

PRELIMINARY
DRAINAGE REPORT

FOR

Buckingham Woods

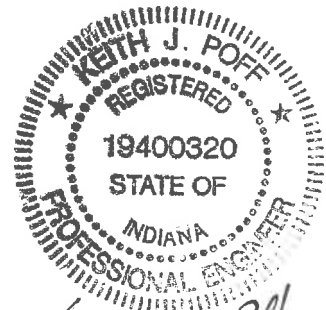
Old State Rd.
Vanderburgh County, Indiana

for

Level Development, L.L.C.

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Report by:
SITECON, Inc.
10335 Hedden Road, Suite 2
Evansville, IN 47725
(812) 868-0877
January 30, 2007



Keith J. Poff

STONEGATE ESTATES
SUBDIVISION

Preliminary Drainage Plan

Project Name and Location

Buckingham Woods
Old State Rd.
Center Township, Section 29, T 5 S, R 10 W
Vanderburgh County, Indiana

Developer Name and Address

Level Development, L.L.C
Dan Buck, Managing Member
P.O. Box 4530
Evansville, IN 47724

Drainage Plan Preparer

SITECON, Inc.
10335 Hedden Road, Suite 2
Evansville, IN 47725
(812) 868-0877

Site Location:

The subject property is an 11.34-acre site located on Old State Road. The property is part of the SW 1/4 of Section 29 of Center Township in Vanderburgh County. The project plans to provide access on its west side where there is approximately 298 feet of frontage along Old State Rd. The subject site is currently wooded.

Existing Site Conditions:

The subject site is steep sloping wooded terrain. The property drains to the southwest. One large valley intersects the property and flows south by southwest. Approximately 75% of the site lies on the eastern side of this valley. On both sides of the valley the land slopes up to ridge tops, on the west the ridge is Old State Rd. and to the east the ridge top is just beyond the boundary of the site. The watershed for the valley is approximately 36.3 acres at the point that the flowline exits the site.

No portion of the property is shown to be within the 100-year flood zone (Zone A) as said property plots by scale on the Flood Insurance Rate Map (FIRM) Community Panel Number 180256 0015 C, dated August 5, 1991.

According to the Soil Survey of Vanderburgh County, Indiana, issued June, 1976, the site consists of Hosmer silt loams (HoD3 & HoC3).

Analysis Procedure:

The Rational Method, valid for watershed areas up to 200 acres, was used for computations of storm water runoff. The post development controlled peak release rate of storm water runoff during a twenty-five (25) year return period storm from the developed project was designed to not exceed the peak release rate during a ten (10) year return period storm in its pre-developed condition.

Proposed Design:

The upstream, 29-acres of the 36.3 acres of, watershed that flows thru the site will be intercepted at the north property line and conveyed through the site via a 100-yr storm pipe. This flow will then be released into the natural drainage way as it exits the site's southern boundary. In addition to the 100-yr pipe an overflow path will also be provided with minimum 1' depth, bottom width, and 4:1 side slopes.

The site's stormwater will be conveyed through the streets, storm pipes and rear yard swales whereupon it will flow into a retention basin at the southwest corner of the property. All stormwater on the site, with the exception of the rear yard runoff for lots 32-35, will be detained in this retention basin before re-entering the existing drainage way.

The site drainage system will be Reinforced Concrete Pipe (RCP).

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Developed Watershed Basins Exhibit
Preliminary Drainage Plan

SUB-BASIN DRAINAGE CALCULATIONS - UNDEVELOPED FLOW FOR A 10 YEAR STORM

Siteon, Inc. Project: 1-07-108

Job Name/Basin #:	ENTIRE SITE			534,772 Total SF	12.28 AC
Structures	4: Total	1,568 SF	100 %	6,272 Total SF	0.14 AC
Drives	4: Total	1,300 SF		5,200 Total SF	0.12 AC
Pavement	0: Width (ft)	0 L (ft)		0 Total SF	0.00 AC
Patios	0: Total	120 SF		0 Total SF	0.00 AC
Sidewalks	0: Width (ft)			0 Total SF	0.00 AC
Impervious surfaces	C=0.92				
Terr 1 (0-2%) lawn	C=0.12	0 SF		0 Total SF	0.00 AC
Terr 2 (2-5%) lawn	C=0.24	53,477 SF		53,477 Total SF	1.23 AC
Terr 3 (5-10%) lawn	C=0.36	136,738 SF		136,738 Total SF	3.14 AC
Terr 4 (0-2%) woods	C=0.12	0 SF		0 Total SF	0.00 AC
Terr 5 (2-5%) woods	C=0.24	26,739 SF		26,739 Total SF	0.61 AC
Terr 6 (5-10%) woods	C=0.36	306,346 SF		306,346 Total SF	7.03 AC
Terr 7 (0-2%) cult	C=0.20	0 SF		0 Total SF	0.00 AC
Terr 8 (2-5%) cult	C=0.35	0 SF		0 Total SF	0.00 AC
Terr 9 (5-10%) cult	C=0.50	0 SF		0 Total SF	0.00 AC
Terr 10-Lakes	C=1.00	0 SF		0 Total SF	0.00 AC
	Wt'd C =	0.48		534,772 Check	
	Wt'd N =	0.52			
	High Pt El=	461.00 ft			
	Inlet El=	411.00 ft			
	Length=	901.00 ft			
	Slope=	0.0555			
	tc=	28.61 min			
0 1	Is 5<tc<10?	i10=	0.00 in/hr		
0 1	Is 10<tc<15?	i10=	0.00 in/hr		
1 1	Is 15<tc<30?	i10=	3.35 in/hr		
1 0	Is 30<tc<60?	i10=	0.00 in/hr		
	Q10=	19.79 cfs		Date:	01/26/07

