Ludlowville Stormwater Control Project
Tompkins County Planning Department

Technical Report 1: Existing Ludlowville Stormwater Conditions

March 2009

Barton & Loguidice, P.C.
Engineers • Environmental Scientists • Planners • Landscape Architects

290 Elwood Davis Road
Box 3107
Syracuse, New York 13220

recycled paper

Ludlowville Stormwater Control Project
Tompkins County Planning Department

Technical Report 1:
Existing Ludlowville Stormwater Conditions

March 2009

Prepared for:

Ludlowville Stormwater Control Project Team
Tompkins County Department of Planning
121 East Court Street
Ithaca, New York 14850

Prepared by:

Barton & Loguidice, P.C.
290 Elwood Davis Road
Box 3107
Syracuse, New York 13220

Table of Contents

Table of Contents – Continued

Executive Summary

On behalf of the Ludlowville Stormwater Control Project Team, the Tompkins County Planning Department retained the services of Barton & Loguidice, P.C. (B&L) to prepare a Drainage Study for the Ludlowville area in response to resident requests to address the historical flooding which has impacted the area for many years. The Project Team includes the County Planning and Highway Departments, the Town of Lansing Zoning, Planning, Code Enforcement and Highway Departments and the Tompkins County Soil and Water Conservation District. The focus of this Technical Report #1 is to model the existing drainage patterns to determine the limiting components of the existing stormwater system and evaluate channel erosion within the study area. Future reports will further evaluate recommendations for proposed stormwater controls as part of this drainage study.

The Ludlowville watershed study area is broken into four drainage basins with a critical design point located at the downstream end of each basin (Figure 1). Three of the basins are located in series and are considered the primary study area (Basins A, B and C). The Lansingville Road (Basin A), Ridge Road/New York State Route 34B (Basin B) and Ludlowville Road (Basin C) drainage basins are connected when an upstream controlling drainage structure overtops and sends a surcharge flow into the next downstream basin. Basin A is 70 acres and terminates at a 24" steel cross-culvert located 0.4 miles north of the intersection of Ridge Road. Flows not conveyed by the culvert overtop the earth embankment in the ditch and remain on the west side of Lansingville Road to Ridge Road. Basin B is 97 acres and terminates at the 57" x 38" corrugated metal pipe-arch crossing Ludlowville Road. This crossing has historically overtopped, flooding residents on Ludlowville Road. Even the flow conveyed by this structure alone has caused significant erosion and flooding downstream. This crossing is a key design point for the study. Basin C is 16 acres and terminates at the 36" culvert crossing under Salmon Creek Road. The secondary study area consists of the Salmon

Creek Road (Basin D) drainage basin which is 48 acres and terminates at a 36" culvert crossing Salmon Creek Road.

Haested Method's PondPack modeling software was used to create runoff hydrographs within the primary and secondary study areas for the 1-, 5-, 10-, 25- and 50-year storms (TR-55 Based). The model has determined the limiting components of the existing system and provided focus points for areas that require improvements. Additional hydraulic modeling including HY-8 (culvert hydraulics) and StormCAD (closed drainage system hydraulics) were utilized to calibrate the PondPack stormwater model. The results indicate that the peak runoff rates exceed the carrying capacity of the culverts at the downstream end of Basins A and B, which is a major contributor to the drainage issues in the area. Overtopping of these structures sends an overflow surcharge to the next downstream drainage basin and overloads the existing stormwater system ultimately overtopping the culverts crossing Ludlowville Road and Salmon Creek Road.

This Report summarizes the watershed study area, previous studies, existing stormwater infrastructure and modeling, streambank channel erosion, and conceptual opportunities for stormwater improvements. Subsequent reports will expand upon the findings presented herein to develop recommended stormwater improvements.

1.0 Introduction

1.1 Background

The Hamlet of Ludlowville is located in the northwestern part of Tompkins County, just off the eastern shore of Cayuga Lake in the Town of Lansing. Residents of Ludlowville in the vicinity of Salmon Creek Road, Ludlowville Road, Ridge Road (New York State Route 34B) and Lansingville Road have experienced recurring flood events over the past several years due to spring thaws and significant rainfall events that produces drainage that exceed the capacity of the existing stormwater system. This results in the existing drainage system overtopping, which allows uncontained flows to travel overland causing damage to basements, landscapes, driveways and other personal and public property. Even flows conveyed by the existing stormwater system have caused significant erosion and sediment loss in several areas. The ongoing streambank erosion has caused significant sediment load directly to Salmon Creek and ultimately Cayuga Lake.

B&L has been retained by the Tompkins County Planning Department, on behalf of the Ludlowville Stormwater Control Project Team, to develop a drainage study and design a solution to mitigate the recurring flooding, sediment loss and channel erosion in the Ludlowville area.

The first phase of this study is to develop a watershed based approach for analysis of the existing drainage conditions. The focus of this phase is to determine the limiting components of the existing stormwater system and to identify areas of extreme channel erosion. The total study area begins in the agricultural fields west of Lansingville Road and extends southeastward to the confluence of Salmon Creek, just downstream of Ludlowville Falls. Approximately 230 acres was included in the model as being the areas that contributed to the existing Ludlowville stormwater conditions. The study includes the watershed hydrology for the project area and analyses of the existing driveway culverts, road cross-culverts, roadside ditches and closed drainage systems along Lansingville, Ridge and Ludlowville Roads.

A previous drainage study was completed by Milone & MacBroom, Inc. in October, 2004 which evaluated the hydraulic capacity of the culvert crossing Ludlowville Road near the intersection of Ridge Road. The study was completed in response to a storm event that overtopped the culvert and caused significant flood damage to private and public property along Ludlowville Road. The results of the study showed that the Ludlowville culvert was a limiting component of the stormwater system. Although the study concluded that the culvert was undersized, it appears to have underestimated the flows contributing to the Ludlowville culvert. The 2004 report did not include all of the runoff from Lansingville Road nor did it account for the runoff from the south side of Ridge Road that is conveyed to the north side via a closed drainage system. These areas account for approximately 40 acres of additional drainage, and substantially higher peak storm flows. The 2004 study was also limited to the capacity analysis of the Ludlowville Road culvert, and did not analyze other upstream drainage structures in the watershed or the existing stormwater system along the lower section of Ludlowville Road.

The primary objectives of this drainage study are to evaluate and model the contributing watersheds along Lansingville, Ridge and Ludlowville Roads and to evaluate the existing drainage system infrastructure including identification of its limiting components. The results of this effort will include preparation of an "existing conditions" model of the watershed which will be used as a tool to plan and design future drainage system improvements intended to mitigate the periodic flooding and sediment loss currently experienced in this area.

2.0 Study Area

2.1 Study Area Description

2.1.1 Primary Study Area

The primary study area begins at the confluence of the unnamed tributary watercourse and Salmon Creek located just downstream of Ludlowville Falls. The watershed area above the confluence totals 183 acres and consists of three major drainage basins that are connected in series as shown in Figure 1. The basins are analyzed separately because at the outlet of each basin, there is a controlling drainage structure that, depending upon flow rates, either routes stormwater to the next downstream drainage basin or diverts flow outside of the study area watershed. If the capacity of the controlling structure is exceeded and overtopped, the flow does not leave the study area watershed and is added as a surcharge load to the next downstream basin.

The primary study area consists of Basins A, B and C. The basin lowest in elevation is Basin C, which extends from the confluence of Salmon Creek up Ludlowville Road to the existing 57" x 38" corrugated metal pipe-arch. The flow through the existing pipe-arch is directed outside of the watershed to converge with Salmon Creek approximately 150 feet downstream of the Ludlowville Road bridge. A separate study focus of this report is the erosive conditions including those associated with the Ludlowville Road culvert which is discussed in Section 4.2.2.4. Basin C totals 16 acres in area and is primarily single family residential developments, woodlands and some agricultural fields. The land consists of moderate to steep terrain with slopes ranging from 10% to areas of 20% or greater.

The second basin is Basin B, which extends from the existing Ludlowville Road 57" x 38" corrugated metal pipe-arch northwest along Ridge Road to the crest of the hill just before the intersection of Beckwith Lane. The basin also extends 0.4 miles north along Lansingville Road to an existing 24" steel cross-culvert. The flow through the Lansingville Road cross-culvert is directed to a hedgerow stream (culvert 5) outside of the main watershed study area. Basin B totals 97 acres in area and is composed primarily of agricultural fields and single family residential developments with some paved road surfaces and scattered woodlands. Excess flows from the Basin B flow to Basin C. The land consists of moderate grade with slopes ranging from 5-10%.

The last basin in the series of three is Basin A, which is the area west of Lansingville Road from the 24" steel cross-culvert northward to the intersection of Davis Road. The basin totals 70 acres in area and is composed primarily of agricultural land with scattered woodlands and single family residential developments. Drainage that exceeds the capacity of the 24" steel cross-culvert flows from Basin A flow into Basin B and ultimately to Basin C. The land consists of moderate grades with slopes ranging from 3-5%.

2.1.2 Secondary Study Area

A separate watershed area was established for a secondary study area that analyzes the 36" culvert that crosses Salmon Creek Road in front of the residence at 34 Salmon Creek Road (see Figure 1). Basin D is not linked to any other drainage basins in the study area. The basin totals 48 acres in area and is primarily woodlands and agricultural fields with slopes averaging 10%.

2.2 Drainage Sub-Area Descriptions – Basis for Hydrologic Modeling

The entire study area drainage basins were divided into a total of 23 sub-catchments for the purposes of completing the watershed model as shown on Figure 2. Sub-catchment boundary lines were developed using Light Detection and Ranging (LIDAR) contour maps provided by the County and Tompkins County Soil and Water Conservation District, detailed field survey conducted by T.G. Miller, and field reconnaissance. As with the larger drainage basins, surface runoff within each sub-catchment is tributary to a single outlet point for that sub-catchment, defined by a culvert pipe, swale/ditch, or closed drainage system.

Individual sub-catchments are summarized in Table 1, generally progressing from the upper-most end of a drainage area, downstream toward the study design point. Land use and soil types within each sub-catchment were determined from aerial mapping and the USDA Soil Conservation Service (SCS) digital soil survey which were used for establishing runoff curve numbers for the model (see Figure 3).

Table 1 – Summary of Drainage Sub-Catchment Areas		
Sub-Catchment	**Area, Acres**	**General Land Use**
Basin A	**69.8**	
A1	15.5	Primarily agricultural, some wooded
A2	14.3	
A3	9.4	
A4	7.3	
A5	23.3	
Basin B	**96.7**	
B1	32.4	Primarily agricultural, some wooded
B2	32.4	
B3	17.9	Primarily residential, some agricultural
B4	4.6	
B5	1.9	
B6	5.4	
B7	2.1	Mix of grass and light forest
Basin C	**16.4**	
C1	0.1	Primarily residential, some wooded
C2	0.2	
C3	0.3	
C4	0.2	
C5	0.3	
C6	13.7	
C7	0.5	
C8	1.1	
Basin D	**48.0**	
D1	15.1	Mix of agricultural and wooded
D2	27.6	
D3	5.3	
TOTAL	**230.9**	

Note: Detailed subarea cover types (land uses) and soil types are provided in the Hydrologic/Hydraulic modeling output of Appendix A.

3.0 Existing Stormwater Infrastructure

As shown on Figure 2, the following is a summary of existing infrastructure within the primary and secondary basins, respectively. The location, size and type of structures were determined by detailed field survey by T.G. Miller and field visits/data collection by B&L personnel conducted on August 12 and October 29, 2008. Several area residents accompanied B&L personnel on October 29 to point out areas of concern and share information regarding existing drainage patterns. This infrastructure was incorporated into the modeling to evaluate the capacity of each respective segment of the existing ditches, culverts, and closed drainage systems.

3.1 Basin A

The upper portion of Basin A begins at the Davis Road intersection and flows south along Lansingville Road to the 24" steel cross-culvert located 0.4 miles north of the intersection of Ridge Road. The stormwater runoff travels overland within sub-catchments down the hillside to the roadside ditches along the west shoulder of Lansingville Road. The runoff is conveyed southward in the grass-lined ditches until intersecting one of the five cross-culverts. Earth embankments block the ditch at the cross-culvert inlets and convey the runoff approximately 45 degrees to enter the 24" diameter steel cross-culverts. The cross-culverts outlet to the east side of Lansingville road into another grass-lined ditch that continues to flow south along the road. The network of ditches and cross-culverts convey all the stormwater in Basin A from north to south to create a hedgerow stream that diverts the runoff eastward outside of the study area watershed to Salmon Creek. The hedgerow stream begins

Lansingville Road – Culvert 5. Start of hedgerow stream.

at the outlet of the 24" cross-culvert which is the design point of Basin A. Should the flows along the west side of Lansingville Road exceed the capacity of the last cross-culvert, the stormwater overtops the embankment in the ditch and continues on the west side of the road to Basin B.

3.2 Basin B

The upper portion of Basin B begins 200 feet south of the intersection of Beckwith Lane Road where stormwater runoff travels overland to the roadside ditch along the north shoulder of Ridge Road. The runoff is carried along the shoulder until entering the closed drainage system at the intersection of Lansingville Road. At this point, the flow from Ridge Road combines with runoff from Lansingville Road.

Lansingville/Ridge Road Intersection

The Ridge Road Basin includes a 0.4 mile segment of Lansingville Road that consists of the area between the 24" steel cross-culvert and the intersection of Ridge Road. Stormwater runoff travels overland to the roadside ditch along the west shoulder of Lansingville Road. Additional flows from Basin A are input into Basin B during large storm events. Runoff then enters a catch basin located 600 feet north of the intersection of Ridge Road where the flow is split to each side of the road. The main outlet consists of a 36" pipe with the same invert as the inlet pipe which keeps a majority of the flow on the west side of Lansingville Road. A secondary outlet consists of a 30" pipe with an invert 3 feet higher than the other inverts to divert

Transition from open to closed drainage at Lansingville/Ridge Road intersection.

some flow to the east side of Lansingville Road when the drainage structure experiences high flows. The runoff that remains on the west side of the road travels through a roadside ditch and enters the closed drainage system to meet the runoff from the western segment of Ridge Road. The runoff that is diverted to the east side of the road flows through a roadside ditch and through two 24" driveway culverts before entering the closed drainage system at the intersection of Ridge Road. The stormwater from both sides of Lansingville Road combine in the closed drainage system at the intersection of Ridge Road.

Open channel drainage upgradient of Ludlowville Road Culvert 12.

Stormwater travels from the intersection of Lansingville Road down the north side of Ridge Road for 560± feet in a closed drainage system consisting of 36" corrugated high density polyethylene (HDPE) pipes. The closed drainage system then outlets into an open channel for 750± feet before entering the 57" x 38" corrugated metal pipe-arch crossing Ludlowville Road. This open channel is deeply incised with steep unvegetated banks and cluttered with dense undergrowth and fallen trees. A second closed drainage system outlets into the channel via a 36" HDPE pipe approximately 350 feet from the beginning of the channel. This closed drainage system brings runoff from the sub-catchments south of Ridge Road and diverts them to the north side of the road. The channel then outlets at the invert of the 57" x 38" pipe-arch crossing Ludlowville Road which is the design point of Basin B. Should the flows exceed the capacity of the pipe-arch,

Ludlowville Road Culvert 12

the stormwater overtops the culvert and continues down the north side of Ludlowville Road into Basin C.

3.3 Basin C

Basin C consists of the area north of Ludlowville Road and beings east of the 57" x 38" pipe-arch that crosses Ludlowville Road. The runoff from the top of the basin is directed to an 18" HDPE pipe on the north side of Ludlowville Road approximately 100 feet below the pipe-arch. Additional flows from the overtopping of the existing pipe-arch are added during significant storm events. The culvert marks the beginning of a 185 foot segment of closed drainage that includes one manhole. The runoff is then carried in an open ditch for 190 feet to an 18" HDPE pipe that begins a 340 foot segment of closed drainage that includes three manholes. The closed drainage system outlets into 400 feet of roadside ditch that contains two 24" driveway pipes. Midway along this ditch, a large volume of runoff enters the ditch from a sub-catchment that begins just east of Ludlowville Road and travels through the yard of 199 Ludlowville Road. The ditch then outlets to a 36" HDPE pipe which crosses under Salmon Creek Road. This 36" HDPE extends approximately 400 feet beyond Salmon Creek Road and then outlets to Salmon Creek.

3.4 Basin D

The basin consists of one 15-acre sub-catchment flowing to a 36" corrugated metal pipe crossing under Salmon Creek Road. The remaining 33 acres is conveyed through a separate 36" HDPE pipe located approximately 180 feet south of the corrugated metal pipe. This culvert has had no history of overtopping and therefore was not included in the model.

4.0 Existing Stormwater Infrastructure Model

4.1 Methodology and Assumptions

4.1.1 Soil Classifications

The various soil classifications within the Ludlowville study area are based on the USDA SCS, digital soil survey for Tompkins County, New York. For modeling purposes the various soil classifications were divided into four (4) Hydrologic Soil Groups; A, B, C, and D. Soils are grouped based on profile characteristics that include depth, texture, organic matter content, structure and degree of swelling when saturated. These groups range from Group A - "well drained soils", to Group D - "poorly drained soils". Runoff from Group D soils, therefore is high; while runoff from Group A soils is low. The soils identified within the study area are B and C which are moderately drained soils. The overlay on Figure 3 shows the limits of the associated Hydrologic Soil Groups for existing soils.

Although the soils within the study drainage basins are moderately well-drained, the effect of infiltration losses through the bottom of a channel or ditch were not applied to the model. The infiltration rate would be impacted significantly by the shallow depth to bedrock in many areas and reliable water table depths were not available. Further, it was assumed that in a worst case situation the available infiltration capacity would be reduced by a preceding wet or frozen period (i.e. spring runoff). Excluding the infiltration option from the model provides a conservative approach that will reduce the possibility of underestimating the modeled runoff volume and peak runoff rates.

4.1.2 Times of Concentration

The time of concentration was determined for each sub-catchment within the project area. The time of concentration is the time at which a sub-catchment area begins to contribute to runoff at its outlet node; this is calculated as the time taken for runoff to flow from the most hydraulically remote point of the drainage area to the design point or outlet. For modeling purposes, the flow path is divided into multiple sections based on three (3) flow types; Sheet Flow, Shallow Concentrated Flow, and Channel Flow. The time required to travel through a given section is determined by three (3) different equations associated with the TR-55 method. Each of these equations determines the travel time through a section incorporating watercourse length, the average watercourse slope of that section, and a coefficient representing the type of groundcover or channel material.

4.1.3 Design Storms

The watersheds of the primary and secondary study areas were modeled in PondPack for the 1-, 5-, 10-, 25-, and 50-year 24-hour storm for Tompkins County, New York. The 100-year storm event was not included in the analysis since all components of the existing drainage system overtop at the 50-year storm event. Rainfall data utilized in the analysis are derived from USDA SCS Technical Release 55. The design storms are based on a Type II, synthetic 24-hour rainfall distribution curve as shown in Appendix A. Table 2 summarizes rainfall for these storm frequencies.

Table 2 Summary of Design Storm Rainfall	
Storm Recurrence Interval	Rainfall Quantity (inches)
1-year	2.3
5-year	3.4
10-Year	3.9
25-year	4.6
50-year	4.9

4.1.4 Hydrologic & Hydraulic Modeling – Primary and Secondary Study Areas

The hydraulic model for the primary and secondary study areas were developed using PondPack from Haestad Methods. A link and node type hydraulic model was constructed for the entire study area based on the existing conditions within the watershed and the existing stormwater infrastructure. The models generate a runoff hydrograph for each sub-catchment based on the TR-55 method as described below.

The hydrographs from the individual sub-catchments are applied to nodes where they combine with runoff hydrographs from other sub-catchments, reach routes or detention areas. The hydrographs are routed through modeled channel and ditch sections (reach routes) using the Modified Pulse Method which uses channel geometry and characteristic information to determine channel capacity and the affect of attenuation (reduction of peak flow rate) on the runoff hydrographs. Reach routing allows the model to transform a sub-catchment runoff hydrograph from its initial point of discharge in a system through the system to a downstream location. At the downstream location the initial hydrograph has combined with other hydrographs and traveled through multiple channel reaches, all with differing characteristics. As the hydrograph moves through the system it undergoes changes in shape (often a reduction in individual peak flow) due to the effects of storage associated with conveying channels.

The model determines the peak runoff through culverts using culvert hydraulic calculation methods which use culvert slope, length, geometry, and losses associated with the inlet and outlet configurations to determine pipe capacity. This calculation method also accounts for the variations in culvert capacity based on inlet and outlet control conditions (i.e., surcharge at the inlet or full pipe flow with free discharge at the outlet). The culverts for the Ludlowville area are inlet controlled since the grades are steep throughout the project area, which provides no opportunity for water to pond at the outlet. The culvert hydraulics were calibrated with a separate HY-8 model.

The model determines peak runoff through the closed drainage systems by modeling the drainage structures as small ponds to account for storage within and around the catch basins when the systems surcharge. Attenuation of flow through catch basins is calculated by the model based on the volume of the catch basin and the capacity of outlet structures. Once the incoming flow rate to the catch basin exceeds the outlet capacity, stormwater is stored in the structure and the water level rises. The closed drainage system overtops once the water level exceeds the rim elevation of the structure. The closed drainage hydraulics were calibrated with a separate StormCAD model.

Flow across roadways at culvert crossings and overtopping of drainage structures were calculated using suppressed weir calculations to approximate the variable conditions observed in the field. Key channel and culvert elevations were obtained through an elevation survey and one foot digital LIDAR contours provided by Tompkins County.

Table 3 summarizes the peak runoff rates that reach the design points at the downstream end of each drainage basin during each of the five (5) design storms. The runoff rates include the stormwater surcharge that may enter the system from overtopping upstream design points. Relevant PondPack model input/output is included in Appendix A.

Table 3 – Summary of Peak Runoff Rates, PondPack Model

Storm Recurrence Interval	Basin A (cfs) [1]	Basin B (cfs) [2]	Basin C (cfs) [3]	Basin D (cfs) [4]
1-year	17	38	5	9
5-year	37	107	20	21
10-year	47	141	51	27
25-year	62	197	100	37
50-year	68	237	131	41

[1] The peak runoff rate is determined at the 24" steel culvert crossing Lansingville Road.
[2] The peak runoff rate is determined at the 57" x 38" corrugated metal pipe-arch crossing Ludlowville Road.
[3] The peak runoff rate is determined at the 36" HDPE crossing Salmon Creek Road.
[4] The peak runoff rate is determined at the 36" CMP crossing Salmon Creek Road.

4.2 Modeling Results and Observations

The modeling results for the primary and secondary study areas are summarized below:

4.2.1 *Basin A*

4.2.1.1 Roadside Ditches

The ditches along the west and east side of Lansingville Road are in fair condition and not limiting factors in the drainage basin. The PondPack model indicates that the ditches along the west side of the roadway provide sufficient capacity up to the 50-year storm event. The ditches along the east side of the roadway also provide sufficient capacity up to the 50-year storm event.

4.2.1.2 Steel Cross-Culverts

A series of five 24" steel cross-culverts carry runoff from the west side of Lansingville Road to the roadside ditch on the east side of the roadway. The flow is then carried southward to the outlet of Clvrt 5 where it is diverted along a hedgerow stream and out of the drainage basin. The results from the PondPack model indicate that the four northernmost cross-culverts (Clvrt 1 thru Clvrt 4 on Figure 2) convey up to the 50-year storm event without overtopping. Stormwater from the sub-catchments along the west side of Lansingville Road down to Clvrt 4 is carried to the ditch on the east side of the road and out of the watershed study area through the hedgerow stream.

According to the PondPack model, the southernmost 24" steel cross-culvert on the west side of Lansingville Road (Clvrt 5) becomes surcharged during significant runoff events. The bulk of stormwater flows are carried by the cross-culvert and are discharged into the hedgerow stream and removed from Basin A. Excess flows not conveyed by the cross culvert are routed into Basin B drainage conveyance system and are ultimately routed through the Ludlowville Road cross culvert. Previous studies did not account for this excess flow to the Ludlowville Road culvert. The condition is summarized in the Table 4.

Table 4 Summary of PondPack Modeling, Lansingville Road Clvrt 5 (Flow to Hedgerow Stream) Capacity			
Storm Recurrence Interval	**Peak Runoff Rate to Clvrt 5 (Inlet, cfs)**	**Peak Runoff Rate Passed by Clvrt 5 (Outlet, cfs)**	**Excess Peak Flows to Ridge Road System (cfs)**
1-Year	17	17	0
5-Year	37	26	11
10-Year	47	27	20
25-Year	62	28	34
50-Year	68	28	40

As shown in the table above, it is estimated that the 24" steel cross-culvert can convey the 1-year runoff without surcharge (i.e., full pipe flow at culvert inlet). Further, the maximum flow conveyed by Clvrt 5 to the channel east of Lansingville Road ranges between approximately 26 to 28 cfs for the 5- and 50-year runoff events, respectively. The culvert becomes surcharged during the peak of the 5-year runoff event. Once the backwater builds to an elevation of 24" over the top of the inlet pipe, the flow begins to overtop the earthen berm at the inlet and continue along the west side of the road. This condition creates an additional surcharge loading to Basin B and C as outlined above. The PondPack results were confirmed using the HY-8 model capacity curve and the results are included in Appendix B.

All the surface runoff generated by Basin A is carried out of the watershed study area via the hedgerow stream except the flows that overtop Clvrt 5 and enter Basin B. The flows directed to the stream range from 20 cfs for the 1-year storm event to 111 cfs for the 50-year storm event. The bed and banks of the hedgerow stream are not armored and the combination of loose soils and significant flows have caused major erosion problems in the downstream section of the hedgerow stream. The erosion has undermined a 1,000 ft. length of dense forest creating a gorge approximately 100 ft across and 25 ft deep. The magnitude of the erosion can also be noted by the large sediment bar at the confluence of Salmon Creek.

Hedgerow stream channel erosion.

4.2.2 *Basin B*

4.2.2.1 Driveway Culverts

Two 24" driveway culverts on the east side of Lansingville Road near the intersection of Ridge Road were included in the PondPack model. It was reported that debris blocked one of the driveway pipes in the past and caused localized flooding of the area. The results of the model indicate that the driveway culverts sufficiently convey the 25-year storm event. The driveway pipes are overtopped at the 50-year storm event which causes runoff to flow over the ditch banks and through private property. It is concluded that the driveway pipes are adequately sized and that the previous flood event was caused by the blockage of the culvert pipe.

4.2.2.2 Closed Drainage System

Basin B consists of two closed drainage systems, one on each the north and south sides of the road. The closed drainage system on the north side of the road is approximately 560 feet long and consists of four catch basins and 36" diameter pipes. The peak runoff rates at the inlet of the closed drainage system include the surcharge from the overflow of Basin A (as described in section 4.2.1.2) along with stormwater from upstream subareas. The results are summarized in Table 5.

Table 5
Summary of PondPack Modeling, North Closed Drainage System (Ridge Road MH-3) Capacity

Storm Recurrence Interval	Peak Runoff Rate to System (Inlet, cfs)	Peak Runoff Rate Passed by System (Outlet, cfs)
1-Year	31	31
5-Year	94	94
10-Year	131	104
25-Year	185	107
50-Year	248	109

As shown in the table above, it is estimated that the closed drainage system can convey the 5-year storm event without surcharge. The culvert becomes surcharged during the 10-year storm event where the water elevation in the drainage structure exceeds the rim elevation. Once this condition is reached, the stormwater is directed along the north shoulder of Ridge Road to the open ditch at the outlet of the closed drainage system (RR Swale1 from Figure 2). Even though the closed drainage system is overtopped during significant storm events, the stormwater remains within the highway boundary and does not impact adjacent private properties. The PondPack results were confirmed using the StormCAD software.

The closed drainage system on the south side of the road is approximately 540 feet long and consists of four catch basins and 36" HDPE pipe. This system collects runoff from the sub-catchments south of Ridge Road and carries it to the north side to RR Swale 2. The results from the PondPack model show that the closed drainage system south of Ridge Road is adequately sized to convey the 50-year storm event.

4.2.2.3 Roadside Ditches

The primary conveyance ditch within Basin B is the earth ditch from the outlet of the closed drainage system on the north side of Ridge Road to the invert of the 57" x 38" pipe-arch crossing Ludlowville Road (RR Swale 1 and RR Swale 2 in Figure 2). The outlets of the two closed drainage systems within the drainage basin combine at the roadside ditch which then carries the flow to the pipe-arch. The PondPack model indicates that the ditch provides sufficient capacity to convey the 50-year storm event.

The other ditches within the drainage basin are along the north side of Ridge Road. These ditches carry runoff from the sub-catchments to the catch basins and also divert overflow to the downstream ditch when the closed drainage system is overtopped. The model shows that these ditches are also sufficient to convey the 50-year storm event.

4.2.2.4 Culverts

The primary design point in the Ridge Road drainage basin is the 57" x 38" corrugated metal pipe-arch crossing Ludlowville

Road (Clvrt 12 in Figure 2). This culvert has overtopped in the past and sent overflow down the north side of Ludlowville Road. The peak runoff rates at the inlet of the culvert include the surcharge from the overflow of Basin A as described in section 4.2.1.2. The results from the PondPack model are summarized in Table 6.

Table 6
Summary of PondPack Modeling, Ludlowville Road Clvrt 12 Capacity

Storm Recurrence Interval	Peak Runoff Rate to Clvrt 12 (Inlet, cfs)	Peak Runoff Rate Passed by Clvrt 12 (Outlet, cfs)	Overflow to North Side of Ludlowville Road (cfs)
1-Year	38	38	0
5-Year	107	84	21
10-Year	141	88	52
25-Year	197	93	103
50-Year	237	96	138

As shown in the table above, it is estimated that existing pipe-arch sufficiently conveys the 1-year storm event, but overtops during the peak of the 5-year storm event. The maximum flow conveyed by the culvert to the south side of Ludlowville Road ranges between 84 and 96 cfs for the 5- and 50- year runoff events, respectively. These results of the culvert analysis were confirmed using the HY-8 model capacity curve. When the peak runoff rate exceeds the capacity of the culvert, the backwater elevation builds until overtopping the stream bank and sending a surcharge flow down the north side of Ludlowville Road into Basin C.

Channel erosion downgradient of Ludlowville Road Culvert 12.

The stormwater runoff conveyed by Clvrt 12 is directed to an open channel that flows 0.4 miles to the southeast to converge with Salmon Creek. The upper portion of the channel is composed of earthen bed and banks with no stream armoring. The outlet velocity of Clvrt 12 was determined by the HY-8 model which ranged from 11.9 ft/s for the 1-year storm to 15.6 ft/s at the capacity of the structure. By comparison, steep channels should generally have velocities ≤3 ft/s to maintain non-erosive conditions. The combination of the large outlet velocities and loose soils in the channel substantiate the significant amount of erosion downstream of the structure. The flows have undermined trees and vegetation on the banks creating near vertical channel side slopes that are prone to further erosion without corrective measures.

Lower unnamed tributary channel.

The lower portion of the channel is characterized by a shallow bedrock bottom and earthen banks. The capacity of the channel is significantly reduced before dropping approximately 30 feet off of a shear rock face behind the residence of 138 Ludlowville Road. The channel cross section reduces to 8 feet wide by 1 foot high which conveys the 1-year

Waterfall at 138 Ludlowville Road.

storm event, but overtops at the 5-year storm event. When the flows overtop the channel banks, they are directed towards the back yard of 138 Ludlowville Road.

4.2.3 *Basin C*

4.2.3.1 Closed Drainage System

Basin C consists of two closed drainage systems on the north side of the road between the Ludlowville Road culvert and Salmon Creek Road. The peak runoff rates at the inlet of the closed drainage system include the surcharge from the overflow of Basins A and B. The results from the PondPack model are summarized in Tables 7 and 8.

Table 7
Summary of PondPack Modeling, Capacity of Western Segment of Ludlowville Road Closed Drainage System

Storm Recurrence Interval	Peak Runoff Rate From Basin C (Inlet, cfs)	Peak Runoff Rate from Overflow (Inlet, cfs)	Peak Runoff Rate Passed by System (Outlet, cfs)	Excess Runoff (cfs)
1-Year	0.3	0	0.3	0
5-Year	0.7	21	19	2.7
10-Year	0.8	52	25	27.8
25-Year	1.1	103	27	77.1
50-Year	1.2	138	28	111.2

Table 8
Summary of PondPack Modeling, Capacity of Eastern Segment of Ludlowville Road Closed Drainage System

Storm Recurrence Interval	Peak Runoff Rate From Basin C (Inlet, cfs)	Peak Runoff Rate from Overflow (Inlet, cfs)	Peak Runoff Rate Passed by System (Outlet, cfs)	Excess Runoff (cfs)
1-Year	0.7	0	0.7	0
5-Year	1.6	21	18	4.6
10-Year	2.0	52	28	26.0
25-Year	2.6	103	31	74.6
50-Year	2.9	138	32	108.9

As shown in the tables above, the PondPack model indicates that the existing closed drainage system is sufficient when only handling runoff from Basin C subareas. The capacity of the closed drainage system is exceeded when the Ludlowville Road cross-culvert is overtopped and the surcharge flow is added to the system during the peak of the 5-year storm event. When the closed drainage system overtops, the additional flow is directed along the north side of Ludlowville Road and onto private properties.

