STORMWATER MANAGEMENT REPORT

for

Block 60 Lot 7

Branchburg Township

Somerset County, N.J.

Prepared by:
Templin Engineering Associates
861 Eisenhower Avenue
Bridgewater, N.J. 08807

REV 7-10-15

Robert J. Templin 2/17/04

Robert J. Templin
P.E. & L.S. 25136

Date

REV 1-24-06
REV 6-2-06
REV 2-2-07
REV 5-18-07
REV 11/04/07
REV 12/19/07
REV 10/13/14
REV 11/5/14

Proposed Project

The project consists of subdividing a 15.9 acre tract located on the south side of Dreahook Road also known as County Route 637, known as Lot 7 in Block 60 on the Branchburg Township Tax Map, into eleven building lots. The current use on the site consists of an existing two story single family dwelling, with several barns and sheds, a stone driveway and a large area of pasture to raise sheep. The soils survey for Somerset County shows the site on Sheet 19 as having the Bucks Series (BuB), Penn Series (PmC) and Abbottstown (AbB). Bucks is covering the majority of the site and is a hydrologic soil "B" type. The other soil types are in the "C" type category, however, for calculations the entire site will be considered to be in the Hydrologic "B" category.

This report will discuss the impact of the project on existing runoff rates from the site to the brook exiting at the southeasterly corner of the tract and how it conforms to both the Somerset County requirements and the Residential Site Improvement Standards (RSIS). Somerset County requires no increase in the rate of runoff after development based on assigned "existing" criteria while the RSIS requires that the runoff rate from the portion of the project under development be reduced 50 percent for the 2 year storm, 25 percent for the ten year storm and 20 percent for the 100 year storm.

The computations in this report are based on TR-55 and were performed using the Eaglepoint Software to develop hydrographs and for routing various frequency storms through the detention basin.

EXISTING CONDITION COUNTY

Somerset County requires that the existing site be considered as having no realty improvements. As the site is in agricultural use the unit hydrograph contained in Appendix A was prepared assuming the 13.74 acres of the site under development was in a pasture condition with a curve number of 46. The time of concentration was calculated to be 35 minutes for the flood hydrographs. The peak rates of runoff for the various storm frequencies are shown in Table One on page 4 for this area prior to development.

EXISTING CONDITION RSIS

A unit hydrograph was prepared for existing condition based on an impervious coverage of 0.32 acs.CN98, a wooded area of 4.0 acres CN60, lawn area of 4.0 acres CN61with a pasture area of 6.42 acres CN61. Appendix A shows the 13.74 acres with an average curve number of 62 used to develop the flood hydrographs for the various frequency storms under existing conditions. Existing peak rates of runoff for existing condition are shown in Table One on page four.

DEVELOPED AREA TO BASIN

Two unit hydrographs for the developed area to the basin area located in Appendix A . The unit hydrographs separate the impervious area from the nonimpervious areas and will be used to developed the flood hydrographs which will be combined and routed through the basin for the various storm frequencies. The developed impervious unit hydrograph shows a 2.95 acre impervious coverage (20% of buildable area of tract) with a CN98 while the pervious hydrograph has a lawn/woods area of 10.75 acres CN61 having an average curve number of 61 and time of concentration of 19.78 minutes. Flood hydrographs were developed for the 1, 2, 10 and 100 year frequency storms and routed through the detention basin.

DETENTION INFILTRATION BASIN

In order to provide water quality and ground water recharge on the site the project proposes a detention/infiltration basin. This basin will be constructed with a 12 inch sand bed over a permeable substratum to infiltrate the runoff from a two year frequency storm. This will provide for both water quality and ground water recharge under the State Stormwater Regulations.

The design of the infiltration basin located on proposed lot 7.08 consists of a berm with a top elevation of 148.0 a 45 foot wide emergency spillway with an invert of 146.25, an outlet structure with a 12 inch weir from elevation 142.75 and a top of structure at elevation 146.25. The bottom of the basin will consist of a 4000 square foot level 12 inch layer of clean sand at elevation 140.0 feet. The one year flood hydrograph was routed through the basin to determine the maximum water surface elevation to hold the one year storm. The one year storm reached an elevation of 142.68 and the 12 inch weir was set at elevation 142.75 to assure no overflow from the basin during the one year storm event.

The emergency spillway storm with an 11.25 inch 24 hour rainfall was routed through the basin assuming that the outlet structures were clogged. The reservoir characteristics are located in Appendix B for the emergency spillway basin through which the storm was routed. The emergency spillway is 45 feet wide with a crest elevation of 146.25. The water elevation in the spillway was calculated to be 146.92 feet with an

outflow of 74.04 c.f.s., a flow area of 30.15 s.f. and a velocity in the spillway of 2.48 fps. The top of berm is at elevation 148.0 feet leaving approximately one foot of freeboard.

Soil logs and permeability tests, located in Appendix C, were taken in the area of the bottom of the basin and show a fractured shale horizon from approximately 36 inches to the bottom of each test pit. The permeability increased with the depth of the log, i.e. showing a hydraulically restrictive horizon to a depth of approximately 48 inches and a permeability rate of 334 inches per hour in soil log 3 at a depth of 7'-4" and a water table at a depth of 6'-0". Based on a permeability rate of 12 inches per hour (not 3334) and a factor of safety of 2 the design permeability rate will be 6 inches per hour. The permeability test elevation was 134.67, the water table elevation was 136.0 and the bottom of the sand filter is at elevation 139.0 (more than the two foot separation required).

The reservoir and outlet structure characteristics are located in Appendix B along with the results of the routing of the various storms through the detention basin. The peak rates of runoff are shown in Table One below.

STORM WATER RECHARGE

To provide storm water recharge the infiltration basin is designed with a 4,000 square foot sand bed to provide for both water recharge and water quality. The recharge rate of 2.97 cubic feet per second is based on 50 percent of the K rate of 0.0002777 feet per second, a hydraulic gradient of 5.36 (the difference between the average water elevation of 141.37 for the one year storm and the ground water elevation of 136.0) and the sand bed area of 4,000 square feet. The basin design calls for the infiltration of 24,991 cubic feet of water for the one year storm which will require 2.34 hours which is less than the 72 hour maximum standard.

The volume of recharge required is the difference between the volumes of the existing runoff for a two year storm and the volume of runoff from the developed site. The volume of runoff from the existing site for the BMP storm (contained in Appendix A) is 0.64 acre feet or 27,878 cubic feet and the volume of runoff in the combined two year storm is 1.1722 acre feet or 51,061 cubic feet. The volume to be recharged is 23,183 cubic feet. The volume of the one year storm that is being recharged is 24,991 cubic feet which meets the BMP Standard in 7:8-5.5.

Table One

Storm Freq.	P in.	Ex. Cty cfs	ExOS cfs	Percent Allowed	Allowed cfs	Routed cfs
2	3.3	0.13	3.05	50	0.50 x 3.05=1.52	0.88
10	5.20	2.75	12.17	75	0.75x12.17=9.13	5.99
100	8.20	14.29	30.17	80	0.80x30.17=24.13	19.39

Ex.Cty - peak rate of runoff from site prior to development based on County criteria

Ex.OS - peak rate of runoff from on site based on RSIS criteria

Allow - reduced peak rate of runoff allowed from site based on RSIS criteria

Rout - peak rate of runoff discharged from basin

STORM SEWER DESIGN

Appendix C shows the design for the storm sewers associated with the development which are based on a 100 year storm frequency. It also contains the calculations for conduit outlet protection.

The offsite drainage area has been routed past the detention basin to the conduit outlet protection adjacent to the detention basin. A time of concentration of 25 minutes was assumed to make sure that the calculated rate of runoff was conservatively high. The bypass design is based on the 100 year storm and the pipe capacities in the system exceed the design rates to provide additional protection to the improvements at the site in the event of a 100 year storm. The rate of runoff to the COP is calculated to be 27.2 c.f.s. for the 100 year storm.

The velocity at the trash rack was calculated based on an invert for the weir at 142.75 and the 100 year water surface elevation of 146.19. The height of flow would be 3.44 feet. As to the area of the weir, the design calls for an 18 inch wide by 18 inch depth which when multiplied by the water height yields a gross area of 15.5 square feet. The flow rate for the 100 year storm is 19.4 c.f.s. The resultant velocity is 1.25 f.p.s. This is half the State allowable velocity of 2.5 f.p.s. and the reduction of area resulting from the ½ inch bars is negligible compared to the factor of safety provided.

LOW IMPACT DEVELOPMENT CHECKLIST

Appendix D contains the low impact checklist contained in Appendix A of the stormwater management manual prepared by the State and the maintenance specification for the sand infiltration basin. It shows the various required aspects of the design utilized to meet the State requirements.

Nonstructural Management Strategies

NJSA 7:8-5.3 (b)

1. The woodlands, wetland, wetland buffer and stream corridor located in the southwest corner of the tract has been left undisturbed in the development of this project. This are provides water quality benefits and is susceptible to soil erosion with sediment loss.
2. Development of the site with residential homes will not require a disproportionate amount of impervious surfaces. The roof runoff will flow overland to allow for infiltration and groundwater recharge. The first 700 feet of the subdivision street will be directed to a grass swale to the detention basin to disconnect the flow over impervious areas and pipes.
3. As mentioned in one above, the southwest corner of the tract will not be disturbed and the tree rows along the borders of the tract will also not be disturbed and are outside the limit of disturbance. As this property was a farm with the majority of the site cleared for fields and pasture, the protection of the remaining vegetation and the existing drainage features described above have been incorporated in the design.
4. Grassed waterways have been incorporated to maximize the time of concentration.
5. As the property was a farm, the site has already been disturbed. The proposed development will revegatate field areas and minimize additional clearing.
6. The plans note that lawn areas are to be graded with light weight construction equipment.
7. A low maintenance planting strip is proposed near the easterly tract border. The area east of this strip will grow in with native vegetation over a short period of time.
8. As mentioned previously, open channel vegetated areas are proposed to convey storm water runoff as part of the site design.
9. To provide for trash grates on the storm water inlets, trash rack on the outlet structure and an area in the detention basin which will allow settlement of suspended solids. The site is designed in accordance with Soil Conservation Standards and the application of fertilizer will be in accordance with their standards.

