv: **0.110** = Req'd Water Quality Volume (in ac-ft)
= (P)(Rv)(A)
12

Total WQv = 0.110 ac-ft

Forebay Requirements:

Minimum Size: 10% of WQv = *0.0110* ac-ft
Minimum Depth: 4 ft.

Pond P-5 -Permanent Pool Requirements:

Minimum Size: 50% of WQv = *0.0551* ac-ft
Minimum Depth: 4 ft.

Chart : Forebay Storage Volume:

							A	1	2	1-2=3	
Contour Elev. (ft)	Contour Area Proposed (ft^2)	Contour Area Average (ft^2)	Contour Area Proposed (ac)	Contour Area Average (ac)	Depth (ft)	Total Volume (ft^3)	Total Volume (ac-ft)	Cumulative Total Volume (ac-ft)	Required Forebay Volume (ac-ft)	Net Volume Provided (ac-ft)	
280	16		0.0004								
		69		0.0016	1	69	0.0016	0.0016	0.0110	-0.0094	
281	122		0.0028								
		203		0.0047	1	203	0.0047	0.0062	0.0110	-0.0048	
282	284		0.0065								
		393		0.0090	1	393	0.0090	0.0153	0.0110	0.0042	ok
283	502		0.0115								
		640		0.0147	1	640	0.0147	0.0299	0.0110	0.0189	
284	777		0.0178								

Chart : Permanent Pool Storage Volume (including Forebay Volumes)

								1	2	1-2=3
Contour Elev. (ft)	Contour Area Proposed (ft^2)	Contour Area Average (ft^2)	Contour Area Proposed (ac)	Contour Area Average (ac)	Depth (ft)	Total Volume (ft^3)	Total Volume (ac-ft)	Total Forebay Volume Provided (ac-ft)	Cumulative Total Volume (ac-ft)	Req'd Permanent Pool Volume (ac-ft)	Net Volume Provided (ac-ft)

280	147		0.0034								
		299		0.0069	1	299	0.0069	0.0016	0.0084	0.0551	-0.0467
281	451		0.0104								
		631		0.0145	1	631	0.0145	0.0047	0.0276	0.0551	-0.0275
282	811		0.0186								
		1020		0.0234	1	1020	0.0234	0.0090	0.0600	0.0551	0.0049
283	1228		0.0282								
		1465		0.0336	1	1465	0.0336	0.0147	0.1083	0.0551	0.0532
284	1702		0.0391								

0.0784 *(Sum of individual Perm. Pool Volume)*

Balance of Water Quality Volume:

(Total Req'd Volume) *(Perm. Pool Cumulative Volume)*

*Balance of Required Water Quality Volume = 0.1103 - 0.1083 = 0.0020 ac-ft.

(100% water quality in permenant pool)

Chart : Basin Volume (excluding Permanent Pool Volume)

								1	2	1-2=3
Contour	Contour Area					Total	Total	Cumulative	*Req'd Water	Net Volume
Elev.	Proposed	Average	Proposed	Average	Depth	Volume	Volume	Total Volume	Quality Volume	for Cp_v treatment
(ft)	(ft^2)	(ft^2)	(ac)	(ac)	(ft)	(ft^3)	(ac-ft)	(ac-ft)	(ac-ft)	(ac-ft)
284	2479		0.0569							
		3470		0.0796	2	6939	0.1593	0.1593	0.002	0.1573
286	4460		0.1024							

Perm. Pool Elevation = 284.00 ft.

Set required WQv Elev:

Elevation: 284.00 ft.

		Elev. (ft.)	Cumulative Volume
Water Quality Basin Permanent Pool Elevation (WQ_{PPE}) =		284.0	(ac-ft)
Water Quality Storage Elevation Range:	High:	286.00	0.1593
	Low:	284.00	0.0000
		Diff. =	0.1593

Minimum WQ Volume required above permanent pool = **0.0020** ac-ft

Interpolated Volume Change = (Higher Cumulative Volume - Req'd WQ Volume over Perm. Pool)/Diff. In Volume in Range

Interpolated Volume Change = (0.1593 - 0.0020)/ 0.1593

Interpolated Volume Ratio = 0.9877

Interpolated Elevation Change = 286.00 - (0.9877 x 2.00)

Interpolated Elevation Change = 284.02 ft.

Minimum Water Quality Volume High Elevation = 284.02 ft.

Set Water Quality Volume Elevation = 284.05 ft.

**Note: Total Storage at elevation: 284.05 is 0.0040 ac-ft, which is greater than req. WQ_v of: 0.0020 ac-ft.* ok

Compute the required WQ_v-ED orifice: *(Note: ED means extended detention.)*

Required WQv = 0.0020 ac-ft.

Average ED release rate = 0.0020 x 43560 ft^2/ac / (24 hr x 3600 sec/hr)

Average ED release rate = 0.00 cfs

*Size WQv-ED orifice
to release average of : 0.00 - 0.00 cfs

Qavg =	0.00	cfs

Average WQv-ED orifice rate is:
Average head (h) = $(WQ_{VE} - WQ_{PPE})/2$

$$\text{Average h} = \frac{284.05 - 284.00}{2}$$

Average h =	0.03	ft.

Use the orifice flow equation to calculate the required cross-sectional area and diameter for the WQ_V-ED orifice:

[Q=ca(sq. rt. (2gh))]

where:
c = 0.61
g = 32.2 sqrt(2gh) = 1.269
Average h = 0.03 a= 0.001 sq. ft. Based upon: [a=Q/c (sq. rt. (2gh))]

Calculate diameter of pipe based upon area = D = 0.040 ft. Based upon: [D = sq. rt. (4a/3.15159)]
D = 0.483 in.

For Design, Use a	3.0	in. diameter hole or equivalent area.

Orifice centerline elevation = Orifice invert + (Orifice size in feet/2)
Orifice centerline elevation = 284.00 + 0.13

Orifice centerline elevation =	284.13	ft.

LEONARD JACKSON ASSOCIATES

Project: **Courtyard at Upper Nyack**
Location: **Village of Upper Nyack, NY**
JOB # 03118

By: PD
Date: 23-Aug-06
Sub-Area: Basin 2

Outlet Structure - Elevation vs. Discharge Calculations

Known Data:

Orifice #1:		***Orifice #2:***		***Orifice #3:***		***Orifice #4:***	
Orifice Dia.:	3.00 in.	Orifice Dia.:	12.00 in.	Orifice Dia.:	0.00 in.	Orifice Dia.:	0.00 in.
Invert El.:	284.00 ft.	Invert El.:	284.50 ft.	Invert El.:	532.85 ft.	Invert El.:	532.85 ft.
Centerline El.:	284.13 ft.	Centerline El.:	285.00 ft.	Centerline El.:	532.85 ft.	Centerline El.:	532.85 ft.
A=	0.049 ft^2	A=	0.785 ft^2	A=	0.000 ft^2	A=	0.000 ft^2

Spillway #1 (Weir):		***Spillway #2 (Top Struct.):***	
Spillway Inv. Elev.:	287.0 ft.	Spillway Inv. Elev.:	287.3 ft.
Spillway Top Elev.:	n/a ft.	Spillway Top Elev.:	n/a ft.
Spillway Length:	3.0 ft.	Spillway Length:	12.0 ft.

In Orifice Flow Eq. ;
Q=cA[sq. rt. (2gH)]

c=	0.61	(orifice #1)
c=	0.61	(orifice #2)
c=	0.61	(orifice #3)
c=	0.61	(orifice #4)
c=	0.61	(orifice #5)
g=	32.2	
H=	(See Below)	

c=	0.61	(orifice #6)
c=	0.61	(orifice #7)
c=	0.61	(orifice #8)
c=	0.61	(orifice #9)

In Weir Flow Eq. ;
Q=cLH**3/2

c=	3.0			
use L=	3.0	> than el.	287.00	ft.
H_4=	(See Below)			

H_1= Height over orifice centerline
H_2= Height over orifice #2 centerline
H_3= Height over orifice #3 centerline
H_4= Height over orifice #4 centerline
H_{10}= Height over spillway #1 elevation
H_{11}= Height over spillway #2 elevation

** c=0.61 for square-edged orifice*
*** c=0.98 for orifice with well-rounded entry*
(Oct., 1959 Seelye Data Book for Civil Engineers)

Elevation vs. Discharge

	Orifice Flows to Orifice #1		***Orifice Flows to Orifice #2***		***Orifice Flows to Orifice #3***		***Orifice Flows to Orifice #4***		***Weir Flows over Spillway #1***		***Weir Flows over Spillway #2***		**Totals**
Elev. (ft.)	H_1 (ft.)	Flow (cfs)	H_2 (ft.)	Flow (cfs)	H_3 (ft.)	Flow (cfs)	H_4 (ft.)	Flow (cfs)	H_{10} (ft.)	Flow (cfs)	H_{11} (ft.)	Flow (cfs)	Cumulative Flow (cfs)
284.00	0.0	0.00											0.00
284.20	0.1	0.07											**0.07**
284.40	0.3	0.13											0.13
284.60	0.5	0.17											0.17
284.80	0.7	0.20											0.20
285.00	0.9	0.22	0.0	0.00									**0.22**
285.20	1.1	0.25	0.2	1.72									**1.97**
285.40	1.3	0.27	0.4	2.43									**2.70**
285.60	1.5	0.29	0.6	2.98									**3.27**
285.80	1.7	0.31	0.8	3.44									3.75
286.00	1.9	0.33	1.0	3.84									4.17
286.20	2.1	0.35	1.2	4.21									4.56
286.40	2.3	0.36	1.4	4.55									4.91
286.60	2.5	0.38	1.6	4.86									5.24
286.80	2.7	0.39	1.8	5.16									**5.55**
287.00	2.9	0.41	2.0	5.44					0.0	0.00			**5.84**
287.20	3.1	0.42	2.2	5.70					0.2	0.80			**6.93**
287.40	3.3	0.43	2.4	5.96					0.4	2.28	0.1	2.09	**10.76**
287.60	3.5	0.45	2.6	6.20					0.6	4.18	0.3	7.45	**18.28**

LEONARD JACKSON ASSOCIATES

Project: **Courtyard at Upper Nyack** By: PD
Location: **Village of Upper Nyack** Date: 23-Aug-06
JOB # 03118

Diversion Manhole - Elevation vs. Discharge Calculations

Known Data:

Orifice #1:

Orifice Dia.: 18.00 in.
Invert El.: 274.00 ft.
Centerline El.: 274.75 ft.
A= 1.767 ft^2

Orifice #2:

Orifice Dia.: 4.00 in.
Invert El.: 274.00 ft.
Centerline El.: 274.17 ft.
A= 0.087 ft^2

In Orifice Flow Eq. ;
Q=cA[sq. rt. (2gH)]

c= 0.61 (orifice #1)
c= 0.61 (orifice #2)
c= 0.61 (orifice #3)
c= 0.61 (orifice #4)
c= 0.61 (orifice #5)
c= 0.61 (orifice #6)
c= 0.61 (orifice #7)
c= 0.61 (orifice #8)
c= 0.61 (orifice #9)
g= 32.2
H= (See Below)

H_1= Head water for 18"Ø pipe - To Point 'A'
H_2= Head water for 4"Ø orifice - To Point 'B'

** c=0.61 for square-edged orifice*
*** c=0.98 for orifice with well-rounded entry*
(Oct., 1959 Seelye Data Book for Civil Engineers)

Elevation vs. Discharge

	Flows to Point A		*Flows to Point B*		Total
Elev. (ft.)	H_1 (ft.)	Flow (cfs)	H_2 (ft.)	Flow (cfs)	Cumulative Flow (cfs)
274.00					0.00
274.20					0.00
274.40	0.0	1.09	0.2	0.21	1.30
274.60	0.0	1.58	0.4	0.28	1.86
274.80	0.0	1.93	0.6	0.34	2.27
275.00	0.2	4.33	0.8	0.39	4.72
275.20	0.4	5.80	1.0	0.43	6.24
275.40	0.6	6.97	1.2	0.47	7.45
275.60	0.8	7.98	1.4	0.51	8.49
275.80	1.0	8.86	1.6	0.55	9.41
276.00	1.2	9.67	1.8	0.58	10.25
276.20	1.4	10.42	2.0	0.61	11.03
276.40	1.6	11.11	2.2	0.64	11.75
276.60	1.8	11.77	2.4	0.67	12.43
276.80	2.0	12.39	2.6	0.69	13.08
277.00	2.2	12.98	2.8	0.72	13.69

Appendix E –Downstream Pipe Analysis:

1.) Pipe Flow Calculations for Downstream Storm Drainage System

Pipe Flow Calculations For Downstream Storm Drainage System - Existing Conditions

Point of Interest*	Point A	Point C	Point D	Point B	Point E	Point F	Point G
Description	Area draining to HW 'A'	Area draining to CB #8	Area draining to CB #10	Area draining to HW 'B'	Area draining to FI #11A	Area draining to CB #12	Area draining to DMH #19
Drainage Area (acres)	**	1.6	8.7	**	3.2	1.6	13.8
'C' Value	**	0.45	0.45	**	0.45	0.45	0.45
25-Year Rainfall Intensity† (i)	**	4.3	4.3	**	4.3	4.3	4.3
100-Year Rainfall Intensity† (i)	**	5.4	5.4	**	5.4	5.4	5.4
25-Year Discharge for Subarea	23.8	3.0	16.6	0.4	6.2	3.1	26.4
100-Year Discharge for Subarea	39.5	3.8	20.8	0.7	7.8	3.9	33.2
25-Year Discharge at Point of Interest	23.8	26.8	43.4	0.4	6.6	53.0	79.4
100-Year Discharge at Point of Interest	39.5	43.3	64.2	0.7	8.5	76.5	109.7
Description of Pipe Leaving Point	24" diameter @ 8.5%	30" diameter @ 0.2%	30" diameter @ 1%	18" diameter @ 24%	18" diameter @ 12%	36" diameter @ 0.2%	36" diameter @ 1.6%
Existing Pipe Capacity‡	27 cfs	17 cfs	38 cfs	14 cfs	14 cfs	28 cfs	80 cfs
Does Pipe Have Capacity for 25-Year / 100-Year Storm	Yes / No	No / No	No / No	Yes / Yes	Yes / Yes	No / No	Yes / No

* Refer to 'Downstream Pipe Analysis Drainage Area Map' for Point of Interest designations

** Flow data for areas draining to HW 'A' and HW 'B' were taken from Hec-1 model output used for Site Drainage Analysis

† Rainfall Intensity from 'Rainfall Intensity Curves for Rockland county, NY' based on 25 minute Time of Concentration

‡ Pipe capacity is based on BPR Design Charts for Open-Channel Flow

Appendix F – Reference Materials:

1.) *Urban Hydrology for Small Watersheds-Cover sheet*
2.) *TR-55 Figure 3-1: Average Velocities for estimating travel time.*
3.) *Rainfall intensity curves for Rockland County*
4.) *Newyork State Stormwater Management Design Manual-Cover sheet*
5.) *Unified Stormwater sizing Criteria*
6.) *Appendix A: The Simple Method to Calculate Urban Stormwater Load*
7.) *Table A.2 Pollutant Concentrations from Source Areas*
8.) *Table 1.1: Urban 'C' Values for use with the Simple Method (mg/l)*
9.) *Figure 15: Comparative Pollutant Removal of Urban BMP Designs*

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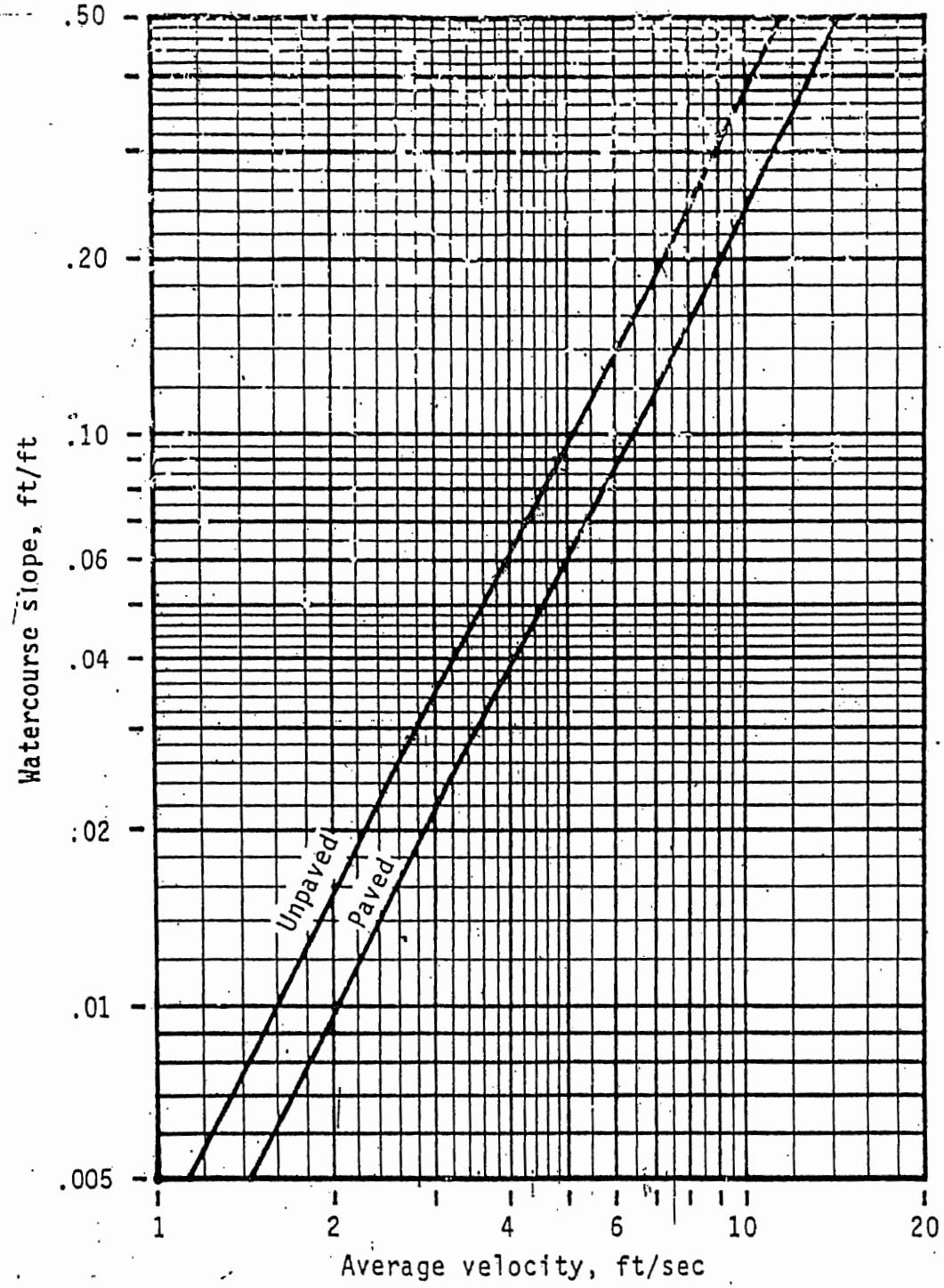
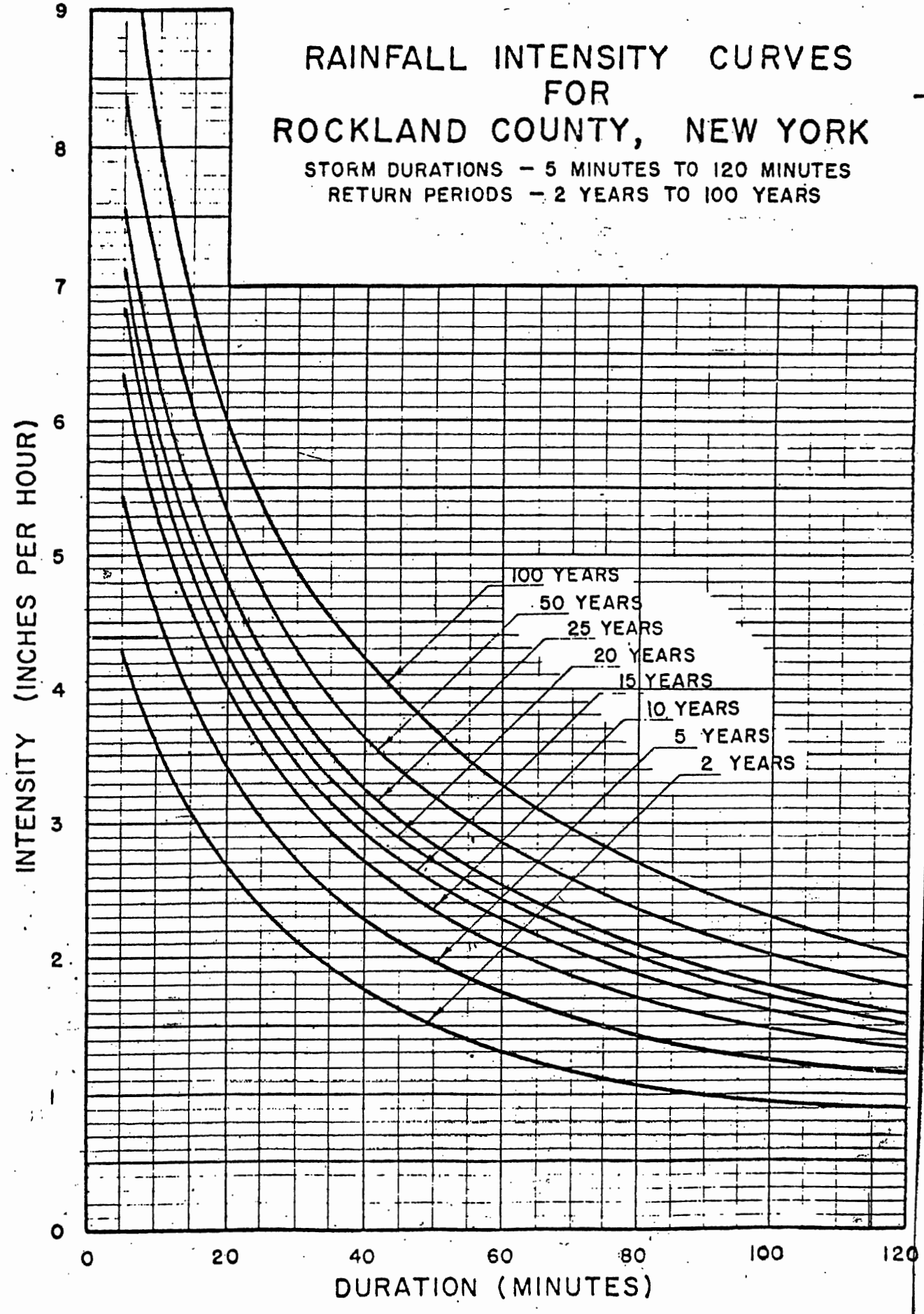


Figure 3-1.—Average velocities for estimating travel time for shallow concentrated flow.

RAINFALL INTENSITY CURVES FOR ROCKLAND COUNTY, NEW YORK

STORM DURATIONS – 5 MINUTES TO 120 MINUTES
RETURN PERIODS – 2 YEARS TO 100 YEARS



New York State

Stormwater Management Design Manual

August 2003

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Albany, NY 12233

George E. Pataki, Governor Erin M. Crotty, Commissioner

Chapter 4

Unified Stormwater Sizing Criteria

Chapter 4: Unified Stormwater Sizing Criteria

Section 4.1 Introduction

This chapter presents a unified approach for sizing SMPs in the State of New York to meet pollutant removal goals, reduce channel erosion, prevent overbank flooding, and help control extreme floods. For a summary, please consult Table 4.1 below. The remaining sections describe the four sizing criteria in detail and present guidance on how to properly compute and apply the required storage volumes.

Table 4.1 New York Stormwater Sizing Criteria

Water Quality (WQ_v)	**90% Rule:** $WQ_v = [(P)(R_v)(A)]$ /12 Rv = 0.05+0.009(I) I = Impervious Cover (Percent) Minimum Rv = 0.2 P = 90% Rainfall Event Number (See Figure 4.1) A = site area in acres
Channel Protection (Cp_v)	**Default Criterion:** Cp_v = 24 hour extended detention of post-developed 1-year, 24-hour storm event. **Option for Sites Larger than 50 Acres:** Distributed Runoff Control - geomorphic assessment to determine the bankfull channel characteristics and thresholds for channel stability and bedload movement.
Overbank Flood (Q_p)	Control the peak discharge from the 10-year storm to 10-year predevelopment rates.
Extreme Storm (Q_f)	Control the peak discharge from the 100-year storm to 100-year predevelopment rates. Safely pass the 100-year storm event.
Note: Channel protection, overbank flood, and extreme storm requirements may be waived in some instances if the conditions specified in this chapter are met. For SMPs involving dams, follow Appendix A Guidelines for Design of Dams for safe passage of the design flood.	

