STORMWATER POLLUTION PREVENTION PLAN
PREPARED FOR

CORNWALL COMMONS LOTS 1-10
TOWN OF CORNWALL, NEW YORK

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I. INTRODUCTION

Cornwall Commons is located in the Town of Cornwall along U.S. Route 9W at the interchange of U.S. Route 9W and N.Y.S. Route 218. The project consists of the subdivision and site plan development of an existing 197.7 acre parcel of land into 10 lots. The property borders the municipal boundary and an old railroad bed between the Town of Cornwall and the Town of New Windsor along the Northern property line. As mentioned above the property is to be subdivided into ten lots, nine of which are to be developed as commercial properties, and the remaining lot is to be developed as a residential use. The commercial development creates lots that range in size from 1.6 acres to 7.8 acres. The development throughout these lots will consist of commercial properties including hotels, retail stores, offices, etc. Currently, it is unknown what specific type of use will be constructed throughout the nine commercial lots. For purposes of this study, the maximum development coverage was assumed on each lot in order to properly size and treat stormwater runoff associated with these lots. Each individual commercial lot will require the preparation of a separate site plan review and approval from the Town of Cornwall Planning Board that will include a drainage analysis to ensure that all stormwater regulations in effect at that time are met and also the development will not exceed the thresholds identified within this SWPPP.

The tenth lot entails the residential development of approximately 160 acres of the property into a planned adult community (PAC). The PAC shall consist of 314 single-family units, 162 multi-family units, and 14 townhouse units mixed throughout the property. The 'PAC' also includes a clubhouse, pool, recreation areas and associated roads and landscaping throughout the development.

Each lot development shall be serviced by municipal water and sewer services provided by the Town of Cornwall. The infrastructure within the 'PAC' lot shall be private water and sewer services, which will have one connection into the respective municipal service. Access to the development shall be provided by a loop boulevard, which traverses through the nine commercial lots and provides ingress and egress to U.S. Route 9W at two locations. The 'PAC' lot shall be serviced by private roads to be owned and maintained by a Homeowners Association with ingress and egress at two locations along the loop boulevard.

The impacts of this type of development must be evaluated, and if necessary, mitigated to ensure minimal impact on the stormwater drainage patterns within the site watershed areas. The purpose of this study is to evaluate if any impacts are associated with the proposed development, ensure treatment of the water quality volume as per current New York State Department of Environmental Conservation (N.Y.S. DEC) stormwater standards and make certain that no increases in the peak discharge from the proposed construction are created as part of SPDES General Stormwater Permit GP-02-01.

II. Appendices to this Plan

The following is a list of the appendices included with this report.

A. Site Location Map and Soil Map
B. Pre-Development Watershed Map
Pre-Development Drainage Analysis
C. Post-Development Watershed Map
Post-Development Drainage Analysis
D. Water Quality Volume Computations
Channel Protection Volume Computations
Extended Detention Orifice
Dry Swales
Extended Detention Pond
Rip-Rap Outlet Protection
E. Excerpts from the "New York State Stormwater Design Manual"
Detention Pond Specifications
Dry Swale Specifications
E. Standard Erosion and Sediment Control Practices to be utilized on Site
Sediment Basin Computations
Construction Best Management Practices
G. Standard Construction Inspection Forms
Standard Maintenance Inspection Forms
H. Notice of Intent
Notice of Termination
Contractor's Site Log Book and Certification Form
I. Site Plans

III. Current Regulations

Stormwater runoff and its subsequent impact to receiving water bodies led Federal, State and Local officials to set new standards on stormwater discharge to attempt to restore stream water quality and control peak flow rates for specific storm events. According to 40 CFR, Part 122 prohibits point source discharges of stormwater to waters of the United States without a permit issued under the National Pollutant Discharge Elimination System (NPDES). The New York State DEC is approved by the EPA to administer the NPDES program, the SPDES regulations are currently in effect. Current regulations require that any construction site proposing a disturbance of one acre or greater prepare a Stormwater Pollution Prevention Plan. This SWPPP may consist of one or all of the following: water quality treatment and control, water quantity control and an Erosion and Sediment Control Plan. Preparation of each portion of the SWPPP depends on the type and level of construction proposed. The development of Cornwall Commons requires the preparation of a full Stormwater Pollution Prevention Plan that includes all of the items mentioned above. Also as part of the SWPPP, the filing of a Notice of Intent five days prior to construction to the NYSDEC Bureau of Water Permits located at 625 Broadway, Albany, New York (see Appendix H) is required. This NOI identifies all of the major requirements and design criteria that are necessary for the site drainage design. This form shall be signed and certified by the owner/operator of the site. A contractor's certification statement (See Appendix H) shall also be completed by the general contractor and submitted to the Town of Cornwall Building Department to ensure on site compliance with local regulations.

The SPDES regulations outline four distinct criteria to be addressed in the development of the Stormwater Pollution Prevention Plan. Three of the four relate to stormwater quantity, specifically, channel protection; over bank flooding; and extreme storm events; and the fourth addresses water quality.

IV. METHODOLOGY

The analysis presented in this report was developed by use of the Haestad Methods computer software program PondPack. PondPack is based upon and implements the Soil Conservation Service Technical Release 55 (SCS TR-55) "Urban Hydrology for Small Watersheds Methodology" for computing CN, Tc, Runoff values and hydrographs for the development of drainage and hydraulic calculations. For purposes of this report and in accordance with the regulations set forth by the NYSDEC as part of a SPDES Permit for Stormwater Discharges From Construction Activities, the 1-(Channel Protection), 10-(Over bank Flood), and 100-year (Extreme Storm) storm events were analyzed. This analysis is specific for this site and is based on current and proposed land cover, underlying soil types, weighted runoff coefficients, theoretical flow paths, and rain events. These were then input into the computer model, which developed hydrographs for both pre- and post-development conditions. This information is shown in Appendices B & C.

V. WATER QUANTITY

The N.Y.S. DEC has selected three criteria as part of the stormwater quantity regulations. They are summarized as follows:

Channel Protection:	24-hour extended detention of post-developed one-year, 24-hour storm event
Over bank Flood:	Control the peak discharge from the 10-year storm to 10-year pre-development rates
Extreme Storm:	Control the peak discharge from 100-year storm to 100-year pre-development rates

The site has been designed to limit post development flow rates to less then or equal to pre development flow rates for all design points. The site has been divided into nine watershed areas and are labeled as A, B, C, D, E, F, G, H and I within the pre- and post-development models. The standard practice of pre development flow rates as compared to post development flow rates shall be employed. All watershed areas within the site have detailed summations of the characteristics for both pre and post development as listed in Section VI & VII of this report.

VI. Pre-Development Conditions

The project site consists of approximately 197.7 acres of land that generally is woodland areas with some areas of dense brush. Based upon the site's topographic mapping, topography provided on the Cornwall U.S.G.S. map and field observations conducted by representatives of this office, it was determined that nine (9) watershed areas totaling 256.3 acres, contribute to the drainage associated with the project site. Furthermore, where necessary, these watershed areas were further broken down into sub-watersheds in order to determine realistic flow paths and cover types. The watershed areas along with any delineated sub-areas are depicted on the Pre-development Drainage Watershed Map located in Appendix B.

The site soil characteristics within the project watershed boundaries are classified all as hydraulic group C soils based on the soil boundaries and characteristics shown within the Orange County Soil Survey as approved by the Soil Conservation Service. However, during storm events it has been observed that a majority of the runoff from the site discharges into the existing ditchline along the old railroad bed and infiltrates into the soil before discharging through the existing culverts under the railroad bed. For purposes of this analysis, this condition was not taken into account in order to hydraulically model the worst-case scenario for the site's stormwater outfall locations. This area will continue to infiltrate in the post development condition because no proposed development or disturbance for this area. A soil classification map is provided within Appendix A.

Each contributing drainage area is further described below:

> *Watershed Area A* consists of 24.38 acres encompassing an area in the southeastern portion of the project along Route 9W. Currently runoff from this area discharges via sheetflow and shallow concentrated flow to the north and traverses over the existing embankment created from the abandoned railroad bed below the project site. For purposes of the hydraulic model, a common outfall location was chosen as the analysis point. This watershed generally discharges over the entire northern boundary but appears to concentrate at Outfall Location A. Land cover in this area consists mainly of woods with dense brush with slopes ranging from 1% to 10%. The pre-development peak discharge for Watershed Area A is summarized in Table 1, located below as well as the pre-development model and analysis located in Appendix B.
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> *Watershed Area B* consists of 95.76 acres encompassing a majority of the northern project site adjacent to Watershed A. This area contains approximately 3.591 acres of non-jurisdictional wetlands. Currently, runoff associated with this watershed discharges via sheetflow and shallow concentrated flow to the north of the project site to a to an existing depression, which attenuates a portion of existing runoff peak flows. This depression is referred to as "Depression B" in the model and watershed mapping. Depression B

discharges to a 36" cast iron culvert pipe which conveys a large majority of the project site drainage to a stable stream course and wetland area north of the property. This stream and wetland area conveys drainage to a culvert pipe along Old Forge Hill Road and eventually to the Moodna Creek. Land cover in this area consists mainly of woods and dense brush with slopes ranging from 5% to 15%. The pre-development peak discharge for Watershed Area B is summarized in Table 1, located below as well as the pre-development model and analysis located in Appendix B.

Watershed Area C consists of 29.83 acres encompassing an area in the southern portion of the project site adjacent to Route 9W. Runoff generated from this watershed discharges via sheetflow and shallow concentrated flow to an existing 3.913 acre Federal Jurisdictional Wetland Area. Drainage converges to channel flow and is directed into an existing depression, which provides some attenuation to the existing runoff peak flows. This depression is referred to as "Depression C" in the model and watershed mapping. This drainage depression discharges south to an existing 36" cast iron culvert pipe conveying the drainage under Route 9W to an existing stream that eventually connects to the Funny Child Creek. Land cover in this area consists mainly of woods and dense brush with slopes ranging from 3% to 10%. The pre-development peak discharge for Watershed Area C is summarized in Table 1, located below as well as the pre-development model and analysis located in Appendix B.

Watershed Area D consists of 9.42 acres consists of an area in the north portion of the project site, adjacent to the abandoned rail bed. Currently, this drainage discharges via sheetflow and shallow concentrated flow to the existing abandoned rail bed. Stormwater flows along the inner side of the railroad bed and discharges over the rail bed in several locations, down the embankment, to the Moodna Creek. Land cover in this area consists mainly of woods and dense brush with slopes ranging from 2% to 10%. The pre-development peak discharge for Watershed Area D is summarized in Table 1, located below as well as the pre-development model and analysis located in Appendix B.

Watershed Area E consists of 11.73 acres encompassing an area in the western portion of the project site adjacent to the abandoned rail bed. Currently this drainage discharges via sheetflow and shallow concentrated flow to the existing abandoned railroad bed. Runoff enters an existing channel along the railroad bed and flows north and west, through a 24" culvert and overland flow in several locations to the creek embankment and low-lying area, and into the Moodna Creek. Land cover in this area consists mainly of woods and dense brush with slopes ranging from 1% to 10%. The pre-development peak discharge for Watershed Area E is summarized in Table 1, located below as well as the pre-development model and analysis located in Appendix B.

Watershed Area F consists of 14.29 acres encompassing an area in the western portion of the project site adjacent to the abandoned railroad bed. This drainage discharges via sheetflow and shallow concentrated flow to the existing abandoned rail bed. Runoff enters an existing channel along the railroad bed and flows north and west, through a 12" culvert and overland flow in several locations to the creek embankment, and into the Moodna Creek. Land cover in this area consists mainly of woods and dense brush with slopes ranging from 1% to 10%. The pre-development peak discharge for Watershed Area F is summarized in Table 1, located below as well as the pre-development model and analysis located in Appendix B.

Watershed Area G consists of 25.71 acres encompassing an area in the eastern portion of the project site adjacent to the abandoned rail bed. This area contains approximately 1.021 acres of non-jurisdictional wetland area. A majority of the runoff in this area is collected in the centrally located wetland areas and transferred to the abandoned railroad bed. Runoff collects into existing channel along the railroad bed and flows north and west, through a 12" culvert and overland flow in several locations to the creek embankment and low-lying area, and into the Moodna Creek. Land cover in this area consists mainly of woods and dense brush with slopes ranging from 1% to 10%. The pre-development peak discharge for Watershed Area G is summarized in Table 1, located below as well as the pre-development model and analysis located in Appendix B.

Watershed Area H consists of 29.93 acres encompassing an area in the southern portion of the project site and an existing residential area on Schofield Lane. This area also contains approximately 1.401 acres of Federal Jurisdictional Wetlands and 1.61 acres of impervious coverage. Currently drainage discharges to the west of the project site into an existing depression, which attenuates a portion of the existing runoff peak flows. This depression is referred to as "Depression H" in the model and watershed mapping. This depression discharges to a 26" culvert pipe located underneath the abandoned railroad bed conveying the drainage to the Moodna Creek. Land cover in this area consists mainly of woods and dense brush with a small amount of existing impervious surfaces with slopes ranging from 1% to 15%. The pre-development peak discharge for Watershed Area H is summarized in Table 1, located below as well as the pre-development model and analysis located in Appendix B.

Watershed Area I consists of 16.59 acres encompassing an area in the southeast portion of the project site adjacent to Route 9W. This area contains approximately 3.698 acres of Federal Jurisdictional Wetland. Currently runoff from this area discharges to the east of the project site and out of the study area to the wooded area adjacent to Route 9W. Land cover in this area consists mainly of woods and dense brush with slopes ranging from 0.5% to 10%. The pre-development peak discharge for Watershed Area I is summarized in Table 1, located below as well as the pre-development model and analysis located in Appendix B.

In determining site runoff volumes along the study limits identified above, contributing areas of various soil types and ground covers were determined for each drainage area and documented. Based upon this data, a cumulative Curve Number (CN) was determined that relates rainfall to the runoff volume over the drainage areas. (See Appendix B) Peak flowrates can then be determined utilizing travel paths (The Time of

Concentration) that are the most hydraulically distant to the study point of each watershed area. Utilizing N.Y.S. DEC Stormwater Management Guidelines and TR-55 Methodologies, 150 feet of overland sheetflow was utilized for the Predevelopment condition and 100 feet of overland sheetflow for the Post-development condition before translating into shallow concentrated flow, where practical. Any signs of a definable channel were accounted for and, therefore, based on each travel path, a collective Time of Concentration was determined therein indicating the time at which the entire drainage area is contributing to the study point. (See Appendix B)

Resultant hydrographs were simulated and created for the site drainage area during Predevelopment Conditions. Peak discharge and runoff volumes were calculated and recorded from the generated hydrographs for each storm event. Tables 1 and 2 summarize the drainage characteristics for the drainage areas, provide for the attenuation of the existing depressions, and outfalls associated with the design storm frequencies.

Watershed Area	Area (Ac.)	CN	Tc (hrs.)	Peak Runoff (cfs) 1 yr	Peak Runoff (cfs) 10 yr	Peak Runoff (cfs) 100 yr
A	24.38	70	.4180	9.77	41.11	73.83
B	95.76	70	.5951	32.85	138.44	248.20
C	29.83	70	.5042	11.10	46.61	83.83
D	9.42	70	.4294	3.75	15.73	28.33
E	11.73	70	.5139	4.30	18.07	32.43
F	14.29	70	.5352	5.14	21.65	38.78
G	25.71	71	.4706	11.39	45.70	80.96
H	29.93	74	.3262	32.04	112.98	194.47
I	16.59	71	.4351	7.15	25.54	50.89
Total	257.65	--	----	----	----	----

Table 1: Pre-Development Conditions

Outfall	Watershed Area Serviced	Peak Runoff (cfs) 1 yr	Peak Runoff (cfs) 10 yr	Peak Runoff (cfs) 100 yr
A	A	9.77	41.11	73.83
B	B	32.80	120.98	244.95
C	C	2.81	31.37	61.40
D	D	3.75	15.73	28.33
E	E	4.30	18.07	32.43
F	F	5.14	21.65	38.78
G	G	11.39	45.70	80.96
H	H	31.98	112.26	193.10
I	I	7.15	28.54	50.89

*Peak runoff flows include detention in the existing site depressions

Table 2: Pre-Development Outfall Conditions

VII. Post-Development Conditions

The proposed development of the parcel into commercial properties and a planned residential community totaling 197.7 acres causes changes in the watershed due to conversion of existing cover types and paths of flow. The six points of discharge used for the pre-development conditions were utilized and evaluated for post-development conditions. In order to minimize site disturbance and affect existing drainage patterns, existing topography was held to the greatest extent possible when determining the proposed site grading. Therefore, the Post-development Watershed follows the existing drainage patterns to the greatest degree possible. Due to the proposed construction the site watershed has been separated into fifteen (15) separate overall watershed areas with associative sub-watersheds. Below is a description of each watershed area that correlates with the Post-development drainage area map provided in Appendix C:

> *Watershed Area A* will consist of a total of approximately 22.54 acres. Approximately 7.50 acres of this area will consist of impervious surfaces and roof drainage. Water quality and quantity for the new construction will be treated in the form of a wet extended detention pond, Pond A, in the southeastern portion of the project near Route 9W. The pond will treat stormwater runoff for water quality and quantity controls and provide stable discharge into the existing roadside swale along Route 9W as it already conveys runoff from this existing watershed. The pond will provide 50% of the required water quality volume in a permanent wet pool with the remaining water quality volume to be provided in the form of extended detention. In addition to the water quality extended detention, channel protection will be provided within the basin by detaining and discharging the 1-year storm event for 24 hours. Pretreatment will be provided by a wet forebay with a minimum depth of 4'. Sumps 18" in depth have been provided within all of the site catch basins that will serve to further provide water quality treatment and groundwater recharge prior to entering the wet extended detention pond. Please refer Appendix D for all applicable design calculations and water

quality volume calculations. The post-development peak discharge for Watershed Area A is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area B will consist of a total of approximately 33.37 acres. Approximately 8.93 acres of this area will consist of impervious roadway and roof drainage. Water quality and quantity for the new construction will be treated in the form of a wet extended detention pond, Pond B. This wet pond is located in the northern portion of the project within Lot 10, adjacent to the existing depression area B. The pond will discharge to the existing depression that conveys drainage through a 36" cast iron culvert pipe under the abandoned railroad embankment to stable stream course and wetland area. The pond will provide 50% of the water quality volume in a permanent wet pool with the remaining required water quality volume to be provided in the form of extended detention. Channel protection will be provided within the basin by detaining and discharging the 1-year storm event over 24 hours. Pretreatment will be provided by a wet forebay with a minimum depth of 4'. Sumps 18" in depth have been provided within all of the site catch basins that will serve to further provide water quality treatment and groundwater recharge prior to entering the wet extended detention pond. Please refer Appendix D for all applicable design calculations and water quality volume calculations. The post-development peak discharge for Watershed Area B is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area B2 will consist of a total of approximately 69.63 acres. Approximately 27.27 acres of this area will consist of impervious roadway and roof drainage. Water quality and quantity for the new construction will be treated in the form of a wet pond, Pond B, located in Watershed Area B. The pond will discharge to the existing depression A. Catch basin sumps will also be provided to further provide water quality treatment and groundwater recharge prior to entering the wet extended detention pond. Please refer to calculations provided in Appendix C.

Watershed Area B3 will consist of a total of approximately 8.19 acres. This area has been reduced in size from pre-development conditions due to the site grading and has been included in another post-development watershed. The remainder of this area that is not to be disturbed has similar drainage patterns and ground covers as Pre-development conditions. Due to the lack of development in the remainder of the watershed water quality treatment and quantity controls are not required in the area and therefore are not provided. The post-development peak discharge for Watershed Area D is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area B4 will consist of a total of approximately 8.60 acres. Approximately 1.64 acres of this area will consist of impervious roof drainage. Water quality and quantity for the new construction will be treated in the form of dry swales. The dry swales discharge to Non-Jurisdictional Wetland B. Please refer Appendix D for all applicable design calculations and water quality volume calculations. The post-development peak discharge for Watershed Area B4 is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area C will consist of a total of approximately 12.00 acres. Approximately 7.50 acres of this area will consist of impervious roadway and roof drainage. Water quality and quantity for the new construction will be treated in the form of a wet extended detention pond, Pond C, located in the eastern portion of the project adjacent to Route 9W. The pond will discharge to the existing depression C, located in Watershed Area C2. The pond will provide 50% of the water quality volume in a permanent wet pool with the remaining water quality to be provided in the form of extended detention. Channel protection will be provided within the basin by detaining and discharging the 1-year storm event over 24 hours. Pretreatment will be provided by a wet forebay with a minimum depth of 4'. Sumps 18" in depth have been provided within all of the site catch basins that will serve to further provide water quality treatment and groundwater recharge prior to entering the wet extended detention pond. Please refer Appendix D for all applicable design calculations and water quality volume calculations. The post-development peak discharge for Watershed Area C is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area C2 will consist of a total of approximately 9.95 acres. Disturbances in this area are minimal due to the proposed development. Drainage pathways and ground cover are similar to the Pre-development Watershed Area C. Stormwater from Pond E is discharged to the north end of Watershed Area C2. Drainage converges to a channel and is directed to an existing depression C, which attenuates discharges to the south of the project site to a culvert pipe crossing 36" cast iron culvert pipe conveying the drainage under Route 9W to a stable stream eventually connecting to the Funny Child Creek. Water quality treatment and quantity control are not provided in this area. Please refer to calculations provided in Appendix C.

Watershed Area C3 will consist of a total of approximately 12.77 acres. Approximately 6.97 acres of this area will consist of impervious roadway and roof drainage. Water quality and quantity for the new construction will be treated in the form of a wet pond, Pond E. This wet pond is located in the central portion of the project within Lot 10. The pond will discharge to the adjacent Watershed Area K existing depression that conveys drainage to the existing depression C. The pond will provide 50% of the water quality volume in a permanent wet pool with the remaining water quality volume to be provided in the form of extended detention. Channel protection will be provided within the basin by holding the 1-year storm event a minimum 24 hours before full release. Pretreatment will be provided by a wet forebay with a minimum depth of 4'. Catch basin sumps will also be provided to further provide water quality treatment and groundwater recharge prior to entering the wet extended detention pond. Please refer to calculations provided in Appendix C.

Watershed Area D will consist of a total of approximately 2.51 acres. This area has been reduced in size from pre-development conditions due to the site grading and has been included in another post-development watershed. The remainder of this area that is not to be disturbed has similar drainage patterns and ground covers as Pre-development conditions. Due to the lack of development in the remainder of the watershed water quality treatment and quantity controls are not required in the area and therefore are not provided. The post-development peak discharge for Watershed Area E is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area E will consist of a total of approximately 5.08 acres. This area has been reduced in size from pre-development conditions due to the site grading and has been included in another post-development watershed. The remainder of this area that is not to be disturbed has similar drainage patterns and ground covers as Pre-development conditions. Due to the lack of development in the remainder of the watershed water quality treatment and quantity controls are not required in the area and therefore are not provided. The post-development peak discharge for Watershed Area F is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area F will consist of a total of approximately 6.06 acres. This area has been reduced in size from pre-development conditions due to the site grading and has been included in another post-development watershed. The remainder of this area that is not to be disturbed has similar drainage patterns and ground covers as Pre-development conditions. Due to the lack of development in the remainder of the watershed water quality treatment and quantity controls are not required in the area and therefore are not provided. The post-development peak discharge for Watershed Area F is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area G will consist of a total of approximately 6.49 acres. The area does not contain impervious areas. Development in this area is limited to construction of a wet swale for the discharge of Pond D. Water quality treatment and quantity control are not provided in this area. The post-development peak discharge for Watershed Area G is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area G2 will consist of a total of approximately 18.78 acres. Approximately 6.59 acres of this area will consist of impervious roadway and roof drainage. Water quality and quantity for the new construction will be treated in the form of a wet extended detention pond, Pond D. This wet pond is located in the central portion of the project within Lot 10. The pond discharges through a culvert to the ground surface in Watershed Area G adjacent to the wetlands. The pond will provide 50% of the water quality volume in a permanent wet pool with the remaining water quality volume to be provided in the form of extended detention. Channel protection will be provided within the basin by holding the 1-year storm event a minimum 24 hours before full release. Pretreatment will be provided by a wet forebay with a minimum depth of 4'. Catch basin sumps will also be provided to further provide water quality treatment and groundwater recharge prior to entering the wet extended detention pond. The post-development peak discharge for Watershed Area G2 is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area H will consist of a total of approximately 28.72 acres encompassing an area in the southern portion of the project site and an existing residential area on Schofield Lane. This area also contains approximately 1.021 acres of non-jurisdictional wetlands and 1.61 acres of impervious coverage. Drainage pathways and ground cover are similar to Pre-development Watershed Area G. Currently, this drainage discharges to the existing depression H, which conveys drainage out through a 26" culvert pipe under the abandoned railroad embankment to Moodna Creek. The post-development peak discharge for Watershed Area H is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

Watershed Area I will consist of a total of approximately 12.98 acres. Approximately 1.85 acres of this area will consist of impervious roadway and roof drainage. This area contains approximately 3.698 acres of Federal Jurisdictional Wetland. Water quality treatment in this area is provided by dry swales located along the eastern edge of the wetland area. The dry swales discharge to the wetlands in 2 locations and the underdrain discharges at the southern end of the area. Pretreatment will be provided by a gravel diaphragm along the edge of the proposed pavement. Please refer Appendix D for all applicable design calculations and water quality volume calculations. The post-development peak discharge for Watershed Area I is summarized in Table 3, located below as well as the post-development model and analysis located in Appendix C.

As was done for the pre-development conditions, the Cumulative Curve Numbers and Times of Concentration for each of these areas were determined based upon the existing and proposed ground covers and the grading of the site. (See Appendix C)

Tables 3 through 5 summarize the post-development drainage characteristics for the drainage areas, existing depressions, retention ponds, and outfalls associated with the design storm frequencies. Based upon the peak discharge rates associated with post-development conditions, the outlet structures for the proposed detention basins were designed to minimize the impacts of the proposed development and control the peak flow rates for each storm event.

Watershed Area	Area (ac.)	Cum. CN	Time of Concentration (Hrs.)	1 Year Peak Runoff (cfs)	10 Year Peak Runoff (cfs)	100 Year Peak Runoff (cfs)
A	22.54	81	.2844	22.52	63.14	100.73
B	33.37	79	.2404	31.29	93.08	151.30
B2	69.63	83	.3456	72.00	190.80	298.94
B3	8.19	70	.2025	4.25	17.73	31.89
B4	8.60	77	.2990	6.63	20.96	39.41
C	12.77	87	.4482	14.91	34.09	50.92
C2	9.95	70	.6803	3.18	13.43	24.09
C3	14.68	88	.0696	22.08	51.63	77.70
D	2.51	70	.2483	1.22	5.12	9.20
E	5.08	70	.2161	2.59	10.83	19.47
F	6.06	70	.1811	3.26	13.57	24.28
G	6.49	70	.1905	3.42	14.26	25.53
G2	18.78	82	.2300	21.17	57.60	91.04
H	28.72	78	.3231	22.94	70.67	116.14
I	12.98	74	.4350	7.07	24.90	42.84

Table 3: Post-Development Watershed Conditions

Detention Area	Watershed Areas Served	1 Year Peak Runoff (cfs)	10 Year Peak Runoff (cfs)	100 Year Peak Runoff (cfs)
Pond A	A	22.52	63.14	100.73
		2.22	40.01	56.45
Pond B	B, B2, B4	107.93	300.75	479.28
		7.43	113.62	227.30
Pond C	C	14.91	34.09	50.92
		0.47	13.37	29.97
Pond D	G2	21.17	57.60	91.04
		0.46	19.45	50.31
Pond E	C3	22.08	51.63	77.70
		0.38	7.46	25.76

Table 4: Post-Development Stormwater Detention Conditions

Outfall	Watershed Areas Served	1 Year Peak Runoff (cfs)	10 Year Peak Runoff (cfs)	100 Year Peak Runoff (cfs)
A	A	2.22	40.01	56.45
B	B, B2, B3, B4	8.14	111.20	234.91
C	C, C1, C2	1.14	20.43	55.88
D	D	1.22	5.12	9.20
E	E	2.59	10.83	19.47
F	F	3.26	13.57	24.28
G	G, G2	3.67	23.55	62.27
H	H	22.93	60.39	115.37
I	I	7.07	24.90	42.84

Table 5: Post-Development Outfall Conditions

As shown above to maintain predevelopment peak flowrates for water quantity protection of the 10- and 100- year storm events, extended detention wet ponds were utilized. A proposed outlet structure was designed to retain the channel protection volume a minimum of 24 hours while also retaining peak flowrates for the 1-, 10- and 100- year storm event to predevelopment conditions. At the outfall of the wet ponds, rock riprap outlet protection will be provided for a stable outfall to the existing discharge points.

VIII. WATER QUALITY

The water quality volume denoted as WQ_v is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQ_v is directly related to the amount impervious cover created at a site. New York State Department of Environmental Conservation has developed the following equation to determine the required water quality storage volume:

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

Where:

P = 90% rainfall event number (Figure 4.1 NYSDEC Manual)
R_v = 0.05 + 0.009(I), where I is percent impervious cover
A = site area in acres

For each watershed, a water quality volume was computed using the post-development conditions discussed in Section VII of this report. This water quality volume was then evaluated in conjunction with the five categories as stated within the N.Y.S. DEC Stormwater Management Design Manual. These categories are listed in Table 5.1 of the New York State Department of Environmental Conservation Stormwater Manual and are included as Appendix E of this report. Wet extended detention stormwater ponds have been selected for this majority of the project since the ponds require low maintenance and also provide a more visual pleasing practice with the opportunity of providing potential passive recreation for the development. Also, stormwater ponds provide the most practical balance between providing both quantity control and water quality treatment Please refer to water quality computations in Appendix D of this report and Table 6, below.

Detention Pond	Required Water Quality Volume (ac.ft)	Provided Water Quality Volume (ac.ft)
A	0.748	0.750
B	2.802	3.816
C	0.735	0.740
D	0.687	0.804
E	0.691	1.526
Total	5.663	7.636

Table 6: Stormwater Pond Water Quality Volumes

Water quality treatment volume is provided by dry swales in areas B4 and I. Dry swales 3 and 4 in Subarea B4 total 779 feet in length with dimensions of 1 feet deep and 6 feet wide. Dry swales 1 and 2 in

Subarea I total 428 feet in length with dimensions of 2 feet deep and 4 feet wide. Please refer to water quality computations in Appendix D of this report and Table 7, below.

Detention Pond	Subarea	Required Water Quality Volume (ac.ft)	Provided Water Quality Volume (ac.ft)
1	I	0.180	0.112
2	I		0.084
3	B4	0.092	0.100
4	B4	0.061	0.061
Total		0.333	0.357

Table 7: Dry Swale Water Quality Volumes

IX. Erosion and Sediment Control Measures

In addition to the above, the general SPDES Permit GP-02-01 for construction activities also requires an Erosion and Sediment Control Plan be developed. This plan will be developed as part of the Subdivision and Site Plans, which should be available at the Town Hall and the construction site. This plan has been designed in compliance with current and proposed regulations, including construction sequence, both short- and long-term maintenance of facilities, storage of materials, and temporary and permanent structures.

As the site is proposed for construction of residential and retail/office commercial, no unusual chemical or waste product (other than construction related) is anticipated to be used or stored at the site. Therefore, erosion control methods employed are based upon the guidelines as outlined within the New York State and Specifications for Erosion and Sediment Controls (aka The Blue Book). Disturbance of over five acres of land is not permitted during construction. To mitigate this potential impact on construction, a phasing plan for the construction of the project has been completed indicating areas 5 acres in size to be disturbed at any one time. Once an area has been disturbed (grubbing and topsoil removal) temporary seeding and stabilization measures should be implemented as outlined within the erosion and sediment control plans. Once temporary seeding and stabilization measures are utilized, disturbance may continue to another portion of the project. Attached As Appendix F are standard erosion and sediment control practices to be utilized during the construction of the project.

X. Implementation Schedule & Maintenance

A. Schedule

As part of the development of the erosion and sediment control plan, an analysis of proposed construction sequencing was conducted to ensure water quality discharges during construction.

The following construction schedule for implementing stormwater management is proposed. Please refer to the attached site plans located within Appendix I for specific sequencing and schedule.

1. Pre-Construction Meeting: Before construction activities a site evaluation of the site will be performed with site contractor, Town personnel and Site Engineer including mark-out areas of special concerns (i.e.: trees, wetlands, wells, etc.)

2. Delineate Site Construction Disturbance Limits: Placement of construction fencing along the limit of disturbance throughout the site or first two phases of construction.

3. Protect Existing Wetlands: Place erosion control devices (silt fencing, diversion berms, etc.) upstream of wetlands and any existing watercourse within or outside of construction areas, prior to the start of any construction.

4. Construction Entrance/Siltation Controls: A temporary construction entrance will be installed along U.S. Route 9W and all other locations specified on the Erosion Control Plan. During wet weather it may necessary to wash vehicle tires at these locations. Therefore, these entrances are to be graded so that runoff is directed onto the construction site. In addition, any other siltation control devices, as shown on the erosion control plan are to be installed adjacent to the temporary entrance and staging area.

5. Construction of temporary sediment basins: Construction of the temporary sediment basins and outlet structures throughout the site shall be completed prior to the start of any major earthwork movement or site construction.

6. Construction of diversion swales and on site ditches: The installation of all on site ditches to be used to convey stormwater to the sediment basins shall be completed. Also, the construction of all diversion swales on the uphill side of the active phase shall be installed.

7. Land Grading: Grading will be required throughout the site. All proposed silt fencing and temporary swales would have been previously installed prior to roadway construction. At this time temporary stockpile areas should be utilized for the specific phase that it is needed.

8. Road Construction: With all erosion control devices in place, construction of the access loop road up to the lot 10 entrance shall be completed.

9. Building Construction: Upon conclusion of the roadway construction, building construction will commence. Drainage is to be directed to recently installed storm sewer system within the loop road and directed into the temporary sediment basins. Additional precautions/sediment controls at the entrances to storm system are to be utilized, including siltation fencing, catch basin protection, and rip rap outfall structures.

10. Landscaping and Final Stabilization: All open areas to be stabilized with topsoil and seeded as per the seeding schedule specified on the erosion and sediment control plans. Removal of all temporary measures, flushing/cleaning of all catch basins and pipe, and removal and disposal of all trapped sediment on site shall be completed.

11. Final Site Inspection and Certification: At the end of construction a site evaluation of the site will be performed with site contractor, town personnel and site engineer to ensure that all stormwater facilities were constructed as per the SWPPP design and that the site has been stabilized.

Please refer to the attached Site Plans within the site plans for specific construction sequencing and seeding schedule for disturbance and final stabilization.

B. Maintenance

1. Construction: The property owner will be responsible for the maintenance and operation of all site related storm water management facilities during and after construction. Please refer to Appendix G for standard Inspection and Maintenance Forms. Maintenance shall be carried out in accordance with the following notes:

   a. Stormwater Basins: Inspection shall be made weekly and after every ½" rainfall event during construction. During the first growing season inspections shall be conducted monthly, and on an annual basis thereafter. The following tasks shall be performed as needed:

      (1) Removal of accumulated sediment and cleaning and/or restoration of the sediment forebays every 5 or 6 years or whenever accumulated sediment reaches a volume of 50% of the available capacity.

      (2) Restoration of any disturbed plant material and any eroded embankments.

      (3) Removal of accumulated debris within the basin and at all inlet and outfall structures.

      (4) Inspection of the outlet structure to ensure structural stability and removal of any accumulated trash within the structure.

      (5) Annual mowing of the berm and surrounding area of the basins. Removal of any fallen trees or limbs.

   c. Swales: Inspection shall be made weekly and after every ½" rainfall event during construction. During the first growing season inspections shall be conducted semi annually, and on an annual basis thereafter. The following tasks shall be performed as needed:

(1) Removal of accumulated sediment and cleaning and/or restoration whenever accumulated sediment reaches a volume of 50% of the available capacity.

(2) Restoration of any eroded embankments. Infrequent reshaping of the swale line should be completed as needed.

(3) Removal of accumulated debris/trash within the swale and at all inlet and outfall structures.

(4) Seasonal mowing of the swale bottom and surrounding side slopes. Removal of any fallen trees or limbs. Replacement and/or restoration of proposed grasses shall occur if more then 50% of the coverage of the facility is not achieved. Grasses should be kept at a maximum height of 6" – 8".

d. Roadway Pavements: Roadway pavements shall be swept on a regular basis to remove accumulated sediment. Collected sediment shall be removed, which will not allow the re-entrance of silt into the storm water drainage system.

e. Catch Basins: Catch basins shall be flushed and cleaned of any collected sediment within the bottom of the basin approximately every 4-5 years. Collected sediment shall be removed, which will not allow the reentrance of silt into the storm water drainage system.

f. Vegetative Stabilization:

(1) All vegetative planting on areas that have been disturbed and are finish graded shall be inspected monthly during the first growing season and annually thereafter. Planting (or seeding) shall be maintained in viable conditions to stabilize the soil and to prevent soil erosion. Restore all site planting and/or seeding which has been damaged to a viable condition.

(2) If vegetative stabilization has been damaged from storm water erosion, correct upstream conditions that caused the erosion. Check dams may be required in drainage ways and stone outfall aprons may be required to be repaired on storm water outfall sites.

Long-Term: The permanent stormwater management structures are to be maintained by the property owner. These structures include catch basins and pipe throughout the drainage network, stormwater basins and any other constructed stormwater practice (swales). The long-term maintenance of the on-site drainage structures will include periodic inspections of various structures and their inlet/outlet devices, including outlet structures, pipes and spillways, to insure proper operation and good equipment condition. In addition, periodic removal of deposited sediment in catch basins, pipes and stormwater basins will be necessary on an infrequent basis.

XI. N.Y.S. DEC STANDARDS AND NOI REQUIREMENTS

Currently, the N.Y.S. DEC SPDES General Permit GP 02-01 requires that a Notice of Intent form be prepared and submitted five business days prior to the start of construction. The following is a list of specific items that need to be provided on the NOI form for the Cornwall Commons Site:

1. Water Quality Volume

   The site is required to provide 5.996 ac-ft of water quality volume. Through the construction of the on site wet ponds and bioretention areas the site will provide 7.993 ac-ft of WQv.

2. Channel Protection Volume

   The site is required to provide 9.210 ac-ft of channel protection volume. Through the construction of the on site wet ponds which will provide for the 24 hour extended detention of the one year storm and the volume of the bioretention areas the site provides 11.142 ac-ft of CPv.

3. Overbank Flood Control (10 Yr storm)

   The PondPack hydraulic analysis provides that the 10-year peak flow for all outfalls shall be less then the pre-development peak flow rates.

4. Extreme Flood Control (100 yr storm)

   The PondPack hydraulic analysis provides that the 100-year peak flow for all outfalls shall be less then the pre-development peak flow rates.

5. Site Areas

   The existing site acreage is 197.7 acres. The watershed area, which was delineated for the project site is 257.6 acres. The existing watershed contains approximately 2.1 acres of impervious surfaces, which equals 0.8% impervious surfaces in pre-development conditions.

   The post development watershed is 257.7 acres, which will include 67.7 acres of new impervious surfaces associated with the site construction. The total impervious surface after construction for the watershed is 69.8 acres or 27.1% (this includes the existing 2.1 acres).

6. Disturbance Acreage

   The proposed project anticipates a disturbance of 150.6 acres of the existing 197.7 acre site. The remaining lands shall be left undisturbed after construction is completed.

XII. Analysis & Conclusions

As can be seen from the calculations provided above, the water quality volumes for the proposed project will be attenuated and treated through the used of the proposed facilities. This is due to the proposed use of the on-site stormwater facilities providing retention of the runoff during the storm events and allowing for the gradual release of stormwater off-site. In addition, water quality facilities will be used in accordance with NYSDEC Regulations to provide for water quality treatment. Peak flows for the 1-year water quality storm will be attenuated using the extended detention wet ponds. Based upon the results of this analysis, the site has demonstrated the ability to meet all requirements for stormwater quantity and quality and an impact to the existing watershed is negligible. Final design of the stormwater facilities and network shall be completed prior to any Site Plan approvals and filing of the NOI with the NYSDEC.

Table 8 below summarizes the pre- and post- development discharges for the development. Please refer to Appendices B and C for a model analysis of the watershed areas.

Outfall		1 Year Peak Runoff (cfs)	10 Year Peak Runoff (cfs)	100 Year Peak Runoff (cfs)
A	Pre-Development	9.77	41.11	73.83
	Post-Development	2.22	40.01	56.45
	Difference	-7.55 (-77.3%)	-1.10 (-2.7%)	-17.38 (-23.5%)
B	Pre-Development	32.80	120.98	244.95
	Post-Development	7.78	110.37	234.41
	Difference	-25.02 (-76.3%)	-10.61 (-8.8%)	-10.54 (-4.3%)
C	Pre-Development	2.81	31.37	61.40
	Post-Development	1.14	20.43	55.88
	Difference	-1.67 (-59.4%)	-10.94 (-34.9%)	-5.52 (-9.0%)
D	Pre-Development	3.75	15.73	28.33
	Post-Development	1.22	5.12	9.20
	Difference	-2.53 (-67.5%)	-10.61 (-67.5%)	-19.13 (-67.5%)
E	Pre-Development	4.30	18.07	32.43
	Post-Development	2.59	10.83	19.47
	Difference	-1.71 (-39.8%)	-7.24 (-40.1%)	-12.96 (-40.0%)
F	Pre-Development	5.14	21.65	38.78
	Post-Development	3.26	13.57	24.28
	Difference	-1.88 (-36.6%)	-8.08 (-37.3%)	-14.50 (-37.4%)
G	Pre-Development	11.39	45.70	80.96
	Post-Development	3.67	23.55	62.27
	Difference	-7.72 (-67.8%)	-22.15 (-48.5%)	-18.69 (-23.1%)
H	Pre-Development	31.98	112.26	193.10
	Post-Development	22.93	60.39	115.37
	Difference	-9.05 (-28.3%)	-51.87 (-46.2%)	-77.73 (-40.3%)
I	Pre-Development	7.15	28.54	50.89
	Post-Development	7.07	24.90	42.84
	Difference	-0.08 (-1.1%)	-3.64 (-12.8%)	-8.05 (-15.8%)

Table 8: Comparison of Pre- & Post-Development Conditions

By implementing both the Stormwater Pollution Prevention Plan and Erosion and Sediment Control Plans during the construction of the proposed project, current New York State Department of Environmental Conservation and Town regulations can be met. However, the owner and contractor are responsible for implementation of the project's erosion and sedimentation controls and any required maintenance. In addition, this also includes filing the NOI and meeting all requirements of the General Permit, including necessary site assessment and weekly inspections.

Respectfully submitted,

LANC & TULLY, P.C.

John Russo, P.E.

JR/esr
Attachments

Preparers Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law. "

Name (please print):John Russo P.E. ____________

Title Professional Engineer __**Date:January 28, 2008**_____

Address: P.O. Box 867, Goshen, NY 10924 __________________

Phone: 845-294-3700____ **Email:eng@lanctully.com** __________________

Signature:____

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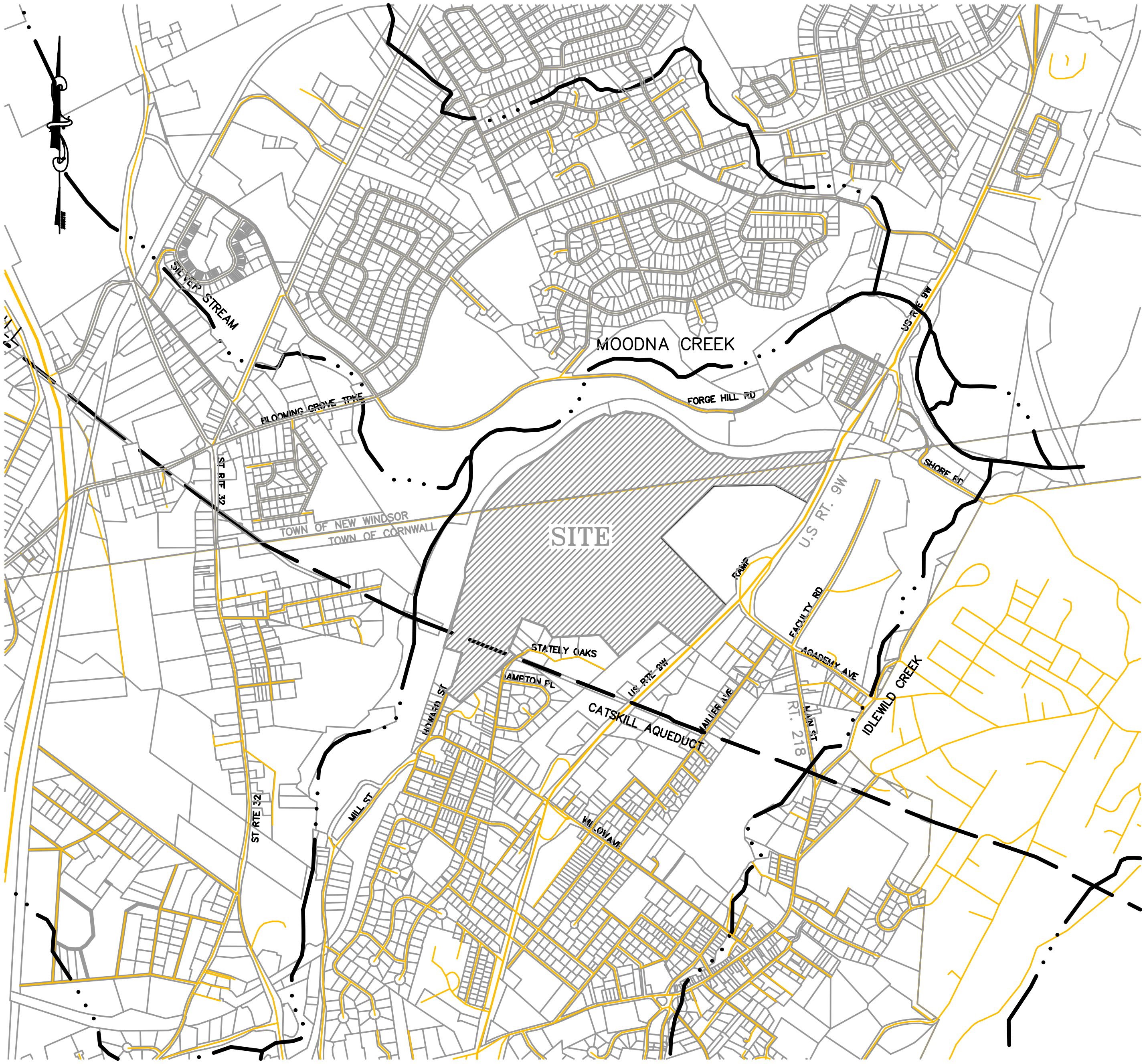
APPENDIX A

SITE LOCATION MAP FOR PROJECT
SOIL MAP FOR PROJECT



LANC & TULLY
ENGINEERING AND SURVEYING, P.C.

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Goshen, N.Y. 10924
(845) 294-3700

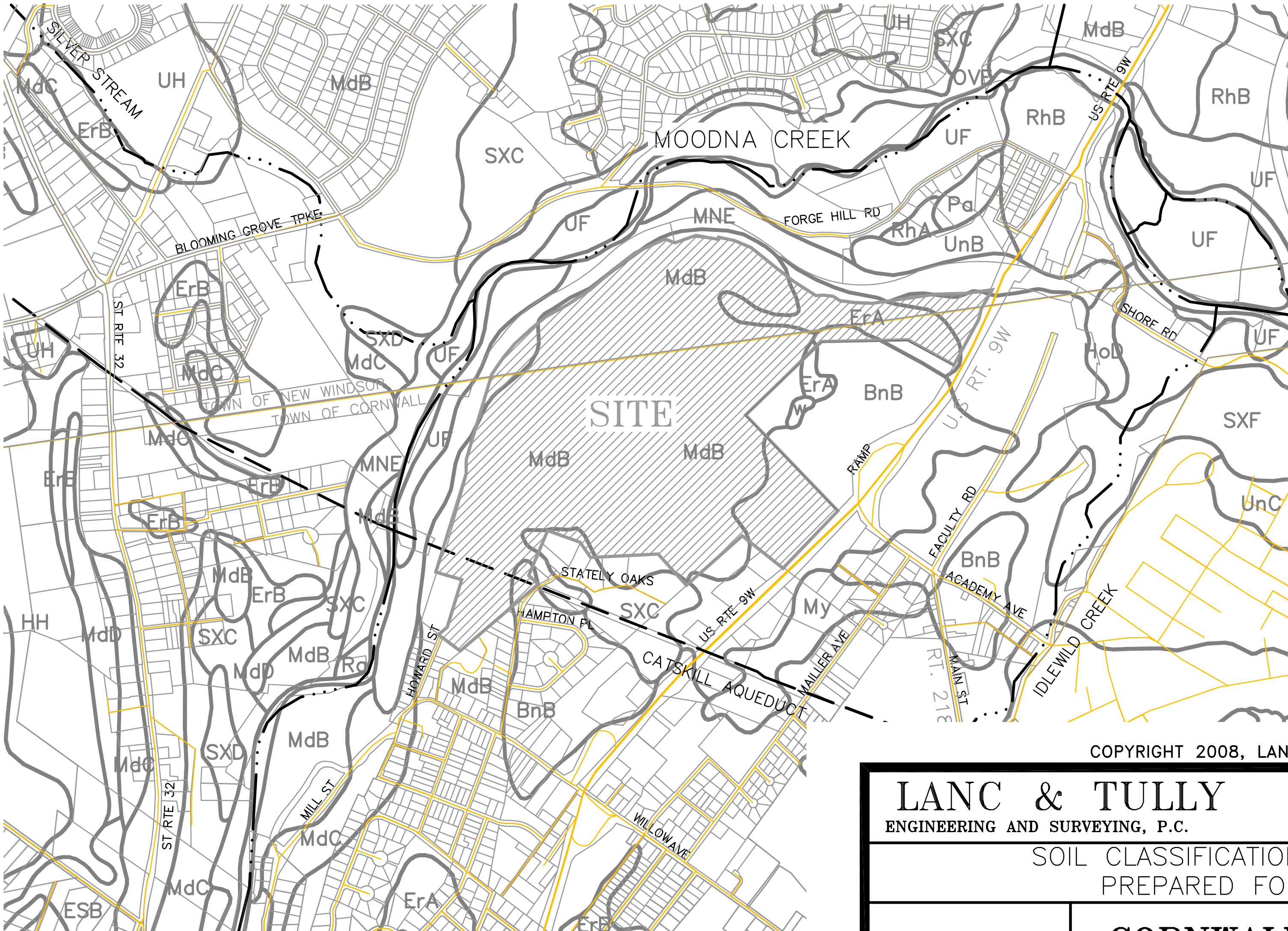
LOCATION MAP PREPARED FOR

CORNWALL COMMONS

TOWN OF CORNWALL
ORANGE COUNTY, NEW YORK

Date:	AUGUST 1, 2007
Revisions:	JANUARY 28, 2008
CAD File:	CC-CORNSUBDIVISION-DRAINAGE
Layout:	LOCATION
Sheet No.:	1 OF 4
Drawing No.:	F - 98 - 0148 - 01

Drawn By:	Checked By:	Scale:	Tax Map No.:
ESR		1" = 1,000'	9-1-25.2 & 37-1-45.1



LEGEND

STREAMS
PARCELS
SOIL CLASSIFICATION BORDER

LANC & TULLY
ENGINEERING AND SURVEYING, P.C.

P.O. Box 687, Rt. 207
Goshen, N.Y. 10924
(845) 294-3700

SOIL CLASSIFICATION MAP
PREPARED FOR

CORNWALL COMMONS

TOWN OF CORNWALL
ORANGE COUNTY, NEW YORK

Drawn By:	Checked By:	Scale:	Tax Map No.:
ESR		1" = 1,000'	9-1-25.2 & 37-1-45.1

Date: AUGUST 1, 2007
Revisions: JANUARY 28, 2008
CAD File: CC-CORNSUBDIVISION-DRAINAGE
Layout: SOILS
Sheet No.: 2 OF 4
Drawing No.: F – 98 – 0148 – 02

APPENDIX B

PRE-DEVELOPMENT WATERSHED MAP
PRE-DEVELOPMENT DRAINAGE ANALYSIS

CORNWALL COMMONS
Town of Cornwall, New York
Watershed Area Summary

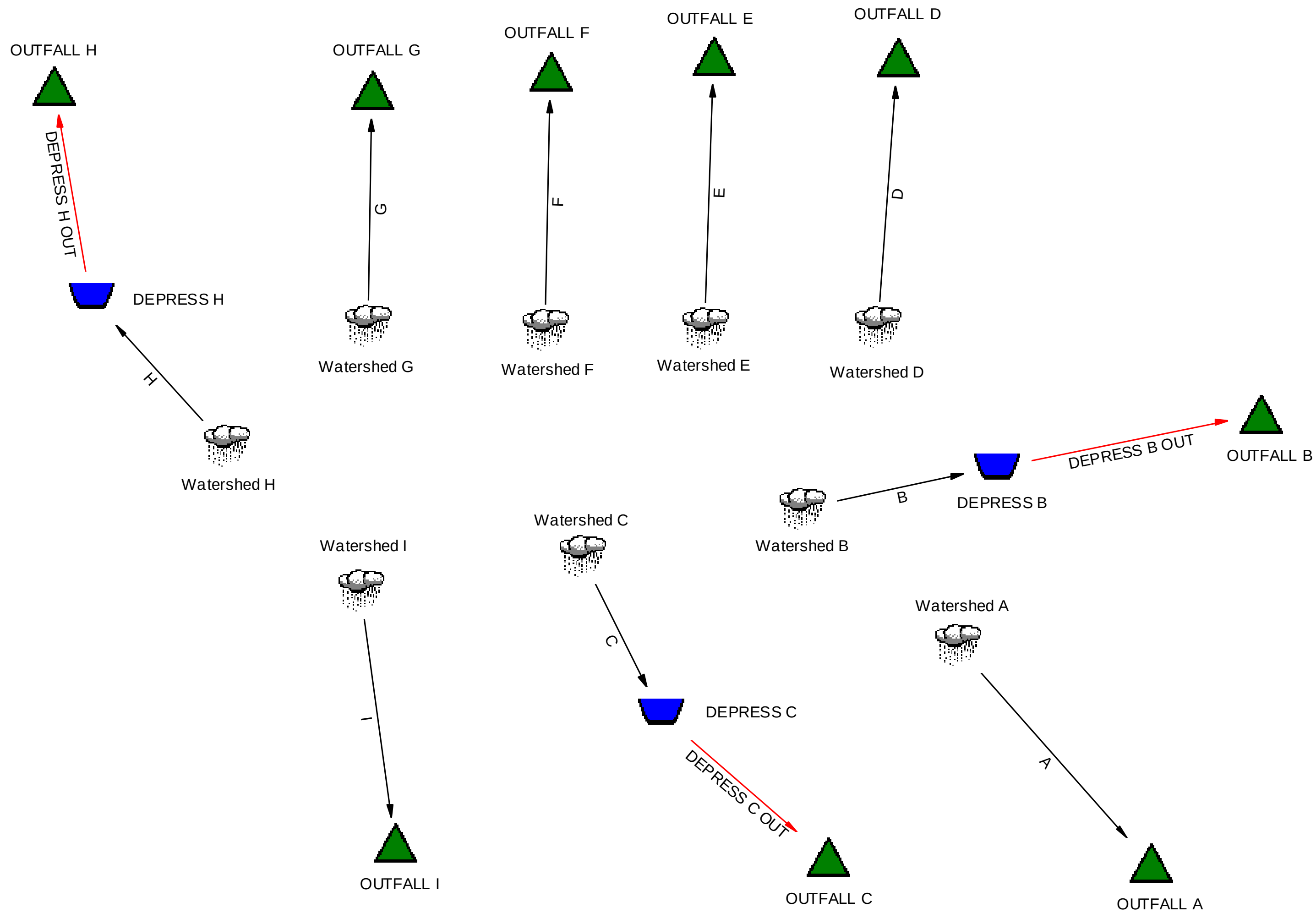
Pre-Development Conditions

Drainage Subarea	Area Breakdown	Area (SF)	Area (ac.)	Percent Impervious	Soil Classification	Hydrologic Group
Watershed A	Total	1,062,178	24.38			
	Woods	1,062,178	24.38		BnB, ErA, MdB	C
	Impervious	0	0.00	0.0%		
Watershed B	Total	4,171,486	95.76			
	Woods	4,171,486	95.76		ErA, MdB	C
	Impervious	0	0.00	0.0%		
Watershed C	Total	1,299,321	29.83			
	Woods	1,299,321	29.83		BnB, MdB	C
	Impervious	0	0.00	0.0%		
Watershed D	Total	410,155	9.42			
	Woods	410,155	9.42		MdB	C
	Impervious	0	0.00	0.0%		
Watershed E	Total	511,151	11.73			
	Woods	511,151	11.73		MdB, MNE	C
	Impervious	0	0.00	0.0%		
Watershed F	Total	622,273	14.29			
	Woods	622,273	14.29		MdB, MNE	C
	Impervious	0	0.00	0.0%		
Watershed G	Total	1,119,939	25.71			
	Woods	1,119,939	25.71		BnB, MdB, SXC	C
	Residential	70,054	1.61		BnB, MdB, SXC	C
	Impervious	4,207	0.10	0.4%		
Watershed H	Total	1,303,920	29.93			
	Woods	1,303,920	29.93		BnB, MdB	C
	Residential	921,008	21.14		BnB, MdB	C
	Impervious	69,959	1.61	5.4%		
Watershed I	Total	722,593	16.59			
	Woods	707,014	16.23		MdB, SXC	C
	Impervious	15,579	0.36	2.2%		
Site Totals	Total	11,223,016	257.645			
	Woods	11,207,437	257.287			
	Residential	991,062	22.752			
	Impervious	89,745	2.060	0.8%		

CORNWALL COMMONS
Town of Cornwall, New York
Peak Runoff Flow Summary

Pre-Development Conditions

Drainage Subarea	Areas Served	1-Year (CFS)	10-Year (CFS)	100-Year (CFS)
Watershed A		9.77	41.11	73.83
Watershed B		32.85	138.44	248.20
Watershed C		11.10	46.61	83.83
Watershed D		3.75	15.73	28.33
Watershed E		4.30	18.07	32.43
Watershed F		5.14	21.65	38.78
Watershed G		11.39	45.70	80.96
Watershed H		32.04	112.98	194.47
Watershed I		7.15	28.54	50.89
Outfall A	A	9.77	41.11	73.83
Outfall B	B	32.80	120.98	244.95
Outfall C	C	2.81	31.37	61.40
Outfall D	D	3.75	15.73	28.33
Outfall E	E	4.30	18.07	32.43
Outfall F	F	5.14	21.65	38.78
Outfall G	G	11.39	45.70	80.96
Oufall H	H	31.98	112.26	193.10
Outfall I	I	7.15	28.54	50.89
Total		109.09	435.41	804.67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JOB TITLE
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Project Date: 8/3/2007
Project Engineer: Eric Rogge
Project Title: Cornwall Commons Pre-Dev
Project Comments:
Revised 1/28/2008

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Unit Hyd. Summary 7.23

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```
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                   Detention Time ....................  10.31

DEPRESS H    OUT Pre 10
                   Pond Routing Summary ..............  10.32
                   Detention Time ....................  10.33

DEPRESS H    OUT Pre100
                   Pond Routing Summary ..............  10.34
                   Detention Time ....................  10.35
```

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Orange County

Return Event	Total Depth in	Rainfall Type	RNF ID
Pre 1	2.9000	Synthetic Curve	TypeIII 24hr
Pre 10	5.5000	Synthetic Curve	TypeIII 24hr
Pre100	7.8000	Synthetic Curve	TypeIII 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	Max Pond Storage ac-ft
DEPRESS B	IN	POND	1	5.262		12.5300	32.85		
DEPRESS B	IN	POND	10	19.266		12.4550	138.44		
DEPRESS B	IN	POND	100	34.258		12.4550	248.20		
DEPRESS B	OUT	POND	1	5.262		12.5400	32.80	90.81	.059
DEPRESS B	OUT	POND	10	19.266		12.6100	120.98	99.01	.934
DEPRESS B	OUT	POND	100	34.258		12.4750	244.95	103.62	1.984
DEPRESS C	IN	POND	1	1.639		12.4350	11.10		
DEPRESS C	IN	POND	10	6.002		12.3700	46.61		
DEPRESS C	IN	POND	100	10.672		12.3700	83.83		
DEPRESS C	OUT	POND	1	1.210		13.4400	2.81	175.82	.636
DEPRESS C	OUT	POND	10	5.541		12.6650	31.37	177.46	1.577
DEPRESS C	OUT	POND	100	10.194		12.6100	61.40	178.68	2.403
DEPRESS H	IN	POND	1	3.712		12.2650	32.04		
DEPRESS H	IN	POND	10	12.157		12.2200	112.98		
DEPRESS H	IN	POND	100	20.840		12.2200	194.47		

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
DEPRESS H	OUT POND	1	3.711		12.2700	31.98	171.69	.007
DEPRESS H	OUT POND	10	12.156		12.2650	112.26	179.00	.377
DEPRESS H	OUT POND	100	20.839		12.2400	193.10	179.93	.487
*OUTFALL A	JCT	1	1.340		12.3700	9.77		
*OUTFALL A	JCT	10	4.905		12.3150	41.11		
*OUTFALL A	JCT	100	8.722		12.3150	73.83		
*OUTFALL B	JCT	1	5.262		12.5400	32.80		
*OUTFALL B	JCT	10	19.266		12.6100	120.98		
*OUTFALL B	JCT	100	34.258		12.4750	244.95		
*OUTFALL C	JCT	1	1.210		13.4400	2.81		
*OUTFALL C	JCT	10	5.541		12.6650	31.37		
*OUTFALL C	JCT	100	10.194		12.6100	61.40		
*OUTFALL D	JCT	1	.518		12.3650	3.75		
*OUTFALL D	JCT	10	1.895		12.3100	15.73		
*OUTFALL D	JCT	100	3.370		12.3100	28.33		
*OUTFALL E	JCT	1	.645		12.4050	4.30		
*OUTFALL E	JCT	10	2.360		12.4000	18.07		
*OUTFALL E	JCT	100	4.196		12.3350	32.43		
*OUTFALL F	JCT	1	.785		12.4600	5.14		
*OUTFALL F	JCT	10	2.875		12.4150	21.65		
*OUTFALL F	JCT	100	5.112		12.4100	38.78		
*OUTFALL G	JCT	1	1.608		12.4150	11.39		
*OUTFALL G	JCT	10	5.716		12.3600	45.70		
*OUTFALL G	JCT	100	10.068		12.3600	80.96		
*OUTFALL H	JCT	1	3.711		12.2700	31.98		
*OUTFALL H	JCT	10	12.156		12.2650	112.26		
*OUTFALL H	JCT	100	20.839		12.2400	193.10		

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
*OUTFALL I	JCT	1	.973		12.3550	7.15		
*OUTFALL I	JCT	10	3.458		12.3000	28.54		
*OUTFALL I	JCT	100	6.091		12.3000	50.89		
WATERSHED A	AREA	1	1.340		12.3700	9.77		
WATERSHED A	AREA	10	4.905		12.3150	41.11		
WATERSHED A	AREA	100	8.722		12.3150	73.83		
WATERSHED B	AREA	1	5.262		12.5300	32.85		
WATERSHED B	AREA	10	19.266		12.4550	138.44		
WATERSHED B	AREA	100	34.258		12.4550	248.20		
WATERSHED C	AREA	1	1.639		12.4350	11.10		
WATERSHED C	AREA	10	6.002		12.3700	46.61		
WATERSHED C	AREA	100	10.672		12.3700	83.83		
WATERSHED D	AREA	1	.518		12.3650	3.75		
WATERSHED D	AREA	10	1.895		12.3100	15.73		
WATERSHED D	AREA	100	3.370		12.3100	28.33		
WATERSHED E	AREA	1	.645		12.4050	4.30		
WATERSHED E	AREA	10	2.360		12.4000	18.07		
WATERSHED E	AREA	100	4.196		12.3350	32.43		
WATERSHED F	AREA	1	.785		12.4600	5.14		
WATERSHED F	AREA	10	2.875		12.4150	21.65		
WATERSHED F	AREA	100	5.112		12.4100	38.78		
WATERSHED G	AREA	1	1.608		12.4150	11.39		
WATERSHED G	AREA	10	5.716		12.3600	45.70		
WATERSHED G	AREA	100	10.068		12.3600	80.96		
WATERSHED H	AREA	1	3.712		12.2650	32.04		
WATERSHED H	AREA	10	12.157		12.2200	112.98		
WATERSHED H	AREA	100	20.840		12.2200	194.47		

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
WATERSHED I	AREA	1	.973		12.3550	7.15		
WATERSHED I	AREA	10	3.458		12.3000	28.54		
WATERSHED I	AREA	100	6.091		12.3000	50.89		

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = Orange County

Storm Tag Name = Pre 1

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 1 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

Node ID		Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
DEPRESS B	IN	POND	5.262		12.5300	32.85	
DEPRESS B	OUT	POND	5.262		12.5400	32.80	90.81
DEPRESS C	IN	POND	1.639		12.4350	11.10	
DEPRESS C	OUT	POND	1.210		13.4400	2.81	175.82
DEPRESS H	IN	POND	3.712		12.2650	32.04	
DEPRESS H	OUT	POND	3.711		12.2700	31.98	171.69
Outfall OUTFALL A		JCT	1.340		12.3700	9.77	
Outfall OUTFALL B		JCT	5.262		12.5400	32.80	
Outfall OUTFALL C		JCT	1.210		13.4400	2.81	
Outfall OUTFALL D		JCT	.518		12.3650	3.75	
Outfall OUTFALL E		JCT	.645		12.4050	4.30	
Outfall OUTFALL F		JCT	.785		12.4600	5.14	
Outfall OUTFALL G		JCT	1.608		12.4150	11.39	
Outfall OUTFALL H		JCT	3.711		12.2700	31.98	
Outfall OUTFALL I		JCT	.973		12.3550	7.15	
WATERSHED A		AREA	1.340		12.3700	9.77	
WATERSHED B		AREA	5.262		12.5300	32.85	
WATERSHED C		AREA	1.639		12.4350	11.10	
WATERSHED D		AREA	.518		12.3650	3.75	
WATERSHED E		AREA	.645		12.4050	4.30	
WATERSHED F		AREA	.785		12.4600	5.14	
WATERSHED G		AREA	1.608		12.4150	11.39	
WATERSHED H		AREA	3.712		12.2650	32.04	
WATERSHED I		AREA	.973		12.3550	7.15	

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = Orange County

Storm Tag Name = Pre 10

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
DEPRESS B IN	POND	19.266		12.4550	138.44	
DEPRESS B OUT	POND	19.266		12.6100	120.98	99.01
DEPRESS C IN	POND	6.002		12.3700	46.61	
DEPRESS C OUT	POND	5.541		12.6650	31.37	177.46
DEPRESS H IN	POND	12.157		12.2200	112.98	
DEPRESS H OUT	POND	12.156		12.2650	112.26	179.00
Outfall OUTFALL A	JCT	4.905		12.3150	41.11	
Outfall OUTFALL B	JCT	19.266		12.6100	120.98	
Outfall OUTFALL C	JCT	5.541		12.6650	31.37	
Outfall OUTFALL D	JCT	1.895		12.3100	15.73	
Outfall OUTFALL E	JCT	2.360		12.4000	18.07	
Outfall OUTFALL F	JCT	2.875		12.4150	21.65	
Outfall OUTFALL G	JCT	5.716		12.3600	45.70	
Outfall OUTFALL H	JCT	12.156		12.2650	112.26	
Outfall OUTFALL I	JCT	3.458		12.3000	28.54	
WATERSHED A	AREA	4.905		12.3150	41.11	
WATERSHED B	AREA	19.266		12.4550	138.44	
WATERSHED C	AREA	6.002		12.3700	46.61	
WATERSHED D	AREA	1.895		12.3100	15.73	
WATERSHED E	AREA	2.360		12.4000	18.07	
WATERSHED F	AREA	2.875		12.4150	21.65	
WATERSHED G	AREA	5.716		12.3600	45.70	
WATERSHED H	AREA	12.157		12.2200	112.98	
WATERSHED I	AREA	3.458		12.3000	28.54	

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = Orange County

Storm Tag Name = Pre100

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
DEPRESS B IN	POND	34.258		12.4550	248.20	
DEPRESS B OUT	POND	34.258		12.4750	244.95	103.62
DEPRESS C IN	POND	10.672		12.3700	83.83	
DEPRESS C OUT	POND	10.194		12.6100	61.40	178.68
DEPRESS H IN	POND	20.840		12.2200	194.47	
DEPRESS H OUT	POND	20.839		12.2400	193.10	179.93
Outfall OUTFALL A	JCT	8.722		12.3150	73.83	
Outfall OUTFALL B	JCT	34.258		12.4750	244.95	
Outfall OUTFALL C	JCT	10.194		12.6100	61.40	
Outfall OUTFALL D	JCT	3.370		12.3100	28.33	
Outfall OUTFALL E	JCT	4.196		12.3350	32.43	
Outfall OUTFALL F	JCT	5.112		12.4100	38.78	
Outfall OUTFALL G	JCT	10.068		12.3600	80.96	
Outfall OUTFALL H	JCT	20.839		12.2400	193.10	
Outfall OUTFALL I	JCT	6.091		12.3000	50.89	
WATERSHED A	AREA	8.722		12.3150	73.83	
WATERSHED B	AREA	34.258		12.4550	248.20	
WATERSHED C	AREA	10.672		12.3700	83.83	
WATERSHED D	AREA	3.370		12.3100	28.33	
WATERSHED E	AREA	4.196		12.3350	32.43	
WATERSHED F	AREA	5.112		12.4100	38.78	
WATERSHED G	AREA	10.068		12.3600	80.96	
WATERSHED H	AREA	20.840		12.2200	194.47	
WATERSHED I	AREA	6.091		12.3000	50.89	

NETWORK RUNOFF NODE SEQUENCE

Runoff Data	Apply to Node	Receiving Link
SCS UH WATERSHED B	Subarea WATERSHED B	Add Hyd WATERSHED B
SCS UH WATERSHED C	Subarea WATERSHED C	Add Hyd WATERSHED C
SCS UH WATERSHED A	Subarea WATERSHED A	Add Hyd WATERSHED A
SCS UH WATERSHED I	Subarea WATERSHED I	Add Hyd WATERSHED I
SCS UH WATERSHED H	Subarea WATERSHED H	Add Hyd WATERSHED H
SCS UH WATERSHED D	Subarea WATERSHED D	Add Hyd WATERSHED D
SCS UH WATERSHED E	Subarea WATERSHED E	Add Hyd WATERSHED E
SCS UH WATERSHED F	Subarea WATERSHED F	Add Hyd WATERSHED F
SCS UH WATERSHED G	Subarea WATERSHED G	Add Hyd WATERSHED G

NETWORK ROUTING SEQUENCE

Link Operation	UPstream Node			DNstream Node		
Add Hyd H	Subarea	WATERSHED H		Pond	DEPRESS H	IN
POND ROUTE TOTAL OUTFLOW...						
Total Pond Outflow	Pond	DEPRESS H	IN	Outflow	DEPRESS H	OUT
SET POND ROUTING LINK TO TOTAL POND OUTFLOW...						
Outlet DEPRESS H OUT	Outflow	DEPRESS H	OUT	Jct	OUTFALL H	
Add Hyd C	Subarea	WATERSHED C		Pond	DEPRESS C	IN
POND ROUTE TOTAL OUTFLOW...						
Total Pond Outflow	Pond	DEPRESS C	IN	Outflow	DEPRESS C	OUT
SET POND ROUTING LINK TO TOTAL POND OUTFLOW...						
Outlet DEPRESS C OUT	Outflow	DEPRESS C	OUT	Jct	OUTFALL C	
Add Hyd B	Subarea	WATERSHED B		Pond	DEPRESS B	IN
POND ROUTE TOTAL OUTFLOW...						
Total Pond Outflow	Pond	DEPRESS B	IN	Outflow	DEPRESS B	OUT
SET POND ROUTING LINK TO TOTAL POND OUTFLOW...						
Outlet DEPRESS B OUT	Outflow	DEPRESS B	OUT	Jct	OUTFALL B	
Add Hyd G	Subarea	WATERSHED G		Jct	OUTFALL G	
Add Hyd F	Subarea	WATERSHED F		Jct	OUTFALL F	
Add Hyd E	Subarea	WATERSHED E		Jct	OUTFALL E	
Add Hyd D	Subarea	WATERSHED D		Jct	OUTFALL D	
Add Hyd I	Subarea	WATERSHED I		Jct	OUTFALL I	
Add Hyd A	Subarea	WATERSHED A		Jct	OUTFALL A	

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Title... Project Date: 8/3/2007
Project Engineer: Eric Rogge
Project Title: Cornwall Commons Pre-Dev
Project Comments:
Revised 1/28/2008

DESIGN STORMS SUMMARY

```
Design Storm File,ID =               Orange County


Storm Tag Name      = Pre  1
----------------------------------------------------------------------
Data Type, File, ID = Synthetic Storm    TypeIII 24hr
Storm Frequency     = 1 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      = Pre 10
----------------------------------------------------------------------
Data Type, File, ID = Synthetic Storm    TypeIII 24hr
Storm Frequency     = 10 yr
Total Rainfall Depth= 5.5000 in
Duration Multiplier =  1
Resulting Duration  = 24.0000 hrs
Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


Storm Tag Name      = Pre100
----------------------------------------------------------------------
Data Type, File, ID = Synthetic Storm    TypeIII 24hr
Storm Frequency     = 100 yr
Total Rainfall Depth= 7.8000 in
Duration Multiplier =  1
Resulting Duration  = 24.0000 hrs
Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs
```

```
                DESIGN STORMS SUMMARY

 Design Storm File,ID =               Orange County


 Storm Tag Name      = Pre  1
 ---------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeIII 24hr
 Storm Frequency     = 1 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      = Pre 10
 ---------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeIII 24hr
 Storm Frequency     = 10 yr
 Total Rainfall Depth= 5.5000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


 Storm Tag Name      = Pre100
 ---------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeIII 24hr
 Storm Frequency     = 100 yr
 Total Rainfall Depth= 7.8000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs
```

CUMULATIVE RAINFALL FRACTIONS

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
.0000	.000	.001	.002	.003	.004
.5000	.005	.006	.007	.008	.009
1.0000	.010	.011	.012	.013	.014
1.5000	.015	.016	.017	.018	.019
2.0000	.020	.021	.022	.023	.024
2.5000	.025	.026	.027	.028	.030
3.0000	.031	.032	.033	.034	.035
3.5000	.037	.038	.039	.040	.042
4.0000	.043	.044	.046	.047	.048
4.5000	.050	.051	.052	.054	.055
5.0000	.057	.058	.060	.061	.063
5.5000	.064	.066	.067	.069	.070
6.0000	.072	.074	.075	.077	.079
6.5000	.081	.083	.084	.086	.088
7.0000	.091	.093	.095	.097	.099
7.5000	.102	.104	.106	.109	.111
8.0000	.114	.117	.119	.122	.125
8.5000	.128	.132	.135	.138	.142
9.0000	.146	.150	.153	.158	.162
9.5000	.166	.170	.175	.179	.184
10.0000	.189	.194	.199	.205	.211
10.5000	.217	.223	.229	.236	.243
11.0000	.250	.258	.266	.276	.287
11.5000	.298	.314	.339	.373	.416
12.0000	.500	.584	.627	.661	.686
12.5000	.702	.713	.724	.734	.742
13.0000	.750	.757	.764	.771	.777
13.5000	.784	.789	.795	.801	.806
14.0000	.811	.816	.821	.825	.830
14.5000	.834	.838	.842	.847	.850
15.0000	.854	.858	.862	.865	.868
15.5000	.872	.875	.878	.881	.883
16.0000	.886	.889	.891	.894	.896
16.5000	.898	.901	.903	.905	.907
17.0000	.910	.912	.914	.916	.918
17.5000	.919	.921	.923	.925	.926
18.0000	.928	.930	.931	.933	.934
18.5000	.936	.937	.939	.940	.942
19.0000	.943	.945	.946	.948	.949
19.5000	.950	.952	.953	.954	.956
20.0000	.957	.958	.960	.961	.962
20.5000	.963	.965	.966	.967	.968
21.0000	.969	.971	.972	.973	.974
21.5000	.975	.976	.977	.979	.980

CUMULATIVE RAINFALL FRACTIONS

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
22.0000	.981	.982	.983	.984	.985
22.5000	.986	.987	.988	.989	.990
23.0000	.991	.992	.993	.994	.995
23.5000	.996	.997	.997	.998	.999
24.0000	1.000				

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0029	.0058	.0087	.0116
.5000	.0145	.0174	.0203	.0232	.0261
1.0000	.0290	.0319	.0348	.0377	.0406
1.5000	.0435	.0464	.0493	.0522	.0551
2.0000	.0580	.0609	.0639	.0669	.0699
2.5000	.0731	.0762	.0794	.0826	.0859
3.0000	.0892	.0925	.0959	.0994	.1029
3.5000	.1064	.1100	.1136	.1172	.1210
4.0000	.1247	.1285	.1323	.1362	.1401
4.5000	.1441	.1481	.1522	.1563	.1604
5.0000	.1646	.1688	.1731	.1774	.1817
5.5000	.1862	.1906	.1951	.1996	.2042
6.0000	.2088	.2135	.2184	.2234	.2285
6.5000	.2338	.2393	.2448	.2506	.2564
7.0000	.2625	.2686	.2749	.2814	.2880
7.5000	.2947	.3016	.3086	.3158	.3231
8.0000	.3306	.3383	.3463	.3547	.3634
8.5000	.3725	.3818	.3916	.4016	.4120
9.0000	.4227	.4337	.4451	.4568	.4688
9.5000	.4812	.4939	.5070	.5203	.5341
10.0000	.5481	.5627	.5779	.5939	.6105
10.5000	.6279	.6459	.6646	.6841	.7042
11.0000	.7250	.7475	.7727	.8005	.8310
11.5000	.8642	.9115	.9843	1.0826	1.2064
12.0000	1.4500	1.6936	1.8174	1.9157	1.9885
12.5000	2.0358	2.0690	2.0995	2.1273	2.1525
13.0000	2.1750	2.1958	2.2159	2.2354	2.2541
13.5000	2.2722	2.2895	2.3061	2.3221	2.3373
14.0000	2.3519	2.3659	2.3797	2.3930	2.4061
14.5000	2.4188	2.4312	2.4432	2.4549	2.4663
15.0000	2.4773	2.4880	2.4984	2.5084	2.5182
15.5000	2.5275	2.5366	2.5453	2.5537	2.5617
16.0000	2.5694	2.5769	2.5842	2.5914	2.5984
16.5000	2.6053	2.6120	2.6186	2.6251	2.6314
17.0000	2.6376	2.6436	2.6494	2.6552	2.6608
17.5000	2.6662	2.6715	2.6766	2.6816	2.6865
18.0000	2.6912	2.6958	2.7004	2.7049	2.7094
18.5000	2.7138	2.7183	2.7226	2.7269	2.7312
19.0000	2.7354	2.7396	2.7437	2.7478	2.7519
19.5000	2.7559	2.7599	2.7638	2.7677	2.7715
20.0000	2.7753	2.7790	2.7828	2.7865	2.7901
20.5000	2.7937	2.7973	2.8009	2.8044	2.8079
21.0000	2.8114	2.8148	2.8182	2.8216	2.8249
21.5000	2.8282	2.8314	2.8347	2.8379	2.8410

CUMULATIVE RAINFALL DEPTHS (in)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
22.0000	2.8442	2.8473	2.8504	2.8534	2.8564
22.5000	2.8593	2.8623	2.8652	2.8681	2.8709
23.0000	2.8737	2.8765	2.8792	2.8819	2.8846
23.5000	2.8873	2.8899	2.8925	2.8950	2.8975
24.0000	2.9000				

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.000	.001	.002	.003	.004
.5000	.005	.006	.007	.008	.009
1.0000	.010	.011	.012	.013	.014
1.5000	.015	.016	.017	.018	.019
2.0000	.020	.021	.022	.023	.024
2.5000	.025	.026	.027	.028	.030
3.0000	.031	.032	.033	.034	.035
3.5000	.037	.038	.039	.040	.042
4.0000	.043	.044	.046	.047	.048
4.5000	.050	.051	.052	.054	.055
5.0000	.057	.058	.060	.061	.063
5.5000	.064	.066	.067	.069	.070
6.0000	.072	.074	.075	.077	.079
6.5000	.081	.083	.084	.086	.088
7.0000	.091	.093	.095	.097	.099
7.5000	.102	.104	.106	.109	.111
8.0000	.114	.117	.119	.122	.125
8.5000	.128	.132	.135	.138	.142
9.0000	.146	.150	.153	.158	.162
9.5000	.166	.170	.175	.179	.184
10.0000	.189	.194	.199	.205	.211
10.5000	.217	.223	.229	.236	.243
11.0000	.250	.258	.266	.276	.287
11.5000	.298	.314	.339	.373	.416
12.0000	.500	.584	.627	.661	.686
12.5000	.702	.713	.724	.734	.742
13.0000	.750	.757	.764	.771	.777
13.5000	.784	.789	.795	.801	.806
14.0000	.811	.816	.821	.825	.830
14.5000	.834	.838	.842	.847	.850
15.0000	.854	.858	.862	.865	.868
15.5000	.872	.875	.878	.881	.883
16.0000	.886	.889	.891	.894	.896
16.5000	.898	.901	.903	.905	.907
17.0000	.910	.912	.914	.916	.918
17.5000	.919	.921	.923	.925	.926
18.0000	.928	.930	.931	.933	.934
18.5000	.936	.937	.939	.940	.942
19.0000	.943	.945	.946	.948	.949
19.5000	.950	.952	.953	.954	.956
20.0000	.957	.958	.960	.961	.962
20.5000	.963	.965	.966	.967	.968
21.0000	.969	.971	.972	.973	.974
21.5000	.975	.976	.977	.979	.980

CUMULATIVE RAINFALL FRACTIONS

Time hrs	Output Time increment = .1000 hrs Time on left represents time for first value in each row.				
22.0000	.981	.982	.983	.984	.985
22.5000	.986	.987	.988	.989	.990
23.0000	.991	.992	.993	.994	.995
23.5000	.996	.997	.997	.998	.999
24.0000	1.000				

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0055	.0110	.0165	.0220
.5000	.0275	.0330	.0385	.0440	.0495
1.0000	.0550	.0605	.0660	.0715	.0770
1.5000	.0825	.0880	.0935	.0990	.1045
2.0000	.1100	.1156	.1212	.1269	.1327
2.5000	.1385	.1445	.1505	.1566	.1629
3.0000	.1691	.1755	.1819	.1885	.1951
3.5000	.2018	.2086	.2154	.2224	.2294
4.0000	.2365	.2437	.2510	.2583	.2658
4.5000	.2733	.2809	.2886	.2963	.3042
5.0000	.3121	.3202	.3282	.3364	.3447
5.5000	.3530	.3615	.3700	.3786	.3873
6.0000	.3960	.4050	.4142	.4237	.4334
6.5000	.4435	.4538	.4644	.4752	.4864
7.0000	.4978	.5095	.5214	.5337	.5462
7.5000	.5590	.5720	.5854	.5990	.6129
8.0000	.6270	.6416	.6569	.6728	.6893
8.5000	.7064	.7242	.7426	.7616	.7813
9.0000	.8016	.8226	.8441	.8664	.8892
9.5000	.9127	.9368	.9615	.9869	1.0129
10.0000	1.0395	1.0671	1.0960	1.1263	1.1579
10.5000	1.1908	1.2250	1.2605	1.2973	1.3355
11.0000	1.3750	1.4177	1.4654	1.5182	1.5761
11.5000	1.6390	1.7287	1.8667	2.0532	2.2880
12.0000	2.7500	3.2120	3.4469	3.6333	3.7714
12.5000	3.8610	3.9239	3.9818	4.0346	4.0823
13.0000	4.1250	4.1645	4.2027	4.2395	4.2750
13.5000	4.3093	4.3421	4.3737	4.4040	4.4329
14.0000	4.4605	4.4871	4.5131	4.5385	4.5632
14.5000	4.5873	4.6108	4.6336	4.6559	4.6774
15.0000	4.6984	4.7187	4.7384	4.7574	4.7758
15.5000	4.7936	4.8107	4.8272	4.8431	4.8584
16.0000	4.8730	4.8872	4.9011	4.9147	4.9280
16.5000	4.9411	4.9539	4.9664	4.9786	4.9906
17.0000	5.0023	5.0137	5.0248	5.0357	5.0463
17.5000	5.0566	5.0666	5.0764	5.0859	5.0951
18.0000	5.1040	5.1127	5.1214	5.1300	5.1385
18.5000	5.1470	5.1553	5.1636	5.1718	5.1798
19.0000	5.1879	5.1958	5.2037	5.2114	5.2191
19.5000	5.2267	5.2342	5.2417	5.2490	5.2563
20.0000	5.2635	5.2706	5.2777	5.2847	5.2916
20.5000	5.2985	5.3053	5.3120	5.3187	5.3253
21.0000	5.3319	5.3384	5.3448	5.3512	5.3576
21.5000	5.3638	5.3700	5.3761	5.3822	5.3882

CUMULATIVE RAINFALL DEPTHS (in)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
22.0000	5.3941	5.4000	5.4058	5.4116	5.4173
22.5000	5.4229	5.4285	5.4340	5.4394	5.4448
23.0000	5.4502	5.4554	5.4606	5.4657	5.4709
23.5000	5.4759	5.4808	5.4857	5.4905	5.4953
24.0000	5.5000				

CUMULATIVE RAINFALL FRACTIONS

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
.0000	.000	.001	.002	.003	.004
.5000	.005	.006	.007	.008	.009
1.0000	.010	.011	.012	.013	.014
1.5000	.015	.016	.017	.018	.019
2.0000	.020	.021	.022	.023	.024
2.5000	.025	.026	.027	.028	.030
3.0000	.031	.032	.033	.034	.035
3.5000	.037	.038	.039	.040	.042
4.0000	.043	.044	.046	.047	.048
4.5000	.050	.051	.052	.054	.055
5.0000	.057	.058	.060	.061	.063
5.5000	.064	.066	.067	.069	.070
6.0000	.072	.074	.075	.077	.079
6.5000	.081	.083	.084	.086	.088
7.0000	.091	.093	.095	.097	.099
7.5000	.102	.104	.106	.109	.111
8.0000	.114	.117	.119	.122	.125
8.5000	.128	.132	.135	.138	.142
9.0000	.146	.150	.153	.158	.162
9.5000	.166	.170	.175	.179	.184
10.0000	.189	.194	.199	.205	.211
10.5000	.217	.223	.229	.236	.243
11.0000	.250	.258	.266	.276	.287
11.5000	.298	.314	.339	.373	.416
12.0000	.500	.584	.627	.661	.686
12.5000	.702	.713	.724	.734	.742
13.0000	.750	.757	.764	.771	.777
13.5000	.784	.789	.795	.801	.806
14.0000	.811	.816	.821	.825	.830
14.5000	.834	.838	.842	.847	.850
15.0000	.854	.858	.862	.865	.868
15.5000	.872	.875	.878	.881	.883
16.0000	.886	.889	.891	.894	.896
16.5000	.898	.901	.903	.905	.907
17.0000	.910	.912	.914	.916	.918
17.5000	.919	.921	.923	.925	.926
18.0000	.928	.930	.931	.933	.934
18.5000	.936	.937	.939	.940	.942
19.0000	.943	.945	.946	.948	.949
19.5000	.950	.952	.953	.954	.956
20.0000	.957	.958	.960	.961	.962
20.5000	.963	.965	.966	.967	.968
21.0000	.969	.971	.972	.973	.974
21.5000	.975	.976	.977	.979	.980

CUMULATIVE RAINFALL FRACTIONS

Time hrs	Output Time increment = .1000 hrs Time on left represents time for first value in each row.				
22.0000	.981	.982	.983	.984	.985
22.5000	.986	.987	.988	.989	.990
23.0000	.991	.992	.993	.994	.995
23.5000	.996	.997	.997	.998	.999
24.0000	1.000				

CUMULATIVE RAINFALL DEPTHS (in)

Time hrs	Output Time increment = .1000 hrs Time on left represents time for first value in each row.				
.0000	.0000	.0078	.0156	.0234	.0312
.5000	.0390	.0468	.0546	.0624	.0702
1.0000	.0780	.0858	.0936	.1014	.1092
1.5000	.1170	.1248	.1326	.1404	.1482
2.0000	.1560	.1639	.1718	.1799	.1881
2.5000	.1965	.2049	.2135	.2221	.2310
3.0000	.2399	.2489	.2580	.2673	.2767
3.5000	.2862	.2958	.3055	.3154	.3253
4.0000	.3354	.3456	.3559	.3664	.3769
4.5000	.3876	.3983	.4093	.4203	.4314
5.0000	.4427	.4540	.4655	.4771	.4888
5.5000	.5007	.5126	.5247	.5369	.5492
6.0000	.5616	.5743	.5873	.6008	.6146
6.5000	.6289	.6435	.6586	.6739	.6898
7.0000	.7059	.7225	.7394	.7568	.7745
7.5000	.7927	.8112	.8302	.8494	.8692
8.0000	.8892	.9099	.9316	.9541	.9775
8.5000	1.0018	1.0270	1.0532	1.0801	1.1081
9.0000	1.1369	1.1666	1.1971	1.2287	1.2610
9.5000	1.2943	1.3285	1.3636	1.3996	1.4364
10.0000	1.4742	1.5134	1.5544	1.5973	1.6421
10.5000	1.6887	1.7372	1.7876	1.8399	1.8940
11.0000	1.9500	2.0105	2.0782	2.1531	2.2352
11.5000	2.3244	2.4515	2.6473	2.9117	3.2448
12.0000	3.9000	4.5552	4.8883	5.1527	5.3485
12.5000	5.4756	5.5648	5.6469	5.7218	5.7895
13.0000	5.8500	5.9060	5.9601	6.0124	6.0628
13.5000	6.1113	6.1579	6.2027	6.2456	6.2866
14.0000	6.3258	6.3636	6.4004	6.4364	6.4715
14.5000	6.5057	6.5390	6.5713	6.6029	6.6334
15.0000	6.6632	6.6919	6.7199	6.7468	6.7730
15.5000	6.7982	6.8225	6.8459	6.8684	6.8901
16.0000	6.9108	6.9309	6.9506	6.9699	6.9888
16.5000	7.0074	7.0255	7.0432	7.0606	7.0776
17.0000	7.0941	7.1103	7.1261	7.1415	7.1565
17.5000	7.1712	7.1854	7.1992	7.2127	7.2258
18.0000	7.2384	7.2508	7.2631	7.2753	7.2874
18.5000	7.2993	7.3112	7.3229	7.3345	7.3460
19.0000	7.3574	7.3686	7.3797	7.3907	7.4017
19.5000	7.4124	7.4231	7.4336	7.4441	7.4544
20.0000	7.4646	7.4747	7.4847	7.4946	7.5045
20.5000	7.5142	7.5239	7.5334	7.5429	7.5523
21.0000	7.5616	7.5708	7.5800	7.5890	7.5980
21.5000	7.6068	7.6156	7.6243	7.6329	7.6414

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
22.0000	7.6499	7.6582	7.6665	7.6746	7.6827
22.5000	7.6906	7.6986	7.7064	7.7141	7.7218
23.0000	7.7293	7.7367	7.7442	7.7514	7.7587
23.5000	7.7658	7.7728	7.7797	7.7866	7.7933
24.0000	7.8000				

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::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400
Hydraulic Length	150.00 ft
2yr, 24hr P	3.5000 in
Slope	.021300 ft/ft

Avg.Velocity .14 ft/sec

Segment #1 Time: .3067 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	508.00 ft
Slope	.080600 ft/ft
Unpaved	

Avg.Velocity 4.58 ft/sec

Segment #2 Time: .0308 hrs

Segment #3: Tc: TR-55 Shallow

Hydraulic Length	431.00 ft
Slope	.008500 ft/ft
Unpaved	

Avg.Velocity 1.49 ft/sec

Segment #3 Time: .0805 hrs

Total Tc: .4180 hrs

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TIME OF CONCENTRATION CALCULATOR

::

Segment #1: Tc: TR-55 Sheet

