



CINCINNATI
COLUMBUS
DAYTON

350 Worthington Rd, Suite B
Westerville, OH 43082
phone ▶ 614.882.4311
fax ▶ 614.882.4479
www.kleingers.com

STORMWATER MANAGEMENT REPORT

For

Butler County

StoryPoint of Fairfield

Fairfield Township



September 26, 2016

JOB #: 150588.000



RECEIVED

RECEIVED

RECEIVED



StoryPoint of Fairfield

STORMWATER MANAGEMENT PLAN

Site Description

The proposed project will consist of the construction of StoryPoint of Fairfield, an assisted living facility on Gilmore Road between Hamilton-Mason Road and SR 129. The proposed construction will consist of a new building, associated utilities, parking lots and stormwater management facilities. The current site drains to two separate outlets. The northwestern portion of the site drains to the northwest to a swale that outlets to a ditch along State Route 129 and is tributary to Crawford Run, ultimately draining to the Great Miami River. The remainder of the site drains south to a wetland area between the proposed site and Hamilton-Mason Road, that is tributary to Pleasant Run and also ultimately the Great Miami River.

Hydrologic Methodologies

The stormwater detention calculations contained in this report were performed by using the SCS Unit Hydrograph hydrologic method in Bentley's PondPack, Version 10.1 software. Pre-developed and post-developed condition hydrographs were generated for storm frequencies of 1, 2, 5, 10, 25, 50, and 100 year 24-hour storm events using an SCS Type II distribution. Please refer to the drainage maps at the back of this report for a delineation of the drainage areas.

The County requires projects to adhere to the stormwater management requirements provided in the Butler County Subdivision Regulations. These regulations stipulate a critical year storm method where the percent increase in runoff from the 1 year, 24-hour storm frequency determines the critical storm event. The post-developed runoff must be controlled for storms of a frequency between one year and the critical storm so that the rate of runoff does not exceed the peak rate of runoff for a pre-developed, 24-hour, 1 year frequency storm. All storm events greater than the critical year must be controlled such the post-developed runoff rate does not exceed the pre-developed runoff rate for the previous storm event frequency.

The 1 year pre-developed hydrologic volume for the southern watershed (PRE SOUTH) is 0.731 ac-ft. The 1 year post-developed hydrologic volume (POST SOUTH A plus POST SOUTH B plus POST SOUTH UNDET) is 1.594 ac-ft. The difference between the two volumes represents an increase in stormwater runoff of 118%, which corresponds to a 25 year critical storm.

The 1 year pre-developed hydrologic volume for the northern watershed (PRE NORTH) is 0.149 ac-ft. The 1 year post-developed hydrologic volume (POST NORTH) is 0.042 ac-ft. The difference between the two volumes represents a decrease in stormwater runoff of 72%, which corresponds to a 1 year critical storm.



INTRODUCTION

Methodology

The Student Leadership Model

Methodology

One of the most significant findings in leadership research is that leadership is a process that can be studied and understood through the study of leadership models. In this study, the model used is the student leadership model. This model is based on the concept of leadership as a process of influence, where leaders seek to lead others in a positive direction, and through this process, leaders help others to develop their own leadership skills and potential. The student leadership model is based on the idea that students are the primary agents of change, and that they have the ability to lead and influence others. This model emphasizes the importance of developing leadership skills and potential in all students, and the need for leaders to provide guidance and support to those who are interested in developing their leadership abilities.

Methodology

In this study, the methodology used is qualitative research, specifically case study research. This method involves collecting data from multiple sources, such as interviews, observations, and documents, to gain a deep understanding of the subject matter. The data collected is analyzed to identify patterns and themes, and to gain insights into the underlying processes and dynamics of the leadership model. The data is also used to develop a detailed description of the leadership model, and to identify its strengths and weaknesses.

The methodology used in this study is qualitative research, specifically case study research. This method involves collecting data from multiple sources, such as interviews, observations, and documents, to gain a deep understanding of the subject matter. The data collected is analyzed to identify patterns and themes, and to gain insights into the underlying processes and dynamics of the leadership model. The data is also used to develop a detailed description of the leadership model, and to identify its strengths and weaknesses. The methodology used in this study is qualitative research, specifically case study research. This method involves collecting data from multiple sources, such as interviews, observations, and documents, to gain a deep understanding of the subject matter. The data collected is analyzed to identify patterns and themes, and to gain insights into the underlying processes and dynamics of the leadership model. The data is also used to develop a detailed description of the leadership model, and to identify its strengths and weaknesses.

The methodology used in this study is qualitative research, specifically case study research. This method involves collecting data from multiple sources, such as interviews, observations, and documents, to gain a deep understanding of the subject matter. The data collected is analyzed to identify patterns and themes, and to gain insights into the underlying processes and dynamics of the leadership model. The data is also used to develop a detailed description of the leadership model, and to identify its strengths and weaknesses.

The methodology used in this study is qualitative research, specifically case study research. This method involves collecting data from multiple sources, such as interviews, observations, and documents, to gain a deep understanding of the subject matter. The data collected is analyzed to identify patterns and themes, and to gain insights into the underlying processes and dynamics of the leadership model. The data is also used to develop a detailed description of the leadership model, and to identify its strengths and weaknesses.

TABLE 1 - Existing Hydrologic Conditions

Tributary Area Name	Area (ac)	CN	Tc (hr)	Q1 (cfs)	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
PRE NORTH	3.390	72	0.3389	1.57	2.39	4.03	5.30	6.92	8.32	9.47
PRE SOUTH	13.494	75	0.4333	7.11	10.28	16.45	21.20	27.14	32.26	36.43

TABLE 2 - Proposed Hydrologic Conditions

Tributary Area Name	Area (ac)	CN	Tc (hr)	Q1 (cfs)	Q2 (cfs)	Q5 (cfs)	Q10 (cfs)	Q25 (cfs)	Q50 (cfs)	Q100 (cfs)
POST NORTH	0.822	74	0.1667	0.63	0.91	1.45	1.87	2.39	2.84	3.21
POST SOUTH A	10.047	86	0.1667	17.10	21.64	29.77	35.66	42.76	48.68	53.42
POST SOUTH B	4.694	86	0.1667	7.99	10.11	13.91	16.66	19.98	22.75	24.96
POST SOUTH UNDET	1.318	74	0.1667	1.00	1.46	2.33	3.00	3.84	4.56	5.14

Applicable Permits

The Ohio Environmental Protection Agency (OEPA) requires projects to capture and treat stormwater for a storm event of 0.75" or less.

The required water quality volume is calculated by the equation:

$$WQ_v = \frac{CPA}{12}$$

Where WQ_v = water quality volume in acre-feet
 C = runoff coefficient, $0.858i^3 - 0.78i^2 + 0.774i + 0.04$, i = fraction of post-construction impervious surface
 P = 0.75 in precipitation depth
 A = area draining into the BMP in acres

ANSWER

ANSWER
1. $\frac{1}{2} \times 10^3$ N/m² or 500 N/m²

ANSWER
2. 1.2×10^{-10} N/m² or 1.2 pN/m

ANSWER
3. 1.2×10^{-10} N/m² or 1.2 pN/m

ANSWER
4. 1.2×10^{-10} N/m² or 1.2 pN/m

ANSWER
5. 1.2×10^{-10} N/m² or 1.2 pN/m

ANSWER
6. 1.2×10^{-10} N/m² or 1.2 pN/m

ANSWER
7. 1.2×10^{-10} N/m² or 1.2 pN/m

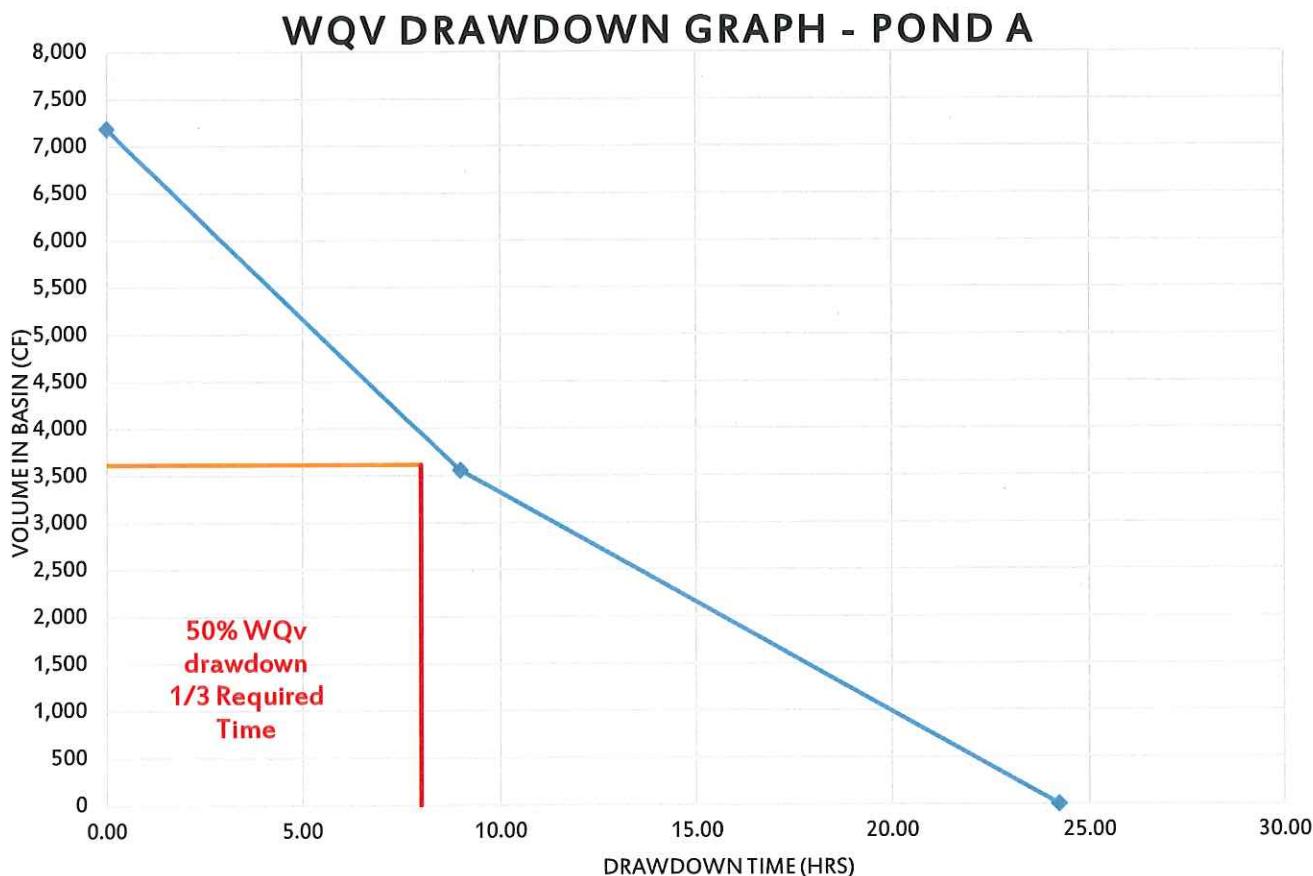
ANSWER
8. 1.2×10^{-10} N/m² or 1.2 pN/m

Retention Pond A

$$WQ_v = \frac{(0.35)(0.75)(10.047)}{12} = 0.221 \text{ acre - feet}$$

As permitted by the OEPA, 75% of the calculated WQ_v storage will be provided for wet retention basins, therefore the required WQ_v is 0.166 ac-ft.

A 3" circular orifice will be used to obtain the required minimum drawdown time of 24. The orifice will be at inv=743.75 and the water quality elevation is 744.05. The orifice provides a 24.25 hour drawdown time for the WQ_v volume.



SOMATOSENSATION

the body. The somatosensory system consists of three main components: the peripheral receptors, the central nervous system, and the brain. The peripheral receptors are located in the skin, muscle, tendon, and joint capsules. They are responsible for detecting touch, pressure, temperature, and pain. The central nervous system consists of the spinal cord and the brain. It processes the sensory information from the receptors and sends commands back to the body. The brain then interprets the information and initiates appropriate responses. The somatosensory system is important for maintaining balance, coordination, and posture. It also plays a role in learning and memory. The somatosensory system is a complex and fascinating topic that continues to be studied by scientists around the world.