SUB-BASIN DRAINAGE CALCULATIONS - DEVELOPED BASIN COEFFICIENT

Siteon, Inc. Project: 1-07-108

Job Name/Basin #:	BUCKINGHAM WOODS	534,772 Total SF	12.28 AC
Exist. Impervious surfaces (2-5%) C=0.94			
Structures	4 Total	1,568 SF	6,272 Total SF 0.14 AC
Pavement	4 Width (ft.)	1,300 Lft	5,200 Total SF 0.12 AC
Stone	0 Total	0 SF	0 Total SF 0.00 AC
			<hr/>
			11,472 TOTAL 0.26 AC
Proposed Impervious surfaces (2-5%) C=0.94			
Structures	35 Total	3,000 SF	105,000 Total SF 2.41 AC
Drives	35 Total	400 SF	14,000 Total SF 0.32 AC
Pavement	29 Width (ft)	1,495 L (ft)	43,355 Total SF 1.00 AC
Patios	35 Total	200 SF	7,000 Total SF 0.16 AC
Sidewalks	0 Width (ft)		0 Total SF 0.00 AC
			<hr/>
			169,355 TOTAL 3.89 AC
Exist cultivated fields:			
0-2% slope	C=0.20	0 SF	0 Total SF 0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF 0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF 0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF 0.00 AC
			<hr/>
			0 TOTAL 0.00 AC
For lawn areas:			
0-2% slope	C=0.15	30,192 SF	30,192 Total SF 0.69 AC
2-5% slope	C=0.25	88,487 SF	88,487 Total SF 2.03 AC
5-10% slope	C=0.40	171,093 SF	171,093 Total SF 3.93 AC
10+% slope	C=0.55	0 SF	0 Total SF 0.00 AC
			<hr/>
			289,772 TOTAL 6.65 AC
For woodland areas:			
0-2% slope	C=0.12	0 SF	0 Total SF 0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF 0.00 AC
5-10% slope	C=0.36	21,177 SF	21,177 Total SF 0.49 AC
10+% slope	C=0.48	42,996 SF	42,996 Total SF 0.99 AC
			<hr/>
			64,173 TOTAL 1.47 AC

Check 534,772 GT

Wtd C = 0.55

Date: 01/26/07

**Vanderburgh County Drainage Board
Form 800**

Computation Sheet for Detention Storage Using the Rational Method

Project: Buckingham Woods **Date:** 01/26/07

Detention Facility Design Return Period 25 years

Release Rate Return Period 10 years

Watershed Area 12.28 acres
 Undeveloped Time of Concentration 28.61 minutes
 Undeveloped Rainfall Intensity (iu) 3.35 inches/hour
 Weighted Undeveloped Runoff Coefficient (Cu) 0.48
 Undeveloped Runoff Rate (O=Cu x iu x Au) 19.75 cfs
 Developed Runoff Coefficient (Cd) 0.55

Storm Duration td	Rainfall Intensity id	Inflow Rate I(td) Cd x id x Ad	Outflow Rate O Cu x iu x Au	Storage Rate (I x td) - O	Required Storage [I(td)-O]x[td/12]
min	inches/hr	cfs	cfs	cfs	acre-ft
5	7.208	48.68	19.75	28.94	0.2009
10	5.925	40.02	19.75	20.27	0.2815
15	5.033	33.99	19.75	14.25	0.2968
20	4.571	30.87	19.75	11.13	0.3091
25	4.108	27.75	19.75	8.00	0.2777
30	3.646	24.63	19.75	4.88	0.2033
40	3.123	21.09	19.75	1.35	0.0748
50	2.601	17.57	19.75	-2.18	-0.1513
60	2.078	14.03	19.75	-5.71	-0.4760
90	1.578	10.66	19.75	-9.09	-1.1361

Required Storage = 0.3091 x 43,560 sf/ac = 13,464 cubic feet

Basin Outlet
 INLET CONTROL
 NOMOGRAPH FOR PROJECTING CONCRETE PIPE
 (Socket End)