Section 4.2 Water Quality Volume (WQ_v)

The Water Quality Volume (denoted as the WQ_v) is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQ_v is directly related to the amount of impervious cover created at a site. Contour lines of the 90% rainfall event are presented in Figure 4.1.

The following equation can be used to determine the water quality storage volume WQ_v (in acre-feet of storage):

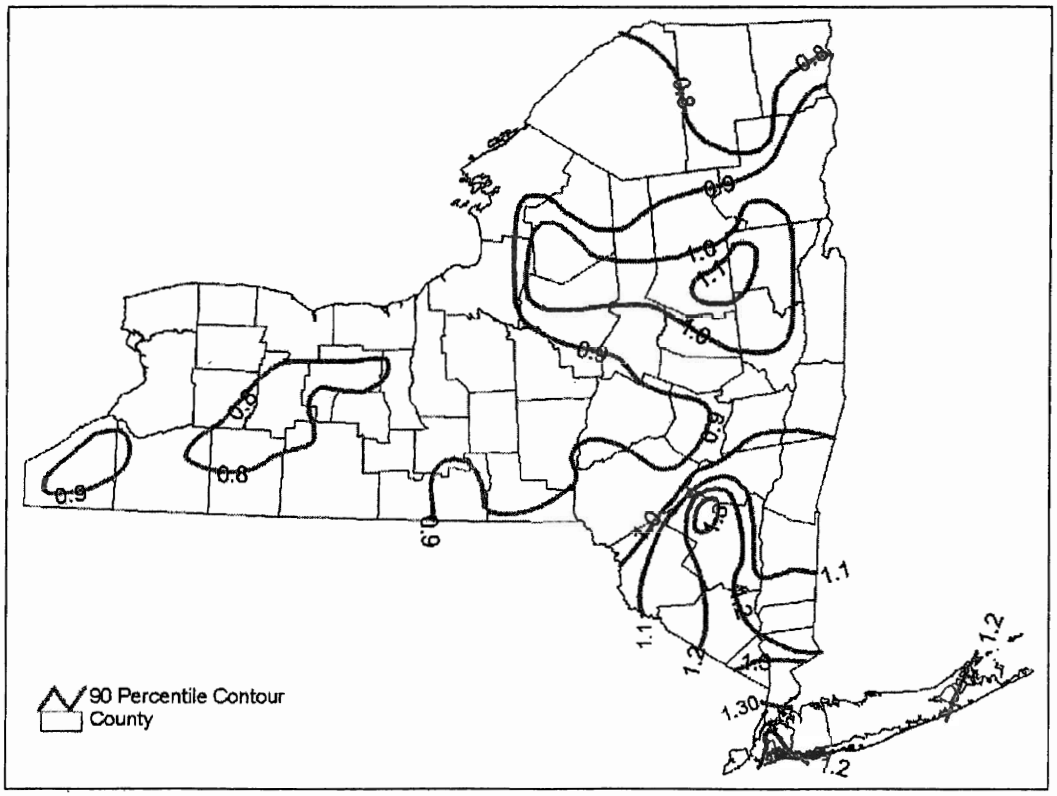
$$WQ_v = \frac{(P)(R_v)(A)}{12}$$

where:

WQ_v = water quality volume (in acre-feet)
P = 90% Rainfall Event Number (see Figure 4.1)
R_v = 0.05 + 0.009(I), where I is percent impervious cover
A = site area in acres (contributing area)

A minimum Rv of 0.2 will be applied to regulated sites. (tributary area)

Figure 4.1 90% Rainfall in New York State



Appendix A: The Simple Method to Calculate Urban Stormwater Loads

This appendix presents data and methodologies for using the Simple Method (Schueler, 1987) to estimate pollutant load from a site or drainage area. This appendix is meant for planning purposes only, and should not be used for SMP design.

The Simple Method estimates stormwater runoff pollutant loads for urban areas. The technique requires a modest amount of information, including the subwatershed drainage area and impervious cover, stormwater runoff pollutant concentrations, and annual precipitation. With the Simple Method, the investigator can either break up land use into specific areas, such as residential, commercial, industrial, and roadway and calculate annual pollutant loads for each type of land, or utilize more generalized pollutant values for urban runoff. It is also important to note that these values may vary depending on other variables such as the age of development.

The Simple Method estimates pollutant loads for chemical constituents as a product of annual runoff volume and pollutant concentration, as:

$$L = 0.226 * R * C * A$$

Where:	L	=	Annual load (lbs)
	R	=	Annual runoff (inches)
	C	=	Pollutant concentration (mg/l)
	A	=	Area (acres)
	0.226	=	Unit conversion factor

For bacteria, the equation is slightly different, to account for the differences in units. The modified equation for bacteria is:

$$L = 103 * R * C * A$$

Where:	L	=	Annual load (Billion Colonies)
	R	=	Annual runoff (inches)
	C	=	Bacteria concentration (1,000/ ml)
	A	=	Area (acres)
	103	=	Unit conversion factor

Table A.2 Pollutant Concentrations from Source Areas							
Constituent	TSS[1]	TP[2]	TN[3]	F Coll[1]	Cu[1]	Pb[1]	Zn[1]
	mg/l	mg/L	mg/l	1,000 col/ ml	ug/l	ug/l	ug/l
Resid Roof	19	0.11	1.5	0.26	20	21	312
Comm Roof	9	0.14	2.1	1.1	7	17	256
Indust Roof	17	-	-	5.8	62	43	1,390
C/R Parking	27	0.15	1.9	1.8	51	28	139
Indust Parking	228	-	-	2.7	34	85	224
Res Street	172	0.55	1.4	37	25	51	173
Comm Street	468	-	-	12	73	170	450
Rural Highway	51	-	22	-	22	80	80
Urban Highway	142	0.32	3.0	-	54	400	329
Lawns	602	2.1	9.1	24	17	17	50
Landscaping	37	-	-	94	94	29	263
Driveway	173	0.56	2.1	17	17	-	107
Gas Station	31	-	-	-	88	80	290
Auto Recycler	335	-	-	-	103	182	520
Heavy Industrial	124	-	-	-	148	290	1600

1: Claytor and Schueler (1996)

2: Average of Steuer et al. (1997),Bannerman (1993) and Waschbusch (2000)

3: Steuer et al. (1997)

4. NATIONAL RUNOFF CONCENTRATIONS were obtained from over 2300 storms monitored at 22 NURP project sites across the nation (US EPA, 1983). These average values are recommended for use in areas outside of the Middle Atlantic states. The national C values are slightly higher than the values for new suburban sites in the Washington, D.C. area, and slightly lower than values for the older urban areas of Baltimore.

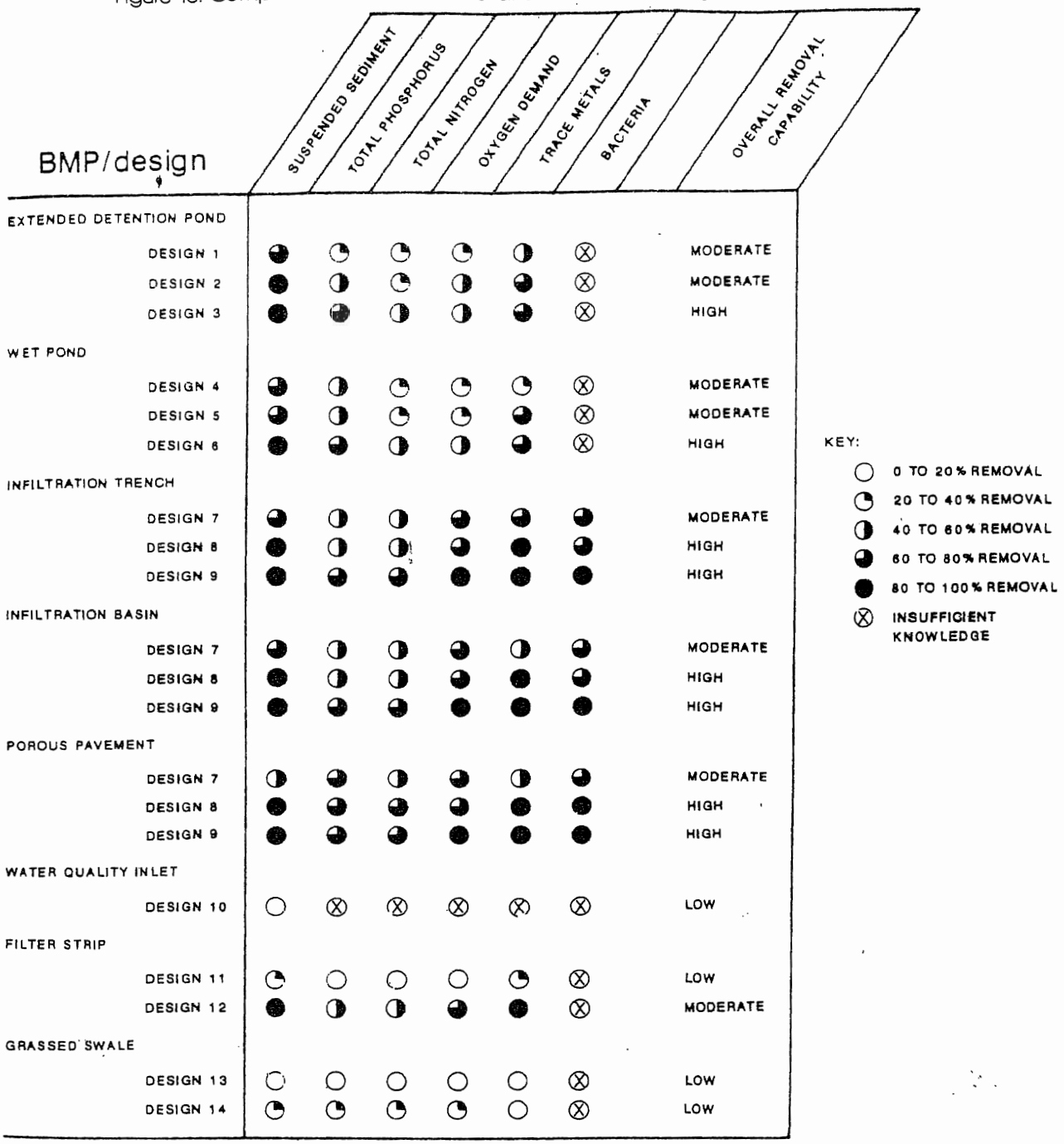
5. NATIONAL URBAN HIGHWAY CONCENTRATIONS were computed from over 250 storm EMC samples collected at eight urban highway sites across the nation as part of a Federal Highway Administration study (Shelley and Gaboury, 1986). The high concentration of metals and phosphate apparently reflects the impact of vehicle emissions. The same study indicated that pollutant concentrations in rural highway runoff were typically one half of the NURP urban runoff average.

The Simple Method has been designed such that any urban storm monitoring dataset can be used as a basis for estimating loads. Thus, if newer or more site specific pollutant concentration data becomes available in the future, the Simple Method can be easily modified to incorporate the new C values. The appropriate procedures for developing new C values are given in Section 3 of Appendix A.

Table 1.1: Urban 'C' Values For Use With the Simple Method (mg/l)

POLLUTANT	NEW SUBURBAN NURP SITES (Wash.,DC)	OLDER URBAN AREAS (Baltimore)	CENTRAL BUSINESS DISTRICT (Wash.,DC)	NATIONAL NURP STUDY AVERAGE	HARDWOOD FOREST (Northern Virginia)	NATIONAL URBAN HIGHWAY RUNOFF
PHOSPHORUS						
Total	0.26	1.08	-	0.46	0.15	-
Ortho	0.12	0.26	1.01	-	0.02	-
Soluble	0.16	-	-	0.16	0.04	0.59
Organic	0.10	0.82	-	0.13	0.11	-
NITROGEN						
Total	2.00	13.6	2.17	3.31	0.78	-
Nitrate	0.48	8.9	0.84	0.96	0.17	-
Ammonia	0.26	1.1	-	-	0.07	-
Organic	1.25	-	-	-	0.54	-
TKN	1.51	7.2	1.49	2.35	0.61	2.72
COD	35.6	163.0	-	90.8	>40.0	124.0
BOD (5-day)	5.1	-	36.0	11.9	-	-
METALS						
Zinc	0.037	0.397	0.250	0.176	-	0.380
Lead	0.018	0.389	0.370	0.180	-	0.550
Copper	-	0.105	-	0.047	-	-

Figure 15: Comparative Pollutant Removal of Urban BMP Designs



Design 1: First-flush runoff volume detained for 6-12 hours.
Design 2: Runoff volume produced by 1.0 inch, detained 24 hours.
Design 3: As in Design 2, but with shallow marsh in bottom stage.
Design 4: Permanent pool equal to 0.5 inch storage per impervious acre.
Design 5: Permanent pool equal to 2.5 (Vr); where Vr=mean storm runoff.
Design 6: Permanent pool equal to 4.0 (Vr); approx. 2 weeks retention.
Design 7: Facility exfiltrates first-flush; 0.5 inch runoff/imper. acre.
Design 8: Facility exfiltrates one inch runoff volume per imper. acre.
Design 9: Facility exfiltrates all runoff, up to the 2 year design storm.
Design 10: 400 cubic feet wet storage per impervious acre.
Design 11: 20 foot wide turf strip.
Design 12: 100 foot wide forested strip, with level spreader.
Design 13: High slope swales, with no check dams.
Design 14: Low gradient swales with check dams.

(Source: MWCG, 1987)

Stormwater Pollutant Concentrations

LAND USE	POLLUTANT CONCENTRATIONS (mg/l)			
	TP	TN	TSS	BOD
Undeveloped	0.15 [3]	0.78 [3]	70 [1]	7.7 [3]
Developed	0.26 [2]	2.00 [2]	100 [1]	9.0 [1]

[1] NURP 50th percentile (median) event mean concentration.

[2] New suburban NURP sites (Washington, DC) event mean concentrations.

[3] Hardwood forest, Northern Virginia (NYSDEC 1992) event mean concentrations.

Appendix G - Hec-1 Analyses:

1.) *Existing Conditions (Hec-1 Model- "ex.h1out")*
2.) *Developed Conditions (Hec-1 Model- "dev.h1out")*

EXISTING CONDITIONS

```
1*************************************
*                                   *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             SEPTEMBER 1990            *
*              VERSION 4.0              *
*                                       *
*  RUN DATE  01/28/2004  TIME  15:10:03 *
*                                       *
*************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

```
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
```

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

   1          ID
   2          ID       HYDROLOGY FOR: COURTYARD AT UPPER NYACK
   3          ID                      VILLAGE OF UPPER NYACK, NY
   4          ID
   5          ID       ANALYSIS PREPARED BY: LEONARD JACKSON ASSOCIATES
   6          ID                             COURTYARD AT UPPER NYACK 03118
   7          ID                             JANUARY 2004
   8          ID
   9          ID  ********************************************************************
  10          ID                        ANALYSIS PARAMETERS:
  11          ID          EXISTING CONDITIONS RUN
  12          ID          STORM RECURRENCE INTERVALS = 2-, 5-, 10-, 25- & 100-YEAR
  13          ID          HYDROGRAPH METHOD:           SCS
  14          ID          RAINFALL DISTRIBUTION:       SCS TYPE III
  15          ID  ********************************************************************
  16          ID  ********************************************************************
  17          ID                        METHODOLOGY:
  18          ID       FOR THE EXISTING CONDITIONS MODEL, 10 SUBAREA WERE UTILIZED, 4 ONSITE
  19          ID         AND 6 OFFSITE
  20          ID
  21          ID
```

```
ID       SUBAREA 1:  Offsite area west of the site, contributing to the stream
ID                   which runs through the site to Point of Interest 'A'.  This
ID                   area is unchanged between existing and developed conditions
ID       SUBAREA 2:  Offsite area to the west of the site which drains through
ID                   the site to Point of Interest 'C'.  This area includes a
ID                   portion of Route 9W and grass area on the shoulder of the
ID                   road.
ID       SUBAREA 3:  Offsite area located to the west of the site, and south of
ID                   Subarea 3, draining to Point of Interest 'B'.  Included in
ID                   this area is pavement from Route 9W and grass on the road
ID                   shoulder.
ID       SUBAREA 4:  Offsite area west of the site between Route 9W and the
ID                   site, which drains to Point of Interest 'A'.  This area
ID                   consists of grass cover.
ID       SUBAREA 5:  Onsite area in the northern portion of the site, draining
ID                   to Point of Interest 'C'.  It is considered to be
ID                   completely wooded under existing conditions.
ID       SUBAREA 6:  Onsite area in the north-central part of the site, which
ID                   drains to Point of Interest 'B', and is completely wooded
ID                   for existing conditions.
ID       SUBAREA 7:  Onsite area in the central and southern part of the site,
ID                   encompassing the majority of the site area.  There is an
ID                   existing stream which flows through this subarea from
ID                   subarea 1, all of which is directed to Point of
ID                   Interest 'A'.  This area is completely wooded under
ID                   existing conditions.
ID       SUBAREA 8:  Onsite area located in the southwest portion of the site,
ID                   draining to Point of interest 'D'.  For existing conditions
ID                   this area is wooded.
ID       SUBAREA 9:  Offsite area to the east of the site, consisting of a
ID                   drainage swale uphill of Wanamaker Lane.  The swale directs
ID                   the runoff from Subareas 3 and 6 to Point of Interest 'B'.
ID       SUBAREA 10:  Offsite area located to the east of the site, containing a
ID                   drainage swale uphill of Wanamaker Lane.  This swale
1                          HEC-1 INPUT                                    PAGE  2

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

ID                   collects the runoff from Subareas 1, 4 and 7 and directs
ID                   it to Point of Interest 'A'.
ID
ID
ID       EXISTING CONDITIONS HYDROGRAPH COMBINATION:
ID
ID           THE HYDROGRAPHS FOR SUBAREAS 1, 4, 7, AND 10 WERE COMBINED TO GIVE
ID              THE PEAK DISCHARGE AT POINT OF INTEREST 'A'
ID           THE HYDROGRAPHS FOR SUBAREAS 3, 6, AND 9 WERE COMBINED TO GIVE THE
ID              DISCHARGE AT POINT OF INTEREST 'B'
ID           THE HYDROGRAPHS FOR SUBAREAS 2 AND 5 WERE COMBINED TO GIVE THE
ID              DISCHARGE AT POINT OF INTEREST 'C'
ID           THE HYDROGRAPH FOR SUBAREA 8 GIVES THE DISCHARGE AT POINT OF
ID              INTEREST 'D'
ID
ID  ********************************************************************************
ID  ********************************************************************************
ID                                   INPUT DATA:
ID       SUBAREA 1: OFFSITE TO PT A              SUBAREA 2: OFFSITE TO PT C
ID        BA CARD:                                BA CARD:
ID          BASIN AREA= 0.02411 SQ MI               BASIN AREA= 0.00038 SQ MI
ID        LU CARD:                                LU CARD:
ID          INITIAL RAINFALL LOSS= 1"               INITIAL RAINFALL LOSS= 1"
ID          UNIFORM RAINFALL LOSS= 0.1 IN/HOUR      UNIFORM RAINFALL LOSS= 0.1 "/HR
ID          PERCENT IMPERVIOUS= 15%                 PERCENT IMPERVIOUS= 48%
ID        UC CARD:                                UC CARD:
ID          TIME OF CONCENTRATION= .26 HOURS        TIME OF CONCENTRATION= 0.02 HOUR
ID          SCS CURVE NUMBER = 41.6                 SCS CURVE NUMBER = 49.5
ID
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 85          ID      SUBAREA 3: OFFSITE TO PT B              SUBAREA 4: ONSITE TO PT A
 86          ID       BA CARD:                                BA CARD:
 87          ID         BASIN AREA= 0.00013 SQ MI               BASIN AREA= 0.00030 SQ MI
 88          ID       LU CARD:                                LU CARD:
 89          ID         INITIAL RAINFALL LOSS= 1"               INITIAL RAINFALL LOSS= 1"
 90          ID         UNIFORM RAINFALL LOSS= 0.1 IN/HOUR      UNIFORM RAINFALL LOSS= 0.1 "/HR
 91          ID         PERCENT IMPERVIOUS= 31%                 PERCENT IMPERVIOUS= 0%
 92          ID       UC CARD:                                UC CARD:
 93          ID         TIME OF CONCENTRATION= .01 HOURS        TIME OF CONCENTRATION= 0.02 HOUR
 94          ID         SCS CURVE NUMBER = 49                   SCS CURVE NUMBER = 46.5
 95          ID
 96          ID      SUBAREA 5: ONSITE TO PT C               SUBAREA 6: ONSITE TO PT B
 97          ID       BA CARD:                                BA CARD:
 98          ID         BASIN AREA= 0.00563 SQ MI               BASIN AREA= 0.00235 SQ MI
 99          ID       LU CARD:                                LU CARD:
100          ID         INITIAL RAINFALL LOSS= 1"               INITIAL RAINFALL LOSS= 1"
101          ID         UNIFORM RAINFALL LOSS= 0.1 IN/HOUR      UNIFORM RAINFALL LOSS= 0.1 "/HR
102          ID         PERCENT IMPERVIOUS= 0%                  PERCENT IMPERVIOUS= 0%
103          ID       UC CARD:                                UC CARD:
104          ID         TIME OF CONCENTRATION= .36 HOURS        TIME OF CONCENTRATION= 0.34 HOUR
105          ID         SCS CURVE NUMBER = 36.6                 SCS CURVE NUMBER = 36.85
106          ID
107          ID      SUBAREA 7: ONSITE TO PT A               SUBAREA 8: ONSITE TO PT D
108          ID       BA CARD:                                BA CARD:
109          ID         BASIN AREA= 0.00927 SQ MI               BASIN AREA= 0.00024 SQ MI
110          ID       LU CARD:                                LU CARD:
```



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

111          ID         INITIAL RAINFALL LOSS= 1"               INITIAL RAINFALL LOSS= 1"
112          ID         UNIFORM RAINFALL LOSS= 0.1 IN/HOUR      UNIFORM RAINFALL LOSS= 0.1 "/HR
113          ID         PERCENT IMPERVIOUS= 0%                  PERCENT IMPERVIOUS= 0%
114          ID       UC CARD:                                UC CARD:
115          ID         TIME OF CONCENTRATION= .34 HOURS        TIME OF CONCENTRATION= 0.14 HOUR
116          ID         SCS CURVE NUMBER = 37.15                SCS CURVE NUMBER = 36
117          ID
118          ID      SUBAREA 9: OFFSITE TO PT B              SUBAREA 10: OFFSITE TO PT A
119          ID       BA CARD:                                BA CARD:
120          ID         BASIN AREA= 0.00004 SQ MI               BASIN AREA= 0.00025 SQ MI
121          ID       LU CARD:                                LU CARD:
122          ID         INITIAL RAINFALL LOSS= 1"               INITIAL RAINFALL LOSS= 1"
123          ID         UNIFORM RAINFALL LOSS= 0.1 IN/HOUR      UNIFORM RAINFALL LOSS= 0.1 "/HR
124          ID         PERCENT IMPERVIOUS= 0%                  PERCENT IMPERVIOUS= 0%
125          ID       UC CARD:                                UC CARD:
126          ID         TIME OF CONCENTRATION= .13 HOURS        TIME OF CONCENTRATION= 0.18 HOUR
127          ID         SCS CURVE NUMBER = 55                   SCS CURVE NUMBER = 51
128          ID
129          ID
130          ID
131          ID  ********************************************************************************
132          ID
             *DIAGRAM
133          IT       6       0       0     300
134          IO       3       0
135          JR    PREC     3.2     4.2     5.0     5.6     7.2