4.2.3.2 Roadside Ditches

Three open channels, including Ldlwvl 1 thru Ldlwvl 3 from Figure 2, are located within Basin C on the north side of Ludlowville Road. The ditches primary function is to carry stormwater down the north side of Ludlowville Road to the culvert crossing Salmon Creek Road. The PondPack model shows that the ditches are sufficient to convey the 50-year storm event. However, as outlined above, the intermixed closed drainage system will not convey flows including and in excess of the 5-year storm event. The excess flow from the closed drainage system is routed onto adjacent private properties.

4.2.3.3 Culverts

The primary design point in Basin C is the 36" HDPE pipe crossing Salmon Creek Road (Clvrt 18 in Figure 2). This culvert has overtopped in the past and sent overflow onto private property. The peak runoff rates at the inlet of the culvert include the surcharge from the overflows of Basins A and B as described in sections 4.2.1.2 and 4.2.2.4, respectively. The results from the PondPack model are summarized in Table 9.

Table 9 Summary of PondPack Modeling, Salmon Creek Road Clvrt 18 Capacity			
Storm Recurrence Interval	**Peak Runoff Rate To Culvert (Inlet, cfs)**	**Peak Runoff Rate Passed by Culvert (Outlet, cfs)**	**Overflow (cfs)**
1-Year	5	5	0
5-Year	20	19	0
10-Year	51	36	14
25-Year	100	38	60
50-Year	131	39	91

As shown in the table above, it is estimated that existing 36" culvert pipe sufficiently conveys the 5-year storm event, but overtops during the peak of the 10-year storm event. The maximum flow conveyed by the culvert to the east side of Salmon Creek Road ranges between 36 and 39 cfs for the 10- and 50- year runoff events, respectively. When the peak runoff rate exceeds the capacity of the culvert, the backwater elevation builds until overtopping the channel and sends stormwater towards adjacent private property.

4.2.4 *Basin D*

4.2.4.1 <u>Culverts</u>

The primary design point in Basin D is the 36" corrugated metal pipe crossing Salmon Creek Road (Salmon Crk Clvrt in Figure 2). The peak runoff rates at the inlet of the culvert are generated from one sub-catchment that extends from Salmon Creek Road to Lansingville Road. There is no potential for surcharge loading in Basin D due to the absence of upstream drainage structures that could overtop. The results from the PondPack model are summarized in Table 10.

Table 10 Summary of PondPack Modeling, Salmon Creek Culvert Capacity			
Storm Recurrence Interval	**Peak Runoff Rate To Culvert (Inlet, cfs)**	**Peak Runoff Rate Passed by Culvert (Outlet, cfs)**	**Overflow (cfs)**
1-Year	9	9	0
5-Year	21	21	0
10-Year	27	27	0
25-Year	37	35	2
50-Year	41	36	5

As shown in the table above, it is estimated that existing 36" culvert pipe sufficiently conveys the 10-year storm event, but overtops during the peak of the 25-year storm event. The maximum flow conveyed by the culvert to the east side of Salmon Creek Road is approximately 35 cfs. When the peak runoff rate exceeds the capacity of the culvert, the backwater elevation builds onto private property and into the driveway of 34 Salmon Creek Road. The velocity of the runoff that travels parallel to the driveway is significant due to the volume of water and the slope of the drainage basin. The modeling substantiates the issues that the adjacent resident has reported regarding their driveway washing out.

4.3 Design Storm Summary

The following shall serve to generally summarize stormwater flow routing within the primary and secondary study areas for the 1-, 5-, 10-, 25- and 50-year design storms. Descriptions of flooding characteristics are based on the hydrographs and PondPack modeling of Appendix A, discussions with area residents, and field observations. The summaries are based on the assumptions that all channels, culverts and closed drainage systems are maintained free of obstacles.

1-Year Storm:

- The culverts and closed drainage systems within both the primary and secondary study areas convey all modeled runoff through the structures.

5-Year Storm:

- Basin A - The culvert at the downstream end of the drainage basin (Clvrt 5) overtops, sending 11 cfs to Basin B.
- Basin B - The closed drainage system along the north side of Ridge Road conveys all of the flow to the culvert at the downstream end of Basin B. The 57" x 38" pipe-arch crossing Ludlowville Road (Clvrt 12) overtops, sending 22 cfs to Basin C. The lower portion of the unnamed tributary also overtops during the 5-year storm event at the crest of the waterfall above the 138 Ludlowville Road property.
- Basin C - The closed drainage system along the north side of Ludlowville Road overtops, but the culvert at the downstream end

of the basin (Clvrt 18) conveys all of the runoff through the structure.

- Basin D - The culvert at the downstream end of the drainage basin conveys all of the stormwater runoff.

10-Year Storm:

- Basin A - The culvert at the downstream end of the drainage basin (Clvrt 5) overtops, sending 20 cfs to Basin B.

- Basin B - The closed drainage system along the north side of Ridge Road is overwhelmed, sending 27 cfs along the north drainage ditch/shoulder down to the culvert at the downstream end of the basin. The 57" x 38" pipe-arch crossing Ludlowville Road overtops (Clvrt 12), sending 53 cfs to Basin C. The lower portion of the unnamed tributary also overtops during the 10-year storm event at the crest of the waterfall above the 138 Ludlowville Road property.

- Basin C - The closed drainage system along the north side of Ludlowville Road overtops as well as the culvert at the downstream end of the drainage basin (Clvrt 18). The structure is overwhelmed by 14 cfs.

- Basin D - The culvert at the downstream end of the drainage basin conveys all of the stormwater runoff

25-Year Storm:

- Basin A - The culvert at the downstream end of the drainage basin (Clvrt 5) overtops, sending 34 cfs to Basin B.

- Basin B - The closed drainage system along the north side of Ridge Road is overwhelmed, sending 78 cfs along the north drainage ditch/shoulder down to the culvert at the downstream end of the basin. The 57" x 38" pipe-arch crossing Ludlowville Road (Clvrt 12) overtops, sending 104 cfs to Basin C. The lower portion of the unnamed tributary also overtops during the 25-year storm event at the crest of the waterfall above the 138 Ludlowville Road property.

- Basin C - The closed drainage system along the north side of Ludlowville Road overtops as well as the culvert at the downstream of the drainage basin (Clvrt 18). The structure is overwhelmed by 62 cfs.

- Basin D - The culvert at the downstream end of the drainage basin overtops, sending 2 cfs onto private property and onto Salmon Creek Road.

50-Year Storm:

- Basin A - The culvert at the downstream end of the drainage basin (Clvrt 5) overtops, sending 40 cfs to Basin B.

- Basin B - The closed drainage system along the north side of Ridge Road is overwhelmed, sending 139 cfs along the north drainage ditch/shoulder down to the culvert at the downstream end of the basin. The 57" x 38" pipe-arch crossing Ludlowville Road (Clvrt 12) overtops, sending 140 cfs to Basin C. The lower portion of the unnamed tributary also overtops during the 50-year storm event at the crest of the waterfall above the 138 Ludlowville Road property.

- Basin C - The closed drainage system along the north side of Ludlowville Road overtops as well as the culvert at the downstream end of the drainage basin (Clvrt 18). The structure is overwhelmed by 92 cfs.

- Basin D - The culvert at the downstream end of the drainage basin overtops, sending 5 cfs onto private property and onto Salmon Creek Road.

The following table identifies structures that are unable to design storm flow rates, along with discharge locations of excess flows.

Table 11 – Summary of Drainage Structure Limitations

Design Storm	Structure	Excess Flow Routed to:
1	All modeled structures pass design storm flows	None
5	Basin A Clvrt 5 Basin B Clvrt 12	Basin B Drainage System Basin C Drainage System
10	Basin A Clvrt 5 Basin B Clvrt 12 Basin C Clvrt 18	Basin B Drainage System Basin C Drainage System Private Properties
25	Basin A Clvrt 5 Basin B Clvrt 12 Basin C Clvrt 18 Basin D Salmon Creek Rd Clvrt	Basin B Drainage System Basin C Drainage System Private Properties Private Properties
50	Same as 25-year storm	Same as 25-year storm

The locations of structure overtopping/surcharging and associated design storms are depicted on Figure 4.

5.0 Stormwater Infrastructure Improvement Opportunities

5.1 Improvement Opportunities

This study has examined in detail and determined the limiting components of the existing stormwater system along Lansingville, Ridge, Ludlowville and Salmon Creek Roads and has provided focus points for areas that may warrant improvements. The existing stormwater system is complex with many drainage structures connected in series. The overtopping of one upstream structure can have cumulative effects on downstream structures.

The peak runoff rate exceeding the capacity of the culverts at the downstream end of Basins A and B is a major contributor to the drainage issues in the area. Excess flows from these areas have caused downgradient issues, specifically at the Ludlowville Road culvert. This culvert has overtopped and caused several localized drainage issues along Ludlowville Road.

The study has also identified areas prone to erosion and sediment loss. Flows have undermined areas of forest and undergrowth by undercutting of the existing channel, exposing the loose soils beneath. These barren areas cannot establish plan growth to stabilize the slopes due to the steep grades and continuing erosion of the channel. Even light rains or snow melts continue to erode streambank sections. Particular areas of note include the hedgerow channel conveying flow from Lansingville Road (Culvert 5) to Salmon Creek (outside of the main study area) and sections of the unnamed tributary directly up and down gradient from culvert 12 on Ludlowville Road. A key consideration in the future improvement opportunities will be to eliminate and restore streambank channels to stable conditions in association with flood hazard mitigation.

This study examined the limitations of the existing drainage system. Further evaluation of potential improvements is the next phase of the study. Several concepts may be considered to improve the existing stormwater system including:

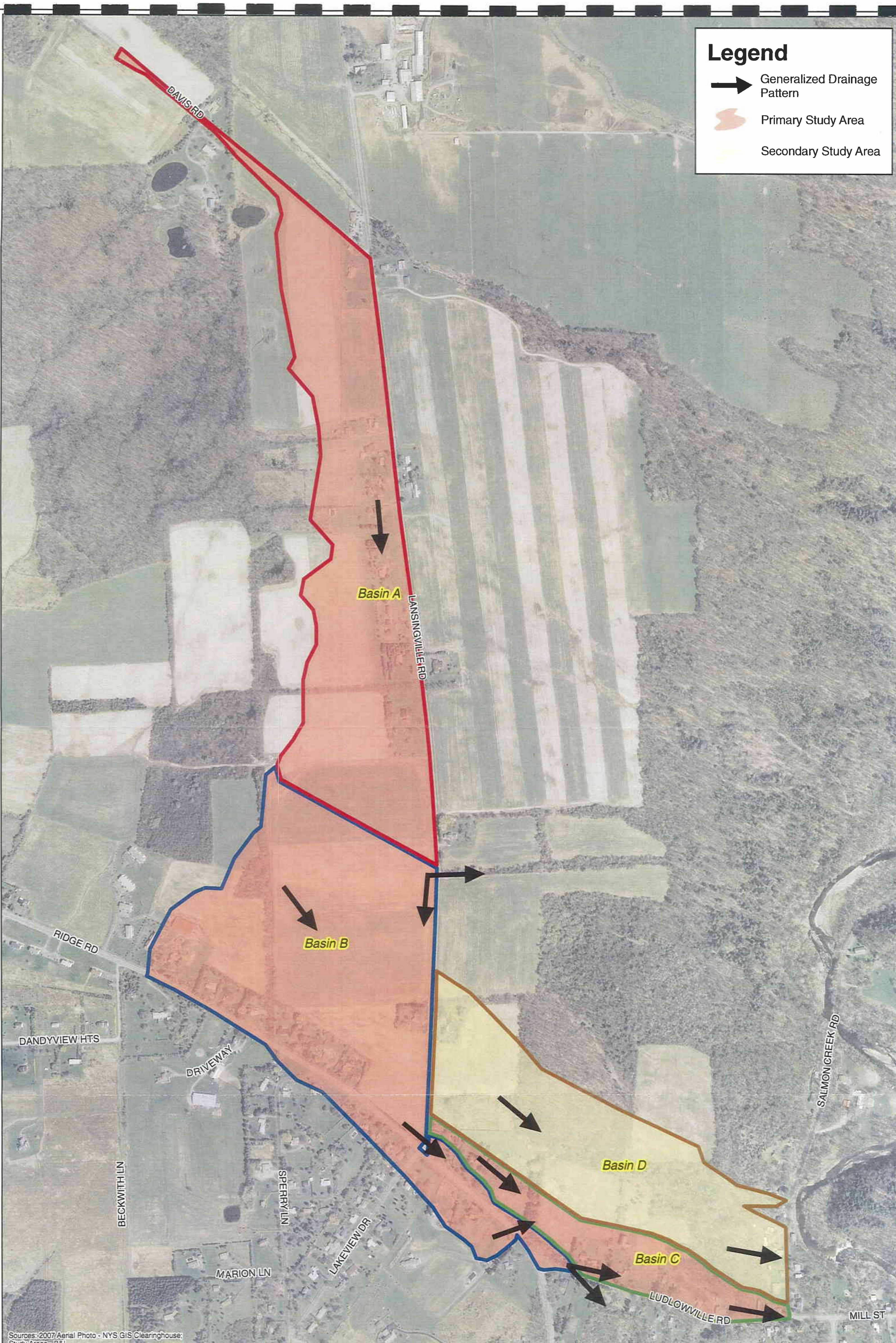
- Increasing the capacity of Clvrt 5 (at the downstream end of Basin A) to eliminate some of the surcharge flow to Ridge Road and ultimately to Ludlowville Road. This may require several improvements to the downstream channel on private property and require easements.
- Modifying existing drainage patterns to divert stormwater runoff away from Clvrt 12 (Ludlowville Road) and convey excess flows along Ridge Road to follow the "natural" drainage pathways.
- Constructing detention basin(s) to store runoff and regulate flows through the watershed.
- Stream bank stabilization channel improvements
- Velocity reducing practices such as check dams.
- Evaluation of above alternatives on the impacts of erosive velocities within Salmon Creek and its tributary.

Further discussion and detailed evaluation of these alternatives, and potentially other alternatives, along with supporting documentation will be provided in the next phase of the study. Opportunity areas will address the potential easements and access agreements, which were not incorporated into this report. All proposed improvements will include an evaluation of downgradient receptors to ensure that the existing conditions are not simply passed on downstream. The evaluation will also include an assessment of the water quality benefits to the receiving waters of Salmon Creek and Cayuga Lake.

Written comments regarding the subject of this report should be directed to:

Scott Doyle, AICP, Senior Planner
Tompkins County Department of Planning
121 East Court Street
Ithaca, New York 14850

Figures



Barton & Loguidice, P.C.

Engineers • Environmental Scientists • Planners • Landscape Architects

0 300 600 1,200 Feet

Ludlowville Drainage Study

Study Area Map

Tompkins County 12/12/08 New York

Figure 1

Project No. 560.013

Barton & Loguidice, P.C.

Engineers • Environmental Scientists • Planners • Landscape Architects

Ludlowville Stormwater Control Project

Existing Conditions - Drainage Areas

Tompkins County 12/14/08 New York

Figure

2

560.013

Barton & Loguidice, P.C.

Engineers • Environmental Scientists • Planners • Landscape Architects

0 500 1,000 Feet

Ludlowville Drainage Study

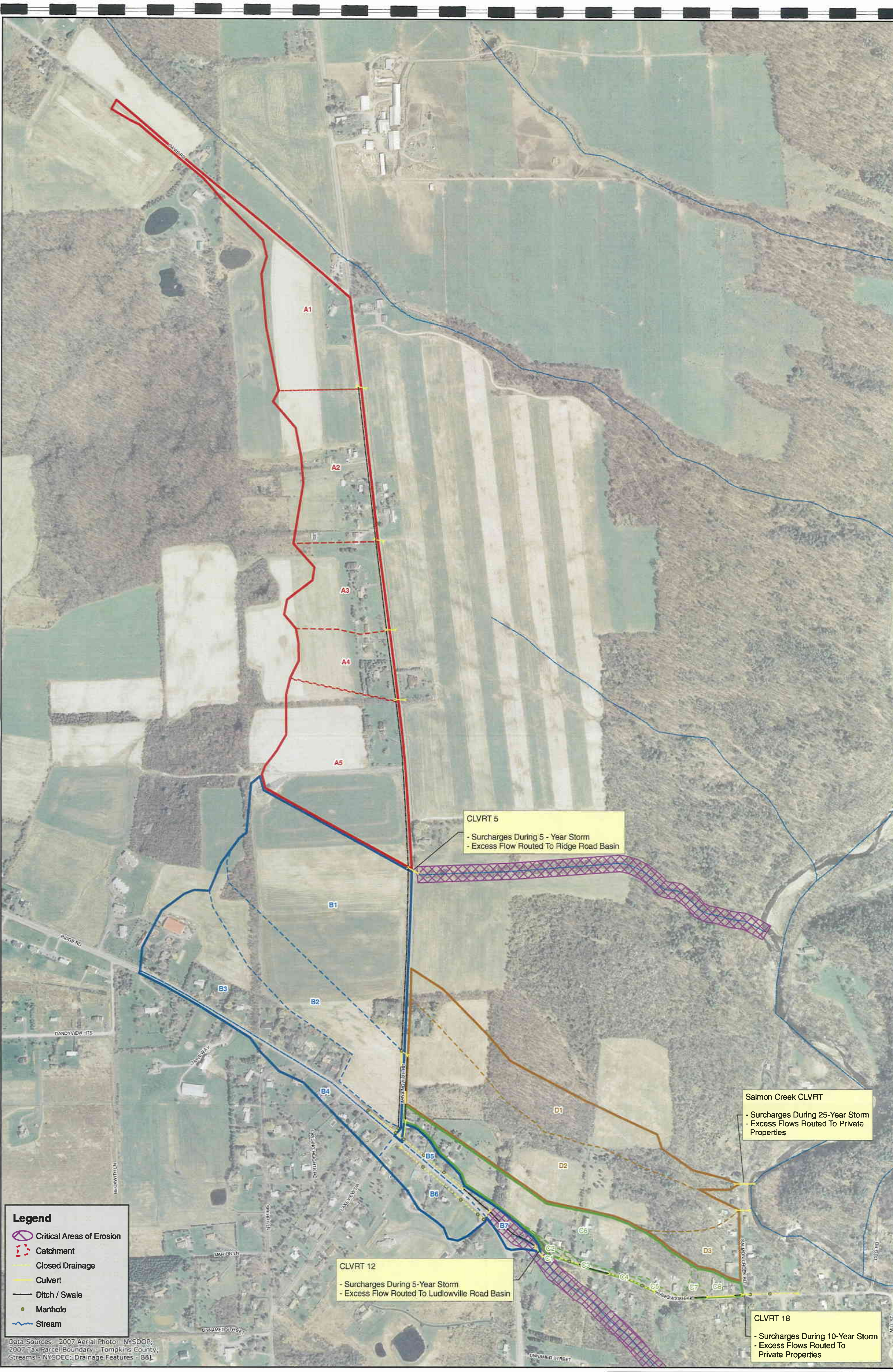
Study Area Soil Classifications

Tompkins County 12/12/08 New York

Figure 3

Project No. 560.013

K:\Projects\500\560013\Projects\Figure 3 soils.mxd



Barton & Loguidice, P.C.

Engineers • Environmental Scientists • Planners • Landscape Architects

0 500 1,000 Feet

Ludlowville Stormwater Control Project

Existing Conditions
Drainage Structure Limitations

Tompkins County 2/25/09 New York

Figure 4

560.013

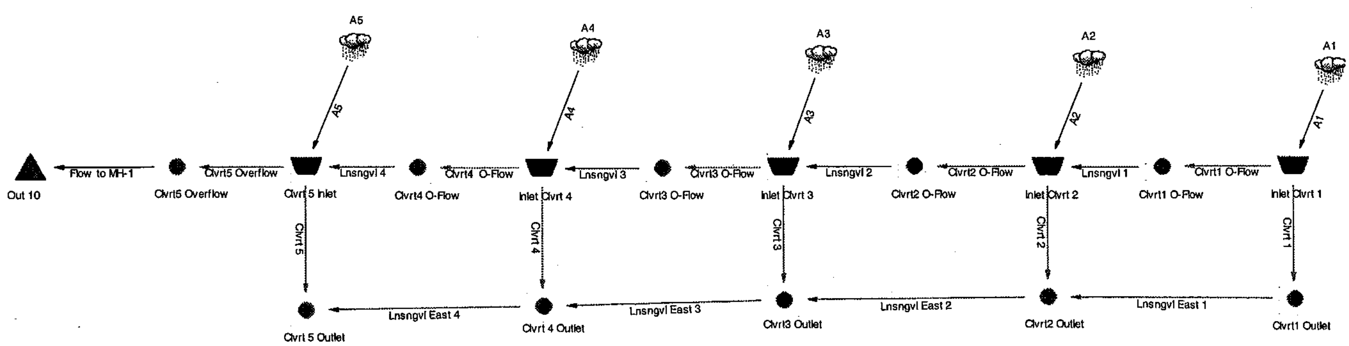
Appendices

Appendix A

PondPack Modeling Output

PondPack Modeling Output

Basin A



A5
A4
A3
A2
A1
A5
A4
A3
A2
A1
Out 10
Flow to MH-1
Clvrt5 Overflow
Clvrt5 Overflow
Clvrt 5 Inlet
Lnsngvl 4
Clvrt4 O-Flow
Clvrt4 O-Flow
Inlet Clvrt 4
Lnsngvl 3
Clvrt3 O-Flow
Clvrt3 O-Flow
Inlet Clvrt 3
Lnsngvl 2
Clvrt2 O-Flow
Clvrt2 O-Flow
Inlet Clvrt 2
Lnsngvl 1
Clvrt1 O-Flow
Clvrt1 O-Flow
Inlet Clvrt 1
Clvrt 5
Clvrt 4
Clvrt 3
Clvrt 2
Clvrt 1
Clvrt 5 Outlet
Lnsngvl East 4
Clvrt 4 Outlet
Lnsngvl East 3
Clvrt3 Outlet
Lnsngvl East 2
Clvrt2 Outlet
Lnsngvl East 1
Clvrt1 Outlet

Table of Contents

********************** REACH ROUTING ***********************

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

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Tompkins County

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.3000	Synthetic Curve	TypeII 24hr
5	3.4000	Synthetic Curve	TypeII 24hr
10	3.9000	Synthetic Curve	TypeII 24hr
25	4.6000	Synthetic Curve	TypeII 24hr
50	4.9000	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
A1	AREA	1	.431		12.1500	3.90		
A1	AREA	5	1.156		12.1000	13.66		
A1	AREA	10	1.553		12.1000	19.07		
A1	AREA	25	2.160		12.1000	27.27		
A1	AREA	50	2.435		12.1000	30.96		
A2	AREA	1	.397		12.1500	3.48		
A2	AREA	5	1.065		12.1000	12.17		
A2	AREA	10	1.431		12.1000	17.05		
A2	AREA	25	1.991		12.1000	24.46		
A2	AREA	50	2.245		12.1000	27.79		
A3	AREA	1	.261		12.2000	2.01		
A3	AREA	5	.701		12.1500	7.15		
A3	AREA	10	.942		12.1500	10.03		
A3	AREA	25	1.311		12.1500	14.41		
A3	AREA	50	1.478		12.1500	16.38		

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
A4	AREA	1	.203		12.1500	1.83		
A4	AREA	5	.544		12.1000	6.46		
A4	AREA	10	.732		12.1000	9.02		
A4	AREA	25	1.018		12.1000	12.90		
A4	AREA	50	1.147		12.1000	14.65		
A5	AREA	1	1.371		12.1000	16.75		
A5	AREA	5	2.890		12.1000	37.00		
A5	AREA	10	3.654		12.1000	47.01		
A5	AREA	25	4.776		12.1000	61.51		
A5	AREA	50	5.271		12.1000	67.85		
CLVRT 4 OUTLET	JCT	1	1.291		12.2500	9.59		
CLVRT 4 OUTLET	JCT	5	3.466		12.2000	36.59		
CLVRT 4 OUTLET	JCT	10	4.658		12.2000	51.25		
CLVRT 4 OUTLET	JCT	25	6.479		12.2000	73.73		
CLVRT 4 OUTLET	JCT	50	7.304		12.2000	83.82		
CLVRT 5 INLETIN	POND	1	1.371		12.1000	16.75		
CLVRT 5 INLETIN	POND	5	2.890		12.1000	37.00		
CLVRT 5 INLETIN	POND	10	3.654		12.1000	47.01		
CLVRT 5 INLETIN	POND	25	4.776		12.1000	61.51		
CLVRT 5 INLETIN	POND	50	5.271		12.1000	67.85		
+CLVRT 5 INLETOUT	POND	1	1.371		12.1000	16.30	863.49	.018
+CLVRT 5 INLETOUT	POND	5	2.889		12.1000	36.50	865.30	.046
+CLVRT 5 INLETOUT	POND	10	3.654		12.1000	46.53	865.48	.049
+CLVRT 5 INLETOUT	POND	25	4.776		12.1000	61.09	865.69	.054
+CLVRT 5 INLETOUT	POND	50	5.271		12.1000	67.46	865.77	.056
*CLVRT 5 OUTLET	JCT	1	2.661		12.2000	20.39		
*CLVRT 5 OUTLET	JCT	5	6.223		12.2500	61.11		
*CLVRT 5 OUTLET	JCT	10	7.972		12.2500	76.56		
*CLVRT 5 OUTLET	JCT	25	10.545		12.2000	100.15		
*CLVRT 5 OUTLET	JCT	50	11.686		12.2000	110.82		

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
CLVRT1 O-FLOW	JCT	1	.000		.0500	.00		
CLVRT1 O-FLOW	JCT	5	.000		.0500	.00		
CLVRT1 O-FLOW	JCT	10	.000		.0500	.00		
CLVRT1 O-FLOW	JCT	25	.000		.0500	.00		
CLVRT1 O-FLOW	JCT	50	.000		.0500	.00		
CLVRT1 OUTLET	JCT	1	.431		12.1500	3.84		
CLVRT1 OUTLET	JCT	5	1.156		12.1500	13.36		
CLVRT1 OUTLET	JCT	10	1.553		12.1500	18.55		
CLVRT1 OUTLET	JCT	25	2.160		12.1000	26.63		
CLVRT1 OUTLET	JCT	50	2.435		12.1000	30.30		
CLVRT2 O-FLOW	JCT	1	.000		.0500	.00		
CLVRT2 O-FLOW	JCT	5	.000		.0500	.00		
CLVRT2 O-FLOW	JCT	10	.000		.0500	.00		
CLVRT2 O-FLOW	JCT	25	.000		.0500	.00		
CLVRT2 O-FLOW	JCT	50	.000		.0500	.00		
CLVRT2 OUTLET	JCT	1	.827		12.2000	6.39		
CLVRT2 OUTLET	JCT	5	2.221		12.1500	24.12		
CLVRT2 OUTLET	JCT	10	2.984		12.1500	34.19		
CLVRT2 OUTLET	JCT	25	4.151		12.1500	49.40		
CLVRT2 OUTLET	JCT	50	4.679		12.1500	56.24		
CLVRT3 O-FLOW	JCT	1	.000		.0500	.00		
CLVRT3 O-FLOW	JCT	5	.000		.0500	.00		
CLVRT3 O-FLOW	JCT	10	.000		.0500	.00		
CLVRT3 O-FLOW	JCT	25	.000		.0500	.00		
CLVRT3 O-FLOW	JCT	50	.000		.0500	.00		
CLVRT3 OUTLET	JCT	1	1.088		12.2500	8.27		
CLVRT3 OUTLET	JCT	5	2.922		12.2000	31.02		
CLVRT3 OUTLET	JCT	10	3.926		12.2000	43.50		
CLVRT3 OUTLET	JCT	25	5.461		12.1500	62.93		
CLVRT3 OUTLET	JCT	50	6.157		12.1500	71.82		

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
CLVRT4 O-FLOW	JCT	1	.000		.0500	.00		
CLVRT4 O-FLOW	JCT	5	.000		.0500	.00		
CLVRT4 O-FLOW	JCT	10	.000		.0500	.00		
CLVRT4 O-FLOW	JCT	25	.000		.0500	.00		
CLVRT4 O-FLOW	JCT	50	.000		.0500	.00		
CLVRT5 OVERFLOW	JCT	1	.000		.0500	.00		
CLVRT5 OVERFLOW	JCT	5	.132		12.1000	9.32		
CLVRT5 OVERFLOW	JCT	10	.339		12.1000	18.56		
CLVRT5 OVERFLOW	JCT	25	.709		12.1000	32.19		
CLVRT5 OVERFLOW	JCT	50	.889		12.1000	38.20		
INLET CLVRT 1IN	POND	1	.431		12.1500	3.90		
INLET CLVRT 1IN	POND	5	1.156		12.1000	13.66		
INLET CLVRT 1IN	POND	10	1.553		12.1000	19.07		
INLET CLVRT 1IN	POND	25	2.160		12.1000	27.27		
INLET CLVRT 1IN	POND	50	2.435		12.1000	30.96		
+INLET CLVRT 1OUT	POND	1	.431		12.1500	3.84	965.06	.004
+INLET CLVRT 1OUT	POND	5	1.156		12.1500	13.36	966.18	.012
+INLET CLVRT 1OUT	POND	10	1.553		12.1500	18.55	966.73	.017
+INLET CLVRT 1OUT	POND	25	2.160		12.1000	26.63	968.18	.041
+INLET CLVRT 1OUT	POND	50	2.435		12.1000	30.30	969.02	.061
INLET CLVRT 2IN	POND	1	.397		12.1500	3.48		
INLET CLVRT 2IN	POND	5	1.065		12.1000	12.17		
INLET CLVRT 2IN	POND	10	1.431		12.1000	17.05		
INLET CLVRT 2IN	POND	25	1.991		12.1000	24.46		
INLET CLVRT 2IN	POND	50	2.245		12.1000	27.79		
+INLET CLVRT 2OUT	POND	1	.397		12.1500	3.39	944.99	.003
+INLET CLVRT 2OUT	POND	5	1.065		12.1500	12.03	946.04	.010
+INLET CLVRT 2OUT	POND	10	1.431		12.1500	16.75	946.53	.015
+INLET CLVRT 2OUT	POND	25	1.991		12.1500	23.89	947.62	.031
+INLET CLVRT 2OUT	POND	50	2.245		12.1500	27.10	948.28	.044

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
INLET CLVRT 3IN	POND	1	.261		12.2000	2.01		
INLET CLVRT 3IN	POND	5	.701		12.1500	7.15		
INLET CLVRT 3IN	POND	10	.942		12.1500	10.03		
INLET CLVRT 3IN	POND	25	1.311		12.1500	14.41		
INLET CLVRT 3IN	POND	50	1.478		12.1500	16.38		
+INLET CLVRT 3OUT	POND	1	.261		12.2000	1.98	918.75	.002
+INLET CLVRT 3OUT	POND	5	.701		12.2000	7.05	919.49	.006
+INLET CLVRT 3OUT	POND	10	.942		12.2000	9.85	919.81	.008
+INLET CLVRT 3OUT	POND	25	1.311		12.1500	14.20	920.27	.012
+INLET CLVRT 3OUT	POND	50	1.478		12.1500	16.17	920.47	.015
INLET CLVRT 4IN	POND	1	.203		12.1500	1.83		
INLET CLVRT 4IN	POND	5	.544		12.1000	6.46		
INLET CLVRT 4IN	POND	10	.732		12.1000	9.02		
INLET CLVRT 4IN	POND	25	1.018		12.1000	12.90		
INLET CLVRT 4IN	POND	50	1.147		12.1000	14.65		
+INLET CLVRT 4OUT	POND	1	.203		12.1500	1.81	903.71	.002
+INLET CLVRT 4OUT	POND	5	.544		12.1500	6.31	904.40	.005
+INLET CLVRT 4OUT	POND	10	.732		12.1500	8.75	904.69	.007
+INLET CLVRT 4OUT	POND	25	1.018		12.1000	12.60	905.10	.011
+INLET CLVRT 4OUT	POND	50	1.147		12.1000	14.34	905.28	.013
*OUT 10	JCT	1	.000		.0500	.00		
*OUT 10	JCT	5	.132		12.1000	9.32		
*OUT 10	JCT	10	.339		12.1000	18.56		
*OUT 10	JCT	25	.709		12.1000	32.19		
*OUT 10	JCT	50	.889		12.1000	38.20		

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinA.ppw

---

Title... Project Date: 11/19/2008
Project Engineer: BMT
Project Title: Ludlowville Storm Drainage
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Tompkins County

Storm Tag Name = 1

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.3000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 5

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 3.4000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 3.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 4.6000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 50

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 4.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

---

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

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

Segment #1:  Tc: TR-55 Sheet

Mannings n           .3000
Hydraulic Length   100.00 ft
2yr, 24hr P        2.7000 in
Slope             .050000 ft/ft