(c) The wetlands and wetland buffers have been incorporated into a conservation easement to be dedicated to the Township. The swales, drainage system and planting strips will likewise be dedicated to the Township to permit maintenance of the storm water measures outlined in the project in perpetuity.

CONCLUSION

The proposed project has been designed to meet the Township and State requirements for storm water management. A homeowners association will be created to maintain the storm water management facilities in accordance with State and local requirements.

To provide for water quality and groundwater recharge the basin is designed to retain and infiltrate the one year frequency storm without any discharge from the basin. A 12 inch weir in the outlet structure will control the rate of runoff for the remaining storm frequencies to the 100 year storm. The rates of runoff have been reduced significantly below the required reductions per the State R.S.I.S. criteria.

APPENDIX A

A1

UNIT HYDROGRAPH REPORT

RECORD NUMBER : 3
TYPE : CURVILINEAR UH
DESCRIPTION : EXISTING SITE RSIS

[UNIT HYDROGRAPH INFORMATION]

Peak Discharge..... = 30.11 (cfs)
Shape Factor..... = 484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
IMPERVIOUS	0.32	98
WOODS	3.00	56
LAWN	4.00	61
PASTURE	6.42	61
Overall Approximation	13.74	61

UNIT HYDROGRAPH REPORT

RECORD NUMBER : 3
TYPE : CURVILINEAR UH
DESCRIPTION : EXISTING SITE RSIS

[TIME CONCENTRATION -- TR-55]

SHEET FLOW

Manning's Roughness Coef. (n)	=	0.20000	
Flow Length (L)	=	150.00	(ft)
2-yr 24-hr Rainfall (R)	=	3.30	(in)
Land Slope (S)	=	0.02000	
Travel Time of Sheet Flow	=	16.80	(min)

SHALLOW FLOW

K_Coef (surface description) (K)	=	1.00000	
Watercourse Slope (S)	=	0.05000	
Velocity (V)	=	2.24	(ft/s)
Flow Length (L)	=	1350.00	(ft)
Travel Time of Shallow Flow	=	10.06	(min)

CHANNEL FLOW

Hydraulic Radius (R)	=	1.00	(ft)
Channel Slope (S)	=	0.03000	
Manning's Roughness Coef. (n)	=	0.05000	
Channel Velocity (V)	=	5.16	(ft/s)
Flow Length (L)	=	1300.00	(ft)
Travel Time of Shallow Flow	=	4.20	(min)

TIME OF CONCENTRATION

Time of Concentration	=	31.06	(min)

A 2-1

HYDROGRAPH REPORT

RECORD NUMBER : 2
TYPE : COMPUTED FLOOD
DESCRIPTION : EXISITNG RUNOFF RATE BMP

[HYDROGRAPH INFORMATION]

Peak Discharge	=	3.85 (cfs)
Volume	=	0.64 (acft)
Multiplication factor	=	1.00

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	3
Unit hydrograph type	=	TRIANGULAR UH
Peak Discharge	=	30.11 (cfs)
Shape Factor	=	484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
IMPERVIOUS	0.32	98
WOODS	3.00	56
LAWN	1.00	74
LAWN	3.00	61
PASTURE	1.30	74
PASTURE	5.12	61
Overall Approximation	13.74	63

A 2-2

HYDROGRAPH REPORT

RECORD NUMBER : 2
TYPE : COMPUTED FLOOD
DESCRIPTION : EXISITNG RUNOFF RATE BMP

[TIME CONCENTRATION -- TR-55]

SHEET FLOW

Manning's Roughness Coef. (n)	=	0.20000	
Flow Length (L)	=	150.00	(ft)
2-yr 24-hr Rainfall (R)	=	3.30	(in)
Land Slope (S)	=	0.02000	
Travel Time of Sheet Flow	=	16.80	(min)

SHALLOW FLOW

K_Coef (surface description) (K)	=	1.00000	
Watercourse Slope (S)	=	0.05000	
Velocity (V)	=	2.24	(ft/s)
Flow Length (L)	=	1350.00	(ft)
Travel Time of Shallow Flow	=	10.06	(min)

CHANNEL FLOW

Hydraulic Radius (R)	=	1.00	(ft)
Channel Slope (S)	=	0.03000	
Manning's Roughness Coef. (n)	=	0.05000	
Channel Velocity (V)	=	5.16	(ft/s)
Flow Length (L)	=	1300.00	(ft)
Travel Time of Shallow Flow	=	4.20	(min)

TIME OF CONCENTRATION

Time of Concentration	=	31.06	(min)

[RAINFALL DESCRIPTION]

Distribution Type	=	SCS III	
Total Precipitation	=	3.30	(in)
Return Period	=		(yr)
Storm Duration	=	24.00	(hr)

UNIT HYDROGRAPH REPORT

RECORD NUMBER : 2
TYPE : CURVILINEAR UH
DESCRIPTION : DEVELOPED SITE TO BASIN IMPERVIOUS

[UNIT HYDROGRAPH INFORMATION]

Peak Discharge..... = 10.15 (cfs)
Shape Factor..... = 484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
IMPERVIOUS	2.95	98
Overall Approximation	2.95	98

UNIT HYDROGRAPH REPORT

RECORD NUMBER : 2
TYPE : CURVILINEAR UH
DESCRIPTION : DEVELOPED SITE TO BASIN IMPERVIOUS

[TIME CONCENTRATION -- TR-55]

SHEET FLOW

Manning's Roughness Coef. (n)	=	0.20000	
Flow Length (L)	=	150.00	(ft)
2-yr 24-hr Rainfall (R)	=	3.30	(in)
Land Slope (S)	=	0.03500	
Travel Time of Sheet Flow	=	13.43	(min)

SHALLOW FLOW

K_Coef (surface description) (K)	=	1.00000	
Watercourse Slope (S)	=	0.01000	
Velocity (V)	=	1.00	(ft/s)
Flow Length (L)	=	313.00	(ft)
Travel Time of Shallow Flow	=	5.22	(min)

CHANNEL FLOW

Hydraulic Radius (R)	=	1.00	(ft)
Channel Slope (S)	=	0.03000	
Manning's Roughness Coef. (n)	=	0.05000	
Channel Velocity (V)	=	5.16	(ft/s)
Flow Length (L)	=	350.00	(ft)
Travel Time of Shallow Flow	=	1.13	(min)

TIME OF CONCENTRATION

Time of Concentration	=	19.78	(min)

UNIT HYDROGRAPH REPORT

RECORD NUMBER : 5
TYPE : CURVILINEAR UH
DESCRIPTION : DEVELOPED SITE TO BASIN WOODS/LAWN

[UNIT HYDROGRAPH INFORMATION]

Peak Discharge..... = 37.00 (cfs)
Shape Factor..... = 484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
WOODS	1.00	61
LAWN	9.75	61
Overall Approximation	10.75	61

UNIT HYDROGRAPH REPORT

RECORD NUMBER : 5
TYPE : CURVILINEAR UH
DESCRIPTION : DEVELOPED SITE TO BASIN WOODS/LAWN

[TIME CONCENTRATION -- TR-55]

SHEET FLOW

Manning's Roughness Coef. (n)	=	0.20000	
Flow Length (L)	=	150.00	(ft)
2-yr 24-hr Rainfall (R)	=	3.30	(in)
Land Slope (S)	=	0.03500	
Travel Time of Sheet Flow	=	13.43	(min)

SHALLOW FLOW

K_Coef (surface description) (K)	=	1.00000	
Watercourse Slope (S)	=	0.01000	
Velocity (V)	=	1.00	(ft/s)
Flow Length (L)	=	313.00	(ft)
Travel Time of Shallow Flow	=	5.22	(min)

CHANNEL FLOW

Hydraulic Radius (R)	=	1.00	(ft)
Channel Slope (S)	=	0.03000	
Manning's Roughness Coef. (n)	=	0.05000	
Channel Velocity (V)	=	5.16	(ft/s)
Flow Length (L)	=	350.00	(ft)
Travel Time of Shallow Flow	=	1.13	(min)

TIME OF CONCENTRATION

Time of Concentration	=	19.78	(min)

APPENDIX B

B-2

OUTLET STRUCTURE REPORT

RECORD NUMBER : 2
TYPE : RECTANGULAR WEIR SUPPRESSED
DESCRIPTION : 12 INCH WEIR

[RATING CURVE LIMIT]

Minimum Elevation..... = 142.75 (ft)
Maximum Elevation..... = 148.00 (ft)
Elevation Increment..... = 0.10 (ft)

[OUTLET STRUCTURE INFORMATION]

Crest Length..... = 1.00 (ft)
Crest Elevation..... = 142.75 (ft)

Coefficient Cw..... = 3.00000
Exponential..... = 1.50000

[RECTANGULAR SUPPRESSED WEIR EQUATION]

Q = Cw*L*H^exp
H = Headwater depth, (ft)
L = Crest length, (ft)

[Discharge vs. Stage]
(the elevation increment is 0.20)

STAGE	ELEVATION (ft)	FLOW (cfs)
0.00	142.75	0.00
0.20	142.95	0.27
0.40	143.15	0.76
0.60	143.35	1.39
0.80	143.55	2.15
1.00	143.75	3.00
1.20	143.95	3.94
1.40	144.15	4.97
1.60	144.35	6.07
1.80	144.55	7.25
2.00	144.75	8.49
2.20	144.95	9.79
2.40	145.15	11.16
2.60	145.35	12.58
2.80	145.55	14.06
3.00	145.75	15.59
3.20	145.95	17.17
3.40	146.15	18.81
3.60	146.35	20.49
3.80	146.55	22.22