```
Mannings n           .2400
Hydraulic Length   150.00 ft
2yr, 24hr P        3.5000 in
Slope             .035500 ft/ft

Avg.Velocity          .17 ft/sec

                                        Segment #1 Time:     .2500 hrs
```

Segment #2: Tc: TR-55 Shallow

```
Hydraulic Length   606.00 ft
Slope             .035500 ft/ft
Unpaved

Avg.Velocity         3.04 ft/sec

                                        Segment #2 Time:     .0554 hrs
```

Segment #3: Tc: TR-55 Shallow

```
Hydraulic Length   435.00 ft
Slope             .004600 ft/ft
Unpaved

Avg.Velocity         1.09 ft/sec

                                        Segment #3 Time:     .1104 hrs
```

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Segment #4: Tc: TR-55 Shallow

Hydraulic Length 1352.00 ft
Slope   .053200 ft/ft
Unpaved

Avg.Velocity   3.72 ft/sec

Segment #4 Time: .1009 hrs

Segment #5: Tc: TR-55 Shallow

Hydraulic Length   923.00 ft
Slope   .041100 ft/ft
Unpaved

Avg.Velocity   3.27 ft/sec

Segment #5 Time: .0784 hrs

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Total Tc: .5951 hrs
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TIME OF CONCENTRATION CALCULATOR
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Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   150.00 ft
2yr, 24hr P        3.5000 in
Slope             .017400 ft/ft

Avg.Velocity          .13 ft/sec

                                        Segment #1 Time:     .3326 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   469.00 ft
Slope             .068600 ft/ft
Unpaved

Avg.Velocity         4.23 ft/sec

                                        Segment #2 Time:     .0308 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Shallow

Hydraulic Length   463.00 ft
Slope             .021600 ft/ft
Unpaved

Avg.Velocity         2.37 ft/sec

                                        Segment #3 Time:     .0542 hrs
------------------------------------------------------------------------
```

Segment #4: Tc: TR-55 Channel

Flow Area	36.0000	sq.ft
Wetted Perimeter	36.00	ft
Hydraulic Radius	1.00	ft
Slope	.073100	ft/ft
Mannings n	.1000	
Hydraulic Length	246.00	ft
Avg.Velocity	4.03	ft/sec

Segment #4 Time: .0170 hrs

Segment #5: Tc: TR-55 Shallow

Hydraulic Length	202.00	ft
Slope	.002500	ft/ft
Unpaved		
Avg.Velocity	.81	ft/sec

Segment #5 Time: .0696 hrs

Total Tc: .5042 hrs

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TIME OF CONCENTRATION CALCULATOR
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Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   150.00 ft
2yr, 24hr P        3.5000 in
Slope             .017500 ft/ft

Avg.Velocity          .13 ft/sec

                                         Segment #1 Time:     .3318 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length  1316.00 ft
Slope             .053900 ft/ft
Unpaved

Avg.Velocity         3.75 ft/sec

                                         Segment #2 Time:     .0976 hrs
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                                                Total Tc:     .4294 hrs
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TIME OF CONCENTRATION CALCULATOR
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Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   150.00 ft
2yr, 24hr P        3.5000 in
Slope             .014000 ft/ft

Avg.Velocity          .11 ft/sec

                                        Segment #1 Time:     .3628 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length  1361.00 ft
Slope             .064200 ft/ft
Unpaved

Avg.Velocity         4.09 ft/sec

                                        Segment #2 Time:     .0925 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Shallow

Hydraulic Length   409.00 ft
Slope             .014400 ft/ft
Unpaved

Avg.Velocity         1.94 ft/sec

                                        Segment #3 Time:     .0587 hrs
------------------------------------------------------------------------

                                              =========================
                                               Total Tc:     .5139 hrs
                                              =========================
```

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


------------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   150.00 ft
2yr, 24hr P        3.5000 in
Slope             .007900 ft/ft

Avg.Velocity          .09 ft/sec

                                         Segment #1 Time:     .4561 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length  1207.00 ft
Slope             .069000 ft/ft
Unpaved

Avg.Velocity         4.24 ft/sec

                                         Segment #2 Time:     .0791 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .5352 hrs
                                               =========================
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

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


------------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n           .2400
Hydraulic Length   150.00 ft
2yr, 24hr P        3.5000 in
Slope             .016300 ft/ft

Avg.Velocity           .12 ft/sec

                                         Segment #1 Time:     .3414 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length  1135.00 ft
Slope             .054000 ft/ft
Unpaved

Avg.Velocity          3.75 ft/sec

                                         Segment #2 Time:     .0841 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Shallow

Hydraulic Length   338.00 ft
Slope             .016600 ft/ft
Unpaved

Avg.Velocity          2.08 ft/sec

                                         Segment #3 Time:     .0452 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .4706 hrs
                                               =========================
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

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


------------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   150.00 ft
2yr, 24hr P        3.5000 in
Slope             .066660 ft/ft

Avg.Velocity          .21 ft/sec

                                        Segment #1 Time:     .1943 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   627.00 ft
Slope             .052900 ft/ft
Unpaved

Avg.Velocity         3.71 ft/sec

                                        Segment #2 Time:     .0469 hrs
------------------------------------------------------------------------

Segment #3:  Tc: Length & Vel.

Hydraulic Length    41.00 ft
Avg.Velocity        10.00 ft/sec

                                        Segment #3 Time:     .0011 hrs
------------------------------------------------------------------------
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

Segment #4: Tc: TR-55 Channel

Flow Area	19.5000	sq.ft
Wetted Perimeter	39.00	ft
Hydraulic Radius	.50	ft
Slope	.041400	ft/ft
Mannings n	.1000	
Hydraulic Length	392.00	ft

Avg.Velocity 1.91 ft/sec

Segment #4 Time: .0570 hrs

Segment #5: Tc: TR-55 Channel

Flow Area	11.0000	sq.ft
Wetted Perimeter	11.50	ft
Hydraulic Radius	.96	ft
Slope	.107300	ft/ft
Mannings n	.1000	
Hydraulic Length	456.00	ft

Avg.Velocity 4.74 ft/sec

Segment #5 Time: .0267 hrs

=========================
Total Tc: .3262 hrs
=========================

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

::

TIME OF CONCENTRATION CALCULATOR

::

Segment #1: Tc: TR-55 Sheet

```
Mannings n           .2400
Hydraulic Length   150.00 ft
2yr, 24hr P        3.5000 in
Slope             .086700 ft/ft

Avg.Velocity          .24 ft/sec
```

Segment #1 Time: .1749 hrs

Segment #2: Tc: TR-55 Shallow

```
Hydraulic Length   454.00 ft
Slope             .026500 ft/ft
Unpaved

Avg.Velocity         2.63 ft/sec
```

Segment #2 Time: .0480 hrs

Segment #3: Tc: TR-55 Channel

```
Flow Area         36.0000 sq.ft
Wetted Perimeter    36.00 ft
Hydraulic Radius     1.00 ft
Slope             .018900 ft/ft
Mannings n          .1000
Hydraulic Length   514.00 ft

Avg.Velocity         2.05 ft/sec
```

Segment #3 Time: .0697 hrs

```
Segment #4:  Tc: TR-55 Shallow

Hydraulic Length   585.00 ft
Slope             .005000 ft/ft
Unpaved

Avg.Velocity         1.14 ft/sec

                                        Segment #4 Time:     .1424 hrs
------------------------------------------------------------------------

                                              =========================
                                               Total Tc:     .4351 hrs
                                              =========================
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	24.380			70.00
COMPOSITE AREA & WEIGHTED CN --->		24.380			70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	95.760			70.00
COMPOSITE AREA & WEIGHTED CN --->		95.760			70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	29.830			70.00

COMPOSITE AREA & WEIGHTED CN ---> 29.830 70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	9.420			70.00

COMPOSITE AREA & WEIGHTED CN ---> 9.420 70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	11.730			70.00
COMPOSITE AREA & WEIGHTED CN --->		11.730			70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	14.290			70.00
COMPOSITE AREA & WEIGHTED CN --->		14.290			70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

RUNOFF CURVE NUMBER DATA
::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Impervious Areas - Paved; open ditc	92	.100			92.00
Woods - good	70	25.710			70.00
Residential Districts - 1 acre	79	1.610			79.00

COMPOSITE AREA & WEIGHTED CN ---> 27.420 70.61 (71)
:::

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	29.930			70.00
Residential Districts - 1 acre	79	21.140			79.00
Impervious Areas - Paved; open ditc	92	1.610			92.00

COMPOSITE AREA & WEIGHTED CN ---> 52.680 74.28 (74)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Impervious Areas - Paved parking lo	98	.360			98.00
Woods - good	70	16.230			70.00

COMPOSITE AREA & WEIGHTED CN ---> 16.590 70.61 (71)

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED A Pre  1
Tc            = .4180 hrs
Drainage Area = 24.380 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .05574 hrs
Computed Peak Time             =  12.3734 hrs
Computed Peak Flow             =     9.78 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3702 hrs
Peak Flow, Interpolated Output =     9.77 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED A
              CN   =   70
              Area =      24.380 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                       1.340 ac-ft

HYG Volume...          1.340 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .41802 hrs (ID: WATERSHED A)
Computational Incr, Tm =   .05574 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 =    66.08 cfs
Unit peak time      Tp =   .27868 hrs
Unit receding limb, Tr =  1.11472 hrs
Total unit time,    Tb =  1.39340 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED A Pre 10
Tc            = .4180 hrs
Drainage Area = 24.380 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .05574 hrs
Computed Peak Time             =  12.3176 hrs
Computed Peak Flow             =    41.14 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3152 hrs
Peak Flow, Interpolated Output =    41.11 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED A
              CN   =   70
              Area =      24.380 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                       4.905 ac-ft

HYG Volume...          4.905 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .41802 hrs (ID: WATERSHED A)
Computational Incr, Tm =   .05574 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 =    66.08 cfs
Unit peak time      Tp =   .27868 hrs
Unit receding limb, Tr =  1.11472 hrs
Total unit time,    Tb =  1.39340 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED A Pre100
Tc            = .4180 hrs
Drainage Area = 24.380 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .05574 hrs
Computed Peak Time             =  12.3176 hrs
Computed Peak Flow             =    73.85 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3152 hrs
Peak Flow, Interpolated Output =    73.83 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED A
              CN   =   70
              Area =      24.380 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      4.2929 in
                       8.722 ac-ft

HYG Volume...          8.722 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .41802 hrs (ID: WATERSHED A)
Computational Incr, Tm =   .05574 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 =    66.08 cfs
Unit peak time      Tp =   .27868 hrs
Unit receding limb, Tr =  1.11472 hrs
Total unit time,    Tb =  1.39340 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 1 year storm
              Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID = work_pad.hyg - WATERSHED B Pre  1
              Tc            = .5951 hrs
              Drainage Area = 95.760 acres  Runoff CN= 70

              ============================================
              Computational Time Increment   =   .07935 hrs
              Computed Peak Time             =  12.5376 hrs
              Computed Peak Flow             =    32.86 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.5352 hrs
              Peak Flow, Interpolated Output =    32.86 cfs
              ============================================

                             DRAINAGE AREA
                          -------------------
                          ID:WATERSHED B
                          CN   =   70
                          Area =      95.760 acres
                          S    =   4.2857 in
                          0.2S =    .8571 in

                           Cumulative Runoff
                          -------------------
                                   .6594 in
                                   5.262 ac-ft

              HYG Volume...          5.262 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .59514 hrs (ID: WATERSHED B)
              Computational Incr, Tm =   .07935 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 =   182.31 cfs
              Unit peak time      Tp =   .39676 hrs
              Unit receding limb, Tr =  1.58703 hrs
              Total unit time,    Tb =  1.98379 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED B Pre 10
Tc            = .5951 hrs
Drainage Area = 95.760 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .07935 hrs
Computed Peak Time             =  12.4582 hrs
Computed Peak Flow             =   138.53 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.4552 hrs
Peak Flow, Interpolated Output =   138.44 cfs
============================================

                  DRAINAGE AREA
              -------------------
              ID:WATERSHED B
              CN   =   70
              Area =      95.760 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                      19.266 ac-ft

HYG Volume...         19.266 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .59514 hrs (ID: WATERSHED B)
Computational Incr, Tm =   .07935 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 =   182.31 cfs
Unit peak time      Tp =   .39676 hrs
Unit receding limb, Tr =  1.58703 hrs
Total unit time,    Tb =  1.98379 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED B Pre100
Tc            = .5951 hrs
Drainage Area = 95.760 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .07935 hrs
Computed Peak Time             =  12.4582 hrs
Computed Peak Flow             =   248.24 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.4552 hrs
Peak Flow, Interpolated Output =   248.20 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED B
              CN   =   70
              Area =      95.760 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      4.2929 in
                      34.257 ac-ft

HYG Volume...         34.258 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .59514 hrs (ID: WATERSHED B)
Computational Incr, Tm =   .07935 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 =   182.31 cfs
Unit peak time      Tp =   .39676 hrs
Unit receding limb, Tr =  1.58703 hrs
Total unit time,    Tb =  1.98379 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED C Pre  1
Tc            = .5042 hrs
Drainage Area = 29.830 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .06722 hrs
Computed Peak Time             =  12.4358 hrs
Computed Peak Flow             =    11.10 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.4352 hrs
Peak Flow, Interpolated Output =    11.10 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED C
              CN   =   70
              Area =      29.830 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                       1.639 ac-ft

HYG Volume...          1.639 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .50415 hrs (ID: WATERSHED C)
Computational Incr, Tm =   .06722 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 =    67.04 cfs
Unit peak time      Tp =   .33610 hrs
Unit receding limb, Tr =  1.34441 hrs
Total unit time,    Tb =  1.68052 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED C Pre 10
Tc            = .5042 hrs
Drainage Area = 29.830 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .06722 hrs
Computed Peak Time             =  12.3686 hrs
Computed Peak Flow             =    46.64 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3702 hrs
Peak Flow, Interpolated Output =    46.61 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED C
              CN   =   70
              Area =      29.830 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                       6.002 ac-ft

HYG Volume...          6.002 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .50415 hrs (ID: WATERSHED C)
Computational Incr, Tm =   .06722 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 =    67.04 cfs
Unit peak time      Tp =   .33610 hrs
Unit receding limb, Tr =  1.34441 hrs
Total unit time,    Tb =  1.68052 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED C Pre100
Tc            = .5042 hrs
Drainage Area = 29.830 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .06722 hrs
Computed Peak Time             =  12.3686 hrs
Computed Peak Flow             =    83.91 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3702 hrs
Peak Flow, Interpolated Output =    83.83 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED C
              CN   =   70
              Area =      29.830 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      4.2929 in
                      10.671 ac-ft

HYG Volume...         10.672 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .50415 hrs (ID: WATERSHED C)
Computational Incr, Tm =   .06722 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 =    67.04 cfs
Unit peak time      Tp =   .33610 hrs
Unit receding limb, Tr =  1.34441 hrs
Total unit time,    Tb =  1.68052 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED D Pre  1
Tc            = .4294 hrs
Drainage Area = 9.420 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .05725 hrs
Computed Peak Time             =  12.3667 hrs
Computed Peak Flow             =     3.75 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3652 hrs
Peak Flow, Interpolated Output =     3.75 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED D
              CN   =   70
              Area =       9.420 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                        .518 ac-ft

HYG Volume...           .518 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .42940 hrs (ID: WATERSHED D)
Computational Incr, Tm =   .05725 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 =    24.86 cfs
Unit peak time      Tp =   .28627 hrs
Unit receding limb, Tr =  1.14507 hrs
Total unit time,    Tb =  1.43134 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED D Pre 10
Tc            = .4294 hrs
Drainage Area = 9.420 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .05725 hrs
Computed Peak Time             =  12.3095 hrs
Computed Peak Flow             =    15.74 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3102 hrs
Peak Flow, Interpolated Output =    15.73 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED D
              CN   =   70
              Area =       9.420 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                       1.895 ac-ft

HYG Volume...          1.895 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .42940 hrs (ID: WATERSHED D)
Computational Incr, Tm =   .05725 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 =    24.86 cfs
Unit peak time      Tp =   .28627 hrs
Unit receding limb, Tr =  1.14507 hrs
Total unit time,    Tb =  1.43134 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED D Pre100
Tc            = .4294 hrs
Drainage Area = 9.420 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .05725 hrs
Computed Peak Time             =  12.3095 hrs
Computed Peak Flow             =    28.34 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3102 hrs
Peak Flow, Interpolated Output =    28.33 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED D
              CN   =   70
              Area =       9.420 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      4.2929 in
                       3.370 ac-ft

HYG Volume...          3.370 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .42940 hrs (ID: WATERSHED D)
Computational Incr, Tm =   .05725 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 =    24.86 cfs
Unit peak time      Tp =   .28627 hrs
Unit receding limb, Tr =  1.14507 hrs
Total unit time,    Tb =  1.43134 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED E Pre  1
Tc            = .5139 hrs
Drainage Area = 11.730 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .06853 hrs
Computed Peak Time             =  12.4717 hrs
Computed Peak Flow             =     4.30 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.4702 hrs
Peak Flow, Interpolated Output =     4.30 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED E
              CN   =   70
              Area =      11.730 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                        .645 ac-ft

HYG Volume...           .645 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .51395 hrs (ID: WATERSHED E)
Computational Incr, Tm =   .06853 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 =    25.86 cfs
Unit peak time      Tp =   .34263 hrs
Unit receding limb, Tr =  1.37052 hrs
Total unit time,    Tb =  1.71315 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED E Pre 10
Tc            = .5139 hrs
Drainage Area = 11.730 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .06853 hrs
Computed Peak Time             =  12.4032 hrs
Computed Peak Flow             =    18.08 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.4002 hrs
Peak Flow, Interpolated Output =    18.07 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED E
              CN   =   70
              Area =      11.730 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                       2.360 ac-ft

HYG Volume...          2.360 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .51395 hrs (ID: WATERSHED E)
Computational Incr, Tm =   .06853 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 =    25.86 cfs
Unit peak time      Tp =   .34263 hrs
Unit receding limb, Tr =  1.37052 hrs
Total unit time,    Tb =  1.71315 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED E Pre100
Tc            = .5139 hrs
Drainage Area = 11.730 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .06853 hrs
Computed Peak Time             =  12.3347 hrs
Computed Peak Flow             =    32.43 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3352 hrs
Peak Flow, Interpolated Output =    32.43 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED E
              CN   =   70
              Area =      11.730 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      4.2929 in
                       4.196 ac-ft

HYG Volume...          4.196 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .51395 hrs (ID: WATERSHED E)
Computational Incr, Tm =   .06853 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 =    25.86 cfs
Unit peak time      Tp =   .34263 hrs
Unit receding limb, Tr =  1.37052 hrs
Total unit time,    Tb =  1.71315 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED F Pre  1
Tc            = .5352 hrs
Drainage Area = 14.290 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .07136 hrs
Computed Peak Time             =  12.4881 hrs
Computed Peak Flow             =     5.15 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.4852 hrs
Peak Flow, Interpolated Output =     5.15 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED F
              CN   =   70
              Area =      14.290 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                        .785 ac-ft

HYG Volume...           .785 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .53520 hrs (ID: WATERSHED F)
Computational Incr, Tm =   .07136 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 =    30.25 cfs
Unit peak time      Tp =   .35680 hrs
Unit receding limb, Tr =  1.42721 hrs
Total unit time,    Tb =  1.78401 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED F Pre 10
Tc            = .5352 hrs
Drainage Area = 14.290 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .07136 hrs
Computed Peak Time             =  12.4167 hrs
Computed Peak Flow             =    21.65 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.4152 hrs
Peak Flow, Interpolated Output =    21.65 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED F
              CN   =   70
              Area =      14.290 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                       2.875 ac-ft

HYG Volume...          2.875 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .53520 hrs (ID: WATERSHED F)
Computational Incr, Tm =   .07136 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 =    30.25 cfs
Unit peak time      Tp =   .35680 hrs
Unit receding limb, Tr =  1.42721 hrs
Total unit time,    Tb =  1.78401 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED F Pre100
Tc            = .5352 hrs
Drainage Area = 14.290 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .07136 hrs
Computed Peak Time             =  12.4167 hrs
Computed Peak Flow             =    38.78 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.4152 hrs
Peak Flow, Interpolated Output =    38.78 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED F
              CN   =   70
              Area =      14.290 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      4.2929 in
                       5.112 ac-ft

HYG Volume...          5.112 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .53520 hrs (ID: WATERSHED F)
Computational Incr, Tm =   .07136 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 =    30.25 cfs
Unit peak time      Tp =   .35680 hrs
Unit receding limb, Tr =  1.42721 hrs
Total unit time,    Tb =  1.78401 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED G Pre  1
Tc            = .4706 hrs
Drainage Area = 27.420 acres  Runoff CN= 71

============================================
Computational Time Increment   =   .06275 hrs
Computed Peak Time             =  12.4246 hrs
Computed Peak Flow             =    11.39 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.4202 hrs
Peak Flow, Interpolated Output =    11.39 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED G
              CN   =   71
              Area =      27.420 acres
              S    =   4.0845 in
              0.2S =    .8169 in

               Cumulative Runoff
              -------------------
                       .7036 in
                       1.608 ac-ft

HYG Volume...          1.608 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .47063 hrs (ID: WATERSHED G)
Computational Incr, Tm =   .06275 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 =    66.01 cfs
Unit peak time      Tp =   .31375 hrs
Unit receding limb, Tr =  1.25501 hrs
Total unit time,    Tb =  1.56876 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 10 year storm
              Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID = work_pad.hyg - WATERSHED G Pre 10
              Tc            = .4706 hrs
              Drainage Area = 27.420 acres  Runoff CN= 71

              ============================================
              Computational Time Increment   =   .06275 hrs
              Computed Peak Time             =  12.3619 hrs
              Computed Peak Flow             =    45.72 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.3602 hrs
              Peak Flow, Interpolated Output =    45.70 cfs
              ============================================

                               DRAINAGE AREA
                            -------------------
                            ID:WATERSHED G
                            CN   =   71
                            Area =      27.420 acres
                            S    =   4.0845 in
                            0.2S =    .8169 in

                             Cumulative Runoff
                            -------------------
                                    2.5014 in
                                     5.716 ac-ft

              HYG Volume...          5.716 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .47063 hrs (ID: WATERSHED G)
              Computational Incr, Tm =   .06275 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 =    66.01 cfs
              Unit peak time      Tp =   .31375 hrs
              Unit receding limb, Tr =  1.25501 hrs
              Total unit time,    Tb =  1.56876 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 100 year storm
              Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID = work_pad.hyg - WATERSHED G Pre100
              Tc            = .4706 hrs
              Drainage Area = 27.420 acres  Runoff CN= 71

              ============================================
              Computational Time Increment   =   .06275 hrs
              Computed Peak Time             =  12.3619 hrs
              Computed Peak Flow             =    80.96 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.3602 hrs
              Peak Flow, Interpolated Output =    80.96 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED G
                            CN   =   71
                            Area =      27.420 acres
                            S    =   4.0845 in
                            0.2S =    .8169 in

                             Cumulative Runoff
                            -------------------
                                    4.4060 in
                                    10.068 ac-ft

              HYG Volume...         10.068 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .47063 hrs (ID: WATERSHED G)
              Computational Incr, Tm =   .06275 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 =    66.01 cfs
              Unit peak time      Tp =   .31375 hrs
              Unit receding limb, Tr =  1.25501 hrs
              Total unit time,    Tb =  1.56876 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED H Pre  1
Tc            = .3262 hrs
Drainage Area = 52.680 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .04349 hrs
Computed Peak Time             =  12.2636 hrs
Computed Peak Flow             =    32.06 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2652 hrs
Peak Flow, Interpolated Output =    32.04 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED H
              CN   =   74
              Area =      52.680 acres
              S    =   3.5135 in
              0.2S =    .7027 in

               Cumulative Runoff
              -------------------
                       .8454 in
                       3.711 ac-ft

HYG Volume...          3.712 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .32616 hrs (ID: WATERSHED H)
Computational Incr, Tm =   .04349 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 =   183.01 cfs
Unit peak time      Tp =   .21744 hrs
Unit receding limb, Tr =   .86976 hrs
Total unit time,    Tb =  1.08720 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED H Pre 10
Tc            = .3262 hrs
Drainage Area = 52.680 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .04349 hrs
Computed Peak Time             =  12.2201 hrs
Computed Peak Flow             =   112.98 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2202 hrs
Peak Flow, Interpolated Output =   112.98 cfs
============================================

                  DRAINAGE AREA
              -------------------
              ID:WATERSHED H
              CN   =   74
              Area =      52.680 acres
              S    =   3.5135 in
              0.2S =    .7027 in

               Cumulative Runoff
              -------------------
                      2.7692 in
                      12.157 ac-ft

HYG Volume...         12.157 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .32616 hrs (ID: WATERSHED H)
Computational Incr, Tm =   .04349 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 =   183.01 cfs
Unit peak time      Tp =   .21744 hrs
Unit receding limb, Tr =   .86976 hrs
Total unit time,    Tb =  1.08720 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED H Pre100
Tc            = .3262 hrs
Drainage Area = 52.680 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .04349 hrs
Computed Peak Time             =  12.2201 hrs
Computed Peak Flow             =   194.48 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2202 hrs
Peak Flow, Interpolated Output =   194.47 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED H
              CN   =   74
              Area =      52.680 acres
              S    =   3.5135 in
              0.2S =    .7027 in

               Cumulative Runoff
              -------------------
                      4.7472 in
                      20.840 ac-ft

HYG Volume...         20.840 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .32616 hrs (ID: WATERSHED H)
Computational Incr, Tm =   .04349 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 =   183.01 cfs
Unit peak time      Tp =   .21744 hrs
Unit receding limb, Tr =   .86976 hrs
Total unit time,    Tb =  1.08720 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED I Pre  1
Tc            = .4351 hrs
Drainage Area = 16.590 acres  Runoff CN= 71

============================================
Computational Time Increment   =   .05801 hrs
Computed Peak Time             =  12.3567 hrs
Computed Peak Flow             =     7.15 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3602 hrs
Peak Flow, Interpolated Output =     7.15 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED I
              CN   =   71
              Area =      16.590 acres
              S    =   4.0845 in
              0.2S =    .8169 in

               Cumulative Runoff
              -------------------
                       .7036 in
                        .973 ac-ft

HYG Volume...           .973 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .43509 hrs (ID: WATERSHED I)
Computational Incr, Tm =   .05801 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 =    43.20 cfs
Unit peak time      Tp =   .29006 hrs
Unit receding limb, Tr =  1.16025 hrs
Total unit time,    Tb =  1.45031 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED I Pre 10
Tc            = .4351 hrs
Drainage Area = 16.590 acres  Runoff CN= 71

============================================
Computational Time Increment   =   .05801 hrs
Computed Peak Time             =  12.2987 hrs
Computed Peak Flow             =    28.55 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3002 hrs
Peak Flow, Interpolated Output =    28.54 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED I
              CN   =   71
              Area =      16.590 acres
              S    =   4.0845 in
              0.2S =    .8169 in

               Cumulative Runoff
              -------------------
                      2.5014 in
                       3.458 ac-ft

HYG Volume...          3.458 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .43509 hrs (ID: WATERSHED I)
Computational Incr, Tm =   .05801 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 =    43.20 cfs
Unit peak time      Tp =   .29006 hrs
Unit receding limb, Tr =  1.16025 hrs
Total unit time,    Tb =  1.45031 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID = work_pad.hyg - WATERSHED I Pre100
Tc            = .4351 hrs
Drainage Area = 16.590 acres  Runoff CN= 71

============================================
Computational Time Increment   =   .05801 hrs
Computed Peak Time             =  12.2987 hrs
Computed Peak Flow             =    50.92 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3002 hrs
Peak Flow, Interpolated Output =    50.89 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED I
              CN   =   71
              Area =      16.590 acres
              S    =   4.0845 in
              0.2S =    .8169 in

               Cumulative Runoff
              -------------------
                      4.4060 in
                       6.091 ac-ft

HYG Volume...          6.091 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .43509 hrs (ID: WATERSHED I)
Computational Incr, Tm =   .05801 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 =    43.20 cfs
Unit peak time      Tp =   .29006 hrs
Unit receding limb, Tr =  1.16025 hrs
Total unit time,    Tb =  1.45031 hrs
```

Name.... DEPRESS B

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
88.00	-----	.0014	.0000	.000	.000
90.00	-----	.0335	.0416	.028	.028
92.00	-----	.0612	.1400	.093	.121
94.00	-----	.0896	.2249	.150	.271
96.00	-----	.1217	.3157	.210	.481
98.00	-----	.1595	.4206	.280	.762
100.00	-----	.1992	.5370	.358	1.120
102.00	-----	.2426	.6617	.441	1.561
104.00	-----	.2900	.7978	.532	2.093

Name.... DEPRESS C

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
174.00	-----	.2223	.0000	.000	.000
176.00	-----	.5296	1.0950	.730	.730
178.00	-----	.6731	1.7998	1.200	1.930
182.00	-----	.9553	2.4302	3.240	5.170
186.00	-----	1.3278	3.4093	4.546	9.716
190.00	-----	1.9426	4.8765	6.502	16.218
192.00	-----	2.4355	6.5532	4.369	20.587

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
166.00	-----	.0005	.0000	.000	.000
168.00	-----	.0005	.0015	.001	.001
170.00	-----	.0013	.0026	.002	.003
172.00	-----	.0048	.0085	.006	.008
174.00	-----	.0298	.0465	.031	.039
176.00	-----	.0573	.1284	.086	.125
178.00	-----	.0938	.2245	.150	.275
180.00	-----	.1281	.3315	.221	.496

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 88.00 ft
Increment = .25 ft
Max. Elev.= 104.00 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
Weir-Rectangular	W1	--->	TW	102.000	104.000
Culvert-Circular	C1	--->	TW	88.000	104.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    102.00 ft
Weir Length       =     16.00 ft
Weir Coeff.       =  3.000000

Weir TW effects     (Use adjustment equation)
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C1
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    3.0000 ft
              Upstream Invert   =     88.00 ft
              Dnstream Invert   =     62.87 ft
              Horiz. Length     =    110.00 ft
              Barrel Length     =    112.83 ft
              Barrel Slope      =    .22845 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0130
              Ke                =     .2000  (forward entrance loss)
              Kb                =   .007228  (per ft of full flow)
              Kr                =     .2000  (reverse entrance loss)
              HW Convergence    =      .001  +/- ft

              INLET CONTROL DATA...
              Equation form     =         1
              Inlet Control K   =     .0045
              Inlet Control M   =    2.0000
              Inlet Control c   =    .03170
              Inlet Control Y   =     .6900
              T1 ratio (HW/D)   =      .981
              T2 ratio (HW/D)   =     1.083
              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 =     90.94 ft  --->  Flow =     42.85 cfs
 At T2 Elev =     91.25 ft  --->  Flow =     48.97 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    30
              Min. TW tolerance =    .10 ft
              Max. TW tolerance =    .10 ft
              Min. HW tolerance =    .10 ft
              Max. HW tolerance =    .10 ft
              Min.  Q tolerance =    .10 cfs
              Max.  Q tolerance =    .10 cfs
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
88.00	.00	Free Outfall		None contributing
88.25	.34	Free Outfall		C1
88.50	1.31	Free Outfall		C1
88.75	2.90	Free Outfall		C1
89.00	5.04	Free Outfall		C1
89.25	7.68	Free Outfall		C1
89.50	10.81	Free Outfall		C1
89.75	14.37	Free Outfall		C1
90.00	18.28	Free Outfall		C1
90.25	22.49	Free Outfall		C1
90.50	27.01	Free Outfall		C1
90.75	31.69	Free Outfall		C1
91.00	36.56	Free Outfall		C1
91.25	41.48	Free Outfall		C1
91.50	46.46	Free Outfall		C1
91.75	51.41	Free Outfall		C1
92.00	56.28	Free Outfall		C1
92.25	61.06	Free Outfall		C1
92.50	65.66	Free Outfall		C1
92.75	69.02	Free Outfall		C1
93.00	71.81	Free Outfall		C1
93.25	74.51	Free Outfall		C1
93.50	77.10	Free Outfall		C1
93.75	79.63	Free Outfall		C1
94.00	82.06	Free Outfall		C1
94.25	84.42	Free Outfall		C1
94.50	86.74	Free Outfall		C1
94.75	88.98	Free Outfall		C1
95.00	91.17	Free Outfall		C1
95.25	93.29	Free Outfall		C1
95.50	95.39	Free Outfall		C1
95.75	97.43	Free Outfall		C1
96.00	99.43	Free Outfall		C1
96.25	101.40	Free Outfall		C1
96.50	103.32	Free Outfall		C1
96.75	105.21	Free Outfall		C1
97.00	107.06	Free Outfall		C1
97.25	108.89	Free Outfall		C1

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
97.50	110.69	Free Outfall		C1
97.75	112.45	Free Outfall		C1
98.00	114.19	Free Outfall		C1
98.25	115.90	Free Outfall		C1
98.50	117.59	Free Outfall		C1
98.75	119.26	Free Outfall		C1
99.00	120.89	Free Outfall		C1
99.25	122.51	Free Outfall		C1
99.50	124.11	Free Outfall		C1
99.75	125.69	Free Outfall		C1
100.00	127.24	Free Outfall		C1
100.25	128.78	Free Outfall		C1
100.50	130.31	Free Outfall		C1
100.75	131.81	Free Outfall		C1
101.00	133.30	Free Outfall		C1
101.25	134.77	Free Outfall		C1
101.50	136.22	Free Outfall		C1
101.75	137.66	Free Outfall		C1
102.00	139.08	Free Outfall		W1 +C1
102.25	146.47	Free Outfall		W1 +C1
102.50	158.75	Free Outfall		W1 +C1
102.75	174.15	Free Outfall		W1 +C1
103.00	192.04	Free Outfall		W1 +C1
103.25	212.03	Free Outfall		W1 +C1
103.50	233.87	Free Outfall		W1 +C1
103.75	257.36	Free Outfall		W1 +C1
104.00	282.36	Free Outfall		W1 +C1

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 174.00 ft
Increment = .10 ft
Max. Elev.= 192.00 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
Weir-Rectangular	W1	--->	TW	191.000	192.000
Culvert-Circular	C1	--->	TW	175.170	192.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    191.00 ft
Weir Length       =     86.00 ft
Weir Coeff.       =  3.000000

Weir TW effects     (Use adjustment equation)
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = C1
Structure Type    = Culvert-Circular
------------------------------------
No. Barrels       =         1
Barrel Diameter   =    4.0000 ft
Upstream Invert   =    175.17 ft
Dnstream Invert   =    170.15 ft
Horiz. Length     =    150.00 ft
Barrel Length     =    150.08 ft
Barrel Slope      =    .03347 ft/ft

OUTLET CONTROL DATA...
Mannings n        =     .0160
Ke                =     .0000  (forward entrance loss)
Kb                =   .007461  (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)   =     1.144
T2 ratio (HW/D)   =     1.290
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 =    179.74 ft  --->  Flow =     87.96 cfs
At T2 Elev =    180.33 ft  --->  Flow =    100.53 cfs
```

```
Structure ID      = TW
Structure Type    = TW SETUP, DS Channel
------------------------------------
FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations=    30
Min. TW tolerance =    .10 ft
Max. TW tolerance =    .10 ft
Min. HW tolerance =    .10 ft
Max. HW tolerance =    .10 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
174.00	.00	Free Outfall		None contributing
174.10	.00	Free Outfall		None contributing
174.20	.00	Free Outfall		None contributing
174.30	.00	Free Outfall		None contributing
174.40	.00	Free Outfall		None contributing
174.50	.00	Free Outfall		None contributing
174.60	.00	Free Outfall		None contributing
174.70	.00	Free Outfall		None contributing
174.80	.00	Free Outfall		None contributing
174.90	.00	Free Outfall		None contributing
175.00	.00	Free Outfall		None contributing
175.10	.00	Free Outfall		None contributing
175.17	.00	Free Outfall		None contributing
175.20	.01	Free Outfall		C1
175.30	.12	Free Outfall		C1
175.40	.36	Free Outfall		C1
175.50	.74	Free Outfall		C1
175.60	1.25	Free Outfall		C1
175.70	1.89	Free Outfall		C1
175.80	2.66	Free Outfall		C1
175.90	3.54	Free Outfall		C1
176.00	4.56	Free Outfall		C1
176.10	5.69	Free Outfall		C1
176.20	6.92	Free Outfall		C1
176.30	8.28	Free Outfall		C1
176.40	9.76	Free Outfall		C1
176.50	11.32	Free Outfall		C1
176.60	13.02	Free Outfall		C1
176.70	14.81	Free Outfall		C1
176.80	16.67	Free Outfall		C1
176.90	18.67	Free Outfall		C1
177.00	20.71	Free Outfall		C1
177.10	22.91	Free Outfall		C1
177.20	25.15	Free Outfall		C1
177.30	27.51	Free Outfall		C1
177.40	29.90	Free Outfall		C1
177.50	32.39	Free Outfall		C1
177.60	34.76	Free Outfall		C1

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
177.70	37.10	Free Outfall		C1
177.80	39.48	Free Outfall		C1
177.90	41.91	Free Outfall		C1
178.00	44.35	Free Outfall		C1
178.10	46.83	Free Outfall		C1
178.20	49.30	Free Outfall		C1
178.30	51.78	Free Outfall		C1
178.40	54.31	Free Outfall		C1
178.50	56.84	Free Outfall		C1
178.60	59.37	Free Outfall		C1
178.70	61.89	Free Outfall		C1
178.80	64.42	Free Outfall		C1
178.90	66.95	Free Outfall		C1
179.00	69.43	Free Outfall		C1
179.10	71.95	Free Outfall		C1
179.20	74.48	Free Outfall		C1
179.30	76.96	Free Outfall		C1
179.40	79.49	Free Outfall		C1
179.50	81.97	Free Outfall		C1
179.60	84.45	Free Outfall		C1
179.70	86.88	Free Outfall		C1
179.80	89.16	Free Outfall		C1
179.90	91.31	Free Outfall		C1
180.00	93.45	Free Outfall		C1
180.10	95.60	Free Outfall		C1
180.20	97.74	Free Outfall		C1
180.30	99.88	Free Outfall		C1
180.40	101.90	Free Outfall		C1
180.50	103.81	Free Outfall		C1
180.60	105.71	Free Outfall		C1
180.70	107.57	Free Outfall		C1
180.80	109.41	Free Outfall		C1
180.90	111.20	Free Outfall		C1
181.00	112.96	Free Outfall		C1
181.10	114.73	Free Outfall		C1
181.20	116.44	Free Outfall		C1
181.30	118.11	Free Outfall		C1
181.40	119.78	Free Outfall		C1

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
181.50	121.45	Free Outfall		C1
181.60	123.07	Free Outfall		C1
181.70	124.67	Free Outfall		C1
181.80	126.24	Free Outfall		C1
181.90	127.79	Free Outfall		C1
182.00	129.34	Free Outfall		C1
182.10	130.87	Free Outfall		C1
182.20	132.37	Free Outfall		C1
182.30	133.87	Free Outfall		C1
182.40	135.35	Free Outfall		C1
182.50	136.80	Free Outfall		C1
182.60	138.24	Free Outfall		C1
182.70	139.67	Free Outfall		C1
182.80	141.10	Free Outfall		C1
182.90	142.48	Free Outfall		C1
183.00	143.86	Free Outfall		C1
183.10	145.24	Free Outfall		C1
183.20	146.60	Free Outfall		C1
183.30	147.96	Free Outfall		C1
183.40	149.30	Free Outfall		C1
183.50	150.61	Free Outfall		C1
183.60	151.92	Free Outfall		C1
183.70	153.21	Free Outfall		C1
183.80	154.52	Free Outfall		C1
183.90	155.78	Free Outfall		C1
184.00	157.05	Free Outfall		C1
184.10	158.31	Free Outfall		C1
184.20	159.57	Free Outfall		C1
184.30	160.79	Free Outfall		C1
184.40	162.03	Free Outfall		C1
184.50	163.25	Free Outfall		C1
184.60	164.46	Free Outfall		C1
184.70	165.65	Free Outfall		C1
184.80	166.85	Free Outfall		C1
184.90	168.04	Free Outfall		C1
185.00	169.21	Free Outfall		C1
185.10	170.39	Free Outfall		C1
185.20	171.54	Free Outfall		C1

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
185.30	172.70	Free Outfall		C1
185.40	173.85	Free Outfall		C1
185.50	174.98	Free Outfall		C1
185.60	176.12	Free Outfall		C1
185.70	177.24	Free Outfall		C1
185.80	178.35	Free Outfall		C1
185.90	179.46	Free Outfall		C1
186.00	180.55	Free Outfall		C1
186.10	181.65	Free Outfall		C1
186.20	182.75	Free Outfall		C1
186.30	183.82	Free Outfall		C1
186.40	184.89	Free Outfall		C1
186.50	185.97	Free Outfall		C1
186.60	187.04	Free Outfall		C1
186.70	188.09	Free Outfall		C1
186.80	189.14	Free Outfall		C1
186.90	190.19	Free Outfall		C1
187.00	191.24	Free Outfall		C1
187.10	192.26	Free Outfall		C1
187.20	193.29	Free Outfall		C1
187.30	194.31	Free Outfall		C1
187.40	195.34	Free Outfall		C1
187.50	196.35	Free Outfall		C1
187.60	197.36	Free Outfall		C1
187.70	198.36	Free Outfall		C1
187.80	199.37	Free Outfall		C1
187.90	200.34	Free Outfall		C1
188.00	201.34	Free Outfall		C1
188.10	202.32	Free Outfall		C1
188.20	203.30	Free Outfall		C1
188.30	204.28	Free Outfall		C1
188.40	205.24	Free Outfall		C1
188.50	206.21	Free Outfall		C1
188.60	207.16	Free Outfall		C1
188.70	208.12	Free Outfall		C1
188.80	209.07	Free Outfall		C1
188.90	210.02	Free Outfall		C1
189.00	210.96	Free Outfall		C1

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
189.10	211.91	Free Outfall		C1
189.20	212.84	Free Outfall		C1
189.30	213.77	Free Outfall		C1
189.40	214.70	Free Outfall		C1
189.50	215.61	Free Outfall		C1
189.60	216.53	Free Outfall		C1
189.70	217.44	Free Outfall		C1
189.80	218.36	Free Outfall		C1
189.90	219.26	Free Outfall		C1
190.00	220.17	Free Outfall		C1
190.10	221.06	Free Outfall		C1
190.20	221.97	Free Outfall		C1
190.30	222.85	Free Outfall		C1
190.40	223.73	Free Outfall		C1
190.50	224.63	Free Outfall		C1
190.60	225.51	Free Outfall		C1
190.70	226.38	Free Outfall		C1
190.80	227.26	Free Outfall		C1
190.90	228.13	Free Outfall		C1
191.00	229.00	Free Outfall		W1 +C1
191.10	238.02	Free Outfall		W1 +C1
191.20	253.78	Free Outfall		W1 +C1
191.30	273.94	Free Outfall		W1 +C1
191.40	297.64	Free Outfall		W1 +C1
191.50	324.40	Free Outfall		W1 +C1
191.60	353.88	Free Outfall		W1 +C1
191.70	385.84	Free Outfall		W1 +C1
191.80	420.09	Free Outfall		W1 +C1
191.90	456.49	Free Outfall		W1 +C1
192.00	494.90	Free Outfall		W1 +C1

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.=   166.00 ft
Increment =   .25 ft
Max. Elev.=   180.00 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
Weir-Rectangular	W1	--->	TW	178.000	180.000
Culvert-Circular	C1	--->	TW	167.870	180.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    178.00 ft
Weir Length       =     16.00 ft
Weir Coeff.       =  3.000000

Weir TW effects     (Use adjustment equation)
```

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```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C1
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    2.1667 ft
              Upstream Invert   =    167.87 ft
              Dnstream Invert   =    164.08 ft
              Horiz. Length     =     64.00 ft
              Barrel Length     =     64.11 ft
              Barrel Slope      =    .05922 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0130
              Ke                =     .2000  (forward entrance loss)
              Kb                =   .011155  (per ft of full flow)
              Kr                =     .2000  (reverse entrance loss)
              HW Convergence    =      .001  +/- ft

              INLET CONTROL DATA...
              Equation form     =         1
              Inlet Control K   =     .0045
              Inlet Control M   =    2.0000
              Inlet Control c   =    .03170
              Inlet Control Y   =     .6900
              T1 ratio (HW/D)   =     1.066
              T2 ratio (HW/D)   =     1.168
              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 =    170.18 ft  --->  Flow =     18.99 cfs
 At T2 Elev =    170.40 ft  --->  Flow =     21.71 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    30
              Min. TW tolerance =    .10 ft
              Max. TW tolerance =    .10 ft
              Min. HW tolerance =    .10 ft
              Max. HW tolerance =    .10 ft
              Min.  Q tolerance =    .50 cfs
              Max.  Q tolerance =    .50 cfs
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
166.00	.00	Free Outfall		None contributing
166.25	.00	Free Outfall		None contributing
166.50	.00	Free Outfall		None contributing
166.75	.00	Free Outfall		None contributing
167.00	.00	Free Outfall		None contributing
167.25	.00	Free Outfall		None contributing
167.50	.00	Free Outfall		None contributing
167.75	.00	Free Outfall		None contributing
167.87	.00	Free Outfall		None contributing
168.00	.08	Free Outfall		C1
168.25	.64	Free Outfall		C1
168.50	1.72	Free Outfall		C1
168.75	3.25	Free Outfall		C1
169.00	5.18	Free Outfall		C1
169.25	7.47	Free Outfall		C1
169.50	10.03	Free Outfall		C1
169.75	12.82	Free Outfall		C1
170.00	15.76	Free Outfall		C1
170.25	18.80	Free Outfall		C1
170.50	21.83	Free Outfall		C1
170.75	24.85	Free Outfall		C1
171.00	26.99	Free Outfall		C1
171.25	28.91	Free Outfall		C1
171.50	30.71	Free Outfall		C1
171.75	32.41	Free Outfall		C1
172.00	34.02	Free Outfall		C1
172.25	35.56	Free Outfall		C1
172.50	37.04	Free Outfall		C1
172.75	38.46	Free Outfall		C1
173.00	39.83	Free Outfall		C1
173.25	41.15	Free Outfall		C1
173.50	42.44	Free Outfall		C1
173.75	43.68	Free Outfall		C1
174.00	44.89	Free Outfall		C1
174.25	46.07	Free Outfall		C1
174.50	47.22	Free Outfall		C1
174.75	48.34	Free Outfall		C1
175.00	49.44	Free Outfall		C1

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
175.25	50.51	Free Outfall		C1
175.50	51.56	Free Outfall		C1
175.75	52.59	Free Outfall		C1
176.00	53.60	Free Outfall		C1
176.25	54.59	Free Outfall		C1
176.50	55.56	Free Outfall		C1
176.75	56.52	Free Outfall		C1
177.00	57.46	Free Outfall		C1
177.25	58.39	Free Outfall		C1
177.50	59.29	Free Outfall		C1
177.75	60.19	Free Outfall		C1
178.00	61.08	Free Outfall		W1 +C1
178.25	67.93	Free Outfall		W1 +C1
178.50	79.68	Free Outfall		W1 +C1
178.75	94.54	Free Outfall		W1 +C1
179.00	111.89	Free Outfall		W1 +C1
179.25	131.35	Free Outfall		W1 +C1
179.50	152.67	Free Outfall		W1 +C1
179.75	175.63	Free Outfall		W1 +C1
180.00	200.11	Free Outfall		W1 +C1

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS B IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS B OUT Pre 1

Pond Node Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 88.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
88.00	.00	.000	.0014	.00	.00	.00
88.25	.34	.001	.0030	.00	.34	2.93
88.50	1.31	.002	.0054	.00	1.31	8.92
88.75	2.90	.003	.0084	.00	2.90	18.77
89.00	5.04	.006	.0121	.00	5.04	33.22
89.25	7.68	.009	.0164	.00	7.68	53.04
89.50	10.81	.014	.0214	.00	10.81	79.01
89.75	14.37	.020	.0271	.00	14.37	111.87
90.00	18.28	.028	.0335	.00	18.28	152.37
90.25	22.49	.036	.0365	.00	22.49	198.90
90.50	27.01	.046	.0396	.00	27.01	249.45
90.75	31.69	.056	.0429	.00	31.69	304.06
91.00	36.56	.067	.0463	.00	36.56	362.89
91.25	41.48	.079	.0499	.00	41.48	425.99
91.50	46.46	.092	.0535	.00	46.46	493.50
91.75	51.41	.106	.0573	.00	51.41	565.50
92.00	56.28	.121	.0612	.00	56.28	642.09
92.25	61.06	.137	.0645	.00	61.06	722.94
92.50	65.66	.153	.0678	.00	65.66	807.59
92.75	69.02	.171	.0713	.00	69.02	895.09

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS B IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS B OUT Pre 1

Pond Node Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 88.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
93.00	71.81	.189	.0748	.00	71.81	986.20
93.25	74.51	.208	.0783	.00	74.51	1081.50
93.50	77.10	.228	.0820	.00	77.10	1181.10
93.75	79.63	.249	.0858	.00	79.63	1285.12
94.00	82.06	.271	.0896	.00	82.06	1393.64
94.25	84.42	.294	.0933	.00	84.42	1506.68
94.50	86.74	.318	.0972	.00	86.74	1624.24
94.75	88.98	.342	.1011	.00	88.98	1746.41
95.00	91.17	.368	.1050	.00	91.17	1873.30
95.25	93.29	.395	.1091	.00	93.29	2004.97
95.50	95.39	.423	.1132	.00	95.39	2141.57
95.75	97.43	.452	.1174	.00	97.43	2283.15
96.00	99.43	.481	.1217	.00	99.43	2429.83
96.25	101.40	.512	.1262	.00	101.40	2581.75
96.50	103.32	.545	.1307	.00	103.32	2739.06
96.75	105.21	.578	.1353	.00	105.21	2901.87
97.00	107.06	.612	.1400	.00	107.06	3070.26
97.25	108.89	.648	.1447	.00	108.89	3244.34
97.50	110.69	.685	.1496	.00	110.69	3424.21
97.75	112.45	.723	.1545	.00	112.45	3609.96

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS B IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS B OUT Pre 1

Pond Node Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 88.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
98.00	114.19	.762	.1595	.00	114.19	3801.69
98.25	115.90	.802	.1642	.00	115.90	3999.27
98.50	117.59	.844	.1690	.00	117.59	4202.59
98.75	119.26	.887	.1739	.00	119.26	4411.73
99.00	120.89	.931	.1788	.00	120.89	4626.75
99.25	122.51	.976	.1838	.00	122.51	4847.76
99.50	124.11	1.023	.1889	.00	124.11	5074.84
99.75	125.69	1.071	.1940	.00	125.69	5308.07
100.00	127.24	1.120	.1992	.00	127.24	5547.52
100.25	128.78	1.170	.2044	.00	128.78	5793.25
100.50	130.31	1.222	.2097	.00	130.31	6045.28
100.75	131.81	1.275	.2150	.00	131.81	6303.70
101.00	133.30	1.330	.2204	.00	133.30	6568.58
101.25	134.77	1.385	.2258	.00	134.77	6840.00
101.50	136.22	1.443	.2314	.00	136.22	7118.05
101.75	137.66	1.501	.2370	.00	137.66	7402.81
102.00	139.08	1.561	.2426	.00	139.08	7694.36
102.25	146.47	1.622	.2483	.00	146.47	7998.74
102.50	158.75	1.685	.2541	.00	158.75	8314.93
102.75	174.15	1.749	.2599	.00	174.15	8641.25

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS B IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS B OUT Pre 1

Pond Node Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 88.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
103.00	192.04	1.815	.2658	.00	192.04	8977.14
103.25	212.03	1.882	.2717	.00	212.03	9322.30
103.50	233.87	1.951	.2777	.00	233.87	9676.54
103.75	257.36	2.021	.2838	.00	257.36	10039.76
104.00	282.36	2.093	.2900	.00	282.36	10411.90

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = work_pad.hyg - DEPRESS B    IN  Pre  1
 Outflow HYG file = work_pad.hyg - DEPRESS B    OUT Pre  1

 Pond Node   Data = DEPRESS B
 Pond Volume Data = DEPRESS B
 Pond Outlet Data = DEPRESS B OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    88.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     32.85 cfs    at   12.5300 hrs
 Peak Outflow      =     32.80 cfs    at   12.5400 hrs
 -----------------------------------------------------
 Peak Elevation    =     90.81 ft
 Peak Storage =           .059 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       5.262
- Infiltration =        .000
- HYG Vol OUT  =       5.262
- Retained Vol =        .000
                ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = work_pad.hyg - DEPRESS B    IN  Pre  1
Outflow HYG file = work_pad.hyg - DEPRESS B    OUT Pre  1

Pond Node   Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.5400 hrs
Tp, Total Inflow        =   12.5300 hrs
Peak to Peak            =     .0100 hrs
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = work_pad.hyg - DEPRESS B    IN  Pre 10
 Outflow HYG file = work_pad.hyg - DEPRESS B    OUT Pre 10

 Pond Node   Data = DEPRESS B
 Pond Volume Data = DEPRESS B
 Pond Outlet Data = DEPRESS B OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    88.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =    138.44 cfs    at   12.4550 hrs
 Peak Outflow      =    120.98 cfs    at   12.6100 hrs
 -----------------------------------------------------
 Peak Elevation    =     99.01 ft
 Peak Storage =           .934 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      19.266
- Infiltration =        .000
- HYG Vol OUT  =      19.266
- Retained Vol =        .000
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = work_pad.hyg - DEPRESS B    IN  Pre 10
Outflow HYG file = work_pad.hyg - DEPRESS B    OUT Pre 10

Pond Node   Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.6100 hrs
Tp, Total Inflow        =   12.4550 hrs
Peak to Peak            =     .1550 hrs
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = work_pad.hyg - DEPRESS B    IN  Pre100
 Outflow HYG file = work_pad.hyg - DEPRESS B    OUT Pre100

 Pond Node   Data = DEPRESS B
 Pond Volume Data = DEPRESS B
 Pond Outlet Data = DEPRESS B OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    88.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =    248.20 cfs    at   12.4550 hrs
 Peak Outflow      =    244.95 cfs    at   12.4750 hrs
 -----------------------------------------------------
 Peak Elevation    =    103.62 ft
 Peak Storage =          1.984 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      34.258
- Infiltration =        .000
- HYG Vol OUT  =      34.258
- Retained Vol =        .000
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = work_pad.hyg - DEPRESS B    IN  Pre100
Outflow HYG file = work_pad.hyg - DEPRESS B    OUT Pre100

Pond Node   Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.4750 hrs
Tp, Total Inflow        =   12.4550 hrs
Peak to Peak            =     .0200 hrs
---------------------------------------
```

Name.... DEPRESS C
File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C OUT Pre 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
174.00	.00	.000	.2223	.00	.00	.00
174.10	.00	.023	.2345	.00	.00	110.55
174.20	.00	.047	.2471	.00	.00	227.08
174.30	.00	.072	.2600	.00	.00	349.80
174.40	.00	.099	.2732	.00	.00	478.82
174.50	.00	.127	.2868	.00	.00	614.35
174.60	.00	.156	.3007	.00	.00	756.52
174.70	.00	.187	.3149	.00	.00	905.46
174.80	.00	.219	.3295	.00	.00	1061.39
174.90	.00	.253	.3443	.00	.00	1224.42
175.00	.00	.288	.3595	.00	.00	1394.75
175.10	.00	.325	.3751	.00	.00	1572.51
175.17	.00	.352	.3861	.00	.00	1701.44
175.20	.01	.363	.3909	.00	.01	1757.85
175.30	.12	.403	.4071	.00	.12	1951.08
175.40	.36	.445	.4236	.00	.36	2152.32
175.50	.74	.488	.4405	.00	.74	2361.80
175.60	1.25	.533	.4576	.00	1.25	2579.65
175.70	1.89	.579	.4751	.00	1.89	2805.98
175.80	2.66	.628	.4930	.00	2.66	3041.03

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C OUT Pre 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
175.90	3.54	.678	.5111	.00	3.54	3284.85
176.00	4.56	.730	.5296	.00	4.56	3537.72
176.10	5.69	.783	.5364	.00	5.69	3796.82
176.20	6.92	.837	.5432	.00	6.92	4059.28
176.30	8.28	.892	.5500	.00	8.28	4325.20
176.40	9.76	.947	.5569	.00	9.76	4594.54
176.50	11.32	1.003	.5639	.00	11.32	4867.34
176.60	13.02	1.060	.5708	.00	13.02	5143.65
176.70	14.81	1.117	.5779	.00	14.81	5423.40
176.80	16.67	1.176	.5849	.00	16.67	5706.67
176.90	18.67	1.234	.5920	.00	18.67	5993.48
177.00	20.71	1.294	.5992	.00	20.71	6283.82
177.10	22.91	1.354	.6064	.00	22.91	6577.80
177.20	25.15	1.415	.6136	.00	25.15	6875.25
177.30	27.51	1.477	.6209	.00	27.51	7176.39
177.40	29.90	1.539	.6283	.00	29.90	7481.06
177.50	32.39	1.603	.6356	.00	32.39	7789.43
177.60	34.76	1.667	.6430	.00	34.76	8101.25
177.70	37.10	1.731	.6505	.00	37.10	8416.59
177.80	39.48	1.797	.6580	.00	39.48	8735.65

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C OUT Pre 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
177.90	41.91	1.863	.6655	.00	41.91	9058.34
178.00	44.35	1.930	.6731	.00	44.35	9384.74
178.10	46.83	1.997	.6796	.00	46.83	9714.59
178.20	49.30	2.066	.6861	.00	49.30	10047.52
178.30	51.78	2.135	.6926	.00	51.78	10383.65
178.40	54.31	2.204	.6991	.00	54.31	10722.93
178.50	56.84	2.275	.7057	.00	56.84	11065.44
178.60	59.37	2.345	.7123	.00	59.37	11411.14
178.70	61.89	2.417	.7189	.00	61.89	11759.99
178.80	64.42	2.489	.7256	.00	64.42	12112.12
178.90	66.95	2.562	.7323	.00	66.95	12467.43
179.00	69.43	2.636	.7390	.00	69.43	12825.99
179.10	71.95	2.710	.7458	.00	71.95	13187.87
179.20	74.48	2.785	.7526	.00	74.48	13552.97
179.30	76.96	2.860	.7594	.00	76.96	13921.37
179.40	79.49	2.937	.7663	.00	79.49	14293.08
179.50	81.97	3.014	.7731	.00	81.97	14668.12
179.60	84.45	3.091	.7801	.00	84.45	15046.50
179.70	86.88	3.170	.7870	.00	86.88	15428.12
179.80	89.16	3.249	.7940	.00	89.16	15813.03

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C OUT Pre 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
179.90	91.31	3.328	.8010	.00	91.31	16201.12
180.00	93.45	3.409	.8080	.00	93.45	16592.67
180.10	95.60	3.490	.8151	.00	95.60	16987.63
180.20	97.74	3.572	.8222	.00	97.74	17385.96
180.30	99.88	3.655	.8293	.00	99.88	17787.80
180.40	101.90	3.738	.8365	.00	101.90	18192.91
180.50	103.81	3.822	.8437	.00	103.81	18601.44
180.60	105.71	3.907	.8509	.00	105.71	19013.46
180.70	107.57	3.992	.8582	.00	107.57	19428.88
180.80	109.41	4.078	.8654	.00	109.41	19847.85
180.90	111.20	4.165	.8728	.00	111.20	20270.24
181.00	112.96	4.253	.8801	.00	112.96	20696.22
181.10	114.73	4.341	.8875	.00	114.73	21125.77
181.20	116.44	4.430	.8949	.00	116.44	21558.78
181.30	118.11	4.520	.9023	.00	118.11	21995.40
181.40	119.78	4.611	.9098	.00	119.78	22435.56
181.50	121.45	4.702	.9173	.00	121.45	22879.41
181.60	123.07	4.794	.9248	.00	123.07	23326.85
181.70	124.67	4.887	.9324	.00	124.67	23777.85
181.80	126.24	4.981	.9400	.00	126.24	24232.57

Name.... DEPRESS C
File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C OUT Pre 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
181.90	127.79	5.075	.9476	.00	127.79	24690.87
182.00	129.34	5.170	.9553	.00	129.34	25152.94
182.10	130.87	5.266	.9638	.00	130.87	25618.91
182.20	132.37	5.363	.9724	.00	132.37	26088.94
182.30	133.87	5.461	.9811	.00	133.87	26563.21
182.40	135.35	5.559	.9898	.00	135.35	27041.59
182.50	136.80	5.659	.9985	.00	136.80	27524.23
182.60	138.24	5.759	1.0072	.00	138.24	28011.07
182.70	139.67	5.860	1.0160	.00	139.67	28502.09
182.80	141.10	5.962	1.0249	.00	141.10	28997.45
182.90	142.48	6.065	1.0337	.00	142.48	29496.97
183.00	143.86	6.169	1.0427	.00	143.86	30000.87
183.10	145.24	6.274	1.0516	.00	145.24	30509.10
183.20	146.60	6.379	1.0606	.00	146.60	31021.56
183.30	147.96	6.486	1.0696	.00	147.96	31538.47
183.40	149.30	6.593	1.0787	.00	149.30	32059.64
183.50	150.61	6.701	1.0878	.00	150.61	32585.28
183.60	151.92	6.811	1.0969	.00	151.92	33115.32
183.70	153.21	6.921	1.1061	.00	153.21	33649.70
183.80	154.52	7.032	1.1153	.00	154.52	34188.64

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C   IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C   OUT Pre 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
183.90	155.78	7.144	1.1246	.00	155.78	34731.91
184.00	157.05	7.257	1.1339	.00	157.05	35279.76
184.10	158.31	7.371	1.1432	.00	158.31	35832.11
184.20	159.57	7.485	1.1526	.00	159.57	36388.91
184.30	160.79	7.601	1.1620	.00	160.79	36950.29
184.40	162.03	7.718	1.1715	.00	162.03	37516.18
184.50	163.25	7.835	1.1809	.00	163.25	38086.70
184.60	164.46	7.954	1.1905	.00	164.46	38661.83
184.70	165.65	8.074	1.2000	.00	165.65	39241.46
184.80	166.85	8.194	1.2096	.00	166.85	39825.82
184.90	168.04	8.315	1.2193	.00	168.04	40414.75
185.00	169.21	8.438	1.2289	.00	169.21	41008.42
185.10	170.39	8.561	1.2387	.00	170.39	41606.80
185.20	171.54	8.686	1.2484	.00	171.54	42209.77
185.30	172.70	8.811	1.2582	.00	172.70	42817.56
185.40	173.85	8.937	1.2680	.00	173.85	43430.00
185.50	174.98	9.065	1.2779	.00	174.98	44047.28
185.60	176.12	9.193	1.2878	.00	176.12	44669.36
185.70	177.24	9.322	1.2978	.00	177.24	45296.13
185.80	178.35	9.452	1.3077	.00	178.35	45927.80

Name.... DEPRESS C
File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\PREDEV-REV.PPW

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C OUT Pre 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
185.90	179.46	9.584	1.3178	.00	179.46	46564.22
186.00	180.55	9.716	1.3278	.00	180.55	47205.59
186.10	181.65	9.849	1.3418	.00	181.65	47852.77
186.20	182.75	9.984	1.3558	.00	182.75	48506.61
186.30	183.82	10.121	1.3699	.00	183.82	49167.33
186.40	184.89	10.258	1.3840	.00	184.89	49834.79
186.50	185.97	10.397	1.3983	.00	185.97	50509.23
186.60	187.04	10.538	1.4126	.00	187.04	51190.57
186.70	188.09	10.680	1.4270	.00	188.09	51878.74
186.80	189.14	10.823	1.4414	.00	189.14	52573.98
186.90	190.19	10.968	1.4560	.00	190.19	53276.15
187.00	191.24	11.115	1.4706	.00	191.24	53985.46
187.10	192.26	11.262	1.4853	.00	192.26	54701.84
187.20	193.29	11.412	1.5000	.00	193.29	55425.23
187.30	194.31	11.562	1.5148	.00	194.31	56155.89
187.40	195.34	11.715	1.5297	.00	195.34	56893.62
187.50	196.35	11.868	1.5447	.00	196.35	57638.69
187.60	197.36	12.023	1.5597	.00	197.36	58391.02
187.70	198.36	12.180	1.5748	.00	198.36	59150.51
187.80	199.37	12.338	1.5900	.00	199.37	59917.46

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C OUT Pre 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	174.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
187.90	200.34	12.498	1.6053	.00	200.34	60691.63
188.00	201.34	12.660	1.6206	.00	201.34	61473.35
188.10	202.32	12.822	1.6360	.00	202.32	62262.48
188.20	203.30	12.987	1.6515	.00	203.30	63058.98
188.30	204.28	13.153	1.6671	.00	204.28	63863.09
188.40	205.24	13.320	1.6827	.00	205.24	64674.62
188.50	206.21	13.489	1.6984	.00	206.21	65493.85
188.60	207.16	13.660	1.7142	.00	207.16	66320.69
188.70	208.12	13.832	1.7300	.00	208.12	67155.05
188.80	209.07	14.006	1.7459	.00	209.07	67997.22
188.90	210.02	14.181	1.7619	.00	210.02	68846.98
189.00	210.96	14.358	1.7780	.00	210.96	69704.62
189.10	211.91	14.537	1.7941	.00	211.91	70570.05
189.20	212.84	14.717	1.8103	.00	212.84	71443.16
189.30	213.77	14.899	1.8266	.00	213.77	72324.27
189.40	214.70	15.082	1.8429	.00	214.70	73213.13
189.50	215.61	15.267	1.8594	.00	215.61	74110.06
189.60	216.53	15.454	1.8759	.00	216.53	75014.95
189.70	217.44	15.643	1.8924	.00	217.44	75927.70
189.80	218.36	15.833	1.9091	.00	218.36	76848.65

LEVEL POOL ROUTING DATA

HYG Dir   = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C   IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C   OUT Pre 1

Pond Node   Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   174.00 ft
Starting Volume   =   .000 ac-ft
Starting Outflow   =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
189.90	219.26	16.024	1.9258	.00	219.26	77777.49
190.00	220.17	16.218	1.9426	.00	220.17	78714.60
190.10	221.06	16.413	1.9659	.00	221.06	79661.41
190.20	221.97	16.611	1.9894	.00	221.97	80619.40
190.30	222.85	16.811	2.0130	.00	222.85	81588.90
190.40	223.73	17.014	2.0367	.00	223.73	82569.71
190.50	224.63	17.219	2.0606	.00	224.63	83562.20
190.60	225.51	17.426	2.0846	.00	225.51	84566.27
190.70	226.38	17.635	2.1088	.00	226.38	85581.84
190.80	227.26	17.848	2.1331	.00	227.26	86609.30
190.90	228.13	18.062	2.1575	.00	228.13	87648.38
191.00	229.00	18.279	2.1821	.00	229.00	88699.48
191.10	238.02	18.498	2.2068	.00	238.02	89770.66
191.20	253.78	18.720	2.2316	.00	253.78	90860.42
191.30	273.94	18.945	2.2566	.00	273.94	91966.80
191.40	297.64	19.172	2.2818	.00	297.64	93088.69
191.50	324.40	19.401	2.3070	.00	324.40	94226.00
191.60	353.88	19.633	2.3324	.00	353.88	95378.29
191.70	385.84	19.868	2.3580	.00	385.84	96545.21
191.80	420.09	20.105	2.3837	.00	420.09	97727.02

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS C IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS C OUT Pre 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
191.90	456.49	20.344	2.4095	.00	456.49	98923.25
192.00	494.90	20.587	2.4355	.00	494.90	100134.20

```
                      LEVEL POOL ROUTING SUMMARY

    HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
    Inflow  HYG file = work_pad.hyg - DEPRESS C    IN  Pre  1
    Outflow HYG file = work_pad.hyg - DEPRESS C    OUT Pre  1

    Pond Node   Data = DEPRESS C
    Pond Volume Data = DEPRESS C
    Pond Outlet Data = DEPRESS C OUT

    No Infiltration

    INITIAL CONDITIONS
    ----------------------------------
    Starting WS Elev   =   174.00 ft
    Starting Volume    =     .000 ac-ft
    Starting Outflow   =      .00 cfs
    Starting Infiltr.  =      .00 cfs
    Starting Total Qout=      .00 cfs
    Time Increment     =    .0050 hrs


    INFLOW/OUTFLOW HYDROGRAPH SUMMARY
    =====================================================
    Peak Inflow       =     11.10 cfs    at   12.4350 hrs
    Peak Outflow      =      2.81 cfs    at   13.4400 hrs
    -----------------------------------------------------
    Peak Elevation    =    175.82 ft
    Peak Storage =           .636 ac-ft
    =====================================================


    MASS BALANCE (ac-ft)
    --------------------------
  + Initial Vol  =        .000
  + HYG Vol IN   =       1.639
  - Infiltration =        .000
  - HYG Vol OUT  =       1.210
  - Retained Vol =        .429
                    ----------
    Unrouted Vol =       -.000 ac-ft  (.012% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = work_pad.hyg - DEPRESS C    IN  Pre  1
Outflow HYG file = work_pad.hyg - DEPRESS C    OUT Pre  1

Pond Node   Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   13.4850 hrs
Tp, Total Inflow        =   12.4350 hrs
Peak to Peak            =    1.0500 hrs
---------------------------------------
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = work_pad.hyg - DEPRESS C    IN  Pre 10
Outflow HYG file = work_pad.hyg - DEPRESS C    OUT Pre 10

Pond Node   Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS
---------------------------------
Starting WS Elev   =   174.00 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     46.61 cfs    at   12.3700 hrs
Peak Outflow      =     31.37 cfs    at   12.6650 hrs
-----------------------------------------------------
Peak Elevation    =    177.46 ft
Peak Storage =          1.577 ac-ft
=====================================================


  MASS BALANCE (ac-ft)
  -------------------------
+ Initial Vol  =       .000
+ HYG Vol IN   =      6.002
- Infiltration =       .000
- HYG Vol OUT  =      5.541
- Retained Vol =       .461
                 ----------
  Unrouted Vol =      -.000 ac-ft  (.003% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = work_pad.hyg - DEPRESS C    IN  Pre 10
Outflow HYG file = work_pad.hyg - DEPRESS C    OUT Pre 10

Pond Node   Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.6700 hrs
Tp, Total Inflow        =   12.3700 hrs
Peak to Peak            =     .3000 hrs
---------------------------------------
```

```
                      LEVEL POOL ROUTING SUMMARY

 HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = work_pad.hyg - DEPRESS C    IN  Pre100
 Outflow HYG file = work_pad.hyg - DEPRESS C    OUT Pre100

 Pond Node   Data = DEPRESS C
 Pond Volume Data = DEPRESS C
 Pond Outlet Data = DEPRESS C OUT

 No Infiltration

 INITIAL CONDITIONS
 ---------------------------------
 Starting WS Elev   =   174.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 ====================================================
 Peak Inflow       =     83.83 cfs    at   12.3700 hrs
 Peak Outflow      =     61.40 cfs    at   12.6100 hrs
 ----------------------------------------------------
 Peak Elevation    =    178.68 ft
 Peak Storage =          2.403 ac-ft
 ====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      10.672
- Infiltration =        .000
- HYG Vol OUT  =      10.194
- Retained Vol =        .478
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.001% of Inflow Volume)
```

```
                      DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = work_pad.hyg - DEPRESS C    IN  Pre100
 Outflow HYG file = work_pad.hyg - DEPRESS C    OUT Pre100

 Pond Node   Data = DEPRESS C
 Pond Volume Data = DEPRESS C
 Pond Outlet Data = DEPRESS C OUT

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   12.6100 hrs
 Tp, Total Inflow        =   12.3700 hrs
 Peak to Peak            =     .2400 hrs
 ---------------------------------------
```

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS H   IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS H   OUT Pre 1

Pond Node Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS H OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	166.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
166.00	.00	.000	.0005	.00	.00	.00
166.25	.00	.000	.0005	.00	.00	.61
166.50	.00	.000	.0005	.00	.00	1.21
166.75	.00	.000	.0005	.00	.00	1.82
167.00	.00	.001	.0005	.00	.00	2.42
167.25	.00	.001	.0005	.00	.00	3.03
167.50	.00	.001	.0005	.00	.00	3.63
167.75	.00	.001	.0005	.00	.00	4.24
167.87	.00	.001	.0005	.00	.00	4.53
168.00	.08	.001	.0005	.00	.08	4.92
168.25	.64	.001	.0006	.00	.64	6.14
168.50	1.72	.001	.0007	.00	1.72	7.96
168.75	3.25	.001	.0007	.00	3.25	10.34
169.00	5.18	.002	.0008	.00	5.18	13.24
169.25	7.47	.002	.0009	.00	7.47	16.61
169.50	10.03	.002	.0010	.00	10.03	20.37
169.75	12.82	.002	.0012	.00	12.82	24.50
170.00	15.76	.003	.0013	.00	15.76	28.91
170.25	18.80	.003	.0016	.00	18.80	33.68
170.50	21.83	.004	.0019	.00	21.83	38.85

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS H IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS H OUT Pre 1

Pond Node Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS H OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 166.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
170.75	24.85	.004	.0023	.00	24.85	44.46
171.00	26.99	.005	.0028	.00	26.99	49.67
171.25	28.91	.005	.0032	.00	28.91	55.19
171.50	30.71	.006	.0037	.00	30.71	61.18
171.75	32.41	.007	.0042	.00	32.41	67.68
172.00	34.02	.008	.0048	.00	34.02	74.75
172.25	35.56	.010	.0068	.00	35.56	83.24
172.50	37.04	.012	.0090	.00	37.04	94.24
172.75	38.46	.014	.0117	.00	38.46	108.15
173.00	39.83	.018	.0146	.00	39.83	125.38
173.25	41.15	.022	.0179	.00	41.15	146.34
173.50	42.44	.027	.0215	.00	42.44	171.44
173.75	43.68	.033	.0255	.00	43.68	201.07
174.00	44.89	.039	.0298	.00	44.89	235.66
174.25	46.07	.047	.0327	.00	46.07	274.61
174.50	47.22	.056	.0358	.00	47.22	317.19
174.75	48.34	.065	.0390	.00	48.34	363.58
175.00	49.44	.075	.0424	.00	49.44	413.95
175.25	50.51	.086	.0459	.00	50.51	468.46
175.50	51.56	.098	.0496	.00	51.56	527.28

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = work_pad.hyg - DEPRESS H IN Pre 1
Outflow HYG file = work_pad.hyg - DEPRESS H OUT Pre 1

Pond Node Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS H OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 166.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
175.75	52.59	.111	.0534	.00	52.59	590.60
176.00	53.60	.125	.0573	.00	53.60	658.58
176.25	54.59	.140	.0614	.00	54.59	731.38
176.50	55.56	.156	.0656	.00	55.56	809.18
176.75	56.52	.173	.0700	.00	56.52	892.14
177.00	57.46	.191	.0745	.00	57.46	980.44
177.25	58.39	.210	.0791	.00	58.39	1074.25
177.50	59.29	.230	.0839	.00	59.29	1173.73
177.75	60.19	.252	.0888	.00	60.19	1279.06
178.00	61.08	.275	.0938	.00	61.08	1390.39
178.25	67.93	.299	.0978	.00	67.93	1513.18
178.50	79.68	.324	.1019	.00	79.68	1645.73
178.75	94.54	.350	.1060	.00	94.54	1786.38
179.00	111.89	.377	.1103	.00	111.89	1934.59
179.25	131.35	.405	.1146	.00	131.35	2090.10
179.50	152.67	.434	.1190	.00	152.67	2252.72
179.75	175.63	.464	.1235	.00	175.63	2422.38
180.00	200.11	.496	.1281	.00	200.11	2599.03

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = work_pad.hyg - DEPRESS H    IN  Pre  1
 Outflow HYG file = work_pad.hyg - DEPRESS H    OUT Pre  1

 Pond Node   Data = DEPRESS H
 Pond Volume Data = DEPRESS H
 Pond Outlet Data = DEPRESS H OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   166.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     32.04 cfs    at   12.2650 hrs
 Peak Outflow      =     31.98 cfs    at   12.2700 hrs
 -----------------------------------------------------
 Peak Elevation    =    171.69 ft
 Peak Storage =           .007 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       3.712
- Infiltration =        .000
- HYG Vol OUT  =       3.711
- Retained Vol =        .001
                ----------
 Unrouted Vol =        .000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = work_pad.hyg - DEPRESS H    IN  Pre  1
Outflow HYG file = work_pad.hyg - DEPRESS H    OUT Pre  1

Pond Node   Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS H OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.2700 hrs
Tp, Total Inflow        =   12.2650 hrs
Peak to Peak            =     .0050 hrs
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = work_pad.hyg - DEPRESS H    IN  Pre 10
 Outflow HYG file = work_pad.hyg - DEPRESS H    OUT Pre 10

 Pond Node   Data = DEPRESS H
 Pond Volume Data = DEPRESS H
 Pond Outlet Data = DEPRESS H OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   166.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =    112.98 cfs    at   12.2200 hrs
 Peak Outflow      =    112.26 cfs    at   12.2650 hrs
 -----------------------------------------------------
 Peak Elevation    =    179.00 ft
 Peak Storage =           .377 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      12.157
- Infiltration =        .000
- HYG Vol OUT  =      12.156
- Retained Vol =        .001
                ----------
 Unrouted Vol =        .000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = work_pad.hyg - DEPRESS H    IN  Pre 10
Outflow HYG file = work_pad.hyg - DEPRESS H    OUT Pre 10

Pond Node   Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS H OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.2650 hrs
Tp, Total Inflow        =   12.2200 hrs
Peak to Peak            =     .0450 hrs
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

  HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
  Inflow  HYG file = work_pad.hyg - DEPRESS H    IN  Pre100
  Outflow HYG file = work_pad.hyg - DEPRESS H    OUT Pre100

  Pond Node   Data = DEPRESS H
  Pond Volume Data = DEPRESS H
  Pond Outlet Data = DEPRESS H OUT

  No Infiltration

  INITIAL CONDITIONS
  ----------------------------------
  Starting WS Elev   =   166.00 ft
  Starting Volume    =     .000 ac-ft
  Starting Outflow   =      .00 cfs
  Starting Infiltr.  =      .00 cfs
  Starting Total Qout=      .00 cfs
  Time Increment     =    .0050 hrs


  INFLOW/OUTFLOW HYDROGRAPH SUMMARY
  =====================================================
  Peak Inflow       =    194.47 cfs    at   12.2200 hrs
  Peak Outflow      =    193.10 cfs    at   12.2400 hrs
  -----------------------------------------------------
  Peak Elevation    =    179.93 ft
  Peak Storage =           .487 ac-ft
  =====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      20.840
- Infiltration =        .000
- HYG Vol OUT  =      20.839
- Retained Vol =        .001
                  ----------
  Unrouted Vol =        .000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = work_pad.hyg - DEPRESS H    IN  Pre100
Outflow HYG file = work_pad.hyg - DEPRESS H    OUT Pre100

Pond Node   Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS H OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.2400 hrs
Tp, Total Inflow        =   12.2200 hrs
Peak to Peak            =     .0200 hrs
---------------------------------------
```

Index of Starting Page Numbers for ID Names

----- D -----
DEPRESS B... 8.01, 10.01
DEPRESS B   OUT Pre 1... 10.05,
  10.06, 10.07, 10.08, 10.09, 10.10
DEPRESS B OUT... 9.01, 9.04
DEPRESS C... 8.02, 10.11
DEPRESS C   OUT Pre 1... 10.21,
  10.22, 10.23, 10.24, 10.25, 10.26
DEPRESS C OUT... 9.06, 9.09
DEPRESS H... 8.03, 10.27
DEPRESS H   OUT Pre 1... 10.30,
  10.31, 10.32, 10.33, 10.34, 10.35
DEPRESS H OUT... 9.14, 9.17