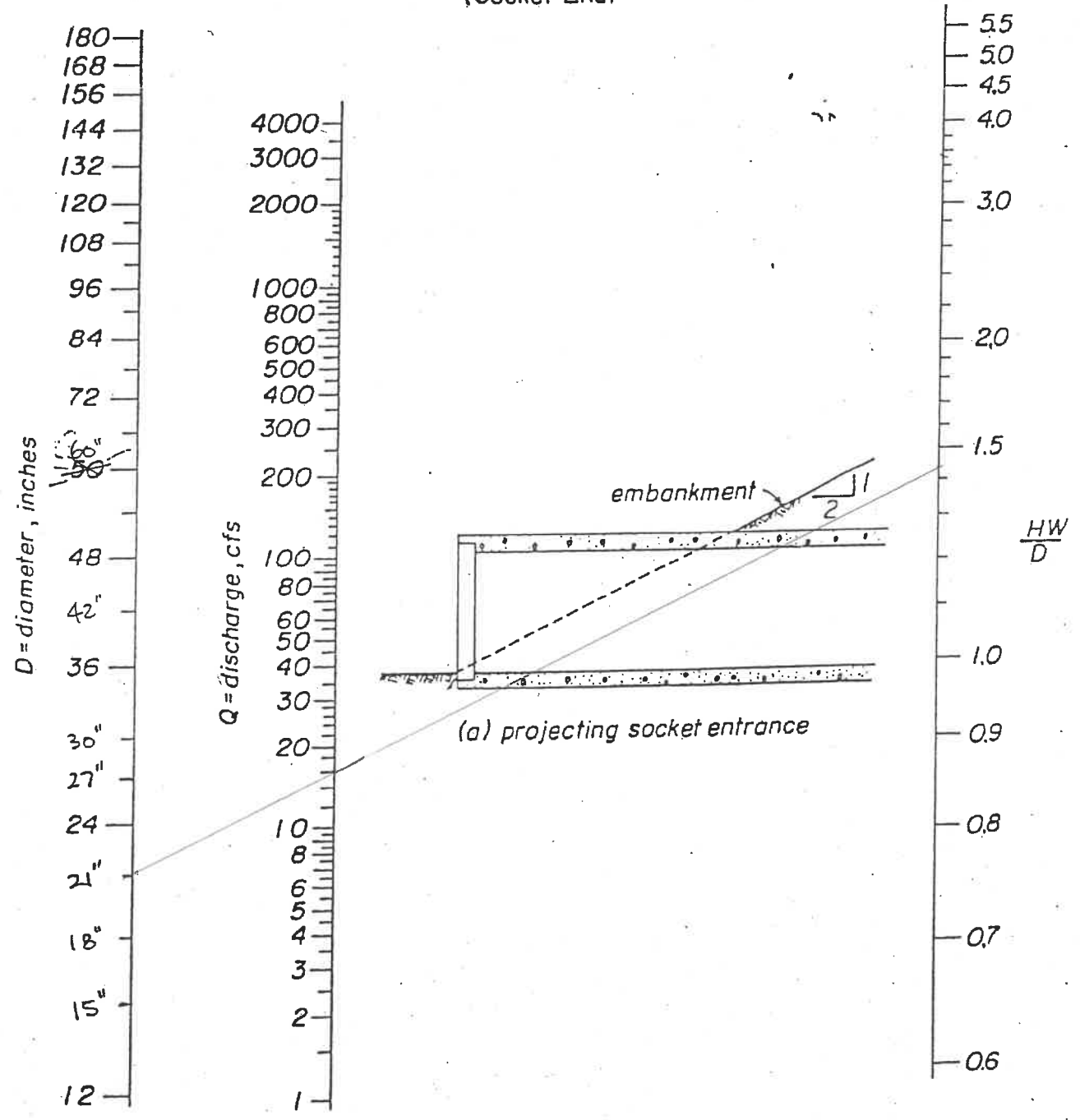


Fig. B-1

$Q_{10} = 19.8 \text{ cfs}$
 $Q_{RESTRICTED} = 16 \text{ cfs}$
 S.W. = 417.5
 N.P. = 415

$417.5 - 415 =$

$\frac{HW}{D} = 1.43$
 $HW = 1.43(1.75)$
 $HW = 2.50$ ✓

**TABLE 1
DETENTION VOLUME REQUIREMENTS**

Sitecon, Inc Project: 001-07-108

Date: 01-25-07

Basin	10 year Undev. Release Rate	Required Storage		Available Storage
		25 year	Restricted	
	19.8 cfs	13,464 cf	17,995 cf	18,103 cf

Retention Volume >>	417.5	Storage Pool Elevation (spillway elev.)
	- 415.00	Normal Pool Elevation
	<u>2.5</u>	2.5 feet (D)

+	9,585	Storage Pool Area (SP)
	<u>4,897</u>	Normal Pool Area (NP)
	14,482	sq. ft.