Avg.Velocity          .13 ft/sec

                                         Segment #1 Time:     .2145 hrs
----------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   300.00 ft
Slope             .070000 ft/ft
Unpaved

Avg.Velocity         4.27 ft/sec

                                         Segment #2 Time:     .0195 hrs
----------------------------------------------------------------------

Segment #3:  Tc: TR-55 Channel

Flow Area          9.0000 sq.ft
Wetted Perimeter     7.00 ft
Hydraulic Radius     1.29 ft
Slope             .010000 ft/ft
Mannings n           .0500
Hydraulic Length  1100.00 ft

Avg.Velocity         3.52 ft/sec

                                         Segment #3 Time:     .0867 hrs
----------------------------------------------------------------------

                                              ========================
                                               Total Tc:      .3208 hrs
                                              ========================
```

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

```
Unpaved surface:
V  = 16.1345 * (Sf**0.5)

Paved surface:
V  = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ==

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.3000	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.7000	in
Slope	.040000	ft/ft
Avg.Velocity	.12	ft/sec

Segment #1 Time: .2346 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	500.00	ft
Slope	.060000	ft/ft
Unpaved		
Avg.Velocity	3.95	ft/sec

Segment #2 Time: .0351 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	10.0000	sq.ft
Wetted Perimeter	8.00	ft
Hydraulic Radius	1.25	ft
Slope	.018000	ft/ft
Mannings n	.0500	
Hydraulic Length	1100.00	ft
Avg.Velocity	4.64	ft/sec

Segment #3 Time: .0659 hrs

========================
Total Tc: .3356 hrs
========================

```
-----------------------------------------------------------------------
Tc Equations used...
-----------------------------------------------------------------------


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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

     Unpaved surface:
     V  = 16.1345 * (Sf**0.5)

     Paved surface:
     V  = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ==

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinA.ppw

::

TIME OF CONCENTRATION CALCULATOR

::

Segment #1: Tc: TR-55 Sheet

Mannings n	.3000	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.7000	in
Slope	.015000	ft/ft
Avg.Velocity	.08	ft/sec

Segment #1 Time: .3473 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	500.00	ft
Slope	.060000	ft/ft
Unpaved		
Avg.Velocity	3.95	ft/sec

Segment #2 Time: .0351 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	11.0000	sq.ft
Wetted Perimeter	9.00	ft
Hydraulic Radius	1.22	ft
Slope	.030000	ft/ft
Mannings n	.0500	
Hydraulic Length	600.00	ft
Avg.Velocity	5.90	ft/sec

Segment #3 Time: .0282 hrs

========================

Total Tc: .4107 hrs

========================

```
-----------------------------------------------------------------------
Tc Equations used...
-----------------------------------------------------------------------

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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

     Unpaved surface:
     V  = 16.1345 * (Sf**0.5)

     Paved surface:
     V  = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ==

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.3000	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.7000	in
Slope	.030000	ft/ft
Avg.Velocity	.11	ft/sec

Segment #1 Time: .2632 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	580.00	ft
Slope	.080000	ft/ft
Unpaved		
Avg.Velocity	4.56	ft/sec

Segment #2 Time: .0353 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	11.0000	sq.ft
Wetted Perimeter	9.00	ft
Hydraulic Radius	1.22	ft
Slope	.030000	ft/ft
Mannings n	.0500	
Hydraulic Length	470.00	ft
Avg.Velocity	5.90	ft/sec

Segment #3 Time: .0221 hrs

Total Tc: .3206 hrs

```
---------------------------------------------------------------------------
Tc Equations used...
---------------------------------------------------------------------------

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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

     Unpaved surface:
     V   = 16.1345 * (Sf**0.5)

     Paved surface:
     V   = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ===

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.3000	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.7000	in
Slope	.045000	ft/ft
Avg.Velocity	.12	ft/sec

Segment #1 Time: .2238 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	715.00	ft
Slope	.080000	ft/ft
Unpaved		
Avg.Velocity	4.56	ft/sec

Segment #2 Time: .0435 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	15.0000	sq.ft
Wetted Perimeter	10.50	ft
Hydraulic Radius	1.43	ft
Slope	.030000	ft/ft
Mannings n	.0500	
Hydraulic Length	1240.00	ft
Avg.Velocity	6.55	ft/sec

Segment #3 Time: .0526 hrs

Total Tc: .3199 hrs

```
-----------------------------------------------------------------------
Tc Equations used...
-----------------------------------------------------------------------


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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

     Unpaved surface:
     V  = 16.1345 * (Sf**0.5)

     Paved surface:
     V  = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ==

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinA.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - fair	69	15.500			69.00
COMPOSITE AREA & WEIGHTED CN --->		15.500			69.00 (69)

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinA.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - fair	69	14.300			69.00
COMPOSITE AREA & WEIGHTED CN --->		14.300			69.00 (69)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - fair	69	9.400			69.00
COMPOSITE AREA & WEIGHTED CN --->		9.400			69.00 (69)

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinA.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - fair	69	7.300			69.00
COMPOSITE AREA & WEIGHTED CN --->		7.300			69.00 (69)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - fair	79	23.300			79.00
COMPOSITE AREA & WEIGHTED CN --->		23.300			79.00 (79)

MODIFIED PULS REACH DATA

```
HYG Dir           = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow  HYG file  = NONE STORED - CLVRT1 O-FLOW     1
Outflow HYG file  = NONE STORED - LNSNGVL 1         1

Reach Link Data   = LNSNGVL 1
Reach Length      = 1135.00 ft
Approx. Total Tt  = .0000 hrs  (based on Wtd.Q = .00 cfs)
Reach Channel     = Lnsngvl Dtch1  (Chn-Trapz.)
Overflow Elev.    = 969.00 ft
Overflow Channel  = NONE

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev    =   965.00 ft
Starting Volume     =     .000 ac-ft
Starting Outflow    =      .00 cfs
Starting Infiltr.   =      .00 cfs
Starting Total Qout=       .00 cfs
Time Increment      =    .0500 hrs
```

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
965.00	.00	.000	.0000	.00	.00	.00
965.01	.00	.001	.0526	.00	.00	.26
965.08	.15	.004	.0563	.00	.15	2.24
965.16	.46	.009	.0604	.00	.46	4.82
965.24	.91	.014	.0646	.00	.91	7.69
965.32	1.47	.019	.0688	.00	1.47	10.84
965.40	2.15	.025	.0730	.00	2.15	14.26
965.48	2.94	.031	.0771	.00	2.94	17.95
965.56	3.84	.037	.0813	.00	3.84	21.91
965.64	4.84	.044	.0855	.00	4.84	26.15
965.72	5.96	.051	.0896	.00	5.96	30.66
965.80	7.19	.058	.0938	.00	7.19	35.44
965.88	8.53	.066	.0980	.00	8.53	40.49
965.96	9.99	.074	.1021	.00	9.99	45.83
966.04	11.57	.082	.1063	.00	11.57	51.44
966.12	13.27	.091	.1105	.00	13.27	57.33
966.20	15.09	.100	.1146	.00	15.09	63.52
966.28	17.03	.109	.1188	.00	17.03	69.98
966.36	19.11	.119	.1230	.00	19.11	76.73
966.44	21.31	.129	.1272	.00	21.31	83.78

MODIFIED PULS REACH DATA

```
HYG Dir            = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow  HYG file = NONE STORED - CLVRT1 O-FLOW     1
Outflow HYG file = NONE STORED - LNSNGVL 1         1

Reach Link Data    = LNSNGVL 1
Reach Length       = 1135.00 ft
Approx. Total Tt = .0000 hrs   (based on Wtd.Q = .00 cfs)
Reach Channel      = Lnsngvl Dtch1  (Chn-Trapz.)
Overflow Elev.     = 969.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev     =    965.00 ft
Starting Volume      =      .000 ac-ft
Starting Outflow     =       .00 cfs
Starting Infiltr.    =       .00 cfs
Starting Total Qout=         .00 cfs
Time Increment       =     .0500 hrs
```

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
966.52	23.65	.139	.1313	.00	23.65	91.13
966.60	26.12	.150	.1355	.00	26.12	98.76
966.68	28.73	.161	.1397	.00	28.73	106.70
966.76	31.48	.172	.1438	.00	31.48	114.94
966.84	34.37	.184	.1480	.00	34.37	123.48
966.92	37.41	.196	.1522	.00	37.41	132.32
967.00	40.60	.208	.1563	.00	40.60	141.48
967.08	43.93	.221	.1605	.00	43.93	150.96
967.16	47.42	.234	.1647	.00	47.42	160.73
967.24	51.06	.247	.1688	.00	51.06	170.83
967.32	54.86	.261	.1730	.00	54.86	181.26
967.40	58.82	.275	.1772	.00	58.82	192.00
967.48	62.94	.289	.1813	.00	62.94	203.05
967.56	67.23	.304	.1855	.00	67.23	214.45
967.64	71.68	.319	.1897	.00	71.68	226.17
967.72	76.30	.335	.1939	.00	76.30	238.21
967.80	81.10	.350	.1980	.00	81.10	250.59
967.88	86.07	.366	.2022	.00	86.07	263.31
967.96	91.22	.383	.2064	.00	91.22	276.37
968.04	96.54	.399	.2105	.00	96.54	289.76

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT1 O-FLOW 1
Outflow HYG file = NONE STORED - LNSNGVL 1 1

Reach Link Data = LNSNGVL 1
Reach Length = 1135.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Dtch1 (Chn-Trapz.)
Overflow Elev. = 969.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 965.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
968.12	102.04	.416	.2147	.00	102.04	303.50
968.20	107.73	.434	.2189	.00	107.73	317.58
968.28	113.61	.451	.2230	.00	113.61	332.02
968.36	119.67	.469	.2272	.00	119.67	346.79
968.44	125.92	.488	.2314	.00	125.92	361.92
968.52	132.37	.506	.2355	.00	132.37	377.41
968.60	139.00	.525	.2397	.00	139.00	393.24
968.68	145.84	.545	.2439	.00	145.84	409.44
968.76	152.87	.564	.2481	.00	152.87	426.00
968.84	160.11	.584	.2522	.00	160.11	442.92
968.92	167.54	.605	.2564	.00	167.54	460.20
969.00	175.19	.625	.2606	.00	175.19	477.86

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT2 O-FLOW 1
Outflow HYG file = NONE STORED - LNSNGVL 2 1

Reach Link Data = LNSNGVL 2
Reach Length = 650.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch2 (Chn-Trapz.)
Overflow Elev. = 949.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 945.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
945.00	.00	.000	.0000	.00	.00	.00
945.01	.01	.000	.0301	.00	.01	.15
945.08	.22	.002	.0322	.00	.22	1.42
945.16	.70	.005	.0346	.00	.70	3.19
945.24	1.37	.008	.0370	.00	1.37	5.25
945.32	2.22	.011	.0394	.00	2.22	7.58
945.40	3.24	.014	.0418	.00	3.24	10.18
945.48	4.43	.018	.0442	.00	4.43	13.03
945.56	5.78	.021	.0466	.00	5.78	16.14
945.64	7.30	.025	.0489	.00	7.30	19.50
945.72	8.98	.029	.0513	.00	8.98	23.13
945.80	10.84	.033	.0537	.00	10.84	27.01
945.88	12.86	.038	.0561	.00	12.86	31.17
945.96	15.06	.042	.0585	.00	15.06	35.59
946.04	17.44	.047	.0609	.00	17.44	40.27
946.12	20.00	.052	.0633	.00	20.00	45.24
946.20	22.75	.057	.0657	.00	22.75	50.48
946.28	25.68	.063	.0680	.00	25.68	56.00
946.36	28.81	.068	.0704	.00	28.81	61.81
946.44	32.13	.074	.0728	.00	32.13	67.91

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT2 O-FLOW 1
Outflow HYG file = NONE STORED - LNSNGVL 2 1

Reach Link Data = LNSNGVL 2
Reach Length = 650.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch2 (Chn-Trapz.)
Overflow Elev. = 949.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 945.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
946.52	35.65	.080	.0752	.00	35.65	74.30
946.60	39.38	.086	.0776	.00	39.38	80.98
946.68	43.31	.092	.0800	.00	43.31	87.96
946.76	47.46	.099	.0824	.00	47.46	95.25
946.84	51.82	.105	.0848	.00	51.82	102.85
946.92	56.40	.112	.0871	.00	56.40	110.75
947.00	61.20	.119	.0895	.00	61.20	118.98
947.08	66.23	.127	.0919	.00	66.23	127.52
947.16	71.48	.134	.0943	.00	71.48	136.38
947.24	76.98	.142	.0967	.00	76.98	145.57
947.32	82.71	.150	.0991	.00	82.71	155.09
947.40	88.68	.158	.1015	.00	88.68	164.95
947.48	94.89	.166	.1039	.00	94.89	175.13
947.56	101.35	.174	.1062	.00	101.35	185.66
947.64	108.07	.183	.1086	.00	108.07	196.54
947.72	115.03	.192	.1110	.00	115.03	207.75
947.80	122.26	.201	.1134	.00	122.26	219.33
947.88	129.76	.210	.1158	.00	129.76	231.26
947.96	137.51	.219	.1182	.00	137.51	243.55
948.04	145.54	.229	.1206	.00	145.54	256.19

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT2 O-FLOW 1
Outflow HYG file = NONE STORED - LNSNGVL 2 1

Reach Link Data = LNSNGVL 2
Reach Length = 650.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch2 (Chn-Trapz.)
Overflow Elev. = 949.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 945.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
948.12	153.84	.238	.1230	.00	153.84	269.21
948.20	162.41	.248	.1253	.00	162.41	282.59
948.28	171.27	.258	.1277	.00	171.27	296.35
948.36	180.40	.269	.1301	.00	180.40	310.47
948.44	189.83	.279	.1325	.00	189.83	324.99
948.52	199.55	.290	.1349	.00	199.55	339.88
948.60	209.55	.301	.1373	.00	209.55	355.15
948.68	219.86	.312	.1397	.00	219.86	370.82
948.76	230.46	.323	.1421	.00	230.46	386.88
948.84	241.37	.335	.1444	.00	241.37	403.34
948.92	252.58	.346	.1468	.00	252.58	420.18
949.00	264.11	.358	.1492	.00	264.11	437.44

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT3 O-FLOW 1
Outflow HYG file = NONE STORED - LNSNGVL 3 1

Reach Link Data = LNSNGVL 3
Reach Length = 540.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch3 (Chn-Trapz.)
Overflow Elev. = 923.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 919.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
919.00	.00	.000	.0000	.00	.00	.00
919.01	.01	.000	.0253	.00	.01	.13
919.08	.19	.002	.0288	.00	.19	1.23
919.16	.61	.005	.0327	.00	.61	2.84
919.24	1.24	.007	.0367	.00	1.24	4.81
919.32	2.06	.010	.0407	.00	2.06	7.13
919.40	3.09	.014	.0446	.00	3.09	9.81
919.48	4.32	.018	.0486	.00	4.32	12.85
919.56	5.78	.022	.0526	.00	5.78	16.26
919.64	7.45	.026	.0565	.00	7.45	20.05
919.72	9.37	.031	.0605	.00	9.37	24.23
919.80	11.52	.036	.0645	.00	11.52	28.80
919.88	13.93	.041	.0684	.00	13.93	33.78
919.96	16.60	.047	.0724	.00	16.60	39.18
920.04	19.55	.053	.0764	.00	19.55	45.00
920.12	22.77	.059	.0803	.00	22.77	51.26
920.20	26.29	.065	.0843	.00	26.29	57.97
920.28	30.10	.072	.0883	.00	30.10	65.12
920.36	34.22	.080	.0922	.00	34.22	72.74
920.44	38.66	.087	.0962	.00	38.66	80.82

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT3 O-FLOW 1
Outflow HYG file = NONE STORED - LNSNGVL 3 1

Reach Link Data = LNSNGVL 3
Reach Length = 540.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch3 (Chn-Trapz.)
Overflow Elev. = 923.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 919.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
920.52	43.42	.095	.1002	.00	43.42	89.39
920.60	48.52	.103	.1041	.00	48.52	98.44
920.68	53.96	.112	.1081	.00	53.96	107.99
920.76	59.75	.120	.1121	.00	59.75	118.05
920.84	65.91	.130	.1160	.00	65.91	128.61
920.92	72.42	.139	.1200	.00	72.42	139.70
921.00	79.32	.149	.1240	.00	79.32	151.32
921.08	86.59	.159	.1279	.00	86.59	163.47
921.16	94.26	.169	.1319	.00	94.26	176.17
921.24	102.33	.180	.1359	.00	102.33	189.42
921.32	110.81	.191	.1398	.00	110.81	203.24
921.40	119.70	.202	.1438	.00	119.70	217.62
921.48	129.01	.214	.1478	.00	129.01	232.57
921.56	138.76	.226	.1517	.00	138.76	248.12
921.64	148.94	.238	.1557	.00	148.94	264.26
921.72	159.57	.251	.1597	.00	159.57	280.99
921.80	170.65	.264	.1636	.00	170.65	298.33
921.88	182.20	.277	.1676	.00	182.20	316.29
921.96	194.21	.291	.1716	.00	194.21	334.87
922.04	206.69	.304	.1755	.00	206.69	354.07

MODIFIED PULS REACH DATA

HYG Dir   = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT3 O-FLOW   1
Outflow HYG file = NONE STORED - LNSNGVL 3   1

Reach Link Data = LNSNGVL 3
Reach Length   = 540.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel   = Lnsngvl Ditch3 (Chn-Trapz.)
Overflow Elev.   = 923.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev =   919.00 ft
Starting Volume   =   .000 ac-ft
Starting Outflow =   .00 cfs
Starting Infiltr. =   .00 cfs
Starting Total Qout=   .00 cfs
Time Increment   =   .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
922.12	219.66	.319	.1795	.00	219.66	373.91
922.20	233.12	.333	.1835	.00	233.12	394.40
922.28	247.08	.348	.1874	.00	247.08	415.54
922.36	261.53	.363	.1914	.00	261.53	437.32
922.44	276.50	.379	.1954	.00	276.50	459.79
922.52	291.99	.394	.1993	.00	291.99	482.92
922.60	308.00	.411	.2033	.00	308.00	506.71
922.68	324.54	.427	.2073	.00	324.54	531.21
922.76	341.63	.444	.2112	.00	341.63	556.40
922.84	359.26	.461	.2152	.00	359.26	582.29
922.92	377.43	.478	.2192	.00	377.43	608.86
923.00	396.17	.496	.2231	.00	396.17	636.17

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT4 O-FLOW 1
Outflow HYG file = NONE STORED - LNSNGVL 4 1

Reach Link Data = LNSNGVL 4
Reach Length = 1290.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch4 (Chn-Trapz.)
Overflow Elev. = 908.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 904.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
904.00	.00	.000	.0000	.00	.00	.00
904.01	.01	.001	.0604	.00	.01	.30
904.08	.20	.005	.0687	.00	.20	2.68
904.16	.65	.011	.0782	.00	.65	5.97
904.24	1.32	.018	.0877	.00	1.32	9.85
904.32	2.21	.025	.0971	.00	2.21	14.31
904.40	3.30	.033	.1066	.00	3.30	19.36
904.48	4.62	.042	.1161	.00	4.62	24.99
904.56	6.18	.052	.1256	.00	6.18	31.22
904.64	7.97	.062	.1350	.00	7.97	38.06
904.72	10.01	.073	.1445	.00	10.01	45.51
904.80	12.32	.085	.1540	.00	12.32	53.60
904.88	14.89	.098	.1635	.00	14.89	62.32
904.96	17.75	.111	.1730	.00	17.75	71.69
905.04	20.90	.126	.1824	.00	20.90	81.71
905.12	24.34	.141	.1919	.00	24.34	92.41
905.20	28.10	.156	.2014	.00	28.10	103.78
905.28	32.18	.173	.2109	.00	32.18	115.84
905.36	36.58	.190	.2203	.00	36.58	128.59
905.44	41.33	.208	.2298	.00	41.33	142.05

MODIFIED PULS REACH DATA

```
HYG Dir           = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow  HYG file  = NONE STORED - CLVRT4 O-FLOW     I
Outflow HYG file  = NONE STORED - LNSNGVL 4         1

Reach Link Data   = LNSNGVL 4
Reach Length      = 1290.00 ft
Approx. Total Tt  = .0000 hrs   (based on Wtd.Q = .00 cfs)
Reach Channel     = Lnsngvl Ditch4   (Chn-Trapz.)
Overflow Elev.    = 908.00 ft
Overflow Channel  = NONE

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev     =    904.00 ft
Starting Volume      =      .000 ac-ft
Starting Outflow     =       .00 cfs
Starting Infiltr.    =       .00 cfs
Starting Total Qout=         .00 cfs
Time Increment       =     .0500 hrs
```

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
905.52	46.42	.227	.2393	.00	46.42	156.23
905.60	51.87	.246	.2488	.00	51.87	171.12
905.68	57.69	.267	.2582	.00	57.69	186.76
905.76	63.88	.288	.2677	.00	63.88	203.13
905.84	70.46	.310	.2772	.00	70.46	220.26
905.92	77.42	.332	.2867	.00	77.42	238.14
906.00	84.79	.355	.2961	.00	84.79	256.79
906.08	92.57	.379	.3056	.00	92.57	276.23
906.16	100.77	.404	.3151	.00	100.77	296.43
906.24	109.40	.430	.3246	.00	109.40	317.45
906.32	118.46	.456	.3341	.00	118.46	339.26
906.40	127.97	.483	.3435	.00	127.97	361.89
906.48	137.92	.511	.3530	.00	137.92	385.32
906.56	148.34	.540	.3625	.00	148.34	409.60
906.64	159.23	.569	.3720	.00	159.23	434.71
906.72	170.59	.599	.3814	.00	170.59	460.64
906.80	182.43	.630	.3909	.00	182.43	487.45
906.88	194.78	.662	.4004	.00	194.78	515.11
906.96	207.62	.694	.4099	.00	207.62	543.64
907.04	220.96	.727	.4193	.00	220.96	573.03

MODIFIED PULS REACH DATA

```
HYG Dir           = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow  HYG file = NONE STORED - CLVRT4 O-FLOW     1
Outflow HYG file = NONE STORED - LNSNGVL 4         1

Reach Link Data  = LNSNGVL 4
Reach Length     = 1290.00 ft
Approx. Total Tt = .0000 hrs  (based on Wtd.Q = .00 cfs)
Reach Channel    = Lnsngvl Ditch4  (Chn-Trapz.)
Overflow Elev.   = 908.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev    =   904.00 ft
Starting Volume     =     .000 ac-ft
Starting Outflow    =      .00 cfs
Starting Infiltr.   =      .00 cfs
Starting Total Qout=       .00 cfs
Time Increment      =    .0500 hrs
```

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
907.12	234.83	.761	.4288	.00	234.83	603.32
907.20	249.22	.796	.4383	.00	249.22	634.50
907.28	264.14	.831	.4478	.00	264.14	666.58
907.36	279.59	.868	.4572	.00	279.59	699.54
907.44	295.59	.905	.4667	.00	295.59	733.44
907.52	312.15	.942	.4762	.00	312.15	768.26
907.60	329.26	.981	.4857	.00	329.26	803.97
907.68	346.95	1.020	.4952	.00	346.95	840.66
907.76	365.21	1.060	.5046	.00	365.21	878.28
907.84	384.06	1.101	.5141	.00	384.06	916.86
907.92	403.49	1.142	.5236	.00	403.49	956.36
908.00	423.52	1.185	.5331	.00	423.52	996.85

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT1 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 1 1

Reach Link Data = LNSNGVL EAST 1
Reach Length = 1130.00 ft
Approx. Total Tt = .1850 hrs (based on Wtd.Q = 1.13 cfs)
Reach Channel = Lnsngvl East 1 (Chn-Trapz.)
Overflow Elev. = 967.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 963.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
963.00	.00	.000	.0000	.00	.00	.00
963.01	.01	.001	.0913	.00	.01	.45
963.08	.29	.007	.0949	.00	.29	3.88
963.16	.90	.015	.0991	.00	.90	8.25
963.24	1.77	.023	.1032	.00	1.77	13.04
963.32	2.87	.032	.1074	.00	2.87	18.21
963.40	4.16	.040	.1115	.00	4.16	23.75
963.48	5.65	.050	.1157	.00	5.65	29.63
963.56	7.33	.059	.1198	.00	7.33	35.87
963.64	9.18	.069	.1240	.00	9.18	42.45
963.72	11.22	.079	.1281	.00	11.22	49.37
963.80	13.44	.089	.1323	.00	13.44	56.63
963.88	15.83	.100	.1365	.00	15.83	64.23
963.96	18.40	.111	.1406	.00	18.40	72.16
964.04	21.15	.122	.1448	.00	21.15	80.43
964.12	24.08	.134	.1489	.00	24.08	89.04
964.20	27.18	.146	.1531	.00	27.18	98.00
964.28	30.47	.159	.1572	.00	30.47	107.29
964.36	33.94	.171	.1614	.00	33.94	116.93
964.44	37.59	.185	.1655	.00	37.59	126.91

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT1 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 1 1

Reach Link Data = LNSNGVL EAST 1
Reach Length = 1130.00 ft
Approx. Total Tt = .1850 hrs (based on Wtd.Q = 1.13 cfs)
Reach Channel = Lnsngvl East 1 (Chn-Trapz.)
Overflow Elev. = 967.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 963.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
964.52	41.44	.198	.1697	.00	41.44	137.24
964.60	45.46	.212	.1738	.00	45.46	147.91
964.68	49.68	.226	.1780	.00	49.68	158.94
964.76	54.09	.240	.1821	.00	54.09	170.33
964.84	58.69	.255	.1863	.00	58.69	182.06
964.92	63.49	.270	.1904	.00	63.49	194.15
965.00	68.49	.285	.1946	.00	68.49	206.60
965.08	73.69	.301	.1987	.00	73.69	219.42
965.16	79.09	.317	.2029	.00	79.09	232.59
965.24	84.70	.334	.2070	.00	84.70	246.13
965.32	90.51	.350	.2112	.00	90.51	260.04
965.40	96.54	.367	.2153	.00	96.54	274.33
965.48	102.77	.385	.2195	.00	102.77	288.97
965.56	109.22	.402	.2236	.00	109.22	304.00
965.64	115.89	.421	.2278	.00	115.89	319.41
965.72	122.77	.439	.2319	.00	122.77	335.19
965.80	129.88	.458	.2361	.00	129.88	351.36
965.88	137.21	.477	.2402	.00	137.21	367.91
965.96	144.77	.496	.2444	.00	144.77	384.85
966.04	152.55	.516	.2485	.00	152.55	402.17

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT1 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 1 1

Reach Link Data = LNSNGVL EAST 1
Reach Length = 1130.00 ft
Approx. Total Tt = .1850 hrs (based on Wtd.Q = 1.13 cfs)
Reach Channel = Lnsngvl East 1 (Chn-Trapz.)
Overflow Elev. = 967.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 963.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
966.12	160.56	.536	.2527	.00	160.56	419.89
966.20	168.81	.556	.2568	.00	168.81	438.01
966.28	177.30	.577	.2610	.00	177.30	456.52
966.36	186.01	.598	.2651	.00	186.01	475.41
966.44	194.97	.619	.2693	.00	194.97	494.72
966.52	204.18	.641	.2734	.00	204.18	514.43
966.60	213.62	.663	.2776	.00	213.62	534.53
966.68	223.31	.685	.2817	.00	223.31	555.06
966.76	233.25	.708	.2859	.00	233.25	575.99
966.84	243.45	.731	.2900	.00	243.45	597.34
966.92	253.89	.755	.2942	.00	253.89	619.08
967.00	264.59	.778	.2983	.00	264.59	641.26

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT2 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 2 1

Reach Link Data = LNSNGVL EAST 2
Reach Length = 650.00 ft
Approx. Total Tt = .0731 hrs (based on Wtd.Q = 1.98 cfs)
Reach Channel = Lnsngvl East 2 (Chn-Trapz.)
Overflow Elev. = 943.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 939.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
939.00	.00	.000	.0000	.00	.00	.00
939.01	.01	.001	.0525	.00	.01	.27
939.08	.38	.004	.0546	.00	.38	2.44
939.16	1.19	.009	.0570	.00	1.19	5.42
939.24	2.33	.013	.0594	.00	2.33	8.81
939.32	3.77	.018	.0618	.00	3.77	12.59
939.40	5.47	.023	.0642	.00	5.47	16.74
939.48	7.43	.029	.0666	.00	7.43	21.22
939.56	9.63	.034	.0689	.00	9.63	26.05
939.64	12.07	.040	.0713	.00	12.07	31.21
939.72	14.75	.045	.0737	.00	14.75	36.69
939.80	17.66	.051	.0761	.00	17.66	42.50
939.88	20.81	.058	.0785	.00	20.81	48.64
939.96	24.19	.064	.0809	.00	24.19	55.11
940.04	27.79	.070	.0833	.00	27.79	61.89
940.12	31.64	.077	.0857	.00	31.64	69.01
940.20	35.73	.084	.0880	.00	35.73	76.46
940.28	40.05	.091	.0904	.00	40.05	84.24
940.36	44.61	.099	.0928	.00	44.61	92.34
940.44	49.41	.106	.0952	.00	49.41	100.78

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT2 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 2 1

Reach Link Data = LNSNGVL EAST 2
Reach Length = 650.00 ft
Approx. Total Tt = .0731 hrs (based on Wtd.Q = 1.98 cfs)
Reach Channel = Lnsngvl East 2 (Chn-Trapz.)
Overflow Elev. = 943.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 939.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
940.52	54.46	.114	.0976	.00	54.46	109.57
940.60	59.75	.122	.1000	.00	59.75	118.68
940.68	65.29	.130	.1024	.00	65.29	128.14
940.76	71.09	.138	.1048	.00	71.09	137.95
940.84	77.14	.147	.1071	.00	77.14	148.10
940.92	83.45	.155	.1095	.00	83.45	158.60
941.00	90.02	.164	.1119	.00	90.02	169.46
941.08	96.85	.173	.1143	.00	96.85	180.67
941.16	103.94	.182	.1167	.00	103.94	192.24
941.24	111.32	.192	.1191	.00	111.32	204.17
941.32	118.96	.201	.1215	.00	118.96	216.48
941.40	126.88	.211	.1239	.00	126.88	229.14
941.48	135.07	.221	.1262	.00	135.07	242.17
941.56	143.55	.231	.1286	.00	143.55	255.59
941.64	152.31	.242	.1310	.00	152.31	269.38
941.72	161.35	.252	.1334	.00	161.35	283.54
941.80	170.69	.263	.1358	.00	170.69	298.09
941.88	180.33	.274	.1382	.00	180.33	313.03
941.96	190.26	.285	.1406	.00	190.26	328.36
942.04	200.49	.297	.1430	.00	200.49	344.08

MODIFIED PULS REACH DATA

```
HYG Dir           = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow  HYG file  = NONE STORED - CLVRT2 OUTLET      1
Outflow HYG file  = NONE STORED - LNSNGVL EAST 2     1

Reach Link Data   = LNSNGVL EAST 2
Reach Length      = 650.00 ft
Approx. Total Tt  = .0731 hrs   (based on Wtd.Q = 1.98 cfs)
Reach Channel     = Lnsngvl East 2   (Chn-Trapz.)
Overflow Elev.    = 943.00 ft
Overflow Channel  = NONE

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev     =   939.00 ft
Starting Volume      =     .000 ac-ft
Starting Outflow     =      .00 cfs
Starting Infiltr.    =      .00 cfs
Starting Total Qout=        .00 cfs
Time Increment       =    .0500 hrs
```

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
942.12	211.02	.308	.1453	.00	211.02	360.19
942.20	221.86	.320	.1477	.00	221.86	376.71
942.28	233.01	.332	.1501	.00	233.01	393.63
942.36	244.47	.344	.1525	.00	244.47	410.94
942.44	256.25	.356	.1549	.00	256.25	428.67
942.52	268.34	.369	.1573	.00	268.34	446.81
942.60	280.75	.381	.1597	.00	280.75	465.35
942.68	293.49	.394	.1621	.00	293.49	484.32
942.76	306.56	.407	.1644	.00	306.56	503.71
942.84	319.95	.421	.1668	.00	319.95	523.52
942.92	333.67	.434	.1692	.00	333.67	543.74
943.00	347.74	.448	.1716	.00	347.74	564.41

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT3 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 3 1

Reach Link Data = LNSNGVL EAST 3
Reach Length = 540.00 ft
Approx. Total Tt = .0592 hrs (based on Wtd.Q = 2.57 cfs)
Reach Channel = Lnsngvl East 3 (Chn-Trapz.)
Overflow Elev. = 921.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 917.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
917.00	.00	.000	.0000	.00	.00	.00
917.01	.01	.000	.0436	.00	.01	.22
917.08	.34	.004	.0454	.00	.34	2.06
917.16	1.07	.007	.0474	.00	1.07	4.59
917.24	2.11	.011	.0493	.00	2.11	7.49
917.32	3.40	.015	.0513	.00	3.40	10.74
917.40	4.94	.019	.0533	.00	4.94	14.30
917.48	6.71	.024	.0553	.00	6.71	18.17
917.56	8.70	.028	.0573	.00	8.70	22.34
917.64	10.90	.033	.0593	.00	10.90	26.80
917.72	13.32	.038	.0612	.00	13.32	31.55
917.80	15.95	.043	.0632	.00	15.95	36.59
917.88	18.79	.048	.0652	.00	18.79	41.92
917.96	21.84	.053	.0672	.00	21.84	47.53
918.04	25.10	.059	.0692	.00	25.10	53.43
918.12	28.58	.064	.0712	.00	28.58	59.63
918.20	32.27	.070	.0731	.00	32.27	66.11
918.28	36.17	.076	.0751	.00	36.17	72.88
918.36	40.29	.082	.0771	.00	40.29	79.94
918.44	44.63	.088	.0791	.00	44.63	87.31