B-3

RESERVOIR REPORT

RECORD NUMBER : 1
STORAGE TYPE : MAN STAGE/AREA
DISCHARGE TYPE : COMP STAGE/DISC
DESCRIPTION : DETENTION BASIN

[RATING CURVE LIMIT]

Minimum Elevation..... = 140.00 (ft)
Maximum Elevation..... = 148.00 (ft)
Elevation Increment..... = 0.10 (ft)

[STAGE STORAGE INFORMATION]

Input file = NULL
Output file = NULL

[Manual Contour Area vs. Elevation]

ELEVATION (ft)	CONTOUR AREA (sqft)
140.00	4055.00
142.00	11910.00
144.00	16664.00
146.00	22063.00
148.00	27630.00

[STAGE DISCHARGE INFORMATION]

OUTLET STRUCTURE:
STR # : 2
TYPE : RECTANGULAR WEIR SUPPRESSED
DESCRIPTION : 12 INCH WEIR

[Reservoir Discharge vs. Stage]
(the elevation increment is 0.20)

STAGE (ft)	ELEVATION (ft)	CONTOUR AREA (sqft)	STORAGE (cuft)	DISCHARGE (cfs)
0.00	140.00	4055.00	0.00	0.00
0.20	140.20	4840.49	889.55	0.00
0.40	140.40	5625.98	1936.20	0.00
0.60	140.60	6411.52	3139.95	0.00
0.80	140.80	7197.01	4500.80	0.00

RESERVOIR REPORT

RECORD NUMBER : 1
STORAGE TYPE : MAN STAGE/AREA

DISCHARGE TYPE : COMP STAGE/DISC
DESCRIPTION : DETENTION BASIN

[Reservoir Discharge vs. Stage]
(the elevation increment is 0.20)

STAGE (ft)	ELEVATION (ft)	CONTOUR AREA (sqft)	STORAGE (cuft)	DISCHARGE (cfs)
1.00	141.00	7982.50	6018.75	0.00
1.20	141.20	8767.99	7693.80	0.00
1.40	141.40	9553.48	9525.95	0.00
1.60	141.60	10339.02	11515.20	0.00
1.80	141.80	11124.51	13661.55	0.00
2.00	142.00	11910.00	15965.00	0.00
2.20	142.20	12385.39	18394.54	0.00
2.40	142.40	12860.79	20919.16	0.00
2.60	142.60	13336.21	23538.87	0.00
2.80	142.80	13811.61	26253.65	0.03
3.00	143.00	14287.00	29063.51	0.38
3.20	143.20	14762.39	31968.45	0.91
3.40	143.40	15237.79	34968.46	1.57
3.60	143.60	15713.21	38063.57	2.35
3.80	143.80	16188.61	41253.75	3.23
4.00	144.00	16664.00	44539.01	4.19
4.20	144.20	17203.89	47925.80	5.24
4.40	144.40	17743.78	51420.57	6.36
4.60	144.60	18283.72	55023.32	7.55
4.80	144.80	18823.61	58734.05	8.81
5.00	145.00	19363.50	62552.76	10.13
5.20	145.20	19903.39	66479.45	11.51
5.40	145.40	20443.28	70514.12	12.94
5.60	145.60	20983.22	74656.77	14.44
5.80	145.80	21523.11	78907.41	15.98
6.00	146.00	22063.00	83266.02	17.58
6.20	146.20	22619.69	87734.29	19.23
6.40	146.40	23176.38	92313.90	20.92
6.60	146.60	23733.12	97004.84	22.67
6.80	146.80	24289.81	101807.13	24.46
7.00	147.00	24846.50	106720.77	26.29
7.20	147.20	25403.19	111745.74	28.17
7.40	147.40	25959.88	116882.05	30.09
7.60	147.60	26516.62	122129.70	32.05
7.80	147.80	27073.31	127488.69	34.05
8.00	148.00	27630.00	132959.02	36.09

B-5

OUTLET STRUCTURE REPORT

RECORD NUMBER : 3
TYPE : RECTANGULAR WEIR SUPPRESSED
DESCRIPTION : 45 FOOT EMERGENCY SPILLWAY

[RATING CURVE LIMIT]

Minimum Elevation.....	=	146.25 (ft)
Maximum Elevation.....	=	148.00 (ft)
Elevation Increment.....	=	0.10 (ft)

[OUTLET STRUCTURE INFORMATION]

Crest Length.....	=	45.00 (ft)
Crest Elevation.....	=	146.25 (ft)
Coefficient Cw.....	=	3.00000
Exponential.....	=	1.50000

[RECTANGULAR SUPPRESSED WEIR EQUATION]

Q = Cw*L*H^exp
H = Headwater depth, (ft)
L = Crest length, (ft)

[Discharge vs. Stage]
(the elevation increment is 0.20)

STAGE	ELEVATION (ft)	FLOW (cfs)
0.00	146.25	0.00
0.20	146.45	12.08
0.40	146.65	34.16
0.60	146.85	62.75
0.80	147.05	96.61
1.00	147.25	135.01
1.20	147.45	177.48
1.40	147.65	223.65
1.60	147.85	273.25
1.75	148.00	312.53

HYDROGRAPH REPORT

RECORD NUMBER : 4
TYPE : COMPUTED FLOOD
DESCRIPTION : 2 YEAR STORM DEVELOPED IMPERVIOUS

[HYDROGRAPH INFORMATION]

Peak Discharge	=	6.42 (cfs)
Volume	=	0.75 (acft)
Multiplication factor	=	1.00

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	2
Unit hydrograph type	=	CURVILINEAR UH
Peak Discharge	=	10.15 (cfs)
Shape Factor	=	484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
IMPERVIOUS	2.95	98
Overall Approximation	2.95	98

HYDROGRAPH REPORT

RECORD NUMBER : 17
TYPE : COMPUTED FLOOD
DESCRIPTION : 2 YEAR STORM DEVELOPED LAWN/WOODS

[HYDROGRAPH INFORMATION]

Peak Discharge.....	=	2.82 (cfs)
Volume.....	=	0.43 (acft)
Multiplication factor.....	=	1.00

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #.....	=	5
Unit hydrograph type.....	=	CURVILINEAR UH
Peak Discharge.....	=	37.00 (cfs)
Shape Factor.....	=	484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
WOODS	1.00	61
LAWN	9.75	61
Overall Approximation	10.75	61

HYDROGRAPH REPORT

RECORD NUMBER : 18
TYPE : COMBINE
DESCRIPTION : 2 YEAR COMBINED DEVELOPED AREA TO BASIN

[HYDROGRAPH INFORMATION]

Peak Discharge..... = 8.95 (cfs)
Volume..... = 1.19 (acft)

[COMBINE HYDROGRAPH RECORD #]

HYDROGRAPH # 4 TYPE : COMPUTED FLOOD
DESCRIPTION : 2 YEAR STORM DEVELOPED IMPERVIOUS
Peak Discharge..... = 6.42 (cfs)
Time to Peak..... = 12.20 (hr)
Time Interval..... = 0.05 (hr)

HYDROGRAPH # 17 TYPE : COMPUTED FLOOD
DESCRIPTION : 2 YEAR STORM DEVELOPED LAWN/WOODS
Peak Discharge..... = 2.82 (cfs)
Time to Peak..... = 12.35 (hr)
Time Interval..... = 0.05 (hr)

HYDROGRAPH REPORT

RECORD NUMBER : 6
TYPE : RESER MOD. PULS
DESCRIPTION : 2 YEAR STORM THRU BASIN

[HYDROGRAPH INFORMATION]

Peak Discharge	=	0.88 (cfs)
Volume	=	1.15 (acft)
Peak Elevation	=	143.09 (ft)

[INFLOW HYDROGRAPH INFORMATION]

Hydrograph #	=	18
Hydrograph Description	=	2 YEAR COMBINED DEVELOPED AREA TO BASIN

HYDROGRAPH REPORT

RECORD NUMBER : 3
TYPE : COMPUTED FLOOD
DESCRIPTION : 10 YEAR STORM DEVELOPED IMPERVIOUS

[HYDROGRAPH INFORMATION]

Peak Discharge	=	10.20 (cfs)
Volume	=	1.22 (acft)
Multiplication factor	=	1.00

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	2
Unit hydrograph type	=	CURVILINEAR UH
Peak Discharge	=	10.15 (cfs)
Shape Factor	=	484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
IMPERVIOUS	2.95	98
Overall Approximation	2.95	98

HYDROGRAPH REPORT

RECORD NUMBER : 19
TYPE : COMPUTED FLOOD
DESCRIPTION : 10 YEAR STORM DEVELOPED LAWN/WOODS

[HYDROGRAPH INFORMATION]

Peak Discharge	=	11.60 (cfs)
Volume	=	1.34 (acft)
Multiplication factor	=	1.00

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	5
Unit hydrograph type	=	CURVILINEAR UH
Peak Discharge	=	37.00 (cfs)
Shape Factor	=	484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
WOODS	1.00	61
LAWN	9.75	61
Overall Approximation	10.75	61

HYDROGRAPH REPORT

RECORD NUMBER : 20
TYPE : COMBINE
DESCRIPTION : 10 YEAR COMBINED DEVELOPED AREA TO BASIN

[HYDROGRAPH INFORMATION]

Peak Discharge..... = 21.69 (cfs)
Volume..... = 2.56 (acft)

[COMBINE HYDROGRAPH RECORD #]

HYDROGRAPH # 3 TYPE : COMPUTED FLOOD
DESCRIPTION : 10 YEAR STORM DEVELOPED IMPERVIOUS
Peak Discharge..... = 10.20 (cfs)
Time to Peak..... = 12.20 (hr)
Time Interval..... = 0.05 (hr)

HYDROGRAPH # 19 TYPE : COMPUTED FLOOD
DESCRIPTION : 10 YEAR STORM DEVELOPED LAWN/WOODS
Peak Discharge..... = 11.60 (cfs)
Time to Peak..... = 12.25 (hr)
Time Interval..... = 0.05 (hr)