----- O -----
Orange County... 3.01, 3.02

----- T -----
TypeIII 24hr Pre 1... 4.01, 4.03,
  4.05, 4.07, 4.09, 4.11

----- W -----
Watershed... 1.01, 2.01, 2.02, 2.03,
  2.04
WATERSHED A... 5.01, 6.01, 7.01,
  7.02, 7.03
WATERSHED B... 5.02, 6.02, 7.04,
  7.05, 7.06
WATERSHED C... 5.04, 6.03, 7.07,
  7.08, 7.09
WATERSHED D... 5.06, 6.04, 7.10,
  7.11, 7.12
WATERSHED E... 5.07, 6.05, 7.13,
  7.14, 7.15
WATERSHED F... 5.08, 6.06, 7.16,
  7.17, 7.18
WATERSHED G... 5.09, 6.07, 7.19,
  7.20, 7.21
WATERSHED H... 5.10, 6.08, 7.22,
  7.23, 7.24
WATERSHED I... 5.12, 6.09, 7.25,
  7.26, 7.27

APPENDIX C

POST-DEVELOPMENT WATERSHED MAP
POST-DEVELOPMENT DRAINAGE ANALYSIS

CORNWALL COMMONS
Town of Cornwall, New York
Watershed Area Summary

Post-Development Conditions

Drainage Subarea	Area Breakdown	Area (SF)	Area (ac.)	Percent Impervious	Soil Classification	Hydrologic Group
Watershed A	Total	981,863	22.54			
	Lawn	304,920	7.00		BnB, ErA, MdB	C
	Woods	350,243	8.04		BnB, ErA, MdB	C
	Impervious	326,700	7.50	33.3%		
Watershed B	Total	1,453,428	33.37			
	Lawn	449,515	10.32		ErA, MdB	C
	Woods	614,955	14.12		ErA, MdB	C
	Impervious	388,958	8.93	26.8%		
Watershed B2	Total	3,033,158	69.63			
	Lawn	1,754,353	40.27		BnB, MdB	C
	Woods	90,997	2.09		BnB, MdB	C
	Impervious	1,187,808	27.27	39.2%		
Watershed B3	Total	356,939	8.19			
	Woods	356,939	8.19		MdB, MNE	C
	Impervious	0	0.00	0.0%		
Watershed B4	Total	374,542	8.60			
	Lawn	146,891	3.37			
	Woods	156,424	3.59			C
	Impervious	71,227	1.64	19.0%		
Watershed C	Total	522,577	12.00			
	Lawn	195,877	4.50		MdB	C
	Impervious	326,700	7.50	62.5%		
Watershed C2	Total	433,343	9.95			
	Woods	433,343	9.95		BnB, MdB	C
	Impervious	0	0.00	0.0%		
Watershed C3	Total	556,266	12.77			
	Lawn	252,672	5.80		BnB, MdB	C
	Impervious	303,594	6.97	54.6%		
Watershed D	Total	109,143	2.51			
	Woods	109,143	2.51		MdB, MNE	C
	Impervious	0	0.00	0.0%		
Watershed E	Total	221,182	5.08			
	Woods	221,182	5.08		BnB, MdB, SXC	C
	Impervious	0	0.00	0.0%		
Watershed F	Total	263,986	6.06			
	Woods	263,986	6.06		BnB, MdB	C
	Impervious	0	0.00	0.0%		
Watershed G	Total	282,787	6.49			
	Woods	282,787	6.49		MdB, SXC	C
	Impervious	0	0.00	0.0%		

CORNWALL COMMONS
Town of Cornwall, New York
Watershed Area Summary

Watershed G2	Total	818,094	18.78			
	Lawn	480,610	11.03		MdB, SXC	C
	Woods	50,530	1.16		MdB, SXC	C
	Impervious	286,954	6.59	35.1%		
Watershed H	Total	1,250,945	28.72			
	Woods	259,978	5.97		MdB, SXC	C
	Residential	921,008	21.14		MdB, SXC	C
	Impervious	69,959	1.61	5.6%		
Watershed I	Total	565,270	12.98			
	Lawn	68,389	1.57			
	Woods	416,333	9.56		MdB, SXC	C
	Impervious	80,548	1.85	14.2%		
Site Totals	Total	11,223,523	257.657			
	Lawn	3,653,227	83.867			
	Woods	3,606,840	82.802			
	Residential	921,008	21.143			
	Impervious	3,042,448	69.845	27.1%		

CORNWALL COMMONS
Town of Cornwall, New York
Peak Runoff Flow Summary

Post-Development Conditions

Drainage Subarea		Areas Served	1-Year (CFS)	10-Year (CFS)	100-Year (CFS)
Watershed A			22.52	63.14	100.73
Watershed B			31.29	93.08	151.30
Watershed B2			72.00	190.80	298.94
Watershed B3			4.25	17.73	31.89
Watershed B4			6.63	20.96	34.91
Watershed C			14.91	34.09	50.92
Watershed C2			3.18	13.43	24.09
Watershed C3			22.08	51.63	77.70
Watershed D			1.22	5.12	9.20
Watershed E			2.59	10.83	19.47
Watershed F			3.26	13.57	24.28
Watershed G			3.42	14.26	25.53
Watershed G2			21.17	57.60	91.04
Watershed H			22.94	70.67	116.14
Watershed I			7.07	24.90	42.84
Pond A	In	A	22.52	63.14	100.73
	Out		2.22	40.01	56.45
Pond B	In	B, B2,B4	107.93	300.75	479.28
	Out		7.43	113.62	227.30
Pond C	In	C	14.91	34.09	50.92
	Out		0.47	13.37	29.97
Pond D	In	G2	21.17	57.60	91.04
	Out		0.46	19.45	50.31
Pond E	In	C3	22.08	51.63	77.70
	Out		0.38	7.46	25.76

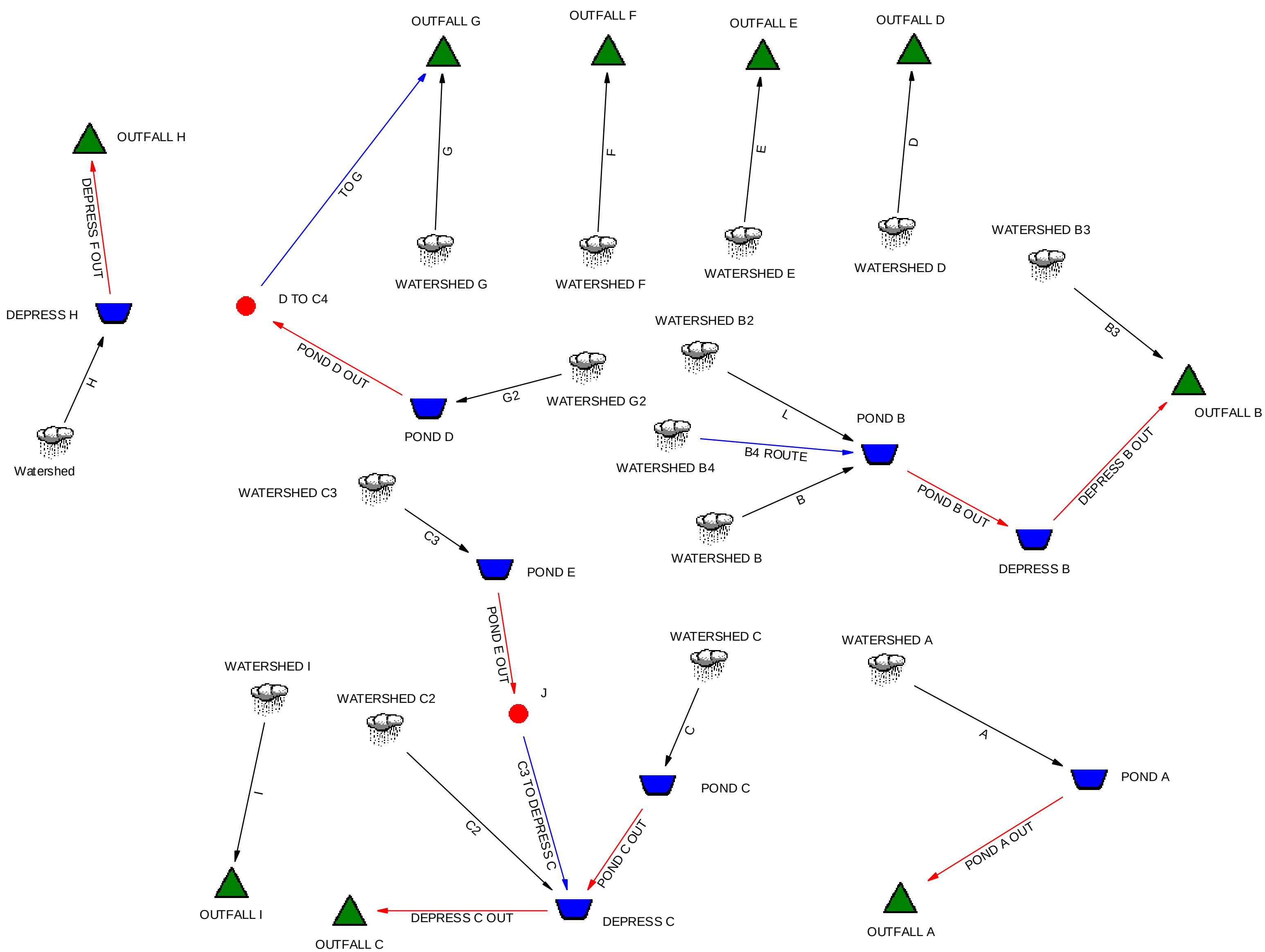
CORNWALL COMMONS
Town of Cornwall, New York
Peak Runoff Flow Summary

Post-Development Conditions

Drainage Subarea	Areas Served	1-Year (CFS)	10-Year (CFS)	100-Year (CFS)
Outfall A	A	2.22	40.01	56.45
Outfall B	B1,B2,B3,B4	7.78	110.37	234.41
Outfall C	C,C2,C3	1.14	20.43	55.88
Outfall D	D	1.22	5.12	9.20
Outfall E	E	2.59	10.83	19.47
Outfall F	F	3.26	13.57	24.28
Outfall G	G,G2	3.67	23.55	62.27
Outfall H	H	22.93	60.39	115.37
Outfall I	I	7.07	24.90	42.84
Total		51.88	309.17	620.17

Outfall Flow Differences

Drainage Subarea	1-Year (CFS)	10-Year (CFS)	100-Year (CFS)
Outfall A	-7.55	-1.10	-17.38
Outfall B	-25.02	-10.61	-10.54
Outfall C	-1.67	-10.94	-5.52
Outfall D	-2.53	-10.61	-19.13
Outfall E	-1.71	-7.24	-12.96
Outfall F	-1.88	-8.08	-14.50
Outfall G	-7.72	-22.15	-18.69
Outfall H	-9.05	-51.87	-77.73
Outfall I	-0.08	-3.64	-8.05
Total	-57.21 -52.4%	-126.24 -29.0%	-184.50 -22.9%


OUTFALL G
OUTFALL F
OUTFALL E
OUTFALL D
OUTFALL H
TO G
G
F
E
D
DEPRESS F OUT
WATERSHED G
WATERSHED F
WATERSHED E
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B
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DEPRESS B
POND E
POND E OUT
WATERSHED C
WATERSHED A
WATERSHED I
J
WATERSHED C2
C
A
C3 TO DEPRESS C
POND C
POND A
I
C2
POND C OUT
POND A OUT
OUTFALL I
DEPRESS C OUT
DEPRESS C
OUTFALL A
OUTFALL C

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JOB TITLE
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Project Date: 8/3/2007
Project Engineer: Eric Rogge
Project Title: Cornwall Commons Post-Dev
Project Comments:
Post-Development Conditions for Revised Grading
Revised 1/28/2008

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DEPRESS H OUT Dev100
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MASTER DESIGN STORM SUMMARY

Network Storm Collection: Orange County

Return Event	Total Depth in	Rainfall Type	RNF ID
Dev 1	2.9000	Synthetic Curve	TypeIII 24hr
Dev 10	5.5000	Synthetic Curve	TypeIII 24hr
Dev100	7.8000	Synthetic Curve	TypeIII 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	Max Pond Storage ac-ft
D TO C4	JCT	1	.471		18.6700	.46		
D TO C4	JCT	10	3.746		12.5700	19.45		
D TO C4	JCT	100	7.067		12.4050	50.31		
DEPRESS B IN	POND	1	5.427		15.7650	7.43		
DEPRESS B IN	POND	10	25.176		12.6500	113.62		
DEPRESS B IN	POND	100	44.752		12.5650	227.30		
DEPRESS B OUT	POND	1	5.422		15.7350	7.43	89.21	.009
DEPRESS B OUT	POND	10	25.171		12.8300	107.14	97.01	.614
DEPRESS B OUT	POND	100	44.746		12.6250	225.82	103.40	1.924
DEPRESS C IN	POND	1	1.382		12.6000	3.64		
DEPRESS C IN	POND	10	6.992		12.7000	27.58		
DEPRESS C IN	POND	100	13.067		12.6050	70.35		
DEPRESS C OUT	POND	1	.925		17.0800	1.14	175.55	.512
DEPRESS C OUT	POND	10	6.526		13.2250	20.43	176.99	1.285
DEPRESS C OUT	POND	100	12.592		12.9450	55.88	178.46	2.247

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
DEPRESS H	IN	POND	1	2.533		12.2350	22.94		
DEPRESS H	IN	POND	10	7.518		12.2350	70.67		
DEPRESS H	IN	POND	100	12.461		12.2350	116.14		
DEPRESS H	OUT	POND	1	2.532		12.2400	22.93	170.82	.004
DEPRESS H	OUT	POND	10	7.517		12.3550	60.39	177.81	.257
DEPRESS H	OUT	POND	100	12.460		12.2450	115.37	179.04	.381
J		JCT	1	.382		17.7250	.38		
J		JCT	10	2.319		12.6100	7.46		
J		JCT	100	4.642		12.3650	25.76		
*OUTFALL A		JCT	1	1.006		14.2400	2.22		
*OUTFALL A		JCT	10	5.115		12.4300	40.01		
*OUTFALL A		JCT	100	9.097		12.4650	56.45		
*OUTFALL B		JCT	1	5.872		15.7100	7.78		
*OUTFALL B		JCT	10	26.819		12.8150	110.37		
*OUTFALL B		JCT	100	47.676		12.6000	234.41		
*OUTFALL C		JCT	1	.925		17.0800	1.14		
*OUTFALL C		JCT	10	6.526		13.2250	20.43		
*OUTFALL C		JCT	100	12.592		12.9450	55.88		
*OUTFALL D		JCT	1	.138		12.2150	1.22		
*OUTFALL D		JCT	10	.505		12.1850	5.12		
*OUTFALL D		JCT	100	.898		12.1850	9.20		
*OUTFALL E		JCT	1	.279		12.1900	2.59		
*OUTFALL E		JCT	10	1.022		12.1600	10.83		
*OUTFALL E		JCT	100	1.817		12.1600	19.47		
*OUTFALL F		JCT	1	.333		12.1700	3.26		
*OUTFALL F		JCT	10	1.219		12.1500	13.57		
*OUTFALL F		JCT	100	2.168		12.1500	24.28		

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
*OUTFALL G	JCT	1	.828		12.1850	3.67		
*OUTFALL G	JCT	10	5.051		12.5600	23.55		
*OUTFALL G	JCT	100	9.389		12.4050	62.27		
*OUTFALL H	JCT	1	2.532		12.2400	22.93		
*OUTFALL H	JCT	10	7.517		12.3550	60.39		
*OUTFALL H	JCT	100	12.460		12.2450	115.37		
*OUTFALL I	JCT	1	.914		12.3550	7.07		
*OUTFALL I	JCT	10	2.995		12.3000	24.90		
*OUTFALL I	JCT	100	5.135		12.2950	42.84		
POND A	IN POND	1	2.324		12.2100	22.52		
POND A	IN POND	10	6.445		12.2100	63.14		
POND A	IN POND	100	10.432		12.2100	100.73		
POND A	OUT POND	1	1.006		14.2400	2.22	128.27	1.760
POND A	OUT POND	10	5.115		12.4300	40.01	129.80	2.555
POND A	OUT POND	100	9.097		12.4650	56.45	131.44	3.563
POND B	IN POND	1	11.751		12.2300	107.93		
POND B	IN POND	10	32.246		12.2150	300.75		
POND B	IN POND	100	52.025		12.2100	479.28		
POND B	OUT POND	1	5.427		15.7650	7.43	132.83	9.482
POND B	OUT POND	10	25.177		12.6500	113.62	136.35	15.929
POND B	OUT POND	100	44.752		12.5650	227.30	139.20	22.217
POND C	IN POND	1	1.810		12.3100	14.91		
POND C	IN POND	10	4.252		12.3100	34.09		
POND C	IN POND	100	6.491		12.3100	50.92		
POND C	OUT POND	1	.518		18.0050	.47	185.03	1.707
POND C	OUT POND	10	2.769		12.7800	13.37	186.66	2.452
POND C	OUT POND	100	4.989		12.6200	29.97	187.77	3.037

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 D IN	POND	1	2.036		12.1750	21.17		
POND D IN	POND	10	5.524		12.1700	57.60		
POND D IN	POND	100	8.874		12.1700	91.04		
POND D OUT	POND	1	.471		18.6700	.46	218.02	1.986
POND D OUT	POND	10	3.746		12.5700	19.45	219.79	2.998
POND D OUT	POND	100	7.067		12.4050	50.31	221.12	3.870
POND E IN	POND	1	1.758		12.1050	22.08		
POND E IN	POND	10	4.300		12.0950	51.63		
POND E IN	POND	100	6.656		12.0950	77.70		
POND E OUT	POND	1	.382		17.7250	.38	209.19	2.154
POND E OUT	POND	10	2.319		12.6100	7.46	210.79	3.212
POND E OUT	POND	100	4.642		12.3650	25.76	211.85	4.036
WATERSHED A	AREA	1	2.324		12.2100	22.52		
WATERSHED A	AREA	10	6.445		12.2100	63.14		
WATERSHED A	AREA	100	10.432		12.2100	100.73		
WATERSHED B	AREA	1	3.103		12.1800	31.29		
WATERSHED B	AREA	10	9.001		12.1800	93.08		
WATERSHED B	AREA	100	14.800		12.1800	151.30		
WATERSHED B2	AREA	1	7.929		12.2600	72.00		
WATERSHED B2	AREA	10	21.062		12.2550	190.80		
WATERSHED B2	AREA	100	33.577		12.2550	298.94		
WATERSHED B3	AREA	1	.450		12.1800	4.25		
WATERSHED B3	AREA	10	1.648		12.1500	17.73		
WATERSHED B3	AREA	100	2.930		12.1500	31.89		
WATERSHED B4	AREA	1	.718		12.2350	6.63		
WATERSHED B4	AREA	10	2.183		12.2000	20.96		
WATERSHED B4	AREA	100	3.649		12.2000	34.91		

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
WATERSHED C	AREA	1	1.810		12.3100	14.91		
WATERSHED C	AREA	10	4.252		12.3100	34.09		
WATERSHED C	AREA	100	6.491		12.3100	50.92		
WATERSHED C2	AREA	1	.547		12.5200	3.18		
WATERSHED C2	AREA	10	2.002		12.5150	13.43		
WATERSHED C2	AREA	100	3.560		12.5150	24.09		
WATERSHED C3	AREA	1	1.758		12.1050	22.08		
WATERSHED C3	AREA	10	4.300		12.0950	51.63		
WATERSHED C3	AREA	100	6.656		12.0950	77.70		
WATERSHED D	AREA	1	.138		12.2150	1.22		
WATERSHED D	AREA	10	.505		12.1850	5.12		
WATERSHED D	AREA	100	.898		12.1850	9.20		
WATERSHED E	AREA	1	.279		12.1900	2.59		
WATERSHED E	AREA	10	1.022		12.1600	10.83		
WATERSHED E	AREA	100	1.817		12.1600	19.47		
WATERSHED F	AREA	1	.333		12.1700	3.26		
WATERSHED F	AREA	10	1.219		12.1500	13.57		
WATERSHED F	AREA	100	2.168		12.1500	24.28		
WATERSHED G	AREA	1	.357		12.1650	3.42		
WATERSHED G	AREA	10	1.306		12.1600	14.26		
WATERSHED G	AREA	100	2.322		12.1400	25.53		
WATERSHED G2	AREA	1	2.036		12.1750	21.17		
WATERSHED G2	AREA	10	5.524		12.1700	57.60		
WATERSHED G2	AREA	100	8.874		12.1700	91.04		
WATERSHED H	AREA	1	2.533		12.2350	22.94		
WATERSHED H	AREA	10	7.518		12.2350	70.67		
WATERSHED H	AREA	100	12.461		12.2350	116.14		

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
WATERSHED I	AREA	1	.914		12.3550	7.07		
WATERSHED I	AREA	10	2.995		12.3000	24.90		
WATERSHED I	AREA	100	5.135		12.2950	42.84		

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = Orange County

Storm Tag Name = Dev 1

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 1 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

Node ID		Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
D TO C4		JCT	.471		18.6700	.46	
DEPRESS B	IN	POND	5.427		15.7650	7.43	
DEPRESS B	OUT	POND	5.422		15.7350	7.43	89.21
DEPRESS C	IN	POND	1.382		12.6000	3.64	
DEPRESS C	OUT	POND	.925		17.0800	1.14	175.55
DEPRESS H	IN	POND	2.533		12.2350	22.94	
DEPRESS H	OUT	POND	2.532		12.2400	22.93	170.82
J		JCT	.382		17.7250	.38	
Outfall OUTFALL A		JCT	1.006		14.2400	2.22	
Outfall OUTFALL B		JCT	5.872		15.7100	7.78	
Outfall OUTFALL C		JCT	.925		17.0800	1.14	
Outfall OUTFALL D		JCT	.138		12.2150	1.22	
Outfall OUTFALL E		JCT	.279		12.1900	2.59	
Outfall OUTFALL F		JCT	.333		12.1700	3.26	
Outfall OUTFALL G		JCT	.828		12.1850	3.67	
Outfall OUTFALL H		JCT	2.532		12.2400	22.93	
Outfall OUTFALL I		JCT	.914		12.3550	7.07	
POND A	IN	POND	2.324		12.2100	22.52	
POND A	OUT	POND	1.006		14.2400	2.22	128.27
POND B	IN	POND	11.751		12.2300	107.93	
POND B	OUT	POND	5.427		15.7650	7.43	132.83
POND C	IN	POND	1.810		12.3100	14.91	
POND C	OUT	POND	.518		18.0050	.47	185.03
POND D	IN	POND	2.036		12.1750	21.17	
POND D	OUT	POND	.471		18.6700	.46	218.02
POND E	IN	POND	1.758		12.1050	22.08	
POND E	OUT	POND	.382		17.7250	.38	209.19
WATERSHED A		AREA	2.324		12.2100	22.52	
WATERSHED B		AREA	3.103		12.1800	31.29	
WATERSHED B2		AREA	7.929		12.2600	72.00	
WATERSHED B3		AREA	.450		12.1800	4.25	
WATERSHED B4		AREA	.718		12.2350	6.63	

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
WATERSHED C	AREA	1.810		12.3100	14.91	
WATERSHED C2	AREA	.547		12.5200	3.18	
WATERSHED C3	AREA	1.758		12.1050	22.08	
WATERSHED D	AREA	.138		12.2150	1.22	
WATERSHED E	AREA	.279		12.1900	2.59	
WATERSHED F	AREA	.333		12.1700	3.26	
WATERSHED G	AREA	.357		12.1650	3.42	
WATERSHED G2	AREA	2.036		12.1750	21.17	
WATERSHED H	AREA	2.533		12.2350	22.94	
WATERSHED I	AREA	.914		12.3550	7.07	

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = Orange County

Storm Tag Name = Dev 10

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID		Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
D TO C4		JCT	3.746		12.5700	19.45	
DEPRESS B	IN	POND	25.176		12.6500	113.62	
DEPRESS B	OUT	POND	25.171		12.8300	107.14	97.01
DEPRESS C	IN	POND	6.992		12.7000	27.58	
DEPRESS C	OUT	POND	6.526		13.2250	20.43	176.99
DEPRESS H	IN	POND	7.518		12.2350	70.67	
DEPRESS H	OUT	POND	7.517		12.3550	60.39	177.81
J		JCT	2.319		12.6100	7.46	
Outfall OUTFALL A		JCT	5.115		12.4300	40.01	
Outfall OUTFALL B		JCT	26.819		12.8150	110.37	
Outfall OUTFALL C		JCT	6.526		13.2250	20.43	
Outfall OUTFALL D		JCT	.505		12.1850	5.12	
Outfall OUTFALL E		JCT	1.022		12.1600	10.83	
Outfall OUTFALL F		JCT	1.219		12.1500	13.57	
Outfall OUTFALL G		JCT	5.051		12.5600	23.55	
Outfall OUTFALL H		JCT	7.517		12.3550	60.39	
Outfall OUTFALL I		JCT	2.995		12.3000	24.90	
POND A	IN	POND	6.445		12.2100	63.14	
POND A	OUT	POND	5.115		12.4300	40.01	129.80
POND B	IN	POND	32.246		12.2150	300.75	
POND B	OUT	POND	25.177		12.6500	113.62	136.35
POND C	IN	POND	4.252		12.3100	34.09	
POND C	OUT	POND	2.769		12.7800	13.37	186.66
POND D	IN	POND	5.524		12.1700	57.60	
POND D	OUT	POND	3.746		12.5700	19.45	219.79
POND E	IN	POND	4.300		12.0950	51.63	
POND E	OUT	POND	2.319		12.6100	7.46	210.79
WATERSHED A		AREA	6.445		12.2100	63.14	
WATERSHED B		AREA	9.001		12.1800	93.08	
WATERSHED B2		AREA	21.062		12.2550	190.80	
WATERSHED B3		AREA	1.648		12.1500	17.73	
WATERSHED B4		AREA	2.183		12.2000	20.96	

NETWORK SUMMARY -- NODES

(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
WATERSHED C	AREA	4.252		12.3100	34.09	
WATERSHED C2	AREA	2.002		12.5150	13.43	
WATERSHED C3	AREA	4.300		12.0950	51.63	
WATERSHED D	AREA	.505		12.1850	5.12	
WATERSHED E	AREA	1.022		12.1600	10.83	
WATERSHED F	AREA	1.219		12.1500	13.57	
WATERSHED G	AREA	1.306		12.1600	14.26	
WATERSHED G2	AREA	5.524		12.1700	57.60	
WATERSHED H	AREA	7.518		12.2350	70.67	
WATERSHED I	AREA	2.995		12.3000	24.90	

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

DEFAULT Design Storm File,ID = Orange County

Storm Tag Name = Dev100

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Node ID		Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
D TO C4		JCT	7.067		12.4050	50.31	
DEPRESS B	IN	POND	44.752		12.5650	227.30	
DEPRESS B	OUT	POND	44.746		12.6250	225.82	103.40
DEPRESS C	IN	POND	13.067		12.6050	70.35	
DEPRESS C	OUT	POND	12.592		12.9450	55.88	178.46
DEPRESS H	IN	POND	12.461		12.2350	116.14	
DEPRESS H	OUT	POND	12.460		12.2450	115.37	179.04
J		JCT	4.642		12.3650	25.76	
Outfall OUTFALL A		JCT	9.097		12.4650	56.45	
Outfall OUTFALL B		JCT	47.676		12.6000	234.41	
Outfall OUTFALL C		JCT	12.592		12.9450	55.88	
Outfall OUTFALL D		JCT	.898		12.1850	9.20	
Outfall OUTFALL E		JCT	1.817		12.1600	19.47	
Outfall OUTFALL F		JCT	2.168		12.1500	24.28	
Outfall OUTFALL G		JCT	9.389		12.4050	62.27	
Outfall OUTFALL H		JCT	12.460		12.2450	115.37	
Outfall OUTFALL I		JCT	5.135		12.2950	42.84	
POND A	IN	POND	10.432		12.2100	100.73	
POND A	OUT	POND	9.097		12.4650	56.45	131.44
POND B	IN	POND	52.025		12.2100	479.28	
POND B	OUT	POND	44.752		12.5650	227.30	139.20
POND C	IN	POND	6.491		12.3100	50.92	
POND C	OUT	POND	4.989		12.6200	29.97	187.77
POND D	IN	POND	8.874		12.1700	91.04	
POND D	OUT	POND	7.067		12.4050	50.31	221.12
POND E	IN	POND	6.656		12.0950	77.70	
POND E	OUT	POND	4.642		12.3650	25.76	211.85
WATERSHED A		AREA	10.432		12.2100	100.73	
WATERSHED B		AREA	14.800		12.1800	151.30	
WATERSHED B2		AREA	33.577		12.2550	298.94	
WATERSHED B3		AREA	2.930		12.1500	31.89	
WATERSHED B4		AREA	3.649		12.2000	34.91	

NETWORK SUMMARY -- NODES
(Trun.= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left & Rt)

Node ID	Type	HYG Vol ac-ft	Trun.	Qpeak hrs	Qpeak cfs	Max WSEL ft
WATERSHED C	AREA	6.491		12.3100	50.92	
WATERSHED C2	AREA	3.560		12.5150	24.09	
WATERSHED C3	AREA	6.656		12.0950	77.70	
WATERSHED D	AREA	.898		12.1850	9.20	
WATERSHED E	AREA	1.817		12.1600	19.47	
WATERSHED F	AREA	2.168		12.1500	24.28	
WATERSHED G	AREA	2.322		12.1400	25.53	
WATERSHED G2	AREA	8.874		12.1700	91.04	
WATERSHED H	AREA	12.461		12.2350	116.14	
WATERSHED I	AREA	5.135		12.2950	42.84	

NETWORK RUNOFF NODE SEQUENCE

Runoff Data		Apply to Node		Receiving Link	
SCS UH	WATERSHED I	Subarea	WATERSHED I	Add Hyd	WATERSHED I
SCS UH	WATERSHED H	Subarea	WATERSHED H	Add Hyd	WATERSHED H
SCS UH	WATERSHED A	Subarea	WATERSHED A	Add Hyd	WATERSHED A
SCS UH	WATERSHED G2	Subarea	WATERSHED G2	Add Hyd	WATERSHED G2
SCS UH	WATERSHED C3	Subarea	WATERSHED C3	Add Hyd	WATERSHED C3
SCS UH	WATERSHED B2	Subarea	WATERSHED B2	Add Hyd	WATERSHED B2
SCS UH	WATERSHED B	Subarea	WATERSHED B	Add Hyd	WATERSHED B
SCS UH	WATERSHED C	Subarea	WATERSHED C	Add Hyd	WATERSHED C
SCS UH	WATERSHED C2	Subarea	WATERSHED C2	Add Hyd	WATERSHED C2
SCS UH	WATERSHED D	Subarea	WATERSHED D	Add Hyd	WATERSHED D
SCS UH	WATERSHED E	Subarea	WATERSHED E	Add Hyd	WATERSHED E
SCS UH	WATERSHED F	Subarea	WATERSHED F	Add Hyd	WATERSHED F
SCS UH	WATERSHED G	Subarea	WATERSHED G	Add Hyd	WATERSHED G
SCS UH	WATERSHED B3	Subarea	WATERSHED B3	Add Hyd	WATERSHED B3
SCS UH	WATERSHED B4	Subarea	WATERSHED B4	Reach	WATERSHED B4

NETWORK ROUTING SEQUENCE

```
============================================================================
Link Operation            UPstream Node             DNstream Node
============================================================================
Add Hyd C3                Subarea WATERSHED C3      Pond    POND E       IN

POND ROUTE TOTAL OUTFLOW...
Total Pond Outflow        Pond    POND E       IN   Outflow POND E       OUT

SET POND ROUTING LINK TO TOTAL POND OUTFLOW...
Outlet  POND E OUT        Outflow POND E       OUT  Jct     J


Add Hyd C                 Subarea WATERSHED C       Pond    POND C       IN

POND ROUTE TOTAL OUTFLOW...
Total Pond Outflow        Pond    POND C       IN   Outflow POND C       OUT

SET POND ROUTING LINK TO TOTAL POND OUTFLOW...
Outlet  POND C OUT        Outflow POND C       OUT  Pond    DEPRESS C    IN

Add Hyd B                 Subarea WATERSHED B       Pond    POND B       IN
Reach   B4 ROUTE          Subarea WATERSHED B4      Pond    POND B       IN
Add Hyd L                 Subarea WATERSHED B2      Pond    POND B       IN

POND ROUTE TOTAL OUTFLOW...
Total Pond Outflow        Pond    POND B       IN   Outflow POND B       OUT

SET POND ROUTING LINK TO TOTAL POND OUTFLOW...
Outlet  POND B OUT        Outflow POND B       OUT  Pond    DEPRESS B    IN

Add Hyd G2                Subarea WATERSHED G2      Pond    POND D       IN

POND ROUTE TOTAL OUTFLOW...
Total Pond Outflow        Pond    POND D       IN   Outflow POND D       OUT

SET POND ROUTING LINK TO TOTAL POND OUTFLOW...
Outlet  POND D OUT        Outflow POND D       OUT  Jct     D TO C4

Add Hyd A                 Subarea WATERSHED A       Pond    POND A       IN

POND ROUTE TOTAL OUTFLOW...
Total Pond Outflow        Pond    POND A       IN   Outflow POND A       OUT

SET POND ROUTING LINK TO TOTAL POND OUTFLOW...
Outlet  POND A OUT        Outflow POND A       OUT  Jct     OUTFALL A

Add Hyd H                 Subarea WATERSHED H       Pond    DEPRESS H    IN

POND ROUTE TOTAL OUTFLOW...
Total Pond Outflow        Pond    DEPRESS H    IN   Outflow DEPRESS H    OUT

SET POND ROUTING LINK TO TOTAL POND OUTFLOW...
Outlet  DEPRESS F OUT     Outflow DEPRESS H    OUT  Jct     OUTFALL H

Reach   C3 TO DEPRESS C   Jct     J                 Pond    DEPRESS C    IN
Add Hyd C2                Subarea WATERSHED C2      Pond    DEPRESS C    IN

POND ROUTE TOTAL OUTFLOW...
Total Pond Outflow        Pond    DEPRESS C    IN   Outflow DEPRESS C    OUT

SET POND ROUTING LINK TO TOTAL POND OUTFLOW...
Outlet  DEPRESS C OUT     Outflow DEPRESS C    OUT  Jct     OUTFALL C


POND ROUTE TOTAL OUTFLOW...
Total Pond Outflow        Pond    DEPRESS B    IN   Outflow DEPRESS B    OUT

SET POND ROUTING LINK TO TOTAL POND OUTFLOW...
Outlet  DEPRESS B OUT     Outflow DEPRESS B    OUT  Jct     OUTFALL B
```

Add Hyd B3	Subarea WATERSHED B3	Jct	OUTFALL B
Add Hyd G	Subarea WATERSHED G	Jct	OUTFALL G
Reach TO G	Jct D TO C4	Jct	OUTFALL G
Add Hyd F	Subarea WATERSHED F	Jct	OUTFALL F
Add Hyd E	Subarea WATERSHED E	Jct	OUTFALL E
Add Hyd D	Subarea WATERSHED D	Jct	OUTFALL D
Add Hyd I	Subarea WATERSHED I	Jct	OUTFALL I

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Title... Project Date: 8/3/2007
Project Engineer: Eric Rogge
Project Title: Cornwall Commons Post-Dev
Project Comments:
Post-Development Conditions for Revised Grading
Revised 1/28/2008

DESIGN STORMS SUMMARY

Design Storm File,ID = Orange County

```
Storm Tag Name      = Dev  1
----------------------------------------------------------------------
Data Type, File, ID = Synthetic Storm    TypeIII 24hr
Storm Frequency     = 1 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      = Dev 10
----------------------------------------------------------------------
Data Type, File, ID = Synthetic Storm    TypeIII 24hr
Storm Frequency     = 10 yr
Total Rainfall Depth= 5.5000 in
Duration Multiplier =  1
Resulting Duration  = 24.0000 hrs
Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


Storm Tag Name      = Dev100
----------------------------------------------------------------------
Data Type, File, ID = Synthetic Storm    TypeIII 24hr
Storm Frequency     = 100 yr
Total Rainfall Depth= 7.8000 in
Duration Multiplier =  1
Resulting Duration  = 24.0000 hrs
Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs
```

DESIGN STORMS SUMMARY

Design Storm File,ID = Orange County

Storm Tag Name = Dev 1

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 1 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 = Dev 10

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 5.5000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = Dev100

Data Type, File, ID = Synthetic Storm TypeIII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 7.8000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

CUMULATIVE RAINFALL FRACTIONS

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
.0000	.000	.001	.002	.003	.004
.5000	.005	.006	.007	.008	.009
1.0000	.010	.011	.012	.013	.014
1.5000	.015	.016	.017	.018	.019
2.0000	.020	.021	.022	.023	.024
2.5000	.025	.026	.027	.028	.030
3.0000	.031	.032	.033	.034	.035
3.5000	.037	.038	.039	.040	.042
4.0000	.043	.044	.046	.047	.048
4.5000	.050	.051	.052	.054	.055
5.0000	.057	.058	.060	.061	.063
5.5000	.064	.066	.067	.069	.070
6.0000	.072	.074	.075	.077	.079
6.5000	.081	.083	.084	.086	.088
7.0000	.091	.093	.095	.097	.099
7.5000	.102	.104	.106	.109	.111
8.0000	.114	.117	.119	.122	.125
8.5000	.128	.132	.135	.138	.142
9.0000	.146	.150	.153	.158	.162
9.5000	.166	.170	.175	.179	.184
10.0000	.189	.194	.199	.205	.211
10.5000	.217	.223	.229	.236	.243
11.0000	.250	.258	.266	.276	.287
11.5000	.298	.314	.339	.373	.416
12.0000	.500	.584	.627	.661	.686
12.5000	.702	.713	.724	.734	.742
13.0000	.750	.757	.764	.771	.777
13.5000	.784	.789	.795	.801	.806
14.0000	.811	.816	.821	.825	.830
14.5000	.834	.838	.842	.847	.850
15.0000	.854	.858	.862	.865	.868
15.5000	.872	.875	.878	.881	.883
16.0000	.886	.889	.891	.894	.896
16.5000	.898	.901	.903	.905	.907
17.0000	.910	.912	.914	.916	.918
17.5000	.919	.921	.923	.925	.926
18.0000	.928	.930	.931	.933	.934
18.5000	.936	.937	.939	.940	.942
19.0000	.943	.945	.946	.948	.949
19.5000	.950	.952	.953	.954	.956
20.0000	.957	.958	.960	.961	.962
20.5000	.963	.965	.966	.967	.968
21.0000	.969	.971	.972	.973	.974
21.5000	.975	.976	.977	.979	.980

CUMULATIVE RAINFALL FRACTIONS

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
22.0000	.981	.982	.983	.984	.985
22.5000	.986	.987	.988	.989	.990
23.0000	.991	.992	.993	.994	.995
23.5000	.996	.997	.997	.998	.999
24.0000	1.000				

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0029	.0058	.0087	.0116
.5000	.0145	.0174	.0203	.0232	.0261
1.0000	.0290	.0319	.0348	.0377	.0406
1.5000	.0435	.0464	.0493	.0522	.0551
2.0000	.0580	.0609	.0639	.0669	.0699
2.5000	.0731	.0762	.0794	.0826	.0859
3.0000	.0892	.0925	.0959	.0994	.1029
3.5000	.1064	.1100	.1136	.1172	.1210
4.0000	.1247	.1285	.1323	.1362	.1401
4.5000	.1441	.1481	.1522	.1563	.1604
5.0000	.1646	.1688	.1731	.1774	.1817
5.5000	.1862	.1906	.1951	.1996	.2042
6.0000	.2088	.2135	.2184	.2234	.2285
6.5000	.2338	.2393	.2448	.2506	.2564
7.0000	.2625	.2686	.2749	.2814	.2880
7.5000	.2947	.3016	.3086	.3158	.3231
8.0000	.3306	.3383	.3463	.3547	.3634
8.5000	.3725	.3818	.3916	.4016	.4120
9.0000	.4227	.4337	.4451	.4568	.4688
9.5000	.4812	.4939	.5070	.5203	.5341
10.0000	.5481	.5627	.5779	.5939	.6105
10.5000	.6279	.6459	.6646	.6841	.7042
11.0000	.7250	.7475	.7727	.8005	.8310
11.5000	.8642	.9115	.9843	1.0826	1.2064
12.0000	1.4500	1.6936	1.8174	1.9157	1.9885
12.5000	2.0358	2.0690	2.0995	2.1273	2.1525
13.0000	2.1750	2.1958	2.2159	2.2354	2.2541
13.5000	2.2722	2.2895	2.3061	2.3221	2.3373
14.0000	2.3519	2.3659	2.3797	2.3930	2.4061
14.5000	2.4188	2.4312	2.4432	2.4549	2.4663
15.0000	2.4773	2.4880	2.4984	2.5084	2.5182
15.5000	2.5275	2.5366	2.5453	2.5537	2.5617
16.0000	2.5694	2.5769	2.5842	2.5914	2.5984
16.5000	2.6053	2.6120	2.6186	2.6251	2.6314
17.0000	2.6376	2.6436	2.6494	2.6552	2.6608
17.5000	2.6662	2.6715	2.6766	2.6816	2.6865
18.0000	2.6912	2.6958	2.7004	2.7049	2.7094
18.5000	2.7138	2.7183	2.7226	2.7269	2.7312
19.0000	2.7354	2.7396	2.7437	2.7478	2.7519
19.5000	2.7559	2.7599	2.7638	2.7677	2.7715
20.0000	2.7753	2.7790	2.7828	2.7865	2.7901
20.5000	2.7937	2.7973	2.8009	2.8044	2.8079
21.0000	2.8114	2.8148	2.8182	2.8216	2.8249
21.5000	2.8282	2.8314	2.8347	2.8379	2.8410

CUMULATIVE RAINFALL DEPTHS (in)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
22.0000	2.8442	2.8473	2.8504	2.8534	2.8564
22.5000	2.8593	2.8623	2.8652	2.8681	2.8709
23.0000	2.8737	2.8765	2.8792	2.8819	2.8846
23.5000	2.8873	2.8899	2.8925	2.8950	2.8975
24.0000	2.9000				

CUMULATIVE RAINFALL FRACTIONS

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
.0000	.000	.001	.002	.003	.004
.5000	.005	.006	.007	.008	.009
1.0000	.010	.011	.012	.013	.014
1.5000	.015	.016	.017	.018	.019
2.0000	.020	.021	.022	.023	.024
2.5000	.025	.026	.027	.028	.030
3.0000	.031	.032	.033	.034	.035
3.5000	.037	.038	.039	.040	.042
4.0000	.043	.044	.046	.047	.048
4.5000	.050	.051	.052	.054	.055
5.0000	.057	.058	.060	.061	.063
5.5000	.064	.066	.067	.069	.070
6.0000	.072	.074	.075	.077	.079
6.5000	.081	.083	.084	.086	.088
7.0000	.091	.093	.095	.097	.099
7.5000	.102	.104	.106	.109	.111
8.0000	.114	.117	.119	.122	.125
8.5000	.128	.132	.135	.138	.142
9.0000	.146	.150	.153	.158	.162
9.5000	.166	.170	.175	.179	.184
10.0000	.189	.194	.199	.205	.211
10.5000	.217	.223	.229	.236	.243
11.0000	.250	.258	.266	.276	.287
11.5000	.298	.314	.339	.373	.416
12.0000	.500	.584	.627	.661	.686
12.5000	.702	.713	.724	.734	.742
13.0000	.750	.757	.764	.771	.777
13.5000	.784	.789	.795	.801	.806
14.0000	.811	.816	.821	.825	.830
14.5000	.834	.838	.842	.847	.850
15.0000	.854	.858	.862	.865	.868
15.5000	.872	.875	.878	.881	.883
16.0000	.886	.889	.891	.894	.896
16.5000	.898	.901	.903	.905	.907
17.0000	.910	.912	.914	.916	.918
17.5000	.919	.921	.923	.925	.926
18.0000	.928	.930	.931	.933	.934
18.5000	.936	.937	.939	.940	.942
19.0000	.943	.945	.946	.948	.949
19.5000	.950	.952	.953	.954	.956
20.0000	.957	.958	.960	.961	.962
20.5000	.963	.965	.966	.967	.968
21.0000	.969	.971	.972	.973	.974
21.5000	.975	.976	.977	.979	.980

CUMULATIVE RAINFALL FRACTIONS

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
22.0000	.981	.982	.983	.984	.985
22.5000	.986	.987	.988	.989	.990
23.0000	.991	.992	.993	.994	.995
23.5000	.996	.997	.997	.998	.999
24.0000	1.000				

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0055	.0110	.0165	.0220
.5000	.0275	.0330	.0385	.0440	.0495
1.0000	.0550	.0605	.0660	.0715	.0770
1.5000	.0825	.0880	.0935	.0990	.1045
2.0000	.1100	.1156	.1212	.1269	.1327
2.5000	.1385	.1445	.1505	.1566	.1629
3.0000	.1691	.1755	.1819	.1885	.1951
3.5000	.2018	.2086	.2154	.2224	.2294
4.0000	.2365	.2437	.2510	.2583	.2658
4.5000	.2733	.2809	.2886	.2963	.3042
5.0000	.3121	.3202	.3282	.3364	.3447
5.5000	.3530	.3615	.3700	.3786	.3873
6.0000	.3960	.4050	.4142	.4237	.4334
6.5000	.4435	.4538	.4644	.4752	.4864
7.0000	.4978	.5095	.5214	.5337	.5462
7.5000	.5590	.5720	.5854	.5990	.6129
8.0000	.6270	.6416	.6569	.6728	.6893
8.5000	.7064	.7242	.7426	.7616	.7813
9.0000	.8016	.8226	.8441	.8664	.8892
9.5000	.9127	.9368	.9615	.9869	1.0129
10.0000	1.0395	1.0671	1.0960	1.1263	1.1579
10.5000	1.1908	1.2250	1.2605	1.2973	1.3355
11.0000	1.3750	1.4177	1.4654	1.5182	1.5761
11.5000	1.6390	1.7287	1.8667	2.0532	2.2880
12.0000	2.7500	3.2120	3.4469	3.6333	3.7714
12.5000	3.8610	3.9239	3.9818	4.0346	4.0823
13.0000	4.1250	4.1645	4.2027	4.2395	4.2750
13.5000	4.3093	4.3421	4.3737	4.4040	4.4329
14.0000	4.4605	4.4871	4.5131	4.5385	4.5632
14.5000	4.5873	4.6108	4.6336	4.6559	4.6774
15.0000	4.6984	4.7187	4.7384	4.7574	4.7758
15.5000	4.7936	4.8107	4.8272	4.8431	4.8584
16.0000	4.8730	4.8872	4.9011	4.9147	4.9280
16.5000	4.9411	4.9539	4.9664	4.9786	4.9906
17.0000	5.0023	5.0137	5.0248	5.0357	5.0463
17.5000	5.0566	5.0666	5.0764	5.0859	5.0951
18.0000	5.1040	5.1127	5.1214	5.1300	5.1385
18.5000	5.1470	5.1553	5.1636	5.1718	5.1798
19.0000	5.1879	5.1958	5.2037	5.2114	5.2191
19.5000	5.2267	5.2342	5.2417	5.2490	5.2563
20.0000	5.2635	5.2706	5.2777	5.2847	5.2916
20.5000	5.2985	5.3053	5.3120	5.3187	5.3253
21.0000	5.3319	5.3384	5.3448	5.3512	5.3576
21.5000	5.3638	5.3700	5.3761	5.3822	5.3882

CUMULATIVE RAINFALL DEPTHS (in)

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
22.0000	5.3941	5.4000	5.4058	5.4116	5.4173
22.5000	5.4229	5.4285	5.4340	5.4394	5.4448
23.0000	5.4502	5.4554	5.4606	5.4657	5.4709
23.5000	5.4759	5.4808	5.4857	5.4905	5.4953
24.0000	5.5000				

CUMULATIVE RAINFALL FRACTIONS

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
.0000	.000	.001	.002	.003	.004
.5000	.005	.006	.007	.008	.009
1.0000	.010	.011	.012	.013	.014
1.5000	.015	.016	.017	.018	.019
2.0000	.020	.021	.022	.023	.024
2.5000	.025	.026	.027	.028	.030
3.0000	.031	.032	.033	.034	.035
3.5000	.037	.038	.039	.040	.042
4.0000	.043	.044	.046	.047	.048
4.5000	.050	.051	.052	.054	.055
5.0000	.057	.058	.060	.061	.063
5.5000	.064	.066	.067	.069	.070
6.0000	.072	.074	.075	.077	.079
6.5000	.081	.083	.084	.086	.088
7.0000	.091	.093	.095	.097	.099
7.5000	.102	.104	.106	.109	.111
8.0000	.114	.117	.119	.122	.125
8.5000	.128	.132	.135	.138	.142
9.0000	.146	.150	.153	.158	.162
9.5000	.166	.170	.175	.179	.184
10.0000	.189	.194	.199	.205	.211
10.5000	.217	.223	.229	.236	.243
11.0000	.250	.258	.266	.276	.287
11.5000	.298	.314	.339	.373	.416
12.0000	.500	.584	.627	.661	.686
12.5000	.702	.713	.724	.734	.742
13.0000	.750	.757	.764	.771	.777
13.5000	.784	.789	.795	.801	.806
14.0000	.811	.816	.821	.825	.830
14.5000	.834	.838	.842	.847	.850
15.0000	.854	.858	.862	.865	.868
15.5000	.872	.875	.878	.881	.883
16.0000	.886	.889	.891	.894	.896
16.5000	.898	.901	.903	.905	.907
17.0000	.910	.912	.914	.916	.918
17.5000	.919	.921	.923	.925	.926
18.0000	.928	.930	.931	.933	.934
18.5000	.936	.937	.939	.940	.942
19.0000	.943	.945	.946	.948	.949
19.5000	.950	.952	.953	.954	.956
20.0000	.957	.958	.960	.961	.962
20.5000	.963	.965	.966	.967	.968
21.0000	.969	.971	.972	.973	.974
21.5000	.975	.976	.977	.979	.980

CUMULATIVE RAINFALL FRACTIONS

Output Time increment = .1000 hrs

Time on left represents time for first value in each row.

Time hrs					
22.0000	.981	.982	.983	.984	.985
22.5000	.986	.987	.988	.989	.990
23.0000	.991	.992	.993	.994	.995
23.5000	.996	.997	.997	.998	.999
24.0000	1.000				

CUMULATIVE RAINFALL DEPTHS (in)
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.0000	.0078	.0156	.0234	.0312
.5000	.0390	.0468	.0546	.0624	.0702
1.0000	.0780	.0858	.0936	.1014	.1092
1.5000	.1170	.1248	.1326	.1404	.1482
2.0000	.1560	.1639	.1718	.1799	.1881
2.5000	.1965	.2049	.2135	.2221	.2310
3.0000	.2399	.2489	.2580	.2673	.2767
3.5000	.2862	.2958	.3055	.3154	.3253
4.0000	.3354	.3456	.3559	.3664	.3769
4.5000	.3876	.3983	.4093	.4203	.4314
5.0000	.4427	.4540	.4655	.4771	.4888
5.5000	.5007	.5126	.5247	.5369	.5492
6.0000	.5616	.5743	.5873	.6008	.6146
6.5000	.6289	.6435	.6586	.6739	.6898
7.0000	.7059	.7225	.7394	.7568	.7745
7.5000	.7927	.8112	.8302	.8494	.8692
8.0000	.8892	.9099	.9316	.9541	.9775
8.5000	1.0018	1.0270	1.0532	1.0801	1.1081
9.0000	1.1369	1.1666	1.1971	1.2287	1.2610
9.5000	1.2943	1.3285	1.3636	1.3996	1.4364
10.0000	1.4742	1.5134	1.5544	1.5973	1.6421
10.5000	1.6887	1.7372	1.7876	1.8399	1.8940
11.0000	1.9500	2.0105	2.0782	2.1531	2.2352
11.5000	2.3244	2.4515	2.6473	2.9117	3.2448
12.0000	3.9000	4.5552	4.8883	5.1527	5.3485
12.5000	5.4756	5.5648	5.6469	5.7218	5.7895
13.0000	5.8500	5.9060	5.9601	6.0124	6.0628
13.5000	6.1113	6.1579	6.2027	6.2456	6.2866
14.0000	6.3258	6.3636	6.4004	6.4364	6.4715
14.5000	6.5057	6.5390	6.5713	6.6029	6.6334
15.0000	6.6632	6.6919	6.7199	6.7468	6.7730
15.5000	6.7982	6.8225	6.8459	6.8684	6.8901
16.0000	6.9108	6.9309	6.9506	6.9699	6.9888
16.5000	7.0074	7.0255	7.0432	7.0606	7.0776
17.0000	7.0941	7.1103	7.1261	7.1415	7.1565
17.5000	7.1712	7.1854	7.1992	7.2127	7.2258
18.0000	7.2384	7.2508	7.2631	7.2753	7.2874
18.5000	7.2993	7.3112	7.3229	7.3345	7.3460
19.0000	7.3574	7.3686	7.3797	7.3907	7.4017
19.5000	7.4124	7.4231	7.4336	7.4441	7.4544
20.0000	7.4646	7.4747	7.4847	7.4946	7.5045
20.5000	7.5142	7.5239	7.5334	7.5429	7.5523
21.0000	7.5616	7.5708	7.5800	7.5890	7.5980
21.5000	7.6068	7.6156	7.6243	7.6329	7.6414

CUMULATIVE RAINFALL DEPTHS (in)

Time hrs	Output Time increment = .1000 hrs Time on left represents time for first value in each row.				
22.0000	7.6499	7.6582	7.6665	7.6746	7.6827
22.5000	7.6906	7.6986	7.7064	7.7141	7.7218
23.0000	7.7293	7.7367	7.7442	7.7514	7.7587
23.5000	7.7658	7.7728	7.7797	7.7866	7.7933
24.0000	7.8000				

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TIME OF CONCENTRATION CALCULATOR
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------------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n           .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope             .024000 ft/ft

Avg.Velocity          .13 ft/sec

                                         Segment #1 Time:     .2114 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   573.00 ft
Slope             .078400 ft/ft
Unpaved

Avg.Velocity         4.52 ft/sec

                                         Segment #2 Time:     .0352 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Shallow

Hydraulic Length   328.00 ft
Slope             .024800 ft/ft
Paved

Avg.Velocity         3.20 ft/sec

                                         Segment #3 Time:     .0285 hrs
------------------------------------------------------------------------

Segment #4:  Tc: Length & Vel.

Hydraulic Length   417.00 ft
Avg.Velocity        12.50 ft/sec

                                         Segment #4 Time:     .0093 hrs
------------------------------------------------------------------------
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Total Tc: .2844 hrs
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TIME OF CONCENTRATION CALCULATOR
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------------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope             .044900 ft/ft

Avg.Velocity          .17 ft/sec

                                        Segment #1 Time:     .1646 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   339.00 ft
Slope             .077300 ft/ft
Unpaved

Avg.Velocity         4.49 ft/sec

                                        Segment #2 Time:     .0210 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Shallow

Hydraulic Length   572.00 ft
Slope             .046200 ft/ft
Unpaved

Avg.Velocity         3.47 ft/sec

                                        Segment #3 Time:     .0458 hrs
------------------------------------------------------------------------

Segment #4:  Tc: Length & Vel.

Hydraulic Length   407.00 ft
Avg.Velocity        12.50 ft/sec

                                        Segment #4 Time:     .0090 hrs
------------------------------------------------------------------------
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Total Tc: .2404 hrs
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TIME OF CONCENTRATION CALCULATOR
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Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope             .021700 ft/ft

Avg.Velocity          .13 ft/sec

                                        Segment #1 Time:     .2201 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   144.00 ft
Slope             .032400 ft/ft
Unpaved

Avg.Velocity         2.90 ft/sec

                                        Segment #2 Time:     .0138 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Shallow

Hydraulic Length   227.00 ft
Slope             .017600 ft/ft
Paved

Avg.Velocity         2.70 ft/sec

                                        Segment #3 Time:     .0234 hrs
------------------------------------------------------------------------

Segment #4:  Tc: Length & Vel.

Hydraulic Length  3976.00 ft
Avg.Velocity        12.50 ft/sec

                                        Segment #4 Time:     .0884 hrs
------------------------------------------------------------------------
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Total Tc: .3456 hrs
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TIME OF CONCENTRATION CALCULATOR
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------------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope             .145100 ft/ft

Avg.Velocity          .27 ft/sec

                                        Segment #1 Time:     .1029 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   140.00 ft
Slope             .158100 ft/ft
Unpaved

Avg.Velocity         6.42 ft/sec

                                        Segment #2 Time:     .0061 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Channel

Flow Area          8.0000 sq.ft
Wetted Perimeter     9.00 ft
Hydraulic Radius      .89 ft
Slope             .014000 ft/ft
Mannings n          .0300
Hydraulic Length  1829.00 ft

Avg.Velocity         5.43 ft/sec

                                        Segment #3 Time:     .0935 hrs
------------------------------------------------------------------------

                                              =========================
                                               Total Tc:     .2025 hrs
                                              =========================
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TIME OF CONCENTRATION CALCULATOR
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Segment #1:  Tc: TR-55 Sheet

Mannings n           .2400
Hydraulic Length    68.00 ft
2yr, 24hr P        3.5000 in
Slope            .005000 ft/ft

Avg.Velocity          .06 ft/sec

                                         Segment #1 Time:     .2908 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length    64.00 ft
Slope            .054700 ft/ft
Unpaved

Avg.Velocity         3.77 ft/sec

                                         Segment #2 Time:     .0047 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Channel

Flow Area         20.0000 sq.ft
Wetted Perimeter     1.50 ft
Hydraulic Radius    13.33 ft
Slope            .016400 ft/ft
Mannings n           .0240
Hydraulic Length   550.00 ft

Avg.Velocity        44.71 ft/sec

                                         Segment #3 Time:     .0034 hrs
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                                                Total Tc:     .2990 hrs
                                               =========================
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 TIME OF CONCENTRATION CALCULATOR
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 Segment #1:  Tc: TR-55 Sheet

 Mannings n          .2400
 Hydraulic Length   100.00 ft
 2yr, 24hr P        3.5000 in
 Slope             .010000 ft/ft

 Avg.Velocity          .09 ft/sec

                                         Segment #1 Time:     .3001 hrs
 -----------------------------------------------------------------------

 Segment #2:  Tc: TR-55 Shallow

 Hydraulic Length   835.00 ft
 Slope             .010000 ft/ft
 Unpaved

 Avg.Velocity         1.61 ft/sec

                                         Segment #2 Time:     .1438 hrs
 -----------------------------------------------------------------------

 Segment #3:  Tc: Length & Vel.

 Hydraulic Length   158.00 ft
 Avg.Velocity        10.00 ft/sec

                                         Segment #3 Time:     .0044 hrs
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                                               =========================
                                                Total Tc:     .4482 hrs
                                               =========================
```

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TIME OF CONCENTRATION CALCULATOR
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Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope             .002500 ft/ft

Avg.Velocity          .05 ft/sec

                                        Segment #1 Time:     .5225 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   904.00 ft
Slope             .012200 ft/ft
Unpaved

Avg.Velocity         1.78 ft/sec

                                        Segment #2 Time:     .1409 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Channel

Flow Area         36.0000 sq.ft
Wetted Perimeter    36.00 ft
Hydraulic Radius     1.00 ft
Slope             .073100 ft/ft
Mannings n          .1000
Hydraulic Length   246.00 ft

Avg.Velocity         4.03 ft/sec

                                        Segment #3 Time:     .0170 hrs
------------------------------------------------------------------------

                                              =========================
                                               Total Tc:     .6803 hrs
                                              =========================
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File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

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TIME OF CONCENTRATION CALCULATOR
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Segment #1:  Tc: TR-55 Sheet

Mannings n          .0300
Hydraulic Length    82.00 ft
2yr, 24hr P        3.5000 in
Slope             .010000 ft/ft

Avg.Velocity          .47 ft/sec

                                         Segment #1 Time:     .0485 hrs
------------------------------------------------------------------------

Segment #2:  Tc: Length & Vel.

Hydraulic Length   950.00 ft
Avg.Velocity        12.50 ft/sec

                                         Segment #2 Time:     .0211 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .0696 hrs
                                               =========================
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TIME OF CONCENTRATION CALCULATOR
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-----------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope             .056500 ft/ft

Avg.Velocity          .19 ft/sec

                                         Segment #1 Time:     .1501 hrs
-----------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   261.00 ft
Slope             .222300 ft/ft
Unpaved

Avg.Velocity         7.61 ft/sec

                                         Segment #2 Time:     .0095 hrs
-----------------------------------------------------------------------

Segment #3:  Tc: TR-55 Shallow

Hydraulic Length   488.00 ft
Slope             .015500 ft/ft
Unpaved

Avg.Velocity         2.01 ft/sec

                                         Segment #3 Time:     .0675 hrs
-----------------------------------------------------------------------
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

Segment #4: Tc: TR-55 Channel

Flow Area	10.0000	sq.ft
Wetted Perimeter	9.50	ft
Hydraulic Radius	1.05	ft
Slope	.015500	ft/ft
Mannings n	.0300	
Hydraulic Length	488.00	ft

Avg.Velocity 6.40 ft/sec

Segment #4 Time: .0212 hrs

Total Tc: .2483 hrs

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


Segment #1:  Tc: TR-55 Sheet

Mannings n           .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope            .036900 ft/ft

Avg.Velocity          .16 ft/sec

                                        Segment #1 Time:     .1780 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   369.00 ft
Slope            .166000 ft/ft
Unpaved

Avg.Velocity         6.57 ft/sec

                                        Segment #2 Time:     .0156 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Channel

Flow Area         10.0000 sq.ft
Wetted Perimeter     9.50 ft
Hydraulic Radius     1.05 ft
Slope            .014200 ft/ft
Mannings n           .0300
Hydraulic Length   496.00 ft

Avg.Velocity         6.12 ft/sec

                                        Segment #3 Time:     .0225 hrs
------------------------------------------------------------------------

                                              =========================
                                               Total Tc:     .2161 hrs
                                              =========================
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

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TIME OF CONCENTRATION CALCULATOR
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------------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope             .066100 ft/ft

Avg.Velocity          .20 ft/sec

                                         Segment #1 Time:     .1410 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   317.00 ft
Slope             .185200 ft/ft
Unpaved

Avg.Velocity         6.94 ft/sec

                                         Segment #2 Time:     .0127 hrs
------------------------------------------------------------------------

Segment #3:  Tc: TR-55 Channel

Flow Area         10.0000 sq.ft
Wetted Perimeter     9.50 ft
Hydraulic Radius     1.05 ft
Slope             .011700 ft/ft
Mannings n          .0300
Hydraulic Length   550.00 ft

Avg.Velocity         5.56 ft/sec

                                         Segment #3 Time:     .0275 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:     .1811 hrs
                                               =========================
```

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


Segment #1:  Tc: TR-55 Sheet

Mannings n          .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope             .045000 ft/ft

Avg.Velocity          .17 ft/sec

                                        Segment #1 Time:     .1644 hrs
-----------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   284.00 ft
Slope             .152700 ft/ft
Unpaved

Avg.Velocity         6.30 ft/sec

                                        Segment #2 Time:     .0125 hrs
-----------------------------------------------------------------------

Segment #3:  Tc: TR-55 Channel

Flow Area         10.0000 sq.ft
Wetted Perimeter     9.50 ft
Hydraulic Radius     1.05 ft
Slope             .017600 ft/ft
Mannings n          .0300
Hydraulic Length   332.00 ft

Avg.Velocity         6.82 ft/sec

                                        Segment #3 Time:     .0135 hrs
-----------------------------------------------------------------------

                                              =========================
                                               Total Tc:     .1905 hrs
                                              =========================
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TIME OF CONCENTRATION CALCULATOR
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-----------------------------------------------------------------------


Segment #1:  Tc: TR-55 Sheet

Mannings n           .2400
Hydraulic Length   100.00 ft
2yr, 24hr P        3.5000 in
Slope             .034100 ft/ft

Avg.Velocity          .15 ft/sec

                                        Segment #1 Time:     .1837 hrs
-----------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   409.00 ft
Slope             .049000 ft/ft
Unpaved

Avg.Velocity         3.57 ft/sec

                                        Segment #2 Time:     .0318 hrs
-----------------------------------------------------------------------

Segment #3:  Tc: Length & Vel.

Hydraulic Length   650.00 ft
Avg.Velocity        12.50 ft/sec

                                        Segment #3 Time:     .0144 hrs
-----------------------------------------------------------------------

                                              =========================
                                               Total Tc:     .2300 hrs
                                              =========================
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

:::
TIME OF CONCENTRATION CALCULATOR
:::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	150.00	ft
2yr, 24hr P	3.5000	in
Slope	.066660	ft/ft
Avg.Velocity	.21	ft/sec

Segment #1 Time: .1943 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	627.00	ft
Slope	.052900	ft/ft
Unpaved		
Avg.Velocity	3.71	ft/sec

Segment #2 Time: .0469 hrs

Segment #3: Tc: Length & Vel.

Hydraulic Length	41.00	ft
Avg.Velocity	10.00	ft/sec

Segment #3 Time: .0011 hrs

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Segment #4: Tc: TR-55 Channel

Flow Area	19.5000	sq.ft
Wetted Perimeter	39.00	ft
Hydraulic Radius	.50	ft
Slope	.041400	ft/ft
Mannings n	.1000	
Hydraulic Length	396.00	ft

Avg.Velocity 1.91 ft/sec

Segment #4 Time: .0576 hrs

Segment #5: Tc: TR-55 Channel

Flow Area	11.0000	sq.ft
Wetted Perimeter	11.50	ft
Hydraulic Radius	.96	ft
Slope	.107300	ft/ft
Mannings n	.1000	
Hydraulic Length	394.00	ft

Avg.Velocity 4.74 ft/sec

Segment #5 Time: .0231 hrs

=========================
Total Tc: .3231 hrs
=========================

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

::

TIME OF CONCENTRATION CALCULATOR

::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2400	
Hydraulic Length	150.00	ft
2yr, 24hr P	3.5000	in
Slope	.086700	ft/ft
Avg.Velocity	.24	ft/sec

Segment #1 Time: .1749 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	428.00	ft
Slope	.026500	ft/ft
Unpaved		
Avg.Velocity	2.63	ft/sec

Segment #2 Time: .0453 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	36.0000	sq.ft
Wetted Perimeter	36.00	ft
Hydraulic Radius	1.00	ft
Slope	.018900	ft/ft
Mannings n	.1000	
Hydraulic Length	514.00	ft
Avg.Velocity	2.05	ft/sec

Segment #3 Time: .0697 hrs

Segment #4: Tc: TR-55 Shallow

Hydraulic Length   596.00 ft
Slope   .005000 ft/ft
Unpaved

Avg.Velocity   1.14 ft/sec

Segment #4 Time: .1451 hrs

=========================
Total Tc: .4350 hrs
=========================

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	8.040			70.00
Impervious Areas - Paved parking lo	98	7.500			98.00
Open space (Lawns,parks etc.) - Goo	74	7.000			74.00
COMPOSITE AREA & WEIGHTED CN --->		22.540			80.56 (81)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	14.120			70.00
Impervious Areas - Paved parking lo	98	8.930			98.00
Open space (Lawns,parks etc.) - Goo	74	10.320			74.00

COMPOSITE AREA & WEIGHTED CN --->   33.370   78.73 (79)

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File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	2.090			70.00
Impervious Areas - Paved parking lo	98	27.270			98.00
Open space (Lawns,parks etc.) - Goo	74	40.270			74.00

COMPOSITE AREA & WEIGHTED CN ---> 69.630 83.28 (83)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	8.190			70.00
COMPOSITE AREA & WEIGHTED CN --->		8.190			70.00 (70)

Name.... WATERSHED B4

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Impervious Areas - Paved parking lo	98	1.640			98.00
Open space (Lawns,parks etc.) - Goo	74	3.370			74.00
Woods - good	70	3.590			70.00
COMPOSITE AREA & WEIGHTED CN --->		8.600			76.91 (77)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Impervious Areas - Paved parking lo	98	7.500			98.00
Open space (Lawns,parks etc.) - Goo	74	4.500			74.00
COMPOSITE AREA & WEIGHTED CN --->		12.000			89.00 (89)

::

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Woods - good	70	9.950			70.00
COMPOSITE AREA & WEIGHTED CN --->		9.950			70.00 (70)

Name.... WATERSHED C3

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Impervious Areas - Paved parking lo	98	6.970			98.00
Open space (Lawns,parks etc.) - Goo	74	5.800			74.00

COMPOSITE AREA & WEIGHTED CN ---> 12.770 87.10 (87)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	2.510			70.00
COMPOSITE AREA & WEIGHTED CN --->		2.510			70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	5.080			70.00

COMPOSITE AREA & WEIGHTED CN ---> 5.080 70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	6.060			70.00
COMPOSITE AREA & WEIGHTED CN --->		6.060			70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	6.490			70.00
COMPOSITE AREA & WEIGHTED CN --->		6.490			70.00 (70)

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	1.160			70.00
Impervious Areas - Paved parking lo	98	6.590			98.00
Open space (Lawns,parks etc.) - Goo	74	11.030			74.00

COMPOSITE AREA & WEIGHTED CN ---> 18.780 82.17 (82)

::

Name.... WATERSHED H

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - good	70	5.970			70.00
Residential Districts - 1 acre	79	21.140			79.00
Impervious Areas - Paved; open ditc	92	1.610			92.00

COMPOSITE AREA & WEIGHTED CN ---> 28.720 77.86 (78)

Name.... WATERSHED I

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Impervious Areas - Paved parking lo	98	1.850			98.00
Woods - good	70	9.560			70.00
Open space (Lawns,parks etc.) - Goo	74	1.570			74.00

COMPOSITE AREA & WEIGHTED CN ---> 12.980 74.47 (74)

::

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 1 year storm
              Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED A Dev  1
              Tc            = .2844 hrs
              Drainage Area = 22.540 acres  Runoff CN= 81

              ============================================
              Computational Time Increment   =   .03792 hrs
              Computed Peak Time             =  12.2094 hrs
              Computed Peak Flow             =    22.53 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.2102 hrs
              Peak Flow, Interpolated Output =    22.52 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED A
                            CN   =   81
                            Area =      22.540 acres
                            S    =   2.3457 in
                            0.2S =    .4691 in

                             Cumulative Runoff
                            -------------------
                                    1.2371 in
                                     2.324 ac-ft

              HYG Volume...          2.324 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .28438 hrs (ID: WATERSHED A)
              Computational Incr, Tm =   .03792 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 =    89.80 cfs
              Unit peak time      Tp =   .18959 hrs
              Unit receding limb, Tr =   .75835 hrs
              Total unit time,    Tb =   .94794 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED A Dev 10
Tc            = .2844 hrs
Drainage Area = 22.540 acres  Runoff CN= 81

============================================
Computational Time Increment   =   .03792 hrs
Computed Peak Time             =  12.2094 hrs
Computed Peak Flow             =    63.18 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2102 hrs
Peak Flow, Interpolated Output =    63.14 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED A
              CN   =   81
              Area =      22.540 acres
              S    =   2.3457 in
              0.2S =    .4691 in

               Cumulative Runoff
              -------------------
                      3.4311 in
                       6.445 ac-ft

HYG Volume...          6.445 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .28438 hrs (ID: WATERSHED A)
Computational Incr, Tm =   .03792 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 =    89.80 cfs
Unit peak time      Tp =   .18959 hrs
Unit receding limb, Tr =   .75835 hrs
Total unit time,    Tb =   .94794 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED A Dev100
Tc            = .2844 hrs
Drainage Area = 22.540 acres  Runoff CN= 81

============================================
Computational Time Increment   =   .03792 hrs
Computed Peak Time             =  12.2094 hrs
Computed Peak Flow             =   100.81 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2102 hrs
Peak Flow, Interpolated Output =   100.73 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED A
              CN   =   81
              Area =      22.540 acres
              S    =   2.3457 in
              0.2S =    .4691 in

               Cumulative Runoff
              -------------------
                      5.5538 in
                      10.432 ac-ft

HYG Volume...         10.432 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .28438 hrs (ID: WATERSHED A)
Computational Incr, Tm =   .03792 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 =    89.80 cfs
Unit peak time      Tp =   .18959 hrs
Unit receding limb, Tr =   .75835 hrs
Total unit time,    Tb =   .94794 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED B Dev  1
Tc            = .2404 hrs
Drainage Area = 33.370 acres  Runoff CN= 79

============================================
Computational Time Increment   =   .03206 hrs
Computed Peak Time             =  12.1811 hrs
Computed Peak Flow             =    31.32 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1802 hrs
Peak Flow, Interpolated Output =    31.29 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED B
              CN   =   79
              Area =      33.370 acres
              S    =   2.6582 in
              0.2S =    .5316 in

               Cumulative Runoff
              -------------------
                      1.1159 in
                       3.103 ac-ft

HYG Volume...          3.103 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .24042 hrs (ID: WATERSHED B)
Computational Incr, Tm =   .03206 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 =   157.27 cfs
Unit peak time      Tp =   .16028 hrs
Unit receding limb, Tr =   .64111 hrs
Total unit time,    Tb =   .80139 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 10 year storm
              Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED B Dev 10
              Tc            = .2404 hrs
              Drainage Area = 33.370 acres  Runoff CN= 79

              ============================================
              Computational Time Increment   =   .03206 hrs
              Computed Peak Time             =  12.1811 hrs
              Computed Peak Flow             =    93.12 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.1802 hrs
              Peak Flow, Interpolated Output =    93.08 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED B
                            CN   =   79
                            Area =      33.370 acres
                            S    =   2.6582 in
                            0.2S =    .5316 in

                             Cumulative Runoff
                            -------------------
                                    3.2366 in
                                     9.001 ac-ft

              HYG Volume...          9.001 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .24042 hrs (ID: WATERSHED B)
              Computational Incr, Tm =   .03206 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 =   157.27 cfs
              Unit peak time      Tp =   .16028 hrs
              Unit receding limb, Tr =   .64111 hrs
              Total unit time,    Tb =   .80139 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED B Dev100
Tc            = .2404 hrs
Drainage Area = 33.370 acres  Runoff CN= 79

============================================
Computational Time Increment   =   .03206 hrs
Computed Peak Time             =  12.1811 hrs
Computed Peak Flow             =   151.34 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1802 hrs
Peak Flow, Interpolated Output =   151.30 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED B
              CN   =   79
              Area =      33.370 acres
              S    =   2.6582 in
              0.2S =    .5316 in

               Cumulative Runoff
              -------------------
                      5.3220 in
                      14.800 ac-ft

HYG Volume...         14.800 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .24042 hrs (ID: WATERSHED B)
Computational Incr, Tm =   .03206 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 =   157.27 cfs
Unit peak time      Tp =   .16028 hrs
Unit receding limb, Tr =   .64111 hrs
Total unit time,    Tb =   .80139 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED B2 Dev  1
Tc            = .3456 hrs
Drainage Area = 69.630 acres  Runoff CN= 83

============================================
Computational Time Increment   =   .04608 hrs
Computed Peak Time             =  12.2582 hrs
Computed Peak Flow             =    72.08 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2602 hrs
Peak Flow, Interpolated Output =    72.00 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED B2
              CN   =   83
              Area =      69.630 acres
              S    =   2.0482 in
              0.2S =    .4096 in

               Cumulative Runoff
              -------------------
                      1.3665 in
                       7.929 ac-ft

HYG Volume...          7.929 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .34562 hrs (ID: WATERSHED B2)
Computational Incr, Tm =   .04608 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 =   228.26 cfs
Unit peak time      Tp =   .23042 hrs
Unit receding limb, Tr =   .92167 hrs
Total unit time,    Tb =  1.15208 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 10 year storm
              Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED B2 Dev 10
              Tc            = .3456 hrs
              Drainage Area = 69.630 acres  Runoff CN= 83

              ============================================
              Computational Time Increment   =   .04608 hrs
              Computed Peak Time             =  12.2582 hrs
              Computed Peak Flow             =   190.87 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.2552 hrs
              Peak Flow, Interpolated Output =   190.80 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED B2
                            CN   =   83
                            Area =      69.630 acres
                            S    =   2.0482 in
                            0.2S =    .4096 in

                             Cumulative Runoff
                            -------------------
                                    3.6298 in
                                    21.062 ac-ft

              HYG Volume...         21.062 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .34562 hrs (ID: WATERSHED B2)
              Computational Incr, Tm =   .04608 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 =   228.26 cfs
              Unit peak time      Tp =   .23042 hrs
              Unit receding limb, Tr =   .92167 hrs
              Total unit time,    Tb =  1.15208 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 100 year storm
              Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED B2 Dev100
              Tc            = .3456 hrs
              Drainage Area = 69.630 acres  Runoff CN= 83

              ============================================
              Computational Time Increment   =   .04608 hrs
              Computed Peak Time             =  12.2582 hrs
              Computed Peak Flow             =   298.96 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.2552 hrs
              Peak Flow, Interpolated Output =   298.94 cfs
              ============================================

                               DRAINAGE AREA
                            -------------------
                            ID:WATERSHED B2
                            CN   =   83
                            Area =      69.630 acres
                            S    =   2.0482 in
                            0.2S =    .4096 in

                             Cumulative Runoff
                            -------------------
                                    5.7866 in
                                    33.577 ac-ft

              HYG Volume...         33.577 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .34562 hrs (ID: WATERSHED B2)
              Computational Incr, Tm =   .04608 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 =   228.26 cfs
              Unit peak time      Tp =   .23042 hrs
              Unit receding limb, Tr =   .92167 hrs
              Total unit time,    Tb =  1.15208 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED B3 Dev  1
Tc            = .2025 hrs
Drainage Area = 8.190 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02700 hrs
Computed Peak Time             =  12.1778 hrs
Computed Peak Flow             =     4.25 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1802 hrs
Peak Flow, Interpolated Output =     4.25 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED B3
              CN   =   70
              Area =       8.190 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                        .450 ac-ft

HYG Volume...           .450 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .20251 hrs (ID: WATERSHED B3)
Computational Incr, Tm =   .02700 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 =    45.82 cfs
Unit peak time      Tp =   .13501 hrs
Unit receding limb, Tr =   .54003 hrs
Total unit time,    Tb =   .67504 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 10 year storm
              Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED B3 Dev 10
              Tc            = .2025 hrs
              Drainage Area = 8.190 acres  Runoff CN= 70

              ============================================
              Computational Time Increment   =   .02700 hrs
              Computed Peak Time             =  12.1508 hrs
              Computed Peak Flow             =    17.74 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.1552 hrs
              Peak Flow, Interpolated Output =    17.73 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED B3
                            CN   =   70
                            Area =       8.190 acres
                            S    =   4.2857 in
                            0.2S =    .8571 in

                             Cumulative Runoff
                            -------------------
                                    2.4143 in
                                     1.648 ac-ft

              HYG Volume...          1.648 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .20251 hrs (ID: WATERSHED B3)
              Computational Incr, Tm =   .02700 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 =    45.82 cfs
              Unit peak time      Tp =   .13501 hrs
              Unit receding limb, Tr =   .54003 hrs
              Total unit time,    Tb =   .67504 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED B3 Dev100
Tc            = .2025 hrs
Drainage Area = 8.190 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02700 hrs
Computed Peak Time             =  12.1508 hrs
Computed Peak Flow             =    31.91 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1502 hrs
Peak Flow, Interpolated Output =    31.89 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED B3
              CN   =   70
              Area =       8.190 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      4.2929 in
                       2.930 ac-ft

HYG Volume...          2.930 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .20251 hrs (ID: WATERSHED B3)
Computational Incr, Tm =   .02700 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 =    45.82 cfs
Unit peak time      Tp =   .13501 hrs
Unit receding limb, Tr =   .54003 hrs
Total unit time,    Tb =   .67504 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED B4 Dev  1
Tc            = .2990 hrs
Drainage Area = 8.600 acres  Runoff CN= 77

============================================
Computational Time Increment   =   .03986 hrs
Computed Peak Time             =  12.2377 hrs
Computed Peak Flow             =     6.63 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2352 hrs
Peak Flow, Interpolated Output =     6.63 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED B4
              CN   =   77
              Area =       8.600 acres
              S    =   2.9870 in
              0.2S =    .5974 in

               Cumulative Runoff
              -------------------
                      1.0023 in
                        .718 ac-ft

HYG Volume...           .718 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .29897 hrs (ID: WATERSHED B4)
Computational Incr, Tm =   .03986 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 =    32.59 cfs
Unit peak time      Tp =   .19931 hrs
Unit receding limb, Tr =   .79725 hrs
Total unit time,    Tb =   .99656 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED B4 Dev 10
Tc            = .2990 hrs
Drainage Area = 8.600 acres  Runoff CN= 77

============================================
Computational Time Increment   =   .03986 hrs
Computed Peak Time             =  12.1979 hrs
Computed Peak Flow             =    20.96 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2002 hrs
Peak Flow, Interpolated Output =    20.96 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED B4
              CN   =   77
              Area =       8.600 acres
              S    =   2.9870 in
              0.2S =    .5974 in

               Cumulative Runoff
              -------------------
                      3.0465 in
                       2.183 ac-ft

HYG Volume...          2.183 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .29897 hrs (ID: WATERSHED B4)
Computational Incr, Tm =   .03986 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 =    32.59 cfs
Unit peak time      Tp =   .19931 hrs
Unit receding limb, Tr =   .79725 hrs
Total unit time,    Tb =   .99656 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED B4 Dev100
Tc            = .2990 hrs
Drainage Area = 8.600 acres  Runoff CN= 77

============================================
Computational Time Increment   =   .03986 hrs
Computed Peak Time             =  12.1979 hrs
Computed Peak Flow             =    34.93 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2002 hrs
Peak Flow, Interpolated Output =    34.91 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED B4
              CN   =   77
              Area =       8.600 acres
              S    =   2.9870 in
              0.2S =    .5974 in

               Cumulative Runoff
              -------------------
                      5.0912 in
                       3.649 ac-ft

HYG Volume...          3.649 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .29897 hrs (ID: WATERSHED B4)
Computational Incr, Tm =   .03986 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 =    32.59 cfs
Unit peak time      Tp =   .19931 hrs
Unit receding limb, Tr =   .79725 hrs
Total unit time,    Tb =   .99656 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 1 year storm
              Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED C Dev  1
              Tc            = .4482 hrs
              Drainage Area = 12.000 acres  Runoff CN= 89

              ============================================
              Computational Time Increment   =   .05976 hrs
              Computed Peak Time             =  12.3112 hrs
              Computed Peak Flow             =    14.92 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.3102 hrs
              Peak Flow, Interpolated Output =    14.91 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED C
                            CN   =   89
                            Area =      12.000 acres
                            S    =   1.2360 in
                            0.2S =    .2472 in

                             Cumulative Runoff
                            -------------------
                                    1.8097 in
                                     1.810 ac-ft

              HYG Volume...          1.810 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .44822 hrs (ID: WATERSHED C)
              Computational Incr, Tm =   .05976 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 =    30.33 cfs
              Unit peak time      Tp =   .29882 hrs
              Unit receding limb, Tr =  1.19526 hrs
              Total unit time,    Tb =  1.49408 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 10 year storm
              Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED C Dev 10
              Tc            = .4482 hrs
              Drainage Area = 12.000 acres  Runoff CN= 89

              ============================================
              Computational Time Increment   =   .05976 hrs
              Computed Peak Time             =  12.3112 hrs
              Computed Peak Flow             =    34.10 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.3102 hrs
              Peak Flow, Interpolated Output =    34.09 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED C
                            CN   =   89
                            Area =      12.000 acres
                            S    =   1.2360 in
                            0.2S =    .2472 in

                             Cumulative Runoff
                            -------------------
                                    4.2523 in
                                     4.252 ac-ft

              HYG Volume...          4.252 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .44822 hrs (ID: WATERSHED C)
              Computational Incr, Tm =   .05976 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 =    30.33 cfs
              Unit peak time      Tp =   .29882 hrs
              Unit receding limb, Tr =  1.19526 hrs
              Total unit time,    Tb =  1.49408 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED C Dev100
Tc            = .4482 hrs
Drainage Area = 12.000 acres  Runoff CN= 89

============================================
Computational Time Increment   =   .05976 hrs
Computed Peak Time             =  12.3112 hrs
Computed Peak Flow             =    50.94 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3102 hrs
Peak Flow, Interpolated Output =    50.92 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED C
              CN   =   89
              Area =      12.000 acres
              S    =   1.2360 in
              0.2S =    .2472 in

               Cumulative Runoff
              -------------------
                      6.4907 in
                       6.491 ac-ft

HYG Volume...          6.491 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .44822 hrs (ID: WATERSHED C)
Computational Incr, Tm =   .05976 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 =    30.33 cfs
Unit peak time      Tp =   .29882 hrs
Unit receding limb, Tr =  1.19526 hrs
Total unit time,    Tb =  1.49408 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 1 year storm
              Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED C2 Dev  1
              Tc            = .6803 hrs
              Drainage Area = 9.950 acres  Runoff CN= 70

              ============================================
              Computational Time Increment   =   .09071 hrs
              Computed Peak Time             =  12.5181 hrs
              Computed Peak Flow             =     3.18 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.5202 hrs
              Peak Flow, Interpolated Output =     3.18 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED C2
                            CN   =   70
                            Area =       9.950 acres
                            S    =   4.2857 in
                            0.2S =    .8571 in

                             Cumulative Runoff
                            -------------------
                                     .6594 in
                                      .547 ac-ft

              HYG Volume...           .547 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .68033 hrs (ID: WATERSHED C2)
              Computational Incr, Tm =   .09071 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 =    16.57 cfs
              Unit peak time      Tp =   .45356 hrs
              Unit receding limb, Tr =  1.81422 hrs
              Total unit time,    Tb =  2.26778 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 10 year storm
              Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED C2 Dev 10
              Tc            = .6803 hrs
              Drainage Area = 9.950 acres  Runoff CN= 70

              ============================================
              Computational Time Increment   =   .09071 hrs
              Computed Peak Time             =  12.5181 hrs
              Computed Peak Flow             =    13.44 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.5152 hrs
              Peak Flow, Interpolated Output =    13.43 cfs
              ============================================

                               DRAINAGE AREA
                            -------------------
                            ID:WATERSHED C2
                            CN   =   70
                            Area =       9.950 acres
                            S    =   4.2857 in
                            0.2S =    .8571 in

                             Cumulative Runoff
                            -------------------
                                    2.4143 in
                                     2.002 ac-ft