136          KK    SUB1**************************************************************************
137          KO               1
138          BA  .02411
139          PB       1
140          IN       6
141          PC       0   0.001   0.002   0.003   0.004   0.005   0.006   0.007   0.008   0.009
142          PC   0.010   0.011   0.012   0.013   0.014   0.015   0.016   0.017   0.018   0.019
143          PC   0.020   0.021   0.022   0.023   0.024   0.026   0.027   0.028   0.029  0.0295
144          PC   0.030   0.031   0.032   0.034   0.035   0.036   0.037   0.038   0.040   0.041
145          PC   0.042   0.043   0.045   0.046   0.047   0.049   0.050   0.051   0.053   0.054
```

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  146          PC   0.055   0.057   0.058   0.060   0.061   0.063   0.064   0.066   0.067   0.069
  147          PC   0.070   0.072   0.074   0.075   0.077   0.079   0.080   0.082   0.084   0.085
  148          PC   0.087   0.089   0.091   0.093   0.095   0.097   0.100   0.103   0.106   0.109
  149          PC   0.112   0.115   0.118   0.121   0.124   0.127   0.130   0.134   0.137   0.140
  150          PC   0.144   0.148   0.151   0.155   0.159   0.163   0.167   0.171   0.176   0.180
  151          PC   0.185   0.189   0.194   0.199   0.205   0.210   0.216   0.222   0.228   0.235
  152          PC   0.242   0.250   0.258   0.266   0.276   0.287   0.298   0.312   0.328   0.363
  153          PC   0.416   0.500   0.584   0.638   0.673   0.689   0.702   0.714   0.725   0.734
  154          PC   0.743   0.751   0.758   0.766   0.772   0.779   0.785   0.790   0.796   0.801
  155          PC   0.806   0.811   0.816   0.821   0.825   0.829   0.834   0.838   0.842   0.845
  156          PC   0.849   0.853   0.857   0.860   0.864   0.867   0.870   0.874   0.877   0.880
  157          PC   0.886   0.889   0.892   0.895   0.898   0.900   0.903   0.906   0.908   0.910
  158          PC   0.911   0.913   0.915   0.917   0.919   0.920   0.922   0.924   0.925   0.927
  159          PC   0.929   0.930   0.932   0.933   0.935   0.936   0.938   0.939   0.941   0.942
  160          PC   0.944   0.945   0.946   0.948   0.949   0.951   0.952   0.953   0.955   0.956
  161          PC   0.957   0.958   0.960   0.961   0.962   0.963   0.965   0.966   0.967   0.968
  162          PC   0.969   0.971   0.972   0.973   0.974   0.975   0.976   0.977   0.978   0.979
  163          PC   0.981   0.982   0.983   0.984   0.985   0.986   0.987   0.988   0.989   0.990
1                                          HEC-1 INPUT                                          PAGE  4

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

  164          PC   0.991   0.992   0.993   0.994   0.995   0.996   0.997   0.998   0.999   1.000
  165          LS       1      47      15
  166          UD   0.158

  167          KK    SUB4*************************************************************************
  168          KM
  169          BA   .0003
  170          LS       1    46.5       0
  171          UD   0.010

  172          KK    SUB7*************************************************************************
  173          KM
  174          BA  .00927
  175          LS       1   37.15       0
  176          UD   0.203

  177          KK   SUB10*************************************************************************
  178          KM
  179          BA  .00025
  180          LS       1      51       0
  181          UD   0.111

  182          KK  COMB A*************************************************************************
  183          KM  COMBINED RUNOFF DRAINING TO POINT OF INTEREST 'A'
  184          HC       4

  185          KK    SUB3*************************************************************************
  186          KM
  187          BA  .00013
  188          LS       1      49      31
  189          UD   0.007

  190          KK    SUB6*************************************************************************
  191          KM
  192          BA  .00235
  193          LS       1   36.85       0
  194          UD   0.207

  195          KK    SUB9*************************************************************************
  196          KM
  197          BA  .00004
  198          LS       1      55       0
  199          UD   0.077

  200          KK  COMB B*************************************************************************
```

```
          201          KM  COMBINED RUNOFF DRAINING TO POINT OF INTEREST 'B'
          202          HC       3

          203          KK    SUB2**************************************************************************
          204          KM
          205          BA  .00038
          206          LS       1    49.5       48
          207          UD   0.010
1                                                HEC-1 INPUT                                                PAGE  5

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

          208          KK    SUB5**************************************************************************
          209          KM
          210          BA  .00563
          211          LS       1    36.6        0
          212          UD   0.214

          213          KK  COMB C************************************************************************
          214          KM  COMBINED RUNOFF DRAINING TO POINT OF INTEREST 'C'
          215          HC       2

          216          KK    SUB8**************************************************************************
          217          KM  TOTAL RUNOFF DRAINING TO POINT OF INTEREST 'D'
          218          BA  .00024
          219          LS       1       36       0
          220          UD   0.082
          221          ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   136        SUB1
                .
                .
   167          .         SUB4
                .           .
                .           .
   172          .           .         SUB7
                .           .           .
                .           .           .
   177          .           .           .        SUB10
                .           .           .           .
                .           .           .           .
   182      COMB A.....................................
                .
                .
   185          .         SUB3
                .           .
                .           .
   190          .           .         SUB6
                .           .           .
                .           .           .
   195          .           .           .         SUB9
                .           .           .           .
                .           .           .           .
   200          .       COMB B.........................
                .           .
                .           .
   203          .           .         SUB2
                .           .           .
                .           .           .
   208          .           .           .         SUB5
```

```
                .           .           .           .
                .           .           .           .
  213           .           .      COMB C.....      .
                .           .           .
                .           .           .
  216           .           .           .       SUB8

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1**************************************
*                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)*
*            SEPTEMBER 1990          *
*             VERSION 4.0            *
*                                    *
*  RUN DATE  01/28/2004  TIME  15:10:03 *
*                                    *
**************************************
```


****
* U.S. ARMY CORPS OF ENGINEERS *
* HYDROLOGIC ENGINEERING CENTER *
* 609 SECOND STREET *
* DAVIS, CALIFORNIA 95616 *
* (916) 756-1104 *
****

HYDROLOGY FOR: COURTYARD AT UPPER NYACK
VILLAGE OF UPPER NYACK, NY

ANALYSIS PREPARED BY: LEONARD JACKSON ASSOCIATES
COURTYARD AT UPPER NYACK 03118
JANUARY 2004

****

ANALYSIS PARAMETERS:

EXISTING CONDITIONS RUN
STORM RECURRENCE INTERVALS = 2-, 5-, 10-, 25- & 100-YEAR
HYDROGRAPH METHOD: SCS
RAINFALL DISTRIBUTION: SCS TYPE III

****

****

METHODOLOGY:

FOR THE EXISTING CONDITIONS MODEL, 10 SUBAREA WERE UTILIZED, 4 ONSITE AND 6 OFFSITE

SUBAREA 1: Offsite area west of the site, contributing to the stream which runs through the site to Point of Interest 'A'. This area is unchanged between existing and developed conditions

SUBAREA 2: Offsite area to the west of the site which drains through the site to Point of Interest 'C'. This area includes a portion of Route 9W and grass area on the shoulder of the road.

SUBAREA 3: Offsite area located to the west of the site, and south of Subarea 3, draining to Point of Interest 'B'. Included in this area is pavement from Route 9W and grass on the road shoulder.

SUBAREA 4: Offsite area west of the site between Route 9W and the site, which drains to Point of Interest 'A'. This area consists of grass cover.

SUBAREA 5: Onsite area in the northern portion of the site, draining to Point of Interest 'C'. It is considered to be completely wooded under existing conditions.

SUBAREA 6: Onsite area in the north-central part of the site, which drains to Point of Interest 'B', and is completely wooded for existing conditions.

SUBAREA 7: Onsite area in the central and southern part of the site, encompassing the majority of the site area. There is an existing stream which flows through this subarea from subarea 1, all of which is directed to Point of

```
                Interest 'A'.  This area is completely wooded under
                existing conditions.
    SUBAREA 8:  Onsite area located in the southwest portion of the site,
                draining to Point of interest 'D'.  For existing conditions
                this area is wooded.
    SUBAREA 9:  Offsite area to the east of the site, consisting of a
                drainage swale uphill of Wanamaker Lane.  The swale directs
                the runoff from Subareas 3 and 6 to Point of Interest 'B'.
    SUBAREA 10:  Offsite area located to the east of the site, containing a
                 drainage swale uphill of Wanamaker Lane.  This swale
                 collects the runoff from Subareas 1, 4 and 7 and directs
                 it to Point of Interest 'A'.


    EXISTING CONDITIONS HYDROGRAPH COMBINATION:

        THE HYDROGRAPHS FOR SUBAREAS 1, 4, 7, AND 10 WERE COMBINED TO GIVE
           THE PEAK DISCHARGE AT POINT OF INTEREST 'A'
        THE HYDROGRAPHS FOR SUBAREAS 3, 6, AND 9 WERE COMBINED TO GIVE THE
           DISCHARGE AT POINT OF INTEREST 'B'
        THE HYDROGRAPHS FOR SUBAREAS 2 AND 5 WERE COMBINED TO GIVE THE
           DISCHARGE AT POINT OF INTEREST 'C'
        THE HYDROGRAPH FOR SUBAREA 8 GIVES THE DISCHARGE AT POINT OF
           INTEREST 'D'

********************************************************************************
********************************************************************************
                                    INPUT DATA:
    SUBAREA 1: OFFSITE TO PT A                  SUBAREA 2: OFFSITE TO PT C
     BA CARD:                                    BA CARD:
       BASIN AREA= 0.02411 SQ MI                   BASIN AREA= 0.00038 SQ MI
     LU CARD:                                    LU CARD:
       INITIAL RAINFALL LOSS= 1"                   INITIAL RAINFALL LOSS= 1"
       UNIFORM RAINFALL LOSS= 0.1 IN/HOUR          UNIFORM RAINFALL LOSS= 0.1 "/HR
       PERCENT IMPERVIOUS= 15%                     PERCENT IMPERVIOUS= 48%
     UC CARD:                                    UC CARD:
       TIME OF CONCENTRATION= .26 HOURS            TIME OF CONCENTRATION= 0.02 HOUR
       SCS CURVE NUMBER = 41.6                     SCS CURVE NUMBER = 49.5

    SUBAREA 3: OFFSITE TO PT B                  SUBAREA 4: ONSITE TO PT A
     BA CARD:                                    BA CARD:
       BASIN AREA= 0.00013 SQ MI                   BASIN AREA= 0.00030 SQ MI
     LU CARD:                                    LU CARD:
       INITIAL RAINFALL LOSS= 1"                   INITIAL RAINFALL LOSS= 1"
       UNIFORM RAINFALL LOSS= 0.1 IN/HOUR          UNIFORM RAINFALL LOSS= 0.1 "/HR
       PERCENT IMPERVIOUS= 31%                     PERCENT IMPERVIOUS= 0%
     UC CARD:                                    UC CARD:
       TIME OF CONCENTRATION= .01 HOURS            TIME OF CONCENTRATION= 0.02 HOUR
       SCS CURVE NUMBER = 49                       SCS CURVE NUMBER = 46.5

    SUBAREA 5: ONSITE TO PT C                   SUBAREA 6: ONSITE TO PT B
     BA CARD:                                    BA CARD:
       BASIN AREA= 0.00563 SQ MI                   BASIN AREA= 0.00235 SQ MI
     LU CARD:                                    LU CARD:
       INITIAL RAINFALL LOSS= 1"                   INITIAL RAINFALL LOSS= 1"
       UNIFORM RAINFALL LOSS= 0.1 IN/HOUR          UNIFORM RAINFALL LOSS= 0.1 "/HR
       PERCENT IMPERVIOUS= 0%                      PERCENT IMPERVIOUS= 0%
     UC CARD:                                    UC CARD:
       TIME OF CONCENTRATION= .36 HOURS            TIME OF CONCENTRATION= 0.34 HOUR
       SCS CURVE NUMBER = 36.6                     SCS CURVE NUMBER = 36.85

    SUBAREA 7: ONSITE TO PT A                   SUBAREA 8: ONSITE TO PT D
     BA CARD:                                    BA CARD:
       BASIN AREA= 0.00927 SQ MI                   BASIN AREA= 0.00024 SQ MI
     LU CARD:                                    LU CARD:
       INITIAL RAINFALL LOSS= 1"                   INITIAL RAINFALL LOSS= 1"
       UNIFORM RAINFALL LOSS= 0.1 IN/HOUR          UNIFORM RAINFALL LOSS= 0.1 "/HR
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                              PERCENT IMPERVIOUS= 0%                  PERCENT IMPERVIOUS= 0%
                            UC CARD:                                UC CARD:
                              TIME OF CONCENTRATION= .34 HOURS        TIME OF CONCENTRATION= 0.14 HOUR
                              SCS CURVE NUMBER = 37.15                SCS CURVE NUMBER = 36

                           SUBAREA 9: OFFSITE TO PT B              SUBAREA 10: OFFSITE TO PT A
                            BA CARD:                                BA CARD:
                              BASIN AREA= 0.00004 SQ MI               BASIN AREA= 0.00025 SQ MI
                            LU CARD:                                LU CARD:
                              INITIAL RAINFALL LOSS= 1"               INITIAL RAINFALL LOSS= 1"
                              UNIFORM RAINFALL LOSS= 0.1 IN/HOUR      UNIFORM RAINFALL LOSS= 0.1 "/HR
                              PERCENT IMPERVIOUS= 0%                  PERCENT IMPERVIOUS= 0%
                            UC CARD:                                UC CARD:
                              TIME OF CONCENTRATION= .13 HOURS        TIME OF CONCENTRATION= 0.18 HOUR
                              SCS CURVE NUMBER = 55                   SCS CURVE NUMBER = 51


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


134 IO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN           6  MINUTES IN COMPUTATION INTERVAL
                      IDATE      1    0  STARTING DATE
                      ITIME        0000  STARTING TIME
                         NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2    0  ENDING DATE
                     NDTIME        0554  ENDING TIME
                     ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL     .10 HOURS
                       TOTAL TIME BASE   29.90 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

    JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   3.20      4.20      5.00      5.60      7.20


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


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          *            *
136 KK    *      SUB1  *     ********************************************************************
          *            *
          **************

137 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           3  PRINT CONTROL
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                    IPLOT          1  PLOT CONTROL
                    QSCAL          0.  HYDROGRAPH PLOT SCALE

140 IN          TIME DATA FOR INPUT TIME SERIES
                     JXMIN          6  TIME INTERVAL IN MINUTES
                    JXDATE      1   0  STARTING DATE
                    JXTIME          0  STARTING TIME

              SUBBASIN RUNOFF DATA

138 BA          SUBBASIN CHARACTERISTICS
                     TAREA        .02  SUBBASIN AREA

                PRECIPITATION DATA

139 PB               STORM       1.00  BASIN TOTAL PRECIPITATION

141 PI            INCREMENTAL PRECIPITATION PATTERN
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .01    .00    .01    .00    .01    .01    .01    .01    .01
                  .01    .01    .01    .01    .01    .01    .01    .02    .03    .05
                  .08    .08    .05    .03    .02    .01    .01    .01    .01    .01
                  .01    .01    .01    .01    .01    .01    .00    .01    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .01
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00    .00
                  .00    .00    .00    .00    .00    .00    .00    .00    .00
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165 LS          SCS LOSS RATE
                    STRTL       1.00  INITIAL ABSTRACTION
                   CRVNBR      47.00  CURVE NUMBER
                    RTIMP      15.00  PERCENT IMPERVIOUS AREA

166 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG        .16  LAG
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UNIT HYDROGRAPH
10 END-OF-PERIOD ORDINATES

25. 56. 42. 18. 8. 4. 2. 1. 0. 0.

TOTAL RAINFALL = 1.00, TOTAL LOSS = .85, TOTAL EXCESS = .15

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	29.90-HR
+	(CFS)	(HR)					
			(CFS)				
+	2.	12.30		0.	0.	0.	0.
			(INCHES)	.106	.150	.150	.150
			(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .02 SQ MI

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

HYDROGRAPH AT STATION SUB1
FOR PLAN 1, RATIO = 3.20

TOTAL RAINFALL = 3.20, TOTAL LOSS = 2.41, TOTAL EXCESS = .79

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 8.	12.30	1.	1.	0.	0.
		(INCHES) .560	.785	.785	.785
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = .02 SQ MI

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

HYDROGRAPH AT STATION SUB1
FOR PLAN 1, RATIO = 4.20

TOTAL RAINFALL = 4.20, TOTAL LOSS = 2.97, TOTAL EXCESS = 1.23

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 13.	12.30	2.	1.	1.	1.
		(INCHES) .905	1.230	1.231	1.231
		(AC-FT) 1.	2.	2.	2.

CUMULATIVE AREA = .02 SQ MI

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

HYDROGRAPH AT STATION SUB1
FOR PLAN 1, RATIO = 5.00

TOTAL RAINFALL = 5.00, TOTAL LOSS = 3.36, TOTAL EXCESS = 1.64

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 18.	12.30	3.	1.	1.	1.
		(INCHES) 1.226	1.639	1.640	1.640
		(AC-FT) 2.	2.	2.	2.

CUMULATIVE AREA = .02 SQ MI

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

HYDROGRAPH AT STATION SUB1
FOR PLAN 1, RATIO = 5.60

TOTAL RAINFALL = 5.60, TOTAL LOSS = 3.63, TOTAL EXCESS = 1.97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				

```
                    (CFS)
+       22.     12.30                4.          1.          1.          1.
                (INCHES)         1.487       1.972       1.973       1.973
                (AC-FT)             2.          3.          3.          3.

                CUMULATIVE AREA =     .02 SQ MI


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

                  HYDROGRAPH AT STATION     SUB1
                    FOR PLAN 1, RATIO = 7.20

    TOTAL RAINFALL =    7.20, TOTAL LOSS =    4.25, TOTAL EXCESS =    2.95

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                    (CFS)
+       34.     12.30                6.          2.          2.          2.
                (INCHES)         2.254       2.948       2.950       2.950
                (AC-FT)             3.          4.          4.          4.

                CUMULATIVE AREA =     .02 SQ MI


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


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              *              *
  167 KK      *     SUB4     *     ********************************************************************
              *              *
              **************


              SUBBASIN RUNOFF DATA

  169 BA        SUBBASIN CHARACTERISTICS
                     TAREA         .00  SUBBASIN AREA

                PRECIPITATION DATA

  139 PB             STORM         1.00  BASIN TOTAL PRECIPITATION

  141 PI          INCREMENTAL PRECIPITATION PATTERN
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .01       .00       .01       .00       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .02       .03       .05
                    .08       .08       .05       .03       .02       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .00       .01       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .01
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00

 170 LS          SCS LOSS RATE
                      STRTL        1.00  INITIAL ABSTRACTION
                     CRVNBR       46.50  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 171 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .01  LAG

                                                                  ***

                                                                UNIT HYDROGRAPH
                                                              5 END-OF-PERIOD ORDINATES
                     1.        0.        0.        0.        0.

     TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =     .00

   PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+        0.        .10                     0.          0.          0.          0.
                (INCHES)                 .000        .000        .000        .000
                (AC-FT)                    0.          0.          0.          0.

                CUMULATIVE AREA =     .00 SQ MI

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

                HYDROGRAPH AT STATION     SUB4
                  FOR PLAN 1, RATIO = 3.20

     TOTAL RAINFALL =    3.20, TOTAL LOSS =    2.85, TOTAL EXCESS =     .35

   PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+        0.      12.20                     0.          0.          0.          0.
                (INCHES)                 .285        .353        .353        .353
                (AC-FT)                    0.          0.          0.          0.

                CUMULATIVE AREA =     .00 SQ MI

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

                HYDROGRAPH AT STATION     SUB4
                  FOR PLAN 1, RATIO = 4.20

     TOTAL RAINFALL =    4.20, TOTAL LOSS =    3.50, TOTAL EXCESS =     .70

   PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+        0.      12.20                     0.          0.          0.          0.
                (INCHES)                 .568        .696        .696        .696
                (AC-FT)                    0.          0.          0.          0.

                CUMULATIVE AREA =     .00 SQ MI
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     ***               ***               ***               ***               ***

                        HYDROGRAPH AT STATION     SUB4
                          FOR PLAN 1, RATIO = 5.00

    TOTAL RAINFALL =    5.00, TOTAL LOSS =    3.97, TOTAL EXCESS =    1.03

  PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     29.90-HR
+   (CFS)        (HR)
                         (CFS)
+        0.      12.20                 0.          0.          0.            0.
                       (INCHES)      .843       1.032       1.032         1.032
                        (AC-FT)        0.          0.          0.            0.

                       CUMULATIVE AREA =      .00 SQ MI

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

                        HYDROGRAPH AT STATION     SUB4
                          FOR PLAN 1, RATIO = 5.60

    TOTAL RAINFALL =    5.60, TOTAL LOSS =    4.29, TOTAL EXCESS =    1.31

  PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     29.90-HR
+   (CFS)        (HR)
                         (CFS)
+        0.      12.20                 0.          0.          0.            0.
                       (INCHES)     1.073       1.314       1.314         1.314
                        (AC-FT)        0.          0.          0.            0.

                       CUMULATIVE AREA =      .00 SQ MI

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

                        HYDROGRAPH AT STATION     SUB4
                          FOR PLAN 1, RATIO = 7.20

    TOTAL RAINFALL =    7.20, TOTAL LOSS =    5.03, TOTAL EXCESS =    2.17

  PEAK FLOW      TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR        24-HR       72-HR     29.90-HR
+   (CFS)        (HR)
                         (CFS)
+        0.      12.20                 0.          0.          0.            0.
                       (INCHES)     1.767       2.171       2.171         2.171
                        (AC-FT)        0.          0.          0.            0.

                       CUMULATIVE AREA =      .00 SQ MI


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

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            *            *
  172 KK    *     SUB7   *    **************************************************************************
            *            *
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SUBBASIN RUNOFF DATA

174 BA SUBBASIN CHARACTERISTICS
TAREA .01 SUBBASIN AREA

PRECIPITATION DATA

139 PB STORM 1.00 BASIN TOTAL PRECIPITATION

141 PI INCREMENTAL PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.01	.00	.01	.00	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.02	.03	.05
.08	.08	.05	.03	.02	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.00	.01	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	

175 LS SCS LOSS RATE
STRTL 1.00 INITIAL ABSTRACTION
CRVNBR 37.15 CURVE NUMBER
RTIMP .00 PERCENT IMPERVIOUS AREA

176 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .20 LAG

***

UNIT HYDROGRAPH
12 END-OF-PERIOD ORDINATES

5.	16.	17.	10.	5.	3.	1.	1.	0.	0.
0.	0.								

TOTAL RAINFALL = 1.00, TOTAL LOSS = 1.00, TOTAL EXCESS = .00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	.10	0.	0.	0.	0.
		(INCHES) .000	.000	.000	.000
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .01 SQ MI

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

HYDROGRAPH AT STATION SUB7

FOR PLAN 1, RATIO = 3.20

TOTAL RAINFALL = 3.20, TOTAL LOSS = 2.95, TOTAL EXCESS = .25

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	29.90-HR
1.	12.40	(CFS) 0.	0.	0.	0.
		(INCHES) .202	.253	.253	.253
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .01 SQ MI

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

HYDROGRAPH AT STATION SUB7
FOR PLAN 1, RATIO = 4.20

TOTAL RAINFALL = 4.20, TOTAL LOSS = 3.69, TOTAL EXCESS = .51

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	29.90-HR
2.	12.40	(CFS) 0.	0.	0.	0.
		(INCHES) .412	.509	.509	.509
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .01 SQ MI

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

HYDROGRAPH AT STATION SUB7
FOR PLAN 1, RATIO = 5.00

TOTAL RAINFALL = 5.00, TOTAL LOSS = 4.24, TOTAL EXCESS = .76

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	29.90-HR
3.	12.40	(CFS) 1.	0.	0.	0.
		(INCHES) .620	.765	.765	.765
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .01 SQ MI

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

HYDROGRAPH AT STATION SUB7
FOR PLAN 1, RATIO = 5.60

TOTAL RAINFALL = 5.60, TOTAL LOSS = 4.62, TOTAL EXCESS = .98

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	29.90-HR
4.	12.40	(CFS) 1.	0.	0.	0.
		(INCHES) .797	.983	.983	.983
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .01 SQ MI

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

HYDROGRAPH AT STATION SUB7
FOR PLAN 1, RATIO = 7.20

TOTAL RAINFALL = 7.20, TOTAL LOSS = 5.54, TOTAL EXCESS = 1.66

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)				
		(CFS)			
7.	12.40	1.	0.	0.	0.
		(INCHES) 1.345	1.663	1.663	1.663
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = .01 SQ MI

*** ***

177 KK SUB10

SUBBASIN RUNOFF DATA

179 BA SUBBASIN CHARACTERISTICS
TAREA .00 SUBBASIN AREA

PRECIPITATION DATA

139 PB STORM 1.00 BASIN TOTAL PRECIPITATION

141 PI INCREMENTAL PRECIPITATION PATTERN

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.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.01	.00	.01	.00	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.02	.03
.08	.08	.05	.03	.02	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.00	.01	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00

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 180 LS          SCS LOSS RATE
                      STRTL        1.00  INITIAL ABSTRACTION
                     CRVNBR       51.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

 181 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .11  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                       8 END-OF-PERIOD ORDINATES
                  1.        1.        0.        0.        0.        0.        0.        0.

     TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =     .00

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+        0.        .10                    0.          0.          0.          0.
                 (INCHES)               .000        .000        .000        .000
                 (AC-FT)                 0.          0.          0.          0.

                 CUMULATIVE AREA =     .00 SQ MI

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

                   HYDROGRAPH AT STATION     SUB10
                     FOR PLAN 1, RATIO = 3.20

     TOTAL RAINFALL =    3.20, TOTAL LOSS =    2.79, TOTAL EXCESS =     .41

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+        0.      12.30                    0.          0.          0.          0.
                 (INCHES)               .331        .410        .410        .410
                 (AC-FT)                 0.          0.          0.          0.

                 CUMULATIVE AREA =     .00 SQ MI

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

                   HYDROGRAPH AT STATION     SUB10
                     FOR PLAN 1, RATIO = 4.20

     TOTAL RAINFALL =    4.20, TOTAL LOSS =    3.40, TOTAL EXCESS =     .80

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     29.90-HR
+    (CFS)        (HR)
                    (CFS)
+        0.      12.30                    0.          0.          0.          0.
                 (INCHES)               .654        .800        .800        .800
                 (AC-FT)                 0.          0.          0.          0.

                 CUMULATIVE AREA =     .00 SQ MI

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

                   HYDROGRAPH AT STATION     SUB10
                     FOR PLAN 1, RATIO = 5.00
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     TOTAL RAINFALL =    5.00, TOTAL LOSS =    3.82, TOTAL EXCESS =    1.18

   PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR      29.90-HR
+    (CFS)       (HR)
                              (CFS)
+        0.     12.30                   0.          0.          0.            0.
                            (INCHES)  .963       1.176       1.176         1.176
                             (AC-FT)    0.          0.          0.            0.

                            CUMULATIVE AREA =     .00 SQ MI


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

                             HYDROGRAPH AT STATION    SUB10
                               FOR PLAN 1, RATIO = 5.60

     TOTAL RAINFALL =    5.60, TOTAL LOSS =    4.11, TOTAL EXCESS =    1.49

   PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR      29.90-HR
+    (CFS)       (HR)
                              (CFS)
+        0.     12.30                   0.          0.          0.            0.
                            (INCHES)  1.219      1.489       1.489         1.489
                             (AC-FT)    0.          0.          0.            0.

                            CUMULATIVE AREA =     .00 SQ MI


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

                             HYDROGRAPH AT STATION    SUB10
                               FOR PLAN 1, RATIO = 7.20

     TOTAL RAINFALL =    7.20, TOTAL LOSS =    4.77, TOTAL EXCESS =    2.43

   PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR      29.90-HR
+    (CFS)       (HR)
                              (CFS)
+        0.     12.30                   0.          0.          0.            0.
                            (INCHES)  1.985      2.432       2.432         2.432
                             (AC-FT)    0.          0.          0.            0.

                            CUMULATIVE AREA =     .00 SQ MI


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

            **************
            *            *
 182 KK     *    COMB A  *    *********************************************************************************
            *            *
            **************
                           COMBINED RUNOFF DRAINING TO POINT OF INTEREST 'A'

 184 HC          HYDROGRAPH COMBINATION
                      ICOMP           4  NUMBER OF HYDROGRAPHS TO COMBINE
                                                           ***
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*** *** *** *** ***

HYDROGRAPH AT STATION COMB A
FOR PLAN 1, RATIO = 3.20

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)			
+ 9.	12.30	2.	1.	0.	0.
		(INCHES) .455	.633	.633	.633
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = .03 SQ MI

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

HYDROGRAPH AT STATION COMB A
FOR PLAN 1, RATIO = 4.20

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)			
+ 15.	12.30	3.	1.	1.	1.
		(INCHES) .762	1.025	1.026	1.026
		(AC-FT) 1.	2.	2.	2.

CUMULATIVE AREA = .03 SQ MI

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

HYDROGRAPH AT STATION COMB A
FOR PLAN 1, RATIO = 5.00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)			
+ 22.	12.30	4.	1.	1.	1.
		(INCHES) 1.052	1.391	1.392	1.392
		(AC-FT) 2.	3.	3.	3.

CUMULATIVE AREA = .03 SQ MI

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

HYDROGRAPH AT STATION COMB A
FOR PLAN 1, RATIO = 5.60

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)			
+ 27.	12.30	5.	2.	1.	1.
		(INCHES) 1.290	1.692	1.693	1.693
		(AC-FT) 2.	3.	3.	3.

CUMULATIVE AREA = .03 SQ MI

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

HYDROGRAPH AT STATION COMB A

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                         FOR PLAN 1, RATIO = 7.20

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                         6-HR       24-HR       72-HR      29.90-HR
+   (CFS)       (HR)
                              (CFS)
+      42.     12.30                       7.          2.          2.            2.
                           (INCHES)     1.997       2.586       2.587         2.587
                            (AC-FT)        4.          5.          5.            5.

                         CUMULATIVE AREA =      .03 SQ MI


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

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            *            *
 185 KK     *      SUB3  *     **********************************************************************
            *            *
            **************


              SUBBASIN RUNOFF DATA

 187 BA         SUBBASIN CHARACTERISTICS
                      TAREA          .00  SUBBASIN AREA

                PRECIPITATION DATA

 139 PB               STORM        1.00  BASIN TOTAL PRECIPITATION

 141 PI           INCREMENTAL PRECIPITATION PATTERN
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                       .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                        08       .08       .05       .03       .02       .01       .01       .01       .01       .01
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 188 LS         SCS LOSS RATE
                      STRTL        1.00  INITIAL ABSTRACTION
                     CRVNBR       49.00  CURVE NUMBER
                      RTIMP       31.00  PERCENT IMPERVIOUS AREA

 189 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .01  LAG
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UNIT HYDROGRAPH
5 END-OF-PERIOD ORDINATES

1. 0 0. 0. 0.

TOTAL RAINFALL = 1.00, TOTAL LOSS = .69, TOTAL EXCESS = .31

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) .219	.310	.310	.310
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB3
FOR PLAN 1, RATIO = 3.20

TOTAL RAINFALL = 3.20, TOTAL LOSS = 1.94, TOTAL EXCESS = 1.26

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) .886	1.257	1.257	1.257
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB3
FOR PLAN 1, RATIO = 4.20

TOTAL RAINFALL = 4.20, TOTAL LOSS = 2.38, TOTAL EXCESS = 1.82

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) 1.305	1.821	1.821	1.821
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB3
FOR PLAN 1, RATIO = 5.00

TOTAL RAINFALL = 5.00, TOTAL LOSS = 2.68, TOTAL EXCESS = 2.32

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			

```
+       0.      12.20                    0.          0.          0.          0.
                              (INCHES)     1.679       2.316       2.316       2.316
                              (AC-FT)        0.          0.          0.          0.

                              CUMULATIVE AREA =      .00 SQ MI

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

                            HYDROGRAPH AT STATION     SUB3
                              FOR PLAN 1, RATIO = 5.60

     TOTAL RAINFALL =     5.60, TOTAL LOSS =     2.89, TOTAL EXCESS =     2.71

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                               (CFS)
+       0.      12.20                    0.          0.          0.          0.
                              (INCHES)     1.977       2.708       2.709       2.709
                              (AC-FT)        0.          0.          0.          0.

                              CUMULATIVE AREA =      .00 SQ MI

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

                            HYDROGRAPH AT STATION     SUB3
                              FOR PLAN 1, RATIO = 7.20

     TOTAL RAINFALL =     7.20, TOTAL LOSS =     3.37, TOTAL EXCESS =     3.83

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6 HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                               (CFS)
+       0.      12.20                    0.          0.          0.          0.
                              (INCHES)     2.831       3.828       3.829       3.829
                              (AC-FT)        0.          0.          0.          0.

                              CUMULATIVE AREA =      .00 SQ MI


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


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                *             *
  190 KK        *     SUB6    *     ************************************************************************
                *             *
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                SUBBASIN RUNOFF DATA

  192 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  139 PB                STORM        1.00  BASIN TOTAL PRECIPITATION

  141 PI            INCREMENTAL PRECIPITATION PATTERN
                      .00         .00         .00         .00         .00         .00         .00         .00         .00         .00
                      .00         .00         .00         .00         .00         .00         .00         .00         .00         .00
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193 LS          SCS LOSS RATE
                     STRTL        1.00  INITIAL ABSTRACTION
                    CRVNBR       36.85  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

194 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .21  LAG

                                                                  ***

                                                  UNIT HYDROGRAPH
                                               12 END-OF-PERIOD ORDINATES
                1.       4.       4.       3.       1.       1.       0.       0.       0.       0.
                0.       0.

    TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =     .00

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                        (CFS)
+       0.        .10             0.           0.           0.           0.
                (INCHES)         .000         .000         .000         .000
                 (AC-FT)           0.           0.           0.           0.

                CUMULATIVE AREA =     .00 SQ MI

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

                  HYDROGRAPH AT STATION     SUB6
                    FOR PLAN 1, RATIO = 3.20

    TOTAL RAINFALL =    3.20, TOTAL LOSS =    2.95, TOTAL EXCESS =     .25

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                        (CFS)
+       0.     12 40             0.           0.           0.           0.
                (INCHES)         .200         .250         .250         .250
                 (AC-FT)           0.           0.           0.           0.

                CUMULATIVE AREA =     .00 SQ MI
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*** *** *** *** ***

HYDROGRAPH AT STATION SUB6
FOR PLAN 1, RATIO = 4.20

TOTAL RAINFALL = 4.20, TOTAL LOSS = 3.70, TOTAL EXCESS = .50

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 1.	12.40	0.	0.	0.	0.
		(INCHES) .408	.504	.504	.504
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB6
FOR PLAN 1, RATIO = 5.00

TOTAL RAINFALL = 5.00, TOTAL LOSS = 4.24, TOTAL EXCESS = .76

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 1.	12.40	0.	0.	0.	0.
		(INCHES) .614	.757	.757	.757
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB6
FOR PLAN 1, RATIO = 5.60

TOTAL RAINFALL = 5.60, TOTAL LOSS = 4.63, TOTAL EXCESS = .97

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 1.	12.40	0.	0.	0.	0.
		(INCHES) .789	.973	.973	.973
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB6
FOR PLAN 1, RATIO = 7.20

TOTAL RAINFALL = 7.20, TOTAL LOSS = 5.55, TOTAL EXCESS = 1.65

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			

```
+       2.     12.40                    0.          0.          0.          0.
                          (INCHES)     1.332       1.647       1.647       1.647
                           (AC-FT)       0.          0.          0.          0.

                          CUMULATIVE AREA =      .00 SQ MI


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              *            *
 195 KK       *     SUB9   *     ************************************************************************
              *            *
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                SUBBASIN RUNOFF DATA

 197 BA           SUBBASIN CHARACTERISTICS
                        TAREA          .00  SUBBASIN AREA

                  PRECIPITATION DATA

 139 PB                 STORM         1.00  BASIN TOTAL PRECIPITATION

 141 PI             INCREMENTAL PRECIPITATION PATTERN
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .01       .00       .01       .00       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .01       .02       .03       .05
                      .08       .08       .05       .03       .02       .01       .01       .01       .01       .01
                      .01       .01       .01       .01       .01       .01       .00       .01       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .01
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00
                      .00       .00       .00       .00       .00       .00       .00       .00       .00

 198 LS           SCS LOSS RATE
                       STRTL        1.00  INITIAL ABSTRACTION
                      CRVNBR       55.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

 199 UD           SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .08  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                              6 END-OF-PERIOD ORDINATES
                  0.        0.        0.        0.        0.        0.
```

TOTAL RAINFALL = 1.00, TOTAL LOSS = 1.00, TOTAL EXCESS = .00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)	(CFS)			
0.	.10	0.	0.	0.	0.
		(INCHES) .000	.000	.000	.000
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB9
FOR PLAN 1, RATIO = 3.20

TOTAL RAINFALL = 3.20, TOTAL LOSS = 2.73, TOTAL EXCESS = .47

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)	(CFS)			
0.	12.20	0.	0.	0.	0.
		(INCHES) .378	.466	.466	.466
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB9
FOR PLAN 1, RATIO = 4.20

TOTAL RAINFALL = 4.20, TOTAL LOSS = 3.30, TOTAL EXCESS = .90

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)	(CFS)			
0.	12.20	0.	0.	0.	0.
		(INCHES) .738	.900	.900	.900
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB9
FOR PLAN 1, RATIO = 5.00

TOTAL RAINFALL = 5.00, TOTAL LOSS = 3.69, TOTAL EXCESS = 1.31

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)	(CFS)			
0.	12.20	0.	0.	0.	0.
		(INCHES) 1.079	1.313	1.313	1.313
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

                        HYDROGRAPH AT STATION     SUB9
                          FOR PLAN 1, RATIO = 5.60

     TOTAL RAINFALL =    5.60, TOTAL LOSS =    3.94, TOTAL EXCESS =    1.66

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0.     12.20                      0.          0.          0.          0.
                        (INCHES)      1.360       1.655       1.655       1.655
                        (AC-FT)         0.          0.          0.          0.

                        CUMULATIVE AREA =     .00 SQ MI

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

                        HYDROGRAPH AT STATION     SUB9
                          FOR PLAN 1, RATIO = 7.20

     TOTAL RAINFALL =    7.20, TOTAL LOSS =    4.53, TOTAL EXCESS =    2.67

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0.     12.20                      0.          0.          0.          0.
                        (INCHES)      2.189       2.673       2.673       2.673
                        (AC-FT)         0.          0.          0.          0.

                        CUMULATIVE AREA =     .00 SQ MI


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


            **************
            *              *
  200 KK    *    COMB B    *     ***********************************************************************
            *              *
            **************
                        COMBINED RUNOFF DRAINING TO POINT OF INTEREST 'B'

  202 HC          HYDROGRAPH COMBINATION
                        ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                    ***
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION   COMB B
                          FOR PLAN 1, RATIO = 3.20

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0      12.40                      0.          0.          0.          0.
                        (INCHES)       .233        .305        .306        .306
                        (AC-FT)         0.          0.          0.          0.
```

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION COMB B
FOR PLAN 1, RATIO = 4.20

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)			
+ 1.	12.40	0.	0.	0.	0.
		(INCHES) .455	.577	.578	.578
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION COMB B
FOR PLAN 1, RATIO = 5.00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)			
+ 1.	12.40	0.	0.	0.	0.
		(INCHES) .672	.846	.846	.846
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION COMB B
FOR PLAN 1, RATIO = 5.60

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)			
+ 1.	12.40	0.	0.	0.	0.
		(INCHES) .855	1.073	1.074	1.074
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION COMB B
FOR PLAN 1, RATIO = 7.20

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)			
+ 2.	12.40	0.	0.	0.	0.
		(INCHES) 1.419	1.775	1.776	1.776
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

          **************
          *            *
203 KK    *     SUB2   *    ********************************************************************
          *            *
          **************


            SUBBASIN RUNOFF DATA

205 BA        SUBBASIN CHARACTERISTICS
                  TAREA          .00  SUBBASIN AREA

              PRECIPITATION DATA

139 PB            STORM         1.00  BASIN TOTAL PRECIPITATION

141 PI        INCREMENTAL PRECIPITATION PATTERN
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .01       .00       .01       .00       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .01       .02       .03       .05
                .08       .08       .05       .03       .02       .01       .01       .01       .01       .01
                .01       .01       .01       .01       .01       .01       .00       .01       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .01
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00

206 LS        SCS LOSS RATE
                  STRTL        1.00  INITIAL ABSTRACTION
                 CRVNBR       49.50  CURVE NUMBER
                  RTIMP       48.00  PERCENT IMPERVIOUS AREA

207 UD        SCS DIMENSIONLESS UNITGRAPH
                   TLAG         .01  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                              5 END-OF-PERIOD ORDINATES
                2.        1.        0.        0.        0.

   TOTAL RAINFALL =     1.00, TOTAL LOSS =      .52, TOTAL EXCESS =      .48

 PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
```

+	0.	12.20		0.	0.	0.	0.
			(INCHES)	.339	.480	.480	.480
			(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB2
FOR PLAN 1, RATIO = 3.20

TOTAL RAINFALL = 3.20, TOTAL LOSS = 1.46, TOTAL EXCESS = 1.74

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)				
+ 0.	12.20		0.	0.	0.	0.
		(INCHES)	1.222	1.739	1.739	1.739
		(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB2
FOR PLAN 1, RATIO = 4.20

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.79, TOTAL EXCESS = 2.41

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)				
+ 0.	12.20		0.	0.	0.	0.
		(INCHES)	1.711	2.413	2.413	2.413
		(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB2
FOR PLAN 1, RATIO = 5.00

TOTAL RAINFALL = 5.00, TOTAL LOSS = 2.01, TOTAL EXCESS = 2.99

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)	(CFS)				
+ 1.	12.20		0.	0.	0.	0.
		(INCHES)	2.131	2.985	2.986	2.986
		(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB2
FOR PLAN 1, RATIO = 5.60

TOTAL RAINFALL = 5.60, TOTAL LOSS = 2.17, TOTAL EXCESS = 3.43

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  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                     (CFS)
+       1.     12.20                 0.           0.           0.           0.
                   (INCHES)      2.461        3.431        3.431        3.431
                   (AC-FT)          0.           0.           0.           0.

                   CUMULATIVE AREA =      .00 SQ MI


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

                     HYDROGRAPH AT STATION     SUB2
                       FOR PLAN 1, RATIO = 7.20

     TOTAL RAINFALL =    7.20, TOTAL LOSS =    2.53, TOTAL EXCESS =    4.67

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                     (CFS)
+       1.     12.20                 0.           0.           0.           0.
                   (INCHES)      3.383        4.674        4.675        4.675
                   (AC-FT)          0.           0.           0.           0.

                   CUMULATIVE AREA =      .00 SQ MI


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

              **************
              *            *
  208 KK      *     SUB5   *     ********************************************************************
              *            *
              **************

              SUBBASIN RUNOFF DATA

  210 BA        SUBBASIN CHARACTERISTICS
                     TAREA         .01  SUBBASIN AREA

                PRECIPITATION DATA

  139 PB             STORM        1.00  BASIN TOTAL PRECIPITATION

  141 PI          INCREMENTAL PRECIPITATION PATTERN
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .01       .00       .01       .00       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .02       .03       .05
                    .08       .08       .05       .03       .02       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .00       .01       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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      .00       .00       .00       .00       .00       .00       .00       .00       .00       .01
      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
      .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
      .00       .00       .00       .00       .00       .00       .00       .00       .00

211 LS          SCS LOSS RATE
                     STRTL        1.00  INITIAL ABSTRACTION
                    CRVNBR       36.60  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

212 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .21  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                            13 END-OF-PERIOD ORDINATES
                3.        9.       10.        7.        3.        2.        1.        1.        0.        0.
                0.        0.        0.

    TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =     .00

  PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      29.90-HR
+   (CFS)        (HR)
                    (CFS)
+       0.        .10                       0.           0.           0.           0.
                (INCHES)                  .000         .000         .000         .000
                 (AC-FT)                     0.           0.           0.           0.

                 CUMULATIVE AREA =     .01 SQ MI

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

                  HYDROGRAPH AT STATION     SUB5
                    FOR PLAN 1, RATIO = 3.20

    TOTAL RAINFALL =    3.20, TOTAL LOSS =    2.95, TOTAL EXCESS =     .25

  PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      29.90-HR
+   (CFS)        (HR)
                    (CFS)
+       1.      12.40                       0.           0.           0.           0.
                (INCHES)                  .198         .248         .248         .248
                 (AC-FT)                     0.           0.           0.           0.

                 CUMULATIVE AREA =     .01 SQ MI

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

                  HYDROGRAPH AT STATION     SUB5
                    FOR PLAN 1, RATIO = 4.20

    TOTAL RAINFALL =    4.20, TOTAL LOSS =    3.70, TOTAL EXCESS =     .50

  PEAK FLOW      TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR      29.90-HR
+   (CFS)        (HR)
                    (CFS)
```

```
+       1.      12.40                    0.          0.          0.          0.
                              (INCHES)      .404        .499        .499        .499
                               (AC-FT)        0.          0.          0.          0.

                              CUMULATIVE AREA =      .01 SQ MI

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

                              HYDROGRAPH AT STATION     SUB5
                                FOR PLAN 1, RATIO = 5.00

     TOTAL RAINFALL =    5.00, TOTAL LOSS =    4.25, TOTAL EXCESS =      .75

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR     29.90-HR
+    (CFS)        (HR)
                                (CFS)
+       2       12.40                     0.          0.          0.          0.
                              (INCHES)      .608        .750        .750        .750
                               (AC-FT)        0.          0.          0.          0.

                              CUMULATIVE AREA =      .01 SQ MI

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

                              HYDROGRAPH AT STATION     SUB5
                                FOR PLAN 1, RATIO = 5.60

     TOTAL RAINFALL =    5.60, TOTAL LOSS =    4.63, TOTAL EXCESS =      .97

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR     29.90-HR
+    (CFS)        (HR)
                                (CFS)
+       2.      12.40                     0.          0.          0.          0.
                              (INCHES)      .782        .965        .965        .965
                               (AC-FT)        0.          0.          0.          0.

                              CUMULATIVE AREA =      .01 SQ MI

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

                              HYDROGRAPH AT STATION     SUB5
                                FOR PLAN 1, RATIO = 7.20

     TOTAL RAINFALL =    7.20, TOTAL LOSS =    5.57, TOTAL EXCESS =     1.63

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR     29.90-HR
+    (CFS)        (HR)
                                (CFS)
+       4.      12.40                     1.          0.          0.          0.
                              (INCHES)     1.322       1.634       1.634       1.634
                               (AC-FT)        0.          0.          0.          0.

                              CUMULATIVE AREA =      .01 SQ MI


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

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213 KK * COMB C * **********

COMBINED RUNOFF DRAINING TO POINT OF INTEREST 'C'

215 HC HYDROGRAPH COMBINATION
ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

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

HYDROGRAPH AT STATION COMB C
FOR PLAN 1, RATIO = 3.20

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 1.	12.40	0.	0.	0.	0.
		(INCHES) .254	.342	.342	.342
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .01 SQ MI

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

HYDROGRAPH AT STATION COMB C
FOR PLAN 1, RATIO = 4.20

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 1.	12.40	0.	0.	0.	0.
		(INCHES) .477	.619	.620	.620
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .01 SQ MI

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

HYDROGRAPH AT STATION COMB C
FOR PLAN 1, RATIO = 5.00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 2.	12.40	0.	0.	0.	0.
		(INCHES) .696	.891	.892	.892
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = .01 SQ MI

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

HYDROGRAPH AT STATION COMB C
FOR PLAN 1, RATIO = 5.60

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				

```
                    (CFS)
+       3.     12.40                  1.          0.          0.          0.
                    (INCHES)        .880       1.120       1.121       1.121
                    (AC-FT)           0.          0.          0.          0.

                    CUMULATIVE AREA =     .01 SQ MI

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

                    HYDROGRAPH AT STATION   COMB C
                      FOR PLAN 1, RATIO = 7.20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                   6-HR        24-HR       72-HR      29.90-HR
+   (CFS)       (HR)
                    (CFS)
+       5      12.40                  1.          0.          0.          0.
                    (INCHES)       1.443       1.825       1.826       1.826
                    (AC-FT)           0.          1.          1.          1.