The somatosensory system is a complex and fascinating topic that continues to be studied by scientists around the world.

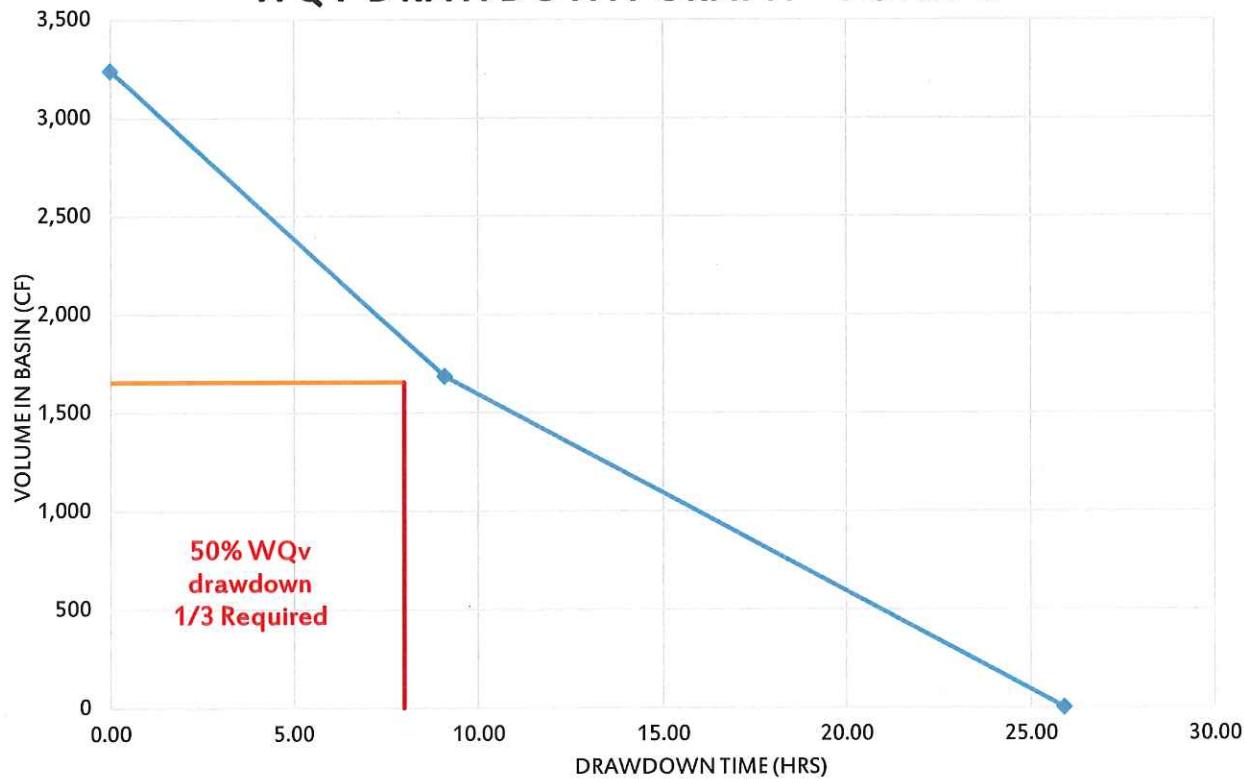
Retention Pond B

$$WQ_v = \frac{(0.35)(0.75)(4.694)}{12} = 0.101 \text{ acre - feet}$$

As permitted by the OEPA, 75% of the calculated WQ_v storage will be provided for wet retention basins, therefore the required WQ_v is 0.076 ac-ft.

A 2-1/8" circular orifice will be used to obtain the required minimum drawdown time of 24. The orifice will be at inv=743.75 and the water quality elevation is 743.96. The orifice provides a 25.92 hour drawdown time for the WQ_v volume.

WQV DRAWDOWN GRAPH - POND B



10
11

ANSWER

12
13

14
15

16
17

18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
205
206
207
208
209
210
211
212
213
214
215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238
239
240
241
242
243
244
245
246
247
248
249
250
251
252
253
254
255
256
257
258
259
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323
324
325
326
327
328
329
330
331
332
333
334
335
336
337
338
339
339
340
341
342
343
344
345
346
347
348
349
349
350
351
352
353
354
355
356
357
358
359
359
360
361
362
363
364
365
366
367
368
369
369
370
371
372
373
374
375
376
377
378
379
379
380
381
382
383
384
385
386
387
388
389
389
390
391
392
393
394
395
396
397
398
399
399
400
401
402
403
404
405
406
407
408
409
409
410
411
412
413
414
415
416
417
418
419
419
420
421
422
423
424
425
426
427
428
429
429
430
431
432
433
434
435
436
437
438
439
439
440
441
442
443
444
445
446
447
448
449
449
450
451
452
453
454
455
456
457
458
459
459
460
461
462
463
464
465
466
467
468
469
469
470
471
472
473
474
475
476
477
478
479
479
480
481
482
483
484
485
486
487
488
489
489
490
491
492
493
494
495
496
497
498
499
499
500
501
502
503
504
505
506
507
508
509
509
510
511
512
513
514
515
516
517
518
519
519
520
521
522
523
524
525
526
527
528
529
529
530
531
532
533
534
535
536
537
538
539
539
540
541
542
543
544
545
546
547
548
549
549
550
551
552
553
554
555
556
557
558
559
559
560
561
562
563
564
565
566
567
568
569
569
570
571
572
573
574
575
576
577
578
579
579
580
581
582
583
584
585
586
587
588
589
589
590
591
592
593
594
595
596
597
598
599
599
600
601
602
603
604
605
606
607
608
609
609
610
611
612
613
614
615
616
617
618
619
619
620
621
622
623
624
625
626
627
628
629
629
630
631
632
633
634
635
636
637
638
639
639
640
641
642
643
644
645
646
647
648
649
649
650
651
652
653
654
655
656
657
658
659
659
660
661
662
663
664
665
666
667
668
669
669
670
671
672
673
674
675
676
677
678
679
679
680
681
682
683
684
685
686
687
688
689
689
690
691
692
693
694
695
696
697
698
699
699
700
701
702
703
704
705
706
707
708
709
709
710
711
712
713
714
715
716
717
718
719
719
720
721
722
723
724
725
726
727
728
729
729
730
731
732
733
734
735
736
737
738
739
739
740
741
742
743
744
745
746
747
748
749
749
750
751
752
753
754
755
756
757
758
759
759
760
761
762
763
764
765
766
767
768
769
769
770
771
772
773
774
775
776
777
778
779
779
780
781
782
783
784
785
786
787
788
789
789
790
791
792
793
794
795
796
797
798
799
799
800
801
802
803
804
805
806
807
808
809
809
810
811
812
813
814
815
816
817
818
819
819
820
821
822
823
824
825
826
827
828
829
829
830
831
832
833
834
835
836
837
838
839
839
840
841
842
843
844
845
846
847
848
849
849
850
851
852
853
854
855
856
857
858
859
859
860
861
862
863
864
865
866
867
868
869
869
870
871
872
873
874
875
876
877
878
879
879
880
881
882
883
884
885
886
887
888
889
889
890
891
892
893
894
895
896
897
898
899
899
900
901
902
903
904
905
906
907
908
909
909
910
911
912
913
914
915
916
917
918
919
919
920
921
922
923
924
925
926
927
928
929
929
930
931
932
933
934
935
936
937
938
939
939
940
941
942
943
944
945
946
947
948
949
949
950
951
952
953
954
955
956
957
958
959
959
960
961
962
963
964
965
966
967
968
969
969
970
971
972
973
974
975
976
977
978
979
979
980
981
982
983
984
985
986
987
988
989
989
990
991
992
993
994
995
996
997
998
999
999
1000



Stormwater Management Plan

Stormwater management for the southern watershed (POST SOUTH OUT) will be achieved through detention in 2 retention basins (POND A and POND B), each having a separate tributary area.

The outlet control for POND A will be a 2x3 catch basin (structure 201). The catch basin will have an 8" reverse flow pipe that enters the structure at 742.25. Once inside the structure, the 8" pipe will turn up and be capped at 745.25. A 3" diameter orifice will be drilled into the 8" pipe at inv=743.75 for water quality drawdown. A 15"Wx3"H window will be cut into the north side of the structure at inv=744.05 for control of larger storm events. The grate will be set at 746.00 and will be activated in the 10-year and larger storm events. The 100-year ponding elevation is 746.72. An emergency spillway is provided at elevation 746.75 and the top of bank elevation is 747.75. The spillway will have a 15' bottom with 4:1 side slopes and a berm width of 6'.

The outlet control for POND B will be a 2x3 catch basin (structure 101). The catch basin will have an 8" reverse flow pipe that enters the structure at 742.25. Once inside the structure, the 8" pipe will turn up and be capped at 745.25. A 2-1/8" diameter orifice will be drilled into the 8" pipe at inv=743.75 for water quality drawdown. A 12"Wx3"H window will be cut into the north side of the structure at inv=743.96 for control of larger storm events. The grate will be set at 746.00. The 100 year ponding elevation is 746.02. An emergency spillway is provided at elevation 746.00 and the top of bank elevation is 747.75. The spillway will have a 15' bottom with 4:1 side slopes and a berm width of 6'.

TABLE 3.1 – POND A Detention Summary

Storm Event	Peak Water Surface Elevation (ft)	Detention Storage Volume (ac-ft)	Peak Flow (cfs)
WQv	744.05	0.166	0.08
1-yr	744.96	0.546	1.09
2-yr	745.23	0.716	1.28
5-yr	745.70	1.035	1.58
10-yr	746.01	1.258	2.27
25-yr	746.21	1.399	4.79
50-yr	746.49	1.614	5.16
100-yr	746.72	1.789	5.44

- later in report
@ 746.0 - 1.249 ac-ft
W/ 744.05 @ 0

1.623

TABLE 3.2 – POND B Detention Summary

Storm Event	Peak Water Surface Elevation (ft)	Detention Storage Volume (ac-ft)	Peak Flow (cfs)
WQv	743.96	0.076	0.04
1-yr	744.59	0.235	0.72
2-yr	744.78	0.308	0.85
5-yr	745.12	0.446	1.06
10-yr	745.37	0.549	1.19
25-yr	745.66	0.676	1.35
50-yr	745.91	0.786	1.46
100-yr	746.02	0.835	3.07

0.759

Results Summary

The northern and southern tributary areas will be detained and adhere to the release rates specified in the Butler County Subdivision Regulations. A summary of the peak flows from each area is presented below for reference.