Volume=(1/2x(SP+NP))xD= 18,103 cu. ft. available

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 001-07-108

Job Name/Basin #:	Buckingham Woods	Basin A-1	52,885 Total SF	1.21 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,000 SF	0 Total SF	0.00 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	4 Total	3,400 SF	13,600 Total SF	0.31 AC
Drives	4 Total	780 SF	3,120 Total SF	0.07 AC
Pavement	295 L (ft)	14.5 Width (ft)	4,271 Total SF	0.10 AC
Patios	4 Total	200 SF	800 Total SF	0.02 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			21,791 TOTAL	0.50 AC
Exist cultivated fields:				
0-2% slope	C=0.20	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	17,598 SF	17,598 Total SF	0.40 AC
5-10% slope	C=0.40	8,346 SF	8,346 Total SF	0.19 AC
10+% slope	C=0.55	0 SF	0 Total SF	0.00 AC
			25,944 TOTAL	0.60 AC
For woodland areas:				
0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	5,150 SF	5,150 Total SF	0.12 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			5,150 TOTAL	0.12 AC

Check 52,885 GT

Wt'd C = 0.57
Wt'd N = 0.26
High Pt El 466.50 ft
Inlet El 448.50 ft
Length 331.00 ft
Slope 0.0544
tc 13.14 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
1 1	Is 10<tc<15?	i 25=	5.36 in/hr
1 0	Is 15<tc<30?	i 25=	0.00 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 3.70 cfs

Date: 1/30/2007

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 001-07-108

Job Name/Basin #:	Buckingham Woods	Basin A-2	9,706 Total SF	0.22 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,000 SF	0 Total SF	0.00 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	0.75 Total	3,400 SF	2,550 Total SF	0.06 AC
Drives	1 Total	780 SF	780 Total SF	0.02 AC
Pavement	137 L (ft)	14.5 Width (ft)	1,991 Total SF	0.05 AC
Patios	0 Total	200 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			5,321 TOTAL	0.12 AC
Exist cultivated fields:				
0-2% slope	C=0.20	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	1,096 SF	1,096 Total SF	0.03 AC
5-10% slope	C=0.40	3,289 SF	3,289 Total SF	0.08 AC
10+% slope	C=0.55	0 SF	0 Total SF	0.00 AC
			4,385 TOTAL	0.10 AC
For woodland areas:				
0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC

Check 9,706 GT

Wt'd C = 0.68
 Wt'd N = 0.19
 High Pt El 458.00 ft
 Inlet El 448.50 ft
 Length 155.00 ft
 Slope 0.0613
 tc 7.74 min

1 1	Is 5<tc<10?	i 25=	6.51 in/hr
1 0	Is 10<tc<15?	i 25=	0.00 in/hr
1 0	Is 15<tc<30?	i 25=	0.00 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 0.98 cfs

Date: 1/30/2007

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 001-07-108

Job Name/Basin #:	Buckingham Woods	Basin A-3	21,180 Total SF	0.49 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,000 SF	0 Total SF	0.00 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	1.75 Total	3,400 SF	5,950 Total SF	0.14 AC
Drives	0 Total	780 SF	0 Total SF	0.00 AC
Pavement	137 L (ft)	14.5 Width (ft)	1,991 Total SF	0.05 AC
Patios	2.75 Total	200 SF	550 Total SF	0.01 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			8,491 TOTAL	0.19 AC
Exist cultivated fields:				
0-2% slope	C=0.20	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	4,188 SF	4,188 Total SF	0.10 AC
5-10% slope	C=0.40	8,501 SF	8,501 Total SF	0.20 AC
10+% slope	C=0.55	0 SF	0 Total SF	0.00 AC
			12,689 TOTAL	0.29 AC
For woodland areas:				
0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC

Check 21,180 GT

Wt'd C = 0.59
 Wt'd N = 0.25
 High Pt El 451.00 ft
 Inlet El 439.00 ft
 Length 243.00 ft
 Slope 0.0494
 tc 11.31 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
1 1	Is 10<tc<15?	i 25=	5.69 in/hr
1 0	Is 15<tc<30?	i 25=	0.00 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 1.62 cfs

Date: 1/30/2007

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 001-07-108

Job Name/Basin #: Buckingham Woods: Basin A-4 42,132 Total SF 0.97 AC

Exist. Impervious surfaces (2-5%) C=0.94			
Structures	0 Total	3,000 SF	0 Total SF 0.00 AC
Drives	0 Total	720 SF	0 Total SF 0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF 0.00 AC
			0 TOTAL 0.00 AC

Proposed Impervious surfaces (2-5%) C=0.94			
Structures	2.75 Total	3,400 SF	9,350 Total SF 0.21 AC
Drives	5 Total	780 SF	3,900 Total SF 0.09 AC
Pavement	565 L (ft)	14.5 Width (ft)	8,186 Total SF 0.19 AC
Patios	0 Total	200 SF	0 Total SF 0.00 AC
Sidewalks	0 Width (ft)		0 Total SF 0.00 AC
			21,436 TOTAL 0.49 AC