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT3 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 3 1

Reach Link Data = LNSNGVL EAST 3
Reach Length = 540.00 ft
Approx. Total Tt = .0592 hrs (based on Wtd.Q = 2.57 cfs)
Reach Channel = Lnsngvl East 3 (Chn-Trapz.)
Overflow Elev. = 921.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 917.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
918.52	49.19	.095	.0811	.00	49.19	94.97
918.60	53.96	.101	.0831	.00	53.96	102.92
918.68	58.97	.108	.0850	.00	58.97	111.19
918.76	64.21	.115	.0870	.00	64.21	119.75
918.84	69.67	.122	.0890	.00	69.67	128.63
918.92	75.37	.129	.0910	.00	75.37	137.81
919.00	81.30	.136	.0930	.00	81.30	147.30
919.08	87.48	.144	.0950	.00	87.48	157.11
919.16	93.88	.152	.0969	.00	93.88	167.24
919.24	100.54	.159	.0989	.00	100.54	177.69
919.32	107.44	.167	.1009	.00	107.44	188.46
919.40	114.60	.176	.1029	.00	114.60	199.56
919.48	121.99	.184	.1049	.00	121.99	210.98
919.56	129.65	.192	.1069	.00	129.65	222.73
919.64	137.57	.201	.1088	.00	137.57	234.83
919.72	145.74	.210	.1108	.00	145.74	247.24
919.80	154.17	.219	.1128	.00	154.17	260.01
919.88	162.88	.228	.1148	.00	162.88	273.12
919.96	171.85	.237	.1168	.00	171.85	286.58
920.04	181.08	.246	.1188	.00	181.08	300.37

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT3 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 3 1

Reach Link Data = LNSNGVL EAST 3
Reach Length = 540.00 ft
Approx. Total Tt = .0592 hrs (based on Wtd.Q = 2.57 cfs)
Reach Channel = Lnsngvl East 3 (Chn-Trapz.)
Overflow Elev. = 921.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 917.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
920.12	190.60	.256	.1207	.00	190.60	314.52
920.20	200.39	.266	.1227	.00	200.39	329.03
920.28	210.46	.276	.1247	.00	210.46	343.89
920.36	220.81	.286	.1267	.00	220.81	359.10
920.44	231.44	.296	.1287	.00	231.44	374.69
920.52	242.37	.306	.1307	.00	242.37	390.63
920.60	253.57	.317	.1326	.00	253.57	406.93
920.68	265.08	.328	.1346	.00	265.08	423.62
920.76	276.88	.338	.1366	.00	276.88	440.67
920.84	288.98	.349	.1386	.00	288.98	458.10
920.92	301.38	.361	.1406	.00	301.38	475.89
921.00	314.08	.372	.1426	.00	314.08	494.08

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT 4 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 4 1

Reach Link Data = LNSNGVL EAST 4
Reach Length = 1280.00 ft
Approx. Total Tt = .1360 hrs (based on Wtd.Q = 3.00 cfs)
Reach Channel = Lnsngvl East 4 (Chn-Trapz.)
Overflow Elev. = 906.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 902.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
902.00	.00	.000	.0000	.00	.00	.00
902.01	.01	.001	.1034	.00	.01	.51
902.08	.33	.008	.1075	.00	.33	4.40
902.16	1.04	.017	.1122	.00	1.04	9.36
902.24	2.04	.026	.1170	.00	2.04	14.80
902.32	3.29	.036	.1217	.00	3.29	20.68
902.40	4.78	.046	.1264	.00	4.78	26.97
902.48	6.49	.056	.1311	.00	6.49	33.66
902.56	8.41	.067	.1358	.00	8.41	40.75
902.64	10.54	.078	.1405	.00	10.54	48.23
902.72	12.88	.089	.1452	.00	12.88	56.09
902.80	15.43	.101	.1499	.00	15.43	64.35
902.88	18.18	.113	.1546	.00	18.18	72.99
902.96	21.13	.126	.1593	.00	21.13	82.02
903.04	24.28	.139	.1640	.00	24.28	91.43
903.12	27.64	.152	.1687	.00	27.64	101.23
903.20	31.21	.166	.1734	.00	31.21	111.42
903.28	34.98	.180	.1781	.00	34.98	122.00
903.36	38.97	.194	.1828	.00	38.97	132.97
903.44	43.16	.209	.1875	.00	43.16	144.33

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT 4 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 4 1

Reach Link Data = LNSNGVL EAST 4
Reach Length = 1280.00 ft
Approx. Total Tt = .1360 hrs (based on Wtd.Q = 3.00 cfs)
Reach Channel = Lnsngvl East 4 (Chn-Trapz.)
Overflow Elev. = 906.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 902.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
903.52	47.57	.224	.1922	.00	47.57	156.10
903.60	52.19	.240	.1969	.00	52.19	168.25
903.68	57.04	.256	.2016	.00	57.04	180.80
903.76	62.10	.272	.2063	.00	62.10	193.77
903.84	67.39	.289	.2110	.00	67.39	207.13
903.92	72.90	.306	.2157	.00	72.90	220.90
904.00	78.64	.323	.2204	.00	78.64	235.08
904.08	84.61	.341	.2251	.00	84.61	249.68
904.16	90.81	.359	.2298	.00	90.81	264.68
904.24	97.24	.378	.2345	.00	97.24	280.11
904.32	103.92	.397	.2392	.00	103.92	295.96
904.40	110.84	.416	.2439	.00	110.84	312.23
904.48	117.99	.436	.2486	.00	117.99	328.91
904.56	125.40	.456	.2533	.00	125.40	346.04
904.64	133.06	.476	.2580	.00	133.06	363.59
904.72	140.96	.497	.2627	.00	140.96	381.57
904.80	149.12	.518	.2674	.00	149.12	400.00
904.88	157.53	.540	.2721	.00	157.53	418.86
904.96	166.21	.562	.2768	.00	166.21	438.17
905.04	175.14	.584	.2815	.00	175.14	457.90

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT 4 OUTLET 1
Outflow HYG file = NONE STORED - LNSNGVL EAST 4 1

Reach Link Data = LNSNGVL EAST 4
Reach Length = 1280.00 ft
Approx. Total Tt = .1360 hrs (based on Wtd.Q = 3.00 cfs)
Reach Channel = Lnsngvl East 4 (Chn-Trapz.)
Overflow Elev. = 906.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 902.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
905.12	184.35	.607	.2862	.00	184.35	478.10
905.20	193.82	.630	.2909	.00	193.82	498.74
905.28	203.56	.653	.2956	.00	203.56	519.84
905.36	213.56	.677	.3003	.00	213.56	541.38
905.44	223.85	.702	.3050	.00	223.85	563.39
905.52	234.42	.726	.3097	.00	234.42	585.86
905.60	245.26	.751	.3144	.00	245.26	608.77
905.68	256.39	.776	.3191	.00	256.39	632.17
905.76	267.80	.802	.3238	.00	267.80	656.04
905.84	279.51	.828	.3285	.00	279.51	680.37
905.92	291.49	.855	.3332	.00	291.49	705.16
906.00	303.78	.882	.3379	.00	303.78	730.45

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 964.00 ft
Increment = .10 ft
Max. Elev.= 971.00 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
Culvert-Circular	C0	--->	TW	964.000	971.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID       = CO
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =        1
Barrel Diameter    =   2.0000 ft
Upstream Invert    =   964.00 ft
Dnstream Invert    =   963.00 ft
Horiz. Length      =    50.00 ft
Barrel Length      =    50.01 ft
Barrel Slope       =   .02000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =    .0160
Ke                 =    .5000  (forward entrance loss)
Kb                 =  .018800  (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)    =    1.150
T2 ratio (HW/D)    =    1.297
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 =    966.30 ft  --->  Flow =     15.55 cfs
At T2 Elev =    966.59 ft  --->  Flow =     17.77 cfs
```

```
OUTLET STRUCTURE INPUT DATA


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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 918.00 ft
Increment = .10 ft
Max. Elev.= 924.00 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
Culvert-Circular	C0	--->	TW	918.000	924.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID       = C0
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =        1
Barrel Diameter    =    2.0000 ft
Upstream Invert    =    918.00 ft
Dnstream Invert    =    917.00 ft
Horiz. Length      =     50.00 ft
Barrel Length      =     50.01 ft
Barrel Slope       =    .02000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0160
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .018800  (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)    =     1.150
T2 ratio (HW/D)    =     1.297
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 =     920.30 ft  ---> Flow =     15.55 cfs
At T2 Elev =     920.59 ft  ---> Flow =     17.77 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 903.00 ft
Increment = .10 ft
Max. Elev.= 909.00 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
Culvert-Circular	C0	--->	TW	903.000	909.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID       = CO
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =        1
Barrel Diameter    =    2.0000 ft
Upstream Invert    =    903.00 ft
Dnstream Invert    =    902.00 ft
Horiz. Length      =     50.00 ft
Barrel Length      =     50.01 ft
Barrel Slope       =    .02000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0160
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .018800  (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)    =     1.150
T2 ratio (HW/D)    =     1.297
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 =    905.30 ft   --->  Flow =     15.55 cfs
At T2 Elev =    905.59 ft   --->  Flow =     17.77 cfs
```

```
OUTLET STRUCTURE INPUT DATA


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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 861.00 ft
Increment = .10 ft
Max. Elev.= 868.00 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
Culvert-Circular	C0	--->	TW	861.000	868.000
TW SETUP, DS Channel					

```
              OUTLET STRUCTURE INPUT DATA


              Structure ID       = C0
              Structure Type     = Culvert-Circular
              ------------------------------------
              No. Barrels        =        1
              Barrel Diameter    =    2.0000 ft
              Upstream Invert    =    861.00 ft
              Dnstream Invert    =    860.20 ft
              Horiz. Length      =     50.00 ft
              Barrel Length      =     50.01 ft
              Barrel Slope       =    .01600 ft/ft

              OUTLET CONTROL DATA...
              Mannings n         =     .0160
              Ke                 =     .5000  (forward entrance loss)
              Kb                 =   .018800  (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)    =      .000
              T2 ratio (HW/D)    =     1.299
              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 =     861.00 ft  --->  Flow =     15.55 cfs
At T2 Elev =     863.60 ft  --->  Flow =     17.77 cfs
```

OUTLET STRUCTURE INPUT DATA

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

FREE OUTFALL CONDITIONS SPECIFIED

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 944.00 ft
Increment = .10 ft
Max. Elev.= 950.00 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
Culvert-Circular	C0	--->	TW	944.000	950.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID        = CO
Structure Type      = Culvert-Circular
------------------------------------
No. Barrels         =        1
Barrel Diameter     =    2.0000 ft
Upstream Invert     =    944.00 ft
Dnstream Invert     =    943.00 ft
Horiz. Length       =     50.00 ft
Barrel Length       =     50.01 ft
Barrel Slope        =    .02000 ft/ft

OUTLET CONTROL DATA...
Mannings n          =     .0160
Ke                  =     .5000  (forward entrance loss)
Kb                  =   .018800  (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)     =     1.150
T2 ratio (HW/D)     =     1.297
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 = 946.30 ft ---> Flow = 15.55 cfs
At T2 Elev = 946.59 ft ---> Flow = 17.77 cfs

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 918.00 ft
Increment = .10 ft
Max. Elev.= 924.00 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	W0	--->	TW	922.000	890.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA



Structure ID       = WO
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    922.00 ft
Weir Length        =     25.00 ft
Weir Coeff.        =  2.800000

Weir TW effects      (Use adjustment equation)



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

CONVERGENCE TOLERANCES...
Maximum Iterations=    30
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 903.00 ft
Increment = .10 ft
Max. Elev.= 909.00 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	W0	--->	TW	907.000	890.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID       = WO
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    907.00 ft
Weir Length        =     10.00 ft
Weir Coeff.        =  2.800000

Weir TW effects     (Use adjustment equation)



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

CONVERGENCE TOLERANCES...
Maximum Iterations=    30
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 964.00 ft
Increment = .10 ft
Max. Elev.= 971.00 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	W0	--->	TW	968.000	890.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID       = W0
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    968.00 ft
Weir Length        =     25.00 ft
Weir Coeff.        =  2.800000

Weir TW effects      (Use adjustment equation)



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

CONVERGENCE TOLERANCES...
Maximum Iterations=    30
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 944.00 ft
Increment = .10 ft
Max. Elev.= 950.00 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	W0	--->	TW	948.000	890.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = WO
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =        1
Crest Elev.        =    948.00 ft
Weir Length        =     25.00 ft
Weir Coeff.        =  2.800000

Weir TW effects      (Use adjustment equation)


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

CONVERGENCE TOLERANCES...
Maximum Iterations=    30
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 861.00 ft
Increment = .10 ft
Max. Elev.= 868.00 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	W0	--->	TW	865.000	890.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = WO
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    865.00 ft
Weir Length        =     20.00 ft
Weir Coeff.        =  2.800000

Weir TW effects      (Use adjustment equation)
```

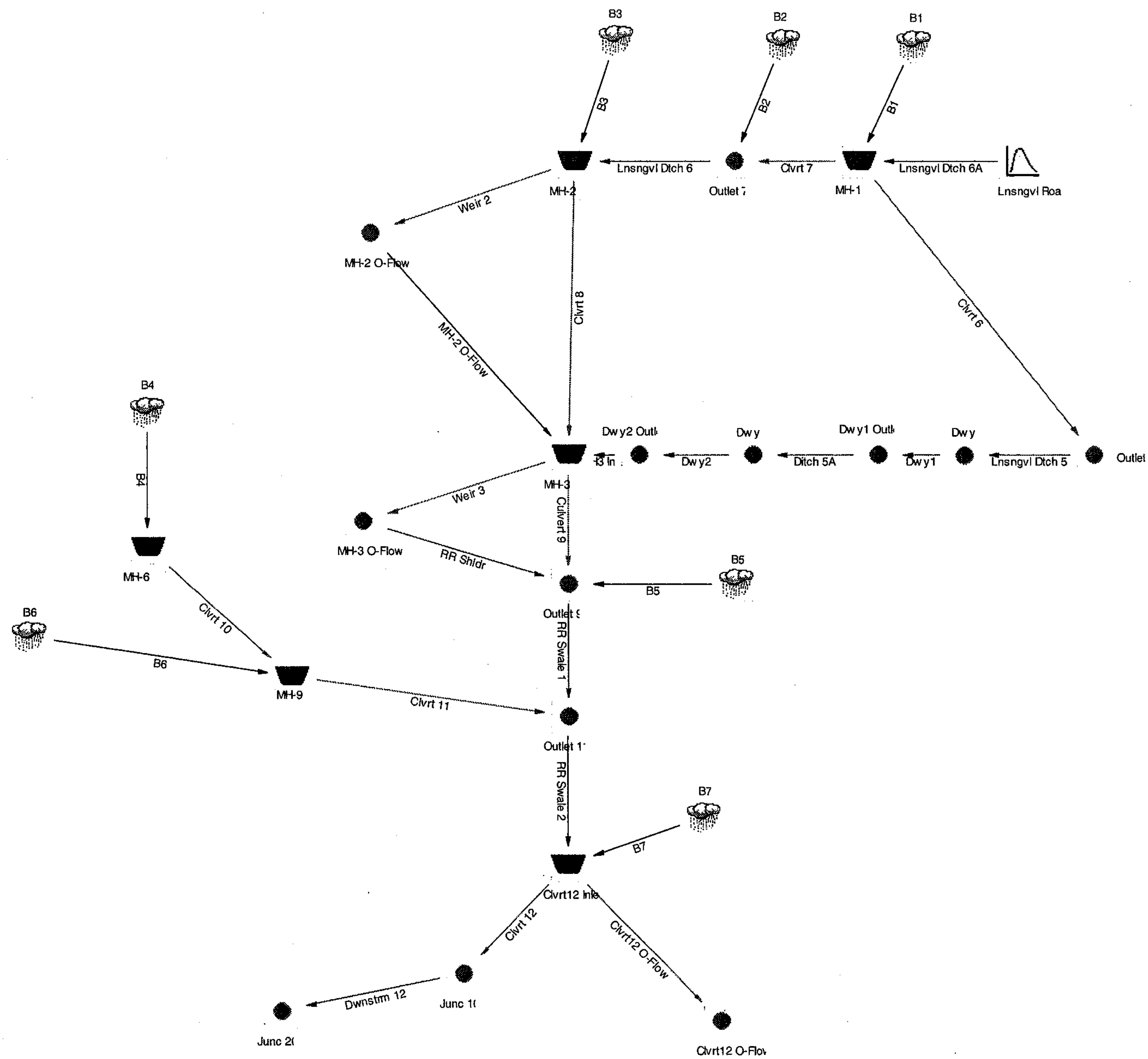
```
Structure ID       = TW
Structure Type     = TW SETUP, DS Channel
------------------------------------
FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations=    30
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

Index of Starting Page Numbers for ID Names

PondPack Modeling Output

Basin B



B3
B2
B1
B3
B2
B1
Lnsngvl Dtch 6
Clvrt 7
Lnsngvl Dtch 6A
MH-2
Outlet 7
MH-1
Lnsngvl Roa
Weir 2
MH-2 O-Flow
Clvrt 8
MH-2 O-Flow
Clvrt 6
B4
Dwy2 Outl
Dwy
Dwy1 Outl
Dwy
Dwy2
Ditch 5A
Dwy1
Lnsngvl Dtch 5
Outlet
B4
MH-3
Weir 3
Culvert 9
MH-3 O-Flow
RR Shldr
B5
MH-6
B5
Outlet 9
B6
Clvrt 10
RR Swale 1
B6
MH-9
Clvrt 11
Outlet 11
RR Swale 2
B7
B7
Clvrt12 Inle
Clvrt 12
Clvrt12 O-Flow
Dwnstrm 12
Junc 10
Junc 20
Clvrt12 O-Flow

Table of Contents

Table of Contents (continued)

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Tompkins County

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.3000	Synthetic Curve	TypeII 24hr
5	3.4000	Synthetic Curve	TypeII 24hr
10	3.9000	Synthetic Curve	TypeII 24hr
25	4.6000	Synthetic Curve	TypeII 24hr
50	4.9000	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
B1	AREA	1	.900		12.1000	8.55		
B1	AREA	5	2.416		12.1000	29.86		
B1	AREA	10	3.246		12.1000	41.44		
B1	AREA	25	4.515		12.1000	58.94		
B1	AREA	50	5.090		12.1000	66.81		
B2	AREA	1	1.348		12.1000	15.35		
B2	AREA	5	3.163		12.1000	40.38		
B2	AREA	10	4.113		12.1000	53.27		
B2	AREA	25	5.534		12.1000	72.33		
B2	AREA	50	6.169		12.1000	80.77		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
B3	AREA	1	.801		12.1000	9.54		
B3	AREA	5	1.837		12.1000	23.89		
B3	AREA	10	2.375		12.1000	31.21		
B3	AREA	25	3.176		12.0500	42.22		
B3	AREA	50	3.533		12.0500	47.14		
B4	AREA	1	.348		12.0000	5.63		
B4	AREA	5	.680		12.0000	11.11		
B4	AREA	10	.843		12.0000	13.73		
B4	AREA	25	1.079		12.0000	17.46		
B4	AREA	50	1.182		12.0000	19.07		
B5	AREA	1	.132		12.0000	2.03		
B5	AREA	5	.262		12.0000	4.14		
B5	AREA	10	.326		12.0000	5.16		
B5	AREA	25	.420		12.0000	6.62		
B5	AREA	50	.461		12.0000	7.25		
B6	AREA	1	.339		12.0500	4.96		
B6	AREA	5	.701		12.0500	10.48		
B6	AREA	10	.882		12.0500	13.18		
B6	AREA	25	1.146		12.0500	17.07		
B6	AREA	50	1.263		12.0500	18.75		
B7	AREA	1	.149		11.9500	2.69		
B7	AREA	5	.298		11.9500	5.37		
B7	AREA	10	.371		11.9000	6.69		
B7	AREA	25	.477		11.9000	8.63		
B7	AREA	50	.523		11.9000	9.47		
CLVRT12 INLETIN	POND	1	4.016		12.2000	38.18		
CLVRT12 INLETIN	POND	5	9.519		12.2000	106.59		
CLVRT12 INLETIN	POND	10	12.536		12.2000	140.67		
CLVRT12 INLETIN	POND	25	17.106		12.2500	196.91		
CLVRT12 INLETIN	POND	50	19.420		12.2500	236.56		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
+CLVRT12 INLETOUT	POND	1	4.016		12.2000	37.49	668.88	.004
+CLVRT12 INLETOUT	POND	5	9.519		12.2000	104.83	670.67	.007
+CLVRT12 INLETOUT	POND	10	12.535		12.2500	140.51	670.83	.008
+CLVRT12 INLETOUT	POND	25	17.106		12.2500	196.16	671.01	.008
+CLVRT12 INLETOUT	POND	50	19.420		12.3000	234.63	671.12	.008
*CLVRT12 O-FLOW	JCT	1	.000		.0500	.00		
*CLVRT12 O-FLOW	JCT	5	.336		12.2000	20.83		
*CLVRT12 O-FLOW	JCT	10	1.230		12.2500	52.37		
*CLVRT12 O-FLOW	JCT	25	2.969		12.2500	102.95		
*CLVRT12 O-FLOW	JCT	50	4.083		12.3000	138.39		
DWY1	JCT	1	.000		.0500	.00		
DWY1	JCT	5	.009		12.1500	.76		
DWY1	JCT	10	.094		12.1500	6.00		
DWY1	JCT	25	.390		12.1500	21.03		
DWY1	JCT	50	.574		12.1500	29.01		
DWY1 OUTLET	JCT	1	.000		.0500	.00		
DWY1 OUTLET	JCT	5	.009		12.2000	.75		
DWY1 OUTLET	JCT	10	.094		12.2000	5.87		
DWY1 OUTLET	JCT	25	.390		12.2000	20.25		
DWY1 OUTLET	JCT	50	.689		12.1500	49.76		
DWY2	JCT	1	.000		.0500	.00		
DWY2	JCT	5	.009		12.2000	.64		
DWY2	JCT	10	.094		12.2000	5.45		
DWY2	JCT	25	.390		12.2000	19.58		
DWY2	JCT	50	.689		12.2000	41.24		
DWY2 OUTLET	JCT	1	.000		.0500	.00		
DWY2 OUTLET	JCT	5	.009		12.2500	.64		
DWY2 OUTLET	JCT	10	.094		12.2500	5.37		
DWY2 OUTLET	JCT	25	.390		12.2500	19.00		
DWY2 OUTLET	JCT	50	.832		12.2000	69.95		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
JUNC 10	JCT	1	4.016		12.2000	37.49		
JUNC 10	JCT	5	9.183		12.2000	84.00		
JUNC 10	JCT	10	11.306		12.2500	88.14		
JUNC 10	JCT	25	14.137		12.2500	93.21		
JUNC 10	JCT	50	15.337		12.3000	96.24		
*JUNC 20	JCT	1	4.016		12.2500	37.47		
*JUNC 20	JCT	5	9.528		12.1500	107.98		
*JUNC 20	JCT	10	11.652		12.0500	107.98		
*JUNC 20	JCT	25	14.490		12.0000	107.98		
*JUNC 20	JCT	50	15.697		12.0000	107.98		
LNSNGVL ROAD	HYG	1	.000		11.9000	.00		
LNSNGVL ROAD	HYG	5	.163		12.1000	10.60		
LNSNGVL ROAD	HYG	10	.381		12.1000	19.83		
LNSNGVL ROAD	HYG	25	.761		12.1000	33.43		
LNSNGVL ROAD	HYG	50	.942	R	12.1000	39.43		
MH-1 IN	POND	1	.900		12.1000	8.55		
MH-1 IN	POND	5	2.579		12.1000	36.26		
MH-1 IN	POND	10	3.627		12.1000	56.93		
MH-1 IN	POND	25	5.276		12.1000	88.24		
MH-1 IN	POND	50	6.032		12.1000	102.18		
+MH-1 OUT	POND	1	.900		12.1500	8.44	804.81	.001
+MH-1 OUT	POND	5	2.579		12.1500	36.12	806.58	.003
+MH-1 OUT	POND	10	3.627		12.1500	56.22	807.41	.003
+MH-1 OUT	POND	25	5.276		12.1500	86.32	808.70	.004
+MH-1 OUT	POND	50	6.032		12.1500	99.68	809.29	.005
MH-2 IN	POND	1	3.049		12.1500	32.00		
MH-2 IN	POND	5	7.570		12.1500	94.31		
MH-2 IN	POND	10	10.020		12.1000	128.35		
MH-2 IN	POND	25	13.595		12.1000	174.62		
MH-2 IN	POND	50	15.160		12.1000	193.60		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
+MH-2	OUT	POND	1	3.048		12.1500	31.69	772.79	.002
+MH-2	OUT	POND	5	7.570		12.1500	94.17	775.91	.005
+MH-2	OUT	POND	10	10.020		12.1500	127.93	776.22	.005
+MH-2	OUT	POND	25	13.595		12.1500	172.42	776.40	.005
+MH-2	OUT	POND	50	15.159		12.1500	190.75	776.46	.005
MH-2 O-FLOW		JCT	1	.000		.0500	.00		
MH-2 O-FLOW		JCT	5	.000		.0500	.00		
MH-2 O-FLOW		JCT	10	.387		12.1500	28.83		
MH-2 O-FLOW		JCT	25	1.369		12.1500	70.49		
MH-2 O-FLOW		JCT	50	1.865		12.1500	87.87		
MH-3	IN	POND	1	3.048		12.1500	31.69		
MH-3	IN	POND	5	7.578		12.1500	94.38		
MH-3	IN	POND	10	10.114		12.1500	130.79		
MH-3	IN	POND	25	13.984		12.1500	185.18		
MH-3	IN	POND	50	15.991		12.2000	248.24		
+MH-3	OUT	POND	1	3.048		12.2000	31.14	766.97	.002
+MH-3	OUT	POND	5	7.578		12.2000	92.49	770.01	.004
+MH-3	OUT	POND	10	10.114		12.2000	128.53	770.70	.005
+MH-3	OUT	POND	25	13.984		12.2000	182.36	770.92	.005
+MH-3	OUT	POND	50	15.991		12.2000	231.85	771.08	.005
MH-3 O-FLOW		JCT	1	.000		.0500	.00		
MH-3 O-FLOW		JCT	5	.000		.0500	.00		
MH-3 O-FLOW		JCT	10	.330		12.2000	25.05		
MH-3 O-FLOW		JCT	25	1.516		12.2000	75.60		
MH-3 O-FLOW		JCT	50	2.428		12.2000	122.73		
MH-6	IN	POND	1	.348		12.0000	5.63		
MH-6	IN	POND	5	.680		12.0000	11.11		
MH-6	IN	POND	10	.843		12.0000	13.73		
MH-6	IN	POND	25	1.079		12.0000	17.46		
MH-6	IN	POND	50	1.182		12.0000	19.07		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
MH-6	OUT POND	1	.348		12.0500	5.48	733.52	.001
MH-6	OUT POND	5	.680		12.0000	10.78	734.01	.001
MH-6	OUT POND	10	.843		12.0000	13.37	734.21	.001
MH-6	OUT POND	25	1.079		12.0000	17.07	734.48	.002
MH-6	OUT POND	50	1.182		12.0000	18.68	734.58	.002
MH-9	IN POND	1	.687		12.0500	10.44		
MH-9	IN POND	5	1.381		12.0500	21.17		
MH-9	IN POND	10	1.725		12.0000	26.40		
MH-9	IN POND	25	2.225		12.0000	34.07		
MH-9	IN POND	50	2.445		12.0000	37.40		
MH-9	OUT POND	1	.687		12.0500	10.27	704.97	.001
MH-9	OUT POND	5	1.381		12.0500	21.11	705.74	.002
MH-9	OUT POND	10	1.725		12.0500	26.37	706.07	.002
MH-9	OUT POND	25	2.225		12.0500	33.91	706.51	.002
MH-9	OUT POND	50	2.445		12.0500	37.18	706.69	.003
OUTLET 11	JCT	1	3.867		12.1500	37.75		
OUTLET 11	JCT	5	9.221		12.1500	105.81		
OUTLET 11	JCT	10	12.165		12.2000	141.22		
OUTLET 11	JCT	25	16.629		12.2000	197.73		
OUTLET 11	JCT	50	18.897		12.2500	239.29		
OUTLET 6	JCT	1	.000		.0500	.00		
OUTLET 6	JCT	5	.009		12.1500	.96		
OUTLET 6	JCT	10	.094		12.1500	6.50		
OUTLET 6	JCT	25	.390		12.1500	21.71		
OUTLET 6	JCT	50	.574		12.1500	29.60		
OUTLET 7	JCT	1	2.248		12.1000	23.28		
OUTLET 7	JCT	5	5.733		12.1000	73.49		
OUTLET 7	JCT	10	7.645		12.1000	101.06		
OUTLET 7	JCT	25	10.419		12.1000	135.94		
OUTLET 7	JCT	50	11.627		12.1000	150.08		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
OUTLET 9	JCT	1	3.180		12.2000	31.96		
OUTLET 9	JCT	5	7.840		12.1500	94.07		
OUTLET 9	JCT	10	10.440		12.2000	129.83		
OUTLET 9	JCT	25	14.404		12.2000	183.76		
OUTLET 9	JCT	50	16.452		12.2500	228.12		

```
Title... Project Date: 11/19/2008
         Project Engineer: BMT
         Project Title: Ludlowville Storm Drainage
         Project Comments:

              DESIGN STORMS SUMMARY

 Design Storm File,ID =              Tompkins County


 Storm Tag Name      = 1
 --------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 1 yr
 Total Rainfall Depth= 2.3000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


 Storm Tag Name      = 5
 --------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 5 yr
 Total Rainfall Depth= 3.4000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


 Storm Tag Name      = 10
 --------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 10 yr
 Total Rainfall Depth= 3.9000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


 Storm Tag Name      = 25
 --------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 25 yr
 Total Rainfall Depth= 4.6000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


 Storm Tag Name      = 50
 --------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 50 yr
 Total Rainfall Depth= 4.9000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs
```

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.3000
Hydraulic Length	100.00 ft
2yr, 24hr P	2.7000 in
Slope	.100000 ft/ft
Avg.Velocity	.17 ft/sec

Segment #1 Time: .1626 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1230.00 ft
Slope	.052000 ft/ft
Unpaved	
Avg.Velocity	3.68 ft/sec

Segment #2 Time: .0929 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	15.0000 sq.ft
Wetted Perimeter	10.50 ft
Hydraulic Radius	1.43 ft
Slope	.022000 ft/ft
Mannings n	.0300
Hydraulic Length	1350.00 ft
Avg.Velocity	9.34 ft/sec

Segment #3 Time: .0401 hrs

Total Tc: .2956 hrs

```
---------------------------------------------------------------------
Tc Equations used...
---------------------------------------------------------------------


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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

     Unpaved surface:
     V  = 16.1345 * (Sf**0.5)

     Paved surface:
     V  = 20.3282 * (Sf**0.5)

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

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

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinB.ppw

```
==== SCS Channel Flow ==================================================

     R  = Aq / Wp
     V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

     Where:  R  = Hydraulic radius
             Aq = Flow area, sq.ft.
             Wp = Wetted perimeter, ft
             V  = Velocity, ft/sec
             Sf = Slope, ft/ft
             n  = Mannings n
             Tc = Time of concentration, hrs
             Lf = Flow length, ft
```

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinB.ppw

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.3000
Hydraulic Length	100.00 ft
2yr, 24hr P	2.7000 in
Slope	.100000 ft/ft
Avg.Velocity	.17 ft/sec

Segment #1 Time: .1626 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1900.00 ft
Slope	.052000 ft/ft
Unpaved	
Avg.Velocity	3.68 ft/sec

Segment #2 Time: .1434 hrs

Total Tc: .3060 hrs

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinB.ppw

---

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

```
Unpaved surface:
V   = 16.1345 * (Sf**0.5)

Paved surface:
V   = 20.3282 * (Sf**0.5)

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

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

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

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

Segment #1:   Tc: TR-55 Sheet

Mannings n            .3000
Hydraulic Length    100.00 ft
2yr, 24hr P         2.7000 in
Slope              .050000 ft/ft

Avg.Velocity           .13 ft/sec

                                          Segment #1 Time:      .2145 hrs
------------------------------------------------------------------------