HYDROGRAPH REPORT

RECORD NUMBER : 8
TYPE : RESER MOD. PULS
DESCRIPTION : 10 YEAR STORM THRU BASIN

[HYDROGRAPH INFORMATION]

Peak Discharge.....	=	5.99 (cfs)
Volume.....	=	2.49 (acft)
Peak Elevation.....	=	144.29 (ft)

[INFLOW HYDROGRAPH INFORMATION]

Hydrograph #.....	=	20
Hydrograph Description.....	=	10 YEAR COMBINED DEVELOPED AREA TO BASIN

HYDROGRAPH REPORT

RECORD NUMBER : 1
TYPE : COMPUTED FLOOD
DESCRIPTION : 100 YEAR STORM DEVELOPED IMPERVIOUS

[HYDROGRAPH INFORMATION]

Peak Discharge.....	=	16.15 (cfs)
Volume.....	=	1.96 (acft)
Multiplication factor.....	=	1.00

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #.....	=	2
Unit hydrograph type.....	=	CURVILINEAR UH
Peak Discharge.....	=	10.15 (cfs)
Shape Factor.....	=	484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
IMPERVIOUS	2.95	98
Overall Approximation	2.95	98

HYDROGRAPH REPORT

RECORD NUMBER : 14
TYPE : COMPUTED FLOOD
DESCRIPTION : 100 YEAR STORM DEVELOPED LAWN/WOODS

[HYDROGRAPH INFORMATION]

Peak Discharge.....	=	30.18 (cfs)
Volume.....	=	3.23 (acft)
Multiplication factor.....	=	1.00

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #.....	=	5
Unit hydrograph type.....	=	CURVILINEAR UH
Peak Discharge.....	=	37.00 (cfs)
Shape Factor.....	=	484.00

[BASIN DESCRIPTION]

[WEIGHTED WATERSHED AREA]

DESCRIPTION	AREA	CN#
WOODS	1.00	61
LAWN	9.75	61
Overall Approximation	10.75	61

HYDROGRAPH REPORT

RECORD NUMBER : 15
TYPE : COMBINE
DESCRIPTION : 100 YEAR COMBINED DEVELOPED AREA TO BASIN

[HYDROGRAPH INFORMATION]

Peak Discharge..... = 46.14 (cfs)
Volume..... = 5.19 (acft)

[COMBINE HYDROGRAPH RECORD #]

HYDROGRAPH # 1 TYPE : COMPUTED FLOOD
DESCRIPTION : 100 YEAR STORM DEVELOPED IMPERVIOUS
Peak Discharge..... = 16.15 (cfs)
Time to Peak..... = 12.20 (hr)
Time Interval..... = 0.05 (hr)

HYDROGRAPH # 14 TYPE : COMPUTED FLOOD
DESCRIPTION : 100 YEAR STORM DEVELOPED LAWN/WOODS
Peak Discharge..... = 30.18 (cfs)
Time to Peak..... = 12.25 (hr)
Time Interval..... = 0.05 (hr)

HYDROGRAPH REPORT

RECORD NUMBER : 9
TYPE : RESER MOD. PULS
DESCRIPTION : 100 YEAR STORM THRU BASIN

[HYDROGRAPH INFORMATION]

Peak Discharge.....	=	19.39 (cfs)
Volume.....	=	5.08 (acft)
Peak Elevation.....	=	146.19 (ft)

[INFLOW HYDROGRAPH INFORMATION]

Hydrograph #.....	=	15
Hydrograph Description.....	=	100 YEAR COMBINED DEVELOPED AREA TO BASIN

HYDROGRAPH REPORT

RECORD NUMBER : 10
TYPE : RESER MOD. PULS
DESCRIPTION : EMERGENCY SPILLWAY

[HYDROGRAPH INFORMATION]

Peak Discharge	=	74.04 (cfs)
Volume	=	6.26 (acft)
Peak Elevation	=	146.92 (ft)

[INFLOW HYDROGRAPH INFORMATION]

Hydrograph #	=	11
Hydrograph Description	=	EMERGENCY SPILLWAY STORM

HYDROGRAPH REPORT

RECORD NUMBER : 22
TYPE : COMBINE
DESCRIPTION : COMBINED 1 YEAR STORM TO BASIN

[HYDROGRAPH INFORMATION]

Peak Discharge..... = 5.71 (cfs)
Volume..... = 0.83 (acft)

[COMBINE HYDROGRAPH RECORD #]

HYDROGRAPH # 5 TYPE : COMPUTED FLOOD
DESCRIPTION : 1 YEAR STORM DEVELOPED IMPERVIOUS
Peak Discharge..... = 5.05 (cfs)
Time to Peak..... = 12.20 (hr)
Time Interval..... = 0.10 (hr)

HYDROGRAPH # 21 TYPE : COMPUTED FLOOD
DESCRIPTION : 1 YEAR STORM DEVELOPED LAWN/WOODS
Peak Discharge..... = 1.15 (cfs)
Time to Peak..... = 12.50 (hr)
Time Interval..... = 0.10 (hr)

APPENDIX C

INLET	AREA	C	ΔCxA	ΣCxA	Tc	I	Q	PIPE	SLOPE	QMAX	V
18-17	2.5	0.40	1.00	1.00	25MIN	5.2	5.2	15"	1.0	6.8	
17-16	0.4	0.60	0.24	1.24	25M	5.2	6.4	15"	1.0	6.8	
16-15	0	0	0	1.24	25M	5.2	6.4	15"	1.0	6.8	
14A-14	0.07	0.6	0.04	0.04	5	8	0.3	15"	1.0	6.8	
14-13	0.63	0.4	0.25	0.29	15	6.8	1.97	15"	4.95	14.0	
13A-13	2.7	0.4	1.08	1.37	15	6.8	9.3	15	1.0	6.8	
13-12	0.4	0.4	0.16	1.53	16	6.7	10.3	24	1.73	30.6	
12A-12	2.1	0.4	0.84	0.84	15	6.8	5.7	15"	1.0	6.8	
12-11	0.6	0.4	0.24	2.61	17	6.3	16.4	27"	1.41	30.6	
11-10	—	—	—	—	—	—	16.4	30"	1.0	44	

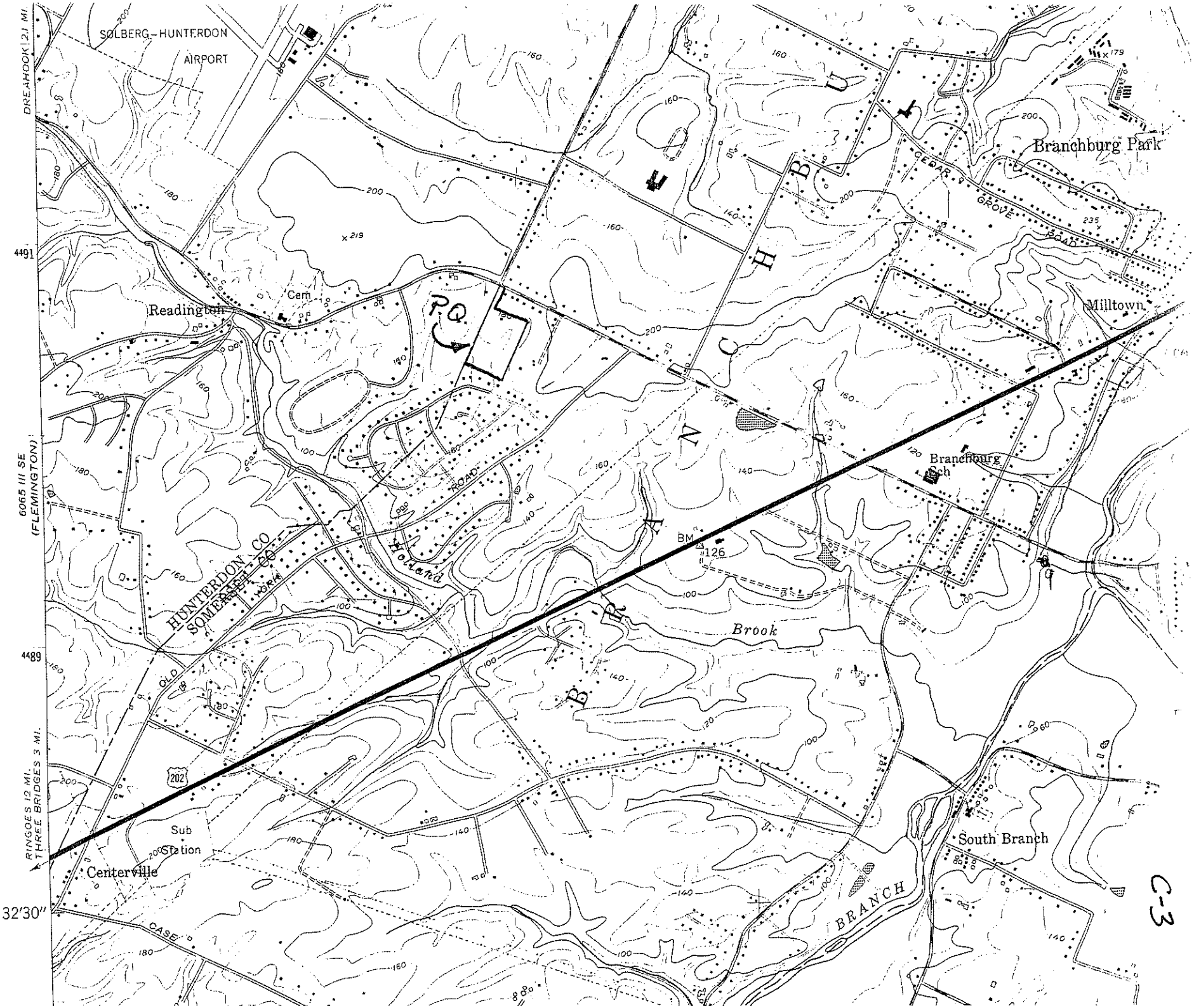
DESIGN FOR 100 YEAR STORM.