              HYG Volume...          2.002 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .68033 hrs (ID: WATERSHED C2)
              Computational Incr, Tm =   .09071 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 =    16.57 cfs
              Unit peak time      Tp =   .45356 hrs
              Unit receding limb, Tr =  1.81422 hrs
              Total unit time,    Tb =  2.26778 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 100 year storm
              Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED C2 Dev100
              Tc            = .6803 hrs
              Drainage Area = 9.950 acres  Runoff CN= 70

              ============================================
              Computational Time Increment   =   .09071 hrs
              Computed Peak Time             =  12.5181 hrs
              Computed Peak Flow             =    24.10 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.5152 hrs
              Peak Flow, Interpolated Output =    24.09 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED C2
                            CN   =   70
                            Area =       9.950 acres
                            S    =   4.2857 in
                            0.2S =    .8571 in

                             Cumulative Runoff
                            -------------------
                                    4.2929 in
                                     3.560 ac-ft

              HYG Volume...          3.560 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .68033 hrs (ID: WATERSHED C2)
              Computational Incr, Tm =   .09071 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 =    16.57 cfs
              Unit peak time      Tp =   .45356 hrs
              Unit receding limb, Tr =  1.81422 hrs
              Total unit time,    Tb =  2.26778 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED C3 Dev  1
Tc            = .0696 hrs
Drainage Area = 12.770 acres  Runoff CN= 87

============================================
Computational Time Increment   =   .00928 hrs
Computed Peak Time             =  12.1044 hrs
Computed Peak Flow             =    22.10 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1052 hrs
Peak Flow, Interpolated Output =    22.08 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED C3
              CN   =   87
              Area =      12.770 acres
              S    =   1.4943 in
              0.2S =    .2989 in

               Cumulative Runoff
              -------------------
                      1.6521 in
                       1.758 ac-ft

HYG Volume...          1.758 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .06962 hrs (ID: WATERSHED C3)
Computational Incr, Tm =   .00928 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 =   207.83 cfs
Unit peak time      Tp =   .04641 hrs
Unit receding limb, Tr =   .18565 hrs
Total unit time,    Tb =   .23206 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED C3 Dev 10
Tc            = .0696 hrs
Drainage Area = 12.770 acres  Runoff CN= 87

============================================
Computational Time Increment   =   .00928 hrs
Computed Peak Time             =  12.0951 hrs
Computed Peak Flow             =    51.63 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.0952 hrs
Peak Flow, Interpolated Output =    51.63 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED C3
              CN   =   87
              Area =      12.770 acres
              S    =   1.4943 in
              0.2S =    .2989 in

               Cumulative Runoff
              -------------------
                      4.0404 in
                       4.300 ac-ft

HYG Volume...          4.300 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .06962 hrs (ID: WATERSHED C3)
Computational Incr, Tm =   .00928 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 =   207.83 cfs
Unit peak time      Tp =   .04641 hrs
Unit receding limb, Tr =   .18565 hrs
Total unit time,    Tb =   .23206 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED C3 Dev100
Tc            = .0696 hrs
Drainage Area = 12.770 acres  Runoff CN= 87

============================================
Computational Time Increment   =   .00928 hrs
Computed Peak Time             =  12.0951 hrs
Computed Peak Flow             =    77.71 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.0952 hrs
Peak Flow, Interpolated Output =    77.70 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED C3
              CN   =   87
              Area =      12.770 acres
              S    =   1.4943 in
              0.2S =    .2989 in

               Cumulative Runoff
              -------------------
                      6.2551 in
                       6.656 ac-ft

HYG Volume...          6.656 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .06962 hrs (ID: WATERSHED C3)
Computational Incr, Tm =   .00928 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 =   207.83 cfs
Unit peak time      Tp =   .04641 hrs
Unit receding limb, Tr =   .18565 hrs
Total unit time,    Tb =   .23206 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED D Dev  1
Tc            = .2483 hrs
Drainage Area = 2.510 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .03311 hrs
Computed Peak Time             =  12.2169 hrs
Computed Peak Flow             =     1.22 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2152 hrs
Peak Flow, Interpolated Output =     1.22 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED D
              CN   =   70
              Area =       2.510 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                        .138 ac-ft

HYG Volume...           .138 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .24831 hrs (ID: WATERSHED D)
Computational Incr, Tm =   .03311 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 =    11.45 cfs
Unit peak time      Tp =   .16554 hrs
Unit receding limb, Tr =   .66216 hrs
Total unit time,    Tb =   .82770 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED D Dev 10
Tc            = .2483 hrs
Drainage Area = 2.510 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .03311 hrs
Computed Peak Time             =  12.1838 hrs
Computed Peak Flow             =     5.12 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1852 hrs
Peak Flow, Interpolated Output =     5.12 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED D
              CN   =   70
              Area =       2.510 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                        .505 ac-ft

HYG Volume...           .505 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .24831 hrs (ID: WATERSHED D)
Computational Incr, Tm =   .03311 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 =    11.45 cfs
Unit peak time      Tp =   .16554 hrs
Unit receding limb, Tr =   .66216 hrs
Total unit time,    Tb =   .82770 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 100 year storm
              Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED D Dev100
              Tc            = .2483 hrs
              Drainage Area = 2.510 acres  Runoff CN= 70

              ============================================
              Computational Time Increment   =   .03311 hrs
              Computed Peak Time             =  12.1838 hrs
              Computed Peak Flow             =     9.21 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.1852 hrs
              Peak Flow, Interpolated Output =     9.20 cfs
              ============================================

                               DRAINAGE AREA
                            -------------------
                            ID:WATERSHED D
                            CN   =   70
                            Area =       2.510 acres
                            S    =   4.2857 in
                            0.2S =    .8571 in

                             Cumulative Runoff
                            -------------------
                                    4.2929 in
                                      .898 ac-ft

              HYG Volume...           .898 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .24831 hrs (ID: WATERSHED D)
              Computational Incr, Tm =   .03311 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 =    11.45 cfs
              Unit peak time      Tp =   .16554 hrs
              Unit receding limb, Tr =   .66216 hrs
              Total unit time,    Tb =   .82770 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED E Dev  1
Tc            = .2161 hrs
Drainage Area = 5.080 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02881 hrs
Computed Peak Time             =  12.1875 hrs
Computed Peak Flow             =     2.59 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1902 hrs
Peak Flow, Interpolated Output =     2.59 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED E
              CN   =   70
              Area =       5.080 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                        .279 ac-ft

HYG Volume...           .279 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .21609 hrs (ID: WATERSHED E)
Computational Incr, Tm =   .02881 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 =    26.64 cfs
Unit peak time      Tp =   .14406 hrs
Unit receding limb, Tr =   .57624 hrs
Total unit time,    Tb =   .72030 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED E Dev 10
Tc            = .2161 hrs
Drainage Area = 5.080 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02881 hrs
Computed Peak Time             =  12.1587 hrs
Computed Peak Flow             =    10.83 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1602 hrs
Peak Flow, Interpolated Output =    10.83 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED E
              CN   =   70
              Area =       5.080 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                       1.022 ac-ft

HYG Volume...          1.022 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .21609 hrs (ID: WATERSHED E)
Computational Incr, Tm =   .02881 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 =    26.64 cfs
Unit peak time      Tp =   .14406 hrs
Unit receding limb, Tr =   .57624 hrs
Total unit time,    Tb =   .72030 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED E Dev100
Tc            = .2161 hrs
Drainage Area = 5.080 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02881 hrs
Computed Peak Time             =  12.1587 hrs
Computed Peak Flow             =    19.49 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1602 hrs
Peak Flow, Interpolated Output =    19.47 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED E
              CN   =   70
              Area =       5.080 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      4.2929 in
                       1.817 ac-ft

HYG Volume...          1.817 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .21609 hrs (ID: WATERSHED E)
Computational Incr, Tm =   .02881 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 =    26.64 cfs
Unit peak time      Tp =   .14406 hrs
Unit receding limb, Tr =   .57624 hrs
Total unit time,    Tb =   .72030 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED F Dev  1
Tc            = .1811 hrs
Drainage Area = 6.060 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02415 hrs
Computed Peak Time             =  12.1728 hrs
Computed Peak Flow             =     3.26 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1702 hrs
Peak Flow, Interpolated Output =     3.26 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED F
              CN   =   70
              Area =       6.060 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                        .333 ac-ft

HYG Volume...           .333 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .18114 hrs (ID: WATERSHED F)
Computational Incr, Tm =   .02415 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 =    37.91 cfs
Unit peak time      Tp =   .12076 hrs
Unit receding limb, Tr =   .48305 hrs
Total unit time,    Tb =   .60381 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED F Dev 10
Tc            = .1811 hrs
Drainage Area = 6.060 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02415 hrs
Computed Peak Time             =  12.1486 hrs
Computed Peak Flow             =    13.58 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1502 hrs
Peak Flow, Interpolated Output =    13.57 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED F
              CN   =   70
              Area =       6.060 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                       1.219 ac-ft

HYG Volume...          1.219 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .18114 hrs (ID: WATERSHED F)
Computational Incr, Tm =   .02415 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 =    37.91 cfs
Unit peak time      Tp =   .12076 hrs
Unit receding limb, Tr =   .48305 hrs
Total unit time,    Tb =   .60381 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 100 year storm
              Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED F Dev100
              Tc            = .1811 hrs
              Drainage Area = 6.060 acres  Runoff CN= 70

              ============================================
              Computational Time Increment   =   .02415 hrs
              Computed Peak Time             =  12.1486 hrs
              Computed Peak Flow             =    24.32 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.1502 hrs
              Peak Flow, Interpolated Output =    24.28 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED F
                            CN   =   70
                            Area =       6.060 acres
                            S    =   4.2857 in
                            0.2S =    .8571 in

                             Cumulative Runoff
                            -------------------
                                    4.2929 in
                                     2.168 ac-ft

              HYG Volume...          2.168 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .18114 hrs (ID: WATERSHED F)
              Computational Incr, Tm =   .02415 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 =    37.91 cfs
              Unit peak time      Tp =   .12076 hrs
              Unit receding limb, Tr =   .48305 hrs
              Total unit time,    Tb =   .60381 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED G Dev  1
Tc            = .1905 hrs
Drainage Area = 6.490 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02539 hrs
Computed Peak Time             =  12.1638 hrs
Computed Peak Flow             =     3.42 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1652 hrs
Peak Flow, Interpolated Output =     3.42 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED G
              CN   =   70
              Area =       6.490 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                       .6594 in
                        .357 ac-ft

HYG Volume...           .357 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .19046 hrs (ID: WATERSHED G)
Computational Incr, Tm =   .02539 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 =    38.61 cfs
Unit peak time      Tp =   .12697 hrs
Unit receding limb, Tr =   .50788 hrs
Total unit time,    Tb =   .63485 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED G Dev 10
Tc            = .1905 hrs
Drainage Area = 6.490 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02539 hrs
Computed Peak Time             =  12.1638 hrs
Computed Peak Flow             =    14.28 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1602 hrs
Peak Flow, Interpolated Output =    14.26 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED G
              CN   =   70
              Area =       6.490 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      2.4143 in
                       1.306 ac-ft

HYG Volume...          1.306 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .19046 hrs (ID: WATERSHED G)
Computational Incr, Tm =   .02539 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 =    38.61 cfs
Unit peak time      Tp =   .12697 hrs
Unit receding limb, Tr =   .50788 hrs
Total unit time,    Tb =   .63485 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED G Dev100
Tc            = .1905 hrs
Drainage Area = 6.490 acres  Runoff CN= 70

============================================
Computational Time Increment   =   .02539 hrs
Computed Peak Time             =  12.1384 hrs
Computed Peak Flow             =    25.54 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1402 hrs
Peak Flow, Interpolated Output =    25.53 cfs
============================================

                  DRAINAGE AREA
              -------------------
              ID:WATERSHED G
              CN   =   70
              Area =       6.490 acres
              S    =   4.2857 in
              0.2S =    .8571 in

               Cumulative Runoff
              -------------------
                      4.2929 in
                       2.322 ac-ft

HYG Volume...          2.322 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .19046 hrs (ID: WATERSHED G)
Computational Incr, Tm =   .02539 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 =    38.61 cfs
Unit peak time      Tp =   .12697 hrs
Unit receding limb, Tr =   .50788 hrs
Total unit time,    Tb =   .63485 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 1 year storm
              Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED G2 Dev  1
              Tc            = .2300 hrs
              Drainage Area = 18.780 acres  Runoff CN= 82

              ============================================
              Computational Time Increment   =   .03066 hrs
              Computed Peak Time             =  12.1728 hrs
              Computed Peak Flow             =    21.19 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.1752 hrs
              Peak Flow, Interpolated Output =    21.17 cfs
              ============================================

                               DRAINAGE AREA
                            -------------------
                            ID:WATERSHED G2
                            CN   =   82
                            Area =      18.780 acres
                            S    =   2.1951 in
                            0.2S =    .4390 in

                             Cumulative Runoff
                            -------------------
                                    1.3007 in
                                     2.036 ac-ft

              HYG Volume...          2.036 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .22996 hrs (ID: WATERSHED G2)
              Computational Incr, Tm =   .03066 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 =    92.53 cfs
              Unit peak time      Tp =   .15331 hrs
              Unit receding limb, Tr =   .61324 hrs
              Total unit time,    Tb =   .76655 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 10 year storm
              Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED G2 Dev 10
              Tc            = .2300 hrs
              Drainage Area = 18.780 acres  Runoff CN= 82

              ============================================
              Computational Time Increment   =   .03066 hrs
              Computed Peak Time             =  12.1728 hrs
              Computed Peak Flow             =    57.67 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.1702 hrs
              Peak Flow, Interpolated Output =    57.60 cfs
              ============================================

                               DRAINAGE AREA
                            -------------------
                            ID:WATERSHED G2
                            CN   =   82
                            Area =      18.780 acres
                            S    =   2.1951 in
                            0.2S =    .4390 in

                             Cumulative Runoff
                            -------------------
                                    3.5299 in
                                     5.524 ac-ft

              HYG Volume...          5.524 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .22996 hrs (ID: WATERSHED G2)
              Computational Incr, Tm =   .03066 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 =    92.53 cfs
              Unit peak time      Tp =   .15331 hrs
              Unit receding limb, Tr =   .61324 hrs
              Total unit time,    Tb =   .76655 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED G2 Dev100
Tc            = .2300 hrs
Drainage Area = 18.780 acres  Runoff CN= 82

============================================
Computational Time Increment   =   .03066 hrs
Computed Peak Time             =  12.1728 hrs
Computed Peak Flow             =    91.11 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.1702 hrs
Peak Flow, Interpolated Output =    91.04 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED G2
              CN   =   82
              Area =      18.780 acres
              S    =   2.1951 in
              0.2S =    .4390 in

               Cumulative Runoff
              -------------------
                      5.6701 in
                       8.874 ac-ft

HYG Volume...          8.874 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .22996 hrs (ID: WATERSHED G2)
Computational Incr, Tm =   .03066 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 =    92.53 cfs
Unit peak time      Tp =   .15331 hrs
Unit receding limb, Tr =   .61324 hrs
Total unit time,    Tb =   .76655 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 1 year storm
              Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED H Dev  1
              Tc            = .3231 hrs
              Drainage Area = 28.720 acres  Runoff CN= 78

              ============================================
              Computational Time Increment   =   .04308 hrs
              Computed Peak Time             =  12.2349 hrs
              Computed Peak Flow             =    22.94 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.2352 hrs
              Peak Flow, Interpolated Output =    22.94 cfs
              ============================================

                                DRAINAGE AREA
                             -------------------
                             ID:WATERSHED H
                             CN   =   78
                             Area =      28.720 acres
                             S    =   2.8205 in
                             0.2S =    .5641 in

                              Cumulative Runoff
                             -------------------
                                     1.0582 in
                                      2.533 ac-ft

              HYG Volume...           2.533 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .32311 hrs (ID: WATERSHED H)
              Computational Incr, Tm =   .04308 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 =   100.71 cfs
              Unit peak time      Tp =   .21540 hrs
              Unit receding limb, Tr =   .86161 hrs
              Total unit time,    Tb =  1.07702 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 10 year storm
Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED H Dev 10
Tc            = .3231 hrs
Drainage Area = 28.720 acres  Runoff CN= 78

============================================
Computational Time Increment   =   .04308 hrs
Computed Peak Time             =  12.2349 hrs
Computed Peak Flow             =    70.68 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2352 hrs
Peak Flow, Interpolated Output =    70.67 cfs
============================================

                  DRAINAGE AREA
              -------------------
              ID:WATERSHED H
              CN   =   78
              Area =      28.720 acres
              S    =   2.8205 in
              0.2S =    .5641 in

               Cumulative Runoff
              -------------------
                      3.1410 in
                       7.518 ac-ft

HYG Volume...          7.518 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .32311 hrs (ID: WATERSHED H)
Computational Incr, Tm =   .04308 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 =   100.71 cfs
Unit peak time      Tp =   .21540 hrs
Unit receding limb, Tr =   .86161 hrs
Total unit time,    Tb =  1.07702 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED H Dev100
Tc            = .3231 hrs
Drainage Area = 28.720 acres  Runoff CN= 78

============================================
Computational Time Increment   =   .04308 hrs
Computed Peak Time             =  12.2349 hrs
Computed Peak Flow             =   116.17 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2352 hrs
Peak Flow, Interpolated Output =   116.14 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED H
              CN   =   78
              Area =      28.720 acres
              S    =   2.8205 in
              0.2S =    .5641 in

               Cumulative Runoff
              -------------------
                      5.2065 in
                      12.461 ac-ft

HYG Volume...         12.461 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .32311 hrs (ID: WATERSHED H)
Computational Incr, Tm =   .04308 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 =   100.71 cfs
Unit peak time      Tp =   .21540 hrs
Unit receding limb, Tr =   .86161 hrs
Total unit time,    Tb =  1.07702 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 1 year storm
Duration      = 24.0000 hrs     Rain Depth = 2.9000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED I Dev  1
Tc            = .4350 hrs
Drainage Area = 12.980 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .05800 hrs
Computed Peak Time             =  12.3546 hrs
Computed Peak Flow             =     7.07 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.3552 hrs
Peak Flow, Interpolated Output =     7.07 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED I
              CN   =   74
              Area =      12.980 acres
              S    =   3.5135 in
              0.2S =    .7027 in

               Cumulative Runoff
              -------------------
                       .8454 in
                        .914 ac-ft

HYG Volume...           .914 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .43502 hrs (ID: WATERSHED I)
Computational Incr, Tm =   .05800 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 =    33.81 cfs
Unit peak time      Tp =   .29002 hrs
Unit receding limb, Tr =  1.16006 hrs
Total unit time,    Tb =  1.45008 hrs
```

```
              SCS UNIT HYDROGRAPH METHOD

              STORM EVENT: 10 year storm
              Duration      = 24.0000 hrs     Rain Depth = 5.5000 in
              Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              Rain File -ID =  - TypeIII 24hr
              Unit Hyd Type = Default Curvilinear
              HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
              HYG File - ID =  - WATERSHED I Dev 10
              Tc            = .4350 hrs
              Drainage Area = 12.980 acres  Runoff CN= 74

              ============================================
              Computational Time Increment   =   .05800 hrs
              Computed Peak Time             =  12.2966 hrs
              Computed Peak Flow             =    24.91 cfs

              Time Increment for HYG File    =    .0050 hrs
              Peak Time, Interpolated Output =  12.3002 hrs
              Peak Flow, Interpolated Output =    24.90 cfs
              ============================================

                                 DRAINAGE AREA
                            -------------------
                            ID:WATERSHED I
                            CN   =   74
                            Area =      12.980 acres
                            S    =   3.5135 in
                            0.2S =    .7027 in

                             Cumulative Runoff
                            -------------------
                                    2.7692 in
                                     2.995 ac-ft

              HYG Volume...          2.995 ac-ft (area under HYG curve)

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

              Time Concentration, Tc =   .43502 hrs (ID: WATERSHED I)
              Computational Incr, Tm =   .05800 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 =    33.81 cfs
              Unit peak time      Tp =   .29002 hrs
              Unit receding limb, Tr =  1.16006 hrs
              Total unit time,    Tb =  1.45008 hrs
```

```
SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration      = 24.0000 hrs     Rain Depth = 7.8000 in
Rain Dir      = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Rain File -ID =  - TypeIII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
HYG File - ID =  - WATERSHED I Dev100
Tc            = .4350 hrs
Drainage Area = 12.980 acres  Runoff CN= 74

============================================
Computational Time Increment   =   .05800 hrs
Computed Peak Time             =  12.2966 hrs
Computed Peak Flow             =    42.88 cfs

Time Increment for HYG File    =    .0050 hrs
Peak Time, Interpolated Output =  12.2952 hrs
Peak Flow, Interpolated Output =    42.84 cfs
============================================

                 DRAINAGE AREA
              -------------------
              ID:WATERSHED I
              CN   =   74
              Area =      12.980 acres
              S    =   3.5135 in
              0.2S =    .7027 in

               Cumulative Runoff
              -------------------
                      4.7472 in
                       5.135 ac-ft

HYG Volume...          5.135 ac-ft (area under HYG curve)

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

Time Concentration, Tc =   .43502 hrs (ID: WATERSHED I)
Computational Incr, Tm =   .05800 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 =    33.81 cfs
Unit peak time      Tp =   .29002 hrs
Unit receding limb, Tr =  1.16006 hrs
Total unit time,    Tb =  1.45008 hrs
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

TRAPEZOIDAL CROSS SECTION

Slope = .032855 ft/ft
Mannings n = 0.24000
Invert Elev. = 175.48 ft
Top of Channel = 176.98 ft
Base width = 100.00 ft
Rt Side slope = 50.000 horizontal :1 vert.
Lt Side slope = 50.000 horizontal :1 vert.

Elev. (ft)	Depth (ft)	Flow (cfs)	Vel. (ft/sec)	Area (sq.ft)	Top W. (ft)	Wet.P. (ft)	Hd (ft)	Froude No.
175.480	.00	.00	.00	.0000	.00	.00	.00	0.00
175.490	.01	.05	.05	1.0044	101.00	101.00	.01	0.09
175.510	.03	.33	.11	3.0449	103.00	103.00	.03	0.11
175.540	.06	1.04	.17	6.1797	106.00	106.00	.06	0.12
175.570	.09	2.06	.22	9.4046	109.00	109.00	.09	0.13
175.600	.12	3.35	.26	12.7195	112.00	112.00	.11	0.14
175.630	.15	4.88	.30	16.1243	115.00	115.00	.14	0.14
175.660	.18	6.66	.34	19.6191	118.00	118.00	.17	0.15
175.690	.21	8.66	.37	23.2058	121.00	121.00	.19	0.15
175.720	.24	10.89	.40	26.8807	124.00	124.01	.22	0.15
175.750	.27	13.33	.43	30.6455	127.00	127.01	.24	0.16
175.780	.30	15.99	.46	34.5004	130.00	130.01	.27	0.16
175.810	.33	18.86	.49	38.4452	133.00	133.01	.29	0.16
175.840	.36	21.95	.52	42.4801	136.00	136.01	.31	0.16
175.870	.39	25.24	.54	46.6049	139.00	139.01	.34	0.16
175.900	.42	28.75	.57	50.8197	142.00	142.01	.36	0.17
175.930	.45	32.46	.59	55.1246	145.00	145.01	.38	0.17
175.960	.48	36.39	.61	59.5194	148.00	148.01	.40	0.17
175.990	.51	40.53	.63	64.0042	151.00	151.01	.42	0.17
176.020	.54	44.88	.65	68.5790	154.00	154.01	.45	0.17
176.050	.57	49.44	.68	73.2462	157.00	157.01	.47	0.17
176.080	.60	54.22	.70	78.0010	160.00	160.01	.49	0.18
176.110	.63	59.21	.71	82.8458	163.00	163.01	.51	0.18
176.140	.66	64.41	.73	87.7806	166.00	166.01	.53	0.18
176.170	.69	69.84	.75	92.8054	169.00	169.01	.55	0.18
176.200	.72	75.48	.77	97.9202	172.00	172.01	.57	0.18
176.230	.75	81.34	.79	103.1250	175.00	175.02	.59	0.18
176.260	.78	87.42	.81	108.4198	178.00	178.02	.61	0.18
176.290	.81	93.73	.82	113.8046	181.00	181.02	.63	0.18
176.320	.84	100.26	.84	119.2793	184.00	184.02	.65	0.18
176.350	.87	107.01	.86	124.8441	187.00	187.02	.67	0.18
176.380	.90	114.00	.87	130.4988	190.00	190.02	.69	0.19
176.410	.93	121.21	.89	136.2436	193.00	193.02	.71	0.19
176.440	.96	128.66	.91	142.0813	196.00	196.02	.72	0.19
176.470	.99	136.34	.92	148.0061	199.00	199.02	.74	0.19

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

Solution to Mannings Open Channel Flow Equation
(Computed values are based on normal depth.)

TRAPEZOIDAL CROSS SECTION

Slope   = .032855 ft/ft
Mannings n = 0.24000
Invert Elev.   = 175.48 ft
Top of Channel = 176.98 ft
Base width   = 100.00 ft
Rt Side slope = 50.000 horizontal :1 vert.
Lt Side slope = 50.000 horizontal :1 vert.

Elev. (ft)	Depth (ft)	Flow (cfs)	Vel. (ft/sec)	Area (sq.ft)	Top W. (ft)	Wet.P. (ft)	Hd (ft)	Froude No.
176.500	1.02	144.25	.94	154.0209	202.00	202.02	.76	0.19
176.530	1.05	152.40	.95	160.1256	205.00	205.02	.78	0.19
176.560	1.08	160.79	.97	166.3204	208.00	208.02	.80	0.19
176.590	1.11	169.42	.98	172.6051	211.00	211.02	.82	0.19
176.620	1.14	178.29	1.00	178.9799	214.00	214.02	.84	0.19
176.650	1.17	187.40	1.01	185.4446	217.00	217.02	.85	0.19
176.680	1.20	196.76	1.02	191.9993	220.00	220.02	.87	0.19
176.710	1.23	206.37	1.04	198.6440	223.00	223.02	.89	0.19
176.740	1.26	216.23	1.05	205.3788	226.00	226.02	.91	0.19
176.770	1.29	226.33	1.07	212.2035	229.00	229.03	.93	0.20
176.800	1.32	236.70	1.08	219.1217	232.00	232.03	.94	0.20
176.830	1.35	247.32	1.09	226.1264	235.00	235.03	.96	0.20
176.860	1.38	258.19	1.11	233.2212	238.00	238.03	.98	0.20
176.890	1.41	269.33	1.12	240.4059	241.00	241.03	1.00	0.20
176.920	1.44	280.72	1.13	247.6806	244.00	244.03	1.02	0.20
176.950	1.47	292.38	1.15	255.0453	247.00	247.03	1.03	0.20
176.980	1.50	304.30	1.16	262.5000	250.00	250.03	1.05	0.20

```
                   REACH ROUTING SUMMARY
                  (Hydrograph Translation)

 HYG Directory       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file-ID = NONE STORED - WATERSHED B4     Dev  1
 Outflow HYG file-ID = NONE STORED - B4 ROUTE         Dev  1

 Base Flow    =       .00 cfs
 No Infiltration

 Translation  =     .0300 hrs

                  Inflow Hydrograph         Outflow Hydrograph
                  -----------------         ------------------
 Time Start...       10.4350 hrs               10.4650 hrs
 Time Step....         .0050 hrs                 .0050 hrs
 Time End.....       24.7250 hrs               24.7550 hrs

 Peak Time....       12.2350 hrs               12.2650 hrs
 Peak Flow....          6.63 cfs                  6.63 cfs


 Inflow/Outflow Volumes
 --------------------------------
 Inflow       =        .718 ac-ft

- Unrouted     =        .000 ac-ft
+ Base Flow    =        .000 ac-ft
- Infiltration =        .000 ac-ft
                ----------------
 Outflow      =        .718 ac-ft
```

REACH ROUTING SUMMARY
(Hydrograph Translation)

```
HYG Directory       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file-ID = NONE STORED - WATERSHED B4     Dev 10
Outflow HYG file-ID = NONE STORED - B4 ROUTE         Dev 10

Base Flow    =       .00 cfs
No Infiltration

Translation  =     .0300 hrs

                 Inflow Hydrograph         Outflow Hydrograph
                 -----------------         ------------------
Time Start...         7.9200 hrs                7.9500 hrs
Time Step....          .0050 hrs                 .0050 hrs
Time End.....        24.8050 hrs               24.8350 hrs

Peak Time....        12.2000 hrs               12.2300 hrs
Peak Flow....          20.96 cfs                 20.96 cfs


Inflow/Outflow Volumes
--------------------------------
Inflow       =       2.183 ac-ft

- Unrouted     =        .000 ac-ft
+ Base Flow    =        .000 ac-ft
- Infiltration =        .000 ac-ft
                ----------------
Outflow      =       2.183 ac-ft
```

```
                   REACH ROUTING SUMMARY
                  (Hydrograph Translation)

 HYG Directory       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file-ID = NONE STORED - WATERSHED B4     Dev100
 Outflow HYG file-ID = NONE STORED - B4 ROUTE         Dev100

 Base Flow    =       .00 cfs
 No Infiltration

 Translation  =     .0300 hrs

                  Inflow Hydrograph         Outflow Hydrograph
                  -----------------         ------------------
 Time Start...        6.4050 hrs                6.4350 hrs
 Time Step....         .0050 hrs                 .0050 hrs
 Time End.....       24.8400 hrs               24.8700 hrs

 Peak Time....       12.2000 hrs               12.2300 hrs
 Peak Flow....         34.91 cfs                 34.91 cfs


 Inflow/Outflow Volumes
 --------------------------------
 Inflow       =       3.649 ac-ft

- Unrouted     =        .000 ac-ft
+ Base Flow    =        .000 ac-ft
- Infiltration =        .000 ac-ft
                ----------------
 Outflow      =       3.649 ac-ft
```

MODIFIED PULS REACH DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - J Dev 1
Outflow HYG file = NONE STORED - C3 TO DEPRESS C Dev 1

Reach Link Data = C3 TO DEPRESS C
Reach Length = 865.00 ft
Approx. Total Tt = 2.1363 hrs (based on Wtd.Q = .36 cfs)
Reach Channel = TO DEPRESS C (Chn-Trapz.)
Overflow Elev. = 176.98 ft
Overflow Channel = APPROXIMATE EXTRAPOLATION
Extrapolate to 10.00 ft above top of channel.

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 175.48 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
175.48	.00	.000	.0000	.00	.00	.00
175.49	.05	.020	2.0056	.00	.05	96.59
175.51	.33	.060	2.0453	.00	.33	292.97
175.54	1.04	.123	2.1049	.00	1.04	594.98
175.57	2.06	.187	2.1645	.00	2.06	905.95
175.60	3.35	.253	2.2240	.00	3.35	1225.83
175.63	4.88	.320	2.2836	.00	4.88	1554.61
175.66	6.66	.390	2.3432	.00	6.66	1892.27
175.69	8.66	.461	2.4028	.00	8.66	2239.00
175.72	10.89	.534	2.4624	.00	10.89	2594.42
175.75	13.33	.609	2.5219	.00	13.33	2958.71
175.78	15.99	.685	2.5815	.00	15.99	3331.86
175.81	18.86	.763	2.6411	.00	18.86	3713.88
175.84	21.95	.844	2.7006	.00	21.95	4104.75
175.87	25.24	.925	2.7602	.00	25.24	4504.49
175.90	28.75	1.009	2.8198	.00	28.75	4913.09
175.93	32.46	1.095	2.8794	.00	32.46	5330.55
175.96	36.39	1.182	2.9389	.00	36.39	5756.86
175.99	40.53	1.271	2.9985	.00	40.53	6192.04
176.02	44.88	1.362	3.0581	.00	44.88	6636.08

MODIFIED PULS REACH DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - J Dev 1
Outflow HYG file = NONE STORED - C3 TO DEPRESS C Dev 1

Reach Link Data = C3 TO DEPRESS C
Reach Length = 865.00 ft
Approx. Total Tt = 2.1363 hrs (based on Wtd.Q = .36 cfs)
Reach Channel = TO DEPRESS C (Chn-Trapz.)
Overflow Elev. = 176.98 ft
Overflow Channel = APPROXIMATE EXTRAPOLATION
Extrapolate to 10.00 ft above top of channel.

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 175.48 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
176.05	49.44	1.454	3.1177	.00	49.44	7089.21
176.08	54.22	1.549	3.1772	.00	54.22	7550.98
176.11	59.21	1.645	3.2368	.00	59.21	8021.61
176.14	64.41	1.743	3.2964	.00	64.41	8501.11
176.17	69.84	1.843	3.3560	.00	69.84	8989.47
176.20	75.48	1.944	3.4155	.00	75.48	9486.70
176.23	81.34	2.048	3.4751	.00	81.34	9992.80
176.26	87.42	2.153	3.5347	.00	87.42	10507.77
176.29	93.73	2.260	3.5942	.00	93.73	11031.61
176.32	100.26	2.369	3.6538	.00	100.26	11564.33
176.35	107.01	2.479	3.7134	.00	107.01	12105.92
176.38	114.00	2.591	3.7729	.00	114.00	12656.39
176.41	121.21	2.705	3.8325	.00	121.21	13215.73
176.44	128.66	2.821	3.8921	.00	128.66	13784.25
176.47	136.34	2.939	3.9517	.00	136.34	14361.37
176.50	144.25	3.058	4.0113	.00	144.25	14947.37
176.53	152.40	3.180	4.0708	.00	152.40	15542.25
176.56	160.79	3.303	4.1304	.00	160.79	16146.02
176.59	169.42	3.428	4.1900	.00	169.42	16758.69
176.62	178.29	3.554	4.2495	.00	178.29	17380.24

MODIFIED PULS REACH DATA

HYG Dir   = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - J   Dev 1
Outflow HYG file = NONE STORED - C3 TO DEPRESS C Dev 1

Reach Link Data = C3 TO DEPRESS C
Reach Length   = 865.00 ft
Approx. Total Tt = 2.1363 hrs (based on Wtd.Q = .36 cfs)
Reach Channel   = TO DEPRESS C (Chn-Trapz.)
Overflow Elev.   = 176.98 ft
Overflow Channel = APPROXIMATE EXTRAPOLATION
Extrapolate to 10.00 ft above top of channel.

No Infiltration

INITIAL CONDITIONS

Starting WS Elev   =   175.48 ft
Starting Volume   =   .000 ac-ft
Starting Outflow   =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
176.65	187.40	3.682	4.3091	.00	187.40	18010.69
176.68	196.76	3.813	4.3687	.00	196.76	18650.03
176.71	206.37	3.945	4.4283	.00	206.37	19298.27
176.74	216.23	4.078	4.4878	.00	216.23	19955.41
176.77	226.33	4.214	4.5474	.00	226.33	20621.45
176.80	236.70	4.351	4.6070	.00	236.70	21296.73
176.83	247.32	4.490	4.6666	.00	247.32	21980.58
176.86	258.19	4.631	4.7261	.00	258.19	22673.34
176.89	269.33	4.774	4.7857	.00	269.33	23375.01
176.92	280.72	4.918	4.8453	.00	280.72	24085.58
176.95	292.38	5.065	4.9048	.00	292.38	24805.07
176.98	304.30	5.213	4.9644	.00	304.30	25533.47
186.98	4278.62	54.559	4.9644	.00	4278.62	268343.90

MODIFIED PULS REACH ROUTING SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - J                Dev  1
Outflow HYG file = NONE STORED - C3 TO DEPRESS C  Dev  1

Reach Link Data  = C3 TO DEPRESS C
Reach Length     = 865.00 ft
Approx. Total Tt = 2.1363 hrs  (based on Wtd.Q = .36 cfs)
Reach Channel    = TO DEPRESS C  (Chn-Trapz.)
Overflow Elev.   = 176.98 ft
Overflow Channel = APPROXIMATE EXTRAPOLATION
Extrapolate to 10.00 ft above top of channel.

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   175.48 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =       .38 cfs    at   17.7250 hrs
Peak Outflow      =       .38 cfs    at   21.4700 hrs
=====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =        .382
- Infiltration =        .000
- HYG Vol OUT  =        .317
- Retained Vol =        .065
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.003% of Inflow Volume)
```

MODIFIED PULS REACH ROUTING SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - J                Dev 10
Outflow HYG file = NONE STORED - C3 TO DEPRESS C  Dev 10

Reach Link Data  = C3 TO DEPRESS C
Reach Length     = 865.00 ft
Approx. Total Tt = .8735 hrs  (based on Wtd.Q = 3.73 cfs)
Reach Channel    = TO DEPRESS C  (Chn-Trapz.)
Overflow Elev.   = 176.98 ft
Overflow Channel = APPROXIMATE EXTRAPOLATION
Extrapolate to 10.00 ft above top of channel.

No Infiltration

INITIAL CONDITIONS
---------------------------------
Starting WS Elev   =   175.48 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =      7.46 cfs    at   12.6100 hrs
Peak Outflow      =      5.68 cfs    at   13.4650 hrs
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =       .000
+ HYG Vol IN   =      2.319
- Infiltration =       .000
- HYG Vol OUT  =      2.221
- Retained Vol =       .098
                 ----------
  Unrouted Vol =      -.000 ac-ft  (.000% of Inflow Volume)
```

```
                    MODIFIED PULS REACH ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - J                Dev100
 Outflow HYG file = NONE STORED - C3 TO DEPRESS C  Dev100

 Reach Link Data  = C3 TO DEPRESS C
 Reach Length     = 865.00 ft
 Approx. Total Tt = .5806 hrs  (based on Wtd.Q = 11.55 cfs)
 Reach Channel    = TO DEPRESS C  (Chn-Trapz.)
 Overflow Elev.   = 176.98 ft
 Overflow Channel = APPROXIMATE EXTRAPOLATION
 Extrapolate to 10.00 ft above top of channel.

 No Infiltration

 INITIAL CONDITIONS
 ---------------------------------
 Starting WS Elev   =   175.48 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     25.76 cfs    at   12.3650 hrs
 Peak Outflow      =     19.05 cfs    at   12.7850 hrs
 =====================================================


 MASS BALANCE (ac-ft)
 -------------------------
+ Initial Vol  =       .000
+ HYG Vol IN   =      4.642
- Infiltration =       .000
- HYG Vol OUT  =      4.519
- Retained Vol =       .124
                 ----------
 Unrouted Vol =      -.000 ac-ft  (.000% of Inflow Volume)
```

REACH ROUTING SUMMARY
(Hydrograph Translation)

HYG Directory = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file-ID = NONE STORED - D TO C4 Dev 1
Outflow HYG file-ID = NONE STORED - TO G Dev 1

Base Flow = .00 cfs
No Infiltration

Translation = .0650 hrs

	Inflow Hydrograph	Outflow Hydrograph
Time Start...	9.5900 hrs	9.6550 hrs
Time Step....	.0050 hrs	.0050 hrs
Time End.....	24.6250 hrs	24.6900 hrs
Peak Time....	18.6700 hrs	18.7350 hrs
Peak Flow....	.46 cfs	.46 cfs

Inflow/Outflow Volumes

Inflow	=	.471 ac-ft
- Unrouted	=	.000 ac-ft
+ Base Flow	=	.000 ac-ft
- Infiltration	=	.000 ac-ft
Outflow	=	.471 ac-ft

REACH ROUTING SUMMARY
(Hydrograph Translation)

```
HYG Directory       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file-ID = NONE STORED - D TO C4          Dev 10
Outflow HYG file-ID = NONE STORED - TO G             Dev 10

Base Flow    =       .00 cfs
No Infiltration

Translation  =     .0650 hrs

                 Inflow Hydrograph         Outflow Hydrograph
                 -----------------         ------------------
Time Start...        6.9350 hrs                7.0000 hrs
Time Step....         .0050 hrs                 .0050 hrs
Time End.....       24.6700 hrs               24.7350 hrs

Peak Time....       12.5700 hrs               12.6350 hrs
Peak Flow....         19.45 cfs                 19.45 cfs


Inflow/Outflow Volumes
--------------------------------
Inflow       =       3.746 ac-ft

- Unrouted     =        .000 ac-ft
+ Base Flow    =        .000 ac-ft
- Infiltration =        .000 ac-ft
                ----------------
Outflow      =       3.746 ac-ft
```

```
                   REACH ROUTING SUMMARY
                  (Hydrograph Translation)

 HYG Directory       = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file-ID = NONE STORED - D TO C4          Dev100
 Outflow HYG file-ID = NONE STORED - TO G             Dev100

 Base Flow    =       .00 cfs
 No Infiltration

 Translation  =     .0650 hrs

                  Inflow Hydrograph         Outflow Hydrograph
                  -----------------         ------------------
 Time Start...         5.4200 hrs                 5.4850 hrs
 Time Step....          .0050 hrs                  .0050 hrs
 Time End.....        24.6850 hrs                24.7500 hrs

 Peak Time....        12.4050 hrs                12.4700 hrs
 Peak Flow....          50.31 cfs                  50.31 cfs


 Inflow/Outflow Volumes
 --------------------------------
 Inflow       =       7.067 ac-ft

- Unrouted     =        .000 ac-ft
+ Base Flow    =        .000 ac-ft
- Infiltration =        .000 ac-ft
                ----------------
 Outflow      =       7.067 ac-ft
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
88.00	-----	.0014	.0000	.000	.000
90.00	-----	.0335	.0416	.028	.028
92.00	-----	.0612	.1400	.093	.121
94.00	-----	.0896	.2249	.150	.271
96.00	-----	.1217	.3157	.210	.481
98.00	-----	.1595	.4206	.280	.762
100.00	-----	.1992	.5370	.358	1.120
102.00	-----	.2426	.6617	.441	1.561
104.00	-----	.2900	.7978	.532	2.093

Name.... DEPRESS C

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Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
174.00	-----	.2223	.0000	.000	.000
176.00	-----	.5296	1.0950	.730	.730
178.00	-----	.6731	1.7998	1.200	1.930
182.00	-----	.9553	2.4302	3.240	5.170
186.00	-----	1.3278	3.4093	4.546	9.716
190.00	-----	1.9426	4.8765	6.502	16.218
192.00	-----	2.4355	6.5532	4.369	20.587

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Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
166.00	-----	.0005	.0000	.000	.000
168.00	-----	.0005	.0015	.001	.001
170.00	-----	.0013	.0026	.002	.003
172.00	-----	.0048	.0085	.006	.008
174.00	-----	.0298	.0465	.031	.039
176.00	-----	.0573	.1284	.086	.125
178.00	-----	.0938	.2245	.150	.275
180.00	-----	.1281	.3315	.221	.496

Name.... POND A

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Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
122.00	-----	.1106	.0000	.000	.000
124.00	-----	.2043	.4652	.310	.310
126.00	-----	.3387	.8061	.537	.848
128.00	-----	.4537	1.1844	.790	1.637
130.00	-----	.5781	1.5440	1.029	2.666
132.00	-----	.7117	1.9311	1.287	3.954

Name.... POND B

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
122.63	-----	.2200	.0000	.000	.000
124.00	-----	.3670	.8711	.398	.398
126.03	-----	.5740	1.4000	.947	1.345
126.63	-----	.7770	2.0188	.404	1.749
128.00	-----	1.0170	2.6829	1.225	2.974
130.00	-----	1.3130	3.4856	2.324	5.298
132.00	-----	1.5480	4.2867	2.858	8.156
134.00	-----	1.7670	4.9689	3.313	11.468
136.00	-----	1.9950	5.6395	3.760	15.228
138.00	-----	2.2320	6.3372	4.225	19.453
140.00	-----	2.4780	7.0618	4.708	24.161

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Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
178.00	-----	.0662	.0000	.000	.000
180.00	-----	.1508	.3169	.211	.211
182.00	-----	.2879	.6470	.431	.643
184.00	-----	.3719	.9870	.658	1.301
186.00	-----	.4653	1.2533	.836	2.136
188.00	-----	.5679	1.5472	1.031	3.168

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Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
210.61	-----	.0420	.0000	.000	.000
212.00	-----	.1080	.2173	.101	.101
214.00	-----	.2140	.4740	.316	.417
216.00	-----	.4190	.9324	.622	1.038
218.00	-----	.5210	1.4072	.938	1.977
220.00	-----	.6320	1.7268	1.151	3.128
222.00	-----	.7520	2.0734	1.382	4.510

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Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
202.29	-----	.1050	.0000	.000	.000
205.69	-----	.2450	.5104	.578	.578
206.29	-----	.3760	.9245	.185	.763
212.00	-----	.8460	1.7860	3.399	4.163
212.75	-----	.9180	2.6453	.661	4.824

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REQUESTED POND WS ELEVATIONS:

Min. Elev.= 88.00 ft
Increment = .50 ft
Max. Elev.= 104.00 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
Weir-Rectangular	W1	--->	TW	102.000	104.000
Culvert-Circular	C1	--->	TW	88.000	104.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    102.00 ft
Weir Length       =     16.00 ft
Weir Coeff.       =  3.000000

Weir TW effects     (Use adjustment equation)
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = C1
Structure Type    = Culvert-Circular
------------------------------------
No. Barrels       =         1
Barrel Diameter   =    3.0000 ft
Upstream Invert   =     88.00 ft
Dnstream Invert   =     62.87 ft
Horiz. Length     =    110.00 ft
Barrel Length     =    112.83 ft
Barrel Slope      =    .22845 ft/ft

OUTLET CONTROL DATA...
Mannings n        =     .0130
Ke                =     .2000  (forward entrance loss)
Kb                =   .007228  (per ft of full flow)
Kr                =     .2000  (reverse entrance loss)
HW Convergence    =      .001  +/- ft

INLET CONTROL DATA...
Equation form     =         1
Inlet Control K   =     .0045
Inlet Control M   =    2.0000
Inlet Control c   =    .03170
Inlet Control Y   =     .6900
T1 ratio (HW/D)   =      .981
T2 ratio (HW/D)   =     1.083
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 =     90.94 ft  --->  Flow =     42.85 cfs
At T2 Elev =     91.25 ft  --->  Flow =     48.97 cfs
```

```
Structure ID      = TW
Structure Type    = TW SETUP, DS Channel
------------------------------------
FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations=    50
Min. TW tolerance =    .10 ft
Max. TW tolerance =    .10 ft
Min. HW tolerance =    .10 ft
Max. HW tolerance =    .10 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
88.00	.00	Free Outfall		None contributing
88.50	1.31	Free Outfall		C1
89.00	5.04	Free Outfall		C1
89.50	10.81	Free Outfall		C1
90.00	18.28	Free Outfall		C1
90.50	27.01	Free Outfall		C1
91.00	36.56	Free Outfall		C1
91.50	46.46	Free Outfall		C1
92.00	56.28	Free Outfall		C1
92.50	65.66	Free Outfall		C1
93.00	71.81	Free Outfall		C1
93.50	77.10	Free Outfall		C1
94.00	82.06	Free Outfall		C1
94.50	86.74	Free Outfall		C1
95.00	91.17	Free Outfall		C1
95.50	95.39	Free Outfall		C1
96.00	99.43	Free Outfall		C1
96.50	103.32	Free Outfall		C1
97.00	107.06	Free Outfall		C1
97.50	110.69	Free Outfall		C1
98.00	114.19	Free Outfall		C1
98.50	117.59	Free Outfall		C1
99.00	120.89	Free Outfall		C1
99.50	124.11	Free Outfall		C1
100.00	127.24	Free Outfall		C1
100.50	130.31	Free Outfall		C1
101.00	133.30	Free Outfall		C1
101.50	136.22	Free Outfall		C1
102.00	139.08	Free Outfall		W1 +C1
102.50	158.75	Free Outfall		W1 +C1
103.00	192.04	Free Outfall		W1 +C1
103.50	233.87	Free Outfall		W1 +C1
104.00	282.36	Free Outfall		W1 +C1

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REQUESTED POND WS ELEVATIONS:

Min. Elev.= 174.00 ft
Increment = .50 ft
Max. Elev.= 192.00 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
Weir-Rectangular	W1	--->	TW	191.000	192.000
Culvert-Circular	C1	--->	TW	175.170	192.000
TW SETUP, DS Channel					

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OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    191.00 ft
Weir Length       =     86.00 ft
Weir Coeff.       =  3.000000

Weir TW effects     (Use adjustment equation)
```

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```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C1
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    4.0000 ft
              Upstream Invert   =    175.17 ft
              Dnstream Invert   =    170.15 ft
              Horiz. Length     =    150.00 ft
              Barrel Length     =    150.08 ft
              Barrel Slope      =    .03347 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0160
              Ke                =     .0000  (forward entrance loss)
              Kb                =   .007461  (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)   =     1.144
              T2 ratio (HW/D)   =     1.290
              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 =    179.74 ft  --->  Flow =     87.96 cfs
 At T2 Elev =    180.33 ft  --->  Flow =    100.53 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    50
              Min. TW tolerance =    .10 ft
              Max. TW tolerance =    .10 ft
              Min. HW tolerance =    .10 ft
              Max. HW tolerance =    .10 ft
              Min.  Q tolerance =    .10 cfs
              Max.  Q tolerance =    .10 cfs
```

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
174.00	.00	Free Outfall		None contributing
174.50	.00	Free Outfall		None contributing
175.00	.00	Free Outfall		None contributing
175.17	.00	Free Outfall		None contributing
175.50	.74	Free Outfall		C1
176.00	4.56	Free Outfall		C1
176.50	11.32	Free Outfall		C1
177.00	20.71	Free Outfall		C1
177.50	32.39	Free Outfall		C1
178.00	44.35	Free Outfall		C1
178.50	56.84	Free Outfall		C1
179.00	69.43	Free Outfall		C1
179.50	81.97	Free Outfall		C1
180.00	93.45	Free Outfall		C1
180.50	103.81	Free Outfall		C1
181.00	112.96	Free Outfall		C1
181.50	121.45	Free Outfall		C1
182.00	129.34	Free Outfall		C1
182.50	136.80	Free Outfall		C1
183.00	143.86	Free Outfall		C1
183.50	150.61	Free Outfall		C1
184.00	157.05	Free Outfall		C1
184.50	163.25	Free Outfall		C1
185.00	169.21	Free Outfall		C1
185.50	174.98	Free Outfall		C1
186.00	180.55	Free Outfall		C1
186.50	185.97	Free Outfall		C1
187.00	191.24	Free Outfall		C1
187.50	196.35	Free Outfall		C1
188.00	201.34	Free Outfall		C1
188.50	206.21	Free Outfall		C1
189.00	210.96	Free Outfall		C1
189.50	215.61	Free Outfall		C1
190.00	220.17	Free Outfall		C1
190.50	224.63	Free Outfall		C1
191.00	229.00	Free Outfall		W1 +C1
191.50	324.40	Free Outfall		W1 +C1
192.00	494.90	Free Outfall		W1 +C1

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REQUESTED POND WS ELEVATIONS:

Min. Elev.= 166.00 ft
Increment = .50 ft
Max. Elev.= 180.00 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
Weir-Rectangular	W1	--->	TW	178.000	180.000
Culvert-Circular	C1	--->	TW	167.870	180.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    178.00 ft
Weir Length       =     16.00 ft
Weir Coeff.       =  3.000000

Weir TW effects     (Use adjustment equation)
```

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```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C1
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    2.1667 ft
              Upstream Invert   =    167.87 ft
              Dnstream Invert   =    164.08 ft
              Horiz. Length     =     64.00 ft
              Barrel Length     =     64.11 ft
              Barrel Slope      =    .05922 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0130
              Ke                =     .2000  (forward entrance loss)
              Kb                =   .011155  (per ft of full flow)
              Kr                =     .2000  (reverse entrance loss)
              HW Convergence    =      .001  +/- ft

              INLET CONTROL DATA...
              Equation form     =         1
              Inlet Control K   =     .0045
              Inlet Control M   =    2.0000
              Inlet Control c   =    .03170
              Inlet Control Y   =     .6900
              T1 ratio (HW/D)   =     1.066
              T2 ratio (HW/D)   =     1.168
              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 =    170.18 ft  --->  Flow =     18.99 cfs
At T2 Elev =    170.40 ft  --->  Flow =     21.71 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    50
              Min. TW tolerance =    .10 ft
              Max. TW tolerance =    .10 ft
              Min. HW tolerance =    .10 ft
              Max. HW tolerance =    .10 ft
              Min.  Q tolerance =    .50 cfs
              Max.  Q tolerance =    .50 cfs
```

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
166.00	.00	Free Outfall		None contributing
166.50	.00	Free Outfall		None contributing
167.00	.00	Free Outfall		None contributing
167.50	.00	Free Outfall		None contributing
167.87	.00	Free Outfall		None contributing
168.00	.08	Free Outfall		C1
168.50	1.72	Free Outfall		C1
169.00	5.18	Free Outfall		C1
169.50	10.03	Free Outfall		C1
170.00	15.76	Free Outfall		C1
170.50	21.83	Free Outfall		C1
171.00	26.99	Free Outfall		C1
171.50	30.71	Free Outfall		C1
172.00	34.02	Free Outfall		C1
172.50	37.04	Free Outfall		C1
173.00	39.83	Free Outfall		C1
173.50	42.44	Free Outfall		C1
174.00	44.89	Free Outfall		C1
174.50	47.22	Free Outfall		C1
175.00	49.44	Free Outfall		C1
175.50	51.56	Free Outfall		C1
176.00	53.60	Free Outfall		C1
176.50	55.56	Free Outfall		C1
177.00	57.46	Free Outfall		C1
177.50	59.29	Free Outfall		C1
178.00	61.08	Free Outfall		W1 +C1
178.50	79.68	Free Outfall		W1 +C1
179.00	111.89	Free Outfall		W1 +C1
179.50	152.67	Free Outfall		W1 +C1
180.00	200.11	Free Outfall		W1 +C1

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REQUESTED POND WS ELEVATIONS:

Min. Elev.= 122.00 ft
Increment = .50 ft
Max. Elev.= 132.00 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
Weir-Rectangular	W1	--->	C1	128.130	132.000
Orifice-Circular	O1	--->	C1	124.240	132.000
Culvert-Circular	C1	--->	TW	124.240	132.000
TW SETUP, DS Channel					

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```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = W1
              Structure Type    = Weir-Rectangular
              ------------------------------------
              # of Openings     =         1
              Crest Elev.       =    128.13 ft
              Weir Length       =      7.00 ft
              Weir Coeff.       =  3.100000

              Weir TW effects     (Use adjustment equation)



              Structure ID      = O1
              Structure Type    = Orifice-Circular
              ------------------------------------
              # of Openings     =         1
              Invert Elev.      =    124.24 ft
              Diameter          =     .2500 ft
              Orifice Coeff.    =      .600
```

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```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C1
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    2.5000 ft
              Upstream Invert   =    124.24 ft
              Dnstream Invert   =    123.26 ft
              Horiz. Length     =     75.00 ft
              Barrel Length     =     75.01 ft
              Barrel Slope      =    .01313 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0100
              Ke                =     .5000  (forward entrance loss)
              Kb                =   .005454  (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)   =     1.154
              T2 ratio (HW/D)   =     1.300
              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 =    127.12 ft  --->  Flow =     27.16 cfs
 At T2 Elev =    127.49 ft  --->  Flow =     31.05 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    50
              Min. TW tolerance =    .10 ft
              Max. TW tolerance =    .10 ft
              Min. HW tolerance =    .10 ft
              Max. HW tolerance =    .10 ft
              Min.  Q tolerance =    .10 cfs
              Max.  Q tolerance =    .10 cfs
```

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Notes		
		Converge		
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
122.00	.00	Free Outfall		(no Q: W1,O1,C1)
122.50	.00	Free Outfall		(no Q: W1,O1,C1)
123.00	.00	Free Outfall		(no Q: W1,O1,C1)
123.50	.00	Free Outfall		(no Q: W1,O1,C1)
124.00	.00	Free Outfall		(no Q: W1,O1,C1)
124.24	.00	Free Outfall		(no Q: W1,O1,C1)
124.50	.08	Free Outfall		O1,C1 (no Q: W1)
125.00	.18	Free Outfall		O1,C1 (no Q: W1)
125.50	.24	Free Outfall		O1,C1 (no Q: W1)
126.00	.29	Free Outfall		O1,C1 (no Q: W1)
126.50	.33	Free Outfall		O1,C1 (no Q: W1)
127.00	.37	Free Outfall		O1,C1 (no Q: W1)
127.50	.41	Free Outfall		O1,C1 (no Q: W1)
128.00	.44	Free Outfall		O1,C1 (no Q: W1)
128.13	.45	Free Outfall		O1,C1 (no Q: W1)
128.50	5.25	Free Outfall		W1,O1,C1
129.00	17.54	Free Outfall		W1,O1,C1
129.50	33.74	Free Outfall		W1,O1,C1
130.00	44.03	Free Outfall		W1,O1,C1
130.50	49.79	Free Outfall		W1,O1,C1
131.00	53.50	Free Outfall		W1,O1,C1
131.50	56.89	Free Outfall		W1,O1,C1
132.00	56.89	Free Outfall		W1,O1,C1

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 122.63 ft
Increment = .50 ft
Max. Elev.= 140.00 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
Weir-Rectangular	W1	--->	TW	132.580	140.000
Orifice-Circular	O1	--->	C1	126.810	140.000
Culvert-Circular	C1	--->	TW	126.810	140.000
TW SETUP, DS Channel					

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OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    132.58 ft
Weir Length       =      5.50 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)
```

```
Structure ID      = O1
Structure Type    = Orifice-Circular
------------------------------------
# of Openings     =         1
Invert Elev.      =    126.81 ft
Diameter          =     .7500 ft
Orifice Coeff.    =      .600
```

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```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C1
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    1.2500 ft
              Upstream Invert   =    126.81 ft
              Dnstream Invert   =    125.67 ft
              Horiz. Length     =    114.00 ft
              Barrel Length     =    114.01 ft
              Barrel Slope      =    .01000 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0100
              Ke                =     .5000  (forward entrance loss)
              Kb                =   .013743  (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)   =     1.156
              T2 ratio (HW/D)   =     1.302
              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 =    128.25 ft  --->  Flow =      4.80 cfs
 At T2 Elev =    128.44 ft  --->  Flow =      5.49 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    50
              Min. TW tolerance =    .10 ft
              Max. TW tolerance =    .10 ft
              Min. HW tolerance =    .10 ft
              Max. HW tolerance =    .10 ft
              Min.  Q tolerance =    .10 cfs
              Max.  Q tolerance =    .10 cfs
```

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
122.63	.00	Free Outfall		(no Q: W1,O1,C1)
123.13	.00	Free Outfall		(no Q: W1,O1,C1)
123.63	.00	Free Outfall		(no Q: W1,O1,C1)
124.13	.00	Free Outfall		(no Q: W1,O1,C1)
124.63	.00	Free Outfall		(no Q: W1,O1,C1)
125.13	.00	Free Outfall		(no Q: W1,O1,C1)
125.63	.00	Free Outfall		(no Q: W1,O1,C1)
126.13	.00	Free Outfall		(no Q: W1,O1,C1)
126.63	.00	Free Outfall		(no Q: W1,O1,C1)
126.81	.00	Free Outfall		(no Q: W1,O1,C1)
127.13	.14	Free Outfall		O1,C1 (no Q: W1)
127.63	.87	Free Outfall		O1,C1 (no Q: W1)
128.13	1.65	Free Outfall		O1,C1 (no Q: W1)
128.63	2.08	Free Outfall		O1,C1 (no Q: W1)
129.13	2.47	Free Outfall		O1,C1 (no Q: W1)
129.63	2.82	Free Outfall		O1,C1 (no Q: W1)
130.13	3.14	Free Outfall		O1,C1 (no Q: W1)
130.63	3.44	Free Outfall		O1,C1 (no Q: W1)
131.13	3.72	Free Outfall		O1,C1 (no Q: W1)
131.63	3.98	Free Outfall		O1,C1 (no Q: W1)
132.13	4.23	Free Outfall		O1,C1 (no Q: W1)
132.58	4.44	Free Outfall		O1,C1 (no Q: W1)
132.63	4.65	Free Outfall		W1,O1,C1
133.13	11.50	Free Outfall		W1,O1,C1
133.63	22.54	Free Outfall		W1,O1,C1
134.13	36.15	Free Outfall		W1,O1,C1
134.63	51.62	Free Outfall		W1,O1,C1
135.13	68.49	Free Outfall		W1,O1,C1
135.63	86.43	Free Outfall		W1,O1,C1
136.13	105.18	Free Outfall		W1,O1,C1
136.63	124.53	Free Outfall		W1,O1,C1
137.13	144.30	Free Outfall		W1,O1,C1
137.63	164.32	Free Outfall		W1,O1,C1
138.13	184.45	Free Outfall		W1,O1,C1
138.63	204.57	Free Outfall		W1,O1,C1
139.13	224.56	Free Outfall		W1,O1,C1
139.63	244.31	Free Outfall		W1,O1,C1
140.00	258.70	Free Outfall		W1,O1,C1

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REQUESTED POND WS ELEVATIONS:

Min. Elev.= 178.00 ft
Increment = .50 ft
Max. Elev.= 188.00 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
Weir-Rectangular	W1	--->	C1	185.340	188.000
Orifice-Circular	O1	--->	C1	180.730	188.000
Culvert-Circular	C1	--->	TW	180.730	188.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    185.34 ft
Weir Length       =      3.00 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)



Structure ID      = O1
Structure Type    = Orifice-Circular
------------------------------------
# of Openings     =         1
Invert Elev.      =    180.73 ft
Diameter          =     .2500 ft
Orifice Coeff.    =      .600
```

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```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C1
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    2.5000 ft
              Upstream Invert   =    180.73 ft
              Dnstream Invert   =    179.43 ft
              Horiz. Length     =     74.00 ft
              Barrel Length     =     74.01 ft
              Barrel Slope      =    .01757 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0100
              Ke                =     .5000  (forward entrance loss)
              Kb                =   .005454  (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)   =     1.151
              T2 ratio (HW/D)   =     1.298
              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 =    183.61 ft  --->  Flow =     27.16 cfs
 At T2 Elev =    183.98 ft  --->  Flow =     31.05 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    50
              Min. TW tolerance =    .10 ft
              Max. TW tolerance =    .10 ft
              Min. HW tolerance =    .10 ft
              Max. HW tolerance =    .10 ft
              Min.  Q tolerance =    .10 cfs
              Max.  Q tolerance =    .10 cfs
```

Name.... POND C OUT

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
178.00	.00	Free Outfall		(no Q: W1,O1,C1)
178.50	.00	Free Outfall		(no Q: W1,O1,C1)
179.00	.00	Free Outfall		(no Q: W1,O1,C1)
179.50	.00	Free Outfall		(no Q: W1,O1,C1)
180.00	.00	Free Outfall		(no Q: W1,O1,C1)
180.50	.00	Free Outfall		(no Q: W1,O1,C1)
180.73	.00	Free Outfall		(no Q: W1,O1,C1)
181.00	.08	Free Outfall		O1,C1 (no Q: W1)
181.50	.18	Free Outfall		O1,C1 (no Q: W1)
182.00	.24	Free Outfall		O1,C1 (no Q: W1)
182.50	.29	Free Outfall		O1,C1 (no Q: W1)
183.00	.33	Free Outfall		O1,C1 (no Q: W1)
183.50	.37	Free Outfall		O1,C1 (no Q: W1)
184.00	.41	Free Outfall		O1,C1 (no Q: W1)
184.50	.44	Free Outfall		O1,C1 (no Q: W1)
185.00	.47	Free Outfall		O1,C1 (no Q: W1)
185.34	.49	Free Outfall		O1,C1 (no Q: W1)
185.50	1.08	Free Outfall		W1,O1,C1
186.00	5.25	Free Outfall		W1,O1,C1
186.50	11.19	Free Outfall		W1,O1,C1
187.00	18.16	Free Outfall		W1,O1,C1
187.50	25.74	Free Outfall		W1,O1,C1
188.00	33.65	Free Outfall		W1,O1,C1

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REQUESTED POND WS ELEVATIONS:

Min. Elev.= 210.61 ft
Increment = .50 ft
Max. Elev.= 222.00 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
Weir-Rectangular	W1	--->	C1	218.350	222.000
Orifice-Circular	O1	--->	C1	213.910	222.000
Culvert-Circular	C1	--->	TW	213.910	222.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    218.35 ft
Weir Length       =      3.50 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)



Structure ID      = O1
Structure Type    = Orifice-Circular
------------------------------------
# of Openings     =         1
Invert Elev.      =    213.91 ft
Diameter          =     .2500 ft
Orifice Coeff.    =      .600
```

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```
OUTLET STRUCTURE INPUT DATA



Structure ID      = C1
Structure Type    = Culvert-Circular
------------------------------------
No. Barrels       =         1
Barrel Diameter   =    3.0000 ft
Upstream Invert   =    213.91 ft
Dnstream Invert   =    212.53 ft
Horiz. Length     =    138.00 ft
Barrel Length     =    138.01 ft
Barrel Slope      =    .01000 ft/ft

OUTLET CONTROL DATA...
Mannings n        =     .0100
Ke                =     .5000  (forward entrance loss)
Kb                =   .004277  (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)   =     1.155
T2 ratio (HW/D)   =     1.302
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 =    217.38 ft  --->  Flow =     42.85 cfs
At T2 Elev =    217.82 ft  --->  Flow =     48.97 cfs
```

```
Structure ID      = TW
Structure Type    = TW SETUP, DS Channel
------------------------------------
FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations=    50
Min. TW tolerance =    .10 ft
Max. TW tolerance =    .10 ft
Min. HW tolerance =    .10 ft
Max. HW tolerance =    .10 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

File.... T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\POSTDEV-REV.PPW

***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
210.61	.00	Free Outfall		(no Q: W1,O1,C1)
211.11	.00	Free Outfall		(no Q: W1,O1,C1)
211.61	.00	Free Outfall		(no Q: W1,O1,C1)
212.11	.00	Free Outfall		(no Q: W1,O1,C1)
212.61	.00	Free Outfall		(no Q: W1,O1,C1)
213.11	.00	Free Outfall		(no Q: W1,O1,C1)
213.61	.00	Free Outfall		(no Q: W1,O1,C1)
213.91	.00	Free Outfall		(no Q: W1,O1,C1)
214.11	.06	Free Outfall		O1,C1 (no Q: W1)
214.61	.17	Free Outfall		O1,C1 (no Q: W1)
215.11	.23	Free Outfall		O1,C1 (no Q: W1)
215.61	.28	Free Outfall		O1,C1 (no Q: W1)
216.11	.33	Free Outfall		O1,C1 (no Q: W1)
216.61	.37	Free Outfall		O1,C1 (no Q: W1)
217.11	.40	Free Outfall		O1,C1 (no Q: W1)
217.61	.43	Free Outfall		O1,C1 (no Q: W1)
218.11	.47	Free Outfall		O1,C1 (no Q: W1)
218.35	.48	Free Outfall		O1,C1 (no Q: W1)
218.61	1.91	Free Outfall		W1,O1,C1
219.11	7.65	Free Outfall		W1,O1,C1
219.61	15.80	Free Outfall		W1,O1,C1
220.11	25.78	Free Outfall		W1,O1,C1
220.61	37.30	Free Outfall		W1,O1,C1
221.11	50.17	Free Outfall		W1,O1,C1
221.61	61.79	Free Outfall		W1,O1,C1
222.00	68.55	Free Outfall		W1,O1,C1

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REQUESTED POND WS ELEVATIONS:

Min. Elev.= 202.29 ft
Increment = .50 ft
Max. Elev.= 212.75 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
Weir-Rectangular	W1	--->	C1	210.090	212.750
Orifice-Circular	O1	--->	C1	206.290	212.750
Culvert-Circular	C1	--->	TW	206.290	212.750
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = W1
Structure Type    = Weir-Rectangular
------------------------------------
# of Openings     =         1
Crest Elev.       =    210.09 ft
Weir Length       =      4.00 ft
Weir Coeff.       =  3.100000

Weir TW effects     (Use adjustment equation)



Structure ID      = O1
Structure Type    = Orifice-Circular
------------------------------------
# of Openings     =         1
Invert Elev.      =    206.29 ft
Diameter          =     .2500 ft
Orifice Coeff.    =      .600
```

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```
              OUTLET STRUCTURE INPUT DATA



              Structure ID      = C1
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    2.0000 ft
              Upstream Invert   =    206.29 ft
              Dnstream Invert   =    205.38 ft
              Horiz. Length     =     91.00 ft
              Barrel Length     =     91.00 ft
              Barrel Slope      =    .01000 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0100
              Ke                =     .5000  (forward entrance loss)
              Kb                =   .007344  (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)   =     1.155
              T2 ratio (HW/D)   =     1.302
              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 =    208.60 ft  --->  Flow =     15.55 cfs
 At T2 Elev =    208.89 ft  --->  Flow =     17.77 cfs



              Structure ID      = TW
              Structure Type    = TW SETUP, DS Channel
              ------------------------------------
              FREE OUTFALL CONDITIONS SPECIFIED

              CONVERGENCE TOLERANCES...
              Maximum Iterations=    50
              Min. TW tolerance =    .10 ft
              Max. TW tolerance =    .10 ft
              Min. HW tolerance =    .10 ft
              Max. HW tolerance =    .10 ft
              Min.  Q tolerance =    .10 cfs
              Max.  Q tolerance =    .10 cfs
```

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***** COMPOSITE OUTFLOW SUMMARY ****

WS Elev, Total Q		Converge		Notes
Elev. ft	Q cfs	TW Elev ft	Error +/-ft	Contributing Structures
202.29	.00	Free Outfall		(no Q: W1,O1,C1)
202.79	.00	Free Outfall		(no Q: W1,O1,C1)
203.29	.00	Free Outfall		(no Q: W1,O1,C1)
203.79	.00	Free Outfall		(no Q: W1,O1,C1)
204.29	.00	Free Outfall		(no Q: W1,O1,C1)
204.79	.00	Free Outfall		(no Q: W1,O1,C1)
205.29	.00	Free Outfall		(no Q: W1,O1,C1)
205.79	.00	Free Outfall		(no Q: W1,O1,C1)
206.29	.00	Free Outfall		(no Q: W1,O1,C1)
206.79	.13	Free Outfall		O1,C1 (no Q: W1)
207.29	.21	Free Outfall		O1,C1 (no Q: W1)
207.79	.26	Free Outfall		O1,C1 (no Q: W1)
208.29	.31	Free Outfall		O1,C1 (no Q: W1)
208.79	.35	Free Outfall		O1,C1 (no Q: W1)
209.29	.39	Free Outfall		O1,C1 (no Q: W1)
209.79	.42	Free Outfall		O1,C1 (no Q: W1)
210.09	.44	Free Outfall		O1,C1 (no Q: W1)
210.29	1.53	Free Outfall		W1,O1,C1
210.79	7.41	Free Outfall		W1,O1,C1
211.29	15.70	Free Outfall		W1,O1,C1
211.79	25.21	Free Outfall		W1,O1,C1
212.29	29.86	Free Outfall		W1,O1,C1
212.75	33.05	Free Outfall		W1,O1,C1

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - DEPRESS B IN Dev 1
Outflow HYG file = NONE STORED - DEPRESS B OUT Dev 1

Pond Node Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 88.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
88.00	.00	.000	.0014	.00	.00	.00
88.50	1.31	.002	.0054	.00	1.31	8.92
89.00	5.04	.006	.0121	.00	5.04	33.22
89.50	10.81	.014	.0214	.00	10.81	79.01
90.00	18.28	.028	.0335	.00	18.28	152.37
90.50	27.01	.046	.0396	.00	27.01	249.45
91.00	36.56	.067	.0463	.00	36.56	362.89
91.50	46.46	.092	.0535	.00	46.46	493.50
92.00	56.28	.121	.0612	.00	56.28	642.09
92.50	65.66	.153	.0678	.00	65.66	807.59
93.00	71.81	.189	.0748	.00	71.81	986.20
93.50	77.10	.228	.0820	.00	77.10	1181.10
94.00	82.06	.271	.0896	.00	82.06	1393.64
94.50	86.74	.318	.0972	.00	86.74	1624.24
95.00	91.17	.368	.1050	.00	91.17	1873.30
95.50	95.39	.423	.1132	.00	95.39	2141.57
96.00	99.43	.481	.1217	.00	99.43	2429.83
96.50	103.32	.545	.1307	.00	103.32	2739.06
97.00	107.06	.612	.1400	.00	107.06	3070.26
97.50	110.69	.685	.1496	.00	110.69	3424.21

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - DEPRESS B IN Dev 1
Outflow HYG file = NONE STORED - DEPRESS B OUT Dev 1

Pond Node Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 88.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
98.00	114.19	.762	.1595	.00	114.19	3801.69
98.50	117.59	.844	.1690	.00	117.59	4202.59
99.00	120.89	.931	.1788	.00	120.89	4626.75
99.50	124.11	1.023	.1889	.00	124.11	5074.84
100.00	127.24	1.120	.1992	.00	127.24	5547.52
100.50	130.31	1.222	.2097	.00	130.31	6045.28
101.00	133.30	1.330	.2204	.00	133.30	6568.58
101.50	136.22	1.443	.2314	.00	136.22	7118.05
102.00	139.08	1.561	.2426	.00	139.08	7694.36
102.50	158.75	1.685	.2541	.00	158.75	8314.93
103.00	192.04	1.815	.2658	.00	192.04	8977.14
103.50	233.87	1.951	.2777	.00	233.87	9676.54
104.00	282.36	2.093	.2900	.00	282.36	10411.90

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - DEPRESS B    IN  Dev  1
 Outflow HYG file = NONE STORED - DEPRESS B    OUT Dev  1

 Pond Node   Data = DEPRESS B
 Pond Volume Data = DEPRESS B
 Pond Outlet Data = DEPRESS B OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    88.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =      7.43 cfs    at   15.7650 hrs
 Peak Outflow      =      7.43 cfs    at   15.7350 hrs
 -----------------------------------------------------
 Peak Elevation    =     89.21 ft
 Peak Storage =           .009 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       5.427
- Infiltration =        .000
- HYG Vol OUT  =       5.422
- Retained Vol =        .005
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.006% of Inflow Volume)
```

```
                      DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - DEPRESS B    IN  Dev  1
 Outflow HYG file = NONE STORED - DEPRESS B    OUT Dev  1

 Pond Node   Data = DEPRESS B
 Pond Volume Data = DEPRESS B
 Pond Outlet Data = DEPRESS B OUT

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   15.7900 hrs
 Tp, Total Inflow        =   15.7650 hrs
 Peak to Peak            =     .0250 hrs

 Qout+Infilt. Centroid   =   18.2468 hrs
 Inflow Centroid         =   18.2386 hrs
 Centroid to Centroid    =     .0083 hrs

 Weighted Avg. Plug Time =     .0143 hrs
 Max.Plug Vol. Plug Time =     .0151 hrs
 Max.Inflow Plug Volume  =      .003 ac-ft   (From 15.7700 to 15.7750 hrs)
 ---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - DEPRESS B    IN  Dev 10
 Outflow HYG file = NONE STORED - DEPRESS B    OUT Dev 10

 Pond Node   Data = DEPRESS B
 Pond Volume Data = DEPRESS B
 Pond Outlet Data = DEPRESS B OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    88.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =    113.62 cfs    at   12.6500 hrs
 Peak Outflow      =    107.14 cfs    at   12.8300 hrs
 -----------------------------------------------------
 Peak Elevation    =     97.01 ft
 Peak Storage =           .614 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      25.176
- Infiltration =        .000
- HYG Vol OUT  =      25.171
- Retained Vol =        .005
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.001% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS B    IN  Dev 10
Outflow HYG file = NONE STORED - DEPRESS B    OUT Dev 10

Pond Node   Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.8350 hrs
Tp, Total Inflow        =   12.6500 hrs
Peak to Peak            =     .1850 hrs

Qout+Infilt. Centroid   =   15.2745 hrs
Inflow Centroid         =   15.2441 hrs
Centroid to Centroid    =     .0305 hrs

Weighted Avg. Plug Time =     .0325 hrs
Max.Plug Vol. Plug Time =     .0618 hrs
Max.Inflow Plug Volume  =      .047 ac-ft   (From 12.6500 to 12.6550 hrs)
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - DEPRESS B    IN  Dev100
 Outflow HYG file = NONE STORED - DEPRESS B    OUT Dev100

 Pond Node   Data = DEPRESS B
 Pond Volume Data = DEPRESS B
 Pond Outlet Data = DEPRESS B OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =    88.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =    227.30 cfs    at   12.5650 hrs
 Peak Outflow      =    225.82 cfs    at   12.6250 hrs
 -----------------------------------------------------
 Peak Elevation    =    103.40 ft
 Peak Storage =          1.924 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      44.752
- Infiltration =        .000
- HYG Vol OUT  =      44.746
- Retained Vol =        .005
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS B    IN  Dev100
Outflow HYG file = NONE STORED - DEPRESS B    OUT Dev100

Pond Node   Data = DEPRESS B
Pond Volume Data = DEPRESS B
Pond Outlet Data = DEPRESS B OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.6250 hrs
Tp, Total Inflow        =   12.5650 hrs
Peak to Peak            =     .0600 hrs

Qout+Infilt. Centroid   =   14.8120 hrs
Inflow Centroid         =   14.7449 hrs
Centroid to Centroid    =     .0671 hrs

Weighted Avg. Plug Time =     .0685 hrs
Max.Plug Vol. Plug Time =     .1030 hrs
Max.Inflow Plug Volume  =      .094 ac-ft   (From 12.5650 to 12.5700 hrs)
---------------------------------------
```

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - DEPRESS C IN Dev 1
Outflow HYG file = NONE STORED - DEPRESS C OUT Dev 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
174.00	.00	.000	.2223	.00	.00	.00
174.50	.00	.127	.2868	.00	.00	614.35
175.00	.00	.288	.3595	.00	.00	1394.75
175.17	.00	.352	.3861	.00	.00	1701.44
175.50	.74	.488	.4405	.00	.74	2361.80
176.00	4.56	.730	.5296	.00	4.56	3537.72
176.50	11.32	1.003	.5639	.00	11.32	4867.34
177.00	20.71	1.294	.5992	.00	20.71	6283.82
177.50	32.39	1.603	.6356	.00	32.39	7789.43
178.00	44.35	1.930	.6731	.00	44.35	9384.74
178.50	56.84	2.275	.7057	.00	56.84	11065.44
179.00	69.43	2.636	.7390	.00	69.43	12825.99
179.50	81.97	3.014	.7731	.00	81.97	14668.12
180.00	93.45	3.409	.8080	.00	93.45	16592.67
180.50	103.81	3.822	.8437	.00	103.81	18601.44
181.00	112.96	4.253	.8801	.00	112.96	20696.22
181.50	121.45	4.702	.9173	.00	121.45	22879.41
182.00	129.34	5.170	.9553	.00	129.34	25152.94
182.50	136.80	5.659	.9985	.00	136.80	27524.23
183.00	143.86	6.169	1.0427	.00	143.86	30000.87

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - DEPRESS C IN Dev 1
Outflow HYG file = NONE STORED - DEPRESS C OUT Dev 1

Pond Node Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 174.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
183.50	150.61	6.701	1.0878	.00	150.61	32585.28
184.00	157.05	7.257	1.1339	.00	157.05	35279.76
184.50	163.25	7.835	1.1809	.00	163.25	38086.70
185.00	169.21	8.438	1.2289	.00	169.21	41008.42
185.50	174.98	9.065	1.2779	.00	174.98	44047.28
186.00	180.55	9.716	1.3278	.00	180.55	47205.59
186.50	185.97	10.397	1.3983	.00	185.97	50509.23
187.00	191.24	11.115	1.4706	.00	191.24	53985.46
187.50	196.35	11.868	1.5447	.00	196.35	57638.69
188.00	201.34	12.660	1.6206	.00	201.34	61473.35
188.50	206.21	13.489	1.6984	.00	206.21	65493.85
189.00	210.96	14.358	1.7780	.00	210.96	69704.62
189.50	215.61	15.267	1.8594	.00	215.61	74110.06
190.00	220.17	16.218	1.9426	.00	220.17	78714.60
190.50	224.63	17.219	2.0606	.00	224.63	83562.20
191.00	229.00	18.279	2.1821	.00	229.00	88699.48
191.50	324.40	19.401	2.3070	.00	324.40	94226.00
192.00	494.90	20.587	2.4355	.00	494.90	100134.20

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - DEPRESS C    IN  Dev  1
 Outflow HYG file = NONE STORED - DEPRESS C    OUT Dev  1

 Pond Node   Data = DEPRESS C
 Pond Volume Data = DEPRESS C
 Pond Outlet Data = DEPRESS C OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   174.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =      3.64 cfs    at   12.6000 hrs
 Peak Outflow      =      1.15 cfs    at   17.0800 hrs
 -----------------------------------------------------
 Peak Elevation    =    175.55 ft
 Peak Storage =           .512 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       1.382
- Infiltration =        .000
- HYG Vol OUT  =        .925
- Retained Vol =        .455
                ----------
 Unrouted Vol =       -.002 ac-ft  (.115% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS C    IN  Dev  1
Outflow HYG file = NONE STORED - DEPRESS C    OUT Dev  1

Pond Node   Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   17.3000 hrs
Tp, Total Inflow        =   12.6000 hrs
Peak to Peak            =    4.7000 hrs

Qout+Infilt. Centroid   =   19.8880 hrs
Inflow Centroid         =   17.2443 hrs
Centroid to Centroid    =    2.6437 hrs

Weighted Avg. Plug Time =    4.5413 hrs
Max.Plug Vol. Plug Time =    3.8075 hrs
Max.Inflow Plug Volume  =      .002 ac-ft   (From 12.6000 to 12.6050 hrs)
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - DEPRESS C    IN  Dev 10
 Outflow HYG file = NONE STORED - DEPRESS C    OUT Dev 10

 Pond Node   Data = DEPRESS C
 Pond Volume Data = DEPRESS C
 Pond Outlet Data = DEPRESS C OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   174.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     27.58 cfs    at   12.7000 hrs
 Peak Outflow      =     20.43 cfs    at   13.2250 hrs
 -----------------------------------------------------
 Peak Elevation    =    176.99 ft
 Peak Storage =          1.285 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       6.992
- Infiltration =        .000
- HYG Vol OUT  =       6.526
- Retained Vol =        .465
                  ----------
 Unrouted Vol =       -.001 ac-ft  (.017% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS C    IN  Dev 10
Outflow HYG file = NONE STORED - DEPRESS C    OUT Dev 10

Pond Node   Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   13.2300 hrs
Tp, Total Inflow        =   12.7000 hrs
Peak to Peak            =     .5300 hrs

Qout+Infilt. Centroid   =   16.2235 hrs
Inflow Centroid         =   15.3758 hrs
Centroid to Centroid    =     .8476 hrs

Weighted Avg. Plug Time =    1.4892 hrs
Max.Plug Vol. Plug Time =     .6586 hrs
Max.Inflow Plug Volume  =      .011 ac-ft   (From 12.6950 to 12.7000 hrs)
---------------------------------------
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS C    IN  Dev100
Outflow HYG file = NONE STORED - DEPRESS C    OUT Dev100

Pond Node   Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   174.00 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     70.35 cfs    at   12.6050 hrs
Peak Outflow      =     55.88 cfs    at   12.9450 hrs
-----------------------------------------------------
Peak Elevation    =    178.46 ft
Peak Storage =          2.247 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      13.067
- Infiltration =        .000
- HYG Vol OUT  =      12.592
- Retained Vol =        .475
                  ----------
Unrouted Vol =       -.001 ac-ft  (.006% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS C    IN  Dev100
Outflow HYG file = NONE STORED - DEPRESS C    OUT Dev100

Pond Node   Data = DEPRESS C
Pond Volume Data = DEPRESS C
Pond Outlet Data = DEPRESS C OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.9500 hrs
Tp, Total Inflow        =   12.6050 hrs
Peak to Peak            =     .3450 hrs

Qout+Infilt. Centroid   =   15.3826 hrs
Inflow Centroid         =   14.7430 hrs
Centroid to Centroid    =     .6396 hrs

Weighted Avg. Plug Time =    1.0236 hrs
Max.Plug Vol. Plug Time =     .4354 hrs
Max.Inflow Plug Volume  =      .029 ac-ft   (From 12.6050 to 12.6100 hrs)
---------------------------------------
```

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - DEPRESS H IN Dev 1
Outflow HYG file = NONE STORED - DEPRESS H OUT Dev 1

Pond Node Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS F OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 166.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
166.00	.00	.000	.0005	.00	.00	.00
166.50	.00	.000	.0005	.00	.00	1.21
167.00	.00	.001	.0005	.00	.00	2.42
167.50	.00	.001	.0005	.00	.00	3.63
167.87	.00	.001	.0005	.00	.00	4.53
168.00	.08	.001	.0005	.00	.08	4.92
168.50	1.72	.001	.0007	.00	1.72	7.96
169.00	5.18	.002	.0008	.00	5.18	13.24
169.50	10.03	.002	.0010	.00	10.03	20.37
170.00	15.76	.003	.0013	.00	15.76	28.91
170.50	21.83	.004	.0019	.00	21.83	38.85
171.00	26.99	.005	.0028	.00	26.99	49.67
171.50	30.71	.006	.0037	.00	30.71	61.18
172.00	34.02	.008	.0048	.00	34.02	74.75
172.50	37.04	.012	.0090	.00	37.04	94.24
173.00	39.83	.018	.0146	.00	39.83	125.38
173.50	42.44	.027	.0215	.00	42.44	171.44
174.00	44.89	.039	.0298	.00	44.89	235.66
174.50	47.22	.056	.0358	.00	47.22	317.19
175.00	49.44	.075	.0424	.00	49.44	413.95

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - DEPRESS H IN Dev 1
Outflow HYG file = NONE STORED - DEPRESS H OUT Dev 1

Pond Node Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS F OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 166.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
175.50	51.56	.098	.0496	.00	51.56	527.28
176.00	53.60	.125	.0573	.00	53.60	658.58
176.50	55.56	.156	.0656	.00	55.56	809.18
177.00	57.46	.191	.0745	.00	57.46	980.44
177.50	59.29	.230	.0839	.00	59.29	1173.73
178.00	61.08	.275	.0938	.00	61.08	1390.39
178.50	79.68	.324	.1019	.00	79.68	1645.73
179.00	111.89	.377	.1103	.00	111.89	1934.59
179.50	152.67	.434	.1190	.00	152.67	2252.72
180.00	200.11	.496	.1281	.00	200.11	2599.03