Exist cultivated fields:			
0-2% slope	C=0.20	0 SF	0 Total SF 0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF 0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF 0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF 0.00 AC
			0 TOTAL 0.00 AC

For lawn areas:			
0-2% slope	C=0.15	0 SF	0 Total SF 0.00 AC
2-5% slope	C=0.25	5,174 SF	5,174 Total SF 0.12 AC
5-10% slope	C=0.40	15,522 SF	15,522 Total SF 0.36 AC
10+% slope	C=0.55	0 SF	0 Total SF 0.00 AC
			20,696 TOTAL 0.48 AC

For woodland areas:			
0-2% slope	C=0.12	0 SF	0 Total SF 0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF 0.00 AC
5-10% slope	C=0.36	0 SF	0 Total SF 0.00 AC
10+% slope	C=0.48	0 SF	0 Total SF 0.00 AC
			0 TOTAL 0.00 AC

Check 42,132 GT

Wt'd C= 0.66
 Wt'd N= 0.21
 High Pt El 435.00 ft
 Inlet El 423.00 ft
 Length 432.00 ft
 Slope 0.0278
 tc 15.56 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
0 1	Is 10<tc<15?	i 25=	0.00 in/hr
1 1	Is 15<tc<30?	i 25=	4.98 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 3.16 cfs

Date: 1/30/2007

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 001-07-108

Job Name/Basin #: Buckingham Woods Basin A-5 28,692 Total SF 0.66 AC

Exist. Impervious surfaces (2-5%) C=0.94

Structures	0 Total	3,000 SF	0 Total SF	0.00 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC

Proposed Impervious surfaces (2-5%) C=0.94

Structures	2.25 Total	3,400 SF	7,650 Total SF	0.18 AC
Drives	5 Total	780 SF	3,900 Total SF	0.09 AC
Pavement	471 L (ft)	14.5 Width (ft)	6,826 Total SF	0.16 AC
Patios	0 Total	200 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			18,376 TOTAL	0.42 AC

Exist cultivated fields:

0-2% slope	C=0.20	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC

For lawn areas:

0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	2,579 SF	2,579 Total SF	0.06 AC
5-10% slope	C=0.40	7,737 SF	7,737 Total SF	0.18 AC
10+% slope	C=0.55	0 SF	0 Total SF	0.00 AC
			10,316 TOTAL	0.24 AC

For woodland areas:

0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC

Check 28,692 GT

Wt'd C = 0.73
 Wt'd N = 0.16
 High Pt El 431.00 ft
 Inlet El 423.00 ft
 Length 403.00 ft
 Slope 0.0199
 tc 14.31 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
1 1	Is 10<tc<15?	i 25=	5.16 in/hr
1 0	Is 15<tc<30?	i 25=	0.00 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 2.49 cfs

Date: 1/30/2007

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 001-07-108

Job Name/Basin #:	Buckingham Woods	Basin A-6	179,571 Total SF	4.12 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	3 Total	1,568 SF	4,704 Total SF	0.11 AC
Drives	3 Total	1,333 SF	3,999 Total SF	0.09 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			8,703 TOTAL	0.20 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	8.5 Total	3,400 SF	28,900 Total SF	0.66 AC
Drives	8.5 Total	780 SF	6,630 Total SF	0.15 AC
Pavement	728 L (ft)	14.5 Width (ft)	10,556 Total SF	0.24 AC
Patios	8.5 Total	200 SF	1,700 Total SF	0.04 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			47,786 TOTAL	1.10 AC
Exist cultivated fields:				
0-2% slope	C=0.20	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	10,430 SF	10,430 Total SF	0.24 AC
5-10% slope	C=0.40	31,289 SF	31,289 Total SF	0.72 AC
10+% slope	C=0.55	62,579 SF	62,579 Total SF	1.44 AC
			104,298 TOTAL	2.39 AC
For woodland areas:				
0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	3,821 SF	3,821 Total SF	0.09 AC
5-10% slope	C=0.36	14,963 SF	14,963 Total SF	0.34 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			18,784 TOTAL	0.43 AC

Check 179,571 GT

Wt'd C = 0.61
 Wt'd N = 0.30
 High Pt El 461.00 ft
 Inlet El 421.00 ft
 Length 760.00 ft
 Slope 0.0526
 tc 20.81 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
0 1	Is 10<tc<15?	i 25=	0.00 in/hr
1 1	Is 15<tc<30?	i 25=	4.50 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 11.24 cfs