                    CUMULATIVE AREA =     .01 SQ MI


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


            **************
            *             *
  216 KK    *      SUB8   *     ***********************************************************************
            *             *
            **************
                    TOTAL RUNOFF DRAINING TO POINT OF INTEREST 'D'

              SUBBASIN RUNOFF DATA

  218 BA        SUBBASIN CHARACTERISTICS
                    TAREA         .00  SUBBASIN AREA

                PRECIPITATION DATA

  139 PB            STORM        1.00  BASIN TOTAL PRECIPITATION

  141 PI          INCREMENTAL PRECIPITATION PATTERN
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .01       .00       .01       .00       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .01       .02       .03       .05
                    .08       .08       .05       .03       .02       .01       .01       .01       .01       .01
                    .01       .01       .01       .01       .01       .01       .00       .01       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .01
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                    .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
```

```
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                .00       .00       .00       .00       .00       .00       .00       .00       .00

219 LS          SCS LOSS RATE
                     STRTL        1.00  INITIAL ABSTRACTION
                    CRVNBR       36.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

220 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .08  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                       6 END-OF-PERIOD ORDINATES
                    1.        1.        0.        0.        0.        0.

     TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =     .00

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR     29.90-HR
+    (CFS)       (HR)
                                (CFS)
+       0.        .10                      0.          0.          0.          0.
                            (INCHES)      .000        .000        .000        .000
                            (AC-FT)         0.          0.          0.          0.

                            CUMULATIVE AREA =     .00 SQ MI

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

                          HYDROGRAPH AT STATION     SUB8
                            FOR PLAN 1, RATIO = 3.20

     TOTAL RAINFALL =    3.20, TOTAL LOSS =    2.96, TOTAL EXCESS =     .24

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR     29.90-HR
+    (CFS)       (HR)
                                (CFS)
+       0.      12.30                      0.          0.          0.          0.
                            (INCHES)      .194        .242        .242        .242
                            (AC-FT)         0.          0.          0.          0.

                            CUMULATIVE AREA =     .00 SQ MI

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

                          HYDROGRAPH AT STATION     SUB8
                            FOR PLAN 1, RATIO = 4.20

     TOTAL RAINFALL =    4.20, TOTAL LOSS =    3.71, TOTAL EXCESS =     .49

   PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR     29.90-HR
+    (CFS)       (HR)
                                (CFS)
+       0.      12.30                      0.          0.          0.          0.
                            (INCHES)      .396        .488        .488        .488
                            (AC-FT)         0.          0.          0.          0.

                            CUMULATIVE AREA =     .00 SQ MI
```

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

HYDROGRAPH AT STATION SUB8
FOR PLAN 1, RATIO = 5.00

TOTAL RAINFALL = 5.00, TOTAL LOSS = 4.27, TOTAL EXCESS = .73

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	12.20		0.	0.	0.	0.
		(INCHES)	.596	.735	.735	.735
		(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB8
FOR PLAN 1, RATIO = 5.60

TOTAL RAINFALL = 5.60, TOTAL LOSS = 4.65, TOTAL EXCESS = .95

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	12.20		0.	0.	0.	0.
		(INCHES)	.767	.946	.946	.946
		(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

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

HYDROGRAPH AT STATION SUB8
FOR PLAN 1, RATIO = 7.20

TOTAL RAINFALL = 7.20, TOTAL LOSS = 5.60, TOTAL EXCESS = 1.60

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	12.20		0.	0.	0.	0.
		(INCHES)	1.297	1.603	1.603	1.603
		(AC-FT)	0.	0.	0.	0.

CUMULATIVE AREA = .00 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 3.20	RATIO 2 4.20	RATIO 3 5.00	RATIO 4 5.60	RATIO 5 7.20
HYDROGRAPH AT									
+	SUB1	.02	1	FLOW	8.2	13.5	18.4	22.4	34.3
				TIME	12.30	12.30	12.30	12.30	12.30

HYDROGRAPH AT									
+	SUB4	.00	1	FLOW	.1	.1	.2	.2	.4
				TIME	12.20	12.20	12.20	12.20	12.20
HYDROGRAPH AT									
+	SUB7	.01	1	FLOW	.9	2.0	3.1	4.1	7.1
				TIME	12.40	12.40	12.40	12.40	12.40
HYDROGRAPH AT									
+	SUB10	.00	1	FLOW	.0	.1	.2	.2	.3
				TIME	12.30	12.30	12.30	12.30	12.30
4 COMBINED AT									
+	COMB A	.03	1	FLOW	9.0	15.5	21.5	26.6	41.6
				TIME	12.30	12.30	12.30	12.30	12.30
HYDROGRAPH AT									
+	SUB3	.00	1	FLOW	.1	.1	.2	.2	.3
				TIME	12.20	12.20	12.20	12.20	12.20
HYDROGRAPH AT									
+	SUB6	.00	1	FLOW	.2	.5	.8	1.0	1.8
				TIME	12.40	12.40	12.40	12.40	12.40
HYDROGRAPH AT									
+	SUB9	.00	1	FLOW	.0	.0	.0	.0	.1
				TIME	12.20	12.20	12.20	12.20	12.20
3 COMBINED AT									
+	COMB B	.00	1	FLOW	.3	.6	.9	1.2	2.0
				TIME	12.40	12.40	12.40	12.40	12.40
HYDROGRAPH AT									
+	SUB2	.00	1	FLOW	.3	.5	.6	.7	1.0
				TIME	12.20	12.20	12.20	12.20	12.20
HYDROGRAPH AT									
+	SUB5	.01	1	FLOW	.5	1.2	1.8	2.4	4.2
				TIME	12.40	12.40	12.40	12.40	12.40
2 COMBINED AT									
+	COMB C	.01	1	FLOW	.7	1.4	2.2	2.8	4.7
				TIME	12.40	12.40	12.40	12.40	12.40
HYDROGRAPH AT									
+	SUB8	.00	1	FLOW	.0	.1	.1	.1	.2
				TIME	12.30	12.30	12.20	12.20	12.20

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

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             MAY   1991                *
*          VERSION 4.0.1U               *
*     Lahey F77L-EM/32 version 5.01     *
*       Dodson & Associates, Inc.       *
*  RUN DATE  08/22/06  TIME  16:03:22   *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 551-1748              *
*                                       *
*****************************************
```

```
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
```

DEVELOPED CONDITIONS

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

   1          ID                    ~~~~~~~~~~~~DEV.IH1~~~~~~~~~~~~~
   2          ID
   3          ID       HYDROLOGY FOR: COURTYARD AT UPPER NYACK #03118
   4          ID                      VILLAGE OF UPPER NYACK, ROCKLAND COUNTY, NEW YORK
   5          ID
   6          ID       ANALYSIS PREPARED BY: LEONARD JACKSON ASSOCIATES
   7          ID                             August 21, 2006 -PD
   8          ID
   9          ID       ANALYSIS PARAMETERS:
  10          ID         DEVELOPED CONDITIONS RUN
  11          ID         STORM RECURRENCE INTERVALS = 2, 5, 10, 25 & 100 YEAR
  12          ID         HYDROGRAPH METHOD:           SCS
  13          ID         RAINFALL DISTRIBUTION:       SCS TYPE III
  14          ID
  15          ID      24 HOUR RAINFALL              2 YEAR: 3.2 INCHES
  16          ID                                    5 YEAR: 4.2 INCHES
  17          ID                                    10 YEAR: 5.0 INCHES
  18          ID                                    25 YEAR: 5.6 INCHES
  19          ID                                    100 YEAR: 7.3 INCHES
  20          ID
  21          ID  ** NOTE: SCS METHOD USED
  22          ID
              *DIAGRAM
  23          IT       6       0       0     300
  24          IO       3       0
  25          JR    PREC     3.2     4.2       5     5.6     7.3

  26          KK   SUB-2OFFSITE RUNOFF TO THE NORTHERLY PORTION OF SITE TOWARD POINT #C
```

```
KM
KM ************************************************************************
KM * DRAINAGE AREA = 0.10 AC = 0.0002 SQ. MI.      Q=0.32 cfs
KM * TIME OF CONCENTRATION = 1.0 MIN = 0.02 HR * 0.6 = 0.01 (SCS LAG)
KM ************************************************************************
KM
BA  0.0002
PB     1.0
IN       6
PC       0   0.001   0.002   0.003   0.004   0.005   0.006   0.007   0.008   0.009
PC   0.010   0.011   0.012   0.013   0.014   0.015   0.016   0.017   0.018   0.019
PC   0.020   0.021   0.022   0.023   0.024   0.026   0.027   0.028   0.029   0.030
PC  0.0305   0.031   0.032   0.034   0.035   0.036   0.037   0.038   0.040   0.041
PC   0.042   0.043   0.045   0.046   0.047   0.049   0.050   0.051   0.053   0.054
PC   0.055   0.057   0.058   0.060   0.061   0.063   0.064   0.066   0.067   0.069
PC   0.070   0.072   0.074   0.075   0.077   0.079   0.080   0.082   0.084   0.085
PC   0.087   0.089   0.091   0.093   0.095   0.097   0.100   0.103   0.106   0.109
PC   0.112   0.115   0.118   0.121   0.124   0.127   0.130   0.134   0.137   0.140
PC   0.144   0.148   0.151   0.155   0.159   0.163   0.167   0.171   0.176   0.180
PC   0.185   0.189   0.194   0.199   0.205   0.210   0.216   0.222   0.228   0.235
PC   0.242   0.250   0.258   0.266   0.276   0.287   0.298   0.312   0.328   0.363
PC   0.416   0.500   0.584   0.638   0.673   0.689   0.702   0.714   0.725   0.734
PC   0.743   0.751   0.758   0.766   0.772   0.779   0.785   0.790   0.796   0.801
PC   0.806   0.811   0.816   0.821   0.825   0.829   0.834   0.838   0.842   0.845
PC   0.849   0.853   0.857   0.860   0.864   0.867   0.870   0.874   0.877   0.880
PC   0.886   0.889   0.892   0.895   0.898   0.900   0.903   0.906   0.908   0.910
PC   0.911   0.913   0.915   0.917   0.919   0.920   0.922   0.924   0.925   0.927
```

1 HEC-1 INPUT PAGE 2

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

PC   0.929   0.930   0.932   0.933   0.935   0.936   0.938   0.939   0.941   0.942
PC   0.944   0.945   0.946   0.948   0.949   0.951   0.952   0.953   0.955   0.956
PC   0.957   0.958   0.960   0.961   0.962   0.963   0.965   0.966   0.967   0.968
PC   0.969   0.971   0.972   0.973   0.974   0.975   0.976   0.977   0.978   0.979
PC   0.981   0.982   0.983   0.984   0.985   0.986   0.987   0.988   0.989   0.990
PC   0.991   0.992   0.993   0.994   0.995   0.996   0.997   0.998   0.999   1.000
LS       1      25      48
UD    0.01

KK   SUB-6SITE RUNOFF TO POINT # c
KM
KM ************************************************************************
KM * DRAINAGE AREA = 0.95 AC = 0.0015 SQ. MI.       Q=1.06 cfs
KM * TIME OF CONCENTRATION =21.4 MIN = 0.35 HR * 0.6 = 0.214 (SCS LAG)
KM ************************************************************************
KM
BA  0.0015
LS       1      52
UD   0.214

KK    PT-CCOMBINE HYDROGRAPHS SUB-2 & SUB-6
HC       2

KK   SUB-3SITE RUNOFF TO POINT # B
KM
KM ************************************************************************
KM * DRAINAGE AREA = 0.14 AC = 0.0002 SQ. MI.       Q=0.45 cfs
KM * TIME OF CONCENTRATION =0.7 MIN = 0.01 HR * 0.6 = 0.07 (SCS LAG)
KM ************************************************************************
KM
BA  0.0002
LS       1      75      48
UD    0.07

KK   SUB-7SITE RUNOFF TO POINT # B
KM
```

```
 86          KM  ************************************************************************
 87          KM  * DRAINAGE AREA = 5.43 AC = 0.0085 SQ. MI.        Q=11.83 cfs
 88          KM  * TIME OF CONCENTRATION =12.8 MIN = 0.21 HR * 0.6 = 0.128 (SCS LAG)
 89          KM  ************************************************************************
 90          KM
 91          BA  0.0085
 92          LS       1   60.05   24.49
 93          UD   0.128

 94          KK    combCOMBINE HYDROGRAPHS SUB-3 & SUB-7
 95          HC       2

 96          KK  BASIN1ROUTING IN BASIN PRIOR TO DISCHARGE TOWARD "PT-B"
 97          KM
 98          KM  OUTLET STRUCTURE DATA:
 99          KM  ***********************************************************
100          KM  *  TOP OF STRUCTURE OVERFLOW LENGTH: 13' LONG AT EL 435.0 *
101          KM  *  WEIR LENGTH = 2.0' WIDE AT EL 439.0                    *
102          KM  *  ORIFICE #1: 3" DIAMETER AT EL.439.5                    *
1                                    HEC-1 INPUT                                        PAGE  3

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

103          KM  ***********************************************************
104          KM
105          RS       1    ELEV     284       0
106          SA   0.075  0.1234  0.1693  0.1942
107          SE     284     286     288     289
108          SQ    0.07    0.17     0.2    0.27    1.51    5.43    5.73     6.3    9.73   15.29
109          SE   284.2   284.6   284.8   285.4   285.6   287.2   287.4   287.6     288   288.2

110          KK  TO PTB*************************************************************************
111          DT  TO PTA
112          DI       0     1.3    1.86    2.27    4.72    6.24    7.45    8.49    9.41   10.25
113          DI   11.03   11.75   12.43   13.08   13.69
114          DQ       0    1.09    1.58    1.93    4.33     5.8    6.97    7.98    8.86    9.67
115          DQ   10.42   11.11   11.77   12.39   12.98

116          KK   SUB-1OFFSITE RUNOFF TO POINT #A
117          KM
118          KM  ************************************************************************
119          KM  * DRAINAGE AREA = 7.75 AC = 0.0121 SQ. MI.        Q=11.87 CFS
120          KM  * TIME OF CONCENTRATION =14.8MIN = 0.24 HR * 0.6 = 0.148 (SCS LAG)
121          KM  ************************************************************************
122          KM
123          BA  0.0121
124          LS       1    54.7    8.35
125          UD   0.148

126          KK   LAG-1LAG OFF-1 HYDROGRAPH TO POINT #A
127          RT       0       0       1

128          KK   SUB-4OFFSITE RUNOFF TO POINT #A
129          KM
130          KM  ************************************************************************
131          KM  * DRAINAGE AREA = 0.15 AC = 0.0002 SQ. MI.        Q=0.48 CFS
132          KM  * TIME OF CONCENTRATION =1.0MIN = 0.01 HR * 0.6 = 0.01 (SCS LAG)
133          KM  ************************************************************************
134          KM
135          BA  0.0002
136          LS       1      78      48
137          UD    0.01

138          KK   SUB-8SITE RUNOFF TO POINT #A
139          KM
140          KM  ************************************************************************
141          KM  * DRAINAGE AREA = 1.90 AC = 0.003 SQ. MI.        Q=2.53 cfs
```

```
  142          KM  * TIME OF CONCENTRATION =9.6 MIN = 0.16 HR * 0.6 = 0.096 (SCS LAG)
  143          KM  ************************************************************************
  144          KM
  145          BA   0.003
  146          LS       1    52.8       0
  147          UD   0.096
1                                        HEC-1 INPUT                                                    PAGE  4

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

  148          KK   SUB-5SITE RUNOFF TO POINT #A
  149          KM
  150          KM  ************************************************************************
  151          KM  * DRAINAGE AREA = 0.12 AC = 0.0002 SQ. MI.        Q=0.38 cfs
  152          KM  * TIME OF CONCENTRATION =1.0 MIN = 0.016 HR * 0.6 = 0.01 (SCS LAG)
  153          KM  ************************************************************************
  154          KM
  155          BA  0.0002
  156          LS       1    52.8      48
  157          UD    0.01

  158          KK   SUB-9SITE RUNOFF TO POINT #A
  159          KM
  160          KM  ************************************************************************
  161          KM  * DRAINAGE AREA = 2.90 AC = 0.0045 SQ. MI.        Q=7.42 cfs
  162          KM  * TIME OF CONCENTRATION =3.2 MIN = 0.05 HR * 0.6 = 0.032 (SCS LAG)
  163          KM  ************************************************************************
  164          KM
  165          BA  0.0045
  166          LS       1    53.9   33.45
  167          UD   0.032

  168          KK    combCOMBINE HYDROGRAPHS SUB-5 & SUB-9
  169          HC       2

  170          KK  BASIN2ROUTING IN BASIN PRIOR TO DISCHARGE TOWARD "PT-B"
  171          KM
  172          KM  OUTLET STRUCTURE DATA:
  173          KM  ********************************************************
  174          KM  *  TOP OF STRUCTURE OVERFLOW LENGTH: 13' LONG AT EL 435.0 *
  175          KM  *  WEIR LENGTH = 2.0' WIDE AT EL 439.0                   *
  176          KM  *  ORIFICE #1: 3" DIAMETER AT EL.439.5                   *
  177          KM  ********************************************************
  178          KM
  179          RS       1    ELEV     284       0
  180          SA    0.058  0.1024  0.1469
  181          SE      284     286      288
  182          SQ     0.07    0.22     1.97      2.7     3.27     5.55     5.84     6.93    10.76
  183          SE    284.2     285    285.2    285.4    285.6    286.8      287    287.2    287.4

  184          KK  SUB-10SITE RUNOFF TO POINT #A
  185          KM
  186          KM  ************************************************************************
  187          KM  * DRAINAGE AREA = 0.19 AC = 0.0003 SQ. MI.        Q=0.31 cfs
  188          KM  * TIME OF CONCENTRATION =11.2 MIN = 0.18 HR * 0.6 = 0.112 (SCS LAG)
  189          KM  ************************************************************************
  190          KM
  191          BA  0.0003
  192          LS       1      60
  193          UD   0.112
1                                        HEC-1 INPUT                                                    PAGE  5

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

  194          KK    combCOMBINE HYDROGRAPHS COMB-1, SITE-3 & OFF-3
```

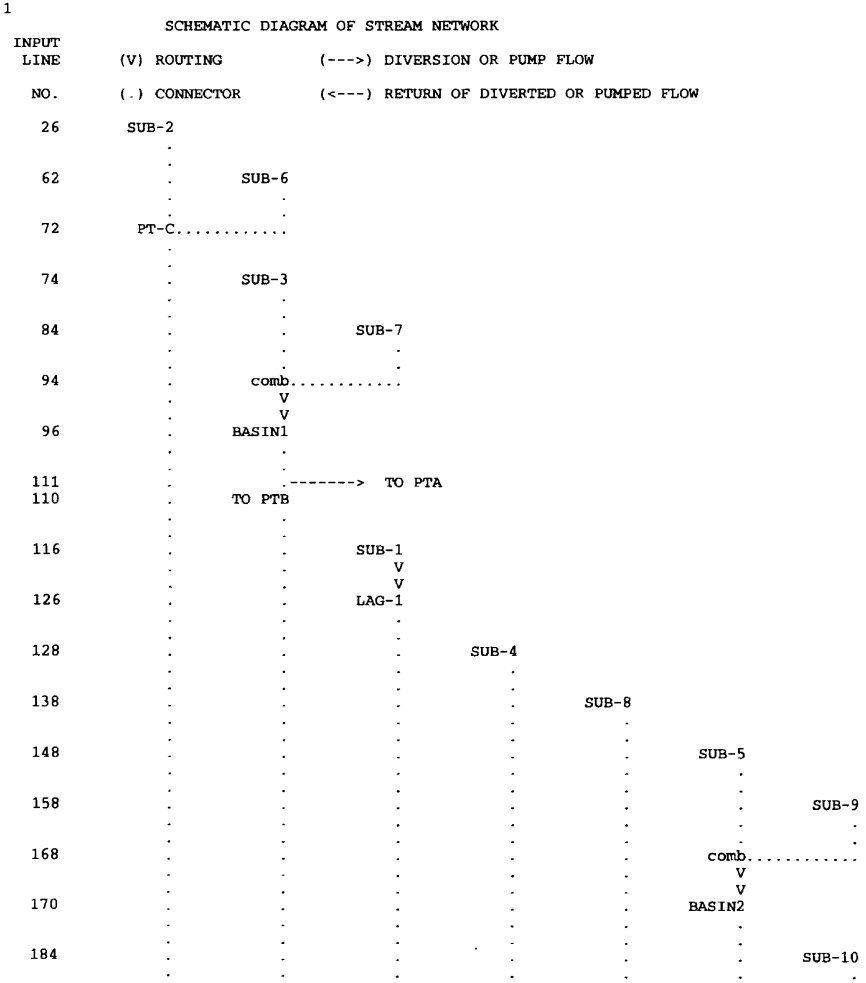
```
195           HC       5

196           KK    RTRV***************************************************************************
197           KM  RETREIVE FLOW DIVERTED TO POINT OF INTEREST 'B'
198           DR  TO PTA

199           KK    PT-ACOMBINE HYDROGRAPHS COMB-1, SITE-3 & OFF-3
200           HC       2
201           ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK



```
                .          .          .          .          .          .          .          .
  194           .          .       comb..........................................
                .          .          .
                .          .          .
  198           .          .          .          .<-------  TO PTA
  196           .          .          .       RTRV
                .          .          .          .
                .          .          .          .
  199           .          .       PT-A..........
```

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1****************************************                    ****************************************
*                                      *                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                    *    U.S. ARMY CORPS OF ENGINEERS      *
*              MAY   1991              *                    *    HYDROLOGIC ENGINEERING CENTER     *
*           VERSION 4.0.1U             *                    *         609 SECOND STREET            *
*     Lahey F77L-EM/32 version 5.01    *                    *       DAVIS, CALIFORNIA 95616        *
*       Dodson & Associates, Inc.      *                    *          (916) 551-1748              *
*  RUN DATE  08/22/06  TIME  16:03:22  *                    *                                      *
****************************************                    ****************************************
```

~~~~~~~~~~~~~DEV.IH1~~~~~~~~~~~~~

HYDROLOGY FOR: COURTYARD AT UPPER NYACK #03118
VILLAGE OF UPPER NYACK, ROCKLAND COUNTY, NEW YORK

ANALYSIS PREPARED BY: LEONARD JACKSON ASSOCIATES
August 21, 2006 -PD

ANALYSIS PARAMETERS:
DEVELOPED CONDITIONS RUN
STORM RECURRENCE INTERVALS = 2, 5, 10, 25 & 100 YEAR
HYDROGRAPH METHOD: SCS
RAINFALL DISTRIBUTION: SCS TYPE III

24 HOUR RAINFALL
2 YEAR: 3.2 INCHES
5 YEAR: 4.2 INCHES
10 YEAR: 5.0 INCHES
25 YEAR: 5.6 INCHES
100 YEAR: 7.3 INCHES

** NOTE: SCS METHOD USED

```
  24 IO          OUTPUT CONTROL VARIABLES
                       IPRNT          3  PRINT CONTROL
                       IPLOT          0  PLOT CONTROL
                       QSCAL         0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN          6  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1   0  STARTING DATE
                       ITIME       0000  STARTING TIME
                          NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2   0  ENDING DATE
                      NDTIME       0554  ENDING TIME
                       ICENT         19  CENTURY MARK

                    COMPUTATION INTERVAL    0.10 HOURS
                        TOTAL TIME BASE   29.90 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

   JP         MULTI-PLAN OPTION
                   NPLAN           1  NUMBER OF PLANS

   JR         MULTI-RATIO OPTION
                  RATIOS OF PRECIPITATION
                3.20      4.20      5.00      5.60      7.30


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


          **************
          *            *
 26 KK    *     SUB-2  *     OFFSITE RUNOFF TO THE NORTHERLY PORTION OF SITE TOWARD POINT #C
          *            *
          **************

                       ************************************************************************
                       * DRAINAGE AREA = 0.10 AC = 0.0002 SQ. MI.      Q=0.32 cfs
                       * TIME OF CONCENTRATION = 1.0 MIN = 0.02 HR * 0.6 = 0.01 (SCS LAG)
                       ************************************************************************


 35 IN          TIME DATA FOR INPUT TIME SERIES
                     JXMIN           6  TIME INTERVAL IN MINUTES
                    JXDATE       1   0  STARTING DATE
                    JXTIME           0  STARTING TIME

               SUBBASIN RUNOFF DATA

 33 BA          SUBBASIN CHARACTERISTICS
                     TAREA        0.00  SUBBASIN AREA

               PRECIPITATION DATA

 34 PB               STORM        1.00  BASIN TOTAL PRECIPITATION

 36 PI            INCREMENTAL PRECIPITATION PATTERN
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                    0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                    0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                    0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
```

```
                0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
                0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
                0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00

60 LS          SCS LOSS RATE
                    STRTL       1.00  INITIAL ABSTRACTION
                   CRVNBR      25.00  CURVE NUMBER
                    RTIMP      48.00  PERCENT IMPERVIOUS AREA

61 UD          SCS DIMENSIONLESS UNITGRAPH
                    TLAG       0.01  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                1.      0.      0.      0.      0.