INLET	AREA	C	ΔCxA	ΣCxA	Tc	I	Q	PIPE	SLOPE	QMAX	V
8→7	4.1	0.4	1.64	1.64	20M	5.7	9.3	18	6.25	25	
7→5	—	—	—	—			9.3	18	1.90	15.6	
6→5	9.0	0.4	3.60	3.6	25M	5.2	27.2	24"	4.17	46.7	
5-4	—	—				100 YEAR	27.2	27"	2.23	50.8	
4-3							27.2	27	2.26	5.0	
3-1							27.2	30	0.50	36.5	
1→FES							27.2	36"	0.5%	50.2	

REV 7/10/15

BY PASS DESIGN FOR 100 YEAR STORM.

TC KEPT SHORT FOR CONSERVATIVE HIGH PEAK RUNOFF RATES.


SOLBERG-HUNTERDON AIRPORT
DREAHOOK 2.1 MI.
6065 III SE (FLEMINGTON)
RINGOES 1.2 MI.
THREE BRIDGES 3 MI.
4491
4489
32'30"
Readington
Cem
Branchburg Park
CEDAR GROVE ROAD
Milltown
Branchburg Sch
BM 126
HUNTERDON CO
SOMERSET CO
Holland ROAD
OLD
202
Sub Station
Centerville
CASE
South Branch
BRANCH
Brook
RQ
C-3

C-4

SOMERSET COUNTY, NEW JERSEY

GRASS WATERWAY DESIGN

T_c - 25 MIN $I = 4.2$ 100 YEAR $I = 5.1$
25 YEAR STORM RET D - .036
**/ RET E - .058

SWALE S1 B = 36"

$A = 1.1$ AC. $C = 0.25$ $I_{25} = 4.2$ $Q = 1.15$ CFS $S = 0.038$

RET D - V = 2.1 F/S $I_{100} = 5.1$ $Q_{100} = 1.4$ RET D - V = 2.43 F/S
RET E - V = 1.5 F/S $I_{100} = 5.1$ $Q_{100} = 1.4$ RET E - 1.77 F/S

**

SWALE S2 B = 36"

$A = 2.3$ AC $C = 0.25$ $I = 4.2$ $Q_{25} = 2.4$ $S = 0.017$

RET D - V = 2.0 F/S $I_{100} = 5.1$ $Q_{100} = 2.93$ RET D - V - 2.59
RET E - V = 1.46 F/S ** RET E - V - 2.06

SWALE S3 B = 36"

$A = 0.4$ AC $C = 0.25$ $I = 4.2$ $Q_{25} = 0.4$ $S = 0.05$

RET D - V = 1.59 F/S
RET E - V = 1.17 F/S

$Q_{100} = 0.5$
RET D - V = 1.73 **
RET E - V = 1.27

SWALE S4 B = 36"

$A = 1.5$ AC $C = 0.25$ $I = 4.2$ $Q_{25} = 1.6$ $S = 0.05$

RET D - V = 2.54 F/S
RET E - V = 1.85 F/S

$Q_{100} = 1.93$ **
RET D - V = 2.77
RET E - V = 2.01

SWALE S5 B = 36"

$A = 2.5$ AC $C = 0.25$ $I = 4.2$ $Q_{25} = 2.6$ $S = 0.036$

RET D - V = 2.63 F/S
RET E - V = 1.89 F/S

$Q_{100} = 3.14$ **
RET D - V = 2.90
RET E - V = 2.09

SWALE S6 B = 72"

$A = 5.0$ AC $C = 0.3$ $I = 4.2$ $Q_{25} = 6.4$ $S = 0.03$

RET D - V = 2.98 F/S
RET E - V = 2.17 F/S

$Q_{100} = 7.74$ **
RET D - V = 3.09
RET E - V = 2.23

CONDUIT OUTLET PROTECTION

FES 15

$D_o = 1.25$ $Q_{25} = 6.4$ CFS $q = 5.12$ $T_w = 0.33$

$L_A = \frac{1.8q}{D_o^{1/2}} + 7D_o = 17'$

$W_A = 6'$ AT BOTTOM + 1½' EACH SIDE (9')

$D_{50} = 4"$ (GABION LINING) $T = 12"$

HW10

$D_o = 2.5'$ $Q_{25} = 13.0$ $q = 5.2$ $T_w = 2'$

$L_A = \frac{3q}{D_o^{1/2}} = 9.9'$ USE 24'

$W_A = 3W_o + .4L_A = 12'$

$D_{50} = 0.07$ USE 4" (GABION LINING) $T = 12"$

FES @ DETENTION BASIN OUTLET

$D_o = 2.5$ $Q_{25} = 18.7$ $q = 7.48$ $T_w = 0.5$

$L_A = 26'$

$W_A =$ MATCH CHANNEL (10'±)

$D_{50} = 0.46'$ USE 6" $T = 12"$

TRASH RACK VELOCITY

INV. 12" WEIR 142.75 : 100 YEAR ELE. 146.19

FLOW HEIGHT 3.44' - WEIR AREA = 4.5 x 3.44 = 15.5

$Q_{100} = 19.4$ CFS $V = 19.4 \div 15.5 = 1.25$ FT/SEC

$V_{ALLOWED} = 2.5$ FT/SEC

APPENDIX D

MAINTENANCE PLAN - FLATWATER FARMS INFILTRATION BASIN

Responsible Party for maintenance and of infiltration basin:

Flatwater Farms Homeowners Association
569 Mountainview Terrace
Dunellen, N.J. 08812
Phone 908-625-8723

General Maintenance

The infiltration basin shall be inspected for clogging, sediment accumulation and excessive debris four times a year as well as after every storm having one inch of rainfall. The inspection shall include the bottom of the infiltration basin, the emergency spill way, the outlet structure and the rip-rap at the inflow and discharge points at the basin.

Sediment removal shall take place when the basin is dry and be disposed of in accordance with state, local and federal guidelines at a suitable disposal/recycling site. The cost estimate for sediment/debris removal is $1,000.00 per year. Detailed logs of all inspections, preventive and corrective measures shall be kept relating to the maintenance of the basin.

Vegetated Areas

Vegetated areas on the sides of the infiltration basin shall be mowed a minimum of once a month between April to November. All vegetated areas shall be inspected twice a year for unwanted growth which shall be removed with minimum disruption to the remaining vegetation and soil. These areas shall be inspected once a year for erosion and scour. Trees are not permitted in the sand bed area and unwanted growth shall be removed at least once a year. Estimated cost for mowing is $1,500.00 per year.

When establishing or restoring vegetation, biweekly inspections shall be made of the vegetation health during the first growing season or until the vegetation is established. Once established, inspections of its health, density and diversity should be performed at least twice annually during the growing and non-growing season. If vegetation has greater than 50 percent damage, the area shall be reestablished in accordance with the original specifications and the inspection requirements above.

The use of fertilizers, mechanical treatments, pesticides and other means to assure optimum vegetation health must not compromise the intended purpose of the infiltration basin. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

Structural Components

All structural components must be inspected annually for cracking, subsidence, spalling, erosion and deterioration. Repairs and or replacement shall be made as necessary to assure the proper functioning of the basin.

Sand Bed Maintenance

The basin is designed to drain in less than 36 hours for the design storm of 3.3 inches, if the basin does not drain hours then the Township Engineer shall be contacted to determine if it is the result of the basins bottom surface, subsoil, groundwater and or tailwater levels. Appropriate measures shall be taken to comply with his recommendations and the proper functioning of the basin.

The bottom sand layer in the basin shall be inspected monthly as well as after a one inch rainfall. If the water fails to infiltrate 72 hours after the end of the 3.3 inch rain storm corrective measures must be taken such as tilling of the sand bed by light equipment. Estimated cost of maintenance $350.00 per year.

D-3

New Jersey Stormwater Best Management Practices Manual

February 2004

http://www.state.nj.us/dep/watershedmgt/bmpmanualfeb2004.htm

APPENDIX A

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

According to the NJDEP Stormwater Management Rules at N.J.A.C. 7:8, the groundwater recharge, stormwater quality, and stormwater quantity standards established by the Rules for major land development projects must be met by incorporating nine specific nonstructural stormwater management strategies into the project's design to the maximum extent practicable.

To accomplish this, the Rules require an applicant seeking land development approval from a regulatory board or agency to identify those nonstructural strategies that have been incorporated into the project's design. In addition, if an applicant contends that it is not feasible to incorporate any of the specific strategies into the project's design, particularly for engineering, environmental, or safety reasons, the Rules further require that the applicant provide a basis for that contention.

This checklist has been prepared to assist applicants, site designers, and regulatory boards and agencies in ensuring that the nonstructural stormwater management requirements of the Rules are met. It provides an applicant with a means to identify both the nonstructural strategies incorporated into the development's design and the specific low impact development BMPs (LID-BMPs) that have been used to do so. It can also help an applicant explain the engineering, environmental, and/or safety reasons that a specific nonstructural strategy could not be incorporated into the development's design.

The checklist can also assist municipalities and other land development review agencies in the development of specific requirements for both nonstructural strategies and LID-BMPs in zoning and/or land use ordinances and regulations. As such, where requirements consistent with the Rules have been adopted, they may supersede this checklist.

Finally, the checklist can be used during a pre-design meeting between an applicant and pertinent review personnel to discuss local nonstructural strategies and LID-BMPs requirements in order to optimize the development's nonstructural stormwater management design.

Since this checklist is intended to promote the use of nonstructural stormwater management strategies and provide guidance in their incorporation in land development projects, municipalities are permitted to revise it as necessary to meet the goals and objectives of their specific stormwater management program and plan within the limits of N.J.A.C. 7:8.