Segment #2:   Tc: TR-55 Shallow

Hydraulic Length    600.00 ft
Slope              .060000 ft/ft
Unpaved

Avg.Velocity          3.95 ft/sec

                                          Segment #2 Time:      .0422 hrs
------------------------------------------------------------------------

Segment #3:   Tc: TR-55 Channel

Flow Area          15.0000 sq.ft
Wetted Perimeter     10.50 ft
Hydraulic Radius      1.43 ft
Slope              .044000 ft/ft
Mannings n           .0250
Hydraulic Length   2250.00 ft

Avg.Velocity         15.86 ft/sec

                                          Segment #3 Time:      .0394 hrs
------------------------------------------------------------------------

                                                ========================
                                                 Total Tc:      .2961 hrs
                                                ========================
```

```
-----------------------------------------------------------------------
Tc Equations used...
-----------------------------------------------------------------------

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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

     Unpaved surface:
     V  = 16.1345 * (Sf**0.5)

     Paved surface:
     V  = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ==

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.3000	
Hydraulic Length	50.00	ft
2yr, 24hr P	2.7000	in
Slope	.050000	ft/ft
Avg.Velocity	.11	ft/sec

Segment #1 Time: .1232 hrs

Segment #2: Tc: TR-55 Channel

Flow Area	15.0000	sq.ft
Wetted Perimeter	10.50	ft
Hydraulic Radius	1.43	ft
Slope	.044000	ft/ft
Mannings n	.0300	
Hydraulic Length	2250.00	ft
Avg.Velocity	13.21	ft/sec

Segment #2 Time: .0473 hrs

Total Tc: .1705 hrs

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

==== SCS Channel Flow ====

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.2500
Hydraulic Length	100.00 ft
2yr, 24hr P	2.7000 in
Slope	.080000 ft/ft
Avg.Velocity	.18 ft/sec

Segment #1 Time: .1536 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	600.00 ft
Slope	.075000 ft/ft
Unpaved	
Avg.Velocity	4.42 ft/sec

Segment #2 Time: .0377 hrs

Total Tc: .1914 hrs

```
------------------------------------------------------------------------
Tc Equations used...
------------------------------------------------------------------------


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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

     Unpaved surface:
     V  = 16.1345 * (Sf**0.5)

     Paved surface:
     V  = 20.3282 * (Sf**0.5)

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

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

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinB.ppw

:::
TIME OF CONCENTRATION CALCULATOR
:::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2500
Hydraulic Length	100.00 ft
2yr, 24hr P	2.7000 in
Slope	.070000 ft/ft

Avg.Velocity .17 ft/sec

Segment #1 Time: .1621 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	900.00 ft
Slope	.067000 ft/ft
Unpaved	

Avg.Velocity 4.18 ft/sec

Segment #2 Time: .0599 hrs

========================
Total Tc: .2219 hrs
========================

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

```
Unpaved surface:
V  = 16.1345 * (Sf**0.5)

Paved surface:
V  = 20.3282 * (Sf**0.5)

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

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

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinB.ppw

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

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

Segment #1:  Tc: TR-55 Sheet

Mannings n           .0250
Hydraulic Length    50.00 ft
2yr, 24hr P        2.7000 in
Slope             .100000 ft/ft

Avg.Velocity         1.09 ft/sec

                                         Segment #1 Time:     .0128 hrs
----------------------------------------------------------------------

Segment #2:  Tc: TR-55 Channel

Flow Area        128.0000 sq.ft
Wetted Perimeter    30.00 ft
Hydraulic Radius     4.27 ft
Slope             .080000 ft/ft
Mannings n          .0500
Hydraulic Length   725.00 ft

Avg.Velocity        22.17 ft/sec

                                         Segment #2 Time:     .0091 hrs
----------------------------------------------------------------------

                                               ========================
                                                Total Tc:     .0219 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =      .0833 hrs
                                               ========================
```

```
-----------------------------------------------------------------------
Tc Equations used...
-----------------------------------------------------------------------

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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

==== SCS Channel Flow ==================================================

     R  = Aq / Wp
     V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

     Where:  R  = Hydraulic radius
             Aq = Flow area, sq.ft.
             Wp = Wetted perimeter, ft
             V  = Velocity, ft/sec
             Sf = Slope, ft/ft
             n  = Mannings n
             Tc = Time of concentration, hrs
             Lf = Flow length, ft
```

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - fair	69	32.400			69.00
COMPOSITE AREA & WEIGHTED CN --->		32.400			69.00 (69)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - good	74	32.400			74.00
COMPOSITE AREA & WEIGHTED CN --->		32.400			74.00 (74)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - good	74	17.100			74.00
Impervious Areas - Paved parking lo	98	.800			98.00
COMPOSITE AREA & WEIGHTED CN --->		17.900			75.07 (75)

RUNOFF CURVE NUMBER DATA

:::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Residential Districts - 1/2 acre	80	3.800			80.00
Impervious Areas - Paved parking lo	98	.800			98.00
COMPOSITE AREA & WEIGHTED CN --->		4.600			83.13 (83)

:::

RUNOFF CURVE NUMBER DATA

::

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Residential Districts - 1/2 acre	80	1.650			80.00
Impervious Areas - Paved parking lo	98	.200			98.00

COMPOSITE AREA & WEIGHTED CN ---> 1.850 81.95 (82)

::

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Residential Districts - 1 acre	79	5.100			79.00
Impervious Areas - Paved parking lo	98	.300			98.00

COMPOSITE AREA & WEIGHTED CN ---> 5.400 80.06 (80)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Impervious Areas - Paved parking lo	98	.300			98.00
Open space (Lawns,parks etc.) - Fai	79	1.800			79.00
COMPOSITE AREA & WEIGHTED CN --->		2.100			81.71 (82)

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - DWY1 OUTLET 1
Outflow HYG file = NONE STORED - DITCH 5A 1

Reach Link Data = DITCH 5A
Reach Length = 150.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch 5A (Chn-Trapz.)
Overflow Elev. = 791.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 788.80 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
788.80	.00	.000	.0000	.00	.00	.00
788.81	.02	.000	.0070	.00	.02	.05
788.84	.16	.000	.0074	.00	.16	.30
788.88	.50	.001	.0080	.00	.50	.79
788.92	1.00	.001	.0085	.00	1.00	1.45
788.96	1.64	.001	.0091	.00	1.64	2.25
789.00	2.41	.002	.0096	.00	2.41	3.21
789.04	3.31	.002	.0102	.00	3.31	4.30
789.08	4.35	.002	.0107	.00	4.35	5.54
789.12	5.51	.003	.0113	.00	5.51	6.92
789.16	6.82	.003	.0118	.00	6.82	8.45
789.20	8.26	.004	.0124	.00	8.26	10.12
789.24	9.84	.004	.0129	.00	9.84	11.95
789.28	11.56	.005	.0135	.00	11.56	13.92
789.32	13.43	.005	.0140	.00	13.43	16.06
789.36	15.44	.006	.0146	.00	15.44	18.35
789.40	17.60	.007	.0152	.00	17.60	20.80
789.44	19.92	.007	.0157	.00	19.92	23.42
789.48	22.40	.008	.0163	.00	22.40	26.20
789.52	25.03	.009	.0168	.00	25.03	29.16

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - DWY1 OUTLET 1
Outflow HYG file = NONE STORED - DITCH 5A 1

Reach Link Data = DITCH 5A
Reach Length = 150.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch 5A (Chn-Trapz.)
Overflow Elev. = 791.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 788.80 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
789.56	27.83	.009	.0174	.00	27.83	32.29
789.60	30.79	.010	.0179	.00	30.79	35.59
789.64	33.93	.011	.0185	.00	33.93	39.08
789.68	37.23	.011	.0190	.00	37.23	42.75
789.72	40.71	.012	.0196	.00	40.71	46.60
789.76	44.38	.013	.0201	.00	44.38	50.65
789.80	48.22	.014	.0207	.00	48.22	54.88
789.84	52.24	.015	.0212	.00	52.24	59.31
789.88	56.46	.015	.0218	.00	56.46	63.94
789.92	60.86	.016	.0223	.00	60.86	68.77
789.96	65.45	.017	.0229	.00	65.45	73.81
790.00	70.25	.018	.0234	.00	70.25	79.05
790.04	75.25	.019	.0240	.00	75.25	84.50
790.08	80.45	.020	.0245	.00	80.45	90.18
790.12	85.85	.021	.0251	.00	85.85	96.06
790.16	91.46	.022	.0256	.00	91.46	102.16
790.20	97.29	.023	.0262	.00	97.29	108.49
790.24	103.32	.024	.0267	.00	103.32	115.04
790.28	109.58	.025	.0273	.00	109.58	121.81
790.32	116.06	.026	.0278	.00	116.06	128.83

MODIFIED PULS REACH DATA

```
HYG Dir           = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow  HYG file  = NONE STORED - DWY1 OUTLET      1
Outflow HYG file  = NONE STORED - DITCH 5A         1

Reach Link Data   = DITCH 5A
Reach Length      = 150.00 ft
Approx. Total Tt  = .0000 hrs  (based on Wtd.Q = .00 cfs)
Reach Channel     = Lnsngvl Ditch 5A  (Chn-Trapz.)
Overflow Elev.    = 791.00 ft
Overflow Channel  = NONE

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev     =   788.80 ft
Starting Volume      =     .000 ac-ft
Starting Outflow     =      .00 cfs
Starting Infiltr.    =      .00 cfs
Starting Total Qout=        .00 cfs
Time Increment       =    .0500 hrs
```

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
790.36	122.75	.028	.0284	.00	122.75	136.07
790.40	129.67	.029	.0289	.00	129.67	143.54
790.44	136.84	.030	.0295	.00	136.84	151.27
790.48	144.22	.031	.0300	.00	144.22	159.23
790.52	151.83	.032	.0306	.00	151.83	167.43
790.56	159.70	.033	.0311	.00	159.70	175.89
790.60	167.79	.035	.0317	.00	167.79	184.59
790.64	176.14	.036	.0322	.00	176.14	193.56
790.68	184.72	.037	.0328	.00	184.72	202.77
790.72	193.55	.039	.0333	.00	193.55	212.24
790.76	202.65	.040	.0339	.00	202.65	221.98
790.80	211.98	.041	.0344	.00	211.98	231.98
790.84	221.57	.043	.0350	.00	221.57	242.24
790.88	231.43	.044	.0355	.00	231.43	252.79
790.92	241.54	.046	.0361	.00	241.54	263.59
790.96	251.92	.047	.0366	.00	251.92	274.67
791.00	262.58	.048	.0372	.00	262.58	286.04

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - JUNC 10 1
Outflow HYG file = NONE STORED - DWNSTRM 12 1

Reach Link Data = DWNSTRM 12
Reach Length = 500.00 ft
Approx. Total Tt = .0227 hrs (based on Wtd.Q = 12.69 cfs)
Reach Channel = Dwnstrm 12 (Chn-Rectang.)
Overflow Elev. = 661.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 660.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
660.00	.00	.000	.0000	.00	.00	.00
660.01	.06	.001	.0918	.00	.06	.50
660.02	.18	.002	.0918	.00	.18	1.07
660.04	.58	.004	.0918	.00	.58	2.36
660.06	1.14	.006	.0918	.00	1.14	3.81
660.08	1.84	.007	.0918	.00	1.84	5.39
660.10	2.65	.009	.0918	.00	2.65	7.10
660.12	3.59	.011	.0918	.00	3.59	8.92
660.14	4.62	.013	.0918	.00	4.62	10.85
660.16	5.75	.015	.0918	.00	5.75	12.86
660.18	6.98	.017	.0918	.00	6.98	14.98
660.20	8.30	.018	.0918	.00	8.30	17.19
660.22	9.69	.020	.0918	.00	9.69	19.47
660.24	11.17	.022	.0918	.00	11.17	21.84
660.26	12.73	.024	.0918	.00	12.73	24.28
660.28	14.36	.026	.0918	.00	14.36	26.80
660.30	16.05	.028	.0918	.00	16.05	29.38
660.32	17.82	.029	.0918	.00	17.82	32.04
660.34	19.66	.031	.0918	.00	19.66	34.77
660.36	21.55	.033	.0918	.00	21.55	37.55

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - JUNC 10 1
Outflow HYG file = NONE STORED - DWNSTRM 12 1

Reach Link Data = DWNSTRM 12
Reach Length = 500.00 ft
Approx. Total Tt = .0227 hrs (based on Wtd.Q = 12.69 cfs)
Reach Channel = Dwnstrm 12 (Chn-Rectang.)
Overflow Elev. = 661.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 660.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
660.38	23.51	.035	.0918	.00	23.51	40.40
660.40	25.54	.037	.0918	.00	25.54	43.32
660.42	27.61	.039	.0918	.00	27.61	46.28
660.44	29.75	.040	.0918	.00	29.75	49.31
660.46	31.95	.042	.0918	.00	31.95	52.39
660.48	34.19	.044	.0918	.00	34.19	55.52
660.50	36.49	.046	.0918	.00	36.49	58.71
660.52	38.84	.048	.0918	.00	38.84	61.95
660.54	41.23	.050	.0918	.00	41.23	65.23
660.56	43.69	.051	.0918	.00	43.69	68.57
660.58	46.18	.053	.0918	.00	46.18	71.96
660.60	48.72	.055	.0918	.00	48.72	75.39
660.62	51.31	.057	.0918	.00	51.31	78.87
660.64	53.95	.059	.0918	.00	53.95	82.39
660.66	56.62	.061	.0918	.00	56.62	85.95
660.68	59.34	.062	.0918	.00	59.34	89.56
660.70	62.10	.064	.0918	.00	62.10	93.21
660.72	64.90	.066	.0918	.00	64.90	96.90
660.74	67.74	.068	.0918	.00	67.74	100.63
660.76	70.63	.070	.0918	.00	70.63	104.40

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - JUNC 10 1
Outflow HYG file = NONE STORED - DWNSTRM 12 1

Reach Link Data = DWNSTRM 12
Reach Length = 500.00 ft
Approx. Total Tt = .0227 hrs (based on Wtd.Q = 12.69 cfs)
Reach Channel = Dwnstrm 12 (Chn-Rectang.)
Overflow Elev. = 661.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 660.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
660.78	73.55	.072	.0918	.00	73.55	108.22
660.80	76.50	.073	.0918	.00	76.50	112.05
660.82	79.49	.075	.0918	.00	79.49	115.94
660.84	82.53	.077	.0918	.00	82.53	119.86
660.86	85.59	.079	.0918	.00	85.59	123.81
660.88	88.69	.081	.0918	.00	88.69	127.80
660.90	91.83	.083	.0918	.00	91.83	131.83
660.92	94.99	.084	.0918	.00	94.99	135.87
660.94	98.19	.086	.0918	.00	98.19	139.97
660.96	101.43	.088	.0918	.00	101.43	144.09
660.98	104.68	.090	.0918	.00	104.68	148.24
661.00	107.98	.092	.0918	.00	107.98	152.43

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - DWY1 1
Outflow HYG file = NONE STORED - DWY1 1

Reach Link Data = DWY1
Reach Length = 36.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Dwy1 (Chn-Circular)
Overflow Elev. = 792.14 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 790.30 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
790.30	.00	.000	.0000	.00	.00	.00
790.34	.03	.000	.0005	.00	.03	.04
790.38	.14	.000	.0006	.00	.14	.16
790.42	.33	.000	.0008	.00	.33	.36
790.46	.60	.000	.0009	.00	.60	.65
790.50	.97	.000	.0010	.00	.97	1.03
790.54	1.42	.000	.0011	.00	1.42	1.50
790.58	1.95	.000	.0011	.00	1.95	2.06
790.62	2.57	.000	.0012	.00	2.57	2.70
790.66	3.28	.000	.0013	.00	3.28	3.43
790.70	4.06	.000	.0013	.00	4.06	4.24
790.74	4.92	.000	.0014	.00	4.92	5.13
790.78	5.86	.000	.0014	.00	5.86	6.09
790.82	6.86	.001	.0015	.00	6.86	7.12
790.86	7.94	.001	.0015	.00	7.94	8.23
790.90	9.08	.001	.0015	.00	9.08	9.39
790.94	10.28	.001	.0015	.00	10.28	10.63
790.98	11.54	.001	.0016	.00	11.54	11.92
791.02	12.85	.001	.0016	.00	12.85	13.26
791.06	14.22	.001	.0016	.00	14.22	14.65

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - DWY1 1
Outflow HYG file = NONE STORED - DWY1 1

Reach Link Data = DWY1
Reach Length = 36.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Dwy1 (Chn-Circular)
Overflow Elev. = 792.14 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 790.30 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
791.10	15.62	.001	.0016	.00	15.62	16.09
791.14	17.07	.001	.0016	.00	17.07	17.57
791.18	18.56	.001	.0016	.00	18.56	19.09
791.22	20.07	.001	.0016	.00	20.07	20.64
791.26	21.62	.001	.0017	.00	21.62	22.21
791.30	23.18	.001	.0017	.00	23.18	23.81
791.34	24.76	.001	.0017	.00	24.76	25.42
791.38	26.35	.001	.0017	.00	26.35	27.05
791.42	27.95	.001	.0017	.00	27.95	28.68
791.46	29.55	.002	.0017	.00	29.55	30.31
791.50	31.15	.002	.0017	.00	31.15	31.93
791.54	32.73	.002	.0017	.00	32.73	33.55
791.58	34.29	.002	.0017	.00	34.29	35.14
791.62	35.83	.002	.0017	.00	35.83	36.71
791.66	37.34	.002	.0017	.00	37.34	38.25
791.70	38.81	.002	.0017	.00	38.81	39.75
791.74	40.24	.002	.0017	.00	40.24	41.21
791.78	41.61	.002	.0017	.00	41.61	42.61
791.82	42.92	.002	.0017	.00	42.92	43.95
791.86	44.16	.002	.0017	.00	44.16	45.21

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - DWY1 1
Outflow HYG file = NONE STORED - DWY1 1

Reach Link Data = DWY1
Reach Length = 36.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Dwy1 (Chn-Circular)
Overflow Elev. = 792.14 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 790.30 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
791.90	45.31	.002	.0017	.00	45.31	46.39
791.94	46.38	.002	.0017	.00	46.38	47.48
791.98	47.34	.002	.0017	.00	47.34	48.46
792.02	48.17	.002	.0017	.00	48.17	49.32
792.06	48.87	.002	.0017	.00	48.87	50.04
792.10	49.41	.002	.0017	.00	49.41	50.60
792.14	49.76	.002	.0017	.00	49.76	50.97

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - DWY2 1
Outflow HYG file = NONE STORED - DWY2 1

Reach Link Data = DWY2
Reach Length = 125.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Dwy2 (Chn-Circular)
Overflow Elev. = 785.44 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 783.60 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
783.60	.00	.000	.0000	.00	.00	.00
783.64	.04	.000	.0016	.00	.04	.06
783.68	.19	.000	.0022	.00	.19	.25
783.72	.46	.000	.0027	.00	.46	.57
783.76	.85	.000	.0031	.00	.85	1.01
783.80	1.36	.000	.0034	.00	1.36	1.59
783.84	1.99	.001	.0037	.00	1.99	2.29
783.88	2.75	.001	.0040	.00	2.75	3.12
783.92	3.62	.001	.0042	.00	3.62	4.07
783.96	4.61	.001	.0044	.00	4.61	5.14
784.00	5.71	.001	.0046	.00	5.71	6.33
784.04	6.92	.001	.0048	.00	6.92	7.63
784.08	8.23	.002	.0049	.00	8.23	9.04
784.12	9.65	.002	.0050	.00	9.65	10.55
784.16	11.16	.002	.0052	.00	11.16	12.16
784.20	12.76	.002	.0053	.00	12.76	13.86
784.24	14.45	.002	.0054	.00	14.45	15.66
784.28	16.22	.003	.0054	.00	16.22	17.53
784.32	18.07	.003	.0055	.00	18.07	19.48
784.36	19.98	.003	.0056	.00	19.98	21.51

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - DWY2 1
Outflow HYG file = NONE STORED - DWY2 1

Reach Link Data = DWY2
Reach Length = 125.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Dwy2 (Chn-Circular)
Overflow Elev. = 785.44 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 783.60 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
784.40	21.96	.003	.0056	.00	21.96	23.59
784.44	24.00	.004	.0057	.00	24.00	25.74
784.48	26.09	.004	.0057	.00	26.09	27.93
784.52	28.22	.004	.0057	.00	28.22	30.18
784.56	30.39	.004	.0057	.00	30.39	32.46
784.60	32.59	.005	.0057	.00	32.59	34.77
784.64	34.81	.005	.0057	.00	34.81	37.10
784.68	37.05	.005	.0057	.00	37.05	39.45
784.72	39.30	.005	.0057	.00	39.30	41.81
784.76	41.54	.005	.0057	.00	41.54	44.17
784.80	43.79	.006	.0057	.00	43.79	46.52
784.84	46.01	.006	.0057	.00	46.01	48.85
784.88	48.21	.006	.0057	.00	48.21	51.16
784.92	50.37	.006	.0057	.00	50.37	53.43
784.96	52.49	.007	.0057	.00	52.49	55.65
785.00	54.56	.007	.0057	.00	54.56	57.83
785.04	56.57	.007	.0057	.00	56.57	59.93
785.08	58.49	.007	.0057	.00	58.49	61.96
785.12	60.34	.007	.0057	.00	60.34	63.90
785.16	62.08	.008	.0057	.00	62.08	65.73

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - DWY2 1
Outflow HYG file = NONE STORED - DWY2 1

Reach Link Data = DWY2
Reach Length = 125.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Dwy2 (Chn-Circular)
Overflow Elev. = 785.44 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 783.60 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
785.20	63.70	.008	.0057	.00	63.70	67.44
785.24	65.20	.008	.0057	.00	65.20	69.03
785.28	66.54	.008	.0057	.00	66.54	70.46
785.32	67.72	.008	.0057	.00	67.72	71.71
785.36	68.70	.008	.0057	.00	68.70	72.77
785.40	69.46	.009	.0057	.00	69.46	73.60
785.44	69.95	.009	.0057	.00	69.95	74.15

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 6 1
Outflow HYG file = NONE STORED - LNSNGVL DTCH 5 1

Reach Link Data = LNSNGVL DTCH 5
Reach Length = 225.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch5 (Chn-Trapz.)
Overflow Elev. = 805.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 802.80 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
802.80	.00	.000	.0000	.00	.00	.00
802.81	.02	.000	.0105	.00	.02	.07
802.84	.16	.000	.0112	.00	.16	.36
802.88	.50	.001	.0120	.00	.50	.94
802.92	1.00	.001	.0128	.00	1.00	1.67
802.96	1.64	.002	.0136	.00	1.64	2.56
803.00	2.41	.002	.0145	.00	2.41	3.61
803.04	3.31	.003	.0153	.00	3.31	4.80
803.08	4.35	.004	.0161	.00	4.35	6.14
803.12	5.51	.004	.0169	.00	5.51	7.63
803.16	6.82	.005	.0178	.00	6.82	9.26
803.20	8.26	.006	.0186	.00	8.26	11.06
803.24	9.84	.007	.0194	.00	9.84	13.00
803.28	11.56	.007	.0202	.00	11.56	15.11
803.32	13.43	.008	.0211	.00	13.43	17.38
803.36	15.44	.009	.0219	.00	15.44	19.81
803.40	17.60	.010	.0227	.00	17.60	22.40
803.44	19.92	.011	.0236	.00	19.92	25.17
803.48	22.40	.012	.0244	.00	22.40	28.11
803.52	25.03	.013	.0252	.00	25.03	31.22

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 6 1
Outflow HYG file = NONE STORED - LNSNGVL DTCH 5 1

Reach Link Data = LNSNGVL DTCH 5
Reach Length = 225.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch5 (Chn-Trapz.)
Overflow Elev. = 805.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 802.80 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
803.56	27.83	.014	.0260	.00	27.83	34.52
803.60	30.79	.015	.0269	.00	30.79	37.99
803.64	33.93	.016	.0277	.00	33.93	41.66
803.68	37.23	.017	.0285	.00	37.23	45.51
803.72	40.71	.018	.0293	.00	40.71	49.54
803.76	44.38	.019	.0302	.00	44.38	53.78
803.80	48.22	.021	.0310	.00	48.22	58.22
803.84	52.24	.022	.0318	.00	52.24	62.85
803.88	56.46	.023	.0326	.00	56.46	67.69
803.92	60.86	.025	.0335	.00	60.86	72.73
803.96	65.45	.026	.0343	.00	65.45	77.98
804.00	70.25	.027	.0351	.00	70.25	83.45
804.04	75.25	.029	.0360	.00	75.25	89.13
804.08	80.45	.030	.0368	.00	80.45	95.04
804.12	85.85	.032	.0376	.00	85.85	101.16
804.16	91.46	.033	.0384	.00	91.46	107.51
804.20	97.29	.035	.0393	.00	97.29	114.09
804.24	103.32	.036	.0401	.00	103.32	120.89
804.28	109.58	.038	.0409	.00	109.58	127.93
804.32	116.06	.040	.0417	.00	116.06	135.21

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 6 1
Outflow HYG file = NONE STORED - LNSNGVL DTCH 5 1

Reach Link Data = LNSNGVL DTCH 5
Reach Length = 225.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch5 (Chn-Trapz.)
Overflow Elev. = 805.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 802.80 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
804.36	122.75	.041	.0426	.00	122.75	142.72
804.40	129.67	.043	.0434	.00	129.67	150.47
804.44	136.84	.045	.0442	.00	136.84	158.48
804.48	144.22	.047	.0450	.00	144.22	166.73
804.52	151.83	.048	.0459	.00	151.83	175.23
804.56	159.70	.050	.0467	.00	159.70	183.99
804.60	167.79	.052	.0475	.00	167.79	192.99
804.64	176.14	.054	.0483	.00	176.14	202.27
804.68	184.72	.056	.0492	.00	184.72	211.79
804.72	193.55	.058	.0500	.00	193.55	221.58
804.76	202.65	.060	.0508	.00	202.65	231.65
804.80	211.98	.062	.0517	.00	211.98	241.98
804.84	221.57	.064	.0525	.00	221.57	252.58
804.88	231.43	.066	.0533	.00	231.43	263.47
804.92	241.54	.068	.0541	.00	241.54	274.62
804.96	251.92	.071	.0550	.00	251.92	286.05
805.00	262.58	.073	.0558	.00	262.58	297.78

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 7 1
Outflow HYG file = NONE STORED - LNSNGVL DTCH 6 1

Reach Link Data = LNSNGVL DTCH 6
Reach Length = 530.00 ft
Approx. Total Tt = .0264 hrs (based on Wtd.Q = 7.11 cfs)
Reach Channel = Lnsngvl Dtch 6 (Chn-Trapz.)
Overflow Elev. = 805.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 802.70 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
802.70	.00	.000	.0000	.00	.00	.00
802.71	.01	.000	.0248	.00	.01	.13
802.75	.16	.001	.0268	.00	.16	.78
802.80	.52	.003	.0292	.00	.52	1.82
802.85	1.05	.004	.0316	.00	1.05	3.08
802.90	1.72	.006	.0341	.00	1.72	4.55
802.95	2.54	.008	.0365	.00	2.54	6.22
803.00	3.51	.009	.0389	.00	3.51	8.10
803.05	4.63	.011	.0414	.00	4.63	10.20
803.10	5.90	.014	.0438	.00	5.90	12.50
803.15	7.33	.016	.0462	.00	7.33	15.02
803.20	8.92	.018	.0487	.00	8.92	17.75
803.25	10.67	.021	.0511	.00	10.67	20.71
803.30	12.58	.023	.0535	.00	12.58	23.89
803.35	14.68	.026	.0560	.00	14.68	27.31
803.40	16.94	.029	.0584	.00	16.94	30.96
803.45	19.38	.032	.0608	.00	19.38	34.84
803.50	22.01	.035	.0633	.00	22.01	38.97
803.55	24.83	.038	.0657	.00	24.83	43.35
803.60	27.85	.042	.0681	.00	27.85	47.99

MODIFIED PULS REACH DATA

```
HYG Dir           = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow  HYG file  = NONE STORED - OUTLET 7          1
Outflow HYG file  = NONE STORED - LNSNGVL DTCH 6    1

Reach Link Data   = LNSNGVL DTCH 6
Reach Length      = 530.00 ft
Approx. Total Tt  = .0264 hrs  (based on Wtd.Q = 7.11 cfs)
Reach Channel     = Lnsngvl Dtch 6  (Chn-Trapz.)
Overflow Elev.    = 805.00 ft
Overflow Channel  = NONE

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev     =   802.70 ft
Starting Volume      =     .000 ac-ft
Starting Outflow     =      .00 cfs
Starting Infiltr.    =      .00 cfs
Starting Total Qout=        .00 cfs
Time Increment       =    .0500 hrs
```

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
803.65	31.06	.045	.0706	.00	31.06	52.88
803.70	34.47	.049	.0730	.00	34.47	58.03
803.75	38.09	.052	.0754	.00	38.09	63.44
803.80	41.92	.056	.0779	.00	41.92	69.12
803.85	45.96	.060	.0803	.00	45.96	75.09
803.90	50.23	.064	.0827	.00	50.23	81.32
803.95	54.71	.068	.0852	.00	54.71	87.84
804.00	59.42	.073	.0876	.00	59.42	94.64
804.05	64.37	.077	.0900	.00	64.37	101.73
804.10	69.55	.082	.0925	.00	69.55	109.13
804.15	74.97	.086	.0949	.00	74.97	116.81
804.20	80.64	.091	.0973	.00	80.64	124.80
804.25	86.55	.096	.0998	.00	86.55	133.10
804.30	92.71	.101	.1022	.00	92.71	141.70
804.35	99.13	.106	.1046	.00	99.13	150.63
804.40	105.81	.112	.1071	.00	105.81	159.87
804.45	112.75	.117	.1095	.00	112.75	169.43
804.50	119.96	.123	.1119	.00	119.96	179.32
804.55	127.44	.128	.1144	.00	127.44	189.53
804.60	135.20	.134	.1168	.00	135.20	200.10

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 7 1
Outflow HYG file = NONE STORED - LNSNGVL DTCH 6 1

Reach Link Data = LNSNGVL DTCH 6
Reach Length = 530.00 ft
Approx. Total Tt = .0264 hrs (based on Wtd.Q = 7.11 cfs)
Reach Channel = Lnsngvl Dtch 6 (Chn-Trapz.)
Overflow Elev. = 805.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 802.70 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
804.65	143.23	.140	.1192	.00	143.23	210.99
804.70	151.55	.146	.1217	.00	151.55	222.22
804.75	160.15	.152	.1241	.00	160.15	233.79
804.80	169.04	.158	.1265	.00	169.04	245.71
804.85	178.24	.165	.1290	.00	178.24	258.01
804.90	187.72	.171	.1314	.00	187.72	270.64
804.95	197.51	.178	.1338	.00	197.51	283.63
805.00	207.60	.185	.1363	.00	207.60	296.99

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - Lnsngvl Rd 1YR
Outflow HYG file = NONE STORED - LNSNGVL DTCH 6A 1

Reach Link Data = LNSNGVL DTCH 6A
Reach Length = 1400.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch6A (Chn-Trapz.)
Overflow Elev. = 866.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 863.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
863.00	.00	.000	.0000	.00	.00	.00
863.01	.01	.001	.0656	.00	.01	.32
863.06	.19	.004	.0720	.00	.19	2.17
863.12	.60	.009	.0797	.00	.60	4.78
863.18	1.21	.014	.0874	.00	1.21	7.82
863.24	2.00	.019	.0951	.00	2.00	11.26
863.30	2.97	.025	.1028	.00	2.97	15.10
863.36	4.11	.031	.1106	.00	4.11	19.35
863.42	5.45	.038	.1183	.00	5.45	24.00
863.48	6.98	.046	.1260	.00	6.98	29.08
863.54	8.70	.053	.1337	.00	8.70	34.57
863.60	10.63	.062	.1414	.00	10.63	40.49
863.66	12.76	.070	.1491	.00	12.76	46.84
863.72	15.11	.080	.1568	.00	15.11	53.64
863.78	17.68	.089	.1646	.00	17.68	60.88
863.84	20.48	.099	.1723	.00	20.48	68.57
863.90	23.52	.110	.1800	.00	23.52	76.72
863.96	26.79	.121	.1877	.00	26.79	85.33
864.02	30.31	.132	.1954	.00	30.31	94.41
864.08	34.08	.144	.2031	.00	34.08	103.97

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - Lnsngvl Rd 1YR
Outflow HYG file = NONE STORED - LNSNGVL DTCH 6A 1

Reach Link Data = LNSNGVL DTCH 6A
Reach Length = 1400.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = Lnsngvl Ditch6A (Chn-Trapz.)
Overflow Elev. = 866.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 863.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
864.14	38.11	.157	.2108	.00	38.11	114.01
864.20	42.41	.170	.2186	.00	42.41	124.55
864.26	46.98	.183	.2263	.00	46.98	135.57
864.32	51.83	.197	.2340	.00	51.83	147.10
864.38	56.96	.211	.2417	.00	56.96	159.14
864.44	62.38	.226	.2494	.00	62.38	171.69
864.50	68.09	.241	.2571	.00	68.09	184.76
864.56	74.11	.257	.2648	.00	74.11	198.35
864.62	80.43	.273	.2725	.00	80.43	212.48
864.68	87.06	.289	.2803	.00	87.06	227.14
864.74	94.02	.306	.2880	.00	94.02	242.34
864.80	101.29	.324	.2957	.00	101.29	258.09
864.86	108.90	.342	.3034	.00	108.90	274.40
864.92	116.85	.360	.3111	.00	116.85	291.26
864.98	125.13	.379	.3188	.00	125.13	308.69
865.04	133.76	.399	.3265	.00	133.76	326.70
865.10	142.74	.418	.3342	.00	142.74	345.27
865.16	152.08	.439	.3420	.00	152.08	364.43
865.22	161.78	.459	.3497	.00	161.78	384.17
865.28	171.86	.481	.3574	.00	171.86	404.53

MODIFIED PULS REACH DATA