TABLE 4 – Southern Tributary Area (POST SOUTH A + POST SOUTH B + POST SOUTH UNDET)

Storm Event	PRE-DEVELOPED RELEASE RATES (cfs) (PRE SOUTH)	ALLOWABLE RELEASE RATE (cfs)	POST-DEVELOPED RELEASE RATES (cfs) (POST SOUTH OUT)
1-yr	7.11	7.11	2.42
2-yr	10.28	7.11	3.10
5-yr	16.45	7.11	4.33
10-yr	21.20	7.11	5.21
25-yr	27.14	7.11	7.07*
50-yr	32.26	27.14	9.21
100-yr	36.43	32.26	10.78

*denotes critical year storm

TABLE 5 – Northern Tributary Area

Storm Event	PRE-DEVELOPED RELEASE RATES (cfs) (PRE NORTH)	ALLOWABLE RELEASE RATE (cfs)	POST-DEVELOPED RELEASE RATES (cfs) (POST NORTH)
1-yr	1.57	1.57	0.63*
2-yr	2.39	1.57	0.91
5-yr	4.03	2.39	1.45
10-yr	5.30	4.03	1.87
25-yr	6.92	5.30	2.39
50-yr	8.32	6.92	2.84
100-yr	9.47	8.32	3.21

*denotes critical year storm

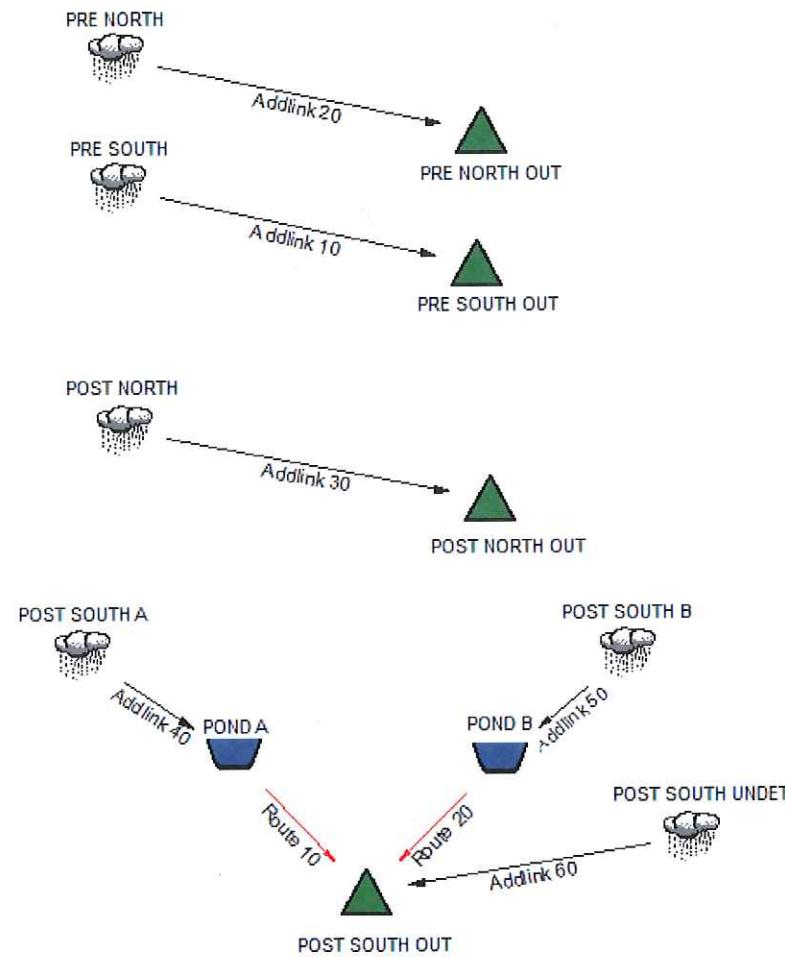


Table of Contents

***** MASTER SUMMARY *****

Watershed..... Master Network Summary 1.01

***** DESIGN STORMS SUMMARY *****

BUTLER..... Design Storms 2.01

***** TC CALCULATIONS *****

POST NORTH..... Tc Calcs 3.01

POST SOUTH A.... Tc Calcs 3.03

POST SOUTH B.... Tc Calcs 3.05

POST SOUTH UNDET Tc Calcs 3.07

PRE NORTH..... Tc Calcs 3.09

PRE SOUTH..... Tc Calcs 3.11

***** CN CALCULATIONS *****

POST NORTH..... Runoff CN-Area 4.01

POST SOUTH A.... Runoff CN-Area 4.02

POST SOUTH B.... Runoff CN-Area 4.03

POST SOUTH UNDET Runoff CN-Area 4.04

Table of Contents (continued)

PRE NORTH.....	Runoff CN-Area	4.05
PRE SOUTH.....	Runoff CN-Area	4.06

*****RUNOFF HYDROGRAPHS*****

POST NORTH.....	1		
		Unit Hyd. Summary	5.01
POST NORTH.....	2		
		Unit Hyd. Summary	5.02
POST NORTH.....	5		
		Unit Hyd. Summary	5.03
POST NORTH.....	10		
		Unit Hyd. Summary	5.04
POST NORTH.....	25		
		Unit Hyd. Summary	5.05
POST NORTH.....	50		
		Unit Hyd. Summary	5.06
POST NORTH.....	100		
		Unit Hyd. Summary	5.07
POST SOUTH A....	1		
		Unit Hyd. Summary	5.08
POST SOUTH A....	2		
		Unit Hyd. Summary	5.09
POST SOUTH A....	5		
		Unit Hyd. Summary	5.10
POST SOUTH A....	10		
		Unit Hyd. Summary	5.11
POST SOUTH A....	25		
		Unit Hyd. Summary	5.12
POST SOUTH A....	50		
		Unit Hyd. Summary	5.13

Table of Contents (continued)

POST SOUTH A....	100		
		Unit Hyd. Summary	5.14
POST SOUTH B....	1		
		Unit Hyd. Summary	5.15
POST SOUTH B....	2		
		Unit Hyd. Summary	5.16
POST SOUTH B....	5		
		Unit Hyd. Summary	5.17
POST SOUTH B....	10		
		Unit Hyd. Summary	5.18
POST SOUTH B....	25		
		Unit Hyd. Summary	5.19
POST SOUTH B....	50		
		Unit Hyd. Summary	5.20
POST SOUTH B....	100		
		Unit Hyd. Summary	5.21
POST SOUTH UNDET	1		
		Unit Hyd. Summary	5.22
POST SOUTH UNDET	2		
		Unit Hyd. Summary	5.23
POST SOUTH UNDET	5		
		Unit Hyd. Summary	5.24
POST SOUTH UNDET	10		
		Unit Hyd. Summary	5.25
POST SOUTH UNDET	25		
		Unit Hyd. Summary	5.26
POST SOUTH UNDET	50		
		Unit Hyd. Summary	5.27
POST SOUTH UNDET	100		
		Unit Hyd. Summary	5.28
PRE NORTH.....	1		
		Unit Hyd. Summary	5.29

Table of Contents (continued)

PRE NORTH.....	2
Unit Hyd. Summary	5.30
PRE NORTH.....	5
Unit Hyd. Summary	5.31
PRE NORTH.....	10
Unit Hyd. Summary	5.32
PRE NORTH.....	25
Unit Hyd. Summary	5.33
PRE NORTH.....	50
Unit Hyd. Summary	5.34
PRE NORTH.....	100
Unit Hyd. Summary	5.35
PRE SOUTH.....	1
Unit Hyd. Summary	5.36
PRE SOUTH.....	2
Unit Hyd. Summary	5.37
PRE SOUTH.....	5
Unit Hyd. Summary	5.38
PRE SOUTH.....	10
Unit Hyd. Summary	5.39
PRE SOUTH.....	25
Unit Hyd. Summary	5.40
PRE SOUTH.....	50
Unit Hyd. Summary	5.41
PRE SOUTH.....	100
Unit Hyd. Summary	5.42

***** POND VOLUMES *****

POND A.....	Vol: Elev-Area	6.01
POND B.....	Vol: Elev-Area	6.02

Table of Contents (continued)

***** OUTLET STRUCTURES *****

- Outlet A..... Outlet Input Data 7.01
Outlet B..... Outlet Input Data 7.05

***** POND ROUTING *****

- POND A OUT 1
 Pond Routing Summary 8.01
- POND A OUT 2
 Pond Routing Summary 8.02
- POND A OUT 5
 Pond Routing Summary 8.03
- POND A OUT 10
 Pond Routing Summary 8.04
- POND A OUT 25
 Pond Routing Summary 8.05
- POND A OUT 50
 Pond Routing Summary 8.06
- POND A OUT 100
 Pond Routing Summary 8.07
- POND B OUT 1
 Pond Routing Summary 8.08
- POND B OUT 2
 Pond Routing Summary 8.09
- POND B OUT 5
 Pond Routing Summary 8.10
- POND B OUT 10
 Pond Routing Summary 8.11

Table of Contents (continued)

POND B	OUT 25	Pond Routing Summary	8.12
POND B	OUT 50	Pond Routing Summary	8.13
POND B	OUT 100	Pond Routing Summary	8.14

Type.... Master Network Summary

Page 1.01

Name.... Watershed

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

MASTER DESIGN STORM SUMMARY

Network Storm Collection: BUTLER

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.5000	Synthetic Curve	TypeII 24hr
2	2.9000	Synthetic Curve	TypeII 24hr
5	3.6000	Synthetic Curve	TypeII 24hr
10	4.1000	Synthetic Curve	TypeII 24hr
25	4.7000	Synthetic Curve	TypeII 24hr
50	5.2000	Synthetic Curve	TypeII 24hr
100	5.6000	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Pond Storage ac-ft
POND A	IN POND	1	1.041		12.0000	17.10		
POND A	IN POND	2	1.320		12.0000	21.64		
POND A	IN POND	5	1.831		12.0000	29.77		
POND A	IN POND	10	2.208		12.0000	35.66		
POND A	IN POND	25	2.669		12.0000	42.76		
POND A	IN POND	50	3.059		12.0000	48.68		
POND A	IN POND	100	3.374		12.0000	53.42		
POND A	OUT POND	1	1.040		13.0000	1.09	744.96	.546
POND A	OUT POND	2	1.320		13.0500	1.28	745.23	.716
POND A	OUT POND	5	1.830		13.3000	1.58	745.70	1.035
POND A	OUT POND	10	2.207		13.1000	2.27	746.01	1.258
POND A	OUT POND	25	2.668		12.5000	4.79	746.21	1.399
POND A	OUT POND	50	3.059		12.5000	5.16	746.49	1.614
POND A	OUT POND	100	3.374		12.5000	5.44	746.72	1.789