D-4

Low Impact Development Checklist

A checklist for identifying nonstructural stormwater management strategies incorporated into proposed land development

Municipality: BRANCHBURG

County: SOMERSET Date: 6-1-06

Review board or agency: PLANNING BOARD

Proposed land development name:

Lot(s): 7 Block(s): 60

Project or application number:

Applicant's name: TOM SCHLEPPENBACH

Applicant's address: 569 MOUNTAINVIEW TERRACE

DUNELLEN NJ. 08812

Telephone: 9086258723 Fax: 732-424-8360

Email address:

Designer's name: ROBERT J. TEMPLIN

Designer's address: 861 EISENHOWER AVENUE

BRIDGEWATER NJ 08807

Telephone: 908 231 1616 Fax: 908 231 1894

Email address:

Part 1: Description of Nonstructural Approach to Site Design

In narrative form, provide an overall description of the nonstructural stormwater management approach and strategies incorporated into the proposed site's design. Attach additional pages as necessary. Details of each nonstructural strategy are provided in Part 3 below.

THE APPLICANT REQUESTED A WAIVER FOR REDUCED PAVEMENT WIDTH, ELIMINATION OF SIDEWALKS AND A 40' RADIUS CUL-DE-SAC IN ORDER TO REDUCE THE AMOUNT OF NEW IMPERVIOUS COVERAGE.

THE APPLICANT PROPOSES LESS IMPERVIOUS COVERAGE THAN IS ALLOWED BY ZONING.

A GRASS SWALE IS PROPOSED TO DRAIN A PORTION OF THE SITE TO THE DETENTION BASIN INCREASING TIME OF CONCENTRATION AND AIDING IN PROVIDING WATER QUALITY.

ROOF LEADERS WILL DRAIN OVERLAND AND ARE NOT CONNECTED TO STORM DRAINS.

D-6

Part 2: Review of Local Stormwater Management Regulations

Title and date of stormwater management regulations used in development design:

None

Do regulations include nonstructural requirements? Yes: _____ No: _____

If yes, briefly describe: _____

List LID-BMPs prohibited by local regulations: _____

Pre-design meeting held? Yes: _____ Date: _____ No: _____

Meeting held with: _____

Pre-design site walk held? Yes: _____ Date: _____ No: _____

Site walk held with: _____

Other agencies with stormwater review jurisdiction:

Name: _____

Required approval: _____

Name: _____

Required approval: _____

Name: _____

Required approval: _____

Part 3: Nonstructural Strategies and LID-BMPs in Design

3.1 Vegetation and Landscaping

Effective management of both existing and proposed site vegetation can reduce a development's adverse impacts on groundwater recharges and runoff quality and quantity. This section of the checklist helps identify the vegetation and landscaping strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to help maintain existing recharge rates and/or minimize or prevent increases in runoff quantity and pollutant loading.

A. Has an inventory of existing site vegetation been performed? Yes: ✓ No: _____

If yes, was this inventory a factor in the site's layout and design? Yes: ✓ No: _____

B. Does the site design utilize any of the following nonstructural LID-BMPs?

Preservation of natural areas? Yes: ✓ No: _____ If yes, specify % of site: 20

Native ground cover? Yes: ✓ No: _____ If yes, specify % of site: 20

Vegetated buffers? Yes: ✓ No: ← ROOF RUNOFF → If yes, specify % of site: 10

C. Do the land development regulations require these nonstructural LID-BMPs?

Preservation of natural areas? Yes: _____ No: ✓ If yes, specify % of site: _____

Native ground cover? Yes: _____ No: ✓ If yes, specify % of site: _____

Vegetated buffers? Yes: _____ No: ✓ If yes, specify % of site: _____

D. If vegetated filter strips or buffers are utilized, specify their functions:

Reduce runoff volume increases through lower runoff coefficient: Yes: ✓ No: _____

Reduce runoff pollutant loads through runoff treatment: Yes: ✓ No: _____

Maintain groundwater recharge by preserving natural areas: Yes: ✓ No: _____

3.2 Minimize Land Disturbance

Minimizing land disturbance is a nonstructural LID-BMP that can be applied during both the development's construction and post-construction phases. This section of the checklist helps identify those land disturbance strategies and nonstructural LID-BMPs that have been incorporated into the proposed development's design to minimize land disturbance and the resultant change in the site's hydrologic character.

A. Have inventories of existing site soils and slopes been performed? Yes: X No: _____

If yes, were these inventories factors in the site's layout and design? Yes: Y No: _____

B. Does the development's design utilize any of the following nonstructural LID-BMPs?

Restrict permanent site disturbance by land owners? Yes: X No: _____

If yes, how: DRAINAGE EASEMENT AROUND WETLAND AREAS.

Restrict temporary site disturbance during construction? Yes: X No: _____

If yes, how: TREE PROTECTION IN AREAS OF EXISTING VEGETATION, WETLANDS AND TREE ROWS ALONG TRACT BOUNDARY.

Consider soils and slopes in selecting disturbance limits? Yes: _____ No: X

If yes, how: _____

C. Specify percentage of site to be cleared: < 5 Regraded: 55

NOT HEAVILY WOODED

D. Specify percentage of cleared areas done so for buildings: 3

For driveways and parking: 1 For roadways: 1

E. What design criteria and/or site changes would be required to reduce the percentages in C and D above?

THE AREA OF DEVELOPMENT IS GENERALLY LAWN AND PASTURE AS SITE IS A FARM USE.

F. Specify site's hydrologic soil group (HSG) percentages:

HSG A: _____ HSG B: 90 HSG C: 10 HSG D: _____

G. Specify percentage of each HSG that will be permanently disturbed:

HSG A: _____ HSG B: 50 HSG C: — HSG D: _____

H. Locating site disturbance within areas with less permeable soils (HSG C and D) and minimizing disturbance within areas with greater permeable soils (HSG A and B) can help maintain groundwater recharge rates and reduce runoff volume increases. In light of the HSG percentages in F and G above, what other practical measures if any can be taken to achieve this?

NONE

I. Does the site include Karst topography? Yes: _____ No: X

If yes, discuss measures taken to limit Karst impacts:

D-10

3.3 Impervious Area Management

New impervious surfaces at a development site can have the greatest adverse effect on groundwater recharge and stormwater quality and quantity. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into a proposed development's design to comprehensively manage the extent and impacts of new impervious surfaces.

A. Specify impervious cover at site: Existing: 3% Proposed: 20%

B. Specify maximum site impervious coverage allowed by regulations: 40%

C. Compare proposed street cartway widths with those required by regulations:

Type of Street	Proposed Cartway Width (feet)	Required Cartway Width (feet)
Residential access – low intensity	30	28'
Residential access – medium intensity		
Residential access – high intensity with parking		
Residential access – high intensity without parking		
Neighborhood		
Minor collector – low intensity without parking		
Minor collector – with one parking lane		
Minor collector – with two parking lanes		
Minor collector – without parking		
Major collector		

D. Compare proposed parking space dimensions with those required by regulations:

Proposed: _____ Regulations: N/A

E. Compare proposed number of parking spaces with those required by regulations:

Proposed: _____ Regulations: N/A

F. Specify percentage of total site impervious cover created by buildings: 4.5

By driveways and parking: 3.5 By roadways: 12

G. What design criteria and/or site changes would be required to reduce the percentages in F above?

ELIMINATE SIDEWALKS, REDUCE PAVEMENT WIDTH

H. Specify percentage of total impervious area that will be unconnected:

Total site: 10.5 Buildings: 4.5 Driveways and parking: 6% Roads: 50%

I. Specify percentage of total impervious area that will be porous: ← ?

Total site: 0 Buildings: _____ Driveways and parking: _____ Roads: _____

J. Specify percentage of total building roof area that will be vegetated: 0

K. Specify percentage of total parking area located beneath buildings: 0

L. Specify percentage of total parking located within multi-level parking deck: 0

3.4 Time of Concentration Modifications

Decreasing a site's time of concentration (Tc) can lead directly to increased site runoff rates which, in turn, can create new and/or aggravate existing erosion and flooding problems downstream. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to effectively minimize such Tc decreases.

When reviewing Tc modification strategies, it is important to remember that a drainage area's Tc should reflect the general conditions throughout the area. As a result, Tc modifications must generally be applied throughout a drainage area, not just along a specific Tc route.

A. Specify percentage of site's total stormwater conveyance system length that will be:

Storm sewer: 50 Vegetated swale: 30 Natural channel: 0

Stormwater management facility: _____ Other: _____

Note: the total length of the stormwater conveyance system should be measured from the site's downstream property line to the downstream limit of sheet flow at the system's headwaters.

B. What design criteria and/or site changes would be required to reduce the storm sewer percentages and increase the vegetated swale and natural channel percentages in A above?

NONE

C. In conveyance system subareas that have overland or sheet flow over impervious surfaces or turf grass, what practical and effective site changes can be made to:

Decrease overland flow slope: NONE

Increase overland flow roughness: NONE

3.5 Preventative Source Controls

The most effective way to address water quality concerns is by pollution prevention. This section of the checklist helps identify those nonstructural strategies and LID-BMPs that have been incorporated into the proposed development's design to reduce the exposure of pollutants to prevent their release into the stormwater runoff.

A. Trash Receptacles

Specify the number of trash receptacles provided: 10

Specify the spacing between the trash receptacles: 150'

Compare trash receptacles proposed with those required by regulations:

Proposed: 10 Regulations: 10

B. Pet Waste Stations

Specify the number of pet waste stations provided: 0

Specify the spacing between the pet waste stations: 0

Compare pet waste stations proposed with those required by regulations:

Proposed: _____ Regulations: N/A

C. Inlets, Trash Racks, and Other Devices that Prevent Discharge of Large Trash and Debris

Specify percentage of total inlets that comply with the NJPDES storm drain inlet criteria: 100

D. Maintenance

Specify the frequency of the following maintenance activities:

Street sweeping: Proposed: NONE Regulations: NONE

Litter collection: Proposed: WEEKLY Regulations: WEEKLY

Identify other stormwater management measures on the site that prevent discharge of large trash and debris:

THE SITE IS ONE ACRE RESIDENTIAL, LITTER IS NOT CONSIDERED A PROBLEM.