Date: 1/25/2007

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 001-07-108

Job Name/Basin #:	Buckingham Woods	Basin A-7	26,405 Total SF	0.61 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,000 SF	0 Total SF	0.00 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	2 Total	3,400 SF	6,800 Total SF	0.16 AC
Drives	4 Total	780 SF	3,120 Total SF	0.07 AC
Pavement	336 L (ft)	14.5 Width (ft)	4,868 Total SF	0.11 AC
Patios	0 Total	200 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			14,788 TOTAL	0.34 AC
Exist cultivated fields:				
0-2% slope	C=0.20	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	6,971 SF	6,971 Total SF	0.16 AC
5-10% slope	C=0.40	2,904 SF	2,904 Total SF	0.07 AC
10+% slope	C=0.55	0 SF	0 Total SF	0.00 AC
			9,875 TOTAL	0.23 AC
For woodland areas:				
0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	1,742 SF	1,742 Total SF	0.04 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			1,742 TOTAL	0.04 AC

Check 26,405 GT

Wt'd C = 0.66
 Wt'd N = 0.20
 High Pt El 434.00 ft
 Inlet El 421.00 ft
 Length 420.00 ft
 Slope 0.0310
 tc 14.76 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
1 1	Is 10<tc<15?	i 25=	5.08 in/hr
1 0	Is 15<tc<30?	i 25=	0.00 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 2.03 cfs

Date: 1/24/2007

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 001-07-108

Job Name/Basin #:	Buckingham Woods:	Basin B-1	56,015 Total SF	1.29 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,000 SF	0 Total SF	0.00 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	4.75 Total	3,400 SF	16,150 Total SF	0.37 AC
Drives	7 Total	780 SF	5,460 Total SF	0.13 AC
Pavement	178 L (ft)	14.5 Width (ft)	2,581 Total SF	0.06 AC
Patios	2.5 Total	200 SF	500 Total SF	0.01 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			24,691 TOTAL	0.57 AC
Exist cultivated fields:				
0-2% slope	C=0.20	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	9,820 SF	9,820 Total SF	0.23 AC
5-10% slope	C=0.40	19,938 SF	19,938 Total SF	0.46 AC
10+% slope	C=0.55	0 SF	0 Total SF	0.00 AC
			29,758 TOTAL	0.68 AC
For woodland areas:				
0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	1,566 SF	1,566 Total SF	0.04 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			1,566 TOTAL	0.04 AC

Check 56,015 GT

Wt'd C = 0.61
 Wt'd N = 0.24
 High Pt El 467.00 ft
 Inlet El 450.00 ft
 Length 317.00 ft
 Slope 0.0536
 tc 12.33 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
1 1	Is 10<tc<15?	i 25=	5.51 in/hr
1 0	Is 15<tc<30?	i 25=	0.00 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 4.33 cfs

Date: 1/30/2007

Basin Number	Upstream Manhole	Downstream Manhole	Pipe Length (ft)	A (Acres)	C	A°C	Sun A°C	Inlet Time tc (min)	t cum. (min)	i (in/hr)	Q (cfs)	Pipe Diameter (in)	Pipe Slope (%)	Pipe Capacity (cfs)	Pipe Capacity Check	Velocity (ft/s)	Travel Time (min)	Rim Elevation (Upstream)	Rim Elevation (Downstream)	Invert Elevation (Upstream)	Invert Elevation (Downstream)	Pipe Cover (Upstream)	Pipe Cover (Downstream)	Pipe Type
1	2	3	4	6	5	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	24
A-1	506	507	29.0	1.21	0.57	0.69	0.69	13.14	13.14	5.35	3.70	12	0.50	3.76	O.K.	4.79	0.10	443.00	443.00	443.50	443.27	1.50	1.73	RCP
A-2	507	508	7.0	0.22	0.68	0.15	0.64	7.74	7.84	6.51	5.46	12	1.75	5.56	O.K.	7.08	0.02	443.00	446.50	443.77	443.15	1.73	2.35	RCP
A-3	508	509	103.2	0.22	0.68	0.15	0.64	7.74	7.84	6.51	5.46	12	6.86	12.17	O.K.	15.49	0.11	446.50	457.00	443.15	434.50	2.35	1.50	RCP
A-4	510	511	38.7	0.37	0.66	0.64	1.77	15.36	15.55	4.98	8.81	12	4.40	8.82	O.K.	14.66	0.15	437.00	427.20	424.70	423.00	1.50	3.20	RCP
A-5	511	514	110.1	0.86	0.73	0.48	2.25	14.31	14.43	5.15	11.61	15	4.84	16.77	O.K.	13.67	0.15	427.20	420.50	422.80	417.04	3.15	2.21	RCP
A-6	512	513	20.0	4.12	0.61	2.51	2.51	20.81	25.81	4.50	11.31	18	0.99	11.77	O.K.	6.66	0.07	420.00	420.00	417.20	416.94	1.30	1.56	RCP
A-7	513	514	7.0	0.61	0.66	0.40	2.92	14.76	14.83	5.06	14.81	18	1.45	14.94	O.K.	8.45	0.01	420.00	420.50	416.94	416.84	1.56	2.16	RCP
	514	515	173.0				5.17	20.68	25.86	4.50	23.25	24	0.83	24.37	O.K.	7.76	0.37	420.50	415.00	416.44	415.00	2.06	-2.00	RCP
B-1	516	517	110.9	1.26	0.61	0.79	0.79	12.33	12.33	5.51	4.34	12	1.72	5.51	O.K.	7.02	0.28	443.50	442.00	444.00	442.00	1.50	ES	RCP