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - DEPRESS H    IN  Dev  1
 Outflow HYG file = NONE STORED - DEPRESS H    OUT Dev  1

 Pond Node   Data = DEPRESS H
 Pond Volume Data = DEPRESS H
 Pond Outlet Data = DEPRESS F OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   166.00 ft
 Starting Volume    =     .000 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     22.94 cfs    at   12.2350 hrs
 Peak Outflow      =     22.93 cfs    at   12.2400 hrs
 -----------------------------------------------------
 Peak Elevation    =    170.82 ft
 Peak Storage =           .004 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =       2.533
- Infiltration =        .000
- HYG Vol OUT  =       2.532
- Retained Vol =        .001
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS H    IN  Dev  1
Outflow HYG file = NONE STORED - DEPRESS H    OUT Dev  1

Pond Node   Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS F OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.2400 hrs
Tp, Total Inflow        =   12.2350 hrs
Peak to Peak            =     .0050 hrs

Qout+Infilt. Centroid   =   14.4134 hrs
Inflow Centroid         =   14.4098 hrs
Centroid to Centroid    =     .0036 hrs

Weighted Avg. Plug Time =     .0075 hrs
Max.Plug Vol. Plug Time =     .0025 hrs
Max.Inflow Plug Volume  =      .009 ac-ft   (From 12.2350 to 12.2400 hrs)
---------------------------------------
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS H    IN  Dev 10
Outflow HYG file = NONE STORED - DEPRESS H    OUT Dev 10

Pond Node   Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS F OUT

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   166.00 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     70.67 cfs    at   12.2350 hrs
Peak Outflow      =     60.39 cfs    at   12.3550 hrs
-----------------------------------------------------
Peak Elevation    =    177.81 ft
Peak Storage =           .257 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =       .000
+ HYG Vol IN   =      7.518
- Infiltration =       .000
- HYG Vol OUT  =      7.517
- Retained Vol =       .001
                ----------
Unrouted Vol =      -.000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS H    IN  Dev 10
Outflow HYG file = NONE STORED - DEPRESS H    OUT Dev 10

Pond Node   Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS F OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.3550 hrs
Tp, Total Inflow        =   12.2350 hrs
Peak to Peak            =     .1200 hrs

Qout+Infilt. Centroid   =   13.8927 hrs
Inflow Centroid         =   13.8788 hrs
Centroid to Centroid    =     .0138 hrs

Weighted Avg. Plug Time =     .0152 hrs
Max.Plug Vol. Plug Time =     .0389 hrs
Max.Inflow Plug Volume  =      .029 ac-ft   (From 12.2300 to 12.2350 hrs)
---------------------------------------
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - DEPRESS H    IN  Dev100
Outflow HYG file = NONE STORED - DEPRESS H    OUT Dev100

Pond Node   Data = DEPRESS H
Pond Volume Data = DEPRESS H
Pond Outlet Data = DEPRESS F OUT

No Infiltration

INITIAL CONDITIONS
---------------------------------
Starting WS Elev   =   166.00 ft
Starting Volume    =     .000 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
====================================================
Peak Inflow       =    116.14 cfs    at   12.2350 hrs
Peak Outflow      =    115.37 cfs    at   12.2450 hrs
----------------------------------------------------
Peak Elevation    =    179.04 ft
Peak Storage =           .381 ac-ft
====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =        .000
+ HYG Vol IN   =      12.461
- Infiltration =        .000
- HYG Vol OUT  =      12.460
- Retained Vol =        .001
                  ----------
Unrouted Vol =        .000 ac-ft  (.000% of Inflow Volume)
```

```
                      DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - DEPRESS H    IN  Dev100
 Outflow HYG file = NONE STORED - DEPRESS H    OUT Dev100

 Pond Node   Data = DEPRESS H
 Pond Volume Data = DEPRESS H
 Pond Outlet Data = DEPRESS F OUT

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   12.2450 hrs
 Tp, Total Inflow        =   12.2350 hrs
 Peak to Peak            =     .0100 hrs

 Qout+Infilt. Centroid   =   13.6572 hrs
 Inflow Centroid         =   13.6386 hrs
 Centroid to Centroid    =     .0186 hrs

 Weighted Avg. Plug Time =     .0195 hrs
 Max.Plug Vol. Plug Time =     .0402 hrs
 Max.Inflow Plug Volume  =      .048 ac-ft   (From 12.2300 to 12.2350 hrs)
 ---------------------------------------
```

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND A IN Dev 1
Outflow HYG file = NONE STORED - POND A OUT Dev 1

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

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 124.23 ft
Starting Volume = .359 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
122.00	.00	.000	.1106	.00	.00	.00
122.50	.00	.060	.1313	.00	.00	292.32
123.00	.00	.132	.1539	.00	.00	637.06
123.50	.00	.215	.1782	.00	.00	1038.53
124.00	.00	.310	.2043	.00	.00	1501.06
124.24	.00	.361	.2187	.00	.00	1746.70
124.50	.08	.420	.2348	.00	.08	2032.03
125.00	.18	.545	.2673	.00	.18	2639.16
125.50	.24	.687	.3019	.00	.24	3327.53
126.00	.29	.848	.3387	.00	.29	4102.25
126.50	.33	1.024	.3659	.00	.33	4954.54
127.00	.37	1.214	.3941	.00	.37	5873.91
127.50	.41	1.418	.4234	.00	.41	6862.91
128.00	.44	1.637	.4537	.00	.44	7924.06
128.13	.45	1.697	.4614	.00	.45	8211.97
128.50	5.25	1.871	.4834	.00	5.25	9062.64
129.00	17.54	2.121	.5140	.00	17.54	10281.65
129.50	33.74	2.386	.5456	.00	33.74	11579.79
130.00	44.03	2.666	.5781	.00	44.03	12949.53
130.50	49.79	2.963	.6102	.00	49.79	14392.90

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND A IN Dev 1
Outflow HYG file = NONE STORED - POND A OUT Dev 1

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

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 124.23 ft
Starting Volume = .359 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
131.00	53.50	3.277	.6431	.00	53.50	15912.95
131.50	56.89	3.607	.6770	.00	56.89	17513.47
132.00	56.89	3.954	.7117	.00	56.89	19193.54

LEVEL POOL ROUTING SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND A       IN  Dev  1
Outflow HYG file = NONE STORED - POND A       OUT Dev  1

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

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   124.23 ft
Starting Volume    =     .359 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     22.52 cfs    at   12.2100 hrs
Peak Outflow      =      2.22 cfs    at   14.2400 hrs
-----------------------------------------------------
Peak Elevation    =    128.27 ft
Peak Storage =          1.760 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =        .359
+ HYG Vol IN   =       2.324
- Infiltration =        .000
- HYG Vol OUT  =       1.006
- Retained Vol =       1.676
                  ----------
Unrouted Vol =       -.000 ac-ft  (.005% of Inflow Volume)
```

```
                      DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND A       IN  Dev  1
 Outflow HYG file = NONE STORED - POND A       OUT Dev  1

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

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   14.2900 hrs
 Tp, Total Inflow        =   12.2100 hrs
 Peak to Peak            =    2.0800 hrs

 Qout+Infilt. Centroid   =   17.1996 hrs
 Inflow Centroid         =   14.2096 hrs
 Centroid to Centroid    =    2.9900 hrs

 Weighted Avg. Plug Time =    7.3053 hrs
 Max.Plug Vol. Plug Time =    4.6168 hrs
 Max.Inflow Plug Volume  =      .009 ac-ft   (From 12.2100 to 12.2150 hrs)
 ---------------------------------------
```

```
                     LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND A       IN  Dev 10
 Outflow HYG file = NONE STORED - POND A       OUT Dev 10

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

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   124.23 ft
 Starting Volume    =     .359 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     63.14 cfs    at   12.2100 hrs
 Peak Outflow      =     40.01 cfs    at   12.4300 hrs
 -----------------------------------------------------
 Peak Elevation    =    129.80 ft
 Peak Storage =          2.555 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .359
+ HYG Vol IN   =       6.445
- Infiltration =        .000
- HYG Vol OUT  =       5.115
- Retained Vol =       1.688
                ----------
 Unrouted Vol =       -.000 ac-ft  (.001% of Inflow Volume)
```

```
                      DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND A       IN  Dev 10
 Outflow HYG file = NONE STORED - POND A       OUT Dev 10

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

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   12.4350 hrs
 Tp, Total Inflow        =   12.2100 hrs
 Peak to Peak            =     .2250 hrs

 Qout+Infilt. Centroid   =   14.6855 hrs
 Inflow Centroid         =   13.7181 hrs
 Centroid to Centroid    =     .9675 hrs

 Weighted Avg. Plug Time =    3.0646 hrs
 Max.Plug Vol. Plug Time =     .6812 hrs
 Max.Inflow Plug Volume  =      .026 ac-ft   (From 12.2050 to 12.2100 hrs)
 ---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND A       IN  Dev100
 Outflow HYG file = NONE STORED - POND A       OUT Dev100

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

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   124.23 ft
 Starting Volume    =     .359 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =    100.73 cfs    at   12.2100 hrs
 Peak Outflow      =     56.45 cfs    at   12.4650 hrs
 -----------------------------------------------------
 Peak Elevation    =    131.44 ft
 Peak Storage =          3.563 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .359
+ HYG Vol IN   =      10.432
- Infiltration =        .000
- HYG Vol OUT  =       9.097
- Retained Vol =       1.694
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND A       IN  Dev100
Outflow HYG file = NONE STORED - POND A       OUT Dev100

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

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.4700 hrs
Tp, Total Inflow        =   12.2100 hrs
Peak to Peak            =     .2600 hrs

Qout+Infilt. Centroid   =   14.3055 hrs
Inflow Centroid         =   13.4908 hrs
Centroid to Centroid    =     .8146 hrs

Weighted Avg. Plug Time =    2.1660 hrs
Max.Plug Vol. Plug Time =     .5921 hrs
Max.Inflow Plug Volume  =      .042 ac-ft   (From 12.2050 to 12.2100 hrs)
---------------------------------------
```

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND B IN Dev 1
Outflow HYG file = NONE STORED - POND B OUT Dev 1

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

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 126.81 ft
Starting Volume = 1.891 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
122.63	.00	.000	.2200	.00	.00	.00
123.13	.00	.122	.2693	.00	.00	591.07
123.63	.00	.270	.3236	.00	.00	1307.50
124.13	.00	.446	.3789	.00	.00	2160.11
124.63	.00	.647	.4263	.00	.00	3133.82
125.13	.00	.873	.4765	.00	.00	4225.70
125.63	.00	1.124	.5296	.00	.00	5442.52
126.13	.00	1.404	.6057	.00	.00	6795.93
126.63	.00	1.749	.7770	.00	.00	8464.70
126.81	.00	1.891	.8067	.00	.00	9154.52
127.13	.14	2.158	.8609	.00	.14	10445.78
127.63	.87	2.610	.9490	.00	.87	12635.58
128.13	1.65	3.108	1.0351	.00	1.65	15041.98
128.63	2.08	3.643	1.1062	.00	2.08	17632.86
129.13	2.47	4.214	1.1796	.00	2.47	20398.55
129.63	2.82	4.823	1.2554	.00	2.82	23344.77
130.13	3.14	5.469	1.3277	.00	3.14	26475.40
130.63	3.44	6.148	1.3849	.00	3.44	29757.73
131.13	3.72	6.855	1.4434	.00	3.72	33180.05
131.63	3.98	7.591	1.5031	.00	3.98	36745.30

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND B IN Dev 1
Outflow HYG file = NONE STORED - POND B OUT Dev 1

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

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	126.81 ft
Starting Volume	=	1.891 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
132.13	4.23	8.358	1.5618	.00	4.23	40455.71
132.58	4.44	9.071	1.6100	.00	4.44	43909.87
132.63	4.65	9.152	1.6154	.00	4.65	44300.39
133.13	11.50	9.973	1.6700	.00	11.50	48282.36
133.63	22.54	10.822	1.7254	.00	22.54	52401.59
134.13	36.15	11.699	1.7814	.00	36.15	56658.54
134.63	51.62	12.603	1.8373	.00	51.62	61052.49
135.13	68.49	13.536	1.8941	.00	68.49	65584.24
135.63	86.43	14.498	1.9518	.00	86.43	70255.55
136.13	105.18	15.488	2.0100	.00	105.18	75068.15
136.63	124.53	16.508	2.0682	.00	124.53	80021.98
137.13	144.30	17.557	2.1273	.00	144.30	85118.12
137.63	164.32	18.635	2.1872	.00	164.32	90358.43
138.13	184.45	19.744	2.2476	.00	184.45	95744.69
138.63	204.57	20.883	2.3081	.00	204.57	101277.00
139.13	224.56	22.052	2.3694	.00	224.56	106956.70
139.63	244.31	23.252	2.4315	.00	244.31	112785.40
140.00	258.70	24.161	2.4780	.00	258.70	117195.60

```
                    LEVEL POOL ROUTING SUMMARY

HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND B       IN  Dev  1
Outflow HYG file = NONE STORED - POND B       OUT Dev  1

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

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   126.81 ft
Starting Volume    =    1.891 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =    107.93 cfs    at   12.2300 hrs
Peak Outflow      =      7.43 cfs    at   15.7650 hrs
-----------------------------------------------------
Peak Elevation    =    132.83 ft
Peak Storage =          9.482 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =       1.891
+ HYG Vol IN   =      11.751
- Infiltration =        .000
- HYG Vol OUT  =       5.427
- Retained Vol =       8.213
                  ----------
  Unrouted Vol =       -.002 ac-ft  (.019% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND B       IN  Dev  1
Outflow HYG file = NONE STORED - POND B       OUT Dev  1

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

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   15.7750 hrs
Tp, Total Inflow        =   12.2300 hrs
Peak to Peak            =    3.5450 hrs

Qout+Infilt. Centroid   =   18.2386 hrs
Inflow Centroid         =   14.2019 hrs
Centroid to Centroid    =    4.0366 hrs

Weighted Avg. Plug Time =    7.7047 hrs
Max.Plug Vol. Plug Time =    5.7663 hrs
Max.Inflow Plug Volume  =      .045 ac-ft   (From 12.2250 to 12.2300 hrs)
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND B       IN  Dev 10
 Outflow HYG file = NONE STORED - POND B       OUT Dev 10

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

 No Infiltration

 INITIAL CONDITIONS
 ---------------------------------
 Starting WS Elev   =   126.81 ft
 Starting Volume    =    1.891 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 ====================================================
 Peak Inflow       =    300.75 cfs    at   12.2150 hrs
 Peak Outflow      =    113.62 cfs    at   12.6500 hrs
 ----------------------------------------------------
 Peak Elevation    =    136.35 ft
 Peak Storage =         15.929 ac-ft
 ====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =       1.891
+ HYG Vol IN   =      32.246
- Infiltration =        .000
- HYG Vol OUT  =      25.177
- Retained Vol =       8.960
                  ----------
 Unrouted Vol =       -.001 ac-ft  (.005% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND B       IN  Dev 10
Outflow HYG file = NONE STORED - POND B       OUT Dev 10

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

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.6500 hrs
Tp, Total Inflow        =   12.2150 hrs
Peak to Peak            =     .4350 hrs

Qout+Infilt. Centroid   =   15.2441 hrs
Inflow Centroid         =   13.7196 hrs
Centroid to Centroid    =    1.5245 hrs

Weighted Avg. Plug Time =    3.6820 hrs
Max.Plug Vol. Plug Time =    1.2858 hrs
Max.Inflow Plug Volume  =      .124 ac-ft   (From 12.2100 to 12.2150 hrs)
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND B       IN  Dev100
Outflow HYG file = NONE STORED - POND B       OUT Dev100

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

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   126.81 ft
Starting Volume    =    1.891 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =    479.28 cfs    at   12.2100 hrs
Peak Outflow      =    227.30 cfs    at   12.5650 hrs
-----------------------------------------------------
Peak Elevation    =    139.20 ft
Peak Storage =         22.217 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =       1.891
+ HYG Vol IN   =      52.025
- Infiltration =        .000
- HYG Vol OUT  =      44.752
- Retained Vol =       9.165
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

```
                      DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND B       IN  Dev100
 Outflow HYG file = NONE STORED - POND B       OUT Dev100

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

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   12.5650 hrs
 Tp, Total Inflow        =   12.2100 hrs
 Peak to Peak            =     .3550 hrs

 Qout+Infilt. Centroid   =   14.7449 hrs
 Inflow Centroid         =   13.4954 hrs
 Centroid to Centroid    =    1.2494 hrs

 Weighted Avg. Plug Time =    2.6962 hrs
 Max.Plug Vol. Plug Time =     .9542 hrs
 Max.Inflow Plug Volume  =      .198 ac-ft   (From 12.2100 to 12.2150 hrs)
 ---------------------------------------
```

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND C IN Dev 1
Outflow HYG file = NONE STORED - POND C OUT Dev 1

Pond Node Data = POND C
Pond Volume Data = POND C
Pond Outlet Data = POND C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 180.73 ft
Starting Volume = .337 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
178.00	.00	.000	.0662	.00	.00	.00
178.50	.00	.038	.0842	.00	.00	181.53
179.00	.00	.085	.1042	.00	.00	409.03
179.50	.00	.142	.1264	.00	.00	687.67
180.00	.00	.211	.1508	.00	.00	1022.66
180.50	.00	.294	.1809	.00	.00	1423.48
180.73	.00	.337	.1957	.00	.00	1633.07
181.00	.08	.393	.2138	.00	.08	1900.67
181.50	.18	.508	.2495	.00	.18	2460.80
182.00	.24	.643	.2879	.00	.24	3110.48
182.50	.29	.792	.3079	.00	.29	3831.23
183.00	.33	.951	.3286	.00	.33	4601.22
183.50	.37	1.120	.3499	.00	.37	5422.08
184.00	.41	1.301	.3719	.00	.41	6295.44
184.50	.44	1.492	.3943	.00	.44	7222.51
185.00	.47	1.695	.4173	.00	.47	8204.47
185.34	.49	1.840	.4333	.00	.49	8904.36
185.50	1.08	1.910	.4410	.00	1.08	9243.48
186.00	5.25	2.136	.4653	.00	5.25	10344.10
186.50	11.19	2.375	.4900	.00	11.19	11505.79

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND C IN Dev 1
Outflow HYG file = NONE STORED - POND C OUT Dev 1

Pond Node Data = POND C
Pond Volume Data = POND C
Pond Outlet Data = POND C OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 180.73 ft
Starting Volume = .337 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
187.00	18.16	2.626	.5153	.00	18.16	12729.01
187.50	25.74	2.890	.5413	.00	25.74	14014.90
188.00	33.65	3.168	.5679	.00	33.65	15364.71

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND C       IN  Dev  1
 Outflow HYG file = NONE STORED - POND C       OUT Dev  1

 Pond Node   Data = POND C
 Pond Volume Data = POND C
 Pond Outlet Data = POND C OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   180.73 ft
 Starting Volume    =     .337 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     14.91 cfs    at   12.3100 hrs
 Peak Outflow      =       .47 cfs    at   18.0050 hrs
 -----------------------------------------------------
 Peak Elevation    =    185.03 ft
 Peak Storage =          1.707 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .337
+ HYG Vol IN   =       1.810
- Infiltration =        .000
- HYG Vol OUT  =        .518
- Retained Vol =       1.628
                  ----------
 Unrouted Vol =       -.001 ac-ft  (.070% of Inflow Volume)
```

```
                      DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND C       IN  Dev  1
 Outflow HYG file = NONE STORED - POND C       OUT Dev  1

 Pond Node   Data = POND C
 Pond Volume Data = POND C
 Pond Outlet Data = POND C OUT

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   18.9700 hrs
 Tp, Total Inflow        =   12.3100 hrs
 Peak to Peak            =    6.6600 hrs

 Qout+Infilt. Centroid   =   18.3920 hrs
 Inflow Centroid         =   13.8478 hrs
 Centroid to Centroid    =    4.5442 hrs

 Weighted Avg. Plug Time =    9.3944 hrs
 Max.Plug Vol. Plug Time =   12.8600 hrs
 Max.Inflow Plug Volume  =      .006 ac-ft   (From 12.3100 to 12.3150 hrs)
 ---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND C       IN  Dev 10
 Outflow HYG file = NONE STORED - POND C       OUT Dev 10

 Pond Node   Data = POND C
 Pond Volume Data = POND C
 Pond Outlet Data = POND C OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   180.73 ft
 Starting Volume    =     .337 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     34.09 cfs    at   12.3100 hrs
 Peak Outflow      =     13.37 cfs    at   12.7800 hrs
 -----------------------------------------------------
 Peak Elevation    =    186.66 ft
 Peak Storage =          2.452 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .337
+ HYG Vol IN   =       4.252
- Infiltration =        .000
- HYG Vol OUT  =       2.769
- Retained Vol =       1.820
                 ----------
 Unrouted Vol =       -.000 ac-ft  (.007% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND C       IN  Dev 10
Outflow HYG file = NONE STORED - POND C       OUT Dev 10

Pond Node   Data = POND C
Pond Volume Data = POND C
Pond Outlet Data = POND C OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.7850 hrs
Tp, Total Inflow        =   12.3100 hrs
Peak to Peak            =     .4750 hrs

Qout+Infilt. Centroid   =   15.3137 hrs
Inflow Centroid         =   13.4484 hrs
Centroid to Centroid    =    1.8653 hrs

Weighted Avg. Plug Time =    5.3437 hrs
Max.Plug Vol. Plug Time =    2.3563 hrs
Max.Inflow Plug Volume  =      .014 ac-ft   (From 12.3050 to 12.3100 hrs)
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND C       IN  Dev100
 Outflow HYG file = NONE STORED - POND C       OUT Dev100

 Pond Node   Data = POND C
 Pond Volume Data = POND C
 Pond Outlet Data = POND C OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   180.73 ft
 Starting Volume    =     .337 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     50.92 cfs    at   12.3100 hrs
 Peak Outflow      =     29.97 cfs    at   12.6200 hrs
 -----------------------------------------------------
 Peak Elevation    =    187.77 ft
 Peak Storage =          3.037 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .337
+ HYG Vol IN   =       6.491
- Infiltration =        .000
- HYG Vol OUT  =       4.989
- Retained Vol =       1.839
                  ----------
 Unrouted Vol =       -.000 ac-ft  (.000% of Inflow Volume)
```

```
                      DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND C       IN  Dev100
 Outflow HYG file = NONE STORED - POND C       OUT Dev100

 Pond Node   Data = POND C
 Pond Volume Data = POND C
 Pond Outlet Data = POND C OUT

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   12.6200 hrs
 Tp, Total Inflow        =   12.3100 hrs
 Peak to Peak            =     .3100 hrs

 Qout+Infilt. Centroid   =   14.6986 hrs
 Inflow Centroid         =   13.2605 hrs
 Centroid to Centroid    =    1.4381 hrs

 Weighted Avg. Plug Time =    3.8941 hrs
 Max.Plug Vol. Plug Time =    1.2429 hrs
 Max.Inflow Plug Volume  =      .021 ac-ft   (From 12.3050 to 12.3100 hrs)
 ---------------------------------------
```

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND D IN Dev 1
Outflow HYG file = NONE STORED - POND D OUT Dev 1

Pond Node Data = POND D
Pond Volume Data = POND D
Pond Outlet Data = POND D OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 213.91 ft
Starting Volume = .398 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
210.61	.00	.000	.0420	.00	.00	.00
211.11	.00	.026	.0622	.00	.00	125.30
211.61	.00	.063	.0864	.00	.00	304.32
212.11	.00	.113	.1129	.00	.00	546.21
212.61	.00	.175	.1365	.00	.00	847.56
213.11	.00	.250	.1624	.00	.00	1208.81
213.61	.00	.338	.1905	.00	.00	1635.38
213.91	.00	.398	.2085	.00	.00	1924.93
214.11	.06	.441	.2235	.00	.06	2133.45
214.61	.17	.564	.2693	.00	.17	2728.98
215.11	.23	.711	.3193	.00	.23	3440.45
215.61	.28	.884	.3737	.00	.28	4278.19
216.11	.33	1.085	.4243	.00	.33	5250.44
216.61	.37	1.303	.4489	.00	.37	6306.98
217.11	.40	1.534	.4742	.00	.40	7423.91
217.61	.43	1.777	.5002	.00	.43	8602.93
218.11	.47	2.034	.5268	.00	.47	9845.66
218.35	.48	2.162	.5397	.00	.48	10465.09
218.61	1.91	2.304	.5537	.00	1.91	11154.44
219.11	7.65	2.588	.5813	.00	7.65	12533.39

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND D IN Dev 1
Outflow HYG file = NONE STORED - POND D OUT Dev 1

Pond Node Data = POND D
Pond Volume Data = POND D
Pond Outlet Data = POND D OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 213.91 ft
Starting Volume = .398 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
219.61	15.80	2.886	.6095	.00	15.80	13982.27
220.11	25.78	3.198	.6383	.00	25.78	15502.09
220.61	37.30	3.524	.6675	.00	37.30	17093.52
221.11	50.17	3.865	.6973	.00	50.17	18757.68
221.61	61.79	4.221	.7278	.00	61.79	20493.54
222.00	68.55	4.510	.7520	.00	68.55	21896.85

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND D       IN  Dev  1
 Outflow HYG file = NONE STORED - POND D       OUT Dev  1

 Pond Node   Data = POND D
 Pond Volume Data = POND D
 Pond Outlet Data = POND D OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   213.91 ft
 Starting Volume    =     .398 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     21.17 cfs    at   12.1750 hrs
 Peak Outflow      =       .46 cfs    at   18.6700 hrs
 -----------------------------------------------------
 Peak Elevation    =    218.02 ft
 Peak Storage =          1.986 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .398
+ HYG Vol IN   =       2.036
- Infiltration =        .000
- HYG Vol OUT  =        .471
- Retained Vol =       1.961
                 ----------
 Unrouted Vol =       -.001 ac-ft  (.067% of Inflow Volume)
```

```
                       DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND D       IN  Dev  1
 Outflow HYG file = NONE STORED - POND D       OUT Dev  1

 Pond Node   Data = POND D
 Pond Volume Data = POND D
 Pond Outlet Data = POND D OUT

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   22.0900 hrs
 Tp, Total Inflow        =   12.1750 hrs
 Peak to Peak            =    9.9150 hrs

 Qout+Infilt. Centroid   =   18.3518 hrs
 Inflow Centroid         =   14.1094 hrs
 Centroid to Centroid    =    4.2424 hrs

 Weighted Avg. Plug Time =    9.0744 hrs
 Max.Plug Vol. Plug Time =   12.4500 hrs
 Max.Inflow Plug Volume  =      .009 ac-ft   (From 12.1700 to 12.1750 hrs)
 ---------------------------------------
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND D       IN  Dev 10
Outflow HYG file = NONE STORED - POND D       OUT Dev 10

Pond Node   Data = POND D
Pond Volume Data = POND D
Pond Outlet Data = POND D OUT

No Infiltration

INITIAL CONDITIONS
---------------------------------
Starting WS Elev   =   213.91 ft
Starting Volume    =     .398 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     57.60 cfs    at   12.1700 hrs
Peak Outflow      =     19.45 cfs    at   12.5700 hrs
-----------------------------------------------------
Peak Elevation    =    219.79 ft
Peak Storage =          2.998 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =        .398
+ HYG Vol IN   =       5.524
- Infiltration =        .000
- HYG Vol OUT  =       3.746
- Retained Vol =       2.176
                  ----------
Unrouted Vol =       -.000 ac-ft  (.003% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND D       IN  Dev 10
Outflow HYG file = NONE STORED - POND D       OUT Dev 10

Pond Node   Data = POND D
Pond Volume Data = POND D
Pond Outlet Data = POND D OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.5750 hrs
Tp, Total Inflow        =   12.1700 hrs
Peak to Peak            =     .4050 hrs

Qout+Infilt. Centroid   =   15.2611 hrs
Inflow Centroid         =   13.6299 hrs
Centroid to Centroid    =    1.6312 hrs

Weighted Avg. Plug Time =    4.6686 hrs
Max.Plug Vol. Plug Time =    1.8313 hrs
Max.Inflow Plug Volume  =      .024 ac-ft   (From 12.1700 to 12.1750 hrs)
---------------------------------------
```

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND D       IN  Dev100
 Outflow HYG file = NONE STORED - POND D       OUT Dev100

 Pond Node   Data = POND D
 Pond Volume Data = POND D
 Pond Outlet Data = POND D OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   213.91 ft
 Starting Volume    =     .398 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     91.04 cfs    at   12.1700 hrs
 Peak Outflow      =     50.31 cfs    at   12.4050 hrs
 -----------------------------------------------------
 Peak Elevation    =    221.12 ft
 Peak Storage =          3.870 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .398
+ HYG Vol IN   =       8.874
- Infiltration =        .000
- HYG Vol OUT  =       7.067
- Retained Vol =       2.204
                ----------
 Unrouted Vol =       -.000 ac-ft  (.005% of Inflow Volume)
```

```
                      DETENTION TIMES SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND D       IN  Dev100
 Outflow HYG file = NONE STORED - POND D       OUT Dev100

 Pond Node   Data = POND D
 Pond Volume Data = POND D
 Pond Outlet Data = POND D OUT

 No Infiltration

 APPROXIMATE DETENTION TIME
 ---------------------------------------
 Tp, Outflow + Infilt.   =   12.4100 hrs
 Tp, Total Inflow        =   12.1700 hrs
 Peak to Peak            =     .2400 hrs

 Qout+Infilt. Centroid   =   14.5964 hrs
 Inflow Centroid         =   13.4070 hrs
 Centroid to Centroid    =    1.1894 hrs

 Weighted Avg. Plug Time =    3.2475 hrs
 Max.Plug Vol. Plug Time =     .9302 hrs
 Max.Inflow Plug Volume  =      .038 ac-ft   (From 12.1650 to 12.1700 hrs)
 ---------------------------------------
```

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND E IN Dev 1
Outflow HYG file = NONE STORED - POND E OUT Dev 1

Pond Node Data = POND E
Pond Volume Data = POND E
Pond Outlet Data = POND E OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 206.29 ft
Starting Volume = .763 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
202.29	.00	.000	.1050	.00	.00	.00
202.79	.00	.057	.1219	.00	.00	274.32
203.29	.00	.122	.1401	.00	.00	591.13
203.79	.00	.197	.1596	.00	.00	953.47
204.29	.00	.282	.1803	.00	.00	1364.42
204.79	.00	.377	.2023	.00	.00	1827.03
205.29	.00	.484	.2255	.00	.00	2344.35
205.79	.00	.604	.2649	.00	.00	2923.02
206.29	.00	.763	.3760	.00	.00	3694.58
206.79	.13	.960	.4096	.00	.13	4645.05
207.29	.21	1.173	.4447	.00	.21	5678.63
207.79	.26	1.405	.4813	.00	.26	6798.85
208.29	.31	1.655	.5192	.00	.31	8009.20
208.79	.35	1.924	.5586	.00	.35	9313.18
209.29	.39	2.214	.5995	.00	.39	10714.27
209.79	.42	2.524	.6418	.00	.42	12215.97
210.09	.44	2.720	.6679	.00	.44	13166.74
210.29	1.53	2.856	.6855	.00	1.53	13822.84
210.79	7.41	3.210	.7307	.00	7.41	15542.08
211.29	15.70	3.587	.7773	.00	15.70	17374.78

LEVEL POOL ROUTING DATA

HYG Dir = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow HYG file = NONE STORED - POND E IN Dev 1
Outflow HYG file = NONE STORED - POND E OUT Dev 1

Pond Node Data = POND E
Pond Volume Data = POND E
Pond Outlet Data = POND E OUT

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 206.29 ft
Starting Volume = .763 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0050 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
211.79	25.21	3.987	.8254	.00	25.21	19323.29
212.29	29.86	4.412	.8735	.00	29.86	21383.99
212.75	33.05	4.824	.9180	.00	33.05	23381.29

```
                    LEVEL POOL ROUTING SUMMARY

 HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
 Inflow  HYG file = NONE STORED - POND E       IN  Dev  1
 Outflow HYG file = NONE STORED - POND E       OUT Dev  1

 Pond Node   Data = POND E
 Pond Volume Data = POND E
 Pond Outlet Data = POND E OUT

 No Infiltration

 INITIAL CONDITIONS
 ----------------------------------
 Starting WS Elev   =   206.29 ft
 Starting Volume    =     .763 ac-ft
 Starting Outflow   =      .00 cfs
 Starting Infiltr.  =      .00 cfs
 Starting Total Qout=      .00 cfs
 Time Increment     =    .0050 hrs


 INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 =====================================================
 Peak Inflow       =     22.08 cfs    at   12.1050 hrs
 Peak Outflow      =       .38 cfs    at   17.7250 hrs
 -----------------------------------------------------
 Peak Elevation    =    209.19 ft
 Peak Storage =          2.154 ac-ft
 =====================================================


 MASS BALANCE (ac-ft)
 --------------------------
+ Initial Vol  =        .763
+ HYG Vol IN   =       1.758
- Infiltration =        .000
- HYG Vol OUT  =        .382
- Retained Vol =       2.137
                 ----------
 Unrouted Vol =       -.002 ac-ft  (.112% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND E       IN  Dev  1
Outflow HYG file = NONE STORED - POND E       OUT Dev  1

Pond Node   Data = POND E
Pond Volume Data = POND E
Pond Outlet Data = POND E OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   21.1300 hrs
Tp, Total Inflow        =   12.1050 hrs
Peak to Peak            =    9.0250 hrs

Qout+Infilt. Centroid   =   17.9941 hrs
Inflow Centroid         =   13.6810 hrs
Centroid to Centroid    =    4.3130 hrs

Weighted Avg. Plug Time =    9.1619 hrs
Max.Plug Vol. Plug Time =   12.0800 hrs
Max.Inflow Plug Volume  =      .009 ac-ft   (From 12.1000 to 12.1050 hrs)
---------------------------------------
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND E       IN  Dev 10
Outflow HYG file = NONE STORED - POND E       OUT Dev 10

Pond Node   Data = POND E
Pond Volume Data = POND E
Pond Outlet Data = POND E OUT

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   206.29 ft
Starting Volume    =     .763 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     51.63 cfs    at   12.0950 hrs
Peak Outflow      =      7.46 cfs    at   12.6100 hrs
-----------------------------------------------------
Peak Elevation    =    210.79 ft
Peak Storage =          3.212 ac-ft
=====================================================


  MASS BALANCE (ac-ft)
  --------------------------
+ Initial Vol  =        .763
+ HYG Vol IN   =       4.300
- Infiltration =        .000
- HYG Vol OUT  =       2.319
- Retained Vol =       2.744
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.006% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND E       IN  Dev 10
Outflow HYG file = NONE STORED - POND E       OUT Dev 10

Pond Node   Data = POND E
Pond Volume Data = POND E
Pond Outlet Data = POND E OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.6200 hrs
Tp, Total Inflow        =   12.0950 hrs
Peak to Peak            =     .5250 hrs

Qout+Infilt. Centroid   =   15.5992 hrs
Inflow Centroid         =   13.2584 hrs
Centroid to Centroid    =    2.3407 hrs

Weighted Avg. Plug Time =    6.3192 hrs
Max.Plug Vol. Plug Time =    5.8724 hrs
Max.Inflow Plug Volume  =      .021 ac-ft   (From 12.0950 to 12.1000 hrs)
---------------------------------------
```

LEVEL POOL ROUTING SUMMARY

```
HYG Dir          = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND E       IN  Dev100
Outflow HYG file = NONE STORED - POND E       OUT Dev100

Pond Node   Data = POND E
Pond Volume Data = POND E
Pond Outlet Data = POND E OUT

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev   =   206.29 ft
Starting Volume    =     .763 ac-ft
Starting Outflow   =      .00 cfs
Starting Infiltr.  =      .00 cfs
Starting Total Qout=      .00 cfs
Time Increment     =    .0050 hrs


INFLOW/OUTFLOW HYDROGRAPH SUMMARY
=====================================================
Peak Inflow       =     77.70 cfs    at   12.0950 hrs
Peak Outflow      =     25.76 cfs    at   12.3650 hrs
-----------------------------------------------------
Peak Elevation    =    211.85 ft
Peak Storage =          4.036 ac-ft
=====================================================


MASS BALANCE (ac-ft)
--------------------------
+ Initial Vol  =        .763
+ HYG Vol IN   =       6.656
- Infiltration =        .000
- HYG Vol OUT  =       4.642
- Retained Vol =       2.777
                  ----------
  Unrouted Vol =       -.000 ac-ft  (.006% of Inflow Volume)
```

DETENTION TIMES SUMMARY

```
HYG Dir           = T:\Land Projects R2\98148AMT\Pondpack\Revised Grading\
Inflow  HYG file = NONE STORED - POND E       IN  Dev100
Outflow HYG file = NONE STORED - POND E       OUT Dev100

Pond Node   Data = POND E
Pond Volume Data = POND E
Pond Outlet Data = POND E OUT

No Infiltration

APPROXIMATE DETENTION TIME
---------------------------------------
Tp, Outflow + Infilt.   =   12.3700 hrs
Tp, Total Inflow        =   12.0950 hrs
Peak to Peak            =     .2750 hrs

Qout+Infilt. Centroid   =   14.7034 hrs
Inflow Centroid         =   13.0593 hrs
Centroid to Centroid    =    1.6441 hrs

Weighted Avg. Plug Time =    4.5282 hrs
Max.Plug Vol. Plug Time =    2.5012 hrs
Max.Inflow Plug Volume  =      .032 ac-ft   (From 12.0950 to 12.1000 hrs)
---------------------------------------
```

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APPENDIX D

COMPUTATIONS-
WATER QUALITY VOLUME
CHANNEL PROTECTION VOLUME
DRY SWALES
EXTENDED DETENTION POND DESIGN
RIP-RAP OUTLET PROTECTION

CORNWALL COMMONS
Town of Cornwall, New York
Water Quality and Channel Protection Volume Summary

(see attached sheets)

Pond	Areas Served	Total Disturbed Area (ac.)	Impervious Area (ac.)	Percent Impervious	CN	Tc (hrs)	Q 1-year (in.)
Pond A	A	14.50	7.50	51.7%	81	0.2844	1.2371
Pond B	B, B2	86.79	36.20	41.7%	82	0.3456	1.2853
Pond C	C	12.00	7.50	62.5%	89	0.4482	1.8097
Pond D	G2	18.78	6.59	35.1%	82	0.2300	1.3007
Pond E	C3	12.77	6.97	54.6%	87	0.0696	1.6521
Dry Swale 1	I	2.71	1.85	68.3%	--	--	--
Dry Swale 2	I						
Dry Swale 3	B2	1.69	0.93	55.2%	--	--	--
Dry Swale 4	B2	1.64	0.59	35.8%	--	--	--

Pond/Swale	Required WQv (ac.ft)	Provided WQv (ac.ft)	Required CPV (ac.ft)	Provided CPV (ac.ft)
Pond A	0.748	0.750	0.956	0.964
Pond B	2.802	3.816	4.698	6.163
Pond C	0.735	0.740	1.133	1.140
Pond D	0.687	0.804	1.290	1.375
Pond E	0.691	1.526	1.133	1.500
Dry Swale 1	0.180	0.112	--	--
Dry Swale 2		0.084	--	--
Dry Swale 3	0.092	0.100	--	--
Dry Swale 4	0.061	0.061	--	--
Total	5.996	7.993	9.210	11.142

CORNWALL COMMONS
Town of Cornwall, New York
Water Quality and Channel Protection Volume Summary

Extended Detention Orifice Sizing

CPv = Channel Protection Volume, from attached worksheet
Qo = Average Outflow discharge, CPv/24 hr*60 min* 60 sec
h = head at orifice centerline, ft
C = Orifice Coefficient : 0.6
g = 32.2, ft^/s

A = Qo/C*sqrt(2*g*h)

Pond	CPv (ac.ft)	Qo (CFS)	h (FT)	Orifice Area, A (SF)	Required Orifice Diameter (in)	Required Orifice Diameter (ft)	Provided Orifice Diameter (ft)
Pond A	0.956	0.4820	3.5	0.0535	3.1	0.26	0.25
Pond B	4.698	2.3686	5.7	0.2060	6.1	0.51	0.75
Pond C	1.133	0.5712	4.5	0.0559	3.2	0.27	0.25
Pond D	1.290	0.6504	4	0.0675	3.5	0.29	0.25
Pond E	1.133	0.5712	2.1	0.0819	3.9	0.32	0.25

CORNWALL COMMONS
Town of Cornwall, New York

Dry Swale Water Quality Volume

Swale I.D.	Areas Served	Swale Segment Slope	Length (FT)	Swale Dimensions: Depth (SF)	Side Slope (y:1)	Bottom Width (SF)	Area (SF)	Provided Water Quality Volume (ac.ft)	Required Water Quality Volume (ac.ft)
1	I	1.00%	244	2.0	3.0	4	20	0.112	0.180
2	I	1.00%	184	2.0	3.0	4	20	0.084	
3	B2	2.33%	485	1.0	3.0	6	9	0.100	0.092
4	B2	1.00%	294	1.0	3.0	6	9	0.061	0.061
Total								0.357	0.333

Gravel Diaphragm Water Quality Volume

Swale I.D.		Length (FT)	Width (FT)	Depth (FT)	Porosity	Volume (CF)	Provided Water Quality Volume (ac.ft)	Required 10% of Water Quality Volume (ac.ft)
1	I	780	2	1.5	0.4	936	0.021	0.018
2	I	780	2	1.5	0.4	936	0.021	
Total							0.043	0.018

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Pond A
Project Location: Town of Cornwall, New York

Water Quality Volume Calculation:

$$WQv = \frac{(P) * (Rv) * (A)}{12}$$

$$Rv = 0.05 + 0.009(I)$$

WQv = Water Quality Volume (ac-ft)
P = 90% Rainfall Event (in)
Rv = Runoff Coffecient
I = % impervious of the site
A = Area of the site (Contributing Acreage)

Impervious Acreage	=	7.5	Acres
Contributing Site Area	=	14.5	Acres
I (% Impervious)	=	51.7	%
Runoff Coffecient (Rv)	=	0.52	* Use Minimum of 0.2 for regulated sites Sheet has been designed to maintain 0.2 min.

90% Rainfall Event	P	1.2	*Rainfall from NYSDEC SWM Figure 4.1
Site Area (Contributing)	A	14.5	

REQUIRED WATER QUALITY VOLUME	=	0.748	AC-FT
		32,561	CU-FT

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Pond A
Project Location: Town of Cornwall, New York

Channel Protection Volume Calculation:

$$Vs = CPv = \frac{(Vs/Vr)(Q\text{-}1Year)(A)}{12}$$

CPv =Channel Protection Volume (ac-ft)
Vs = Required Storage Volume (ac-ft)
Vr = Runoff Volume (ac-ft)
Q-1Year = Post Developed Runoff for 1 year Design Storm (in)
A = Drainage Area
CN = Curve Number
P = Rainfall for 1-yr, 24-h Storm event (in)
Tc=Time of Concentration

Site Curve Number (CN)	81
Precipitation (P) (in)	2.9
Time of Concentration (Hrs.)	0.2844
Q-1Year Runoff (From Pondpack) (in)	1.2371
Site Area (acres)	14.5

Ia = Initial Abstraction
Ia= 0.4691
Ia/P= 0.1618
Using Exhibit 4-III - Unit Peak Discharge (Qu) Type II Type III Distribution

Qu= 575 csm/in

Using Figure D.11.2 - Detention Time vs. Discharge Ratios for 24 hours

Qo/Qi= 0.031

Vs/Vr= 0.639

CPv=Vs= 0.9555 Ac-Ft

REQUIRED CHANNEL PROTECTION VOLUME	=	0.956	AC-FT
	=	41,623	CU-FT

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Pond B
Project Location: Town of Cornwall, New York

Water Quality Volume Calculation:

$$WQv = \frac{(P) * (Rv) * (A)}{12}$$

$$Rv = 0.05 + 0.009(I)$$

WQv = Water Quality Volume (ac-ft)
P = 90% Rainfall Event (in)
Rv = Runoff Coffecient
I = % impervious of the site
A = Area of the site (Contributing Acreage)

Impervious Acreage	=	27.27	Acres
Contributing Site Area	=	69.63	Acres
I (% Impervious)	=	39.2	%
Runoff Coffecient (Rv)	=	0.40	* Use Minimum of 0.2 for regulated sites Sheet has been designed to maintain 0.2 min.

90% Rainfall Event	P	1.2	*Rainfall from NYSDEC SWM Figure 4.1
Site Area (Contributing)	A	69.63	

REQUIRED WATER QUALITY VOLUME	=	2.802	AC-FT
		122,075	CU-FT

Lanc and Tully Engineering, P.C.

Project Name:	Cornwall Commons - Pond B
Project Location:	Town of Cornwall, New York

Channel Protection Volume Calculation:

$$Vs = CPv = \frac{(Vs/Vr)(Q\text{-}1Year)(A)}{12}$$

CPv =Channel Protection Volume (ac-ft)
Vs = Required Storage Volume (ac-ft)
Vr = Runoff Volume (ac-ft)
Q-1Year = Post Developed Runoff for 1 year Design Storm (in)
A = Drainage Area
CN = Curve Number
P = Rainfall for 1-yr, 24-h Storm event (in)
Tc=Time of Concentration

Site Curve Number (CN)	82
Precipitation (P) (in)	2.9
Time of Concentration (Hrs.)	0.3458
Q-1Year Runoff (From Pondpack) (in)	1.2853
Site Area (acres)	69.63

Ia = Initial Abstraction

Ia=	0.4390
Ia/P=	0.1514

Using Exhibit 4-III - Unit Peak Discharge (Qu) Type II Type III Distribution

Qu= 447 csm/in

Using Figure D.11.2 - Detention Time vs. Discharge Ratios for 24 hours

Qo/Qi= 0.038

Vs/Vr= 0.630

CPv=Vs= 4.6984 Ac-Ft

REQUIRED CHANNEL PROTECTION VOLUME	=	4.698	AC-FT
	=	204,662	CU-FT

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Pond C
Project Location: Town of Cornwall, New York

Water Quality Volume Calculation:

$$WQv = \frac{(P) * (Rv) * (A)}{12}$$

$$Rv = 0.05 + 0.009(I)$$

WQv = Water Quality Volume (ac-ft)
P = 90% Rainfall Event (in)
Rv = Runoff Coffecient
I = % impervious of the site
A = Area of the site (Contributing Acreage)

Impervious Acreage	=	7.5	Acres
Contributing Site Area	=	12	Acres
I (% Impervious)	=	62.5	%
Runoff Coffecient (Rv)	=	0.61	* Use Minimum of 0.2 for regulated sites Sheet has been designed to maintain 0.2 min.

90% Rainfall Event	P	1.2	*Rainfall from NYSDEC SWM Figure 4.1
Site Area (Contributing)	A	12	

REQUIRED WATER QUALITY VOLUME	=	0.735	AC-FT
		32,017	CU-FT

Lanc and Tully Engineering, P.C.

Project Name:	Cornwall Commons - Pond C
Project Location:	Town of Cornwall, New York

Channel Protection Volume Calculation:

$$Vs = CPv = \frac{(Vs/Vr)(Q\text{-}1Year)(A)}{12}$$

CPv =Channel Protection Volume (ac-ft)
Vs = Required Storage Volume (ac-ft)
Vr = Runoff Volume (ac-ft)
Q-1Year = Post Developed Runoff for 1 year Design Storm (in)
A = Drainage Area
CN = Curve Number
P = Rainfall for 1-yr, 24-h Storm event (in)
Tc=Time of Concentration

Site Curve Number (CN)	89
Precipitation (P) (in)	2.9
Time of Concentration (Hrs.)	0.4482
Q-1Year Runoff (From Pondpack) (in)	1.8097
Site Area (acres)	12

Ia = Initial Abstraction

Ia= 0.2472

Ia/P= 0.0852

Using Exhibit 4-III - Unit Peak Discharge (Qu) Type II Type III Distribution

Qu= 445 csm/in

Using Figure D.11.2 - Detention Time vs. Discharge Ratios for 24 hours

Qo/Qi= 0.041

Vs/Vr= 0.626

CPv=Vs= 1.1330 Ac-Ft

REQUIRED CHANNEL PROTECTION VOLUME	=	1.133	AC-FT
	=	49,354	CU-FT

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Pond D
Project Location: Town of Cornwall, New York

Water Quality Volume Calculation:

$$WQv = \frac{(P) * (Rv) * (A)}{12}$$

$$Rv = 0.05 + 0.009(I)$$

WQv = Water Quality Volume (ac-ft)
P = 90% Rainfall Event (in)
Rv = Runoff Coffecient
I = % impervious of the site
A = Area of the site (Contributing Acreage)

Impervious Acreage	=	6.59	Acres
Contributing Site Area	=	18.78	Acres
I (% Impervious)	=	35.1	%
Runoff Coffecient (Rv)	=	0.37	* Use Minimum of 0.2 for regulated sites Sheet has been designed to maintain 0.2 min.

90% Rainfall Event	P	1.2	*Rainfall from NYSDEC SWM Figure 4.1
Site Area (Contributing)	A	18.78	

REQUIRED WATER QUALITY VOLUME	=	0.687	AC-FT
		29,926	CU-FT

Lanc and Tully Engineering, P.C.

Project Name:	Cornwall Commons - Pond D
Project Location:	Town of Cornwall, New York

Channel Protection Volume Calculation:

$$Vs = CPv = \frac{(Vs/Vr)(Q\text{-}1Year)(A)}{12}$$

CPv =Channel Protection Volume (ac-ft)
Vs = Required Storage Volume (ac-ft)
Vr = Runoff Volume (ac-ft)
Q-1Year = Post Developed Runoff for 1 year Design Storm (in)
A = Drainage Area
CN = Curve Number
P = Rainfall for 1-yr, 24-h Storm event (in)
Tc=Time of Concentration

Site Curve Number (CN)	82
Precipitation (P) (in)	2.9
Time of Concentration (Hrs.)	0.23
Q-1Year Runoff (From Pondpack) (in)	1.3007
Site Area (acres)	18.78

Ia = Initial Abstraction
Ia= 0.4390
Ia/P= 0.1514
Using Exhibit 4-III - Unit Peak Discharge (Qu) Type II Type III Distribution

Qu= 505 csm/in

Using Figure D.11.2 - Detention Time vs. Discharge Ratios for 24 hours

Qo/Qi= 0.035

Vs/Vr= 0.634

CPv=Vs= 1.2904 Ac-Ft

REQUIRED CHANNEL PROTECTION VOLUME	=	1.290	AC-FT
	=	56,210	CU-FT

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Pond E
Project Location: Town of Cornwall, New York

Water Quality Volume Calculation:

$$WQv = \frac{(P) * (Rv) * (A)}{12}$$

WQv = Water Quality Volume (ac-ft)
P = 90% Rainfall Event (in)
Rv = Runoff Coffecient
I = % impervious of the site
A = Area of the site (Contributing Acreage)

$$Rv = 0.05 + 0.009(I)$$

Impervious Acreage	=	0.697	Acres
Contributing Site Area	=	12.77	Acres
I (% Impervious)	=	17.0	%
Runoff Coffecient (Rv)	=	0.20	* Use Minimum of 0.2 for regulated sites Sheet has been designed to maintain 0.2 min.

90% Rainfall Event	P	1.2	*Rainfall from NYSDEC SWM Figure 4.1
Site Area (Contributing)	A	12.77	

REQUIRED WATER QUALITY VOLUME	=	0.259	AC-FT
		11,292	CU-FT

Lanc and Tully Engineering, P.C.

Project Name:	Cornwall Commons - Pond E
Project Location:	Town of Cornwall, New York

Channel Protection Volume Calculation:

$$Vs = CPv = \frac{(Vs/Vr)(Q\text{-}1Year)(A)}{12}$$

CPv =Channel Protection Volume (ac-ft)
Vs = Required Storage Volume (ac-ft)
Vr = Runoff Volume (ac-ft)
Q-1Year = Post Developed Runoff for 1 year Design Storm (in)
A = Drainage Area
CN = Curve Number
P = Rainfall for 1-yr, 24-h Storm event (in)
Tc=Time of Concentration

Site Curve Number (CN)	88
Precipitation (P) (in)	2.9
Time of Concentration (Hrs.)	0.0696
Q-1Year Runoff (From Pondpack) (in)	1.6521
Site Area (acres)	12.77

Ia = Initial Abstraction

Ia= 0.2727

Ia/P= 0.0940

Using Exhibit 4-III - Unit Peak Discharge (Qu) Type II Type III Distribution

Qu= 700 csm/in

Using Figure D.11.2 - Detention Time vs. Discharge Ratios for 24 hours

Qo/Qi= 0.027

Vs/Vr= 0.645

CPv=Vs= 1.1332 Ac-Ft

REQUIRED CHANNEL PROTECTION VOLUME	=	1.133	AC-FT
	=	49,363	CU-FT

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Swales 1 & 2
Project Location: Town of Cornwall, New York

Water Quality Volume Calculation:

$$WQv = \frac{(P) * (Rv) * (A)}{12}$$

$$Rv = 0.05 + 0.009(I)$$

WQv = Water Quality Volume (ac-ft)
P = 90% Rainfall Event (in)
Rv = Runoff Coffecient
I = % impervious of the site
A = Area of the site (Contributing Acreage)

Impervious Acreage	=	1.85	Acres
Contributing Site Area	=	2.71	Acres
I (% Impervious)	=	68.3	%
Runoff Coffecient (Rv)	=	0.66	* Use Minimum of 0.2 for regulated sites Sheet has been designed to maintain 0.2 min.

90% Rainfall Event	P	1.2	*Rainfall from NYSDEC SWM Figure 4.1
Site Area (Contributing)	A	2.71	

REQUIRED WATER QUALITY VOLUME	=	0.180	AC-FT
		7,843	CU-FT

Lanc and Tully Engineering, P.C.

Project Name:	Cornwall Commons - Swales 1 & 2
Project Location:	Town of Cornwall, New York

Channel Protection Volume Calculation:

$$Vs = CPv = \frac{(Vs/Vr)(Q\text{-}1Year)(A)}{12}$$

CPv =Channel Protection Volume (ac-ft)
Vs = Required Storage Volume (ac-ft)
Vr = Runoff Volume (ac-ft)
Q-1Year = Post Developed Runoff for 1 year Design Storm (in)
A = Drainage Area
CN = Curve Number
P = Rainfall for 1-yr, 24-h Storm event (in)
Tc=Time of Concentration

Site Curve Number (CN)	74
Precipitation (P) (in)	2.9
Time of Concentration (Hrs.)	0.435
Q-1Year Runoff (From Pondpack) (in)	0.8454
Site Area (acres)	14.5

Ia = Initial Abstraction

Ia= 0.7027

Ia/P= 0.2423

Using Exhibit 4-III - Unit Peak Discharge (Qu) Type II Type III Distribution

Qu= 390 csm/in

Using Figure D.11.2 - Detention Time vs. Discharge Ratios for 24 hours

Qo/Qi= 0.043

Vs/Vr= 0.623

CPv=Vs= 0.6369 Ac-Ft

REQUIRED CHANNEL PROTECTION VOLUME	=	0.637	AC-FT
	=	27,743	CU-FT

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Dry Swale 3
Project Location: Town of Cornwall, New York

Water Quality Volume Calculation:

$$WQv = \frac{(P) * (Rv) * (A)}{12}$$

WQv = Water Quality Volume (ac-ft)
P = 90% Rainfall Event (in)
Rv = Runoff Coffecient
I = % impervious of the site
A = Area of the site (Contributing Acreage)

$$Rv = 0.05 + 0.009(I)$$

Impervious Acreage	=	0.93	Acres
Contributing Site Area	=	1.685	Acres
I (% Impervious)	=	55.2	%
Runoff Coffecient (Rv)	=	0.55	* Use Minimum of 0.2 for regulated sites Sheet has been designed to maintain 0.2 min.

90% Rainfall Event	P	1.2	*Rainfall from NYSDEC SWM Figure 4.1
Site Area (Contributing)	A	1.685	

REQUIRED WATER QUALITY VOLUME	=	0.092	AC-FT
		4,013	CU-FT

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Dry Swale 3
Project Location: Town of Cornwall, New York

Channel Protection Volume Calculation:

$$V_s = CP_v = \frac{(V_s/V_r)(Q\text{-}1Year)(A)}{12}$$

CPv =Channel Protection Volume (ac-ft)
Vs = Required Storage Volume (ac-ft)
Vr = Runoff Volume (ac-ft)
Q-1Year = Post Developed Runoff for 1 year Design Storm (in)
A = Drainage Area
CN = Curve Number
P = Rainfall for 1-yr, 24-h Storm event (in)
Tc=Time of Concentration

Site Curve Number (CN)	77
Precipitation (P) (in)	2.9
Time of Concentration (Hrs.)	0.299
Q-1Year Runoff (From Pondpack) (in)	1.0023
Site Area (acres)	8.6

Ia = Initial Abstraction

Ia= 0.5974

Ia/P= 0.2060

Using Exhibit 4-III - Unit Peak Discharge (Qu) Type II Type III Distribution

Qu= 450 csm/in

Using Figure D.11.2 - Detention Time vs. Discharge Ratios for 24 hours

Qo/Qi= 0.040

Vs/Vr= 0.627

CPv=Vs= 0.4507 Ac-Ft

REQUIRED CHANNEL PROTECTION VOLUME	=	0.451	AC-FT
	=	19,630	CU-FT

Lanc and Tully Engineering, P.C.

Project Name: Cornwall Commons - Dry Swale 4
Project Location: Town of Cornwall, New York

Water Quality Volume Calculation:

$$WQv = \frac{(P) * (Rv) * (A)}{12}$$

$$Rv = 0.05 + 0.009(I)$$

WQv = Water Quality Volume (ac-ft)
P = 90% Rainfall Event (in)
Rv = Runoff Coffecient
I = % impervious of the site
A = Area of the site (Contributing Acreage)

Impervious Acreage	=	0.587	Acres
Contributing Site Area	=	1.64	Acres
I (% Impervious)	=	35.8	%
Runoff Coffecient (Rv)	=	0.37	* Use Minimum of 0.2 for regulated sites Sheet has been designed to maintain 0.2 min.

90% Rainfall Event	P	1.2	*Rainfall from NYSDEC SWM Figure 4.1
Site Area (Contributing)	A	1.64	

REQUIRED WATER QUALITY VOLUME	=	0.061	AC-FT
		2,658	CU-FT

Lanc and Tully Engineering, P.C.

Project Name:	Cornwall Commons - Dry Swale 4
Project Location:	Town of Cornwall, New York

Channel Protection Volume Calculation:

$$Vs = CPv = \frac{(Vs/Vr)(Q\text{-}1Year)(A)}{12}$$

CPv =Channel Protection Volume (ac-ft)
Vs = Required Storage Volume (ac-ft)
Vr = Runoff Volume (ac-ft)
Q-1Year = Post Developed Runoff for 1 year Design Storm (in)
A = Drainage Area
CN = Curve Number
P = Rainfall for 1-yr, 24-h Storm event (in)
Tc=Time of Concentration

Site Curve Number (CN)	77
Precipitation (P) (in)	2.9
Time of Concentration (Hrs.)	0.299
Q-1Year Runoff (From Pondpack) (in)	1.0023
Site Area (acres)	8.6

Ia = Initial Abstraction

Ia= 0.5974

Ia/P= 0.2060

Using Exhibit 4-III - Unit Peak Discharge (Qu) Type II Type III Distribution

Qu= 450 csm/in

Using Figure D.11.2 - Detention Time vs. Discharge Ratios for 24 hours

Qo/Qi= 0.040

Vs/Vr= 0.627

CPv=Vs= 0.4507 Ac-Ft

REQUIRED CHANNEL PROTECTION VOLUME	=	0.451	AC-FT
	=	19,630	CU-FT

Exhibit 4-III Unit peal discharge (q_u) for NRCS (SCS) type III rainfall distribution

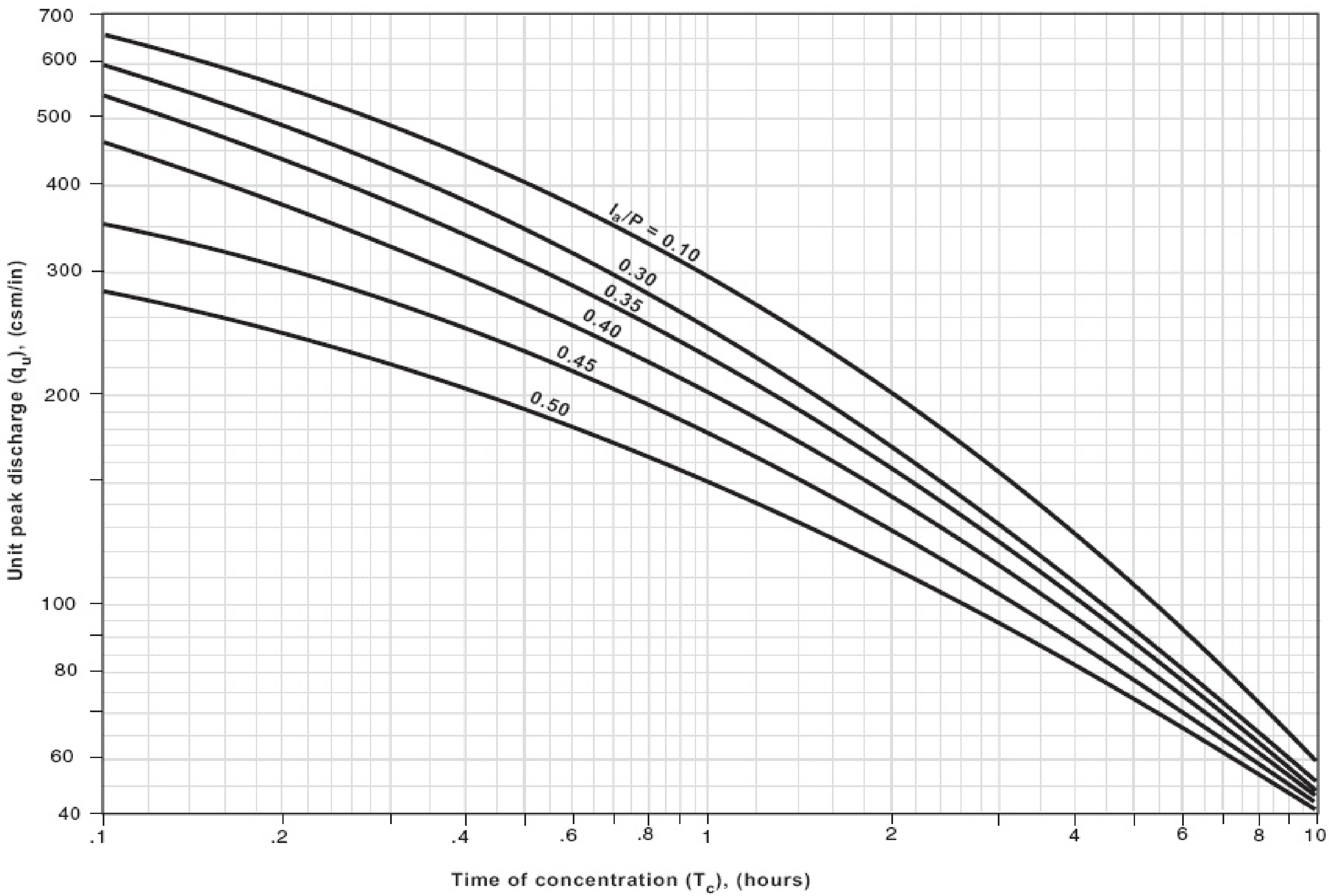


Figure D.11.2 Detention Time Versus Discharge Ratios $\left(\frac{q_o}{q_i}\right)$

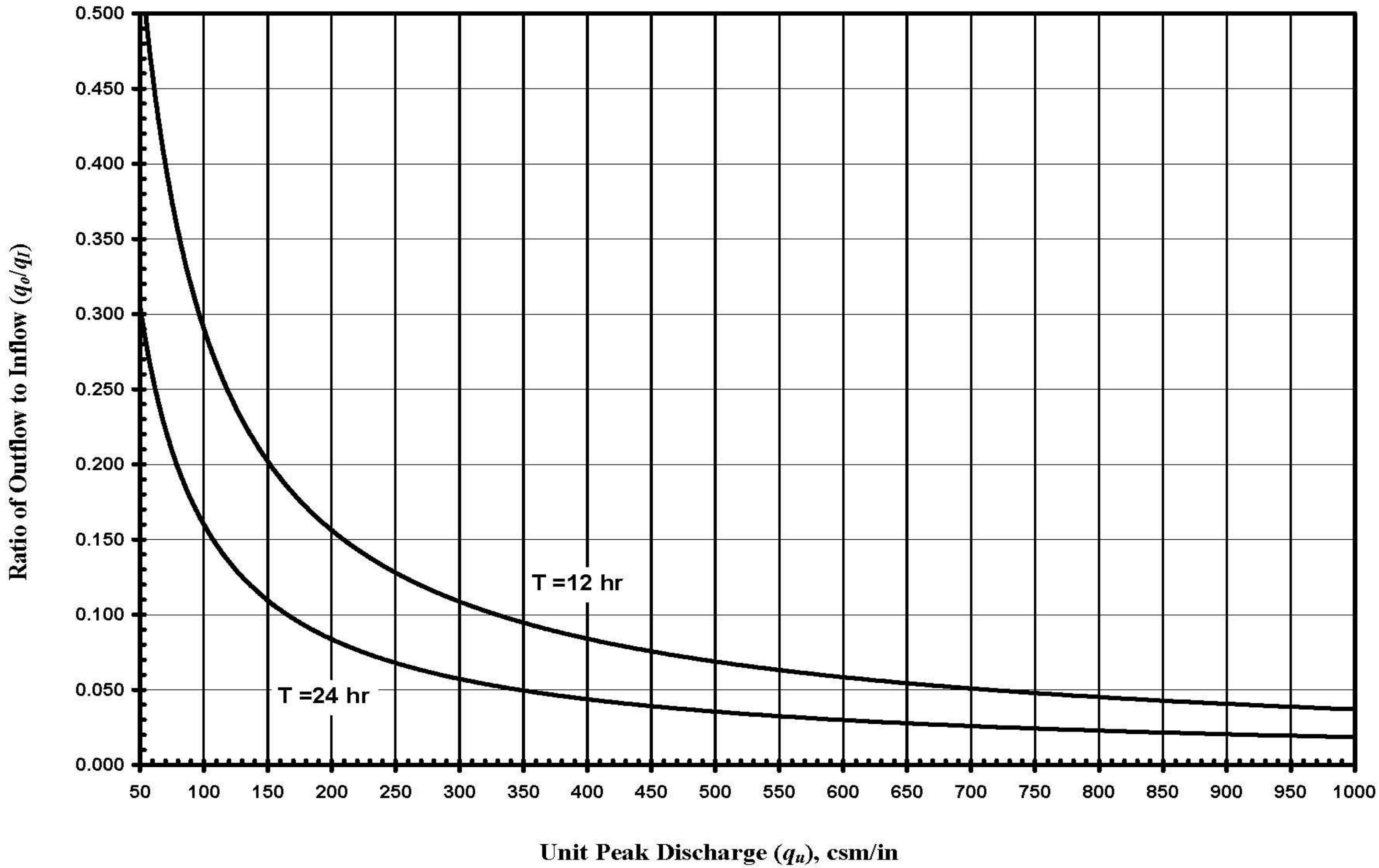
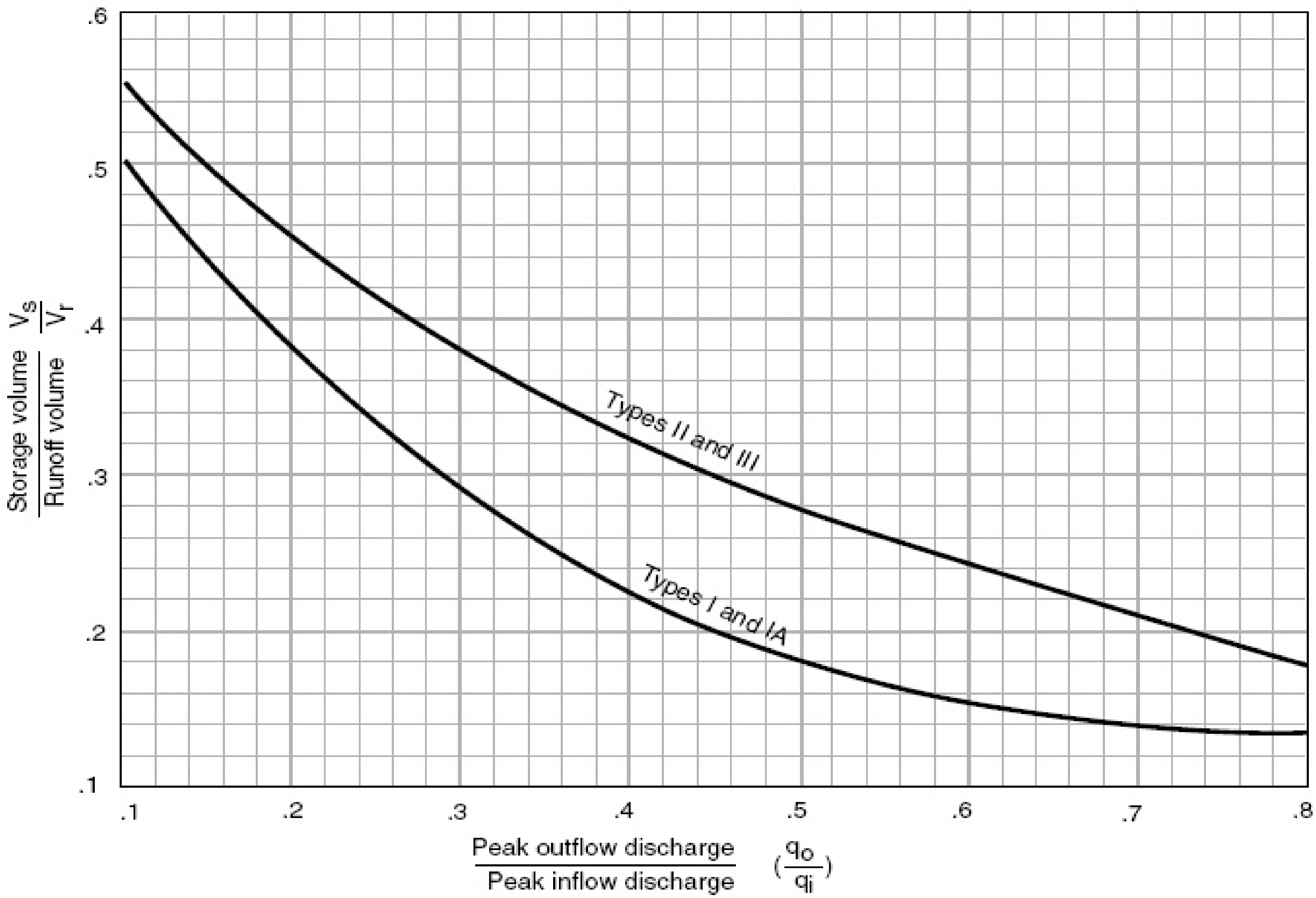


Figure 6-1 Approximate detention basin routing for rainfall types I, IA, II, and III



CORNWALL COMMONS
Town of Cornwall, New York
Wet Extended Detention Pond Design

Stormwater Detention Pond A

Elevation	Area (ac.)	Volume (ac.ft)	Cumulative Volume (ac.ft)
122.00	0.111	0.000	0.000
124.00	0.204	0.310	0.310
126.00	0.339	0.537	0.847
128.00	0.454	0.790	1.637
130.00	0.578	1.029	2.666
132.00	0.712	1.287	3.953

* Includes permanent pool

	Required Storage (ac.ft)	Provided Storage (ac.ft)	Elevation Provided
Water Quality Volume	0.748	0.750	-
Channel Protection Volume	0.956	0.964	-
50% Permanent Pool (50% of WQv)	0.374	0.375	124.24
Extended Detention (CPv plus 50% of WQv)	1.330	1.339	128.13
Total Storage (WQv + CPv)	1.704	1.714	128.13

Outlet Structures

	Inv. Elevation	Dimensions (ft)
Orifice (diameter)	124.24	0.25
Weir (length)	128.13	7.00
Culvert (diameter)	124.24	2.50

CORNWALL COMMONS
Town of Cornwall, New York
Wet Extended Detention Pond Design

Stormwater Detention Pond B

Elevation	Area (ac.)	Volume (ac.ft)	Cumulative Volume (ac.ft)
122.63	0.222	0.000	0.000
124.00	0.367	0.398	0.398
126.00	0.574	0.947	1.345
126.63	0.777	0.404	1.749
128.00	1.017	1.225	2.974
130.00	1.313	2.325	5.299
132.00	1.548	2.858	8.157
134.00	1.767	3.313	11.470
136.00	1.995	3.760	15.230
138.00	2.232	4.225	19.455
140.00	2.478	4.708	24.163

* Includes permanent pool

	Required Storage (ac.ft)	Provided Storage (ac.ft)	Elevation Provided
Water Quality Volume	2.802	3.816	-
Channel Protection Volume	4.698	6.163	-
50% Permanent Pool (50% of WQv)	1.401	1.908	126.81
Extended Detention (CPv plus 50% of WQv)	6.099	8.071	132.58
Total Storage (WQv + CPv)	7.500	9.979	133.10

Outlet Structures

	Inv. Elevation	Dimensions (ft)
Orifice (diameter)	126.81	0.75
Weir (length)	132.58	5.50
Culvert (diameter)	126.81	1.25

CORNWALL COMMONS
Town of Cornwall, New York
Wet Extended Detention Pond Design

Stormwater Detention Pond C

Elevation	Area (ac.)	Volume (ac.ft)	Cumulative Volume (ac.ft)
178.00	0.066	0.000	0.000
180.00	0.151	0.211	0.211
182.00	0.288	0.431	0.642
184.00	0.372	0.658	1.300
186.00	0.465	0.836	2.136
188.00	0.568	1.031	3.167

* Includes permanent pool

	Required Storage (ac.ft)	Provided Storage (ac.ft)	Elevation Provided
Water Quality Volume	0.735	0.740	-
Channel Protection Volume	1.133	1.140	-
50% Permanent Pool (50% of WQv)	0.368	0.370	180.73
Extended Detention (CPv plus 50% of WQv)	1.501	1.510	185.34
Total Storage (WQv + CPv)	1.868	1.880	185.34

Outlet Structures

	Inv. Elevation	Dimensions (ft)
Orifice (diameter)	180.73	0.25
Weir (length)	185.34	3.00
Culvert (diameter)	180.73	2.50

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Wet Extended Detention Pond Design

Stormwater Detention Pond D

Elevation	Area (ac.)	Volume (ac.ft)	Cumulative Volume (ac.ft)
210.61	0.042	0.000	0.000
212.00	0.108	0.101	0.101
214.00	0.214	0.316	0.417
216.00	0.419	0.622	1.039
218.00	0.521	0.938	1.977
220.00	0.632	1.151	3.128
222.00	0.752	1.382	4.510

* Includes permanent pool

	Required Storage (ac.ft)	Provided Storage (ac.ft)	Elevation Provided
Water Quality Volume	0.687	0.804	-
Channel Protection Volume	1.29	1.375	-
50% Permanent Pool (50% of WQv)	0.344	0.402	213.91
Extended Detention (CPv plus 50% of WQv)	1.634	1.777	218.35
Total Storage (WQv + CPv)	1.977	2.178	218.35

Outlet Structures

	Inv. Elevation	Dimensions (ft)
Orifice (diameter)	213.91	0.25
Weir (length)	218.35	3.50
Culvert (diameter)	213.91	3.00

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Wet Extended Detention Pond Design

Stormwater Detention Pond E

Elevation	Area (ac.)	Volume (ac.ft)	Cumulative Volume (ac.ft)
202.29	0.105	0.000	0.000
205.69	0.245	0.578	0.578
206.29	0.376	0.185	0.763
212.00	0.846	3.399	4.162
212.75	0.918	0.661	4.823

* Includes permanent pool

	Required Storage (ac.ft)	Provided Storage (ac.ft)	Elevation Provided
Water Quality Volume	0.691	1.526	-
Channel Protection Volume	1.133	1.500	-
50% Permanent Pool (50% of WQv)	0.346	0.763	206.29
Extended Detention (CPv plus 50% of WQv)	1.479	2.263	210.09
Total Storage (WQv + CPv)	1.824	3.026	210.09

Outlet Structures

	Inv. Elevation	Dimensions (ft)
Orifice (diameter)	206.29	0.25
Weir (length)	210.09	4.00
Culvert (diameter)	206.29	2.00

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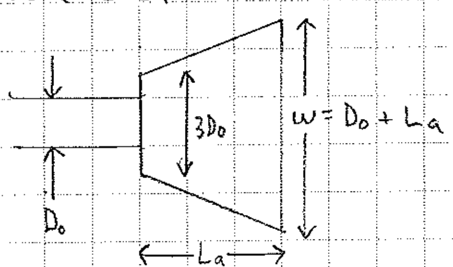
JOB Cornwall Commons
SHEET NO. 1 OF 3
CALCULATED BY ESR DATE 9/12/07
CHECKED BY ______ DATE ______
SCALE ______

Pond B Spillway Outlet Protection

Flowrates from storms at spillway

10 yr-24 hr storm $Q = 114.72$ cfs
100 yr-24 hr storm $Q = 227.72$ cfs $D_o = 5.5'$

Rock Outlet Protection from NYS



D_o = width of spillway = 5.5'
w = outlet end width
L_a = outlet length

$\boxed{\text{Figure 5B.12}}$

$Q = 227.72, d = 66'' \longrightarrow d_{50} = 1$ ft
$\longrightarrow L_a = 28$ ft

$W = D_o + L_a = 5.5 + 28 = 33.5$ ft
$3D_o = 16.5$ ft

Rip-Rap Specs

$d_{50} = 12''$
$d_{max} = 18''$
min. blanket thickness = 27"

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Pond C Spillway Outlet Protection

$Q_{max} = 29.97$ cfs
$D_o = 30"$

$\boxed{\text{Figure 5B.12}}$

$Q = 29.97, d = 30"$ ⟶ $d_{50} = 0.4'$
⟶ $L_A = 12"$

$W = D_o + L_a = 2.5 + 12" = 14.5'$
$3 D_o = 7.5'$

Rip-Rap Specs
$d_{50} = 6"$
$d_{max} = 9"$
min. blanket thickness = 14"

Pond A, no pipe outlet.

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SHEET NO. 3 OF 3
CALCULATED BY ESR DATE 9/12/07
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Pond D Pipe Outlet Protection

$Q_{max} = 54.89$ cfs
$D_o = 3'$

$\boxed{\text{Figure 5B.12}}$

$Q = 54.89$, $d = 36''$ $\longrightarrow$ $d_{50} = 0.6$ ft
$\longrightarrow$ $L_a = 20$ ft

$W = D_o + L_a = 3 + 20 = 23$ ft
$3D_o = 9$ ft

Rip-Rap Specs
$d_{50} = 9''$
$d_{max} = 14''$
min. blanket thickness $= 20''$

Pond E Pipe Outlet Protection

$Q_{max} = 30.45$ cfs
$D_o = 2'$

$\boxed{\text{Figure 5B.12}}$

$Q = 30.45$, $d = 24''$ $\longrightarrow$ $d_{50} = 0.6$ ft
$\longrightarrow$ $L_a = 18$ ft

$W = D_o + L_a = 2 + 18 = 20'$
$3D_o = 6'$

Rip-Rap Specs
$d_{50} = 9''$
$d_{max} = 14''$
min. blanket thickness $= 20''$

Pond B outlet velocity

POND B OUTLET SLOPE.txt

Channel Calculator

Given Input Data:

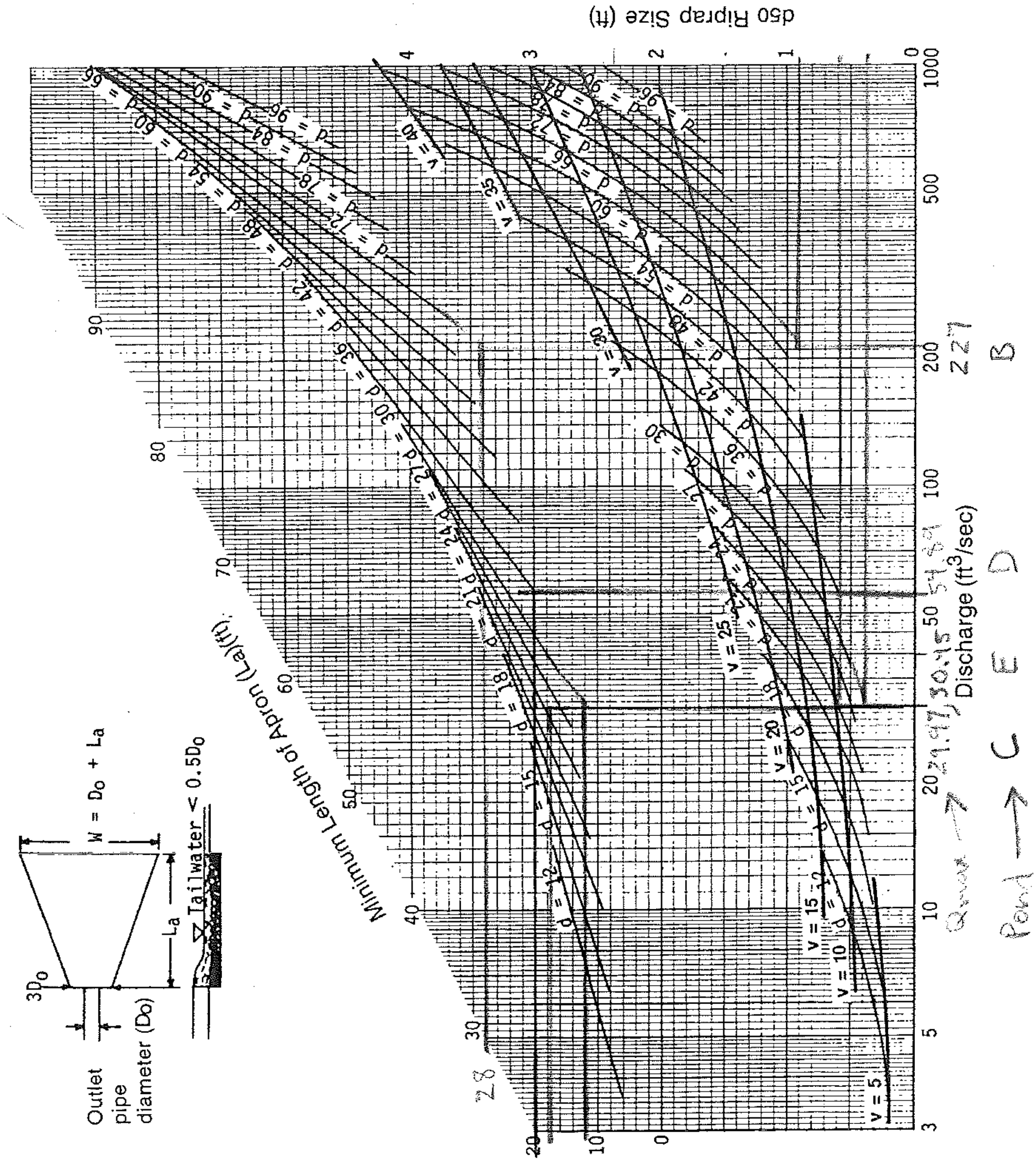
Shape	Trapezoidal
Solving for	Depth of Flow
Flowrate	220.0000 cfs
Slope	0.5000 ft/ft
Manning's n	0.0370
Height	18.0000 in
Bottom width	660.0000 in
Left slope	0.5000 ft/ft (V/H)
Right slope	0.5000 ft/ft (V/H)

Computed Results:

Depth	3.6974 in
Velocity	12.8383 fps
Full Flowrate	3106.5063 cfs
Flow area	17.1363 ft2
Flow perimeter	676.5352 in
Hydraulic radius	3.6474 in
Top width	674.7896 in
Area	87.0000 ft2
Perimeter	740.4984 in
Percent full	20.5411 %

Figure 5B.12

Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_0$) (USDA - NRCS)



Bottom Grade

The outlet protection apron shall be constructed with no slope along its length. There shall be no overfall at the end of the apron. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

Alignment

The outlet protection apron shall be located so that there are no bends in the horizontal alignment.

Materials

The outlet protection may be done using rock riprap, grouted riprap, or gabions.

Riprap shall be composed of a well-graded mixture of stone size so that 50 percent of the pieces, by weight, shall be larger than the d_{50} size determined by using the charts. A well-graded mixture, as used herein, is defined as a mixture composed primarily of larger stone sizes, but with a sufficient mixture of other sizes to fill the smaller voids between the stones. The diameter of the largest stone size in such a mixture shall be 1.5 times the d_{50} size.

Thickness

The minimum thickness of the riprap layer shall be 1.5 times the maximum stone diameter for d_{50} of 15 inches or less; and 1.2 times the maximum stone size for d_{50} greater than 15 inches. The following chart lists some examples:

D_{50} (inches)	d_{max} (inches)	Minimum Blanket Thickness (inches)
4	6	9
6	9	14
9	14	20
12	18	27
15	22	32
18	27	32
21	32	38
24	36	43

Stone Quality

Stone for riprap shall consist of field stone or rough unhewn quarry stone. The stone shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual stones shall be at least 2.5.

Recycled concrete equivalent may be used provided it has a density of at least 150 pounds per cubic foot, and does not have any exposed steel or reinforcing bars.

Filter

A filter is a layer of material placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap. Riprap shall have a filter placed under it in all cases.

A filter can be of two general forms: a gravel layer or a plastic filter cloth. The plastic filter cloth can be woven or non-woven monofilament yarns, and shall meet these base requirements: thickness 20-60 mils, grab strength 90-120 lbs; and shall conform to ASTM D-1777 and ASTM D-1682.

Gravel filter blanket, when used, shall be designed by comparing particle sizes of the overlying material and the base material. Design criteria are available in Standard and Specification for Riprap Slope Protection on page 5B.57.

Gabions

Gabions shall be made of hexagonal triple twist mesh with heavily galvanized steel wire. The maximum linear dimension of the mesh opening shall not exceed 4 ½ inches and the area of the mesh opening shall not exceed 10 square inches.