D-14

Part 4: Compliance with Nonstructural Requirements of NJDEP Stormwater Management Rules

1. Based upon the checklist responses above, indicate which nonstructural strategies have been incorporated into the proposed development's design in accordance with N.J.A.C. 7:8-5.3(b):

No.	Nonstructural Strategy	Yes	No
1.	Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss.	X	
2.	Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces.	X	
3.	Maximize the protection of natural drainage features and vegetation.	X	
4.	Minimize the decrease in the pre-construction time of concentration.	X	
5.	Minimize land disturbance including clearing and grading.	X	
6.	Minimize soil compaction.	X	
7.	Provide low maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers, and pesticides.	X	
8.	Provide vegetated open-channel conveyance systems discharge into and through stable vegetated areas.	X	
9.	Provide preventative source controls.		X

2. For those strategies that have not been incorporated into the proposed development's design, provide engineering, environmental, and/or safety reasons. Attached additional pages as necessary.

THE SITE DESIGN MEETS THE OBJECTIVES OF THE STORMWATER MANAGEMENT RULES.

D-15

FORM 2-B
SOIL LOGS AND INTERPRETATION

(Complete and submit TWELVE (12) copies of this form for each lot)

Applicant's Name Flatwater Development Block 60 Lot 7 Proposed Lot Det. Basin

Describe in accordance with 7:9A-5.3 (inches top-bottom) all profile pits in or within 20 ft of proposed disposal field *(use additional forms if necessary)*.

Log ID # 1 Date 4/1/06		Log ID # 2 Date 4/1/06	
Description		Description	
0-8"	Topsoil	0-8"	Topsoil
8-48"	Reddish Brown (2.5YR4/4) Silt Loam; Blocky, Moist, Friable. 20% Shale Fragments.	8-30"	Reddish Brown (2.5YR4/4) Silt Loam; Blocky, Moist, Friable. 20% Shale Fragments.
48-108"	Reddish Brown (2.5YR4/4) Fractured Shale (1" x 4"). 5% Clay Loam.	30-84"	Reddish Brown (2.5YR4/4) Fractured Shale (1" x 4"). 5% Clay Loam.
	No Seepage No Water No Mottling Hard Bottom Machine Refusal		No Seepage No Water No Mottling Hard Bottom Machine Refusal
Depths in inches:		Depths in inches:	
1st Seepage	None	1st Seepage	None
Infiltration	None	Infiltration	None
24-hour static	None	24-hour static	None
SHWT	108"+ Date 4/1/06	SHWT	84"+ Date 4/1/06
Highest Mottling	None	Highest Mottling	None
Non-soil at	48"	Non-soil at	30"
Soil Limiting Zones: Depths as indicated		Soil Limiting Zones: Depths as indicated	
Fractured Rock Substratum – *top*		Fractured Rock Substratum – *top*	
Massive Rock Substratum – *top*	108"	Massive Rock Substratum – *top*	84"
Excessively Coarse Horizon *(top to bottom)*	48-108"	Excessively Coarse Horizon *(top to bottom)*	30-84"
Excessively Coarse Substratum – *top*		Excessively Coarse Substratum – *top*	
Hydraulically Restrictive Horizon *(top to bottom)*		Hydraulically Restrictive Horizon *(top to bottom)*	
Hydraulically Restrictive Sub.		Hydraulically Restrictive Sub.	
Perched Zone of Saturation *(top to bottom)*		Perched Zone of Saturation *(top to bottom)*	
Regional Zone of Saturation – *top*	108"+	Regional Zone of Saturation – *top*	84"+
Soil Suitability Class *(from table 5.4)*		Soil Suitability Class *(from table 5.4)*	
Type of Field *(from table 10.1)*		Type of Field *(from table 10.1)*	

I hereby certify that the information furnished on form 2-B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

I further certify that all borings and excavations on this lot have been properly backfilled for safety purposes.

Signature of Site Evaluator: _____ Date: 5/8/06

Signature of Professional Engineer: _____ License No. 25136

D-16

FORM 2-B
SOIL LOGS AND INTERPRETATION

(Complete and submit TWELVE (12) copies of this form for each lot)

Applicant's Name Flatwater Development Block 60 Lot 7 Proposed Lot Det. Basin

Describe in accordance with 7:9A-5.3 (inches top-bottom) all profile pits in or within 20 ft of proposed disposal field *(use additional forms if necessary)*.

Log ID # SL3/PB1 Date 5/5/06	Log ID # SL4/BF1 Date 5/5/06
Description	Description
0-8" Topsoil 8-48" Reddish Brown (2.5YR4/4) Silt Loam; Blocky, Moist, Friable. 30% Shale Fragments. 48-120" Reddish Brown (2.5YR4/4) Fractured Shale (1" x 4"). 5% Clay Loam. No Seepage Infiltration 72"/24 hour = 72" No Mottling Hard Bottom/Machine Refusal Pit Bail at 96"	0-8" Topsoil 8-36" Reddish Brown (2.5YR4/4) Fractur Shale (1" x 2"). 5% Clay Loam. No Seepage No Water No Mottling Basin Flood at 36" No Movement/Abandon
Depths in inches:	Depths in inches:
1st Seepage None	1st Seepage None
Infiltration 72"	Infiltration None
24-hour static 72"	24-hour static None
SHWT 72" Date 5/6/06	SHWT 36"+ Date 5/5/06
Highest Mottling None	Highest Mottling None
Non-soil at 48"	Non-soil at 8"
Soil Limiting Zones: Depths as indicated	Soil Limiting Zones: Depths as indicated
Fractured Rock Substratum – *top*	Fractured Rock Substratum – *top*
Massive Rock Substratum – *top* 120"	Massive Rock Substratum – *top*
Excessively Coarse Horizon 48-120" *(top to bottom)*	Excessively Coarse Horizon 8-36" *(top to bottom)*
Excessively Coarse Substratum – *top*	Excessively Coarse Substratum – *top*
Hydraulically Restrictive Horizon *(top to bottom)*	Hydraulically Restrictive Horizon 8-36" *(top to bottom)*
Hydraulically Restrictive Sub	Hydraulically Restrictive Sub.
Perched Zone of Saturation *(top to bottom)*	Perched Zone of Saturation *(top to bottom)*
Regional Zone of Saturation – *top* 72"	Regional Zone of Saturation – *top*
Soil Suitability Class *(from table 5.4)*	Soil Suitability Class *(from table 5.4)*
Type of Field *(from table 10.1)*	Type of Field *(from table 10.1)*

I hereby certify that the information furnished on form 2-B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

I further certify that all borings and excavations on this lot have been properly backfilled for safety purposes.

Signature of Site Evaluator: _____ Date: 5/8/06

Signature of Professional Engineer: _____ License No. 25136

D-17

FORM 2-B
SOIL LOGS AND INTERPRETATION

(Complete and submit TWELVE (12) copies of this form for each lot)

Applicant's Name Flatwater Development Block 60 Lot 7 Proposed Lot Det. Basin

Describe in accordance with 7:9A-5.3 (inches top-bottom) all profile pits in or within 20 ft of proposed disposal field *(use additional forms if necessary)*.

Log ID # SL5 Date 5/5/06		Log ID # SL6/BF1 Date 5/5/06	
Description		Description	
0-8"	Topsoil	0-8"	Topsoil
8-48"	Reddish Brown (2.5YR4/4) Silt Loam; Blocky, Moist, Friable. 30% Shale Fragments.	8-36"	Reddish Brown (2.5YR4/4) Fractured Shale (1" x 4"). 5% Clay Loam.
48-84"	Reddish Brown (2.5YR4/4) Fractured Shale (2" x 5"). 5% Clay Loam.		No Seepage No Water No Mottling
	No Seepage Slight Infiltation 72"/24 hour = 72" No Mottling Hard Bottom Machine Refusal		Basin Flood at 36" No Movement/Abandon
Depths in inches:		Depths in inches:	
1st Seepage	None	1st Seepage	None
Infiltration	72"	Infiltration	None
24-hour static	72"	24-hour static	None
SHWT	72" Date 5/6/06	SHWT	36"+ Date 5/5/06
Highest Mottling	None	Highest Mottling	None
Non-soil at	48"	Non-soil at	8"
Soil Limiting Zones: Depths as indicated		Soil Limiting Zones: Depths as indicated	
Fractured Rock Substratum – *top*		Fractured Rock Substratum – *top*	
Massive Rock Substratum – *top*	84"	Massive Rock Substratum – *top*	
Excessively Coarse Horizon *(top to bottom)*	48-84"	Excessively Coarse Horizon *(top to bottom)*	8-36"
Excessively Coarse Substratum – *top*		Excessively Coarse Substratum – *top*	
Hydraulically Restrictive Horizon *(top to bottom)*		Hydraulically Restrictive Horizon *(top to bottom)*	
Hydraulically Restrictive Sub.		Hydraulically Restrictive Sub.	
Perched Zone of Saturation *(top to bottom)*		Perched Zone of Saturation *(top to bottom)*	
Regional Zone of Saturation – *top*	72"	Regional Zone of Saturation – *top*	36"+
Soil Suitability Class *(from table 5.4)*		Soil Suitability Class *(from table 5.4)*	
Type of Field *(from table 10.1)*		Type of Field *(from table 10.1)*	

I hereby certify that the information furnished on form 2-B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

I further certify that all borings and excavations on this lot have been properly backfilled for safety purposes.

Signature of Site Evaluator: _____ Date: 5/8/06

Signature of Professional Engineer: _____ License No. 25136

FORM 2-B

SOIL LOGS AND INTERPRETATION

D-18

(Complete and submit TWELVE (12) copies of this form for each lot)

Applicant's Name Flatwater Development Block 60 Lot 7 Proposed Lot Det. Basin

Describe in accordance with 7:9A-5.3 (inches top-bottom) all profile pits in or within 20 ft of proposed disposal field *(use additional forms if necessary)*.