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 001-07-108

Job Name/Basin #: Buckingham Woods Basin Ent. Culvert 14,024 Total SF 0.32 AC

Exist. Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,000 SF	0 Total SF	0.00 AC
Drives	3 Total	150 SF	450 Total SF	0.01 AC
Pavement	11 Width (ft)	441 L (ft)	4,851 Total SF	0.11 AC
			5,301 TOTAL	0.12 AC

Proposed Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,400 SF	0 Total SF	0.00 AC
Drives	0 Total	780 SF	0 Total SF	0.00 AC
Pavement	0 L (ft)	14.5 Width (ft)	0 Total SF	0.00 AC
Patios	0 Total	200 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			0 TOTAL	0.00 AC

Exist cultivated fields:				
0-2% slope	C=0.20	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC

For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.40	8,723 SF	8,723 Total SF	0.20 AC
10+% slope	C=0.55	0 SF	0 Total SF	0.00 AC
			8,723 TOTAL	0.20 AC

For woodland areas:				
0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC

Check 14,024 GT

Wt'd C = 0.60
 Wt'd N = 0.26
 High Pt El 461.00 ft
 Inlet El 435.00 ft
 Length 433.00 ft
 Slope 0.0600
 tc 14.38 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
1 1	Is 10<tc<15?	i 25=	5.14 in/hr
1 0	Is 15<tc<30?	i 25=	0.00 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 1.00 cfs

Date: 1/26/2007

DEVELOPED CALCULATIONS FLOW FOR A 100 YEAR STORM

Sitecon, Inc. Project: 001-07-108

1,264,750 Total SF 29.03 AC

Job Name/Basin #:	Buckingham Woods	THRU- FLOW		
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	14 Total	1,850 SF	25,900 Total SF	0.59 AC
Drives	8 Total	1,125 SF	9,000 Total SF	0.21 AC
Pavement	12 Width (ft)	1,100 L (ft)	13,200 Total SF	0.30 AC
			48,100 TOTAL	1.10 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	6 Total	2,500 SF	15,000 Total SF	0.34 AC
Drives	4 Total	1,000 SF	4,000 Total SF	0.09 AC
Pavement	0 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
Patios	6 Total	200 SF	1,200 Total SF	0.03 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			20,200 TOTAL	0.46 AC
Exist cultivated fields:				
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			0 TOTAL	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	112,012 SF	112,012 Total SF	2.57 AC
5-10% slope	C=0.40	74,675 SF	74,675 Total SF	1.71 AC
10+% slope	C=0.55	560,060 SF	560,060 Total SF	12.86 AC
			746,747 TOTAL	17.14 AC
For woodland areas:				
0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	67,455 SF	67,455 Total SF	1.55 AC
10+% slope	C=0.48	382,248 SF	382,248 Total SF	8.78 AC
			449,703 TOTAL	10.32 AC

Check 1,264,750 GT

Wt'd C = 0.50
 Wt'd N = 0.45
 High Pt El 491.60 ft
 Inlet El 418.00 ft
 Length 1,390.00 ft
 Slope 0.0529
 tc 33.23 min

0 1	Is 5<tc<10?	i100=	0.00 in/hr
0 1	Is 10<tc<15?	i100=	0.00 in/hr
0 1	Is 15<tc<30?	i100=	0.00 in/hr
1 1	Is 30<tc<60?	i100=	4.40 in/hr
1 0	Is 60<tc<120?	i100=	0.00 in/hr

Q100= 64.41 cfs

Date: 1/26/2007

21

Entrance Culvert
 INLET CONTROL
 NOMOGRAPH FOR PROJECTING CONCRETE PIPE
 (Socket End)