     TOTAL RAINFALL =    1.00, TOTAL LOSS =    0.52, TOTAL EXCESS =    0.48

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0.     12.20                 0.          0.          0.          0.
                        (INCHES)    0.339       0.480       0.480       0.480
                        (AC-FT)       0.          0.          0.          0.

                        CUMULATIVE AREA =    0.00 SQ MI


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

                      HYDROGRAPH AT STATION    SUB-2
                        FOR PLAN 1, RATIO = 3.20

     TOTAL RAINFALL =    3.20, TOTAL LOSS =    1.59, TOTAL EXCESS =    1.61

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0.     12.20                 0.          0.          0.          0.
                        (INCHES)    1.134       1.614       1.614       1.614
                        (AC-FT)       0.          0.          0.          0.

                        CUMULATIVE AREA =    0.00 SQ MI


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

                      HYDROGRAPH AT STATION    SUB-2
                        FOR PLAN 1, RATIO = 4.20

     TOTAL RAINFALL =    4.20, TOTAL LOSS =    2.02, TOTAL EXCESS =    2.18

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0.     12.20                 0.          0.          0.          0.
                        (INCHES)    1.531       2.176       2.176       2.176
                        (AC-FT)       0.          0.          0.          0.

                        CUMULATIVE AREA =    0.00 SQ MI
```

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

                        HYDROGRAPH AT STATION    SUB-2
                          FOR PLAN 1, RATIO = 5.00

     TOTAL RAINFALL =    5.00, TOTAL LOSS =    2.36, TOTAL EXCESS =    2.64

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)         (HR)
                    (CFS)
+        0.      12.20                  0.           0.           0.           0.
                (INCHES)          1.864        2.644        2.645        2.645
                 (AC-FT)             0.           0.           0.           0.

                        CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION    SUB-2
                          FOR PLAN 1, RATIO = 5.60

     TOTAL RAINFALL =    5.60, TOTAL LOSS =    2.59, TOTAL EXCESS =    3.01

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)         (HR)
                    (CFS)
+        0.      12.20                  0.           0.           0.           0.
                (INCHES)          2.123        3.005        3.006        3.006
                 (AC-FT)             0.           0.           0.           0.

                        CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION    SUB-2
                          FOR PLAN 1, RATIO = 7.30

     TOTAL RAINFALL =    7.30, TOTAL LOSS =    3.23, TOTAL EXCESS =    4.07

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)         (HR)
                    (CFS)
+        0.      12.20                  0.           0.           0.           0.
                (INCHES)          2.891        4.072        4.073        4.073
                 (AC-FT)             0.           0.           0.           0.

                        CUMULATIVE AREA =    0.00 SQ MI


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


            **************
            *            *
  62 KK     *     SUB-6  *     SITE RUNOFF TO POINT # c
            *            *
            **************

                        ********************************************************************
                        * DRAINAGE AREA = 0.95 AC = 0.0015 SQ. MI.        Q=1.06 cfs
```

```
                    * TIME OF CONCENTRATION =21.4 MIN = 0.35 HR * 0.6 = 0.214 (SCS LAG)
                    ************************************************************************

          SUBBASIN RUNOFF DATA

 69 BA      SUBBASIN CHARACTERISTICS
               TAREA        0.00  SUBBASIN AREA

            PRECIPITATION DATA

 34 PB           STORM        1.00  BASIN TOTAL PRECIPITATION

 36 PI        INCREMENTAL PRECIPITATION PATTERN
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

 70 LS      SCS LOSS RATE
               STRTL        1.00  INITIAL ABSTRACTION
              CRVNBR       52.00  CURVE NUMBER
               RTIMP        0.00  PERCENT IMPERVIOUS AREA

 71 UD      SCS DIMENSIONLESS UNITGRAPH
               TLAG        0.21  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                            13 END-OF-PERIOD ORDINATES
                1.        2.        3.        2.        1.        1.        0.        0.        0.        0.
                0.        0.        0.

    TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =    0.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0.      0.10                0.           0.           0.           0.
                        (INCHES)    0.000        0.000        0.000        0.000
                         (AC-FT)      0.           0.           0.           0.

                         CUMULATIVE AREA =    0.00 SQ MI
```

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

                        HYDROGRAPH AT STATION    SUB-6
                          FOR PLAN 1, RATIO = 3.20

    TOTAL RAINFALL =    3.20, TOTAL LOSS =    2.78, TOTAL EXCESS =    0.42

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                                    (CFS)
+       0.      12.40                  0.           0.           0.           0.
                                (INCHES)       0.341        0.423        0.423        0.423
                                (AC-FT)          0.           0.           0.           0.

                        CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION    SUB-6
                          FOR PLAN 1, RATIO = 4.20

    TOTAL RAINFALL =    4.20, TOTAL LOSS =    3.38, TOTAL EXCESS =    0.82

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                                    (CFS)
+       1.      12.40                  0.           0.           0.           0.
                                (INCHES)       0.673        0.824        0.824        0.824
                                (AC-FT)          0.           0.           0.           0.

                        CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION    SUB-6
                          FOR PLAN 1, RATIO = 5.00

    TOTAL RAINFALL =    5.00, TOTAL LOSS =    3.79, TOTAL EXCESS =    1.21

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                                    (CFS)
+       1.      12.40                  0.           0.           0.           0.
                                (INCHES)       0.990        1.209        1.209        1.209
                                (AC-FT)          0.           0.           0.           0.

                        CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION    SUB-6
                          FOR PLAN 1, RATIO = 5.60

    TOTAL RAINFALL =    5.60, TOTAL LOSS =    4.07, TOTAL EXCESS =    1.53

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                                    (CFS)
+       1.      12.40                  0.           0.           0.           0.
                                (INCHES)       1.253        1.530        1.530        1.530
```

```
                        (AC-FT)        0.          0.          0.          0.

                        CUMULATIVE AREA =    0.00 SQ MI

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

                        HYDROGRAPH AT STATION    SUB-6
                          FOR PLAN 1, RATIO = 7.30

    TOTAL RAINFALL =    7.30, TOTAL LOSS =    4.74, TOTAL EXCESS =    2.56

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       2.     12.40                   0.          0.          0.          0.
                        (INCHES)     2.086       2.556       2.556       2.556
                        (AC-FT)        0.          0.          0.          0.

                        CUMULATIVE AREA =    0.00 SQ MI


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


            **************
            *            *
  72 KK     *      PT-C  *     COMBINE HYDROGRAPHS SUB-2 & SUB-6
            *            *
            **************

  73 HC          HYDROGRAPH COMBINATION
                      ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                    ***
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION     PT-C
                          FOR PLAN 1, RATIO = 3.20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0.     12.40                   0.          0.          0.          0.
                        (INCHES)     0.417       0.563       0.564       0.564
                        (AC-FT)        0.          0.          0.          0.

                        CUMULATIVE AREA =    0.00 SQ MI

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

                        HYDROGRAPH AT STATION     PT-C
                          FOR PLAN 1, RATIO = 4.20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       1.     12.40                   0.          0.          0.          0.
                        (INCHES)     0.757       0.982       0.983       0.983
                        (AC-FT)        0.          0.          0.          0.
```

```
                    CUMULATIVE AREA =    0.00 SQ MI

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

                    HYDROGRAPH AT STATION     PT-C
                      FOR PLAN 1, RATIO = 5.00

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                     (CFS)
+       1.     12.40                0.          0.          0.          0.
                   (INCHES)     1.077       1.377       1.378       1.378
                   (AC-FT)        0.          0.          0.          0.

                    CUMULATIVE AREA =    0.00 SQ MI

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

                    HYDROGRAPH AT STATION     PT-C
                      FOR PLAN 1, RATIO = 5.60

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                     (CFS)
+       1.     12.40                0.          0.          0.          0.
                   (INCHES)     1.339       1.702       1.704       1.704
                   (AC-FT)        0.          0.          0.          0.

                    CUMULATIVE AREA =    0.00 SQ MI

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

                    HYDROGRAPH AT STATION     PT-C
                      FOR PLAN 1, RATIO = 7.30

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                     (CFS)
+       2.     12.40                0.          0.          0.          0.
                   (INCHES)     2.168       2.732       2.734       2.734
                   (AC-FT)        0.          0.          0.          0.

                    CUMULATIVE AREA =    0.00 SQ MI


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


            **************
            *            *
  74 KK     *     SUB-3  *     SITE RUNOFF TO POINT # B
            *            *
            **************

                    ********************************************************************
                    * DRAINAGE AREA = 0.14 AC = 0.0002 SQ. MI.        Q=0.45 cfs
                    * TIME OF CONCENTRATION =0.7 MIN = 0.01 HR * 0.6 = 0.07 (SCS LAG)
                    ********************************************************************
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```
                SUBBASIN RUNOFF DATA

  81 BA           SUBBASIN CHARACTERISTICS
                       TAREA         0.00  SUBBASIN AREA

                  PRECIPITATION DATA

  34 PB                STORM         1.00  BASIN TOTAL PRECIPITATION

  36 PI              INCREMENTAL PRECIPITATION PATTERN
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                        0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                        0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                        0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                        0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

  82 LS           SCS LOSS RATE
                       STRTL         1.00  INITIAL ABSTRACTION
                      CRVNBR        75.00  CURVE NUMBER
                       RTIMP        48.00  PERCENT IMPERVIOUS AREA

  83 UD           SCS DIMENSIONLESS UNITGRAPH
                        TLAG         0.07  LAG

                                                        ***

                                                    UNIT HYDROGRAPH
                                                5 END-OF-PERIOD ORDINATES
                      1.        0.        0.        0.        0.

     TOTAL RAINFALL =     1.00, TOTAL LOSS =     0.52, TOTAL EXCESS =     0.48

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR        24-HR        72-HR     29.90-HR
+    (CFS)        (HR)
                     (CFS)
+         0.     12.20                   0.           0.           0.           0.
                (INCHES)      0.339       0.480        0.480        0.480
                  (AC-FT)       0.          0.           0.           0.

                  CUMULATIVE AREA =     0.00 SQ MI


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

                    HYDROGRAPH AT STATION    SUB-3
```

FOR PLAN 1, RATIO = 3.20

TOTAL RAINFALL = 3.20, TOTAL LOSS = 1.21, TOTAL EXCESS = 1.99

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) 1.417	1.990	1.991	1.991
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION SUB-3
FOR PLAN 1, RATIO = 4.20

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.37, TOTAL EXCESS = 2.83

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) 2.052	2.830	2.831	2.831
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION SUB-3
FOR PLAN 1, RATIO = 5.00

TOTAL RAINFALL = 5.00, TOTAL LOSS = 1.47, TOTAL EXCESS = 3.53

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) 2.592	3.533	3.535	3.535
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION SUB-3
FOR PLAN 1, RATIO = 5.60

TOTAL RAINFALL = 5.60, TOTAL LOSS = 1.53, TOTAL EXCESS = 4.07

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) 3.007	4.074	4.075	4.075
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

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

                        HYDROGRAPH AT STATION    SUB-3
                          FOR PLAN 1, RATIO = 7.30

     TOTAL RAINFALL =    7.30, TOTAL LOSS =    1.65, TOTAL EXCESS =    5.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                        (CFS)
+       1.      12.20                0.           0.           0.           0.
                      (INCHES)     4.207        5.645        5.646        5.646
                       (AC-FT)       0.           0.           0.           0.

                      CUMULATIVE AREA =    0.00 SQ MI


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


            **************
            *            *
  84 KK     *     SUB-7  *     SITE RUNOFF TO POINT # B
            *            *
            **************

                        ********************************************************************
                        * DRAINAGE AREA = 5.43 AC = 0.0085 SQ. MI.        Q=11.83 cfs
                        * TIME OF CONCENTRATION =12.8 MIN = 0.21 HR * 0.6 = 0.128 (SCS LAG)
                        ********************************************************************


              SUBBASIN RUNOFF DATA

  91 BA         SUBBASIN CHARACTERISTICS
                     TAREA        0.01  SUBBASIN AREA

              PRECIPITATION DATA

  34 PB              STORM        1.00  BASIN TOTAL PRECIPITATION

  36 PI          INCREMENTAL PRECIPITATION PATTERN
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                   0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                   0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                   0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                   0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
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                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

 92 LS          SCS LOSS RATE
                     STRTL        1.00  INITIAL ABSTRACTION
                    CRVNBR       60.05  CURVE NUMBER
                     RTIMP       24.49  PERCENT IMPERVIOUS AREA

 93 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG        0.13  LAG

                                                    ***

                                                UNIT HYDROGRAPH
                                              8 END-OF-PERIOD ORDINATES
                14.       23.       11.        4.        2.        1.        0.        0.

     TOTAL RAINFALL =    1.00, TOTAL LOSS =    0.76, TOTAL EXCESS =    0.24

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       1.     12.30                0.          0.          0.          0.
                         (INCHES)   0.173       0.245       0.245       0.245
                         (AC-FT)     0.          0.          0.          0.

                         CUMULATIVE AREA =    0.01 SQ MI

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

                       HYDROGRAPH AT STATION    SUB-7
                         FOR PLAN 1, RATIO = 3.20

     TOTAL RAINFALL =    3.20, TOTAL LOSS =    2.00, TOTAL EXCESS =    1.20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       5.     12.30                1.          0.          0.          0.
                         (INCHES)   0.854       1.196       1.197       1.197
                         (AC-FT)     0.          1.          1.          1.

                         CUMULATIVE AREA =    0.01 SQ MI

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

                       HYDROGRAPH AT STATION    SUB-7
                         FOR PLAN 1, RATIO = 4.20

     TOTAL RAINFALL =    4.20, TOTAL LOSS =    2.39, TOTAL EXCESS =    1.81

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       7.     12.30                1.          0.          0.          0.
                         (INCHES)   1.331       1.812       1.813       1.813
                         (AC-FT)     1.          1.          1.          1.

                         CUMULATIVE AREA =    0.01 SQ MI
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      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    SUB-7
                          FOR PLAN 1, RATIO = 5.00

    TOTAL RAINFALL =    5.00, TOTAL LOSS =    2.64, TOTAL EXCESS =    2.36

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                          (CFS)
+       10.     12.30                2.           1.           0.           0.
                         (INCHES)   1.758        2.357        2.359        2.359
                         (AC-FT)      1.           1.           1.           1.

                        CUMULATIVE AREA =    0.01 SQ MI

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

                        HYDROGRAPH AT STATION    SUB-7
                          FOR PLAN 1, RATIO = 5.60

    TOTAL RAINFALL =    5.60, TOTAL LOSS =    2.81, TOTAL EXCESS =    2.79

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                          (CFS)
+       12.     12.30                2.           1.           1.           1.
                         (INCHES)   2.098        2.790        2.791        2.791
                         (AC-FT)      1.           1.           1.           1.

                        CUMULATIVE AREA =    0.01 SQ MI

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

                        HYDROGRAPH AT STATION    SUB-7
                          FOR PLAN 1, RATIO = 7.30

    TOTAL RAINFALL =    7.30, TOTAL LOSS =    3.20, TOTAL EXCESS =    4.10

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                          (CFS)
+       18.     12.30                3.           1.           1.           1.
                         (INCHES)   3.121        4.100        4.102        4.102
                         (AC-FT)      1.           2.           2.           2.

                        CUMULATIVE AREA =    0.01 SQ MI


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

            **************
            *            *
  94 KK     *      comb  *     COMBINE HYDROGRAPHS SUB-3 & SUB-7
            *            *
            **************

  95 HC          HYDROGRAPH COMBINATION
```

ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION comb
FOR PLAN 1, RATIO = 3.20

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 5.	12.30	1.	0.	0.	0.
		(INCHES) 0.867	1.214	1.215	1.215
		(AC-FT) 0.	1.	1.	1.

CUMULATIVE AREA = 0.01 SQ MI

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

HYDROGRAPH AT STATION comb
FOR PLAN 1, RATIO = 4.20

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 8.	12.30	1.	0.	0.	0.
		(INCHES) 1.347	1.836	1.837	1.837
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = 0.01 SQ MI

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

HYDROGRAPH AT STATION comb
FOR PLAN 1, RATIO = 5.00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 10.	12.30	2.	1.	0.	0.
		(INCHES) 1.777	2.384	2.386	2.386
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = 0.01 SQ MI

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

HYDROGRAPH AT STATION comb
FOR PLAN 1, RATIO = 5.60

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 12.	12.30	2.	1.	1.	1.
		(INCHES) 2.118	2.819	2.821	2.821
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = 0.01 SQ MI

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

                        HYDROGRAPH AT STATION     comb
                          FOR PLAN 1, RATIO = 7.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR      29.90-HR
+   (CFS)       (HR)
                              (CFS)
+      18.     12.30                3.          1.          1.          1.
                             (INCHES)      3.146       4.135       4.137       4.137
                             (AC-FT)         1.          2.          2.          2.

                           CUMULATIVE AREA =    0.01 SQ MI


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


            **************
            *            *
  96 KK     *    BASIN1  *     ROUTING IN BASIN PRIOR TO DISCHARGE TOWARD "PT-B"
            *            *
            **************

                        OUTLET STRUCTURE DATA:
                        ************************************************************
                        *  TOP OF STRUCTURE OVERFLOW LENGTH: 13' LONG AT EL 435.0 *
                        *  WEIR LENGTH = 2.0' WIDE AT EL 439.0                    *
                        *  ORIFICE #1: 3" DIAMETER AT EL.439.5                    *
                        ************************************************************


              HYDROGRAPH ROUTING DATA

  105 RS          STORAGE ROUTING
                       NSTPS          1  NUMBER OF SUBREACHES
                        ITYP       ELEV  TYPE OF INITIAL CONDITION
                       RSVRIC     284.00  INITIAL CONDITION
                           X       0.00 WORKING R AND D COEFFICIENT

  106 SA               AREA         0.1       0.1       0.2       0.2

  107 SE          ELEVATION      284.00    286.00    288.00    289.00

  108 SQ          DISCHARGE          0.        0.        0.        0.        2.        5.        6.        6.       10.       15.


  109 SE          ELEVATION      284.20    284.60    284.80    285.40    285.60    287.20    287.40    287.60    288.00    288.20

                                                      ***

                                          COMPUTED STORAGE-ELEVATION DATA

                STORAGE       0.00      0.20      0.49      0.67
              ELEVATION     284.00    286.00    288.00    289.00

                                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                STORAGE       0.00      0.02      0.05      0.07      0.13      0.15      0.20      0.36      0.39      0.42
                OUTFLOW       0.07      0.07      0.17      0.20      0.27      1.51      2.49      5.43      5.73      6.30
              ELEVATION     284.00    284.20    284.60    284.80    285.40    285.60    286.00    287.20    287.40    287.60
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STORAGE	0.49	0.52	0.67
OUTFLOW	9.73	15.29	37.53
ELEVATION	288.00	288.20	289.00

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

HYDROGRAPH AT STATION BASIN1
FOR PLAN 1, RATIO = 3.20

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2.	12.60		1.	0.	0.	0.
		(INCHES)	0.678	1.142	1.215	1.215
		(AC-FT)	0.	1.	1.	1.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)					
0.	12.60		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)					
285.88	12.60		285.46	284.77	284.62	284.62

CUMULATIVE AREA = 0.01 SQ MI

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

HYDROGRAPH AT STATION BASIN1
FOR PLAN 1, RATIO = 4.20

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4.	12.60		1.	0.	0.	0.
		(INCHES)	1.182	1.731	1.805	1.805
		(AC-FT)	1.	1.	1.	1.

PEAK STORAGE	TIME		MAXIMUM AVERAGE STORAGE			
			6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)					
0.	12.60		0.	0.	0.	0.

PEAK STAGE	TIME		MAXIMUM AVERAGE STAGE			
			6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)					
286.48	12.60		285.61	284.94	284.75	284.75

CUMULATIVE AREA = 0.01 SQ MI

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

HYDROGRAPH AT STATION BASIN1
FOR PLAN 1, RATIO = 5.00

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 5.	12.60		2.	1.	0.	0.
		(INCHES)	1.645	2.260	2.333	2.333

```
                          (AC-FT)        1.          1.          1.          1.

 PEAK STORAGE    TIME                              MAXIMUM AVERAGE STORAGE
                                          6-HR        24-HR       72-HR     29.90-HR
+  (AC-FT)       (HR)
        0.      12.60                      0.          0.          0.          0.

  PEAK STAGE    TIME                               MAXIMUM AVERAGE STAGE
                                          6-HR        24-HR       72-HR     29.90-HR
+   (FEET)       (HR)
     287.01     12.60                   285.75      285.06      284.85      284.85

                          CUMULATIVE AREA =    0.01 SQ MI


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

                        HYDROGRAPH AT STATION   BASIN1
                          FOR PLAN 1, RATIO = 5.60

  PEAK FLOW     TIME                               MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                            (CFS)
+        6.     12.60                      2.          1.          1.          1.
                          (INCHES)      2.014       2.687       2.760       2.760
                          (AC-FT)         1.          1.          1.          1.

 PEAK STORAGE   TIME                              MAXIMUM AVERAGE STORAGE
                                          6-HR        24-HR       72-HR     29.90-HR
+  (AC-FT)      (HR)
        0.      12.60                      0.          0.          0.          0.

  PEAK STAGE    TIME                               MAXIMUM AVERAGE STAGE
                                          6-HR        24-HR       72-HR     29.90-HR
+   (FEET)       (HR)
     287.41     12.60                   285.87      285.14      284.92      284.92

                          CUMULATIVE AREA =    0.01 SQ MI


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

                        HYDROGRAPH AT STATION   BASIN1
                          FOR PLAN 1, RATIO = 7.30

  PEAK FLOW     TIME                               MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                            (CFS)
+       13.     12.50                      3.          1.          1.          1.
                          (INCHES)      3.109       3.994       4.069       4.069
                          (AC-FT)         1.          2.          2.          2.

 PEAK STORAGE   TIME                              MAXIMUM AVERAGE STORAGE
                                          6-HR        24-HR       72-HR     29.90-HR
+  (AC-FT)      (HR)
        1.      12.50                      0.          0.          0.          0.

  PEAK STAGE    TIME                               MAXIMUM AVERAGE STAGE
                                          6-HR        24-HR       72-HR     29.90-HR
+   (FEET)       (HR)
     288.11     12.50                   286.13      285.29      285.05      285.05

                          CUMULATIVE AREA =    0.01 SQ MI
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*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              **************
              *            *
 110 KK       *    TO PTB  *     **************************************************************************
              *            *
              **************

     DT          DIVERSION
                      ISTAD      TO PTA  DIVERSION HYDROGRAPH IDENTIFICATION

     DI              INFLOW        0.00      1.30      1.86      2.27      4.72      6.24      7.45      8.49      9.41     10.25
                                  11.03     11.75     12.43     13.08     13.69

     DQ       DIVERTED FLOW        0.00      1.09      1.58      1.93      4.33      5.80      6.97      7.98      8.86      9.67
                                  10.42     11.11     11.77     12.39     12.98

                                                                  ***

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

                        DIVERSION HYDROGRAPH   TO PTA
                          FOR PLAN 1, RATIO = 3.20

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       2.     12.60                    1.          0.          0.          0.
                        (INCHES)     0.572       0.960       1.022       1.022
                         (AC-FT)        0.          0.          0.          0.

                        CUMULATIVE AREA =    0.01 SQ MI

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

                        HYDROGRAPH AT STATION   TO PTB
                          FOR PLAN 1, RATIO = 3.20

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0.     12.60                    0.          0.          0.          0.
                        (INCHES)     0.107       0.182       0.193       0.193
                         (AC-FT)        0.          0.          0.          0.

                        CUMULATIVE AREA =    0.01 SQ MI

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

                        DIVERSION HYDROGRAPH   TO PTA
                          FOR PLAN 1, RATIO = 4.20

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       3.     12.60                    1.          0.          0.          0.
                        (INCHES)     1.020       1.480       1.542       1.542
                         (AC-FT)        0.          1.          1.          1.
```

CUMULATIVE AREA = 0.01 SQ MI

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

HYDROGRAPH AT STATION TO PTB
FOR PLAN 1, RATIO = 4.20

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.50	0.	0.	0.	0.
		(INCHES) 0.163	0.251	0.263	0.263
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.01 SQ MI

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

DIVERSION HYDROGRAPH TO PTA
FOR PLAN 1, RATIO = 5.00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 5.	12.60	1.	0.	0.	0.
		(INCHES) 1.442	1.958	2.020	2.020
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = 0.01 SQ MI

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

HYDROGRAPH AT STATION TO PTB
FOR PLAN 1, RATIO = 5.00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.50	0.	0.	0.	0.
		(INCHES) 0.203	0.302	0.314	0.314
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.01 SQ MI

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

DIVERSION HYDROGRAPH TO PTA
FOR PLAN 1, RATIO = 5.60

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 5.	12.60	2.	1.	0.	0.
		(INCHES) 1.782	2.346	2.407	2.407
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = 0.01 SQ MI

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

                    HYDROGRAPH AT STATION   TO PTB
                      FOR PLAN 1, RATIO = 5.60

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                                   (CFS)
+       0.     12.60                 0.           0.           0.           0.
                                (INCHES)       0.232        0.341        0.353        0.353
                                 (AC-FT)          0.           0.           0.           0.