```
HYG Dir            = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow  HYG file   = NONE STORED - Lnsngvl Rd        1YR
Outflow HYG file   = NONE STORED - LNSNGVL DTCH 6A  1

Reach Link Data    = LNSNGVL DTCH 6A
Reach Length       = 1400.00 ft
Approx. Total Tt   = .0000 hrs  (based on Wtd.Q = .00 cfs)
Reach Channel      = Lnsngvl Ditch6A  (Chn-Trapz.)
Overflow Elev.     = 866.00 ft
Overflow Channel   = NONE

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev     =   863.00 ft
Starting Volume      =     .000 ac-ft
Starting Outflow     =      .00 cfs
Starting Infiltr.    =      .00 cfs
Starting Total Qout=        .00 cfs
Time Increment       =    .0500 hrs
```

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
865.34	182.31	.502	.3651	.00	182.31	425.47
865.40	193.13	.525	.3728	.00	193.13	447.00
865.46	204.34	.547	.3805	.00	204.34	469.15
865.52	215.93	.570	.3882	.00	215.93	491.91
865.58	227.92	.594	.3960	.00	227.92	515.28
865.64	240.31	.618	.4037	.00	240.31	539.28
865.70	253.11	.642	.4114	.00	253.11	563.91
865.76	266.31	.667	.4191	.00	266.31	589.17
865.82	279.93	.692	.4268	.00	279.93	615.07
865.88	293.96	.718	.4345	.00	293.96	641.61
865.94	308.43	.745	.4422	.00	308.43	668.81
866.00	323.32	.771	.4500	.00	323.32	696.65

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - MH-3 O-FLOW 1
Outflow HYG file = NONE STORED - RR SHLDR 1

Reach Link Data = RR SHLDR
Reach Length = 570.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = RR Shldr (Chn-Trapz.)
Overflow Elev. = 772.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 770.40 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
770.40	.00	.000	.0000	.00	.00	.00
770.41	.20	.001	.1335	.00	.20	.84
770.43	1.25	.004	.1387	.00	1.25	3.21
770.46	4.01	.008	.1466	.00	4.01	8.04
770.49	7.98	.013	.1544	.00	7.98	14.20
770.52	13.04	.018	.1623	.00	13.04	21.55
770.55	19.16	.023	.1701	.00	19.16	30.09
770.58	26.29	.028	.1780	.00	26.29	39.74
770.61	34.44	.033	.1858	.00	34.44	50.54
770.64	43.58	.039	.1937	.00	43.58	62.43
770.67	53.75	.045	.2015	.00	53.75	75.47
770.70	64.92	.051	.2094	.00	64.92	89.62
770.73	77.14	.057	.2172	.00	77.14	104.94
770.76	90.37	.064	.2251	.00	90.37	121.37
770.79	104.68	.071	.2329	.00	104.68	139.01
770.82	120.02	.078	.2408	.00	120.02	157.79
770.85	136.48	.085	.2486	.00	136.48	177.81
770.88	154.00	.093	.2565	.00	154.00	198.99
770.91	172.68	.101	.2643	.00	172.68	221.45
770.94	192.44	.109	.2722	.00	192.44	245.11

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - MH-3 O-FLOW 1
Outflow HYG file = NONE STORED - RR SHLDR 1

Reach Link Data = RR SHLDR
Reach Length = 570.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = RR Shldr (Chn-Trapz.)
Overflow Elev. = 772.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 770.40 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
770.97	213.40	.117	.2800	.00	213.40	270.08
771.00	235.48	.126	.2879	.00	235.48	296.28
771.03	258.79	.134	.2957	.00	258.79	323.83
771.06	283.25	.143	.3036	.00	283.25	352.64
771.09	308.99	.153	.3114	.00	308.99	382.84
771.12	335.91	.162	.3193	.00	335.91	414.34
771.15	364.15	.172	.3271	.00	364.15	447.27
771.18	393.66	.182	.3350	.00	393.66	481.60
771.21	424.40	.192	.3428	.00	424.40	517.26
771.24	456.53	.202	.3507	.00	456.53	554.42
771.27	489.91	.213	.3585	.00	489.91	592.95
771.30	524.71	.224	.3664	.00	524.71	633.02
771.33	560.81	.235	.3742	.00	560.81	674.48
771.36	598.36	.246	.3821	.00	598.36	717.54
771.39	637.24	.258	.3899	.00	637.24	762.01
771.42	677.62	.270	.3978	.00	677.62	808.12
771.45	719.36	.282	.4056	.00	719.36	855.68
771.48	762.64	.294	.4135	.00	762.64	904.91
771.51	807.30	.306	.4213	.00	807.30	955.63
771.54	853.55	.319	.4292	.00	853.55	1008.06

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - MH-3 O-FLOW 1
Outflow HYG file = NONE STORED - RR SHLDR 1

Reach Link Data = RR SHLDR
Reach Length = 570.00 ft
Approx. Total Tt = .0000 hrs (based on Wtd.Q = .00 cfs)
Reach Channel = RR Shldr (Chn-Trapz.)
Overflow Elev. = 772.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 770.40 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
771.57	901.21	.332	.4370	.00	901.21	1062.00
771.60	950.49	.345	.4449	.00	950.49	1117.69
771.63	1001.22	.359	.4527	.00	1001.22	1174.93
771.66	1053.61	.373	.4606	.00	1053.61	1233.96
771.69	1107.48	.387	.4685	.00	1107.48	1294.57
771.72	1163.05	.401	.4763	.00	1163.05	1357.00
771.75	1220.12	.415	.4842	.00	1220.12	1421.04
771.78	1278.94	.430	.4920	.00	1278.94	1486.95
771.81	1339.28	.445	.4999	.00	1339.28	1554.49
771.84	1401.42	.460	.5077	.00	1401.42	1623.94
771.87	1465.10	.475	.5156	.00	1465.10	1695.05
771.90	1530.62	.491	.5234	.00	1530.62	1768.12
771.93	1597.85	.507	.5313	.00	1597.85	1843.02
771.96	1666.68	.523	.5391	.00	1666.68	1919.61
771.99	1737.40	.539	.5470	.00	1737.40	1998.22
772.00	1761.22	.544	.5496	.00	1761.22	2024.68

MODIFIED PULS REACH DATA

```
HYG Dir            = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow  HYG file   = NONE STORED - OUTLET 9        1
Outflow HYG file   = NONE STORED - RR SWALE 1      1

Reach Link Data    = RR SWALE 1
Reach Length       = 350.00 ft
Approx. Total Tt   = .0266 hrs   (based on Wtd.Q = 10.18 cfs)
Reach Channel      = RR Swale2   (Chn-Trapz.)
Overflow Elev.     = 702.00 ft
Overflow Channel   = NONE

No Infiltration

INITIAL CONDITIONS
----------------------------------
Starting WS Elev    =   694.00 ft
Starting Volume     =     .000 ac-ft
Starting Outflow    =      .00 cfs
Starting Infiltr.   =      .00 cfs
Starting Total Qout=       .00 cfs
Time Increment      =    .0500 hrs
```

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
694.00	.00	.000	.0000	.00	.00	.00
694.01	.03	.001	.0644	.00	.03	.34
694.16	2.95	.010	.0668	.00	2.95	8.03
694.32	9.36	.021	.0694	.00	9.36	19.71
694.48	18.37	.033	.0720	.00	18.37	34.20
694.64	29.67	.044	.0746	.00	29.67	51.17
694.80	43.05	.057	.0771	.00	43.05	70.43
694.96	58.42	.069	.0797	.00	58.42	91.87
695.12	75.67	.082	.0823	.00	75.67	115.40
695.28	94.78	.095	.0848	.00	94.78	140.97
695.44	115.68	.109	.0874	.00	115.68	168.54
695.60	138.36	.123	.0900	.00	138.36	198.09
695.76	162.82	.138	.0926	.00	162.82	229.62
695.92	189.03	.153	.0951	.00	189.03	263.10
696.08	217.00	.168	.0977	.00	217.00	298.54
696.24	246.72	.184	.1003	.00	246.72	335.92
696.40	278.21	.201	.1028	.00	278.21	375.28
696.56	311.46	.217	.1054	.00	311.46	416.60
696.72	346.49	.234	.1080	.00	346.49	459.89
696.88	383.33	.252	.1106	.00	383.33	505.18

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 9 1
Outflow HYG file = NONE STORED - RR SWALE 1 1

Reach Link Data = RR SWALE 1
Reach Length = 350.00 ft
Approx. Total Tt = .0266 hrs (based on Wtd.Q = 10.18 cfs)
Reach Channel = RR Swale2 (Chn-Trapz.)
Overflow Elev. = 702.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 694.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
697.04	421.95	.270	.1131	.00	421.95	552.47
697.20	462.41	.288	.1157	.00	462.41	601.79
697.36	504.68	.307	.1183	.00	504.68	653.12
697.52	548.82	.326	.1208	.00	548.82	706.52
697.68	594.81	.345	.1234	.00	594.81	761.96
697.84	642.70	.365	.1260	.00	642.70	819.51
698.00	692.47	.386	.1286	.00	692.47	879.13
698.16	744.16	.406	.1311	.00	744.16	940.88
698.32	797.80	.428	.1337	.00	797.80	1004.78
698.48	853.39	.449	.1363	.00	853.39	1070.81
698.64	910.97	.471	.1388	.00	910.97	1139.05
698.80	970.52	.494	.1414	.00	970.52	1209.45
698.96	1032.11	.516	.1440	.00	1032.11	1282.10
699.12	1095.71	.540	.1466	.00	1095.71	1356.94
699.28	1161.39	.563	.1491	.00	1161.39	1434.07
699.44	1229.12	.587	.1517	.00	1229.12	1513.45
699.60	1298.94	.612	.1543	.00	1298.94	1595.11
699.76	1370.90	.637	.1568	.00	1370.90	1679.12
699.92	1444.96	.662	.1594	.00	1444.96	1765.43
700.08	1521.21	.688	.1620	.00	1521.21	1854.13

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 9 1
Outflow HYG file = NONE STORED - RR SWALE 1 1

Reach Link Data = RR SWALE 1
Reach Length = 350.00 ft
Approx. Total Tt = .0266 hrs (based on Wtd.Q = 10.18 cfs)
Reach Channel = RR Swale2 (Chn-Trapz.)
Overflow Elev. = 702.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 694.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
700.24	1599.60	.714	.1646	.00	1599.60	1945.16
700.40	1680.22	.741	.1671	.00	1680.22	2038.62
700.56	1763.02	.767	.1697	.00	1763.02	2134.46
700.72	1848.05	.795	.1723	.00	1848.05	2232.73
700.88	1935.37	.823	.1748	.00	1935.37	2333.50
701.04	2024.93	.851	.1774	.00	2024.93	2436.69
701.20	2116.82	.879	.1800	.00	2116.82	2542.42
701.36	2210.99	.908	.1826	.00	2210.99	2650.62
701.52	2307.52	.938	.1851	.00	2307.52	2761.40
701.68	2406.38	.968	.1877	.00	2406.38	2874.69
701.84	2507.64	.998	.1903	.00	2507.64	2990.59
702.00	2611.26	1.028	.1928	.00	2611.26	3109.04

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 11 1
Outflow HYG file = NONE STORED - RR SWALE 2 1

Reach Link Data = RR SWALE 2
Reach Length = 400.00 ft
Approx. Total Tt = .0280 hrs (based on Wtd.Q = 12.56 cfs)
Reach Channel = RR Swale2 (Chn-Trapz.)
Overflow Elev. = 702.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 694.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
694.00	.00	.000	.0000	.00	.00	.00
694.01	.03	.001	.0736	.00	.03	.39
694.16	2.95	.012	.0764	.00	2.95	8.76
694.32	9.36	.024	.0793	.00	9.36	21.19
694.48	18.37	.037	.0823	.00	18.37	36.46
694.64	29.67	.051	.0852	.00	29.67	54.25
694.80	43.05	.065	.0882	.00	43.05	74.34
694.96	58.42	.079	.0911	.00	58.42	96.65
695.12	75.67	.094	.0940	.00	75.67	121.07
695.28	94.78	.109	.0970	.00	94.78	147.57
695.44	115.68	.125	.0999	.00	115.68	176.10
695.60	138.36	.141	.1028	.00	138.36	206.63
695.76	162.82	.158	.1058	.00	162.82	239.17
695.92	189.03	.175	.1087	.00	189.03	273.68
696.08	217.00	.193	.1117	.00	217.00	310.19
696.24	246.72	.211	.1146	.00	246.72	348.66
696.40	278.21	.229	.1175	.00	278.21	389.15
696.56	311.46	.248	.1205	.00	311.46	431.61
696.72	346.49	.268	.1234	.00	346.49	476.09
696.88	383.33	.288	.1264	.00	383.33	522.59

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 11 1
Outflow HYG file = NONE STORED - RR SWALE 2 1

Reach Link Data = RR SWALE 2
Reach Length = 400.00 ft
Approx. Total Tt = .0280 hrs (based on Wtd.Q = 12.56 cfs)
Reach Channel = RR Swale2 (Chn-Trapz.)
Overflow Elev. = 702.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 694.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
697.04	421.95	.308	.1293	.00	421.95	571.11
697.20	462.41	.329	.1322	.00	462.41	621.70
697.36	504.68	.350	.1352	.00	504.68	674.32
697.52	548.82	.372	.1381	.00	548.82	729.04
697.68	594.81	.395	.1410	.00	594.81	785.84
697.84	642.70	.418	.1440	.00	642.70	844.77
698.00	692.47	.441	.1469	.00	692.47	905.80
698.16	744.16	.465	.1499	.00	744.16	968.98
698.32	797.80	.489	.1528	.00	797.80	1034.35
698.48	853.39	.513	.1557	.00	853.39	1101.88
698.64	910.97	.539	.1587	.00	910.97	1171.63
698.80	970.52	.564	.1616	.00	970.52	1243.59
698.96	1032.11	.590	.1646	.00	1032.11	1317.81
699.12	1095.71	.617	.1675	.00	1095.71	1394.26
699.28	1161.39	.644	.1704	.00	1161.39	1473.03
699.44	1229.12	.671	.1734	.00	1229.12	1554.07
699.60	1298.94	.699	.1763	.00	1298.94	1637.42
699.76	1370.90	.728	.1792	.00	1370.90	1723.15
699.92	1444.96	.757	.1822	.00	1444.96	1811.21
700.08	1521.21	.786	.1851	.00	1521.21	1901.69

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - OUTLET 11 1
Outflow HYG file = NONE STORED - RR SWALE 2 1

Reach Link Data = RR SWALE 2
Reach Length = 400.00 ft
Approx. Total Tt = .0280 hrs (based on Wtd.Q = 12.56 cfs)
Reach Channel = RR Swale2 (Chn-Trapz.)
Overflow Elev. = 702.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 694.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
700.24	1599.60	.816	.1881	.00	1599.60	1994.53
700.40	1680.22	.846	.1910	.00	1680.22	2089.82
700.56	1763.02	.877	.1939	.00	1763.02	2187.53
700.72	1848.05	.908	.1969	.00	1848.05	2287.69
700.88	1935.37	.940	.1998	.00	1935.37	2390.37
701.04	2024.93	.972	.2028	.00	2024.93	2495.51
701.20	2116.82	1.005	.2057	.00	2116.82	2603.22
701.36	2210.99	1.038	.2086	.00	2210.99	2713.43
701.52	2307.52	1.072	.2116	.00	2307.52	2826.24
701.68	2406.38	1.106	.2145	.00	2406.38	2941.59
701.84	2507.64	1.140	.2174	.00	2507.64	3059.58
702.00	2611.26	1.175	.2204	.00	2611.26	3180.15

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 732.40 ft
Increment = .10 ft
Max. Elev.= 738.40 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
Culvert-Circular	C0	--->	TW	732.400	738.400
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = C0
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =        1
Barrel Diameter    =    3.0000 ft
Upstream Invert    =    732.40 ft
Dnstream Invert    =    703.60 ft
Horiz. Length      =    420.00 ft
Barrel Length      =    420.99 ft
Barrel Slope       =    .06857 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0120
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .006159  (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)    =     1.125
T2 ratio (HW/D)    =     1.273
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 =    735.78 ft   --->  Flow =     42.85 cfs
At T2  Elev =    736.22 ft   --->  Flow =     48.97 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 703.40 ft
Increment = .10 ft
Max. Elev.= 725.00 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
Culvert-Circular	CO	--->	TW	703.400	725.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID       = C0
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =        1
Barrel Diameter    =    3.0000 ft
Upstream Invert    =    703.40 ft
Dnstream Invert    =    701.00 ft
Horiz. Length      =    120.00 ft
Barrel Length      =    120.02 ft
Barrel Slope       =    .02000 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0120
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .006159  (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)    =     1.150
T2 ratio (HW/D)    =     1.297
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 =    706.85 ft  ---> Flow =     42.85 cfs
At T2 Elev =    707.29 ft  ---> Flow =     48.97 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 803.40 ft
Increment = .10 ft
Max. Elev.= 820.00 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
Culvert-Circular	C0	--->	TW	803.400	820.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = C0
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =        1
Barrel Diameter    =    3.0000 ft
Upstream Invert    =    803.40 ft
Dnstream Invert    =    802.70 ft
Horiz. Length      =     35.00 ft
Barrel Length      =     35.01 ft
Barrel Slope       =    .02000 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)    =     1.150
T2 ratio (HW/D)    =     1.297
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 =   806.85 ft   ---> Flow =   42.85 cfs
At T2 Elev =   807.29 ft   ---> Flow =   48.97 cfs

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 770.20 ft
Increment = .10 ft
Max. Elev.= 780.00 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
Culvert-Circular	C0	--->	TW	770.200	780.000
TW SETUP, DS Channel					

```
              OUTLET STRUCTURE INPUT DATA


              Structure ID       = C0
              Structure Type     = Culvert-Circular
              ------------------------------------
              No. Barrels        =         1
              Barrel Diameter    =    3.0000 ft
              Upstream Invert    =    770.20 ft
              Dnstream Invert    =    764.60 ft
              Horiz. Length      =     75.00 ft
              Barrel Length      =     75.21 ft
              Barrel Slope       =    .07467 ft/ft

              OUTLET CONTROL DATA...
              Mannings n         =     .0130
              Ke                 =     .0000  (forward entrance loss)
              Kb                 =   .007228  (per ft of full flow)
              Kr                 =     .0100  (reverse entrance loss)
              HW Convergence     =      .001  +/- ft

              INLET CONTROL DATA...
              Equation form      =         0
              Inlet Control K    =     .0001
              Inlet Control M    =     .0001
              Inlet Control c    =    .00010
              Inlet Control Y    =     .0001
              T1 ratio (HW/D)    =     1.190
              T2 ratio (HW/D)    =      .151
              Slope Factor       =     2.000

Use unsubmerged inlet control Form 0 equ. below T1 elev.
Use    submerged inlet control Form 0 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =     773.77 ft  --->  Flow =      42.85 cfs
At T2 Elev =     770.65 ft  --->  Flow =      48.97 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 764.40 ft
Increment = .10 ft
Max. Elev.= 790.00 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
Culvert-Circular	CO	--->	TW	764.400	790.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = CO
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =        1
Barrel Diameter    =    3.0000 ft
Upstream Invert    =    764.40 ft
Dnstream Invert    =    724.60 ft
Horiz. Length      =    560.00 ft
Barrel Length      =    561.41 ft
Barrel Slope       =    .07107 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0130
Ke                 =     .0000  (forward entrance loss)
Kb                 =   .007228  (per ft of full flow)
Kr                 =     .0000  (reverse entrance loss)
HW Convergence     =      .001  +/- ft

INLET CONTROL DATA...
Equation form      =         0
Inlet Control K    =     .0010
Inlet Control M    =     .0010
Inlet Control c    =    .00100
Inlet Control Y    =     .0010
T1 ratio (HW/D)    =     1.006
T2 ratio (HW/D)    =     -.019
Slope Factor       =     -.500
```

```
Use unsubmerged inlet control Form 0 equ. below T1 elev.
Use   submerged inlet control Form 0 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =    767.42 ft   --->  Flow =     42.85 cfs
At T2 Elev =    764.34 ft   --->  Flow =     48.97 cfs
```

OUTLET STRUCTURE INPUT DATA

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

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...

Maximum Iterations=	30
Min. TW tolerance =	.01 ft
Max. TW tolerance =	.01 ft
Min. HW tolerance =	.01 ft
Max. HW tolerance =	.01 ft
Min. Q tolerance =	.10 cfs
Max. Q tolerance =	.10 cfs

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 666.00 ft
Increment = .10 ft
Max. Elev.= 672.00 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
Culvert-Circular	C0	--->	TW	666.000	672.000
TW SETUP, DS Channel					

```
            OUTLET STRUCTURE INPUT DATA



            Structure ID       = C0
            Structure Type     = Culvert-Circular
            ------------------------------------
            No. Barrels        =         1
            Barrel Diameter    =    4.0000 ft
            Upstream Invert    =    666.00 ft
            Dnstream Invert    =    660.10 ft
            Horiz. Length      =     80.00 ft
            Barrel Length      =     80.22 ft
            Barrel Slope       =    .07375 ft/ft

            OUTLET CONTROL DATA...
            Mannings n         =     .0240
            Ke                 =     .5000  (forward entrance loss)
            Kb                 =   .016787  (per ft of full flow)
            Kr                 =     .5000  (reverse entrance loss)
            HW Convergence     =      .001  +/- ft

            INLET CONTROL DATA...
            Equation form      =         1
            Inlet Control K    =     .0078
            Inlet Control M    =    2.0000
            Inlet Control c    =    .03790
            Inlet Control Y    =     .6900
            T1 ratio (HW/D)    =     1.099
            T2 ratio (HW/D)    =     1.260
            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 =    670.40 ft   --->  Flow =     87.96 cfs
At T2 Elev =    671.04 ft   --->  Flow =    100.53 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.=	803.40	ft
Increment =	.10	ft
Max. Elev.=	820.00	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
Culvert-Circular	C0	--->	TW	806.100	820.000
TW SETUP, DS Channel					

```
              OUTLET STRUCTURE INPUT DATA


              Structure ID       = C0
              Structure Type     = Culvert-Circular
              ------------------------------------
              No. Barrels        =        1
              Barrel Diameter    =    2.5000 ft
              Upstream Invert    =    806.10 ft
              Dnstream Invert    =    802.80 ft
              Horiz. Length      =     55.00 ft
              Barrel Length      =     55.10 ft
              Barrel Slope       =    .06000 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)    =     1.130
              T2 ratio (HW/D)    =     1.277
              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 =    808.92 ft   --->  Flow =     27.16 cfs
At T2 Elev =    809.29 ft   --->  Flow =     31.05 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.=	666.00 ft
Increment =	.10 ft
Max. Elev.=	672.00 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	W0	--->	TW	670.500	672.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = W0
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    670.50 ft
Weir Length        =    100.00 ft
Weir Coeff.        =  2.800000

Weir TW effects     (Use adjustment equation)



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

CONVERGENCE TOLERANCES...
Maximum Iterations=    30
Min. TW tolerance =    .01 ft
Max. TW tolerance =    .01 ft
Min. HW tolerance =    .01 ft
Max. HW tolerance =    .01 ft
Min.  Q tolerance =    .10 cfs
Max.  Q tolerance =    .10 cfs
```

REQUESTED POND WS ELEVATIONS:

Min. Elev.=	770.20 ft
Increment =	.10 ft
Max. Elev.=	780.00 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	W0	--->	TW	776.000	780.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = W0
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    776.00 ft
Weir Length        =    100.00 ft
Weir Coeff.        =  2.800000

Weir TW effects      (Use adjustment equation)



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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.=	764.40	ft
Increment =	.10	ft
Max. Elev.=	790.00	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	W0	--->	TW	770.500	790.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = W0
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =        1
Crest Elev.        =    770.50 ft
Weir Length        =    100.00 ft
Weir Coeff.        =  2.800000

Weir TW effects      (Use adjustment equation)


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

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

Index of Starting Page Numbers for ID Names

PondPack Modeling Output

Basin C

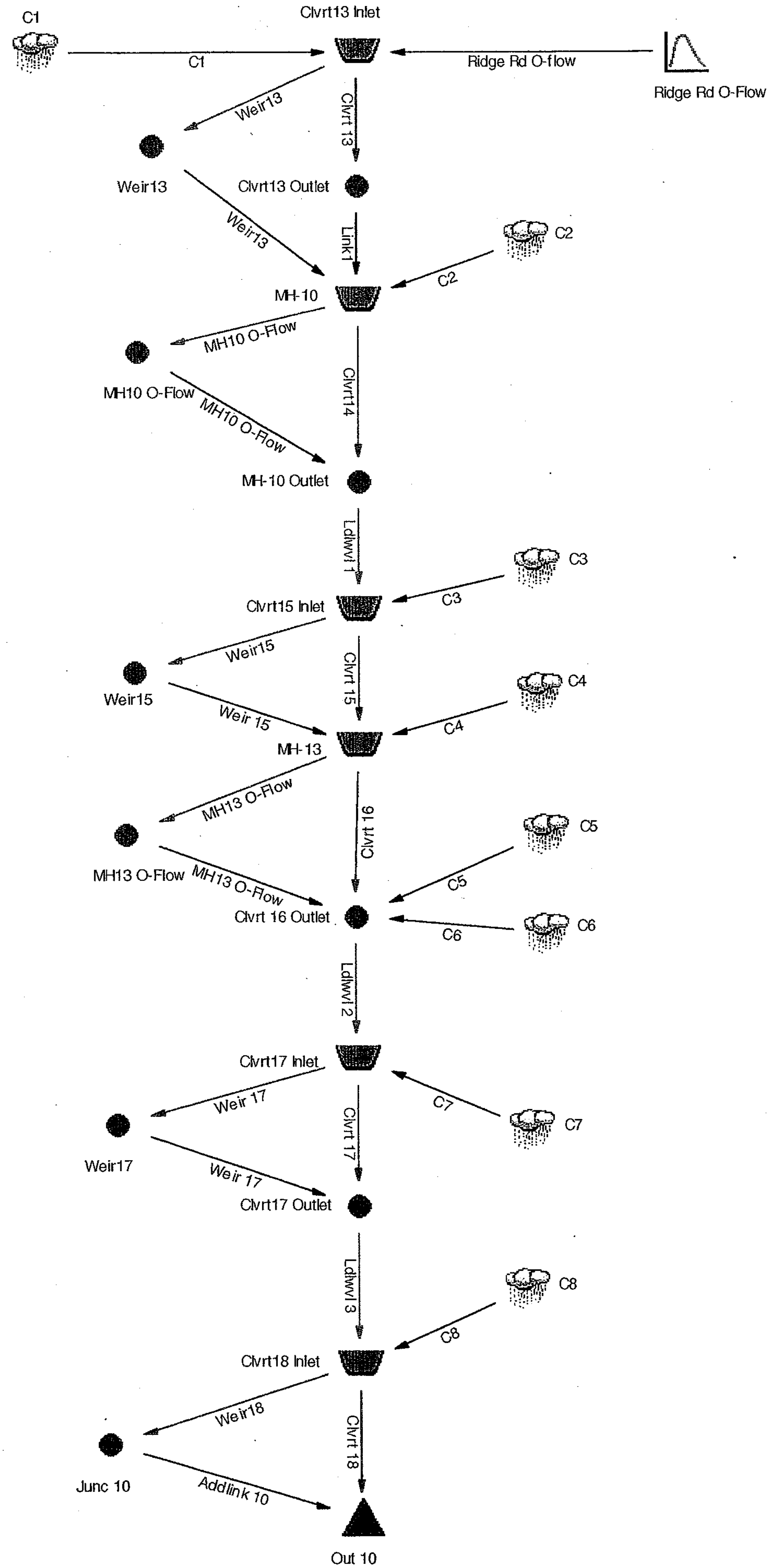

C1
Clvrt13 Inlet
C1
Ridge Rd O-flow
Ridge Rd O-Flow
Weir13
Clvrt 13
Weir13
Clvrt13 Outlet
Weir13
Link1
C2
C2
MH-10
MH10 O-Flow
MH10 O-Flow
MH10 O-Flow
Clvrt14
MH-10 Outlet
Ldlwvl 1
C3
C3
Clvrt15 Inlet
Weir15
Clvrt 15
Weir15
C4
Weir 15
C4
MH-13
MH13 O-Flow
Clvrt 16
C5
MH13 O-Flow
MH13 O-Flow
C5
Clvrt 16 Outlet
C6
C6
Ldlwvl 2
Clvrt17 Inlet
Weir 17
Clvrt 17
C7
C7
Weir17
Weir 17
Clvrt17 Outlet
Ldlwvl 3
C8
C8
Clvrt18 Inlet
Weir18
Clvrt 18
Junc 10
Addlink 10
Out 10

Table of Contents

Table of Contents (continued)

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Tompkins County

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.3000	Synthetic Curve	TypeII 24hr
5	3.4000	Synthetic Curve	TypeII 24hr
10	3.9000	Synthetic Curve	TypeII 24hr
25	4.6000	Synthetic Curve	TypeII 24hr
50	4.9000	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
C1	AREA	1	.008		12.0000	.13		
C1	AREA	5	.017		12.0000	.28		
C1	AREA	10	.022		12.0000	.36		
C1	AREA	25	.029		12.0000	.46		
C1	AREA	50	.032		12.0000	.51		
C2	AREA	1	.011		12.0000	.18		
C2	AREA	5	.024		12.0000	.39		
C2	AREA	10	.030		12.0000	.49		
C2	AREA	25	.039		12.0000	.64		
C2	AREA	50	.043		12.0000	.71		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
C3	AREA	1	.016		11.9500	.28		
C3	AREA	5	.035		11.9500	.62		
C3	AREA	10	.044		11.9500	.79		
C3	AREA	25	.057		11.9500	1.03		
C3	AREA	50	.063		11.9500	1.13		
C4	AREA	1	.013		11.9500	.23		
C4	AREA	5	.027		11.9500	.49		
C4	AREA	10	.034		11.9500	.62		
C4	AREA	25	.045		11.9000	.81		
C4	AREA	50	.050		11.9000	.90		
C5	AREA	1	.000		.0500	.00		
C5	AREA	5	.005		12.0500	.03		
C5	AREA	10	.009		12.0000	.09		
C5	AREA	25	.016		12.0000	.22		
C5	AREA	50	.019		12.0000	.28		
C6	AREA	1	.380		12.0500	5.03		
C6	AREA	5	1.021		12.0000	16.47		
C6	AREA	10	1.372		12.0000	22.62		
C6	AREA	25	1.909		12.0000	31.89		
C6	AREA	50	2.152		12.0000	36.05		
C7	AREA	1	.000		.0500	.00		
C7	AREA	5	.000		.0500	.00		
C7	AREA	10	.000		.0500	.00		
C7	AREA	25	.002		13.4500	.00		
C7	AREA	50	.004		14.6000	.00		
C8	AREA	1	.004		14.4000	.00		
C8	AREA	5	.026		12.0500	.25		
C8	AREA	10	.041		12.0000	.50		
C8	AREA	25	.067		12.0000	.99		
C8	AREA	50	.080		12.0000	1.22		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
CLVRT 16 OUTLET	JCT	1	.429		12.0500	5.73		
CLVRT 16 OUTLET	JCT	5	1.466		12.3500	21.39		
CLVRT 16 OUTLET	JCT	10	2.741		12.3500	52.88		
CLVRT 16 OUTLET	JCT	25	5.063		12.4000	101.79		
CLVRT 16 OUTLET	JCT	50	6.410		12.4000	135.81		
CLVRT13 INLETIN	POND	1	.008		12.0000	.13		
CLVRT13 INLETIN	POND	5	.353		12.2000	20.92		
CLVRT13 INLETIN	POND	10	1.252		12.2500	52.46		
CLVRT13 INLETIN	POND	25	2.997		12.2500	103.06		
CLVRT13 INLETIN	POND	50	4.083		12.3000	138.49		
+CLVRT13 INLETOUT	POND	1	.008		12.0500	.13	652.90	.000
+CLVRT13 INLETOUT	POND	5	.353		12.2500	20.86	655.75	.006
+CLVRT13 INLETOUT	POND	10	1.252		12.2500	51.35	656.04	.007
+CLVRT13 INLETOUT	POND	25	2.997		12.3000	101.18	656.36	.007
+CLVRT13 INLETOUT	POND	50	4.083		12.3000	136.64	656.56	.008
CLVRT13 OUTLET	JCT	1	.008		12.0500	.13		
CLVRT13 OUTLET	JCT	5	.279		12.2500	12.93		
CLVRT13 OUTLET	JCT	10	.490		12.2500	13.77		
CLVRT13 OUTLET	JCT	25	.678		12.3000	14.67		
CLVRT13 OUTLET	JCT	50	.739		12.3000	15.18		
CLVRT15 INLETIN	POND	1	.036		12.0000	.53		
CLVRT15 INLETIN	POND	5	.412		12.3000	19.58		
CLVRT15 INLETIN	POND	10	1.325		12.3000	50.19		
CLVRT15 INLETIN	POND	25	3.094		12.3500	99.01		
CLVRT15 INLETIN	POND	50	4.190		12.3500	133.43		
+CLVRT15 INLETOUT	POND	1	.036		12.0500	.53	616.11	.000
+CLVRT15 INLETOUT	POND	5	.412		12.3500	18.24	620.08	.004
+CLVRT15 INLETOUT	POND	10	1.325		12.3500	49.69	620.62	.004
+CLVRT15 INLETOUT	POND	25	3.094		12.3500	98.48	621.14	.004
+CLVRT15 INLETOUT	POND	50	4.190		12.4000	130.48	621.43	.005