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
POND B	IN POND	1	.486		12.0000	7.99		
POND B	IN POND	2	.617		12.0000	10.11		
POND B	IN POND	5	.856		12.0000	13.91		
POND B	IN POND	10	1.032		12.0000	16.66		
POND B	IN POND	25	1.247		12.0000	19.98		
POND B	IN POND	50	1.429		12.0000	22.75		
POND B	IN POND	100	1.577		12.0000	24.96		
POND B	OUT POND	1	.486		12.5500	.72	744.59	.235
POND B	OUT POND	2	.616		12.6000	.85	744.78	.308
POND B	OUT POND	5	.855		12.7000	1.06	745.12	.446
POND B	OUT POND	10	1.031		12.7000	1.19	745.37	.549
POND B	OUT POND	25	1.246		12.8500	1.35	745.66	.676
POND B	OUT POND	50	1.429		12.8000	1.46	745.91	.786
POND B	OUT POND	100	1.576		12.4500	3.07	746.02	.835
POST NORTH	AREA	1	.042		12.0000	.63		
POST NORTH	AREA	2	.058		12.0000	.91		
POST NORTH	AREA	5	.090		12.0000	1.45		
POST NORTH	AREA	10	.114		12.0000	1.87		
POST NORTH	AREA	25	.146		12.0000	2.39		
POST NORTH	AREA	50	.173		12.0000	2.84		
POST NORTH	AREA	100	.195		12.0000	3.21		
*POST NORTH OUT	JCT	1	.042		12.0000	.63		
*POST NORTH OUT	JCT	2	.058		12.0000	.91		
*POST NORTH OUT	JCT	5	.090		12.0000	1.45		
*POST NORTH OUT	JCT	10	.114		12.0000	1.87		
*POST NORTH OUT	JCT	25	.146		12.0000	2.39		
*POST NORTH OUT	JCT	50	.173		12.0000	2.84		
*POST NORTH OUT	JCT	100	.195		12.0000	3.21		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
POST SOUTH A	AREA	1	1.041	--	12.0000	17.10		
POST SOUTH A	AREA	2	1.320	--	12.0000	21.64		
POST SOUTH A	AREA	5	1.831	--	12.0000	29.77		
POST SOUTH A	AREA	10	2.208	--	12.0000	35.66		
POST SOUTH A	AREA	25	2.669	--	12.0000	42.76		
POST SOUTH A	AREA	50	3.059	--	12.0000	48.68		
POST SOUTH A	AREA	100	3.374	--	12.0000	53.42		
POST SOUTH B	AREA	1	.486	--	12.0000	7.99		
POST SOUTH B	AREA	2	.617	--	12.0000	10.11		
POST SOUTH B	AREA	5	.856	--	12.0000	13.91		
POST SOUTH B	AREA	10	1.032	--	12.0000	16.66		
POST SOUTH B	AREA	25	1.247	--	12.0000	19.98		
POST SOUTH B	AREA	50	1.429	--	12.0000	22.75		
POST SOUTH B	AREA	100	1.577	--	12.0000	24.96		
*POST SOUTH OUT	JCT	1	1.593	--	12.0500	2.42		
*POST SOUTH OUT	JCT	2	2.029	--	12.0500	3.10		
*POST SOUTH OUT	JCT	5	2.829	--	12.0500	4.33		
*POST SOUTH OUT	JCT	10	3.421	--	12.0500	5.21		
*POST SOUTH OUT	JCT	25	4.148	--	12.2000	7.07		
*POST SOUTH OUT	JCT	50	4.765	--	12.1000	9.21		
*POST SOUTH OUT	JCT	100	5.263	--	12.0500	10.78		
POST SOUTH UNDET	AREA	1	.067	--	12.0000	1.00		
POST SOUTH UNDET	AREA	2	.093	--	12.0000	1.46		
POST SOUTH UNDET	AREA	5	.144	--	12.0000	2.33		
POST SOUTH UNDET	AREA	10	.183	--	12.0000	3.00		
POST SOUTH UNDET	AREA	25	.234	--	12.0000	3.84		
POST SOUTH UNDET	AREA	50	.277	--	12.0000	4.56		
POST SOUTH UNDET	AREA	100	.313	--	12.0000	5.14		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversions;
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Pond Storage ac-ft
PRE NORTH	AREA	1	.149		12.1500	1.57		
PRE NORTH	AREA	2	.212		12.1000	2.39		
PRE NORTH	AREA	5	.335		12.1000	4.03		
PRE NORTH	AREA	10	.432		12.1000	5.30		
PRE NORTH	AREA	25	.556		12.1000	6.92		
PRE NORTH	AREA	50	.665		12.1000	8.32		
PRE NORTH	AREA	100	.754		12.1000	9.47		
*PRE NORTH OUT	JCT	1	.149		12.1500	1.57		
*PRE NORTH OUT	JCT	2	.212		12.1000	2.39		
*PRE NORTH OUT	JCT	5	.335		12.1000	4.03		
*PRE NORTH OUT	JCT	10	.432		12.1000	5.30		
*PRE NORTH OUT	JCT	25	.556		12.1000	6.92		
*PRE NORTH OUT	JCT	50	.665		12.1000	8.32		
*PRE NORTH OUT	JCT	100	.754		12.1000	9.47		
PRE SOUTH	AREA	1	.731		12.2000	7.11		
PRE SOUTH	AREA	2	1.007		12.1500	10.28		
PRE SOUTH	AREA	5	1.544		12.1500	16.45		
PRE SOUTH	AREA	10	1.958		12.1500	21.20		
PRE SOUTH	AREA	25	2.483		12.1500	27.14		
PRE SOUTH	AREA	50	2.937		12.1500	32.26		
PRE SOUTH	AREA	100	3.310		12.1500	36.43		
*PRE SOUTH OUT	JCT	1	.731		12.2000	7.11		
*PRE SOUTH OUT	JCT	2	1.007		12.1500	10.28		
*PRE SOUTH OUT	JCT	5	1.544		12.1500	16.45		
*PRE SOUTH OUT	JCT	10	1.958		12.1500	21.20		
*PRE SOUTH OUT	JCT	25	2.483		12.1500	27.14		
*PRE SOUTH OUT	JCT	50	2.937		12.1500	32.26		
*PRE SOUTH OUT	JCT	100	3.310		12.1500	36.43		

Type.... Design Storms

Page 2.01

Name.... BUTLER

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Title... Project Date: 5/9/2016
Project Engineer: masonm
Project Title: 150588 StoryPoint Fairfield
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File, ID = BUTLER

Storm Tag Name = 1

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 2

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 2 yr
Total Rainfall Depth= 2.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 5

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 3.6000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 4.1000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 4.7000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Design Storms
Name.... BUTLER

Page 2.02

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Title... Project Date: 5/9/2016
Project Engineer: masonm
Project Title: 150588 StoryPoint Fairfield
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File, ID = BUTLER

Storm Tag Name = 50

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 5.2000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 100

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 5.6000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Tc Calcs
Name.... POST NORTH

Page 3.01

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

:::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
:::::::::::::::::::

Segment #1: Tc: User Defined

Segment #1 Time: .1667 hrs

=====

Total Tc: .1667 hrs

=====

Type.... Tc Calcs
Name.... POST NORTH

Page 3.02

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Tc Calcs
Name.... POST SOUTH A

Page 3.03

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

:::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
:::::::::::::::::::

Segment #1: Tc: User Defined

Segment #1 Time: .1667 hrs

=====

Total Tc: .1667 hrs

=====

Type.... Tc Calcs
Name.... POST SOUTH A

Page 3.04

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Tc Calcs
Name.... POST SOUTH B

Page 3.05

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

:::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
:::::::::::::::::::

Segment #1: Tc: User Defined

Segment #1 Time: .1667 hrs

=====

Total Tc: .1667 hrs

=====

Type.... Tc Calcs
Name.... POST SOUTH B

Page 3.06

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Tc Equations used...

===== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Tc Calcs
Name.... POST SOUTH UNDET

Page 3.07

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

:::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
:::::::::::::::::::

Segment #1: Tc: User Defined

Segment #1 Time: .1667 hrs

=====

Total Tc: .1667 hrs

=====

Type.... Tc Calcs
Name.... POST SOUTH UNDET

Page 3.08

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Tc Equations used...

==== User Defined =====

Tc = Value entered by user

Where: Tc = Time of concentration

Type.... Tc Calcs
Name.... PRE NORTH

Page 3.09

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

:::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
:::::::::::::::::::

Segment #1: Tc: TR-55 Sheet

Mannings n .4000
Hydraulic Length 100.00 ft
2yr, 24hr P 2.9000 in
Slope .030000 ft/ft

Avg.Velocity .09 ft/sec

Segment #1 Time: .3197 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length 236.00 ft
Slope .044500 ft/ft
Unpaved

Avg.Velocity 3.40 ft/sec

Segment #2 Time: .0193 hrs

=====

Total Tc: .3389 hrs

=====

Type.... Tc Calcs
Name.... PRE NORTH

Page 3.10

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Tc Equations used...

===== SCS TR-55 Sheet Flow =====

$$Tc = (.007 * ((n * Lf)^{**0.8})) / ((P^{**.5}) * (Sf^{**.4}))$$

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

===== SCS TR-55 Shallow Concentrated Flow =====

Unpaved surface:

$$V = 16.1345 * (Sf^{**0.5})$$

Paved surface:

$$V = 20.3282 * (Sf^{**0.5})$$

$$Tc = (Lf / V) / (3600sec/hr)$$

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Tc Calcs
Name.... PRE SOUTH

Page 3.11

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

:::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
:::::::::::::::::::

Segment #1: Tc: TR-55 Sheet

Mannings n .4000
Hydraulic Length 100.00 ft
2yr, 24hr P 2.9000 in
Slope .030800 ft/ft

Avg.Velocity .09 ft/sec

Segment #1 Time: .3163 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length 821.00 ft
Slope .014600 ft/ft
Unpaved

Avg.Velocity 1.95 ft/sec

Segment #2 Time: .1170 hrs

=====

Total Tc; .4333 hrs

=====

Type.... Tc Calcs
Name.... PRE SOUTH

Page 3.12

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Tc Equations used...

===== SCS TR-55 Sheet Flow =====

$$Tc = (.007 * ((n * Lf)^{0.8})) / ((P^{0.5}) * (Sf^{0.4}))$$

Where: Tc = Time of concentration, hrs

n = Mannings n

Lf = Flow length, ft

P = 2yr, 24hr Rain depth, inches

Sf = Slope, %

===== SCS TR-55 Shallow Concentrated Flow =====

Unpaved surface:

$$V = 16.1345 * (Sf^{0.5})$$

Paved surface:

$$V = 20.3282 * (Sf^{0.5})$$

$$Tc = (Lf / V) / (3600sec/hr)$$

Where: V = Velocity, ft/sec

Sf = Slope, ft/ft

Tc = Time of concentration, hrs

Lf = Flow length, ft

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Runoff CN-Area

Page 4.01

Name.... POST NORTH

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

RUNOFF CURVE NUMBER DATA

:::::::::::::::::::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C %UC	Adjusted CN
Open space (Lawns,parks etc.) - Goo	74	.822		74.00

COMPOSITE AREA & WEIGHTED CN ---> .822 74.00 (74)

:::::::::::::::::::

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Runoff CN-Area
Name.... POST SOUTH A

Page 4.02

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C %UC	Adjusted CN
Open space (Lawns, parks etc.) - Goo	74	4.845		74.00
Impervious Areas - Paved parking lo	98	5.202		98.00

COMPOSITE AREA & WEIGHTED CN ---> 10.047 86.43 (86)

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Runoff CN-Area

Page 4.03

Name.... POST SOUTH B

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

RUNOFF CURVE NUMBER DATA

:::::::::::::::::::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C %UC	Adjusted CN
Open space (Lawns,parks etc.) - Goo	74	2.309		74.00
Impervious Areas - Paved parking lo	98	2.385		98.00

COMPOSITE AREA & WEIGHTED CN ---> 4.694 86.19 (86)

:::::::::::::::::::

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Runoff CN-Area
Name.... POST SOUTH UNDET

Page 4.04

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C %UC	Adjusted CN
Open space (Lawns,parks etc.) - Goo	74	1.318		74.00

COMPOSITE AREA & WEIGHTED CN ---> 1.318 74.00 (74)

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Runoff CN-Area
Name.... PRE NORTH

Page 4.05

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C %UC	Adjusted CN
Woods - grass combination - good	72	3.390		72.00

COMPOSITE AREA & WEIGHTED CN ---> 3.390 72.00 (72)

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Runoff CN-Area
Name.... PRE SOUTH

Page 4.06

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
Woods - grass combination - good	72	10.519			72.00
Row crops - Straight row (SR), good	85	2.975			85.00

COMPOSITE AREA & WEIGHTED CN ---> 13.494 74.87 (75)

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Unit Hyd. Summary

Page 5.01

Name.... POST NORTH Tag: 1

Event: 1 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 1

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm

Duration = 24.0000 hrs Rain Depth = 2.5000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST NORTH 1

Tc = .1667 hrs

Drainage Area = .822 acres Runoff CN= 74

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 12.0246 hrs

Computed Peak Flow = .64 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = .63 cfs

WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%

=====

DRAINAGE AREA

ID:POST NORTH

CN = 74

Area = .822 acres

S = 3.5135 in

0.2S = .7027 in

Cumulative Runoff

.6082 in

.042 ac-ft

HYG Volume... .042 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST NORTH)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 5.59 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.02

Name.... POST NORTH Tag: 2

Event: 2 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 2

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm

Duration = 24.0000 hrs Rain Depth = 2.9000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST NORTH 2

Tc = .1667 hrs

Drainage Area = .822 acres Runoff CN= 74

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 12.0246 hrs

Computed Peak Flow = .92 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = .91 cfs

DRAINAGE AREA

ID: POST NORTH

CN = 74

Area = .822 acres

S = 3.5135 in

0.2S = .7027 in

Cumulative Runoff

.8454 in

.058 ac-ft

HYG Volume... .058 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST NORTH)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 5.59 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.03

Name.... POST NORTH Tag: 5

Event: 5 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 5

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm

Duration = 24.0000 hrs Rain Depth = 3.6000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST NORTH 5

Tc = .1667 hrs

Drainage Area = .822 acres Runoff CN= 74

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 12.0024 hrs

Computed Peak Flow = 1.46 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 1.45 cfs

=====

DRAINAGE AREA

ID:POST NORTH

CN = 74

Area = .822 acres

S = 3.5135 in

0.2S = .7027 in

Cumulative Runoff

1.3094 in

.090 ac-ft

HYG Volume... .090 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST NORTH)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 5.59 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.04

Name.... POST NORTH Tag: 10

Event: 10 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 10

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 24.0000 hrs Rain Depth = 4.1000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST NORTH 10
Tc = .1667 hrs
Drainage Area = .822 acres Runoff CN= 74

=====
Computational Time Increment = .02223 hrs
Computed Peak Time = 12.0024 hrs
Computed Peak Flow = 1.87 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 1.87 cfs

=====

DRAINAGE AREA

ID:POST NORTH
CN = 74
Area = .822 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

1.6701 in
.114 ac-ft

HYG Volume... .114 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST NORTH)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 5.59 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

S/N:

Bentley PondPack (10.01.04.00)

Bentley Systems, Inc.