Log ID # SL7/BF1 Date 5/5-5/7/06	Log ID # Date
Description	Description
0-36" Topsoil 36-120" Reddish Brown (2.5YR4/4) Fractured Shale (2" x 4"). 5% Clay Loam. No Seepage Infiltration 84" No Mottling Hard Bottom Machine Refusal Basin Flood at 48"	

Depths in inches:	Depths in inches:
1st Seepage None	1st Seepage
Infiltration 84"	Infiltration
24-hour static	24-hour static
SHWT 84" Date 5/7/06	SHWT Date
Highest Mottling None	Highest Mottling
Non-soil at 36"	Non-soil at
Soil Limiting Zones: Depths as indicated	Soil Limiting Zones: Depths as indicated
Fractured Rock Substratum – *top*	Fractured Rock Substratum – *top*
Massive Rock Substratum – *top* 120"	Massive Rock Substratum – *top*
Excessively Coarse Horizon 36-120" *(top to bottom)*	Excessively Coarse Horizon *(top to bottom)*
Excessively Coarse Substratum – *top*	Excessively Coarse Substratum – *top*
Hydraulically Restrictive Horizon *(top to bottom)*	Hydraulically Restrictive Horizon *(top to bottom)*
Hydraulically Restrictive Sub.	Hydraulically Restrictive Sub.
Perched Zone of Saturation *(top to bottom)*	Perched Zone of Saturation *(top to bottom)*
Regional Zone of Saturation – *top* 84"	Regional Zone of Saturation – *top*
Soil Suitability Class *(from table 5.4)*	Soil Suitability Class *(from table 5.4)*
Type of Field *(from table 10.1)*	Type of Field *(from table 10.1)*

I hereby certify that the information furnished on form 2-B of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

I further certify that all borings and excavations on this lot have been properly backfilled for safety purposes.

Signature of Site Evaluator: Date: 5/8/06

Signature of Professional Engineer: License No. 25136

D-19

Form 3g

Basin Flood Data Sheet *(Submit 3 copies)*

BLOCK: 60 LOT: 7 PROPOSED LOT: Det. Basin

APPLICANT'S NAME: Flatwater Development

DESCRIPTION OF PIT IN WHICH TEST WAS CONDUCTED: **DATE TESTED:** 5/5/06

See Soil Log 4/Basin Flood 1
Form 2B 36"

BASIN FLOOD ID #: SL4/BF1 **AREA OF PIT:** 50 **sq. ft.**

Description of Rock Substratum within Test Zone:

ROCK TYPE: Shale; FORMATION: Brunswick AVERAGE FRACTURE SPACING: 3mm

Type of Fractures *(check appropriate category)*:

☐ open (wide), clean – width of openings (mm) _____

☐ open (wide), infilled with fines – width of openings (mm) _____ ☒ tight (closed) Not Interconnected

Orientation of Fractures:

☐ horizontal *(parallel to pit bottom) or nearly so* ☒ inclined ☐ vertical *(parallel to sides of pit) or nearly so*

Hardness of Rock: ☒ rippable with hand tools ☐ not rippable with hand tools, rippable by machine

***Time/Date of first basin flooding:** 10:10 AM 5/5/06 **Volume of water added (gallons)** 300

RESULT OF FIRST BASIN FLOODING:

☐ basin drained within 24 hours – indicate time/date _____

☒ basin not drained within 24 hours No Movement/Abandon

***Time/Date of second basin flooding:** _____ **Volume of water added (gallons):** _____

RESULT OF SECOND BASIN FLOODING:

☐ basin drained within 24 hours – indicate time/date _____

☐ basin not drained within 24 hours

I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

John U. Lee — 5/8/06

Signature of Site Evaluator — Date

Robert J. [illegible] — 25136

Signature of Professional Engineer — License No.

D-20

Form 3g
Basin Flood Data Sheet *(Submit 3 copies)*

BLOCK: 60 LOT: 7 PROPOSED LOT: Det. Basin

APPLICANT'S NAME: Flatwater Development

DESCRIPTION OF PIT IN WHICH TEST WAS CONDUCTED: **DATE TESTED:** 5/5/06

See Soil Log 6/Basin Flood 1
Form 2B
36"

BASIN FLOOD ID #: SL6/BF1 **AREA OF PIT:** 50 **sq. ft.**

Description of Rock Substratum within Test Zone:

ROCK TYPE: Shale ; FORMATION: Brunswick AVERAGE FRACTURE SPACING: 3mm

Type of Fractures (*check appropriate category*):

☐ open (wide), clean – width of openings (mm) _____

☐ open (wide), infilled with fines – width of openings (mm) _____ ☒ tight (closed) Not Interconnected

Orientation of Fractures:

☐ horizontal *(parallel to pit bottom) or nearly so* ☒ inclined ☐ vertical *(parallel to sides of pit) or nearly so*

Hardness of Rock: ☒ rippable with hand tools ☐ not rippable with hand tools, rippable by machine

***Time/Date of first basin flooding:** 12:01 PM - 5/5/06 **Volume of water added (gallons)** 400

RESULT OF FIRST BASIN FLOODING:

☐ basin drained within 24 hours – indicate time/date _____

☒ basin not drained within 24 hours No Movement/Abandon

***Time/Date of second basin flooding:** _____ **Volume of water added (gallons):** _____

RESULT OF SECOND BASIN FLOODING:

☐ basin drained within 24 hours – indicate time/date _____

☐ basin not drained within 24 hours

I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator — 5/8/06 Date

Signature of Professional Engineer — 25136 License No.

Form 3g

Basin Flood Data Sheet *(Submit 3 copies)* D-21

BLOCK: 60 LOT: 7 PROPOSED LOT: Det. Basin

APPLICANT'S NAME: Flatwater Development

DESCRIPTION OF PIT IN WHICH TEST WAS CONDUCTED: **DATE TESTED:** 5/5-5/7/06

See Soil Log 7/Basin Flood 1
Form 2B 48"

BASIN FLOOD ID #: SL7/BF1 **AREA OF PIT:** 50 **sq. ft.**

Description of Rock Substratum within Test Zone:

ROCK TYPE: Shale ; FORMATION: Brunswick AVERAGE FRACTURE SPACING: 3mm

Type of Fractures (*check appropriate category*):

☐ open (wide), clean – width of openings (mm) _____

☒ open (wide), infilled with fines – width of openings (mm) _____ ☐ tight (closed)

Orientation of Fractures:

☐ horizontal *(parallel to pit bottom) or nearly so* ☒ inclined ☐ vertical *(parallel to sides of pit) or nearly so*

Hardness of Rock: ☒ rippable with hand tools ☐ not rippable with hand tools, rippable by machine

***Time/Date of first basin flooding:** 12:45 PM **Volume of water added (gallons)** 400

RESULT OF FIRST BASIN FLOODING:

☒ basin drained within 24 hours – indicate time/date 10:20 AM - 5/6/06

☐ basin not drained within 24 hours

***Time/Date of second basin flooding:** 10:43 AM **Volume of water added (gallons):** 400
5/6/06

RESULT OF SECOND BASIN FLOODING:

☒ basin drained within 24 hours – indicate time/date 8:10 AM - 5/7/06

☐ basin not drained within 24 hours

I hereby certify that the information furnished on this form is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator — Date: 5/8/06

Signature of Professional Engineer — License No.: 25136

D-22

Form 3f
Pit-Bailing Test Data

Applicant's Name: Flatwater Development Date Tested 5/5/06

Block: 60 Lot: 7 Proposed Lot: Det. Basin

Description of pit in which test was conducted:

See Soil Log 3/PB1
Form 2B

Pit Bail ID #: SL3/PB1

Depth to Bottom of Pit: 8.0' 24hour static water level 6.0 (D_{water}) ft

Depth to Impermeable Stratum 10.0 ($D_{stratum}$) ft; $H = D_{stratum} - D_{water}$ = 4.0 ft

Calculate the following values and enter in the table below:

A_n = Water Surface Area in Square Feet
h_{rise} = Water Level Rise
A_{av} = Avg. Water Surface Area, ft^2 $\left(\frac{A_n + \text{previous } A_n}{2} \right)$

h = Avg. Height of Water Level Above $D_{stratum}$ (take average of current water level and previous water level, convert to feet and subtract from $D_{stratum}$)

$\frac{Ka}{t} = \frac{h_{rise} \times A_{av}}{2.27 (H^2 - h^2)} \times 60$ min/hr (K in inches/hr)

T_n	D_{water} (in)	l,w (ft)	A_n (ft^2)	h_{rise} (in)	A_{av} (ft^2)	h(ft)	K_a
11:15	88	2.08x4.25	8.84				
11:16	85	2.58x4.25	10.96	3.0	9.90	2.80	96.22
11:17	82	2.83x4.25	12.02	3.0	11.49	3.05	136.06
11:18	79	3.25x4.25	13.81	3.0	12.91	3.30	200.50
11:19	76	3.50x4.25	14.87	3.0	14.34	3.55	334.78

Before the test is terminated, be assured that the successive K values are stabilized. Either an increasing or decreasing trend in the values obtained indicates that the test should not be terminated. Continue testing until stabilization is achieved.

Final Depth of Pit 10.0 ft

24-hour groundwater reading 6.0 ft

Height of 24-hour groundwater reading above $D_{stratum}$ 4.0 ft (H)

Average height of water level above $D_{stratum}$ 12.60 ft (h)

(take average depth of water levels at the beginning and end of the last time interval, convert to feet and subtract from $D_{stratum}$)

Calculate K using above data and final time interval of test:

$K = [h_{rise}/t] \times [A_{av} / 2.27 (H^2 - h^2)] \times 60$ min./hr.

$= [3.0 / 1.0] \times [14.34 / 2.27 (16.0^2 - 3.55^2)] \times 60$ min./hr.

$= 334.78$

I hereby certify that the information furnished on Form 3f of this application is true and accurate. I am aware that falsification of data is a violation of the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.) and is subject to penalties as prescribed in N.J.A.C. 7:14-8.

Signature of Site Evaluator _____ Date 5/8/06

Signature of Professional Engineer _____ License # 25136