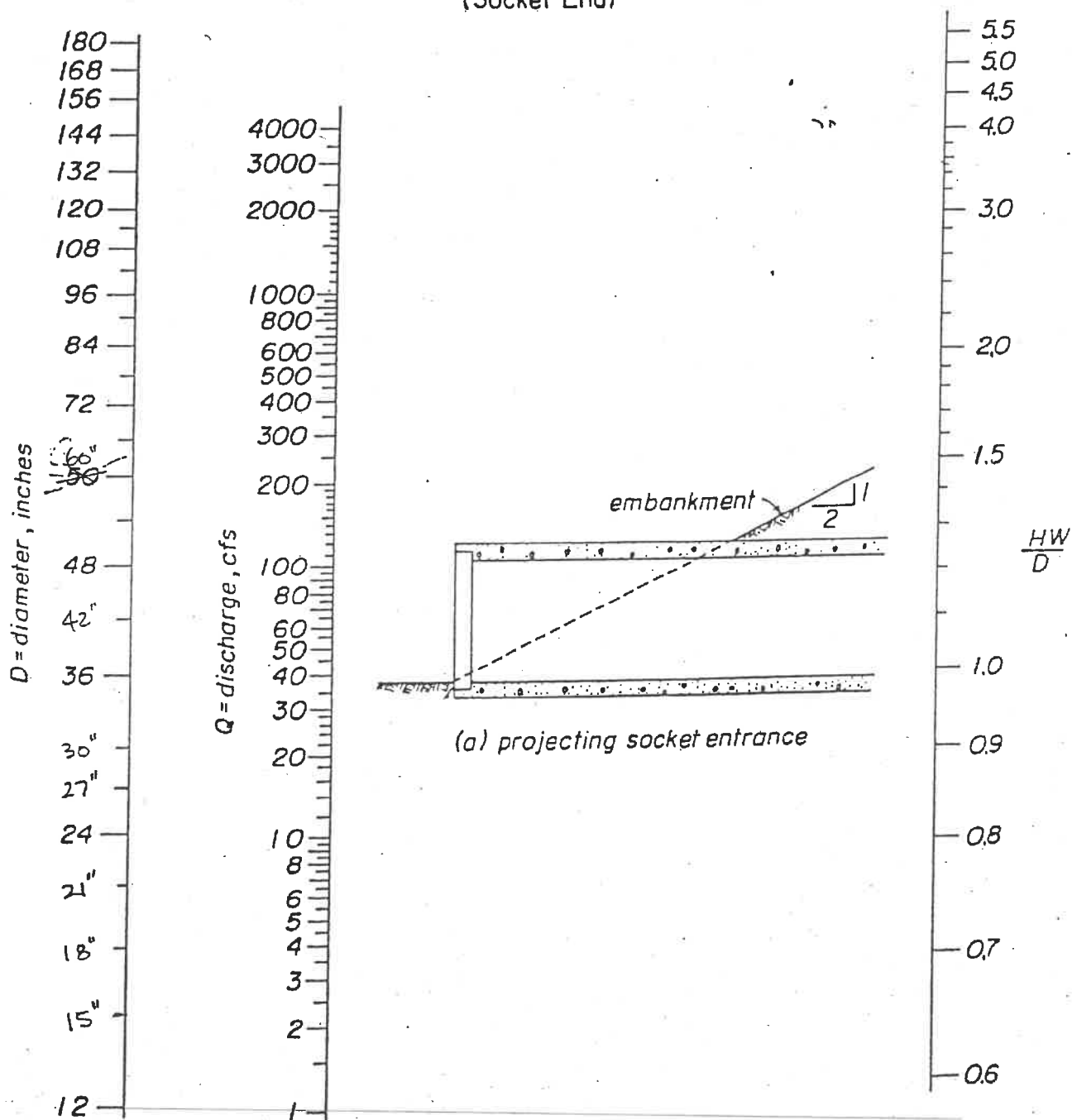


Fig. B-1

$Q = 1 \text{ cfs}$

$$\frac{HW}{D} = 0.6$$

$HW = 0.6 \checkmark$

Buckingham Woods

100-yr Thru-Flow

Sewer Pipes -- English Units

Civil Tools for Windows
(01-29-2007, 16:11:28)

Flowrate (cfs)	Diameter (in)	Friction (λ)	Slope (%)	Velocity (fps)
64.41	30.00	0.010	1.46	13.12

Buckingham Woods

Ditch Section "A"

Man Made Channels -- English Units

Civil Tools for Windows

(01-29-2007, 16:14:26)

Flow Depth = 1.000 ft
Flowrate = 63.014 cfs
Channel Bottom Width = 1.000 ft
Channel Side Slope = 4.000 ft/ft
Channel Slope = 0.80000 ft/ft
Channel Roughness = 0.070
Wetted Area = 5.00 sf
Wetted Perimeter = 9.25 ft
Velocity = 12.60 fps
Froude No. = 2.98
Flow = Super-Critical

Buckingham Woods

Ditch Section "B"

Man Made Channels -- English Units

Civil Tools for Windows

(01-29-2007, 16:14:56)

Flow Depth = 1.000 ft
Flowrate = 79.740 cfs
Channel Bottom Width = 2.000 ft
Channel Side Slope = 4.000 ft/ft
Channel Slope = 0.80000 ft/ft
Channel Roughness = 0.070
Wetted Area = 6.00 sf
Wetted Perimeter = 10.25 ft
Velocity = 13.29 fps
Froude No. = 3.02
Flow = Super-Critical