9:46 AM

8/30/2016

Type.... Unit Hyd. Summary

Page 5.05

Name.... POST NORTH Tag: 25

Event: 25 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 25

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm

Duration = 24.0000 hrs Rain Depth = 4.7000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST NORTH 25

Tc = .1667 hrs

Drainage Area = .822 acres Runoff CN= 74

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 12.0024 hrs

Computed Peak Flow = 2.39 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 2.39 cfs

=====

DRAINAGE AREA

ID:POST NORTH

CN = 74

Area = .822 acres

S = 3.5135 in

0.2S = .7027 in

Cumulative Runoff

2.1274 in

.146 ac-ft

HYG Volume... .146 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST NORTH)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 5.59 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Unit Hyd. Summary

Page 5.08

Name.... POST SOUTH A Tag: 1

Event: 1 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 1

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm

Duration = 24.0000 hrs Rain Depth = 2.5000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH A 1

Tc = .1667 hrs

Drainage Area = 10.047 acres Runoff CN= 86

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 12.0024 hrs

Computed Peak Flow = 17.11 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 17.10 cfs

=====

DRAINAGE AREA

ID:POST SOUTH A

CN = 86

Area = 10.047 acres

S = 1.6279 in

0.2S = .3256 in

Cumulative Runoff

1.2435 in

1.041 ac-ft

HYG Volume... 1.041 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH A)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 68.29 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Unit Hyd. Summary

Page 5.09

Name.... POST SOUTH A Tag: 2

Event: 2 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 2

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm

Duration = 24.0000 hrs Rain Depth = 2.9000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH A 2

Tc = .1667 hrs

Drainage Area = 10.047 acres Runoff CN= 86

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 12.0024 hrs

Computed Peak Flow = 21.64 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 21.64 cfs

=====

DRAINAGE AREA

ID:POST SOUTH A

CN = 86

Area = 10.047 acres

S = 1.6279 in

0.2S = .3256 in

Cumulative Runoff

1.5771 in

1.320 ac-ft

HYG Volume... 1.320 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH A)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 68.29 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.10

Name.... POST SOUTH A Tag: 5

Event: 5 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 5

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm

Duration = 24.0000 hrs Rain Depth = 3.6000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH A 5

Tc = .1667 hrs

Drainage Area = 10.047 acres Runoff CN= 86

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 11.9802 hrs

Computed Peak Flow = 29.89 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 29.77 cfs

DRAINAGE AREA

ID:POST SOUTH A

CN = 86

Area = 10.047 acres

S = 1.6279 in

0.2S = .3256 in

Cumulative Runoff

2.1871 in

1.831 ac-ft

HYG Volume... 1.831 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH A)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 68.29 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary
Name.... POST SOUTH A Tag: 10 Event: 10 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 10

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 24.0000 hrs Rain Depth = 4.1000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH A 10
Tc = .1667 hrs
Drainage Area = 10.047 acres Runoff CN= 86

=====
Computational Time Increment = .02223 hrs
Computed Peak Time = 11.9802 hrs
Computed Peak Flow = 35.88 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 35.66 cfs

=====

DRAINAGE AREA

ID:POST SOUTH A
CN = 86
Area = 10.047 acres
S = 1.6279 in
0.2S = .3256 in

Cumulative Runoff

2.6371 in
2.208 ac-ft

HYG Volume... 2.208 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH A)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 68.29 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.12

Name.... POST SOUTH A Tag: 25

Event: 25 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 25

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm

Duration = 24.0000 hrs Rain Depth = 4.7000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH A 25

Tc = .1667 hrs

Drainage Area = 10.047 acres Runoff CN= 86

=====

Computational Time Increment = .02223 hrs
Computed Peak Time = 11.9802 hrs
Computed Peak Flow = 43.10 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 42.76 cfs

DRAINAGE AREA

ID:POST SOUTH A

CN = 86

Area = 10.047 acres

S = 1.6279 in

0.2S = .3256 in

Cumulative Runoff

3.1880 in
2.669 ac-ft

HYG Volume... 2.669 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH A)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 68.29 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.13

Name.... POST SOUTH A Tag: 50

Event: 50 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 50

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm
Duration = 24.0000 hrs Rain Depth = 5.2000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH A 50
Tc = .1667 hrs
Drainage Area = 10.047 acres Runoff CN= 86

=====
Computational Time Increment = .02223 hrs
Computed Peak Time = 11.9802 hrs
Computed Peak Flow = 49.14 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 48.68 cfs

=====

DRAINAGE AREA

ID:POST SOUTH A
CN = 86
Area = 10.047 acres
S = 1.6279 in
0.2S = .3256 in

Cumulative Runoff

3.6541 in
3.059 ac-ft

HYG Volume... 3.059 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH A)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 68.29 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.14

Name.... POST SOUTH A Tag: 100

Event: 100 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 100

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 5.6000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH A 100
Tc = .1667 hrs
Drainage Area = 10.047 acres Runoff CN= 86

=====
Computational Time Increment = .02223 hrs
Computed Peak Time = 11.9802 hrs
Computed Peak Flow = 53.97 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 53.42 cfs

=====

DRAINAGE AREA

ID:POST SOUTH A
CN = 86
Area = 10.047 acres
S = 1.6279 in
0.2S = .3256 in

Cumulative Runoff

4.0305 in
3.374 ac-ft

HYG Volume... 3.374 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH A)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 68.29 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.15

Name.... POST SOUTH B Tag: 1

Event: 1 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 1

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm

Duration = 24.0000 hrs Rain Depth = 2.5000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH B 1

Tc = .1667 hrs

Drainage Area = 4.694 acres Runoff CN= 86

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 12.0024 hrs

Computed Peak Flow = 7.99 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 7.99 cfs

=====

DRAINAGE AREA

ID:POST SOUTH B

CN = 86

Area = 4.694 acres

S = 1.6279 in

0.2S = .3256 in

Cumulative Runoff

1.2435 in

.486 ac-ft

HYG Volume... .486 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH B)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 31.90 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.16

Name.... POST SOUTH B Tag: 2

Event: 2 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 2

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm

Duration = 24.0000 hrs Rain Depth = 2.9000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH B 2

Tc = .1667 hrs

Drainage Area = 4.694 acres Runoff CN= 86

Computational Time Increment = .02223 hrs

Computed Peak Time = 12.0024 hrs

Computed Peak Flow = 10.11 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 10.11 cfs

DRAINAGE AREA

ID:POST SOUTH B

CN = 86

Area = 4.694 acres

S = 1.6279 in

0.2S = .3256 in

Cumulative Runoff

1.5771 in

.617 ac-ft

HYG Volume... .617 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH B)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 31.90 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

S/N:

Bentley PondPack (10.01.04.00)

Bentley Systems, Inc.

9:46 AM

8/30/2016

Type.... Unit Hyd. Summary

Page 5.17

Name.... POST SOUTH B Tag: 5

Event: 5 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 5

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm

Duration = 24.0000 hrs Rain Depth = 3.6000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH B 5

Tc = .1667 hrs

Drainage Area = 4.694 acres Runoff CN= 86

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 11.9802 hrs

Computed Peak Flow = 13.97 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 13.91 cfs

=====

DRAINAGE AREA

ID:POST SOUTH B

CN = 86

Area = 4.694 acres

S = 1.6279 in

0.2S = .3256 in

Cumulative Runoff

2.1871 in

.856 ac-ft

HYG Volume... .856 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH B)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 31.90 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.18

Name.... POST SOUTH B Tag: 10

Event: 10 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 10

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 24.0000 hrs Rain Depth = 4.1000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH B 10
Tc = .1667 hrs
Drainage Area = 4.694 acres Runoff CN= 86

=====
Computational Time Increment = .02223 hrs
Computed Peak Time = 11.9802 hrs
Computed Peak Flow = 16.76 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 16.66 cfs

=====

DRAINAGE AREA

ID:POST SOUTH B
CN = 86
Area = 4.694 acres
S = 1.6279 in
0.2S = .3256 in

Cumulative Runoff

2.6371 in
1.032 ac-ft

HYG Volume... 1.032 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH B)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 31.90 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Unit Hyd. Summary

Page 5.19

Name.... POST SOUTH B Tag: 25

Event: 25 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 25

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm

Duration = 24.0000 hrs Rain Depth = 4.7000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH B 25

Tc = .1667 hrs

Drainage Area = 4.694 acres Runoff CN= 86

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 11.9802 hrs

Computed Peak Flow = 20.14 cfs

=====

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 19.98 cfs

=====

DRAINAGE AREA

ID:POST SOUTH B

CN = 86

Area = 4.694 acres

S = 1.6279 in

0.2S = .3256 in

Cumulative Runoff

3.1880 in

1.247 ac-ft

HYG Volume... 1.247 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH B)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 31.90 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.20

Name.... POST SOUTH B Tag: 50

Event: 50 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 50

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm
Duration = 24.0000 hrs Rain Depth = 5.2000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH B 50
Tc = .1667 hrs
Drainage Area = 4.694 acres Runoff CN= 86

Computational Time Increment = .02223 hrs
Computed Peak Time = 11.9802 hrs
Computed Peak Flow = 22.96 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 22.75 cfs

DRAINAGE AREA

ID:POST SOUTH B
CN = 86
Area = 4.694 acres
S = 1.6279 in
0.2S = .3256 in

Cumulative Runoff

3.6541 in
1.429 ac-ft

HYG Volume... 1.429 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH B)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 31.90 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Unit Hyd. Summary

Page 5.21

Name.... POST SOUTH B Tag: 100

Event: 100 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 100

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm

Duration = 24.0000 hrs Rain Depth = 5.6000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH B 100

Tc = .1667 hrs

Drainage Area = 4.694 acres Runoff CN= 86

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 11.9802 hrs

Computed Peak Flow = 25.22 cfs

=====

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 24.96 cfs

=====

DRAINAGE AREA

ID:POST SOUTH B

CN = 86

Area = 4.694 acres

S = 1.6279 in

0.2S = .3256 in

Cumulative Runoff

4.0305 in

1.577 ac-ft

HYG Volume... 1.577 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH B)

Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 31.90 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.22

Name.... POST SOUTH UNDET Tag: 1

Event: 1 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 1

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration = 24.0000 hrs Rain Depth = 2.5000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH UNDET 1
Tc = .1667 hrs
Drainage Area = 1.318 acres Runoff CN= 74

Computational Time Increment = .02223 hrs
Computed Peak Time = 12.0246 hrs
Computed Peak Flow = 1.03 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 1.00 cfs
WARNING: The difference between calculated peak flow
and interpolated peak flow is greater than 1.50%

DRAINAGE AREA

ID:POST SOUTH UNDET
CN = 74
Area = 1.318 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

.6082 in
.067 ac-ft

HYG Volume... .067 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH UNDET)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 8.96 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary
Name.... POST SOUTH UNDET Tag: 2 Event: 2 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 2

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm
Duration = 24.0000 hrs Rain Depth = 2.9000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH UNDET 2
Tc = .1667 hrs
Drainage Area = 1.318 acres Runoff CN= 74

Computational Time Increment = .02223 hrs
Computed Peak Time = 12.0246 hrs
Computed Peak Flow = 1.47 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 1.46 cfs

DRAINAGE AREA

ID:POST SOUTH UNDET
CN = 74
Area = 1.318 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

.8454 in
.093 ac-ft

HYG Volume... .093 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH UNDET)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 8.96 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.24

Name.... POST SOUTH UNDET Tag: 5

Event: 5 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 5

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm

Duration = 24.0000 hrs Rain Depth = 3.6000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - POST SOUTH UNDET 5

Tc = .1667 hrs

Drainage Area = 1.318 acres Runoff CN= 74

=====

Computational Time Increment = .02223 hrs

Computed Peak Time = 12.0024 hrs

Computed Peak Flow = 2.33 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.0000 hrs