Gabions shall be fabricated in such a manner that the sides, ends, and lid can be assembled at the construction site into a rectangular basket of the specified sizes. Gabions shall be of single unit construction and shall be installed according to manufacturers recommendations.

The area on which the gabion is to be installed shall be graded as shown on the drawings. Foundation conditions shall be the same as for placing rock riprap, and filter cloth shall be placed under all gabions. Where necessary, key, or tie, the structure into the bank to prevent undermining of the main gabion structure.

Maintenance

Once a riprap outlet has been installed, the maintenance needs are very low. It should be inspected after high flows for evidence of scour beneath the riprap or for dislodged stones. Repairs should be made immediately.

Design Procedure

1. Investigate the downstream channel to assure that nonerosive velocities can be maintained.

2. Determine the tailwater condition at the outlet to establish which curve to use.
3. Enter the appropriate chart with the design discharge to

APPENDIX E

EXCERPTS FROM THE “NY STATE STORMWATER DESIGN MANUAL”
DETENTION POND SPECIFICATIONS
DRY SWALE SPECIFICATION

Section 4.1 Introduction

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

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

Table 5.1 Stormwater Management Practices Acceptable for Water Quality		
Group	**Practice**	**Description**
Pond	Micropool Extended Detention Pond (P-1)	Pond that treats the majority of the water quality volume through extended detention, and incorporates a micropool at the outlet of the pond to prevent sediment resuspension.
	Wet Pond (P-2)	Pond that provides storage for the entire water quality volume in the permanent pool.
	Wet Extended Detention Pond (P-3)	Pond that treats a portion of the water quality volume by detaining storm flows above a permanent pool for a specified minimum detention time.
	Multiple Pond System (P-4)	A group of ponds that collectively treat the water quality volume.
	Pocket Pond (P-5)	A stormwater wetland design adapted for the treatment of runoff from small drainage areas that has little or no baseflow available to maintain water elevations and relies on ground water to maintain a permanent pool.
Wetland	Shallow Wetland (W-1)	A wetland that provides water quality treatment entirely in a wet shallow marsh.
	Extended Detention Wetland (W-2)	A wetland system that provides some fraction of the water quality volume by detaining storm flows above the marsh surface.
	Pond/ Wetland System (W-3)	A wetland system that provides a portion of the water quality volume in the permanent pool of a wet pond that precedes the marsh for a specified minimum detention time.
	Pocket Wetland (W-4)	A shallow wetland design adapted for the treatment of runoff from small drainage areas that has variable water levels and relies on groundwater for its permanent pool.
Infiltration	Infiltration Trench (I-1)	An infiltration practice that stores the water quality volume in the void spaces of a gravel trench before it is infiltrated into the ground.
	Infiltration Basin (I-2)	An infiltration practice that stores the water quality volume in a shallow depression, before it is infiltrated it into the ground.
	Dry Well (I-3)	An infiltration practice similar in design to the infiltration trench, and best suited for treatment of rooftop runoff.
Filtering Practices	Surface Sand Filter (F-1)	A filtering practice that treats stormwater by settling out larger particles in a sediment chamber, and then filtering stormwater through a sand matrix.
	Underground Sand Filter (F-2)	A filtering practice that treats stormwater as it flows through underground settling and filtering chambers.
	Perimeter Sand Filter (F-3)	A filter that incorporates a sediment chamber and filer bed as parallel vaults adjacent to a parking lot.
	Organic Filter (F-4)	A filtering practice that uses an organic medium such as compost in the filter, in the place of sand.
	Bioretention (F-5)	A shallow depression that treats stormwater as it flows through a soil matrix, and is returned to the storm drain system.
Open Channels	Dry Swale (O-1)	An open drainage channel or depression explicitly designed to detain and promote the filtration of stormwater runoff into the soil media.
	Wet Swale (O-2)	An open drainage channel or depression designed to retain water or intercept groundwater for water quality treatment.

Stormwater Ponds

Description:
Constructed stormwater retention basin that has a permanent pool (or micropool). Runoff from each rain event is detained and treated in the pool through settling and biological uptake mechanisms.

Design Options:
Micropool Extended Detention (P-1), Wet Pond (P-2), Wet Extended Detention (P-3), Multiple Pond (P-4), Pocket Pond (P-5)

KEY CONSIDERATIONS

FEASIBILITY

- Contributing drainage area greater than 10 acres for P-1, 25 acres for P-2 to P-4.
- Follow DEC Guidelines for Design of Dams.
- Provide a minimum 2' separation from the groundwater in sole source aquifers.
- Do not locate ponds in jurisdictional wetlands.
- Avoid directing hotspot runoff to design P-5.

CONVEYANCE

- Forebay at each inlet, unless the inlet contributes less than 10% of the total inflow, 4' to 6' deep.
- Stabilize the channel below the pond to prevent erosion.
- Stilling basin at the outlet to reduce velocities.

PREATREATMENT

- Forebay volume at least 10% of the WQ_v
- Forebay shall be designed with non-erosive outlet conditions.
- Provide direct access to the forebay for maintenance equipment
- In sole source aquifers, provide 100% pretreatment for hotspot runoff.

TREATMENT

- Provide the water quality volume in a combination of permanent pool and extended detention (Table 6.1 in manual provides limitations on storage breakdown)
- Minimum length to width ratio of 1.5:1
- Minimum surface area to drainage area ratio of 1:100

LANDSCAPING

- Provide a minimum 10' and preferably 15' safety bench extending from the high water mark, with a maximum slope of 6%.
- Provide an aquatic bench extending 15 feet outward from the shoreline, and a maximum depth of 18" below normal water elevation.
- Develop a landscaping plan.
- Provide a 25'pond buffer.
- No woody vegetation within 15 feet of the toe of the embankment, or 25 feet from the principal spillway.

STORMWATER MANAGEMENT SUITABILITY

X	**Water Quality**
X	**Channel Protection**
X	**Overbank Flood Protection**
X	**Extreme Flood Protection**

Accepts Hotspot Runoff: *Yes (2 feet minimum separation distance required to water table)*

FEASIBILITY CONSIDERATIONS

L	**Cost**
L	**Maintenance Burden**

Key: L=Low **M**=Moderate **H**=High

Residential Subdivision Use: Yes

High Density/Ultra-Urban: *No*

Soils: *Hydrologic group 'A' soils may require pond liner*

Hydrologic group 'D' soils may have compaction constraints

Other Considerations:

- *Thermal effects*
- *Outlet clogging*
- *Safety bench*

MAINTENANCE REQUIREMENTS	POLLUTANT REMOVAL
• Legally binding maintenance agreement • Sediment removal from forebay every five to six years or when 50% full. • Provide a maintenance easement and right-of-way. • Removable trash rack on the principal spillway. • Non-clogging low flow orifice • Riser in the embankment. • Pond drain required, capable of drawing down the pond in 24 hours. • Notification required for pond drainage. • Provide an adjustable gate valve on both the WQ_v-ED pipe, and the pond drain. • Side Slopes less than 3:1, and terminate at a safety bench. • Principal spillway shall not permit access by small children, and endwalls above pipes greater than 48" in diameter shall be fenced.	G **Phosphorus** G **Nitrogen** G **Metals** - Cadmium, Copper, Lead, and Zinc removal G **Pathogens** Coliform, E.Coli, Streptococci removal **Key:** **G**=Good **F**=Fair **P**=Poor

Open Channels

Description: Vegetated channels that are explicitly designed and constructed to capture and treat stormwater runoff within dry or wet cells formed by check dams or other means.

Design Options:
Dry Swale (O-1), Wet Swale (O-2)

KEY CONSIDERATIONS

FEASIBILITY

- Maximum longitudinal slope of 4%

CONVEYANCE

- Non-erosive (3.5 to 5.0 fps) peak velocity for the 2-year storm
- Safe conveyance of the ten-year storm with a minimum of 6 inches of freeboard.
- Side slopes gentler than 2:1 (3:1 preferred).
- The maximum allowable temporary ponding time of 48 hours

PRETREATMENT

- 10% of the WQ_v in pretreatment, usually provided using check dams at culverts or driveway crossings.

TREATMENT

- Temporary storage the WQ_v within the facility to be released over a minimum 30 minute duration.
- Bottom width no greater than 8 feet, but no less than two feet.
- Soil media as detailed in Appendix H.

MAINTENANCE

- Removal of sediment build-up within the bottom of the channel or filter strip when 25% of the original WQ_v volume has been exceeded.
- Maintain a grass height of 4" to 6" in dry swales.

MANAGEMENT CAPABILITY

G	**Phosphorus**
F	**Nitrogen**
G	**Metals** - Cadmium, Copper, Lead, and Zinc removal
P	**Pathogens** - Coliform, Streptococci, E.Coli removal

Key: **G**=Good **F**=Fair **P**=Poor

STORMWATER MANAGEMENT SUITABILITY

X	**Water Quality**
	Channel Protection
	Overbank Flood Protection
	Extreme Flood Protection

Accepts Hotspot Runoff: *Yes (requires impermeable liner)*

IMPLEMENTATION CONSIDERATIONS

L	**Capital Cost**
L	**Maintenance Burden**

Residential Subdivision Use: Yes

High Density/Ultra-Urban: *No*

Drainage Area: *5 acres max.*

Soils: *No restrictions*

Other Considerations:

- *Permeable soil layer (dry swale)*
- *Wetland plants (wet swale)*

Key: **H**=High **M**=Medium **L**=Low

Specifications for Open Channels and Filter Strips

Material Specifications
The recommended construction materials for open channels and filter strips are detailed in Table G.3.

Dry Swales

Roto-till soil/gravel interface approximately 6" to avoid a sharp soil/gravel interface.

Permeable soil mixture (20" to 30" deep) should meet the bioretention planting soil specifications.

Check dams, if required, shall be placed as specified.

System to have 6" of freeboard, minimum.

Side slopes to be 3:1 minimum; (4:1 or greater preferred).

No gravel or perforated pipe is to be placed under driveways.

Bottom of facility to be above the seasonably high water table.

Seed with flood/drought resistant grasses; see your local NRCS Standards and Specifications guidance.

Longitudinal slope to be 1 to 2%, maximum [up to 5% with check dams].

Bottom width to be 8'= maximum to avoid braiding; larger widths may be used if proper berming is supplied. Width to be 2'= minimum.

Wet Swales
Follow above information for dry swales, with the following exceptions: the seasonally high water table may inundate the swale; but not above the design bottom of the channel [NOTE: if the water table is stable within the channel; the WQv storage may start at this point]

Excavate into undisturbed soils; do not use an underdrain system.

Filter Strips

Construct pea gravel diaphragms 12" wide, minimum, and 24" deep minimum.

Pervious berms to be a sand/gravel mix (35-60% sand, 30-55% silt, and 10-25% gravel). Berms to have overflow weirs with 6 inch minimum avilable head.

Slope range to be 2% minimum to 6% maximum.

Table C.3 Open Vegetated Swale and Filter Strip Materials Specifications

Parameter	Specification	Size	Notes
Dry swale soil	USCS; ML, SM, SC	n/a	soil with a higher percent organic content is preferred
Dry Swale sand	ASTM C-33 fine aggregate concrete sand	0.02" to 0.04"	
Check Dam (pressure treated)	AWPA Standard C6	6" by 6" or 8" by 8"	*do not* coat with creosote; embed at least 3= into side slopes
Check Dam (natural wood)	Black Locust, Red Mulberry, Cedars, Catalpa, White Oak, Chestnut Oak, Black Walnut	6" to 12" diameter; notch as necessary	*do not* use the following, as these species have a predisposition towards rot: Ash, Beech, Birch, Elm, Hackberry, hemlock, Hickories, Maples, Red and Black Oak, Pines, Poplar, Spruce, Sweetgum, Willow
Filter Strip sand/gravel pervious berm	sand: per dry swale sand gravel; AASHTO M-43 No. 57	sand: 0.02" to 0.04" gravel: 2" to 1"	mix with approximately 25% loan soil to support grass cover crop; see Bioretention planting soil notes for more detail.
pea gravel diaphragm and curtain drain	ASTM D 448	varies (No. 6) or (1/8" to 3/8")	use clean bank-run gravel
under drain gravel	AASHTO M-43 No. 67	0.25" to 0.75"	
under drain	ASTM D -1785 or AASHTO M-278	6" rigid Schedule 40 PVC	3/8" perf. @ 6" o.c.; 4 holes per row
Geotextile	See local DOT Standards and Specs	n/a	
rip rap	per local DOT criteria	size per New York State DOT requirements based on 10-year design flows	

Appendix C: Construction Standards and Specifications

C.1 Pond Construction Standards/Specifications

These specifications are generally appropriate to all earthen ponds, and are adapted from NRCS Pond Code 378. This document is available at http://www.dec.state.ny.us/website/dow/toolbox/tools.html. Practitioners should always consult the New York State Department of Environmental Conservation – Dam Safety Division for the most recent guidance. All references to ASTM and AASHTO specifications apply to the most recent version.

C.2 Construction Specifications for Infiltration Practices

Infiltration Trench General Notes and Specifications

The infiltration trench systems may not receive run-off until the entire contributing drainage area to the infiltration system has received final stabilization.

1. Heavy equipment and traffic shall be restricted from traveling over the infiltration trench to minimize compaction of the soil.

2. Excavate the infiltration trench to the design dimensions. Excavated materials shall be placed away from the trench sides to enhance trench wall stability. Large tree roots must be trimmed flush with the trench sides in order to prevent fabric puncturing or tearing of the filter fabric during subsequent installation procedures. The side walls of the trench shall be roughened where sheared and sealed by heavy equipment.

3. A Class "C" geotextile or better shall interface between the trench side walls and between the stone reservoir and gravel filter layers. A partial list of non-woven filter fabrics that meet the Class "C" criteria is contained below. Any alternative filter fabric must be approved by the local municipality prior to installation.

    Mirafi 180-N
    Amoco 4552
    WEBTEC N70
    GEOLON N70
    Carthage FX-80S

    The width of the geotextile must include sufficient material to conform to trench perimeter irregularities and for a 6-inch minimum top overlap. The filter fabric shall be tucked under the sand layer on the bottom of the infiltration trench for a distance of 6 to 12 inches. Stones or other anchoring objects should be placed on the fabric at the edge of the trench to keep the trench open during windy periods. When overlaps are required between rolls, the uphill roll should lap a minimum of 2 feet over the downhill roll in order to provide a shingled effect.

4. A 6 inch sand layer may be placed on the bottom of the infiltration trench in lieu of filter fabric, and shall be compacted using plate compactors. The sand for the infiltration trench shall be washed and meet AASHTO Std. M-43, Size No. 9 or No. 10. Any alternative sand gradation must be approved by the Engineer or the local municipality.

5. The stone aggregate should be placed in lifts and compacted using plate compactors. A maximum loose lift thickness of 12 inches is recommended. Gravel filling (rounded bank run gravel is preferred) for the infiltration trench shall be washed and meet one of the following: AASHTO Std. M-43; Size No. 2 or No. 3.

6. Following the stone aggregate placement, the filter fabric shall be folded over the stone aggregate to form a 6-inch minimum longitudinal lap. The desired fill soil or stone aggregate shall be placed over the lap at sufficient intervals to maintain the lap during subsequent backfilling.

7. Care shall be exercised to prevent natural or fill soils from intermixing with the stone aggregate. All contaminated stone aggregate shall be removed and replaced with uncontaminated stone aggregate.

8. Voids can be created between the fabric and the excavation sides and shall be avoided. Removing boulders or other obstacles from the trench walls is one source of such voids, therefore, natural soils should be placed in these voids at the most convenient time during construction to ensure fabric conformity to the excavation sides.

9. Vertically excavated walls may be difficult to maintain in areas where soil moisture is high or where soft cohesive or cohesionless soils are predominate. These conditions may require laying back of the side slopes to maintain stability.

10. PVC distribution pipes shall be Schedule 40 and meet ASTM Std. D 1784. All fittings and perforations (1/2 inch in diameter) shall meet ASTM Std. D 2729. A perforated pipe shall be provided only within the infiltration trench and shall terminate 1 foot short of the infiltration trench wall. The end of the PVC pipe shall be capped.

11. Corrugated metal distribution pipes shall conform to AASHTO Std. M-36, and shall be aluminized in accordance with AASHTO Std. M-274. Coat aluminized pipe in contact with concrete with an inert compound capable of effecting isolation of the deleterious effect of the aluminum on the concrete. Perforated distribution pipe shall be provided only within the infiltration trench and shall terminate 1 foot short of the infiltration trench wall. An aluminized metal plate shall be welded to the end of the pipe.

12. The observation well is to consist of 6-inch diameter PVC Schedule 40 pipe (ASTM Std. D 1784) with a cap set 6 inches above ground level and is to be located near the longitudinal center of the infiltration trench. Preferably the observation well will not be located in vehicular traffic areas. The pipe shall have a plastic collar with ribs to prevent rotation when removing cap. The screw top lid shall be a "Panella" type cleanout with a locking mechanism or special bolt to discourage vandalism. A perforated (1/2 inch in diameter) PVC Schedule 40 pipe shall be provided and placed vertically within the gravel portion of the infiltration trench and a cap provided at the bottom of the pipe. The bottom of the cap shall rest on the infiltration trench bottom.

13. If a distribution structure with a wet well is used, a 4-inch PVC drain pipe shall be provided at opposite ends of the infiltration trench distribution structure. Two (2) cubic feet of porous backfill meeting AASHTO Std. M-43 Size No. 57 shall be provided at each drain.

14. If a distribution structure is used, the manhole cover shall be bolted to the frame.

NOTE: PVC pipe with a wall thickness classification of SDR-35 meeting ASTM standard D3034 is an acceptable substitution for PVC Schedule 40 pipe.

Infiltration Basins Notes and Specifications

1. The sequence of various phases of basin construction shall be coordinated with the overall project construction schedule. A program should schedule rough excavation of the basin (to not less than 2' from final grade) with the rough grading phase of the project to permit use of the material as fill in earthwork areas. The partially excavated basin, however, **cannot** serve as a sedimentation basin.

   Specifications for basin construction should state: (1) the earliest point in progress when storm drainage may be directed to the basin, and (2) the means by which this delay in use is to be accomplished. Due to the wide variety of conditions encountered among projects, each should be separately evaluated in order to postpone use as long as is reasonably possible.

2. Initial basin excavation should be carried to within 2 feet of the final elevation of the basin floor. Final excavation to the finished grade should be deferred until all disturbed areas on the watershed have been stabilized or protected. The final phase excavation should remove all accumulated sediment. Relatively light tracked equipment is recommended for this operation to avoid compaction of the basin floor. After the final grading is completed, the basin should retain a highly porous surface texture.

3. Infiltration basins may be lined with a 6- to 12-inch layer of filter material such as coarse sand (AASHTO Std. M-43, Sizes 9 or 10) to help prevent the buildup of impervious deposits on the soil surface. The filter layer can be replaced or cleaned when it becomes clogged. When a 6-inch layer of coarse organic material is specified for discing (such as hulls, leaves, stems, etc.) or spading into the basin floor to increase the permeability of the soils, the basin floor should be soaked or inundated for a brief period, then allowed to dry subsequent to this operation. This induces the organic material to decay rapidly, loosening the upper soil layer.

4. Establishing dense vegetation on the basin side slopes and floor is recommended. A dense vegetative stand will not only prevent erosion and sloughing, but will also provide a natural means of maintaining relatively high infiltration rates. Erosion protection of inflow points to the basin shall also be provided.

5. Selection of suitable vegetative materials for the side slope and all other areas to be stabilized with vegetation and application of required lime, fertilizer, etc. shall be done in accordance with the NRCS Standards and Specifications or your local Standards and Specifications for Soil Erosion and Sediment Control.

6. Grasses of the fescue family are recommended for seeding primarily due to their adaptability to dry sandy soils, drought resistance, hardiness, and ability to withstand brief inundations. The use of fescues will also permit long intervals between mowings. This is important due to the relatively steep slopes which make mowing difficult. Mowing twice a year, once in June and again in September, is generally satisfactory.

C.3 Construction Specifications for Bioretention, Sand Filters and Open Channels

Sand Filter Specifications

Material Specifications for Sand Filters

The allowable materials for sand filter construction are detailed in Table 1.

Sand Filter Testing Specifications

Underground sand filters, facilities within sensitive groundwater aquifers, and filters designed to serve urban hot spots are to be tested for water tightness prior to placement of filter layers. Entrances and exits should be plugged and the system completely filled with water to demonstrate water tightness.

All overflow weirs, multiple orifices and flow distribution slots to be field-tested as to verify adequate distribution of flows.

Sand Filter Construction Specifications

Provide sufficient maintenance access; 12-foot-wide road with legally recorded easement. Vegetated access slopes to be a maximum of 10%; gravel slopes to 15%; paved slopes to 25%.

Absolutely no runoff is to enter the filter until all contributing drainage areas have been stabilized.

Surface of filter bed to be *completely level.*

All sand filters should be clearly delineated with signs so that they may be located when maintenance is due.

Surface sand filters shall be planted with appropriate grasses as specified in your local NRCS Standards and Specifications guidance.

Pocket sand filters (and residential bioretention facilities treating areas larger than an acre) shall be sized with an ornamental stone window covering approximately 10% of the filter area. This surface shall be 2" to 5" size stone on top of a pea gravel layer (3/4 inch stone) approximately 4 to 6" of pea gravel.

Specifications Pertaining to Underground Sand Filters

Provide manhole and/or grates to all underground and below grade structures. Manholes shall be in compliance with standard specifications for each jurisdiction but diameters should be 30" minimum (to comply with OSHA confined space requirements) but not too heavy to lift. Aluminum and steel louvered doors are also acceptable. Ten-inch long (minimum) manhole steps (12" o.c.) shall be cast in place or drilled and mortared into the wall below each manhole. A 5= minimum height clearance (from the top of the sand layer to the bottom of the slab) is required for all permanent underground structures. Lift rings are to be supplied to remove/replace top slabs. Manholes may need to be grated to allow for proper ventilation; if required, place manholes *away* from areas of heavy pedestrian traffic.

Underground sand filters shall be constructed with a dewatering gate valve located just above the top of the filter bed should the bed clog.

Underground sand beds shall be protected from trash accumulation by a wide mesh geotextile screen to be placed on the surface of the sand bed; screen is to be rolled up, removed, cleaned and re-installed during maintenance operations.

Table C-1 Sand Filter Material Specifications

Parameter	Specification	Size	Notes
Sand	Clean AASHTO M-6 or ASTM C-33 concrete sand	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. "Rock dust" cannot be substituted for sand.
Peat	Ash content: < 15% PH range: 5.2 to 4.9 Loose bulk density 0.12 to 0.15 g/cc	n/a	The material must be Reed-Sedge Hemic Peat, shredded, uncompacted, uniform, and clean.
Underdrain Gravel	AASHTO M-43 No. 67	0.25" to 0.75"	
Geotextile Fabric (if required)	ASTM D-751 (puncture strength - 125 lb.) ASTM D-1117 (Mullen Burst Strength - 400 psi) ASTM D-1682 (Tensile Strength - 300 lb.)	0.08" thick equivalent opening size of #80 sieve	Must maintain 125 gpm per sq. ft. flow rate. Note: a 4" pea gravel layer may be substituted for geotextiles meant to separate sand filter layers.
Impermeable Liner (if required)	ASTM D 751 (thickness) ASTM D 412 (tensile strength 1,100 lb., elongation 200%) ASTM D 624 (Tear resistance - 150 lb./in) ASTM D 471 (water adsorption: +8 to -2% mass)	30mil thickness	Liner to be ultraviolet resistant. A geotextile fabric should be used to protect the liner from puncture.
Underdrain Piping	ASTM D-1785 or AASHTO M-278	6" rigid schedule 40 PVC	3/8" perf. 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes
Concrete (Cast-in-place)	See local DOT Standards and Specs. f=c = 3500 psi, normal weight, air-entrained; re-inforcing to meet ASTM 615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) *not using previously approved State or local standards* requires design drawings sealed and approved by a licensed professional structural engineer.
Concrete (pre-cast)	per pre-cast manufacturer	n/a	SEE ABOVE NOTE
Non-rebar steel	ASTM A-36	n/a	structural steel to be hot-dipped galvanized ASTM A123

APPENDIX F

STANDARD EROSION AND SEDIMENT CONTROL PRACTICES
SEDIMENT BASIN COMPUTATIONS
CONSTRUCTION BEST MANAGEMENT PRACTICES

STANDARD AND SPECIFICATIONS
FOR
TEMPORARY SWALE

Definition

A temporary excavated drainage way.

Purpose

The purpose of a temporary swale is to prevent runoff from entering disturbed areas by intercepting and diverting it to a stabilized outlet or to intercept sediment laden water and divert it to a sediment trapping device.

Conditions Where Practice Applies

Temporary swales are constructed:

1. to divert flows from entering a disturbed area.

2. intermittently across disturbed areas to shorten overland flow distances.

3. to direct sediment laden water along the base of slopes to a trapping device.

4. to transport offsite flows across disturbed areas such as rights-of-way.

Swales collecting runoff from disturbed areas shall remain in place until the disturbed areas are permanently stabilized.

Design Criteria

See Figure 5A.2 on page 5A.5 for details.

	Swale A	Swale B
Drainage Area	<5 Ac	5-10 Ac
Bottom Width of Flow Channel	4 ft	6 ft
Depth of Flow Channel	1 ft	1 ft
Side Slopes	2:1 or flatter	2:1 or flatter
Grade	0.5% Min. 20% Max.	0.5% Min. 20% Max.

For drainage areas larger than 10 acres, refer to the Standard and Specification for Waterways on page 5B.11.

Stabilization

Stabilization of the swale shall be completed within 7 days of installation in accordance with the appropriate standard and specifications for vegetative stabilization or stabilization with mulch as determined by the time of year. The flow channel shall be stabilized as per the following criteria:

Type of Treatment	Channel Grade[1]	Flow Channel A (<5 Ac.)	Flow Channel B (5-10 Ac)
1	0.5-3.0%	Seed & Straw Mulch	Seed & Straw Mulch
2	3.1-5.0%	Seed & Straw Mulch	Seed and cover with RECP, Sod, or lined with plastic or 2 in. stone
3	5.1-8.0%	Seed and cover with RECP, Sod, or line with plastic or 2 in. stone	Line with 4-8 in. or stone or Recycled Concrete Equivalent[2] or geotextile
4	8.1-20%	Line with 4-8 in. stone or Recycled Concrete Equivalent[2] or geotextile	Site Specific Engineering Design

[1] In highly erodible soils, as defined by the local approving agency, refer to the next higher slope grade for type of stabilization.
[2] Recycled Concrete Equivalent shall be concrete broken into the required size, and shall contain no steel reinforcement.

Outlet

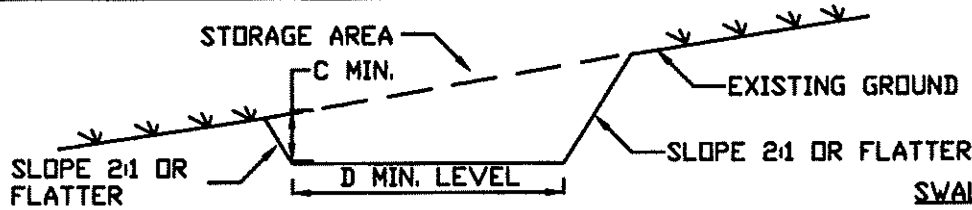
Swale shall have an outlet that functions with a minimum of erosion, and dissipates runoff velocity prior to discharge off the site.

Runoff shall be conveyed to a sediment trapping device such as a sediment trap or sediment basin until the drainage area above the swale is adequately stabilized.

The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet condition.

If a swale is used to divert clean water flows from entering a disturbed area, a sediment trapping device may not be needed.

Figure 5A.2
Temporary Swale

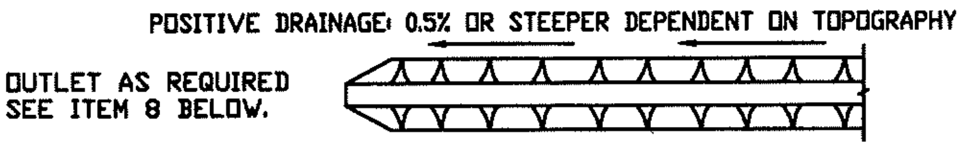


CROSS SECTION

SYMBOL

A-2 / B-3

	SWALE A	SWALE B
C	1'	1'
D	4'	6'



PLAN VIEW

CONSTRUCTION SPECIFICATIONS

1. ALL TEMPORARY SWALES SHALL HAVE UNINTERUPTED POSITIVE GRADE TO AN OUTLET.
2. DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
3. DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE SWALE.
5. THE SWALE SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
6. FILLS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
7. ALL EARTH REMOVED AND NOT NEEDED FOR CONSTRUCTION SHALL BE PLACED SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE SWALE.
8. STABILIZATION SHALL BE AS PER THE FLOW CHANNEL STABILIZATION CHART BELOW:

TYPE OF TREATMENT	CHANNEL GRADE	A(5 AC. OR LESS)	B(5 AC -10AC)
1	0.5-3.0%	SEED AND STRAW MULCH	SEED AND STRAW MULCH
2	3.1-5.0%	SEED AND STRAW MULCH	SEED AND COVER USING RECP
3	5.1-8.0%	SEED AND COVER WITH RECP	LINED WITH 4-8' RIP-RAP OR GEOTEXTILE
4	8.1-20.%	LINED WITH 4-8' RIP-RAP OR GEOTEXTILE	ENGINEERED DESIGN

9. PERIODIC INSPECTION AND REQUIRED MAINTENANCE MUST BE PROVIDED AFTER EACH RAIN EVENT.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	TEMPORARY SWALE

STANDARD AND SPECIFICATIONS FOR LEVEL SPREADER

Definition

A temporary non-erosive outlet for concentrated runoff, constructed to disperse flow uniformly across a slope.

Purpose

To convert concentrated flow to sheet flow and release it uniformly over a stabilized area.

Conditions Where Practice Applies

Where sediment-free storm runoff can be released in sheet flow down a stabilized slope without causing erosion; where a level lip can be constructed without filling; where the area below the level lip is uniform with a slope of 10% or less and the runoff will not re-concentrate after release; and where no traffic will be allowed over spreader.

Design Criteria

The design capacity shall be determined by estimating the peak flow from the 10-year storm. The drainage area shall be restricted to limit the maximum flows into the spreader to 30 cfs. The level spreader shall have the following minimum dimension:

Design Flow (cfs)	Minimum Entrance Width (ft.)	Depth (ft.)	End Width (ft.)	Length (ft.)
0-10	10	0.5	3	10
10-20	16	0.6	3	20
20-30	24	0.7	3	30

A transition section 20 feet in length shall be constructed from the width of the diversion or channel to the width of the spreader to ensure uniform outflow. This last transition section will blend the diversion grade to zero grade at the beginning of the spreader.

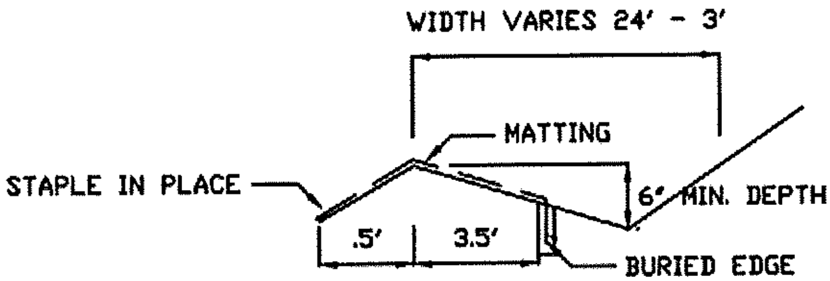
Construct the level lip in undisturbed soil to a uniform height and zeros grade over the length of the spreader. Protect the lip with an erosion resistant material or mat to prevent erosion and allow vegetation to become established.

The outlet area should be a generally smooth, well-vegetated areas no steeper than 10 percent.

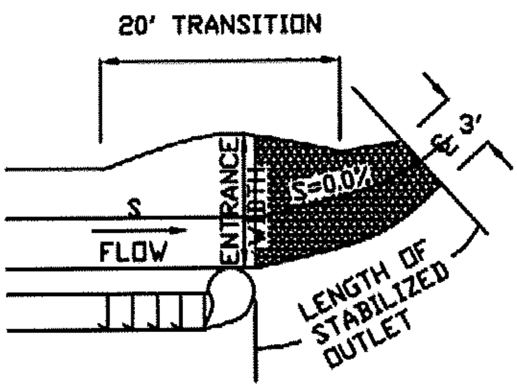
See Figure 5A.5 on page 5A.14 for details.

Figure 5A.5
Level Spreader

SYMBOL



CROSS SECTION
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

Q(cfs)	E.W.(ft)	D(ft)	LENGTH(ft)
0-10	10	0.5	10
10-20	16	0.6	20
20-30	24	0.7	30

CONSTRUCTION SPECIFICATIONS

1. THE MATTING SHOULD BE A MINIMUM OF 4FT. WIDE EXTENDING 6 INCHES OVER THE LIP AND BURIED 6 INCHES DEEP IN A VERTICAL TRENCH ON THE LOWER EDGE. THE UPPER EDGE SHOULD BUTT AGAINST SMOOTHLY CUT SOD AND BE SECURELY HELD IN PLACE WITH CLOSELY SPACED HEAVY DUTY WIRE STAPLES AT LEAST 12 INCHES IN LENGTH.
2. ENSURE THAT THE LIP IS LEVEL TO UNIFORMLY SPREAD DISCHARGE.
3. THE LIP SHALL BE CONSTRUCTED ON UNDISTURBED SOIL NOT FILL.
4. A 20 FOOT TRANSITION SECTION WILL BE CONSTRUCTED FROM THE DIVERSION CHANNEL TO THE SPREADER TO SMOOTHLY BLEND THE DIFFERENT DIMENSION AND GRADES.
5. THE RUNOFF DISCHARGE WILL BE OUTLETED ONTO A STABILIZED VEGETATED SLOPE NOT EXCEEDING 10%.
6. SEED AND MULCH THE DISTURBED AREA IMMEDIATELY AFTER CONSTRUCTION.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	LEVEL SPREADER

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence placed on a slope are:

Slope Steepness	Maximum Length (ft.)
2:1	25
3:1	50
4:1	75
5:1 or flatter	100

2. Maximum drainage area for overland flow to a silt fence shall not exceed ¼ acre per 100 feet of fence, with maximum ponding depth of 1.5 feet behind the fence; and

3. Erosion would occur in the form of sheet erosion; and

4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff. All silt fences shall be placed as close to the areas as possible, but at least 10 feet from the toe of a slope to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.

Sensitive areas to be protected by silt fence may need to be reinforced by using heavy wire fencing for added support to prevent collapse.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. A detail of the silt fence shall be shown on the plan. See Figure 5A.8 on page 5A.21 for details.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682

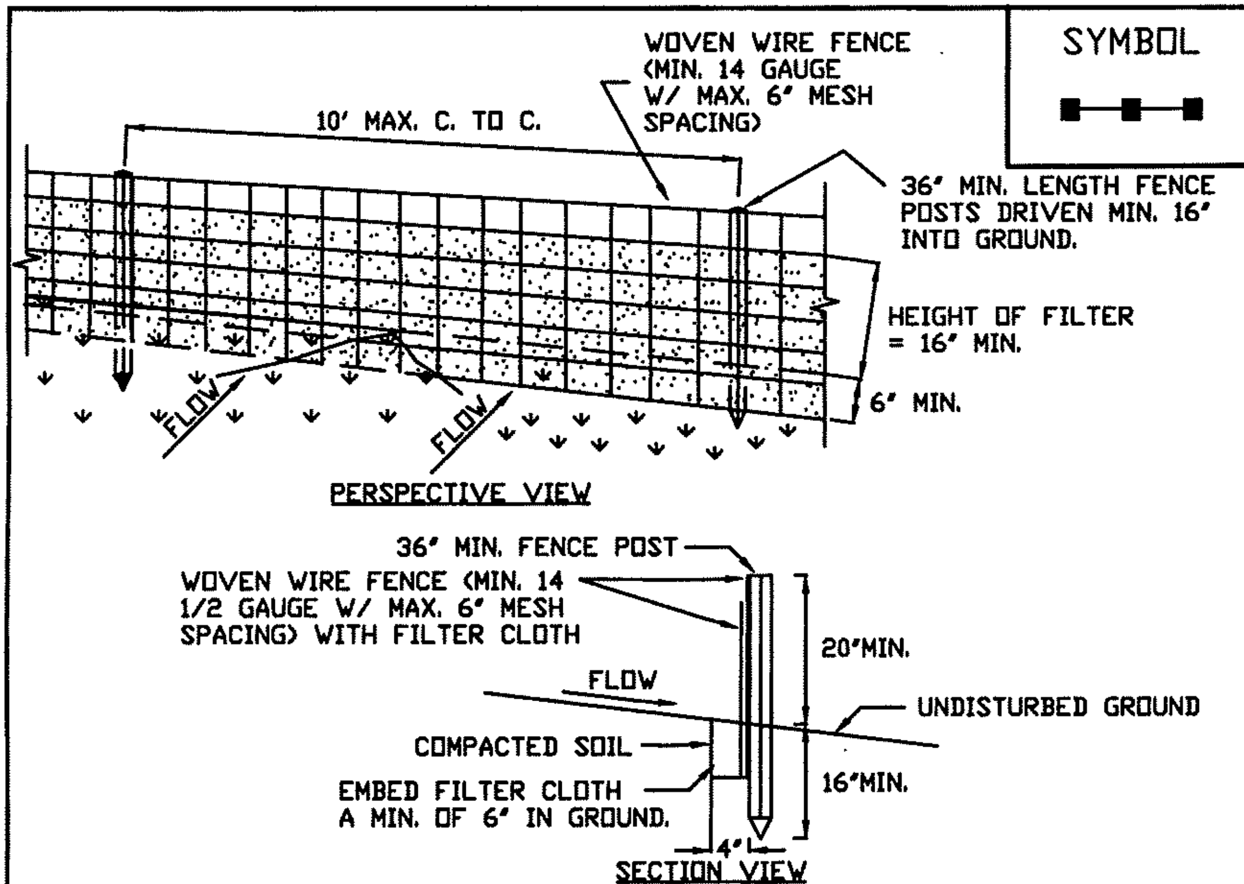
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.

3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated Units: Envirofence, Geofab, or approved equal, may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.8.

Figure 5A.8
Silt Fence



CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER-LAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	SILT FENCE

STANDARD AND SPECIFICATIONS FOR CHECK DAM

Definition

Small barriers or dams constructed of stone, bagged sand or gravel, or other durable material across a drainage way.

Purpose

To reduce erosion in a drainage channel by restricting the velocity of flow in the channel.

Condition Where Practice Applies

This practice is used as a temporary or emergency measure to limit erosion by reducing velocities in small open channels that are degrading or subject to erosion and where permanent stabilization is impractical due to short period of usefulness and time constraints of construction.

Design Criteria

Drainage Area: Maximum drainage area above the check dam shall not exceed two (2) acres.

Height: Not greater than 2 feet. Center shall be maintained 9 inches lower than abutments at natural ground elevation.

Side Slopes: Shall be 2:1 or flatter.

Spacing: The check dams shall be spaced as necessary in the channel so that the crest of the downstream dam is at the elevation of the toe of the upstream dam. This spacing is equal to the height of the check dam divided by the channel slope.

Therefore:

$$S = h/s$$

Where:

S = spacing interval (ft.)
h = height of check dam (ft.)
s = channel slope (ft./ft.)

Example:

For a channel with a 4% slope and 2 ft. high stone check dams, they are spaced as follows:

$$S = \frac{2\text{ ft.}}{.04\text{ ft/ft.}} = 50\text{ ft.}$$

Stone size: Use a well graded stone matrix 2 to 9 inches in size (NYS – DOT Light Stone Fill meets these requirements).

The overflow of the check dams will be stabilized to resist erosion that might be caused by the check dam. See Figure 5A.9 on page 5A.24 for details.

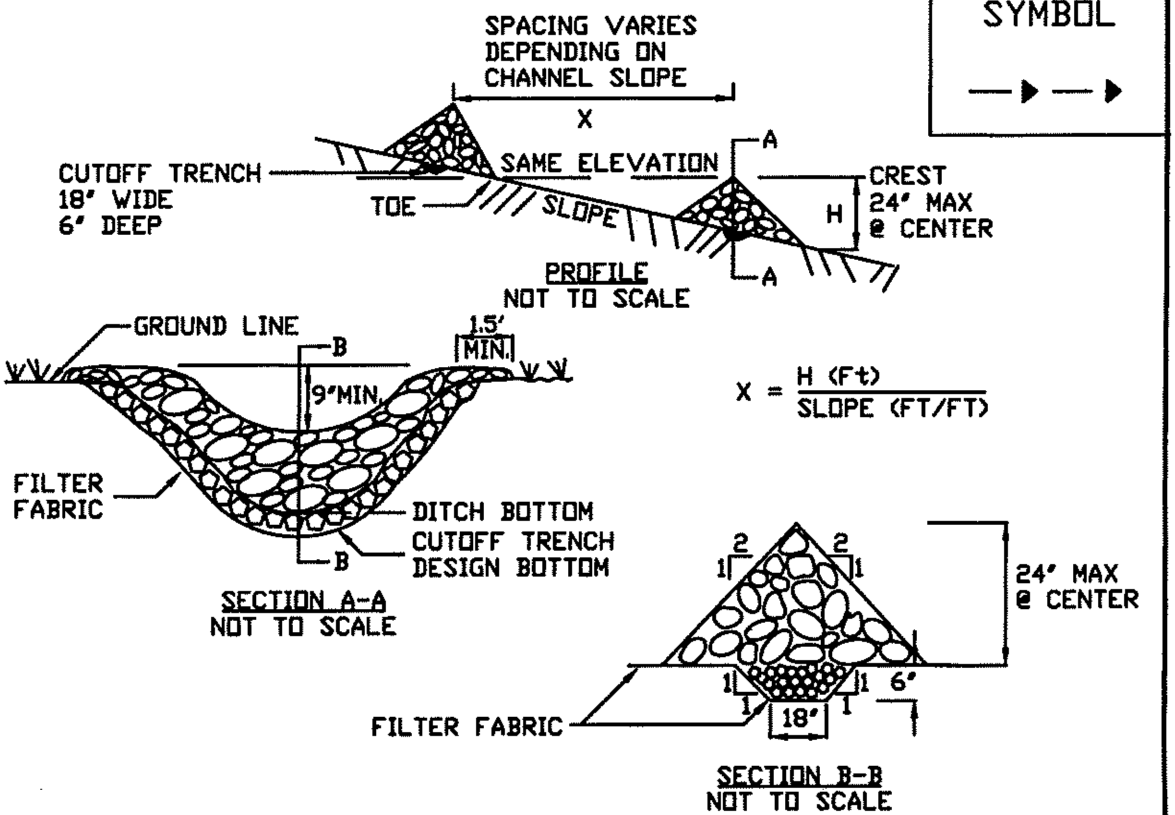
Check dams should be anchored in the channel by a cutoff trench 1.5 ft. wide and 0.5 ft. deep and lined with filter fabric to prevent soil migration.

Maintenance

The check dams should be inspected after each runoff event. Correct all damage immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material should be installed in that portion of the channel.

Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam. Replace stones as needed to maintain the design cross section of the structures.

Figure 5A.9
Check Dam



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.

MAXIMUM DRAINAGE AREA 2 ACRES.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	CHECK DAM

STANDARD AND SPECIFICATIONS
FOR
ROCK DAM

Definition

A rock embankment located to capture sediment.

Purpose

To retain sediment on the construction site and prevent sedimentation in off site water bodies.

Conditions Where Practice Applies

The rock dam may be used instead of the standard sediment basin with barrel and riser. The rock dam is preferred when it is difficult to construct a stable, earthen embankment and rock materials are readily available. The site should be accessible for periodic sediment removal. This rock dam should not be located in a perennial stream. The top of the dam will serve as the overflow outlet. The inside of the dam will be faced with smaller stone to reduce the rate of seepage so a sediment pool forms during runoff events.

Design Criteria

Drainage Area: The drainage area for this off stream structure is limited to 50 acres.

Location: The location of the dam should:

- provide a large area to trap sediment
- intercept runoff from disturbed areas
- be accessible to remove sediment
- not interfere with construction activities

Storage Volume: The storage volume behind the dam shall be at least 3,600 cubic feet per acre of drainage area to the dam. This volume is measured one foot below the crest of the dam.

Dam Section:

Top Width	5 feet minimum @ crest
Side Slopes	2:1 upstream slope 3:1 downstream slope
Height	6' max to spillway crest

Length of Crest: The crest length should be designed to carry the 10 yr. peak runoff with a flow depth of 1 foot and 1 foot of freeboard.

Rock at the abutments should extend at least 2 feet above the spillway and be at least 2 feet thick. These rock abutments should extend at least one foot above the downstream slope to prevent abutment scour. A rock apron at least 1.5 feet thick should extend downstream from the toe of the dam a distance equal to the height of the dam to protect the outlet area from scour.

Rock Fill: The rock fill should be well graded, hard, erosion resistant stone with a minimum d_{50} size of 9 inches. A "key trench" lined with geotextile filter fabric should be installed in the soil foundation under the rock fill. The filter fabric must extend from the key trench to the downstream edge of the apron and abutments to prevent soil movement and piping under the dam.

The upstream face of the dam should be covered with a fine gravel (NYS-DOT #1 washed stone or equal) a minimum 3 feet thick to reduce the drainage rate.

Trapping Efficiency: To obtain maximum trapping efficiency, design for a long detention period. Usually a minimum of eight (8) hours before the basin is completely drained. Maximize the length of travel of sediment laden water from the inlet to the drain. Achieve a surface area equal to 0.01 acres per cfs (inflow) based on the 10-year storm.

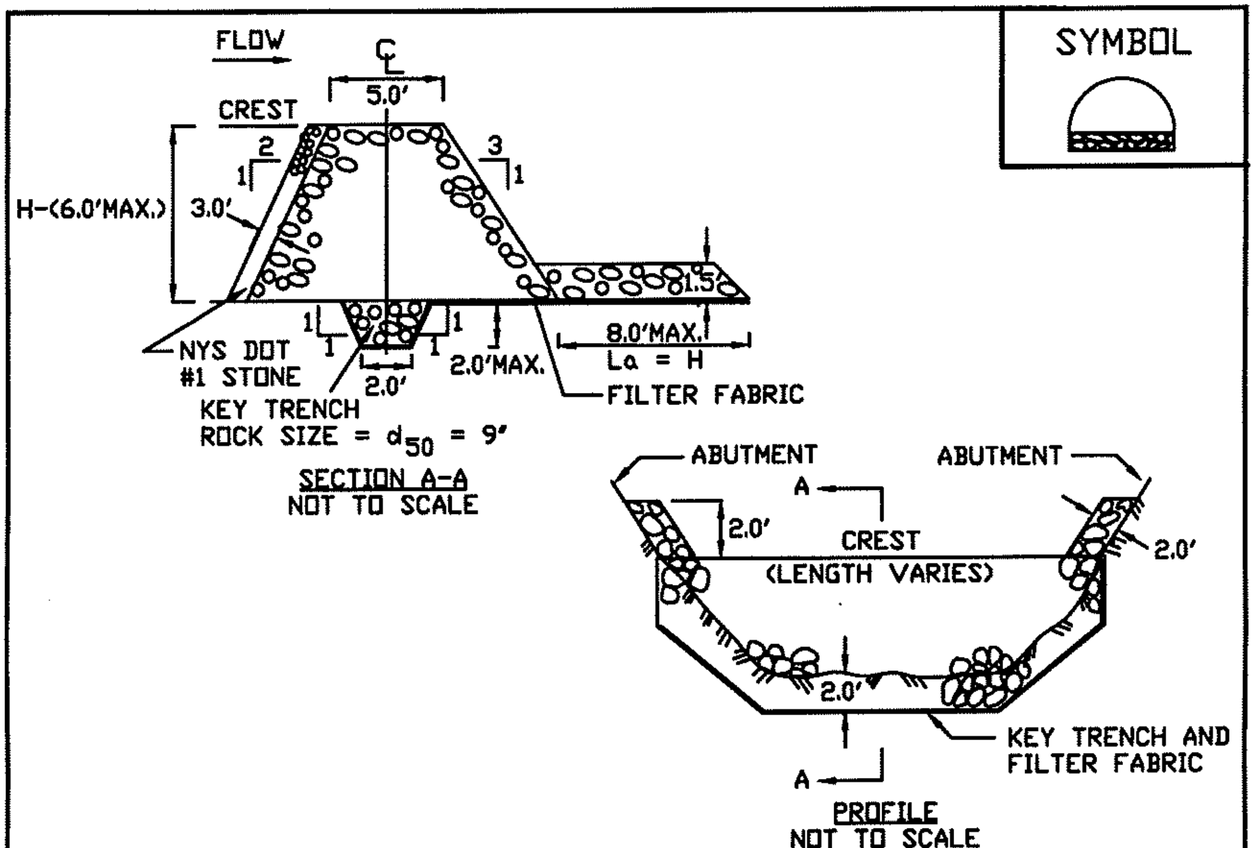
See Figure 5A.10 on page 5A.26 for details.

Maintenance

Check the basin area after each rainfall event. Remove sediment and restore original volume when sediment accumulates to one-half the design volume. Check the structure for erosion, piping, and rock displacement after each significant event and replace immediately.

Remove the structure and any sediment immediately after the construction area has been permanently stabilized. All water should be removed from the basin prior to the removal of the rock dam. Sediment should be placed in designated disposal areas and not allowed to flow into streams or drainage ways during structure removal.

Figure 5A.10
Rock Dam



CONSTRUCTION SPECIFICATIONS

1. THE AREA UNDER THE ROCK DAM SHALL BE CLEARED AND STRIPPED OF ROOTS AND OTHER OBJECTIONABLE MATERIAL. THE RESERVOIR SHALL BE CLEARED AS NEEDED TO FACILITATE SEDIMENT REMOVAL.

2. DIMENSIONS SHOWN ARE MINIMUM. TRENCH SHALL BE EXCAVATED FROM ABUTMENT TO ABUTMENT ON THE DAM CENTERLINE. FILTER FABRIC SHALL BE PLACED FROM UPSTREAM EDGE OF KEYTRENCH TO DOWNSTREAM EDGE OF APRON. JOINTS WILL LAP A MINIMUM OF 1 FT. WITH UPSTREAM STRIP ON TOP.

3. CONSTRUCT THE ROCK EMBANKMENT TO THE DIMENSIONS SHOWN ON THE DRAWING. ROCK ABUTMENTS SHALL BE MAINTAINED 2 FT. ABOVE THE CREST.

4. THE ROCK DAM SHALL BE CONSTRUCTED PRIOR TO CLEARING THE BASIN AREA. STABILIZE ALL DISTURBED AREAS, EXCEPT THE BASIN AREA, WITH TEMPORARY SEEDING.

5. FENCES AND WARNING SIGNS SHOULD BE PLACED AS APPROPRIATE.

MAXIMUM DRAINAGE AREA: 50 ACRES

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	ROCK DAM

STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION

Definition

A temporary, somewhat permeable barrier, installed around inlets in the form of a fence, berm or excavation around an opening, trapping water and thereby reducing the sediment content of sediment laden water by settling.

Purpose

To prevent heavily sediment laden water from entering a storm drain system through inlets.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are four (4) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Curb Drop Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

See details for Excavated Drop Inlet Protection in Figure 5A.11 on page 5A.29.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection

See Figure 5A.12 for details on Filter Fabric Drop Inlet Protection on page 5A.30.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

If straw bales are used in lieu of filter fabric, they should be placed tight with the cut edge adhering to the ground at least 3 inches below the elevation of the drop inlet. Two anchor stakes per bale shall be driven flush to bale surface. Straw bales will be replaced every 4 months until the area is stabilized.

Type III – Stone and Block Drop Inlet Protection

See Figure 5A.13 for details on Stone and Block Drop Inlet Protection on page 5A.31.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilized in a manner appropriate to the site.

Type IV – Curb Drop Inlet Protection

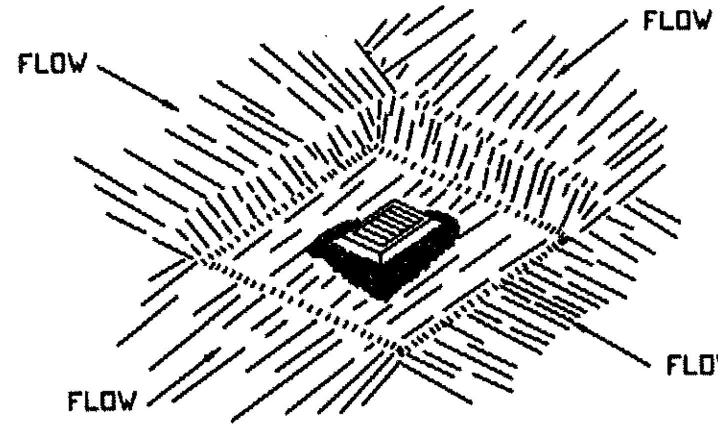
See Figure 5A. 14 for details on Curb Drop Inlet Protection on page 5A.32.

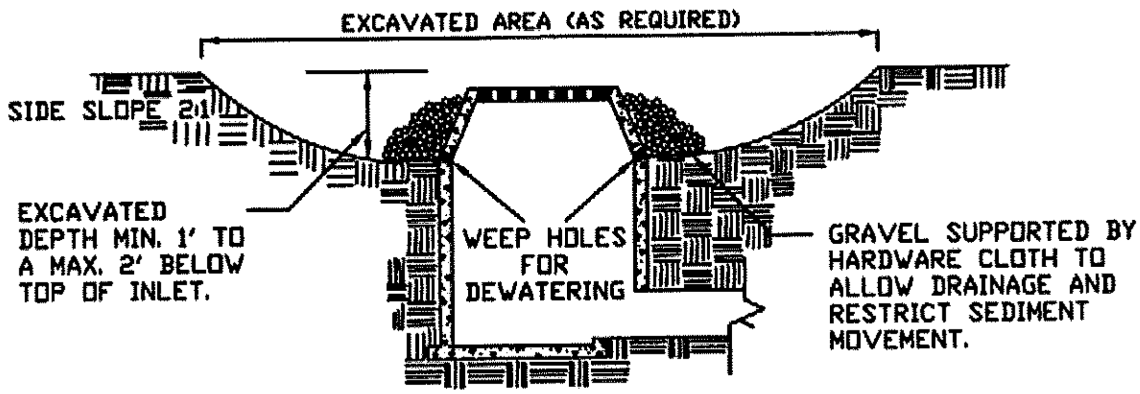
The drainage area should be limited to 1 acre at the drop inlet. The wire mesh must be of sufficient strength to support the filter fabric and stone with the water fully impounded against it. Stone is to be 2 inches in size and clean. The filter fabric must be of a type approved for this purpose with an equivalent opening size (EOS) of 40-85. The protective structure will be constructed to extend beyond the inlet 2 feet in both directions. Assure that storm flow does not bypass the inlet by installing temporary dikes (such as sand bags) directing flow into the inlet. Make sure that the overflow weir is stable. Traffic safety shall be integrated with the use of this practice.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any stone missing should be replaced. Check materials for proper anchorage and secure as necessary.

Figure 5A.11
Excavated Drop Inlet Protection

SYMBOL





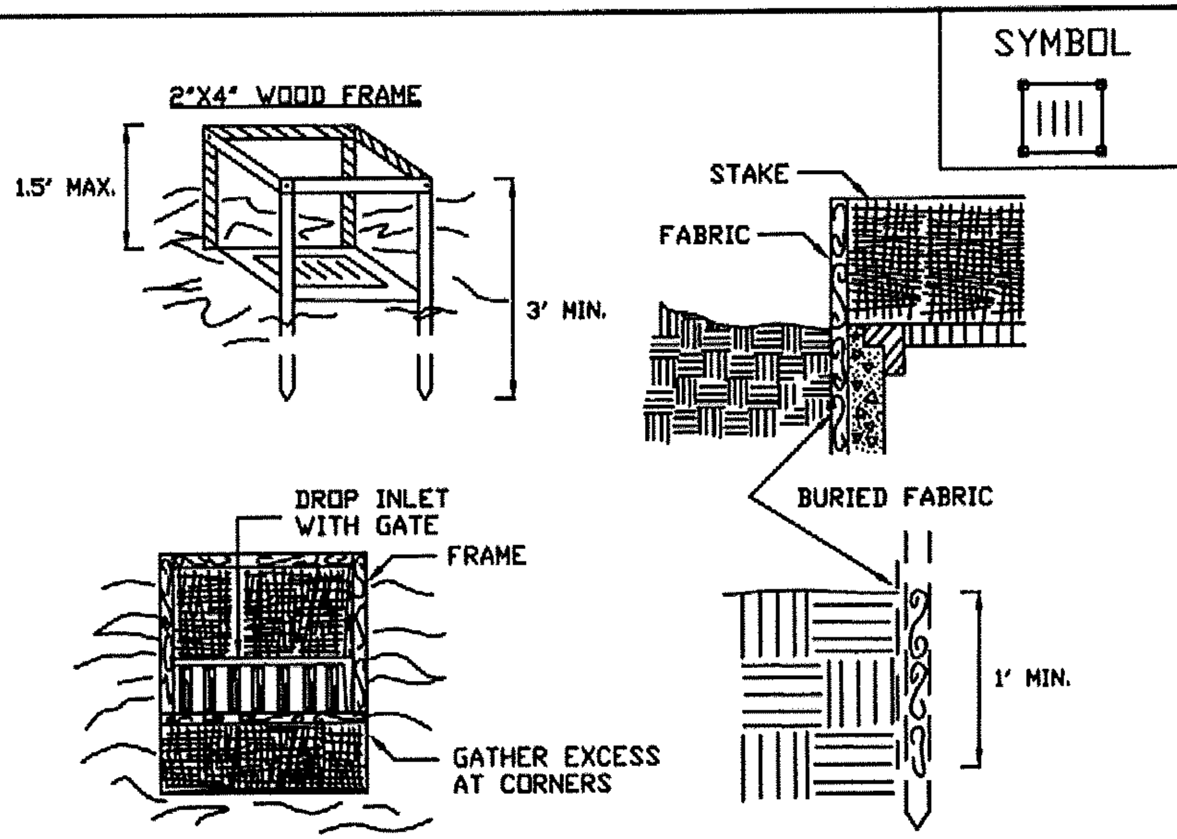
CONSTRUCTION SPECIFICATIONS

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, SEAL WEEP HOLES, FILL EXCAVATION WITH STABLE SOIL TO FINAL GRADE, COMPACT IT PROPERLY AND STABILIZE WITH PERMANENT SEEDING.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	EXCAVATED DROP INLET PROTECTION

Figure 5A.12
Filter Fabric Drop Inlet Protection



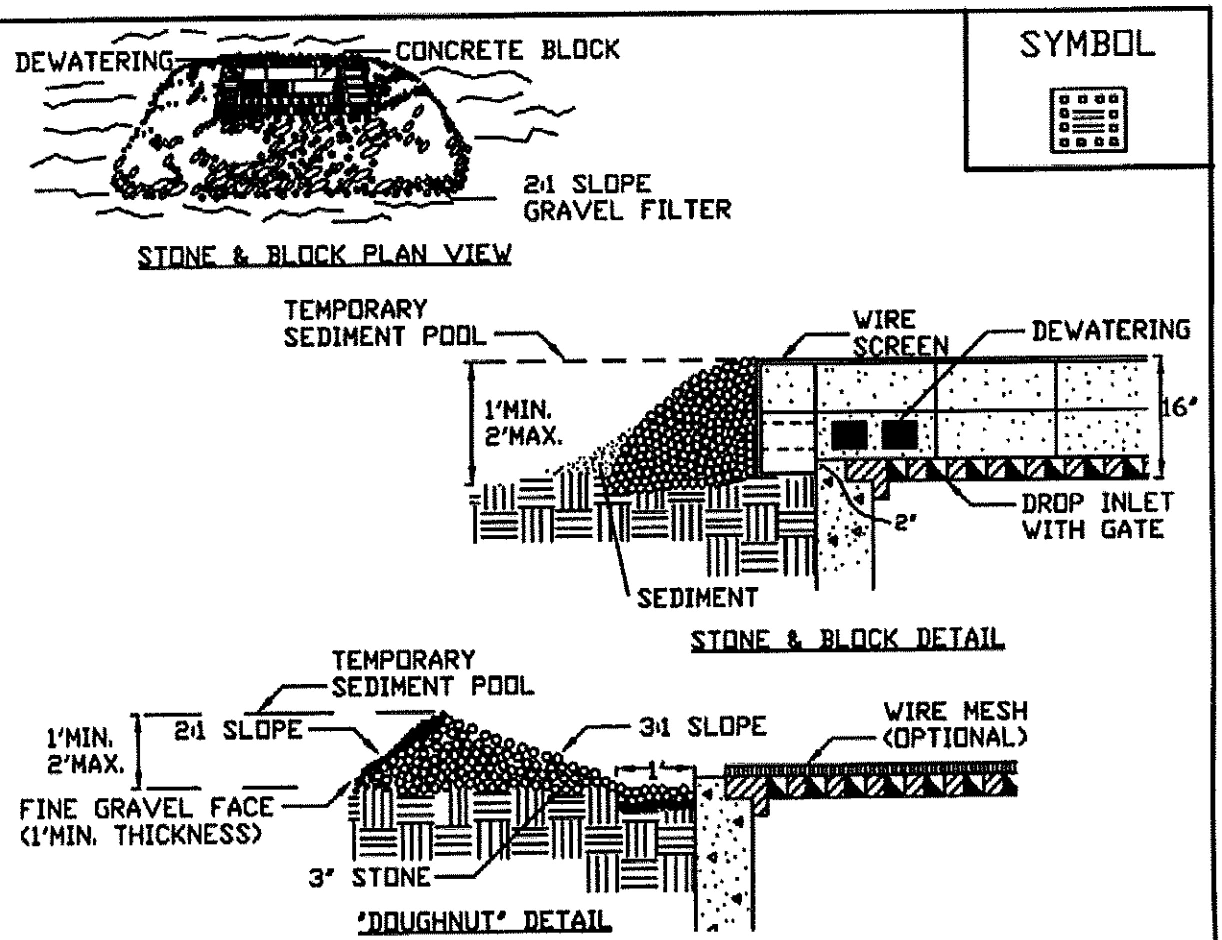
CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2" x 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.

MAXIMUN DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	FILTER FABRIC DROP INLET PROTECTION

Figure 5A.13
Stone & Block Drop Inlet Protection



CONSTRUCTION SPECIFICATIONS

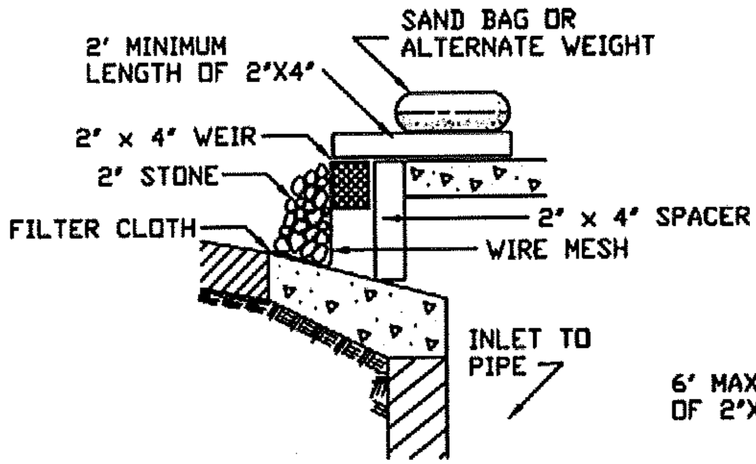
1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2-3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.

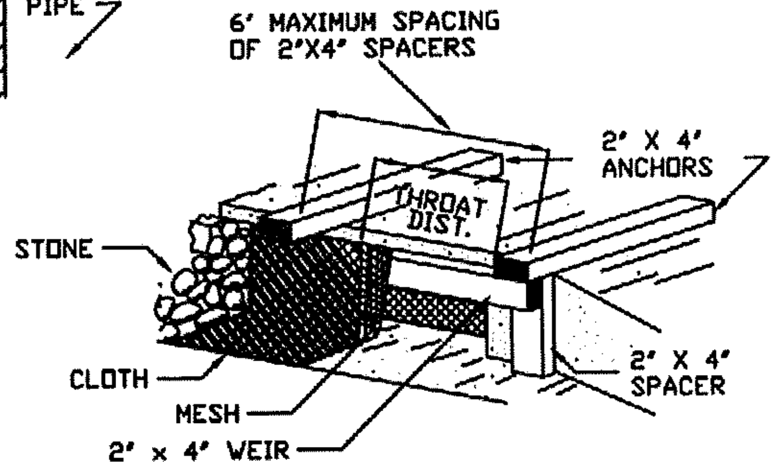
MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STONE & BLOCK DROP INLET PROTECTION

Figure 5A.14
Curb Drop Inlet Protection

SYMBOL





CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN AOS OF 40-85.
2. WOODEN FRAME SHALL BE CONSTRUCTED OF 2" x 4" CONSTRUCTION GRADE LUMBER.
3. WIRE MESH ACROSS THROAT SHALL BE A CONTINUOUS PIECE 30 INCH MINIMUM WIDTH WITH A LENGTH 4 FEET LONGER THAN THE THROAT. IT SHALL BE SHAPED AND SECURELY NAILED TO A 2" x 4" WEIR.
4. THE WEIR SHALL BE SECURELY NAILED TO 2" x 4" SPACERS 9 INCHES LONG SPACED NO MORE THAN 6 FEET APART.
5. THE ASSEMBLY SHALL BE PLACED AGAINST THE INLET AND SECURED BY 2" x 4" ANCHORS 2 FEET LONG EXTENDING ACROSS THE TOP OF THE INLET AND HELD IN PLACE BY SANDBAGS OR ALTERNATE WEIGHTS.

MAXIMUM DRAINAGE AREA 1 ACRE

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	CURB DROP INLET PROTECTION

STANDARD AND SPECIFICATIONS
FOR
TURBIDITY CURTAIN

Definition

A flexible, impenetrable barrier used to trap sediment in water bodies. This curtain is weighted at the bottom to achieve closure while supported at the top through a flotation system.

Purpose

To prevent the migration of silt from a work site in a water environment into the larger body of water.

Condition Where Practice Applies

A turbidity curtain is generally used when construction activity occurs within a waterbody or along its shoreline and is of short duration, generally less than one month. Curtains are used in calm water surfaces. **Turbidity curtains are not to be used across flowing watercourses.**

Design Criteria

The turbidity curtain shall be located beyond the lateral limits of the construction site and firmly anchored in place. The alignment should be set as close to the work area as possible but not so close as to be disturbed by applicable construction equipment. The height of the curtain shall be 20 percent greater than the depth of the water to allow for water level fluctuations. The area that the turbidity curtain protects shall not contain large culverts or drainage areas that if flows occur behind the curtain would cause a breach or lost contact at the bottom surface.

If water depths at the design alignment are minimal, the toe can be anchored in place by staking.

See Figure 5A.15 on page 5A.34.

Construction Specifications

The area of proposed installation of the curtain shall be inspected for obstacles and impediments that could damage the curtain or impair its effectiveness to retain sediment. All materials shall be removed so they cannot enter the waterbody. Shallow installations can be made by securing the curtain by staking rather than using a flotation system. Supplemental anchors of the turbidity curtain toe shall be used, as needed, depending on water surface disturbances such as boats and wave action by winds.

Maintenance

The turbidity curtain shall be inspected daily and repaired or replaced immediately. It is not normally necessary to remove sediment deposited behind the curtain; but, when necessary, removal is usually done by hand prior to removal of the barrier. All removed silt is stabilized away from the waterbody. The barrier shall be removed by carefully pulling it toward the construction site to minimize the release of attached sediment. Any floating construction or natural debris shall be immediately removed to prevent damage to the curtain. If the curtain is oriented in a manner that faces the prevailing winds, frequent checks of the anchorage shall be made.

STANDARD AND SPECIFICATIONS FOR SEDIMENT BASIN

Definition

A temporary barrier or dam constructed across a drainage way or at other suitable locations to intercept sediment laden runoff and to trap and retain the sediment.

Scope

This standard applies to the installation of temporary sediment basins on sites where: (a) failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities; (b) the drainage area does not exceed 100 acres; and (c) the basin is to be removed within 36 months after the beginning of construction of the basin.

Permanent (to function more than 36 months) sediment basins, or temporary basins exceeding the classification requirements for class 1 and 2, or structures that temporarily function as a sediment basin but are intended for use as a permanent pool shall be classified as permanent structures and shall conform to criteria appropriate for permanent structures. These structures shall be designed and constructed to conform to NRCS Standard And Specification No. 378 for Ponds in the National Handbook of Conservation Practices and the New York State Department of Environmental Conservation, "Guidelines for the Design of Dams." The total volume of permanent sediment basins shall equal to or exceed the capacity requirements for temporary basins contained herein.

Classification of Temporary Sediment Basins

For the purpose of this standard, temporary sediment basins are classified as follows:

Class	1	2
Max. Drainage Area (acres)	100	100
Max. Height[1] of Dam (ft.)	10	15
Min. Embankment Top Width	8	10
Embankment Side Slopes	2:1 or Flatter	2 ½:1 or Flatter
Anti-Seep Control Required	Yes	Yes

[1] Height is measured from the low point of original ground at the downstream toe of the dam to the top of the dam.

Purpose

The purpose of a sediment basin is to intercept sediment-laden runoff and reduce the amount of sediment leaving the disturbed area in order to protect drainage ways, properties, and rights-of-way below the sediment basin.

Conditions Where Practice Applies

A sediment basin is appropriate where physical site conditions or land ownership restrictions preclude the installation of other erosion control measures to adequately control runoff, erosion, and sedimentation. However, it is strongly encouraged to use a basin in addition to other ESC measures if practicable. It may be used below construction operations which expose critical areas to soil erosion. The basin shall be maintained until the disturbed area is protected against erosion by permanent stabilization.

Design Criteria

Compliance with Laws and Regulations

Design and construction shall comply with state and local laws, ordinances, rules and regulations, including permits.

Location

The sediment basin should be located to obtain the maximum storage benefit from the terrain and for ease of cleanout of the trapped sediment. It should be located to minimize interference with construction activities and construction of utilities. Whenever possible, sediment basins should be located so that storm drains may outfall or be diverted into the basin. **Do not locate basins in perennial streams.**

Size and Shape of the Basin

The minimum sediment storage volume of the basin, as measured from the bottom of the basin to the elevation of the crest of the principal spillway shall be at least 3,600 cubic feet per acre draining to the basin. This 3,600 cubic feet is equivalent to one inch of sediment per acre of drainage area. The entire drainage area is used for this computation, rather than the disturbed area above, to maximize trapping efficiency. The length to width ratio shall be greater than 2:1, where length is the distance between the inlet and outlet. A wedge shape shall be used with the inlet located at the narrow end.

Surface Area

Recent studies (Barfield and Clar 1985; Pitt, 2003) indicate that the following relationship between surface area and peak inflow rate gives a trapping efficiency of 75% for silt loam soils, and greater than 90% for loamy sand soils:

$A = 0.01\ Qp$ or, $A = 0.015x\ D.A.$
(whichever is greater)
where,

A = the basin surface area, acres, measured at the service spillway crest; and

Qp = the peak inflow rate for the design storm.
(The minimum design storm will be a 10 year, 24 hour storm under construction conditions).

D.A. = contributing drainage area.

One half of the design sediment storage volume (67 cubic yards per acre drainage area) shall be in the form of a permanent pool, and the remaining half as drawdown volume.

Sediment basins shall be cleaned out when the permanent pool volume remaining as described above is reduced by 50 percent, except in no case shall the sediment level be permitted to build up higher than one foot below the principal spillway crest. At this elevation, cleanout shall be performed to restore the original design volume to the sediment basin.

The elevation corresponding to the maximum allowable sediment level shall be determined and shall be stated in the design data as a distance below the top of the riser and shall be clearly marked on the riser.

The basin dimensions necessary to obtain the required basin volume as stated above shall be clearly shown on the plans to facilitate plan review, construction, and inspection.

Spillway Design

Runoff shall be computed by the method outlined in: Chapter 2, Estimating Runoff, Engineering Field Handbook available in the Natural Resources Conservation Service offices or, by TR-55, Urban Hydrology for Small Watersheds. **Runoff computations shall be based upon the worst soil cover conditions expected to prevail in the contributing drainage area during the anticipated effective life of the structure.** The combined capacities of the principal and emergency spillway shall be sufficient to pass the peak rate of runoff from a ten-year frequency storm.

1. Principal spillway: A spillway consisting of a vertical pipe or box type riser joined (watertight connection) to a pipe (barrel) which shall extend through the embankment and outlet beyond the downstream toe of the fill. The minimum capacity of the principal spillway shall be 0.2 cfs per acre of drainage area when the water surface is at the emergency spillway crest elevation. For those basins with no emergency spillway, the principal spillway shall have the capacity to handle the peak flow from a ten-year frequency rainfall event. The minimum size of the barrel shall be 8 inches in diameter. See Figures 5A.25, 5A.26, and 5A.27 on pages 5A.60, 5A.61, and 5A.62 for principal spillway sizes and capacities.

A. Crest elevation: When used in combination with an emergency spillway, the crest elevation of the riser shall be a minimum one foot below the elevation of the control section of the emergency spillway.

B. Watertight riser and barrel assembly: The riser and all pipe connections shall be completely watertight except for the inlet opening at the top, or a dewatering opening. There shall not have any other holes, leaks, rips, or perforations in the structure.

C. Dewatering the basin: The drawdown volume will be discharged over a 10 hour period. The size of the orifice to provide this control can be approximated as follows:

$$A_o = \frac{A_s \times 2h^{0.5}}{T \times Cd \times 20{,}428} \quad \text{therefore,} \quad Ao = \frac{A_s \times 2h^{0.5}}{122{,}568}$$

where,
Ao = surface area of the dewatering orifice
As = surface area of the basin
h = head of water above orifice
Cd = coefficient of contraction for an orifice (0.6)
T = detention time needed to dewater the basin (10 hours)

D. Anti-vortex device and trash rack: An anti-vortex device and trash rack shall be securely installed on top of the riser and shall be the concentric type as shown in Figure 5A.29(1) and 5A.29(2) on pages 5A.64 and 5A.65.

E. Base: The riser shall have a base attached with a watertight connection and shall have sufficient weight to prevent flotation of the riser. Two approved bases for risers ten feet or less in height are: 1) a concrete base 18 in. thick with the riser embedded 9 in. in the base, and 2) a ¼" minimum thickness steel plate attached to the riser by a continuous weld around the circumference of the riser to form a watertight connection. The plate shall have 2.5 feet of stone, gravel, or compacted earth placed on it to prevent flotation. In either case, each side of the square base shall be twice the riser diameter.

For risers greater than ten feet high, computations shall be made to design a base which will prevent flotation. The minimum factor of safety shall be 1.20 (Downward forces = 1.20 x upward forces). See Figure 5A.30 on page 5A.66 for details.

F. Anti-Seep Collars: Anti-seep collars shall be installed around all conduits through earth fills of impoundment structures according to the following criteria:

1) Collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2) Collar spacing shall be between 5 and 14 times the vertical projection of each collar.

3) All collars shall be placed within the saturation zone.

4) The assumed normal saturation zone (phreatic line) shall be determined by projecting a line at a slope of 4 horizontal to 1 vertical from the point where the normal water (riser crest) elevation touches the upstream slope of the fill to a point where this line intersects the invert of the pipe conduit. All fill located within this line may be assumed as saturated.

When anti-seep collars are used, the equation for revised seepage length becomes:

$2(N)(P)=1.15(L_s)$ or,

$N=(0.075)(L_s)/P$

Where: Ls = Saturated length is length, in feet, of pipe between riser and intersection of phreatic line and pipe invert.

N = number of anti-seep collars.

P = vertical projection of collar from pipe, in feet.

5) All anti-seep collars and their connections shall be watertight.

See Figure 5A.31(1) and 5A.31(2) on pages 5A.67 and 5A.68 for anti-seep collar design and Figure 5A.32 on page 5A.69 for construction details. Seepage diaphragms may be used in lieu of anti-seep collars. They shall be designed in accordance to USDA NRCS Pond Standard 378.

G. Outlet: An outlet shall be provided, including a means of conveying the discharge in an erosion free manner to an existing stable channel. Where discharge occurs at the property line, drainage easements will be obtained in accordance with local ordinances. Adequate notes and references will be shown on the erosion and sediment control plan.

Protection against scour at the discharge end of the pipe spillway shall be provided. Measures may include basin, riprap, revetment, excavated plunge pools, or other approved methods. See Standard and Specification for Rock Outlet Protection, page 5B.21.

2. Emergency Spillways: The entire flow area of the emergency spillway shall be constructed in undisturbed ground (not fill). The emergency spillway cross-section shall be trapezoidal with a minimum bottom width of eight feet. This spillway channel shall have a straight control section of at least 20 feet in length; and a straight outlet section for a minimum distance equal to 25 feet.

A. Capacity: The minimum capacity of the emergency spillway shall be that required to pass the peak rate of runoff from the 10 year 24-hour frequency storm, less any reduction due to flow in the pipe spillway. Emergency spillway dimensions may be determined by using the method described in Figure 5A.33 on page 5A.70.

B. Velocities: The velocity of flow in the exit channel shall not exceed 5 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be within the non-erosive range for the type of protection used.

C. Erosion Protection: Erosion protection shall be provided for by vegetation as prescribed in this publication or by other suitable means such as riprap, asphalt or concrete.

D. Freeboard: Freeboard is the difference between the design high water elevation in the emergency spillway and the top of the settled embankment. If there is no emergency spillway, it is the difference between the water surface elevation required to pass the design flow through the pipe and the top of the settled embankment. Freeboard shall be at least one foot.

Embankment Cross-Section

Class 1 Basins: The minimum top width shall be eight feet. The side slopes shall not be steeper than 2:1.

Class 2 Basins: The minimum top width shall be ten feet. The side slopes shall not be steeper than 2 ½:1.

Entrance of Runoff into Basin

Points of entrance of surface runoff into excavated sediment basins shall be protected to prevent erosion. Considerable care should be given to the major points of inflow into basins. In many cases the difference in elevation of the inflow and the bottom of the basin is considerable, thus creating a potential for sever gullying and sediment generation. Often a riprap drop at major points of inflow would eliminate gullying and sediment generation.

Diversions, grade stabilization structures or other water control devices shall be installed as necessary to ensure direction of runoff and protect points of entry into the basin. Points of entry should be located so as to ensure maximum travel distance of entering runoff to point of exit (the riser) from the basin.

Disposal

The sediment basin plans shall indicate the method(s) of disposing of the sediment removed from the basin. The sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the basin, adjacent to a stream or floodplain. Disposal sites will be covered by an approved sediment control plan.

The sediment basis plans shall also show the method of disposing of the sediment basin after the drainage area is stabilized, and shall include the stabilization of the sediment basin site. Water contained within the storage areas shall be removed from the basin by pumping, cutting the top of the riser, or other appropriate method prior to removing or breaching the embankment. Sediment shall not be allowed to flush into a stream or drainage way.

Chemical Treatment

Precipitation of sediment is enhanced with the use of specific chemical flocculants that can be applied to the sediment basin in liquid, powder, or solid form. Flocculants include polyacrylimides, aluminum sulfate (alum), and polyaluminum chloride. Cationic polyelectrolytes have a greater toxicity to fish and other aquatic organisms than anionic polyelectrolytes because they bind to the gills of fish resulting in respiratory failure (Pitt, 2003).

Chemical treatment shall not be substituted for proper erosion and sediment control. To reduce the need for flocculants, proper controls include planning, phasing, sequencing and practice design in accordance to NY Standards. Chemical applications shall not be applied without written approval from the NYSDEC.

Safety

Sediment basins are attractive to children and can be very dangerous. Local ordinances and regulations must be adhered to regarding health and safety. The developer or owner shall check with local building officials on applicable safety requirements. If fencing of sediment basins is required, the location of and type of fence shall be shown on the plans.

Construction Specifications

Site Preparation

Areas under the embankment shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots, or other objectionable material. In order to facilitate cleanout and restoration, the pool area (measured at the top of the pipe spillway) will be cleared of all brush, trees, and other objectionable materials.

Cutoff-Trench

A cutoff trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be two feet. The cutoff trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be four feet, but wide enough to permit operation of excavation and compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for embankment. The trench shall be dewatered during the back-filling/compaction operations.

Embankment

The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of a ball, it is too wet for proper compaction. Fill material shall be placed in six to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.

Pipe Spillway

The riser shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight bank assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four-inch layers and compacted under and around the pipe to at least the same density as the adjacent embankment.

A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment. Steel base plates on risers shall have at least 2 ½ feet of compacted earth, stone, or gravel placed over it to prevent flotation.

Emergency Spillway

The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of +/- 0.2 feet.

Vegetative Treatment

Stabilize the embankment and emergency spillway in accordance with the appropriate vegetative standard and specification immediately following construction. In no case shall the embankment remain unstabilized for more than seven (7) days.

Erosion and Pollution Control

Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local laws shall be complied with concerning pollution abatement.

Safety

State and local requirements shall be met concerning fencing and signs, warning the public of hazards of soft sediment and floodwater.

Maintenance

1. Repair all damages caused by soil erosion and construction equipment at or before the end of each working day.

2. Sediment shall be removed from the basin when it reaches the specified distance below the top of the riser (shall not exceed 50 percent capacity). This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.

Final Disposal

When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry, graded, and back filled.

Information to be Submitted

Sediment basin designs and construction plans submitted for review to a local municipality, Soil and Water Conservation District, or other agency shall include the following:

1. Specific location of the basin.

2. Plan view of the storage basin and emergency spillway, showing existing and proposed contours.

3. Cross section of dam, principal spillway, emergency spillway, and profile of emergency spillway.

4. Details of pipe connections, riser to pipe connections, riser base, anti-seep control, trash rack cleanout elevation, and anti-vortex device.

5. Runoff calculations for 1 and 10-year frequency storms, if required.

6. Storage Computation
   A. Total required
   B. Total Available
   C. Level of sediment at which cleanout shall be required; to be stated as a distance from the riser crest to the sediment surface.

7. Calculations showing design of pipe and emergency spillway.

Note: Items 5 through 7 above may be submitted using the design data sheet on pages 7A.54 through 7A.59.

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by____________________Date____________Checked by__________________Date__________

Project____Basin #__________________

Location_________________________Total Area draining to basin ______________________________Acres

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu. yds. x__________acres of drainage area = ___________cu.yds.
2. a. Cleanout at 50 percent of minimum required volume = ________cu. yds.
   b. Elevation corresponding to scheduled time to clean out_______________
   c. Distance below top of riser___________feet
3. Minimum surface area is larger of 0.01 $Q_{(1)}$_________or, 0.015 DA = ___________ use ___________acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$ = ____________________________cfs
   (EFH, Ch. 2, TR-55, or Section 4; Attach runoff computation sheet)

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap., Q_{ps} = 0.2 x_______ac. Drainage = ________cfs
   Note: If there is no emergency spillway, then req'd $Q_{ps} = Q_{p(10)}$ = ________cfs.
6. H = ________ft. Barrel length = ________ft
7. Barrel: Diam. _______inches; Q_{ps} = (Q)___________x (cor.fac.)________=_________cfs.
8. Riser: Diam. _______inches; Length________ft.; h = _________ft. Crest Elev. _____________
9. Trash Rack: Diam.________inches; H = __________inches

Emergency Spillway Design

10. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = ___________ - ____________ = ___________cfs.
11. Width _______ft.; H_p_________ft Crest elevation ___________; Design High Water Elev. ___________
    Entrance channel slope___________________________% ; Top of Dam Elev. _______________
    Exit channel slope ______________________________%

ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y = ________ft.; z = _______:1; pipe slope = ________%, L_s = _______ft.
    Use_______collars, ________ - __________inches square; projection = ________ft.

Diaphragms:

#________ width________ ft. height_________ft.

DEWATERING ORIFICE SIZING

13. $$Ao = \frac{A_s \times (2h)^{0.5}}{122{,}568}$$ = ________sq. ft.; h = _____ ft.; therefore use, ____________________________

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET INSTRUCTIONS FOR USE OF FORM

1. Minimum required sediment storage volume is 134 cubic yards (3600 cubic feet) per acre from each acre of drainage area. Values larger than 134 cubic yards per acre may be used for greater protection. Compute volume using entire drainage area although only part may be disturbed.

2. The volume of a naturally shaped basin (no excavation in basin) may be approximated by the formula V = (0.4)(A)(d), where V is in cubic feet, A is the surface area of the basin, in square feet, and d is the maximum depth of the basin, in feet. Volume may be computed from contour information or other suitable methods.

3. If volume of basin is not adequate for required storage, excavate to obtain the required volume.

4. The minimum surface area of the basin pool at the storage volume elevation will be the larger of the two elevations shown.

5 USDA-NRCS TR-55 or the NRCS Engineering Field Handbook, Chapter 2, are the preferred methods for runoff computation. Runoff curve numbers will be computed for the drainage area that reflects the maximum construction condition.

6. Required minimum discharge from pipe spillway equals 0.2 cfs/ac. times total drainage area. (This is equivalent to a uniform runoff of 5 in. per 24 hours). The pipe shall be designed to carry Q_p if site conditions preclude installation of an emergency spillway to protect the structure.

7. Determine value of "H" from field conditions; "H" is the interval between the centerline of the outlet pipe and the emergency spillway crest, or if there is no emergency spillway, to the design high water.