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
CLVRT17 INLETIN	POND	1	.429		12.0500	5.67		
CLVRT17 INLETIN	POND	5	1.466		12.3500	20.38		
CLVRT17 INLETIN	POND	10	2.741		12.4000	52.13		
CLVRT17 INLETIN	POND	25	5.065		12.4000	101.62		
CLVRT17 INLETIN	POND	50	6.414		12.4000	133.11		
+CLVRT17 INLETOUT	POND	1	.429		12.0500	5.34	517.08	.002
+CLVRT17 INLETOUT	POND	5	1.466		12.4000	20.25	518.40	.005
+CLVRT17 INLETOUT	POND	10	2.741		12.4000	51.45	520.29	.009
+CLVRT17 INLETOUT	POND	25	5.065		12.4500	99.65	520.89	.010
+CLVRT17 INLETOUT	POND	50	6.414		12.4500	132.80	521.20	.011
CLVRT17 OUTLET	JCT	1	.429		12.0500	5.34		
CLVRT17 OUTLET	JCT	5	1.466		12.4000	20.25		
CLVRT17 OUTLET	JCT	10	2.741		12.4000	51.45		
CLVRT17 OUTLET	JCT	25	5.065		12.4500	99.65		
CLVRT17 OUTLET	JCT	50	6.414		12.4500	132.80		
CLVRT18 INLETIN	POND	1	.433		12.1000	5.33		
CLVRT18 INLETIN	POND	5	1.491		12.4000	19.51		
CLVRT18 INLETIN	POND	10	2.783		12.4500	50.78		
CLVRT18 INLETIN	POND	25	5.133		12.4500	99.75		
CLVRT18 INLETIN	POND	50	6.494		12.4500	130.77		
+CLVRT18 INLETOUT	POND	1	.432		12.1500	5.06	496.54	.003
+CLVRT18 INLETOUT	POND	5	1.491		12.4500	19.37	497.83	.006
+CLVRT18 INLETOUT	POND	10	2.782		12.4500	50.18	499.14	.008
+CLVRT18 INLETOUT	POND	25	5.132		12.4500	97.81	499.37	.009
+CLVRT18 INLETOUT	POND	50	6.493		12.5000	130.18	499.50	.009
JUNC 10	JCT	1	.000		.0500	.00		
JUNC 10	JCT	5	.000		.0500	.00		
JUNC 10	JCT	10	.197		12.4500	14.25		
JUNC 10	JCT	25	1.544		12.4500	59.95		
JUNC 10	JCT	50	2.601		12.5000	91.35		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
MH-10 IN	POND	1	.020		12.0000	.31		
MH-10 IN	POND	5	.377		12.2500	20.95		
MH-10 IN	POND	10	1.282		12.2500	51.46		
MH-10 IN	POND	25	3.036		12.3000	101.30		
MH-10 IN	POND	50	4.126		12.3000	136.77		
+MH-10 OUT	POND	1	.020		12.0500	.30	644.37	.000
+MH-10 OUT	POND	5	.377		12.2500	19.50	647.48	.001
+MH-10 OUT	POND	10	1.282		12.3000	51.08	648.65	.002
+MH-10 OUT	POND	25	3.036		12.3000	100.66	649.19	.002
+MH-10 OUT	POND	50	4.126		12.3500	134.17	649.49	.002
MH-10 OUTLET	JCT	1	.020		12.0500	.30		
MH-10 OUTLET	JCT	5	.377		12.2500	19.50		
MH-10 OUTLET	JCT	10	1.282		12.3000	51.08		
MH-10 OUTLET	JCT	25	3.036		12.3000	100.66		
MH-10 OUTLET	JCT	50	4.126		12.3500	134.16		
MH-13 IN	POND	1	.049		12.0000	.72		
MH-13 IN	POND	5	.439		12.3500	18.31		
MH-13 IN	POND	10	1.360		12.3500	49.77		
MH-13 IN	POND	25	3.139		12.3500	98.58		
MH-13 IN	POND	50	4.239		12.4000	130.59		
+MH-13 OUT	POND	1	.049		12.0500	.70	584.73	.000
+MH-13 OUT	POND	5	.439		12.3500	18.30	587.00	.001
+MH-13 OUT	POND	10	1.360		12.3500	48.84	588.76	.002
+MH-13 OUT	POND	25	3.139		12.4000	96.82	589.31	.002
+MH-13 OUT	POND	50	4.239		12.4000	130.28	589.62	.002
MH10 O-FLOW	JCT	1	.000		.0500	.00		
MH10 O-FLOW	JCT	5	.000		.0500	.00		
MH10 O-FLOW	JCT	10	.450		12.3000	26.33		
MH10 O-FLOW	JCT	25	1.825		12.3000	73.80		
MH10 O-FLOW	JCT	50	2.800		12.3500	106.24		

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method
Hydrograph File Import Option Used For 1 node(s)

(*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
MH13 O-FLOW	JCT	1	.000		.0500	.00		
MH13 O-FLOW	JCT	5	.000		.0500	.00		
MH13 O-FLOW	JCT	10	.324		12.3500	20.57		
MH13 O-FLOW	JCT	25	1.634		12.4000	66.24		
MH13 O-FLOW	JCT	50	2.570		12.4000	98.47		
*OUT 10	JCT	1	.432		12.1500	5.06		
*OUT 10	JCT	5	1.491		12.4500	19.37		
*OUT 10	JCT	10	2.782		12.4500	50.18		
*OUT 10	JCT	25	5.132		12.4500	97.81		
*OUT 10	JCT	50	6.493		12.5000	130.18		
RIDGE RD O-FLOW	HYG	1	.000		11.9500	.00		
RIDGE RD O-FLOW	HYG	5	.336		12.2000	20.83		
RIDGE RD O-FLOW	HYG	10	1.230		12.2500	52.37		
RIDGE RD O-FLOW	HYG	25	2.969		12.2500	102.95		
RIDGE RD O-FLOW	HYG	50	4.067	R	12.3000	138.39		
WEIR13	JCT	1	.000		.0500	.00		
WEIR13	JCT	5	.075		12.2500	7.93		
WEIR13	JCT	10	.762		12.2500	37.58		
WEIR13	JCT	25	2.320		12.3000	86.51		
WEIR13	JCT	50	3.344		12.3000	121.46		
WEIR15	JCT	1	.000		.0500	.00		
WEIR15	JCT	5	.014		12.3500	1.74		
WEIR15	JCT	10	.609		12.3500	31.95		
WEIR15	JCT	25	2.109		12.3500	79.63		
WEIR15	JCT	50	3.112		12.4000	111.05		
WEIR17	JCT	1	.000		.0500	.00		
WEIR17	JCT	5	.000		.0500	.00		
WEIR17	JCT	10	.117		12.4000	10.13		
WEIR17	JCT	25	1.284		12.4500	54.17		
WEIR17	JCT	50	2.243		12.4500	85.28		

```
Title... Project Date: 11/19/2008
         Project Engineer: BMT
         Project Title: Ludlowville Storm Drainage
         Project Comments:

                DESIGN STORMS SUMMARY

 Design Storm File,ID =               Tompkins County


 Storm Tag Name       = 1
 ---------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 1 yr
 Total Rainfall Depth= 2.3000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


 Storm Tag Name       = 5
 ---------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 5 yr
 Total Rainfall Depth= 3.4000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


 Storm Tag Name       = 10
 ---------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 10 yr
 Total Rainfall Depth= 3.9000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


 Storm Tag Name       = 25
 ---------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 25 yr
 Total Rainfall Depth= 4.6000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs


 Storm Tag Name       = 50
 ---------------------------------------------------------------------
 Data Type, File, ID = Synthetic Storm    TypeII  24hr
 Storm Frequency     = 50 yr
 Total Rainfall Depth= 4.9000 in
 Duration Multiplier =  1
 Resulting Duration  = 24.0000 hrs
 Resulting Start Time= .0000 hrs  Step= .1000 hrs  End= 24.0000 hrs
```

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2500	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.7000	in
Slope	.060000	ft/ft
Avg.Velocity	.16	ft/sec

Segment #1 Time: .1724 hrs

Segment #2: Tc: TR-55 Channel

Flow Area	3.0000	sq.ft
Wetted Perimeter	4.00	ft
Hydraulic Radius	.75	ft
Slope	.120000	ft/ft
Mannings n	.0300	
Hydraulic Length	150.00	ft
Avg.Velocity	14.20	ft/sec

Segment #2 Time: .0029 hrs

Total Tc: .1753 hrs

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

==== SCS Channel Flow ====

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

::

TIME OF CONCENTRATION CALCULATOR

::

Segment #1:   Tc: TR-55 Sheet

Mannings n	.2500
Hydraulic Length	100.00 ft
2yr, 24hr P	2.7000 in
Slope	.100000 ft/ft
Avg.Velocity	.20 ft/sec

Segment #1 Time: .1405 hrs

Segment #2:   Tc: TR-55 Shallow

Hydraulic Length	250.00 ft
Slope	.100000 ft/ft
Unpaved	
Avg.Velocity	5.10 ft/sec

Segment #2 Time: .0136 hrs

Segment #3:   Tc: TR-55 Channel

Flow Area	4.0000 sq.ft
Wetted Perimeter	3.00 ft
Hydraulic Radius	1.33 ft
Slope	.110000 ft/ft
Mannings n	.0300
Hydraulic Length	70.00 ft
Avg.Velocity	19.96 ft/sec

Segment #3 Time: .0010 hrs

========================

Total Tc: .1551 hrs

========================

```
--------------------------------------------------------------------------
Tc Equations used...
--------------------------------------------------------------------------

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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

     Unpaved surface:
     V  = 16.1345 * (Sf**0.5)

     Paved surface:
     V  = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ==

```
R   = Aq / Wp
V   = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

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

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

Segment #1:  Tc: TR-55 Sheet

Mannings n            .2500
Hydraulic Length     70.00 ft
2yr, 24hr P         2.7000 in
Slope              .100000 ft/ft

Avg.Velocity           .18 ft/sec

                                         Segment #1 Time:     .1056 hrs
----------------------------------------------------------------------

Segment #2:  Tc: TR-55 Channel

Flow Area           4.0000 sq.ft
Wetted Perimeter      3.00 ft
Hydraulic Radius      1.33 ft
Slope              .110000 ft/ft
Mannings n           .0300
Hydraulic Length    180.00 ft

Avg.Velocity         19.96 ft/sec

                                         Segment #2 Time:     .0025 hrs
----------------------------------------------------------------------

                                              ========================
                                               Total Tc:      .1082 hrs
                                              ========================
```

```
----------------------------------------------------------------------
Tc Equations used...
----------------------------------------------------------------------


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

     Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

==== SCS Channel Flow ================================================

     R  = Aq / Wp
     V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

     Where:  R  = Hydraulic radius
             Aq = Flow area, sq.ft.
             Wp = Wetted perimeter, ft
             V  = Velocity, ft/sec
             Sf = Slope, ft/ft
             n  = Mannings n
             Tc = Time of concentration, hrs
             Lf = Flow length, ft
```

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

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

Segment #1:  Tc: TR-55 Sheet

Mannings n           .0250
Hydraulic Length     70.00 ft
2yr, 24hr P         2.7000 in
Slope              .120000 ft/ft

Avg.Velocity          1.25 ft/sec

                                        Segment #1 Time:     .0156 hrs
------------------------------------------------------------------------

Segment #2:  Tc: TR-55 Channel

Flow Area           7.0000 sq.ft
Wetted Perimeter      5.00 ft
Hydraulic Radius      1.40 ft
Slope              .100000 ft/ft
Mannings n           .0250
Hydraulic Length    250.00 ft

Avg.Velocity         23.59 ft/sec

                                        Segment #2 Time:     .0029 hrs
------------------------------------------------------------------------

                                               =========================
                                                Total Tc:       .0185 hrs

                                                Calculated Tc < Min.Tc:
                                                Use Minimum Tc...
                                                Use Tc =        .0833 hrs
                                               =========================
```

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

==== SCS Channel Flow ====

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.2500	
Hydraulic Length	60.00	ft
2yr, 24hr P	2.7000	in
Slope	.120000	ft/ft
Avg.Velocity	.19	ft/sec

Segment #1 Time: .0868 hrs

Segment #2: Tc: TR-55 Channel

Flow Area	6.0000	sq.ft
Wetted Perimeter	7.00	ft
Hydraulic Radius	.86	ft
Slope	.140000	ft/ft
Mannings n	.0300	
Hydraulic Length	270.00	ft
Avg.Velocity	16.77	ft/sec

Segment #2 Time: .0045 hrs

Total Tc: .0913 hrs

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

==== SCS Channel Flow ====

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.0300	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.7000	in
Slope	.100000	ft/ft
Avg.Velocity	1.08	ft/sec

Segment #1 Time: .0258 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1900.00	ft
Slope	.100000	ft/ft
Unpaved		
Avg.Velocity	5.10	ft/sec

Segment #2 Time: .1034 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	20.0000	sq.ft
Wetted Perimeter	20.00	ft
Hydraulic Radius	1.00	ft
Slope	.100000	ft/ft
Mannings n	.0300	
Hydraulic Length	550.00	ft
Avg.Velocity	15.71	ft/sec

Segment #3 Time: .0097 hrs

Total Tc: .1389 hrs

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

```
Unpaved surface:
V  = 16.1345 * (Sf**0.5)

Paved surface:
V  = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ==

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

::

TIME OF CONCENTRATION CALCULATOR

::

Segment #1: Tc: TR-55 Sheet

Mannings n	.3000	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.7000	in
Slope	.220000	ft/ft
Avg.Velocity	.23	ft/sec

Segment #1 Time: .1186 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	150.00	ft
Slope	.200000	ft/ft
Unpaved		
Avg.Velocity	7.22	ft/sec

Segment #2 Time: .0058 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	5.0000	sq.ft
Wetted Perimeter	5.00	ft
Hydraulic Radius	1.00	ft
Slope	.120000	ft/ft
Mannings n	.0350	
Hydraulic Length	150.00	ft
Avg.Velocity	14.75	ft/sec

Segment #3 Time: .0028 hrs

========================

Total Tc: .1272 hrs

========================

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

```
Unpaved surface:
V  = 16.1345 * (Sf**0.5)

Paved surface:
V  = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ==

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

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

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

Segment #1:  Tc: TR-55 Sheet

Mannings n           .3000
Hydraulic Length   100.00 ft
2yr, 24hr P        2.7000 in
Slope             .320000 ft/ft

Avg.Velocity          .27 ft/sec

                                        Segment #1 Time:     .1021 hrs
----------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   300.00 ft
Slope             .200000 ft/ft
Unpaved

Avg.Velocity         7.22 ft/sec

                                        Segment #2 Time:     .0115 hrs
----------------------------------------------------------------------

                                              ========================
                                               Total Tc:     .1137 hrs
                                              ========================
```

```
----------------------------------------------------------------------
Tc Equations used...
----------------------------------------------------------------------

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

    Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

    Unpaved surface:
    V  = 16.1345 * (Sf**0.5)

    Paved surface:
    V  = 20.3282 * (Sf**0.5)

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

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

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinC.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Residential Districts - 1/2 acre	80	.135			80.00
COMPOSITE AREA & WEIGHTED CN --->		.135			80.00 (80)

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinC.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Residential Districts - 1 acre	79	.190			79.00
COMPOSITE AREA & WEIGHTED CN --->		.190			79.00 (79)

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinC.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Residential Districts - 1 acre	79	.280			79.00
COMPOSITE AREA & WEIGHTED CN --->		.280			79.00 (79)

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinC.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Residential Districts - 1 acre	79	.220			79.00
COMPOSITE AREA & WEIGHTED CN --->		.220			79.00 (79)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Residential Districts - 1 acre	51	.320			51.00
COMPOSITE AREA & WEIGHTED CN --->		.320			51.00 (51)

Name.... C6

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinC.ppw

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Pasture, grassland, or range - fair	69	13.700			69.00
COMPOSITE AREA & WEIGHTED CN --->		13.700			69.00 (69)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - fair	36	.450			36.00
COMPOSITE AREA & WEIGHTED CN --->		.450			36.00 (36)

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Residential Districts - 1/2 acre	54	1.100			54.00
COMPOSITE AREA & WEIGHTED CN --->		1.100			54.00 (54)

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - MH-10 OUTLET 1
Outflow HYG file = NONE STORED - LDLWVL 1 1

Reach Link Data = LDLWVL 1
Reach Length = 190.00 ft
Approx. Total Tt = .0224 hrs (based on Wtd.Q = .10 cfs)
Reach Channel = Ldlwvl 1 (Chn-Trapz.)
Overflow Elev. = 641.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 637.30 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
637.30	.00	.000	.0000	.00	.00	.00
637.31	.01	.000	.0044	.00	.01	.03
637.37	.19	.000	.0050	.00	.19	.35
637.44	.62	.001	.0056	.00	.62	.95
637.51	1.23	.001	.0062	.00	1.23	1.76
637.58	2.01	.002	.0068	.00	2.01	2.77
637.65	2.98	.002	.0074	.00	2.98	3.97
637.72	4.12	.003	.0080	.00	4.12	5.38
637.79	5.45	.003	.0086	.00	5.45	6.99
637.86	6.96	.004	.0092	.00	6.96	8.81
637.93	8.68	.004	.0099	.00	8.68	10.85
638.00	10.60	.005	.0105	.00	10.60	13.11
638.07	12.73	.006	.0111	.00	12.73	15.61
638.14	15.08	.007	.0117	.00	15.08	18.35
638.21	17.66	.008	.0123	.00	17.66	21.33
638.28	20.46	.008	.0129	.00	20.46	24.56
638.35	23.51	.009	.0135	.00	23.51	28.06
638.42	26.80	.010	.0141	.00	26.80	31.82
638.49	30.35	.011	.0147	.00	30.35	35.85
638.56	34.16	.012	.0154	.00	34.16	40.17

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - MH-10 OUTLET 1
Outflow HYG file = NONE STORED - LDLWVL 1 1

Reach Link Data = LDLWVL 1
Reach Length = 190.00 ft
Approx. Total Tt = .0224 hrs (based on Wtd.Q = .10 cfs)
Reach Channel = Ldlwvl 1 (Chn-Trapz.)
Overflow Elev. = 641.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 637.30 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
638.63	38.23	.014	.0160	.00	38.23	44.77
638.70	42.58	.015	.0166	.00	42.58	49.67
638.77	47.20	.016	.0172	.00	47.20	54.86
638.84	52.11	.017	.0178	.00	52.11	60.37
638.91	57.32	.018	.0184	.00	57.32	66.19
638.98	62.82	.020	.0190	.00	62.82	72.33
639.05	68.63	.021	.0196	.00	68.63	78.79
639.12	74.75	.022	.0202	.00	74.75	85.59
639.19	81.19	.024	.0208	.00	81.19	92.73
639.26	87.96	.025	.0215	.00	87.96	100.21
639.33	95.05	.027	.0221	.00	95.05	108.04
639.40	102.48	.028	.0227	.00	102.48	116.22
639.47	110.25	.030	.0233	.00	110.25	124.77
639.54	118.38	.032	.0239	.00	118.38	133.70
639.61	126.85	.033	.0245	.00	126.85	142.99
639.68	135.69	.035	.0251	.00	135.69	152.67
639.75	144.89	.037	.0257	.00	144.89	162.74
639.82	154.47	.039	.0263	.00	154.47	173.20
639.89	164.42	.041	.0270	.00	164.42	184.05
639.96	174.75	.042	.0276	.00	174.75	195.30

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - MH-10 OUTLET 1
Outflow HYG file = NONE STORED - LDLWVL 1 1

Reach Link Data = LDLWVL 1
Reach Length = 190.00 ft
Approx. Total Tt = .0224 hrs (based on Wtd.Q = .10 cfs)
Reach Channel = Ldlwvl 1 (Chn-Trapz.)
Overflow Elev. = 641.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 637.30 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
640.03	185.47	.044	.0282	.00	185.47	206.97
640.10	196.59	.046	.0288	.00	196.59	219.06
640.17	208.12	.048	.0294	.00	208.12	231.56
640.24	220.04	.051	.0300	.00	220.04	244.50
640.31	232.38	.053	.0306	.00	232.38	257.86
640.38	245.13	.055	.0312	.00	245.13	271.66
640.45	258.31	.057	.0318	.00	258.31	285.91
640.52	271.90	.059	.0325	.00	271.90	300.59
640.59	285.94	.062	.0331	.00	285.94	315.73
640.66	300.41	.064	.0337	.00	300.41	331.34
640.73	315.33	.066	.0343	.00	315.33	347.41
640.80	330.70	.069	.0349	.00	330.70	363.95
640.87	346.52	.071	.0355	.00	346.52	380.96
640.94	362.80	.074	.0361	.00	362.80	398.46
641.00	377.13	.076	.0366	.00	377.13	413.84

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT 16 OUTLET 1
Outflow HYG file = NONE STORED - LDLWVL 2 1

Reach Link Data = LDLWVL 2
Reach Length = 220.00 ft
Approx. Total Tt = .0142 hrs (based on Wtd.Q = 1.48 cfs)
Reach Channel = Ldlwvl 2 (Chn-Trapz.)
Overflow Elev. = 551.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 547.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
547.00	.00	.000	.0000	.00	.00	.00
547.01	.01	.000	.0102	.00	.01	.06
547.08	.47	.001	.0109	.00	.47	.88
547.16	1.49	.002	.0117	.00	1.49	2.33
547.24	2.93	.003	.0125	.00	2.93	4.24
547.32	4.75	.004	.0133	.00	4.75	6.56
547.40	6.93	.005	.0141	.00	6.93	9.28
547.48	9.47	.006	.0149	.00	9.47	12.38
547.56	12.36	.007	.0158	.00	12.36	15.87
547.64	15.61	.009	.0166	.00	15.61	19.74
547.72	19.21	.010	.0174	.00	19.21	23.99
547.80	23.17	.011	.0182	.00	23.17	28.65
547.88	27.50	.013	.0190	.00	27.50	33.70
547.96	32.21	.014	.0198	.00	32.21	39.15
548.04	37.29	.016	.0206	.00	37.29	45.02
548.12	42.76	.018	.0214	.00	42.76	51.30
548.20	48.63	.019	.0222	.00	48.63	58.02
548.28	54.91	.021	.0230	.00	54.91	65.17
548.36	61.59	.023	.0238	.00	61.59	72.76
548.44	68.70	.025	.0246	.00	68.70	80.80

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT 16 OUTLET 1
Outflow HYG file = NONE STORED - LDLWVL 2 1

Reach Link Data = LDLWVL 2
Reach Length = 220.00 ft
Approx. Total Tt = .0142 hrs (based on Wtd.Q = 1.48 cfs)
Reach Channel = Ldlwvl 2 (Chn-Trapz.)
Overflow Elev. = 551.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 547.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
548.52	76.23	.027	.0255	.00	76.23	89.31
548.60	84.19	.029	.0263	.00	84.19	98.27
548.68	92.61	.031	.0271	.00	92.61	107.72
548.76	101.47	.033	.0279	.00	101.47	117.65
548.84	110.80	.036	.0287	.00	110.80	128.07
548.92	120.58	.038	.0295	.00	120.58	138.98
549.00	130.85	.040	.0303	.00	130.85	150.41
549.08	141.60	.043	.0311	.00	141.60	162.35
549.16	152.84	.045	.0319	.00	152.84	174.80
549.24	164.58	.048	.0327	.00	164.58	187.80
549.32	176.83	.051	.0335	.00	176.83	201.33
549.40	189.60	.053	.0343	.00	189.60	215.41
549.48	202.88	.056	.0352	.00	202.88	230.04
549.56	216.70	.059	.0360	.00	216.70	245.24
549.64	231.06	.062	.0368	.00	231.06	261.00
549.72	245.95	.065	.0376	.00	245.95	277.33
549.80	261.41	.068	.0384	.00	261.41	294.26
549.88	277.43	.071	.0392	.00	277.43	311.79
549.96	294.02	.074	.0400	.00	294.02	329.91
550.04	311.17	.077	.0408	.00	311.17	348.62

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT 16 OUTLET 1
Outflow HYG file = NONE STORED - LDLWVL 2 1

Reach Link Data = LDLWVL 2
Reach Length = 220.00 ft
Approx. Total Tt = .0142 hrs (based on Wtd.Q = 1.48 cfs)
Reach Channel = Ldlwvl 2 (Chn-Trapz.)
Overflow Elev. = 551.00 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 547.00 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
550.12	328.92	.081	.0416	.00	328.92	367.97
550.20	347.26	.084	.0424	.00	347.26	387.93
550.28	366.19	.087	.0432	.00	366.19	408.53
550.36	385.72	.091	.0440	.00	385.72	429.74
550.44	405.88	.095	.0448	.00	405.88	451.62
550.52	426.65	.098	.0457	.00	426.65	474.15
550.60	448.04	.102	.0465	.00	448.04	497.32
550.68	470.08	.106	.0473	.00	470.08	521.17
550.76	492.75	.109	.0481	.00	492.75	545.69
550.84	516.08	.113	.0489	.00	516.08	570.90
550.92	540.05	.117	.0497	.00	540.05	596.77
551.00	564.69	.121	.0505	.00	564.69	623.36

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT17 OUTLET 1
Outflow HYG file = NONE STORED - LDLWVL 3 1

Reach Link Data = LDLWVL 3
Reach Length = 60.00 ft
Approx. Total Tt = .0051 hrs (based on Wtd.Q = 1.43 cfs)
Reach Channel = Ldlwvl 3 (Chn-Trapz.)
Overflow Elev. = 502.80 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 498.90 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
498.90	.00	.000	.0000	.00	.00	.00
498.91	.01	.000	.0028	.00	.01	.02
498.98	.31	.000	.0030	.00	.31	.42
499.06	.97	.000	.0032	.00	.97	1.20
499.14	1.92	.001	.0034	.00	1.92	2.27
499.22	3.11	.001	.0036	.00	3.11	3.60
499.30	4.54	.001	.0039	.00	4.54	5.18
499.38	6.20	.002	.0041	.00	6.20	6.99
499.46	8.09	.002	.0043	.00	8.09	9.05
499.54	10.22	.002	.0045	.00	10.22	11.34
499.62	12.57	.003	.0047	.00	12.57	13.88
499.70	15.17	.003	.0050	.00	15.17	16.66
499.78	18.00	.003	.0052	.00	18.00	19.69
499.86	21.08	.004	.0054	.00	21.08	22.98
499.94	24.41	.004	.0056	.00	24.41	26.52
500.02	28.00	.005	.0058	.00	28.00	30.32
500.10	31.84	.005	.0061	.00	31.84	34.40
500.18	35.94	.006	.0063	.00	35.94	38.74
500.26	40.32	.006	.0065	.00	40.32	43.37
500.34	44.97	.007	.0067	.00	44.97	48.27

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT17 OUTLET 1
Outflow HYG file = NONE STORED - LDLWVL 3 1

Reach Link Data = LDLWVL 3
Reach Length = 60.00 ft
Approx. Total Tt = .0051 hrs (based on Wtd.Q = 1.43 cfs)
Reach Channel = Ldlwvl 3 (Chn-Trapz.)
Overflow Elev. = 502.80 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 498.90 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
500.42	49.90	.007	.0069	.00	49.90	53.47
500.50	55.12	.008	.0072	.00	55.12	58.96
500.58	60.62	.009	.0074	.00	60.62	64.75
500.66	66.43	.009	.0076	.00	66.43	70.84
500.74	72.53	.010	.0078	.00	72.53	77.24
500.82	78.94	.010	.0080	.00	78.94	83.96
500.90	85.66	.011	.0083	.00	85.66	90.99
500.98	92.70	.012	.0085	.00	92.70	98.36
501.06	100.06	.012	.0087	.00	100.06	106.05
501.14	107.74	.013	.0089	.00	107.74	114.08
501.22	115.76	.014	.0091	.00	115.76	122.45
501.30	124.12	.015	.0094	.00	124.12	131.16
501.38	132.82	.015	.0096	.00	132.82	140.23
501.46	141.86	.016	.0098	.00	141.86	149.65
501.54	151.26	.017	.0100	.00	151.26	159.43
501.62	161.02	.018	.0102	.00	161.02	169.58
501.70	171.13	.019	.0105	.00	171.13	180.09
501.78	181.62	.019	.0107	.00	181.62	190.99
501.86	192.48	.020	.0109	.00	192.48	202.26
501.94	203.71	.021	.0111	.00	203.71	213.93

MODIFIED PULS REACH DATA

HYG Dir = C:\Documents and Settings\drh\Desktop\Ludlowville\
Inflow HYG file = NONE STORED - CLVRT17 OUTLET 1
Outflow HYG file = NONE STORED - LDLWVL 3 1

Reach Link Data = LDLWVL 3
Reach Length = 60.00 ft
Approx. Total Tt = .0051 hrs (based on Wtd.Q = 1.43 cfs)
Reach Channel = Ldlwvl 3 (Chn-Trapz.)
Overflow Elev. = 502.80 ft
Overflow Channel = NONE

No Infiltration

INITIAL CONDITIONS

Starting WS Elev = 498.90 ft
Starting Volume = .000 ac-ft
Starting Outflow = .00 cfs
Starting Infiltr. = .00 cfs
Starting Total Qout= .00 cfs
Time Increment = .0500 hrs

Elevation ft	Outflow cfs	Storage ac-ft	Area acres	Infilt. cfs	Q Total cfs	2S/t + O cfs
502.02	215.33	.022	.0113	.00	215.33	225.98
502.10	227.33	.023	.0116	.00	227.33	238.43
502.18	239.73	.024	.0118	.00	239.73	251.27
502.26	252.51	.025	.0120	.00	252.51	264.52
502.34	265.71	.026	.0122	.00	265.71	278.18
502.42	279.30	.027	.0125	.00	279.30	292.26
502.50	293.32	.028	.0127	.00	293.32	306.76
502.58	307.74	.029	.0129	.00	307.74	321.67
502.66	322.58	.030	.0131	.00	322.58	337.02
502.74	337.85	.031	.0133	.00	337.85	352.80
502.80	349.58	.032	.0135	.00	349.58	364.92

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 652.70 ft
Increment = .10 ft
Max. Elev.= 665.00 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
Culvert-Circular	C0	--->	TW	652.700	665.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = C0
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =        1
Barrel Diameter    =   1.5000 ft
Upstream Invert    =   652.70 ft
Dnstream Invert    =   644.10 ft
Horiz. Length      =    74.00 ft
Barrel Length      =    74.50 ft
Barrel Slope       =   .11622 ft/ft

OUTLET CONTROL DATA...
Mannings n         =    .0130
Ke                 =    .5000  (forward entrance loss)
Kb                 =  .018213  (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)    =    1.102
T2 ratio (HW/D)    =    1.249
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 =    654.35 ft  --->  Flow =      7.58 cfs
At T2 Elev =    654.57 ft  --->  Flow =      8.66 cfs
```

```
OUTLET STRUCTURE INPUT DATA


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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 615.70 ft
Increment = .10 ft
Max. Elev.= 625.00 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
Culvert-Circular	C0	--->	TW	615.700	625.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID        = C0
Structure Type      = Culvert-Circular
------------------------------------
No. Barrels         =        1
Barrel Diameter     =   1.5000 ft
Upstream Invert     =   615.70 ft
Dnstream Invert     =   584.30 ft
Horiz. Length       =   260.00 ft
Barrel Length       =   261.89 ft
Barrel Slope        =   .12077 ft/ft