Peak Flow, Interpolated Output = 2.33 cfs

=====

DRAINAGE AREA

ID:POST SOUTH UNDET

CN = 74

Area = 1.318 acres

S = 3.5135 in

0.2S = .7027 in

Cumulative Runoff

1.3094 in

.144 ac-ft

HYG Volume... .144 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH UNDET)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 8.96 cfs

Unit peak time Tp = .11113 hrs

Unit receding limb, Tr = .44453 hrs

Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary
Name.... POST SOUTH UNDET Tag: 10 Event: 10 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 10

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 24.0000 hrs Rain Depth = 4.1000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH UNDET 10
Tc = .1667 hrs
Drainage Area = 1.318 acres Runoff CN= 74

=====
Computational Time Increment = .02223 hrs
Computed Peak Time = 12.0024 hrs
Computed Peak Flow = 3.00 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 3.00 cfs

=====

DRAINAGE AREA

ID:POST SOUTH UNDET
CN = 74
Area = 1.318 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

1.6701 in
.183 ac-ft

HYG Volume... .183 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH UNDET)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 8.96 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.26

Name.... POST SOUTH UNDET Tag: 25

Event: 25 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 25

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm
Duration = 24.0000 hrs Rain Depth = 4.7000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH UNDET 25
Tc = .1667 hrs
Drainage Area = 1.318 acres Runoff CN= 74

=====
Computational Time Increment = .02223 hrs
Computed Peak Time = 12.0024 hrs
Computed Peak Flow = 3.84 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 3.84 cfs

=====

DRAINAGE AREA

ID:POST SOUTH UNDET
CN = 74
Area = 1.318 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

2.1274 in
.234 ac-ft

HYG Volume... .234 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH UNDET)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 8.96 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Unit Hyd. Summary
Name.... POST SOUTH UNDET Tag: 50 Event: 50 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 50

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm
Duration = 24.0000 hrs Rain Depth = 5.2000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH UNDET 50
Tc = .1667 hrs
Drainage Area = 1.318 acres Runoff CN= 74

=====
Computational Time Increment = .02223 hrs
Computed Peak Time = 12.0024 hrs
Computed Peak Flow = 4.56 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 4.56 cfs

=====

DRAINAGE AREA

ID:POST SOUTH UNDET
CN = 74
Area = 1.318 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

2.5248 in
.277 ac-ft

HYG Volume... .277 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH UNDET)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 8.96 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

Type.... Unit Hyd. Summary

Page 5.28

Name.... POST SOUTH UNDET Tag: 100

Event: 100 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 100

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 5.6000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - POST SOUTH UNDET 100
Tc = .1667 hrs
Drainage Area = 1.318 acres Runoff CN= 74

=====
Computational Time Increment = .02223 hrs
Computed Peak Time = 12.0024 hrs
Computed Peak Flow = 5.15 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 5.14 cfs

=====

DRAINAGE AREA

ID:POST SOUTH UNDET
CN = 74
Area = 1.318 acres
S = 3.5135 in
0.2S = .7027 in

Cumulative Runoff

2.8515 in
.313 ac-ft

HYG Volume... .313 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .16670 hrs (ID: POST SOUTH UNDET)
Computational Incr, Tm = .02223 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 8.96 cfs
Unit peak time Tp = .11113 hrs
Unit receding limb, Tr = .44453 hrs
Total unit time, Tb = .55567 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Unit Hyd. Summary

Page 5.29

Name.... PRE NORTH

Tag: 1

Event: 1 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 1

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm

Duration = 24.0000 hrs Rain Depth = 2.5000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - PRE NORTH 1

Tc = .3389 hrs

Drainage Area = 3.390 acres Runoff CN= 72

=====

Computational Time Increment = .04519 hrs

Computed Peak Time = 12.1110 hrs

Computed Peak Flow = 1.59 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.1500 hrs

Peak Flow, Interpolated Output = 1.57 cfs

=====

DRAINAGE AREA

ID:PRE NORTH

CN = 72

Area = 3.390 acres

S = 3.8889 in

0.2S = .7778 in

Cumulative Runoff

.5286 in

.149 ac-ft

HYG Volume... .149 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .33893 hrs (ID: PRE NORTH)

Computational Incr, Tm = .04519 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 11.33 cfs

Unit peak time Tp = .22595 hrs

Unit receding limb, Tr = .90381 hrs

Total unit time, Tb = 1.12976 hrs

Type.... Unit Hyd. Summary

Page 5.30

Name.... PRE NORTH

Tag: 2

Event: 2 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 2

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm

Duration = 24.0000 hrs Rain Depth = 2.9000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - PRE NORTH 2

Tc = .3389 hrs

Drainage Area = 3.390 acres Runoff CN= 72

=====

Computational Time Increment = .04519 hrs

Computed Peak Time = 12.1110 hrs

Computed Peak Flow = 2.42 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.1000 hrs

Peak Flow, Interpolated Output = 2.39 cfs

=====

DRAINAGE AREA

ID:PRE NORTH

CN = 72

Area = 3.390 acres

S = 3.8889 in

0.2S = .7778 in

Cumulative Runoff

.7493 in

.212 ac-ft

HYG Volume... .212 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .33893 hrs (ID: PRE NORTH)

Computational Incr, Tm = .04519 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 11.33 cfs

Unit peak time Tp = .22595 hrs

Unit receding limb, Tr = .90381 hrs

Total unit time, Tb = 1.12976 hrs

Type.... Unit Hyd. Summary

Page 5.31

Name.... PRE NORTH

Tag: 5

Event: 5 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 5

. SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm

Duration = 24.0000 hrs Rain Depth = 3.6000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - PRE NORTH 5

Tc = .3389 hrs

Drainage Area = 3.390 acres Runoff CN= 72

=====

Computational Time Increment = .04519 hrs

Computed Peak Time = 12.1110 hrs

Computed Peak Flow = 4.06 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.1000 hrs

Peak Flow, Interpolated Output = 4.03 cfs

=====

DRAINAGE AREA

ID:PRE NORTH

CN = 72

Area = 3.390 acres

S = 3.8889 in

0.2S = .7778 in

Cumulative Runoff

1.1868 in

.335 ac-ft

HYG Volume... .335 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .33893 hrs (ID: PRE NORTH)

Computational Incr, Tm = .04519 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 11.33 cfs

Unit peak time Tp = .22595 hrs

Unit receding limb, Tr = .90381 hrs

Total unit time, Tb = 1.12976 hrs

Type.... Unit Hyd. Summary

Page 5.32

Name.... PRE NORTH

Tag: 10

Event: 10 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 10

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 24.0000 hrs Rain Depth = 4.1000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - PRE NORTH 10
Tc = .3389 hrs
Drainage Area = 3.390 acres Runoff CN= 72

=====
Computational Time Increment = .04519 hrs
Computed Peak Time = 12.1110 hrs
Computed Peak Flow = 5.34 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.1000 hrs
Peak Flow, Interpolated Output = 5.30 cfs
=====

DRAINAGE AREA

ID:PRE NORTH
CN = 72
Area = 3.390 acres
S = 3.8889 in
0.2S = .7778 in

Cumulative Runoff

1.5306 in
.432 ac-ft

HYG Volume... .432 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .33893 hrs (ID: PRE NORTH)
Computational Incr, Tm = .04519 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 11.33 cfs
Unit peak time Tp = .22595 hrs
Unit receding limb, Tr = .90381 hrs
Total unit time, Tb = 1.12976 hrs

S/N:

Bentley PondPack (10.01.04.00)

Bentley Systems, Inc.

9:46 AM

8/30/2016

Type.... Unit Hyd. Summary
Name.... PRE NORTH Tag: 25 Event: 25 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 25

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm
Duration = 24.0000 hrs Rain Depth = 4.7000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - PRE NORTH 25
Tc = .3389 hrs
Drainage Area = 3.390 acres Runoff CN= 72

=====
Computational Time Increment = .04519 hrs
Computed Peak Time = 12.1110 hrs
Computed Peak Flow = 6.96 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.1000 hrs
Peak Flow, Interpolated Output = 6.92 cfs
=====

DRAINAGE AREA

ID:PRE NORTH
CN = 72
Area = 3.390 acres
S = 3.8889 in
0.2S = .7778 in

Cumulative Runoff

1.9695 in
.556 ac-ft

HYG Volume... .556 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .33893 hrs (ID: PRE NORTH)
Computational Incr, Tm = .04519 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 11.33 cfs
Unit peak time Tp = .22595 hrs
Unit receding limb, Tr = .90381 hrs
Total unit time, Tb = 1.12976 hrs

Type.... Unit Hyd. Summary

Page 5.34

Name.... PRE NORTH

Tag: 50

Event: 50 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 50

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm
Duration = 24.0000 hrs Rain Depth = 5.2000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - PRE NORTH 50
Tc = .3389 hrs
Drainage Area = 3.390 acres Runoff CN= 72

Computational Time Increment = .04519 hrs
Computed Peak Time = 12.1110 hrs
Computed Peak Flow = 8.36 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.1000 hrs
Peak Flow, Interpolated Output = 8.32 cfs

DRAINAGE AREA

ID:PRE NORTH
CN = 72
Area = 3.390 acres
S = 3.8889 in
0.2S = .7778 in

Cumulative Runoff

2.3530 in
.665 ac-ft

HYG Volume... .665 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .33893 hrs (ID: PRE NORTH)
Computational Incr, Tm = .04519 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 11.33 cfs
Unit peak time Tp = .22595 hrs
Unit receding limb, Tr = .90381 hrs
Total unit time, Tb = 1.12976 hrs

Type.... Unit Hyd. Summary

Page 5.35

Name.... PRE NORTH

Tag: 100

Event: 100 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 100

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm

Duration = 24.0000 hrs Rain Depth = 5.6000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - PRE NORTH 100

Tc = .3389 hrs

Drainage Area = 3.390 acres Runoff CN= 72

=====

Computational Time Increment = .04519 hrs

Computed Peak Time = 12.1110 hrs

Computed Peak Flow = 9.51 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.1000 hrs

Peak Flow, Interpolated Output = 9.47 cfs

=====

DRAINAGE AREA

ID:PRE NORTH

CN = 72

Area = 3.390 acres

S = 3.8889 in

0.2S = .7778 in

Cumulative Runoff

2.6694 in

.754 ac-ft

HYG Volume... .754 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .33893 hrs (ID: PRE NORTH)

Computational Incr, Tm = .04519 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 11.33 cfs

Unit peak time Tp = .22595 hrs

Unit receding limb, Tr = .90381 hrs

Total unit time, Tb = 1.12976 hrs

Type.... Unit Hyd. Summary

Page 5.36

Name.... PRE SOUTH

Tag: 1

Event: 1 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 1

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm

Duration = 24.0000 hrs Rain Depth = 2.5000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - PRE SOUTH 1

Tc = .4333 hrs

Drainage Area = 13.494 acres Runoff CN= 75

=====

Computational Time Increment = .05777 hrs

Computed Peak Time = 12.1902 hrs

Computed Peak Flow = 7.19 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.2000 hrs

Peak Flow, Interpolated Output = 7.11 cfs

DRAINAGE AREA

ID:PRE SOUTH

CN = 75

Area = 13.494 acres

S = 3.3333 in

0.2S = .6667 in

Cumulative Runoff

.6505 in

.732 ac-ft

HYG Volume... .731 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .43330 hrs (ID: PRE SOUTH)

Computational Incr, Tm = .05777 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 35.29 cfs

Unit peak time Tp = .28887 hrs

Unit receding limb, Tr = 1.15547 hrs

Total unit time, Tb = 1.44433 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Unit Hyd. Summary

Page 5.37

Name.... PRE SOUTH

Tag: 2

Event: 2 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 2

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 2 year storm

Duration = 24.0000 hrs Rain Depth = 2.9000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - PRE SOUTH 2

Tc = .4333 hrs

Drainage Area = 13.494 acres Runoff CN= 75

=====

Computational Time Increment = .05777 hrs

Computed Peak Time = 12.1902 hrs

Computed Peak Flow = 10.34 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.1500 hrs