                    CUMULATIVE AREA =    0.01 SQ MI

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

                    DIVERSION HYDROGRAPH   TO PTA
                      FOR PLAN 1, RATIO = 7.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                                   (CFS)
+      12.     12.50                 3.           1.           1.           1.
                                (INCHES)       2.798        3.540        3.603        3.603
                                 (AC-FT)          1.           2.           2.           2.

                    CUMULATIVE AREA =    0.01 SQ MI

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

                    HYDROGRAPH AT STATION   TO PTB
                      FOR PLAN 1, RATIO = 7.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                                   (CFS)
+       1.     12.50                 0.           0.           0.           0.
                                (INCHES)       0.312        0.455        0.467        0.467
                                 (AC-FT)          0.           0.           0.           0.

                    CUMULATIVE AREA =    0.01 SQ MI


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


            **************
            *            *
  116 KK    *     SUB-1  *     OFFSITE RUNOFF TO POINT #A
            *            *
            **************

                        **********************************************************************
                        * DRAINAGE AREA = 7.75 AC = 0.0121 SQ. MI.        Q=11.87 CFS
                        * TIME OF CONCENTRATION =14.8MIN = 0.24 HR * 0.6 = 0.148 (SCS LAG)
                        **********************************************************************

              SUBBASIN RUNOFF DATA
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123 BA          SUBBASIN CHARACTERISTICS
                     TAREA        0.01  SUBBASIN AREA

                PRECIPITATION DATA

 34 PB               STORM        1.00  BASIN TOTAL PRECIPITATION

 36 PI            INCREMENTAL PRECIPITATION PATTERN
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                    0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                    0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                    0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

124 LS          SCS LOSS RATE
                     STRTL        1.00  INITIAL ABSTRACTION
                    CRVNBR       54.70  CURVE NUMBER
                     RTIMP        8.35  PERCENT IMPERVIOUS AREA

125 UD          SCS DIMENSIONLESS UNITGRAPH
                      TLAG        0.15  LAG

                                                  ***

                                                UNIT HYDROGRAPH
                                              9 END-OF-PERIOD ORDINATES
                    14.       30.       20.       8.        4.        2.        1.        0.        0.

     TOTAL RAINFALL =     1.00, TOTAL LOSS =     0.92, TOTAL EXCESS =     0.08

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR       72-HR     29.90-HR
+    (CFS)       (HR)
                      (CFS)
+       0.     12.30             0.          0.          0.          0.
                     (INCHES)    0.059       0.083       0.084       0.084
                     (AC-FT)       0.          0.          0.          0.

                     CUMULATIVE AREA =     0.01 SQ MI


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

                       HYDROGRAPH AT STATION     SUB-1
                         FOR PLAN 1, RATIO = 3.20

     TOTAL RAINFALL =     3.20, TOTAL LOSS =     2.51, TOTAL EXCESS =     0.69
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  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                 6-HR          24-HR          72-HR      29.90-HR
+   (CFS)       (HR)
                              (CFS)
+       4.     12.30                1.             0.             0.             0.
                          (INCHES)     0.509          0.690          0.690          0.690
                          (AC-FT)        0.             0.             0.             0.

                          CUMULATIVE AREA =    0.01 SQ MI


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

                          HYDROGRAPH AT STATION    SUB-1
                            FOR PLAN 1, RATIO = 4.20

     TOTAL RAINFALL =    4.20, TOTAL LOSS =    3.03, TOTAL EXCESS =    1.17

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                 6-HR          24-HR          72-HR      29.90-HR
+   (CFS)       (HR)
                              (CFS)
+       7.     12.30                1.             0.             0.             0.
                          (INCHES)     0.895          1.167          1.168          1.168
                          (AC-FT)        1.             1.             1.             1.

                          CUMULATIVE AREA =    0.01 SQ MI


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

                          HYDROGRAPH AT STATION    SUB-1
                            FOR PLAN 1, RATIO = 5.00

     TOTAL RAINFALL =    5.00, TOTAL LOSS =    3.39, TOTAL EXCESS =    1.61

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                 6-HR          24-HR          72-HR      29.90-HR
+   (CFS)       (HR)
                              (CFS)
+      10.     12.30                2.             1.             0.             0.
                          (INCHES)     1.253          1.611          1.611          1.611
                          (AC-FT)        1.             1.             1.             1.

                          CUMULATIVE AREA =    0.01 SQ MI


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

                          HYDROGRAPH AT STATION    SUB-1
                            FOR PLAN 1, RATIO = 5.60

     TOTAL RAINFALL =    5.60, TOTAL LOSS =    3.63, TOTAL EXCESS =    1.97

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                 6-HR          24-HR          72-HR      29.90-HR
+   (CFS)       (HR)
                              (CFS)
+      12.     12.30                2.             1.             1.             1.
                          (INCHES)     1.545          1.972          1.973          1.973
                          (AC-FT)        1.             1.             1.             1.

                          CUMULATIVE AREA =    0.01 SQ MI


       ***             ***             ***             ***             ***
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                    HYDROGRAPH AT STATION    SUB-1
                      FOR PLAN 1, RATIO = 7.30

    TOTAL RAINFALL =    7.30, TOTAL LOSS =    4.20, TOTAL EXCESS =    3.10

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                  (CFS)
+      19.     12.30                3.          1.          1.          1.
               (INCHES)          2.454       3.103       3.104       3.104
               (AC-FT)             2.          2.          2.          2.

               CUMULATIVE AREA =    0.01 SQ MI


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


           **************
           *            *
  126 KK   *     LAG-1  *     LAG OFF-1 HYDROGRAPH TO POINT #A
           *            *
           **************

              HYDROGRAPH ROUTING DATA

  127 RT        TATUM OR STRADDLE-STAGGER ROUTING
                   NSTPS            0   NUMBER OF TATUM STEPS
                   NSTDL            0   NUMBER OF ORDINATES TO BE AVERAGED
                   LAG              1   NUMBER OF INTERVALS TO LAG HYDROGRAPH

                                                          ***

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

                    HYDROGRAPH AT STATION    LAG-1
                      FOR PLAN 1, RATIO = 3.20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                  (CFS)
+       4.     12.40                1.          0.          0.          0.
               (INCHES)          0.509       0.690       0.690       0.690
               (AC-FT)             0.          0.          0.          0.

               CUMULATIVE AREA =    0.01 SQ MI

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

                    HYDROGRAPH AT STATION    LAG-1
                      FOR PLAN 1, RATIO = 4.20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                  (CFS)
+       7.     12.40                1.          0.          0.          0.
               (INCHES)          0.895       1.167       1.168       1.168
               (AC-FT)             1.          1.          1.          1.

               CUMULATIVE AREA =    0.01 SQ MI
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      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    LAG-1
                          FOR PLAN 1, RATIO = 5.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                        (CFS)
+      10.     12.40                2.           1.           0.           0.
                      (INCHES)     1.253        1.611        1.611        1.611
                      (AC-FT)        1.           1.           1.           1.

                      CUMULATIVE AREA =    0.01 SQ MI


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

                        HYDROGRAPH AT STATION    LAG-1
                          FOR PLAN 1, RATIO = 5.60

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                        (CFS)
+      12.     12.40                2.           1.           1.           1.
                      (INCHES)     1.545        1.972        1.973        1.973
                      (AC-FT)        1.           1.           1.           1.

                      CUMULATIVE AREA =    0.01 SQ MI


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

                        HYDROGRAPH AT STATION    LAG-1
                          FOR PLAN 1, RATIO = 7.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                        (CFS)
+      19.     12.40                3.           1.           1.           1.
                      (INCHES)     2.454        3.103        3.104        3.104
                      (AC-FT)        2.           2.           2.           2.

                      CUMULATIVE AREA =    0.01 SQ MI


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


            **************
            *            *
  128 KK    *     SUB-4  *     OFFSITE RUNOFF TO POINT #A
            *            *
            **************

                  ********************************************************************
                  * DRAINAGE AREA = 0.15 AC = 0.0002 SQ. MI.        Q=0.48 CFS
                  * TIME OF CONCENTRATION =1.0MIN = 0.01 HR * 0.6 = 0.01 (SCS LAG)
                  ********************************************************************


              SUBBASIN RUNOFF DATA
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135 BA          SUBBASIN CHARACTERISTICS
                     TAREA        0.00  SUBBASIN AREA

                PRECIPITATION DATA

 34 PB               STORM        1.00  BASIN TOTAL PRECIPITATION

 36 PI            INCREMENTAL PRECIPITATION PATTERN
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.01       0.00       0.01       0.00       0.01       0.01       0.01       0.01       0.01
                    0.01       0.01       0.01       0.01       0.01       0.01       0.01       0.02       0.03       0.05
                    0.08       0.08       0.05       0.03       0.02       0.01       0.01       0.01       0.01       0.01
                    0.01       0.01       0.01       0.01       0.01       0.01       0.00       0.01       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.01
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00
                    0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00

136 LS          SCS LOSS RATE
                     STRTL        1.00  INITIAL ABSTRACTION
                    CRVNBR       78.00  CURVE NUMBER
                     RTIMP       48.00  PERCENT IMPERVIOUS AREA

137 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG        0.01  LAG

                                                        ***

                                                    UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
                    1.         0.         0.         0.         0.

    TOTAL RAINFALL =     1.00, TOTAL LOSS =     0.52, TOTAL EXCESS =     0.48

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR     29.90-HR
+   (CFS)        (HR)
                    (CFS)
+        0.     12.20                       0.          0.          0.          0.
                (INCHES)                 0.339       0.480       0.480       0.480
                (AC-FT)                     0.          0.          0.          0.

                CUMULATIVE AREA =     0.00 SQ MI


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

                  HYDROGRAPH AT STATION     SUB-4
                    FOR PLAN 1, RATIO = 3.20

    TOTAL RAINFALL =     3.20, TOTAL LOSS =     1.16, TOTAL EXCESS =     2.04
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                              6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                (CFS)
+       0.     12.20             0.          0.          0.          0.
              (INCHES)        1.455       2.037       2.037       2.037
              (AC-FT)           0.          0.          0.          0.

              CUMULATIVE AREA =    0.00 SQ MI


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

                HYDROGRAPH AT STATION    SUB-4
                  FOR PLAN 1, RATIO = 4.20

    TOTAL RAINFALL =    4.20, TOTAL LOSS =    1.30, TOTAL EXCESS =    2.90

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                              6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                (CFS)
+       0.     12.20             0.          0.          0.          0.
              (INCHES)        2.112       2.900       2.900       2.900
              (AC-FT)           0.          0.          0.          0.

              CUMULATIVE AREA =    0.00 SQ MI


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

                HYDROGRAPH AT STATION    SUB-4
                  FOR PLAN 1, RATIO = 5.00

    TOTAL RAINFALL =    5.00, TOTAL LOSS =    1.38, TOTAL EXCESS =    3.62

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                              6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                (CFS)
+       0.     12.20             0.          0.          0.          0.
              (INCHES)        2.667       3.619       3.620       3.620
              (AC-FT)           0.          0.          0.          0.

              CUMULATIVE AREA =    0.00 SQ MI


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

                HYDROGRAPH AT STATION    SUB-4
                  FOR PLAN 1, RATIO = 5.60

    TOTAL RAINFALL =    5.60, TOTAL LOSS =    1.43, TOTAL EXCESS =    4.17

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                              6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                (CFS)
+       0.     12.20             0.          0.          0.          0.
              (INCHES)        3.093       4.170       4.171       4.171
              (AC-FT)           0.          0.          0.          0.

              CUMULATIVE AREA =    0.00 SQ MI


      ***           ***           ***           ***           ***
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HYDROGRAPH AT STATION SUB-4
FOR PLAN 1, RATIO = 7.30

TOTAL RAINFALL = 7.30, TOTAL LOSS = 1.53, TOTAL EXCESS = 5.77

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)				
		(CFS)			
1.	12.20	0.	0.	0.	0.
		(INCHES) 4.314	5.766	5.767	5.767
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

*** ***

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          **************
          *            *
138 KK    *    SUB-8   *    SITE RUNOFF TO POINT #A
          *            *
          **************

                    ********************************************************************
                    * DRAINAGE AREA = 1.90 AC = 0.003 SQ. MI.        Q=2.53 cfs
                    * TIME OF CONCENTRATION =9.6 MIN = 0.16 HR * 0.6 = 0.096 (SCS LAG)
                    ********************************************************************

            SUBBASIN RUNOFF DATA

145 BA        SUBBASIN CHARACTERISTICS
                   TAREA        0.00  SUBBASIN AREA

              PRECIPITATION DATA

 34 PB             STORM        1.00  BASIN TOTAL PRECIPITATION

 36 PI          INCREMENTAL PRECIPITATION PATTERN
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                  0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                  0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                  0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
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                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

  146 LS          SCS LOSS RATE
                       STRTL        1.00  INITIAL ABSTRACTION
                      CRVNBR       52.80  CURVE NUMBER
                       RTIMP        0.00  PERCENT IMPERVIOUS AREA

  147 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG        0.10  LAG

                                                          ***

                                                    UNIT HYDROGRAPH
                                                7 END-OF-PERIOD ORDINATES
                    8.        8.        3.        1.        0.        0.        0.

     TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =    0.00

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     29.90-HR
+    (CFS)        (HR)
                      (CFS)
+        0.      0.10                   0.          0.          0.          0.
                     (INCHES)       0.000       0.000       0.000       0.000
                      (AC-FT)          0.          0.          0.          0.

                     CUMULATIVE AREA =    0.00 SQ MI

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

                       HYDROGRAPH AT STATION    SUB-8
                         FOR PLAN 1, RATIO = 3.20

     TOTAL RAINFALL =    3.20, TOTAL LOSS =    2.77, TOTAL EXCESS =    0.43

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     29.90-HR
+    (CFS)        (HR)
                      (CFS)
+        1.      12.30                  0.          0.          0.          0.
                     (INCHES)       0.351       0.434       0.434       0.434
                      (AC-FT)          0.          0.          0.          0.

                     CUMULATIVE AREA =    0.00 SQ MI

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

                       HYDROGRAPH AT STATION    SUB-8
                         FOR PLAN 1, RATIO = 4.20

     TOTAL RAINFALL =    4.20, TOTAL LOSS =    3.36, TOTAL EXCESS =    0.84

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     29.90-HR
+    (CFS)        (HR)
                      (CFS)
+        1.      12.30                  0.          0.          0.          0.
                     (INCHES)       0.691       0.844       0.844       0.844
                      (AC-FT)          0.          0.          0.          0.

                     CUMULATIVE AREA =    0.00 SQ MI

        ***             ***             ***             ***             ***
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                        HYDROGRAPH AT STATION    SUB-8
                          FOR PLAN 1, RATIO = 5.00

     TOTAL RAINFALL =    5.00, TOTAL LOSS =    3.76, TOTAL EXCESS =    1.24

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                          (CFS)
+       2.      12.30                0.           0.           0.           0.
                        (INCHES)     1.014        1.237        1.237        1.237
                        (AC-FT)      0.           0.           0.           0.

                        CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION    SUB-8
                          FOR PLAN 1, RATIO = 5.60

     TOTAL RAINFALL =    5.60, TOTAL LOSS =    4.04, TOTAL EXCESS =    1.56

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                          (CFS)
+       3.      12.30                0.           0.           0.           0.
                        (INCHES)     1.281        1.563        1.563        1.563
                        (AC-FT)      0.           0.           0.           0.

                        CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION    SUB-8
                          FOR PLAN 1, RATIO = 7.30

     TOTAL RAINFALL =    7.30, TOTAL LOSS =    4.70, TOTAL EXCESS =    2.60

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                          (CFS)
+       4.      12.30                1.           0.           0.           0.
                        (INCHES)     2.128        2.604        2.604        2.604
                        (AC-FT)      0.           0.           0.           0.

                        CUMULATIVE AREA =    0.00 SQ MI


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


            **************
            *            *
148 KK      *     SUB-5  *     SITE RUNOFF TO POINT #A
            *            *
            **************

                        ************************************************************************
                        * DRAINAGE AREA = 0.12 AC = 0.0002 SQ. MI.        Q=0.38 cfs
                        * TIME OF CONCENTRATION =1.0 MIN = 0.016 HR * 0.6 = 0.01 (SCS LAG)
                        ************************************************************************
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                SUBBASIN RUNOFF DATA

 155 BA           SUBBASIN CHARACTERISTICS
                        TAREA        0.00  SUBBASIN AREA

                  PRECIPITATION DATA

  34 PB                 STORM        1.00  BASIN TOTAL PRECIPITATION

  36 PI             INCREMENTAL PRECIPITATION PATTERN
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                       0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                       0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                       0.01      0 01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                       0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

 156 LS           SCS LOSS RATE
                        STRTL        1.00  INITIAL ABSTRACTION
                       CRVNBR       52.80  CURVE NUMBER
                        RTIMP       48.00  PERCENT IMPERVIOUS AREA

 157 UD           SCS DIMENSIONLESS UNITGRAPH
                         TLAG        0.01  LAG

                                                  ***

                                               UNIT HYDROGRAPH
                                           5 END-OF-PERIOD ORDINATES
                  1.        0.        0.        0.        0.

    TOTAL RAINFALL =    1.00, TOTAL LOSS =    0.52, TOTAL EXCESS =    0.48

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR      29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       0.     12.20                   0.          0.          0.            0.
                        (INCHES)     0.339       0.480       0.480         0.480
                         (AC-FT)       0.          0.          0.            0.

                          CUMULATIVE AREA =    0.00 SQ MI


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

                           HYDROGRAPH AT STATION    SUB-5
```

FOR PLAN 1, RATIO = 3.20

TOTAL RAINFALL = 3.20, TOTAL LOSS = 1.44, TOTAL EXCESS = 1.76

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) 1.239	1.762	1.762	1.762
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION SUB-5
FOR PLAN 1, RATIO = 4.20

TOTAL RAINFALL = 4.20, TOTAL LOSS = 1.75, TOTAL EXCESS = 2.45

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) 1.743	2.454	2.455	2.455
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION SUB-5
FOR PLAN 1, RATIO = 5.00

TOTAL RAINFALL = 5.00, TOTAL LOSS = 1.96, TOTAL EXCESS = 3.04

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) 2.177	3.042	3.043	3.043
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION SUB-5
FOR PLAN 1, RATIO = 5.60

TOTAL RAINFALL = 5.60, TOTAL LOSS = 2.10, TOTAL EXCESS = 3.50

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)				
		(CFS)			
+ 0.	12.20	0.	0.	0.	0.
		(INCHES) 2.518	3.500	3.501	3.501
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

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

                        HYDROGRAPH AT STATION     SUB-5
                          FOR PLAN 1, RATIO = 7.30

    TOTAL RAINFALL =     7.30, TOTAL LOSS =     2.44, TOTAL EXCESS =     4.86

  PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR         24-HR         72-HR      29.90-HR
+   (CFS)         (HR)
                                  (CFS)
+        1.      12.20                 0.            0.            0.            0.
                               (INCHES)         3.529         4.857         4.858         4.858
                                (AC-FT)            0.            0.            0.            0.

                        CUMULATIVE AREA =     0.00 SQ MI


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


            **************
            *            *
  158 KK    *     SUB-9  *     SITE RUNOFF TO POINT #A
            *            *
            **************

                        **************************************************************************
                        * DRAINAGE AREA = 2.90 AC = 0.0045 SQ. MI.        Q=7.42 cfs
                        * TIME OF CONCENTRATION =3.2 MIN = 0.05 HR * 0.6 = 0.032 (SCS LAG)
                        **************************************************************************


              SUBBASIN RUNOFF DATA

  165 BA        SUBBASIN CHARACTERISTICS
                      TAREA         0.00  SUBBASIN AREA

              PRECIPITATION DATA

   34 PB              STORM         1.00  BASIN TOTAL PRECIPITATION

   36 PI          INCREMENTAL PRECIPITATION PATTERN
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                    0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                    0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                    0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                    0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
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                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

166 LS          SCS LOSS RATE
                     STRTL        1.00  INITIAL ABSTRACTION
                    CRVNBR       53.90  CURVE NUMBER
                     RTIMP       33.45  PERCENT IMPERVIOUS AREA

167 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG        0.03  LAG

                                                    ***

                                                          UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                  22.       6.        1.        0.        0.

     TOTAL RAINFALL =    1.00, TOTAL LOSS =    0.67, TOTAL EXCESS =    0.33

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     29.90-HR
+    (CFS)       (HR)
                    (CFS)
+       1.     12.20                   0.          0.          0.          0.
                (INCHES)          0.236       0.334       0.335       0.335
                 (AC-FT)            0.          0.          0.          0.

                 CUMULATIVE AREA =    0.00 SQ MI


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

                   HYDROGRAPH AT STATION    SUB-9
                     FOR PLAN 1, RATIO = 3.20

     TOTAL RAINFALL =    3.20, TOTAL LOSS =    1.83, TOTAL EXCESS =    1.37

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     29.90-HR
+    (CFS)       (HR)
                    (CFS)
+       3.     12.20                   0.          0.          0.          0.
                (INCHES)          0.967       1.370       1.370       1.370
                 (AC-FT)            0.          0.          0.          0.

                 CUMULATIVE AREA =    0.00 SQ MI


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

                   HYDROGRAPH AT STATION    SUB-9
                     FOR PLAN 1, RATIO = 4.20

     TOTAL RAINFALL =    4.20, TOTAL LOSS =    2.22, TOTAL EXCESS =    1.98

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     29.90-HR
+    (CFS)       (HR)
                    (CFS)
+       5.     12.20                   1.          0.          0.          0.
                (INCHES)          1.425       1.984       1.985       1.985
                 (AC-FT)            0.          0.          0.          0.

                 CUMULATIVE AREA =    0.00 SQ MI
```

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

                        HYDROGRAPH AT STATION    SUB-9
                          FOR PLAN 1, RATIO = 5.00

    TOTAL RAINFALL =    5.00, TOTAL LOSS =    2.48, TOTAL EXCESS =    2.52

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                  (CFS)
+       6.     12.20                1.          0.          0.          0.
                (INCHES)         1.832       2.520       2.521       2.521
                (AC-FT)             0.          1.          1.          1.

                CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION    SUB-9
                          FOR PLAN 1, RATIO = 5.60

    TOTAL RAINFALL =    5.60, TOTAL LOSS =    2.66, TOTAL EXCESS =    2.94

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                  (CFS)
+       7.     12.20                1.          0.          0.          0.
                (INCHES)         2.155       2.943       2.944       2.944
                (AC-FT)             1.          1.          1.          1.

                CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION    SUB-9
                          FOR PLAN 1, RATIO = 7.30

    TOTAL RAINFALL =    7.30, TOTAL LOSS =    3.08, TOTAL EXCESS =    4.22

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                  (CFS)
+      11.     12.20                2.          1.          0.          0.
                (INCHES)         3.130       4.219       4.220       4.220
                (AC-FT)             1.          1.          1.          1.