OUTLET CONTROL DATA...
Mannings n          =    .0130
Ke                  =    .5000  (forward entrance loss)
Kb                  =  .018213  (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)     =    1.100
T2 ratio (HW/D)     =    1.246
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 =    617.35 ft  --->  Flow =      7.58 cfs
At T2 Elev =    617.57 ft  --->  Flow =      8.66 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 515.90 ft
Increment = .10 ft
Max. Elev.= 525.00 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
Culvert-Circular	C0	--->	TW	515.900	525.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID        = C0
Structure Type      = Culvert-Circular
------------------------------------
No. Barrels         =        1
Barrel Diameter     =    2.5000 ft
Upstream Invert     =    515.90 ft
Dnstream Invert     =    498.90 ft
Horiz. Length       =    200.00 ft
Barrel Length       =    200.72 ft
Barrel Slope        =    .08500 ft/ft

OUTLET CONTROL DATA...
Mannings n          =     .0130
Ke                  =     .5000  (forward entrance loss)
Kb                  =   .009217  (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)     =     1.118
T2 ratio (HW/D)     =     1.264
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 =    518.69 ft  --->  Flow =      27.16 cfs
At T2 Elev =    519.06 ft  --->  Flow =      31.05 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 495.00 ft
Increment = .10 ft
Max. Elev.= 501.00 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
Culvert-Circular	CO	--->	TW	495.400	501.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID       = C0
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =         1
Barrel Diameter    =    2.5000 ft
Upstream Invert    =    495.40 ft
Dnstream Invert    =    473.60 ft
Horiz. Length      =    400.00 ft
Barrel Length      =    400.59 ft
Barrel Slope       =    .05450 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0130
Ke                 =     .5000  (forward entrance loss)
Kb                 =   .009217  (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)    =     1.133
T2 ratio (HW/D)    =     1.280
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 =    498.23 ft  --->  Flow =     27.16 cfs
At T2 Elev =    498.60 ft  --->  Flow =     31.05 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 644.10 ft
Increment = .10 ft
Max. Elev.= 655.00 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
Culvert-Circular	CO	--->	TW	644.100	655.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = C0
Structure Type     = Culvert-Circular
------------------------------------
No. Barrels        =        1
Barrel Diameter    =    1.5000 ft
Upstream Invert    =    644.10 ft
Dnstream Invert    =    637.30 ft
Horiz. Length      =    111.00 ft
Barrel Length      =    111.21 ft
Barrel Slope       =    .06126 ft/ft

OUTLET CONTROL DATA...
Mannings n         =     .0130
Ke                 =     .0000  (forward entrance loss)
Kb                 =   .018213  (per ft of full flow)
Kr                 =     .0000  (reverse entrance loss)
HW Convergence     =      .001  +/- ft

INLET CONTROL DATA...
Equation form      =         0
Inlet Control K    =     .0010
Inlet Control M    =     .0010
Inlet Control c    =    .00100
Inlet Control Y    =     .0010
T1 ratio (HW/D)    =      .000
T2 ratio (HW/D)    =     -.014
Slope Factor       =     -.500
```

```
Use unsubmerged inlet control Form 0 equ. below T1 elev.
Use   submerged inlet control Form 0 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =     644.10 ft  --->  Flow =       7.58 cfs
At T2 Elev =     644.08 ft  --->  Flow =       8.66 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 584.30 ft
Increment = .10 ft
Max. Elev.= 592.00 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
Culvert-Circular	CO	--->	TW	584.300	592.000
TW SETUP, DS Channel					

```
              OUTLET STRUCTURE INPUT DATA


              Structure ID      = C0
              Structure Type    = Culvert-Circular
              ------------------------------------
              No. Barrels       =         1
              Barrel Diameter   =    2.0000 ft
              Upstream Invert   =    584.30 ft
              Dnstream Invert   =    576.30 ft
              Horiz. Length     =     80.00 ft
              Barrel Length     =     80.40 ft
              Barrel Slope      =    .10000 ft/ft

              OUTLET CONTROL DATA...
              Mannings n        =     .0130
              Ke                =     .5000  (forward entrance loss)
              Kb                =   .012411  (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)   =     1.110
              T2 ratio (HW/D)   =     1.257
              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 =     586.52 ft  ---> Flow =     15.55 cfs
At T2 Elev =     586.81 ft  ---> Flow =     17.77 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 644.10 ft
Increment = .10 ft
Max. Elev.= 655.00 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	W0	--->	TW	648.100	655.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID       = WO
Structure Type     = Weir-Rectangular
-----------------------------------
# of Openings      =        1
Crest Elev.        =    648.10 ft
Weir Length        =     25.00 ft
Weir Coeff.        =  2.600000

Weir TW effects      (Use adjustment equation)



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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 584.30 ft
Increment = .10 ft
Max. Elev.= 592.00 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	WO	--->	TW	588.300	592.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = WO
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    588.30 ft
Weir Length        =     25.00 ft
Weir Coeff.        =  2.600000

Weir TW effects      (Use adjustment equation)
```

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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 515.90 ft
Increment = .10 ft
Max. Elev.= 525.00 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	W0	--->	TW	520.000	525.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID        = WO
Structure Type      = Weir-Rectangular
------------------------------------
# of Openings       =        1
Crest Elev.         =    520.00 ft
Weir Length         =     25.00 ft
Weir Coeff.         =  2.600000

Weir TW effects       (Use adjustment equation)



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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 652.70 ft
Increment = .10 ft
Max. Elev.= 665.00 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	W0	--->	TW	655.600	665.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = W0
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =          1
Crest Elev.        =     655.60 ft
Weir Length        =      50.00 ft
Weir Coeff.        =   2.600000

Weir TW effects      (Use adjustment equation)


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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 615.70 ft
Increment = .10 ft
Max. Elev.= 625.00 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	W0	--->	TW	620.000	625.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = WO
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    620.00 ft
Weir Length        =     25.00 ft
Weir Coeff.        =  2.600000

Weir TW effects      (Use adjustment equation)


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

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

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 495.00 ft
Increment = .10 ft
Max. Elev.= 501.00 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	WO	--->	TW	499.000	501.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID       = W0
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    499.00 ft
Weir Length        =    100.00 ft
Weir Coeff.        =  2.600000

Weir TW effects     (Use adjustment equation)
```

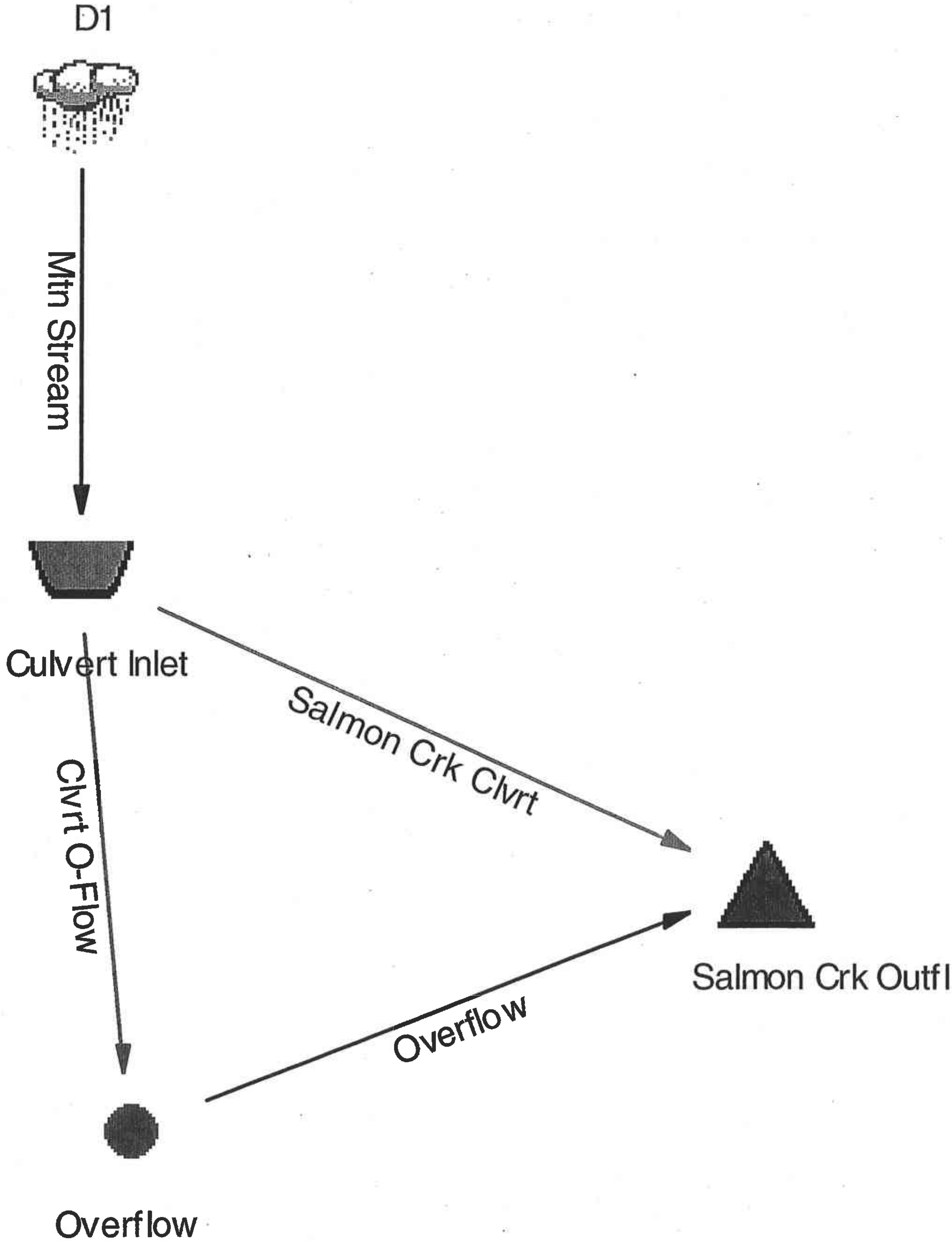
```
Structure ID       = TW
Structure Type     = TW SETUP, DS Channel
------------------------------------
FREE OUTFALL CONDITIONS SPECIFIED

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

Index of Starting Page Numbers for ID Names

PondPack Modeling Output

Basin D


D1
Mtn Stream
Culvert Inlet
Salmon Crk Clvrt
Clvrt O-Flow
Salmon Crk Outfl
Overflow
Overflow

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Tompkins County

Return Event	Total Depth in	Rainfall Type	RNF ID
1	2.3000	Synthetic Curve	TypeII 24hr
5	3.4000	Synthetic Curve	TypeII 24hr
10	3.9000	Synthetic Curve	TypeII 24hr
25	4.6000	Synthetic Curve	TypeII 24hr
50	4.9000	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

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

Node ID	Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
CULVERT INLETIN	POND	1	.726		12.1000	8.77		
CULVERT INLETIN	POND	5	1.627		12.1000	21.19		
CULVERT INLETIN	POND	10	2.092		12.1000	27.47		
CULVERT INLETIN	POND	25	2.781		12.1000	36.67		
CULVERT INLETIN	POND	50	3.087		12.1000	40.72		
+CULVERT INLETOUT	POND	1	.726		12.1000	8.51	490.75	.002
+CULVERT INLETOUT	POND	5	1.627		12.1000	20.97	491.76	.005
+CULVERT INLETOUT	POND	10	2.092		12.1000	27.30	492.20	.007
+CULVERT INLETOUT	POND	25	2.781		12.1000	36.60	492.68	.009
+CULVERT INLETOUT	POND	50	3.087		12.1000	40.70	492.80	.010
D1	AREA	1	.726		12.1000	8.77		
D1	AREA	5	1.627		12.1000	21.19		
D1	AREA	10	2.092		12.1000	27.47		
D1	AREA	25	2.781		12.1000	36.67		
D1	AREA	50	3.087		12.1000	40.72		

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
OVERFLOW	JCT	1	.000		.0500	.00		
OVERFLOW	JCT	5	.000		.0500	.00		
OVERFLOW	JCT	10	.000		.0500	.00		
OVERFLOW	JCT	25	.017		12.1000	1.98		
OVERFLOW	JCT	50	.046		12.1000	4.23		
*SALMON CRK OUTFL	JCT	1	.726		12.1000	8.51		
*SALMON CRK OUTFL	JCT	5	1.627		12.1000	20.97		
*SALMON CRK OUTFL	JCT	10	2.092		12.1000	27.30		
*SALMON CRK OUTFL	JCT	25	2.781		12.1000	36.60		
*SALMON CRK OUTFL	JCT	50	3.087		12.1000	40.70		

Title... Project Date: 11/19/2008
Project Engineer: BMT
Project Title: Ludlowville Storm Drainage
Project Comments:

DESIGN STORMS SUMMARY

Design Storm File,ID = Tompkins County

Storm Tag Name = 1

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 1 yr
Total Rainfall Depth= 2.3000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 5

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 5 yr
Total Rainfall Depth= 3.4000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 10

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 10 yr
Total Rainfall Depth= 3.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 25

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 25 yr
Total Rainfall Depth= 4.6000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

Storm Tag Name = 50

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 50 yr
Total Rainfall Depth= 4.9000 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

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

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

Segment #1:  Tc: TR-55 Sheet

Mannings n            .3000
Hydraulic Length    100.00 ft
2yr, 24hr P         2.7000 in
Slope             .080000 ft/ft

Avg.Velocity           .16 ft/sec

                                   Segment #1 Time:     .1778 hrs
----------------------------------------------------------------------

Segment #2:  Tc: TR-55 Shallow

Hydraulic Length   1500.00 ft
Slope             .090000 ft/ft
Unpaved

Avg.Velocity          4.84 ft/sec

                                   Segment #2 Time:     .0861 hrs
----------------------------------------------------------------------

Segment #3:  Tc: TR-55 Channel

Flow Area          20.0000 sq.ft
Wetted Perimeter     20.00 ft
Hydraulic Radius      1.00 ft
Slope             .120000 ft/ft
Mannings n            .0500
Hydraulic Length   1400.00 ft

Avg.Velocity         10.32 ft/sec

                                   Segment #3 Time:     .0377 hrs
----------------------------------------------------------------------

                                        ========================
                                         Total Tc:      .3015 hrs
                                        ========================
```

Tc Equations used...

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

```
Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

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

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

```
Unpaved surface:
V  = 16.1345 * (Sf**0.5)

Paved surface:
V  = 20.3282 * (Sf**0.5)

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

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

==== SCS Channel Flow ==

```
R  = Aq / Wp
V  = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

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

Where:  R  = Hydraulic radius
        Aq = Flow area, sq.ft.
        Wp = Wetted perimeter, ft
        V  = Velocity, ft/sec
        Sf = Slope, ft/ft
        n  = Mannings n
        Tc = Time of concentration, hrs
        Lf = Flow length, ft
```

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - grass combination - fair	76	15.100			76.00
COMPOSITE AREA & WEIGHTED CN --->		15.100			76.00 (76)

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 489.20 ft
Increment = .01 ft
Max. Elev.= 496.00 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
Culvert-Circular	CO	--->	TW	489.200	496.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID        = C0
Structure Type      = Culvert-Circular
------------------------------------
No. Barrels         =        1
Barrel Diameter     =    3.0000 ft
Upstream Invert     =    489.20 ft
Dnstream Invert     =    486.00 ft
Horiz. Length       =     40.00 ft
Barrel Length       =     40.13 ft
Barrel Slope        =    .08000 ft/ft

OUTLET CONTROL DATA...
Mannings n          =     .0220
Ke                  =     .9000  (forward entrance loss)
Kb                  =   .020700  (per ft of full flow)
Kr                  =     .5000  (reverse entrance loss)
HW Convergence      =      .001  +/- ft

INLET CONTROL DATA...
Equation form       =         1
Inlet Control K     =     .0340
Inlet Control M     =    1.5000
Inlet Control c     =    .05530
Inlet Control Y     =     .5400
T1 ratio (HW/D)     =      .000
T2 ratio (HW/D)     =     1.385
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 =    489.20 ft  --->  Flow =     42.85 cfs
At T2 Elev =    493.35 ft  --->  Flow =     48.97 cfs
```

OUTLET STRUCTURE INPUT DATA

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

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

File.... C:\Documents and Settings\drh\Desktop\Ludlowville\BasinD.ppw

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 489.20 ft
Increment = .10 ft
Max. Elev.= 496.00 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	W0	--->	TW	492.500	496.000
TW SETUP, DS Channel					

```
OUTLET STRUCTURE INPUT DATA


Structure ID       = WO
Structure Type     = Weir-Rectangular
------------------------------------
# of Openings      =         1
Crest Elev.        =    492.50 ft
Weir Length        =     10.00 ft
Weir Coeff.        =  2.600000

Weir TW effects      (Use adjustment equation)



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

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

Index of Starting Page Numbers for ID Names

Appendix B

HY-8 Culvert Modeling

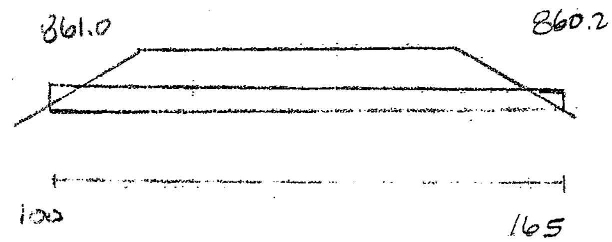
Barton & Loguidice, P.C.
Engineers • Environmental Scientists • Planners • Landscape Architects
290 Elwood Davis Road • Box 3107 • Syracuse, New York 13220
Telephone: 315-457-5200 • Facsimile: 315-451-0052

JOB 560.013 - LUDLOWVILLE
SHEET NO. ______ OF ______
CALCULATED BY ______ DATE ______
CHECKED BY ______ DATE ______
DESCRIPTION LANSINGVILLE - CULVERT 5

CHECK CULVERT 5 W/ HY-8 ANALYSIS. → LNSNGVL

1 YR → 16.8 CFS
25 YR → 61.5 CFS ⇒ INPUT 31 CFS → MAX CLVRT CAPACITY FROM POND PACK
50 YR → 67.9 CFS

EMBANKMENT TOE DATA



- USE CONCRETE PIPE : ADJUST "n"
- SAY SQUARE EDGE W/ HEADWALL TO CONSIDER SKEW OF INLET
- n = 0.016 (SMOOTH STEEL)

CHECK HY-8 OUTPUT

↳ FOR 1 YEAR STORM (SINCE ALL FLOW IS THRU THE CULVERT)

HY-8 = 863.45'
POND PACK = 863.49'

6

CURRENT DATE: 11-26-2008 FILE DATE: 11-26-2008
CURRENT TIME: 13:20:27 FILE NAME: LNSNGVL

FHWA CULVERT ANALYSIS
HY-8, VERSION 6.1

C U L V NO.	SITE DATA: INLET ELEV. (ft)	OUTLET ELEV. (ft)	CULVERT LENGTH (ft)	CULVERT SHAPE, MATERIAL, INLET: BARRELS SHAPE MATERIAL	SPAN (ft)	RISE (ft)	MANNING n	INLET TYPE
1	860.98	860.22	61.01	1 RCP	2.00	2.00	.016	CONVENTIONAL
2								
3								
4								
5								
6								

SUMMARY OF CULVERT FLOWS (cfs) FILE: LNSNGVL DATE: 11-26-2008

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
863.45	16.8	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
864.22	21.9	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
865.23	27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
866.22	31.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
867.99	37.2	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
869.68	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
871.59	47.5	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
873.71	52.6	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
876.50	57.7	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
880.42	62.8	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
886.01	67.9	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0
0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING	

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: LNSNGVL DATE: 11-26-2008

HEAD ELEV (ft)	HEAD ERROR (ft)	TOTAL FLOW (cfs)	FLOW ERROR (cfs)	% FLOW ERROR
863.45	0.000	16.80	0.00	0.00
864.22	0.000	21.91	0.00	0.00
865.23	0.000	27.02	0.00	0.00
866.22	0.000	31.00	0.00	0.00
867.99	0.000	37.24	0.00	0.00
869.68	0.000	42.35	0.00	0.00
871.59	0.000	47.46	0.00	0.00
873.71	0.000	52.57	0.00	0.00
876.50	0.000	57.68	0.00	0.00
880.42	0.000	62.79	0.00	0.00
886.01	0.000	67.90	0.00	0.00

<1> TOLERANCE (ft) = 0.010 <2> TOLERANCE (%) = 1.000

2

CURRENT DATE: 11-26-2008 FILE DATE: 11-26-2008

CURRENT TIME: 13:20:27 FILE NAME: LNSNGVL

ÄÄÄ

PERFORMANCE CURVE FOR CULVERT 1 - 1(2.00 (ft) BY 2.00 (ft)) RCP

ÄÄÄ

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
16.80	863.45	2.47	2.47	5-S2n	1.38	1.47	1.27	1.06	7.98	5.03
21.91	864.22	3.25	3.06	2-M2c	2.00	1.66	1.66	1.22	7.88	5.40
27.02	865.23	4.25	4.17	2-M2c	2.00	1.81	1.81	1.37	9.02	5.71
31.00	**866.22**	**5.19**	**5.24**	**2-M2c**	**2.00**	**1.93**	**1.93**	**1.47**	**10.05**	**5.92**
37.24	867.99	6.91	7.01	6-FFc	2.00	2.00	2.00	1.62	11.85	6.20
42.35	869.68	8.54	8.70	6-FFc	2.00	2.00	2.00	1.73	13.48	6.41
47.46	871.59	10.41	10.61	6-FFc	2.00	2.00	2.00	1.84	15.11	6.60
52.57	873.71	12.65	12.73	6-FFc	2.00	2.00	2.00	1.94	16.73	6.77
57.68	876.50	15.53	15.10	4-S2n	2.00	2.00	1.90	2.03	18.85	6.93
62.79	880.42	19.45	17.75	4-S2n	2.00	2.00	1.90	2.12	20.52	7.08
67.90	886.01	25.03	20.61	4-S2n	2.00	2.00	1.90	2.20	22.19	7.22

ÄÄÄ

El. inlet face invert 860.98 ft El. outlet invert 860.22 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

ÄÄÄ

***** SITE DATA ***** EMBANKMENT TOE **************

UPSTREAM STATION	100.00 ft
UPSTREAM ELEVATION	861.00 ft
UPSTREAM EMBANKMENT SLOPE (X:1)	1.00
DOWMSTREAM STATION	165.00 ft
DOWNSTREAM ELEVATION	860.20 ft
DOWNSTREAM EMBANKMENT SLOPE (X:1)	1.00

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	CIRCULAR
BARREL DIAMETER	2.00 ft
BARREL MATERIAL	CONCRETE
BARREL MANNING'S n	0.016
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	SQUARE EDGE WITH HEADWALL
INLET DEPRESSION	NONE

ÄÄÄ

3

CURRENT DATE: 11-26-2008 FILE DATE: 11-26-2008
CURRENT TIME: 13:20:27 FILE NAME: LNSNGVL

ÄÄÄ
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ TAILWATER ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
ÄÄÄ

******* REGULAR CHANNEL CROSS SECTION ****************

BOTTOM WIDTH	2.00 ft
SIDE SLOPE H/V (X:1)	1.0
CHANNEL SLOPE V/H (ft/ft)	0.032
MANNING'S n (.01-0.1)	0.040
CHANNEL INVERT ELEVATION	860.20 ft
CULVERT NO.1 OUTLET INVERT ELEVATION	860.22 ft

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (cfs)	W.S.E. (ft)	FROUDE NUMBER	DEPTH (ft)	VEL. (f/s)	SHEAR (psf)
16.80	861.28	0.852	1.08	5.03	2.16
21.91	861.45	0.852	1.25	5.40	2.49
27.02	861.59	0.852	1.39	5.71	2.78
31.00	861.70	0.852	1.50	5.92	2.99
37.24	861.85	0.852	1.65	6.20	3.29
42.35	861.96	0.852	1.76	6.41	3.51
47.46	862.06	0.852	1.86	6.60	3.72
52.57	862.16	0.852	1.96	6.77	3.91
57.68	862.25	0.853	2.05	6.93	4.10
62.79	862.34	0.853	2.14	7.08	4.28
67.90	862.42	0.853	2.22	7.22	4.44

ÄÄÄ
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ROADWAY OVERTOPPING DATA ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
ÄÄÄ

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	50.00 ft
CREST LENGTH	1000.00 ft
OVERTOPPING CREST ELEVATION	865.00 ft

ÄÄÄ
▯

Barton & Loguidice, P.C.
Engineers • Environmental Scientists • Planners • Landscape Architects
290 Elwood Davis Road • Box 3107 • Syracuse, New York 13220
Telephone: 315-457-5200 • Facsimile: 315-451-0052

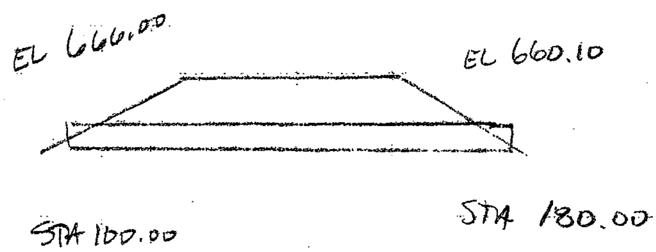
JOB 560.013 - LUDLOWVILLE
SHEET NO. ____ OF ____
CALCULATED BY BMT DATE 11-26-08
CHECKED BY ____ DATE ____
DESCRIPTION RIDGE ROAD - CULVERT 12

CHECK CULVERT 12 W/ HY-8 ANALYSIS → CLVRT12

1 YR → 38.2 CFS
25 YR → 213.6 CFS
50 YR → 241.6 CFS

EMBANKMENT DATA

"n" = 0.024 CORR. STEEL



COMPARE POND PACK W/ HY-8

- WEIR ELEV = 670.5 (BYPASSES CULVERT DOWN LUDLOWVILLE RD)

- FROM HY-8, CULVERT HANDLES ≈ 90-95 CFS BEFORE OVERFLOWING TO LUDLOWVILLE ROAD.

- POND PACK RESULTS 89-97 CFS

∴ CULVERT 12 CHECKS

```
                                                                        1
CURRENT DATE: 11-26-2008                              FILE DATE: 11-26-2008
CURRENT TIME: 15:01:03                                FILE NAME: CLVRT12

ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ   FHWA CULVERT ANALYSIS    ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ    HY-8, VERSION 6.1       ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
ÚÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ¿
³ C ³          SITE DATA          ³      CULVERT SHAPE, MATERIAL, INLET       ³
³ U ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ´
³ L ³  INLET    OUTLET   CULVERT  ³ BARRELS                                   ³
³ V ³  ELEV.    ELEV.    LENGTH   ³ SHAPE       SPAN   RISE   MANNING   INLET   ³
³NO.³  (ft)     (ft)     (ft)     ³ MATERIAL    (ft)   (ft)      n      TYPE    ³
³ 1 ³ 665.59   660.65    67.20    ³ 1 CMPA      4.75   3.17    .024  CONVENTIONAL³
³ 2 ³                             ³                                           ³
³ 3 ³                             ³                                           ³
³ 4 ³                             ³                                           ³
³ 5 ³                             ³                                           ³
³ 6 ³                             ³                                           ³
ÀÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÙ

ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
SUMMARY OF CULVERT FLOWS (cfs)        FILE: CLVRT12           DATE: 11-26-2008

 ELEV (ft)   TOTAL      1      2      3      4      5      6   ROADWAY ITR
  667.86      38.2    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  668.68      58.5    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  669.68      78.9    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  670.99      99.2    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  672.66     119.6    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  674.67     139.9    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  677.00     160.2    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  679.66     180.6    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  682.63     200.9    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  684.64     213.6    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
  689.52     241.6    0.0    0.0    0.0    0.0    0.0    0.0     0.00  0
    0.00       0.0    0.0    0.0    0.0    0.0    0.0    0.0 OVERTOPPING
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ

ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
  SUMMARY OF ITERATIVE SOLUTION ERRORS   FILE: CLVRT12         DATE: 11-26-2008

        HEAD           HEAD           TOTAL          FLOW           % FLOW
      ELEV (ft)     ERROR (ft)     FLOW (cfs)     ERROR (cfs)       ERROR
       667.86          0.000          38.20          0.00           0.00
       668.68          0.000          58.54          0.00           0.00
       669.68          0.000          78.88          0.00           0.00
       670.99          0.000          99.22          0.00           0.00
       672.66          0.000         119.56          0.00           0.00
       674.67          0.000         139.90          0.00           0.00
       677.00          0.000         160.24          0.00           0.00
       679.66          0.000         180.58          0.00           0.00
       682.63          0.000         200.92          0.00           0.00
       684.64          0.000         213.60          0.00           0.00
       689.52          0.000         241.60          0.00           0.00
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
 <1> TOLERANCE (ft) = 0.010                      <2> TOLERANCE (%) = 1.000
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
                                                                        2

CURRENT DATE: 11-26-2008                              FILE DATE: 11-26-2008
```

CURRENT TIME: 15:01:03 FILE NAME: CLVRT12

ÄÄ

PERFORMANCE CURVE FOR CULVERT 1 - 1(4.75 (ft) BY 3.17 (ft)) CMPA

ÄÄ

DIS-CHARGE FLOW (cfs)	HEAD-WATER ELEV. (ft)	INLET CONTROL DEPTH (ft)	OUTLET CONTROL DEPTH (ft)	FLOW TYPE <F4>	NORMAL DEPTH (ft)	CRIT. DEPTH (ft)	OUTLET DEPTH (ft)	TW DEPTH (ft)	OUTLET VEL. (fps)	TW VEL. (fps)
38.20	667.86	2.27	2.27	1-S2n	0.83	1.42	0.84	0.21	11.86	6.72
58.54	668.68	3.09	3.09	1-S2n	1.06	1.82	1.02	0.41	14.54	7.68
78.88	669.68	4.09	4.09	5-S2n	1.27	2.16	1.30	0.58	14.66	8.41
99.22	670.99	5.39	5.39	5-S2n	1.48	2.44	1.52	0.74	15.60	9.00
119.56	672.66	7.07	7.07	5-S2n	1.68	2.66	1.74	0.87	16.33	9.51
139.90	674.67	9.08	9.08	5-S2n	1.89	2.84	1.96	1.00	16.86	9.95
160.24	677.00	11.41	11.41	5-S2n	2.11	3.03	2.19	1.11	17.38	10.34
180.58	679.66	14.07	10.01	6-S2n	2.37	3.17	2.45	1.22	17.83	10.69
200.92	682.63	17.04	12.81	6-S2n	2.76	3.17	3.07	1.32	17.20	11.02
213.60	684.64	19.05	14.71	6-S2n	3.17	3.17	3.07	1.38	18.29	11.20
241.60	689.52	23.93	19.32	6-S2n	3.17	3.17	3.07	1.51	20.68	11.59

ÄÄ

El. inlet face invert 665.59 ft El. outlet invert 660.65 ft
El. inlet throat invert 0.00 ft El. inlet crest 0.00 ft

ÄÄ

***** SITE DATA ***** EMBANKMENT TOE **************

UPSTREAM STATION	100.00 ft
UPSTREAM ELEVATION	666.00 ft
UPSTREAM EMBANKMENT SLOPE (X:1)	2.00
DOWMSTREAM STATION	180.00 ft
DOWNSTREAM ELEVATION	660.10 ft
DOWNSTREAM EMBANKMENT SLOPE (X:1)	2.00

***** CULVERT DATA SUMMARY ************************

BARREL SHAPE	PIPE ARCH
BARREL SPAN	4.75 ft
BARREL RISE	3.17 ft
BARREL MATERIAL	STEEL OR ALUMINUM
BARREL MANNING'S n	0.024
INLET TYPE	CONVENTIONAL
INLET EDGE AND WALL	PROJECTING
INLET DEPRESSION	NONE

ÄÄ

3

CURRENT DATE: 11-26-2008 FILE DATE: 11-26-2008
CURRENT TIME: 15:01:03 FILE NAME: CLVRT12

ÄÄ

ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ TAILWATER ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ

ÄÄ

******* REGULAR CHANNEL CROSS SECTION ****************

BOTTOM WIDTH	6.00 ft
SIDE SLOPE H/V (X:1)	2.0
CHANNEL SLOPE V/H (ft/ft)	0.100
MANNING'S n (.01-0.1)	0.050
CHANNEL INVERT ELEVATION	660.10 ft
CULVERT NO.1 OUTLET INVERT ELEVATION	660.65 ft

******* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW (cfs)	W.S.E. (ft)	FROUDE NUMBER	DEPTH (ft)	VEL. (f/s)	SHEAR (psf)
38.20	660.86	1.363	0.76	6.72	4.72
58.54	661.06	1.381	0.96	7.68	6.00
78.88	661.23	1.392	1.13	8.41	7.08
99.22	661.39	1.400	1.29	9.00	8.02
119.56	661.52	1.405	1.42	9.51	8.87
139.90	661.65	1.409	1.55	9.95	9.65
160.24	661.76	1.413	1.66	10.34	10.37
180.58	661.87	1.416	1.77	10.69	11.05
200.92	661.97	1.419	1.87	11.02	11.68
213.60	662.03	1.421	1.93	11.20	12.06
241.60	662.16	1.424	2.06	11.59	12.85

ÄÄÄ
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ ROADWAY OVERTOPPING DATA ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
ÄÄÄ

ROADWAY SURFACE	PAVED
EMBANKMENT TOP WIDTH	50.00 ft
CREST LENGTH	1000.00 ft
OVERTOPPING CREST ELEVATION	670.50 ft

ÄÄÄ
▯