Peak Flow, Interpolated Output = 10.28 cfs

=====

DRAINAGE AREA

ID:PRE SOUTH

CN = 75

Area = 13.494 acres

S = 3.3333 in

0.2S = .6667 in

Cumulative Runoff

.8960 in

1.008 ac-ft

HYG Volume... 1.007 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .43330 hrs (ID: PRE SOUTH)

Computational Incr, Tm = .05777 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 35.29 cfs

Unit peak time Tp = .28887 hrs

Unit receding limb, Tr = 1.15547 hrs

Total unit time, Tb = 1.44433 hrs

Type.... Unit Hyd. Summary

Page 5.38

Name.... PRE SOUTH

Tag: 5

Event: 5 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 5

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 5 year storm

Duration = 24.0000 hrs Rain Depth = 3.6000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - PRE SOUTH 5
Tc = .4333 hrs
Drainage Area = 13.494 acres Runoff CN= 75

=====

Computational Time Increment = .05777 hrs
Computed Peak Time = 12.1324 hrs
Computed Peak Flow = 16.49 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.1500 hrs
Peak Flow, Interpolated Output = 16.45 cfs

DRAINAGE AREA

ID:PRE SOUTH
CN = 75
Area = 13.494 acres
S = 3.3333 in
0.2S = .6667 in

Cumulative Runoff

1.3730 in
1.544 ac-ft

HYG Volume... 1.544 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .43330 hrs (ID: PRE SOUTH)
Computational Incr, Tm = .05777 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 35.29 cfs
Unit peak time Tp = .28887 hrs
Unit receding limb, Tr = 1.15547 hrs
Total unit time, Tb = 1.44433 hrs

Type.... Unit Hyd. Summary

Page 5.39

Name.... PRE SOUTH

Tag: 10

Event: 10 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 10

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration = 24.0000 hrs Rain Depth = 4.1000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - PRE SOUTH 10
Tc = .4333 hrs
Drainage Area = 13.494 acres Runoff CN= 75

=====
Computational Time Increment = .05777 hrs
Computed Peak Time = 12.1324 hrs
Computed Peak Flow = 21.28 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.1500 hrs
Peak Flow, Interpolated Output = 21.20 cfs

=====

DRAINAGE AREA

ID:PRE SOUTH
CN = 75
Area = 13.494 acres
S = 3.3333 in
0.2S = .6667 in

Cumulative Runoff

1.7420 in
1.959 ac-ft

HYG Volume... 1.958 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .43330 hrs (ID: PRE SOUTH)
Computational Incr, Tm = .05777 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 35.29 cfs
Unit peak time Tp = .28887 hrs
Unit receding limb, Tr = 1.15547 hrs
Total unit time, Tb = 1.44433 hrs

Type.... Unit Hyd. Summary

Page 5.40

Name.... PRE SOUTH Tag: 25

Event: 25 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 25

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 25 year storm

Duration = 24.0000 hrs Rain Depth = 4.7000 in

Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\

Rain File -ID = - TypeII 24hr

Unit Hyd Type = Default Curvilinear

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\

HYG File - ID = - PRE SOUTH 25

Tc = .4333 hrs

Drainage Area = 13.494 acres Runoff CN= 75

=====

Computational Time Increment = .05777 hrs

Computed Peak Time = 12.1324 hrs

Computed Peak Flow = 27.30 cfs

Time Increment for HYG File = .0500 hrs

Peak Time, Interpolated Output = 12.1500 hrs

Peak Flow, Interpolated Output = 27.14 cfs

DRAINAGE AREA

ID:PRE SOUTH

CN = 75

Area = 13.494 acres

S = 3.3333 in

0.2S = .6667 in

Cumulative Runoff

2.2083 in

2.483 ac-ft

HYG Volume... 2.483 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .43330 hrs (ID: PRE SOUTH)

Computational Incr, Tm = .05777 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)

K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))

Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 35.29 cfs

Unit peak time Tp = .28887 hrs

Unit receding limb, Tr = 1.15547 hrs

Total unit time, Tb = 1.44433 hrs

Type.... Unit Hyd. Summary

Page 5.41

Name.... PRE SOUTH

Tag: 50

Event: 50 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 50

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 50 year storm
Duration = 24.0000 hrs Rain Depth = 5.2000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - PRE SOUTH 50
Tc = .4333 hrs
Drainage Area = 13.494 acres Runoff CN= 75

=====
Computational Time Increment = .05777 hrs
Computed Peak Time = 12.1324 hrs
Computed Peak Flow = 32.48 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.1500 hrs
Peak Flow, Interpolated Output = 32.26 cfs

=====

DRAINAGE AREA

ID:PRE SOUTH
CN = 75
Area = 13.494 acres
S = 3.3333 in
0.2S = .6667 in

Cumulative Runoff

2.6124 in
2.938 ac-ft

HYG Volume... 2.937 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .43330 hrs (ID: PRE SOUTH)
Computational Incr, Tm = .05777 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp)))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 35.29 cfs
Unit peak time Tp = .28887 hrs
Unit receding limb, Tr = 1.15547 hrs
Total unit time, Tb = 1.44433 hrs

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Unit Hyd. Summary

Page 5.42

Name.... PRE SOUTH Tag: 100

Event: 100 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 100

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 5.6000 in
Rain Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
HYG File - ID = - PRE SOUTH 100
Tc = .4333 hrs
Drainage Area = 13.494 acres Runoff CN= 75

=====
Computational Time Increment = .05777 hrs
Computed Peak Time = 12.1324 hrs
Computed Peak Flow = 36.71 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 12.1500 hrs
Peak Flow, Interpolated Output = 36.43 cfs

DRAINAGE AREA

ID:PRE SOUTH
CN = 75
Area = 13.494 acres
S = 3.3333 in
0.2S = .6667 in

Cumulative Runoff

2.9441 in
3.311 ac-ft

HYG Volume... 3.310 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .43330 hrs (ID: PRE SOUTH)
Computational Incr, Tm = .05777 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 35.29 cfs
Unit peak time Tp = .28887 hrs
Unit receding limb, Tr = 1.15547 hrs
Total unit time, Tb = 1.44433 hrs

Type.... Vol: Elev-Area

Page 6.01

Name.... POND A

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
744.05	-----	24472	0	.000	.000
745.00	-----	27805	78362	.570	.570
746.00	-----	31419	88781	.679	1.249
747.00	-----	35130	99772	.763	2.013
747.75	-----	37980	109637	.629	2.642

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1} * \text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment

Area1, Area2 = Areas computed for EL1, EL2, respectively

Volume = Incremental volume between EL1 and EL2

spillway = 746.75

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Vol: Elev-Area

Page 6.02

Name.... POND B

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Elevation (ft)	Planimeter (sq.in)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	Volume (ac-ft)	Volume Sum (ac-ft)
743.96	-----	15616	0	.000	.000
744.00	-----	15692	46962	.014	.014
745.00	-----	17657	49995	.383	.397
746.00	-----	19750	56081	.429	.826
746.50	-----	20848	60890	.233	1.059
747.75	-----	23541	66543	.637	1.696

Spillway @ 746.0

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

$$\text{Volume} = (1/3) * (\text{EL2}-\text{EL1}) * (\text{Area1} + \text{Area2} + \text{sq.rt.}(\text{Area1}*\text{Area2}))$$

where: EL1, EL2 = Lower and upper elevations of the increment

Area1, Area2 = Areas computed for EL1, EL2, respectively

Volume = Incremental volume between EL1 and EL2

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Outlet Input Data

Page 7.01

Name.... Outlet A

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 744.05 ft
Increment = .05 ft
Max. Elev.= 747.75 ft

OUTLET CONNECTIVITY

--> Forward Flow Only (UpStream to DnStream)
<-- Reverse Flow Only (DnStream to UpStream)
<--> Forward and Reverse Both Allowed

Structure	No.	Outfall	E1, ft	E2, ft
Orifice-Area	O1	-->	C0	744.050
Orifice-Area	O2	-->	C0	746.000
Culvert-Circular	C0	-->	TW	743.750
Weir-XY Points	W0	-->	TW	746.750

TW SETUP, DS Channel

Type.... Outlet Input Data

Page 7.02

Name.... Outlet A

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

OUTLET STRUCTURE INPUT DATA

Structure ID = O1
Structure Type = Orifice-Area

of Openings = 1
Invert Elev. = 744.05 ft
Area = .3125 sq.ft
Top of Orifice = 744.30 ft
Datum Elev. = 744.18 ft
Orifice Coeff. = .600

Structure ID = O2
Structure Type = Orifice-Area

of Openings = 8
Invert Elev. = 746.00 ft
Area = .3194 sq.ft
Top of Orifice = .00 ft
Datum Elev. = 746.00 ft
Orifice Coeff. = .600

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Outlet Input Data

Page 7.03

Name.... Outlet A

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

OUTLET STRUCTURE INPUT DATA

Structure ID = C0
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 1.0000 ft
Upstream Invert = 743.75 ft
Dnstream Invert = 743.54 ft
Horiz. Length = 46.55 ft
Barrel Length = 46.55 ft
Barrel Slope = .00451 ft/ft

OUTLET CONTROL DATA...

Mannings n = .0120
Ke = .5000 (forward entrance loss)
Kb = .026647 (per ft of full flow)
Kr = .5000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...

Equation form = 1
Inlet Control K = .0098
Inlet Control M = 2.0000
Inlet Control c = .03980
Inlet Control Y = .6700
T1 ratio (HW/D) = 1.158
T2 ratio (HW/D) = 1.305
Slope Factor = -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.

Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

At T1 Elev = 744.91 ft ---> Flow = 2.75 cfs
At T2 Elev = 745.05 ft ---> Flow = 3.14 cfs

Type.... Outlet Input Data
Name.... Outlet A

Page 7.04

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

OUTLET STRUCTURE INPUT DATA

Structure ID = W0
Structure Type = Weir-XY Points

of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	747.75
4.00	746.75
19.00	746.75
23.00	747.75

Lowest Elev. = 746.75 ft
Weir Coeff. = 3.000000
Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

Type.... Outlet Input Data

Page 7.05

Name.... Outlet B

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 743.96 ft
Increment = .05 ft
Max. Elev.= 747.75 ft

OUTLET CONNECTIVITY

--> Forward Flow Only (UpStream to DnStream)
<-- Reverse Flow Only (DnStream to UpStream)
<--> Forward and Reverse Both Allowed

Structure	No.	Outfall	E1, ft	E2, ft
Orifice-Area	O1	-->	C0	743.960
Orifice-Area	O2	-->	C0	746.000
Culvert-Circular	C0	-->	TW	743.750
Weir-XY Points	W0	-->	TW	746.000
TW SETUP, DS Channel				

Type.... Outlet Input Data

Page 7.06

Name.... Outlet B

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

OUTLET STRUCTURE INPUT DATA

Structure ID = 01
Structure Type = Orifice-Area

of Openings = 1
Invert Elev. = 743.96 ft
Area = .2500 sq.ft
Top of Orifice = 744.21 ft
Datum Elev. = 744.09 ft
Orifice Coeff. = .600

Structure ID = 02
Structure Type = Orifice-Area

of Openings = 8
Invert Elev. = 746.00 ft
Area = .3194 sq.ft
Top of Orifice = .00 ft
Datum Elev. = 746.00 ft
Orifice Coeff. = .600

Type.... Outlet Input Data

Page 7.07

Name.... Outlet B

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

OUTLET STRUCTURE INPUT DATA

Structure ID = C0
Structure Type = Culvert-Circular

No. Barrels = 1
Barrel Diameter = 1.5000 ft
Upstream Invert = 743.75 ft
Dnstream Invert = 743.50 ft
Horiz. Length = 73.50 ft
Barrel Length = 73.50 ft
Barrel Slope = .00340 ft/ft

OUTLET CONTROL DATA...

Mannings n = .0120
Ke = .5000 (forward entrance loss)
Kb = .015519 (per ft of full flow)
Kr = .5000 (reverse entrance loss)
HW Convergence = .001 +/- ft

INLET CONTROL DATA...