                CUMULATIVE AREA =    0.00 SQ MI


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

            **************
            *            *
  168 KK    *      comb  *     COMBINE HYDROGRAPHS SUB-5 & SUB-9
            *            *
            **************

  169 HC          HYDROGRAPH COMBINATION
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ICOMP 2 NUMBER OF HYDROGRAPHS TO COMBINE

***

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

HYDROGRAPH AT STATION comb
FOR PLAN 1, RATIO = 3.20

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	29.90-HR
3.	12.20	(CFS) 0.	0.	0.	0.
		(INCHES) 0.978	1.386	1.387	1.387
		(AC-FT) 0.	0.	0.	0.

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION comb
FOR PLAN 1, RATIO = 4.20

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	29.90-HR
5.	12.20	(CFS) 1.	0.	0.	0.
		(INCHES) 1.439	2.004	2.005	2.005
		(AC-FT) 0.	1.	1.	1.

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION comb
FOR PLAN 1, RATIO = 5.00

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	29.90-HR
7.	12.20	(CFS) 1.	0.	0.	0.
		(INCHES) 1.846	2.542	2.543	2.543
		(AC-FT) 0.	1.	1.	1.

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION comb
FOR PLAN 1, RATIO = 5.60

PEAK FLOW (CFS)	TIME (HR)	MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	29.90-HR
8.	12.20	(CFS) 1.	0.	0.	0.
		(INCHES) 2.170	2.967	2.968	2.968
		(AC-FT) 1.	1.	1.	1.

CUMULATIVE AREA = 0.00 SQ MI

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

                        HYDROGRAPH AT STATION     comb
                          FOR PLAN 1, RATIO = 7.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                  (CFS)
+      11.     12.20                2.          1.          0.          0.
                (INCHES)         3.147       4.246       4.247       4.247
                (AC-FT)            1.          1.          1.          1.

                CUMULATIVE AREA =    0.00 SQ MI


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


          **************
          *            *
170 KK    *    BASIN2  *     ROUTING IN BASIN PRIOR TO DISCHARGE TOWARD "PT-B"
          *            *
          **************

                    OUTLET STRUCTURE DATA:
                    ************************************************************
                    *  TOP OF STRUCTURE OVERFLOW LENGTH: 13' LONG AT EL 435.0 *
                    *  WEIR LENGTH = 2.0' WIDE AT EL 439.0                    *
                    *  ORIFICE #1: 3" DIAMETER AT EL.439.5                    *
                    ************************************************************


            HYDROGRAPH ROUTING DATA

179 RS          STORAGE ROUTING
                     NSTPS          1  NUMBER OF SUBREACHES
                      ITYP       ELEV  TYPE OF INITIAL CONDITION
                    RSVRIC     284.00  INITIAL CONDITION
                         X       0.00 WORKING R AND D COEFFICIENT

180 SA              AREA         0.1       0.1       0.1

181 SE          ELEVATION      284.00    286.00    288.00

182 SQ          DISCHARGE          0.        0.        2.        3.        3.        6.        6.        7.       11.

183 SE          ELEVATION      284.20    285.00    285.20    285.40    285.60    286.80    287.00    287.20    287.40

                                                    ***

                                        COMPUTED STORAGE-ELEVATION DATA

          STORAGE       0.00      0.16      0.41
        ELEVATION     284.00    286.00    288.00

                                    COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE       0.00      0.01      0.07      0.08      0.10      0.12      0.16      0.25      0.27      0.30
          OUTFLOW       0.07      0.07      0.22      1.97      2.70      3.27      4.03      5.55      5.84      6.93
        ELEVATION     284.00    284.20    285.00    285.20    285.40    285.60    286.00    286.80    287.00    287.20

          STORAGE       0.32      0.41
          OUTFLOW      10.76     22.25
```

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          ELEVATION     287.40    288.00

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

                              HYDROGRAPH AT STATION   BASIN2
                                FOR PLAN 1, RATIO = 3.20

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       2.     12.40                        0.           0.           0.           0.
                        (INCHES)        0.819        1.375        1.512        1.512
                        (AC-FT)           0.           0.           0.           0.

 PEAK STORAGE   TIME                              MAXIMUM AVERAGE STORAGE
                                          6-HR        24-HR        72-HR     29.90-HR
+  (AC-FT)      (HR)
        0.     12.30                        0.           0.           0.           0.

  PEAK STAGE    TIME                              MAXIMUM AVERAGE STAGE
                                          6-HR        24-HR        72-HR     29.90-HR
+   (FEET)      (HR)
     285.29     12.40                     284.98       284.43       284.35       284.35

                              CUMULATIVE AREA =    0.00 SQ MI


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

                              HYDROGRAPH AT STATION   BASIN2
                                FOR PLAN 1, RATIO = 4.20

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       3.     12.40                        1.           0.           0.           0.
                        (INCHES)        1.292        1.937        2.074        2.074
                        (AC-FT)           0.           0.           1.           1.

 PEAK STORAGE   TIME                              MAXIMUM AVERAGE STORAGE
                                          6-HR        24-HR        72-HR     29.90-HR
+  (AC-FT)      (HR)
        0.     12.40                        0.           0.           0.           0.

  PEAK STAGE    TIME                              MAXIMUM AVERAGE STAGE
                                          6-HR        24-HR        72-HR     29.90-HR
+   (FEET)      (HR)
     285.62     12.40                     285.06       284.53       284.42       284.42

                              CUMULATIVE AREA =    0.00 SQ MI


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

                              HYDROGRAPH AT STATION   BASIN2
                                FOR PLAN 1, RATIO = 5.00

  PEAK FLOW     TIME                              MAXIMUM AVERAGE FLOW
                                          6-HR        24-HR        72-HR     29.90-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.40                        1.           0.           0.           0.
                        (INCHES)        1.724        2.442        2.578        2.578
                        (AC-FT)           0.           1.           1.           1.
```

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
0.	12.40	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
285.92	12.40	285.11	284.60	284.48	284.48

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION BASIN2
FOR PLAN 1, RATIO = 5.60

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4.	12.40		1.	0.	0.	0.
		(INCHES)	2.070	2.847	2.983	2.983
		(AC-FT)	1.	1.	1.	1.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
0.	12.40	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
286.16	12.40	285.16	284.66	284.53	284.53

CUMULATIVE AREA = 0.00 SQ MI

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

HYDROGRAPH AT STATION BASIN2
FOR PLAN 1, RATIO = 7.30

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	29.90-HR
+ (CFS)	(HR)					
		(CFS)				
+ 6.	12.40		2.	1.	0.	0.
		(INCHES)	3.125	4.091	4.227	4.227
		(AC-FT)	1.	1.	1.	1.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (AC-FT)	(HR)				
0.	12.40	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	29.90-HR
+ (FEET)	(HR)				
286.85	12.40	285.31	284.81	284.66	284.66

CUMULATIVE AREA = 0.00 SQ MI

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

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          *            *
184 KK    *    SUB-10  *     SITE RUNOFF TO POINT #A
          *            *
          **************

                    ***********************************************************************
                    * DRAINAGE AREA = 0.19 AC = 0.0003 SQ. MI.        Q=0.31 cfs
                    * TIME OF CONCENTRATION =11.2 MIN = 0.18 HR * 0.6 = 0.112 (SCS LAG)
                    ***********************************************************************


               SUBBASIN RUNOFF DATA

191 BA           SUBBASIN CHARACTERISTICS
                       TAREA        0.00  SUBBASIN AREA

                 PRECIPITATION DATA

 34 PB                 STORM        1.00  BASIN TOTAL PRECIPITATION

 36 PI             INCREMENTAL PRECIPITATION PATTERN
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.01      0.00      0.01      0.00      0.01      0.01      0.01      0.01      0.01
                     0.01      0.01      0.01      0.01      0.01      0.01      0.01      0.02      0.03      0.05
                     0.08      0.08      0.05      0.03      0.02      0.01      0.01      0.01      0.01      0.01
                     0.01      0.01      0.01      0.01      0.01      0.01      0.00      0.01      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.01
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00
                     0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00      0.00

192 LS           SCS LOSS RATE
                      STRTL        1.00  INITIAL ABSTRACTION
                     CRVNBR       60.00  CURVE NUMBER
                      RTIMP        0.00  PERCENT IMPERVIOUS AREA

193 UD           SCS DIMENSIONLESS UNITGRAPH
                       TLAG        0.11  LAG

                                                  ***

                                              UNIT HYDROGRAPH
                                           8 END-OF-PERIOD ORDINATES
                1.        1.        0.        0.        0.        0.        0.        0.

   TOTAL RAINFALL =    1.00, TOTAL LOSS =    1.00, TOTAL EXCESS =    0.00

PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

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                                                  6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                                (CFS)
+       0.       0.10                          0.           0.           0.           0.
                              (INCHES)        0.000        0.000        0.000        0.000
                               (AC-FT)          0.           0.           0.           0.

                              CUMULATIVE AREA =    0.00 SQ MI


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

                            HYDROGRAPH AT STATION   SUB-10
                              FOR PLAN 1, RATIO = 3.20

     TOTAL RAINFALL =    3.20, TOTAL LOSS =    2.65, TOTAL EXCESS =    0.55

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                                  6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                                (CFS)
+       0.      12.30                          0.           0.           0.           0.
                              (INCHES)        0.444        0.546        0.546        0.546
                               (AC-FT)          0.           0.           0.           0.

                              CUMULATIVE AREA =    0.00 SQ MI


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

                            HYDROGRAPH AT STATION   SUB-10
                              FOR PLAN 1, RATIO = 4.20

     TOTAL RAINFALL =    4.20, TOTAL LOSS =    3.16, TOTAL EXCESS =    1.04

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                                  6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                                (CFS)
+       0.      12.30                          0.           0.           0.           0.
                              (INCHES)        0.855        1.038        1.038        1.038
                               (AC-FT)          0.           0.           0.           0.

                              CUMULATIVE AREA =    0.00 SQ MI


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

                            HYDROGRAPH AT STATION   SUB-10
                              FOR PLAN 1, RATIO = 5.00

     TOTAL RAINFALL =    5.00, TOTAL LOSS =    3.50, TOTAL EXCESS =    1.50

  PEAK FLOW     TIME                                MAXIMUM AVERAGE FLOW
                                                  6-HR        24-HR        72-HR     29.90-HR
+   (CFS)        (HR)
                                (CFS)
+       0.      12.30                          0.           0.           0.           0.
                              (INCHES)        1.237        1.500        1.500        1.500
                               (AC-FT)          0.           0.           0.           0.

                              CUMULATIVE AREA =    0.00 SQ MI


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

                            HYDROGRAPH AT STATION   SUB-10
```

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                          FOR PLAN 1, RATIO = 5.60

     TOTAL RAINFALL =     5.60, TOTAL LOSS =     3.72, TOTAL EXCESS =     1.88

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR      29.90-HR
+    (CFS)        (HR)
                    (CFS)
+        0.      12.30                  0.           0.           0.           0.
                (INCHES)           1.548        1.878        1.878        1.878
                 (AC-FT)             0.           0.           0.           0.

                          CUMULATIVE AREA =    0.00 SQ MI


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

                          HYDROGRAPH AT STATION   SUB-10
                            FOR PLAN 1, RATIO = 7.30

     TOTAL RAINFALL =     7.30, TOTAL LOSS =     4.24, TOTAL EXCESS =     3.06

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR      29.90-HR
+    (CFS)        (HR)
                    (CFS)
+        1.      12.30                  0.           0.           0.           0.
                (INCHES)           2.515        3.061        3.061        3.061
                 (AC-FT)             0.           0.           0.           0.

                          CUMULATIVE AREA =    0.00 SQ MI


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


             **************
             *            *
  194 KK     *      comb  *     COMBINE HYDROGRAPHS COMB-1, SITE-3 & OFF-3
             *            *
             **************

  195 HC           HYDROGRAPH COMBINATION
                         ICOMP           5  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                        ***

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

                          HYDROGRAPH AT STATION     comb
                            FOR PLAN 1, RATIO = 3.20

   PEAK FLOW      TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR        24-HR        72-HR      29.90-HR
+    (CFS)        (HR)
                    (CFS)
+        7.      12.40                  1.           0.           0.           0.
                (INCHES)         0.563        0.821        0.854        0.854
                 (AC-FT)             1.           1.           1.           1.

                          CUMULATIVE AREA =    0.02 SQ MI


       ***              ***              ***              ***              ***
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                         HYDROGRAPH AT STATION     comb
                           FOR PLAN 1, RATIO = 4.20

  PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR        72-HR      29.90-HR
+   (CFS)        (HR)
                               (CFS)
+       11.     12.40                      2.           1.           1.            1.
                            (INCHES)     0.966        1.310        1.345         1.345
                             (AC-FT)       1.           1.           1.            1.

                          CUMULATIVE AREA =    0.02 SQ MI


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

                         HYDROGRAPH AT STATION     comb
                           FOR PLAN 1, RATIO = 5.00

  PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR        72-HR      29.90-HR
+   (CFS)        (HR)
                               (CFS)
+       15.     12.40                      3.           1.           1.            1.
                            (INCHES)     1.339        1.761        1.798         1.798
                             (AC-FT)       1.           2.           2.            2.

                          CUMULATIVE AREA =    0.02 SQ MI


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

                         HYDROGRAPH AT STATION     comb
                           FOR PLAN 1, RATIO = 5.60

  PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR        72-HR      29.90-HR
+   (CFS)        (HR)
                               (CFS)
+       19.     12.40                      4.           1.           1.            1.
                            (INCHES)     1.641        2.128        2.167         2.167
                             (AC-FT)       2.           2.           2.            2.

                          CUMULATIVE AREA =    0.02 SQ MI


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

                         HYDROGRAPH AT STATION     comb
                           FOR PLAN 1, RATIO = 7.30

  PEAK FLOW      TIME                              MAXIMUM AVERAGE FLOW
                                         6-HR        24-HR        72-HR      29.90-HR
+   (CFS)        (HR)
                               (CFS)
+       29.     12.40                      6.           2.           1.            1.
                            (INCHES)     2.579        3.272        3.316         3.316
                             (AC-FT)       3.           4.           4.            4.

                          CUMULATIVE AREA =    0.02 SQ MI


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          **************
          *            *
196 KK    *      RTRV  *    ********************************************************************************
          *            *
          **************
                RETREIVE FLOW DIVERTED TO POINT OF INTEREST 'B'

198 DR          RETRIEVE DIVERSION HYDROGRAPH
                     ISTAD      TO PTA  DIVERSION HYDROGRAPH IDENTIFICATION
                                                                ***

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

                      HYDROGRAPH AT STATION     RTRV
                        FOR PLAN 1, RATIO = 3.20

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                 (CFS)
+       2.     12.60                1.          0.          0.          0.
               (INCHES)      0.245       0.411       0.438       0.438
               (AC-FT)         0.          0.          0.          0.

                      CUMULATIVE AREA =    0.00 SQ MI


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

                      HYDROGRAPH AT STATION     RTRV
                        FOR PLAN 1, RATIO = 4.20

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                 (CFS)
+       3.     12.60                1.          0.          0.          0.
               (INCHES)      0.437       0.634       0.661       0.661
               (AC-FT)         0.          1.          1.          1.

                      CUMULATIVE AREA =    0.00 SQ MI


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

                      HYDROGRAPH AT STATION     RTRV
                        FOR PLAN 1, RATIO = 5.00

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
+   (CFS)       (HR)
                 (CFS)
+       5.     12.60                1.          0.          0.          0.
               (INCHES)      0.618       0.839       0.866       0.866
               (AC-FT)         1.          1.          1.          1.

                      CUMULATIVE AREA =    0.00 SQ MI


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

                      HYDROGRAPH AT STATION     RTRV
                        FOR PLAN 1, RATIO = 5.60

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     29.90-HR
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+   (CFS)        (HR)
                          (CFS)
+       5.      12.60                2.          1.          0.          0.
                       (INCHES)     0.764       1.005       1.032       1.032
                        (AC-FT)       1.          1.          1.          1.

                       CUMULATIVE AREA =    0.00 SQ MI


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

                        HYDROGRAPH AT STATION     RTRV
                          FOR PLAN 1, RATIO = 7.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     29.90-HR
+   (CFS)        (HR)
                          (CFS)
+      12.      12.50                3.          1.          1.          1.
                       (INCHES)     1.199       1.517       1.544       1.544
                        (AC-FT)       1.          2.          2.          2.

                       CUMULATIVE AREA =    0.00 SQ MI


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


            **************
            *            *
  199 KK    *       PT-A *     COMBINE HYDROGRAPHS COMB-1, SITE-3 & OFF-3
            *            *
            **************

  200 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
                                                                      ***

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

                        HYDROGRAPH AT STATION     PT-A
                          FOR PLAN 1, RATIO = 3.20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     29.90-HR
+   (CFS)        (HR)
                          (CFS)
+       8.      12.40                2.          1.          1.          1.
                       (INCHES)     0.807       1.227       1.292       1.292
                        (AC-FT)       1.          1.          1.          1.

                       CUMULATIVE AREA =    0.02 SQ MI


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

                        HYDROGRAPH AT STATION     PT-A
                          FOR PLAN 1, RATIO = 4.20

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR        24-HR       72-HR     29.90-HR
+   (CFS)        (HR)
                          (CFS)
+      14.      12.40                3.          1.          1.          1.
```

(INCHES)	1.402	1.935	2.006	2.006
(AC-FT)	2.	2.	2.	2.

CUMULATIVE AREA = 0.02 SQ MI

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

HYDROGRAPH AT STATION PT-A
FOR PLAN 1, RATIO = 5.00

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)				
		(CFS)			
20.	12.40	4.	1.	1.	1.
		(INCHES) 1.954	2.589	2.664	2.664
		(AC-FT) 2.	3.	3.	3.

CUMULATIVE AREA = 0.02 SQ MI

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

HYDROGRAPH AT STATION PT-A
FOR PLAN 1, RATIO = 5.60

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)				
		(CFS)			
24.	12.40	5.	2.	1.	1.
		(INCHES) 2.401	3.122	3.198	3.198
		(AC-FT) 3.	3.	3.	3.

CUMULATIVE AREA = 0.02 SQ MI

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

HYDROGRAPH AT STATION PT-A
FOR PLAN 1, RATIO = 7.30

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	29.90-HR
(CFS)	(HR)				
		(CFS)			
40.	12.40	8.	3.	2.	2.
		(INCHES) 3.774	4.778	4.860	4.860
		(AC-FT) 4.	5.	5.	5.

CUMULATIVE AREA = 0.02 SQ MI

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
VOLUME IN ACRE-FEET, TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION				
OPERATION	STATION	AREA	PLAN		RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5
					3.20	4.20	5.00	5.60	7.30
HYDROGRAPH AT									
SUB-2		0.000	1	FLOW	0.17	0.23	0.28	0.32	0.44
				TIME	12.20	12.20	12.20	12.20	12.20

				VOLUME	0.02	0.02	0.03	0.03	0.04
HYDROGRAPH AT									
+	SUB-6	0.002	1	FLOW	0.25	0.54	0.82	1.06	1.80
				TIME	12.40	12.40	12.40	12.40	12.40
				VOLUME	0.03	0.07	0.10	0.12	0.20
2 COMBINED AT									
+	PT-C	0.002	1	FLOW	0.34	0.66	0.97	1.22	2.03
				TIME	12.40	12.40	12.40	12.40	12.40
				VOLUME	0.05	0.09	0.12	0.15	0.25
HYDROGRAPH AT									
+	SUB-3	0.000	1	FLOW	0.21	0.31	0.39	0.45	0.63
				TIME	12.20	12.20	12.20	12.20	12.20
				VOLUME	0.02	0.03	0.04	0.04	0.06
HYDROGRAPH AT									
+	SUB-7	0.009	1	FLOW	4.67	7.43	9.88	11.83	17.71
				TIME	12.30	12.30	12.30	12.30	12.30
				VOLUME	0.54	0.82	1.07	1.27	1.86
2 COMBINED AT									
+	comb	0.009	1	FLOW	4.85	7.69	10.21	12.21	18.24
				TIME	12.30	12.30	12.30	12.30	12.30
				VOLUME	0.56	0.85	1.11	1.31	1.92
ROUTED TO									
+	BASIN1	0.009	1	FLOW	2.19	3.67	4.95	5.75	12.70
				TIME	12.60	12.60	12.60	12.60	12.50
				VOLUME	0.56	0.84	1.08	1.28	1.89
			**	PEAK STAGES IN FEET **					
			1	STAGE	285.88	286.48	287.01	287.41	288.11
				TIME	12.60	12.60	12.60	12.60	12.50
DIVERSION TO									
+	TO PTA	0.009	1	FLOW	1.86	3.31	4.55	5.33	12.03
				TIME	12.60	12.60	12.60	12.60	12.50
				VOLUME	0.47	0.72	0.94	1.12	1.67
HYDROGRAPH AT									
+	TO PTB	0.009	1	FLOW	0.33	0.37	0.40	0.42	0.67
				TIME	12.60	12.50	12.50	12.60	12.50
				VOLUME	0.09	0.12	0.15	0.16	0.22
HYDROGRAPH AT									
+	SUB-1	0.012	1	FLOW	3.64	6.69	9.54	11.87	19.16
				TIME	12.30	12.30	12.30	12.30	12.30
				VOLUME	0.45	0.75	1.04	1.27	2.00
ROUTED TO									
+	LAG-1	0.012	1	FLOW	3.64	6.69	9.54	11.87	19.16
				TIME	12.40	12.40	12.40	12.40	12.40
				VOLUME	0.45	0.75	1.04	1.27	2.00
HYDROGRAPH AT									
+	SUB-4	0.000	1	FLOW	0.22	0.33	0.42	0.48	0.67
				TIME	12.20	12.20	12.20	12.20	12.20
				VOLUME	0.02	0.03	0.04	0.04	0.06
HYDROGRAPH AT									
+	SUB-8	0.003	1	FLOW	0.63	1.32	1.98	2.53	4.26
				TIME	12.30	12.30	12.30	12.30	12.30
				VOLUME	0.07	0.13	0.20	0.25	0.42
HYDROGRAPH AT									

+	SUB-5	0.000	1	FLOW	0.19	0.27	0.33	0.38	0.54
				TIME	12.20	12.20	12.20	12.20	12.20
				VOLUME	0.02	0.03	0.03	0.04	0.05
HYDROGRAPH AT									
+	SUB-9	0.004	1	FLOW	3.26	4.88	6.30	7.42	10.83
				TIME	12.20	12.20	12.20	12.20	12.20
				VOLUME	0.33	0.48	0.60	0.71	1.01
2 COMBINED AT									
+	comb	0.005	1	FLOW	3.45	5.14	6.63	7.81	11.37
				TIME	12.20	12.20	12.20	12.20	12.20
				VOLUME	0.35	0.50	0.64	0.74	1.06
ROUTED TO									
+	BASIN2	0.005	1	FLOW	2.29	3.30	3.89	4.33	5.62
				TIME	12.40	12.40	12.40	12.40	12.40
				VOLUME	0.38	0.52	0.65	0.75	1.06
			** PEAK STAGES IN FEET **						
			1	STAGE	285.29	285.62	285.92	286.16	286.85
				TIME	12.40	12.40	12.40	12.40	12.40
HYDROGRAPH AT									
+	SUB-10	0.000	1	FLOW	0.08	0.16	0.24	0.31	0.51
				TIME	12.30	12.30	12.30	12.30	12.30
				VOLUME	0.01	0.02	0.02	0.03	0.05
5 COMBINED AT									
+	comb	0.020	1	FLOW	6.68	11.41	15.48	18.77	28.95
				TIME	12.40	12.40	12.40	12.40	12.40
				VOLUME	0.92	1.46	1.95	2.35	3.59
HYDROGRAPH AT									
+	RTRV	0.000	1	FLOW	1.86	3.31	4.55	5.33	12.03
				TIME	12.60	12.60	12.60	12.60	12.50
				VOLUME	0.47	0.72	0.94	1.12	1.67
2 COMBINED AT									
+	PT-A	0.020	1	FLOW	8.26	14.37	19.61	23.80	39.54
				TIME	12.40	12.40	12.40	12.40	12.40
				VOLUME	1.40	2.17	2.88	3.46	5.26

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