8. See Pipe Spillway Design Charts, Figures 5A.26 and 5A.27 on pages 5A.61 and 5A.62.

9. See Riser Inflow Curves, Figure 5A.25 on page 5A.60.

10. Compute the orifice size required to dewater the basin over a 10 hour period.

11. See Trash Rack and Anti-Vortex Device Design, Figures 5A.29 on pages 5A.64 and 5A.65.

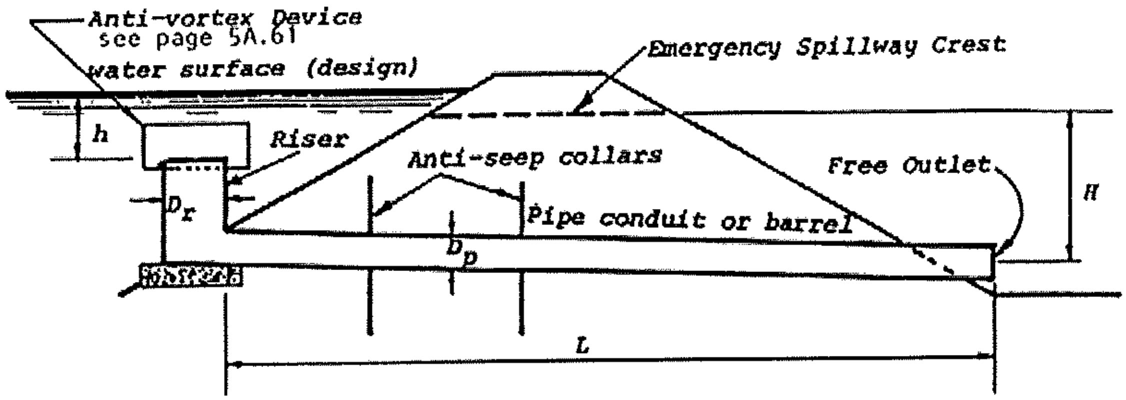
12. Compute Q_{es} by subtracting actual flow carried by the pipe spillway from the total inflow, Q_p.

13. Use appropriate tables to obtain values of H_p, bottom width, and actual Q_{es}. If no emergency spillway is to be used, so state, giving reason(s).

14. See Anti-Seep Collar / Seepage Diaphragm Design.

15. Fill in design elevations. The emergency spillway crest must be set no closer to riser crest than value of h, which causes pipe spillway to carry the minimum, required Q. Therefore, the elevation difference between spillways shall be equal to the value of h, or one foot, whichever is greater. Design high water is the elevation of the emergency spillway crest plus the value of H_p, or if there is no emergency spillway, it is the elevation of the riser crest plus h required to handle the 10-year storm. Minimum top of dam elevation requires 1.0 ft. of freeboard above design high water.

Pipe Spillway Design



H = Head on pipe spillway (pipe flow), ft. (centerline of outlet to emergency spillway crest or to design high water if no emergency spillway)

h = Head over riser crest, ft.

L = Length of pipe in ft.

D_p = Diameter of pipe conduit (barrel)

Dr = Diameter of riser

To use charts for pipe spillway design:

- Enter chart, Figures 5A.26 and 5A.27 on Pages 5A.61 and 5A.62 with H and required discharge.
- Find diameter of pipe conduit that provides equal or greater discharge
- Enter chart, Figure 5A.25 on Page 5A.60 with actual pipe discharge. Read across to select smallest riser that provides discharge within weir flow portion of rating curve. Read down to find corresponding h required. This h must be 1 foot or less.

Example:

Given: Q (required) = 5.8 cfs, L = 60 ft., H = 9 ft. to centerline of pipe = Free outlet
Find: Pipe size, actual Q and size of riser, use corrugated metal pipe, n = 0.025

Q of 12 in. pipe = 5.95 cfs x (correction factor) 1.07 = 6.4 cfs from the Pipe Flow Chart. From Riser Inflow Curves (Figures 5A.25 on page 5A .60), smallest riser = 18 in. (@ h = 0.60).

Design Example #1

Snooks Pond is a senior citizen assisted living center under construction. A sediment basin will be utilized as a component of the erosion and sediment control plan for the project. The Drainage area to the basin is 20 acres, the one year storm peak discharge is 32 cubic feet per second, and 88 cfs for the 10 year storm based on analysis of the site under maximum construction condition. Design the sediment basin when the overall head (H) is 10 feet and the smooth steel pipe spillway is used. An emergency spillway can be constructed on the site. Base the design volumes and elevations on the stage storage curve developed for the natural topography or as excavated (see Page 5A.58).

Design Example # 2

Us the same data as example #1, but no emergency spillway is possible (see Page 7A. 59).

Notes:
1. Use a 1.0 foot minimum between riser crest and emergency spillway crest, thus riser crest = 1.0 ft.

2. To provide 50% of the storage as permanent pool, the dewatering orifice is set at the out elevation.

Figure 5A.23
Sediment Basin

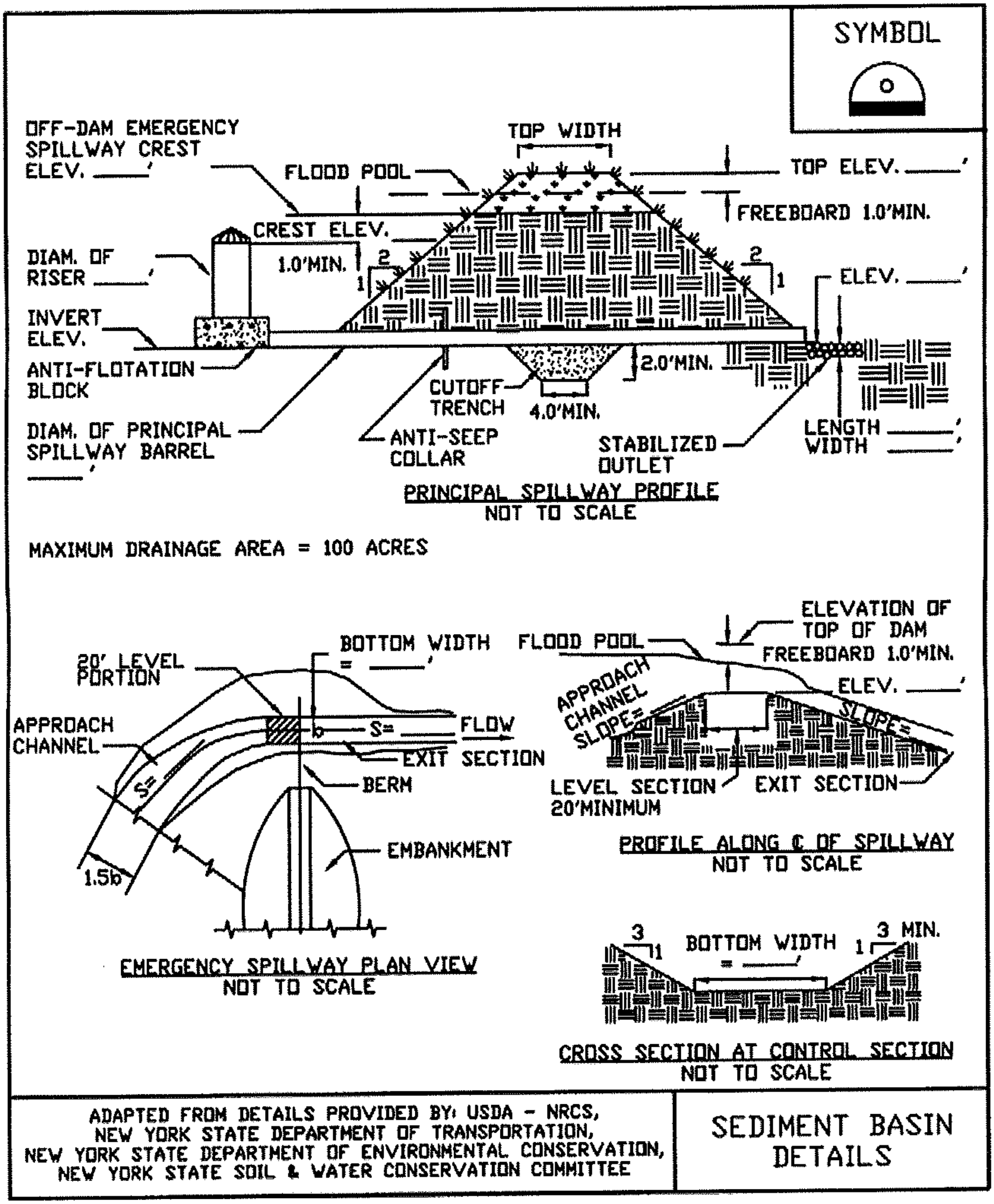


Figure 5A.24(1)
Sediment Basin Design Example #1

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by DWL Date 1-04 Checked by PLS Date 1-04

Project SNOOKS POND Basin # 1

Location MANLIUS, NY Total Area draining to basin 20 Acres

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu. yds. x 20 acres of drainage area = 2,680 cu.yds.
2. a. Cleanout at 50 percent of minimum required volume = 1,340 cu. yds.
   b. Elevation corresponding to scheduled time to clean out 96.5
   c. Distance below top of riser 3.5 Ft.
3. Minimum surface area is larger of 0.01 $Q_{(1)}$ 0.32 or, 0.015 DA = 0.30 use 0.32 Acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$ = 88 cfs
   (EFH, Ch. 2, TR-55, or Section 4; Attach runoff computation sheet)

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap., Q_{ps} = 0.2 x 20 ac. Drainage = 4 cfs
   Note: If there is no emergency spillway, then req'd $Q_{ps} = Q_{p(10)}$ = —— cfs.
6. H = 10 ft. Barrel length = 85 ft
7. Barrel: Diam. 12 inches; Q_{ps} = (Q) 10.2 x (cor.fac.) .945 = 9.6 cfs.
8. Riser: Diam. 21 inches; Length 9 ft.; h = 1.0 ft. Crest Elev. 100.0
9. Trash Rack: Diam. 30 inches; H = 11 inches

Emergency Spillway Design

10. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = 88 - 10 = 78 cfs.
11. Width 20 ft.; H_p 1.4 ft Crest elevation 101.0 ; Design High Water Elev. 102.4
    Entrance channel slope 2 % ; Top of Dam Elev. 103.4
    Exit channel slope > 2.7 %

ANTI-SEEP COLLAR/
SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y = 8 ft.; z = 2 :1; pipe slope = 1 %, L_s = 50 ft.
    Use 2 collars, 4' - 6" inches square; projection = 1.8 ft.

Diaphragms:

1 width 7 ft. height 10 ft.

DEWATERING ORIFICE SIZING

13. $$Ao = \frac{A_s \times (2h)^{0.5}}{122,568}$$ = 0.30 sq. ft.; h = 3.5 ft.; therefore use, 7.4" → USE 6" orifice

Figure 5A.24(2)
Sediment Basin Design Example #2

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by DWL Date 1-04 Checked by PLS Date 1-04
Project SNOOKS POND Basin # 1
Location MANLIUS, NY Total Area draining to basin 20 Acres

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu. yds. x 20 acres of drainage area = 2,680 cu.yds.
2. a. Cleanout at 50 percent of minimum required volume = 1,340 cu. yds.
   b. Elevation corresponding to scheduled time to clean out 96.5
   c. Distance below top of riser 3.5 feet
3. Minimum surface area is larger of 0.01 $Q_{(1)}$ 0.32 or, 0.015 DA = 0.30 use 0.32 acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$ = 88 cfs
   (EFH, Ch. 2, TR-55, or Section 4; Attach runoff computation sheet)

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap., Q_{ps} = 0.2 x 20 ac. Drainage = 4 cfs
   Note: If there is no emergency spillway, then req'd Q_{ps} = $Q_{p(10)}$ = 88 cfs.
6. H = 10 ft. Barrel length = 85 ft
7. Barrel: Diam. 36 inches; Q_{ps} = (Q) 91.2 x (cor.fac.) .955 = 87.1 cfs.
8. Riser: Diam. 54 inches; Length 9 ft.; h = 1.7 ft. Crest Elev. 100.0
9. Trash Rack: Diam. 78 inches; H = 25 inches

Emergency Spillway Design

10. Emergency Spillway Flow, Q_{es} = Q_p - Q_{ps} = ______ - ______ = ______ cfs.
11. Width ______ ft.; H_p ______ ft Crest elevation ______; Design High Water Elev. ______
    Entrance channel slope ______ % ; Top of Dam Elev. ______
    Exit channel slope ______ %

ANTI-SEEP COLLAR/
SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y = 8 ft.; z = 2 :1; pipe slope = 1 %, L_s = 50 ft.
    Use 2 collars, 4' - 6 inches square; projection = 1.8 ft.

Diaphragms:

1 width 7 ft. height 10 ft.

DEWATERING ORIFICE SIZING

13. $Ao = \dfrac{A_s \times (2h)^{0.5}}{122{,}568}$ = 0.30 sq. ft.; h = 3.5 ft.; therefore use, 7.4" → USE 6" orifice

Figure 5A.25
Riser Inflow Chart (USDA - NRCS)

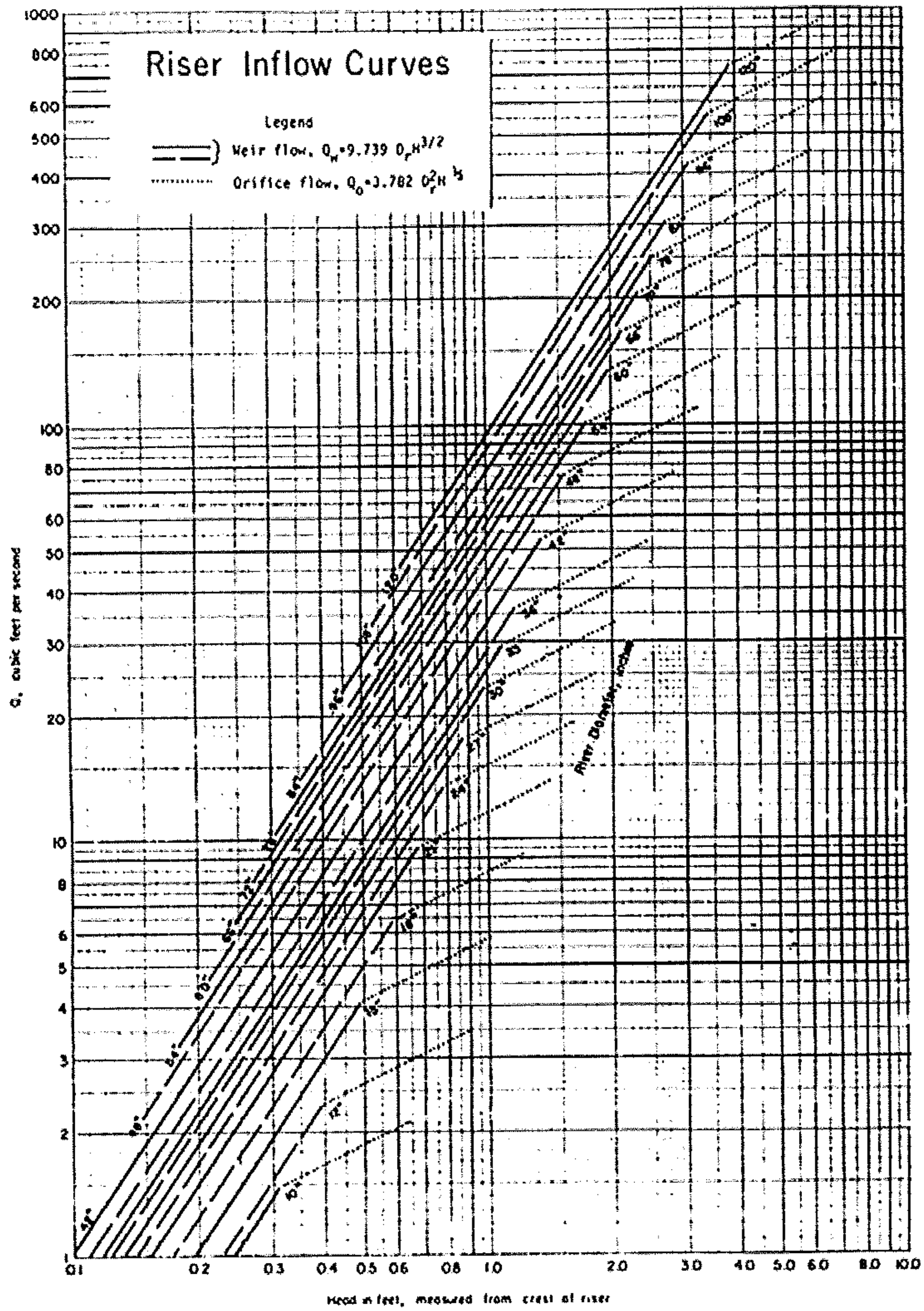


Figure 5A.26
Pipe Flow Chart; "n" = 0.025 (USDA - NRCS)

PIPE FLOW CHART n = 0.025
FOR CORRUGATED METAL PIPE INLET $K_m = K_e + K_b = 1.0$ AND 70 FEET OF CORRUGATED METAL PIPE CONDUIT (full flow assumed)
Note correction factors for pipe lengths other than 70 feet
diameter of pipe in inches

H, in feet	6"	8"	10"	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
1	0.33	0.70	1.25	1.90	3.48	5.47	7.99	11.0	18.8	28.8	41.1	55.7	72.6	91.8	113	137	163	191	222	255	290
2	0.47	0.99	1.76	2.80	4.92	7.74	11.3	15.6	26.6	40.8	58.2	78.8	103	130	160	194	231	271	314	360	410
3	0.58	1.22	2.16	3.43	6.02	9.48	13.8	19.1	32.6	49.9	71.2	96.5	126	159	196	237	282	331	384	441	502
4	0.67	1.40	2.49	3.97	6.96	10.9	16.0	22.1	37.6	57.7	82.3	111	145	184	226	274	326	383	444	510	580
5	0.74	1.57	2.79	4.43	7.78	12.2	17.9	24.7	42.1	64.5	92.0	125	162	205	253	306	365	428	496	570	648
6	0.82	1.72	3.05	4.86	8.52	13.4	19.6	27.0	46.1	70.6	101	136	178	225	277	336	399	469	544	624	710
7	0.88	1.86	3.30	5.25	9.20	14.5	21.1	29.2	49.8	76.3	109	147	192	243	300	362	431	506	587	674	767
8	0.94	1.99	3.53	5.61	9.84	15.5	22.6	31.2	53.2	81.5	116	158	205	260	320	388	461	541	628	721	820
9	1.00	2.11	3.74	5.95	10.4	16.4	24.0	33.1	56.4	86.5	123	167	218	275	340	411	489	574	666	764	870
10	1.05	2.22	3.94	6.27	11.0	17.3	25.3	34.9	59.5	91.2	130	176	230	290	358	433	516	605	702	806	917
11	1.10	2.33	4.13	6.58	11.5	18.2	26.5	36.6	62.4	95.6	136	185	241	304	376	454	541	635	736	845	962
12	1.15	2.43	4.32	6.87	12.1	19.0	27.7	38.2	65.2	99.9	142	193	252	318	392	475	565	663	769	883	1004
13	1.20	2.53	4.49	7.15	12.6	19.7	28.8	39.8	67.8	104	148	201	262	331	408	494	588	690	800	919	1045
14	1.25	2.63	4.66	7.42	13.0	20.5	29.9	41.3	70.4	108	154	208	272	343	424	513	610	716	830	951	1085
15	1.29	2.72	4.83	7.68	13.5	21.2	30.9	42.8	72.8	112	159	216	281	355	439	531	631	741	860	987	1123
16	1.33	2.81	4.99	7.93	13.9	21.9	32.0	44.2	75.2	115	165	223	290	367	453	548	652	765	888	1019	1160
17	1.37	2.90	5.14	8.18	14.3	22.6	32.9	45.5	77.5	119	170	230	299	378	467	565	672	789	915	1051	1195
18	1.41	2.98	5.29	8.41	14.8	23.2	33.9	46.8	79.8	120	174	236	308	389	480	581	692	812	942	1081	1230
19	1.45	3.06	5.43	8.64	15.2	23.9	34.8	48.1	82.0	126	179	243	316	400	494	597	711	834	967	1111	1264
20	1.49	3.14	5.57	8.87	15.6	24.5	35.7	49.4	84.1	129	184	249	325	410	506	613	729	856	993	1139	1297
21	1.53	3.22	5.71	9.09	15.9	25.1	36.6	50.6	86.2	132	188	255	333	421	519	628	747	877	1017	1168	1329
22	1.56	3.29	5.85	9.30	16.3	25.7	37.5	51.8	88.2	135	193	261	341	430	531	643	765	898	1041	1195	1360
23	1.60	3.37	5.98	9.51	16.7	26.2	38.3	53.0	90.2	138	197	267	348	440	543	657	782	918	1064	1222	1390
24	1.63	3.44	6.11	9.72	17.0	26.8	39.1	54.1	92.1	141	201	273	356	450	555	671	799	937	1087	1248	1420
25	1.66	3.51	6.23	9.92	17.4	27.4	39.9	55.2	94.0	144	206	279	363	459	566	685	815	957	1110	1274	1450
26	1.70	3.58	6.36	10.1	17.7	27.9	40.7	56.3	95.9	147	210	284	370	468	577	699	831	976	1132	1299	1478
27	1.73	3.65	6.48	10.3	18.1	28.4	41.5	57.4	97.7	150	214	290	377	477	588	712	847	994	1153	1324	1507
28	1.76	3.72	6.60	10.5	18.4	29.0	42.3	58.4	99.5	153	218	295	384	486	599	725	863	1013	1174	1348	1534
29	1.79	3.78	6.71	10.7	18.7	29.5	43.0	59.5	101	155	221	300	391	494	610	738	878	1030	1195	1372	1561
30	1.82	3.85	6.83	10.9	19.1	30.0	43.7	60.5	103	158	225	305	398	503	620	750	893	1048	1216	1396	1588

Correction Factors For Other Pipe Lengths

L, in feet	6"	8"	10"	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
20	1.49	1.63	1.58	1.53	1.47	1.42	1.37	1.34	1.28	1.24	1.20	1.18	1.16	1.14	1.13	1.11	1.10	1.10	1.09	1.08	1.08
30	1.44	1.41	1.39	1.36	1.32	1.29	1.27	1.24	1.21	1.18	1.15	1.13	1.12	1.11	1.10	1.09	1.08	1.07	1.07	1.06	1.06
40	1.28	1.27	1.25	1.23	1.21	1.20	1.18	1.17	1.14	1.12	1.11	1.10	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.05	1.04
50	1.16	1.16	1.15	1.14	1.13	1.12	1.11	1.10	1.09	1.08	1.07	1.06	1.06	1.05	1.05	1.04	1.04	1.04	1.03	1.03	1.03
60	1.07	1.07	1.07	1.06	1.06	1.05	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.01
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	.94	.94	.95	.95	.95	.95	.96	.96	.96	.97	.97	.97	.98	.98	.98	.98	.98	.98	.99	.99	.99
90	.89	.89	.90	.90	.91	.91	.92	.92	.93	.94	.94	.95	.95	.96	.96	.96	.97	.97	.97	.97	.94
100	.85	.85	.86	.86	.87	.88	.89	.89	.90	.91	.92	.93	.93	.94	.94	.95	.95	.95	.96	.96	.94
120	.78	.79	.79	.80	.81	.82	.83	.83	.85	.86	.87	.89	.89	.90	.91	.89	.92	.93	.93	.94	.92
140	.72	.73	.74	.75	.76	.77	.78	.79	.81	.82	.84	.85	.86	.87	.88	.86	.89	.90	.91	.91	.90
160	.68	.69	.69	.70	.71	.73	.74	.75	.77	.79	.80	.82	.83	.84	.85	.92	.87	.88	.89	.89	

Figure 5A.27
Pipe Flow Chart; "n" = 0.013 (USDA - NRCS)

PIPE FLOW CHART n = 0.013
FOR REINFORCED CONCRETE PIPE INLET $K_m = K_e + K_b = 1.00$ AND 70 FEET OF REINFORCED CONCRETE PIPE CONDUIT (full flow assumed)
Note correction factors for pipe lengths other than 70 feet
diameter of pipe in inches

H, in feet	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
1	3.22	5.44	8.29	11.8	15.9	26.0	38.6	53.8	71.4	91.5	114	139	167	197	229	264	302	342
2	4.55	7.69	11.7	16.7	22.5	36.8	54.6	76.0	101	129	161	197	236	278	324	374	427	483
3	5.57	9.42	14.4	20.4	27.5	45.0	66.9	93.1	124	159	198	241	289	341	397	458	523	592
4	6.43	10.9	16.6	23.5	31.8	52.0	77.3	108	143	183	228	278	334	394	459	529	604	683
5	7.19	12.2	18.5	26.3	35.5	58.1	86.4	120	160	205	255	311	373	440	513	591	675	764
6	7.88	13.3	20.3	28.8	38.9	63.7	94.6	132	175	224	280	341	409	482	562	647	739	837
7	8.51	14.4	21.9	31.1	42.0	68.8	102	142	189	242	302	368	441	521	607	699	798	904
8	9.10	15.4	23.5	33.3	44.9	73.5	109	152	202	259	323	394	472	557	685	748	854	966
9	9.65	16.3	24.9	35.3	47.7	78.0	116	161	214	275	342	418	500	590	688	793	905	1025
10	10.2	17.2	26.2	37.2	50.2	82.2	122	170	226	289	361	440	527	622	725	836	954	1080
11	10.7	18.0	27.5	39.0	52.7	86.2	128	178	237	304	379	462	553	653	761	877	1001	1133
12	11.1	18.9	28.7	40.8	55.0	90.1	134	186	247	317	395	482	578	682	794	916	1045	1184
13	11.6	19.6	29.9	42.4	57.3	93.7	139	194	257	330	411	502	601	710	827	953	1088	1232
14	12.0	20.4	31.0	44.1	59.4	97.3	145	201	267	342	427	521	624	736	858	989	1129	1278
15	12.5	21.1	32.1	45.6	61.5	101	150	208	277	354	442	539	646	762	888	1024	1169	1323
16	12.9	21.8	33.2	47.1	63.5	104	155	215	286	366	457	557	667	787	917	1057	1207	1367
17	13.3	22.4	34.2	48.5	65.5	107	159	222	294	377	471	574	688	812	946	1090	1244	1409
18	13.7	23.1	35.2	49.9	67.4	110	164	228	303	388	484	591	708	835	973	1121	1280	1450
19	14.0	23.7	36.1	51.3	69.2	113	168	234	311	399	497	607	727	858	1000	1152	1315	1489
20	14.4	24.3	37.1	52.6	71.0	116	173	240	319	409	510	623	746	880	1026	1182	1350	1528
21	14.7	24.9	38.0	53.9	72.8	119	177	246	327	419	523	638	764	902	1051	1211	1383	1566
22	15.1	25.5	38.9	55.2	74.5	122	181	252	335	429	535	653	782	923	1076	1240	1415	1603
23	15.4	26.1	39.8	56.5	76.2	125	186	258	342	439	547	668	800	944	1100	1260	1447	1639
24	15.8	26.7	40.6	57.7	77.8	127	189	263	350	448	559	682	817	964	1123	1295	1478	1674
25	16.1	27.2	41.5	58.9	79.4	130	193	269	357	458	571	696	834	984	1147	1322	1509	1708
26	16.4	27.7	42.3	60.0	81.0	133	197	274	364	467	582	710	850	1004	1169	1340	1539	1742
27	16.7	28.3	43.1	61.2	82.5	135	201	279	371	476	593	723	867	1023	1192	1373	1568	1775
28	17.0	28.8	43.9	62.3	84.1	138	204	285	378	484	604	737	883	1041	1214	1399	1597	1808
29	17.3	29.3	44.7	63.4	85.5	140	208	290	384	493	615	750	898	1060	1235	1423	1625	1840
30	17.6	29.8	45.4	64.5	87.0	142	212	294	391	501	625	763	913	1078	1256	1440	1653	1871

Correction Factors For Other Pipe Lengths

L, in feet	12"	15"	18"	21"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	102"
20	1.30	1.24	1.21	1.18	1.15	1.12	1.10	1.08	1.07	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03
30	1.22	1.18	1.15	1.13	1.12	1.09	1.08	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02
40	1.15	1.13	1.11	1.10	1.08	1.07	1.05	1.05	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.02	1.02	1.02
50	1.09	1.08	1.07	1.06	1.05	1.04	1.04	1.03	1.03	1.02	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01
60	1.04	1.04	1.03	1.03	1.03	1.02	1.02	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01
70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	.96	.97	.97	.97	.98	.98	.98	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99	.99
90	.93	.94	.94	.95	.95	.96	.97	.97	.98	.98	.98	.98	.98	.99	.99	.99	.99	.99
100	.90	.91	.92	.93	.93	.95	.95	.96	.97	.97	.97	.98	.98	.98	.98	.98	.98	.99
120	.84	.86	.87	.89	.90	.92	.93	.94	.94	.95	.96	.96	.96	.97	.97	.97	.97	.98
140	.80	.82	.83	.85	.86	.88	.90	.91	.92	.93	.94	.94	.95	.95	.96	.96	.96	.97
160	.76	.78	.80	.82	.83	.86	.88	.89	.90	.91	.92	.93	.94	.94	.95	.95	.95	.96

Figure 5A.28
Optional Sediment Basin Dewatering Methods

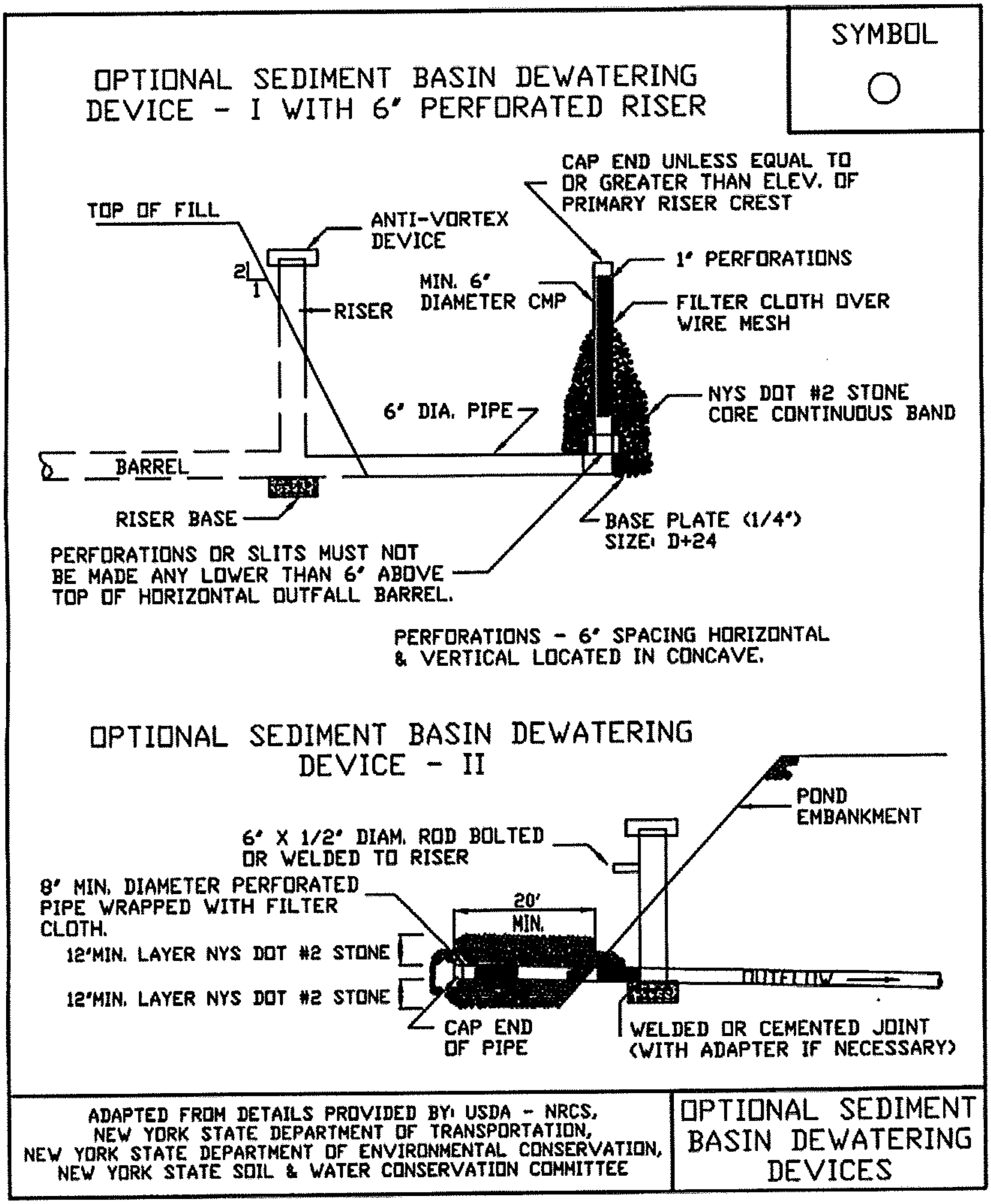
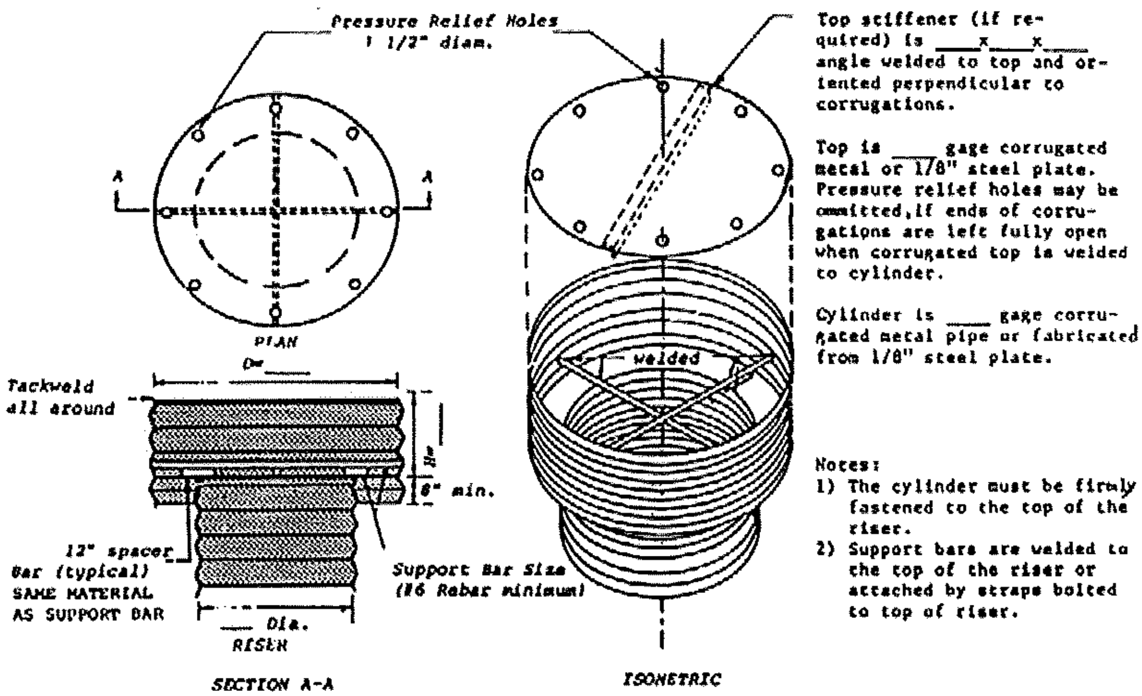


Figure 5A.29(1)
Concentric Trash Rack and Anti-Vortex Device
(USDA - NRCS)



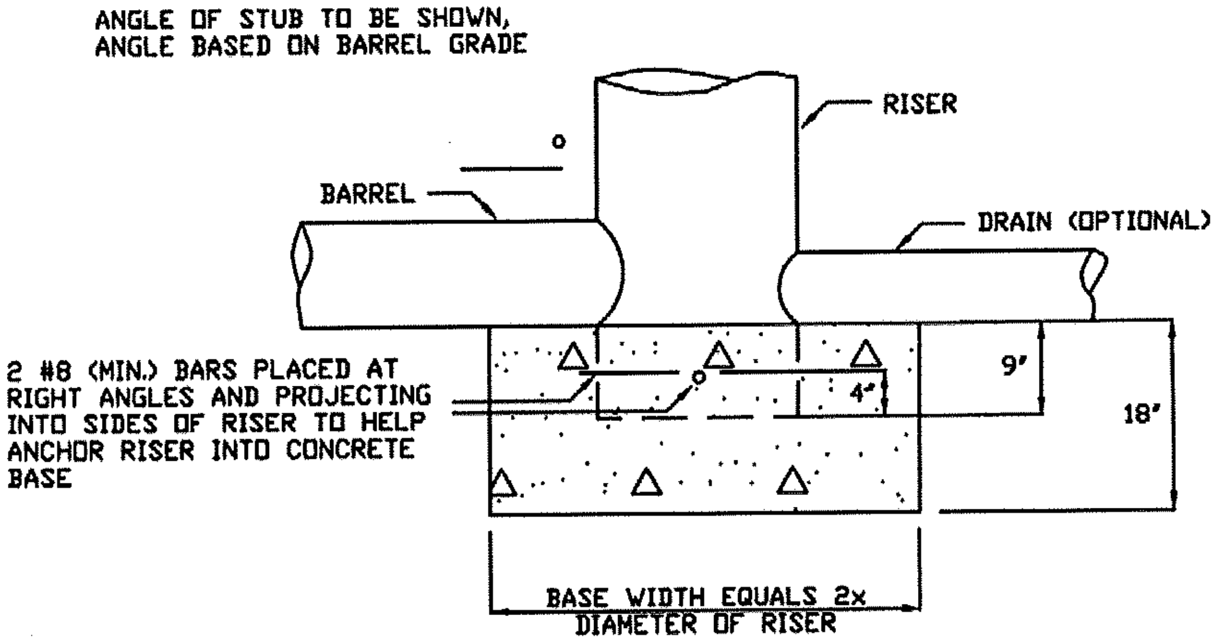
CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE
(not to scale)

Figure 5A.29(2)
Concentric Trash Rack and Anti-Vortex Device Design Table
(USDA - NRCS)

Riser	Cylinder	Thick.		Minimum Size	Minimum Top	
Diam.(in)	Diam (in.)	Gage	H (in.)	Support Bar	Thickness	Stiffener
12	18	16	6	#6 Rebar	16 ga.	—
15	21	16	7	#6 Rebar	16 ga.	—
18	27	16	8	#6 Rebar	16 ga.	—
21	30	16	11	#6 Rebar	16 ga.	—
24	36	16	13	#6 Rebar	14 ga.	—
27	42	16	15	#6 Rebar	14 ga.	—
36	54	14	17	#8 Rebar	12 ga.	—
42	60	14	19	#8 Rebar	12 ga.	—
48	72	12	21	1 1/4" pipe or 1 1/4x1 1/4x1/4 angle	10 ga.	—
54	78	12	25	See 48" Riser	10 ga.	—
60	90	12	29	1 1/2" pipe or 1 1/2x1 1/2x1/2 angle	8 ga.	—
66	96	10	33	2" pipe or 2x2x3/16 angle	8 ga. w/stiffener	2x2x1/4 angle
72	102	10	36	———See 66" Riser———		2 1/2x2 1/2x1/4 angle
78	114	10	39	2 1/2" pipe or 2x2x1/4 angle	See 72" Riser	See 72" Riser
84	120	10	42	2 1/2" pipe or 2 1/2x2 1/2x1/4 angle	See 72" Riser	2 1/2x 2 1/2x 5/16 angle

Note: The criteria for sizing the cylinder is that the area between the inside of the cylinder and the outside of the riser is equal to or greater than the area inside the riser. Therefore, the above table is invalid for use with concrete pipe risers.

Figure 5A.30
Riser Base Details



CONSTRUCTION SPECIFICATIONS

1. THE CONCRETE BASE SHALL BE POURED IN SUCH A MANNER TO INSURE THAT THE CONCRETE FILLS THE BOTTOM OF THE RISER TO THE INVERT OF THE OUTLET PIPE TO PREVENT THE RISER FROM BREAKING AWAY FROM THE BASE.
2. WITH ALUMINUM OR ALUMINIZED PIPE, THE EMBEDDED SECTION MUST BE PAINTED WITH CHROMATE OR EQUIVALENT.
3. RISER BASE MAY BE SIZED AS COMPUTED USING FLOATATION WITH A FACTOR OF SAFETY OF 1.2.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	RISER BASE DETAIL SEDIMENT BASIN

Figure 5A.31(1)
Anti-Seep Collar Design

This procedure provides the anti-seep collar dimensions for only temporary sediment basins to increase the seepage length by 15% for various pipe slopes, embankment slopes and riser heights.

The first step in designing anti-seep collars is to determine the length of pipe within the saturated zone of the embankment. This can be done graphically or by the following equation, assuming that the upstream slope of the embankment intersects the invert of the pipe at its upstream end. (See embankment-invert intersection on the drawing below:

$$L_s = y\,(z + 4)\left[1 + \frac{\text{pipe slope}}{0.25 - \text{pipe slope}}\right]$$

Where: L_s = length of pipe in the saturated zone (ft.)

y = distance in feet from upstream invert of pipe to highest normal water level expected to occur during the life of the structure, usually the top of the riser.

z = slope of upstream embankment as a ratio of z ft. horizontal to one ft. vertical.

pipe slope = slope of pipe in feet per foot.

This procedure is based on the approximation of the phreatic line as shown in the drawing below:

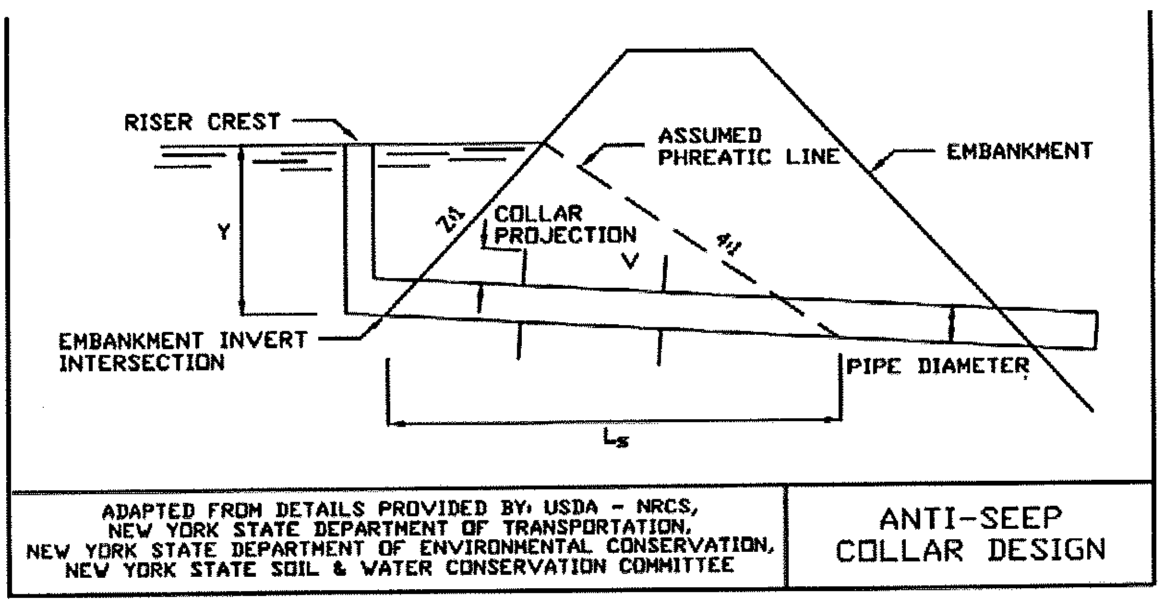


Figure 5A.31(2)
Anti-Seep Collar Design Charts (USDA - NRCS)

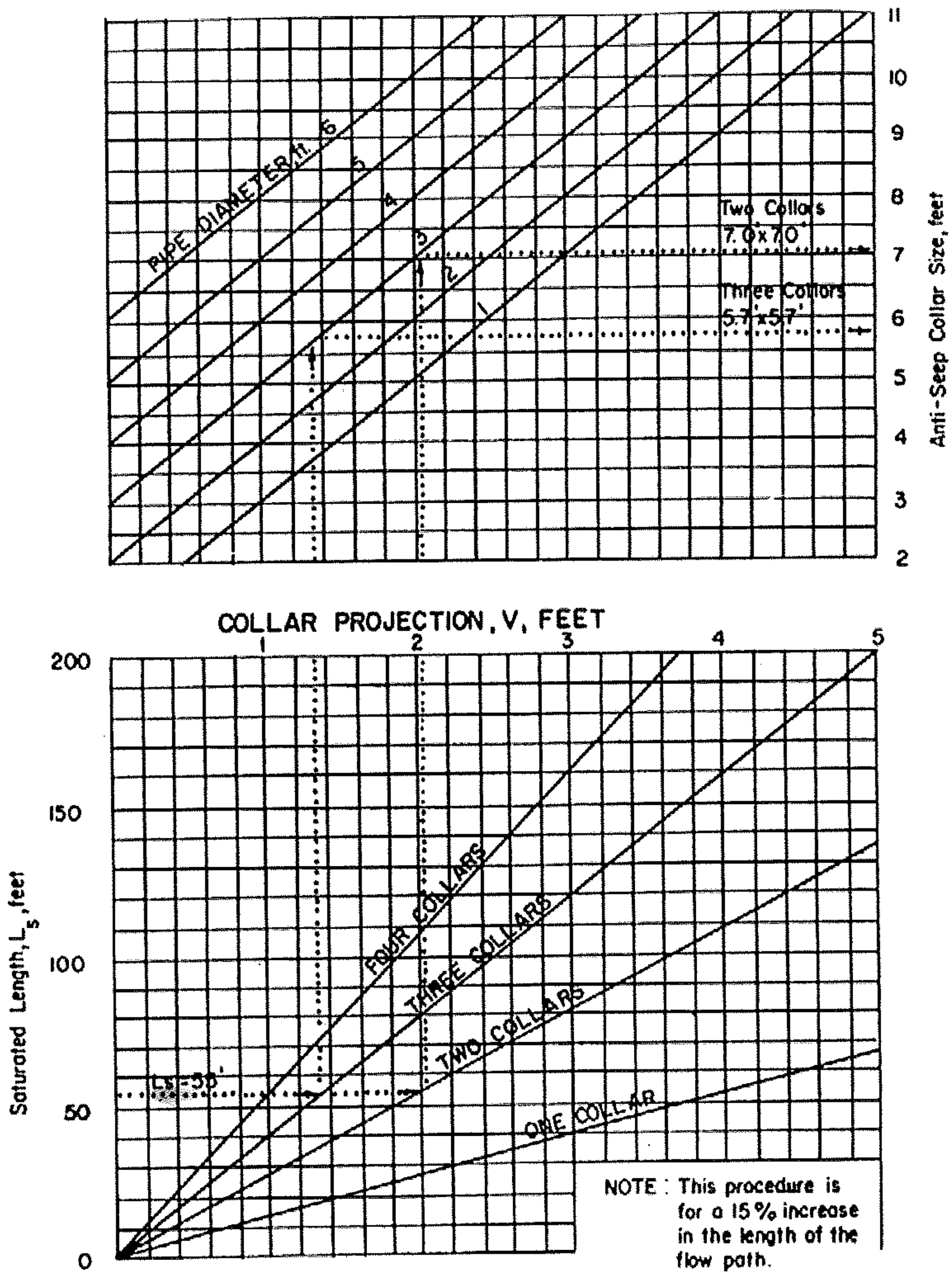


Figure 5A.32
Anti-Seep Collar Design

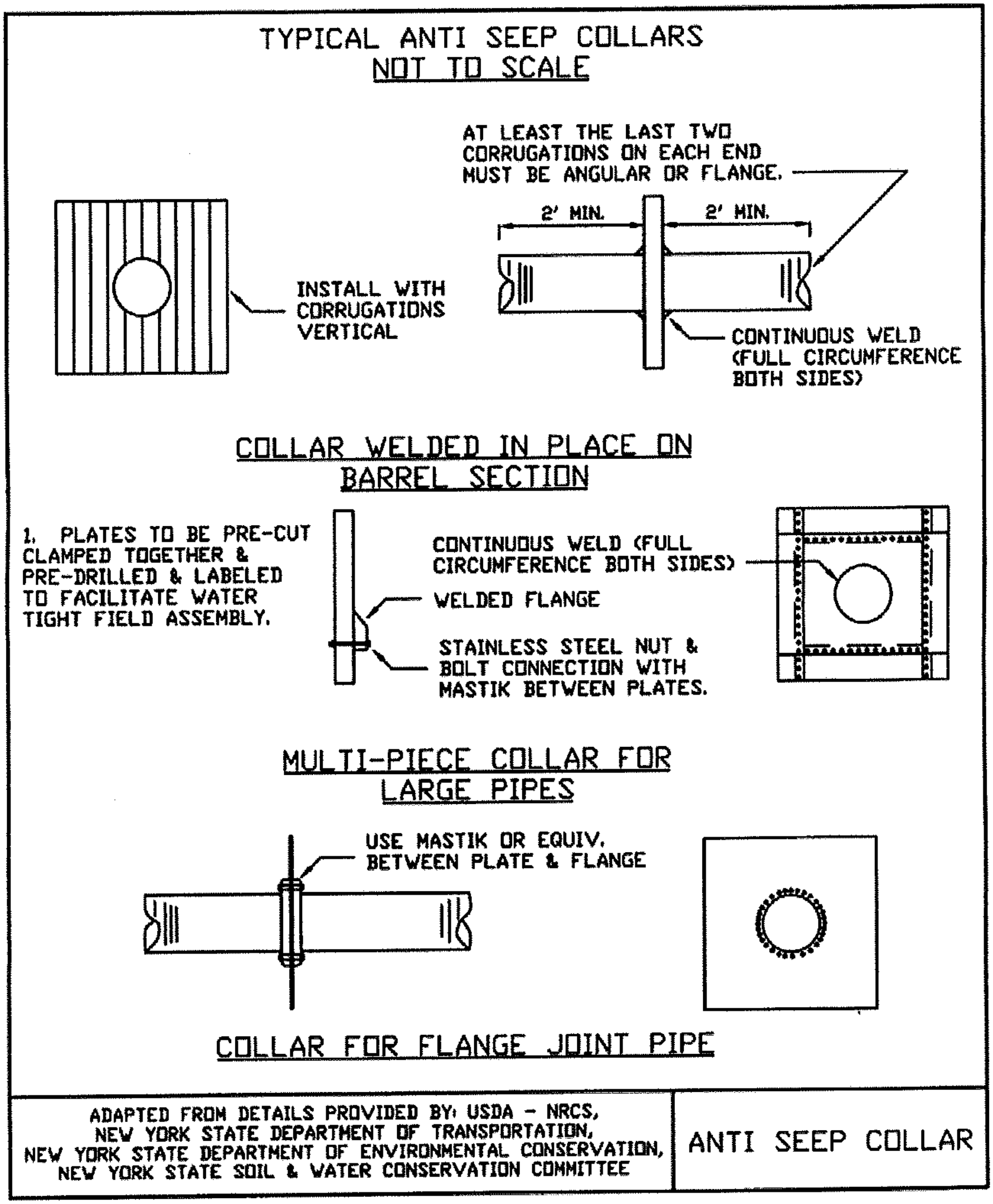
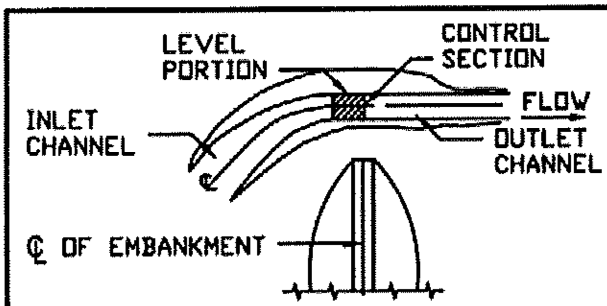
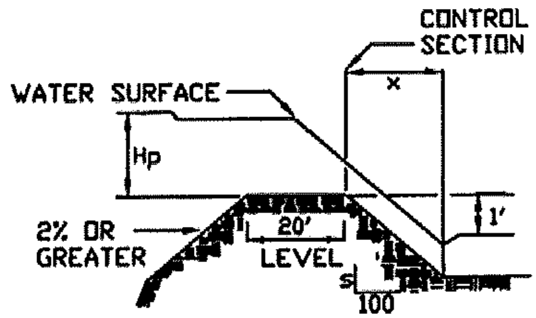


Figure 5A.33(1)
Design Data for Earth Spillways



PLAN OF EARTH SPILLWAY

CROSS SECTION OF EARTH SPILLWAY AT CONTROL SECTION



PROFILE ALONG CENTERLINE OF EARTH SPILLWAY

LEGEND

n = MANNING'S COEFFICIENT OF ROUGHNESS.

Hp = DIFFERENCE IN ELEVATION BETWEEN CREST OF EARTH SPILLWAY AT THE CONTROL SECTION AND WATER SURFACE IN RESERVOIR, IN FEET.

b = BOTTOM WIDTH OF EARTH SPILLWAY AT THE CONTROL SECTION, IN FEET.

Q = TOTAL DISCHARGE, IN cfs.

V = VELOCITY, IN FEET PER SECOND, THAT WILL EXIST IN CHANNEL BELOW CONTROL SECTION, AT DESIGN Q, IF CONSTRUCTED TO SLOPE (S) THAT IS SHOWN.

S = FLATTEST SLOPE (S), IN %, ALLOWABLE FOR CHANNEL BELOW CONTROL SECTION.

X = MINIMUM LENGTH OF CHANNEL BELOW CONTROL SECTION, IN FEET.

z = SIDE SLOPE RATIO.

NOTES:

1) FOR A GIVEN Hp A DECREASE IN THE EXIT SLOPE FROM S AS GIVEN IN THE TABLE DECREASES SPILLWAY DISCHARGE BUT INCREASING THE EXIT SLOPE FROM S DOES NOT INCREASE DISCHARGE. IF AN EXIT SLOPE (Se) STEEPER THAN S IS USED, THEN VELOCITY (Ve) IN THE EXIT CHANNEL WILL INCREASE ACCORDING TO THE FOLLOWING RELATIONSHIP:

$$Ve = V\left(\frac{Se}{S}\right)^{0.3}$$

2) DATA TO RIGHT OF HEAVY VERTICAL LINES ON DRAWINGS SHOULD BE USED WITH CAUTION, AS THE RESULTING SECTIONS WILL BE EITHER POORLY PROPORTIONED OR HAVE VELOCITIES IN EXCESS OF 6 FT/SEC.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	DESIGN DATA FOR EARTH SPILLWAYS

Figure 5A.33(2)
Design Table for Vegetated Spillways Excavated in Erosion Resistant Soils (side slopes—3 horizontal : 1 vertical)
(USDA - NRCS)

Discharge Q CFS	Slope Range Minimum Percent	Slope Range Maximum Percent	Bottom Width Feet	Stage Feet
15	3.3	12.2	8	.83
	3.5	18.2	12	.69
20	3.1	8.9	8	.97
	3.2	13.0	12	.81
	3.3	17.3	16	.70
25	2.9	7.1	8	1.09
	3.2	9.9	12	.91
	3.3	13.2	16	.79
	3.3	17.2	20	.70
30	2.9	6.0	8	1.20
	3.0	8.2	12	1.01
	3.0	10.7	16	.88
	3.3	13.8	20	.78
35	2.8	5.1	8	1.30
	2.9	6.9	12	1.10
	3.1	9.0	16	.94
	3.1	11.3	20	.85
	3.2	14.1	24	.77
40	2.7	4.5	8	1.40
	2.9	6.0	12	1.18
	2.9	7.6	16	1.03
	3.1	9.7	20	.91
	3.1	11.9	24	.83
45	2.6	4.1	8	1.49
	2.8	5.3	12	1.25
	2.9	6.7	16	1.09
	3.0	8.4	20	.98
	3.0	10.4	24	.89
50	2.7	3.7	8	1.57
	2.8	4.7	12	1.33
	2.8	6.0	16	1.16
	2.9	7.3	20	1.03
	3.1	9.0	24	.94
60	2.6	3.1	8	1.73
	2.7	3.9	12	1.47
	2.7	4.8	16	1.28
	2.9	5.9	20	1.15
	2.9	7.3	24	1.05
	3.0	8.6	28	.97
70	2.5	2.8	8	1.88
	2.6	3.3	12	1.60
	2.6	4.1	16	1.40
	2.7	5.0	20	1.26
	2.8	6.1	24	1.15
	2.9	7.0	28	1.05
80	2.5	2.9	12	1.72
	2.6	3.6	16	1.51
	2.7	4.3	20	1.35
80	2.8	5.2	24	1.24
	2.8	5.9	28	1.14
	2.9	7.0	32	1.06
90	2.5	2.6	12	1.84
	2.5	3.1	16	1.61
	2.6	3.8	20	1.45
	2.7	4.5	24	1.32
	2.8	5.3	28	1.22
	2.8	6.1	32	1.14
100	2.5	2.8	16	1.71
	2.6	3.3	20	1.54
	2.6	4.0	24	1.41
	2.7	4.8	28	1.30
	2.7	5.3	32	1.21
	2.8	6.1	36	1.13
120	2.5	2.8	20	1.71
	2.6	3.2	24	1.56
	2.7	3.8	28	1.44
	2.7	4.2	32	1.34
	2.7	4.8	36	1.26
140	2.5	2.7	24	1.71
	2.5	3.2	28	1.58
	2.6	3.6	32	1.47
	2.6	4.0	36	1.38
	2.7	4.5	40	1.30
160	2.5	2.7	28	1.70
	2.5	3.1	32	1.58
	2.6	3.4	36	1.49
	2.6	3.8	40	1.40
	2.7	4.3	44	1.33
180	2.4	2.7	32	1.72
	2.4	3.0	36	1.60
	2.5	3.4	40	1.51
	2.6	3.7	44	1.43
200	2.5	2.7	36	1.70
	2.5	2.9	40	1.60
	2.5	3.3	44	1.52
	2.6	3.6	48	1.45
220	2.4	2.6	40	1.70
	2.5	2.9	44	1.61
	2.5	3.2	48	1.53
240	2.5	2.6	44	1.70
	2.5	2.9	48	1.62
	2.6	3.2	52	1.54
260	2.4	2.6	48	1.70
	2.5	2.9	52	1.62
280	2.4	2.6	52	1.70
300	2.5	2.6	56	1.69

Figure 5A.33(3)
Design Table for Vegetated Spillways Excavated in Very Erodible Soils (side slopes—3 horizontal : 1 vertical)
(USDA - NRCS)

Discharge Q CFS	Slope Range Minimum Percent	Slope Range Maximum Percent	Bottom Width Feet	Stage Feet
10	3.5	4.7	8	.68
15	3.4	4.4	12	.69
	3.4	5.9	16	.60
20	3.3	3.3	12	.80
	3.3	4.1	16	.70
	3.5	5.3	20	.62
25	3.3	3.3	16	.79
	3.3	4.0	20	.70
	3.5	4.9	24	.64
30	3.3	3.3	20	.78
	3.3	4.0	24	.71
	3.4	4.7	28	.65
	3.4	5.5	32	.61
35	3.2	3.2	24	.77
	3.3	3.9	28	.71
	3.5	4.6	32	.66
	3.5	5.2	36	.62
40	3.3	3.3	28	.76
	3.4	3.8	32	.71
	3.4	4.4	36	.67
	3.4	5.0	40	.64
45	3.3	3.3	32	.76
	3.4	3.8	36	.71
	3.4	4.3	40	.67
	3.4	4.8	44	.64
50	3.3	3.3	36	.75
	3.3	3.8	40	.71
	3.3	4.3	44	.68
60	3.2	3.2	44	.75
	3.2	3.7	48	.72
70	3.3	3.3	52	.75
80	3.1	3.1	56	.78

Procedure for Determining or Altering Sediment Basin Shape

As specified in the Standard and Specification, the pool area at the elevation of the crest of the principal spillway shall have a length to width ratio of at least 2.0 to 1. The purpose of this requirement is to minimize the "short circuiting" effect of the sediment laden inflow to the riser and thereby increase the effectiveness of the sediment basin. The purpose of this procedure is to prescribe the parameters, procedures, and methods of determining and modifying the shape of the basin.

The length of the flow path (L) is the distance from the point of inflow to the riser (outflow point). The point of inflow is the point that the stream enters the normal pool (pool level at the riser crest elevation). The pool area (A) is the area of the normal pool. The effective width (W_e) is found by the equation:

$$W_e = A/L \text{ and L:W ratio} = L/W_e$$

In the event there is more than one inflow point, any inflow point that conveys more than 30 percent of the total peak inflow rate shall meet the length to width ratio criteria.

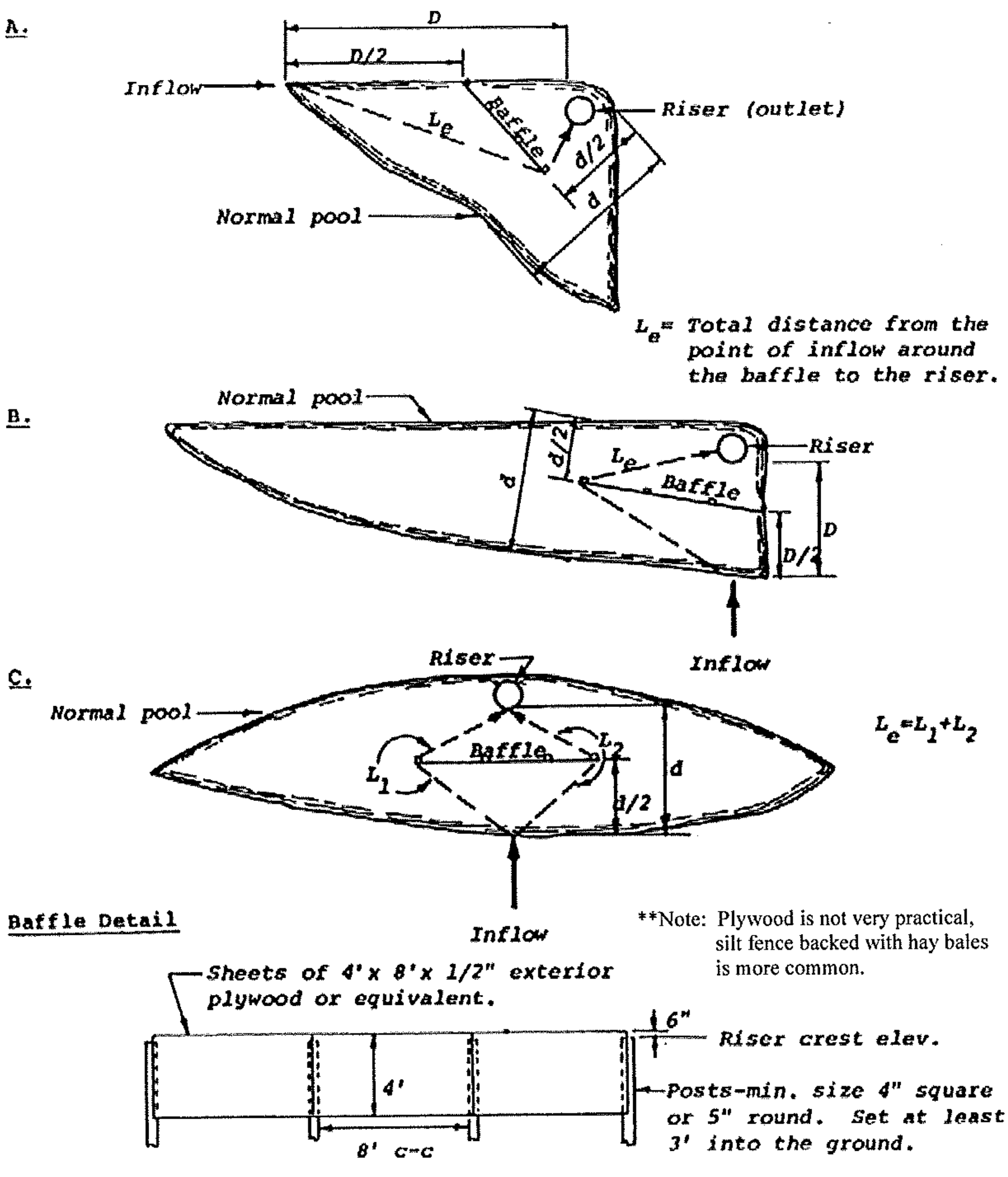
The required basin shape may be obtained by proper site selection by excavation or by constructing a baffle in the basin. The purpose of the baffle is to increase the effective flow length from the inflow point to the riser. Baffles (see Figure 5A.34 on following page) shall be placed midway between the inflow point around the end of the baffle to the outflow point. Then:

$$W_e = A/L_e \text{ and L:W ratio} = L_e/W_e$$

Three examples are shown on the following page. Note that for the special case in example C the water is allowed to go around both ends of the baffle and the effective length, $L_e = L_1 + L_2$. Otherwise, the length to width ratio computations are the same as shown above. This special case procedure for computing L_e is allowable only when the two flow paths are equal, i.e., when $L_1 = L_2$. A baffle detail is also shown in Figure 5A.37 on page 5A.72.

Figure 5A.34
Sediment Basin Baffle Details (USDA - NRCS)

Examples: Plan Views - not to scale



**Note: Plywood is not very practical, silt fence backed with hay bales is more common.

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ENTRANCE

Definition

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area.

Purpose

The purpose of stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction entrance shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 5A.35 on page 5A.76 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile

The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Brust Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 modified
Equivalent Opening Size	40-80	40-80	US Std Sieve CW-02215
Aggregate Depth	6	10	--

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

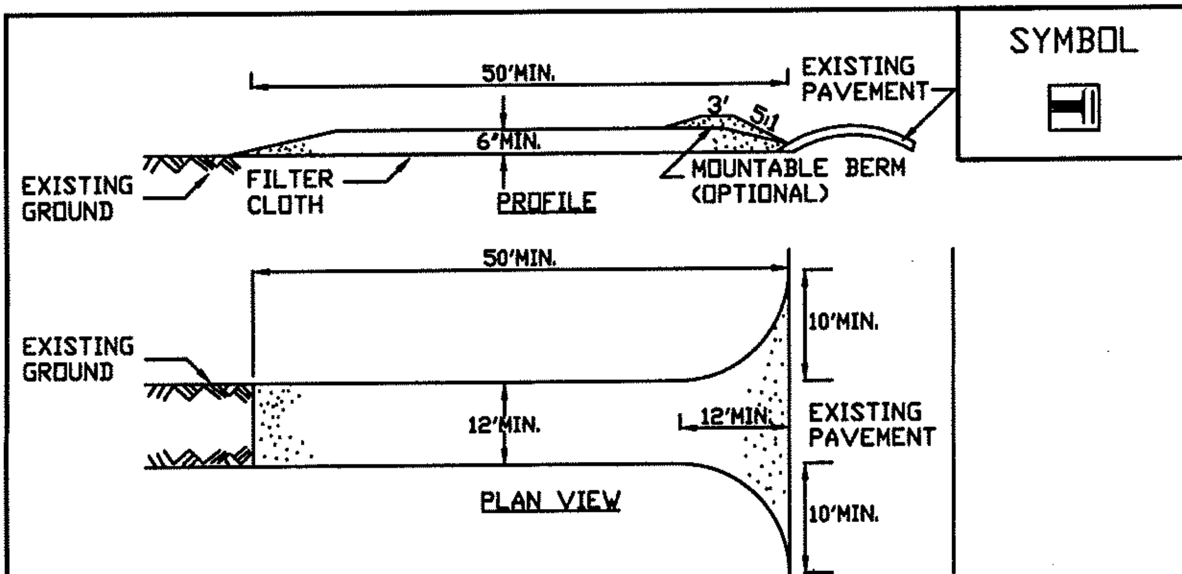
[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 5A.35
Stabilized Construction Entrance



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACTED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STABILIZED CONSTRUCTION ENTRANCE

Outlets
Each diversion must have an adequate outlet. The outlet may be a grassed waterway, vegetated or paved area, grade stabilization structure, stable watercourse, or subsurface drain outlet. In all cases, the outlet must convey runoff to a point where outflow will not cause damage. Vegetated outlets shall be installed before diversion construction, if needed, to ensure establishment of vegetative cover in the outlet channel.

The design elevation of the water surface in the diversion shall not be lower than the design elevation of the water surface in the outlet at their junction when both are operating at design flow.

Stabilization

Diversions shall be stabilized in accordance with the following tables.

Construction Specifications

See Figure 5B.1 on page 5B.3 for details.

Table 5B.1
Diversion Maximum Permissible Design Velocities

Soil Texture	Retardance and Cover	Permissible Velocity (ft / second) for Selected Channel Vegetation
Sand, Silt, Sandy loam, silty loam, loamy sand (ML, SM, SP, SW)	C-Kentucky 31 tall fescue and Kentucky bluegrass	3.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	2.5
Silty clay loam, Sandy clay loam (ML-CL, SC)	C-Kentucky 31 tall fescue and Kentucky bluegrass	4.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	3.5
Clay (CL)	C-Kentucky 31 tall fescue and Kentucky bluegrass	5.0
	D-Annuals[1] Small grain (rye, oats, barley, millet) Ryegrass	4.0

[1] Annuals—Use only as temporary protection until permanent vegetation is established.

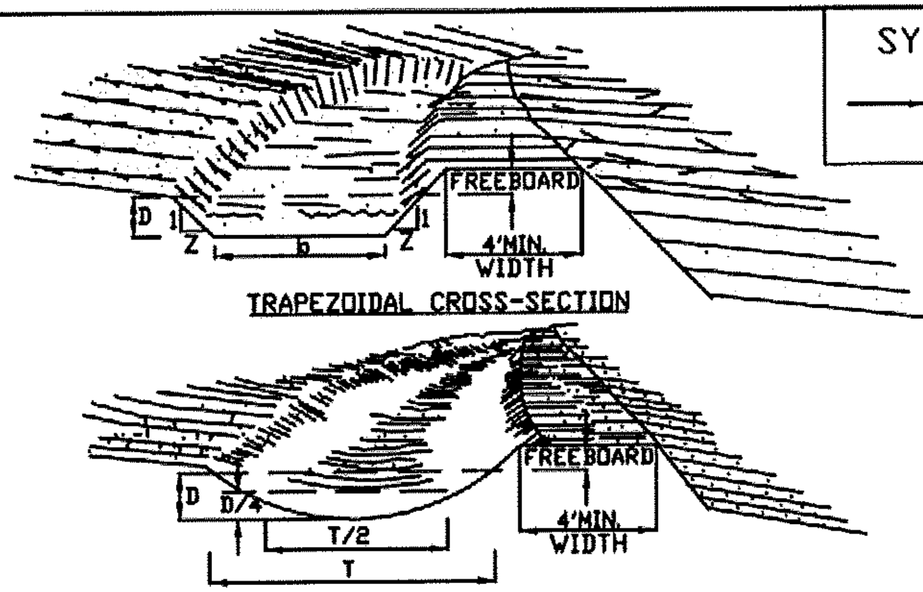
Table 5B.2—Retardance Factors for Various Grasses and Legumes

Retardance	Cover	Condition
A	Reed canarygrass	Excellent stand, tall (average 36 inches)
B	Smooth bromegrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue	Good stand, unmowed (average 18 inches)
	Grass-legume mixture—Timothy, smooth bromegrass, or Orchard grass with birdsfoot trefoil	Good stand, uncut (average 20 inches)
	Reed canarygrass	Good stand, mowed (average 12 to 15 inches)
	Tall fescue, with birdsfoot trefoil or ladino clover	Good stand, uncut (average 18 inches)
C	Redtop	Good stand, headed (15 to 20 inches)
	Grass-legume mixture—summer (Orchard grass, redtop, Annual ryegrass, and ladino or white clover)	Good stand, uncut (6 to 8 inches)
	Kentucky bluegrass	Good stand, headed (6 to 12 inches)
D	Red fescue	Good stand, headed (12 to 18 inches)
	Grass-legume mixture—fall, spring (Orchard grass, redtop, Annual ryegrass, and white or ladino clover)	Good stand, uncut (4 to 5 inches)

Figure 5B.1
Diversion

SYMBOL

—— D ——



CONSTRUCTION SPECIFICATIONS

1. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE DIVERSION.
2. THE DIVERSION SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS SECTION AS REQUIRED TO MEET THE CRITERIA SPECIFIED HEREIN, AND BE FREE OF BANK PROJECTIONS OR OTHER IRREGULARITIES WHICH WILL IMPEDE NORMAL FLOW.
3. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETE DIVERSION.
4. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE DIVERSION.
5. STABILIZATION SHALL BE DONE ACCORDING TO THE APPROPRIATE STANDARD AND SPECIFICATIONS FOR VEGETATIVE PRACTICES.
   A. FOR DESIGN VELOCITIES OF LESS THAN 3.5 FT. PER. SEC., SEEDING AND MULCHING MAY BE USED FOR THE ESTABLISHMENT OF THE VEGETATION. IT IS RECOMMENDED THAT, WHEN CONDITIONS PERMIT, TEMPORARY DIVERSIONS OR OTHER MEANS SHOULD BE USED TO PREVENT WATER FROM ENTERING THE DIVERSION DURING THE ESTABLISHMENT OF THE VEGETATION.
   B. FOR DESIGN VELOCITIES OF MORE THAN 3.5 FT. PER. SEC., THE DIVERSION SHALL BE STABILIZED WITH SOD, WITH SEEDING PROTECTED BY JUTE OR EXCELSIOR MATTING OR WITH SEEDING AND MULCHING INCLUDING TEMPORARY DIVERSION OF THE WATER UNTIL THE VEGETATION IS ESTABLISHED.

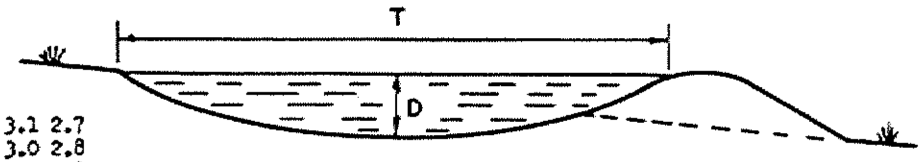
ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	DIVERSION

Figure 5B.2
Parabolic Diversion Design, Without Freeboard-1 (USDA - NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD	RETARDANCE - D & C GRADE, % - 0.25

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15																											
20																											
25	10	2.4	1.6																								
30	11	2.3	1.7																								
35	13	2.3	1.7																								
40	15	2.3	1.8	10	2.7	2.1																					
45	17	2.2	1.8	12	2.6	2.2																					
50	19	2.2	1.8	13	2.6	2.2																					
55	20	2.2	1.8	14	2.6	2.3																					
60	22	2.2	1.8	15	2.5	2.3																					
65	24	2.2	1.8	17	2.5	2.3																					
70	26	2.2	1.9	18	2.5	2.3	13	3.1	2.7																		
75	28	2.2	1.9	19	2.5	2.4	13	3.0	2.8																		
80	29	2.2	1.9	20	2.5	2.4	14	3.0	2.8																		
90	33	2.2	1.9	23	2.5	2.4	16	3.0	2.8																		
100	37	2.2	1.9	25	2.5	2.4	18	3.0	2.9																		
110	40	2.2	1.9	28	2.5	2.4	19	2.9	2.9																		
120	44	2.2	1.9	30	2.5	2.4	21	2.9	2.9	15	3.6	3.3															
130	48	2.2	1.9	33	2.5	2.4	23	2.9	2.9	16	3.6	3.3															
140	51	2.2	1.9	35	2.5	2.4	25	2.9	2.9	18	3.5	3.4															
150	55	2.2	1.9	37	2.5	2.4	26	2.9	2.9	19	3.5	3.4															
160	58	2.2	1.9	40	2.5	2.4	28	2.9	3.0	20	3.5	3.4															
170	62	2.2	1.9	42	2.5	2.4	30	2.9	3.0	21	3.5	3.4	17	4.0	3.8												
180	66	2.2	1.9	45	2.5	2.4	31	2.9	3.0	22	3.5	3.5	18	4.0	3.8												
190	69	2.2	1.9	47	2.5	2.4	33	2.9	3.0	24	3.5	3.5	19	4.0	3.9												
200	73	2.2	1.9	50	2.5	2.4	35	2.9	3.0	25	3.4	3.5	19	3.9	3.9												
220	80	2.2	1.9	55	2.5	2.4	38	2.9	3.0	27	3.4	3.5	21	3.9	3.9												
240	87	2.2	1.9	60	2.5	2.5	42	2.9	3.0	30	3.4	3.6	23	3.9	4.0												
260	95	2.2	1.9	65	2.5	2.4	45	2.9	3.0	32	3.4	3.5	25	3.9	4.0	20	4.6	4.3									
280				69	2.5	2.5	49	2.9	3.0	35	3.4	3.6	27	3.9	4.0	21	4.6	4.3									
300				74	2.5	2.5	52	2.9	3.0	37	3.4	3.6	29	3.8	4.1	22	4.5	4.4									



T = Top width, Retardance "C"
D = Flow depth, Retardance "C"
V_1 = Permissible velocity, Retardance "D"
V_2 = Velocity, Retardance "C"

T and D are the dimensions required to carry the design flow. Add freeboard and allowance for settlement as necessary.