Equation form = 1
Inlet Control K = .0098
Inlet Control M = 2.0000
Inlet Control c = .03980
Inlet Control Y = .6700
T1 ratio (HW/D) = 1.159
T2 ratio (HW/D) = 1.305
Slope Factor = -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.

Use submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

At T1 Elev = 745.49 ft ---> Flow = 7.58 cfs
At T2 Elev = 745.71 ft ---> Flow = 8.66 cfs

Type.... Outlet Input Data
Name.... Outlet B

Page 7.08

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

OUTLET STRUCTURE INPUT DATA

Structure ID = W0
Structure Type = Weir-XY Points

of Openings = 1
WEIR X-Y GROUND POINTS

X, ft	Elev, ft
.00	747.75
7.00	746.00
22.00	746.00
29.00	747.75

Lowest Elev. = 746.00 ft
Weir Coeff. = 3.000000
Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

Type.... Pond Routing Summary
Name.... POND A OUT Tag: 1 Event: 1 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 1

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND A IN 1
Outflow HYG file = NONE STORED - POND A OUT 1

Pond Node Data = POND A
Pond Volume Data = POND A
Pond Outlet Data = Outlet A

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 744.05 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====
Peak Inflow = 17.10 cfs at 12.0000 hrs
Peak Outflow = 1.09 cfs at 13.0000 hrs
=====
Peak Elevation = 744.96 ft
Peak Storage = .546 ac-ft
=====

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 1.041
- Infiltration = .000
- HYG Vol OUT = 1.040
- Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.002% of Inflow Volume)

Type.... Pond Routing Summary

Page 8.02

Name.... POND A OUT Tag: 2

Event: 2 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 2

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND A IN 2
Outflow HYG file = NONE STORED - POND A OUT 2

Pond Node Data = POND A

Pond Volume Data = POND A

Pond Outlet Data = Outlet A

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 744.05 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow = 21.64 cfs at 12.0000 hrs
Peak Outflow = 1.28 cfs at 13.0500 hrs

Peak Elevation = 745.23 ft
Peak Storage = .716 ac-ft

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 1.320
- Infiltration = .000
- HYG Vol OUT = 1.320
- Retained Vol = .001

Unrouted Vol = .000 ac-ft (.001% of Inflow Volume)

Type.... Pond Routing Summary
Name.... POND A OUT Tag: 5 Event: 5 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 5

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND A IN 5
Outflow HYG file = NONE STORED - POND A OUT 5

Pond Node Data = POND A
Pond Volume Data = POND A
Pond Outlet Data = Outlet A

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 744.05 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====

Peak Inflow = 29.77 cfs at 12.0000 hrs
Peak Outflow = 1.58 cfs at 13.3000 hrs

=====

Peak Elevation = 745.70 ft
Peak Storage = 1.035 ac-ft

=====

MASS BALANCE (ac-ft)

=====

+ Initial Vol = .000
+ HYG Vol IN = 1.831
- Infiltration = .000
- HYG Vol OUT = 1.830
- Retained Vol = .001

=====

Unrouted Vol = .000 ac-ft (.001% of Inflow Volume)

Type.... Pond Routing Summary
Name.... POND A OUT Tag: 10 Event: 10 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 10

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND A IN 10
Outflow HYG file = NONE STORED - POND A OUT 10

Pond Node Data = POND A
Pond Volume Data = POND A
Pond Outlet Data = Outlet A

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 744.05 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====

Peak Inflow = 35.66 cfs at 12.0000 hrs
Peak Outflow = 2.27 cfs at 13.1000 hrs

=====

Peak Elevation = 746.01 ft
Peak Storage = 1.258 ac-ft

=====

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 2.208
- Infiltration = .000
- HYG Vol OUT = 2.207
- Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)

Type.... Pond Routing Summary
Name.... POND A OUT Tag: 25 Event: 25 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 25

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND A IN 25
Outflow HYG file = NONE STORED - POND A OUT 25

Pond Node Data = POND A
Pond Volume Data = POND A
Pond Outlet Data = Outlet A

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 744.05 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow = 42.76 cfs at 12.0000 hrs
Peak Outflow = 4.79 cfs at 12.5000 hrs

Peak Elevation = 746.21 ft
Peak Storage = 1.399 ac-ft

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 2.669
- Infiltration = .000
- HYG Vol OUT = 2.668
- Retained Vol = .001

Unrouted Vol = .000 ac-ft (.000% of Inflow Volume)

Type.... Pond Routing Summary

Page 8.06

Name.... POND A OUT Tag: 50

Event: 50 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 50

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND A IN 50
Outflow HYG file = NONE STORED - POND A OUT 50

Pond Node Data = POND A

Pond Volume Data = POND A

Pond Outlet Data = Outlet A

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 744.05 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow = 48.68 cfs at 12.0000 hrs
Peak Outflow = 5.16 cfs at 12.5000 hrs

Peak Elevation = 746.49 ft
Peak Storage = 1.614 ac-ft

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 3.059
- Infiltration = .000
- HYG Vol OUT = 3.059
- Retained Vol = .001

Unrouted Vol = .000 ac-ft (.000% of Inflow Volume)

Type.... Pond Routing Summary

Page 8.07

Name.... POND A OUT Tag: 100

Event: 100 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 100

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND A IN 100
Outflow HYG file = NONE STORED - POND A OUT 100

Pond Node Data = POND A
Pond Volume Data = POND A
Pond Outlet Data = Outlet A

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 744.05 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow = 53.42 cfs at 12.0000 hrs
Peak Outflow = 5.44 cfs at 12.5000 hrs

Peak Elevation = 746.72 ft
Peak Storage = 1.789 ac-ft

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 3.374
- Infiltration = .000
- HYG Vol OUT = 3.374
- Retained Vol = .001

Unrouted Vol = .000 ac-ft (.000% of Inflow Volume)

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Pond Routing Summary

Page 8.08

Name.... POND B OUT Tag: 1

Event: 1 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 1

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND B IN 1
Outflow HYG file = NONE STORED - POND B OUT 1

Pond Node Data = POND B

Pond Volume Data = POND B

Pond Outlet Data = Outlet B

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 743.96 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====
Peak Inflow = 7.99 cfs at 12.0000 hrs
Peak Outflow = .73 cfs at 12.5500 hrs

Peak Elevation = 744.59 ft
Peak Storage = .235 ac-ft
=====

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = .486
- Infiltration = .000
- HYG Vol OUT = .486
- Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)

S/N:

Bentley PondPack (10.01.04.00)

9:46 AM

Bentley Systems, Inc.

8/30/2016

Type.... Pond Routing Summary
Name.... POND B OUT Tag: 2 Event: 2 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 2

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND B IN 2
Outflow HYG file = NONE STORED - POND B OUT 2

Pond Node Data = POND B
Pond Volume Data = POND B
Pond Outlet Data = Outlet B

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 743.96 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====

Peak Inflow = 10.11 cfs at 12.0000 hrs
Peak Outflow = .86 cfs at 12.6000 hrs

=====

Peak Elevation = 744.78 ft
Peak Storage = .308 ac-ft

=====

MASS BALANCE (ac-ft)

=====

+ Initial Vol = .000
+ HYG Vol IN = .617
- Infiltration = .000
- HYG Vol OUT = .616
- Retained Vol = .001

=====

Unrouted Vol = -.000 ac-ft (.002% of Inflow Volume)

Type.... Pond Routing Summary
Name.... POND B OUT Tag: 5
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 5

Page 8.10

Event: 5 yr

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND B IN 5
Outflow HYG file = NONE STORED - POND B OUT 5

Pond Node Data = POND B
Pond Volume Data = POND B
Pond Outlet Data = Outlet B

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 743.96 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====

Peak Inflow = 13.91 cfs at 12.0000 hrs
Peak Outflow = 1.06 cfs at 12.7000 hrs

=====

Peak Elevation = 745.12 ft
Peak Storage = .446 ac-ft

=====

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = .856
- Infiltration = .000
- HYG Vol OUT = .855
- Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)

Type.... Pond Routing Summary
Name.... POND B OUT Tag: 10 Event: 10 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 10

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND B IN 10
Outflow HYG file = NONE STORED - POND B OUT 10

Pond Node Data = POND B
Pond Volume Data = POND B
Pond Outlet Data = Outlet B

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 743.96 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow = 16.66 cfs at 12.0000 hrs
Peak Outflow = 1.20 cfs at 12.7000 hrs

Peak Elevation = 745.37 ft
Peak Storage = .549 ac-ft

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 1.032
- Infiltration = .000
- HYG Vol OUT = 1.031
- Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.000% of Inflow Volume)

Type.... Pond Routing Summary

Page 8.12

Name.... POND B OUT Tag: 25

Event: 25 yr

File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw

Storm... TypeII 24hr Tag: 25

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND B IN 25
Outflow HYG file = NONE STORED - POND B OUT 25

Pond Node Data = POND B

Pond Volume Data = POND B

Pond Outlet Data = Outlet B

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 743.96 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow = 19.98 cfs at 12.0000 hrs
Peak Outflow = 1.35 cfs at 12.8500 hrs

Peak Elevation = 745.66 ft
Peak Storage = .676 ac-ft

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 1.247
- Infiltration = .000
- HYG Vol OUT = 1.246
- Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)

Type.... Pond Routing Summary
Name.... POND B OUT Tag: 50 Event: 50 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 50

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND B IN 50
Outflow HYG file = NONE STORED - POND B OUT 50

Pond Node Data = POND B
Pond Volume Data = POND B
Pond Outlet Data = Outlet B

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 743.96 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

=====
Peak Inflow = 22.75 cfs at 12.0000 hrs
Peak Outflow = 1.46 cfs at 12.8000 hrs

Peak Elevation = 745.91 ft
Peak Storage = .786 ac-ft
=====

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 1.429
- Infiltration = .000
- HYG Vol OUT = 1.429
- Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)

Type.... Pond Routing Summary
Name.... POND B OUT Tag: 100 Event: 100 yr
File.... H:\Columbus\P\150588\Design\Storm Drainage\2016-08-22 150588det000.ppw
Storm... TypeII 24hr Tag: 100

LEVEL POOL ROUTING SUMMARY

HYG Dir = H:\Columbus\P\150588\Design\Storm Drainage\
Inflow HYG file = NONE STORED - POND B IN 100
Outflow HYG file = NONE STORED - POND B OUT 100

Pond Node Data = POND B
Pond Volume Data = POND B
Pond Outlet Data = Outlet B

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 743.96 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow = 24.96 cfs at 12.0000 hrs
Peak Outflow = 3.07 cfs at 12.4500 hrs

Peak Elevation = 746.02 ft
Peak Storage = .835 ac-ft

MASS BALANCE (ac-ft)

+ Initial Vol = .000
+ HYG Vol IN = 1.577
- Infiltration = .000
- HYG Vol OUT = 1.576
- Retained Vol = .001

Unrouted Vol = -.000 ac-ft (.001% of Inflow Volume)

Index of Starting Page Numbers for ID Names

----- B -----

BUTLER... 2.01

----- O -----

Outlet A... 7.01
Outlet B... 7.05

----- P -----

POND A... 6.01, 8.01, 8.02, 8.03,
8.04, 8.05, 8.06, 8.07
POND B... 6.02, 8.08, 8.09, 8.10,
8.11, 8.12, 8.13, 8.14
POST NORTH... 3.01, 4.01, 5.01,
5.02, 5.03, 5.04, 5.05, 5.06,
5.07
POST SOUTH A... 3.03, 4.02, 5.08,
5.09, 5.10, 5.11, 5.12, 5.13,
5.14
POST SOUTH B... 3.05, 4.03, 5.15,
5.16, 5.17, 5.18, 5.19, 5.20,
5.21
POST SOUTH UNDET... 3.07, 4.04,
5.22, 5.23, 5.24, 5.25, 5.26,
5.27, 5.28
PRE NORTH... 3.09, 4.05, 5.29, 5.30,
5.31, 5.32, 5.33, 5.34, 5.35
PRE SOUTH... 3.11, 4.06, 5.36, 5.37,
5.38, 5.39, 5.40, 5.41, 5.42

----- W -----

Watershed... 1.01