Figure 5B.3
Parabolic Diversion Design, Without Freeboard-2 (USDA - NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD — RETARDANCE - D & C; GRADE, % - 0.50

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	9	1.6	1.6																								
20	11	1.6	1.7																								
25	14	1.6	1.7	9	1.9	2.1																					
30	17	1.6	1.7	11	1.9	2.2	8	2.2	2.5																		
35	20	1.6	1.7	12	1.9	2.3	9	2.1	2.6																		
40	22	1.6	1.7	14	1.8	2.3	11	2.1	2.7																		
45	25	1.5	1.7	16	1.8	2.3	12	2.0	2.8																		
50	28	1.5	1.7	18	1.8	2.4	13	2.0	2.8	10	2.4	3.2															
55	31	1.5	1.7	19	1.8	2.4	15	2.0	2.8	11	2.4	3.3															
60	33	1.5	1.7	21	1.8	2.4	16	2.0	2.8	11	2.4	3.3															
65	36	1.5	1.8	23	1.8	2.4	17	2.0	2.9	12	2.4	3.3															
70	39	1.5	1.7	24	1.8	2.4	18	2.0	2.9	13	2.3	3.4															
75	42	1.5	1.8	26	1.8	2.4	19	2.0	2.9	14	2.3	3.4	11	2.7	3.7												
80	44	1.5	1.8	28	1.8	2.4	21	2.0	2.9	15	2.3	3.4	12	2.7	3.8												
90	50	1.5	1.8	31	1.8	2.4	24	2.0	2.9	17	2.3	3.4	13	2.7	3.8												
100	55	1.5	1.8	35	1.8	2.4	26	2.0	2.9	19	2.3	3.5	15	2.6	3.9	12	3.0	4.1									
110	61	1.5	1.8	38	1.8	2.4	29	2.0	2.9	21	2.3	3.5	16	2.6	3.9	13	3.0	4.2									
120	66	1.5	1.8	42	1.8	2.4	31	2.0	2.9	22	2.3	3.5	18	2.6	3.9	14	2.9	4.3									
130	72	1.5	1.8	45	1.8	2.4	34	2.0	2.9	24	2.3	3.5	19	2.6	4.0	15	2.9	4.4									
140	77	1.5	1.8	48	1.8	2.4	36	2.0	2.9	26	2.3	3.5	20	2.6	4.0	16	2.9	4.3									
150	83	1.5	1.8	52	1.8	2.4	39	2.0	2.9	28	2.3	3.5	22	2.6	4.0	18	2.9	4.4	14	3.3	4.8						
160	88	1.5	1.8	55	1.8	2.4	41	2.0	2.9	30	2.3	3.5	23	2.6	4.0	19	2.9	4.4	15	3.3	4.8						
170	93	1.5	1.8	59	1.8	2.4	44	2.0	2.9	32	2.3	3.6	25	2.6	4.0	20	2.9	4.4	16	3.3	4.9						
180	99	1.5	1.8	62	1.8	2.4	47	2.0	2.9	33	2.3	3.6	26	2.6	4.0	21	2.9	4.5	17	3.3	4.9						
190				65	1.8	2.4	49	2.0	2.9	35	2.3	3.6	28	2.6	4.0	22	2.9	4.5	18	3.3	5.0						
200				69	1.8	2.4	52	2.0	2.9	37	2.3	3.6	29	2.6	4.0	23	2.9	4.5	18	3.3	5.0	15	3.7	5.2			
220				76	1.8	2.4	57	2.0	2.9	41	2.3	3.6	32	2.6	4.0	25	2.9	4.5	20	3.2	5.0	17	3.7	5.4			
240				82	1.8	2.5	62	2.0	2.9	44	2.3	3.6	45	2.5	4.1	28	2.9	4.5	22	3.2	5.0	18	3.7	5.4			
260				89	1.8	2.5	67	2.0	2.9	48	2.3	3.6	38	2.6	4.1	30	2.9	4.5	24	3.2	5.1	20	3.5	5.4			
280				96	1.8	2.5	72	2.0	3.0	52	2.3	3.6	40	2.5	4.1	32	2.8	4.6	26	3.2	5.1	21	3.6	5.5	18	4.1	5.8
300							77	2.0	3.0	55	2.3	3.6	43	2.5	4.1	35	2.8	4.6	27	3.2	5.2	23	3.6	5.5	19	4.1	5.8

Figure 5B.4
Parabolic Diversion Design, Without Freeboard-3 (USDA - NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD	RETARDANCE - D & C GRADE, % - 0.75

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	12	1.3	1.5	7	1.6	2.0																					
20	16	1.3	1.5	9	1.5	2.2																					
25	19	1.3	1.5	11	1.5	2.2	8	1.7	2.6																		
30	23	1.3	1.5	13	1.5	2.2	10	1.7	2.7	8	1.9	3.0															
35	27	1.3	1.5	15	1.5	2.3	11	1.7	2.7	9	1.9	3.1															
40	31	1.3	1.5	18	1.5	2.3	13	1.7	2.8	10	1.9	3.2															
45	35	1.3	1.6	20	1.5	2.3	14	1.7	2.8	11	1.8	3.2															
50	38	1.3	1.6	22	1.5	2.3	16	1.6	2.9	13	1.8	3.3	9	2.2	3.7												
55	42	1.3	1.6	24	1.5	2.3	18	1.6	2.9	14	1.8	3.3	10	2.1	3.8												
60	46	1.3	1.6	26	1.5	2.3	19	1.6	2.8	15	1.8	3.3	11	2.1	3.9												
65	50	1.3	1.6	28	1.5	2.3	21	1.6	2.9	16	1.8	3.3	12	2.1	3.8	10	2.4	4.1									
70	53	1.3	1.5	30	1.5	2.3	22	1.6	2.9	17	1.8	3.3	13	2.1	3.8	11	2.4	4.2									
75	57	1.3	1.5	33	1.5	2.3	24	1.6	2.9	19	1.8	3.3	14	2.1	4.0	11	2.3	4.2									
80	61	1.3	1.6	35	1.5	2.3	25	1.6	2.9	20	1.8	3.4	15	2.1	4.0	12	2.3	4.3									
90	68	1.3	1.6	39	1.5	2.3	28	1.6	2.9	22	1.8	3.4	16	2.1	4.0	13	2.3	4.4	11	2.6	4.6						
100	76	1.3	1.6	43	1.5	2.3	32	1.6	2.9	25	1.8	3.4	18	2.1	4.0	15	2.3	4.4	12	2.6	4.8						
110	83	1.3	1.6	48	1.5	2.3	35	1.6	2.9	27	1.8	3.4	20	2.0	4.0	16	2.3	4.5	13	2.6	4.8						
120	91	1.3	1.6	52	1.5	2.3	38	1.6	2.9	30	1.8	3.4	22	2.1	4.0	18	2.3	4.4	15	2.5	4.8	12	2.8	5.2			
130	98	1.3	1.6	56	1.5	2.4	41	1.6	2.9	32	1.8	3.4	23	2.1	4.0	19	2.2	4.5	16	2.5	4.9	13	2.8	5.3			
140				60	1.5	2.4	44	1.6	2.9	34	1.8	3.4	25	2.0	4.1	21	2.3	4.5	17	2.5	4.9	14	2.8	5.3			
150				65	1.5	2.4	47	1.6	2.9	37	1.8	3.4	27	2.0	4.1	22	2.2	4.5	18	2.5	4.9	15	2.8	5.3	13	3.1	5.8
160				69	1.5	2.4	50	1.6	2.9	39	1.8	3.4	29	2.0	4.1	24	2.2	4.5	19	2.5	4.9	16	2.8	5.4	14	3.1	5.8
170				73	1.5	2.4	53	1.6	2.9	42	1.8	3.4	30	2.0	4.1	25	2.2	4.5	20	2.5	5.0	17	2.8	5.4	15	3.1	5.9
180				77	1.5	2.4	56	1.6	2.9	44	1.8	3.4	32	2.0	4.1	27	2.2	4.5	22	2.5	5.0	18	2.8	5.5	16	3.1	5.9
190				82	1.5	2.4	60	1.6	2.9	47	1.8	3.4	34	2.0	4.1	28	2.2	4.6	23	2.5	5.0	19	2.8	5.5	16	3.1	5.9
200				86	1.5	2.4	63	1.6	3.0	49	1.8	3.4	36	2.0	4.1	29	2.2	4.5	24	2.5	5.0	20	2.7	5.5	18	3.1	5.9
220				94	1.5	2.4	69	1.6	3.0	54	1.8	3.4	39	2.0	4.1	32	2.2	4.6	26	2.5	5.1	22	2.7	5.5	19	3.1	6.0
240							75	1.6	3.0	59	1.8	3.4	43	2.0	4.1	35	2.2	4.6	29	2.5	5.0	24	2.7	5.6	21	3.1	6.1
260							81	1.6	3.0	64	1.8	3.4	46	2.0	4.1	38	2.2	4.6	31	2.5	5.1	26	2.7	5.6	23	3.0	6.1
280							87	1.6	3.0	68	1.8	3.4	50	2.0	4.1	41	2.2	4.6	33	2.5	5.1	27	2.7	5.7	24	3.0	6.1
300							93	1.6	3.0	73	1.8	3.5	53	2.0	4.1	44	2.2	4.6	35	2.5	5.1	29	2.7	5.6			

Figure 5B.5
Parabolic Diversion Design, Without Freeboard-4 (USDA - NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD | RETARDANCE - D & C | GRADE, % - 1.0

V_1 based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	13	1.1	1.5	8	1.3	2.0																					
20	18	1.1	1.5	11	1.3	2.1	8	1.5	2.6																		
25	22	1.1	1.5	14	1.3	2.1	9	1.5	2.6	8	1.6	3.0															
30	27	1.1	1.5	17	1.3	2.1	11	1.5	2.7	9	1.6	3.0															
35	31	1.1	1.5	19	1.3	2.2	13	1.5	2.8	11	1.6	3.1	8	1.8	3.6												
40	35	1.1	1.5	22	1.3	2.1	15	1.4	2.8	12	1.5	3.1	9	1.8	3.7												
45	40	1.1	1.5	25	1.3	2.2	17	1.5	2.8	13	1.6	3.2	10	1.8	3.7												
50	44	1.1	1.5	28	1.3	2.7	19	1.4	2.8	15	1.6	3.2	11	1.8	3.7	9	2.0	4.2									
55	48	1.1	1.5	30	1.3	2.2	20	1.4	2.8	16	1.5	3.3	12	1.8	3.8	10	2.0	4.3									
60	53	1.1	1.5	33	1.3	2.2	22	1.4	2.8	18	1.5	3.3	14	1.7	3.8	10	2.0	4.3									
65	57	1.1	1.5	36	1.3	2.2	24	1.4	2.8	19	1.5	3.3	15	1.7	3.8	11	2.0	4.3	9	2.2	4.7						
70	61	1.1	1.5	38	1.3	2.2	26	1.4	2.8	21	1.5	3.3	16	1.7	3.9	12	2.0	4.4	10	2.2	4.7						
75	66	1.1	1.5	41	1.3	2.2	28	1.4	2.9	22	1.5	3.3	17	1.7	3.9	13	2.0	4.5	11	2.2	4.7						
80	70	1.1	1.5	44	1.3	2.2	29	1.4	2.9	24	1.5	3.3	18	1.7	3.9	14	2.0	4.4	11	2.2	4.9						
90	79	1.1	1.5	49	1.3	2.2	33	1.4	2.9	27	1.5	3.3	20	1.7	3.9	15	1.9	4.5	13	2.2	4.9	11	2.4	5.2			
100	87	1.1	1.5	55	1.3	2.2	37	1.4	2.9	29	1.5	3.3	22	1.7	3.9	17	1.9	4.5	14	2.2	4.9	12	2.4	5.3			
110	96	1.1	1.5	60	1.3	2.2	40	1.4	2.9	32	1.5	3.3	24	1.7	3.9	19	1.9	4.5	15	2.1	5.0	13	2.4	5.3	11	2.6	5.7
120				65	1.3	2.2	44	1.4	2.9	35	1.5	3.3	27	1.7	4.0	20	1.9	4.6	17	2.1	5.0	14	2.4	5.4	12	2.6	5.7
130				71	1.3	2.2	47	1.4	2.9	38	1.5	3.3	29	1.7	4.0	22	1.9	4.6	18	2.1	5.0	15	2.4	5.4	13	2.6	5.8
140				76	1.3	2.2	51	1.4	2.9	41	1.5	3.3	31	1.7	4.0	24	1.9	4.6	20	2.1	5.0	16	2.3	5.5	14	2.6	5.8
150				81	1.3	2.2	55	1.4	2.9	44	1.5	3.3	33	1.7	4.0	25	1.9	4.6	21	2.1	5.1	17	2.4	5.5	15	2.6	5.8
160				87	1.3	2.2	58	1.4	2.9	47	1.5	3.3	35	1.7	4.0	27	1.9	4.6	22	2.1	5.1	19	2.3	5.5	16	2.5	6.0
170				92	1.3	2.2	62	1.4	2.9	50	1.5	3.3	38	1.7	4.0	29	1.9	4.6	24	2.1	5.1	20	2.3	5.7	17	2.5	5.9
180				97	1.3	2.2	65	1.4	2.9	53	1.5	3.4	40	1.7	4.0	30	1.9	4.6	25	2.1	5.1	21	2.3	5.6	18	2.5	5.9
190							69	1.4	2.9	55	1.5	3.4	42	1.7	4.0	32	1.9	4.6	26	2.1	5.1	22	2.3	5.6	19	2.5	6.0
200							72	1.4	2.9	58	1.5	3.4	44	1.7	4.0	34	1.9	4.7	28	2.1	5.1	23	2.3	5.6	20	2.5	6.0
220							80	1.4	2.9	64	1.5	3.4	48	1.7	4.0	37	1.9	4.6	31	2.1	5.1	25	2.3	5.6	22	2.5	6.1
240							87	1.4	2.9	70	1.5	3.4	53	1.7	4.0	40	1.9	4.7	33	2.1	5.1	28	2.3	5.7	24	2.5	6.1
260							94	1.4	2.9	76	1.5	3.4	57	1.7	4.0	44	1.9	4.7	36	2.1	5.1	30	2.3	5.4	26	2.5	6.1
280										81	1.5	3.4	61	1.7	4.0	47	1.9	4.7	39	2.1	5.1	32	2.3	5.6	28	2.5	6.2
300										87	1.5	3.4	66	1.7	4.0	50	1.9	4.7	42	2.1	5.1	34	2.3	5.7	30	2.5	6.1

Figure 5B.6
Parabolic Diversion Design, Without Freeboard-5 (USDA - NRCS)

PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 1.5

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	17	0.9	1.4	11	1.1	1.9	8	1.2	2.4																		
20	23	0.9	1.4	15	1.0	1.9	10	1.2	2.5	7	1.4	3.0	5	1.5	3.4												
25	28	0.9	1.4	19	1.0	1.9	12	1.2	2.6	8	1.4	3.2	7	1.5	3.6												
30	34	0.9	1.4	22	1.0	1.9	15	1.2	2.6	10	1.3	3.2	8	1.5	3.6	7	1.6	4.0									
35	40	0.9	1.4	26	1.0	2.0	17	1.1	2.6	12	1.3	3.3	10	1.4	3.7	8	1.6	4.1									
40	45	0.9	1.4	30	1.0	1.9	20	1.2	2.6	14	1.3	3.3	11	1.4	3.7	9	1.6	4.2	7	1.8	4.6						
45	51	0.9	1.4	33	1.0	2.0	22	1.1	2.5	15	1.3	3.4	12	1.4	3.8	10	1.5	4.3	8	1.8	4.6						
50	56	0.9	1.4	37	1.0	2.0	25	1.1	2.7	17	1.3	3.4	14	1.4	3.9	11	1.5	4.3	9	1.8	4.8						
55	62	0.9	1.5	41	1.0	2.0	27	1.1	2.6	19	1.3	3.4	15	1.4	3.9	12	1.5	4.3	10	1.7	4.9	8	1.9	5.1			
60	67	0.9	1.5	44	1.0	2.0	30	1.1	2.7	20	1.3	3.4	16	1.4	3.9	14	1.5	4.4	11	1.7	4.9	9	1.9	5.2			
65	73	0.9	1.5	48	1.0	2.0	32	1.1	2.7	22	1.3	3.4	18	1.4	3.9	15	1.5	4.4	11	1.7	5.0	10	1.9	5.3			
70	78	0.9	1.5	51	1.0	2.0	34	1.1	2.7	24	1.3	3.4	19	1.4	3.9	16	1.5	4.4	12	1.7	4.9	10	1.9	5.4	9	2.1	5.6
75	83	0.9	1.5	55	1.0	2.0	37	1.1	2.7	25	1.3	3.4	21	1.4	3.9	17	1.5	4.4	13	1.7	5.0	11	1.9	5.4	9	2.1	5.6
80	89	0.9	1.5	59	1.0	2.0	39	1.1	2.7	27	1.3	3.4	22	1.4	3.9	18	1.5	4.4	14	1.7	5.0	12	1.9	5.5	10	2.1	5.8
90	100	0.9	1.5	66	1.0	2.0	44	1.1	2.7	30	1.3	3.5	25	1.4	3.9	20	1.5	4.4	16	1.7	5.0	13	1.9	5.4	11	2.0	5.9
100				73	1.0	2.0	49	1.1	2.7	33	1.3	3.5	27	1.4	3.9	22	1.5	4.5	17	1.7	5.1	15	1.9	5.5	12	2.0	6.0
110				80	1.0	2.0	54	1.1	2.7	37	1.3	3.5	30	1.4	3.9	25	1.5	4.5	19	1.7	5.1	16	1.8	5.6	14	2.0	6.0
120				87	1.0	2.0	58	1.1	2.7	40	1.3	3.5	33	1.4	4.0	27	1.5	4.5	21	1.7	5.1	18	1.9	5.5	15	2.0	6.0
130				95	1.0	2.0	63	1.1	2.7	43	1.3	3.5	35	1.4	3.9	29	1.5	4.5	22	1.7	5.1	19	1.8	5.6	15	2.0	6.1
140							68	1.1	2.7	47	1.3	3.5	38	1.4	4.0	31	1.5	4.5	24	1.7	5.2	20	1.8	5.5	17	2.0	6.1
150							73	1.1	2.7	50	1.3	3.5	41	1.4	4.0	33	1.5	4.5	26	1.7	5.2	22	1.8	5.6	19	2.0	6.1
160							78	1.1	2.7	53	1.3	3.5	43	1.4	4.0	36	1.5	4.5	27	1.7	5.2	23	1.8	5.6	20	2.0	6.1
170							82	1.1	2.7	56	1.3	3.5	46	1.4	4.0	38	1.5	4.5	29	1.7	5.2	25	1.8	5.6	21	2.0	6.1
180							87	1.1	2.7	60	1.3	3.5	49	1.4	4.0	40	1.5	4.5	31	1.7	5.2	26	1.8	5.7	22	2.0	6.1
190							92	1.1	2.7	63	1.3	3.5	51	1.4	4.0	42	1.5	4.5	33	1.7	5.2	27	1.8	5.7	23	2.0	6.2
200							97	1.1	2.7	66	1.3	3.5	54	1.4	4.0	44	1.5	4.5	34	1.7	5.2	29	1.8	5.6	24	2.0	6.2
220										73	1.3	3.5	59	1.4	4.0	49	1.5	4.5	38	1.7	5.2	32	1.8	5.7	27	2.0	6.2
240										79	1.3	3.5	65	1.4	4.0	53	1.5	4.5	41	1.7	5.2	35	1.8	5.7	29	2.0	6.2
260										86	1.3	3.5	70	1.4	4.0	57	1.5	4.5	44	1.7	5.2	37	1.8	5.7	32	2.0	6.2
280										92	1.3	3.5	75	1.4	4.0	62	1.5	4.5	48	1.7	5.2	40	1.8	5.7	34	2.0	6.2
300										99	1.3	3.5	81	1.4	4.0	66	1.5	4.5	51	1.7	5.2	43	1.8	5.7	36	2.0	6.2

Figure 5B.7
Parabolic Diversion Design, Without Freeboard-6 (USDA - NRCS)

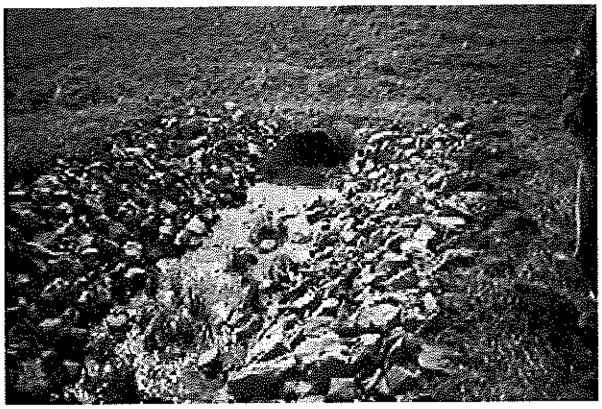
PARABOLIC DIVERSION DESIGN, WITHOUT FREEBOARD

RETARDANCE - D & C
GRADE, % - 2.0

V_1 Based on Permissible Velocity of the Soil With Retardance "D"
Top Width, Depth & V_2 Based on Retardance "C"

Q	V_1 = 2.0			V_1 = 2.5			V_1 = 3.0			V_1 = 3.5			V_1 = 4.0			V_1 = 4.5			V_1 = 5.0			V_1 = 5.5			V_1 = 6.0		
cfs	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2	T	D	V_2
15	21	0.8	1.3	13	0.9	1.9	9	1.0	2.4	7	1.2	2.9															
20	28	0.8	1.3	17	0.9	1.9	12	1.0	2.4	9	1.1	3.0	7	1.3	3.5	5	1.4	3.8									
25	35	0.8	1.3	21	0.9	1.9	15	1.0	2.4	11	1.1	3.0	8	1.3	3.7	7	1.4	4.0									
30	41	0.8	1.3	26	0.9	1.9	18	1.0	2.5	13	1.1	3.0	10	1.2	3.7	8	1.3	4.2	7	1.5	4.5						
35	48	0.8	1.4	30	0.9	1.9	22	1.0	2.4	15	1.1	3.1	11	1.2	3.8	9	1.3	4.2	8	1.5	4.7						
40	55	0.8	1.3	34	0.9	1.9	25	1.0	2.5	18	1.1	3.1	13	1.2	3.8	11	1.3	4.3	9	1.5	4.7	7	1.7	5.0			
45	62	0.8	1.4	38	0.9	1.9	28	1.0	2.5	20	1.1	3.1	14	1.2	3.8	12	1.3	4.3	10	1.4	4.8	8	1.6	5.2			
50	68	0.8	1.4	42	0.9	1.9	31	1.0	2.5	22	1.1	3.1	16	1.2	3.9	13	1.3	4.3	11	1.4	4.8	9	1.6	5.3	8	1.7	5.6
55	75	0.8	1.4	46	0.9	1.9	34	1.0	2.5	24	1.1	3.1	17	1.2	3.8	14	1.3	4.3	12	1.4	4.9	10	1.6	5.3	8	1.7	5.8
60	82	0.8	1.4	51	0.9	1.9	37	1.0	2.5	26	1.1	3.1	19	1.2	3.9	16	1.3	4.4	13	1.4	4.8	11	1.6	5.3	9	1.7	5.7
65	88	0.8	1.4	55	0.9	1.9	40	1.0	2.5	28	1.1	3.1	21	1.2	3.9	17	1.3	4.4	14	1.4	4.9	11	1.6	5.4	10	1.7	5.7
70	95	0.8	1.4	59	0.9	1.9	43	1.0	2.5	30	1.1	3.1	22	1.2	3.9	18	1.3	4.4	15	1.4	4.9	12	1.6	5.4	10	1.7	5.8
75				63	0.9	1.9	46	1.0	2.5	32	1.1	3.2	24	1.2	3.9	20	1.3	4.4	16	1.4	5.0	13	1.6	5.5	11	1.7	5.9
80				67	0.9	2.0	48	1.0	2.5	35	1.1	3.1	25	1.2	3.9	21	1.3	4.4	17	1.4	4.9	14	1.6	5.4	12	1.7	6.0
90				75	0.9	2.0	54	1.0	2.5	39	1.1	3.2	28	1.2	3.9	23	1.3	4.4	19	1.4	4.9	16	1.6	5.5	13	1.7	5.9
100				83	0.9	2.0	60	1.0	2.5	43	1.1	3.2	31	1.2	3.9	26	1.3	4.4	21	1.4	5.0	17	1.6	5.5	15	1.7	6.0
110				92	0.9	2.0	66	1.0	2.5	47	1.1	3.2	34	1.2	3.9	28	1.3	4.4	23	1.4	5.0	19	1.5	5.6	16	1.7	6.0
120				100	0.9	2.0	72	1.0	2.5	52	1.1	3.2	38	1.2	3.9	31	1.3	4.4	26	1.4	5.0	21	1.5	5.6	18	1.7	6.1
130							78	1.0	2.5	56	1.1	3.2	41	1.2	3.9	34	1.3	4.5	28	1.4	5.0	23	1.5	5.6	19	1.7	6.0
140							84	1.0	2.5	60	1.1	3.2	44	1.2	4.0	36	1.3	4.5	30	1.4	5.0	24	1.5	5.6	21	1.7	6.1
150							90	1.0	2.5	64	1.1	3.2	47	1.2	4.0	39	1.3	4.5	32	1.4	5.0	26	1.5	5.6	22	1.7	6.1
160							96	1.0	2.5	69	1.1	3.2	50	1.2	4.0	41	1.3	4.5	34	1.4	5.1	28	1.5	5.6	23	1.7	6.1
170										73	1.1	3.2	53	1.2	4.0	44	1.3	4.5	36	1.4	5.1	29	1.5	5.7	25	1.7	6.1
180										77	1.1	3.2	56	1.2	4.0	46	1.3	4.5	38	1.4	5.0	31	1.5	5.7	26	1.7	6.1
190										81	1.1	3.2	59	1.2	4.0	49	1.3	4.5	40	1.4	5.0	33	1.5	5.7	28	1.7	6.1
200										85	1.1	3.2	62	1.2	4.0	51	1.3	4.5	42	1.4	5.0	34	1.5	5.7	29	1.7	6.2
220										94	1.1	3.2	68	1.2	4.0	56	1.3	4.5	46	1.4	5.1	38	1.5	5.7	32	1.7	6.2
240													74	1.2	4.0	61	1.3	4.5	51	1.4	5.1	41	1.5	5.7	35	1.7	6.2
260													80	1.2	4.0	66	1.3	4.5	55	1.4	5.1	45	1.5	5.7	38	1.7	6.2
280													86	1.2	4.0	71	1.3	4.5	59	1.4	5.1	48	1.5	5.7	41	1.7	6.2
300													92	1.2	4.0	76	1.3	4.5	63	1.4	5.1	51	1.5	5.7	44	1.7	6.2

STANDARD AND SPECIFICATIONS FOR ROCK OUTLET PROTECTION



Definition

A section of rock protection placed at the outlet end of the culverts, conduits, or channels.

Purpose

The purpose of the rock outlet protection is to reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving downstream reach.

Scope

This standard applies to the planning, design, and construction of rock riprap and gabions for protection of downstream areas. It does not apply to rock lining of channels or streams.

Conditions Where Practice Applies

This practice applies where discharge velocities and energies at the outlets of culverts, conduits, or channels are sufficient to erode the next downstream reach. This applies to:

1. Culvert outlets of all types.

2. Pipe conduits from all sediment basins, dry storm water ponds, and permanent type ponds.

3. New channels constructed as outlets for culverts and conduits.

Design Criteria

The design of rock outlet protection depends entirely on the location. Pipe outlet at the top of cuts or on slopes steeper than 10 percent, cannot be protected by rock aprons or riprap sections due to re-concentration of flows and high velocities encountered after the flow leaves the apron.

Many counties and state agencies have regulations and design procedures already established for dimensions, type and size of materials, and locations where outlet protection is required. Where these requirements exist, they shall be followed.

Tailwater Depth

The depth of tailwater immediately below the pipe outlet must be determined for the design capacity of the pipe. If the tailwater depth is less than half the diameter of the outlet pipe, and the receiving stream is wide enough to accept divergence of the flow, it shall be classified as a Minimum Tailwater Condition; see Figure 5B.12 on page 5B.25 as an example. If the tailwater depth is greater than half the pipe diameter and the receiving stream will continue to confine the flow, it shall be classified as a Maximum Tailwater Condition; see Figure 5B.13 on page 5B.26 as an example. Pipes which outlet onto flat areas with no defined channel may be assumed to have a Minimum Tailwater Condition; see Figure 5B.12 on page 5B.25 as an example.

Apron Size

The apron length and width shall be determined from the curves according to the tailwater conditions:

Minimum Tailwater – Use Figure 5B.12 on page 5B.25
Maximum Tailwater – Use Figure 5B.13 on page 5B.26

If the pipe discharges directly into a well defined channel, the apron shall extend across the channel bottom and up the channel banks to an elevation one foot above the maximum tailwater depth or to the top of the bank, whichever is less.

The upstream end of the apron, adjacent to the pipe, shall have a width two (2) times the diameter of the outlet pipe, or conform to pipe end section if used.

Bottom Grade

The outlet protection apron shall be constructed with no slope along its length. There shall be no overfall at the end of the apron. The elevation of the downstream end of the apron shall be equal to the elevation of the receiving channel or adjacent ground.

Alignment

The outlet protection apron shall be located so that there are no bends in the horizontal alignment.

Materials

The outlet protection may be done using rock riprap, grouted riprap, or gabions.

Riprap shall be composed of a well-graded mixture of stone size so that 50 percent of the pieces, by weight, shall be larger than the d_{50} size determined by using the charts. A well-graded mixture, as used herein, is defined as a mixture composed primarily of larger stone sizes, but with a sufficient mixture of other sizes to fill the smaller voids between the stones. The diameter of the largest stone size in such a mixture shall be 1.5 times the d_{50} size.

Thickness

The minimum thickness of the riprap layer shall be 1.5 times the maximum stone diameter for d_{50} of 15 inches or less; and 1.2 times the maximum stone size for d_{50} greater than 15 inches. The following chart lists some examples:

D_{50} (inches)	d_{max} (inches)	Minimum Blanket Thickness (inches)
4	6	9
6	9	14
9	14	20
12	18	27
15	22	32
18	27	32
21	32	38
24	36	43

Stone Quality

Stone for riprap shall consist of field stone or rough unhewn quarry stone. The stone shall be hard and angular and of a quality that will not disintegrate on exposure to water or weathering. The specific gravity of the individual stones shall be at least 2.5.

Recycled concrete equivalent may be used provided it has a density of at least 150 pounds per cubic foot, and does not have any exposed steel or reinforcing bars.

Filter

A filter is a layer of material placed between the riprap and the underlying soil surface to prevent soil movement into and through the riprap. Riprap shall have a filter placed under it in all cases.

A filter can be of two general forms: a gravel layer or a plastic filter cloth. The plastic filter cloth can be woven or non-woven monofilament yarns, and shall meet these base requirements: thickness 20-60 mils, grab strength 90-120 lbs; and shall conform to ASTM D-1777 and ASTM D-1682.

Gravel filter blanket, when used, shall be designed by comparing particle sizes of the overlying material and the base material. Design criteria are available in Standard and Specification for Riprap Slope Protection on page 5B.57.

Gabions

Gabions shall be made of hexagonal triple twist mesh with heavily galvanized steel wire. The maximum linear dimension of the mesh opening shall not exceed 4 ½ inches and the area of the mesh opening shall not exceed 10 square inches.

Gabions shall be fabricated in such a manner that the sides, ends, and lid can be assembled at the construction site into a rectangular basket of the specified sizes. Gabions shall be of single unit construction and shall be installed according to manufacturers recommendations.

The area on which the gabion is to be installed shall be graded as shown on the drawings. Foundation conditions shall be the same as for placing rock riprap, and filter cloth shall be placed under all gabions. Where necessary, key, or tie, the structure into the bank to prevent undermining of the main gabion structure.

Maintenance

Once a riprap outlet has been installed, the maintenance needs are very low. It should be inspected after high flows for evidence of scour beneath the riprap or for dislodged stones. Repairs should be made immediately.

Design Procedure

1. Investigate the downstream channel to assure that nonerosive velocities can be maintained.

2. Determine the tailwater condition at the outlet to establish which curve to use.
3. Enter the appropriate chart with the design discharge to

determine the riprap size and apron length required. It is noted that references to pipe diameters in the charts are based on full flow. For other than full pipe flow, the parameters of depth of flow and velocity must be used to adjust the design discharges.

4. Calculate apron width at the downstream end if a flare section is to be employed.

Examples

Example 1: Pipe Flow (full) with discharge to unconfined section.

Given: A circular conduit flowing full.

Q = 280 cfs, diam. = 66 in., tailwater (surface) is 2 ft. above pipe invert (minimum tailwater condition).

Find: Read d_{50} = 1.2 and apron length (L_a) = 38 ft.

Apron width = diam. + L_a = 5.5 + 38 = 43.5 ft.

Use: d_{50} = 15", d_{max} = 22", blanket thickness = 32"

Example 2: Box Flow (partial) with high tailwater

Given: A box conduit discharging under partial flow conditions. A concrete box 5.5 ft. x 10 ft. flowing 5.0 ft. deep,

Q = 600 cfs and tailwater surface is 5 ft. above invert (max. tailwater condition).

Since this is not full pipe and does not directly fit the nomograph assumptions of Figure 7B.13 substitute depth as the diameter, to find a discharge equal to full pipe flow for that diameter, in this case 60 inches.

Since, Q = AV and $A = \frac{\pi D^2}{4}$

First, compute velocity:

V = (Q/A) = (600/(5) (10)) = 12 fps

Then substituting:

$$Q = \frac{\pi D^2}{4} \times V = \frac{3.14\ (5\ \text{ft})^2}{4} \times 12\ \text{fps} = 236\ \text{cfs}$$

At the intersection of the curve d = 60 in. and Q = 236 cfs, read d_{50} = 0.4 ft.

Then reading the d = 60 in. curve, read apron length (L_a) = 40 ft.

Apron width, W = conduit width + (6.4)(L_a) = 10 + (0.4) (40) = 26 ft.

Example 3: Open Channel Flow with Discharge to Unconfined Section

Given: A trapezoidal concrete channel 5 ft. wide with 2:1 side slopes is flowing 2 ft. deep, Q = 180 cfs (velocity = 10 fps) and the tailwater surface downstream is 0.8 ft. (minimum tailwater condition).

Find: Using similar principles as Example 2, compute equivalent discharge for a 2 foot, using depth as a diameter, circular pipe flowing full at 10 feet per second.

Velocity:

$$Q = \frac{\pi\ (2\text{ft})^2}{4} \times 10\ \text{fps} = 31.4\ \text{cfs}$$

At intersection of the curve, d = 24 in. and Q = 32 cfs, read d_{50} = 0.6 ft.

Then reading the d = 24 in. curve, read apron length (L_a) = 20 ft.

Apron width, W = bottom width of channel + L_a = 5 + 20 = 25 ft.

Example 4: Pipe flow (partial) with discharge to a confined section

Given: A 48 in. pipe is discharging with a depth of 3 ft. Q = 100 cfs, and discharge velocity of 10 fps (established from partial flow analysis) to a confined trapezoidal channel with a 2 ft. bottom, 2:1 side slopes, n = .04, and grade of 0.6%.

Calculation of the downstream channel (by Manning's Equation) indicates a normal depth of 3.1 ft. and normal velocity of 3.9 fps.

Since the receiving channel is confined, the maximum tailwater condition controls.

Find: discharge using previous principles:

$$Q = \frac{\pi\ (3\text{ft})^2}{4} \times 10\ \text{fps} = 71\ \text{cfs}$$

At the intersection of d = 36 in. and Q = 71 cfs, read d_{50} = 0.3 ft.

Reading the d = 36" curve, read apron length (L_a) = 30 ft.

Since the maximum flow depth in this reach is 3.1 ft., that is the minimum depth of riprap to be maintained for the entire length.

Construction Specifications

1. The subgrade for the filter, riprap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of approximately that of the surrounding undisturbed material.

2. The rock or gravel shall conform to the specified grading limits when installed respectively in the riprap or filter.

3. Filter cloth shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of cloth over the damaged part or by completely replacing the cloth. All overlaps, whether for repairs or for joining two pieces of cloth shall be a minimum of one foot.

4. Stone for the riprap or gabion outlets may be placed by equipment. Both shall each be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for riprap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogenous with the smaller stones and spalls filling the voids between the larger stones. Riprap shall be placed in a manner to prevent damage to the filter blanket or filter cloth. Hand placement will be required to the extent necessary to prevent damage to the permanent works.

Figure 5B.12
Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)

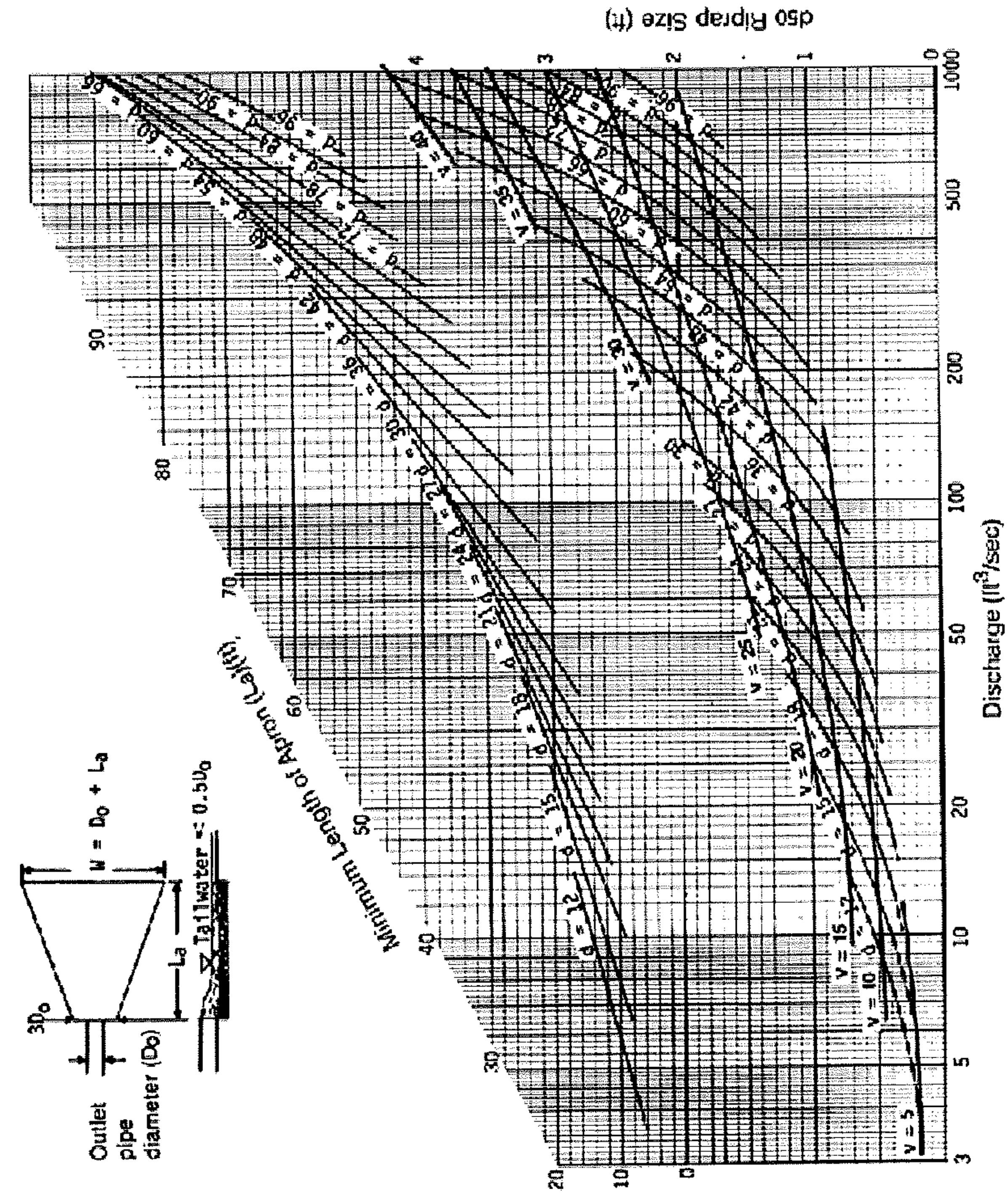


Figure 5B.13
Outlet Protection Design—Maximum Tailwater Condition
(Design of Outlet Protection from a Round Pipe Flowing Full, Maximum Tailwater Condition: $T_w \geq 0.5D_o$) (USDA - NRCS)

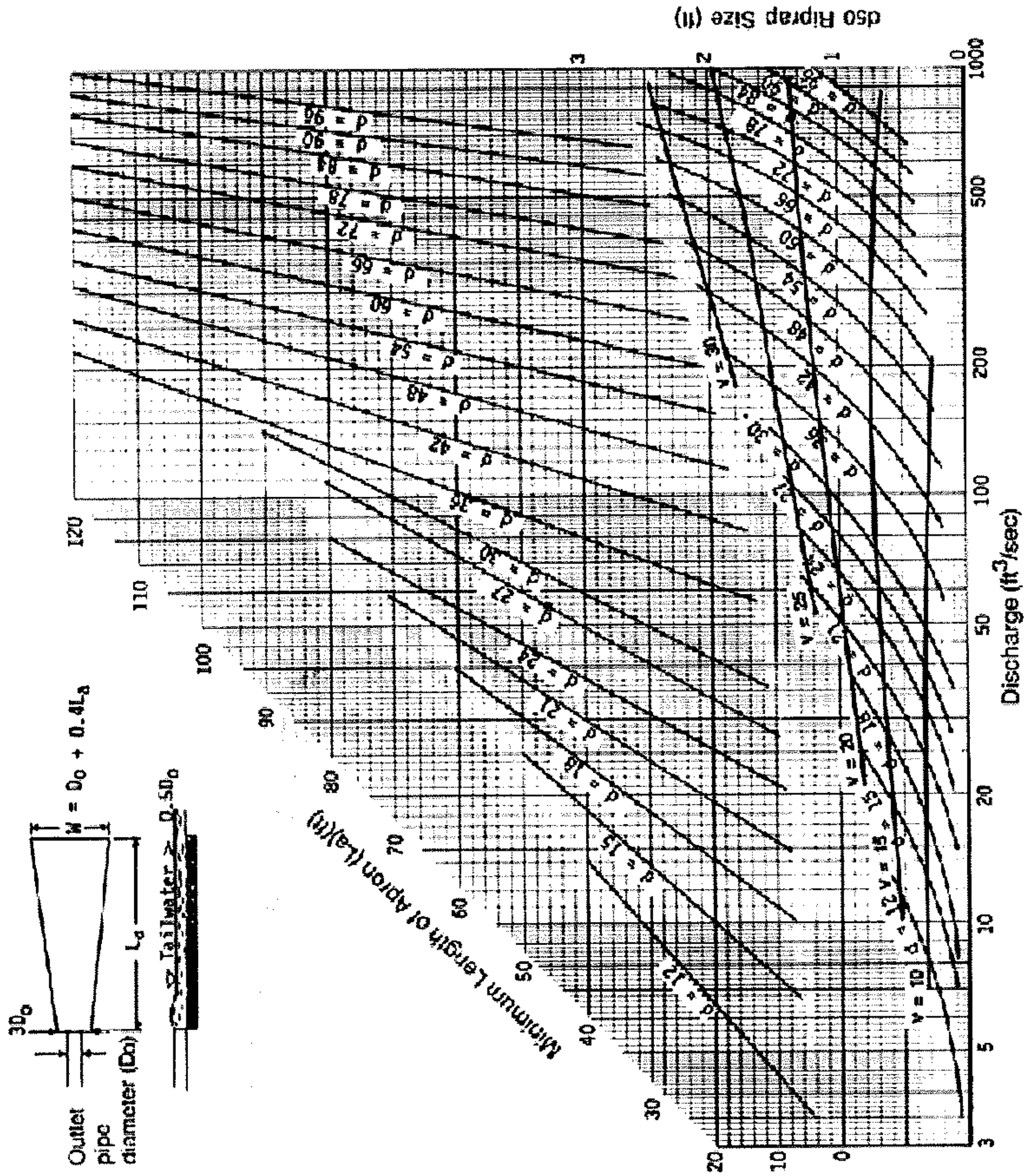


Figure 5B.14
Riprap Outlet Protection Detail (1)

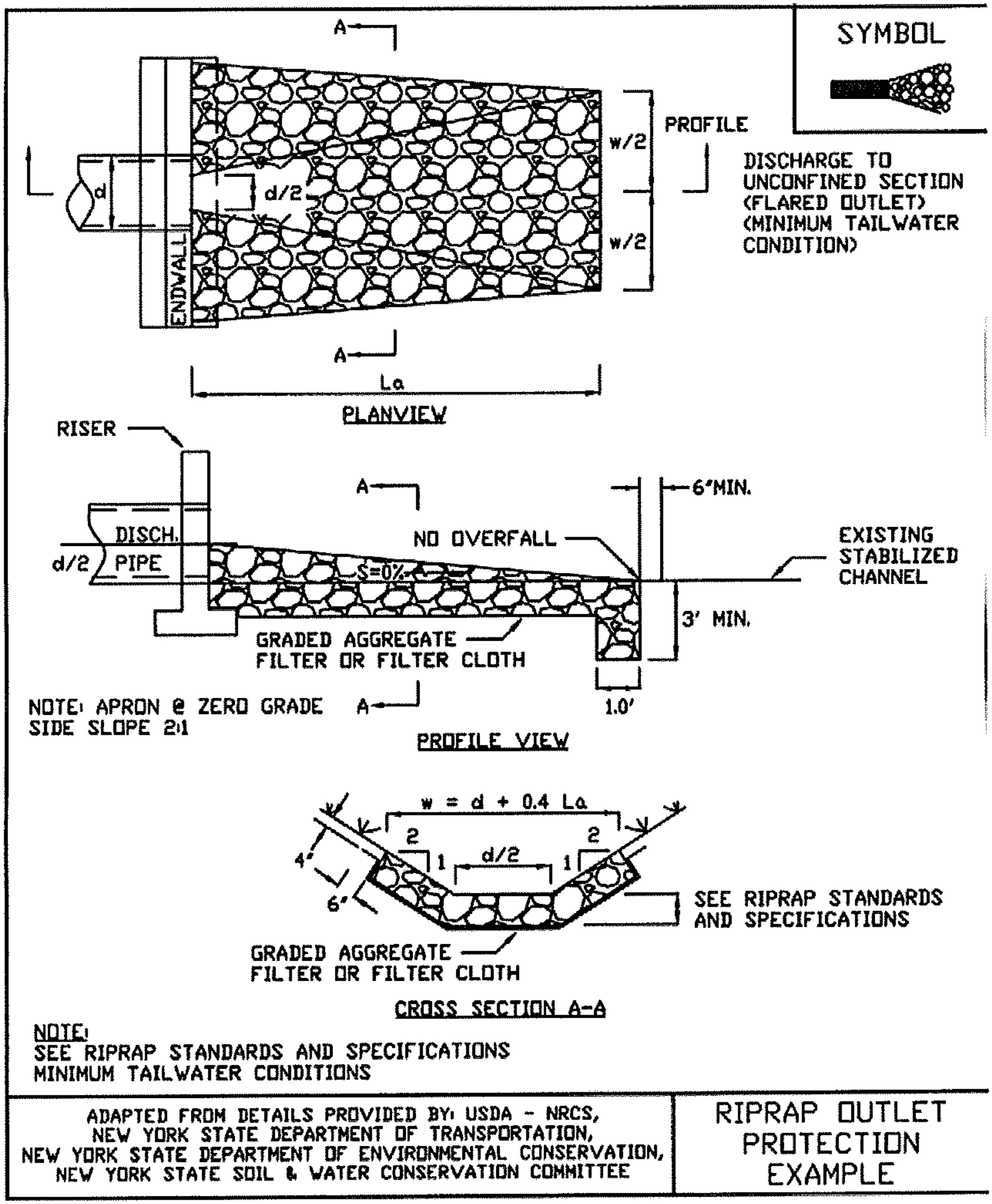


Figure 5B.15
Riprap Outlet Protection Detail (2)

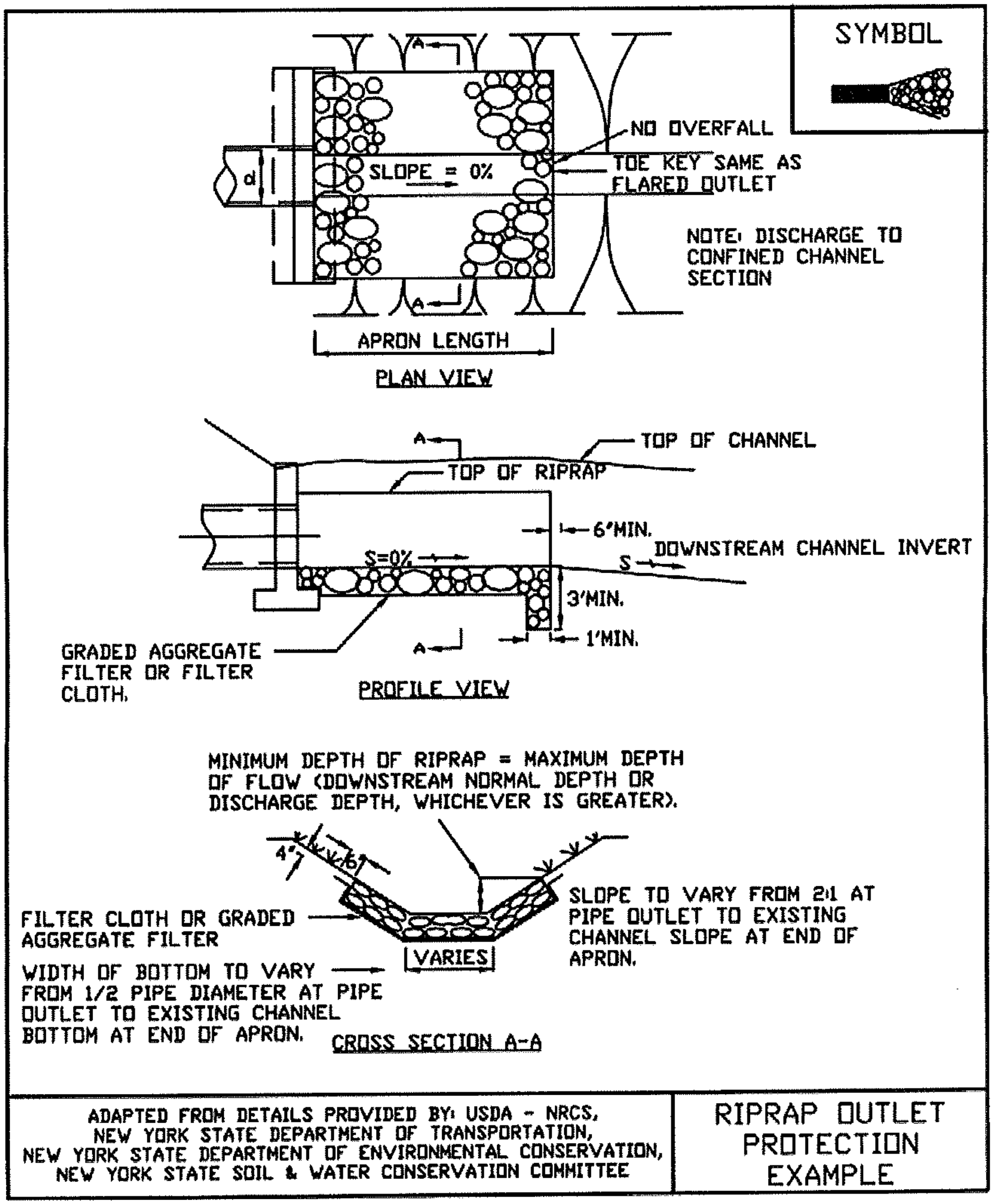
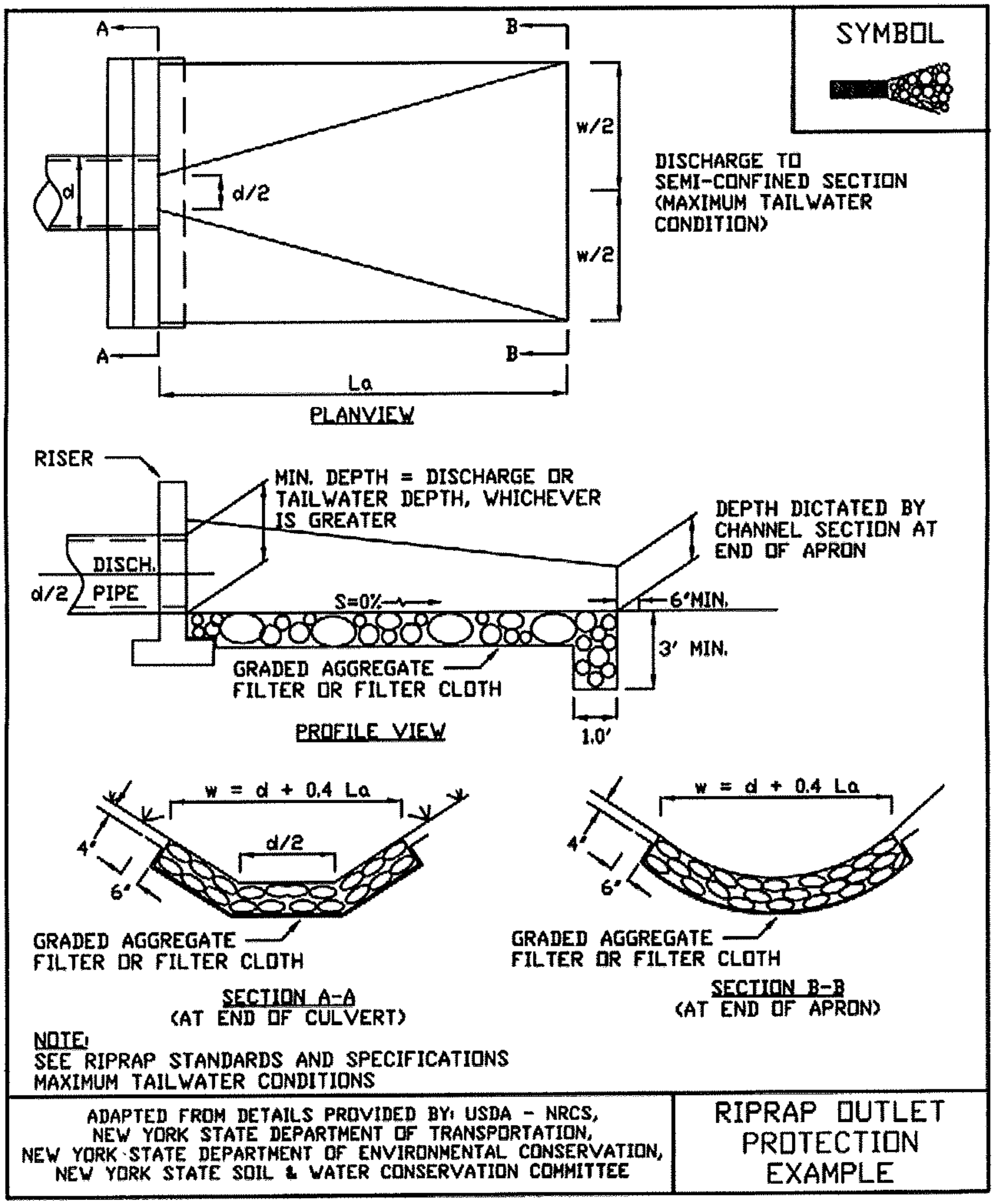


Figure 5B.16
Riprap Outlet Protection Detail (3)



TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by CRV Date 3/31/06 Checked by ________ Date ________
Project Cornwall Commons Basin # A
Location Cornwall, NY Total Area draining to basin 20.5 Acres

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu. yds. x 20.5 acres of drainage area = 2747 cu.yds.
2. a. Cleanout at 50 percent of minimum required volume = 1374 cu. yds.
   b. Elevation corresponding to scheduled time to clean out 126.0
   c. Distance below top of riser 2.5 feet
3. Minimum surface area is larger of 0.01 $Q_{(1)}$ 0.1609 or, 0.015 DA = 0.3075 use 0.3075 acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$ = 44.37 cfs
   (EFH, Ch. 2, TR-55, or Section 4; Attach runoff computation sheet)

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap., Q_{ps} = 0.2 x 20.5 ac. Drainage = 4.1 cfs
   Note: If there is no emergency spillway, then req'd $Q_{ps} = Q_{p(10)}$ = ________ cfs.
6. H = 6.5 ft. Barrel length = 75 ft
7. Barrel: Diam. 30 inches; Q_{ps} = (Q) 63.7 x (cor.fac.) 1.0 = 63.7 cfs.
8. Riser: Diam. 15 inches; Length 15 ft.; h = 3.68 ft. Crest Elev. 128.50
9. Trash Rack: Diam. 21 inches; H = 6 inches

Emergency Spillway Design

10. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = 44.37 - 20.5 = 23.87 cfs.
11. Width 24 ft.; H_p 0.64 ft Crest elevation 131.54; Design High Water Elev. 132.18
    Entrance channel slope 3.3 % ; Top of Dam Elev. 134.50
    Exit channel slope 3.3 %

ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y = 5 ft.; z = 4 :1; pipe slope = 1.3 %, L_s = 42.2 ft.
    Use 3 collars, 54 - 54 inches square; projection = 1 ft.

Diaphragms:

\# ________ width ________ ft. height ________ ft.

DEWATERING ORIFICE SIZING

13. $$Ao = \frac{A_s \times (2h)^{0.5}}{122{,}568}$$ = 0.3 sq. ft.; h = 3.68 ft.; therefore use, 4" orifice DIA.

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by ESR Date 7-28-07 Checked by ______ Date ______

Project Cornwall Commons Basin # B

Location Cornwall, NY Total Area draining to basin 96.39 Acres

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu. yds. x 96.39 acres of drainage area = 12,916 cu.yds.
2. a. Cleanout at 50 percent of minimum required volume = 6,458 cu. yds.
   b. Elevation corresponding to scheduled time to clean out 128.95
   c. Distance below top of riser 3.11 feet
3. Minimum surface area is larger of 0.01 $Q_{(1)}$ 101.06 or, 0.015 DA = 1.45 use 1.45 acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$ = 277.74 cfs
   (EFH, Ch. 2, TR-55, or Section 4; Attach runoff computation sheet)

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap., Q_{ps} = 0.2 x 96.39 ac. Drainage = 19.28 cfs
   Note: If there is no emergency spillway, then req'd $Q_{ps} = Q_{p(10)}$ = — cfs.
6. H = 3.8 ft. Barrel length = 114 ft
7. Barrel: Diam. 36 inches; Q_{ps} = (Q) 57.07 x (cor.fac.) 0.87 = 49.65 cfs.
8. Riser: Diam. 30 inches; Length 5.75 ft.; h = 4.88 ft. Crest Elev. 132.06
9. Trash Rack: Diam. 54 inches; H = 17 inches

Emergency Spillway Design

10. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = 277.74 - 19.28 = 258.46 cfs.
11. Width 52 ft.; H_p 1.70 ft Crest elevation 133.52 ; Design High Water Elev. 136.94
    Entrance channel slope ______ % ; Top of Dam Elev. 140.00
    Exit channel slope ______ %

ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y = 10.2 ft.; z = 4 :1; pipe slope = 1.0 %, L_s = 85 ft.
    Use 4 collars, 74 - 74 inches square; projection = 1.55 ft.

Diaphragms:

______ width ______ ft. height ______ ft.

DEWATERING ORIFICE SIZING

13. $$Ao = \frac{A_s \times (2h)^{0.5}}{122{,}568}$$ = 1.89 sq. ft.; h = 6.74 ft.; therefore use, 18 in.

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by CRV Date 3/31/06 Checked by ____ Date ____
Project Cornwall Commons Basin # C
Location Cornwall, NY Total Area draining to basin 11.9 Acres

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu. yds. x 11.9 acres of drainage area = 1594.6 cu.yds.
2. a. Cleanout at 50 percent of minimum required volume = 797.3 cu. yds.
   b. Elevation corresponding to scheduled time to clean out 184.0
   c. Distance below top of riser 2 feet
3. Minimum surface area is larger of 0.01 $Q_{(1)}$ 0.033 or, 0.015 DA = 0.18 use 0.18 acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$ = 38.73 cfs
   (EFH, Ch. 2, TR-55, or Section 4; Attach runoff computation sheet)

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap., Q_{ps} = 0.2 x 11.9 ac. Drainage = 2.38 cfs
   Note: If there is no emergency spillway, then req'd $Q_{ps} = Q_{p(10)}$ = ____ cfs.
6. H = 6.18 ft. Barrel length = 70 ft
7. Barrel: Diam. 30 inches; Q_{ps} = (Q) 63.7 x (cor.fac.) 1.0 = 63.7 cfs.
8. Riser: Diam. 15 inches; Length 2 ft.; h = 2.8 ft. Crest Elev. 186.0
9. Trash Rack: Diam. 21 inches; H = 6 inches

Emergency Spillway Design

10. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = 38.73 - 2.38 = 36.35 cfs.
11. Width 36 ft.; H_p 0.62 ft Crest elevation 188.18; Design High Water Elev. 188.8
    Entrance channel slope 3.5 % ; Top of Dam Elev. 190.5
    Exit channel slope 5.2 %

ANTI-SEEP COLLAR/
SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y = 4.8 ft.; z = 4 :1; pipe slope = 2.9 %, L_s = 43.4 ft.
    Use 2 collars, 72 - 72 inches square; projection = 1.6 ft.

Diaphragms:

#____ width____ ft. height____ ft.

DEWATERING ORIFICE SIZING

13. $Ao = \frac{A_s \times (2h)^{0.5}}{122,568}$ = 0.15 sq. ft.; h = 2.8 ft.; therefore use, 2" DIA ORIFICE

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by ESR Date 7-28-07 Checked by ____ Date ____
Project Cornwall Commons Basin # D
Location Cornwall, NY Total Area draining to basin 16.23 Acres

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu. yds. x 16.23 acres of drainage area = 2,175 cu.yds.
2. a. Cleanout at 50 percent of minimum required volume = 1088 cu. yds.
   b. Elevation corresponding to scheduled time to clean out 216.22
   c. Distance below top of riser 2.1 feet
3. Minimum surface area is larger of 0.01 $Q_{(1)}$ 21.50 or, 0.015 DA = .24 use 0.24 acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$ = 57.06 cfs
   (EFH, Ch. 2, TR-55, or Section 4; Attach runoff computation sheet)

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap., Q_{ps} = 0.2 x 16.23 ac. Drainage = 3.25 cfs
   Note: If there is no emergency spillway, then req'd $Q_{ps} = Q_{p(10)}$ = 57.06 cfs.
6. H = 4.16 ft. Barrel length = 138 ft
7. Barrel: Diam. 36 inches; Q_{ps} = (Q) 70.6 x (cor.fac.) 0.82 = 57.89 cfs.
8. Riser: Diam. 48 inches; Length 3.39 ft.; h = 2.27 ft. Crest Elev. 218.32
9. Trash Rack: Diam. 72 inches; H = 21 inches

Emergency Spillway Design N/A

10. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = ____ - ____ = ____ cfs.
11. Width ____ ft.; H_p ____ ft Crest elevation ____; Design High Water Elev. ____
    Entrance channel slope ____ % ; Top of Dam Elev. ____
    Exit channel slope ____ %

ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y = 5.66 ft.; z = 4 :1; pipe slope = 1.0 %, L_s = 47.17 ft.
    Use 3 collars, 63 - 63 inches square; projection = 1.1 ft.

Diaphragms:

____ width ____ ft. height ____ ft.

DEWATERING ORIFICE SIZING

13. $$Ao = \frac{A_s \times (2h)^{0.5}}{122{,}568}$$ = 0.25 sq. ft.; h = 4.4 ft.; therefore use, 7 in.

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

Computed by ESR Date 7-28-07 Checked by ________ Date ________
Project Cornwall Commons Basin # E
Location Corwall, NY Total Area draining to basin 14.68 Acres

BASIN SIZE DESIGN

1. Minimum sediment storage volume = 134 cu. yds. x 14.68 acres of drainage area = 1,967 cu.yds.
2. a. Cleanout at 50 percent of minimum required volume = 984 cu. yds.
   b. Elevation corresponding to scheduled time to clean out 205.15
   c. Distance below top of riser 1.43 feet
3. Minimum surface area is larger of 0.01 $Q_{(1)}$ 26.54 or, 0.015 DA = 0.229 use 0.265 acres

DESIGN OF SPILLWAYS & ELEVATIONS

Runoff

4. $Q_{p(10)}$ = 60.60 cfs
   (EFH, Ch. 2, TR-55, or Section 4; Attach runoff computation sheet)

Pipe Spillway (Q_{ps})

5. Min. pipe spillway cap., Q_{ps} = 0.2 x 14.68 ac. Drainage = 2.94 cfs
   Note: If there is no emergency spillway, then req'd $Q_{ps} = Q_{p(10)}$ = 60.60 cfs.
6. H = 4.51 ft. Barrel length = 91 ft
7. Barrel: Diam. 24 inches; Q_{ps} = (Q) 22.1 x (cor.fac.) 0.89 = 19.67 cfs.
8. Riser: Diam. 48 inches; Length 3.58 ft.; h = 2.47 ft. Crest Elev. 206.58
9. Trash Rack: Diam. 72 inches; H = 21 inches

Emergency Spillway Design N/A

10. Emergency Spillway Flow, $Q_{es} = Q_p - Q_{ps}$ = ________ - ________ = ________ cfs.
11. Width ______ ft.; H_p ______ ft Crest elevation ________; Design High Water Elev. ________
    Entrance channel slope ________ % ; Top of Dam Elev. ________
    Exit channel slope ________ %

ANTI-SEEP COLLAR/ SEEPAGE DIAPHRAGM DESIGN

Collars:

12. y = 5.69 ft.; z = 4 :1; pipe slope = 1.0 %, L_s = 22 ft.
    Use 1 collars, 60 - 60 inches square; projection = 1.5 ft.

Diaphragms:

\# ______ width ______ ft. height ______ ft.

DEWATERING ORIFICE SIZING

13. $Ao = \frac{A_s \times (2h)^{0.5}}{122,568}$ = 0.26 sq. ft.; h = 3.83 ft.; therefore use, 7 in.

BMP C140: Dust Control

Purpose

Dust control prevents wind transport of dust from disturbed soil surfaces onto roadways, drainage ways, and surface waters.

Conditions of Use

- In areas (including roadways) subject to surface and air movement of dust where on-site and off-site impacts to roadways, drainage ways, or surface waters are likely.

Design and Installation Specifications

- Vegetate or mulch areas that will not receive vehicle traffic. In areas where planting, mulching, or paving is impractical, apply gravel or landscaping rock.
- Limit dust generation by clearing only those areas where immediate activity will take place, leaving the remaining area(s) in the original condition, if stable. Maintain the original ground cover as long as practical.
- Construct natural or artificial windbreaks or windscreens. These may be designed as enclosures for small dust sources.
- Sprinkle the site with water until surface is wet. Repeat as needed. To prevent carryout of mud onto street, refer to Stabilized Construction Entrance (BMP C105).
- Irrigation water can be used for dust control. Irrigation systems should be installed as a first step on sites where dust control is a concern.
- Spray exposed soil areas with a dust palliative, following the manufacturer's instructions and cautions regarding handling and application.. Used oil is prohibited from use as a dust suppressant. Local governments may approve other dust palliatives such as calcium chloride or PAM.
- PAM (BMP C126) added to water at a rate of 0.5 lbs. per 1,000 gallons of water per acre and applied from a water truck is more effective than water alone. This is due to the increased infiltration of water into the soil and reduced evaporation. In addition, small soil particles are bonded together and are not as easily transported by wind. Adding PAM may actually reduce the quantity of water needed for dust control, . Since the wholesale cost of PAM is about $ 4.00 per pound, this is an extremely cost-effective dust control method.

Techniques that can be used for unpaved roads and lots include:

- Lower speed limits. High vehicle speed increases the amount of dust stirred up from unpaved roads and lots.
- Upgrade the road surface strength by improving particle size, shape, and mineral types that make up the surface and base materials.

- Add surface gravel to reduce the source of dust emission. Limit the amount of fine particles (those smaller than .075 mm) to 10 to 20 percent.
- Use geotextile fabrics to increase the strength of new roads or roads undergoing reconstruction.
- Encourage the use of alternate, paved routes, if available.
- Restrict use by tracked vehicles and heavy trucks to prevent damage to road surface and base.
- Apply chemical dust suppressants using the admix method, blending the product with the top few inches of surface material. Suppressants may also be applied as surface treatments.
- Pave unpaved permanent roads and other trafficked areas.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Limit dust-causing work on windy days.
- Contact your local Air Pollution Control Authority for guidance and training on other dust control measures. Compliance with the local Air Pollution Control Authority constitutes compliance with this BMP.

Maintenance Standards

Respray area as necessary to keep dust to a minimum.

BMP C151: Concrete Handling

Purpose

Concrete work can generate process water and slurry that contain fine particles and high pH, both of which can violate water quality standards in the receiving water. This BMP is intended to minimize and eliminate concrete process water and slurry from entering waters of the state.

Conditions of Use

Any time concrete is used, these management practices shall be utilized. Concrete construction projects include, but are not limited to, the following:

- Curbs
- Sidewalks
- Roads
- Bridges
- Foundations
- Floors
- Runways

Design and Installation Specifications

- Concrete truck chutes, pumps, and internals shall be washed out only into formed areas awaiting installation of concrete or asphalt.
- Unused concrete remaining in the truck and pump shall be returned to the originating batch plant for recycling.
- Hand tools including, but not limited to, screeds, shovels, rakes, floats, and trowels shall be washed off only into formed areas awaiting installation of concrete or asphalt.
- Equipment that cannot be easily moved, such as concrete pavers, shall only be washed in areas that do not directly drain to natural or constructed stormwater conveyances.
- Washdown from areas such as concrete aggregate driveways shall not drain directly to natural or constructed stormwater conveyances.
- When no formed areas are available, washwater and leftover product shall be contained in a lined container. Contained concrete shall be disposed of in a manner that does not violate groundwater or surface water quality standards.

Maintenance Standards

Containers shall be checked for holes in the liner daily during concrete pours and repaired the same day.

BMP C152: Sawcutting and Surfacing Pollution Prevention

Purpose

Sawcutting and surfacing operations generate slurry and process water that contains fine particles and high pH (concrete cutting), both of which can violate the water quality standards in the receiving water. This BMP is intended to minimize and eliminate process water and slurry from entering waters of the State.

Conditions of Use

Anytime sawcutting or surfacing operations take place, these management practices shall be utilized. Sawcutting and surfacing operations include, but are not limited to, the following:

- Sawing
- Coring
- Grinding
- Roughening
- Hydro-demolition
- Bridge and road surfacing

Design and Installation Specifications

- Slurry and cuttings shall be vacuumed during cutting and surfacing operations.
- Slurry and cuttings shall not remain on permanent concrete or asphalt pavement overnight.
- Slurry and cuttings shall not drain to any natural or constructed drainage conveyance.
- Collected slurry and cuttings shall be disposed of in a manner that does not violate groundwater or surface water quality standards.
- Process water that is generated during hydro-demolition, surface roughening or similar operations shall not drain to any natural or constructed drainage conveyance and shall be disposed of in a manner that does not violate groundwater or surface water quality standards.
- Cleaning waste material and demolition debris shall be handled and disposed of in a manner that does not cause contamination of water. If the area is swept with a pick-up sweeper, the material must be hauled out of the area to an appropriate disposal site.

Maintenance Standards

Continually monitor operations to determine whether slurry, cuttings, or process water could enter waters of the state. If inspections show that a violation of water quality standards could occur, stop operations and immediately implement preventive measures such as berms, barriers, secondary containment, and vacuum trucks.

APPENDIX G

STANDARD CONSTRUCTION INSPECTION FORMS
STANDARD MAINTENANCE INSPECTION FORMS

Stormwater/Wetland Pond Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

Construction Sequence	Satisfactory/ Unsatisfactory	Comments
Pre-Construction/Materials and Equipment		
Pre-construction meeting		
Pipe and appurtenances on-site prior to construction and dimensions checked		
1. Material (including protective coating, if specified)		
2. Diameter		
3. Dimensions of metal riser or pre-cast concrete outlet structure		
4. Required dimensions between water control structures (orifices, weirs, etc.) are in accordance with approved plans		
5. Barrel stub for prefabricated pipe structures at proper angle for design barrel slope		
6. Number and dimensions of prefabricated anti-seep collars		
7. Watertight connectors and gaskets		
8. Outlet drain valve		
Project benchmark near pond site		
Equipment for temporary de-watering		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
2. Subgrade Preparation		
Area beneath embankment stripped of all vegetation, topsoil, and organic matter		
3. Pipe Spillway Installation		
Method of installation detailed on plans		
A. Bed preparation		
Installation trench excavated with specified side slopes		
Stable, uniform, dry subgrade of relatively impervious material (If subgrade is wet, contractor shall have defined steps before proceeding with installation)		
Invert at proper elevation and grade		
B. Pipe placement		
Metal / plastic pipe		
1. Watertight connectors and gaskets properly installed		
2. Anti-seep collars properly spaced and having watertight connections to pipe		
3. Backfill placed and tamped by hand under "haunches" of pipe		
4. Remaining backfill placed in max. 8 inch lifts using small power tamping equipment until 2 feet cover over pipe is reached		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
3. Pipe Spillway Installation		
Concrete pipe		
1. Pipe set on blocks or concrete slab for pouring of low cradle		
2. Pipe installed with rubber gasket joints with no spalling in gasket interface area		
3. Excavation for lower half of anti-seep collar(s) with reinforcing steel set		
4. Entire area where anti-seep collar(s) will come in contact with pipe coated with mastic or other approved waterproof sealant		
5. Low cradle and bottom half of anti-seep collar installed as monolithic pour and of an approved mix		
6. Upper half of anti-seep collar(s) formed with reinforcing steel set		
7. Concrete for collar of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
8. Forms stripped and collar inspected for honeycomb prior to backfilling. Parge if necessary.		
C. Backfilling		
Fill placed in maximum 8 inch lifts		
Backfill taken minimum 2 feet above top of anti-seep collar elevation before traversing with heavy equipment		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
4. Riser / Outlet Structure Installation		
Riser located within embankment		
A. Metal riser		
Riser base excavated or formed on stable subgrade to design dimensions		
Set on blocks to design elevations and plumbed		
Reinforcing bars placed at right angles and projecting into sides of riser		
Concrete poured so as to fill inside of riser to invert of barrel		
B. Pre-cast concrete structure		
Dry and stable subgrade		
Riser base set to design elevation		
If more than one section, no spalling in gasket interface area; gasket or approved caulking material placed securely		
Watertight and structurally sound collar or gasket joint where structure connects to pipe spillway		
C. Poured concrete structure		
Footing excavated or formed on stable subgrade, to design dimensions with reinforcing steel set		
Structure formed to design dimensions, with reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing while curing, if necessary)		
Forms stripped & inspected for "honeycomb" prior to backfilling; parge if necessary		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Embankment Construction		
Fill material		
Compaction		
Embankment		
1. Fill placed in specified lifts and compacted with appropriate equipment		
2. Constructed to design cross-section, side slopes and top width		
3. Constructed to design elevation plus allowance for settlement		
6. Impounded Area Construction		
Excavated / graded to design contours and side slopes		
Inlet pipes have adequate outfall protection		
Forebay(s)		
Pond benches		
7. Earth Emergency Spillway Construction		
Spillway located in cut or structurally stabilized with riprap, gabions, concrete, etc.		
Excavated to proper cross-section, side slopes and bottom width		
Entrance channel, crest, and exit channel constructed to design grades and elevations		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
8. Outlet Protection		
A. End section		
Securely in place and properly backfilled		
B. Endwall		
Footing excavated or formed on stable subgrade, to design dimensions and reinforcing steel set, if specified		
Endwall formed to design dimensions with reinforcing steel set as per plan		
Concrete of an approved mix and vibrated into place (protected from freezing, if necessary)		
Forms stripped and structure inspected for "honeycomb" prior to backfilling; parge if necessary		
C. Riprap apron / channel		
Apron / channel excavated to design cross-section with proper transition to existing ground		
Filter fabric in place		
Stone sized as per plan and uniformly place at the thickness specified		
9. Vegetative Stabilization		
Approved seed mixture or sod		
Proper surface preparation and required soil amendments		
Excelsior mat or other stabilization, as per plan		

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
10. Miscellaneous		
Drain for ponds having a permanent pool		
Trash rack / anti-vortex device secured to outlet structure		
Trash protection for low flow pipes, orifices, etc.		
Fencing (when required)		
Access road		
Set aside for clean-out maintenance		
11. Stormwater Wetlands		
Adequate water balance		
Variety of depth zones present		
Approved pondscaping plan in place Reinforcement budget for additional plantings		
Plants and materials ordered 6 months prior to construction		
Construction planned to allow for adequate planting and establishment of plant community (April-June planting window)		
Wetland buffer area preserved to maximum extent possible		

Comments:

Actions to be Taken:

Open Channel System Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Pre-construction meeting		
Runoff diverted		
Facility location staked out		
2. Excavation		
Size and location		
Side slope stable		
Soil permeability		
Groundwater / bedrock		
Lateral slopes completely level		
Longitudinal slopes within design range		
Excavation does not compact subsoils		
3. Check dams		
Dimensions		
Spacing		
Materials		

Construction Sequence	Satisfactory / Unsatisfactory	Comments
4. Structural Components		
Underdrain installed correctly		
Inflow installed correctly		
Pretreatment devices installed		
5. Vegetation		
Complies with planting specifications		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		
6. Final inspection		
Dimensions		
Check dams		
Proper outlet		
Effective stand of vegetation and stabilization		
Contributing watershed stabilized before flow is routed to the factility		

Comments:

Actions to be Taken:

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project ______________________________
Location: ______________________________
Site Status: ______________________________

Date: ______________________________
Time: ______________________________

Inspector: ______________________________

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam "As-Built"		

Maintenance Item	**Satisfactory/ Unsatisfactory**	**Comments**
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete ______ Corrugated pipe ______ Masonry ______ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

Open Channel Operation, Maintenance, and Management Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Monthly)		
Contributing areas clean of debris		
2. Check Dams or Energy Dissipators (Annual, After Major Storms)		
No evidence of flow going around structures		
No evidence of erosion at downstream toe		
Soil permeability		
Groundwater / bedrock		
3. Vegetation (Monthly)		
Mowing done when needed		
Minimum mowing depth not exceeded		
No evidence of erosion		
Fertilized per specification		
4. Dewatering (Monthly)		
Dewaters between storms		

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
5. Sediment deposition (Annual)		
Clean of sediment		
6. Outlet/Overflow Spillway (Annual)		
Good condition, no need for repairs		
No evidence of erosion		

Comments:

Actions to be Taken:

APPENDIX H

NOTICE OF INTENT – BLANK
NOTICE OF TERMINATION – BLANK
SITE LOG BOOK AND CONTRACTOR’S CERTIFICATION FORM

1752059166

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR ______ (for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-02-01

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

To properly complete this form, please refer to the Instruction Manual which can be accessed at www.dec.state.ny.us/website/dow/toolbox/instr_man.pdf

-IMPORTANT-

THIS FORM FOR MACHINE PRINT ONLY

RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)

Owner/Operator Contact Person Last Name (NOT CONSULTANT)

Owner/Operator Contact Person First Name

Owner/Operator Mailing Address

City

State

Zip -

Phone (Owner/Operator) - -

Fax (Owner/Operator) - -

Email (Owner/Operator)

7599059161

Location Information

Project Site Information

Project/Site Name
Cornwall Commons

Street Address (NOT P.O. BOX)

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Town of Cornwall

State
NY

Zip
-

County
Orange

DEC Region (if known)
3

Name of Nearest Cross Street
NYS Route 218

Distance to Nearest Cross Street (Feet)
600

Direction to Nearest Cross Street
○ North ○ South ● East ○ West

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.state.ny.us/website/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site go to the dropdown menu on the left and choose "Get Coordinates". Click on the center of your site and a small window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)	Y Coordinates (Northing)
580484	4589242

2. What is the nature of this construction project?

● **New Construction**
○ **Redevelopment with increase in imperviousness**
○ **Redevelopment with no increase in imperviousness**

Project Site Information

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use

- (●) FOREST
- ( ) PASTURE/OPEN LAND
- ( ) CULTIVATED LAND
- ( ) SINGLE FAMILY HOME
- ( ) SINGLE FAMILY SUBDIVISION
- ( ) TOWN HOME RESIDENTIAL
- ( ) MULTIFAMILY RESIDENTIAL
- ( ) INSTITUTIONAL/SCHOOL
- ( ) INDUSTRIAL
- ( ) COMMERCIAL
- ( ) ROAD/HIGHWAY
- ( ) RECREATIONAL/SPORTS FIELD
- ( ) BIKE PATH/TRAIL
- ( ) SUBSURFACE UTILITY
- ( ) PARKING LOT
- ( ) OTHER

OTHER

Post-Development Future Land Use

- ( ) SINGLE FAMILY HOME
- ( ) SINGLE FAMILY SUBDIVISION
- ( ) TOWN HOME RESIDENTIAL
- ( ) MULTIFAMILY RESIDENTIAL
- ( ) INSTITUTIONAL/SCHOOL
- ( ) INDUSTRIAL
- ( ) COMMERCIAL
- ( ) ROAD/HIGHWAY
- ( ) RECREATIONAL/SPORTS FIELD
- ( ) BIKE PATH/TRAIL
- ( ) LINEAR UTILITY (water, sewer, gas, etc.)
- ( ) PARKING LOT
- (●) OTHER

Number of Lots

OTHER Single Family, Town Houses, Commercial

4. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law ? ( ) **Yes** (●) **No**

5. Is this a project which does not require coverage under the General Permit (e.g. Project done under an Individual SPDES Permit, or department approved remediation)? ( ) **Yes** (●) **No**

6. Is this property owned by a state authority, state agency or local government? ( ) **Yes** (●) **No**

7. In accordance with the larger common plan of development or sale; enter the total project site acreage, the acreage to be disturbed and the future impervious area (acreage)within the disturbed area. Round to the nearest tenth of an acre.

Total Site Acreage	Acreage To Be Disturbed	Existing Impervious Area Within Disturbed	Future Impervious Area Within Disturbed
197.7	119.3	0.0	68.2

8. Will there be more than 5 acres disturbed at any given time? ( ) **Yes** (●) **No**

9. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
0 %	0 %	100 %	0 %

10. Is this a phased project? (**if yes, The SWPPP must address all planned phases)**

* ● Yes ○ No

11. Enter the planned start and end dates of the disturbance activities

Start Date 06/11/2008 - **End Date** 12/11/2009

Receiving System(s)

12. Provide the name of the nearest, natural, classified surface waterbody(ies) into which construction site runoff has the potential to discharge.

Moodna Creek

For Questions 13 and 14 refer to the Instruction Manual for a subset of 303(d) segments and TMDL watersheds subject to Condition A of the permit. These waterbodies and watersheds have been identified for regulation within the stormwater program due to some level of impairment by nutrients, silt or sediment. The Instruction Manual can be accessed at www.dec.state.ny.us/website/dow/toolbox/instr_man.pdf

13. Has the surface waterbody(ies) in question 12 been identified as a 303(d) segment?

* ○ Yes ● No

14. Is this project located in a TMDL Watershed?

* ○ Yes ● No

***NOTE:** If you answered Yes to either question 13 or 14, Pursuant to Part I.D.3.(b) of the permit, you must have your SWPPP prepared and certified by a licensed/certified professional and the SWPPP is subject to a 60-business day review.**

15. Does the site runoff enter a separate storm sewer system- including roadside drains, swales, ditches, culverts, etc? **(if no, skip question 16)**

○ Yes ● No ○ Unknown

16. What is the name of the municipality/entity that owns the separate storm sewer system?

17. Does any runoff from the site enter a sewer classified as a Combined Sewer?

○ Yes ● No ○ Unknown

Stormwater Pollution Prevention Plan (SWPPP)

18. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book) ?

● Yes ○ No *

19. Does this construction activity require the development of a SWPPP that includes Water Quality and Quantity Control components (Post-Construction Stormwater Management Practices) **If no, Skip question 20**

● Yes ○ No

20. Have the Water Quality and Quantity Control components of the SWPPP been developed in comformance with the current NYS Stormwater Management Design Manual ?

● Yes ○ No *

NOTE: If you answered no to question 18 or 20, Pursuant to Part I.D.3.(b) of the permit, you must have your SWPPP prepared and certified by a licensed/certified professional and the SWPPP is subject to a 60-business day review. Please provide further details in the details/comment section on the last page of this form.

21. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

● **Professional Engineer (P.E.)**

○ **Soil and Water Conservation District (SWCD)**

○ **Registered Landscape Architect (R.L.A)**

○ **Certified Professional in Erosion and Sediment Control (CPESC)**

○ **Owner/Operator**

○ **Other**

SWPPP Preparer Information
(if different from Owner/Operator info)

SWPPP Preparer
Lanc & Tully Engineering & Surveying PC

Contact Name (Last, Space, First)
Russo, John

Mailing Address
P.O. Box 687

City
Goshen

State
NY

Zip
10924-

Phone
845-294-3700

Fax
845-294-8609

Email
eng@lanctully.com

2200059165

Stormwater Pollution Prevention Plan (SWPPP)

Erosion and Sediment Control Practices

22. Has a construction sequence schedule for the planned management practices been prepared?

● Yes ○ No

23. Select **all** of the erosion and sediment control practices that will be employed on the project site.

Temporary Structural

- ○ Check Dams
- ○ Construction Road Stabilization
- ○ Dust Control
- ○ Earth Dike
- ● Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ● Sediment Basin
- ○ Sediment Traps
- ● Silt Fence
- ● Stabilized Construction Entrance
- ○ Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ● Temporary Stormdrain Diversion
- ○ Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ○ Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ● Temporary Swale
- ○ Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ○ Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ● Retaining Wall
- ○ Riprap Slope Protection
- ● Rock Outlet Protection
- ○ Streambank Protection

Other

3471059166

Stormwater Pollution Prevention Plan (SWPPP)

Water Quality and Quantity Control

Important: Completion of Questions 24-30 is not required if the project:

Disturbs less than 5 acres and is planned for single-family residential homes(including subdivisions) or construction on agricultural property and does not have a discharge to a 303(d) water or is not located within a TMDL watershed.

Additionally, sites where there will be no future impervious area within the disturbed area and that do not have a change(pre to post development)in hydrology do not need to complete questions 24-30.

24. Indicate **all** the permanent Stormwater Management Practice(s) that will be installed on this site

Post Construction Stormwater Management Practices

Ponds

- ○ **Micropool Extended Detention (P-1)**
- ○ **Wet Pond (P-2)**
- ● **Wet Extended Detention (P-3)**
- ○ **Multiple Pond System (P-4)**
- ○ **Pocket Pond (P-5)**

Filtering

- ○ **Surface Sand Filter (F-1)**
- ○ **Underground Sand Filter (F-2)**
- ○ **Perimeter Sand Filter (F-3)**
- ○ **Organic Filter (F-4)**
- ○ **Bioretention (F-5)**

Wetlands

- ○ **Shallow Wetland (W-1)**
- ○ **Extended Detention Wetland (W-2)**
- ○ **Pond/Wetland System (W-3)**
- ○ **Pocket Wetland (W-4)**

Infiltration

- ○ **Infiltration Trench (I-1)**
- ○ **Infiltration Basin (I-2)**
- ○ **Dry Well (I-3)**

Open Channels

- ● **Dry Swale (O-1)**
- ○ **Wet Swale (O-2)**

○ **Other**

Describe other stormwater management practices not listed above or explain any deviations from the technicial standards. If the SWPPP does not conform to the technicial standards, the SWPPP must be prepared and certified by a licensed/certified professional and is subject to a 60-business day review.

Has a long term Operation and Maintenance plan for the post construction management practices been developed? ● **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

Stormwater Pollution Prevention Plan (SWPPP)
Water Quality and Quantity Control

25. Provide the total water quality volume required and the total provided for the site.

Total Water Quality Volume (WQv)

WQv Required 5.996 **acre-feet**

WQv Provided 7.993 **acre-feet**

26. Provide the following Unified Stormwater Sizing Criteria for the site.

Total Channel Protection Storage Volume (CPv) - Extended detention of post-developed 1 year, 24 hour storm event

CPv Required 9.210 **acre-feet**

CPv Provided 11.142 **acre-feet**

The need to provide for channel protection has been waived because
- ○ **Site discharges directly to fourth order stream or larger**

Total Overbank Flood Control Criteria (Qp) - Peak discharge rate for the 10 year storm

Pre-Development 435.31 **CFS**

Post-development 309.17 **CFS**

Total Extreme Flood Control Criteria (Qf) - Peak discharge rate for the 100 year storm

Pre-Development 804.67 **CFS**

Post-development 620.17 **CFS**

The need to provide for flood control has been waived because
- ○ **Site discharges directly to fourth order stream or larger**
- ○ **Downstream analysis reveals that flood control is not required**

IMPORTANT: For questions 27 and 28 impervious area should be calculated considering the project site and all offsite areas that drain to the post-construction stormwater management practice(s) (Total Drainage Area = Project Site + Offsite areas)

27. Pre-Construction Impervious Area - As a percent of the Total Drainage Area enter the percentage of the existing impervious areas before construction begins. 1 %

28. Post-Construction Impervious Area - As a percent of the Total Drainage Area enter the percentage of the future impervious areas that will be created/remain on the site after completion of construction. 27 %

29. Indicate the total number of permanent stormwater management practices to be installed 2

30. Provide the total number of stormwater discharge points from the site (include discharges to either surface waters or to seperate storm sewer systems) 6

Other Permits

31. Select any other DEC permits that are required for this project or ● None

DEC Permits

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Other SPDES
- ○ Solid Waste
- ○ Stream Protection/Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers

Other

32. If this NOI is being submitted for the purpose of continuing coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned.

N Y R

Details/Comments

Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I also certify under penalty of law that this document and the corresponding documents were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction. and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name

MI

Print Last Name

Owner/Operator Signature

Date

/ /

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NOTICE OF TERMINATION for Storm Water Discharges Associated with Construction Activity UNDER SPDES GENERAL PERMIT: ☐ #GP-93-06 or ☒ #GP-02-01

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Permittee Information

1. Owner/Operator Name:

2a. Mailing Address:

2b. City/State/Zip:

3a. Contact Person:

3b. Phone:

3c. E-mail:

II. Site /Activity Information

4. Facility/Project Site Name: Cornwall Commons

5a. Street Address:

5b. City/State/Zip: Cornwall, New York

6. County: Orange

III. Reason for Termination

7a. ☒ Site has been finally stabilized in accordance with permit and SWPPP. Date site stabilization completed: ____________________ month/year

7b. ☒ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR _ _ _ _ _ _
(Note: Permit coverage can not be terminated by permittee identified in I.1. above until new owner/operator obtains coverage under GP-02-01)

IV. Final Site Information:

8a. Are there permanent stormwater management practices remaining on the site? ☒ yes ☐ no
If the answer to question 8a. is no, go to question 8e.
If the answer to question 8a. is yes, answer the following questions 8b., 8c., and 8d.:

8b. Is the design and function of each permanent practice described in the final SWPPP? ☒ yes ☐ no

8c. Who will be responsible for long-term operation and maintenance of practice(s)? Property Owner

8d. Has the individual(s) responsible for long-term operation and maintenance been given a copy of the operation and maintenance requirements? ☒ yes ☐ no

8e. Provide the total acreage of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? 68.24

V. Certification

I certify under penalty of law that this document was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person(s) who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name:

Title/Position:

Signature:

Date:

Reset Button

APPENDIX H

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

CONSTRUCTION SITE LOG BOOK

Table of Contents

I. Pre-Construction Meeting Documents
   a. Preamble to Site Assessment and Inspections
   b. Operator's Certification
   c. Qualified Professional's Credentials & Certification
   d. Pre-Construction Site Assessment Checklist

II. Construction Duration Inspections
   a. Directions
   b. Modification to the SWPPP

III. Monthly Summary Reports

IV. Monitoring, Reporting, and Three-Month Status Reports
   a. Operator's Compliance Response Form

Properly completing forms such as those contained in Appendix H meet the inspection requirement of NYS-DEC SPDES GP for Construction Activities. Completed forms shall be kept on site at all times and made available to authorities upon request.

I. PRE-CONSTRUCTION MEETING DOCUMENTS

Project Name ____

Permit No. ____________________________ **Date of Authorization** ______________

Name of Operator ____

Prime Contractor ____

a. Preamble to Site Assessment and Inspections

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified professional[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements.

When construction starts, site inspections shall be conducted by the qualified professional at least every 7 calendar days and within 24 hours of the end of a storm event of 0.5 inches or greater (Construction Duration Inspections). The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request. The Operator shall post at the site, in a publicly accessible location, a summary of the site inspection activities on a monthly basis (Monthly Summary Report).

The operator shall also prepare a written summary of compliance with this general permit at a minimum frequency of every three months (Operator's Compliance Response Form), while coverage exists. The summary should address the status of achieving each component of the SWPPP.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified professional perform a final site inspection. The qualified professional shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 "Qualified Professional means a person knowledgeable in the principles and practice of erosion and sediment controls, such as a Certified Professional in Erosion and Sediment Control (CPESC), soil scientist, licensed engineer or someone working under the direction and supervision of a licensed engineer (person must have experience in the principles and practices of erosion and sediment control).

2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.

3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Operators Certification

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. Further, I hereby certify that the SWPPP meets all Federal, State, and local erosion and sediment control requirements. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law.

Name (please print): ______________________________

Title ______________________________ **Date:** ______________

Address: ______________________________

Phone: ______________ **Email:** ______________________________

Signature: ______________________________

c. Qualified Professional's Credentials & Certification

"I hereby certify that I meet the criteria set forth in the General Permit to conduct site inspections for this project and that the appropriate erosion and sediment controls described in the SWPPP and as described in the following Pre-construction Site Assessment Checklist have been adequately installed or implemented, ensuring the overall preparedness of this site for the commencement of construction."

Name (please print): ______________________________

Title ______________________________ **Date:**______________

Address: ______________________________

Phone: ___________ **Email:** ______________________________

Signature: ______________________________

d. Pre-construction Site Assessment Checklist
(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?_______________________________
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?______________
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?______________
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Perimeter Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page ______
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? _________________

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:
Inspection Forms will be filled out during the entire construction phase of the project.
Required Elements:

(1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

(2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

(3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

(4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

(5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

(6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

______________________________________ ______________________________________

Inspector (print name) **Date of Inspection**

______________________________________ ______________________________________

Qualified Professional (print name) **Qualified Professional Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA
[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions
Yes No NA
[ ] [ ] [ ] Is construction site litter and debris appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing
Yes No NA
[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

Runoff Control Practices

1. Excavation Dewatering
Yes No NA
[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

2. Level Spreader
Yes No NA
[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales
Yes No NA
[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

Runoff Control Practices (continued)

4. Stone Check Dam

Yes No NA

[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Stabilized Construction Entrance

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)
Yes No NA
[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation ___% of design capacity.

4. Temporary Sediment Trap
Yes No NA
[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.
Sediment accumulation is ___% of design capacity.

5. Temporary Sediment Basin
Yes No NA
[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design.
Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

The Operator shall amend the SWPPP whenever:
1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

III. Monthly Summary of Site Inspection Activities

Name of Permitted Facility:	**Today's Date:**	**Reporting Month:**
Location:	**Permit Identification #:**	
Name and Telephone Number of Site Inspector:		

Date of Inspection	Regular / Rainfall based Inspection	Name of Inspector	Items of Concern

<u>Owner/Operator Certification:</u>

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that false statements made herein are punishable as a class A misdemeanor pursuant to Section 210.45 of the Penal Law."

Signature of Permittee or Duly Authorized Representative   Name of Permittee or Duly Authorized Representative   Date

Duly authorized representatives <u>must</u> have written authorization, submitted to DEC, to sign any permit documents.

APPENDIX I

SITE PLANS